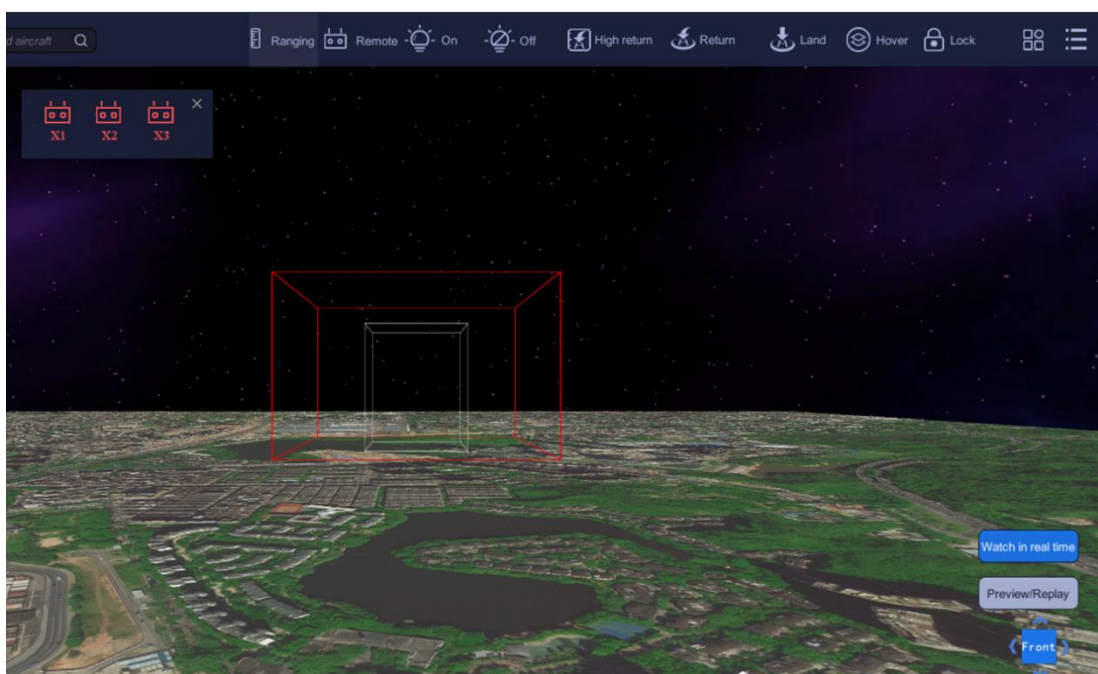
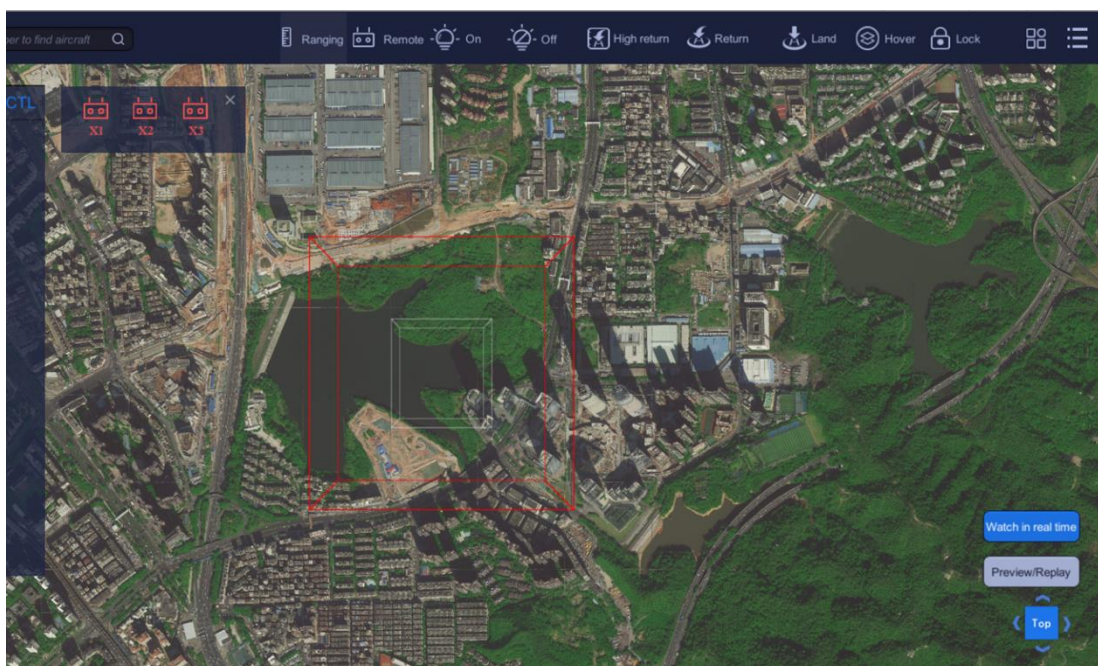


anding or return area of the abnormal drone. When the abnormal drone exceeds the fence, the motor will be turned off directly. The setting range is 10-2000 meters. Do not enable this function unless necessary.

(This function requires authorization and is currently only open to users in Europe and the United States)



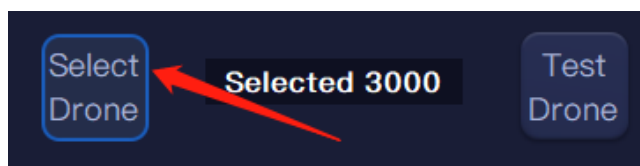
The range of the No-fly zone fence (kill the drones fence) can be adjusted according to the performance site environment or performance safety needs, and is measured with the help of the ranging function in Skyshow.

As shown in the Skyshow above, the white area is the dance performance flight area, and the red area is the manually set no-fly zone fence of 200 meters in the horizontal direction and 100 meters in the vertical direction. When the drone is in the red area and the white area, the drone with abnormal positioning will automatically return according to the lowest return altitude for abnormal landing set by the user (if it is not set, it will not automatically return, and the flight controller will land on the spot) When the position of the drone exceeds the red flight range (no-fly zone fence), **the drone lock paddle will be triggered!**



※ Please do not use No-fly zone fence (kill the drones fence) function unless it is necessary. When the drone flies out of the no-fly area, **the paddles will be locked. Please judge by yourself and bear the possible losses of using this function.**

3.5.3 Select drone



Select the drone to be operated and controlled, and select the drone according to the drone number to test operation or take-off in batches. (Long press Ctrl + left mouse button click to select multiple drones directly on the main interface)

Please input the drone ID to be selected and use the space bar to separate them

*Please separate the selected drones with space, e.g. 0 2 66-88 [Dance boundary](#)

*You may use the conjunction symbol (-) to select continuously numbered drones, e.g. 0-100 [Area 1](#)
[Area 2](#)

Confirm
Clear

- * Please separate the selected drones with spaces, e.g. 0 2 6
- * You may use the conjunction symbol (-) to select continuously numbered drones, e.g. 0-100
- * Clear and back: You may clear the entered drone number, and the main interface displays all drones connected to the server, and all selected drones resume status.

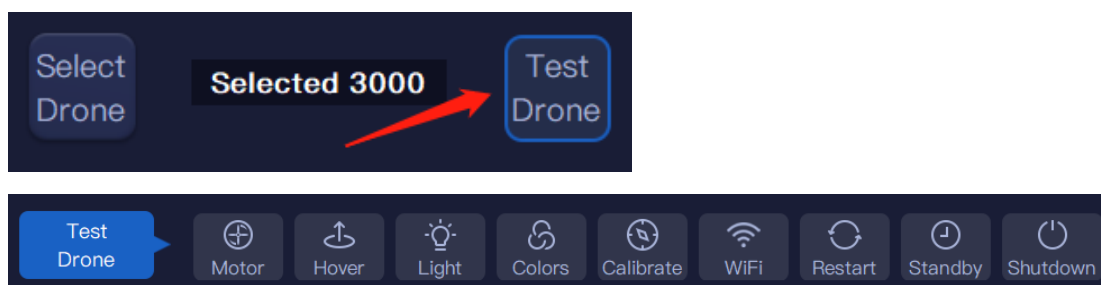
Dance boundary: Auto-fill UAV numbers at the dance boundary for pre-flight testing.

Area1: Auto-fill with UAV numbers ending in an even number (including 0)

Area2: Auto fill the UAV numbers ending in an odd ending number

The Area1 and Area2 functions are mainly used for hovering tests to take off the UAVs in separate intervals to reduce mutual airflow interference or collision.

3.5.4 Test drone and adjust

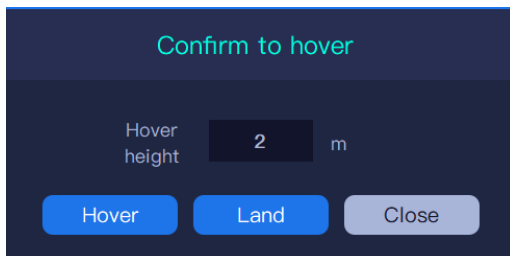


Test Drone Test the selected number or all drones before take-off, and use them when checking the status of drones.

- Motor

When unlocking, the drone paddles rotate at idle speed, and when locking, the paddles stop rotating. This item checks whether the drone paddles and motors are in abnormal condition.

- Hover



The selected drone hovers in the air. After setting the hovering height, Hover is clicked, and the selected drone hovers according to the set height. This item checks whether the drone flies stably, the wind interference strength on site, and whether there are any conditions such as drone spinning, shaking, positioning deviation and fluctuation. (Hovering height limit 1~50m) ,click “land” the drone landed in place.



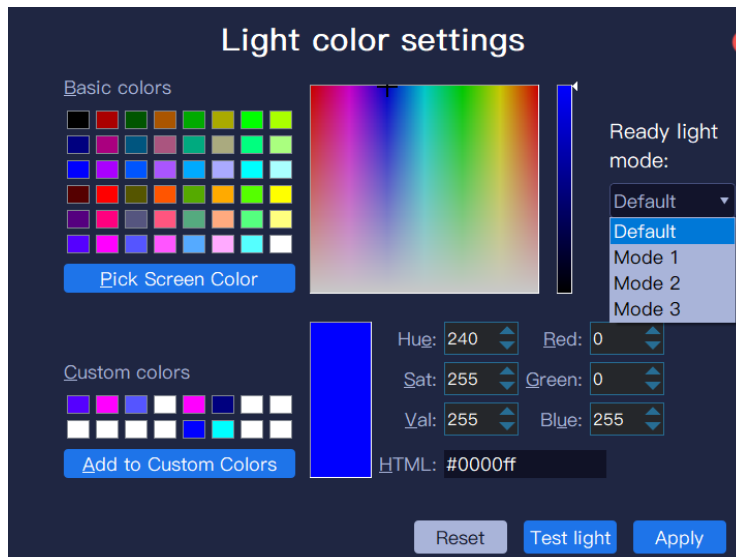
※ Please ensure that the safe distance on both left and right sides of drone is 1.5 m or more before hovering test.

It is recommended to hover at a height of 2 m, which is convenient for users to check the flight status of drone.

- Light

The host computer sends commands to control the lights of the drone to turn on/off the lights.

- Colors



The light module can change the light color by customizing the RGB values. When all three values of RGB are 0, the lights are turned off.

* Please refer to the following website for RGB color matching value:
<https://www.sojson.com/rgb.html>

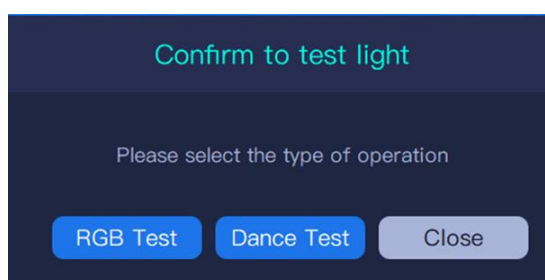
* Users can click Add to Custom Colors to save RGB color matching values to the menu.

Enter #666888 in the HTML bar to write random colorful lighting effects to the drone.

Ready light mode: After the drone is ready, you can choose three dynamic lighting modes here (the drone array needs to be larger than 5x5).

Reset: Restore the light

Test light: LED light RGB three-colour flashing test or Dance light colour test



Apply: Apply the set light colours.

● Calibrate

The magnetometer of drone is used to detect the magnetic field strength and direction of the site, and provide accurate heading and orientation for the drone. If the host computer has large heading deviation, large magnetic field interference (drone flashing yellow and green alternately), magnetometer

failure, or obvious nose deviation after take-off, or abnormal flight path such as flashing after take-off in the test process, the user can try calibrate to solve the above problems. It is necessary to select the drone for magnetic calibrate, and the "calibrate" button is clicked to adjust the magnetometer of the current drone. The "calibrate" is clicked, and the host computer sends the magnetometer calibrate instruction to the selected drone, and the drone enters the calibrate state. After entering the calibrate state, the host computer no longer receives the external light control instruction until it exits the calibrate state.

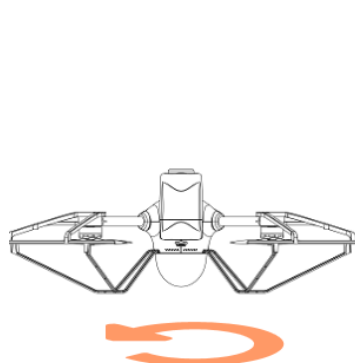
Horizontal calibrate of magnetometer: When the drone calibrates the magnetometer horizontally, the blue light is always on, and the drone horizontally rotates as shown in the figure below until the blue light flashes.

Vertical calibrate of magnetometer: When vertically calibrating magnetometer, the blue light flashes, and the drone vertically rotates as shown in the figure below until the blue light flashes when exiting.

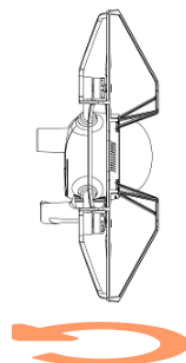
Calibrate success: The drone returns to its original light state.

Calibrate failure: The drone is always in the calibrate state. For example, if the vertical calibrate fails, the blue light will flash until the host computer sends an calibrate exit instruction.

Click "Cancel" to exit the calibration status.

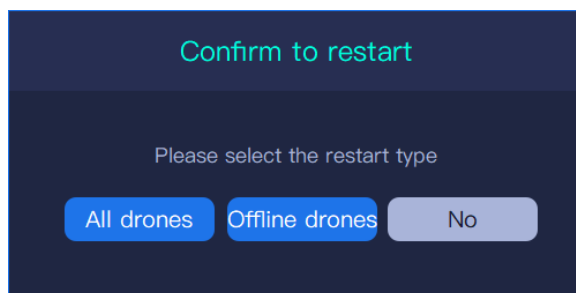


Horizontal calibrate



Vertical calibrate

- WIFI
Turn on/off UAV WIFI
- Restart



Restart is divided into restarting all drones and restarting offline drones. It can be used to restart drones that cannot be connected to AP, and there is no need to unplug and plug the battery of the drone to restart. After the drone ticks, the selected drone will restart.

- Standby

The UAV enters into standby mode, but the radio and RTK are always working, and the other modules enter into hibernation, which can be restored to the original state by "cancel".

- Shutdown

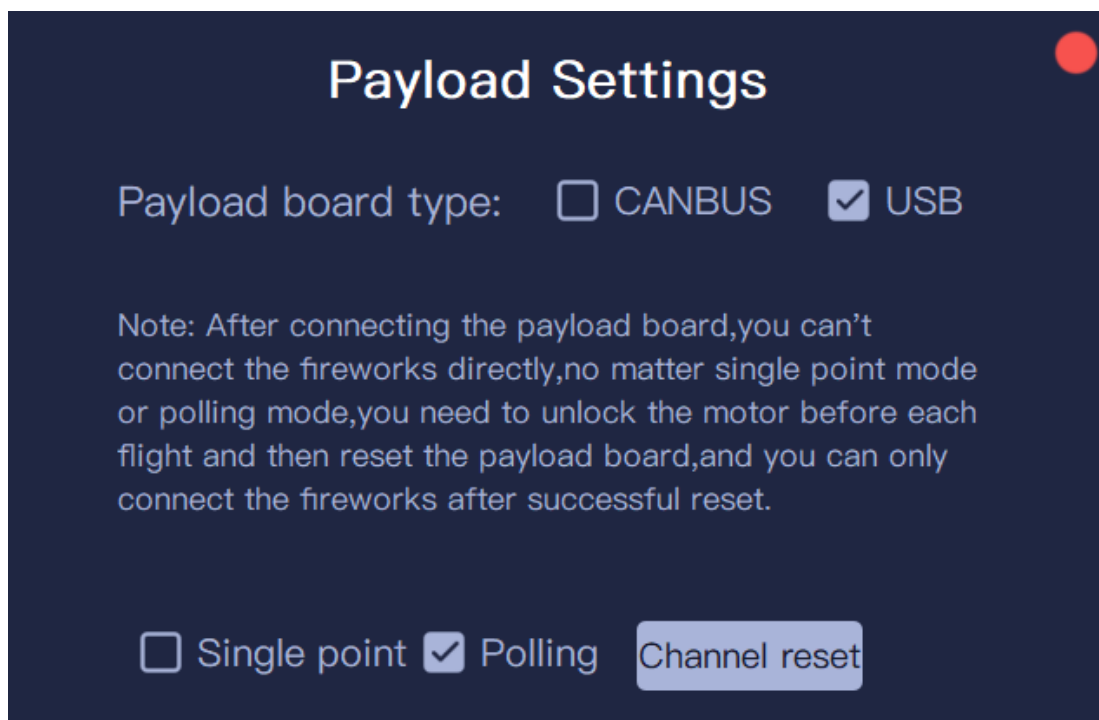
The drone powers down or enters an ultra-low power state. After switching off, the battery needs to be pulled out and plugged in again to re-power on and start.

3.5.5 Payload settings

This function is used for ignition configuration related to fireworks mounted on the drone.

Payload board type: Select the payload board type, USB type or CANBUS type

USB type:



Single point mode: Only one firework is connected, the firework can be inserted into any channel as all three channels are triggered simultaneously during ignition. (Note that due to the limited output current of the ignition module, only one firework can be connected in single point mode)

Polling mode: Three fireworks can be connected with the triggering sequence starting in order of channel 0, channel 1, then channel 2. After each trigger, the program will automatically add 1, 0-1-2 polling. When designing the dance steps, it is not necessary to consider which channel is triggered, as long as the step sends a special frame, the ignition module will trigger channel 0 for the first time (requiring channel reset), if another ignition command is received, the ignition module will trigger channel 1, and so on.

Channel reset: Channel reset is a safety measure. After selecting the mode, it is necessary to unlock the motor before performing "channel reset". After channel reset, it is necessary to screen the fireworks status on the host computer to check for any payload boards that have not been successfully reset. If it is necessary to replace the payload board, a channel reset is required for the new payload board. After all drone channels are reset, the fireworks can be connected and normal pre-flight preparations can begin.

 **Tips:** Reset the channel only when the drone is unlocked and no other devices are connected to any USB ports of all drones, except the payload board. Connect the payload board to fireworks after a successful reset.

CANBUS type

Payload Settings

Payload board type: ☒ CANBUS ☐ USB

Select the channel: Channel 0 ▼

Current interface drone: ☒ Set ☐ Not set

Set:0, Not set:4000 Clear all

Set channel Light Color ▼

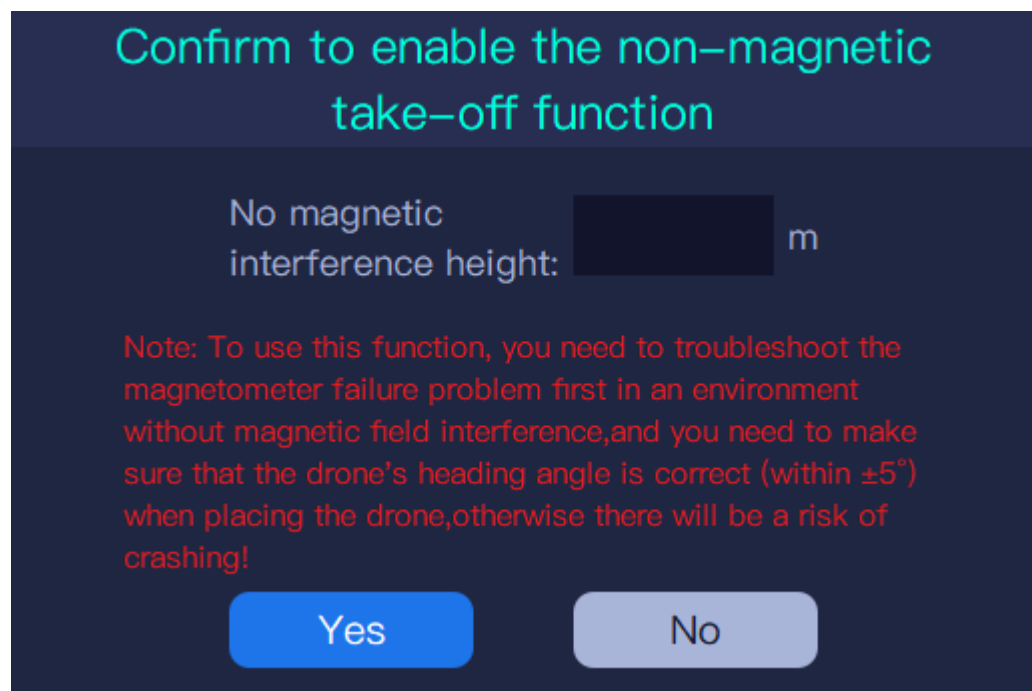
Select the Channel: Used for manually configuring the channel to trigger the payload. No configuration is necessary if the ignition is triggered by a dance step.

Current Interface Drone: Enables filtering and viewing of "Set" or "Not Set" drones for the currently selected drone.

Set Channel: Configures channels for drones that have not been set based on the current selection.

Light Color: Facilitates drone screening by enabling operation of lighting on the current drone interface.

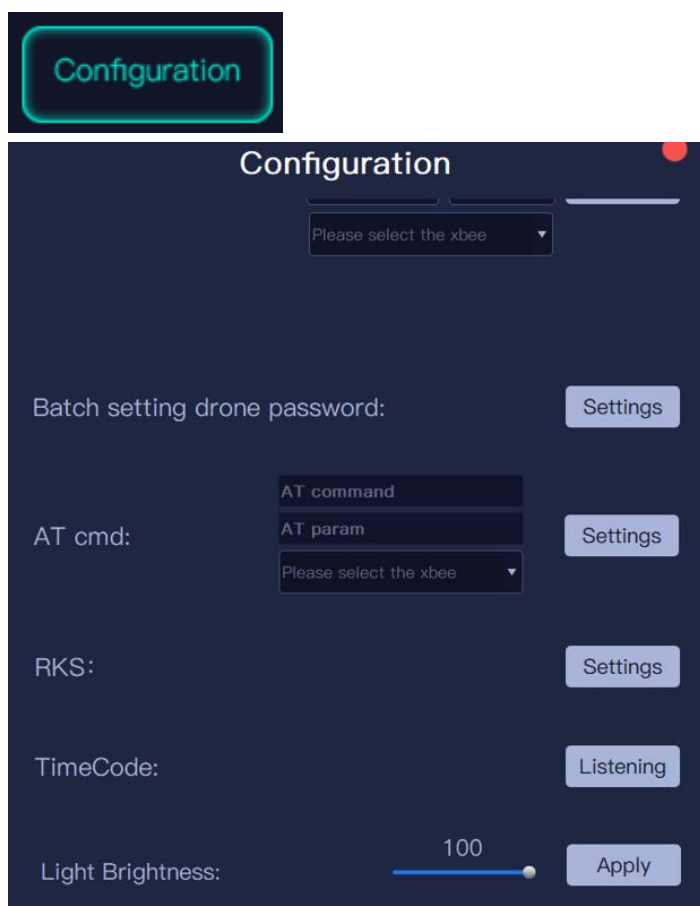
3.5.6 Non-magnetic Take-off



This feature is designed for use in environments with significant ground magnetic interference. It allows users to identify drones affected by magnetic interference using the upper computer, then activating the Non-Magnetic Takeoff function for those drones. To use this feature, drones must first be placed in a magnetically clean environment to eliminate any hardware issues with the magnetometer. Then return to the magnetic interference zone to test the height without magnetic interference and fill in the height value. Lastly, it is crucial to ensure precise drone orientation during placement (within $\pm 5^\circ$). Skipping any of these steps could pose a risk of malfunction!

3.5.7 Formation flying interface function

3.5.7.1 Configuration



- Upgrade Firmware

It is used to upgrade and modify the drone firmware version. Please place the firmware files for upgrading in the FlyContrlUpdate folder of the installation folder. During upgrade or transmission, the purple light of drone is always on. If communication is occupied, the host computer instructions will not be processed.

- USB Flashing Settings

USB Flashing

Drone Firmware:	N/A
Drone Password:	N/A
Drone WiFi SSID:	N/A
Drone WiFi PWD:	N/A
Drone Xbee1 ID:	N/A
Drone Xbee2 ID:	N/A
Drone Number:	N/A
New drone nubmer:	1000
WiFi:	☐
Xbee ID:	☐
Select firmware:	▼
Synchronized dance file:	☐
Select serial port:	▼ Open

No device connection

Flash

Download log

After connecting the drone to the computer through a dedicated RIFF data line, select the corresponding serial port to read and display the drone's firmware information, password, WIFI ID, Xbee ID, current number, and other data. At the same time, you can perform firmware modification, number modification, WIFI ID, Xbee ID modification, dance step upload, drone log download, and other operations.etc.



In case of successful connection when inserting USB, the white light will flash at high frequency for 2 seconds. All lights can be interrupted and return to the original state after quick flashing for 2 seconds. After successful flashing, the cyan light is always on for 4 seconds, and the purple light is on when flashing the dance. **Please do not disconnect the data line during USB flashing.**

- Synchronize the drone number to the base

When the RIFF BASE is connected to the drone through the magnetic head, the drone number is synchronized to the RIFF BASE.

- Xbee serial

GCS Switch Xbee radio is connected to the computer through USB port, and can be connected by selecting the serial number of Xbee radio connection in the host computer configuration. Xbee radio is used to send flight instructions of pause, continuing, filling and backward return during the dance step of drone. The Xbee radio can send control commands in the event of WIFI failure.



※ In any case, please install the GCS Switch Xbee radio and open the xbee serial communication settings before it is ready to take off, so as to avoid that it cannot be used immediately in case of emergency during the performance!

※ If the GCS Switch Xbee radio is disconnected during use, the user needs to click 'CLOSE' in the device configuration and then open xbee serial

- Manage Firmware File

Open the default firmware folder FlyContrlUpdate in the installation folder to modify and manage the firmware file.

	Downsoftware	4/2/2021 9:51 AM
	FlyContrlUpdate	6/29/2021 3:11 PM
	LocalDanceStep	6/29/2021 3:18 PM
	LogFile	6/8/2021 2:14 PM

- Manage Dance File

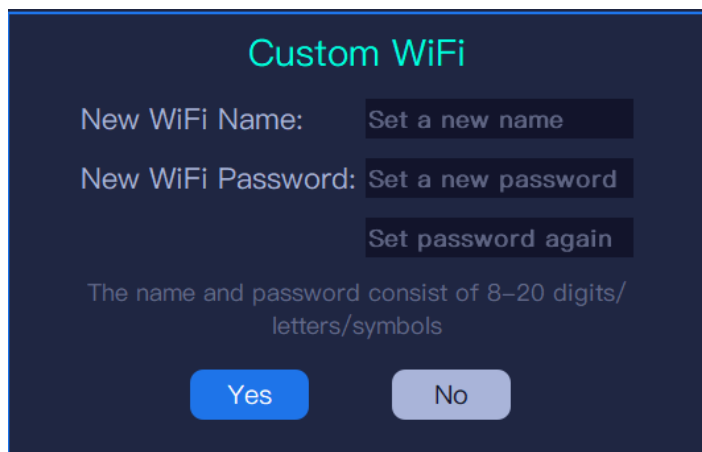
Open the default dance folder LocalDanceStep in the Installation folder, and change and manage the dance file in it.

