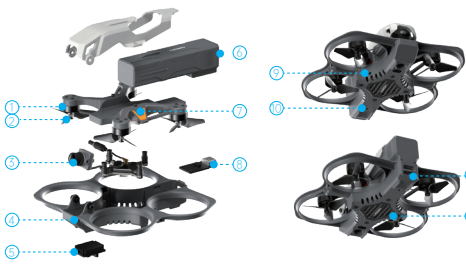
CADDXFPV PROTOS

User Guide

V1.4

■ Part Name

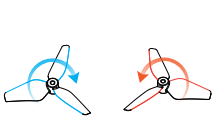


1. Motor
2. Propeller
3. Ascent Lite
4. Injection-Molded Frame
5. Optical Flow Sensor Module
6. 2S Battery
7. Indicator Light
8. Type-C
9. Linking Button
10. Boot Button
11. Switch Button
12. Aluminum Alloy Heat Sink

■ Component Installation

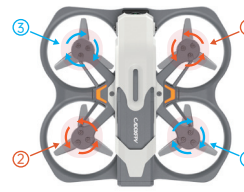
① Installing the Propellers

Before leaving the factory, PROTOS comes with propellers pre-installed. We do not recommend replacing them with other types of propellers, as this may cause the drone to malfunction or exhibit abnormal behavior during use. If a propeller is damaged and needs replacement, please use the spare propellers included in the package. Remove the damaged propeller, align the central mounting hole of the front side of the spare propeller (the curved convex side) with the motor's central shaft, and press it down until the top of the shaft is flush with the bottom of the propeller. If you are unsure how to identify the positions of the four propellers, place the Drone facing forward on a flat surface and view it from behind. The rotation directions of the four motors and their corresponding propellers are as follows:



CW
Reverse Propeller

CCW
Standard Propeller



1) Front Right Motor: Counterclockwise Rotation (CCW – Standard Propeller)
2) Rear Left Motor: Counterclockwise Rotation (CCW – Standard Propeller)
3) Front Left Motor: Clockwise Rotation (CW – Reverse Propeller)
4) Rear Right Motor: Clockwise Rotation (CW – Reverse Propeller)

Attention! The propellers rotate with the front side facing up. When viewed from the side, the blades rotate around the central mounting hole toward the higher edge of the blade. Please install and check the propellers in the correct order. Incorrect installation may cause the Drone to lose control and could result in injury to the user or others, as well as unnecessary trouble.

② Installing the Battery

Align the module battery with the battery compartment and push it in. When you hear a "click" and the battery does not wobble or come out easily, the module battery is properly installed.

1) Attention! Installing the battery while it still has available power will directly power on the Drone.Please exercise caution.
2) Ensure that the remote controller and flight goggles are powered on before performing this operation (refer to the CADDXFPV Alink Remote Controller and Ascent Goggles User Guide).

③ Battery Removal

Lift the long slot on top of the canopy upward, and with your other hand, slightly raise the battery from the rear of the Drone and pull it out firmly. This is the proper way to remove the battery.

1) At this point, if the Drone is powered on, it will be immediately powered off.
2) Do not store a module battery that has entered power-off protection in the Drone's battery compartment. It should be promptly removed for charging and activation (refer to the 2S Charger user guide for module battery use).

■ Connect to a Computer

IInsert the module battery and turn on the aircraft. The tail button and the indicators on both sides of the Drone will light up. Press the tail button and select the internal module you want to connect:

① Indicator light is green

At this time, the top Type-C port is connected to the flight controller module. Using a data cable to connect to a computer allows you to upgrade the flight controller firmware. Do not remove the battery during the connection process, as this will disconnect the flight controller from the computer and may cause the firmware upgrade to fail or damage the flight controller.

Warning! We do not recommend replacing the aircraft's firmware with other flight controller firmware. If you attempt to do so, CADDXFPV assumes no legal responsibility for any consequences.

② Indicator light is orange

At this time, the top Type-C port is connected to the CADDXFPV Ascent digital video transmission module. By connecting to a computer with a data cable, you can use the

dedicated tool to upgrade the video transmission firmware. Please note: do not remove the battery or forcibly disconnect during the firmware upgrade process, as this may cause the built-in video transmission module to fail or become damaged.

③ DFU Mode

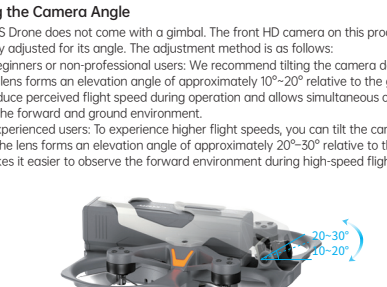
1) Ensure the drone's indicator light is green before powering off. Turn the drone over. There's a small hole in the center of the rear bottom that houses the Boot button.

2) First, plug the data cable into the Type-C port on the rear of the drone (note: do not connect the other end of the cable to a computer yet).

3) Now use a SIM card inserter or other insulated tool to insert the cable vertically while holding the Boot button pressed.

4) Plug the other end of the cable into a computer USB port. Once the power is on, release the Boot button. (It's recommended to insert a battery to provide additional power to the flight controller.)

