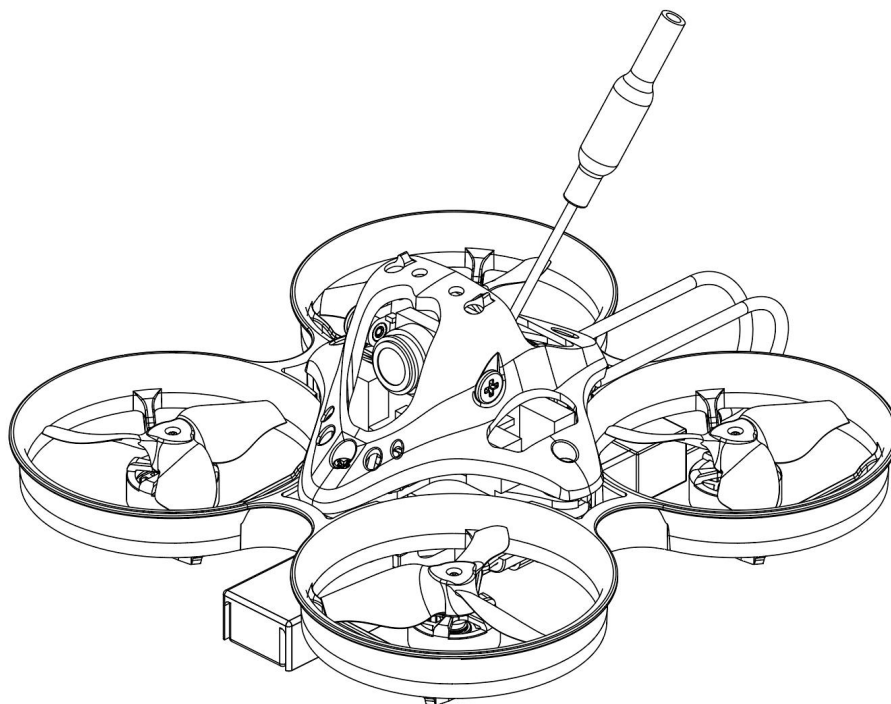


*Tinyhawk Nanoscout*

# Tinyhawk Nanoscout



Thank you for purchasing the Tinyhawk Nanoscout.  
Designed in California, USA, and manufactured in China.

## **Disclaimer**

1. Please read this disclaimer carefully before using this product.
2. By using this product, you agree to this disclaimer and confirm that you have read this product carefully.
3. This product is not suitable for individuals under 18 years old. It is strongly recommended that children under 18 years old be supervised by adults.
4. Please carefully read the user manual and warnings.
5. Before each flight, ensure that the battery is fully charged, the power connection is secure, and avoid flying near crowds, children, animals, or objects.
6. Tinyhawk Nanoscout is equipped with open-source flight controllers and electronic speed controllers to meet the upgrading needs of FPV enthusiasts.
7. EMAX is not liable for any direct or indirect damages or injuries caused by the use of this product.

## **Notes**

1. Please assemble and operate this product correctly according to the instructions.
2. Fly this product in a safe area away from crowds.
3. Do not use this product in strong electromagnetic environments.
4. Do not use this product in harsh environments such as wind, rain, lightning, snow, etc.
5. Do not use this product if you have physical or mental illness, dizziness, fatigue, or under the influence of alcohol or drugs.
6. Do not modify or use unauthorized EMAX parts and accessories.
7. This manual is for the Tinyhawk Nanoscout series and may include information about other models or different products. Please refer to the product you purchased.

## **Support**

For updates or technical support, please visit [emax-usa.com](http://emax-usa.com) or [emaxmodel.com](http://emaxmodel.com).



**Tinyhawk Nanoscout -RTF**

	Tinyhawk Nanoscout
wheelbase	65mm
Maximum size	L*W*H=84x84x35mm
weight	23.1g (excluding battery)
motor	08015(22000KV)
propeller	Avia 31mm
FC	STM32F411 (100MHz) main control Integrated 4-in-1-6A-8 bit electronic control, input voltage 1S Onboard ELRS (2.4G) receiver (SPI communication)
camera	RunCam Nano 3
Image transmission	EMAX-32-bit open-source simulation image transmission Power: 25mW/100mW/200mW/400mW
Battery	1S HV 320mAh(EM2.0) E8 Transmitter(ELRS-2.4G)
Maximum size	L*W*H=150x140x45mm
weight	260g(excluding battery)
Number of channels	8
agreement	ELRS-2.4G
working frequency	2.4GHz (2400-2483.5MHz)
power	10mW/25mW/50mW/100mW
Battery	1800mAh-18650-Lithium ion battery
Charging system	Built in USB 1A linear lithium-ion battery charging system
working voltage	3.7-4.2V
External interface	Type-C interface, 3.5mm audio interface (wired coach interface) Support emulator, support joystick calibration, support switching between left and right hands, support firmware updates (USB mode), support adjustable power
other	

Support adjustable sending/returning rates, support changing binding keys

Transporter II

Maximum size	L*W*H=155x100x90mm
weight	398g(including headband and antenna)
Screen resolution	480x800
Display Size	4.3inch
Battery	Built in 1300mAh lithium-ion battery
Voltage	3.7V-4.2V
working frequency	5.8GHz (5658-5945MHz)
Charging system	Built in USB 1A linear lithium-ion battery charging system
	Maximum supported memory 32GB TF card
DVR	File format AV size: VGA/D1/HD (optional)

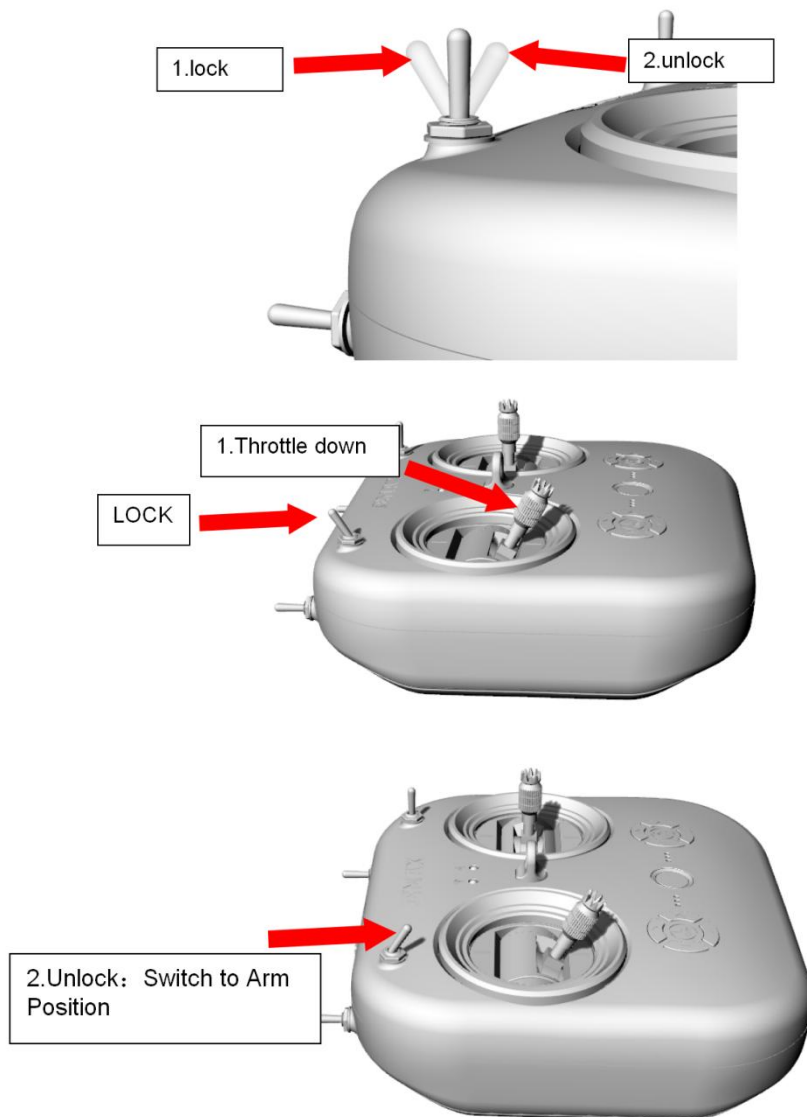
**Tinyhawk Nanoscout - RTF Product List**

1. Tinyhawk Nanoscout ..... ×1
2. EMAX E8 Transmitter (ELRS-2.4G) ..... ×1
3. EMAX Transporter II ..... ×1
4. EMAX 1s HV 650mAh ..... ×1
5. Charger ..... ×1
6. Propellers ..... (2xCW, 2xCCW)
7. Accessory Pack ..... ×2

## 1.1 Remote Controller & Aircraft Quick Start

### 1.1.1 Remote Controller Quick Start

Remove the remote controller from its packaging. Slide the toggle switch located at the upper left corner to the unlock position as shown in the diagram. Push the left joystick throttle to its lowest position. Press and hold the power button on the remote controller for 4 seconds until the power indicator light turns red. Wait for the remote controller to emit a beep sound and the power indicator light to change to green. This indicates that the remote controller has successfully started up.

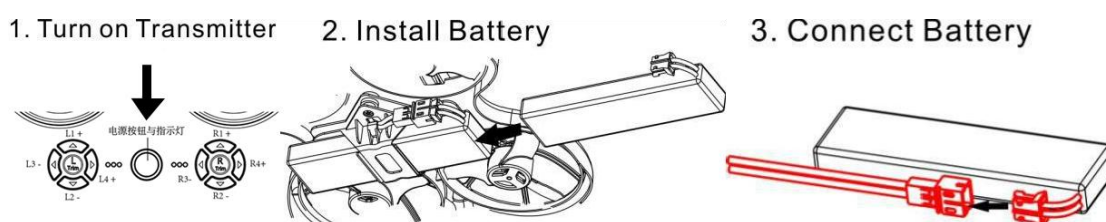


### 1.1.2 Aircraft Quick Start

Remove the battery and insert it into the aircraft's battery compartment. Connect the aircraft's power interface to the battery's interface. You will see the aircraft's red and blue lights blinking. Place the aircraft on the ground in a level position and wait for about 3 seconds. The red indicator light on the aircraft will blink and then stay on steadily, while the blue indicator light will blink and then turn off. This indicates that the aircraft initialization is complete, and it has successfully paired with the remote controller.

### 1.1.3 Takeoff Status Verification

Move the toggle switch at the upper left corner of the remote controller to the LOCK position. You will observe the aircraft propellers spinning at low speed. Move the toggle switch at the upper left corner of the remote controller to the ULOCK position. The aircraft propellers will stop spinning.