	Downsoftware	4/2/2021 9:51 AM
	FlyContrlUpdate	6/29/2021 3:11 PM
	LocalDanceStep	6/29/2021 3:18 PM
	LogFile	6/8/2021 2:14 PM

- Batch setting WIFI

The host computer broadcasts WIFI SSID and password to the correct UAV through GCS Switch, and the UAV password should be entered before modification, and the UAV password can be obtained through "USB Flashing

Setting". The purpose of modifying WIFI is to use multiple sets of flight equipment at the same field to achieve the purpose of non-interference. After modifying the WIFI SSID and password, you need to modify the SSID and password of the router synchronously. Tap to confirm the setting, the drone light will flash white for 2 seconds after successful setting, please pay attention to the light colour change during the setting process, if the setting fails, you can repeat the setting for several times.



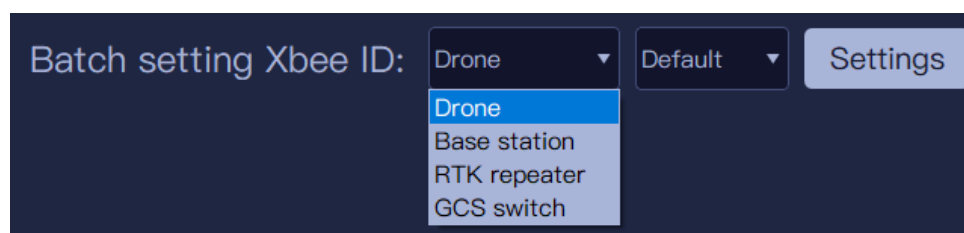
Custom WiFi

New WiFi Name:

New WiFi Password:

The name and password consist of 8–20 digits/ letters/symbols

● Batch setting Xbee ID



Batch setting Xbee ID:

The purpose of batch setting Xbee IDs is the same as batch setting WIFI. In order to use multiple sets of equipment in the same venue for flight performances, modifying Xbee IDs requires ensuring that all devices in the formation system that contain Xbee modules use the same ID number. Therefore, it is necessary to modify the same ID one by one for drones, base stations, RTK repeaters, and GCS Switches (formerly known as XBee repeaters), otherwise they cannot communicate with each other.

Setting Drone Xbee ID: Batch setting of drone Xbee IDs requires setting through the WIFI network. Therefore, before setting, it is necessary to ensure that all drones are connected to the server and that the drone numbers do not duplicate, otherwise they cannot be set. If the setting is successful, the drone light will flash white for 2 seconds. Please pay attention to checking the light

color during the setting process. If the setting fails, please repeat or check the drone network connection.

Setting Base station XBee ID: To set the base station ID, you need to enter the MAC address number of the base station. The MAC address number is pasted on the bottom of the base station. Different frequency bands have different MAC addresses. Please fill in all the MAC address codes.

Setting GCS Switch XBee ID: At first, you need to connect the GCS Switch USB port to the computer, and then you can directly set it .



Setting RTK repeater XBee ID: the same as setting the GCS switch

● Batch Setting Drone Password

To modify drones passwords, you need to enter an old password, with an initial password of 123456. Forgotten passwords can be read through "USB flashing".



※ When modifying WIFI ID, XBee ID, and drone password, it is important to note that the same batch of devices are set with different IDs or passwords, and it is necessary to make identification on the devices to distinguish between them. If the passwords are confused or forgotten, it is necessary to use a "USB flashing" to connect the devices and read and configure them one by one.

● RKS Setting

RKS devices are used in the EU region. For configuration instructions, see the 《Remote Kill Switch Quick - Reference Guide》

● Time Code

Access Time Code device.

● Light Brightness

Adjusts the brightness of the dance lights, default 100%.

3.5.7.2 Load dance

Load Dance

Load Dance Program

Current Dance File:
100.2基地演示

Select Current Dance:

100.2基地演示 ▼

Please place the dance file in the folder "/LocalDanceStep/" [Position preview](#)

Turn off number lights ☐
Irregular formation auto numbering ☐

Auto Numbering

Stop Numbering

Send Dance File

Fill Time:
0 s

Loaded dance
0 pcs

Compass Status: Unchecked
Refer Heading: 0 °

Position Status: Unchecked
True Heading: 322.000000 °

Number of GPS:
0

Generate the position table

Unify Position

Auto Placement

Configure RemoteID

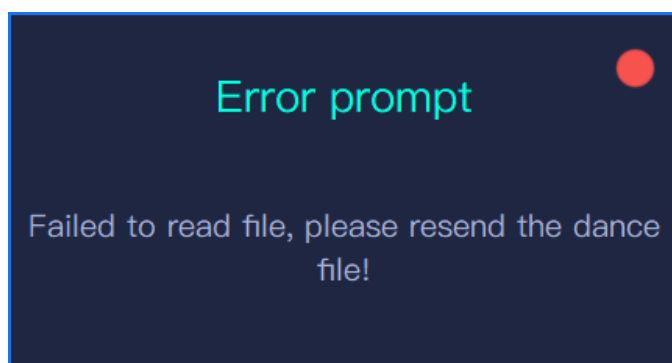
- **Select current dance**

It is used to select pre-selected dance to be uploaded to drone. The default dance folder is located in the "LocalDanceStep" folder of the installation file. If the dance has a fill of absent drones function after selecting a dance, it will show which second the specific filling time is at the bottom. When it is 0S, it means that there is no fill of absent drones function for dance.

Fill Time:
0
s

When the host computer prompts that it fails to read the dance step file,

please check whether the dance step file is damaged or the format is wrong.



● Auto numbering

After loading the dance, the drone needs to be numbered. Before using the auto numbering function, it is necessary to ensure that all drones are turned on and successfully connected to the server, and all drones enter Fix positioning state, ensure the above state, and then follow the following steps for operation:

① Step1: change the drone number

By modifying the numbering function, all the 0 and pile drone numbers that appear in the host computer are cleared. (Pile drone refers to the last drone in the first row of the dance steps. As shown in the figure below, the dance steps are 100. 10*10, then the last drone in the first row is number 9) Make sure that there are no drones and pile drones at the scene, and then perform the second step to manually flash number.

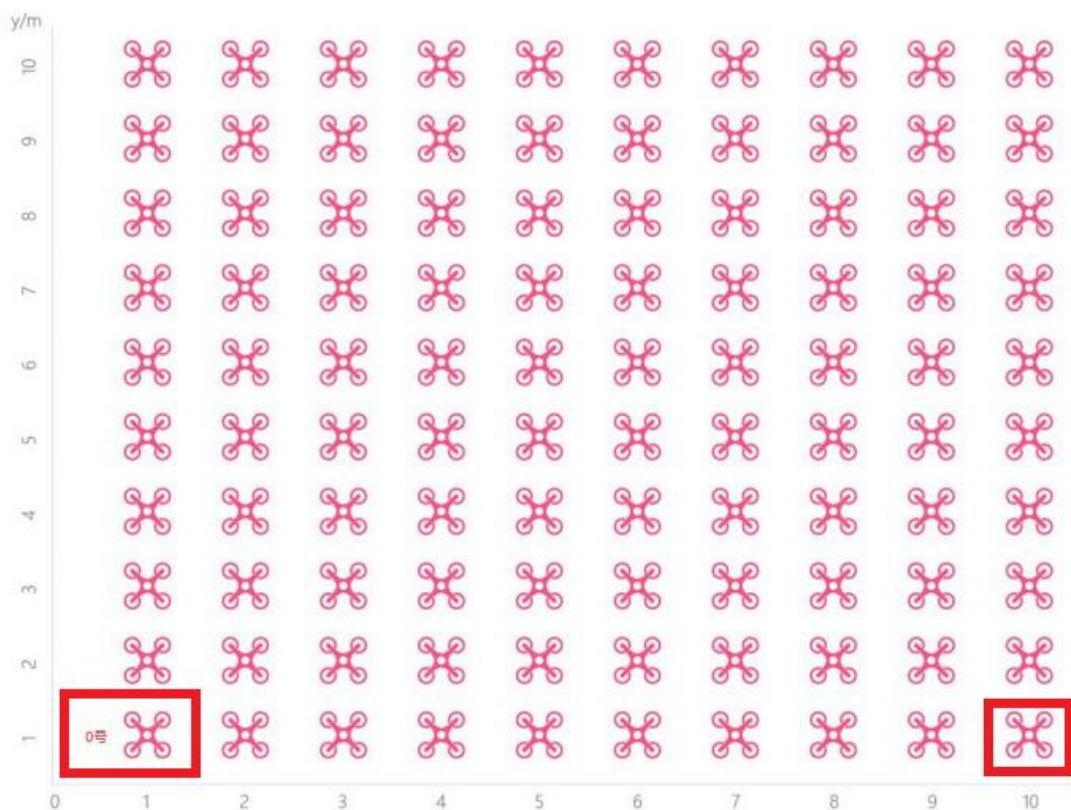
② Step 2: Manual flashing number

Select two drones and use USB flashing drone to determine the number 0 drone and pile drone. Note that the for pile drone number also needs to ensure that there is no duplicate number of the drone at the scene. If there is a duplicate number, you need to manually modify it.

The manual flashing process is as follows: Configuration>USB flashing settings>Select serial port>Fill in new number of drone>Flash (flashing lamp signal: insert USB, after successful connection, the white light will flash for 2 seconds at a high frequency; after successful flashing, the cyan light will always be on for 4 seconds).

③ Step 3: Place No. 0 drone and pile drone

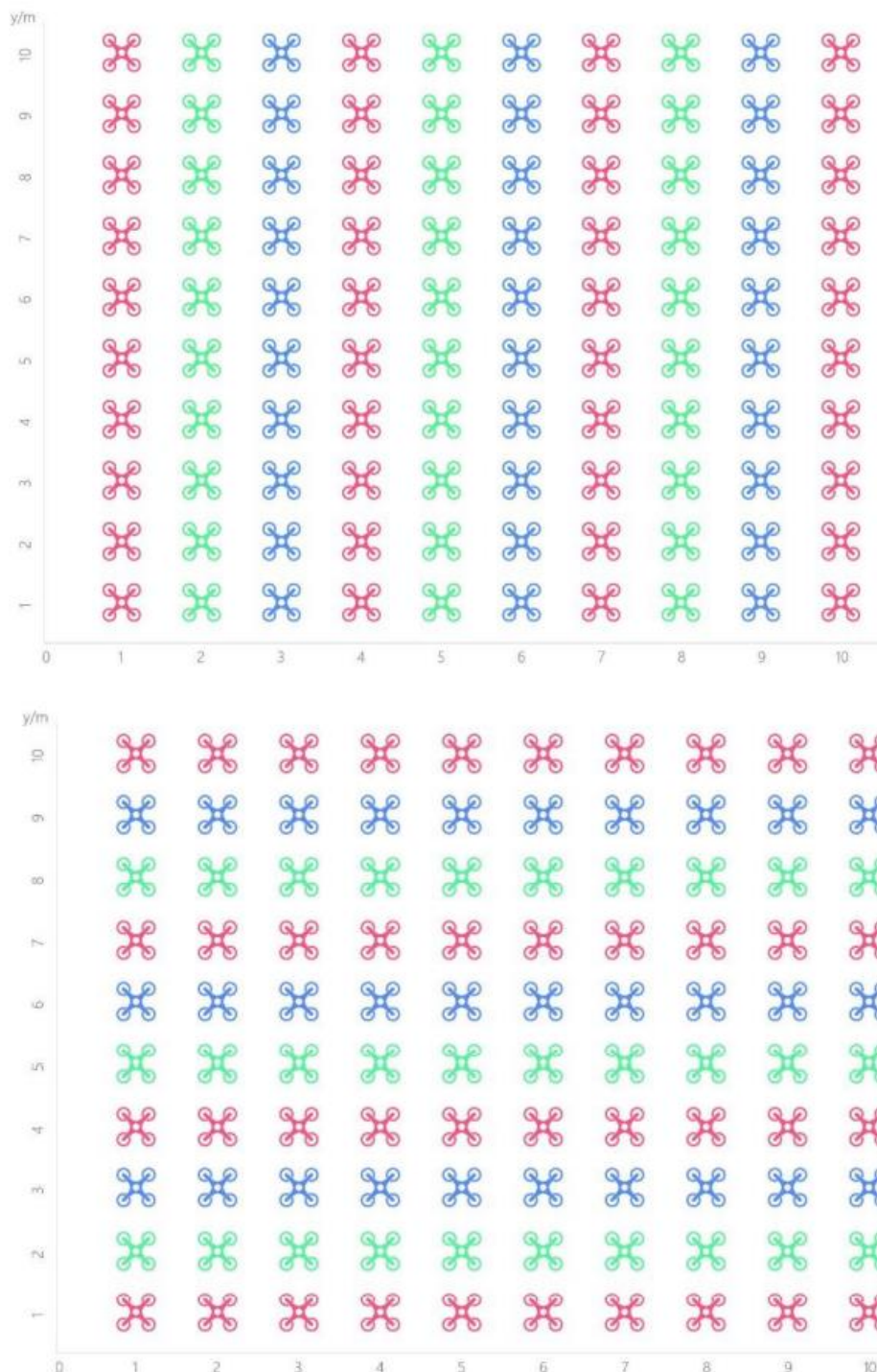
Place No. 0 drone and pile drone in the positions shown in the dance drawing, in the same row.



drone 0

Pile drone

Once more than 90% of the numbering is completed, the server sends light control instructions, the same lights are displayed in the same row or column, including green and blue lights on at intervals, the same row or column light shift controls secondary (to prevent dead lights, rows and columns are all of the same color); for numbers that are not within the specified range of dance (i.e. drone greater than the number of dances), orange-red (RGB: 255, 61, 0) lights are always on. After auto numbering is stopped, all lights return to their original state. After successful numbering, the light changes as follows:



If you want to turn off the three-color light effect during auto numbering, you can check the "Turn off number lights ". If the numbering of a drone fails in the process of auto numbering, the system will automatically assign a drone number greater than the number of dances, and the orange-red lights of the drone greater than the number of dances will always be on. If the number of drones with numbering failure is small, you can choose to flash the number manually or with USB, or check the placement of the drones and renumber

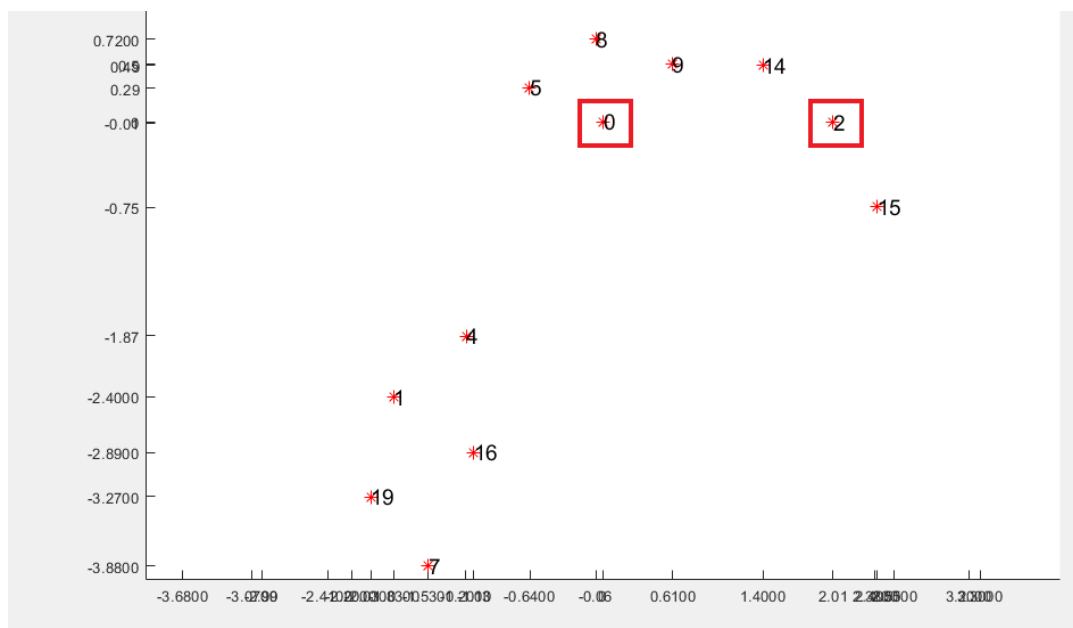
them automatically.



- ※ You can turn on as many drones as you need for dances. Other unnecessary drones shall not be turned on to avoid numbering failure. The pile drone must be placed in the correct position and turned on, otherwise the auto numbering will fail. Auto numbering can be successful only after all drones are in Fix state, and drones without positioning Fix state will not be auto numbered.
- ※ When you select pile drone for auto numbering, you should select the long side of the drone square for numbering, if you select the short side, it may easily cause auto numbering failure.

● Irregular formation auto numbering

Due to some ground restrictions during the performance, drones cannot be placed in a square array, so we need to check 'Irregular formation auto numbering' function. Irregular formation auto numbering process is similar to the 'Auto numbering'. Select No. 0 and a pile drone number. No. 0 and pile drone numbers cannot have the same number. The choice of pile drone number needs to be determined according to the dance steps. The pile drone number is selected as the drone of the No. 0 drones on the positive direction of the Y-axis. As shown in the figure below for Irregular formation dance steps, you can choose drone No. 2 as the plie drone, and place the two drones in the positions corresponding to the dance steps. After positioning them, start numbering according to the auto numbering process.



- Send Dance File

The current pre-selected dances are uploaded to the drone, and wait for the program to prompt that all the dances to be uploaded at present are uploaded successfully, and 0 fails, that is, the dances are uploaded successfully. If a small number of drones are not uploaded successfully, USB flashing can be selected to flash the dances.

- Generate the position table

This function is mainly used in irregular site conditions. When the drone cannot be placed regularly, it is necessary to generate the position table, and the dance programmers design the dances for the placement of the drones on site according to such position table.

Methods for generating the position table:

Drones are placed according to the site. Attention shall be paid to the safe distance between drones when placing them. After placement, they shall be turned on, any dances shall be selected for auto numbering, and then it is necessary to check the host computer to ensure that all turned-on drones are online and have no duplicate numbers. Then click 'unify position', After the sending is completed, "generate the position table" is clicked. The host computer obtains the coordinate list of all drones and makes a document in .txt format for storage.

- Unify position

The dance host computer sends auxiliary dance, just like send dance file.

It needs to wait for the program to prompt that all auxiliary dances are uploaded successfully, and 0 fails, that is, the auxiliary dance steps are uploaded successfully.



※ After clicking the "Unify position", the host computer will prompt to wait.

After the sending is completed, the number of successful sent and failed to sent will be displayed. If there are failed drones for a long time, they shall be send again.

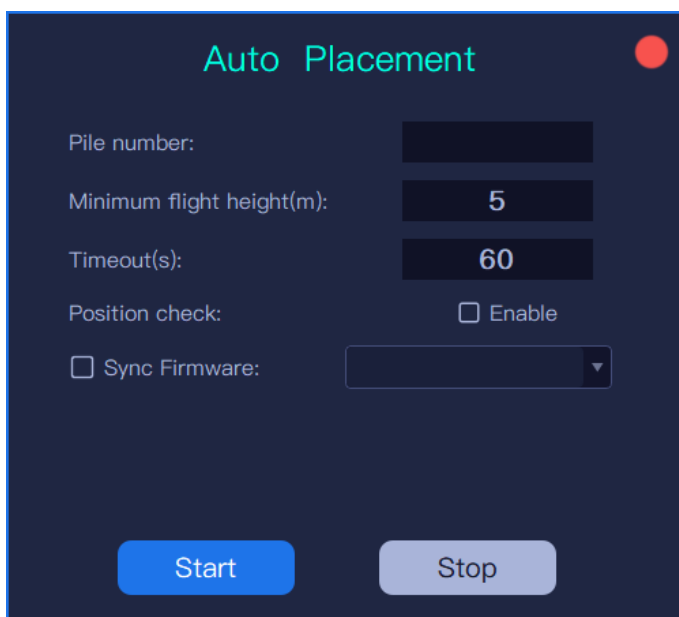
- Reference heading angle

The reference heading angle is the heading angle of the unmanned aerial vehicle No. 0 automatically obtained by the system. Please note that the unmanned aerial vehicle No. 0 is placed correctly.

- True heading angle

The true heading angle is obtained during the automatic numbering process. During flight, the formation flies according to this heading angle. The true heading angle can also be manually entered, and attention should be paid to ensuring that the angle value is accurate when manually entering.

- Auto Placement



The screenshot shows a software interface titled "Auto Placement" with a red status indicator in the top right corner. The interface contains the following controls:

- Pile number:** A text input field.
- Minimum flight height(m):** A numeric input field with the value "5" displayed.
- Timeout(s):** A numeric input field with the value "60" displayed.
- Position check:** A checkbox labeled "Enable" which is currently unchecked.
- Sync Firmware:** A checkbox which is unchecked, followed by a dropdown menu.
- Start:** A blue button at the bottom left.
- Stop:** A grey button at the bottom right.

Auto Placement is used to automatically arrange drones before takeoff, replacing manual placement procedures. To use this function, position the 0# drone and Pile drone first, then initiate the auxiliary dance steps. Once other drones are powered on and positioned anywhere around the takeoff area, the system will perform a self-check of drone status. Upon confirming all drone statuses as OK, drones will display alternating red and blue lights and take off from the spot and follow the steps straight to the placement point for landing.

Pile Number: Refers to the pile number, aligning with Drone 0 to form the 0-degree angle direction on the positive X-axis.

Minimum Flight height: Sets the minimum height for drone flight during placement. Adjust this height higher than obstacles if the site has obstacles.

Timeout: The system continuously conducts real-time comparisons of the completion of placement with the dance step placement diagram. This setting determines the timeout duration for these checks. When there are numerous dance steps for the drones, it may be necessary to extend the timeout period appropriately. If the system fails to detect any missing drones, manual placement can be used to supplement them.

Position Check:

By default, no check is performed. When drones are automatically placed, the placement procedure executes only once. Regardless of whether the drone reaches the position accurately, once it has completed the automatic placement procedure, no second calibration will occur.

If "Check" is selected: Drones always target the dance step placement point as the final destination. The system conducts real-time checks. If the drone's position is offset during the initial execution, the system instructs the drone to perform the placement command again until it reaches the precise position (position offset standard is $\pm 50\text{cm}$).

Sync Firmware: After powering on, the drone will automatically check the version of the flight controller's firmware. If the firmware version is lower than the current setting, the flight controller is upgraded before executing the placement procedure.

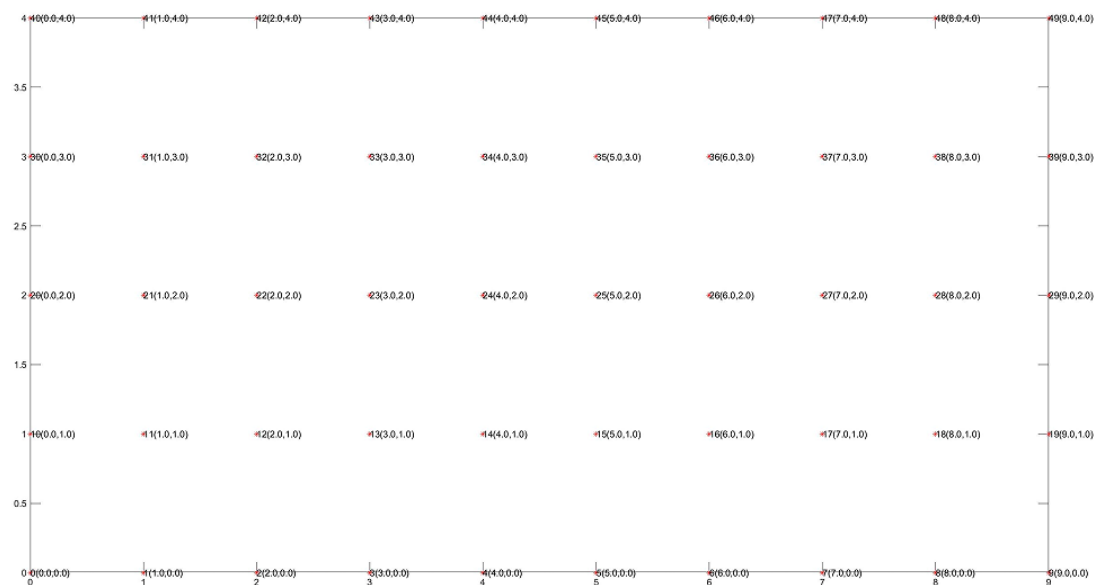


When using the auto placement function, you need to pay attention to the placement position of the No. 0 #drone and the pile drone. Then start automatic placement. After about 60 seconds, you can import the map and heading angle preview on SkyShow ,and verify whether the placement area meets the requirements by combining with the actual map. If the requirements are not met, the positions of 0#drone and Pile drone need to be adjusted. After confirmation, turn on other drones ,. At the same time, you need to understand the drone's flight altitude space and the unobstructed flight route. Before placement, the drone should not be placed in the dance step take-off area. During the placement process, there should be no pedestrians walking in the take-off area. Pay attention to flight safety, and you can interrupt it by "stop" in the middle.

Placement Example:

A. Grid Formation

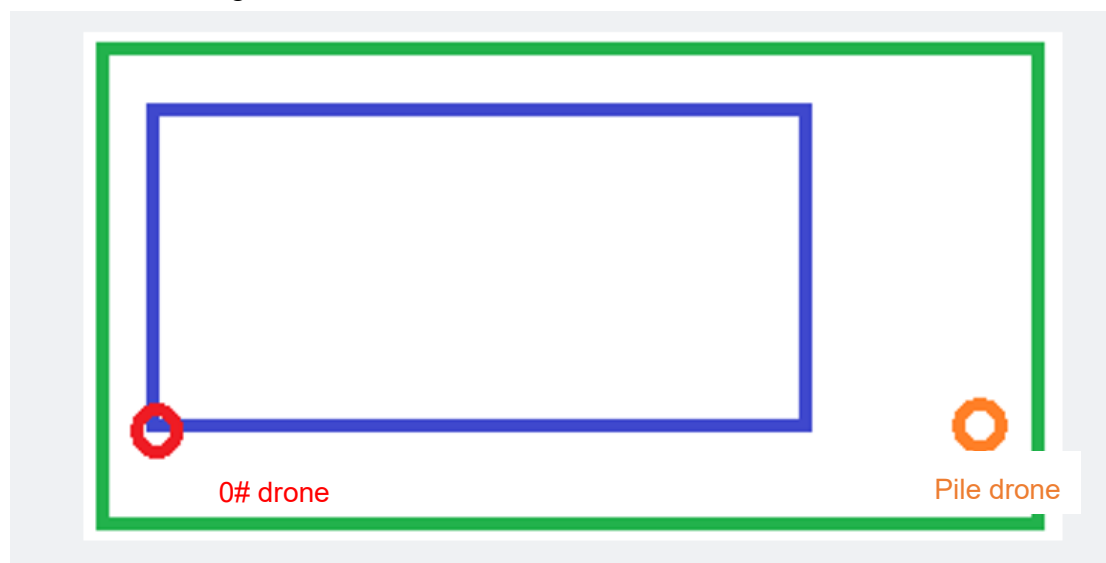
1. Review the dance step positioning diagram and the current scene.



(Dance Step Placement Diagram)

As shown in the diagram above, first locate Drone 0, then observe the

direction at 0 degrees.

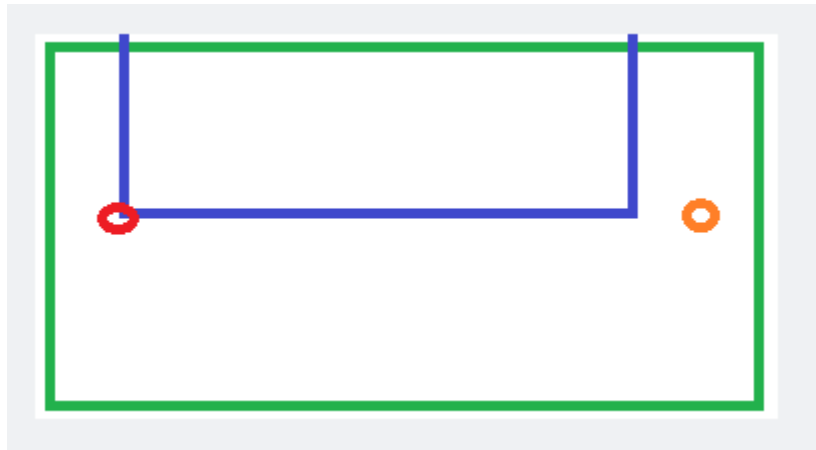


(Placement Diagram)

The red circle represents the placement position of 0# drone, and the orange circle represents the placement position of the pile machine. The green box indicates the actual area where drones can be placed on the site. The blue lines represent the actual matrix of drones placed.

