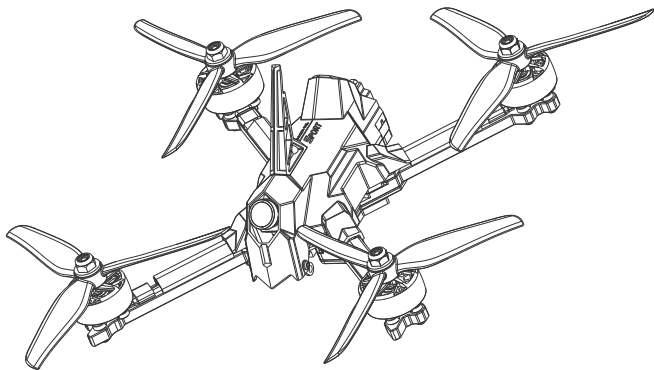


MACH R5 SPORT

Quick Start Guide

快速入门指南



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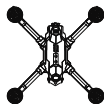
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一、MACH R5 SPORT 概述

Mach R5 Sport旨在为竞速飞手们提供一款既保留DIY创作空间，又具备高度成品化品质的飞行器。碳板与塑胶件相结合，极大地优化了内部结构布局，不仅使得日常维护变得轻而易举，且在有效减轻机身重量的同时，也增强了整体构架的稳固性。经过设计的空间布局，确保了所有硬件元件都能得到合理、有序的放置，大大降低了因挤压碰撞造成损坏的风险。

产品清单



Mach R5 Sport x1



正转螺旋桨 x4



反转螺旋桨 x4



鲨鱼鳍 x1



固定扣 x1



防滑垫 x2



电池扎带 x2



配件包 x1



贴纸 x1

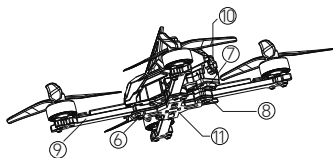
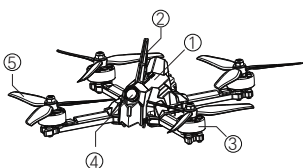


安全提示卡 x1



免责声明 x1

外观部件

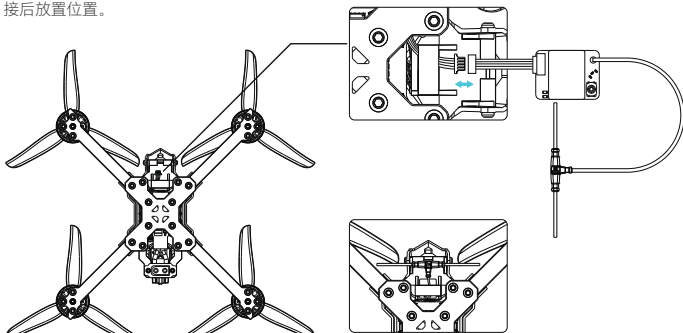


- ① 头罩 ② 鲨鱼鳍 ③ 电机 ④ 摄像头 ⑤ 螺旋桨 ⑥ 接收机 ⑦ XT60
⑧ 底板 ⑨ 机臂 ⑩ 固定扣 ⑪ 防滑垫

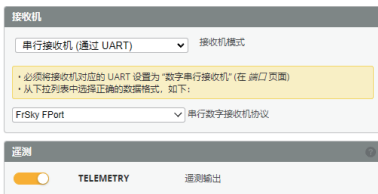
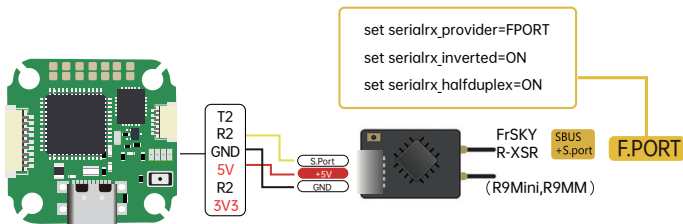
二、对频指南