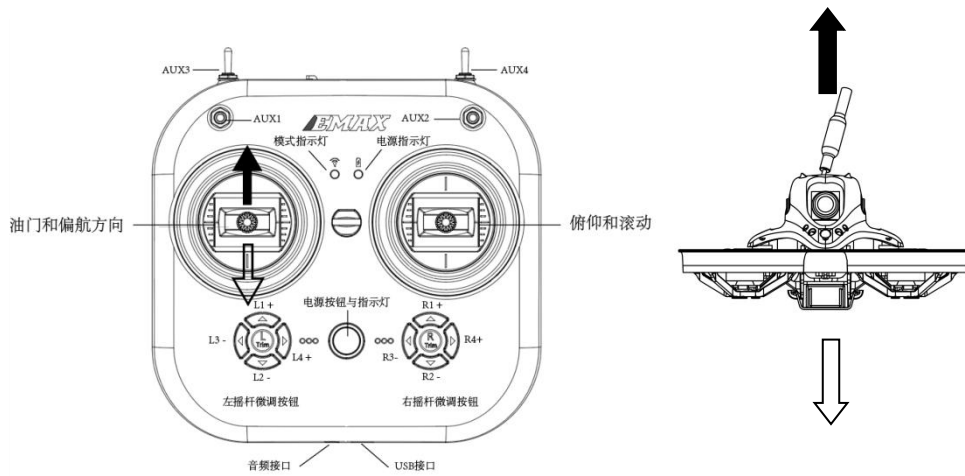


## 1.2 Aircraft Control

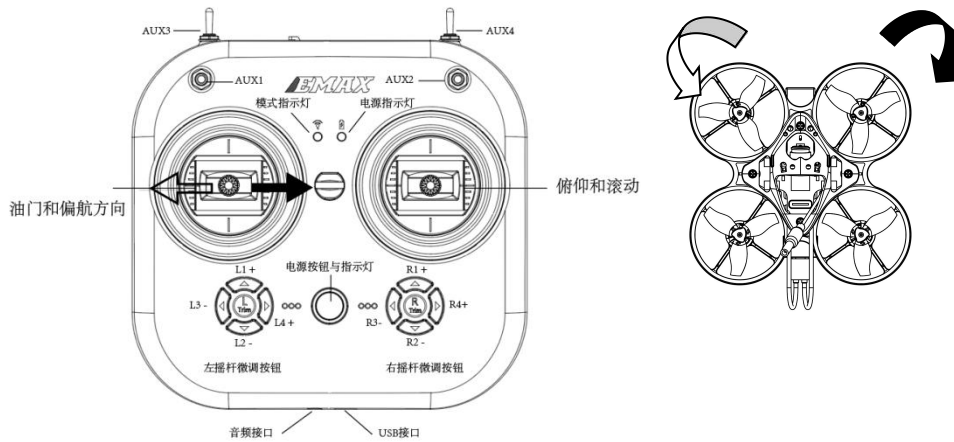
Following the diagram shown above, unlock the aircraft again so that the motors spin at low speed.

A. As shown in the diagram below, use the left joystick to control the aircraft's ascent and descent:

[Diagram Placeholder]

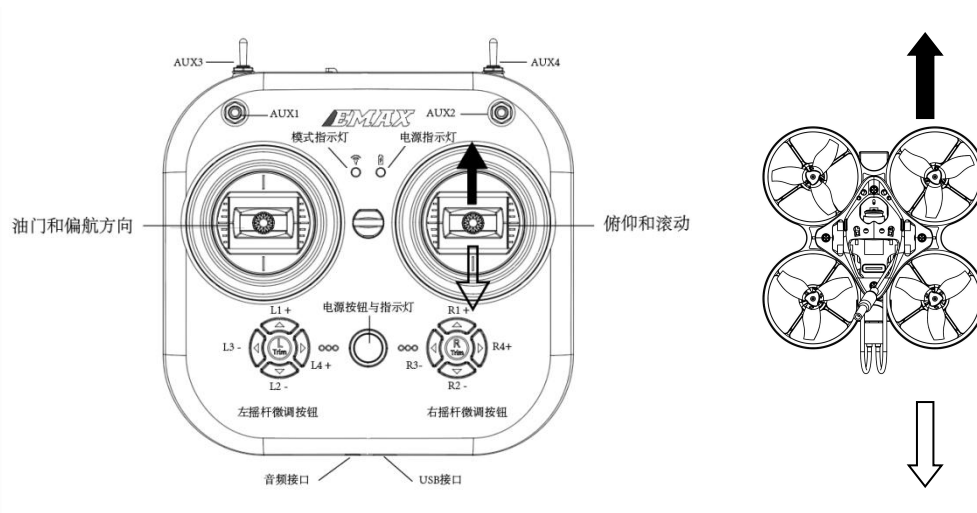


As shown in the diagram below, use the left joystick to control the aircraft's rotation left and right:

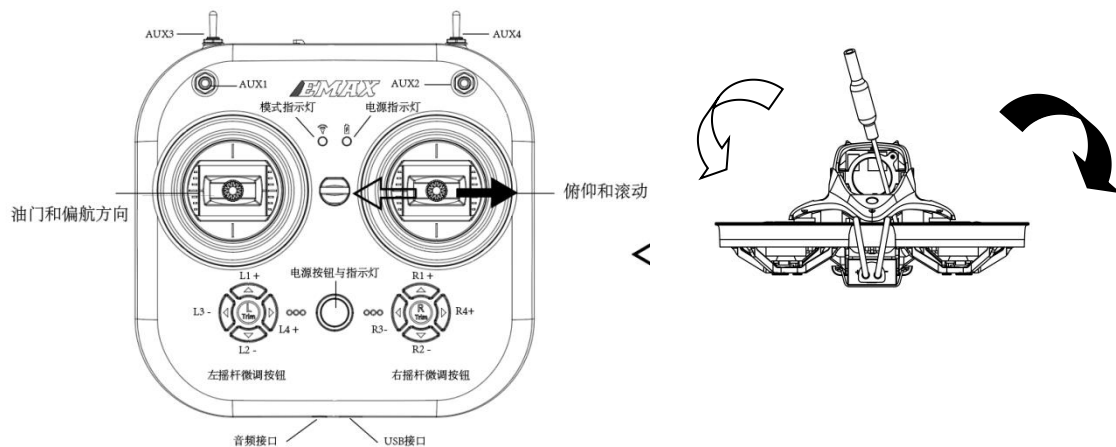


As shown in the diagram below, use the right joystick to control the aircraft's pitch (nose up and down):





As shown in the diagram below, use the right joystick to control the aircraft's roll (tilt left and right):



It is recommended to prioritize practicing the basic operations mentioned above, mastering these fundamental controls, and becoming familiar with the sensitivity of the joysticks.

### 1.3 Visual Flight

First, ensure the flight is within line of sight (without wearing FPV goggles). Power on the Tinyhawk Nanoscout and place it in a safe, open room. Start the Tinyhawk Nanoscout and use the left joystick to raise the throttle to hover position. Begin by trying to maintain a stable altitude. Use your thumbs on the left and right joysticks to control the pitch and roll of the Tinyhawk Nanoscout to maintain normal flight. Practice multiple times to become proficient.

Note: After safely landing the aircraft on the ground, move the toggle switch at the upper left corner of the remote controller to the ULOCK position to lock the aircraft, as shown in the diagram below.

## **1.4 FPV Flight**

Once you have a basic understanding of flight operations, you can try flying with FPV goggles. Ensure the Tinyhawk Nanoscout and FPV goggles are on the same VTX channel. Choose a spacious and safe area. Based on your experience flying the Tinyhawk Nanoscout in normal mode, control the throttle to maintain a slow and level flight. This approach makes learning FPV flight easier. As you gain experience, you'll be able to maneuver the Tinyhawk Nanoscout freely in the air, much like driving a car.

The FPV goggles display (OSD) shows video feed from the Tinyhawk Nanoscout's camera. The OSD displays important information such as flight time and battery voltage. During flight, always monitor these numbers to understand the remaining battery voltage. The Tinyhawk Nanoscout can fly for up to 4 minutes. When the battery reaches 3.2 volts, land the Tinyhawk Nanoscout. Avoid letting the battery voltage drop below 3.2 volts as it may damage the battery.

**Warning:** Maintain controlled altitude during flight. Avoid jerking the joysticks aggressively, as this can make the aircraft difficult to control. Do not allow the battery voltage to drop below 3.2 volts. Activate the motor beep feature if you lose sight of the aircraft, to aid in locating the Tinyhawk Nanoscout.

## **1.5 Flight Modes**

The Tinyhawk Nanoscout has three flight modes:

(1) **Simple Mode (Stabilized Mode ARM):** This is a simple flight control mode where the maximum angle of the Tinyhawk Nanoscout is limited during flight to help restrict speed and make flying easier. In this mode, aircraft control is attitude-based. Pitch and roll inputs from the remote control adjust the aircraft's pitch and roll angles. For example, a 20-degree tilt of the joystick will correspond to a 20-degree roll tilt of the Tinyhawk Nanoscout.

(2) **Intermediate Mode (Semi-stabilized Mode Horizon):** This mode has a higher angle limit for faster flight, with similar attitude control. The main difference is that at the endpoint of pitch and roll, the aircraft will flip towards that direction.

(3) **Advanced Mode (Manual Mode Acro):** This mode gives you complete control of the aircraft. There are no angle limits anymore; control is rate-based. This means control inputs from the joystick set a rotational rate around the described axis.