The flight controller is now connected to the computer and enters DFU mode. Firmware upgrades can be performed in this mode, as shown below:

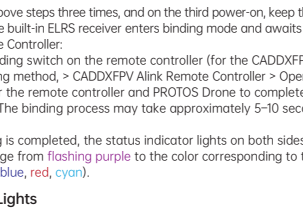


■ Adjusting the Camera Angle

The PROTOS Drone does not come with a gimbal. The front HD camera on this product must be manually adjusted for its angle. The adjustment method is as follows:

① For beginners or non-professional users: We recommend tilting the camera downward so that the lens forms an elevation angle of approximately 10°~20° relative to the ground. This helps reduce perceived flight speed during operation and allows simultaneous observation of both the forward and ground environment.

② For experienced users: To experience higher flight speeds, you can tilt the camera upward so that the lens forms an elevation angle of approximately 20°~30° relative to the ground. This makes it easier to observe the forward environment during high-speed flight.



Adjust the camera according to your personal needs, and learn to observe the differences in the view inside the flight goggles at different camera angles. Mentally associate the current flight attitude with the camera's placement angle. This will help you learn how to properly operate the Drone in stunt mode.

■ Onboard Integrated ELRS 2.4GHz Receiver

The PROTOS Drone has a built-in ELRS 2.4GHz receiver. The binding procedure is as follows:

① Activate the binding mode using the module battery:

1) Lift and hold the battery latch on top of the canopy.

2) Insert the module battery into the canopy to power on the Drone.

3) Two seconds after powering on, remove the module battery to turn off the Drone.

4) Repeat the above steps three times, and on the third insertion, keep the Drone powered on. At this point, the built-in ELRS receiver enters binding mode and awaits binding.

② Activate the binding mode using USB power:

1) Insert a USB Type-C data cable into the Type-C port at the rear of the Drone.

2) Connect the other end of the cable to a computer or power adapter to supply power to the Drone.

3) Two seconds after powering on, unplug the cable (from the power source) to turn off the Drone.

4) Repeat the above steps three times, and on the third power-on, keep the Drone powered. At this point, the built-in ELRS receiver enters binding mode and awaits binding.

③ Bind the Remote Controller:

1) Press the binding switch on the remote controller (for the CADDXFPV Alink remote controller binding method, > CADDXFPV Alink Remote Controller > Operating Instructions ②) and wait for the remote controller and PROTOS Drone to complete the binding process. Note: The binding process may take approximately 5–10 seconds, so please be patient.

2) After binding is completed, the status indicator lights on both sides of the PROTOS drone will change from flashing purple to the color corresponding to the current flight mode (orange, blue, red, cyan).

■ Status Indicator Lights

There are two status indicators on each side of the drone, indicating the drone's current status (based on the default PROTOS drone firmware). The indicators are as follows:

① Rapidly flashing purple: The drone is in an abnormal state or arming is prohibited. In this state, the drone cannot arm.

② Solid Orange: The drone is in Position mode. In this state, arming and flight are possible.

③ Solid Blue: The drone is in Angle mode. In this state, arming and flight are possible.

④ Solid Red: The drone is in Acro mode. In this state, arming and flight are possible.

⑤ Solid Cyan: The drone is in Anti-Turtle (FLIP) mode. While in this mode, you can arm and reverse the motors, but you cannot fly normally..

⑥ Short Red Flashing: Mode change or invalid arm.

⑦ Two quick green flashes: The gyroscope (IMU) has completed leveling calibration.

⑧ Slow Flashing Yellow: The battery is low. Please fly with caution.

⑨ Fast Flashing Yellow: The battery has reached the minimum safety threshold. Please land immediately to avoid a protective power outage due to low battery voltage. (Refer to the module battery and 2S Charger instructions.)

■ Flight/Function Modes

To cater to both novice and advanced users, the PROTOS drone's default firmware provides the following three flight and function modes for you to choose from:

① Poshold Mode

In this mode, the drone automatically maintains its altitude during flight, remaining in position even without any user input. If a minor collision or displacement occurs, the drone will detect the surface texture within its range and automatically return to its current hovering position. The maximum flight speed in this mode is 3 meters per second (3m/s), and the maximum ascent and descent speed is 1.5 meters per second (1.5m/s). The flight control indicator light will be orange, indicating that the downward optical flow and laser ranging modules are operating. When flying in this mode, please note the following points:

1) Altitude Limit: The effective altitude indoors is between 20 cm and 4 meters, and outdoors, between 20 cm and 2 meters.

2) When taking off in Hold Mode, push the remote controller's throttle stick approximately one notch above center. The drone will automatically ascend and hover above the ground.
At this point, position the throttle stick slightly above center and wait for the drone to stabilize before proceeding.

3) If the drone is in Hold Mode (POSHOLD) and exceeds the above altitude limits, it will automatically switch to Altitude Hold Mode (ALTHOLD). In this mode, the drone will only maintain its current altitude and will not be able to hover.

4) If the drone is in Altitude Hold Mode and descends to within the above effective altitude, it will automatically switch back to Hold Mode and can now hover normally. (Please note that any jitter caused by attitude correction when switching modes in mid-flight is normal.)

5) During flight, if the drone is in a dynamic environment or has no texture, a weak texture, or a reflective surface, fixed-point hovering may be impaired or impossible.

6) To switch to this mode, the throttle must be below 75%, the other joysticks must be centered, and the sensor below the optical flow module must be clear. Otherwise, the switch will fail.

② ANGLE Mode

In this mode, the drone automatically maintains a level attitude during flight, but does not automatically hover at its current position.

Unlike fixed-point mode, this mode requires some experience. The flight control indicator light turns blue.

