BETAFPV

Cetus X HD

FPV KIT

—— Betaflight Firmware Version ——

BETAFLIGHT × **ExpressLRS**

User Manual

Version No.I   2023-12-15

Contents

1. Product List

1 x Cetus X HD Brushless Quadcopter (Betaflight Firmware)
1 x LiteRadio 3 Transmitter
1 x Fatshark Recon HD FPV Goggles

Box Contents:
2 x BT3.0 450mAh 2S LiHV Battery
1 x XT60 3000mAh 2S FPV Goggles Battery
1 x 2S Battery Charger and Voltage Tester| BT3.0 (white)
1 x 2S Battery Charger and Voltage Tester| XH2.54 (black)
4 x 2020 4-Blades Prop (Spare Set)
1 x Goggles Headband
1 x Goggles Nose Pad
1 x Propeller Removal Tool
1 x Special Screw Package (Spare Set)
1 x Phillips screwdriver
1 x 4Pin Adapter Cable
1 x Avatar HD Mini Camera Manual
1 x Cetus X HD Kit Manual
1 x Fatshark Recon HD FPV Goggles Instruction Card
1 x DC5.5 to XT60 Power Cable (1.2 Meters)
1 x USB Type-C Adapter Board (Used with 4Pin Adapter Cable to adjust parameters on Betaflight Configurator)
1 x JST Type-C Adapter Board (Used with the exposed JST0.8 cable on the drone to export recorded camera videos)
1 x Portable Storage Bag

2. Pre-flight Checks

1. Check all parts are included according to product check-list. Ensure all parts are intact and the frame is undamaged.

2. Ensure that propellers and motors are installed correctly and stably.

3. Ensure the motors can spin smoothly. If there are any obstructions, such as propeller friction or foreign objects entangled, please deal with them first.

4. Ensure batteries (of transmitter, quadcopter, and FPV goggles) are fully charged.

5. This quadcopter uses BT3.0 450mAh 2S LiHV battery. When connecting the battery, please ensure that the positive and negative poles of the battery match with the poles of the quadcopter power cable.

6. The BT3.0 450mAh 2S LiHV battery should be installed with the BETAFPV logo facing outward for proper connection to the quadcopter's power supply line.

7. Familiarize yourself with the functions of each joystick before flying. For detailed information on the transmitter joystick functions, please kindly refer to the manual.

8. During the test flight, keep a safe distance in all directions around the quadcopter (at least one meter). Operate the quadcopter carefully in an open space.

3. Quick Start Guide

3.1 Quick Start

Before flying, verify that the remote control radio transmitter is successfully connected with the quadcopter, all basic controls are functional, and the quadcopter can be taken off normally.

● Step 1: Take out the remote control radio transmitter and set the throttle joystick and two switches SB and SC on the top to the lowest position while ensuring that switches SA and SD are pop-up. Hold the power button on the remote control radio transmitter for 5 seconds until it beeps three times, and then release. When the remote control radio transmitter power indicator turns from flash red to solid blue, it means the transmitter has been successfully powered on.
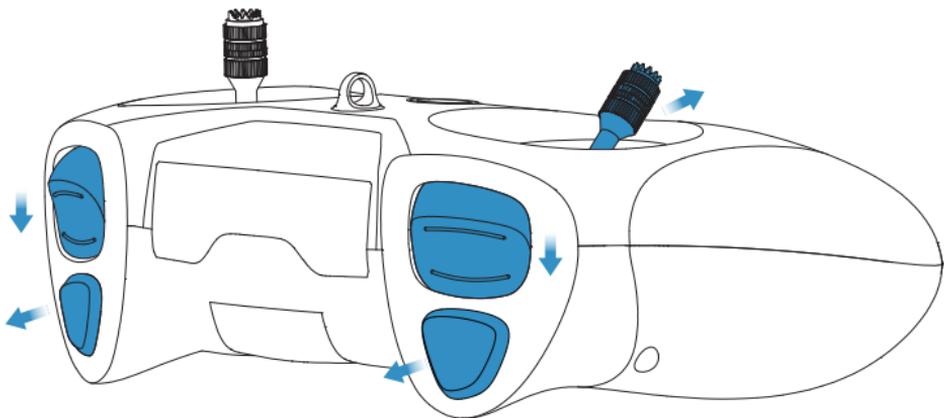
Set the Throttle, SB and SC to the Lowest Position and
Ensure That Switches SA and SD Are Pushed Up

● Step 2: Install the battery into the battery mounting slot under the quadcopter. Connect the quadcopter with the battery, and then place the quadcopter on a horizontal surface. Wait 3-5 seconds until its green LED lights on the FC board to change from flashing green to solid green, which represents a complete initialization of the quadcopter and its successful connection with the remote control radio transmitter.

Green LED
Blue LED
RGB LED

BIND Button
RGB LED
USB Port
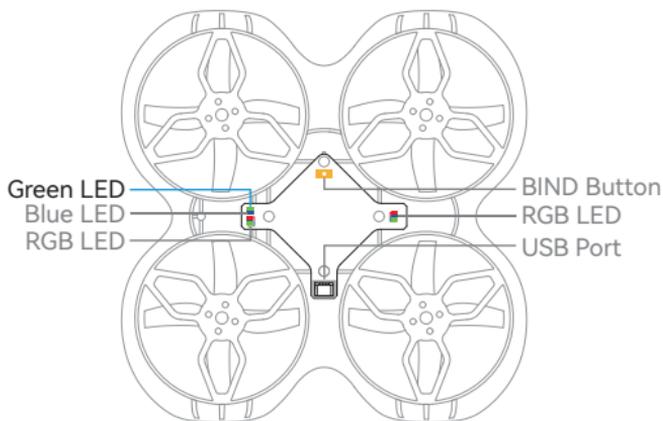
● Step 3: Press switch SA to arm the quadcopter. The throttle joystick must be at the lowest position or the quadcopter will not be armed. After being armed, the motors will spin slowly. Pressing SA again and making it push up will help disarm the quadcopter and stop motors.
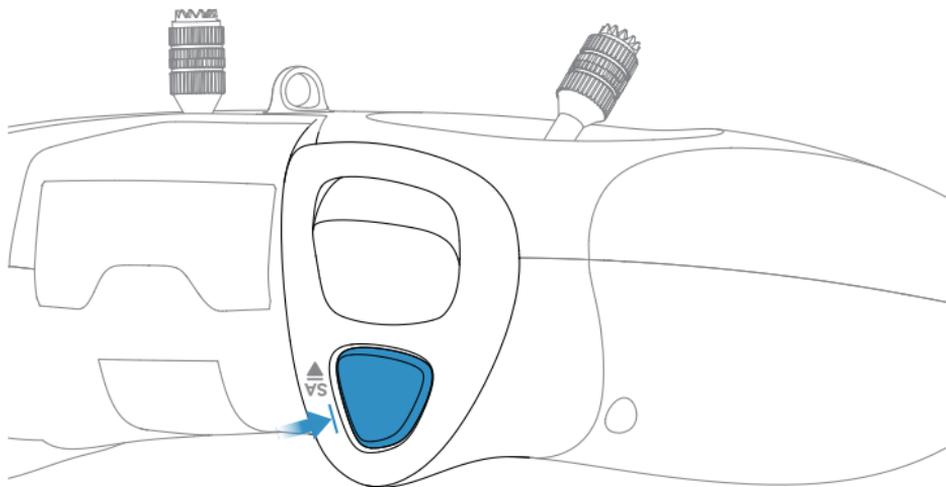
Press the Switch SA to Arm the Quadcopter

Complete above three steps to ensure that the quadcopter and the remote control radio transmitter can work normally. Then, the following flight operations can be continued.

3.2 Flight Operations

● Step 4: Re-arm quadcopter (step 3). Motors will spin at a low speed.

Throttle (left) Joystick:

  Up/down controls the rate of ascent/ descent.

  Left/Right controls counterclockwise/ clockwise rotation.

