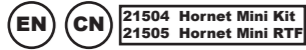


# Hornet Mini

## Instruction Manual · 使用说明



Thank you for selecting the Hornet Mini from Dualsky! This kit is designed to be fun to fly and uses top quality parts for durability and performance. This instruction manual you are reading was designed to be easy to follow, yet thorough in its explanations. Dualsky wants you to enjoy the performance and experience of using our products. If you have come across any problems or require further assistance, contact us or one of our international distributors and we will do our very best to help you. You can also contact us on the internet at [www.dualsky.com](http://www.dualsky.com). This is a high performance R/C kit, and it requires regular maintenance for best performance. If you don't do regular maintenance the performance will suffer. Dualsky has all the necessary parts and accessories available to keep your aircraft performing at its best.

The caution or attention symbols will warn you about steps that can be very dangerous.

Please read and understand the instructions carefully before proceeding.

感谢您选择双天的Hornet Mini！这款套件力求让您体验到飞行的乐趣，在设计时我们选用顶级材料与配件以保证最佳的可靠性和飞行表现。您正在阅读的这份使用说明力求通过简单易懂的描述让您对本产品有一个全面细致的了解。我们希望您能够喜欢我们的产品。如果您在使用过程中遇到问题，或者需要一些帮助来完成某一步骤，请您致电我们公司，我们会竭诚为您服务。您也可以通过我们的网站（[www.dualsky.com](http://www.dualsky.com)）来联系我们。

这是一款高性能的遥控模型套件，它需要一定的常规维护来使其保持在最佳状态。如果您不进行常规维护，那么产品的性能将会受到影响。双天公司提供完备的产品配件及附属装备来保证您的飞行器始终工作在最佳状态下。

警告及注意事项符号将会提醒您哪些安装或使用步骤会变得十分危险。

请在操作前仔细阅读并完全理解这些说明。

**Caution 警告**  
Failure to follow these instructions can damage your kit, and cause serious bodily injury or death.  
未能按照说明操作将会损坏您的套件，并会造成严重的身体伤害甚至死亡。

**Attention 注意**  
Failure to follow these instructions can cause injury to yourself or others. You might also cause property damage or damage your kit.  
未能按照说明操作将会伤害到您或他人。您也有可能造成财产损失或损坏到您的套件。

**Caution 警告**  
**Before Flying**  
● Please read manual with parent or guardian (responsible adult).  
● Turn ON transmitter first, and then turn ON the receiver. This will prevent the aircraft from losing control.

**Before Operating**  
● Make sure that all screws and nuts are properly tightened.  
● Always use fully charged batteries in your transmitter and receiver to avoid losing control of the model.  
● Make sure no one else is using the same radio frequency that you are using.  
● Please confirm the range of the radio operation.

**During Flying**  
● Please do not fly in a public area, this could cause serious accidents, personal injuries and/or property damage.  
● Please do not fly near pedestrians or small children.  
● Please do not fly in small and confined areas.

**After Flying**  
● Turn OFF receiver first, then turn OFF transmitter. This will prevent the aircraft from losing control.

### Battery Safety

- Please be careful when handling the battery. It could be hot after running. As part of a regular maintenance routine, be sure to check all wiring including battery wire and terminals.

### 在飞行前

- 请与父母或监护人（能够负责任的成年人）一起阅读本“使用说明”。
- 先打开遥控器的开关，再打开接收机的开关。这样可以防止飞行器失控。

### 在操作前

- 确保所有螺丝和螺帽都已经正确锁紧。
- 总是在遥控器和接收机中使用全新的或完全充电的电池以防止模型失控。
- 确保没有人和您使用相同的遥控频率。
- 请确认遥控距离在遥控器的可操作范围之内。