This mode limits the drone's maximum throttle (80%) and the maximum roll and pitch angles (based on a level attitude, the maximum pitch angle in each direction is ±30°). When flying in this mode, please note the following.

1) Angle mode does not have an active braking function.

2) Angle mode does not have an altitude hold function, requires the operator to precisely control the throttle to maintain altitude and speed.

3) To switch to this mode, the throttle value must be below 75% and the other joysticks must be centered.

③ Aerobatic Mode (ACRO)

In this mode, the drone transfers all control authority to the user, unlocking the maximum throttle value (100%) and not automatically maintaining altitude and level attitude. This mode is the most difficult of all modes and is also a common way to play with a drone. It is recommended that operators have proficient drone flying experience or have learned acrobatic mode in a simulator before attempting this mode. The flight control indicator light turns red, and the flight control no longer limits the drone's maximum roll and pitch angles.

When flying in this mode, please note the following points:

1) Stunt Mode does not have an automatic return function. Unless the operator intervenes, the drone maintains its current attitude during flight. Please note: The joystick no longer simply controls flight direction; it fully controls the drone's attitude in the air. Joystick pressure only controls the drone's angular velocity during the corresponding maneuver (the drone rolls around its X, Y, and Z axes, with the speed of the roll being called angular velocity, measured in degrees per second).

a. The drone's factory firmware has a preset angular rate (rate) switch, which you can think of as joystick sensitivity.

b. Function channel CH8, the CADDXFPV Alink remote controller uses a three-position SC switch: high (500°/s), medium (400°/s), and low (300°/s).

c. The lowest setting is recommended for beginners, the medium setting for advanced training, and the highest setting for acrobatic maneuvers.

Returning the joystick to center does not affect the drone's attitude.

2) Angle mode does not have an altitude hold function. During flight, the operator must precisely control the throttle to maintain the correct altitude and speed. The hovering throttle position for this mode is between 30% and 35%, depending on the battery voltage of the current module.

3) To switch to this mode, the throttle position must be below 45% and the other joysticks must be centered.

4) When switching to Acro mode during flight, please note that the hovering throttle position for Acrobatic mode is lower than that for Stabilized and POSHOLD modes. Therefore, the drone's altitude will fluctuate significantly when switching between these modes, requiring prompt refueling to maintain altitude. This operation carries certain risks, so proceed with caution.

④ Flip Mode (FLIP)

This mode is a standard flight mode for unusual situations, primarily used when the drone's attitude is incorrect after landing and correction is required.

The flight control indicator light turns cyan. In this mode, the throttle stick is disabled, the drone cannot fly directly, and the ESC switches to reverse mode. When using this mode to correct the drone's attitude, please note the following points:

1) This mode can only be activated before unlocking. After unlocking, the motor is in a disabled state and will not enter the idle state. Please pay attention to safety and be careful to avoid mis-operation after unlocking.

a. If you accidentally touch the Flip Mode switch (SD rebound button on the CADDXFPV Alink remote controller, function channel CH9) after arming, the drone will be unable to switch to normal flight mode under any circumstances.

b. If you accidentally turn off the Flip Mode switch, the flight mode will directly switch to the mode corresponding to the current mode switch (SB three-position switch on the CADDXFPV Alink remote controller, function channel CH7).

c. If you accidentally touch the Flip Mode switch, you must immediately turn it off. Do not attempt to switch flight modes in this state. This may cause the drone to lose control and crash.

2) After entering this mode and arming the Ascent Goggles, only use the roll or pitch stick to adjust the drone's attitude (follow the Flip mode arrow on the center screen). Do not use the directional sticks, as this may damage the drone.

3) Quickly and decisively adjust the drone's attitude by moving the roll or pitch stick to its maximum position in one direction. The motors will automatically reach the appropriate speed to flip the drone. If a successful flip is not successful on the first try, try again. However, avoid prolonged use of the sticks, as prolonged reversal may damage the motors or ESCs.

4) After successfully adjusting the drone's attitude using this mode, immediately turn off the flip mode switch and re-arm the drone before resuming normal flight.

⑤ Buzzer Mode

This mode is not flight mode. When the function is activated, the motors emit a continuous beeping sound to indicate the current position of the drone, making it easier to find it.

1) For CADDXFPV Alink remote controllers, use the SA Rebound switch to enable/disable this function.

2) The function channel is CH6.

⑥ IMU Calibration Mode

This mode is not flight mode, but is used to calibrate the drone's horizontal deviation caused by multiple impacts or drops. The flight control indicator light flashes green twice. This mode operates automatically. After activation, the drone must remain horizontally still until calibration is complete. No stick movement is required during this process. Instructions for using this mode are as follows:

1) This mode can only be used in the locked state.

2) Place the drone on a level surface.

3) Stick Operation Methods

a. Lower the left stick and move it right to its full range of travel and hold.

b. Center the right stick and move it downward to its full range of travel and hold.

c. After the sticks are correctly engaged, the calibration menu will appear on the headset screen.

d. Release both joysticks. The menu will remain displayed. Use the right joystick to select the desired option. The current option will flash rapidly.

a) IMU CALIBRATION

b) EXIT

e. Use the left joystick to move right to select the desired option.

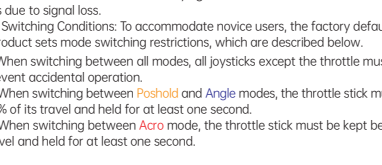
4) The first quick green flash indicates calibration has begun, the second quick green flash indicates calibration is complete, and the red light will flash if calibration fails.

