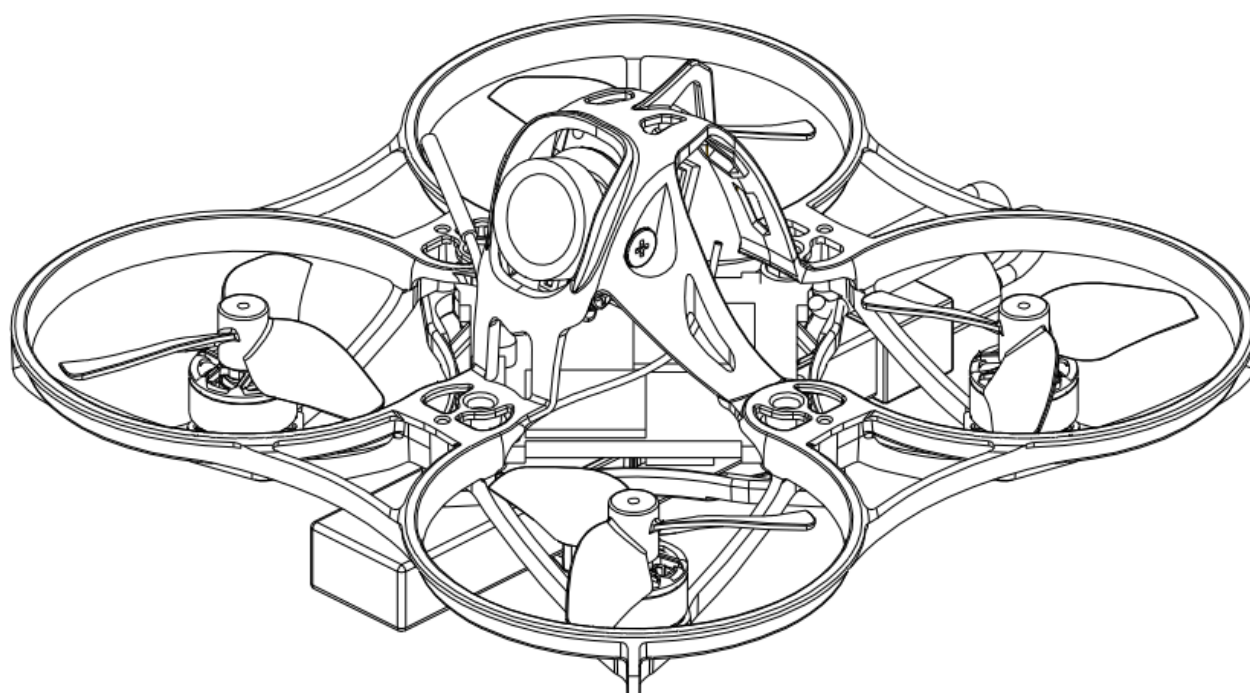




Thank you for purchasing the Tinyhawk Aero_HDZero. Designed in California, USA; manufactured in China.

Congratulations on becoming a Tinyhawk Aero_HDZero pilot.

From this moment on, you are entering the world of real FPV flight, not playing with an ordinary toy.

The Tinyhawk Aero_HDZero is like a sports car with a manual transmission: it will neither make decisions for you nor protect you from mistakes.

Control, judgment, and timing are entirely in your hands.

At first, it may make you nervous. You may make mistakes or even crash; but those challenges will help you grow into a skilled pilot, step by step.

Crashes are inevitable, and new challenges will follow.

Yet the first time you smoothly clear an obstacle and land precisely, you will understand the true excitement of FPV flight.

Keep practicing and take on the challenges. A new world of speed, freedom, and excitement awaits.

Welcome to FPV flying.

Now, take off.

Disclaimer

1. Read this disclaimer carefully before using the product.
2. By using this product, you agree to this disclaimer and confirm that you have read the product information carefully.
3. This product is not suitable for children under 14. Adult supervision is strongly recommended for children under 14.
4. Read the user manual and warnings carefully.
5. The Tinyhawk Aero_HDZero features an open-source flight controller and electronic speed controller to support FPV enthusiasts who wish to upgrade their quadcopter.
6. EMAX assumes no liability for damage or injury caused directly or indirectly by the use of this product.

Precautions

1. Assemble and operate this product correctly, following the instructions.
2. Before every flight, make sure the batteries are adequately charged and all connections are secure.
3. Fly in a safe area away from people, animals, and obstacles.
4. Do not use this product in a strong electromagnetic field.
5. Do not use this product in adverse weather, including wind, rain, lightning, or snow.
6. Do not operate this product if you are ill, dizzy, fatigued, or under the influence of alcohol or medication, or if a physical or mental condition impairs your ability to fly safely.
7. Follow all applicable local laws and regulations, and fly safely.
8. Do not modify the product or use unapproved EMAX parts or accessories.

How to use this manual:

EMAX provides this Tinyhawk Aero_HDZero BNF User Manual. For a quick start, read Chapter 1, "Tinyhawk Aero_HDZero Quick Start Guide." For detailed product information, read the remaining chapters.

Support

Visit emax-usa.com or emaxmodel.com for updates and technical support.

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Tinyhawk Aero_HDZero BNF Specifications

The Tinyhawk Aero_HDZero is available in three versions.

HD Freestyle: Tinyhawk Aero_HDZero Freestyle	
Wheelbase	65 mm
Maximum overall dimensions	L × W × H = 85 × 85 × 40 mm
Weight	Approx. 18.9 g (without battery)
Brushless motors	0702B-27000KV (sleeve bearings)
Propellers	HQProp 31 mm × 3 (1.2 × 1.1 × 3), translucent gray
HDZero AIO5	STM32F411 (100 MHz) MCU; integrated four-in-one 5 A 8-bit ESC; 5.8 GHz HDZero VTX, 25/200 mW; SPI 2.4 GHz ExpressLRS receiver; 5 V/1 A BEC.
Camera	HDZ3261 HD camera
Battery	Recommended: 1S HV 320 mAh (EM2.0 connector)

HD Racing: Tinyhawk Aero_HDZero Racing	
Wheelbase	65 mm
Maximum overall dimensions	L × W × H = 85 × 85 × 40 mm
Weight	Approx. 18.8 g (without battery)
Brushless motors	0702B-30000KV (sleeve bearings)
Propellers	HQProp 31 mm × 3 (1.2 × 0.9 × 3), translucent gray
HDZero AIO5	STM32F411 (100 MHz) MCU; integrated four-in-one 5 A 8-bit ESC; 5.8 GHz HDZero VTX, 25/200 mW; SPI 2.4 GHz ExpressLRS receiver; 5 V/1 A BEC.
Camera	HDZ3261 HD camera
Battery	Recommended: 1S HV 320 mAh (EM2.0 connector)

HD Performance: Tinyhawk Aero_HDZero Performance	
Wheelbase	65 mm
Maximum overall dimensions	L × W × H = 85 × 85 × 40 mm
Weight	Approx. 19.3 g (without battery)
Brushless motors	0702-35000KV (ball bearings)
Propellers	HQProp 31 mm × 3 (1.2 × 0.9 × 3), translucent gray
HDZero AIO5	STM32F411 (100 MHz) MCU; integrated four-in-one 5 A 8-bit ESC; 5.8 GHz HDZero VTX, 25/200 mW; SPI 2.4 GHz ExpressLRS receiver; 5 V/1 A BEC.
Camera	HDZ3261 HD camera
Battery	Recommended: 1S HV 320 mAh (EM2.0 connector)

Tinyhawk Aero_HDZero Freestyle BNF Package

Contents

1. Tinyhawk Aero_HDZero Freestyle aircraft ×1
2. Screw accessory pack ×1
3. EM2.0 accessory pack ×1
4. Propeller pack (2 CW, 2 CCW)
5. Printed cards and other materials ×1

Tinyhawk Aero_HDZero Racing BNF Package

Contents

1. Tinyhawk Aero_HDZero Racing aircraft ×1
2. Screw accessory pack ×1
3. EM2.0 accessory pack ×1
4. Propeller pack (2 CW, 2 CCW)
5. Printed cards and other materials ×1

Tinyhawk Aero_HDZero Performance BNF

Package Contents

1. Tinyhawk Aero_HDZero Performance aircraft ×1
2. Screw accessory pack ×1
3. EM2.0 accessory pack ×1
4. Propeller pack (2 CW, 2 CCW)
5. Printed cards and other materials ×1

1. Tinyhawk Aero_HDZero Quick Start Guide

1.1 Getting Ready

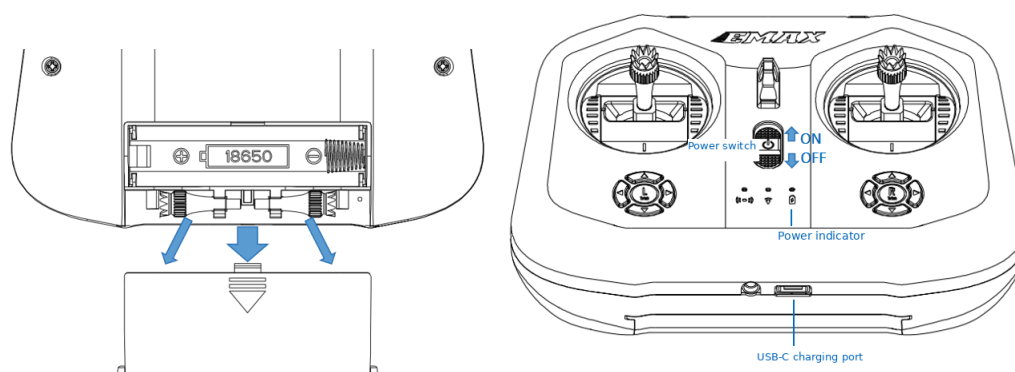
The Tinyhawk Aero_HDZero BNF package includes the aircraft only, without a transmitter or goggles. To help you get flying quickly, this chapter uses the E8 Transmitter GO and Transporter II HD goggles as examples.

1.1.1 Charging the Equipment

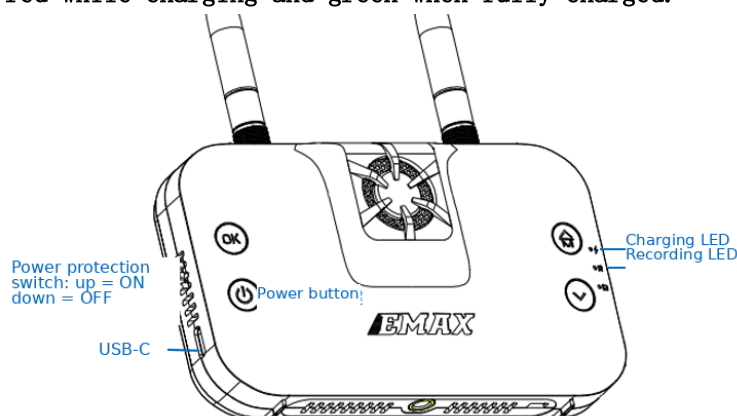
Fully charge the transmitter, goggles, and aircraft battery. This is the first step toward a safe flight.