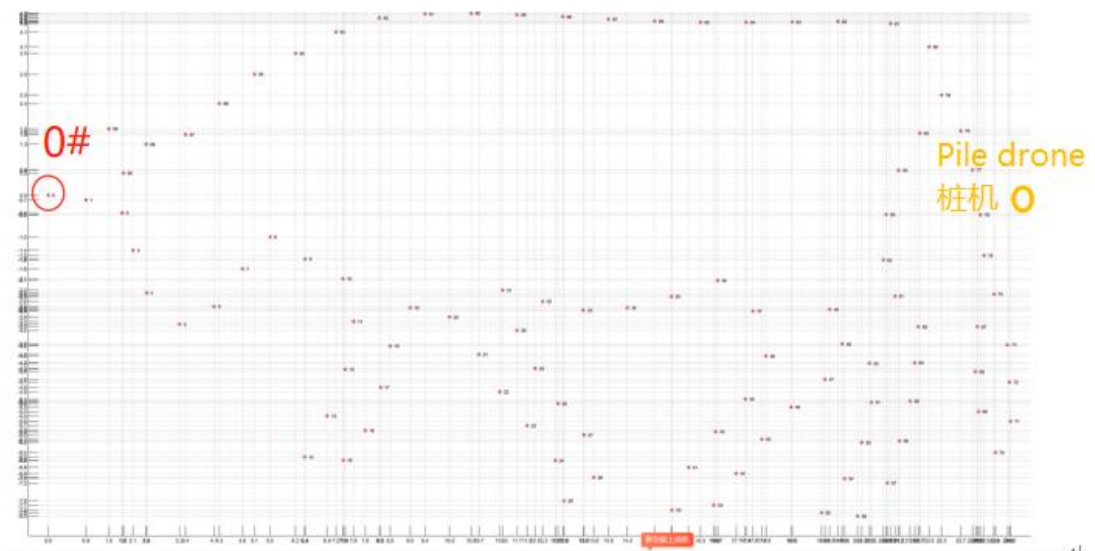
Correct Example: In the diagram below, the green area indicates where you can place drones. Position 0# drone at the red circle in the bottom-left of the green box, and position the pile machine at the orange circle. This placement ensures that the drones will be within the blue outlined placement points.

Incorrect Example: In the diagram below, the green area indicates where you can place drones. If 0# drone is positioned at the red circle in the middle of the green box, and the pile machine is placed at the orange circle, the drones will end up within the blue outlined placement points. However, the vertices of the blue box extend beyond the green border, meaning some drones will be placed outside the actual permitted area. Therefore, it is crucial to pay attention to the positions of 0# drone and the pile drone before placement.



B. Non-grid Formation Placement

The method is similar to grid formation placement. Referring to the dance step diagram, locate 0# drone and then place a pile machine to the right of 0# drone (i.e., outside the maximum boundary of the placement diagram). (Note: When designing dance steps, it is preferable to position 0# drone as far left as possible on the placement diagram.)



Tip: With this feature, you can now create patterns on the ground.

- **Configure Remote ID**

Remote ID requires drone models equipped with this feature and used in countries or regions where relevant regulations mandate it. Before use, parameters related to Remote ID need to be filled out.

Configure remotelD

Device Control:

TransmittedPower dBm

TransmittedChannel 2404 — 2476 MHz

MessageCycle ms

Enable Broadcast Mode

Basic Information:

UAType

CAA ID

UTM UUID

SessionID

HeightType

Operator Information:

IdType ☐ ID ☒ Phone Number

ID

LocationType

Latitude

Longitude

Height

System Info Configuration:

AreaCeiling(m)

AreaFloor(m)

AreaCount

AreaRadius(m)

UALable

UAGroup

Device Control

Transmission Power: Default 15 dBm

Transmission Channel: Configure frequency range according to current country or regional frequency requirements

Message Cycle: Default 1000ms

Enable Broadcast Mode: Supports both BLE and WiFi broadcasting modes, defaulting to BLE-DUAL mode

Basic Information

UAV Type: Default fill in 1, (When in the EU: 0-Unknown, 1-class0 6-class7; When in China, 0-micro UAV, 1-light UAV, 2-small UAV, 3-other UAVs with operational recognition capabilities)

CAA ID: CAA Assigned Registration ID obtained from the local civil aviation

authority

UTM UUID: UTM Assigned Universally Unique Identifier allocated during task execution

Session ID: Temporarily not needed

Height type: Default 0, (Range 0 or 1, 0 represents off-ground altitude, 1 represents AGL altitude.)

Operator Information

ID Type: Can select to fill in operator's identity ID or mobile phone number

ID: Fill in corresponding number according to selected ID type

Location Type: Default fill in 0, Range 0, 1, 2 (0 represents takeoff position, 1 represents dynamic position, 2 represents fixed position)

Latitude, Longitude, Height: Automatically obtained by the system after positioning

System Information Configuration

Area Ceiling: Automatically obtained by the system after positioning

Area Floor: Automatically obtained by the system after positioning

Area Count: Automatically obtained by the system after positioning

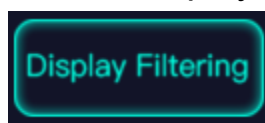
Area Radius: Automatically obtained by the system after positioning

UA Lable: Default fill in 2, Fill in range 0, 1, 2 (0 - Unknown, 1 - EU, 2 - China)

UA Group: Default fill in 1, (0 - Undefined, 1 - Open Class, 2 - Licensed Class, 3 - Certified Class)

Broadcasting Method: Can choose Boundary Broadcast, All Broadcast, or Turn Off Broadcast. Boundary Broadcast means only drones at the dance step boundary are broadcasted; All Broadcast means all drones are broadcasting; Turn Off Broadcast means this function is not used (ensure compliance with local regulations when turning off broadcast).

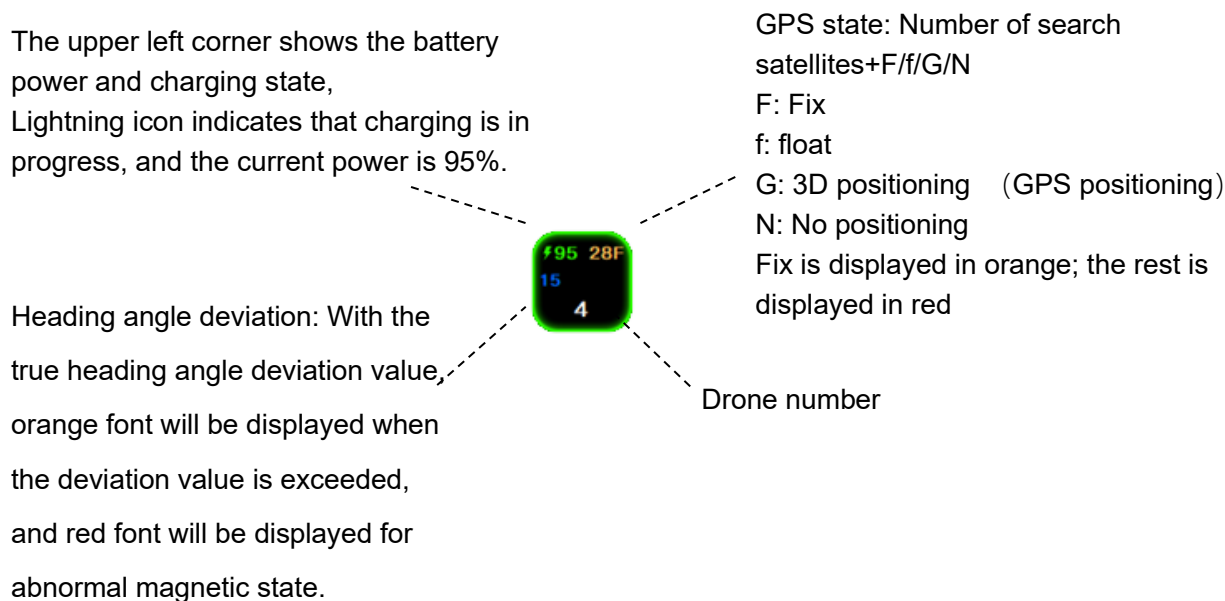
3.5.7.3 Display Filtering



Filter the state of selected drone, such as the current power of the drone, GPS state, dance loading, etc.

- Display information

The selected information will be displayed on the drone state icon of the main interface. The display information has three main contents: drone number, number of GPS search satellites and heading angle.



※ When there are many drones, the user can hide some information that does not need to be viewed temporarily, and then open the display when it needs to be viewed, which can relieve the pressure of computer video memory and reduce the jamming of the page.

- Filtering

It will filter the states of drone, the filtered item is clicked, and the filtering threshold is entered. For the drone that passes the filtering, ✓ is displayed on the state bar, while for the drone that fails to pass the filtering, ✗ is displayed on the state bar. Before the formal dance performance, focus shall be given on filtering the drone's power, GPS state, dance file uploading and firmware

version.

For the drones with abnormal status, the red light will light up, and the drone icon with the corresponding number in the host computer will light up in red. (You can also check the "Turn off the filter light" to turn off the red lights during screening)

GPS: GPS has four states, F: Fix; f: float; G: 3D positioning; N: No positioning. When using the auto numbering function, the numbering can be successful after all drones enter Fix state, and drones without Fix state cannot complete auto numbering.

Battery: To ensure the smooth progress of formation performance, it is recommended to filter the battery power before take-off, and the default filtering power is 80%.

Heading : The filtering range of heading angle deviation value can be set, and the smaller the deviation value, the stricter the detection of nose placement. When the ground magnetic field interference is small, the default filtering heading angle is set to 20, which is beneficial to detect the nose placement deviation. If the heading angle detection cannot be passed when the nose is placed accurately, it is necessary to try to set the deviation range to a large one.

IMU Abnormal: The IMU sensor is responsible for attitude control in flight. To filter out the drones with abnormal IMU, you can click the drone icon with the corresponding number, and use the calibration IMU function to align and calibrate. For the IMU calibration steps, please refer to 3.5.5 Stand-alone state data and calibration IMU.

Mag Abnormal: The magnetometer sensor is responsible for the heading control of the drone in flight. If the abnormal drone is screened out, you can click the icon of the drone with the corresponding number and use the magnetic calibration function to align and calibrate. Please refer to 3.5.4 Test drone and adjust.

BAT TEMP: Different battery temperatures have a slight impact on the discharge performance of the battery. When the battery temperature is higher than 60 degrees, it is recommended to replace the battery or to use it after the battery is cooled down. Or when the ambient temperature is lower than 5 degrees and the battery temperature is low, it is recommended to place the battery at room temperature of 20 degrees before carrying out formation

performance to ensure the best performance of the battery.

Cycle Count: The life of battery is related to the times of charging and discharging. A charging cycle means that all the power of the battery is used from full to empty, and then the battery is charged from empty to full. After many charge and discharge cycles, the battery performance will be weakened, the internal resistance of the battery will become larger, the activity of internal chemical elements will decrease, and the aging battery will affect the formation performance. The system filters batteries with 100 charge and discharge cycles by default.

BAT voltage: Filter the current battery voltage. Intelligent S3 battery output voltage: 11.4 V; The intelligent S4 battery output voltage is 14.54 V. It is recommended to replace the battery with excessive voltage difference.

Satellites: Filter the number of satellite signals received by drone, with the default filtering number of 25. To ensure the smooth progress of formation performance, it is necessary to watch whether there are tall buildings around the flight site before flight, and keep away from tall buildings, crowds and strong magnetic interference areas (at least 150m safe distance from crowds), otherwise it may lead to weak GPS signal and abnormal magnetic compass of drone, which may lead to take-off failure of drone.

Galileo: Filter the number of Galileo satellites received by drone, with the default value of 5.

BAT Status: Check the battery state. When there is a problem with the battery, there will be three states of "**voltage imbalance, power mutation, and battery error**". When the filter result prompts, please replace the battery according to the flight requirements.

Abnormal landing: Filter the cause of abnormal landing of drone. These include magnetometer failure, low battery landing, abnormal positioning, out-of-control rotation, excessive attitude, etc. When the landing reasons of drone cannot be checked, it is necessary to export the flight log of abnormal drone to analyze the specific reasons.

Ublox: Filter drone Ublox version.

No Base: Filter the connection status between the USB of the base and the drone.

Unloaded dance: Filter the sending of drone dance.

Unupgraded firmware: Filter the firmware upgrade of drone, and make sure that the firmware versions of drone are consistent before take-off.

Xbee data: Filter the reception of Xbee signals of drone.

Position deviation: Filter out drones whose position deviation is beyond the range of the dance step placement map

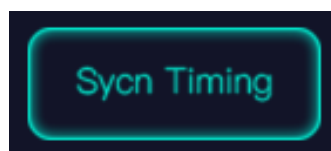


※ The surrounding area of formation flight site shall be as far away from large buildings and strong magnetic interference areas as possible (and it needs to be far away from the crowd to ensure a safe distance of 150m), otherwise it may lead to weak GPS signal and abnormal magnetic compass, which may lead to the take-off failure of drone. At the same time, the wind speed is detected to ensure that it is below 7.9m/s, which has achieved better performance effect.

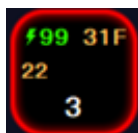
● Operation

This operation is mainly aimed at the selected drones. It is necessary to carry out further firmware upgrade, send dance, light operation, restart, etc.

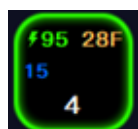
3.5.7.4 Sync timing



Unified sync timing is carried out for all drones which determine a standard time to achieve the purpose of synchronous flight. When the sync timing fails, the state icon of drone will be displayed in red, and when it is passed, it will be displayed in green. For the drone with sync timing failure, the state icon can be clicked to check whether each state is normal!



Sync timing failure



Sync timing success

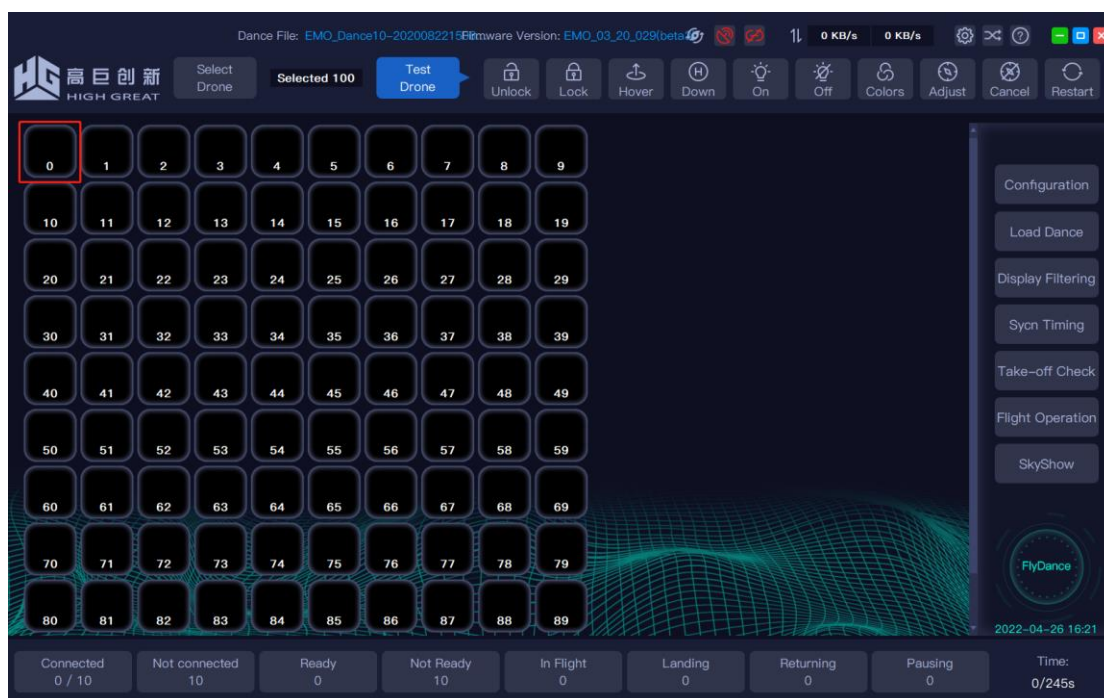
3.5.7.5 Take-off check



It is necessary to check whether all states of drone are passed, including dance program, firmware version, sync timing, auxiliary dance, positioning state, etc. When the state icon of drone is displayed in green, that is, all take-off checks have been passed, flight operation can be carried out.



Stand-alone state data and calibration IMU



The detailed state data of drone can be aroused by clicking the number of formation flight control interface. The detailed state of drone is shown in the following figure.



Click the switch buttons on both sides of the status bar or use the left and right arrow keys to quickly switch the drone number to view the drone status.

SN: N/A WIFI SSID: N/A Xbee1 ID: N/A Xbee2 ID: N/A Total flight time: N/A
RemotelD: N/A

Drone number:	68	Modify	Heading check	★	NO	SPI_FLASH	★	NO
Battery	★	0%	Position check	★	NO	IMU1	★	Unchecked
Base station data1/2	★	NO NO	Height check	★	NO	IMU2	★	Unchecked
Positioning status	★	Unchecked	Unify position	★	NO	Mag compass 1	★	Unchecked
Dance files	★	NO	Timing	★	NO	Mag compass 2	★	Unchecked
Firmware version	★	V0.0.0	Take off license	★	NO	Barometer	★	NO
Status		0	Throttle on		NO	Heading angle		0
IMU temperature		0	Landing		NO	X axis		0
Battery temperature		-30	Landing reason		Normal	Y axis		0
Battery voltage		0.0V	Flight duration		0s	Z axis		0
Battery cycle		0	Number of satellites		0	Geodetic height		0
Battery power		0.0W	Shaking value		0 0	Vibration value		0 0
Base battery		NO	Firework		NO	Reset		

Return Seek Drone ▼ Light Color ▼ Light Motor Hover
Calibrate IMU Calibrate Mag Standby Shutdown Restart Land

* Items marked with ☆ are those that must be tested and passed before take-off

The light of the drone selected by the single machine flashes orange, and the user can modify the number of the drone separately by clicking "Modify"



※ Note: When manually modifying the number, the drone cannot be modified to the same number of the drone currently online. In case of two drones with duplicate numbers, the number needs to be modified again.

Shortcut keys in the detailed stand-alone interface of the drone:

O (Turn on the lights only for the currently selected drone)

P (Turn off the lights only for the currently selected drone)

C (Modify the number of the currently selected drone)

F5 (When WIFI is offline, drone heartbeat packet data is transmitted back through XBee radio)

The detailed data shows the self-test state of the drone with the current number, battery temperature, battery, Firmware version, barometer state, IMU state, mag compass state, dance file state, positioning state, sync timing state, number of satellites geodetic heading, auxiliary dance file state, heading inspection, take-off license prompt,

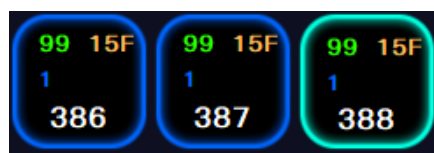
the clicked drone lights flashing orange-red (RGB: 255, 61, 0), normal state data font showing green and abnormal font showing red.

Battery:

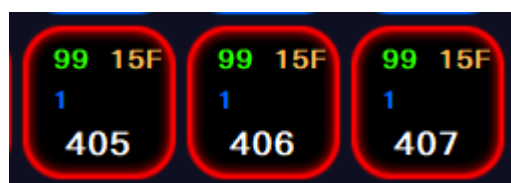


The power mutation of battery refers to the detection in flight. This kind of problem generally occurs when the flight is close to low-power landing. When the battery power drops rapidly by more than 10%, a prompt is given, and the battery life of this phenomenon will be reduced.

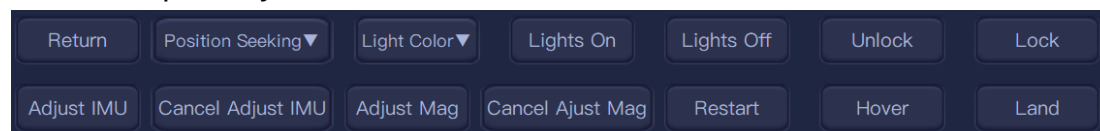
“voltage unbalance” or “power mutation” are still allowed to take off. Users need to fully evaluate the flight requirements during use. When these two states occur, the corresponding drone frame will be colored cyan as shown in the figure below.



The battery abnormality will be detected in real time after the drone is turned on. When the voltage of the four cells and the total voltage of the battery have a large deviation, the problem will be prompted. The box is shown in red in the image below.



The bottom debug button can test the state of the drone with the current number separately.



Return: The current drone returns directly to the take-off point.

Position Seeking:

After the light color is selected, the drones with adjacent numbers of the

drone lights up in the same color. Drones used for out-of-order landing return to their original positions. For example, No. 2 drone is selected in purple for drone locating, and the adjacent No. 1 and No. 3 drones light up in purple at the same time.

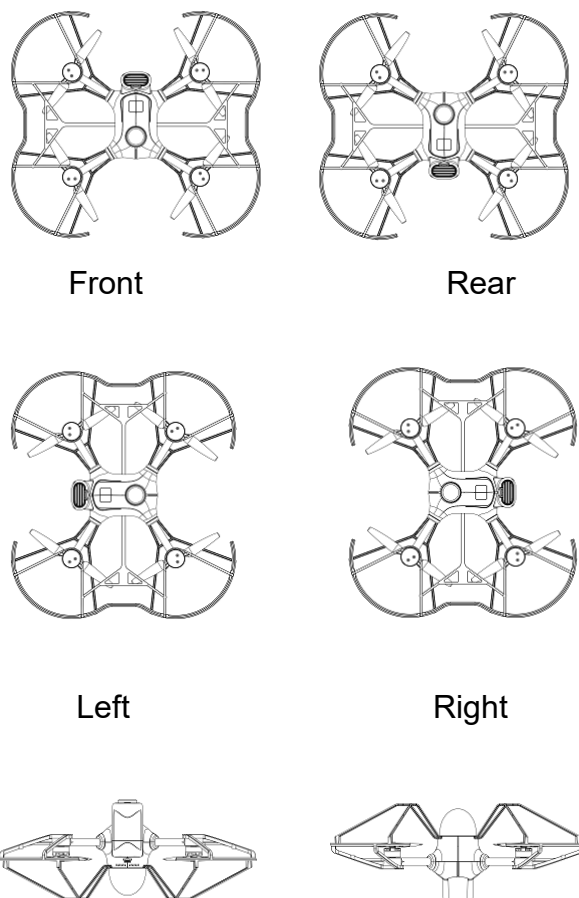
Adjust Mag:

Please refer to [3.5.4Test drone and adjust](#)

Adjust IMU:

An IMU contains accelerometer and gyroscope and is used to measure the angular velocity and acceleration of an object in three-dimensional space, based on which the attitude of object is calculated. In the flight of drone, the flight attitude is given to the main control board by this sensor, so that the main control board can make judgment according to the attitude information.

When the drone deviates obviously during flight and its attitude cannot be kept stable, the user can try to adjust IMU, and put the six surfaces of the drone horizontally and statically on one drone to adjust IMU as shown in the figure below.



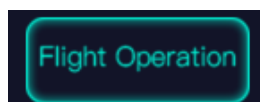
Bottom

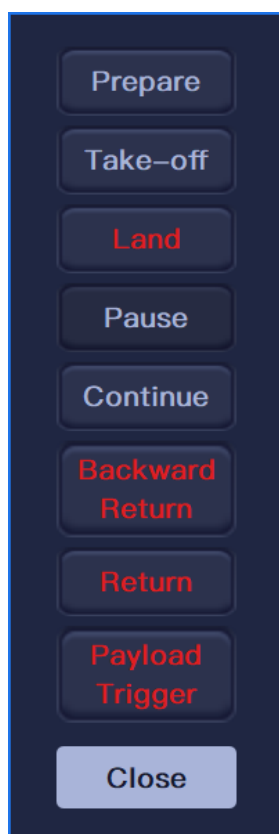
Top

1. After placing one surface of the drone horizontally on the horizontal drone, the yellow light is always on (the green light is always on after calibrate is completed) when the system detects that the current surface is not adjusted; it is detected that the current surface has been adjusted, and the green light is always on;
2. When the IMU data acquisition on the current surface is finished, the motor sound prompts that the calibrate on the current surface is completed (the green light is always on at the same time). It is necessary to collect all the data on six surfaces, and the motor self-test sound prompts that the calibrate is completed.
3. The final calibrate is successful, and the green light flashes quickly for three seconds; the final calibrate fails, and the red light flashes quickly for three seconds.

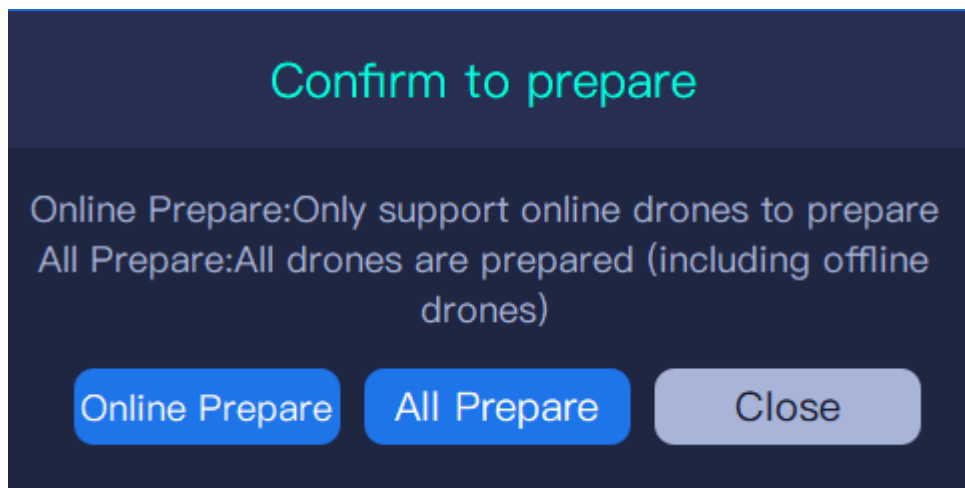
3.5.7.6 Flight operation

In addition to sending instructions through the server for flight operations, it also supports sending instructions through GCS Switch Xbee Radio in offline mode during the flight to deal with emergencies during the performance. (Offline mode: server disconnected).





- Prepare



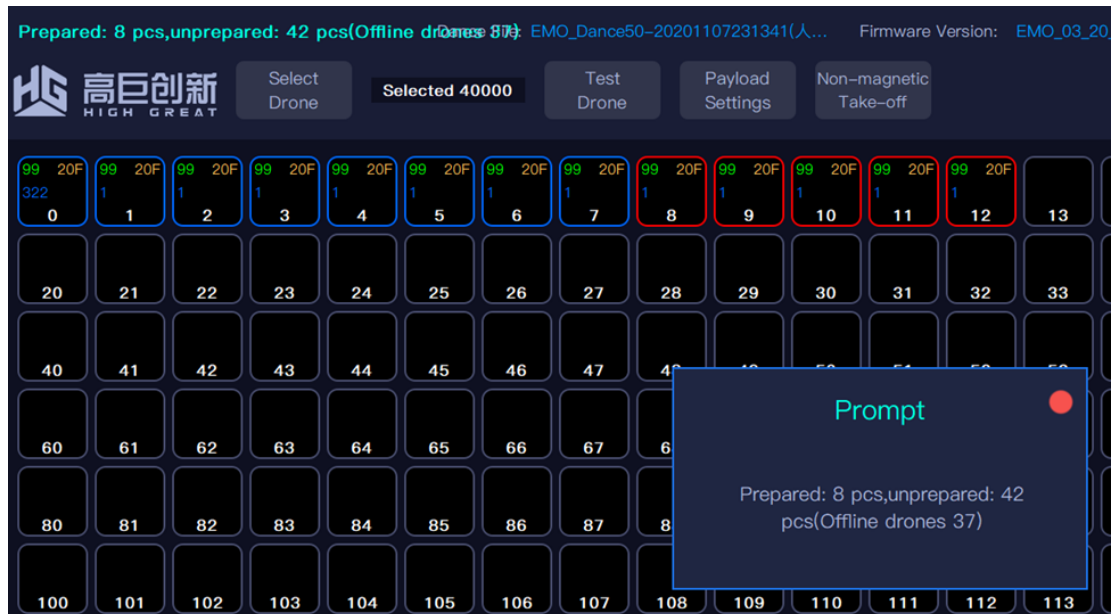
Preparation is divided into "Online Prepare" or "All Prepare".