5) We recommend waiting for approximately 10 seconds after calibration before attempting any flight operations for optimal calibration results.

The above describes all functions of the PROTOS drone's default firmware. Please read and understand them carefully to avoid accidental injury to yourself or others due to unfamiliarity with the product's functions.

■ Video Transmission Module

The PROTOS drone has a built-in Ascent digital image transmission module, which can be connected to the included goggles for FPV flight. To link the module, power on the drone and wait for the built-in image transmission module to start (the green light flashes). Insert a SIM card reader or other small insulating stick into the module's link hole. Press the link button on the module. the indicator light will turn solide red, indicating the module is in the linking state. Once successfully linked to the goggles, the indicator light will turn solid green.



■ Safety Mechanisms

This product is a professional, entry-level model drone, not a children's toy. To prevent user error, the PROTOS drone's factory default firmware incorporates the following safety mechanisms:

① Arming is prohibited when the throttle stick is not in the lowest position: This mechanism prevents the drone from suddenly accelerating and taking off after arming, resulting in loss of control. Therefore, arming cannot be performed when the throttle stick is not in the lowest position.

② Failsafe: If the drone is disconnected from the remote controller in any state, it will automatically enter a locked state and will not be able to automatically arm. If the drone is in flight, it will crash. Users should avoid flying in crowded areas to avoid accidental injury to others due to signal loss.

Mode Switching Conditions: To accommodate novice users, the factory default firmware of this product sets mode switching restrictions, which are described below.

1) When switching between all modes, all joysticks except the throttle must be centered to prevent accidental operation.

2) When switching between Poshold and Angle modes, the throttle stick must be kept below 75% of its travel and held for at least one second.

3) When switching between Acro mode, the throttle stick must be kept below 45% of its travel and held for at least one second.

■ Notes

To ensure a more pleasant flight experience, please be aware of the following points:

① The metal heat sink located on the bottom of the PROTOS drone will generate high temperatures if powered on for extended periods. If the drone is not in flight, heat dissipation will be lost and the drone will shut down as a protective measure if the temperature exceeds 100℃/212℉. Do not touch it during this time to prevent burns.

② The PROTOS drone has an auto-lock feature. To prevent misoperation, the drone will automatically lock and stop its motors if the following conditions are met:

1) After unlocked, the drone will remain stationary for 10 seconds without any operation or attitude change.

2) After landing, the drone will remain stationary for more than 4 seconds without any operation or attitude change.

3) A severe impact occurs during flight.

Please note: To prevent the sensor from misjudging the environment, causing the drone to automatically lock or lose its attitude when lowering the throttle, we recommend flying at least 30 cm above any obstacles below for a good flight experience.
③ Do not touch the motors and propellers while they are in operation! This may cause injury.
④ If you are a non-professional user or a beginner, do not attempt to take off the drone by placing it on your palm or using other specialized methods. CADDXFPV recommends that you only place the drone on a flat, clear surface for takeoff.
If you attempt to use specialized methods for takeoff, CADDXFPV assumes no legal responsibility for any consequences.

■ Declaration for Micro-power Short-range Devices

① Compliance with specific clauses and usage scenarios outlined in the "Catalog and Technical Requirements for Micro-power Short-range Radio Transmission Equipment," including the types and performance of antennas used, as well as methods for control, adjustment, and switching.
② Unauthorized changes to usage scenarios or conditions, expansion of transmission frequency ranges, increase of transmission power (including the addition of external RF power amplifiers), and modification of transmission antennas are prohibited.
③ The device must not cause harmful interference to other lawful wireless stations, nor shall it claim protection against such interference.
④ The device must tolerate interference from industrial, scientific, and medical (ISM) applications emitting radio frequency energy, as well as interference from other lawful wireless stations.
⑤ If harmful interference is caused to other lawful wireless stations, use of the device must cease immediately and may only resume after measures have been taken to eliminate the interference.
⑥ When using micro-power devices within electromagnetic protection areas, such as aircraft, radio astronomy observatories, meteorological radar stations, satellite earth stations (including tracking, telemetry, control, ranging, reception, and navigation stations), and military or civilian wireless stations delineated by laws, regulations, national standards, or related provisions, compliance with electromagnetic protection requirements and regulations of the relevant industry authorities is mandatory.
⑦ The use of all types of model remote controllers is prohibited within a 5,000-meter radius centered on the airport runway.
⑧ Environmental conditions, such as temperature and voltage, during the operation of micro-power devices must be adhered to.

■ Product Specification

PROTOS	Model	C0CA-FP027
	FCC ID	2BHG9-C0CA-FP027
	Flight Control	Caddx Protos Aio 1.0
	Video Transmission	Ascent Lite
	Motor Diagonal Distance	78mm
	Motor	1102 14000KV
	Propeller	HQprop U40mm×3GR-PC-1.5mm
	Weight	104.4g±1.5g
	Dimensions	110x102.8x41mm
	Flight Endurance	8.5min ±0.5min
	RC Receiver	ELRS 2.4GHz
FC	Main Control Chip	STM32-F405RGT6
	Gyroscope	BMI270
	Barometer	SPL06
	Onboard Receiver	ESP8285
	Receiver Protocol	ELRS 2.4GHz
	ESC Protocol Compatibility	Bluejay / BLHeli-S Optional
	ESC Maximum Current	12A (Single Channel)
VTX	VTX Model	Ascent Lite
	Image Sensor	1 / 2.8 inch Sensor
	FOV	147°
	Ratio	16:9
	Resolution	1080P 60FPS;720P 60FPS
	Power	25~100mW
	Max Transmission Range	Max 3km
	Latency	Average delay 35ms

FC ID 2BHG9-C0CA-FP027

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

-- Reorient or relocate the receiving antenna.
-- Increase the separation between the equipment and receiver.
-- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
-- Consult the dealer or an experienced radio/TV technician for help.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipmen.