(1) Transmitter: Before first use, open the battery compartment on the back, remove the metal stick ends, and screw them onto the left and right sticks. Then connect the transmitter to a 5 V charger with a USB Type-C cable.

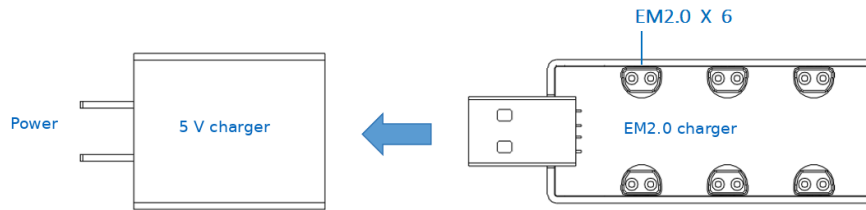
Power indicator: flashing green while charging; steady green when fully charged.



(2) Goggles: First move the power protection switch up to the ON position. Connect the goggles to a 5 V charger with a USB Type-C cable. The charging indicator is red while charging and green when fully charged.



(3) Battery (1S 320 mAh): A 1S 320 mAh battery is recommended for the Tinyhawk Aero. Connect the EM2.0 charger to a 5 V charger, then connect the charger to power. The EM2.0 charger shows a steady green light during charging; the light goes out when charging is complete.



1.1.2 Choosing a Flying Area

Choose a spacious indoor area or an open outdoor area with no wind or bystanders. Indoor flying is recommended for your first flight.

1.2 Preparing to Fly (Equipment, Video Channel, and Binding)

1.2.1 Flight Modes

On the E8 Transmitter GO, the three-position AUX2 switch selects one of three flight modes.

(1) Angle mode: Beginner-friendly rating ★★★★★ (safest)

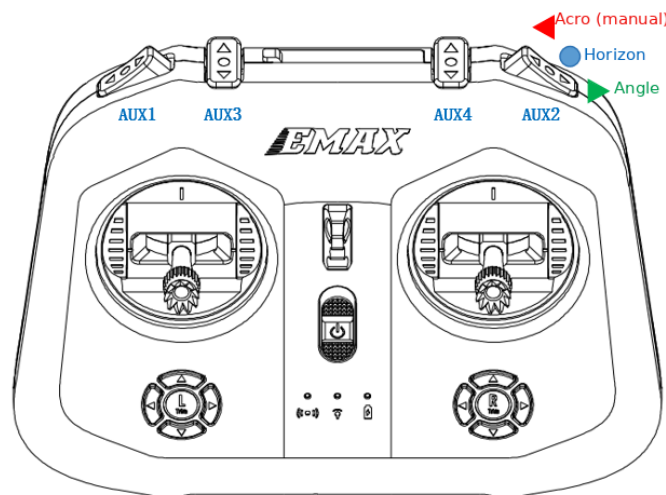
This simple flight mode limits the aircraft's maximum tilt angle, helping limit speed and making flight easier. When you release the sticks, the aircraft automatically levels itself; it can then be held in a hover with throttle control.

(2) Horizon mode: Beginner-friendly rating ★★★☆☆ (behavior changes with stick position)

This mode combines self-leveling and manual control. With small stick inputs, the aircraft self-levels. At full stick deflection, it allows flips and rolls.

(3) Acro mode: Beginner-friendly rating ★☆☆☆☆ (very high crash risk)

This mode gives you full control without an angle limit. When you release the sticks, the aircraft retains its current attitude rather than self-leveling, allowing aerobatic maneuvers.



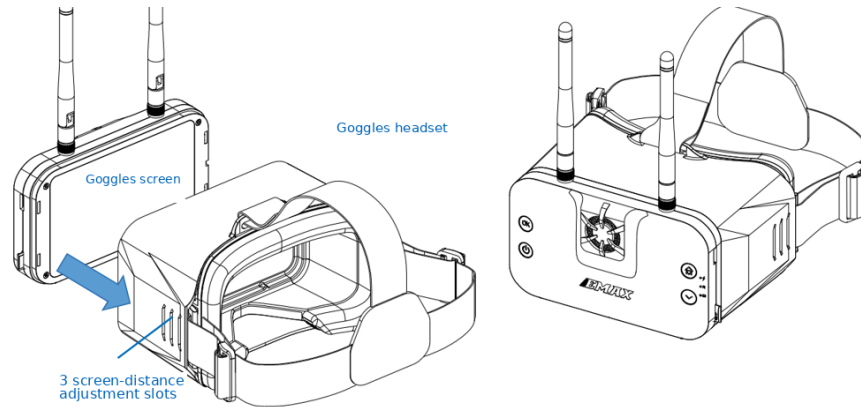
1.2.2 FPV Flying Options

FPV means “first-person view.” Instead of watching the aircraft from the ground, you pilot it using live video from its front-facing camera, displayed on the goggles screen. It feels like sitting in the cockpit of a sports car.

With the Transporter II HD goggles, there are two options: immersive FPV flying and screen-mounted FPV flying.

(1) Immersive FPV flying

- 1 Attach the goggles screen to the headset with the strong magnets.
- 2 Choose an appropriate screen-distance adjustment slot, using the same position on both sides.
- 3 Finally, put on the goggles.



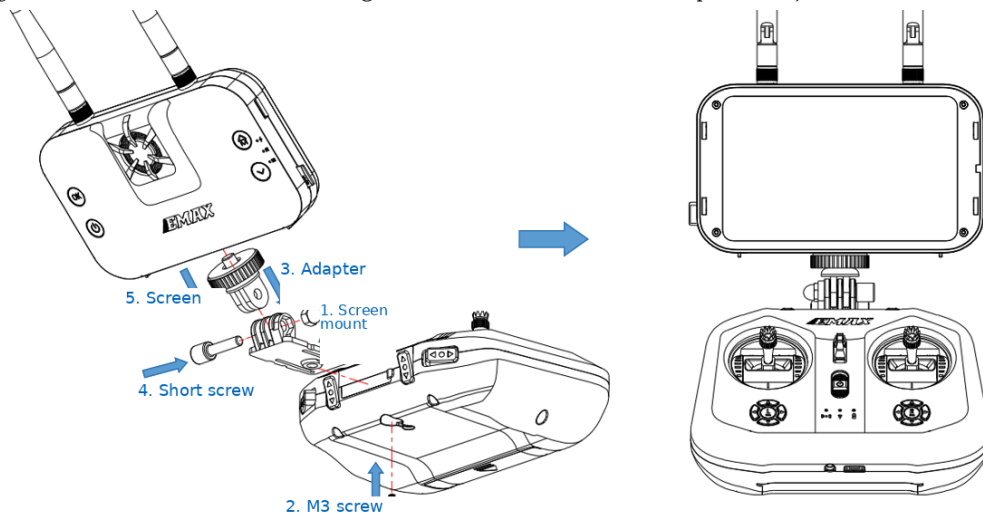
(2) Screen-mounted FPV flying

Mount the goggles screen on the transmitter so that you can view both the screen and the aircraft.

This option is suitable if you are prone to motion sickness, wear eyeglasses, are new to flying, or find the headset uncomfortable. It is beginner-friendly.

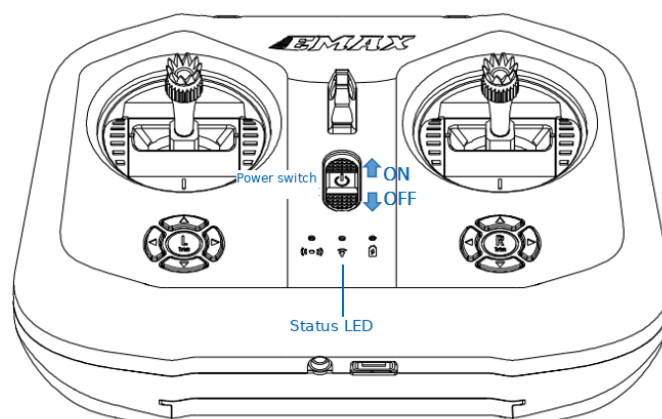
- 1 Push the screen mount firmly into the transmitter.
 - 2 Tighten the M3 screw on the transmitter with a hex screwdriver.
 - 3 Insert the adapter into the screen mount.
 - 4 Secure the adapter to the screen mount with the short screw and nut.
- Leave it loose enough to adjust the screen's vertical angle.

- 5 Fasten the screen to the adapter. The adapter can be rotated to adjust the screen left or right until it faces the operator, as shown below.



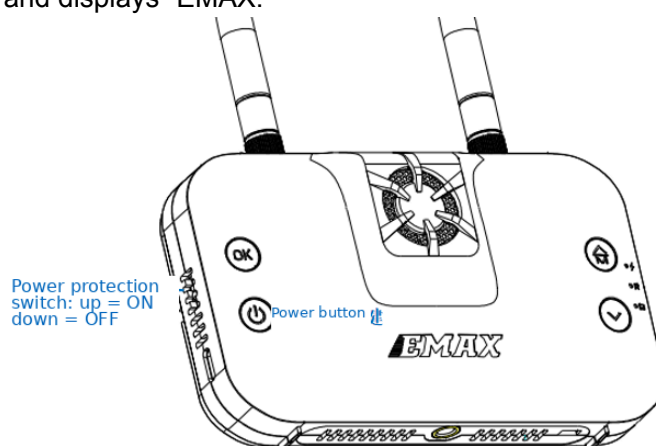
1.2.3 Powering Up Before Flight

- (1) Turn on the transmitter: Move the power switch up to ON. After a beep, the status indicator changes from red to steady green.



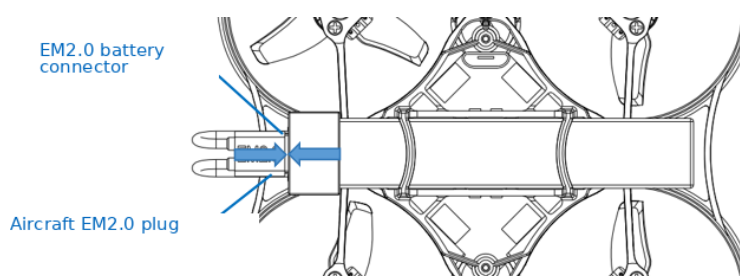
(2) Turn on the Transporter II HD goggles:

Check that the power protection switch is ON. Press and hold the power button until the screen turns on and displays “EMAX.”