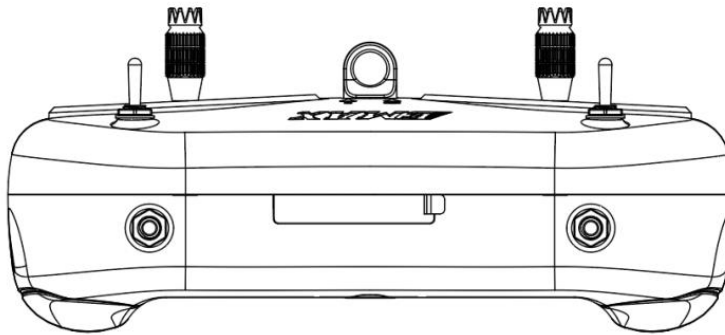
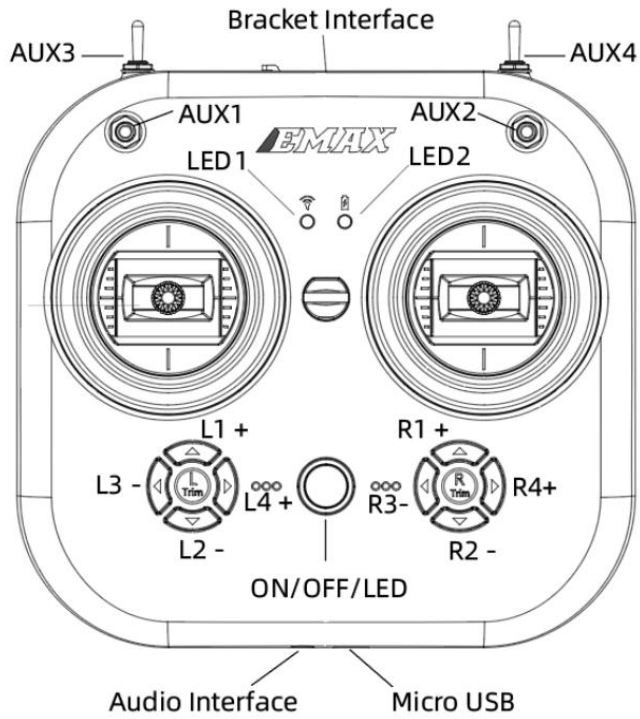
## **1.6 Aircraft Battery Charging**

A single battery can fly for approximately 4 minutes. When the OSD screen on your FPV goggles displays "LOW VOL," it indicates the battery is low and needs charging. Follow these steps to charge the battery:

1. Take out the charger and insert the battery into the charger's battery interface.
2. Insert the USB plug of the charger into a USB power adapter.
3. The charger indicator light will be solid green during charging, off when charging is complete, and flashing if no battery is detected.

2.E8 Transmitter(ELRS-2.4G)

2.1 E8 Transmitter(ELRS-2.4G)



## 2.2 E8 Transmitter(ELRS-2.4G Specification parameters

### EMAX E8 Transmitter (ELRS-2.4G)

Weight	260g (without battery)
Size	LxWxH=150x140x45mm
Channel	8
2.4G system	SX1280
frequency range	2.4GHz(2400MHz-2483.5MHz)
Sending rate	50Hz/150Hz/250Hz/500Hz;
retrieval rate	OFF/1:128/1:64/1:32/1:16/1:8/1:4/1:2;
Power	10mW/25mW/50mW/100mW ;
Working voltage/current	3.7-4.2V/170mA;
Battery	1800mAh 18650 battery;
Charging system	Compatible with Type-C, built-in 1A linear lithium-ion battery charging system;
External interface	Type-C interface, 3.5mm audio interface (wired coach interface);
simulator	support
Joystick calibration	support
Switch left and right hands	support
other	Supports firmware updates (USB mode), adjustable power, adjustable send/return rates, and changes to binding keys

## 2.3 E8 Transmitter (ELRS-2.4G) Operation

### 2.3.1 Binding & Unbinding

To enter Binding mode on the E8 Transmitter (ELRS-2.4G):

1. Turn on the E8 Transmitter (ELRS-2.4G).
2. Press and hold the "L4+" and "R3-" buttons simultaneously for 1 second.
3. You will hear a beep sound, and the central indicator light will alternate between green and red flashing, indicating that the transmitter has entered Binding mode.

To enter Unbinding mode on the E8 Transmitter (ELRS-2.4G):

1. Turn on the E8 Transmitter (ELRS-2.4G) while it is successfully bound to the flight controller.
2. Press and hold the "L4+" and "R3-" buttons simultaneously for 1 second.
3. You will hear a beep sound, and the central indicator light will alternate between green and red flashing, indicating that the transmitter has unbound from the flight controller.

### **2.3.2 Button Functions**

- Pressing the power switch: Turns on the transmitter and enters ELRS protocol mode, indicated by a steady red mode indicator light.
- Pressing the power switch and "L3-": Turns on and enters calibration mode.
- Pressing "L4+" and "R3-" simultaneously: Enters Binding mode.
- Pressing "R4+" and then simultaneously pressing the power switch (when the transmitter is off): Enters serial port flashing mode.

### **2.3.3 Trim Adjustment**

Each joystick on the E8 Transmitter has corresponding trim buttons, which adjust the direction controlled by the joystick. Each adjustment emits a beep sound, and when centered, a longer beep indicates neutral position. With the joystick centered for hover, adjust the trim buttons for pitch and roll to achieve stable hovering without needing joystick input.

### **2.3.4 Joystick Calibration**

The E8 Transmitter (ELRS-2.4G) comes pre-calibrated, but recalibration can resolve certain issues. With the E8 Transmitter powered off, press and hold the "L3-" button and the power button simultaneously to power on. Wait for the central indicator light to illuminate and change from rapid flashing to slow flashing. Move each joystick of the E8 Transmitter to its maximum travel in the up, down, left, and right directions. Press the "L3-" button, a beep sound will indicate exit from calibration mode, and the E8 Transmitter will restart.

### **2.3.5 Switching between Left and Right Hand Mode**

Remove the screws and open the rear cover of the E8 Transmitter (ELRS-2.4G). On the left side of the board, there's a toggle switch. Set the switch to "L" (left-hand throttle mode) or "R" (right-hand throttle mode), and swap the positions of the joysticks accordingly (no need to change the position of the 6-pin wire connecting the joysticks to the mainboard).

- Left Hand Mode: Left joystick controls throttle and yaw of the Tinyhawk III PLUS; Right joystick controls pitch and roll of the Tinyhawk III PLUS.

- Right Hand Mode: Left joystick controls pitch and roll of the Tinyhawk III PLUS; Right joystick controls throttle and yaw of the Tinyhawk III PLUS.

### **2.3.6 Trainer Port & Simulator**

Insert one end of a 3.5mm male-to-male cable into the trainer port (3.5mm audio jack) and the other end into a simulator (purchased separately) to output corresponding channel values. Insert a Type-C data cable into the transmitter to output corresponding channel values.

### **2.3.7 Battery & Charging**

The E8 Transmitter (ELRS-2.4G) is compatible with a single 18650 battery, operating between 4.2V and 3.7V. To reinstall the battery, slide the battery compartment cover backward, insert the battery with correct polarity (negative end on the spring side of the battery compartment), ensure the cover matches perfectly, and slide it forward until it locks. Incorrect battery installation will prevent proper charging and startup.

To charge the transmitter, use the bottom Type-C port. When the Type-C cable is inserted:

- Red light steady: Charging in progress
- Green light steady: Charging complete

**Note:** Use a 5V-1A adapter and Type-C cable for charging. When voltage is low (3.7V), an alarm will sound, indicating the need for timely charging.

## 2.4 E8 Transmitter (ELRS) Serial Upgrade Tool Instructions

**First, press and hold the R4+ button, then press the power button. A prompt sound will be heard, the mode indicator light will flash green, and the center indicator light will stay green, indicating that the transmitter has entered serial flashing mode.**

1. Use a Type-C data cable to connect the transmitter to your computer.
2. Open the EMAX Serial Upgrade Tool on your computer.
3. Find and select the appropriate COM port.
4. Click "Open Port".
5. Click "Select File", choose the firmware file you wish to update, and click "Update File".
6. Wait for a few seconds. When the transmission progress reaches 100%, the transmitter will automatically power off, indicating a successful firmware update.

**Note:** If the COM port is not recognized, try changing the data cable, repeating steps (1) and (2), clicking "Refresh Port", or reconnecting the Type-C data cable.

### 2.4.2 Switching Power, Changing Telemetry/Transmission Rate

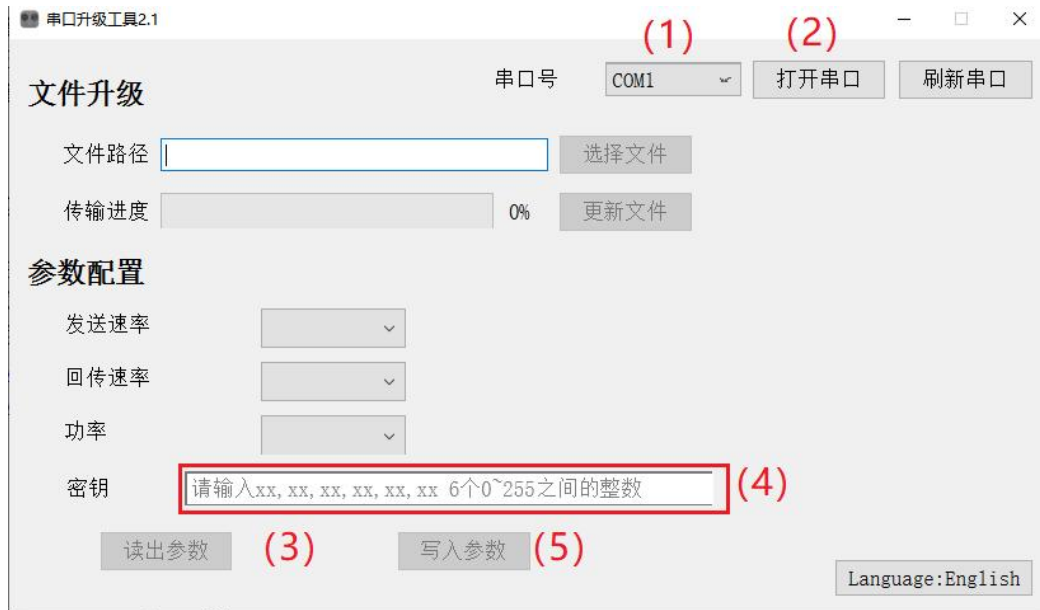
Same as (1) in the firmware update process; Same as (2) in the firmware update process; In the parameter configuration section, click on "Read Parameters". This will display all current parameters set on the transmitter. Next, locate options such as transmission rate, telemetry rate, power, etc., within the parameter list. Click on the corresponding dialogue box for each parameter you wish to adjust. Select the appropriate parameters by clicking on the suitable options. Click "Write Parameters". Once the parameters have been successfully written, you will see a confirmation message indicating the completion of the parameter modification. Power off the transmitter and then power it on again to apply the changes.