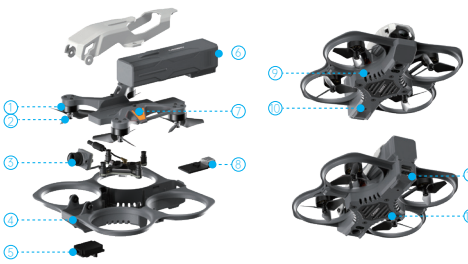
*RF warning for Mobile device:
This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

CADDXFPV PROTOS

用户手册

V1.4

■ 部件名称

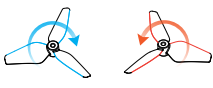


1. 电机
2. 螺旋桨
3. Ascent数字图传
4. 注塑机架圈
5. 光流传感模块
6. 飞行电池
7. 状态指示灯光
8. Type-C 接口
9. 对频按键孔位
10. Boot 按钮
11. 连接切换按钮
12. 散热铝片

■ 零部件安装方式

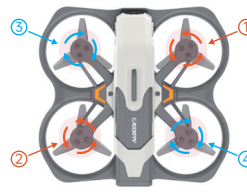
① 安装桨叶

在出厂前，PROTOS 飞行器已经提前安装好桨叶，我们不推荐您更换其他型号的桨叶，因为这可能导致飞行器无法正常使用或使用中产生异常现象。 若因桨叶损坏需进行更换，请使用包装内附赠的备用桨叶。 取下损坏桨叶，将备用桨叶正面（桨叶弧形凸出面）中央的安装孔，对准电机中央的安装轴，按压至安装轴顶部与桨叶底部齐平即可。若您不清楚如何分辨四枚桨叶对应的位置，可将飞行器朝前平放，由后方俯视飞行器，四个电机与对应桨叶的旋转方向如下：



CW
反桨

CCW
正桨



1) 右前电机: 逆时针旋转（CCW 正桨）
2) 左后电机: 逆时针旋转（CCW 正桨
3) 左前电机: 顺时针旋转（CW 反桨）
4) 右后电机: 顺时针旋转（CW 反桨

注意！ 桨叶的旋转方向为正面朝上， 由侧面观察，叶片朝边缘较高一侧围绕桨叶中心安装孔进行旋转运动，请依照正确顺序安装并检查桨叶，若错误安装，可能会导致飞行器失控，以及对使用者及周围人员造成损伤和不必要的麻烦。

② 安装电池

将模组电池电池对准电池舱， 向内推入， 听到"咔哒"一声，且电池不晃动并无法直接拔出，则模组电池电池正常安装。

1) 请注意！在电池尚有可用电量时，安装电池会直接将飞行器开机，请注意安全。
2) 保证在进行此操作前，已将遥控器与飞行眼镜开机（参考CADDXFPV Alink遥控器与Ascent Goggles飞行眼镜使用说明）。

③ 拆卸电池

将头罩上方的长条形卡槽向上掰动，并用另一只手将电池从飞行器后方轻微抬起并用力拔出为正常拆卸。

1) 此时若飞行器处于开机状态则会直接断电关机。
2) 请勿将已执行断电保护的模组电池存放于机身电池舱内，需及时取出进行充电激活。
（参考2S Charger 充电管家于模组电池使用说明）

■ 连接电脑

插入模组电池使飞行器开机， 此时尾部按钮与机身两侧会亮起指示灯， 请按动尾部按钮， 选择您需要连接的内部模块：

① 指示灯为绿色

此时上方Type-C接口连接飞控模块，使用数据线连接电脑后可进行飞控固件升级；连接过程中请勿拔除电池，这会使飞控与电脑断开连接，并导致固件升级失败或飞控损坏。（警告！我们不推荐您将飞行器的固件更换为其他飞控固件，若执意进行尝试，CADDXFPV官方对由此产生的任何后果不承担相关法律责任。）

② 指示灯为橙色

用专用工具升级图传固件。请注意，固件升级过程中请请勿拔除电池或强行断开连接，这可能使飞行器内置的图传模块升级失败或图传模块损坏。

③ DFU模式

1) 确保飞行器断电前指示灯为绿色, 翻转飞行器, 位于底部后方中央有一小孔, 孔内为Boot按钮。
2) 先将数据线插入飞行器尾部Type-C 接口（请注意！数据线另一端暂时不要连接电脑）
3) 此时使用SIM卡针或其他绝缘小棒垂直插入并保持Boot按钮为按压状态。
4) 数据线另一端插入电脑USB接口， 正常通电后可松开Boot按钮（推荐连接时插入电池，为飞控进行额外供电）

此时飞控连接电脑并进入DFU模式。

该模式下可进行固件升级，如下图所示一

Boot Button

■相机角度调整

PROTOS飞行器未安装云台，该产品的前置高清相机需要手动调整摆放角度。调整方式如下所示：

① 若您为初学者或非专业使用者，我们推荐您将相机向下掰动，镜头与地面呈现 10°~20° 左右的仰角，以方便在飞行时可降低主观操作的飞行速度，且能够同时观察前方与地面环境。