"Online Prepare" only sends preparation commands to drones that are online with WIFI, while "All Prepare" can send preparation commands to both online and offline drones.

Online Prepare:

When the drone receives the ready command, the icon of the online

drones that have passed the preparation will turn blue, and the icon of the drone that has failed will turn red. If a drone fails to pass the preparation, users need to check whether the drone status is normal or not.

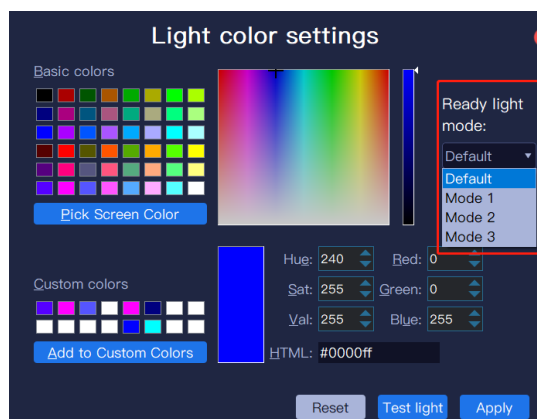


The drone is ready to start the formal dance step. After it is ready, the drone icon turns blue, waiting for the host computer to send the take-off instruction. If the drone being ready to take off fails, the user needs to check whether various states of the drone is normal.

Prepared: The number of prepared drone within the current dance range, including drone with battery status alarm (cyan frame)

Un Prepared: The number of unprepared drones (including offline drones) within the current dance step range. Prepared/unprepared drones do not include the number of fill drones.

* When preparing the state, the default drone forest is always on. Or can modify the dynamic lighting effect when preparing the preparation state in the light color of the test, there is three modes option.



All Prepare:

Sends preparation commands to both online and offline drones, The online drone preparation is the same as the above method. If use "Offline drone prepare", due to the offline status, the drone's status cannot be viewed on the FlyDance. Status can only be inferred from the drone's LED lights: Green light indicates successful preparation and red light indicates preparation failure. (Criteria for offline preparation failure:Drones perform self-checks based on parameters set in the "Settings" section of the ground station. If these parameters are not met, the drone's red light will indicate preparation failure).



※ Tips for Offline Preparation: When facing issues such as insufficient APs on-site or WiFi interference, preventing drones from going online, you can effectively utilize this feature.

Method 1: Test drones in batches. After completing the testing, turn off the WiFi of all drones except Drone 0 using the ground station. Power on another batch of drones for testing. Finally, use the "All Prepare" function.

Method 2: If WiFi cannot be used at the site, prepare drones in advance in an environment with available WiFi. Assign numbers to drones and load dance steps (for a small number of drones, use USB for loading dance steps and assigning numbers). Affix number labels on drones and arrange them according to the dance step diagram at the performance site. During positioning (while pushing auxiliary dance steps), ensure the status of Drone 0 by accessing it via the ground station and using the radio to transmit status data (press F5). Configure

relevant parameters, enabling drones to prepare without WiFi entirely.

- Take-off

After clicking take-off, the host computer sends the instruction to start dance step. After the countdown of take-off delay, the drone takes off. Indigo LED is always on in the take-off countdown of the drone.

- Land

It will send the dance stop command, and the drone lands vertically and slowly from the current position. The drone will not avoid collision during this landing, **Do not use unless necessary!** If low battery landing is set for the drone in the dance step, the drone will turn off the lights and land automatically when it reaches low battery; when the drone is positioned abnormally for more than 15 seconds, it will also turn off the lights and land automatically. At the end of the performance, other drones will land automatically according to the path and time planned by dance.

- Pause

The host computer sends a pause command, the dance step is paused, and the drone hovers in the air at the current position of the dance .

- Continue

The host computer sends the instruction to continue, the dance step continues, and the drone continues to perform the dance step from the paused position.

- Backward return

The drone flies backwards according to the original dance. If the drone needs to return urgently at the time of dance performance, it can support the drone to return backwards according to the original dance, so as to ensure that the drone will not collide during the return process. **It is necessary to evaluate whether the current power of the drone** can complete the backward dance step Before backward return. Once the drone receives the relevant instructions, **there is no room to cancel the instructions on the way** until all drones land. **It is necessary to connect the Xbee module before the dance performance starts and ensure that the instructions can be sent**

normally.

- Return

All drones stop the performance, and returns from the current flight position while maintains the current altitude. After return to the sky above the take off point, an overall landing will be proceed. In the process of returning, the drone will not avoid collision in the air. This function must only be used in emergency situations

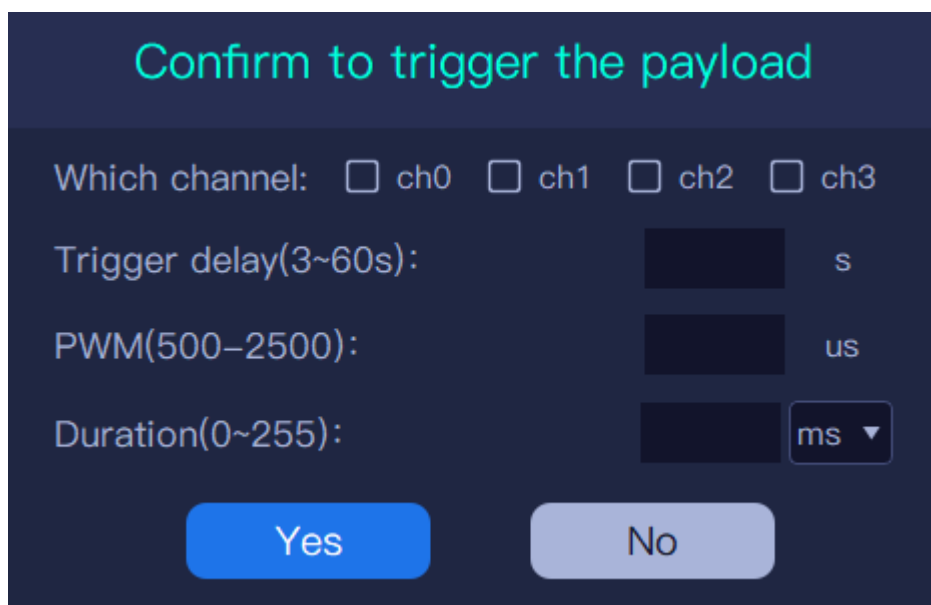


※ Backward return and Retrun are two different functions, please pay attention to the distinction when using

- Payload Trigger

When a manual trigger is needed for the payload, first configure it in the "Payload Settings" section, then adjust the parameters accordingly.

(note :that you must pass the Sync timing on the ground before triggering)



Select the configured payload channel, fill in a trigger delay time of 3-60 seconds, and then set the duration of 0-255ms according to the payload requirements. After the setting is complete, click "Yes" to execute the trigger action.

Select channel: select according to the configured payload channel

Trigger delay: 3-60 seconds delay

PWM and duration: Fill in the trigger pulse or continuous trigger time according to the type of payload.

After the settings are complete, click "Yes" to execute the triggering action.

Fill of absent drone

If some drones cannot take off normally since various conditions cannot meet the take-off conditions, we can use fill of absent drone function at this time. The premise of using this function: When designing the dance, it is necessary to design the filling dance in advance, and when placing the drone, it is necessary to place the filling drone in advance. The minimum height of the dance step when filling the position should be $\geq 10\text{m}$.

When the filling node is reached, the system will automatically pop up the following dialog box, and the user can choose whether to fill or not. After filling, it is necessary to click the "Continue" button in "Flight Operation".

List of absent drone

2 4 6 8 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200
210 220 230 240 250 260 270 280 290 300 310 320

List of offline drone

Refresh list

Start

Stop

The list of absent drone refers to the drone that the system automatically determines the vacancy and is online. The list of offline drone refers to the drone that is offline before taking off. The drone that is
★ offline in the air will not be included in the list.If the drone is offline due to accidental plane explosion,please input the number at the offline list.If one patch is unsuccessful, the list can be refreshed for more than one patch.



※ The list of absent drone refers to the drone that the system automatically determines the vacancy and is online; the list of offline

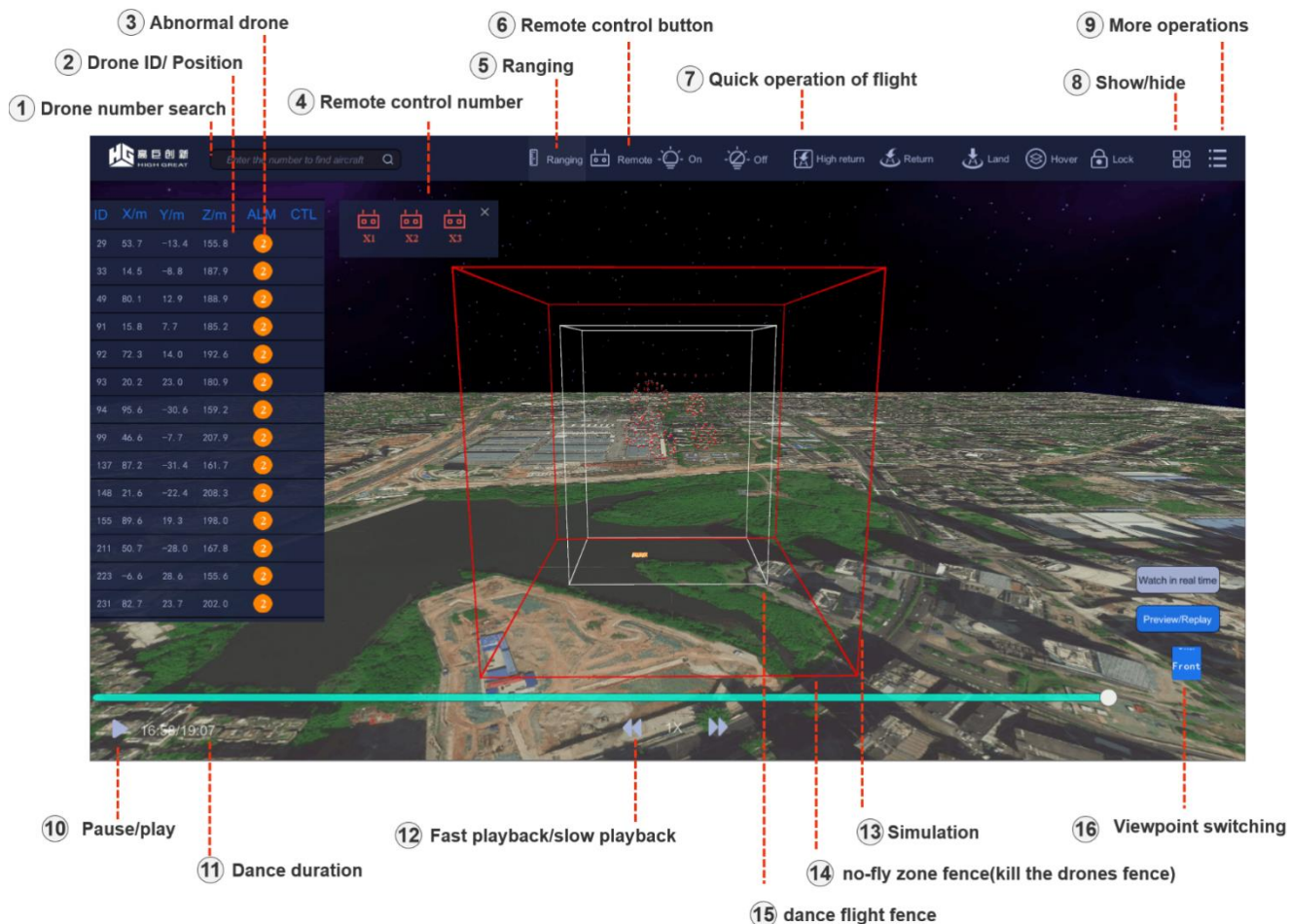
drones refers to the drone that is offline before taking off (being unable to connect the server). If the drone is offline due to the explosion after taking off from the ground, the system cannot identify whether it is vacant. At this time, it needs to be manually added to the list of offline drones. If the drone is still online after the explosion, the system can still automatically identify it to the list of absent drone.

- ✕ Drone filling will consume a certain amount of flight time. The filling time depends on the number of absent drone and the size of dance, which usually takes 2-5 minutes. It is necessary to use this function according to the actual situation during the flight performance.

3.5.7.7 SkyShow



Skyshow is a platform for simulating and watching drone formation flight state and playing back historical records in real time. The software simulates and displays the flight dynamics on the computer mainly through the coordinate data transmitted by the drone in real time, so as to achieve the purpose of real-time flight monitoring. Once the drone is abnormal, corresponding emergency flight operation can be made on software. Meanwhile, The software can also automatically record the flight log of the entire dance step performance and save, playback, preview dance steps and other functions.



Through real-time watching, the state information of drone currently in formation can be watched in real time. In the log playback, the log that needs to be played can be imported from the local end of the computer. Drone number search: After entering the drone number to be searched and clicking Search, the found drone will display different colors in the simulation display area.

The white frame on the periphery is the dance step fence (the electronic fence). When the drone is flying beyond this range, the automatic return or landing mechanism will be activated.

The red box is the no-fly zone fence (kill the drones fence) set on the host computer. Drones beyond the range of this red box the paddles will be locked and the drone will fall from the sky

The functions are introduced in the order of the numbers in the figure below:

1. Drone number search: After entering the drone number to be searched and clicking Search, the found drone will display different colors in the simulation display area.

2. Drone ID/position: It can display the current ID and X/Y/Z position information of formation drone in real time.
3. Abnormal drone:

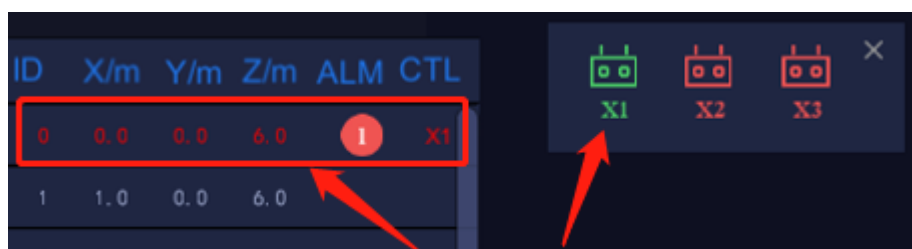
	Abnormality type	Abnormal drone representative serial number	Remote control takeover ways
ALM means abnormal drone	Abnormal flashing		Manual setting of takeover
	Abnormal position deviation		Manual setting of takeover
	Abnormal position deviation due to strong wind		Manual setting of takeover
	GPS without abnormal positioning		Manual setting of takeover / automatically taken over
	Offline drone		Can not be takeover

Instructions for handling abnormal drone operation:

- When the drone is abnormal, the abnormal drone representative serial number will be automatically arranged to the forefront of the table.
- First, it is necessary to quickly select the abnormal drone through shortcut keys Ctrl+1 (select the drone with abnormal flashing), Ctrl+2 (select the drone with abnormal position deviation) and Ctrl+3 (select the drone with GPS without abnormal positioning).
- Then, it is necessary to use Ctrl+G (high return, which means return at fixed altitude), Ctrl+U (return, which means local return), Ctrl+L (landing), Ctrl+H (hovering), Ctrl + B (locked) shortcut keys for operation processing, or click

relevant operation processing through the mouse.

- Remote control takeover: When there is a drone with abnormal positioning, the drone with abnormal positioning will be automatically taken over by the remote control if the console is connected with a remote control, and the drone will be officially taken over when the remote controller hits the lever. If the remote control does not hit the lever or the console is not connected with the remote control, the drone with abnormal positioning will automatically land according to the flight control logic. The remote control takeover function can also be manually set for other abnormal drones through software. Manual setting of takeover as shown in the following figure: It is necessary to select a drone in SkyShow and click one of the remote control icons for takeover. After the remote control is turned on, it can take over the control directly.



Exit remote control takeover: When the drone is not selected, the remote control is clicked to exit the takeover, or when the drone lands on the ground, the remote control automatically exits the takeover.

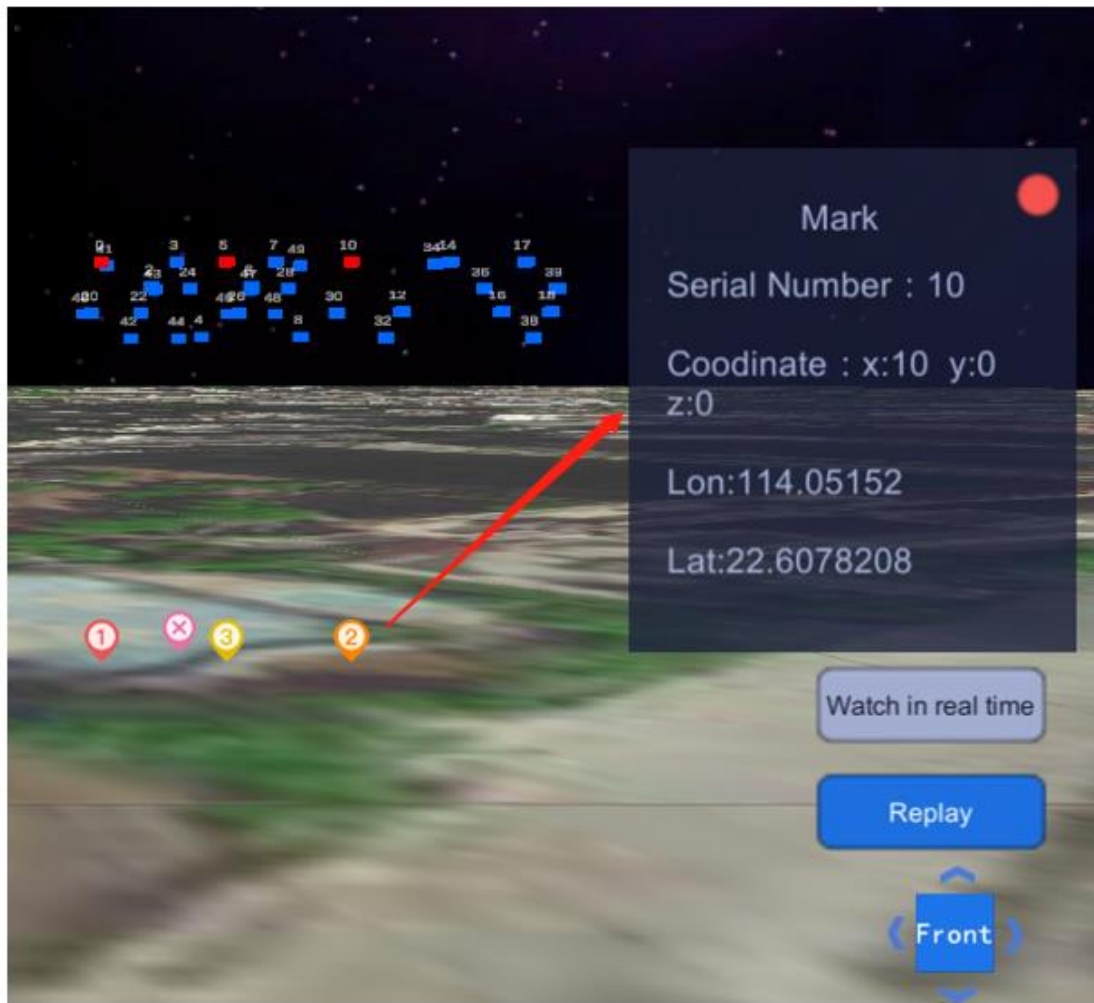


- ※ Automatic takeover means that there is no need to set the remote control takeover function on the computer, and the first drone will be automatically taken over when the remote control hits the lever more than 5%, and the second drone will be automatically taken over when the remote control hits the lever 5% for the second time... The taken-over drone will no longer be taken over automatically, but can be taken over manually.

- ※ After the remote control is turned off (the receiver is disconnected from the computer), it will exit the program. If it needs to take over again, it is necessary to re-select the port in the remote control calibrate.
- ※ One remote control can only take over one drone at a time. When there are many drones with abnormal positioning, the system will take over the drone according to the time sequence of abnormal positioning

- Abnormal drone location mark

After the abnormal drone appears, the software will record the coordinates and latitude and longitude of the abnormal drone before it was offline for the last time and display it on the map. Click on the marked point to view the drone's number and related coordinate data. The number ① ② ③ on the mark corresponds to the landing reason code. ⊗ stands for offline drone. Clicking on the mark will display the coordinate position of the drone when it is offline.



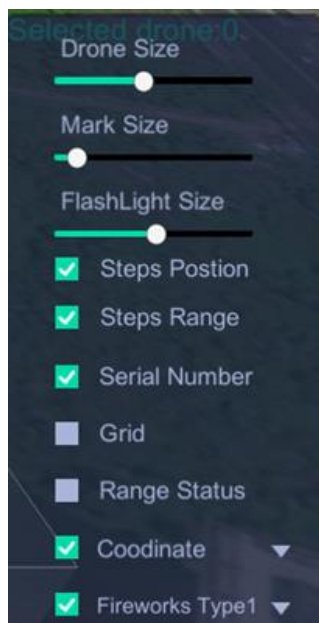
4. Remote control number: It displays the remote control number of the drone that has been taken over at present.
5. Ranging: Click the ranging button to start the distance measurement, click two points on the map to measure the distance between the two points, this function can be used to measure the setting interval of the no-fly fence(kill the drones fence), or measure the distance between the dance step range and the building. Click the 'Ranging' button again to exit the ranging function.
6. The remote control button is used to control the turn-on of the remote control.
7. Quick operation of flight: It includes remote control takeover, on/off, high return, return, landing and locked quick operation. Flight operation is mainly used to control drone with abnormal emergency control during flight viewing.

- Remote control takeover: The remote control is used to control the abnormal drone, in which those with abnormal positioning are automatically taken over on the premise of accessing the remote control, without manual pairing, and other abnormal drones can be manually paired with the drone to be controlled.
- High return: It means that the drone flies vertically to the specified altitude before returning and landing on the take-off point.
- Return: After receiving the instruction, the drone directly returns to the current position and lands on the take-off point.
- Land: The drone lands in place after receiving the instruction.
- Hove: The drone hovers in place after receiving the instruction.
- Lock: The drone will be locked immediately after receiving the instruction, and will stop paddling and fall to the ground directly.
- On/off: The lights used to control abnormal drone are turned on or off.



※ Note: The above flight control can only take effect when the drone is online. All operations shall be careful, and collision with other normal performance drones during return or landing shall be avoided during use.

8. Show/hide



Drag the corresponding scroll bar to adjust the size of the displayed drone, marked, flashlight.

Steps Postion: After importing the map, you can preview the drone's dance steps position on the ground (you need to “unify position” before can use this function).

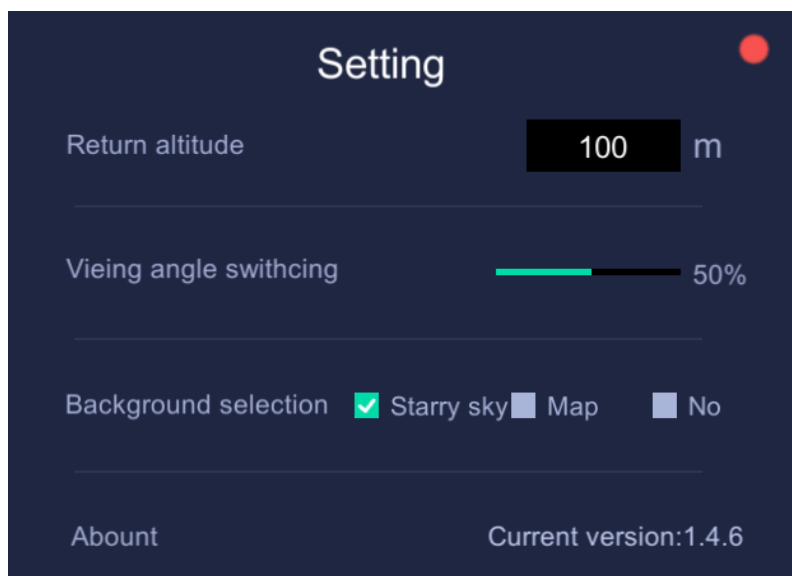
Select the Steps Range, Serial number, Grid, and Coodinate related display/hide operations.

Enable the Fireworks type to preview the simulation of a dance step with a designed payload of fireworks.

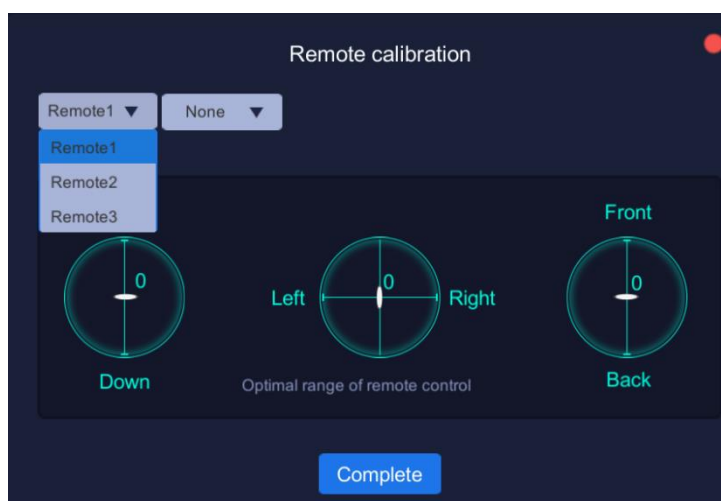
9. More operations

More operations include setting, remote calibration and operation instructions.

- Setting: It can set the return altitude of high return, the sensitivity of vieing angle switching of simulated drone, the background selection and the version display.

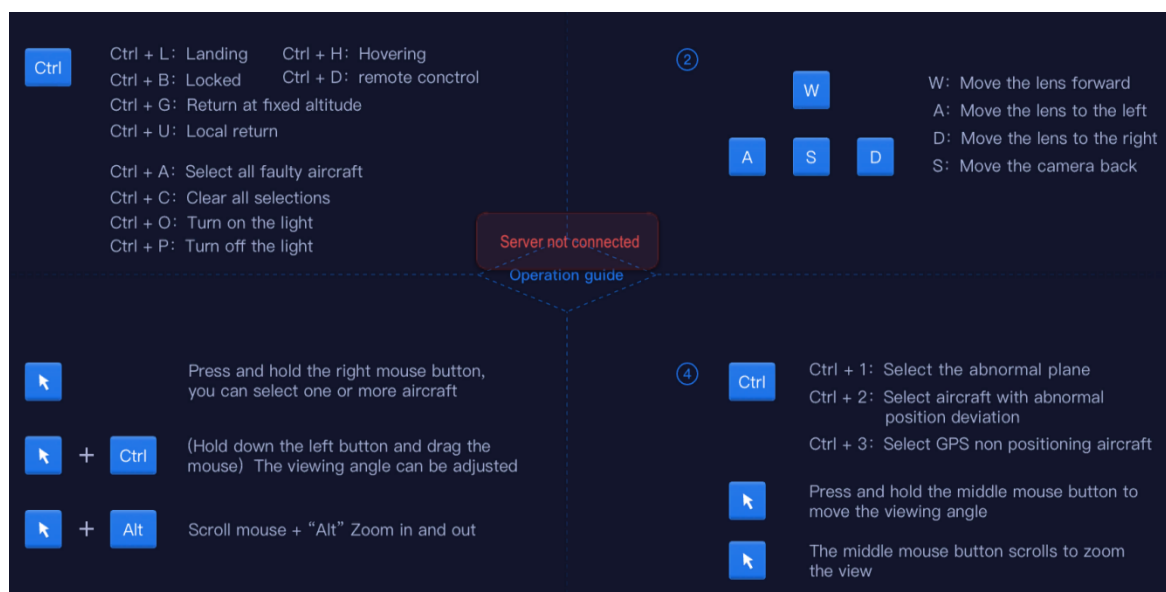


- Remote calibration:



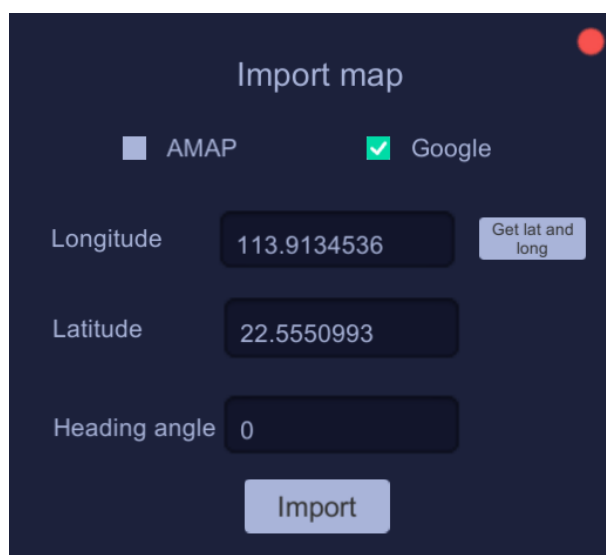
It can calibrate the deviation value of the remote control, only one port can be selected for each remote control, and an error will be reported if the same port is selected for multiple remote controls. After the remote control selects the port number, it will push the rocker to test whether the slider in the above figure is sensitive. If the rocker is not 0 when it is in neutral position, it shall be operated to 0 through fine-tune first.