(3) Power the aircraft:

Connect the battery to the aircraft's EM2.0 connector. Set the aircraft on a level surface and let it complete its self-check. The indicator lights up when startup is complete.

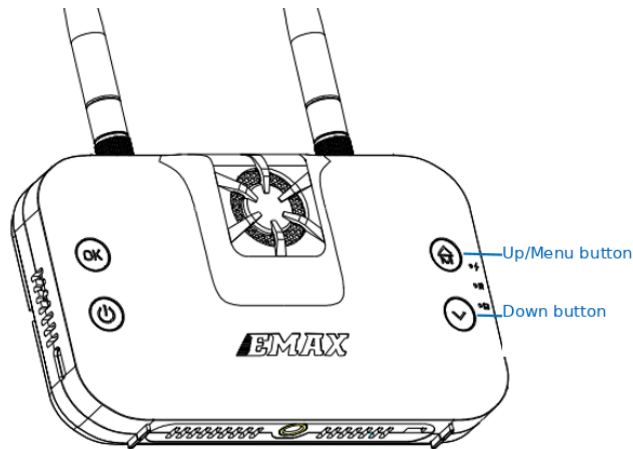


Note: If you are an advanced drone pilot with an amateur radio (HAM) license, you may press and hold the button on the aircraft's video transmitter while connecting the battery to unlock a higher VTX output power where legally permitted. The button location and available power levels vary by aircraft model. You can also use stick commands to navigate Betaflight or the Betaflight OSD and adjust the VTX transmission level. See the aircraft manual for details.

1.2.4 Matching the Aircraft Video Channel to the Goggles

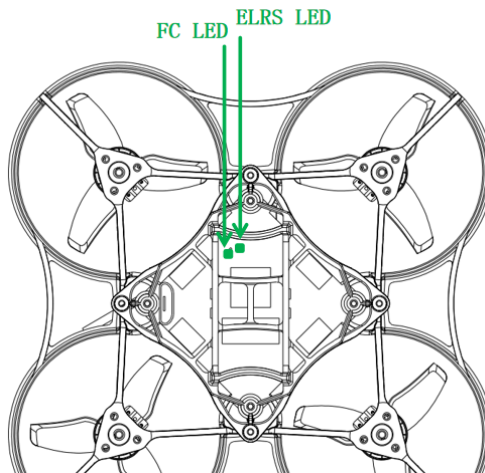
After power-up, the goggles automatically search for and match the aircraft's channel. Live video from the camera appears on the screen. If no live video appears, select the channel manually:

(1) Manual channel selection: Briefly press the Up/Menu or Down button until you find the aircraft's default channel and establish a connection.



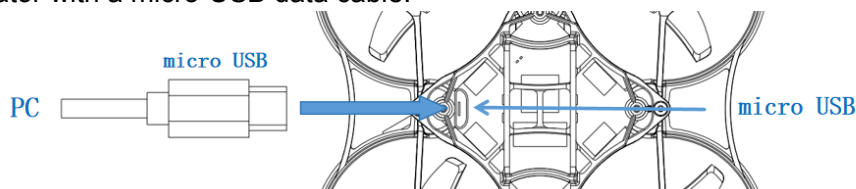
1.2.5 Binding the Aircraft to the Transmitter

After power-up, a steady green ELRS LED on the flight controller indicates successful binding.

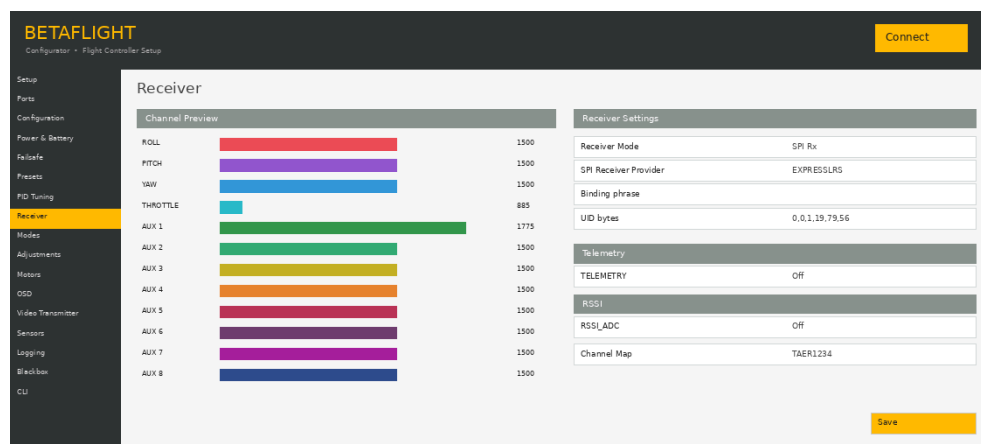


If the ELRS LED keeps flashing, the aircraft and transmitter have not bound successfully. Bind them manually as follows.

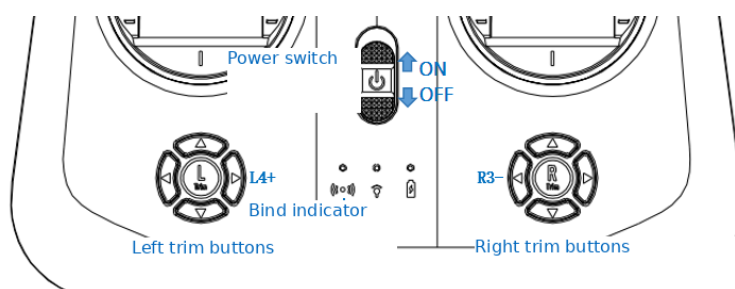
(1) Connect the Tinyhawk Aero_HDZero to a computer running Betaflight Configurator with a micro-USB data cable.



(2) Put the flight controller in bind mode: On the Receiver page, click Bind. The ELRS LED changes from slow to fast flashing.



(3) Put the transmitter in bind mode: Move its power switch up to ON, then press “L4+” and “R3-” simultaneously. The bind indicator on the left alternates green and red.



(4) Wait until the ELRS LED on the flight controller changes from fast flashing to steady green. The aircraft and transmitter are now bound.

(5) If binding fails, repeat steps (1)–(4) until it succeeds.

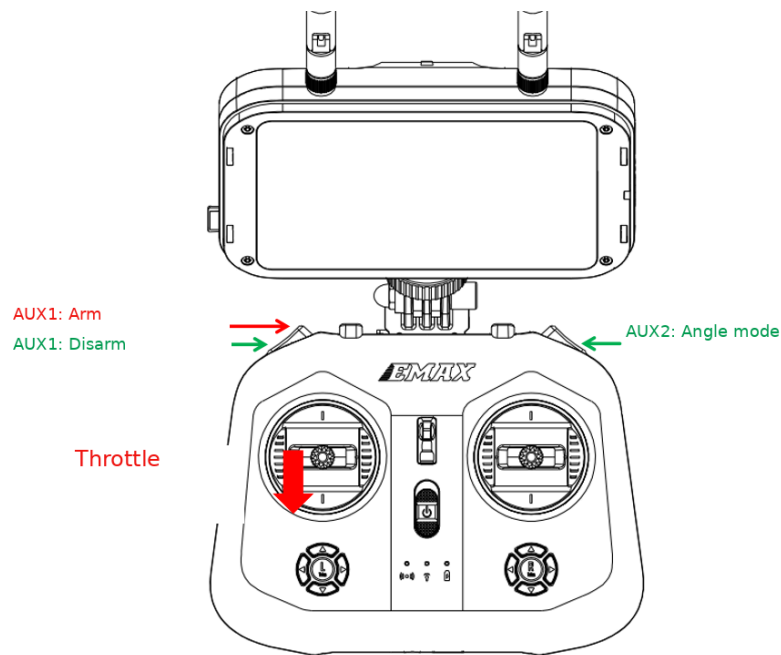
1.3 Flying the Aircraft

After completing Sections 1.1 and 1.2, select a flying arrangement and mode suited to you (for example, screen-mounted FPV flying in Angle mode).

1.3.1 Arming the Motors

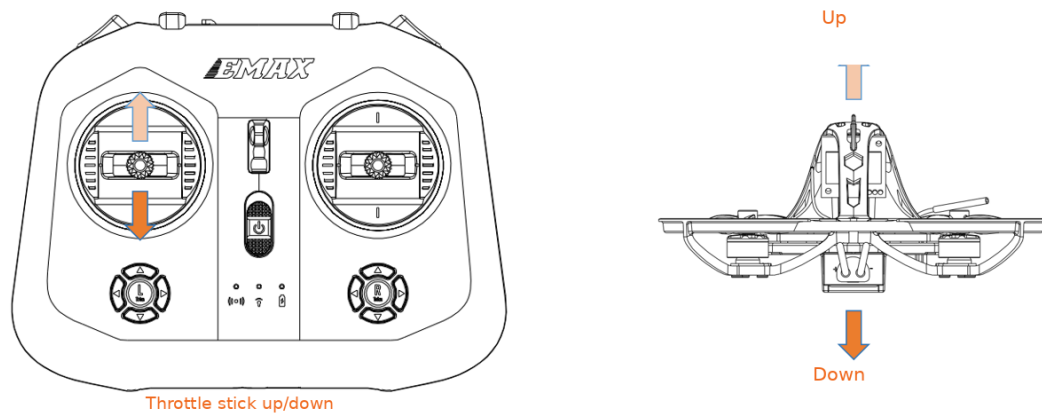
- (1) Place the aircraft on level ground, such as a floor.
- (2) Make sure the throttle stick is fully down.
- (3) Move the AUX1 arm switch from the far-left (disarmed) position to the far-right (armed) position. A beep sounds and the motors begin to spin slowly. The aircraft is armed and the propellers are turning. Do not touch them!

Tip: Move AUX1 back to the disarmed position to stop the motors and disarm the aircraft.