Ascent

Joystick Up/Down

Decent

Counterclockwise Rotation

Clockwise Rotation
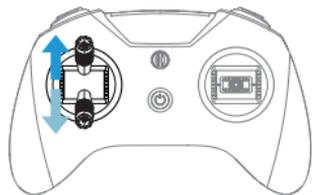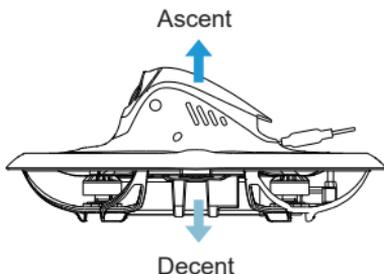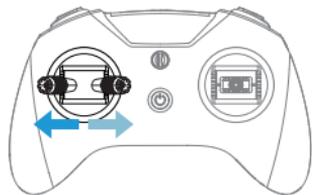
Joystick Left/Right
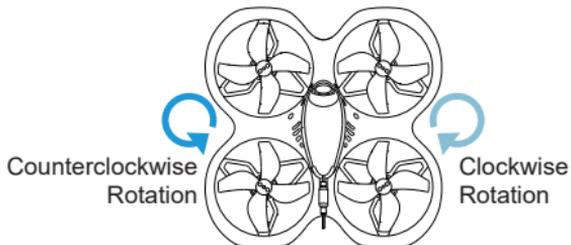
Direction (right) Joystick:

  Up/down controls forward/ backward tilt (pitch).

  Left/right controls left/ right tilt (roll).
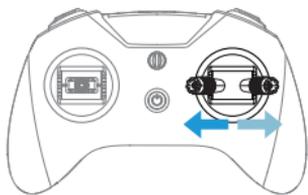
Joystick Left/Right
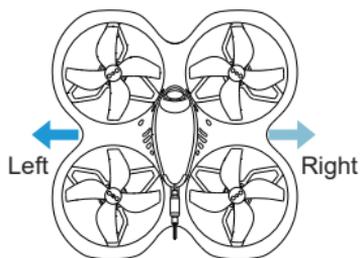
Before flying with goggles, it is recommended to practice and get familiar with the sensitivity of joysticks by following the above-mentioned operation steps.

Caution:
1. Find a suitable open place for the first flight.
2. Give a slow push to the joysticks, especially the throttle joystick.
3. If the quadcopter becomes out of control or collides with objects, press switch SA immediately to disarm, and motors will stop spinning.

● Step 5: Land quadcopter steadily and press switch SA to make it push up, which is shown as below:
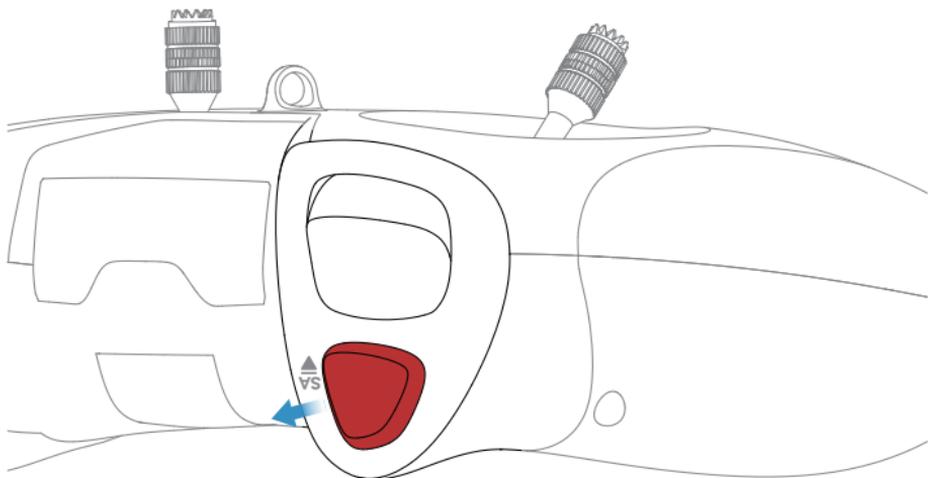
Press switch SA to pop-up status to disarm the drone

● Step 6: Disconnect the batteries with the quadcopter through removing it from the mounting slot. Holding the power button on the remote control radio transmitter and the remote control radio transmitter will stop work after three beeps.

3.3 First Person View (FPV)

First-person view (FPV) is to operate the quadcopter through the real-time image transmitted by FPV goggles' camera.

The goggles in this kit has been paired with the quadcopter by default. Take out the goggles and power the goggles with 2S 3000mah battery provided in the kit. Image should appear on goggles once powering on the quadcopter and goggles. Next, power on the radio transmitter to control the quadcopter to enjoy flying in HD imagery.

FPV Goggles 2S Battery

XT60 Port
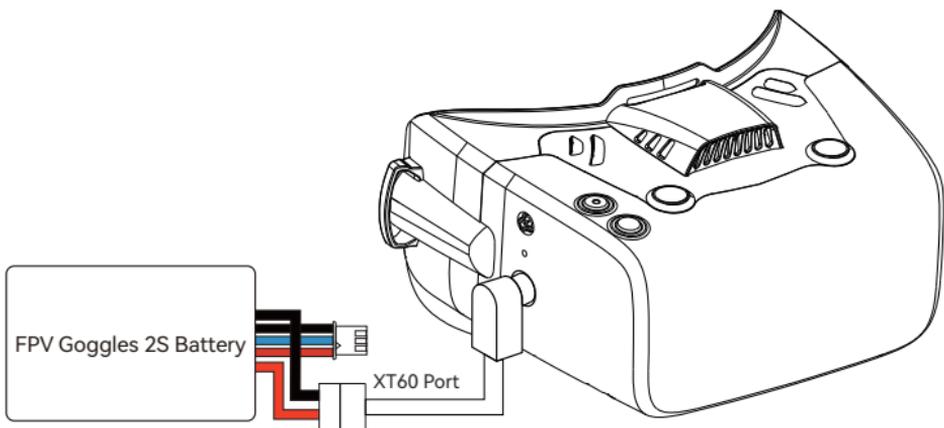
Power the goggles with the FPV goggles 2S battery provided in the kit

Caution: If goggles and quadcopter is not paired, please refer to the following chapter "5.1 Avatar HD Mini Camera and Goggles Binding".

3.4 On Screen Display (OSD)

Once the binding is complete, flight information and FPV camera images will be shown on the display. This information is called On Screen Display (OSD) , which is shown as below:

RSSI dBm value   Link Quality   Flight Status   Flight Mode

```
..ıl – 1 3 0              B A T T  <  F U L L           A N G L
LQ 2 : 1 0 0             C E T U S   X   H D      FLY  0 0 : 0 0
                                                   TIME
🔋 7 . 4 8 ᴗ

              ▬ 7.3V
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Quad Battery   Goggles   Model of Quad   Flight Time
Voltage   Battery Voltage
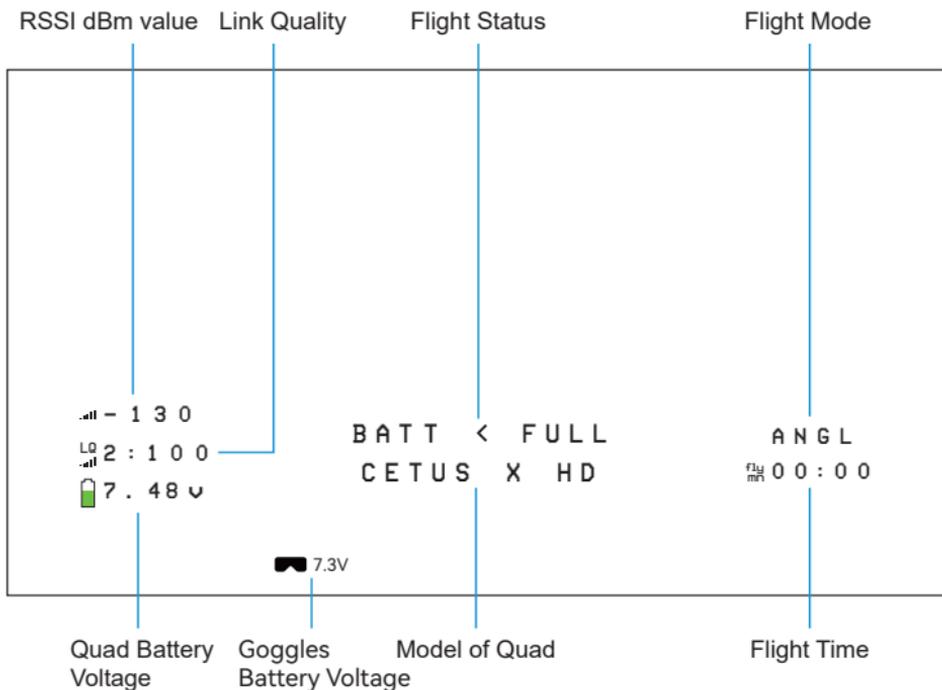
About OSD information:

● The flight status of the quadcopter is displayed in the center.

　ARMED indicates unlocked status;

　CRASH FLIP SWITCH indicates activated Turtle Mode;

　BATT < FULL indicates that the battery voltage status;

● Status of the quadcopter is displayed in the bottom of the screen, including the quad model, signal quality of the remote control, quad battery voltage, flight time, flight mode and goggles battery voltage.

3.5 Flight Modes

The flight mode is displayed in the lower left corner of the flight screen, corresponding to the different quadcopter flight modes. Pilots can choose different flight modes according to different flight environments and their different preference for operating the quad.

1. Angle Mode: when the quadcopter ascends, pilots need to control and adjust the altitude of the quad through the throttle joystick. The position of the direction joystick controls the tilt direction and tilt angle of the quadcopter. After moving the throttle joysticks back to the center, the quadcopter will return to a horizontal position. Although Angle Mode does not have auxiliary functions like altitude-hold or position-hold, it is still an easy mode equip with betaflight firmware for beginners to start their FPV trip. ANGL displayed in the OSD represents Angle Mode.

2. Horizon Mode: Pilot needs to control the flight altitude through the throttle joystick. The quadcopter will maintain a horizontal attitude when the direction joystick is moved to the center. Compared with Angle mode, this mode allows pilots to do flips and rolls as there is no limitation of full stick deflections. Horizon mode is suitable for skillful pilot and also without auxiliary functions like altitude-hold or position-hold. HOR displayed in the OSD represents Horizon Mode.

3. Air Mode: One type of Acro mode. The altitude and attitude of the quadcopter are manually controlled by pilot. The quadcopter will maintain its current position when the direction joystick is moved to the center. But compared with Acro mode, pilots can hold its roll and pitch position when the stick is at full deflection. With no auxiliary functions like altitude-hold or position-hold, the flight on Air mode totally depends on the operation of pilots on the remote control, which is relatively hard. AIR displayed in the OSD represents Air Mode.

4. Turtle Mode: If the quadcopter crashes into the ground and the fuselage is flip, the turtle mode can be activated to reverse the motor and turn the quadcopter back to the front. When the mode is in use, the direction joystick is used to control the rotation of motors to drive the blades to rotate in the reverse direction, realizing a reverse rotation of the fuselage. CRASH FLIP SWITCH displayed in the center of the OSD represents Turtle Mode. For more details, please refer to the chapter "8.1 Turtle Mode".

The flight mode is selected by a switch SB on the remote control radio transmitter. For more details, please refer to the chapter "4.1 Switch Functions".

3.6 Battery Charging

The kit is equipped with two type of 2S batteries for the quadcopter and googles respectively. The white 2S BT3.0 charger is prepared for charging quadcopter batteries, while the black 2S XH2.54 charger is prepared for the goggles battery. The display status of the two chargers are the same.

Quadcopter Battery Charging

Each battery provides about 5.5 minutes of smooth flight. When LOW VOL is displayed in the OSD flight interface, which indicates that the battery is too low and needs to be charged. Charging this battery to full capacity takes approximately 20 minutes using a BT3.0 2S Battery Charger. Charging steps are shown as below:

1. Connect adapter and battery charger with Type-C cable and plug the adapter into the power socket.
2. To charge the battery, connect the 2S battery to the BT3.0 port.
3. When the LED digital display shows the battery voltage and indicator stays solid red, the battery is charging; When LED digital display is circling rectangular display and the indicator turns off, the battery is fully charged and charging ends.

Adapter

Type-C Port

2S Battery Charger and Voltage Tester | BT3.0 (white)

2S Battery

Cautions:
1. Please pay attention to the positive and negative pole signs labeled on the charger. Please do not charge with the reversed pole.
2. This charger supports high-voltage 2S batteries charging. if it is used to charge standard-voltage 2S batteries (8.4V), there is the risk of overcharging. Please pay attention to the type of battery;
3. If the LED digital display shows that voltage exceeds 8.7V while charging, (such as 9V), please power off immediately to check whether the battery and charger are damaged.

Goggles Battery Charging