### 在飞行中

- 请不要在公共场合飞行，这可能会引起严重的意外事故、人身伤害及财产损失。
- 请不要在行人或儿童附近飞行。
- 请不要在狭小受限的环境中飞行。

### 在飞行后

- 先关闭接收机的开关，再关闭遥控器的开关。这样可以防止飞行器失控。

### 电池安全

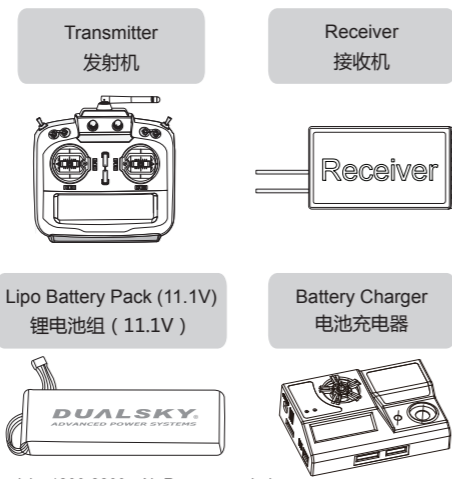
- 请小心使用电池。它在飞行之后会变得很热。如果电池组的接线受到磨损，有可能会短路，进而引发火灾。作为日常维护工作的一部分，请确保检查电池接线和插头。

## Equipment Needed 所需设备

### Electronics 电子设备

The Hornet Mini requires the following items to complete: at minimum a 4-channel radio system (we recommend a 5-channel or higher radio system), Lithium Polymer (LiPo) battery pack (recommend Dualsky 1200-2200mAh 11.1V) and battery charger.