### 2.4.3 Changing Binding Keys

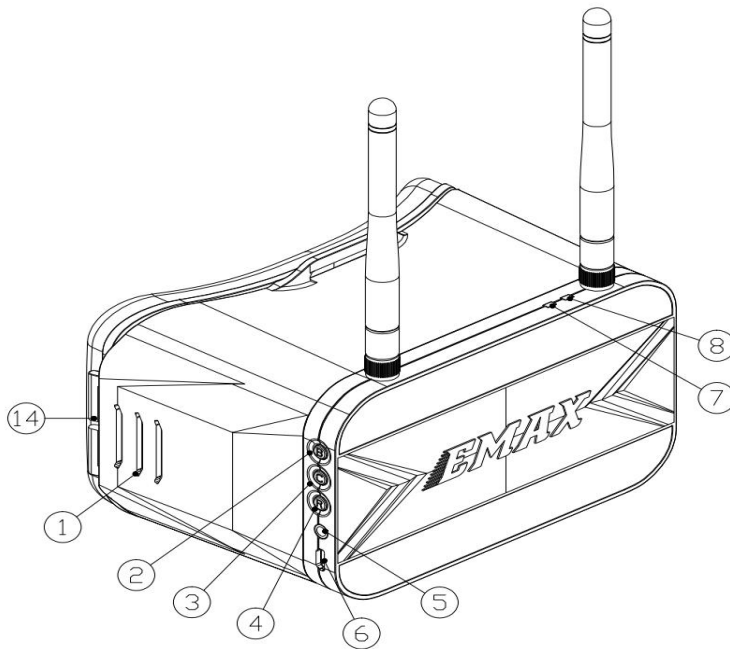
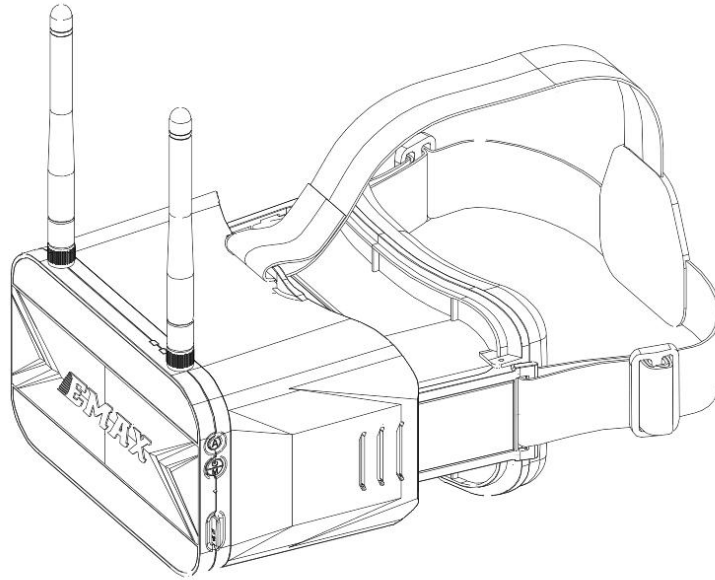
(1) Same as (1) in the firmware update process; (2) Same as (2) in the firmware update process; (3) In the parameter configuration section, click on "Read Parameters". This will display the current binding key set on the transmitter. (4) If you need to change the binding key, enter the corresponding key in the dialogue box following the key. Note that the key format is XX, XX, XX, XX, XX, XX (six integers between 0-255). (5) Click "Write Parameters". Upon successful parameter writing, you will see a message indicating the key change was successful. Power off the transmitter and then power it on again to apply the changes.



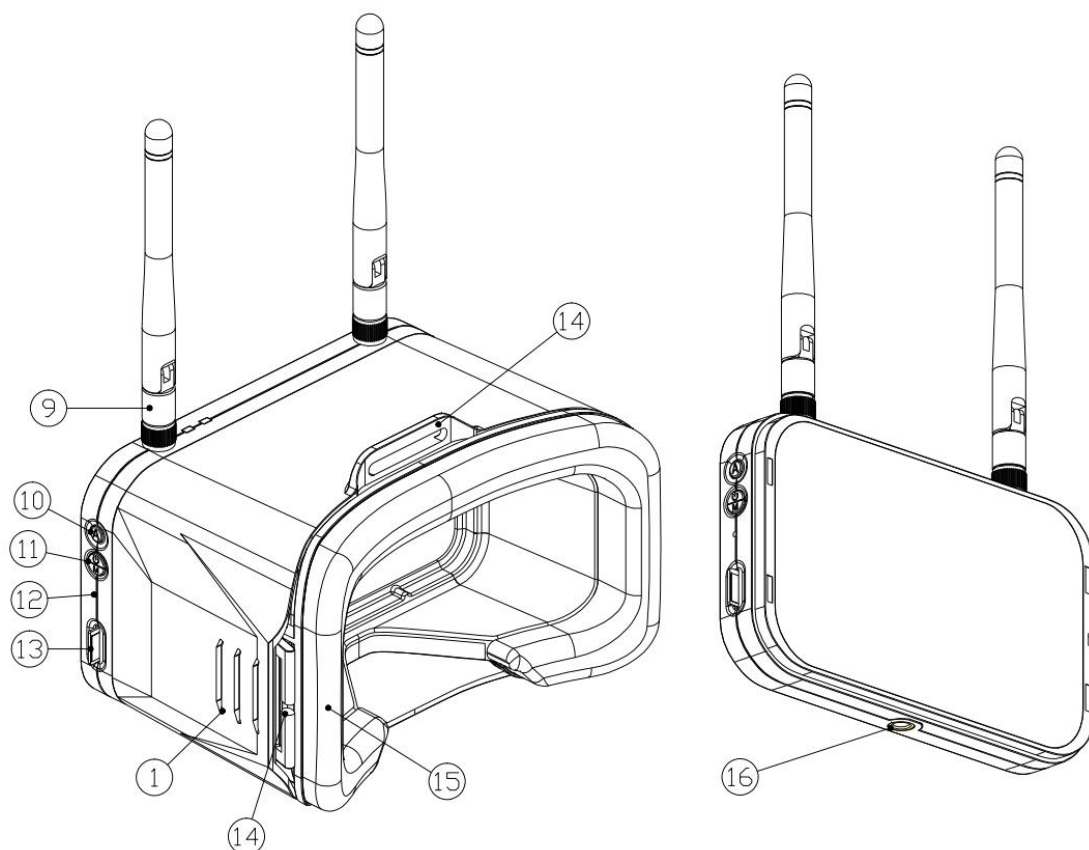
Note: To obtain the Serial Update Tool, unzip the "release" file and locate the file named "serial\_bootloader.exe". Double-click to run it directly. You can download the related compressed packages and firmware update files from the EMAX official website ([www.emax-usa.com](http://www.emax-usa.com)).

### 3. Transporter II User Manual

#### 3.1 Transporter II Schematic Diagram



1. Distance adjustment slot
2. Frequency band switch button
3. Channel switch button
4. Record button
5. Audio interface
6. Micro USB
7. Recording card indicator light
8. Charging indicator light



9. Antenna
10. Auto Channel Search Button
11. Turn on/off (long press) & menu button (short press)
12. Reset switch
13. Micro SD card slot
14. Eye Distance Adjustment
15. Sponge pad
16. Tripod Screw Mount

Note: To operate the Transporter II correctly, follow these steps: Install the included antenna on the SMA connector and detach the antenna and charging USB power cable when wearing goggles.

### 3.2 Transporter II Specifications

	Transporter II
Weight (excluding battery)	398g(including headband and antenna)
Screen resolution	480X800
Display Size	4.3 INCH
Battery	Built in 1300mAh lithium-ion battery
Operating voltage	4.2V-3.7V
working frequency	5.8GHz (5658MHz-5945MHz)
Charging system	Built in USB 1A linear lithium-ion battery charging system
DVR	Maximum support for 32GB TF card, compression format MJPEG, file format AV
Video recording size	VGA/D1/HD
time	Off/3 minutes/5 minutes/10 minutes (optional)
Maximum external dimensions (excluding antenna, folded state)	LxWxH=155x100x90mm;

### 3.3 Transporter II Operation

#### 3.3.1 Video Channel Selection

The Transporter II is equipped with a Band Selection button (Button B) and a Channel Selection button (Button C). These buttons allow manual selection of the correct frequency band and channel. When cycling through bands/channels, the channel number and frequency will be displayed in the top left corner of the screen.

**Band Selection Button (Button B):** Press once to cycle through the following sequence: A → B → E → F → R. For example, if the current band is set to E, pressing Button B once will switch to Band F, pressing again will switch to Band R, and so forth in a continuous loop.

**Channel Selection Button (Button C):** Press once to cycle through the 8 available channels. Channels cycle continuously.

**Note:** Ensure the Tinyhawk Nanoscout is powered on when cycling through channels to select the correct channel and band.

FR \ CH	CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8	
A	5865	5845	5825	5805	5785	5765	5745	5725	MHz
B	5733	5752	5771	5790	5809	5828	5847	5866	MHz
E	5705	5685	5665	—	5885	5905	—	—	MHz
F	5740	5760	5780	5800	5820	5840	5860	5880	MHz
R	5658	5695	5732	5769	5806	5843	5880	5917	MHz

Reminder: (1) Before adjusting parameters, hold the CH button or FR button for 3 seconds. (2) Ensure Tinyhawk Nanoscout's power is on. When cycling through channels, using Tinyhawk Nanoscout's FPV goggles will make it easier to find the correct channel.

Note: Please ensure that Transporter II is on the correct channel where Tinyhawk Nanoscout is located. The current frequency band and channel selected for Tinyhawk Nanoscout will be displayed in the top left corner of the screen.

### 3.3.2 Video Channel

Auto Search Transporter II features an automatic search function labeled "A" to help locate Tinyhawk Nanoscout on its channel. First, power on Tinyhawk Nanoscout, then press the "A" button on Transporter II to activate the auto-search mode. This mode will scan through all channels and select the one with the best video reception. Once all channels have been searched, the optimal channel number, frequency band, and frequency will display in the top left corner of the screen. Warning: If multiple Tinyhawk Nanoscouts (or other drones with FPV systems) are operating simultaneously, using this function may select the wrong drone's channel. We recommend manually selecting the correct channel to avoid incorrect matching!!!

### 3.3.3 Recording Control

To Start Recording: While in DVR mode, short press the right-side R button. A solid red dot will appear at the top center of the screen, and the DVR red LED will stay lit continuously. After a moment, the red dot on the screen will begin blinking, and the DVR red LED will flash, indicating it's in recording mode. To Stop Recording: While DVR is recording, short press the R button again. The red dot on the screen will disappear, and the DVR red LED will turn off.

Setting Recording Duration: Press the screen/card recording parameter setting to select loop recording, short press the right B/C button to select: 3min, 5min, 10min, off.

### **3.3.4 SD Card Recording Parameter Settings**

Short press the left M button to access the screen/card recording parameter setting menu; (TF card needs to be purchased separately). Press the left M button again to select the screen/card recording parameter setting submenu. Each press of the left M button selects the next submenu. Use the right B/C button to select appropriate parameters.