The equipped XT60 3000mAh 2S FPV goggles battery can last up to 2.5 hours. When the goggles displays for the low-battery alarm, goggles beeping, and the voltage signal flashing red, this indicates that the battery is in low in power and charging is needed. Charging this battery to full capacity takes approximately 2 hours using a XH2.54 2S Battery Charger. Charging steps are shown as below:

1. Connect adapter and battery charger with Type-C cable and plug the adapter into the power socket.
2. To charge the battery, connect the 2S battery to the XH.54 balance port.
3. When LED digital display shows the battery voltage, and indicator stays solid red, this indicates the battery is charging. When LED digital display is circling rectangular display and the indicator turns off, the battery is fully charged and charging ends.

XT60 Port

FPV Goggles 2S Battery

Type-C Port

Adapter

2S Battery Charger and Voltage Tester | XH2.54 (black)
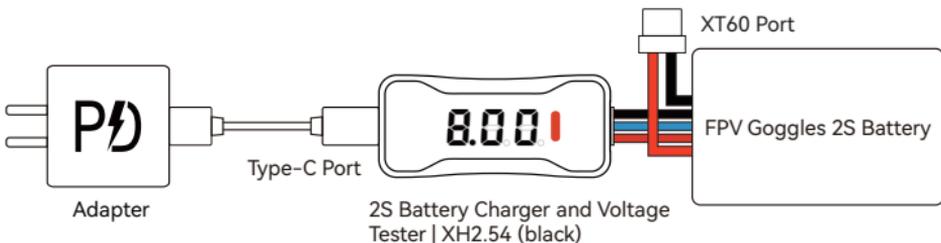
Cautions:
1. Please pay attention to the positive and negative pole signs labeled on the charger. Please do not charge with the sides reversed.
2. This charger supports the charging of ordinary voltage 2S batteries. Using this charger to charge high-voltage 2S batteries (8.7V) will lead to battery being undercharged. Please pay attention to distinguishing the type of battery;
3. If the LED digital display shows voltage exceeds 8.4V, (such as 9V). Please power off immediately to check whether the battery and charger are damaged.

Charger Display Functions

Disconnect the power connection of the charger, connect 2S battery to charger, and the charger will display the total voltage of 2S battery and the voltage of two individual cells.

Total battery voltage:

ALL	8.00

Cell 1 voltage:

b-1	4.00

Cell 2 voltage:

b-2	4.00
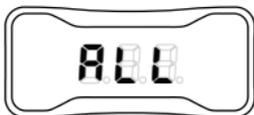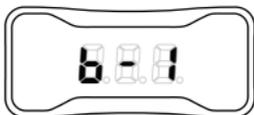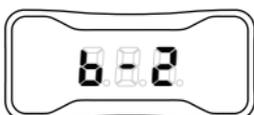
The LED digital display and red light of the charger indicate the working status of the charger.

LED Digital Display	Indicator Status	Description
Circling rectangular display	Red light off	Not charging
Total voltage	Red light on	Charging
Rectangle symbol	Red light off	Charging completed
No display	Red light flash	Abnormal battery

Note: When the charger fails to work or the red light flashes, please check whether the battery is working normally or replace the battery for charging.

4. Remote Control Radio Transmitter

The remote control radio transmitter included in this kit is the LiteRadio 3 (ELRS 2.4G). Indication of functions of button and switches is shown as below.

Switch SC

Switch SB

Switch SD

Switch SA

Throttle Joystick

Direction Joystick

Power Button

LED Ring

SETUP   BIND

Audio Port Type-C Port
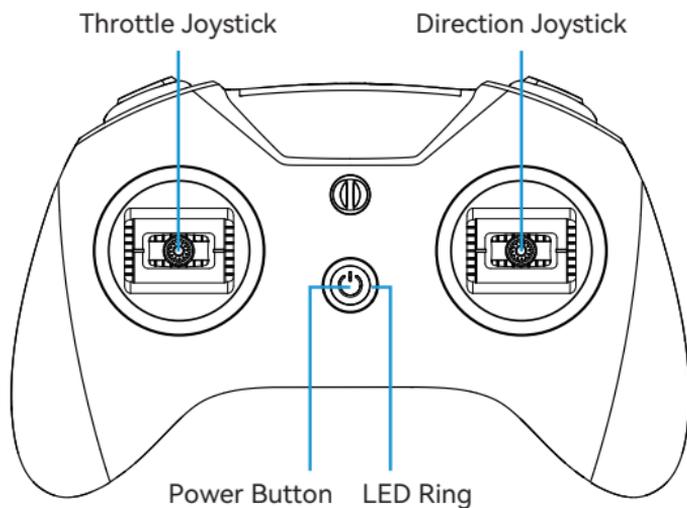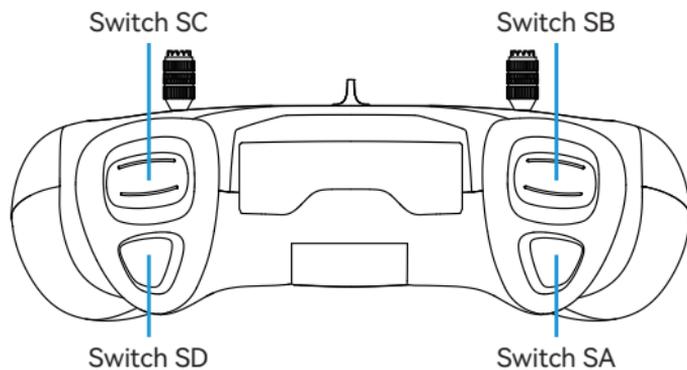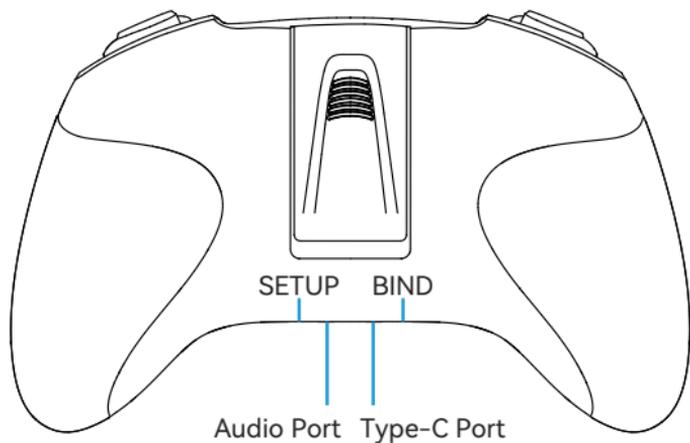
4.1 Switch Functions

Four switches are provided on the front of the remote control radio transmitter: switch SA, switch SB, switch SC, and switch SD, as shown below. Pilot can change different modes and parameters of the quadcopter with these switches. Please take notice that these switch can only work after the remote control radio transmitter is successfully connected to the quadcopter.
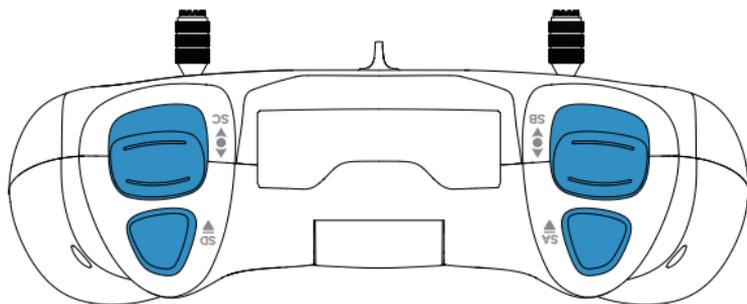
Switch SA: Arm/Disarm Quadcopter

● Quadcopter will be disarmed if switch SA is up.
● Quadcopter will be armed if switch SA is pressed.

Switch SB: Flight Mode of Quadcopter
● The flight mode is "Angle Mode" if switch SB is down (ANGL).
● The flight mode is "Horizon mode" if switch SB is in the middle (HOR).
● The flight mode is "Air mode" if switch SB is up (AIR).

Switch SC (If the Quadcopter is facing down) : Control for Turtle Mode
● Switch SC up will enter Turtle Mode
● (Once the Quadcopter is facing up) Pressing the switch to down or middle will turn off Turtle Mode

Switch SD: Unused

4.2 Joystick Functions

Two joysticks (throttle&direction joysticks) on the front of the remote control radio transmitter control the quadcopter as following: Ascent/descent (throttle), forward/backward tilt (pitch), left/right tilt (roll), and rotation of flight direction(yaw).
Throttle (left) Joystick - Ascent/descent (throttle) and rotation of flight direction (yaw).

Ascent
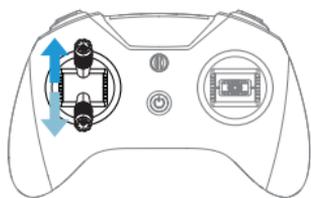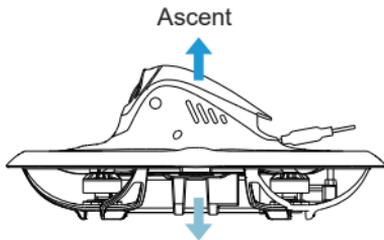
Joystick Up/Down

Decent

Joystick Left/Right

Counterclockwise Rotation

Clockwise Rotation
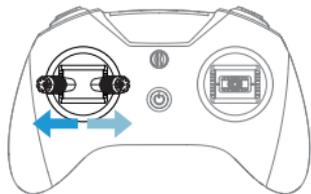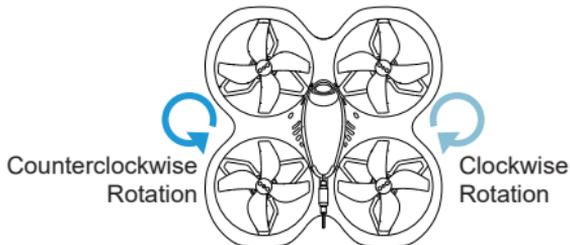
Direction (right) Joystick - forward/backward tilt (pitch) and left/right tilt (roll).

Jotstick Up/Down

Forward

Backward
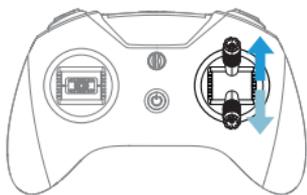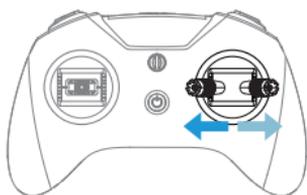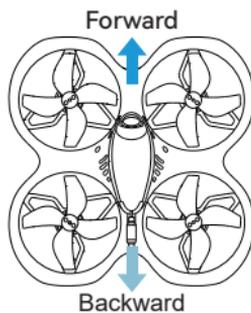
Joystick Left/Right

Left

Right
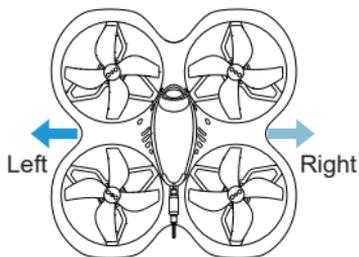
4.3 Button Functions

There are three buttons on the remote control radio transmitter.

● Power button: Turns the remote control radio transmitter on/off with a long press.

● BIND button: Enter binding mode with a short press when the remote control radio transmitter is powered on.