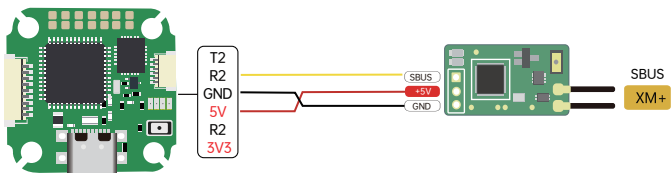
1. PNP接线示意

套机PNP预留空机线，客户可自行接TBS，ELRS等。将接收机连接好天线&端子线，对插套机PNP预留的空机线，把接收机天线放至接收机天线孔位，利用工具(镊子)把多余长的线规整好塞入机身内部【也可根据“掀盖操作示意图”打开头罩后更加方便】。如下图接收机连接好天线&端子线，连接后放置位置。



将接收机放置进接收机槽,并使用背胶固定。





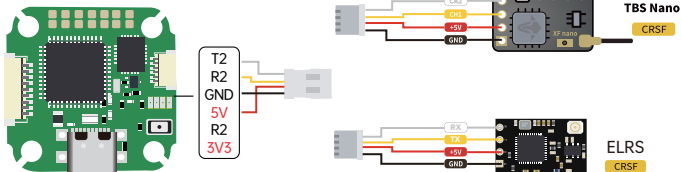
接收机

串行接收机 (通过 UART) 接收机模式

· 必须将接收机对应的 UART 设置为“数字串行接收机”(在 端口 页面)

· 从下拉列表中选择正确的数据格式, 如下:

SBUS 串行数字接收机协议



接收机

串行接收机 (通过 UART) 接收机模式

· 必须将接收机对应的 UART 设置为“数字串行接收机”(在 端口 页面)

· 从下拉列表中选择正确的数据格式, 如下:

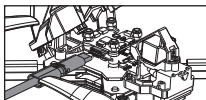
CRSF 串行数字接收机协议

源测

TELEMETRY 遥测输出

2. 接收机对频方法+步骤(ELRS+TBS)

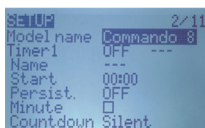
ELRS对频方式一：使用传统方式对频（以iFLIGHT Commando8 连接 ELRS900为例，其他遥控器的具体操作请参考对应遥控器的说明书）



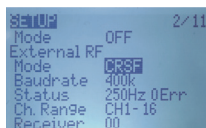
连续插拔USB口三次：连续开机关机三次或者在未开机的状态下，通过USB口给接收机通电，连续插拔USB口三次，接收机蓝灯呈持续双闪，此时接收机进入对频状态，下一步再到遥控器对频。



1.上电后，通过长按Model setup 按键来到MODELSEL界面



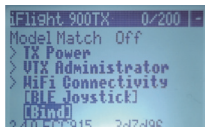
2.短按Next Page来到SETUP界面



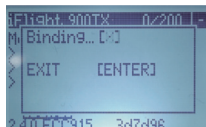
3.选择并打开ExternalRF的CRSF协议



4. 长按 System Settings 来到 TOOLS 界面 移动光标至 ExpressLRS 选项长按 Enter 进入下一界面\选项



5.把光标移动至【Bind】选项，按下Enter进入对频模式。



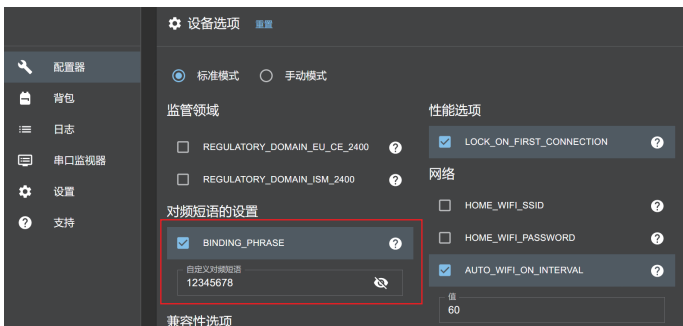
6.对频完成后，接收机的蓝灯双闪会变成蓝灯常亮状态，此时已对频成功

[注意]

- 1.由于ELRS对频速度较快，先使接收机进入对频模式，再让遥控器进入对频模式。
- 2.对频完成后，建议给接收机重新上电。
- 3.对频时，接收机与遥控器距离要在1m以上。
- 4.接收机固件版本与高频头固件版本需保持一致，如遇到无法对频的情况可尝试把接收机和高频头固件升级到最新的固件，再尝试对频。
- 5.如遇到无法对频情况，可尝试重启遥控器与接收机。