您需要准备一套至少4通道（建议5通道或以上）的遥控设备、锂电池组和电池充电器。



\*Dualsky 1200-2200mAh Recommended

**Caution 警告**  
If you do not use a charger designed to charge Nickel Metal Hydride / LiPo batteries, the batteries will be damaged.

如果您使用的电池充电器不是专为镍氢和锂电池所设计的，那电池将会被损坏。

### Tools 工具

Tools needed for assembly. Sold Separately.  
组装所需的工具。需要单独购买。

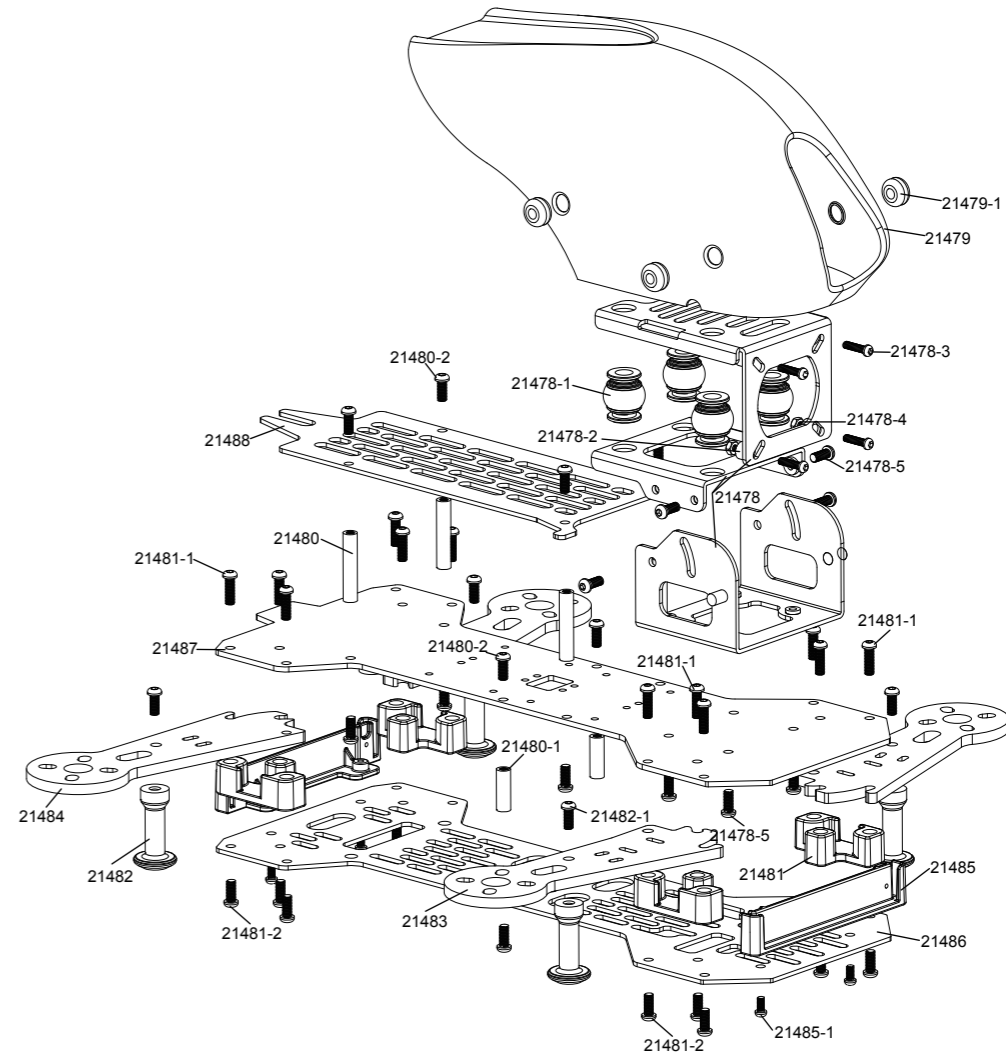
**Allen Wrench 1.3mm** 内六角螺丝刀  
**Allen Wrench 1.5mm** 内六角螺丝刀  
**Allen Wrench 2.0mm** 内六角螺丝刀  
**Sharp-nose pliers** 尖嘴钳