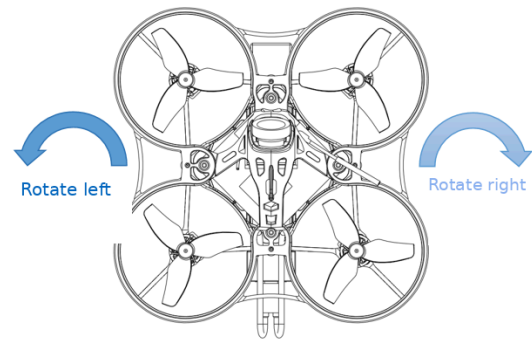
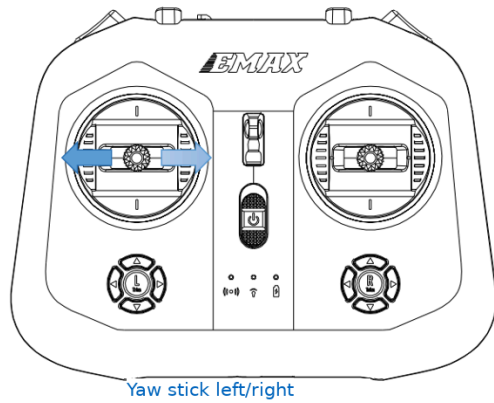


1.3.2 Stick Controls

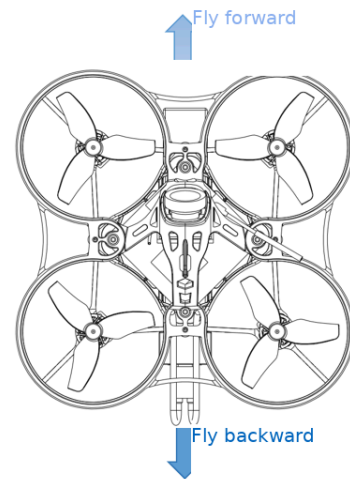
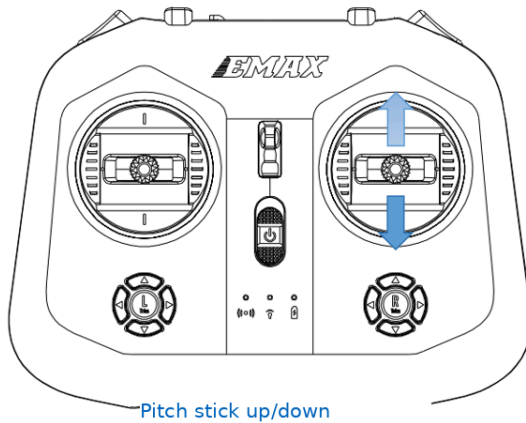
(1) Raise the throttle stick very slowly to lift off gradually. Lower it slowly to descend. Practice holding a steady hover about 1 m above the ground.



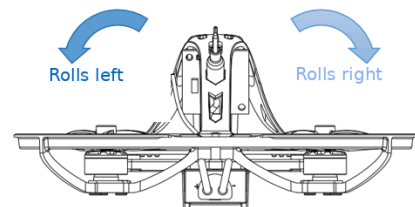
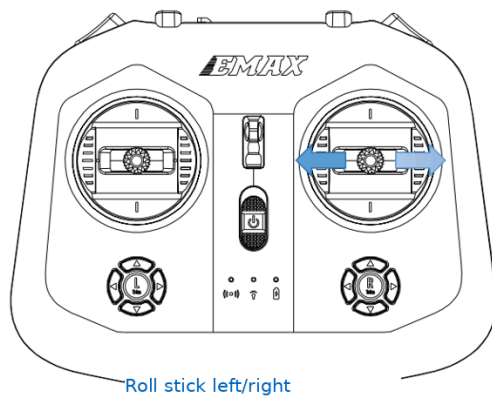
(2) Make small yaw inputs: move the yaw stick left to rotate left, or right to rotate right.



(3) Make small pitch inputs: move the pitch stick up to fly forward, or down to fly backward.



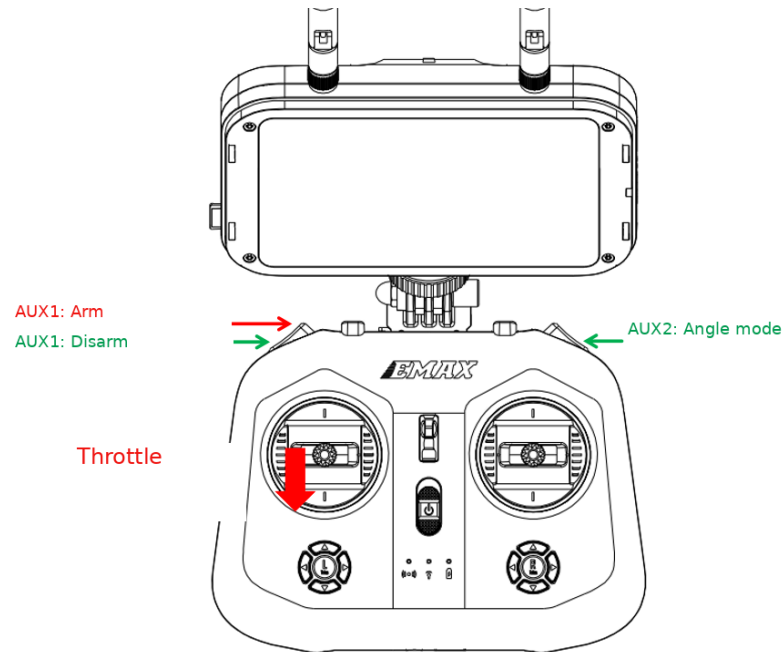
(4) Make small roll inputs: move the roll stick left to roll left, or right to roll right.



1.3.3 Landing and Powering Off

When the goggles display a battery voltage of 3.3–3.5 V, the battery is running low. Typically, about 30–60 seconds remain before it is depleted. Return to your starting point.

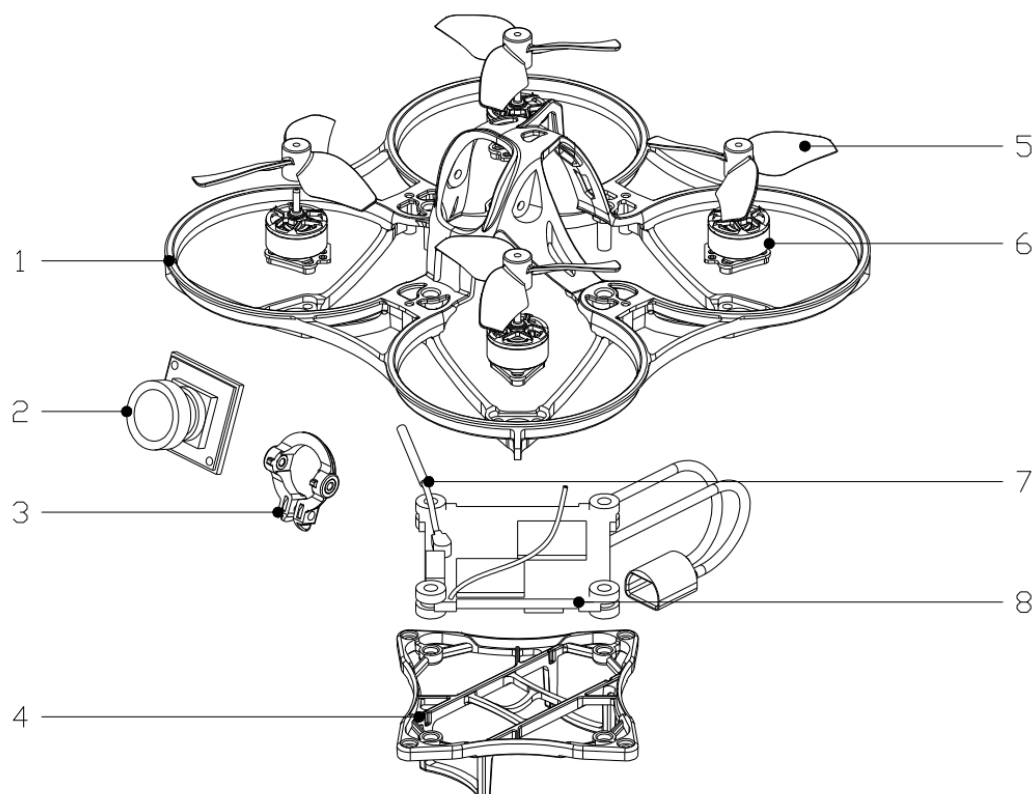
- (1) Slowly pull the throttle stick all the way down to land.
- (2) Move AUX1 to the left, disarmed position. The motors stop.



- (3) Powering off
 - Disconnect and remove the battery from the aircraft.
 - Press and hold the goggles' power button until the screen turns off.
 - Move the transmitter's power switch down to OFF and wait for the status indicator to go out.

2. Tinyhawk Aero_HDZero

2.1 Tinyhawk Aero_HDZero Diagram



1. Frame
2. Camera
3. Camera mount
4. Battery compartment
5. HQProp 31 mm three-blade propeller
6. 0702 brushless motor
7. Antenna
8. AIO5 flight controller

2.2 Tinyhawk Aero_HDZero Propellers

The Tinyhawk Aero_HDZero uses two propeller rotation directions: clockwise (CW) and counterclockwise (CCW). Purchase two CW and two CCW propellers per set. A propeller rotates toward the blunt side of its blade edge. Install each propeller in the correct orientation shown below.

1. Installing the Propellers

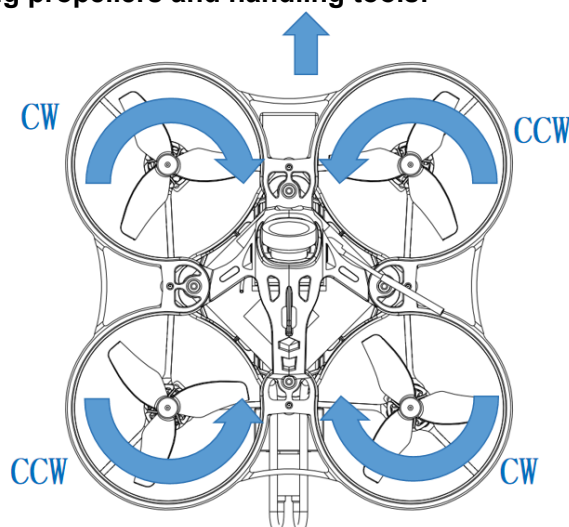
Align the propeller hub with the motor shaft. Support the back of the motor and press the propeller down by hand until it is flush with the shaft.

Warning: Incorrect propeller orientation can prevent the Tinyhawk Aero_HDZero from flying normally and may make it uncontrollable. Check the orientation carefully. Failing to support the back of the motor may break the frame. Use caution when installing propellers!

2. Removing the Propellers

Use a small tool such as a propeller remover to lift the propeller off the motor shaft, or hold the root of a blade and slowly twist it off by hand. Hold the frame firmly around the motor housing with your other hand until the propeller comes free.

Warning: Remove a propeller only when replacing it with a new one. Use caution when removing propellers and handling tools!