ELRS对频方式二：绑定短语对频与传统方式对频

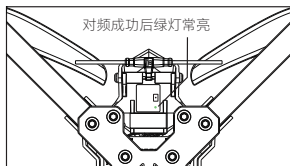
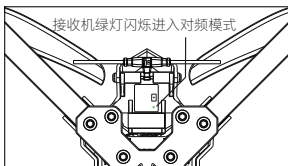
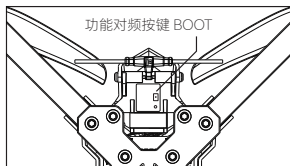
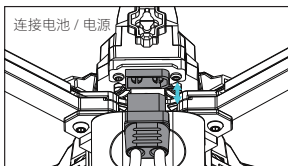
如果你正在刷写接收机与高频头固件，只需要设置好绑定短语即可直接将接收机与高频头绑定，无需使用传统方式对频。在Custom binding phrase中设置你的绑定短语。注意！绑定短语内容必须具有唯一性，不要设置简单的绑定短语，否则在ELRS信号范围内同样绑定短语的设备将会被绑定。



具体操作流程请参考EXPRESSLRs官网中的快速上手教程，或FLIGHT官方哔哩哔哩账号视频教程。

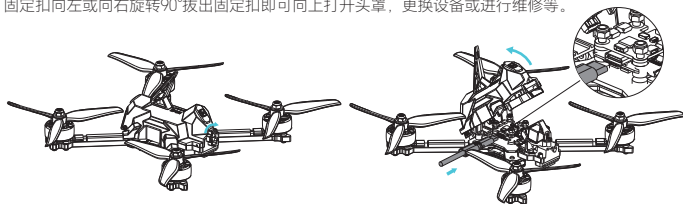
TBS对频方式：按键对频

将套机连接电源 / 电池 飞机正常自检后，用镊子短按一下 TBS 接收机 BOOT 按键，绿灯闪烁表示进入对频模式，黑羊遥控器或黑羊高频头设置页面进入高频头页面，找到【Bind】选项点击确认进入对频，对频成功后 TBS 接收机指示灯为绿灯常亮。



三、Betaflight安装与设置 (FC连接位置示意图)

固定扣向左或向右旋转90°拔出固定扣即可向上打开头罩，更换设备或进行维修等。



下载 BF 地面站后连接 FC

a. 接收机端口/协议

ELRS/TBS接收机: CRSF

Identifier	Configuration/MSP	Serial Rx	Telemetry Output	
USB VCP	☒ 115200	☐	Disabled	AUTO
UART1	☒ 115200	☐	Disabled	AUTO
UART2	☐ 115200	☒	Disabled	AUTO
UART3	☐ 115200	☐	Disabled	AUTO
UART4	☐ 115200	☐	Disabled	AUTO
UART5	☐ 115200	☐	Disabled	AUTO
UART6	☐ 115200	☐	Disabled	AUTO

Receiver

Serial (via UART)

Receiver Mode

• The UART for the receiver must be set to 'Serial Rx' (in the Ports tab)
• Select the correct data format from the drop-down, below:

CRSF

Serial Receiver Provider

Telemetry

☒ TELEMETRY Telemetry output

b. 通道映射设置

接收机通道映射: "AETR1234" 美国手-左手油门 "TAER1234" 日本手-右手油门

设置

端口

配置

动力 & 电池

预设

PID 调校

接收机

模式

电机

OSD 屏幕叠加显示

图传(VTX)

黑盒子

CLI命令行

预览



横滚 (A)

俯仰 (E)

偏航 (R)

油门 (T)

AUX 1

AUX 2

AUX 3

AUX 4

AUX 5

AUX 6

AUX 7

AUX 8

AUX 9

AUX 10

AUX 11

AUX 12

接收机

串行接收机 (通过 UART)

接收机模式

• 必须将接收机对应的 UART 设置为 "数字串行接收机" (在 端口 页面)
• 从下拉列表中选择正确的数据格式, 如下:

CRSF

串行数字接收机协议

遥测

☒ TELEMETRY 遥测输出

RSSI (接收机信号强度)

☐ RSSI_ADC 模拟 RSSI 输入

通道映射

AETR1234

RSSI 通道

摇杆低位 摇杆中点 摇杆高位

1050 1500 1900

Rc 死区时间 Yaw 死区时间 3D 油门死区

0 0 50

Rc 平滑

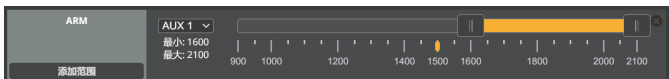
开启 平滑模式

刷新 保存

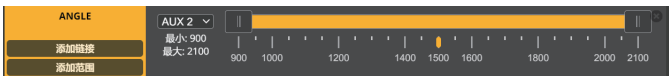
c. 接收机端口/协议

套机默认出货为自稳，客户也可自行设置其他等。

ARM: 解锁/上锁通道开关，用于飞行器的解锁与上锁，默认出厂设置为AUX1,低位为上锁，高位为解锁。图标亮起表示解锁，图标呈现灰色表示上锁。

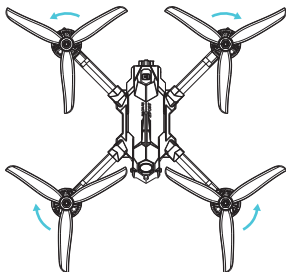


ANGLE: 自稳通道开关，用于飞行器开启自稳飞行模式，默认出厂设置为AUX2该模式全程保持开启状态。图标亮起表示开启自稳模式，图标呈现灰色表示非自稳模式。



四、桨叶安装-示意图

正转CW & 反转CCW，用户需根据桨叶迎风面识别桨叶方向，安装至套机。



五、上电前检查及注意事项

- 1.检查使用的电池电量是否充足且健康，确保电池无明显破损、变形或泄露现象。
 - 2.确认电池型号与穿越机兼容，电压规格正确（比如对于6S电池，应为22.2V左右）。
 - 3.检查电池插头与穿越机电池插座接触良好，无松动、污物或损坏情况。
 - 4.遥控器开启并已与穿越机正确对频，确认接收机指示灯正常闪烁或显示已连接。
 - 5.确保电机旋转方向正确，拆卸桨叶后，在地面站的电机页面推动油门确认
 - 6.确认螺旋桨安装方向，确定螺丝螺母不会松动。
 - 7.确保起飞地点空旷无障碍物，远离人群和贵重物品，以防止意外失控造成的损失。
 - 8.如果是首次飞行或重大升级后，建议先进行地面测试，确认所有功能正常后再进行空中飞行。
- 通过以上这些预防性检查，可以有效降低因疏忽导致的飞行事故，保证FPV穿越机的安全运行。

六、起飞/降落步骤及注意事项

起飞步骤:

需要先将油门(throttle)推至最低位置, 然后慢慢提升油门, 使穿越机离地约10-20厘米。观察穿越机的姿态稳定后, 收油门遥控器上锁。再戴上FPV眼镜或者面对查看显示器(如小飞手), 解锁缓慢提高油门, 使其平稳升空。

降落步骤:

- 1.降低高度, 在降落前, 先将穿越机逐渐降低至合适高度, 保持稳定的飞行速度和姿态。
- 2.靠近降落点, 控制穿越机慢慢接近预先选好的降落区域, 尽量采用滑翔方式接近, 才能更好控制距离点位。
- 3.减小油门, 缓慢减少油门输出, 让穿越机缓慢下沉。
- 4.接触地面或距离地面5-10cm即可上锁, 小心周围环境避免硬着陆损坏。
- 5.降落后拿到机子优先将电池插头拔掉使设备断电。