**#2 Philips Head Screwdriver** 十字螺丝刀(2号)

## Hornet Mini Kit 空机组装说明

### Parts List 配件清单

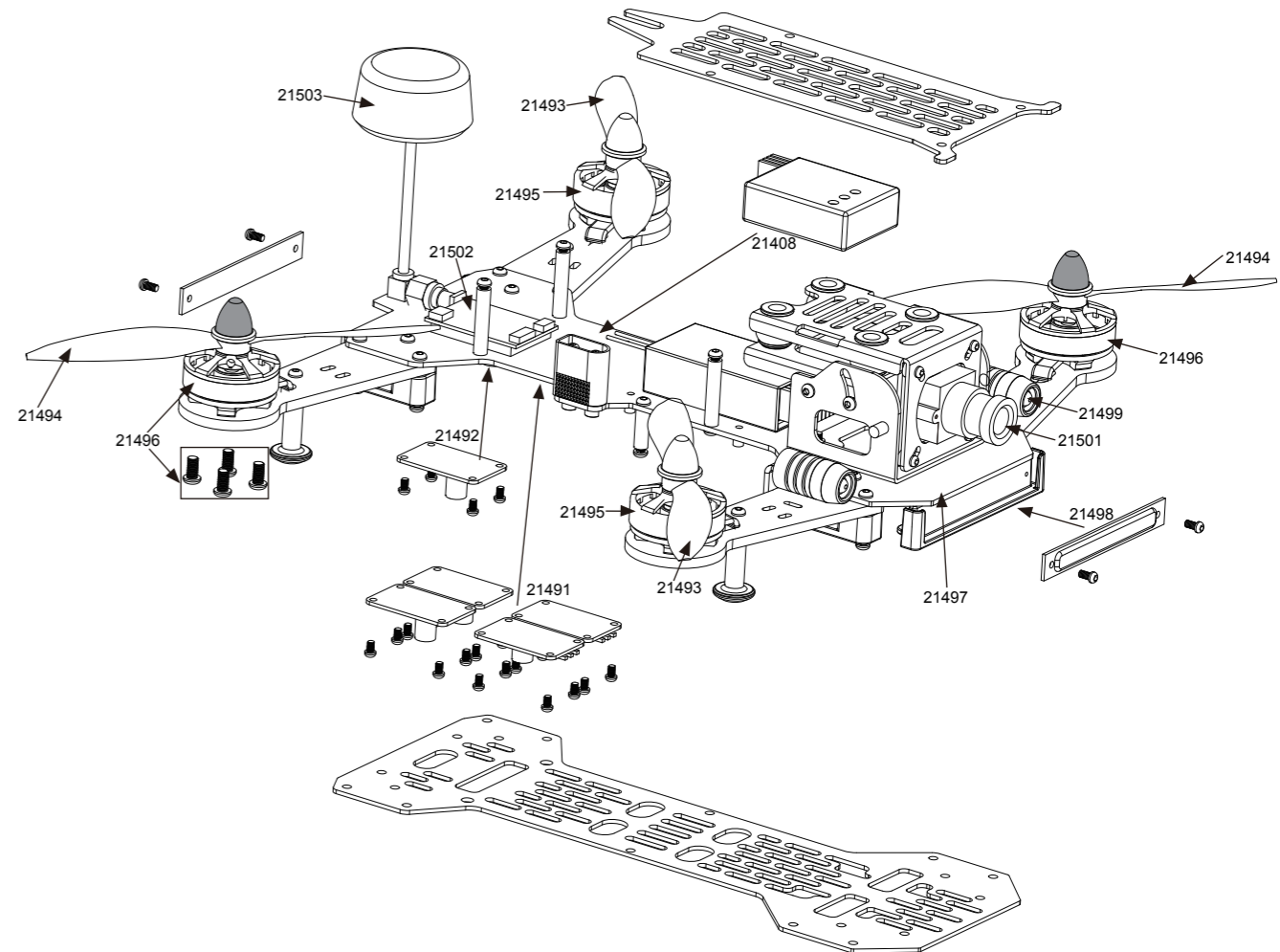
21478	HM-Gimbal	3pcs
21478-1		4pcs
21478-2		4pcs
21478-3		(M2×8mm)×4pcs
21478-4		M2×4pcs
21478-5		(M2.5×6mm)×8pcs
21479	HM-Cowl	1pcs
21479-1		4pcs
21480	HM-StrutSet	4pcs
21480-1		2pcs
21480-2		(M2.5×6mm)×12pcs
21481	HM-JointSet	4pcs
21481-1		(M2.5×8mm)×12pcs
21481-2		(M2.5×6mm)×12pcs
21482	HM-Gears	4pcs
21482-1		(M2.5×6mm)×4pcs
21483	HM-FrontArms	1 bag (2 pcs per bag)
21484	HM-RearArms	1 bag (2 pcs per bag)
21485	HM-LEDStand	2pcs
21485-1		(M2×6mm)×4pcs
21486	HM-BottomDeck	1pcs
21487	HM-MiddleDeck	1pcs
21488	HM-TopDeck	1pcs