### **3.3.5 Screen Parameter Settings**

Press the "M" button once to open the menu, where you can adjust brightness, contrast, saturation, and language. Once in the menu, press the "M" button again to select the next menu option. Highlight the current selection in the menu, then press the "B" and "C" buttons to increase or decrease the values. If no button input is detected, the menu will automatically close after 3 seconds.

### **3.3.6 Battery & Charging**

Transporter II is equipped with an internal 1300mAh lithium battery. If battery replacement is needed, please contact us or visit our official website for assistance. Do not attempt to open the back cover yourself to avoid damaging the product.

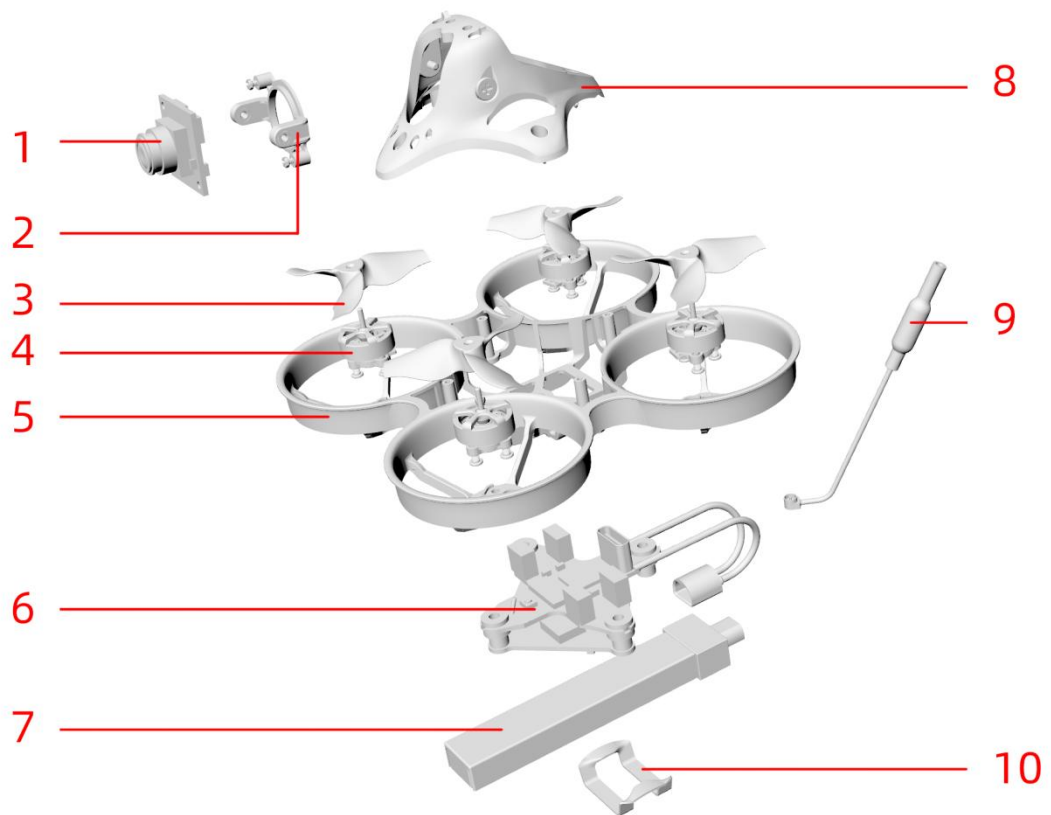
To charge using a 5V-1A adapter and a micro-USB cable, here are the charging indicator statuses for Transporter II:

- **Red light steady:** Charging in progress.
- **Green light steady:** Charging complete.

Note: On the Transporter II display screen, the battery level is indicated in the upper right corner. When it shows "Low Battery," please charge promptly to prevent the Transporter II from shutting down within two minutes due to insufficient power.

#### 4. Tinyhawk Nanoscout

##### 4.1 Tinyhawk Nanoscout



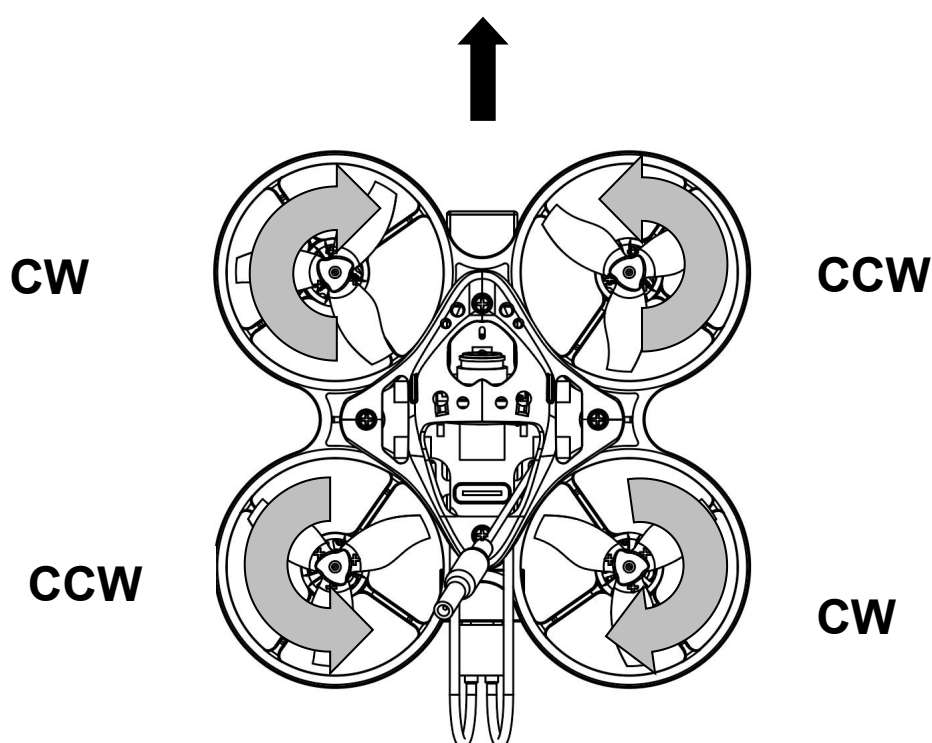
1. Camera
2. Camera mount/bracket
3. Propeller
4. Brushless motor
5. Frame (as in the frame of an aircraft or drone)
6. Main control board (flight controller)
7. 1S battery (1-cell battery)
8. Aircraft fuselage frame
9. Antenna
10. Battery securing rubber band



## 4.2 Tinyhawk Nanoscout Propellers & Brushless Motors

### 4.2.1 Tinyhawk Nanoscout Propellers

Tinyhawk Nanoscout propellers have two rotational directions: clockwise (CW) and counterclockwise (CCW). When purchasing a set of propellers, please buy 2 clockwise and 2 counterclockwise propellers. Propellers rotate along the blunt edge. When installing propellers, please follow the correct direction as shown in the diagram below.



**Propeller Installation:** Align the 3 shafts of the propeller with the 3 shafts of the motor, supporting behind the motor. Press the propeller blades with your hand until they are flush with the motor shaft.

**Warning:** Incorrect propeller installation may cause the Tinyhawk Nanoscout to be unable to fly properly and become uncontrollable. Verify carefully that the propeller direction is correct. Lack of support behind the motor may lead to frame breakage. Ensure safety precautions when installing propellers!!!

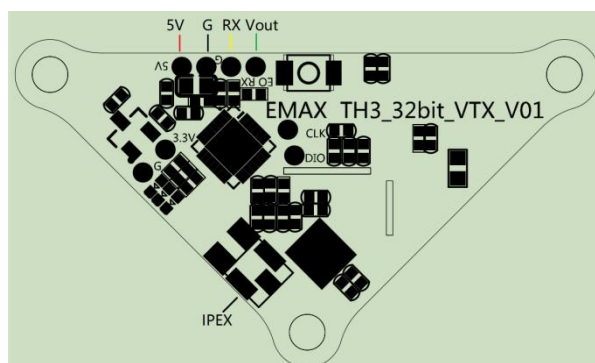
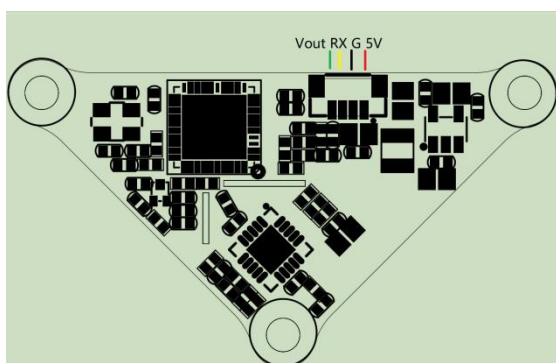
**Propeller Removal:** Use a small tool (such as a 1.5mm hex wrench or a small screwdriver) to press between the metal at the bottom of the motor and the Tinyhawk Nanoscout. Hold the propeller blades with your fingers until the propeller pops out from the motor.

**Warning:** Only remove the propeller blades when replacing them with new ones. Practice safety precautions when removing propellers and using tools!!!

**4.2.2 Tinyhawk Nanoscout Brushless Motor** The model of the Tinyhawk Nanoscout brushless motor is: 08015 (22000KV). **Note:** The connector terminals between the motor and the main control board are: P = 1.25mm, 1x3p plug connector.

**4.3 Tinyhawk Nanoscout Camera** The model of the Tinyhawk Nanoscout camera is: RUCAM Nano 3.

**4.4 Tinyhawk Nanoscout Video Transmitter**  
**4.4.1 EMAX 32-bit Open Source Analog Video Transmitter Schematic**



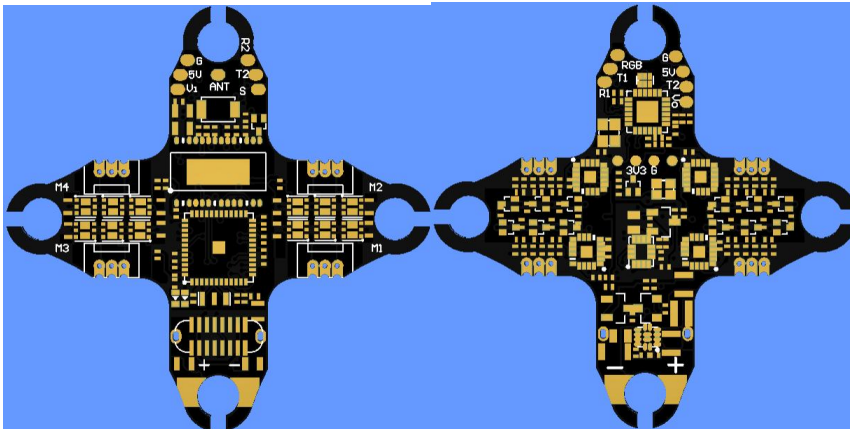
EMAX 32-bit simulation image transmission

frequency	5.8G 40CH
RF power	25mW/100mW/200mW/400mW
Power/Current	5V
Support agreement	Smartaudio agreement
Power signal interface	P=0.8mm,1x4p
Firmware Update	Support updating VTX firmware through flight control
antenna	Omnidirectional antenna, gain 2db
Antenna interface	IPEX 1st generation or welding

## 4.5 Tinyhawk Nanoscout-AIO

### 4.5.1 Tinyhawk Nanoscout-AIO Schematic

Tinyhawk Nanoscout PLUS-AIO integrates an ELRS (2.4G) receiver, 6A BIHeliSuite ESC, and F411 flight controller on a single board.