- Operation guide:



Precautions for shortcut keys of operation instructions: Turn on the light (Ctrl+O), turn off the light (Ctrl+P), high return (Ctrl+G), return (Ctrl+U), landing (Ctrl+L), hovering (Ctrl+H) and locked (Ctrl+B) quick operations can be effective after abnormal drones are selected.

※ Import map



This item can be imported into AMAP or Google Maps, enter the longitude and latitude coordinates of the performance site, or it can be automatically obtained by the on-site 0# drone. Click "Import" to download the on-site satellite map (to import the map, the computer needs to be connected to the internet).

10. Pause/play: Pause/play can be performed when playing logs.

11. Dance duration: It displays the total dance duration and performed duration of drones flying in formation.
12. Fast playback/slow playback: Fast playback/slow playback can be performed when playing logs.
13. Simulation drone display: It simulates the current real-time performance drone.
14. no-fly zone fence (kill the drones fence): When the no-fly zone fence function is checked in Flydance, a red frame will be added to the screen. When the drone is between the white area and the red area, the drone with abnormal positioning will automatically return according to the lowest return altitude for abnormal landing set by the user (not When set, will not automatically return, and the flight control will control the in-situ landing)

When the position of the drone exceeds the red flight range (no-fly zone fence), the drone lock paddle will be triggered!

The scope of the No-fly zone fence(kill the drones fence) can be adjusted according to the performance site environment or performance safety needs. Measurements can be made with the help of the ranging function in Skyshow.



※ Please do not use this function unless it is necessary. When the drone flies out of the no-fly area, **the paddles will be locked. Please judge by yourself and bear the possible losses of using this function.**

15. dance step fence (the electronic fence): The white frame on the periphery is the space range occupied by the formation flight performance of the current dance step, (the electronic fence). When the drone is flying beyond this range, the automatic return mechanism will be activated. Please observe the terrain during the formation process to avoid existence in the formation flight range. buildings or mountains.

16. Viewpoint switching: It switches the drone display angle on the current simulation page.

3.6Appendixes

3.6.1Explanation of Lamp Signal

Non-calibration State Lamp Signal

1. Highest instruction: In case of successful connection when inserting USB, the white light will flash at high frequency for 2 seconds. (All lights can be interrupted and return to the original state after quick flashing for 2 seconds).
 2. Instructions to turn on/off the light from the host computer. (Priority 1)
 3. The power supply is lower than 5% of power. (Priority 2)
 4. The white light is always on when the AP is not connected, and the white light flash slowly when the server is not connected (Priority 3)
 5. Hardware failure such as IMU, barometer or magnetometer: white, blue and purple lights quickly flash. (Priority 4)
 6. Host Computer low-power detection: red light quickly flashes.
 7. Upgrade the flight control of the host computer and transmit the dance: purple light is always on. (If communication is occupied in the process of upgrading or transmission, the host computer instructions will not be processed)
 8. Auto numbering
 - a. The auto numbering function is turned on to calibrate the No. 0 drone, and the red, green and blue lights of the No. 0 drone will switch with each other and flash. More than 90% of the numbering is completed, the server sends light control instructions, the same lights are displayed in the same row or column, including green and blue lights on at intervals, the same row or column light shift controls secondary. numbers that are not within the specified range of dance (i.e. drone larger than the number of dances), and orange-red (RGB: 255, 61, 0) lights are always on.
 - b. For numbers that are not within the specified range of dance (i.e., drone greater than the number of dances), orange-red (RGB: 255, 61, 0) lights are always on.
 - c. After auto numbering is stopped, all lights return to their original state.
- * Note: When a certain drone encounters the first, second, third, fourth and fifth lamp signals with high priority in the process of flashing numbers, the

auto numbering lamp signal will be on according to the lamp signal with high priority.

9. When manually modifying the number (including flashing the number through USB), the cyan light will always be on for 4 seconds after successful flashing.
10. When the drone is selected by the host computer, the orange-red light will flash to exit the selection, and the light returns to the previous state. If the host computer sends the light color instruction in the selected state, the light will be on according to the instruction.
11. Get ready to take off: The forest green light is always on.
12. Take-off countdown: The indigo light is always on.
13. During the dance step, it will be only executed according to the dance lights, and no other light control instructions are executed.
14. In case of abnormal landing of the drone during the dance step, the configuration switch of the host computer is pressed or the lights are turned off to land during landing.
15. In case of repetitive drone number, the orange-red light is always on.
16. After the drone is powered on and positioned normally, it will automatically turn off the light, with the state when turning on the light:
Fix The green light is always on
Float The yellow light is always on
GPS The purple light flashes.
17. The lights are forced to be on in the following states:
It includes selected drone, positioning (Float or GPS), filter, low battery, hardware failure, number modification, adjust, IMU calibrate and base connection. When the above conditions occur, the lights are forcibly turned on, and when the above operations are exited or the fault state does not exist, the state before forcibly turning on the lights will be restored.

Calibrate state lamp signal

When it is in the calibrate state, it will no longer receive external lamp control instructions until exit the calibrate state

1. Adjust magnetometer:
Horizontal calibrate: the blue light is always on; Vertical calibrate: The blue light flashes.

Calibrate success: Restore the original lamp signal state.

Calibrate failure: It is always in the calibrate state, e.g. if the vertical calibrate fails, the blue light flashes all the time until the calibrate exit instruction is sent.

2. Calibrate acceleration:

The yellow light is always on (the green light is always on after calibrate is completed) when the system detects that the current surface is not adjusted; it is detected that the current surface has been adjusted, and the green light is always on;

when the data acquisition on the current surface is finished, the motor sound prompts that the calibrate on the current surface is completed (the green light is always on at the same time). After all the data on six surfaces are collected, the motor self-test sound prompts that the calibrate is completed. The final calibrate is successful, and the green light flashes quickly for three seconds; the final calibrate fails, and the red light flashes quickly for three seconds.

3.6.2 Shortcut keys of the main interface

Ctrl+left key (click the drone box to select multiple drones, and orange lights will be on for all selected drones)

Ctrl+A (restore the original state light of the drone)

O (turn on all lights)

P (Turn off all lights)

Shortcut keys in the stand-alone detailed state data interface:

O (Turn on the lights only for the currently selected drone)

P (Turn off the lights only for the currently selected drone)

C (Modify the number of the currently selected drone)

F5 (Retransmit heartbeat packet data through Xbee radio. Do not reuse this function during flight, otherwise it may affect positioning)

3.6.3 Skyshow shortcut keys

Ctrl+1 Select the drone with abnormal flashing.

Ctrl+2 Select abnormal drone with position deviation

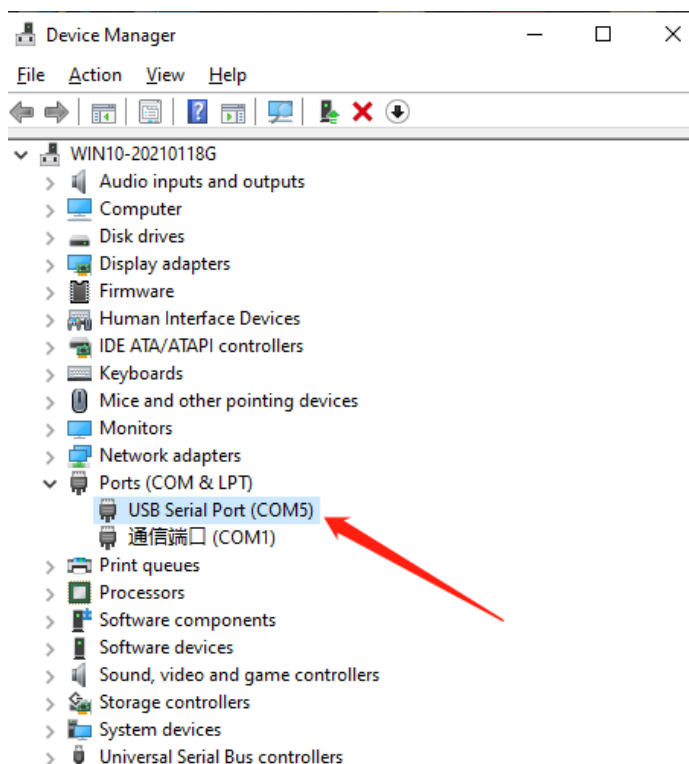
Ctrl+3 Choose abnormal drone without GPS positioning

The following shortcuts are valid only for the selected drone

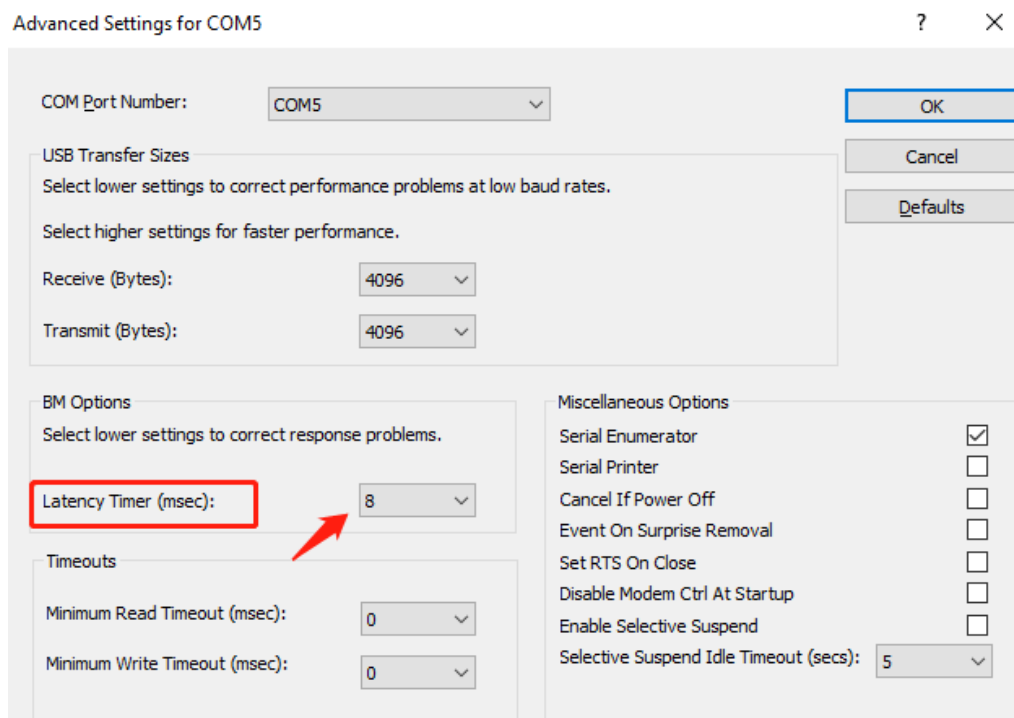
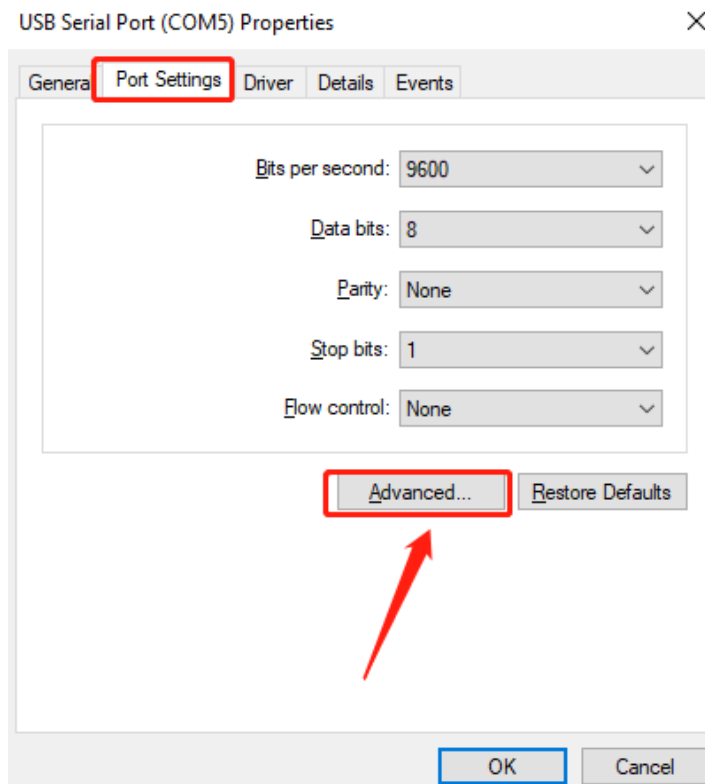
Ctrl+L Landing	Ctrl+G High return
Ctrl+H Hovering	Ctrl+U Return
Ctrl+B Locked	Ctrl+D Turn on the remote control
Ctrl+A Select all faulty drones	Ctrl+C Clear all selections
Ctrl+O Turn on the light	Ctrl+P Turn off the light

3.6.4 Serial port setting and driver installation

1. It is necessary to connect the receiver to the USB interface of the laptop, open the Device Manager, and locate the ports (COM and LPT).

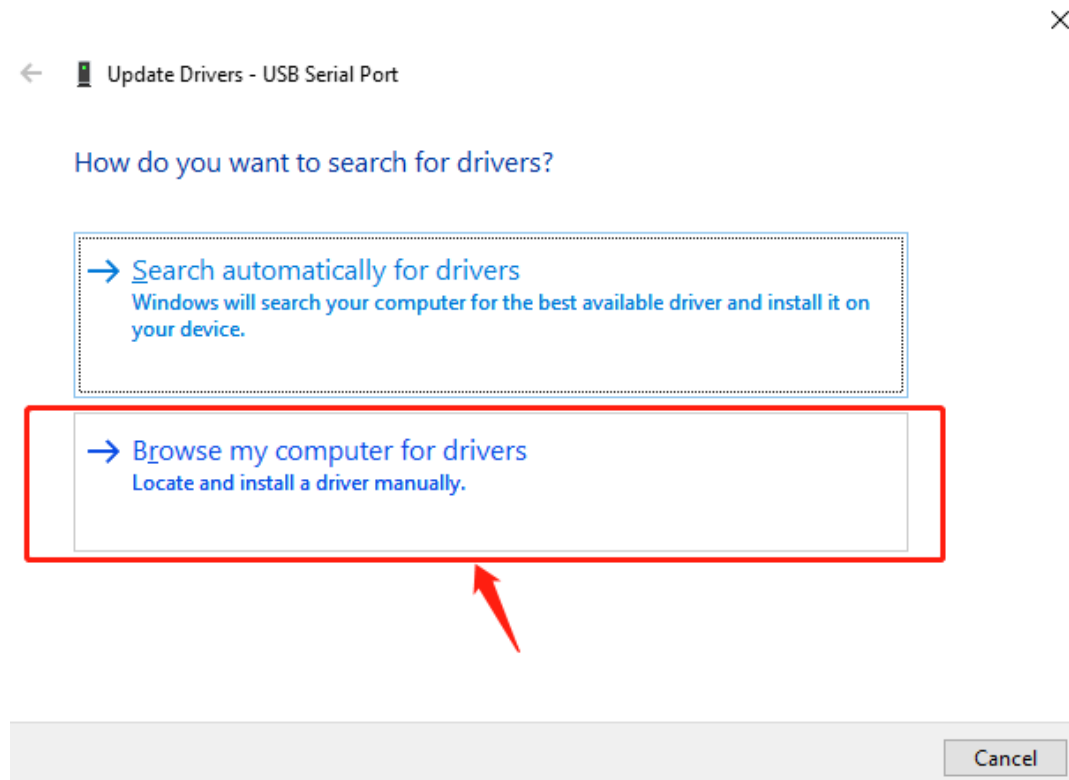
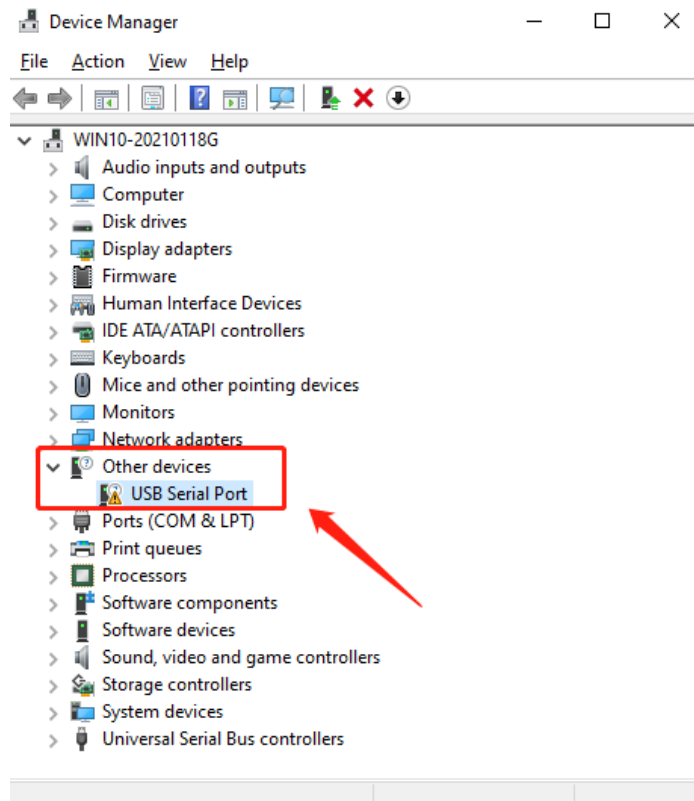


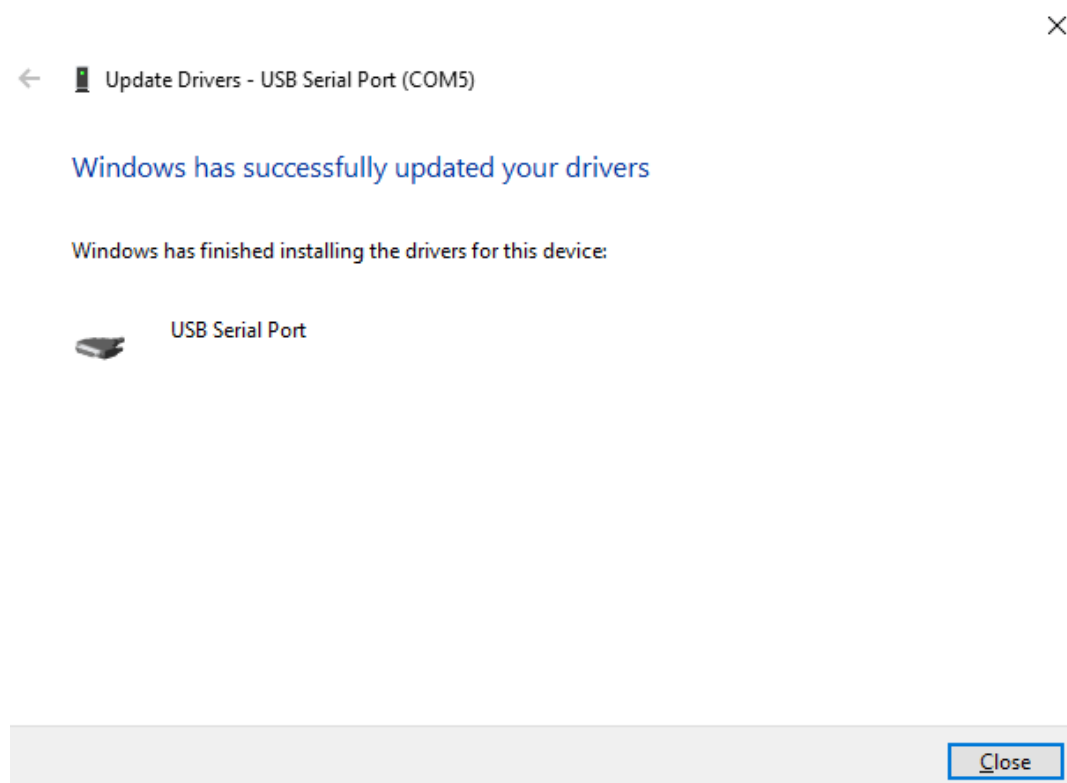
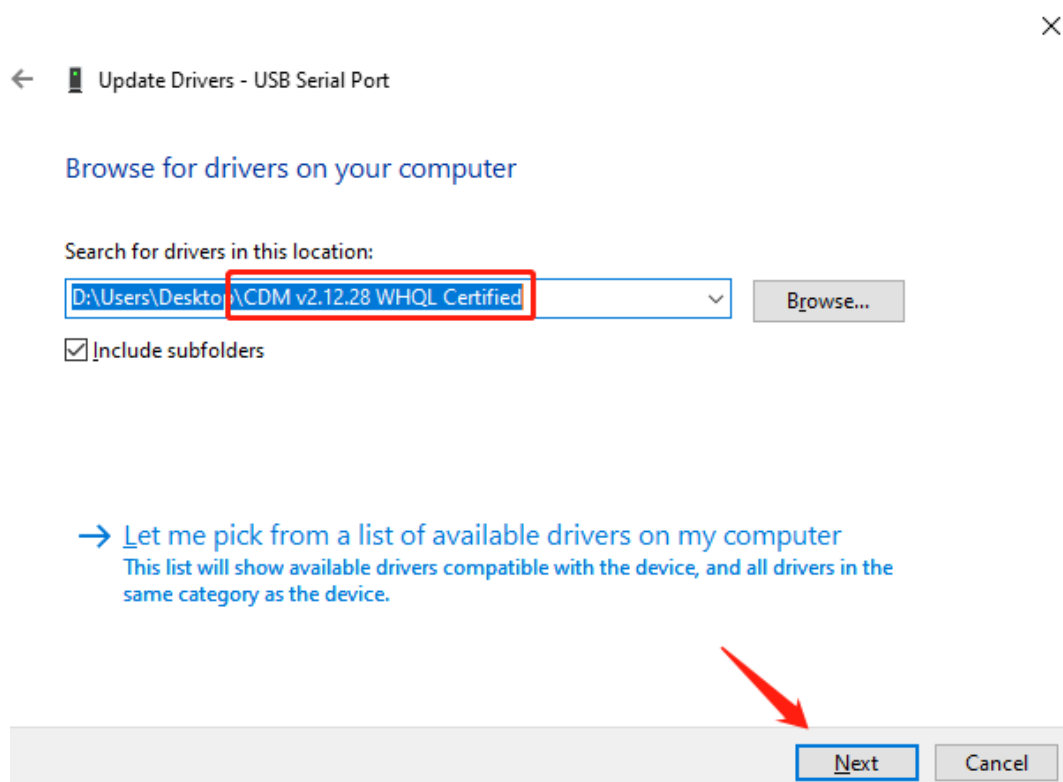
2. It is necessary to locate the receiver port USB Serial Port, right-click and select Properties-> Port Settings-> Advanced (A)-> Latency Timer (msec) to 8, and then restart the computer.



3. If the device cannot be recognized after the receiver is connected to the PC, it is necessary to contact the manufacturer to obtain the driver CDM v2.12.28 WHQL Certified file, update the driver manually, and then modify the Latency Timer in the second step. The driver is installed as follows:
Device Manager-> Other devices-> right-click to select Update Drivers->

Browse My Computer for drivers-> Select the path to the driver folder->
Click Next-> Restart the computer after the update.

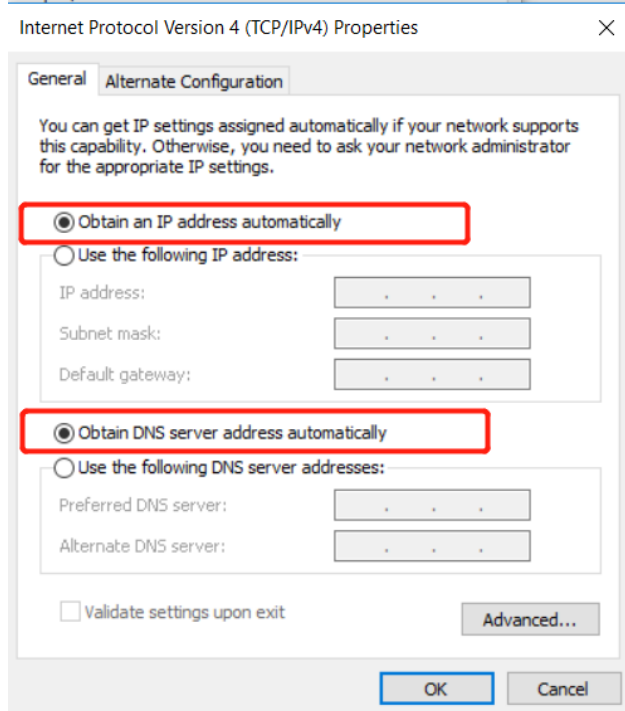
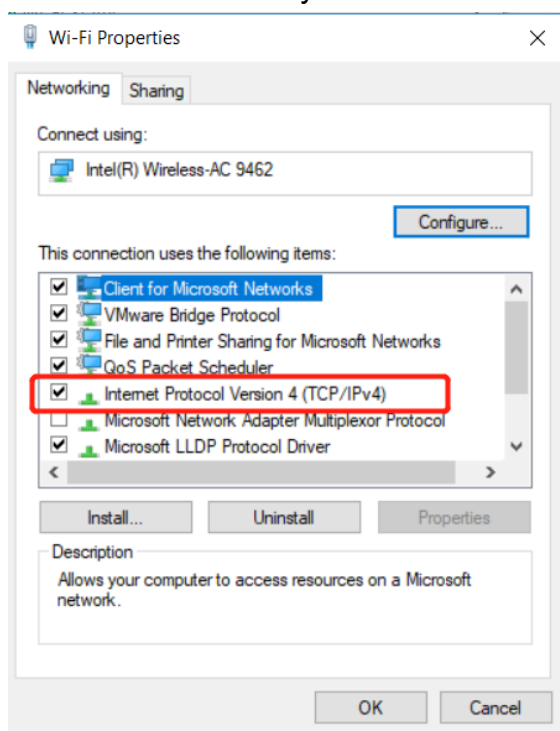




3.6.5 Ubuntu IP Settings

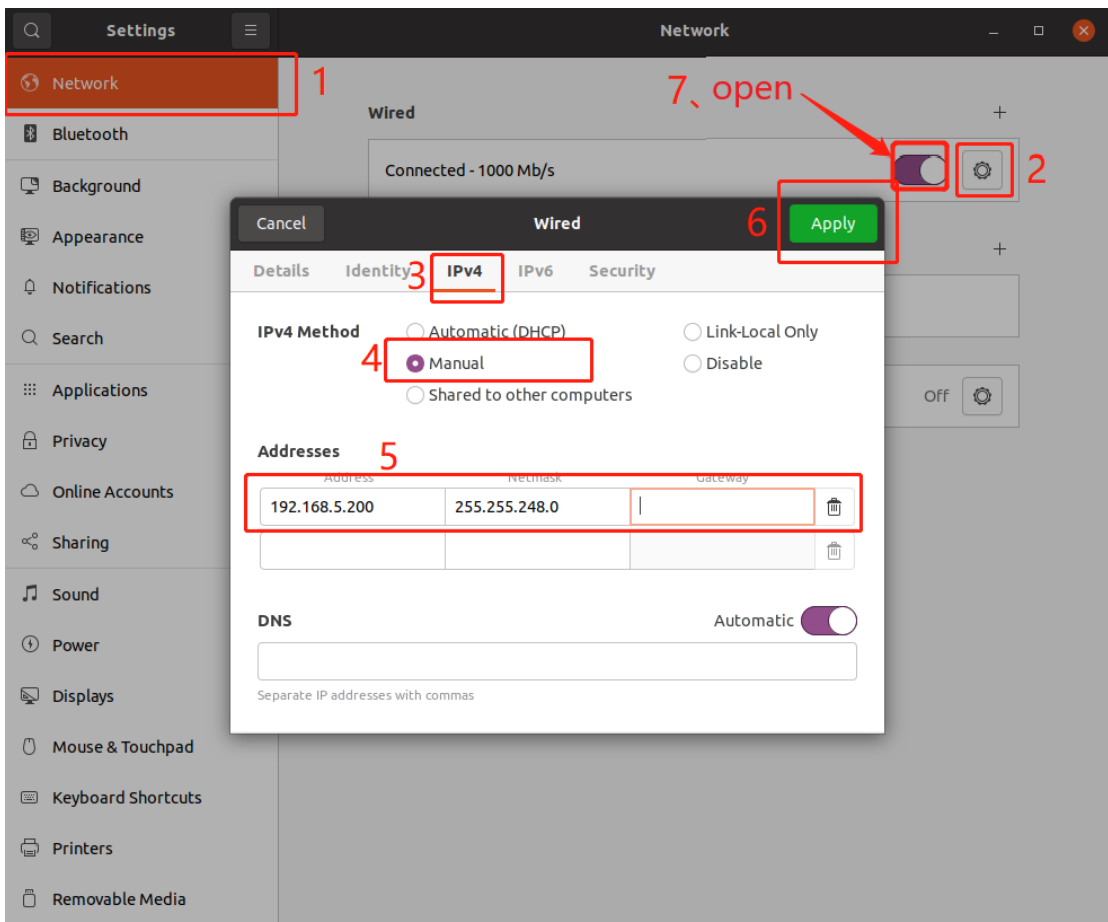
1.Virtual machine Ubuntu IP settings

- (1) After the computer is connected to the switch and AP, open Windows Settings -> Network and Internet -> Ethernet -> Change Adapter Options -> Right-click the current network
- (2) rk properties -> Double-click the ipv4 protocol -> Choose to obtain an IP address automatically.