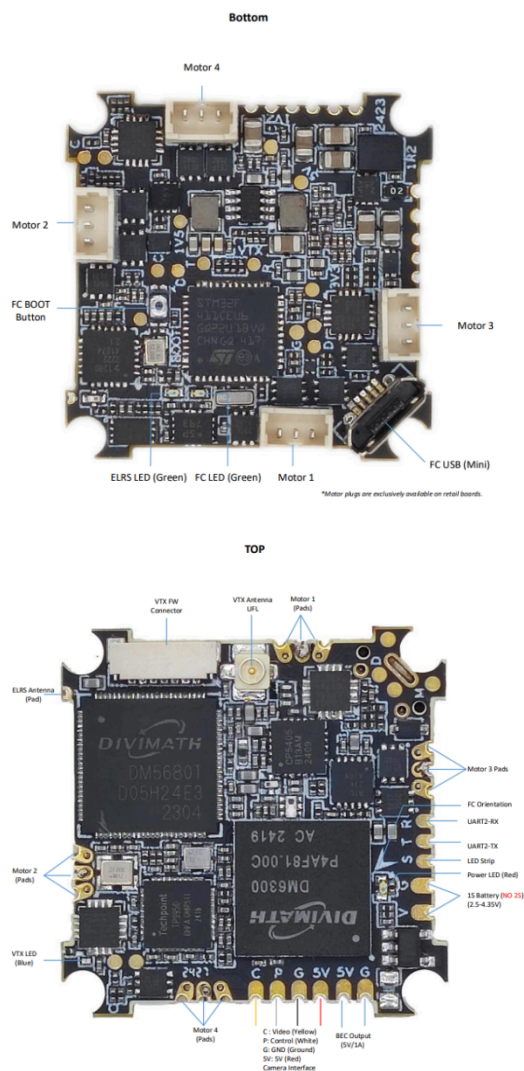


2.3 Tinyhawk Aero_HDZero Camera

Manufacturer	RunCam
Model	HDZ3261
Sensor size	1/3 inch
Resolution	720 at 60 fps, 4:3
Shutter	Rolling shutter
Field of view (FOV)	D: 150° ; H: 120° ; V: 98°
Input voltage	3.3 - 5 V
Power consumption	0.5 W
Weight	1.8 g
Dimensions	L 14 × W 14 × H 13 mm

2.4 Tinyhawk Aero_HDZero AIO5 Flight Controller

The Tinyhawk Aero_HDZero uses the HDZero AIO5, a five-in-one board integrating an F4 flight controller, 5.8 GHz HDZero digital video transmitter, SPI 2.4 GHz ExpressLRS 3.0 receiver, DSHOT four-in-one ESC, and 5 V/1 A BEC.



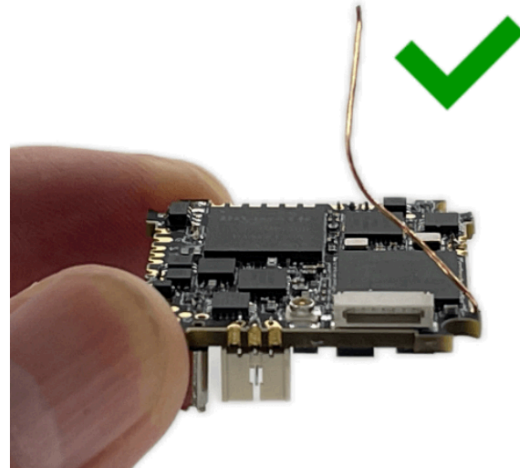
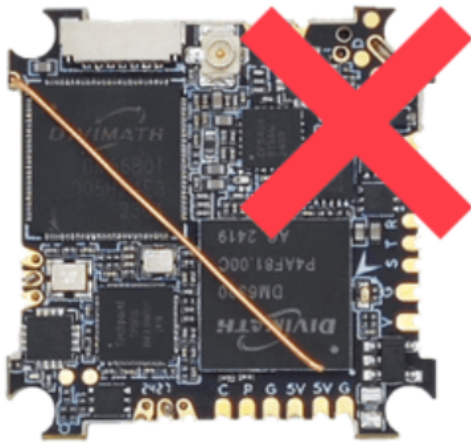
2.4.1 HDZero AIO5 Specifications

- MCU: STM32F411 (100 MHz, 512 KB flash)
- Gyroscope: BM1270 (HDZero AIO5 1R2) / ICM42688P (HDZero AIO5 1R3)
- Integrated voltage and current meters
- Integrated 5 A (per channel) BLHeli_S four-in-one ESC
MCU: EFM8BB21
Current rating: 5 A continuous; 6 A peak (3 seconds)
Factory firmware: O_H_5_48_V0.19.2.HEX
Supports Dshot600
- Integrated 5.8 GHz HDZero video transmitter
RF output: 25 mW / 200 mW
Supported channels: R1–R8, F2/F4, L1–L8
U.FL connector (ultralight linear antenna included)
- Integrated SPI ExpressLRS 2.4 GHz receiver
Available packet rates: 50/150/250/500 Hz
Pre-soldered enamel-wire antenna
Telemetry output power: <12 dBm
- Integrated 5 V/1 A BEC
- Flight controller firmware target: CRAZYBEEF4SX1280
- Power supply: 1S battery (2.5–4.35 V)

2.4.2 HDZero AIO5 Installation Notes

(1) ELRS antenna

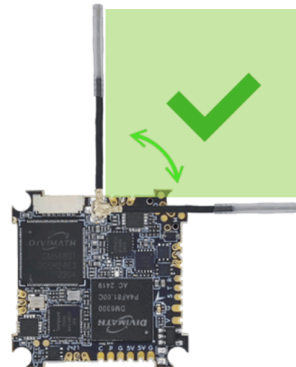
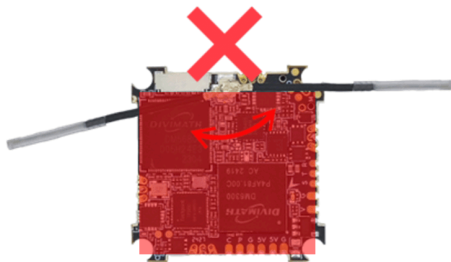
The ELRS receiver's wire antenna (quarter-wave) is pre-soldered close to the board for a compact fit. Raise the antenna so that it is at least 3 mm away from the board.



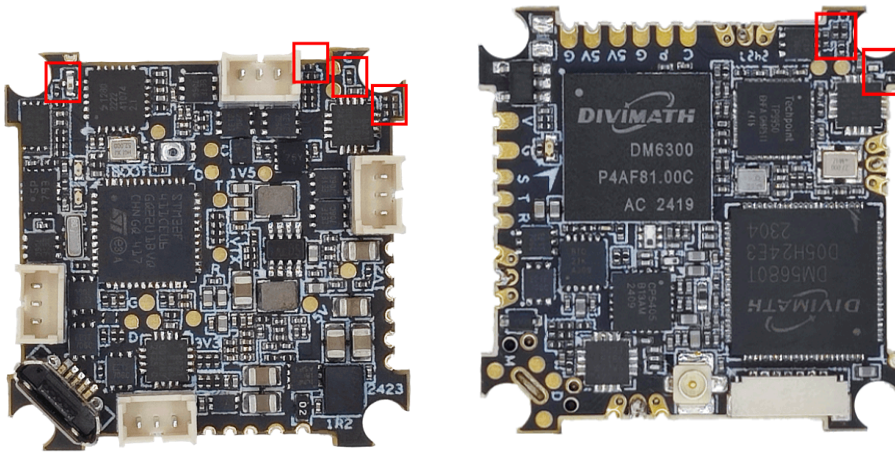
(2) VTX antenna

The HDZero video transmitter integrated into the AIO5 has specific installation requirements to prevent the video RF signal from feeding back into the onboard power amplifier and causing video noise.

Install the VTX antenna facing outward, not inward.



Warning: Take particular care near the mounting holes at the board's edges during installation. Damage in these areas may cause the device to fail. See the areas shown below.

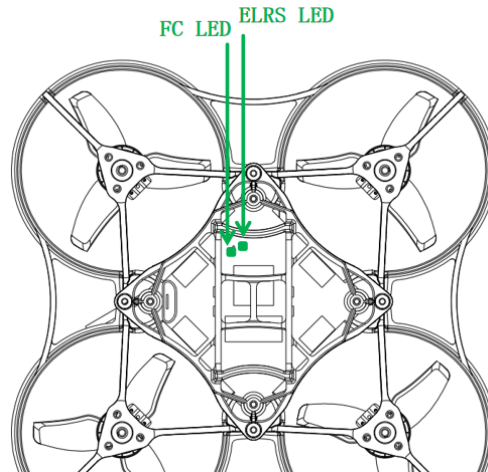


2.5 Indicator LEDs

2.5.1 Flight Controller LED Status

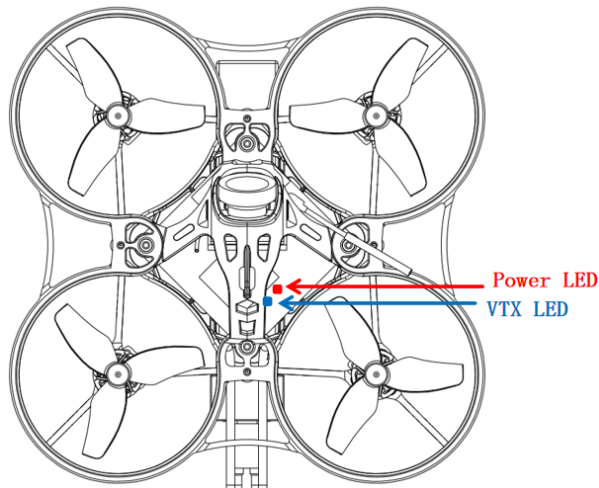
The Tinyhawk Aero_HDZero AIO5 flight controller has a green ELRS LED and a green FC LED. They indicate power, standby, preflight, and flight states, as shown below.

Indicator	LED state	Transmitter signal	Meaning
ELRS LED (green)	Steady	Connected	Aircraft receives transmitter signal; binding succeeded
	Fast flash	Disconnected	Aircraft is in bind mode and searching for the transmitter
	Slow flash	Disconnected	Aircraft does not receive a transmitter signal
FC LED (green)	Slow flash	Disconnected	Aircraft in normal standby
		Connected	Throttle stick is not fully down
	Fast flash	—	Three fast flashes at power-up indicate successful automatic gyro calibration
		Connected	Five fast flashes, motors stopped: AUX1 moved to armed while throttle was not fully down
	Off	Connected	AUX1 disarmed and throttle fully down
	Steady	Connected	AUX1 armed, motors turning; aircraft in normal flight



2.5.2 Video Transmitter LED Status

The Tinyhawk Aero_HDZero AIO5 also has a red Power LED and a blue VTX LED to indicate video transmitter status.



(1) Power LED (red): This indicates power. If it is off or flashing, the VTX may have a fault. It should be steadily red during normal operation. If it is not red, check the VTX power connection.

(2) VTX LED (blue): When the VTX powers up, three quick flashes indicate that VTX–FC communication is active. Without the three flashes, communication has failed, OSD will be unavailable, and the system will not work correctly.

During VTX operation, each mode is shown by a sequence of long (1-second) and short (1/4-second) pulses in a four-second period.