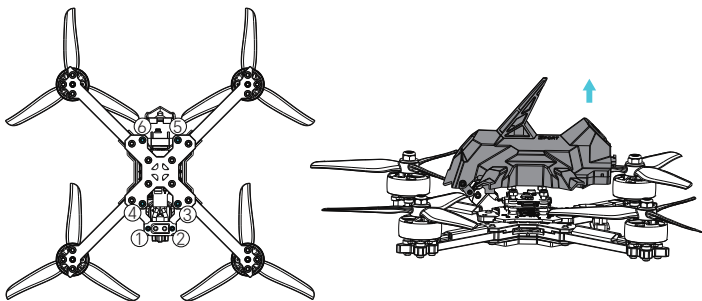
注意事项:

- 电池电量过低, 飞行中可查看FPV眼镜或显示器中的OSD 电池电量显示, 按飞行距离自行判断(越远需提前返航), 电池单片电芯电压在3.7V时就需要注意返航降落。
- 观察四周, 在降落前再次确认周围环境安全, 没有人员或动物进入降落区。
- 降落后优先将电池插头拔掉使设备断电, 避免再次误触遥控器开关 再次解锁极其危险。应优先在取下电池前, 确保遥控器上的油门归零并断开与飞行器的连接。

七、对频成功无法解锁的可能原因

- 1.检查实际接线的串口和接收机协议设置是否和接收机所连接的串口一致;
- 2.模式设置有冲突导致解锁失败, 检查地面站模式设置;
- 3.检查地面站电机选项是否开了双向dshot, 电调是否支持双向dshot;
- 4.检查接收机通道预设是否和遥控器的通道预设一致;
- 5.飞机在倾斜角度下无法解锁, 检查地面站配置页面的最大解锁角度;
- 6.带GPS的套机无法解锁, 检查失控保护设置是否开启了GPS救援, 搜星不成功导致无法解锁。

八、头罩换碳板+打印件的步骤（拆除螺丝的示意图）



拆掉底部这六颗螺丝，打开头罩上盖，取下摄像头 / 接收机 / 图传天线的端子线，取出电设，摄像头 / 接收机 / 图传天线，更换碳板套件的螺丝铝柱请按照普通 R5 进行安装，具体操作可扫一扫右方二维码查看官方安装视频。



九、免责声明

本产品并非玩具，需要有一定的基础知识才能控制，所以要循序渐进。在开始使用前，请特别注意《免责声明和安全操作引导》中的注意与警告。

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星河仲恺人工智能产业园B 2栋厂房第5-6层

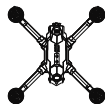


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I. Overview

The Mach R5 Sport aims to provide racing pilots a high-quality finished FPV drone while still allowing for DIY customization. By utilizing carbon plates and plastic components, the internal structure layout has been significantly improved. This not only facilitates easy maintenance but also reduces the weight of the drone while enhancing overall stability. The organized space layout guarantees that hardware components can be positioned logically, thus minimizing the risks of damage from crash impacts.

Packing List



Mach R5 Sport x1



CW Propellers x4



CCW Propellers x4



Sharkfin x1



Quick-release
Buckle x1



Battery Pad x2



Battery Strap x2



Accessory Pack x1



Sticker x1

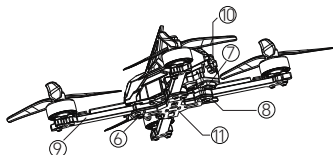
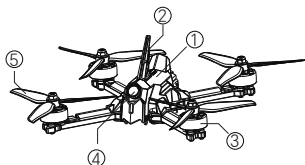


Safety Warning Card x1



Disclaimer x1

External Parts

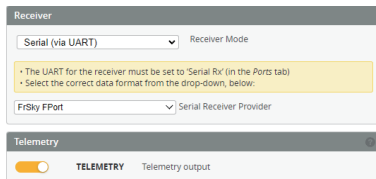
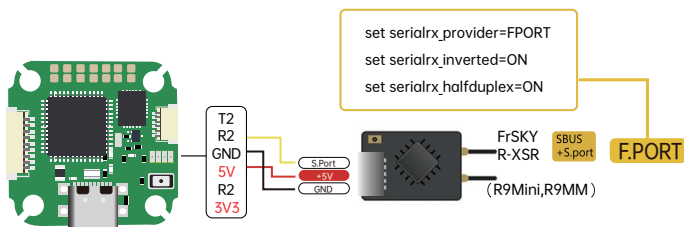
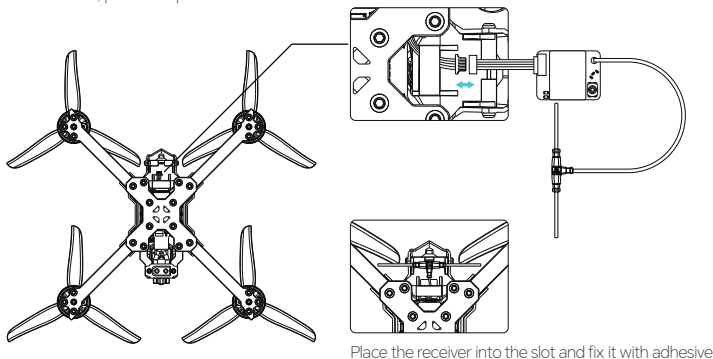