- (3) Network IP settings in the virtual machine:

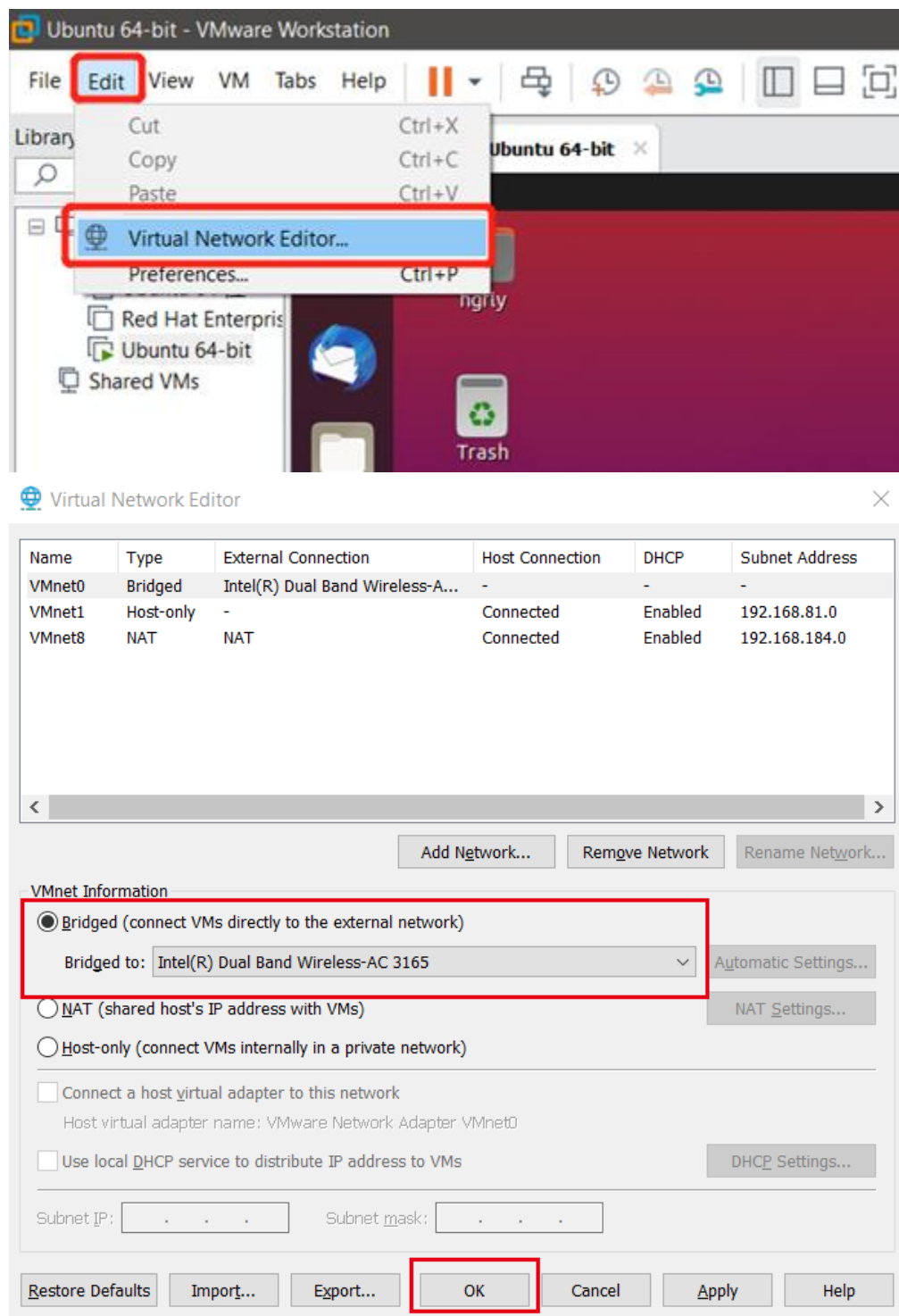
Menu->Settings->Network->Click Settings->Select IPV4 Manual mode->Addresser input IP->Click Apply->Open Wired button. (Note: restart the virtual machine after setting it up)



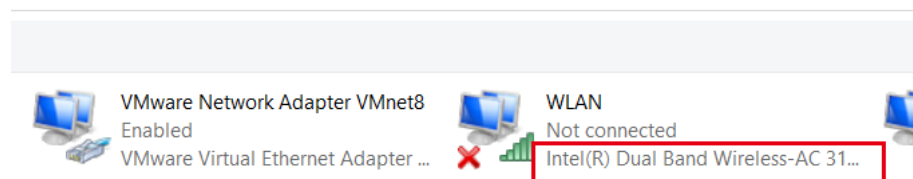
(4) Virtual machine network bridge connection settings:

In VMware, click Edit -> Virtual Machine Network Connection -> Change Settings -> Modify Bridge Mode -> Select the network card model of the external network cable connected to the Ethernet.

(Bridged to connected network)



Control Panel Items > Network Connections



2. Windows Ubuntu 20.04LTS IP settings

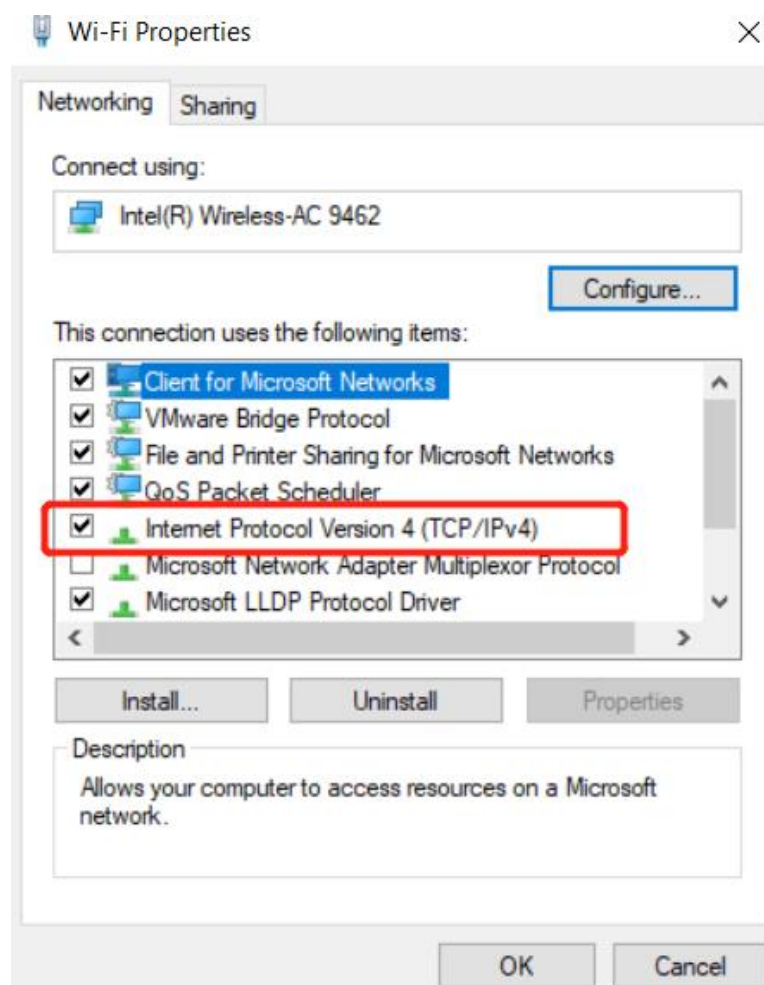
- (1) After the computer is connected to the switch and AP, open Windows Settings -> Network and Internet -> Ethernet -> Change Adapter Options -> Right-click the current network properties -> Double-click the ipv4 protocol -> Enter the following IP address. Fill in the corresponding IP and click OK.

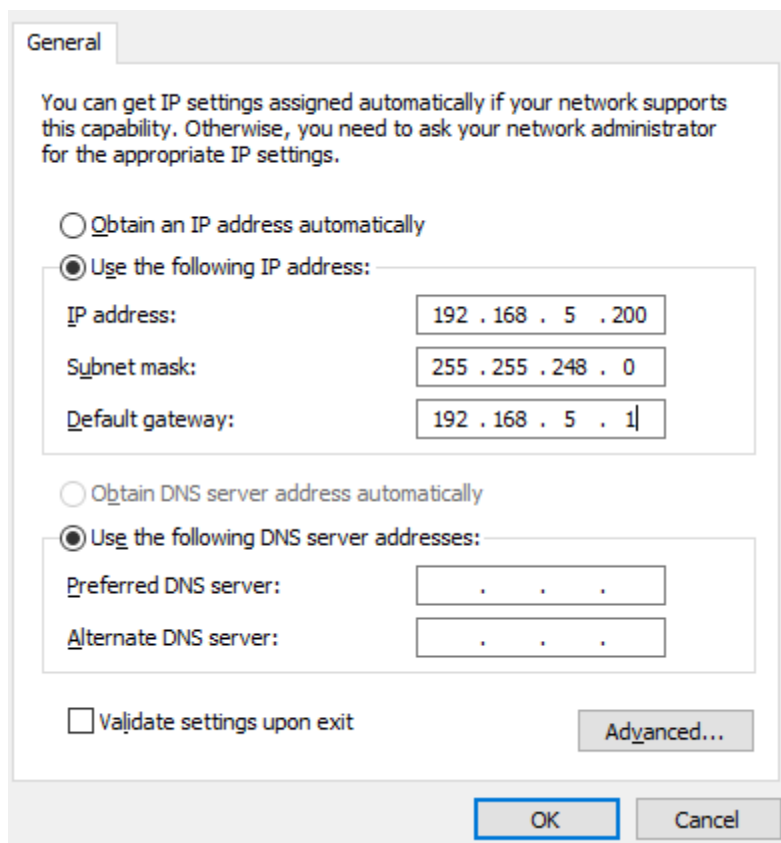
If the number of drones flying is less than 1000, set it to

192.168.5.200 255.255.248.0 192.168.5.1

If the number of drones flying exceeds 1000, set it to

192.168.200.200 255.255.0.0 192.168.200.1






- ※ When the program prompts "Unable to connect, please try again!", the server connection fails. Please follow the steps of [WIFI Formation Server Installation Guide](#) to check whether WIFI Formation Server is installed successfully!

4. Operating Manual for RIFF drone Formation Flight Performance System

4.1 Introduction to Ground Base Station

For detailed introduction and installation of ground reference stations, go to the directory 1.4.3 Introduction and installation of ground reference stations.

4.2 Instructions for Erecting Controller, Switch, AP and Xbee Repeater

1. The controller is mainly used for centralized control and management of wireless APs, for example, saving and modifying configuration parameters, radio frequency intelligent management, access security control, etc. The switch is a network device mainly used for electrical signal forwarding, and the AP is used for data transmission within the range.



Controller



Switch

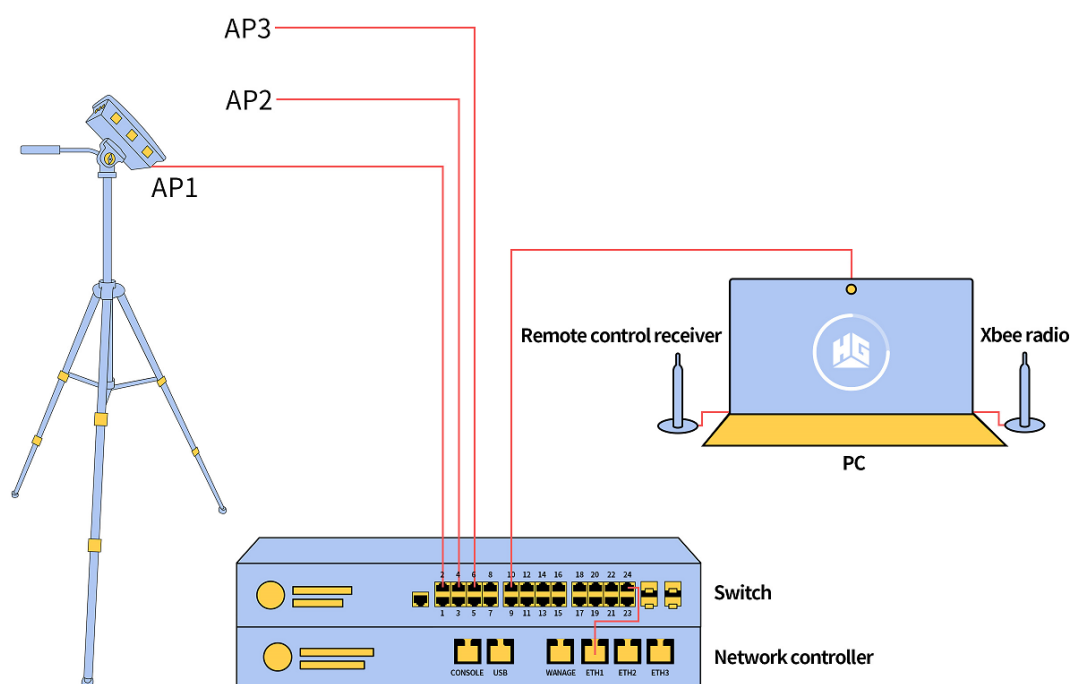


Front view of AP



AP interface

2. The controller ETH1-ETH3 provides parallel serial ports to connect to the switch. Each switch connecting to the controller needs only one serial port. A controller can be connected to up to 3 switches, In practice, we need to connect 24# port of the switch to 1# port of the AC controller, 1-23#port of the switch connect to computer and AP.
3. In the figure, the blue line is connected to the controller switch, the black one to the computer, and the yellow one to the AP (connected to the interface in turn if there are multiple APs).



(Network connection diagram)





The blue light is always on when the AP is working.



POE port for AP connection

4. Xbee radio is mainly used for the transmission of instructions such as pause, resume, backward return, and landing during the flight, and it is connected to the USB port of the computer. (The FT232RL driver needs to be installed for the first connection to the computer, which can be searched online, or obtained from technical support personnel).



4.3 Outdoor Operating Procedures

4.3.1 Deployment of drone

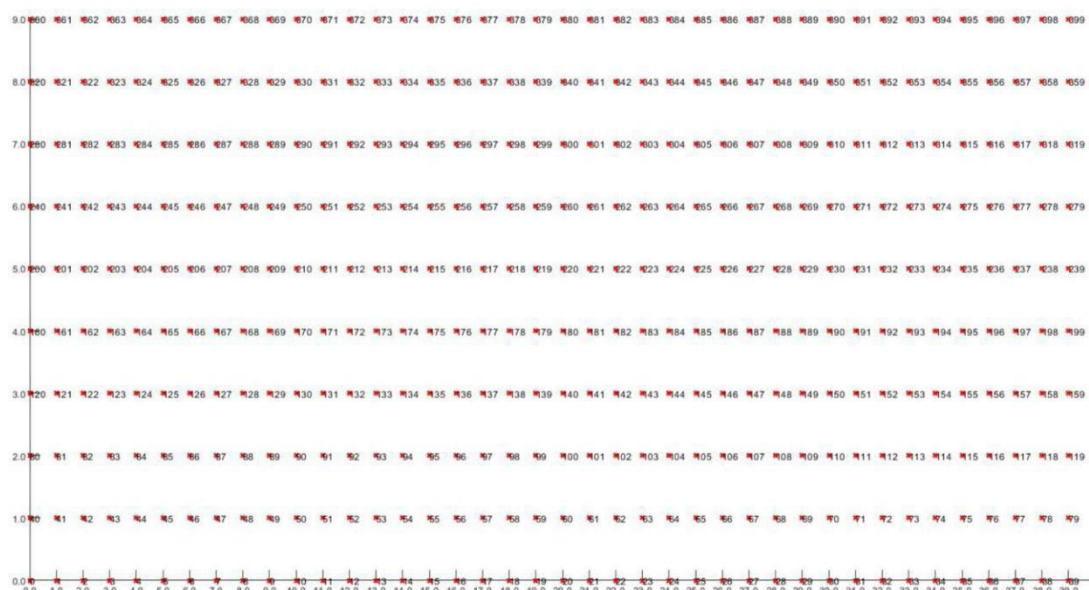
1. Before outdoor operation, the engineer will first send pattern information as follows:

```
*****
finddist of end and head: 0.000000
mindist_xyz: 1.200314minindex:1 times: 432.966667s
maxvyaw0.000000
vx 4.296741 vy 2.332563 vz 3.448334
minvz -1.981430
maxx: 96.170898 maxy: 13.500000 maxz:143.447754
minx: -43.830402 miny: -5.710010 minz:0.000000
error mindist3 1.200314
*****
```

Where, times: 432.966667s represents the flight time of 432 seconds, so it is required to ensure sufficient power supply and is recommended to ensure that the drone battery is fully charged before each take-off. The direction of drone nose is generally the positive direction of Y axis of the coordinate (please ask the engineer for specific dance steps); maxx 96.170898 represents the maximum value, 96 meters, at positive direction of X axis during flight, maxy: 13.500000 represents the maximum value, 13.5 meters, at positive direction of Y axis during flight, and maxz: 143.447754 represents the maximum value, 143 meters, at positive direction of Y axis during flight. minx: -43.830402 represents the maximum value, 43.8 meters, at negative direction of X axis during flight, miny: -5.710010 represents the maximum value, 5.7 meters, at negative direction of Y axis during flight, minz: 0.000000 represents the maximum value, 0 meter, at negative direction of Z axis during flight (since the drone lands on the ground after the performance). It is therefore necessary to survey the field before flight to see if the flight conditions are qualified.

The deployment diagram of drone will be sent simultaneously. Generally the drone is positioned with the rear facing the audience (contact the sales staff for the deployment of drone nose). Pay attention to the distance between

drones and the number of drones each row. As shown below, the distance between drones is 1 meter, 40 drones each row, ten rows in total. 0# drone is generally positioned at the origin of the 3D coordinate, and the position of 1# drone should be determined (the direction should be determined to avoid confusion in the vertical and horizontal directions). The rest of drones can be placed with the distance specified by the dance step chart, regardless of the serial number.



2. Put the compressed package of dance steps into the dancefile folder in server folder of C drive;



此电脑 > Windows (C:) > server > dancefile

名称	修改日期	类型	大小
B03DanceStep2-split-1600.Sep-2018...	2018/10/12 9:41	WinRAR 压缩文件	1,882 KB
B03DanceStep10-20200414154722(4...	2020/4/14 15:47	WinRAR 压缩文件	1,892 KB
B03DanceStep10-20200414160316(2...	2020/4/14 16:22	WinRAR 压缩文件	183 KB
B03DanceStep10-20200414162614(1...	2020/4/15 9:22	WinRAR 压缩文件	541 KB
B03DanceStep10-20200822150637(B...	2020/8/22 15:07	WinRAR 压缩文件	2,601 KB
B03DanceStep50-20200722142740(1...	2020/7/22 14:28	WinRAR 压缩文件	740 KB
B03DanceStep50-20201107231341(...	2020/11/21 8:59	WinRAR 压缩文件	14,125 KB
B03DanceStep200-20201110181831(...	2020/11/21 8:59	WinRAR 压缩文件	64,966 KB
B03DanceStep200-20201114100355(...	2020/11/21 8:59	WinRAR 压缩文件	52,475 KB
B03DanceStep200-20201201151756(...	2020/12/16 14:36	WinRAR 压缩文件	67,900 KB

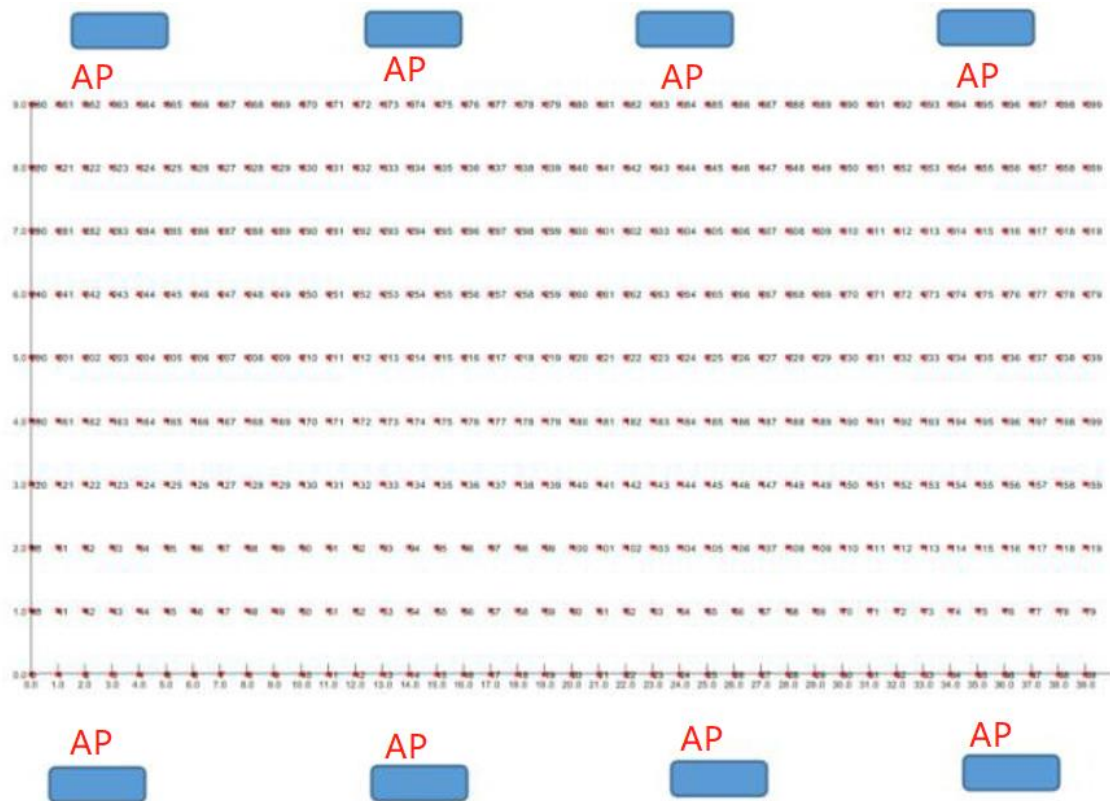
4.3.2Erection of Base Station and IP Setting

1. Before flying, check whether there are tall buildings around the field. Keep away from tall buildings, crowds, and areas with strong magnetic interference (at least with a safe distance of 150m from crowds), otherwise it may cause takeoff failure due to weak GPS signals and abnormal magnetic compass. Make sure the wind speed is below 7.9m/s.
2. Before taking off, connect the base station, controller and other equipment, and check whether the equipment is abnormal. The base station should be in an open space and unobstructed, more than 10m away from the drone formation. The control box faces the drone formation.



3. After the controller, switch, AP and other equipment are connected, keep the AP facing the drone, about 2 meters away from the drone formation. The distance between two APs is about 15-20 meters (as shown below, the blue box means the location where AP is positioned, generally on both sides of the long side of the drone formation). Our factory is equipped with two different

types of APs. For example, if you use 3620 type AP, you need one for 50 drones on average (if you use 8220-X type AP, 150-200 drone use one), so the ratio between AP and the number of drone Please decide according to the specific AP model! If conditions permit, please increase the number of backup APs.



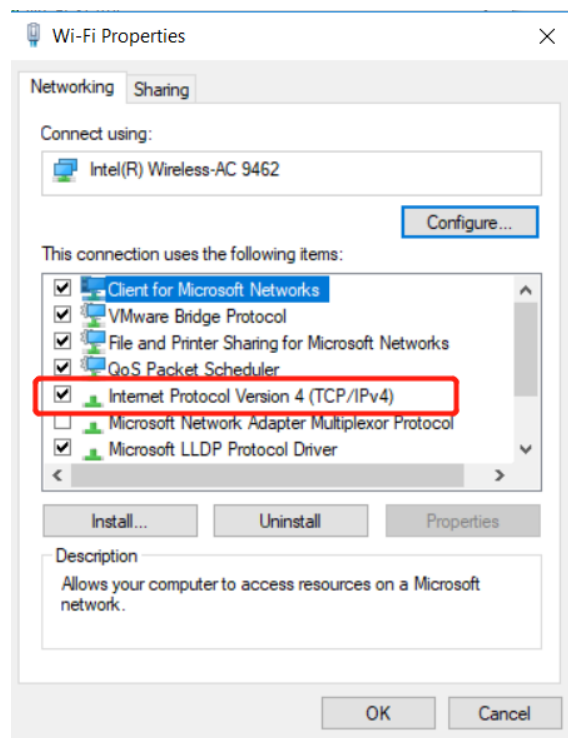
When setting up the AP, please face the AP to the drone array to ensure stable communication. After the UAV takes off, the AP needs to be oriented towards the dance flight performance area to ensure the best communication effect.



4. IP settings

Option One: Modify the IP of the virtual machine

(1) After the computer is connected to the switch and AP, open and operate the computer, Control Panel> Network> Network Connection, and select Ethernet, right-click the Properties, double-click the ipv4 Protocol and select Automatic.