## Hornet Mini ARF 整机组装说明

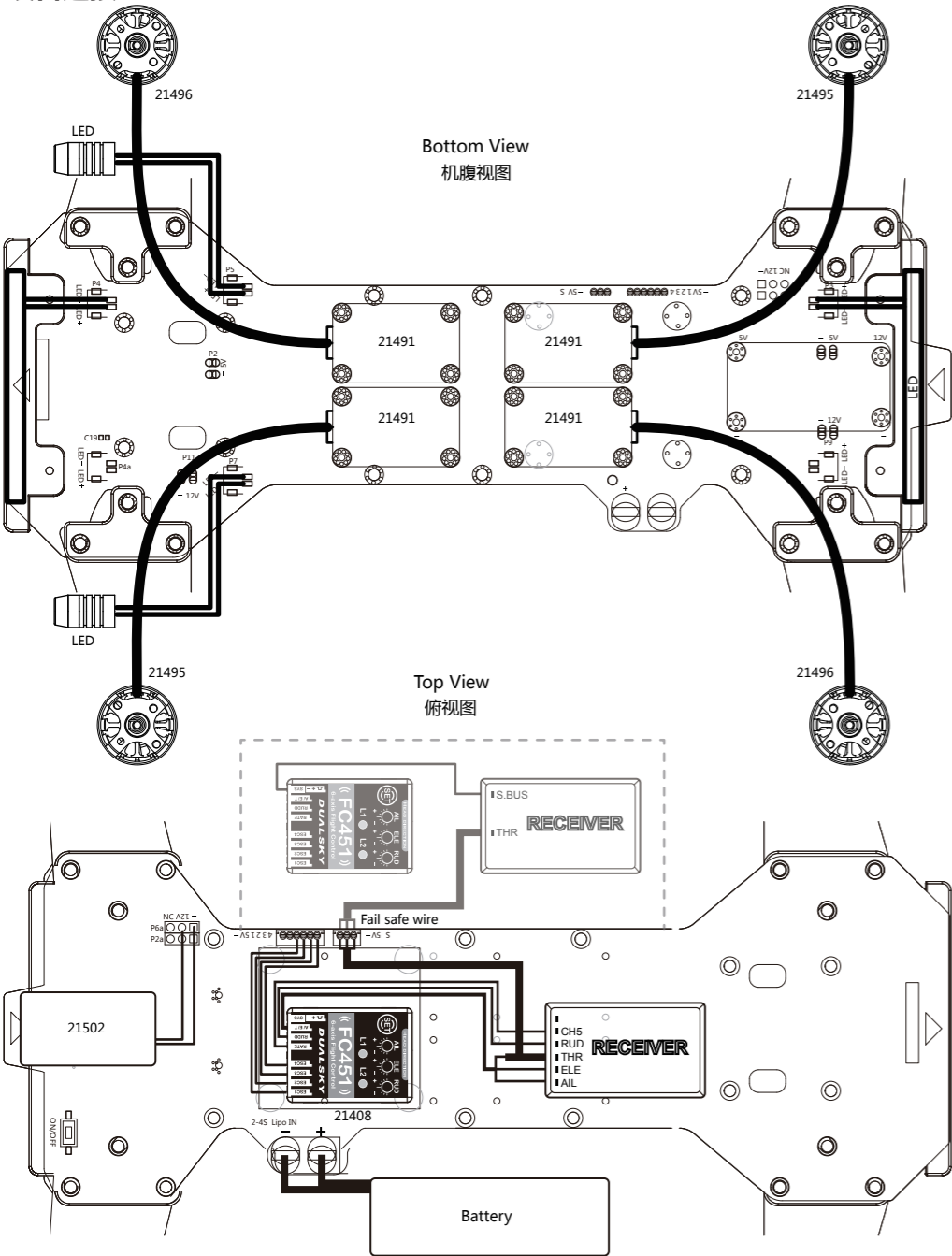
### Parts List 配件清单

21491	HM-PCU12	w/ screws 4 set
21408	FC451	w/ wires 1 set
21492	HM-PM12V	1 set
21493	HM-P5045BN	1 bag (2 pcs)
21494	HM-P5045BNR	1 bag (2 pcs)
21495	HM-ECO2204X	w/ screws 2 set
21496	HM-ECO2204XR	w/ screws 2 set
21497	HM-PMB	1 pcs
21498	HM-LEDSet	1 set
21499	HM-LEDSet2	1 set (2 pcs)
21500	HM-BattStrap	not shown on the pic
21501	HM-Camera	Sold separately
21502	HM-VideoTX	Sold separately
21503	HM-VideoAntenna	Sold separately



## Device connection 设备连接

### 设备连接



## Configuration 设定与调试

### 设定与调试

#### Transmitter Setting 遥控器设置

- The FC451 needs a 4-channel or higher radio controller to operate; if you are using a 5-channel or higher radio controller, please assign a 3-position or 2-position switch on the radio to CH5/GEAR channel and make sure the switch doesn't have other function, set this switch to Low (Switch channel pulse width range should be: low 900~1300µs, high 1300~2100µs). This channel is used to switch the flight mode. If you are using a 4-channel radio controller, the flight mode can be set in FC451.
- Set the radio to "Airplane Mode", turn off all the mixing functions, set all channel's D/R to 100%;
- Set all channel's trim, sub-trim and mechanical trim to "0";
- Set all channel's direction according to the below chart;
- Please check the Diagram for corresponding value of channel direction.