② 若您是熟练使用者，想体验更快的飞行速度，可将相机向上掰动，镜头与地面呈现 20°~30° 左右的仰角，以方便在高速飞行时更易于观察到前方环境。

请您依据个人需求进行调整，并学习观察不同镜头角度下飞行眼镜内的画面差异，在内心中构建出当前飞行姿态与相机摆放角度的关系，这有助于您学习如何正确操作该飞行器的特技模式。

■板载集成ELRS 2.4G接收机

PROTOS飞行器内置ELRS 2.4G接收机，对频方式如下：

① 使用模组电池激活对频状态：

1) 将头罩上方电池卡扣向上掰起并保持。
2) 将模组电池插入头罩内使飞行器开机。
3) 开机两秒后拔除模组电池使飞行器断电。
4) 快速重复以上操作三次，并于第三次插入模组电池时保持开机状态。此时内置ELRS接收机进入对频状态，等待对频。

② 使用USB供电激活对频状态：

1) 使用USB Type-C数据线插入飞行器尾部的Type-C接口。
2) 将数据线另一头插入电脑或电源适配器使飞行器通电。
3) 通电两秒后拔出数据线（连接电源一头）使飞行器断电。
4) 重复以上操作三次，并于第三次通电时保持通电状态。此时内置ELRS接收机进入对频状态，等待对频。

③ 绑定遥控器：

1) 按下遥控器上的对频开关（CADDXFPV Alink 遥控器对频方法 >Alink 遥控器说明书 > 操作说明②）并等待遥控器与PROTOS飞行器完成对频绑定（注意，对频过程可能需要5~10秒左右的时间，请耐心等待）。
2) 完成对频后，PROTOS飞行器两侧状态指示灯由紫灯频闪转变为当前飞行模式对应颜色 (橙, 蓝, 红, 青)。

■状态指示灯

位于飞行器两侧各有一颗状态指示灯，用于指示飞行器当前状态(基于PROTOS飞行器默认固件)，提示如下：

① 紫灯快闪: 飞行器状态异常或禁止解锁，处于该状态，飞行器无法解锁。
② 橙灯常亮: 当前位于定点模式(Poshold)，处于该状态，可正常解锁并飞行。
③ 蓝灯常亮: 当前位于运动模式(Angle)，处于该状态下，可正常解锁并飞行。
④ 红灯常亮: 当前位于特技模式(Acro)，处于该状态下，可正常解锁并飞行。
⑤ 绿灯常亮: 当前位于反马龟模式(Flip)，处于该模式下，可解锁操作电机反转，但无法正常飞行。
⑥ 红灯短闪: 切换模式或无效解锁。
⑦ 绿灯二次快闪: 电子陀螺仪（IMU）完成水平校准。
⑧ 黄灯慢闪: 当前电量低，请谨慎飞行。
⑨ 黄灯快闪: 当前电量已达到最低安全阈值，请立即降落，以免电池电压过低导致保护性断电（参考模组电池及2S Charger充电管家使用说明）

■飞行/功能模式

为兼顾新手玩家与进阶玩家的使用需求，PROTOS飞行器出厂默认固件设置了以下三个飞行模式与三个功能模式供玩家按需选择：

① 定点模式 (POSHOLD)

处于该模式下，飞行器在飞行过程中会自动保持飞行高度，即使玩家不进行任何操作，飞行器也能悬停于当前位置。若产生轻微碰撞并位移时，飞行器会识别所处范围内的地表纹理，自动回到当前悬停位置附近。此模式的最大飞行速度为5m每秒(5m/s)，最大升降速度为1.5m每秒 (1.5m/s)。飞控指示灯为 [橙色], 下视光流及激光测距模块处于工作状态。使用该模式飞行时，需注意以下几点—

1) 高度限制：室内环境有效高度为20厘米至4米范围内，室外环境为20厘米至2米以范围内。
2) 处于定点模式下起飞时，将遥控器的油门摇杆推至中位以上一格左右，飞行器会自动升空至离地悬停，此时将油门摇杆置于中位点略微偏上，待飞行器自行稳定当前位置后，方可进行操作。
3) 当飞行器处于定点模式(POSHOLD)，且超出以上高度限制飞行时，会自动转变为定高模式（ALTHOLD），位于该模式下，飞行器仅自动保持当前飞行高度，无法进行定点悬停。
4) 当飞行器处于定高模式，并下降至以上有效高度内飞行时，会自动转变回定点模式，此时可正常定点悬停。（空中切换模式时，姿态因矫正产生的抖动为正常现象，请知悉。）
5) 飞行过程中，飞行器下方若为动态环境或无纹理、弱纹理、反光表面，则定点悬停效果不佳或无法定点悬停。
6) 切换该模式，油门值需低于75%，其他摇杆居中，且光流模块下方的传感器无物体遮挡，否则会导致切换失败。

② 运动模式 (ANGLE)

处于该模式下，飞行器在飞行过程中会自动保持水平姿态，但并不会自动悬停于当前位置，该模式不同于定点模式，需要使用者有一定的操作经验。飞控指示灯为 [蓝色]，该模式会限制飞行器的最大油门值 (80%) 与横滚 (Roll)、俯仰 (Pitch) 的最大角度（基于水平姿态，朝各方向运动的最大俯仰角度为±30°）。使用该模式飞行时，需注意以下几点—