● SETUP button: Enter joystick calibration mode with a short press after the remote control radio transmitter is powered on.

Refer to chapter "8 Advanced Settings" for more information on binding or joystick calibration.

4.4 Charging the Remote Control Radio Transmitter

The remote control radio transmitter has a built-in 2000mAh battery. External battery is not required. If LED ring breathes in red and beeps twice, it indicates that the battery is low and needs to be recharged. Steps to charge the remote control radio transmitter battery:

● Turn off the remote control radio transmitter;

● Connect remote control radio transmitter and adapter with the Type-C cable. (5V output adapter is allowed, such as mobile phone charger);

● The LED ring breathes in red means charging, while in green means fully charged.

Output 5V

Type-C Port
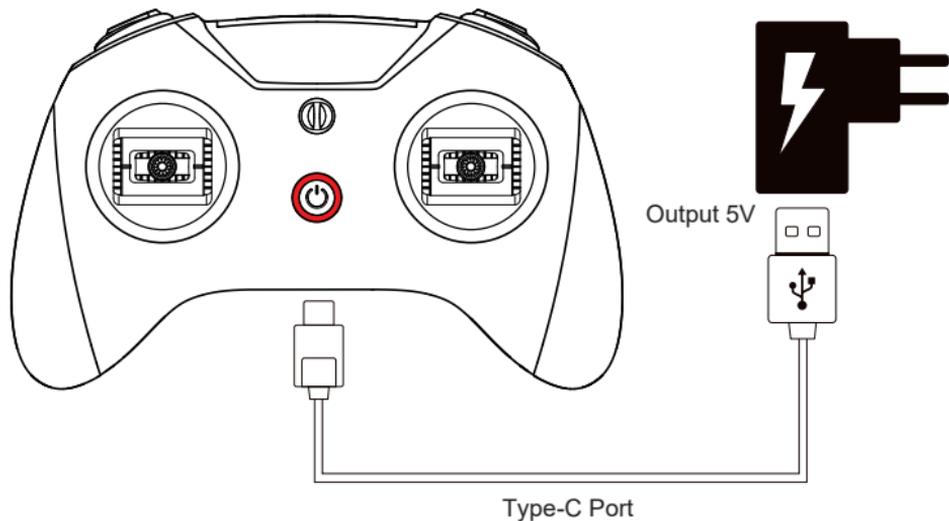
Note: Fast charging protocol is not supported. So radio transmitter can not be quickly charged.

5. FPV Goggles

The Cetus X HD quadcopter (Betaflight FC version) is equipped with the Walksnail Avatar HD Mini digital camera. Walksnail HD goggles is required to match.

More information about Fatshark Recon HD FPV goggles is stated on the following website.

https://fatshark.helpscoutdocs.com/article/177-recon-hd

To obtain more information about the Walksnail Avatar HD Mini camera, please kindly refer to the Avatar HD Mini camera manual or log into the following website for consultation: https://caddxfpv.com/products/walksnail-avatar-hd-mini-1s-kit

Anti-fog Fan Control
Back
Record
5-Way Switch
BIND
Power Input (7-24V)

Micro SD Card Slot
USB-C (HDMI Out)
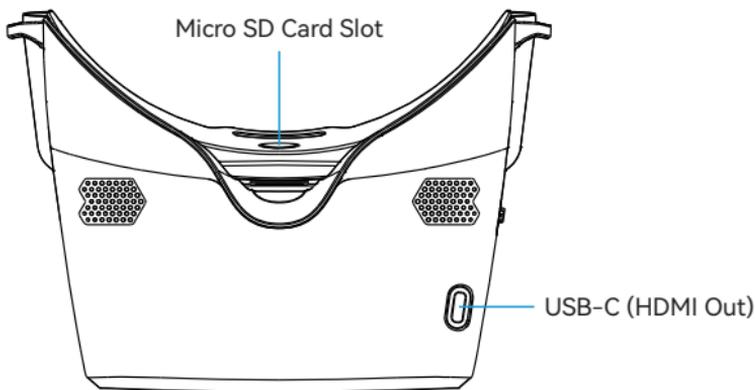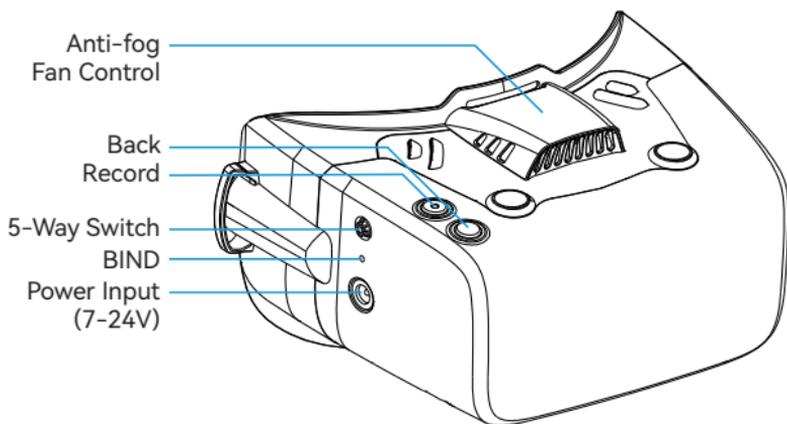
5.1 Avatar HD Mini Camera and Goggles Binding

To bind the Avatar HD Mini camera with the Walksnail HD goggles, the steps are as follows:

● Power on the quadcopter and wait for the initialization process to complete.

● Gently press the digital bind button on the side of the quadcopter with a screwdriver for one second, and the LED light on the digital VTX board to flash red.

● Power on the Walksnail HD goggles and wait for it to complete initialization.

● Press the digital bind button on the Walksnail HD goggles with a pointed object for one second, following a "beep beep" sound.

● If the LED light on the digital VTX board turns solid green and the Walksnail HD goggles receive the camera's video image, it means the binding is successful.
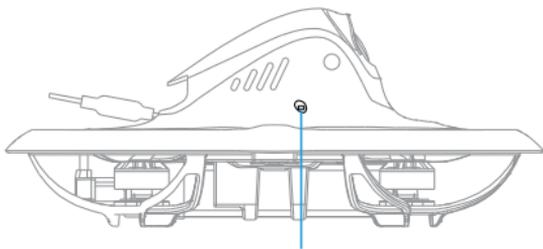
Gently press the digital bind button on the side of the quadcopter with a screwdriver for one second
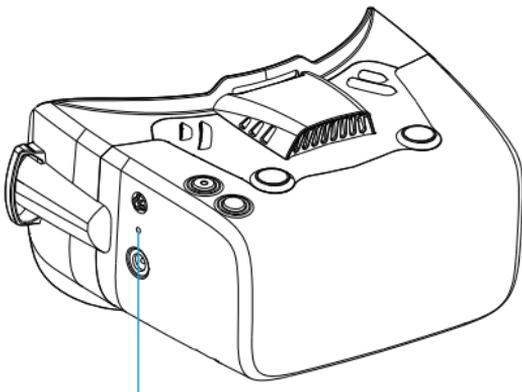
Press the digital bind button on the Walksnail HD goggles with a pointed object for one second

5.2 Avatar HD VTX Power Switching

The power of Walksnail Avatar HD VTX is divided into 25mW, 200mW and 500mW. The power can be switched through Walksnail HD goggles through the following steps:

● Ensure that the Walksnail Avatar HD Mini camera is connected to Walksnail HD goggles firstly.

● Enter the goggles settings interface through the 5-Way Switch on Walksnail HD goggles.

● In the settings interface, navigate to Settings -> Transmit Power, choose the specific power before press the 5-Way Switch.

● Use the 5-Way Switch to select the desired power, and press the 5-Way Switch again to confirm.

● After completing the settings, press the return button on Walksnail HD goggles to exit the settings interface, then the power switching is successfully completed.

5.3 Setting up OSD Display on the Quadcopter

The OSD may not be centered when connecting Walksnail HD goggles for the first time. If that happens, please kindly center it through adjusting the settings of Walksnail HD goggles. Steps are as follows:

● Ensure firstly that the Walksnail Avatar HD Mini camera is connected to the Walksnail HD goggles.

● Press the 5-Way Switch on the Walksnail HD goggles to access the goggle settings interface.

● In the settings interface, navigate to: Settings -> Display -> OSD Position, then press the 5-Way Switch to confirm.

● Use the 5-Way Switch to move the OSD position up/down/left/right until it is centered on the goggle screen, then press the 5-Way Switch to confirm again.

● After completing the settings, exit the setting interface through the return button of the Walksnail HD goggles to complete the OSD setting.

Note: If your Walksnail HD goggle does not have the option to adjust the OSD settings, it may be that the goggle firmware is not updated to the latest version.

6. Quadcopter OSD Menu Operation

The OSD menu is a set of operation interfaces designed to modify the configuration of the quadcopter. It's most used functions are switching the VTX frequency and output power .

6.1 How to Access/Operate OSD Setting Menu

The position of joysticks to access the OSD setting menu is as shown below. The throttle joystick is moved to the left-center and the direction joystick towards the upward center.

Caution： Make sure the quadcopter is disarmed before accessing the OSD menu.
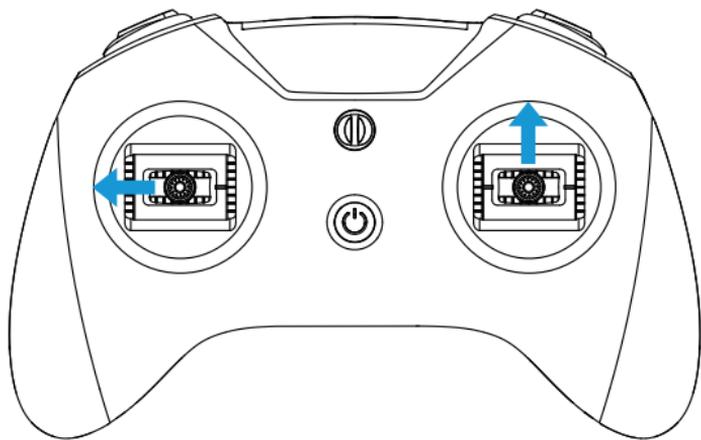
⬅ Throttle Joystick Left ⬆ Direction Joystick Up

After accessing the OSD menu, pilot will see the following menu interface on the FPV screen.