#### 4.5.2 Tinyhawk Nanoscout

Flight control part	
FC (MCU)	STM32F411CEU6 (100MHz)
Gyroscope&accelerometer (MPU)	ICM42688 (SPI connect)
Character overlay (OSD)	AT74569E(SPI connect)
input voltage	1S
output voltage (BEC)	5V@2A、3.3V@1A
firmware (betaflight)	EMAX_TINYHAWKF4SX1280
Support electric adjustment protocol	Shot150 、 D-Shot300, D-Shot600,Multishoth, OneShot125、PWM
Programmable RGB color lights	support
Serial port	2 ↑ (UART1、UART2)
SBUS protocol	support (UART1)
Electric tuning part	
Continuous current	6A
peak current	6.7A(10S)
FC ((MCU)	EFM8BB21F16G(50MHz)
input voltage	1S
Firmware (Bluebird)	JESC_SH90_48_2_3.HEX;
Receiver	
RF chip	SX1280(SPI support)
Frequency band	2400-2480MHz
agreement	CRSF

## 5. Advanced Features

### 5.1 Aircraft Re-level Calibration

After multiple takeoffs and landings, the aircraft's gyroscopic data may drift, causing attitude problems during flight. At this point, you can calibrate the aircraft's gyro data with the following steps:

1. Connect the flight controller to the computer using a Type-C data cable and ensure it is in a level position.
2. Open the Betaflight Configurator software.
3. Click on "Calibrate Accelerometer" and then click "Reset Z-axis".
4. Check in the Betaflight Configurator software to see if the aircraft's status returns to normal. A prompt will indicate that accelerometer calibration is complete.

## **5.2 Rebinding Aircraft with Remote Controller**

### **5.2.1 Tinyhawk Nanoscout Binding with E8 Transmitter**

Binding refers to the process of connecting the receiver and remote controller. One receiver can only bind with one remote controller, but one remote controller can bind with multiple receivers.

The E8 Transmitter (ELRS-2.4G) is already bound with the Tinyhawk Nanoscout in the RTF kit. If you need to bind them again, follow these steps (assuming you haven't changed the binding key):

- 1.Aircraft Enters Binding Mode:** Power on the Tinyhawk Nanoscout. After it starts up, press and hold the Bind button to put the Tinyhawk Nanoscout into binding mode. The Tinyhawk Nanoscout flight controller's blue indicator light will flash and then become steady, indicating it's in binding mode.
- 2.E8 Transmitter Enters Binding Mode:** Power on the E8 Transmitter (ELRS-2.4G). Press and hold the "L4+" & "R3-" buttons simultaneously for 1 second until the center indicator light alternates between green and red flashing, indicating the transmitter is in binding mode.
- 3.Observe Binding Confirmation:** Watch for the blue light on the Tinyhawk III PLUS flight controller board to change from flashing to steady after the "L4+" & "R3-" buttons on the E8 Transmitter (ELRS-2.4G) are released, indicating successful binding.
- 4.Exit Binding Mode:** Disconnect the Tinyhawk Nanoscout's battery to power it off and exit binding mode.

**Note:** You do not need to repeat the binding process between the remote controller and receiver unless you have replaced either product.

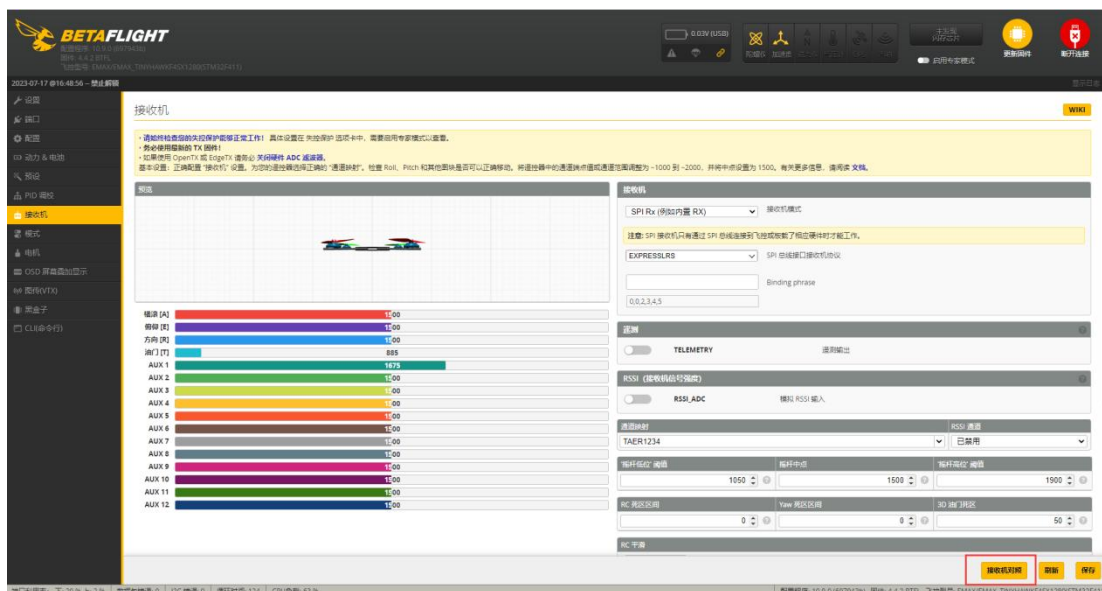
## 5.2.2 Other Binding Methods for Tinyhawk Nanoscout

**First Method:** You can put the receiver into binding mode using a command in the Betaflight Configurator. Follow these steps:

1. Open the Betaflight Configurator.
2. Navigate to the CLI tab.
3. Type the following command: bind\_rx
4. Press Enter. The receiver will enter binding mode.

**Second Method:** You can also use the Betaflight Configurator to initiate binding mode directly from the receiver section. Follow these steps:

1. Open the Betaflight Configurator.
2. Go to the Receiver tab.
3. Click on "Bind Receiver". The receiver will enter binding mode.



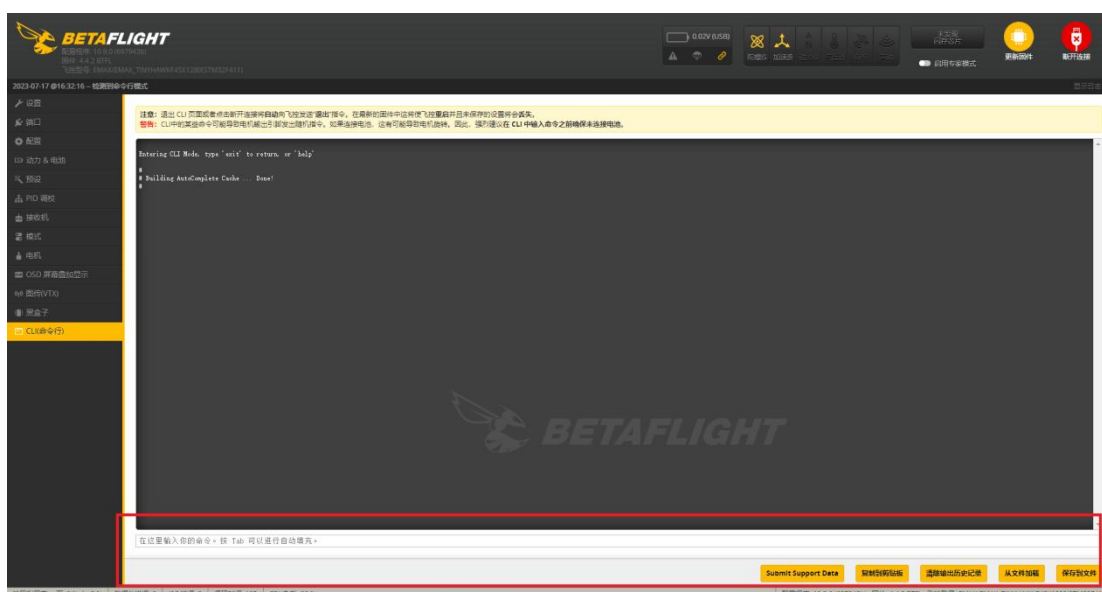
## 5.2.3 Changing Binding Key for Flight Controller

Through the Betaflight Configurator software and EMAX Serial Upgrade Tool, you can read the current binding keys of both the aircraft and the transmitter. You can write the aircraft's binding key to the transmitter using the EMAX Serial

Upgrade Tool, or write the transmitter's binding key to the flight controller using the Betaflight Configurator software.

### Changing Flight Controller Binding Key via Betaflight Configurator:

1. Enter the following command into the command line of the Betaflight Configurator (using 0, 1, 2, 3, 4, 5 as an example for the key):
2. Save the changes.
3. Press Enter. Wait for the flight controller to restart and enter Betaflight Configurator again. This indicates that the binding key modification was successful.