Note: The first three LED patterns indicate errors and take priority over all other modes. If an error occurs, such as VTX thermal protection, its pattern overrides other settings. For example, setting the board to 0 mW while thermal protection is active may not produce an apparent change in the LED pattern.

1 2 3 4 5 6 7 8 9 10 11 12

References

There are two methods for binding the receive

Button binding

When the SPI receiver enters bind mode (the ELRS LED flashes rapidly), insert the ELRS TX module into an OpenTX transmitter. Select External RF mode and set the protocol to CRSF. Find the ELRS menu in the transmitter's System menu (first copy ELRS.LUA to the SD card's Tools folder). Open the ELRS menu and select [Bind]. On successful binding, the RX LED on the flight controller stays lit.

(2) Binding phrase

Starting with Betaflight 4.4 and Betaflight Configurator 10.9.0, you can set an ExpressLRS binding phrase directly on the Receiver page of Betaflight Configurator.

Configure the Receiver page for the ExpressLRS SPI receiver: Set Receiver Mode (1) to SPI RX and SPI Bus Receiver Provider (2) to EXPRESSLRS. Enter your binding phrase in field (3); it is converted to UID bytes (4) and saved to the Betaflight configuration. You can also enable telemetry (5) and make sure RSSI_ADC (6) and RSSI Channel (7) are disabled, as shown.

Warning:

The SPI ELRS receiver does not support D (D250, D500), F (F500, F1000), or Full Res (100 Hz Full Res, 333 Hz Full Res) packet-rate modes. It cannot bind or synchronize with a TX module using those modes.

Supported packet rates: 50, 150, 250, and 500 Hz.

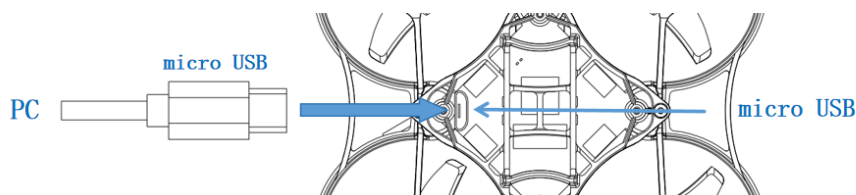
ELRS LED status

- **Steady:** Binding succeeded or a connection is established.
- **Fast flashing (500 ms):** Bind mode.
- **Slow flashing (1 second):** No signal connection to the TX module.

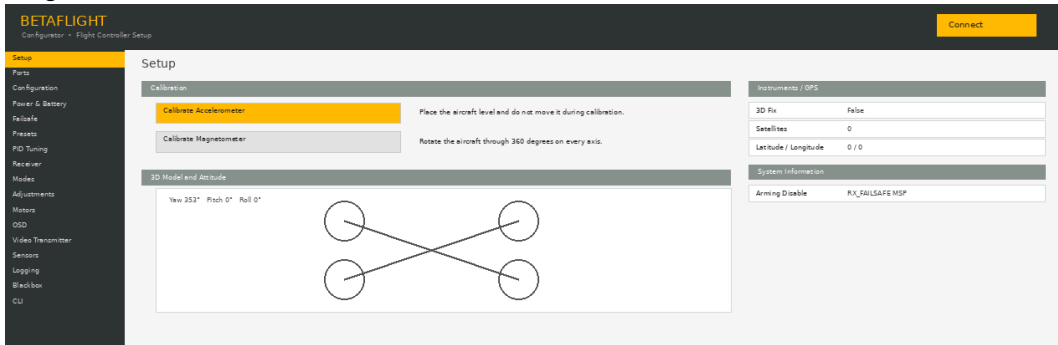
3.2 Calibrating the Accelerometer

The Tinyhawk Aero_HDZero accelerometer is factory calibrated. Recalibrate it if the aircraft drifts consistently in one direction or cannot hover steadily in Angle or Horizon mode, or after replacing the flight controller or reflashing its firmware.

(1) Connect the Tinyhawk Aero_HDZero to Betaflight Configurator with a micro-USB data cable.

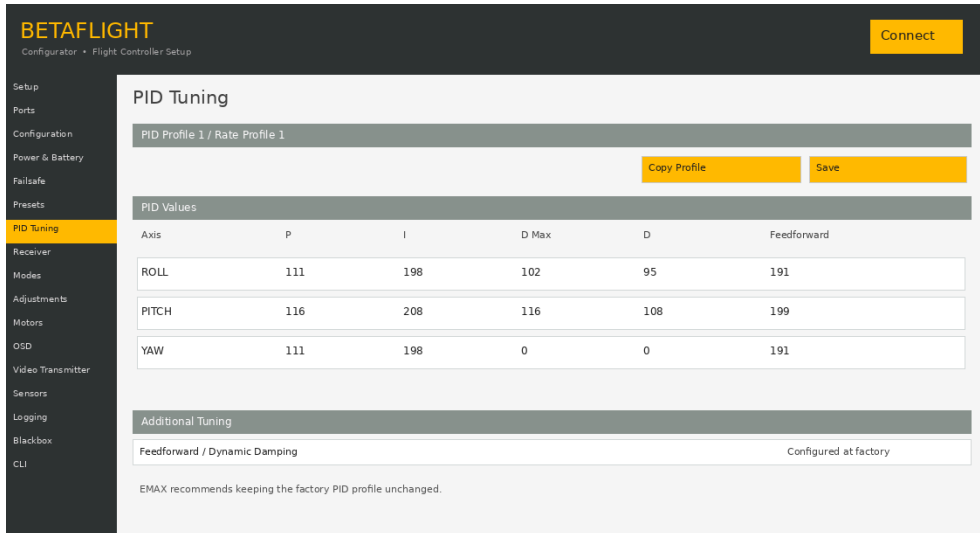


(2) Place the Tinyhawk Aero_HDZero on a level surface. Open Setup in Betaflight Configurator and click “Calibrate Accelerometer.” Do not move the aircraft during calibration.



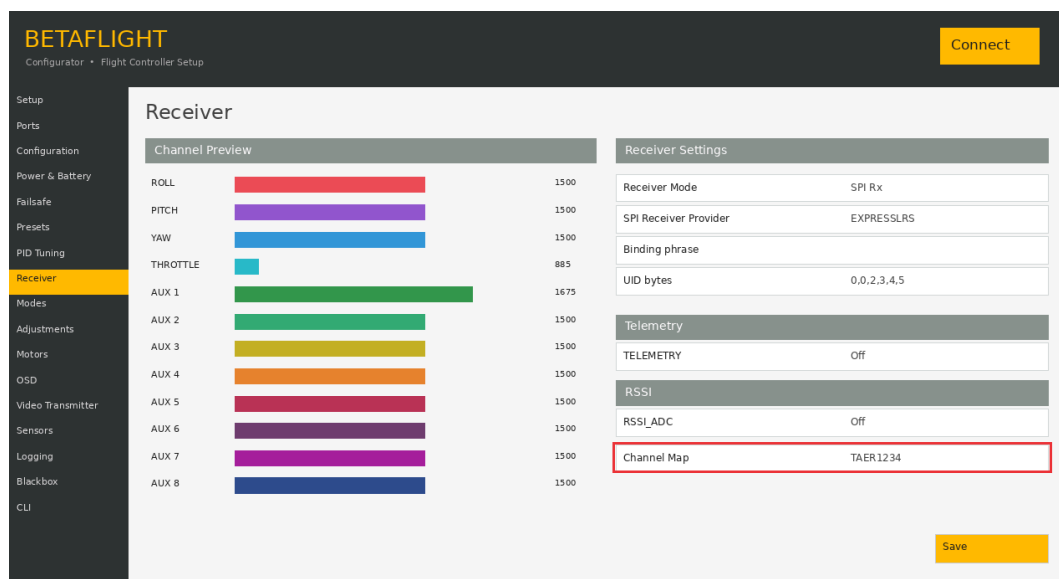
3.3 PID Profile Overview

PID Profile 1 is tuned and optimized for the Tinyhawk Aero_HDZero with a 1S 320 mAh battery for indoor and outdoor flight control. It has been tuned by multiple professionals. EMAX strongly recommends leaving these values unchanged.



3.4 Adjusting Channel Settings

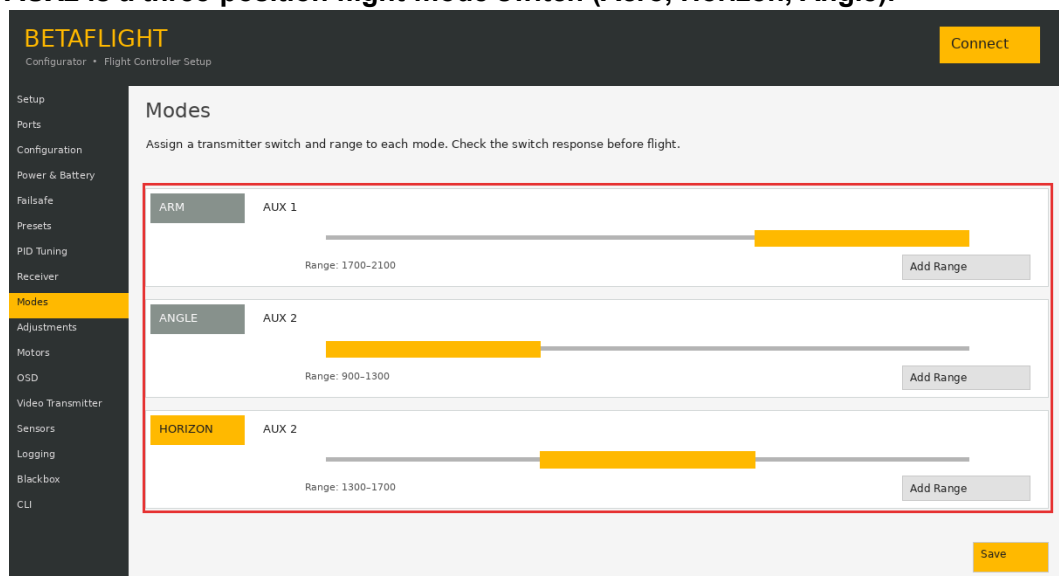
Use Betaflight Configurator to change Tinyhawk Aero_HDZero settings. Betaflight Configurator and flight controller firmware are available at <https://github.com/betaflight/>. The Tinyhawk Aero_HDZero is factory-configured with the TAER1234 channel map.



For example, with the E8 Transmitter GO:

AUX1 is a three-position arming switch (ARM).