```
- - MAIN - -

> PROFILE
  FEATURES
  OSD
  FC&FW INEO
  MISC
  SAVE/EXIT
```

The OSD menu cursor can be controlled by the right joystick to operate in OSD interface:

● Up: move the cursor up
● Down: move the cursor down
● Right: confirm/modify selection
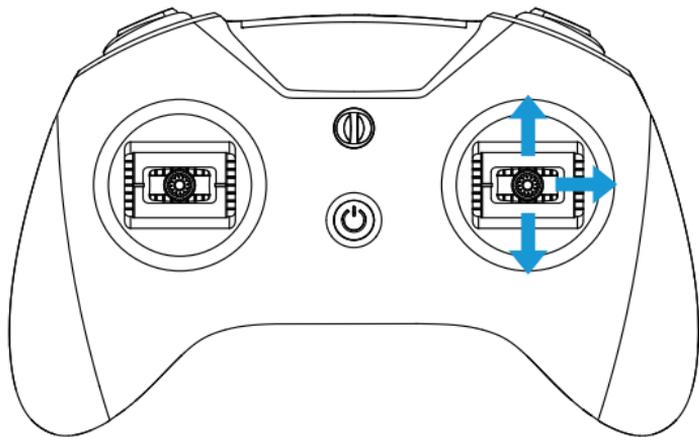
Joystick Up:
Cursor Move Up

Joystick Down:
Cursor Move Down

Joystick Right:
Modification/Confirmation

7. LED Light / Beep Status Codes

7.1 Quadcopter LED Light

There is a blue LED light and a green LED light on the flight controller. It is used to indicate whether the quadcopter is powered on normally and various status of the quadcopter.
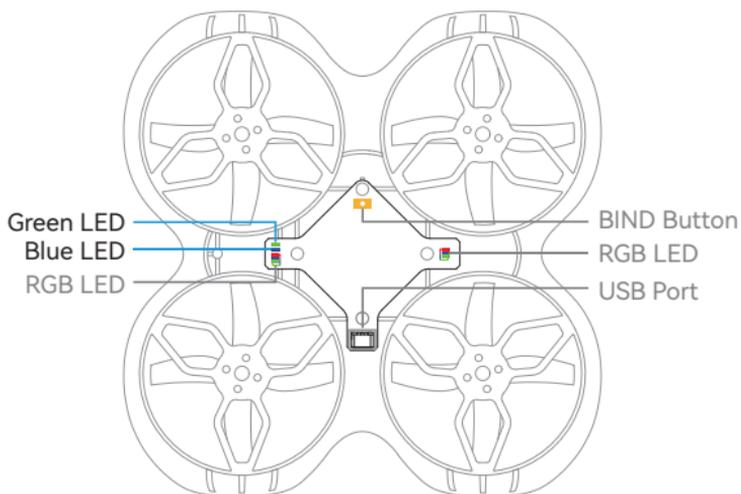
Green LED
Blue LED
RGB LED

BIND Button
RGB LED
USB Port

The green LED light is the receiver status light. Its codes are as follows:

Status	State description	Solution
Flashing slowly	Remote control radio transmitter's receiver not connected	Open remote control radio transmitter connection
Flashing fast	Quadcopter is in binding mode	Press the BIND button on the remote control radio
Solid	The quadcopter is connected with the remote control radio transmitter	

The green LED light is the receiver status light. Its codes are as follows:

Status	State description	Solution
Off	Normal, able to arm	
Flashing	Error, unable to arm	Throttle stick at lowest
Solid On	Armed	

7.2 Remote Control Radio Transmitter LED Light & Beep Status Codes

There is a blue & red LED indicator light around the power button which indicates the status of the remote control radio transmitter.
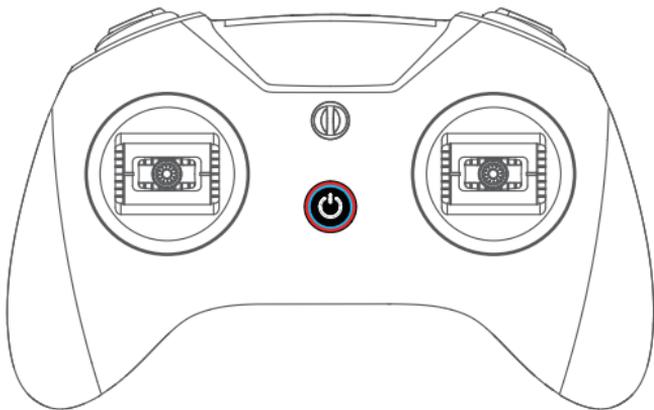
Indicator LED color	Status	State description	Solution
Red	Solid	Throttle joystick is not at the lowest position when starting	Move throttle joystick to the lowest position
Red	Flashing fast	Remote control radio transmitter is in binding mode	Wait for binding
Red	Flashing slowly	Battery voltage is too low	Charge remote control radio transmitter

There is a built-in beeper, pilot can recognize the working status of the remote control radio transmitter by its sound.

Beep	State description
The buzzer alarms twice: di-di	Low battery

8. Advanced Settings

Additional advanced settings are available in case of special operations.

8.1 Turtle Mode

When the quadcopter falls to the ground and is facing down, we can activate turtle mode with the remote control radio transmitter to turn it over. To activate turtle mode:

● Press the switch SA to pop-up status, make the drone in disarmed status;
● Toggle switch SC from down to up to activate turtle mode. CRASH FLIP SWITCH is displayed in the OSD;
● Press the switch SA to arm the drone next;
● Move the direction joystick towards either direction. The motor will spin, and the quadcopter will reverse;
● When the OSD display "> CRASH FLIP <", which means the drone reversed and is normal now. Press the switch SA to disarm the drone now.
● Toggle switch SC from up to down to off turtle mode;
● Arm the quadcopter and operate normally.
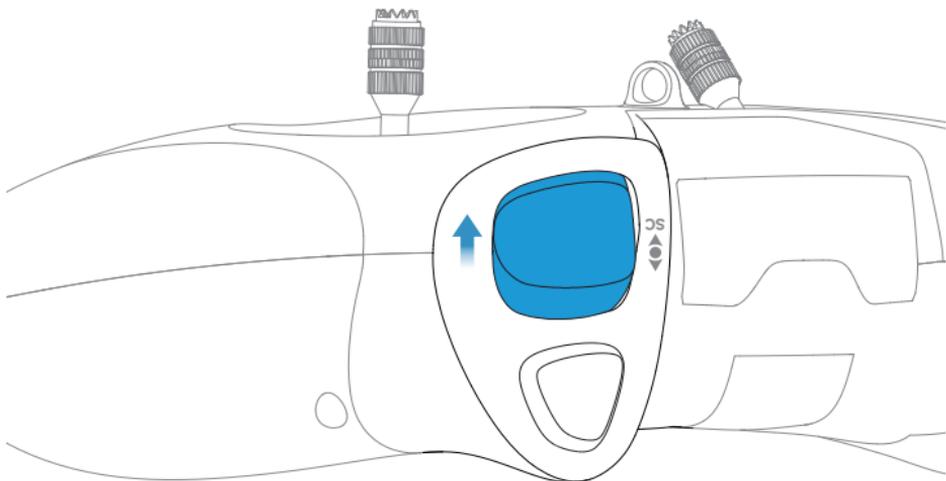
Quadcopter in Flip Status:
Toggle the Switch SC from Down to Up to Activate the Turtle Mode

8.2 Re-Bind for Quadcopter

If quadcopter and remote control radio transmitter cannot be connected successfully, the pilot may need to re-bind. This can happen when replacing new electronic parts of the quadcopter during maintenance or upgrading the remote control radio transmitter.

The re-bind steps for SPI ELRS 2.4G receiver version are as follows:
● First, please make sure that the current protocol of the remote control radio transmitter is ExpressLRS 2.4G protocol version2;
● Power on the quadcopter and wait for the its system to load completely;
● Use a screwdriver to lightly press the button on the quadcopter and the green LED light on the quadcopter changes from slow flashing to fast flashing;
● Power on the remote control radio transmitter and wait for its system to load completely;