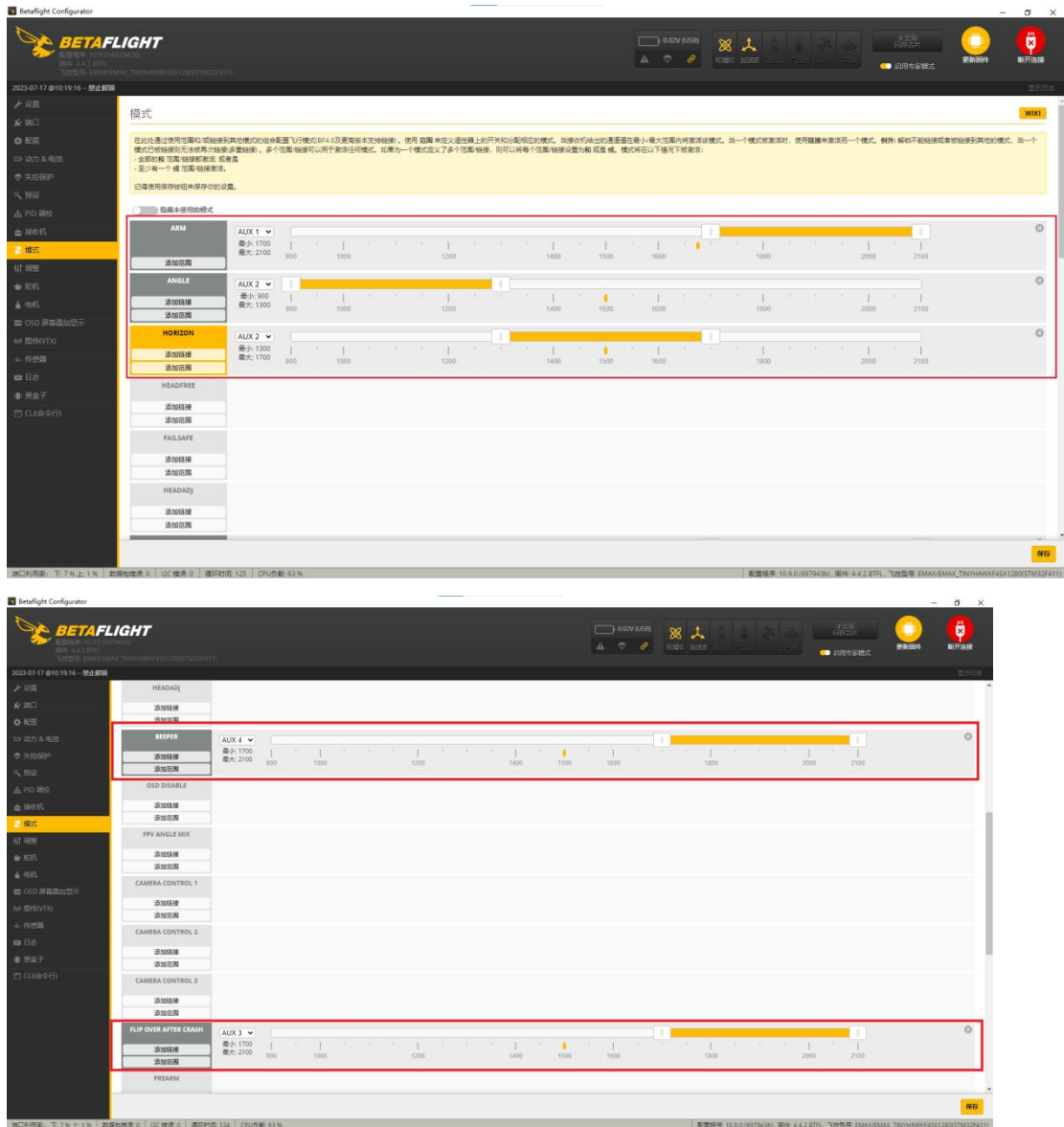


### 5.3 Adjusting Mode Settings

In the E8 Transmitter (ELRS-2.4G):

- AUX 1 is a 3-position switch, used as the ARM switch (Unlock).
- AUX 2 is a 3-position switch, used for flight modes: Acro (Manual), Horizon (Semi-Stable), Angle (Stable).
- AUX 3 is a 2-position switch, configured for Flip Over After Crash (Turtle mode).
- AUX 4 is a 2-position switch, configured for the Beeper.

If you wish to modify the mode settings, locate the corresponding channels for the switches in the Betaflight Configurator software, make the desired changes, and then save and restart.

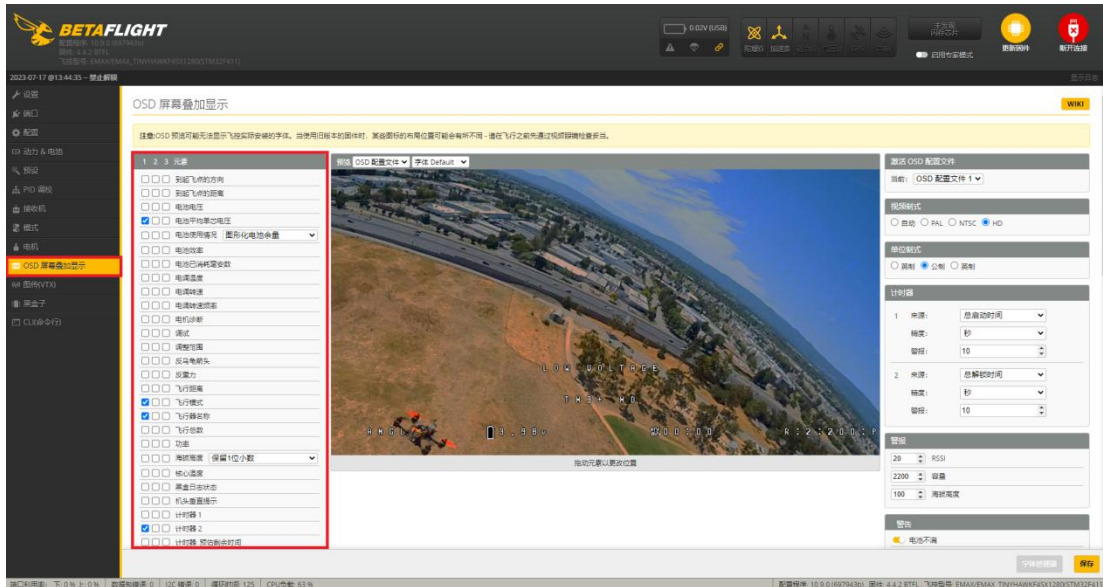


## 5.4 Changing OSD Settings

To change OSD settings using the Betaflight Configurator software, Tinyhawk Nanoscout comes pre-configured with OSD settings. If you wish to make changes, follow these steps:

1. In the Betaflight Configurator software, locate the OSD (On-Screen Display) tab.
2. Configure the OSD screen overlay according to the characters and information you wish to display on your FPV goggles.
3. Click "Save" to apply the changes.
4. After saving, restart the system to implement the updated OSD settings.





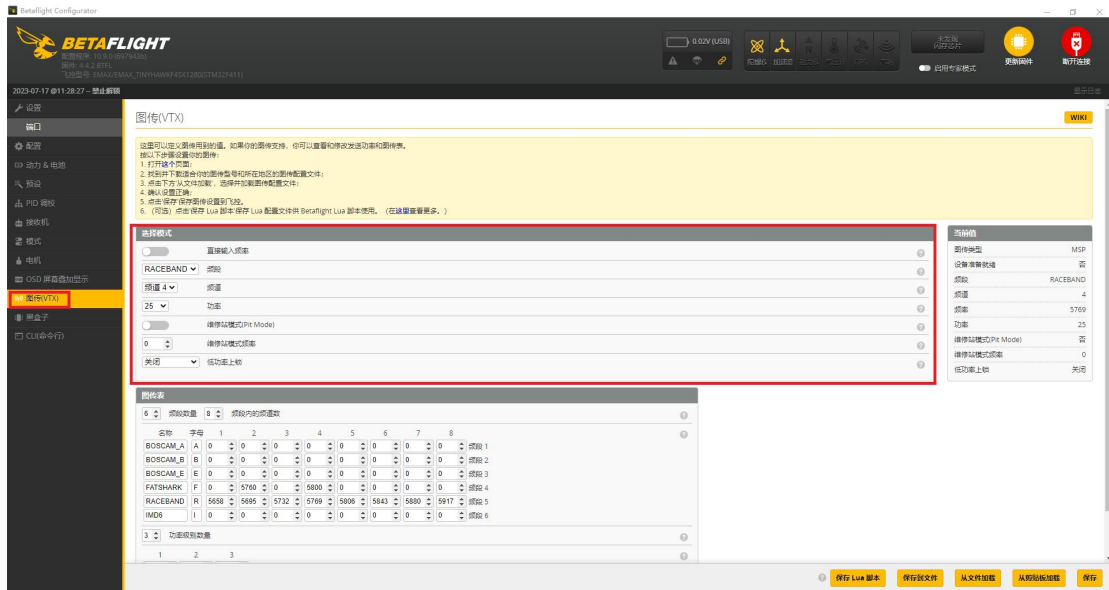
## 5.5 Changing VTX (Video Transmitter) Settings

### 5.5.1 Modifying VTX Settings Using Betaflight Configurator

Tinyhawk Nanoscout comes with the default VTX settings of R:4:25mW. If you wish to make changes, follow these steps:

1. Open the Betaflight Configurator software.
2. Locate the VTX tab.
3. Modify the desired parameters such as channel, frequency, power, and enable low power lock.
4. Click "Save" to apply the changes.
5. After saving, restart the system to implement the updated VTX settings.

**Note:** The low power lock feature ensures that the VTX operates at low power until it is unlocked. Once unlocked, it operates at the set power level.



### 5.5.2 Changing VTX Settings Using Video Goggles OSD

The Tinyhawk Nanoscout is equipped with SmartAudio, which is already configured. The analog video transmitter's SmartAudio is on UART2 TX. Power on the Tinyhawk Nanoscout, Transporter II, and E8 Transmitter.

Follow the on-screen instructions to enter the main setup menu. Center the throttle, move the left stick left, and pitch up (THROTTLE MID + YAW LEFT + PITCH UP) to enter the OSD parameter adjustment menu.

In the menu interface, use pitch (up/down) to navigate and select menu options. Move the cursor to "FEATURES," then push the roll stick (right) to enter the next menu. Use pitch (up/down) to move the cursor to "VTX SA." Push the roll stick (right) to enter the VTX configuration menu.