1) 运动模式不具备主动刹车功能。
2) 运动模式不具备高度保持功能，需要操作者精确操作油门量，以确保飞行高度与飞行速度。
3)切换该模式，需油门值低于75%，且其他摇杆居中，即可直接切入。

③ 特技模式 (ACRO)

处于该模式下，飞行器将所有控制权限交由使用者操控，解锁最大油门值(100%)，且不会自动保持高度与水平姿态。该模式为所有模式中操作难度最高的模式，也是穿越机的常规玩法之一。建议操作者有熟练的穿越机飞行经验或已通过模拟器学习过特技模式后，再尝试处于该模式的飞行。飞控指示灯为 [红色]，飞控不再限制飞行器在横滚 (Roll) 与俯仰 (Pitch) 轴上的最大、倾角。使用该模式飞行时，需注意以下几点—

1) 特技模式不具备自动回正功能，在操作者不进行干预的任何情况下，飞行器在飞行过程中仅保持当前姿态。请注意！此时摇杆不再是单纯的控制飞行方向，而是完全操控飞行器在空中的飞行姿态，摇杆力度，仅控制飞行器在对应动作上的角速率（飞行器以中心为原点，以XYZ 为旋转轴做绕轴滚转运动，其中滚转的速度叫做角速率，单位：度/每秒）
   a. 飞行器出厂固件预设了角速率（Rate值）切换功能，您可以理解为摇杆操作灵敏度。
   b. 功能通道CH8，CADDXFPV Alink遥控器为SC三段开关，开关由上至下分别为高(500°/s)、中(400°/s)、低(300°/s)。
   c. 推荐最低档位用于新手入门练习，中等档位用于进阶训练，最高档位用于特技花式飞行。
摇杆回中的过程则不影响飞行器的姿态。
2) 运动模式不具备高度保持功能。飞行器在飞行过程中，需要操作者精确操作油门配合当前飞行姿态，以确保飞行高度与飞行速度。该模式的悬停油门位置为30%-35%，根据飞行器当前所使用的模组电池电压产生变化。
3) 切换该模式，需油门值低于45%，且其他摇杆居中，即可直接切入。
4) 于飞行过程中切换特技模式时请注意：由于特技模式的悬停油门位置低于自稳模式与定点模式，故而在切换该模式时飞行器高度会产生较大变化，需及时进行补油保持飞行高度。该操作有一定风险，请慎重操作。

④ 反马龟模式 (FLIP)

该模式非常规情况下的飞行模式，主要用于飞行器落地后姿态不正，需进行修正的情况。飞控指示灯为青色， 处于该模式下，油门摇杆失效，飞行器无法直接飞行， 且电调控制器切换为反转模式。使用该模式修正飞行器姿态时，需注意以下几点—

1) 该模式仅能在解锁前启动，且解锁后电机为禁止状态，并不会进入怠速状态。请操作者注意安全，谨防解锁后误操作。
   a.若解锁后误触反马龟模式开关 (CADDXFPV Alink遥控器为SD回弹按钮，功能通道CH9)，会导致飞行器在任何状态下无法切换常规飞行模式。
   b.在误触状态下关闭反马龟开关后，飞行模式会直接切换为当前模式开关（CADDXFPV Alink遥控器为SB三段式开关，功能通道CH7）档位对应模式。
   c.在误触后需及时关闭反马龟模式开关，请勿在此状态下尝试切换飞行模式，这可能导致您的飞行器失控坠毁。
2)进入该模式并解锁后，请仅使用横滚或俯仰摇杆进行姿态调整 (可根据Ascent Goggles飞行眼镜内屏幕中央的反马龟指示箭头方向进行打杆操作），请勿使用方向摇杆进行操作，这可能导致飞行器损坏。
3) 请于脆利落的将横滚或俯仰摇杆朝一个方向打到最大位置进行调整，电机会自动进入合适的转速将飞行器翻转。若一次未成功翻转，可多次尝试，但请勿长时间打杆操作，长时间反转可能导致电机或电调烧毁。
4) 使用该模式成功修正飞行器姿态后，请直接关闭反马龟模式开关，并重新解锁后方可正常飞行。

⑤ 蜂鸣器模式

该模式非飞行模式，功能启动后电机持续发出鸣叫声，用于提示当前飞行器的位置，方便您寻找飞行器—

1) CADDXFPV Alink遥控器为SA回弹开关启动/关闭该功能
2) 功能通道为CH6

⑥ IMU校准模式

该模式非飞行模式，用于校准飞行器多次撞击、跌落导致的水平偏差。飞控指示灯为二次绿灯快闪，该模式为自动运行功能，启动后需水平静置直至校准完成，过程中无需打杆操作。 该模式使用方法如下—

1) 该模式只能在上锁状态下运行。
2) 将飞行器静置于水平表面
3) 操作打杆方式
   a. 左摇杆置于低位，且向右打杆至最大行程并保持。
   b. 右摇杆居中，并向下打杆至最大行程并保持。
   c. 正确打杆后，眼镜内画面会出现校准菜单。

d. 放开所有摇杆，菜单会保持显示状态，使用右摇杆上下打杆选择对应选项，当前选项为文字快速闪烁状态。
   a) IMU CALIBRATION（校准飞行器水平状态）
   b) EXIT（退出菜单）
e. 使用左摇杆向右打杆，运行功能选项。

4)) 第一次绿灯快闪为开始校准，第二次绿灯快闪为校准完成，若校准失败则为红灯闪烁。
5) 我们推荐您校准完成后静置10秒左右再进行飞行操作，以达到更好的校准效果。