● Lightly press the BIND button on the back of the remote control radio transmitter with a screwdriver, the red LED light of the remote control radio transmitter start flashing fastly;
● If re-bind is successful, quadcopter green LED light will change from fast flashing to solid.

Green LED
Blue LED
RGB LED
BIND Button
RGB LED
USB Port

8.3 Remote Control Radio Transmitter Calibration

After repeated use or if the remote control radio transmitter is subjected to physical impact, the joysticks may no longer read correctly and require recalibration. Calibrate the joystick value can ensure that its joystick value is in the neutral position.

● After powering on, press the SETUP button on the back of the remote control radio transmitter which will beep twice, and red LED flashing fastly(twice at a time). The remote control radio transmitter has entered calibration mode.

● Move throttle joystick and direction joystick to middle position. Press SETUP button again and wait until the remote control radio transmitter beeps three times. The red LED flashing fastly(twice at a time). This indicates joysticks center data has been acquired and enter boundary data calibration.

● Toggle the joystick to move to the top, bottom, left, and right joystick boundaries respectively (do not press too hard, the joystick just needs to touch the boundary) and keep the position for 1-2S, then press the SETUP button one more time, we can hear a long beeping sound (about 3 seconds) from the buzzer again, and the red LED light stops flashing, indicating that the calibration of the joystick is completed.

8.4 Betaflight Configuration

Parameters of Cetus X HD quadcopter (Betaflight version) are calibrated before delivery which means customers need not repeat this procedure. The only preparation before a flight is to bind the transmitter and quadcopter.

It is recommended to master the basics of Betaflight Configurator and Betaflight firmware before configuring the quadcopter.

Note: If you have no prior knowledge or experience with Betaflight flight controllers, it is recommended to read and study the following video: https://www.bilibili.com/video/av803250559

The FC assembled in Cetus X HD quadcopter(Betaflight version) is F4 2S 15A AIO(with SPI ELRS 2.4G receiver).

The configuration of the SPI ELRS 2.4G receiver is shown below:

Receiver
SPI Rx (e.g. built-in Rx) ▼ Receiver Mode
Note: The SPI RX provider will only work if the required hardware is on connected to an SPI bus.
EXPRESSLRS ▼ SPI Bus Receiver Provider

Set receiver's channel as AETR1234. The throttle stick minimum threshold is 1050(If the lowest value of radio controller is being set above 1050, arming will be invalid.) Exact setting is shown below:

Channel Map	
AETR1234 ▼	
'Stick Low'Threshold	Stick Center
1050 ⬍ ?	1500 ⬍ ?

The default setting for flight mode is shown below.
AUX1: Arm/Disarm Quadcopter;
AUX2: Flight Modes of Quadcopter configured with Horizon Mode, Angle Mode and Air Mode;
AUX3: Turtle mode;

Mode	Channel	Min	Max
ARM	AUX 1	Min: 1600	Max: 2100
ANGLE	AUX 2	Min: 900	Max: 1300
HORIZON	AUX 2	Min: 1300	Max: 1700
BEEPER	AUX 4	Min: 1700	Max: 2100
FLIP OVER AFTER CRASH	AUX 3	Min: 1550	Max: 2100
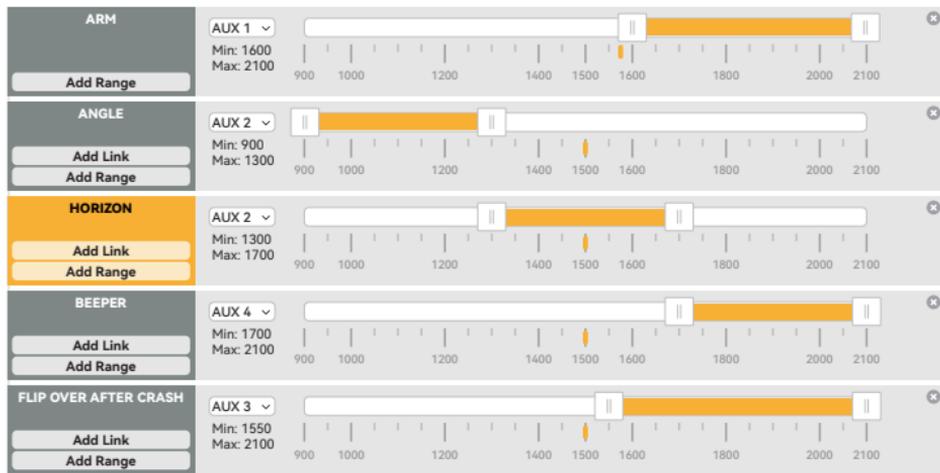
The default firmware and configuration for the Cetus X HD quadcopter(Betaflight version)are shown below, facilitating customers to restore the default settings. If necessary, please visit our official website for more information and consultation. (Kindly select the corresponding firmware and configuration based on the quadcopter information)

https://support.betafpv.com/hc/en-us/sections/9435794300441-Cetus-Series

9. Supplement

9.1 Warning & Security

● Move the throttle joystick as gently as possible to avoid the quadcopter ascending and descending too sudden.

● Press switch SA on the remote control radio transmitter immediately if the quadcopter collides with any object.

● Please try to keep motors perpendicular to the body. Otherwise, flight performance will be degraded.