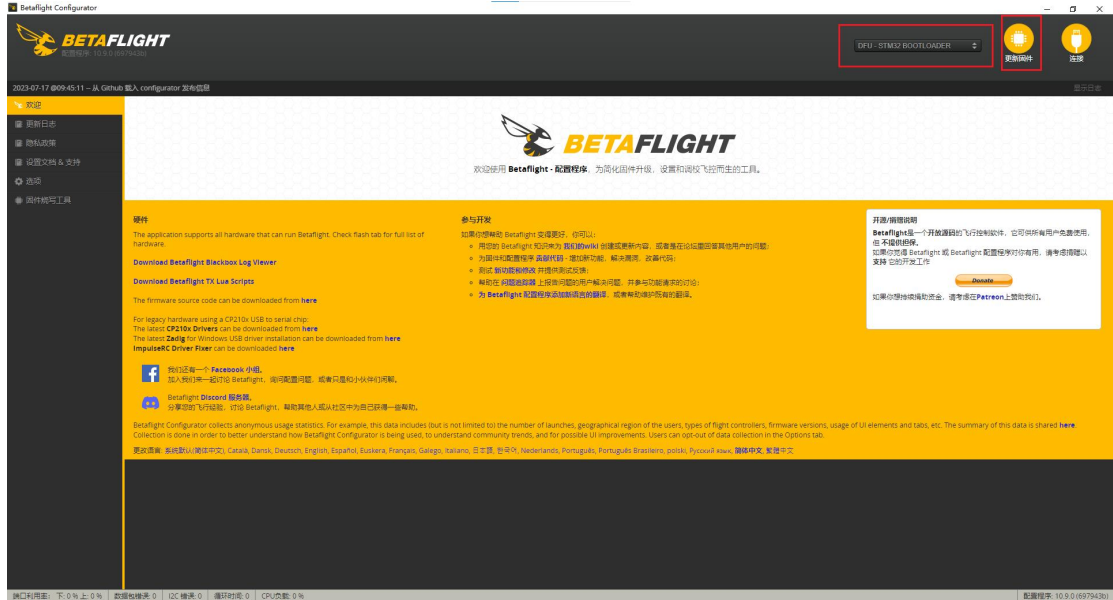
In the VTX SA menu, you can configure BAND, CHAN, and POWER. Use the pitch stick (up/down) to move the cursor and select the desired VTX options. Once the parameters are set, move the cursor to "SET" and push the roll stick (right) to enter "SET" and select "YES." Push the roll stick (right) again to save the settings.

In the VTX SA menu, move the cursor to "CONFIG" to enter the menu. Move the cursor to "PIT FMODE," then push the roll stick (right) to turn off the VTX power.

Note: The low-power lock function allows the VTX to operate at low power before unlocking, and then operate at the set power.

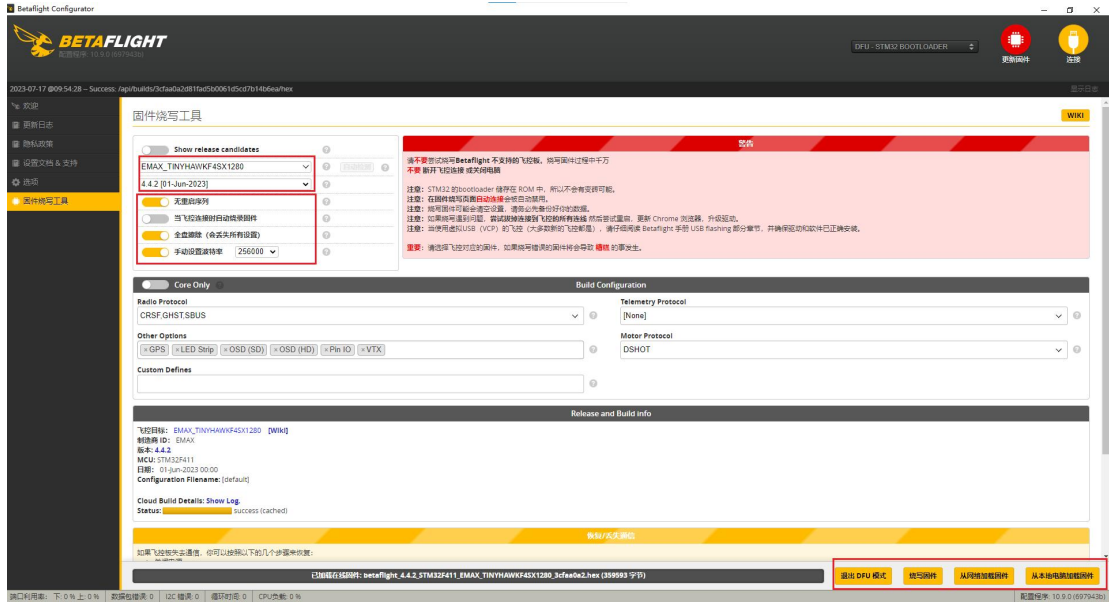
## 5.6 Flight Controller Firmware Flashing

First, locate the Boot button on the flight controller board. Then, while holding down the Boot button, connect the flight controller using a Type-C data cable to enter DFU mode. Next, click on the update firmware button.



## Steps for Flight Controller Firmware Flashing

1. **Step 1:** Select EMAX\_TINYHAWKF4SX1280, 4.4.3 as the firmware. In the dropdown menu, choose a manual baud rate of 256000.
2. **Step 2:** Choose to load the firmware from the internet or from your local computer. Wait for the download to complete.
3. **Step 3:** Finally, click on the "flash firmware" button. After a few seconds, the flashing process will be complete.

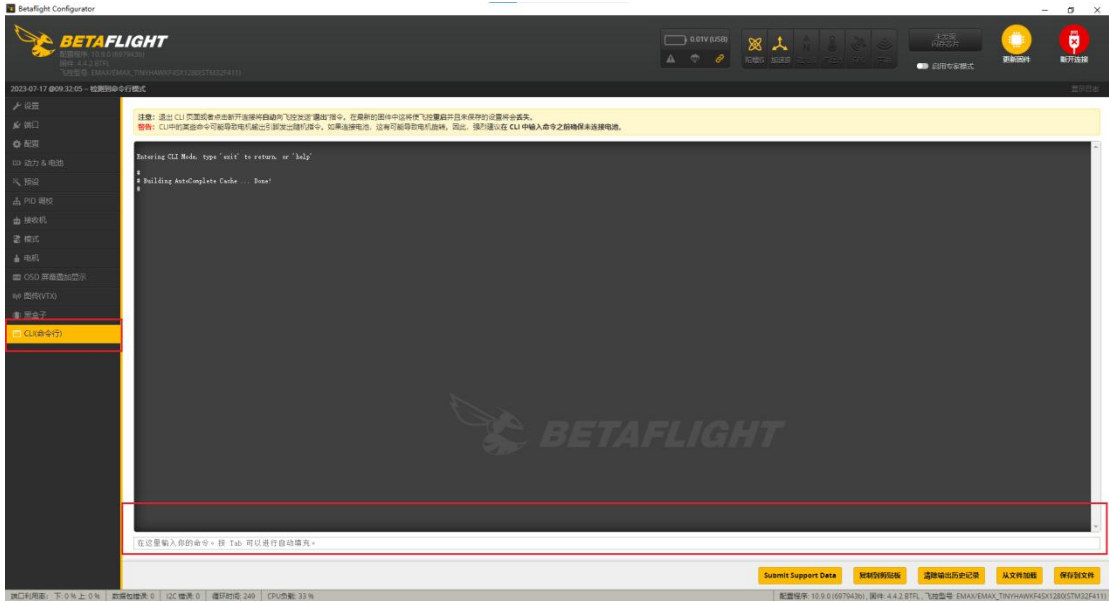


**Notes:**

- The BOOT button and BIND button are the same button, which is also the only button on the flight controller board. If DFU mode is not detected, please check if your computer has the necessary drivers installed.

**5.7 Flight Controller Parameter Flashing**

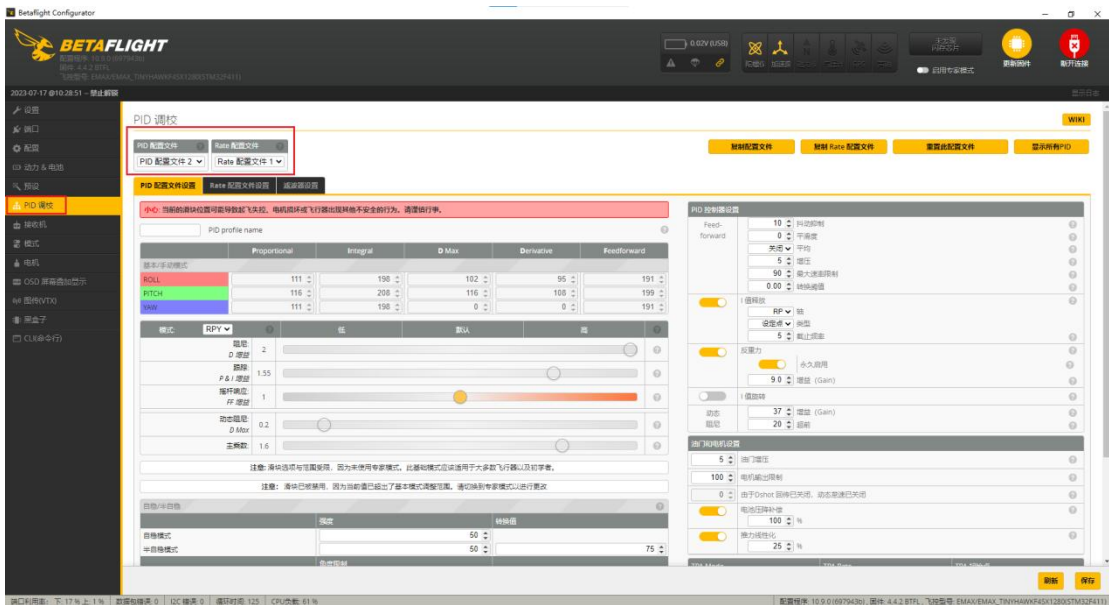
1. Download the latest CLI Dump file from <https://emax-usa.com/>.
2. Open the CLI Dump file in a text editor and copy all the text.
3. Paste the copied text into the command line interface (CLI) of the Betaflight Configurator software and press Enter.
4. Once the process is complete, reconnect to the Betaflight Configurator software. The Tinyhawk Nanoscout will be restored to its default settings.



## 5.8 Tinyhawk Nanoscout-PID File Overview

PID Configuration File 1 is tailored and optimized for the Tinyhawk Nanoscout and the provided Emax 1s HV 320 mAh battery, designed for ultimate flight control both indoors and outdoors. This file is optimized for the best indoor flight control when using the Emax 1s HV 650 mAh battery.

This configuration has been professionally adjusted by multiple experts. EMAX strongly recommends not altering these values arbitrarily.



## **Disclaimer**

The Tinyhawk Nanoscout has been adjusted to its optimal state. Changing the factory PID settings may affect flight time, overall speed, control of the aircraft, and may cause internal motor overheating. We do not recommend changing any settings of the Tinyhawk Nanoscout or upgrading the firmware to a new version.

Thank you for purchasing our product! Enjoy your flight!



Warning:

## Safety Notice

Please be aware of your surroundings. Usage is prohibited for individuals under 18 years of age. This product contains small parts. Keep out of reach of children to prevent accidental ingestion.



**MADE IN CHINA**