- F451需要一台四通道或以上的遥控设备; 如果您使用五通道或以上的遥控器, 请在遥控器上将CH5 映射至三段或两段开关, 行程设为100%, 并确保在遥控器中该通道没有用作其他功能。开关通道脉宽区间为: 低900-1300µs, 高1300-2100µs。该通道用来调节四旋翼的飞行模式。如果使用四通道遥控器, 飞行模式可在飞行设定项中设定;
- 设定遥控器为固定翼模式, 如果遥控器有混控功能, 请关闭所有混控, 将各通道行程都设为100%;
- 各通道的电子微调 (TRIM或SUBTRIM菜单) 和摇杆的机械微调都归 "0";
- 如下图所示, 根据品牌设定遥控器各通道正反向。

	Futaba	JR	Spektrum	HOTT
AILERON	NOR	REV	REV	REV
ELEVATOR	REV	NOR	NOR	NOR
THROTTLE	REV	NOR	NOR	NOR
RUDDER	NOR	REV	REV	REV
CH5/GEAR	NOR	REV	NOR	REV

2100µs  
Self-stabilizing Mode 自稳模式  
1300µs  
Manual Mode 手动模式  
900µs

## ESC Initial Setting 电调行程设定

Before flying Hornet mini, please calibrate throttle travels of all ESCs and flight controller, make sure them fit your radio. FC451 used in Hornet mini supports calibrating 4 ESCs at one time, please follow the contents below to run calibration:

- Turn on your transmitter, push throttle stick to its maximum, power on Hornet mini, then the L1 of FC451 turns blue, indicates that FC451 is in calibration mode;
- ESC's will beep for about 7 seconds, wait until ESC's stop beeping;
- Pull throttle stick to its minimum, ESC's will beep again for another 7 seconds, wait until ESC's stop beeping;
- Power off Hornet mini, and calibration for all ESC's and FC451 are finished.

在使用Hornet mini前请设定电调和飞控行程, 确保电调和飞控的行程与遥控器匹配。

- Hornet mini使用的FC451飞控支持同时对4个电调设定行程, 具体步骤如下:
- 开启遥控器, 将油门推至最高。然后开启Hornet mini的电源, 飞控L1蓝灯亮起, 进入行程设定模式;
  - 此时电调会发出响声, 等待电调所有的响声都结束 (持续约7秒);
  - 将油门拉至最低, 电调会再次发出响声, 等待电调所有的响声都结束 (持续约7秒);
  - 关闭电源, 即完成所有电调和FC451油门行程的设定。

## Test Flight 试飞

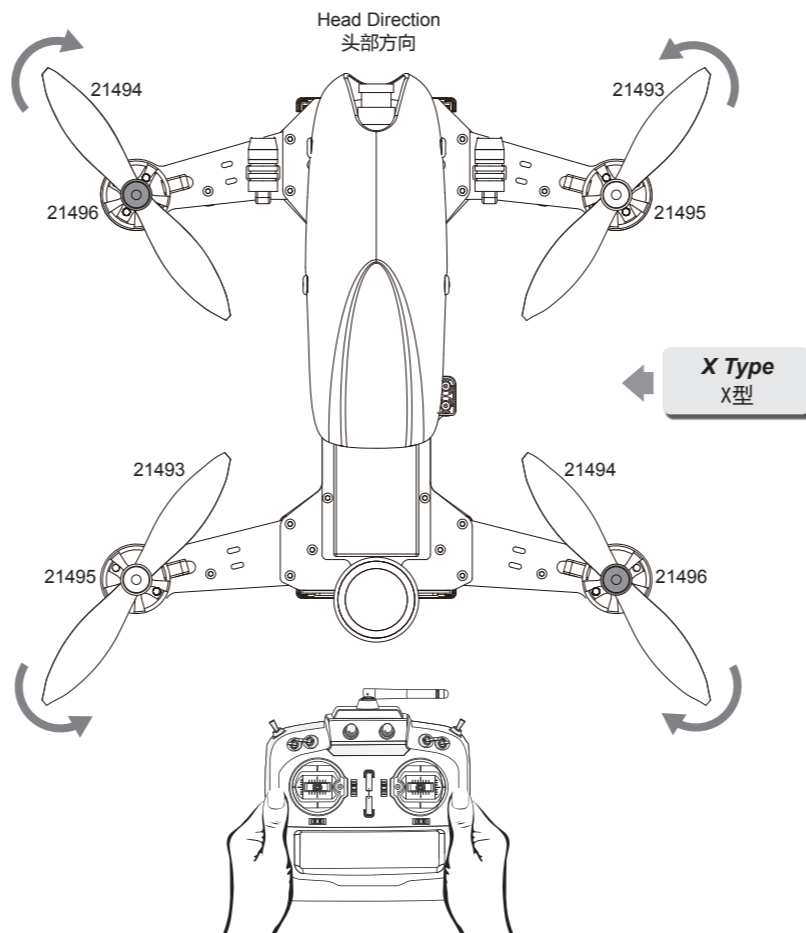
### Unlock & Propeller Direction Check 解锁与螺旋桨方向检查