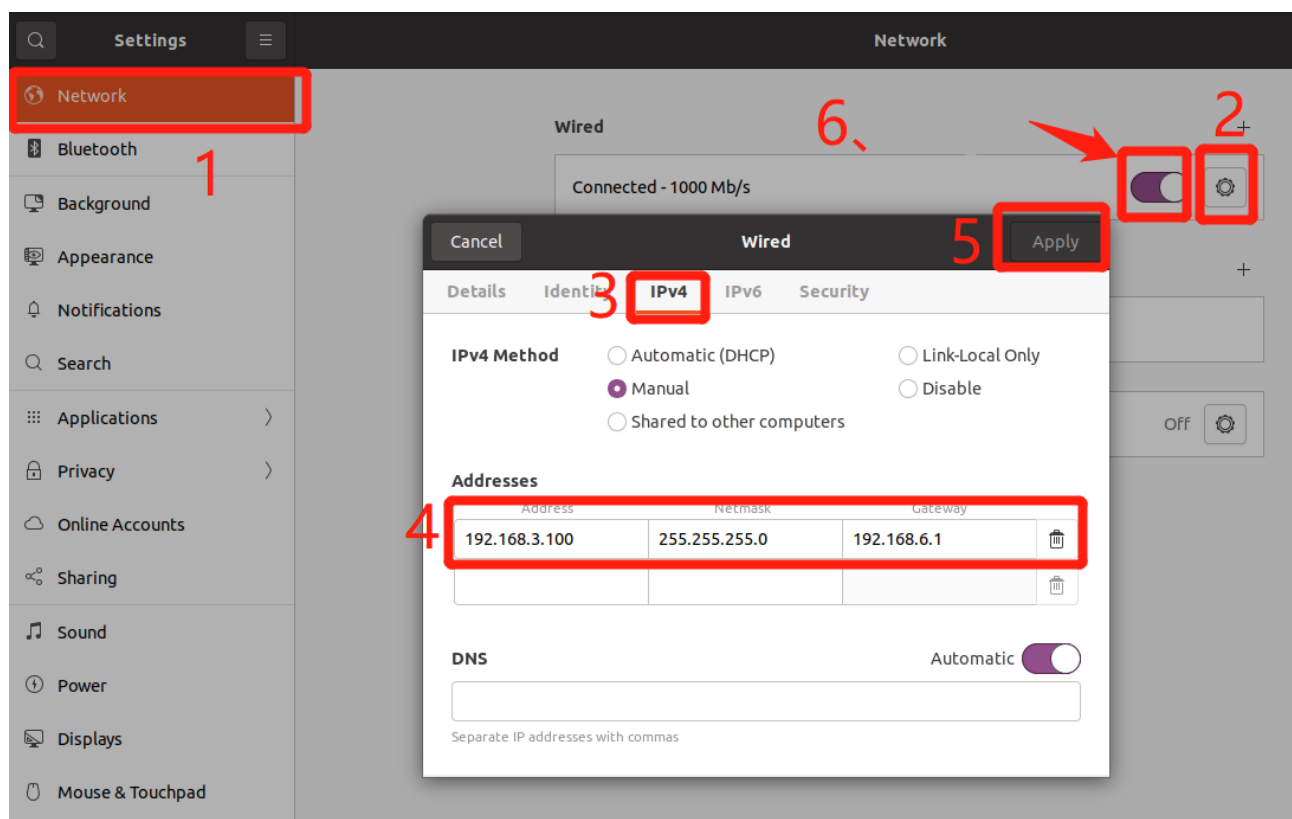


(2) Virtual machine network IP setting (Note: restart the virtual machine after setting)

A. [Click Menu> Settings](#)

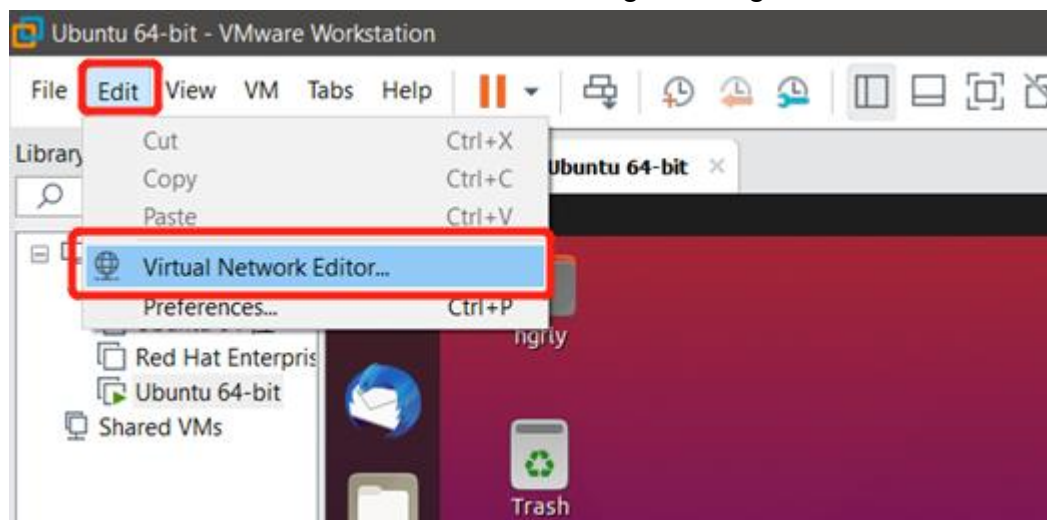


B. Click Network> Settings> Select IPV4 Mode> Enter IP> Click Apply> Open button.

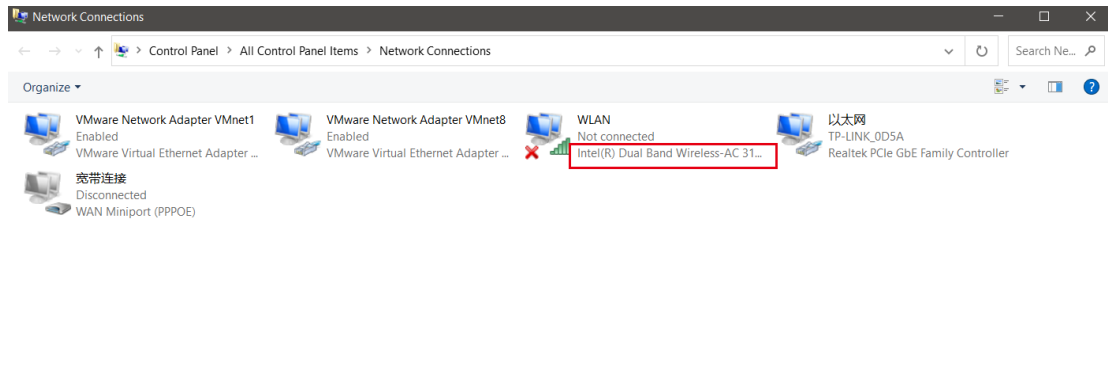


(3) Bridging connection settings of virtual machine

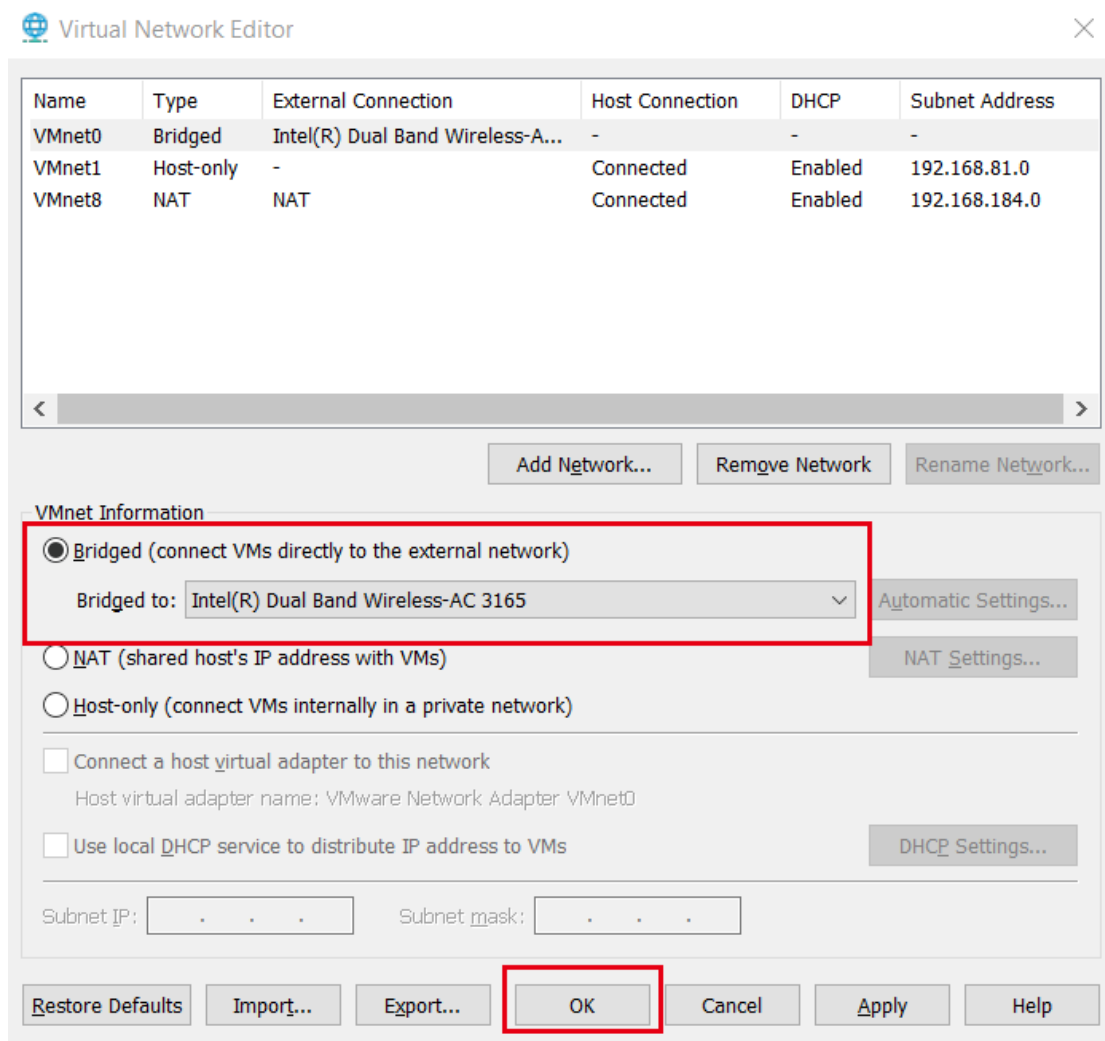
A. Click Edit> Virtual Network Editor> Change Settings



B. Check the model of computer network card



C. Select the model of network card and click OK.

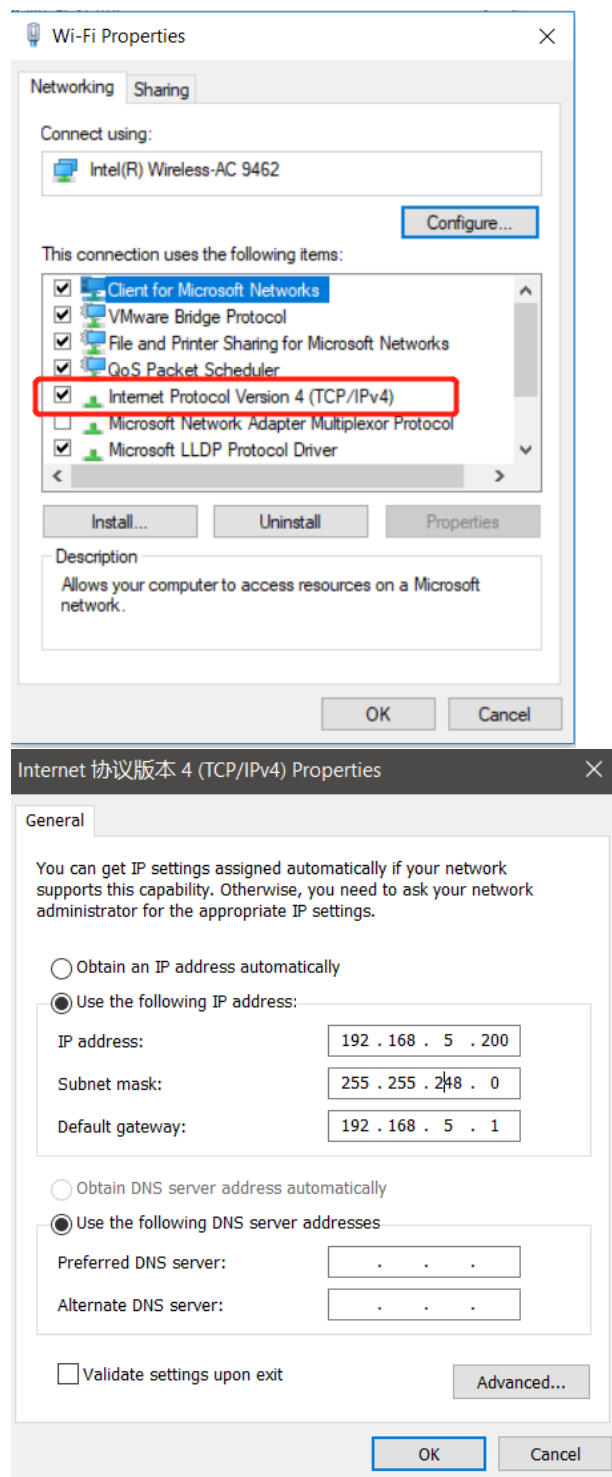


Option two: Win10 comes with liunx virtual machine IP settings

(1) After the computer is connected to the switch and AP, open and operate the computer, Control Panel> Network> Network Connection, and select

Ethernet, right-click the Properties, double-click the ipv4 Protocol, Choose to use the IP address below, fill in the corresponding IP and click OK.

If there are less than 1,000 drones, the IP will be configured as “192.168.5.200 255.255.248.0 192.168.5.1”; if there are more than 1,000 drones, the IP will be configured as “192.168.200.200 255.255.0.0 192.168.200.1”.





✘ Do not move the base station after it is placed! Otherwise, there will be a risk of crash!



- ✘ An AP is required for an average of 50 drones.
- ✘ All drones are based on the positioning angle of the 0# drone as a reference. If the position of 0# drone is deviated, and it will prompt the wrong heading angle even if other drones are placed correctly.

4.3.3 Operation of FlyDance Host Computer

1. Enable FlyDance Host Computer

Select drone model, login the personal account

2. Enable Server

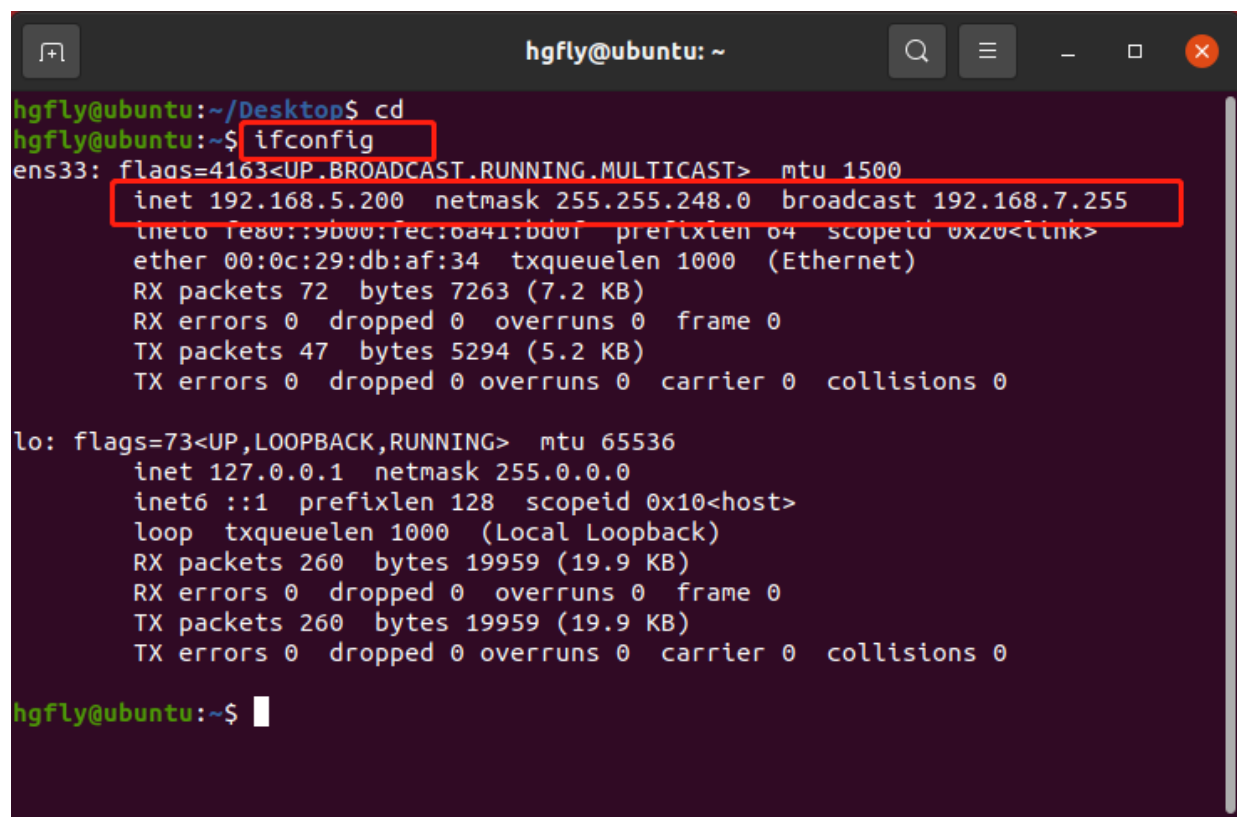
(1) At the terminal, enter `cd` and then enter the start command line and click Enter (for server installation, please refer to the “Installation Instructions for wifi Formation Server” -- The computer configured by HG Innovation Company has been installed before leaving the factory)

```

Feb 23 14:20
hgfly@ubuntu: ~
hgfly@ubuntu:~/desktop$ cd
hgfly@ubuntu:~$ start
[2021-02-23 14:20:01] [SMELL] [INFO] user:hgfly action:r
[2021-02-23 14:20:02.036422] [SIMPLE] [139897265026880] [INFO] [src/uttl.cpp] [1300] send_file_time:200000!
[2021-02-23 14:20:02.037549] [SIMPLE] [139897265026880] [INFO] [src/uttl.cpp] [1329] current server type is drone!
[2021-02-23 14:20:02.037694] [SIMPLE] [139897265026880] [src/multi_terminal.cpp] [468]
[2021-02-23 14:20:02.037706] [SIMPLE] [139897265026880] [src/multi_terminal.cpp] [469]
[2021-02-23 14:20:02.037713] [SIMPLE] [139897265026880] [src/multi_terminal.cpp] [470]
[2021-02-23 14:20:02.037720] [SIMPLE] [139897265026880] [src/multi_terminal.cpp] [471]
[2021-02-23 14:20:02.037726] [SIMPLE] [139897265026880] [src/multi_terminal.cpp] [472]
[2021-02-23 14:20:02.037732] [SIMPLE] [139897265026880] [src/multi_terminal.cpp] [473]
[2021-02-23 14:20:02.037738] [SIMPLE] [139897265026880] [src/multi_terminal.cpp] [474]
[2021-02-23 14:20:02.037744] [SIMPLE] [139897265026880] [src/multi_terminal.cpp] [475]
[2021-02-23 14:20:02.037751] [SIMPLE] [139897265026880] [src/multi_terminal.cpp] [476]
[2021-02-23 14:20:02.037818] [SIMPLE] [139897265026880] [src/multi_terminal.cpp] [477]
[2021-02-23 14:20:02.037851] [SIMPLE] [139897265026880] [src/multi_terminal.cpp] [478]
[2021-02-23 14:20:02.037888] [SIMPLE] [139897265026880] [src/multi_terminal.cpp] [479]
[2021-02-23 14:20:02.037920] [SIMPLE] [139897265026880] [src/multi_terminal.cpp] [480]
[2021-02-23 14:20:02.037941] [SIMPLE] [139897265026880] [src/multi_terminal.cpp] [481] [HG dance drone server 1.2.2 server number:1]
[2021-02-23 14:20:02.038023] [SIMPLE] [139897265026880] [src/multi_terminal.cpp] [482]
[2021-02-23 14:20:03.044765] [INFO] [139897265026880] [Service.cpp] [1377] apply share memory size:4787(k)
[2021-02-23 14:20:03.104653] [SIMPLE] [139897265026880] [INFO] [src/CThreadPool.cpp] [479] memory pool block count:2041
[2021-02-23 14:20:03.104870] [INFO] [139897265026880] [CEpoll.cpp] [58] create server type:drone server_socket:9
[2021-02-23 14:20:03.105837] [INFO] [139897251727104] [CThreadPool.cpp] [1497] drone server auto number thread running.
[2021-02-23 14:20:03.105910] [INFO] [139897192978176] [CThreadPool.cpp] [1266] drone server task thread running.
[2021-02-23 14:20:03.105874] [INFO] [139897234941696] [CThreadPool.cpp] [1218] drone server event thread running
[2021-02-23 14:20:03.105944] [INFO] [139897176192768] [CThreadPool.cpp] [1392] drone server file task thread running
[2021-02-23 14:20:03.105961] [INFO] [139897159407360] [CThreadPool.cpp] [1392] drone server file task thread running
[2021-02-23 14:20:03.105977] [INFO] [139897226548992] [CThreadPool.cpp] [1218] drone server event thread running
[2021-02-23 14:20:03.106002] [INFO] [139897209763384] [CThreadPool.cpp] [1266] drone server task thread running.
[2021-02-23 14:20:03.106016] [INFO] [139897260119888] [CThreadPool.cpp] [1169] drone server control thread run...
[2021-02-23 14:20:03.105945] [INFO] [139897201370880] [CThreadPool.cpp] [1266] drone server task thread running.
[2021-02-23 14:20:03.106043] [INFO] [139897187808064] [CThreadPool.cpp] [1392] drone server file task thread running
[2021-02-23 14:20:03.106061] [INFO] [139897262214832] [CThreadPool.cpp] [1392] drone server file task thread running
  
```

(2) After the server is running normally, as shown in the figure, this is the drone operation background that cannot be disenabled during flight. After use, it can be disenabled using the stop command line.

(3) Enter ifconfig to view IP



```

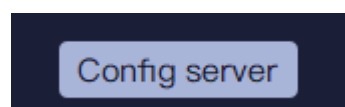
hgfly@ubuntu: ~
hgfly@ubuntu:~/Desktop$ cd
hgfly@ubuntu:~$ ifconfig
ens33: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 192.168.5.200 netmask 255.255.248.0 broadcast 192.168.7.255
    inet6 fe80::9b00:fec:6a41:bd0f prefixlen 64 scopeid 0x20<link>
    ether 00:0c:29:db:af:34 txqueuelen 1000 (Ethernet)
    RX packets 72 bytes 7263 (7.2 KB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 47 bytes 5294 (5.2 KB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
    inet 127.0.0.1 netmask 255.0.0.0
    inet6 ::1 prefixlen 128 scopeid 0x10<host>
    loop txqueuelen 1000 (Local Loopback)
    RX packets 260 bytes 19959 (19.9 KB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 260 bytes 19959 (19.9 KB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

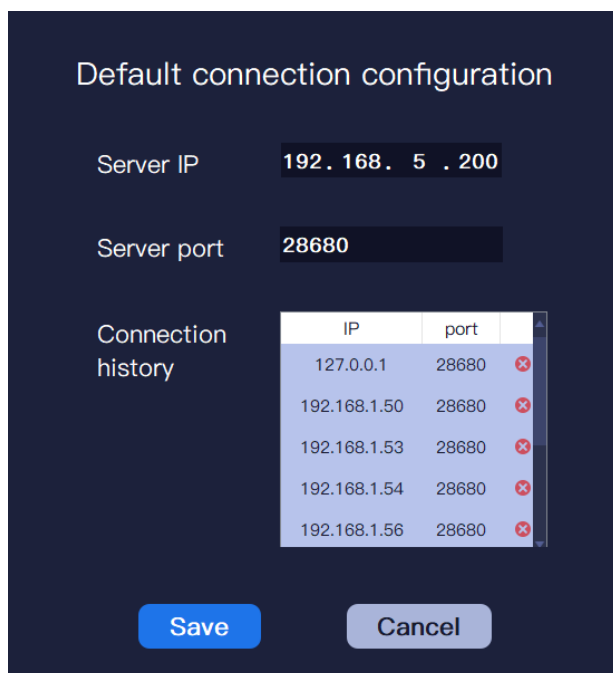
hgfly@ubuntu:~$
  
```

3. Configuration and Selecting the Server

(1) Click Config Server



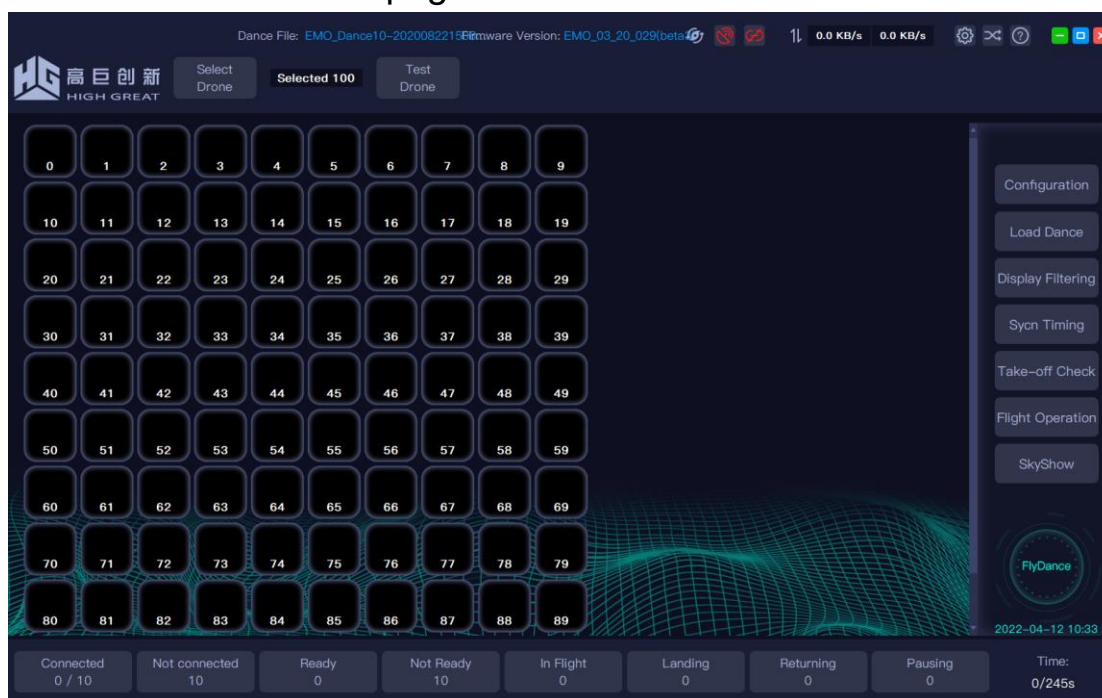
(2) Enter the IP of the server just queried: 192.168.5.200, and the drone port is 28680



4. Click Connect



5. Enter drone Control page



6. Equipment Power-on

(1) First, turn on the smart battery of the drone. Note that the battery will be

loaded into the drone immediately after it is turned on, otherwise the battery will be automatically shut down. It is required to short press again to turn it on if the battery is turned off.

After the drone is powered on, view the status of drone by observing the light signals:

After the drone is anchor normally, the light will be off (the light is green when it is on), and the light will automatically turn on if the positioning is abnormal (yellow light for Float status, and flashing purple light for GPS status);

Orange-red light always on: the drone is renumbered/ a certain drone is selected by the host computer.

White light always on: drone not connected to AP

Breathing white light: not connected to the server

Red light: electricity quantity less than 5%

Quick flashing in white, blue and purple: failure of hardware such as IMU, barometer or magnetometer

For more details about drone light signals, please refer to Chapter VI “Description of drone Status Light Signals”.



※When powering on for the first time, there may be drones with the same number, so the host computer may not display all the drones. You only need to keep all the drones powered on without hardware failure, and ensure that the server is successfully connected.

7. Setting

(1) Click the Settings button in the upper right corner



(2) Setting page

Complete the settings according to the prompts on the page. The ambient temperature and the Lowest return altitude for abnormal drone are required items for formation performances.