以上为PROTOS飞行器默认固件的所有功能，请您熟读并知悉，避免在使用过程中因不熟悉产品功能导致误伤自己或他人。

■ 图传模块

PROTOS飞行器内置了Ascent数字图传模块，可连接套装内的飞行眼镜进行FPV视角飞行，对频方式如下：飞行器通电后，待内置图传模块启动 (绿灯闪烁)，请使用SIM卡针或其他绝缘小棒插入该孔， 按下图传模块的对频按钮，此时指示灯变为红色, 且处于常亮状态，图传模块进入对频状态。成功与飞行眼镜对频后，指示灯则显示绿色并且常亮。

■ 安全机制

该产品为专业入门级航模，并非儿童玩具，为防止使用者误操作，PROTOS飞行器出厂默认固件设立了以下安全机制：

① 油门摇杆非低位时，禁止解锁: 该机制为防止解锁后飞行器突然加速升空导致失控，故油门摇杆不在最低位置时，无法进行解锁操作。
② 失控保护： 飞行器在任何状态下，若与遥控器断开连接，则会自动进入上锁状态，无法自动解锁。若处于飞行中则会坠落。使用者需避开人群飞行，避免因信号断连产生误伤他人等情况。
③ 模式切换条件： 本产品为照顾初学者玩家，出厂默认固件设置了模式切换的限制条件，说明如下一
   1) 所有模式切换时，除油门摇杆外的所有摇杆均需居中，防止切换过程中误操作。
   2) 定点模式(Poshold)于运动模式(Angle) 切换时，油门摇杆行程需低于75%并保持1秒以上。
   3) 特技模式(ACRO) 切换时，油门摇杆行程需低于45%并保持1秒以上。

■ 注意事项

为了能有更愉快的飞行体验，该产品有以下几点注意事项，请您悉知：

① 位于PROTOS飞行器底部的金属散热片，在长时间通电状态下会产生高温，若飞行器不处于飞行状态则无法进行散热，且超过100℃/212℉后会进行保护性关机。此时请勿触碰，防止造成烫伤。
② PROTOS飞行器具有自动上锁功能，为防止误操作，飞行器在满足以下条件时会执行自动上锁，停止电机运转:
   1) 飞行器解锁后处于静置状态持续目 10 秒内无任何操作、飞行器无姿态变化。
   2) 飞行并降落后处于静置状态且持续4秒以上无任何操作、姿态变化。
   3) 飞行过程中产生严重撞击。

请注意：为了防止传感器对环境的错误判断，导致飞行过程中自动上锁或收低油门时无法保持姿态，我们建议您在飞行时距离下方障碍物至少30cm的高度，以获得良好的飞行体验。
③ 请勿触碰运行中的电机与桨叶！这可能使您受伤。
④ 若您是非专业使用者或初学者，请不要将飞行器置于手掌上起飞，或使用其他特殊方 法起飞。CADDXFPV官方仅推荐使用者将飞行器置于平坦无杂物的地面完成起飞操作。
若您执意尝试使用特殊方法起飞，CADDXFPV官方对由此产生的后果不承担任何相关法律责任。

■ 微功率短距离设备声明

① 符合"微功率短距离无线电发射设备目录和技术要求"的具体条款和使用场景，采用的天线类型和性能，控制、调整及开关等使用方法；
② 不得擅自改变使用场景或使用条件、扩大发射频率范围、加大发射功率（包括额外加装射频功率放大器），不得擅自更改发射天线；
③ 不得对其他合法的无线电台（站）产生有害干扰，也不得提出免受有害干扰保护；
④ 应当承受辐射射频能量的工业、科学及医疗（ISM）应用设备的干扰或其他合法的无线电台（站）干扰；
⑤ 如对其他合法的无线电台（站）产生有害干扰时，应立即停止使用，并采取措施消除干扰后方可继续使用；
⑥ 在航空器内和依据法律法规、国家有关规定、标准划设的射电天文台、气象雷达站、卫星地球站（含测控、测距、接收、导航站）等军民用无线电台（站）、机场等的电磁环境保护区域内使用微功率设备，应当遵守电磁环境保护及相关行业主管部门的规定；
⑦ 禁止在以机场跑道中心点为圆心、半径5000米的区域内使用各类模型遥控器；
⑧ 微功率设备使用时温度和电压的环境条件。

■ 参数规格

PROTOS	型号	C0CA-FP027
	FCC ID	2BHG9-C0CA-FP027
	飞控	Caddx Protos Aio 1.0
	图传	Ascent Lite
	电机对角距离	78mm
	电机	1102 14000KV
	螺旋桨	HQprop U40mm×3GR-PC-1.5mm
	重量	104.4g±1.5g
	尺寸	110x102.8x41mm
	飞行续航时间	8.5min ±0.5min
	遥控接收机	ELRS 2.4GHz
飞控参数	主控芯片	STM32-F405RGT6
	陀螺仪	BMI270
	气压计	SPL06
	板载接收机	ESP8285
	接收机协议	ELRS 2.4GHz
	电调协议兼容	Bluejay / BLHeli-S可选
	电调最大电流	12A (单路)
图传参数	图传型号	Ascent Lite
	传感器	1 / 2.8 inch Sensor
	FOV	147°
	画面比例	16:9
	录制分辨率	1080P 60FPS;720P 60FPS
	功率	25~100mW
	最大传输距离	Max 3km
	平均延迟	平均延迟 35ms