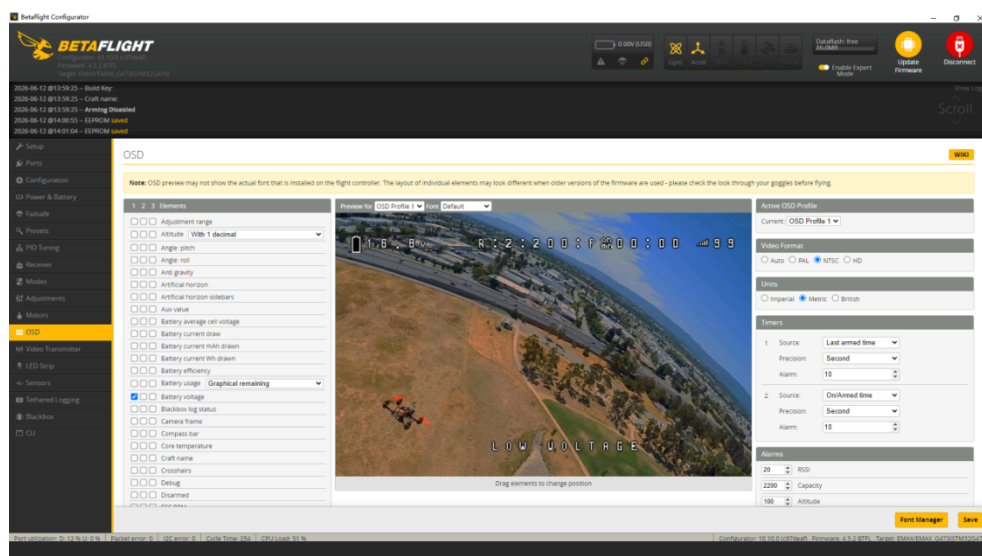
AUX2 is a three-position flight-mode switch (Acro, Horizon, Angle).



Configure your E8 Transmitter GO as described above, or change these settings in Betaflight Configurator.

3.5 Changing OSD Settings

The Tinyhawk Aero_HDZero ships with OSD settings already configured. To change them, connect the aircraft to Betaflight Configurator with a micro-USB data cable. Open the OSD page, select the items you want displayed on the goggles, and click Save. The new settings take effect after restart.



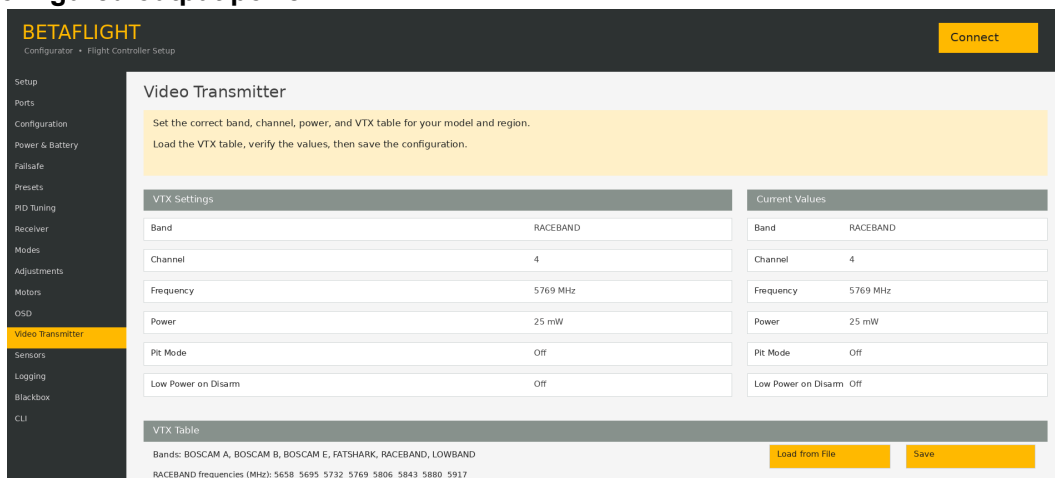
3.6 Changing Video Transmitter Settings

3.6.1 Setting the VTX in Betaflight Configurator

The Tinyhawk Aero_HDZero factory VTX setting is R:4:25 mW. To change it:

Open the Video Transmitter page in Betaflight Configurator. Set the desired band, channel, power, and low-power disarm options, then click Save. The changes take effect after restart.

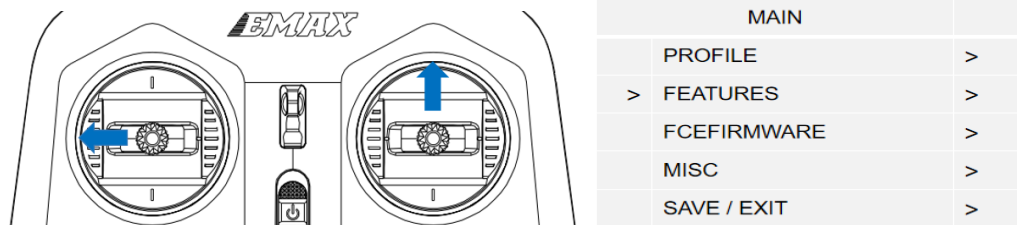
Note: Low-power disarm runs the VTX at low power until arming, then uses the configured output power.



3.6.2 SmartAudio (Changing Settings Through the Goggles' OSD with the Transmitter)

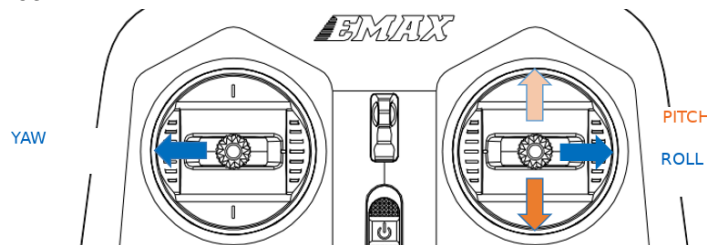
SmartAudio is installed and configured on the Tinyhawk Aero_HDZero. It uses the UART2 TX port. Use transmitter stick commands and the goggles screen to adjust the VTX band, channel, power, and OSD settings. The following example changes the VTX settings.

- ◆ Power on the aircraft, goggles, and transmitter. Confirm that video channels match and the aircraft and transmitter are bound.
- ◆ With the throttle centered, move the sticks to YAW LEFT and PITCH UP simultaneously (THROTTLE MID + YAW LEFT + PITCH UP) to open the OSD menu in the goggles.



- ◆ In the goggles' OSD menu, use these controls:

YAW LEFT: go back; PITCH UP/DOWN: move between menu items; ROLL RIGHT: open a submenu or confirm.



- ◆ Move the cursor to FEATURES and use ROLL RIGHT to open it. Move the cursor to VTX and use ROLL RIGHT. The VTX configuration menu (SMARTAUDIO) opens.

— FEATURES —		— SMARTAUDIO —	
> VTX	>	F R4 5769 25	
LED STRIP	>	> BAND	RACEBAND
POWER	>	CHAN	4
PERSISTENT STATS	>	(FREQ)	5769
BACK		POWER	25
		PIT	OFF
		SAVE & EXIT	>
		CONFIG	>
		BACK	

Set BAND, CHAN, POWER, and other options in the SMARTAUDIO menu. When finished, select SAVE or EXIT to save and leave the menu.

Warning: Select only power levels permitted by local law and regulations!

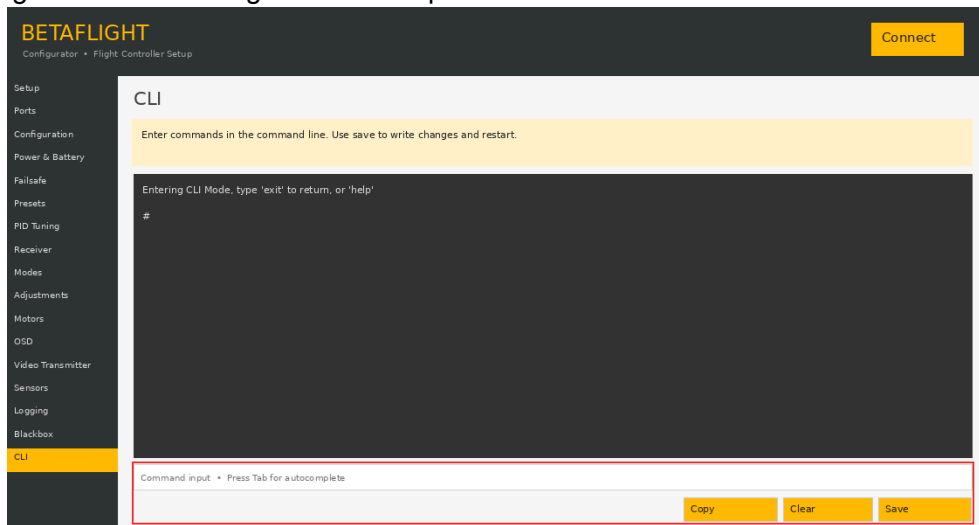
3.7 Changing the Flight Controller Binding UID

Use Betaflight Configurator and the EMAX serial upgrade tool to read the current binding UIDs of the aircraft and transmitter. You can write the aircraft's UID to the transmitter with the EMAX tool, or write the transmitter's UID to the flight controller with Betaflight Configurator.

To change the flight controller's binding UID in Betaflight Configurator, enter the following CLI command (the values 0, 1, 2, 3, 4, 5 are an example):

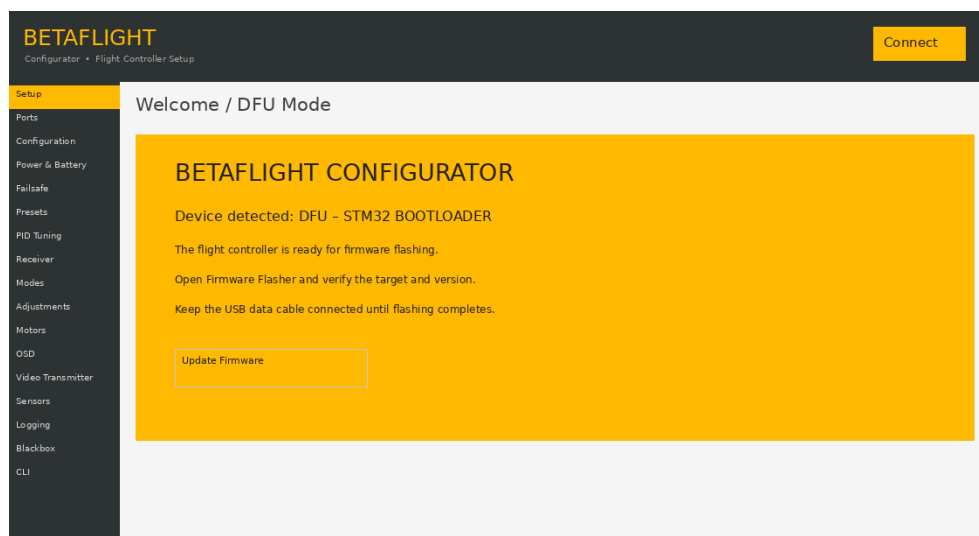
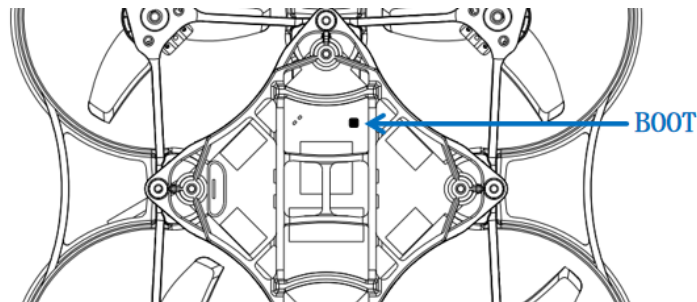
```
set expresslrs_uid = 0,1,2,3,4,5
save
```

Press Enter and wait for the flight controller to restart and reconnect to Betaflight Configurator. The binding UID is now updated.