Settings

 **Low Battery** When the battery level is lower than the set percentage, an alarm will be given.

 **Low battery landing** Please check before take-off. The drone will land when 5% battery remaining.

 **Displayed number of drone** Total 1000 row 50 col 20

 **Take-off delay** Set the waiting time after receiving the take off command. Range: 5~20s.

 **Ambient temperature** The best performance based on current ambient temperature. Range: -20~40°C.

 **Pause after _ seconds** Automatically pause when the dance flying reaches the set time. Range: 0~3600s, 0s means no pause.

 **Lowest return altitude for abnormal landing** The drone will automatically make a stratified return flight according to the lowest return altitude set. Please set the altitude according to the highest obstacle on the return route. Range: 15~255m, 0 means invalid.

 **Heading angle sensitivity** The smaller deviation means that the inspection for nose placement should be more strictly. The recommended default setting is 20°. When the nose placement is accurate, if the heading angle inspection cannot be passed, please try to set a larger deviation range, but there will be a certain flight risk if it is larger than 20°. (Sensitivity: 0~180°, 0 means no inspection demand)

 **Safe spacing range** When the drone position is correctly placed according to the dance file but the position inspection is not passed, please try to make the safety position sensitivity slightly larger according to the placement spacing of the dance flying. (Safety range: 0.0~3.0m, 0 means no inspection demand)

 **Inspection height** If the drone is outside the set height range from the reference plane, the drone will not be allowed to take-off. If the height inspection is not passed, please try to set the inspection height slightly larger. (Inspection height: 0.0~3.0m, 0 means no inspection)

80 %

☐

1000 50 20

5 sec.

°C

0 sec.

m

± 20 °

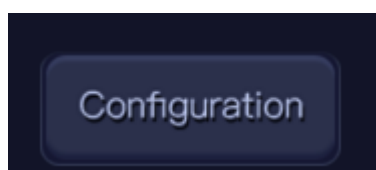
± 1 m

± 1 m

Save
Cancel

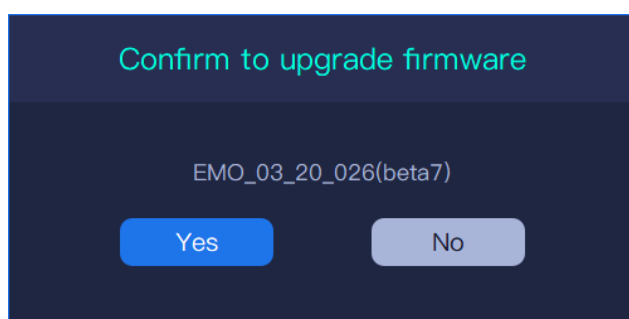
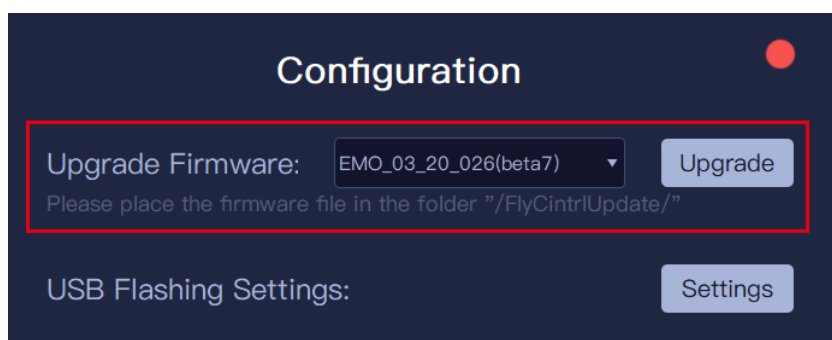
8. Configuration

(1) Click Configuration

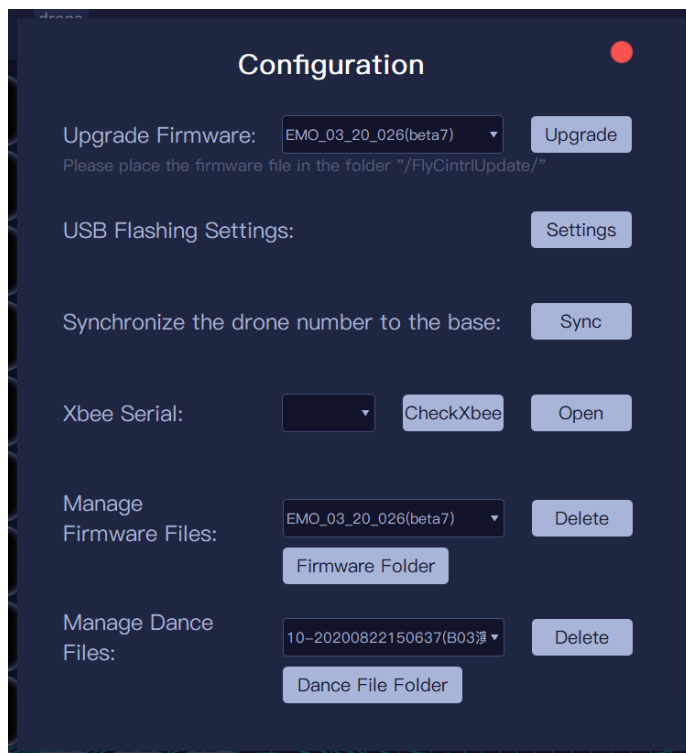


>>211

(2) Select the corresponding firmware to upgrade (only needed when a new flight control firmware upgrade is available)



(3) After the computer is connected to Xbee repeater, select the serial port and click Connect; after successful connection, click “CheckXbee” to ensure the successful connection and normal communication.



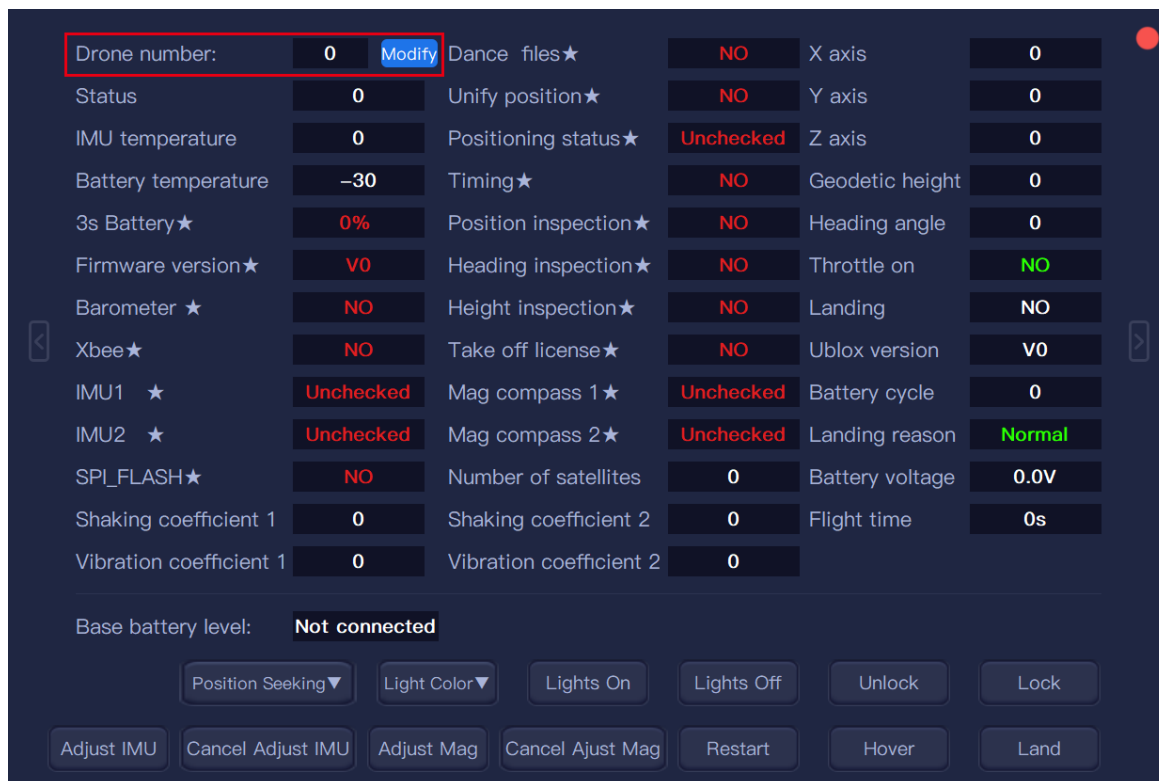
 **⊗ Be sure to install the Xbee repeater before taking off, and enable the serial communication settings, in order to use the function immediately during performance in case of emergency! If the Xbee repeater is directly unplugged, the interface will also display the connection status. After reconnecting, you need to click Disconnect and then click Connect.**

9. Auto Numbering +Send Dance File

Before using the auto numbering function, it is necessary to ensure that all drones have been turned on, successfully connected to the server, and they have been in the Fix positioning state. Confirm the above state and then follow the steps below:

(1) Change the drone number: First, set all the number 0 in the upper computer and the number of the last drone in the first row of the dance step layout diagram (for example, the dance step layout diagram is 100, 10*10, and the first The last drone in the row is number 9) to any other number, click on the upper computer drone number 0 and the following interface will appear. After

modifying the machine number in the upper left corner, click OK, and the machine number will be changed. The purpose of changing the drone number 0 is to ensure that there is no drone number 0 at the scene.



Drone number:	0	Modify	Dance files★	NO	X axis	0
Status	0		Unify position★	NO	Y axis	0
IMU temperature	0		Positioning status★	Unchecked	Z axis	0
Battery temperature	-30		Timing★	NO	Geodetic height	0
3s Battery★	0%		Position inspection★	NO	Heading angle	0
Firmware version★	V0		Heading inspection★	NO	Throttle on	NO
Barometer ★	NO		Height inspection★	NO	Landing	NO
Xbee★	NO		Take off license★	NO	Ublox version	V0
IMU1 ★	Unchecked		Mag compass 1★	Unchecked	Battery cycle	0
IMU2 ★	Unchecked		Mag compass 2★	Unchecked	Landing reason	Normal
SPI_FLASH★	NO		Number of satellites	0	Battery voltage	0.0V
Shaking coefficient 1	0		Shaking coefficient 2	0	Flight time	0s
Vibration coefficient 1	0		Vibration coefficient 2	0		

Base battery level: **Not connected**

Position Seeking▼ Light Color▼ Lights On Lights Off Unlock Lock

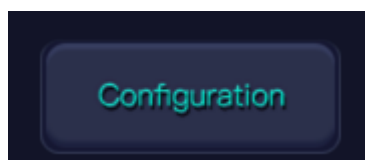
Adjust IMU Cancel Adjust IMU Adjust Mag Cancel Adjust Mag Restart Hover Land

(2) First select two airdrones and flash them to the number 0 and the pile number via USB flashing. The pile number is the number of the last drone in the first row of the dance step layout, such as: 100 performance drone, the layout picture is 10*10, and the pile number is 9 (Note that it is also required to ensure that the drones on the field do not have a duplicate number, and if any, manually modify it).

The manual flash process is as follows:

Configuration>USB flashing settings>Select serial port>open>New number of drone>Flash

(Flashing light signals: After the USB is inserted and connected successfully, the white light flashes at high frequency for 2 seconds, and the blue light will be always on for 4 seconds after successful flashing)



USB flashing

Current drone firmware:

N/A

Current drone number:

N/A

New number of drone:

1000

Select firmware:

EMO_03_20_026(beta7) ▼

Synchronous dance file:

☐

Select serial port:

▼

Open

No device connection

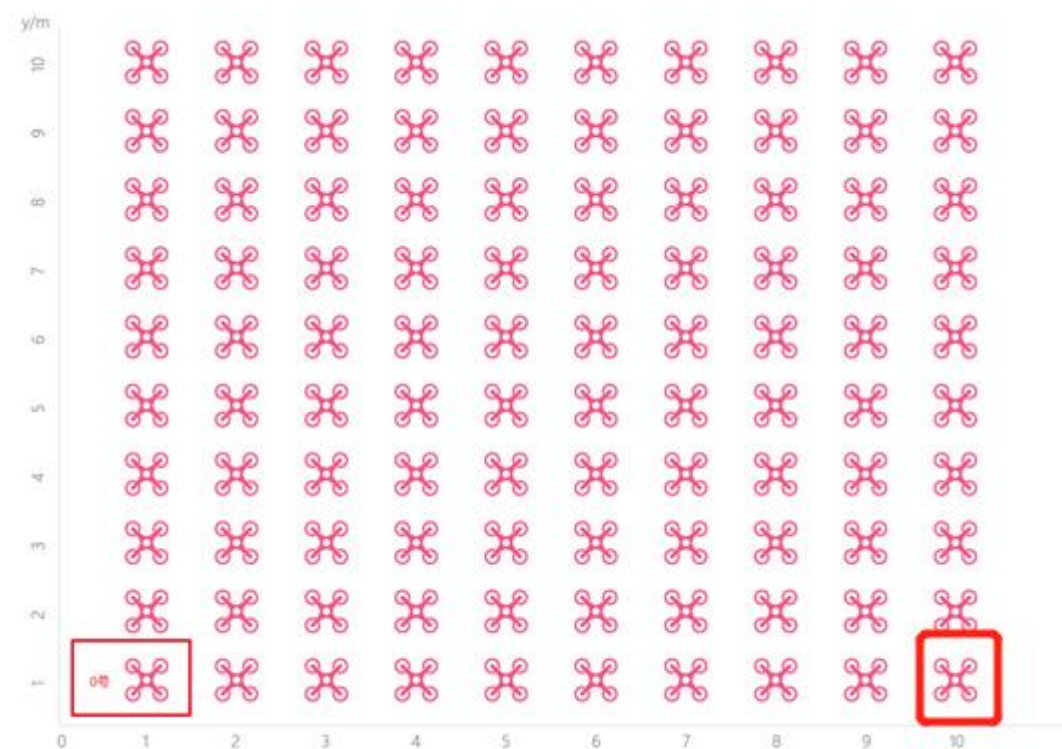
Flash

Download log

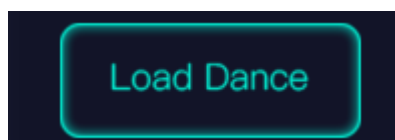


※ To use the USB flashing function, you need to install the "STSW_STM32102 virtual serial port" driver in advance. HIGH GREAT will pre-install it before the computer is delivered. Please contact your technical support staff if reinstallation is required.

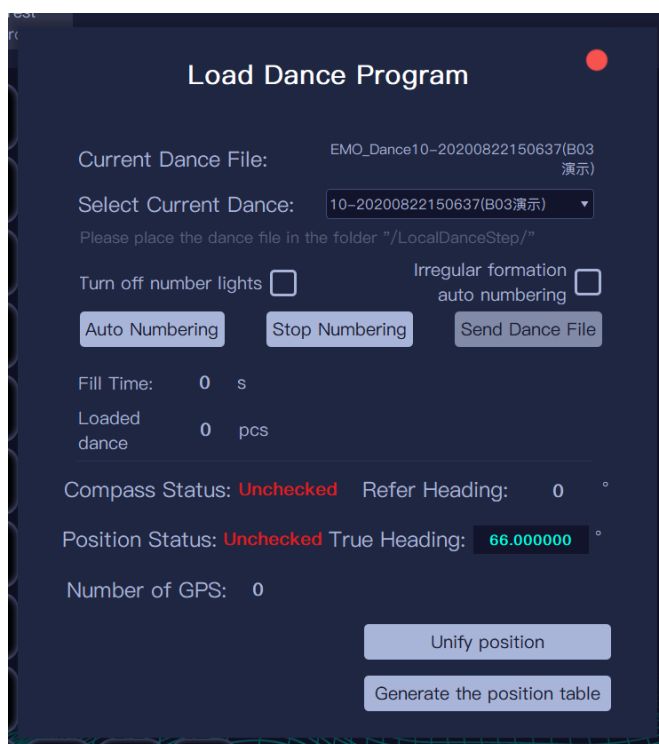
(3) In the dance step chart, place 0# drone and positioning drone in the same row, with the positioning drone placed at the end of the first row.



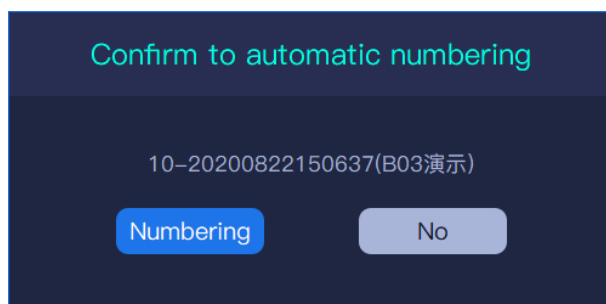
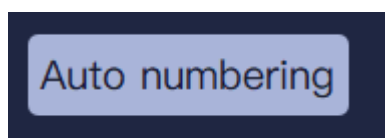
(4) Click Load Dance



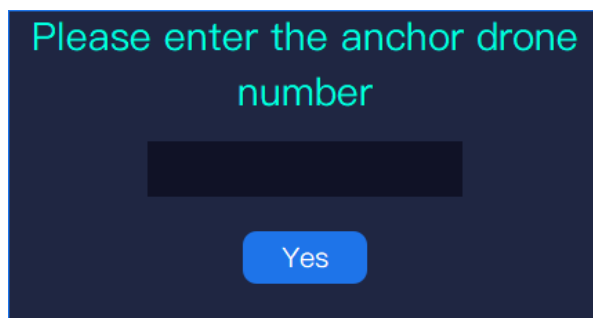
(5) Select Dance



(6) Click Auto Numbering and confirm it again. (If the dance step chart is not placed in a square matrix, check the “Irregular formation auto numbering”).



(7) Enter the anchor drone number.



Auto numbering

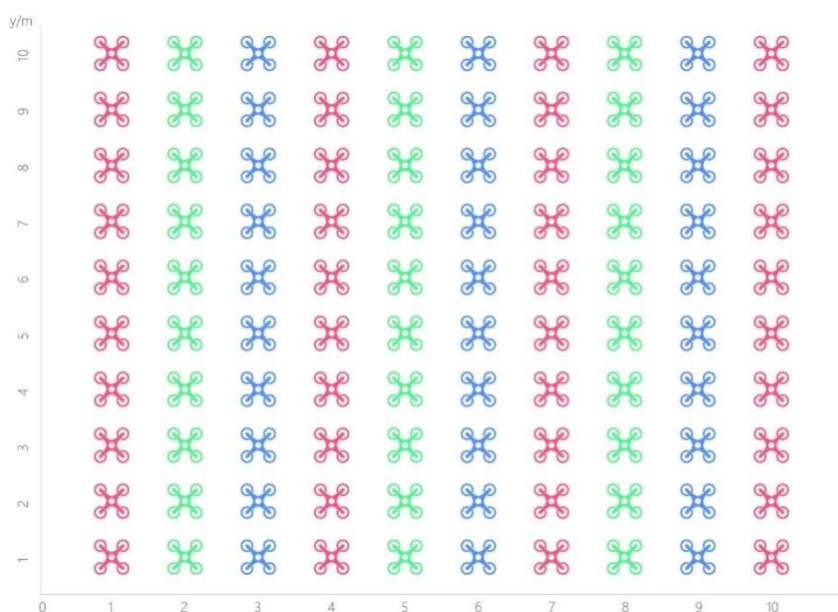


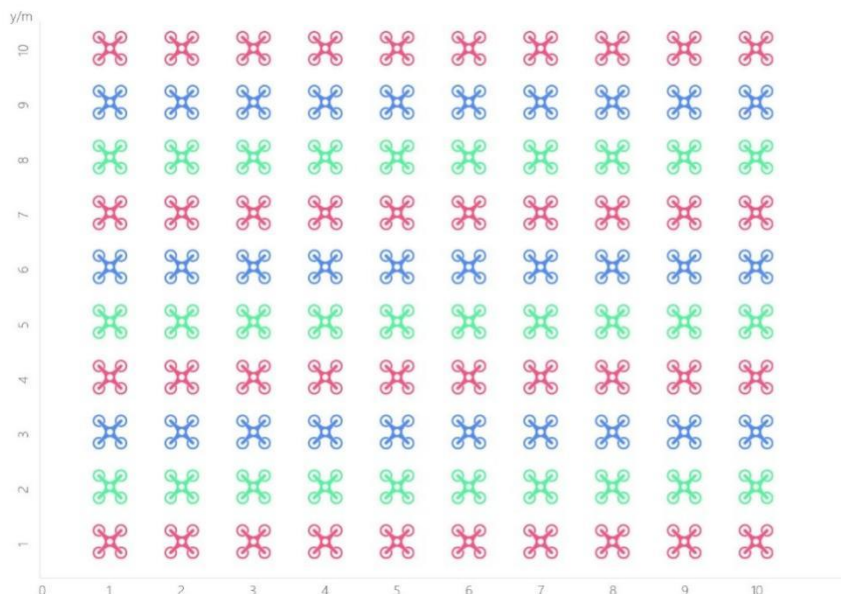
※ The positioning drone must be placed in the correct position and turned on, otherwise the auto numbering will fail.

※ All drones shall be in the Fix state before they are automatically and successfully numbered, and the drones that are not in the Fix state will not be auto numbered.

(8) During auto numbering, the lights of 0# drone will flash red, green and blue alternately, and others will display the same lights in the same line or in the same row. If the red, green, and blue lights are lit at intervals, it means that the auto numbering is successful.

The lighting changes after successful numbering are as follows:





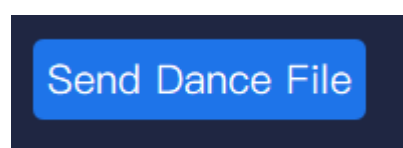
※If, in the process of auto numbering, a certain drone fails to be numbered, the system will automatically assign a drone number that is greater than the number of dance steps, and the light of the drone assigned with greater number than the number of dance steps is always on in orange red. If there is only a few failed drone, you can choose to manually flash the numbers, or check the placement of drones and renumber them automatically.

※Power on as many drones as needed for dance steps. Do not turn on other drones to avoid unsuccessful numbering.

※If the layout of dance step drones is quite special, please check “Lrrgular formation auto numbering”.

(9) Send Dance File

After successful auto numbering, click “Send Dance File”.

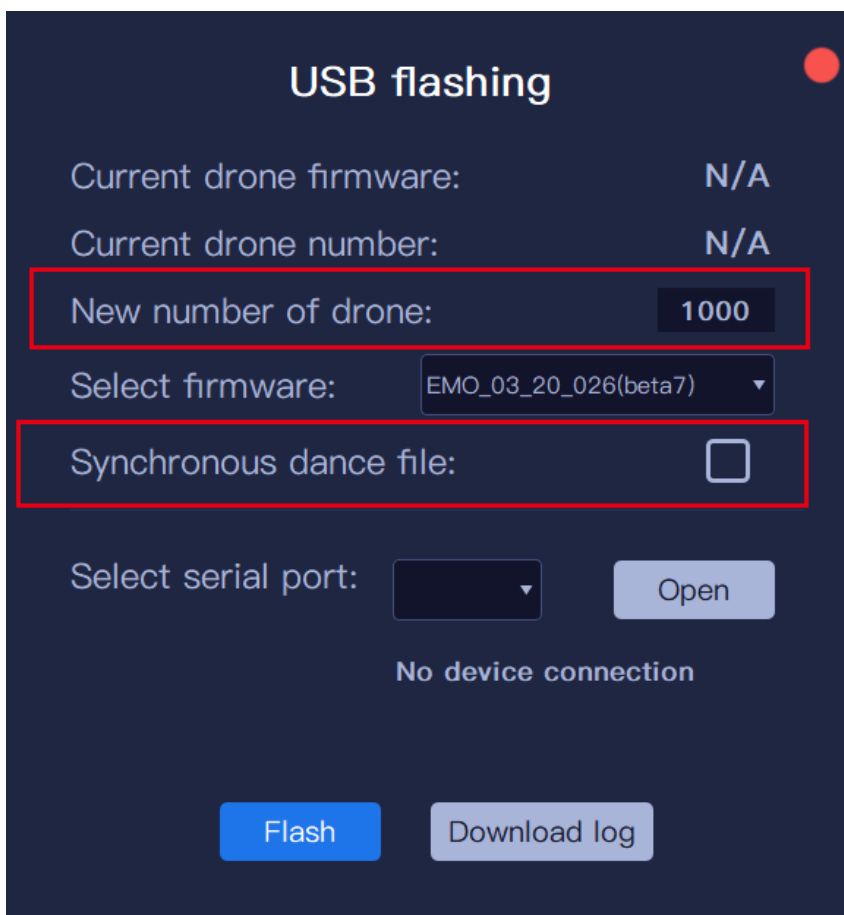




※After clicking Send, wait for the number of all drones to be displayed in the successful place. If failed drones exist for a long time, please send the dance steps again.

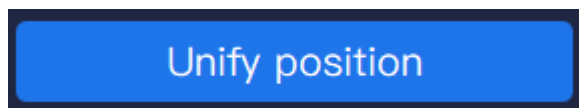
If, during the push of dance steps, a few drone dance steps fail to be pushed, use the USB flashing function to flash the dance steps of a single drone as follows:

Select Serial port> Select firmware> New number of drone> Check “synchronous dance file”> Flash.



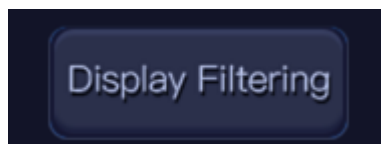

※Please note when flashing dance steps with USB: enter the current drone number in the new drone number, otherwise incorrect numbers will cause wrong numbers and dance steps to be flashed.

(10) Unify position. During the transmission of dance steps, the drone's purple light is always on.



※After clicking Push, wait for the number of all drones to be displayed in the successful place. Please push the auxiliary dance steps again if failed drones exist for a long time. Or use USB flashing to transfer dance steps.

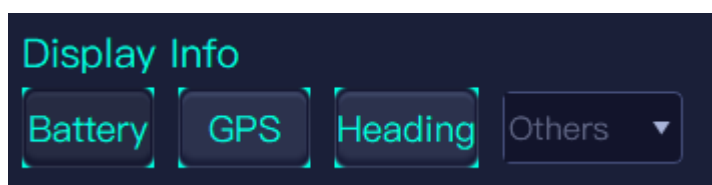
10. Display Filtering

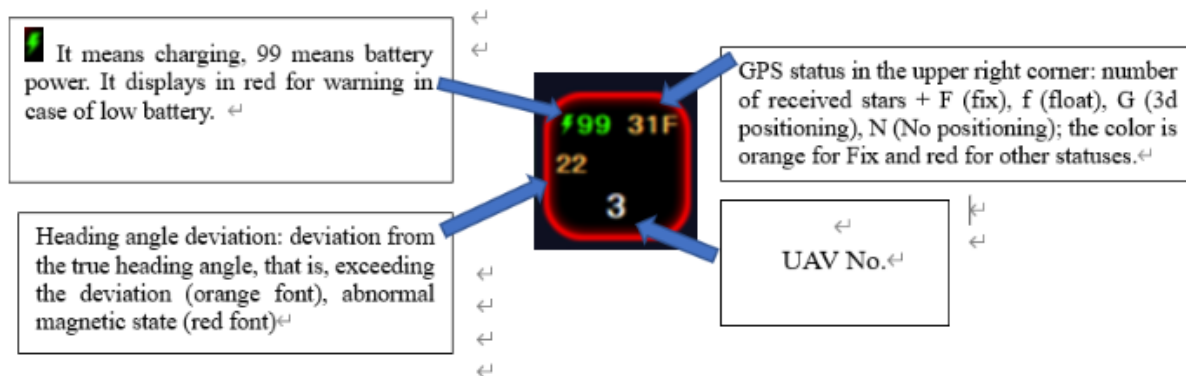


Display Filtering is mainly used to screen the status of drones

(1) Display info

The display settings of drone status information can display or hide drone-related information status.





※ In case of a large number of drones, you can hide some of the information that you do not want to view temporarily, and then turn on the display when necessary. This can increase the display cache of computer and reduce page jamming.

(2) Screening

Click the Relevant Information button to screen and select the droneS that do not meet the requirements.

(The following picture shows the options that can be screened. In the picture, the drones with less than 50% power are being screened, and those with less than 50% power will be automatically selected).