- Make sure your quadcopter's battery is fully charged, and you are in a wide and flat area;
- Turn on the radio, pull the throttle stick to lowest position, plug in the power to the quadcopter (press and hold the power button for more than 2 seconds). L1 LED on FC451 Flight Control will flash Green (initial startup process), don't move sticks on the radio controller, keep the quadcopter still. When the L1 LED changes to Red, it means the initial startup process has finished and the quadcopter is now in Lock Mode (throttle will not operate). Move the sticks as shown in the diagram and hold for about 0.5 sec to unlock the quadcopter. After unlock, motors will reach idle speed for about 1 sec. If you don't do any stick movements during this period after "unlock" (5-seconds) the quadcopter will return to Lock Mode again.
- After unlock, push the throttle a fraction above idle speed, check if the propellers run in correct direction like shown in below diagram.

- 确保您的四旋翼的动力电池电量充足, 飞行器四周没有障碍物;
- 打开遥控器, 油门收至最低, 接通四旋翼飞行器的电源 (长按开关2秒以上)。飞控上的L1绿灯闪烁时为飞控初始化过程, 此过程中请勿拨动操纵杆, 并保持飞行器静止。L1绿灯闪烁结束红灯常亮后即进入锁定状态, 此时推油门无效。执行图中的拨杆动作并保持约0.5秒即可解锁, 解锁后电机保持怠速约一秒。解锁后五秒内如不将油门推高或执行拨杆动作, 飞控将会重新进入锁定状态。
- 解锁后, 将油门推至略高于怠速, 查看螺旋桨旋转方向是否与图所示一致。

After unlock, push the throttle a fraction above idle speed, check if the propellers run in correct direction like shown in below diagram.

解锁后, 将油门推至略高于怠速, 查看螺旋桨旋转方向是否与下图所示一致。



## Ground Test 地面测试

- CH5 is used to adjust flight mode, if you are using it, please toggle the CH5 switch before flight. L2 LED will indicate the state of the current switch position: blue indicates low stick input, green indicates high stick input. Put the CH5 switch to high (auto level flight mode).
- Direction check: Controlling the throttle, make sure the quadcopter doesn't leave the ground. Slightly move each stick to observe if the quadcopter moves with your stick input direction. If the direction is opposite, please change the channel direction on the radio.

- CH5通道用于调节飞行模式, 如果接入了CH5通道, 在飞行前请拨动CH5通道的开关, 观察飞控上的状态指示灯L2显示是否正确(低: 蓝灯, 高: 绿灯), 初次飞行请将遥控器上的开关拨至高(自稳飞行)。
- 控制油门, 保证飞行器不要离开地面, 依次轻微拨动各通道操纵杆, 观察飞行器在地面的倾斜状态与操纵杆的方向是否一致, 如不一致, 请在遥控器上更改相应通道的正反。



## Adjust the sensitivity 调节敏感度

- Hornet Mini (250mm class) quadcopter can use the default gain to get a good flight performance.
- Different quadcopters may vary in Weight and center of gravity, gains need to be adjusted to improve flight performance. follow the contents below to optimise gain settings.
- Normally, too high gains on pitch(elevator) or roll(aileron) axis may cause vibration on corresponding axis. if the gain is set to small, the quadcopter will have a slower response to stick movement.
- If the gain is set too high on the rudder axis it will cause the motors over reacting, which will make the quadcopter unstable in pitch and roll direction; if the gain is set too low on the rudder axis, the quadcopter will have difficulty on tail lock.
- When adjusting the gain, don't change too much, 5-10 degrees a time is enough. When you find a stable range, tweak it slightly to optimise performance.