3.8 Flashing Flight Controller Firmware

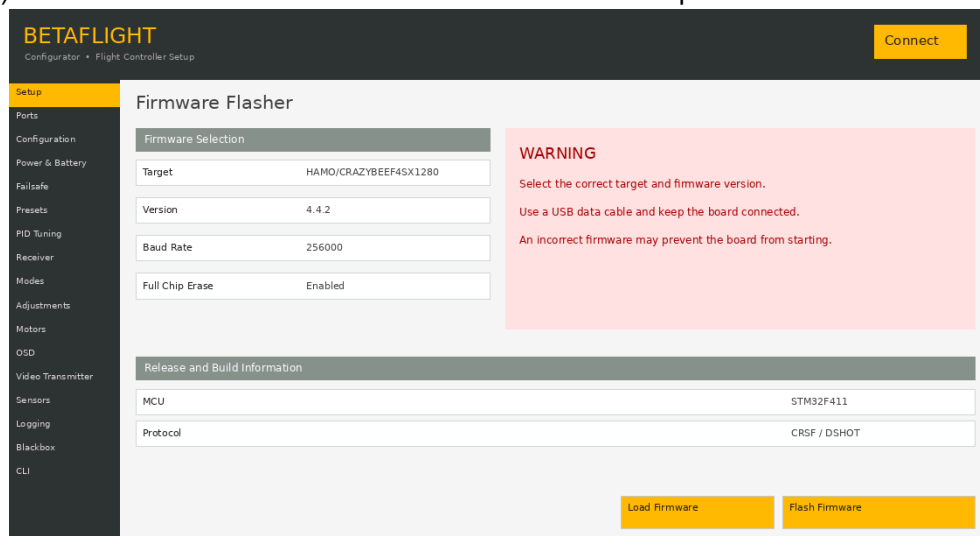
(1) Locate the BOOT button on the flight controller. Hold it while connecting the board with a micro-USB data cable to enter DFU mode, then click Update Firmware. If DFU mode does not start, check the cable and computer drivers.



(2) Select HAMO/CRAZYBEEF4SX1280 (STM32F411) 4.4.2 firmware and choose the manual baud rate of 256000 from the menu.

(3) Select firmware from the Internet or a local file and wait for it to load.

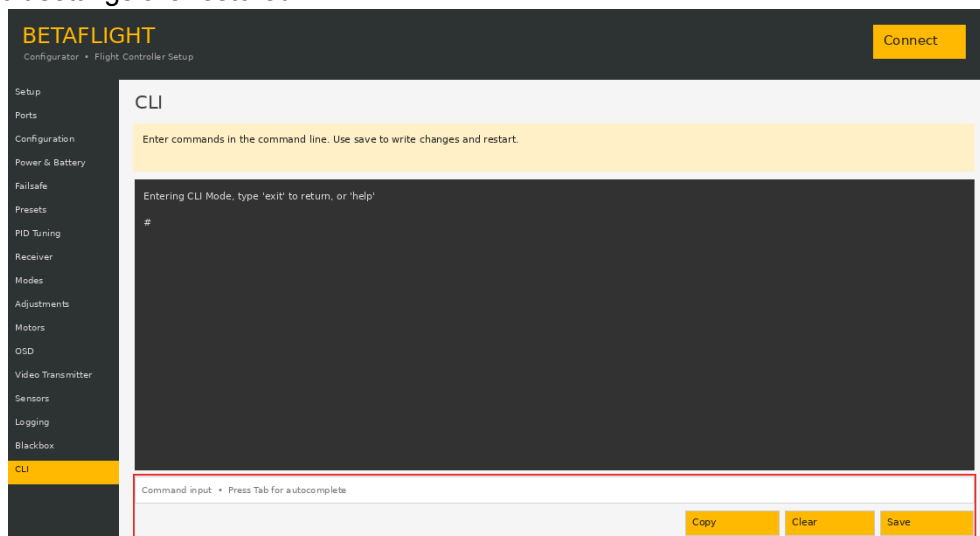
(4) Click Flash Firmware and wait a few seconds for completion.



3.9 Restoring Flight Controller Settings

Download the latest CLI Dump from <https://emax-usa.com/>. Open it in a text editor, copy the entire contents, paste them into the CLI command area, and press Enter.

After the process finishes, the aircraft reconnects to Betaflight Configurator and its default settings are restored.



Disclaimer:

The Tinyhawk Aero_HDZero has been tuned for optimal performance. Changing the PID settings may affect flight time, overall speed, control, and motor temperature. We do not recommend changing any PID settings or upgrading to a newer firmware version.

4. Battery Safety and Precautions

The recommended battery for the Tinyhawk Aero_HDZero is a 1S 320 mAh high-voltage lithium battery. Handle it safely.

4.1 Inspection and Emergency Response

(1) Before every use, inspect the battery. If you notice swelling, deformation, damage, or leakage, stop using it immediately and dispose of it properly as hazardous waste. Do not charge it or fly with it.

(2) Never puncture, crush, drop, disassemble, or modify the battery.

(3) Keep exposed EM2.0 connectors on unused batteries away from metal objects to prevent short circuits.

(4) If the battery smells unusual, smokes, overheats, or catches fire during charging or use:

- ◆ Disconnect the power immediately!
- ◆ Small fire: Cover with a generous amount of dry-powder extinguishing agent or sand.
- ◆ Large fire: Evacuate immediately and call the fire department.

4.2 Charging Safety

(1) The 1S 320 mAh high-voltage lithium battery has a maximum full-charge voltage of 4.35 V. Use an EM2.0 charger designed for 1S high-voltage lithium batteries or another charger that supports this battery type.

(2) Always supervise charging. Never leave the battery charging unattended for an extended period.

(3) Charge in a safe, well-ventilated location at an appropriate ambient temperature (for example, 10–45 °C), on a firm nonflammable surface such as tile or concrete. Remove flammable materials within 1 m.

(4) After a flight, let the battery cool to room temperature (about 25 °C) before charging.

(5) Never reverse the charging polarity. Connect the battery's positive and negative terminals correctly. Reverse polarity may prevent charging and can cause odors, smoke, overheating, short circuits, or other serious hazards.

4.3 Discharging and Use

(1) During FPV flight, enable the battery voltage display in the goggles' OSD or use a voltage alarm for continuous monitoring. Landing at or above 3.2–3.3 V is recommended to avoid overdischarge. The minimum safe discharge limit for a 1S battery is 3.0 V; dropping below it can permanently damage the battery.

(2) Avoid excessive discharge. Prolonged full-throttle flight draws high current, causes sudden voltage sag and heat buildup, damages the battery, and may cause loss of control from low voltage.

4.4 Storage and Maintenance

(1) Storage voltage: If you will not fly for more than three days, charge or discharge the battery to 3.7–3.9 V. Do not store it fully charged for an extended time; doing so can cause swelling and loss of capacity.

(2) Storage conditions: Store in a dry, cool, dark place at –20 to 35 °C. For storage over three months, an environment of 23 ± 2 °C and ≤75% relative humidity is recommended. A dedicated fire-resistant battery bag is preferable.

(3) Periodic maintenance: Even during extended nonuse, perform a full charge/discharge cycle every three months, then return the battery to the 3.7–3.9 V storage range to maintain battery performance.

5. Flight Safety

5.1 Preflight Preparation

(1) Choose a suitable flying area.

(2) Check the equipment:

Tinyhawk Aero_HDZero aircraft: Check that the frame is not deformed; propellers and motors are correctly installed and rotate freely; VTX and antenna connections are secure; and the battery is firmly attached and adequately charged.

Transmitter: Confirm that all buttons and sticks work, the battery is charged, and the transmitter is bound to the aircraft.

Goggles: Confirm that all buttons work, the battery is charged, the video channel matches the aircraft, and the OSD image is clear and displays normally.

(3) Choose immersive or screen-mounted FPV flying.

(4) Select Angle, Horizon, or Acro flight mode.

(5) Check the hover at low altitude: Arm the aircraft, slowly raise the throttle to about 1 m, and hover for 2–3 seconds.

Check for the following:

Abnormal vibration (resolve any problem before continuing).

Unintended yaw or drift (recalibrate the accelerometer if necessary).

5.2 Monitoring During Flight

5.2.1 Battery Voltage

Keep checking the aircraft battery voltage in the goggles' OSD.

(1) Fully charged battery: 4.35 V (the displayed value in use may be lower).

(2) Low-battery warning: Return when in-flight voltage falls to about 3.3–3.5 V, accounting for the distance from the pilot. Land at or above 3.2–3.3 V to avoid overdischarge. The minimum safe discharge limit for a 1S battery is 3.0 V; going lower can permanently damage it.

5.2.2 Safety Margin

Altitude: Beginners should practice below 10 m and leave enough room to recover.

Distance: Keep the aircraft nearby and within visual line of sight (recommended within 200 m), or at least where the video is clear and the signal stable.

Avoid people: Keep away from crowds and never fly directly over anyone, even at altitude. If control is lost, a grassy or dirt area is a safer crash site than a road, vehicle, or crowd.

5.2.3 Signal Awareness

If video becomes snowy or OSD displays “RXLOSS” (receiver signal lost), hover or reduce altitude immediately. Do not continue forward. Reorient the antenna or return to an area with a stronger signal.

5.3 Landing and Inspection

Land on a level surface. Immediately disarm the aircraft with AUX1, disconnect its battery, and let it cool on a safe, heat-resistant surface.

Check the motors and flight controller for a burnt smell and confirm that the motors rotate normally. If everything is normal, install another battery to continue flying, or turn off the transmitter and goggles.

Thank you for purchasing our product. Enjoy your flight!



Warning:

Be aware of your surroundings. Not for children under 14. Contains small parts.
Keep away from children to prevent accidental swallowing.



MADE IN CHINA