● Learn to control the quadcopter proficiently before flying in a large outdoor area or with the wind.

● Battery life can be significantly reduced if pilot continues to fly after the low voltage warning is shown.

● Do not fly in rain. Humidity may cause unstable flight or loss of control.

● Keep the battery away from water. If the flight controller touches water, a short circuit may occur and the flight controller may burn out.

● Do not fly in inclement weather with thunderstorms or lightning.

● Do not fly in areas that are not permitted by local law.

9.2 Precautions for Battery Use and Charging

● Do not immerse the battery in water. Store in a dry area if not used for a long time.

● Keep away from children. If swallowed, seek medical attention immediately.

● Do not use or store the battery near heat sources, microwave ovens, or open flames.

● Only use a battery charger that meets the specifications when charging.

● Do not throw the battery into fire or heat the battery.

● Do not use or store the battery in an extremely hot environment, such as in a car under direct sunlight or hot weather. Overheating affect the performance of the battery and shortens the service life of the battery. Overheated batteries can catch fire.

● If the battery has a peculiar smell, temperature, deformation, discoloration, or any other abnormal phenomenon, stop using the battery. Recycle and replace the battery.

● If the battery connector gets dirty, please wipe it with a dry cloth before use. Avoid getting battery contacts dirty, which can cause energy loss or failure to charge.

● Disposing of the battery randomly may cause a fire. Please fully discharge the battery and use insulating tape to dispose of the battery output connector before disposing of the battery. Refer to local regulations before disposing or recycling a battery.

10. FAQ

10.1 How to Replace Propellers

Propellers can be deformed or fall off when a quadcopter collides with an object. Bent or missing propellers need to be replaced.

Use the included propeller removal tool to remove propellers from the motor. Please hold the motor instead of the frame duct with your hand when removing propellers to protect the frame from being deformed by overexertion.

4pcs spare propellers are included; 2pcs clockwise (CW) and 2pcs counterclockwise (CCW). Install as in the diagram below.

CCW Propeller GF 2020

CW Propeller GF 2020R
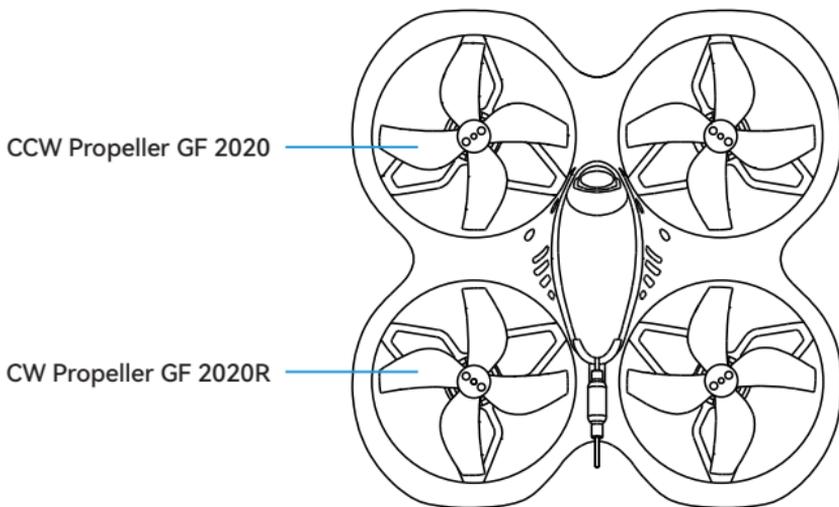
10.2 How to Use FPV Simulator

The safest and quickest method to get started is to use an FPV simulator. The LiteRadio 3 remote control radio transmitter supports most FPV simulators on the market with a comprehensive configuration.

USB Data Cable
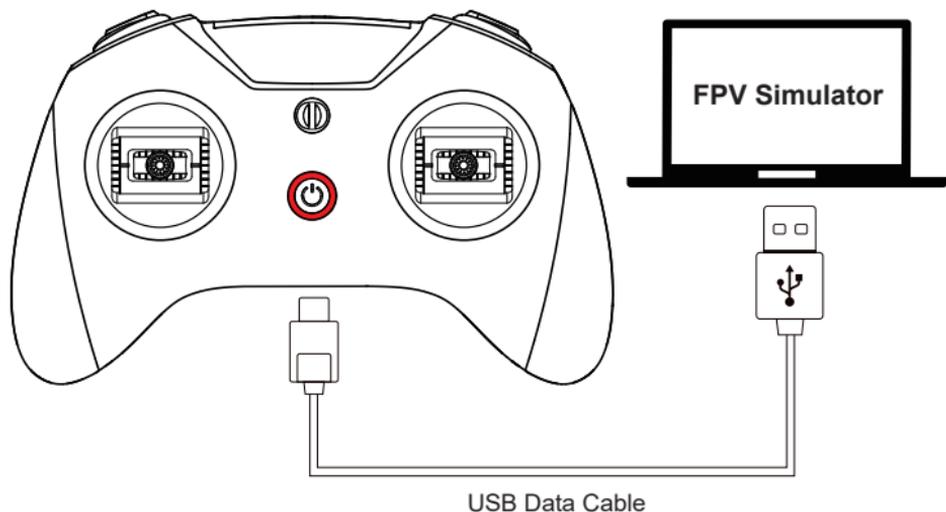
Operation steps below:

● Turn off the radio transmitter.

● Connect the transmitter to computer via a USB cable. Wait for the LED ring breathes in red or green.

● Install driver from PC automatically, prompt box pops up after successful installation. Then, radio transmitter works as a joystick human interface device (AKA HID device) normally.

✿ **Setting up a device**	→
We're setting up'BETAFPV JoyStick'.	⚙

Bluetootn & other devices

Other devices

🎮 BETAFPV JoyStick

User needs to manually install driver if PC doesn't install automatically or is installed incorrectly.

Caution: Do not power on the transmitter and connect it to the PC. The USB port is invalid in this situation.

10.3 How to Stop After A Collision

● Press switch SA on the remote control radio transmitter immediately once the quadcopter collides with an object. When the switch SA pop up, all motors will immediately stop.

● If the flying altitude is too high and it is difficult to control, please press switch SA immediately to stop the motor.

Caution: Press switch SA immediately when the quadcopter is hit or the propellers scratch against the frame duct.
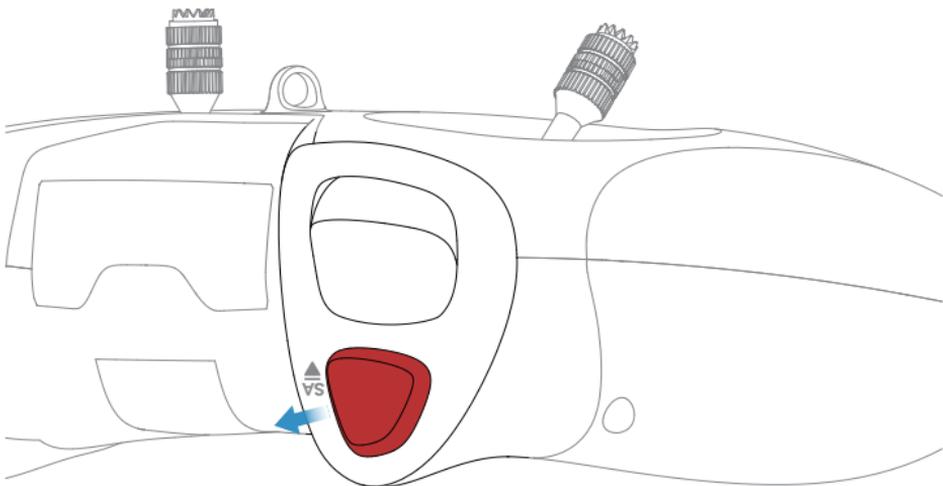
Press switch SA to pop-up status to disarm the drone

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