- Hornet Mini (轴距250mm左右) 四旋翼使用飞控默认电位器敏感度即可很好的飞行。
- 不同的四旋翼飞行器因为重量、重心、马达和螺旋桨的不同会导致敏感度也不同。
- 一般俯仰轴和横滚轴的敏感度过大会导致在该轴上的震荡; 敏感度过低会导致在该轴上的动作偏软, 突然打杆时飞行器停止不干脆、难以控制。
- 航向轴的敏感度过大会导致电机的加减速过于激烈, 导致其他方向上的不稳定; 过低则对航向的锁定有影响, 打杆时飞行器停止不干脆。
- 每次敏感度调节请勿过大, 每次旋转电位器5-10度即可, 基本稳定后可继续进行细微调节。

## Flight Control Setting 飞控设置

**Attention 注意**

**ALL SETTINGS ARE OPTIMIZED TO FIT HORNET Mini, DON'T CHANGE THEM UNLESS IT'S NECESSARY.**

设定项目根据双天Hornet Mini已做最优化处理, 如非特殊情况无需设定。

- How to enter Setting Mode: Turn on radio controller, move the throttle to lowest position; turn on power to the quadcopter, wait until the L1 LED finishes flashing Green and then changes to RED (Now the flight control is in Lock Mode); press the "SET" button on the flight control to enter Setting Mode. After you enter Setting Mode, L1 displays the corresponding SETTING ITEM menu attributes (color), and L2 displays the corresponding SETTING VALUE menu attribute (color).
- "SET" Button usage:
  - Long Press (more than 2 sec) under Lock Mode: enter Setting Mode
  - Single Click under Setting Mode: switch between SETTING ITEM
  - Double Click (finish within 0.5 sec) under Setting Mode: change SETTING VALUE
  - Long Press (more than 2 sec) under Setting Mode: Save and Quit to Lock Mode
- Please check the chart at the right side for all settings.

- 如何进入设定模式: 打开遥控器, 油门收至最低, 接通四旋翼飞行器的电源, 等待飞控L1绿灯闪烁结束红灯常亮 (此时为锁定状态) 后, 长按飞控上的 "SET" 按钮进入设定模式。此时, L1的颜色指示设定项目, L2的颜色指示该设定项当前设定值。
- 按键操作说明:
  - 锁定状态下长按 (大于两秒): 进入设定模式
  - 设定状态下单击: 改变设定项
  - 设定状态下双击 (双击有效间隔小于0.5秒): 改变该项设定值
  - 设定状态下长按: 保存并退出
- 具体设定项如右表所示:

L1		L2			
Setting Item 设定选项	Setting Value 设定值	Setting Value 设定值	Setting Value 设定值	Setting Value 设定值	Setting Value 设定值
Blue 蓝色	Default flight mode (without mode switch) 默认飞行模式(无模式切换开关时)	Blue 蓝色	Green 绿色	Red 红色	Yellow 黄色
Green 绿色	ESC PWM Freq. 电调PWM频率	Self-stabilizing Mode 自稳模式	Manual Mode 手动模式	400Hz	200Hz
Red 红色	Potentiometer Lock 电位器锁定	Not Lock 未锁定	Lock 锁定	266Hz	333Hz
Yellow 黄色	Aircraft mode 飞行器模式	X Type X型	Cross Type 十字型	Flashing Recovery 闪烁恢复	
White 白色	Factory Reset 恢复预设值	* Blue color setting indicates default values * 蓝色设定值是默认值			

Some settings will take effect after the FC451 restarted. Cut the power to the quadcopter and reconnect after 5 seconds to apply the new settings. 部分设定需重启飞控后才能生效, 因此在飞控设定完成后, 请重新上电以应用新的设定值。