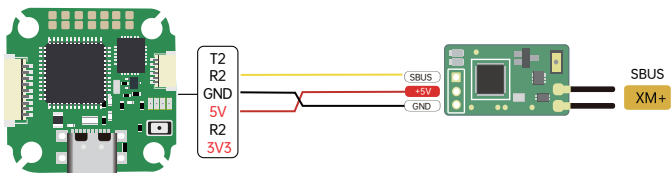
- ① Canopy Cover ② Sharkfin ③ Motors ④ Camera ⑤ Propellers
⑥ Receiver ⑦ XT60 ⑧ Bottom Plate ⑨ Arms ⑩ Quick-release Buckle
⑪ Battery Pad

II. Binding Instruction

1. PNP Wiring Diagram

The PNP version has reserved a wire for customers to connect TBS, ELRS, etc. Connect the receiver to the antenna and wire, then plug in the reserved wire, place the receiver antenna into the receiver antenna slot, use a tool (tweezers) to arrange the excess wires neatly and stuff them into the inside of the drone (or open the canopy cover according to the "Flip-top cover operation diagram" for more convenience). After connecting the receiver antenna and terminal wire as shown below, place it in position.



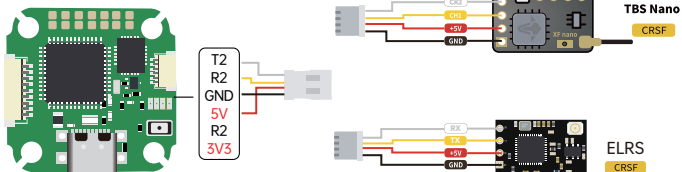


Receiver

Serial (via UART) Receiver Mode

• The UART for the receiver must be set to 'Serial Rx' (in the Ports tab)
• Select the correct data format from the drop-down, below:

SBUS Serial Receiver Provider



Receiver

Serial (via UART) Receiver Mode

• The UART for the receiver must be set to 'Serial Rx' (in the Ports tab)
• Select the correct data format from the drop-down, below:

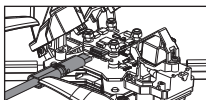
CRSF Serial Receiver Provider

Telemetry

TELEMETRY Telemetry output

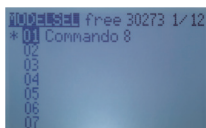
2. Receiver Binding Methods + Steps (ELRS+TBS)

1. Traditional Binding Procedure (Example: iFlight ExpressLRS 900TX)

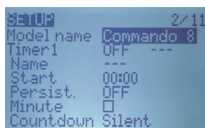


Plug and unplug the USB port for three times

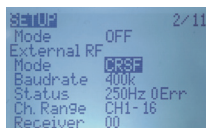
Power on and off the aircraft for three times, or plug and unplug the USB port for 3 times to supply power to the receiver when the aircraft is power off, the blue LED will start to double flash continuously. BIND mode active.



1. Once you power on the radio, press and hold the the Model setup to enter the MODELSEL page.



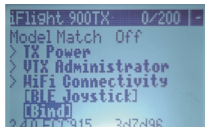
2. Press Next Page to enter the SETUP page.



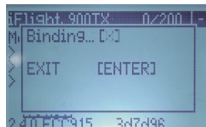
3. Scroll down to External RF and select CRSF.



4. Select the ExpressLRS LUA scrip (latest version installed). Press to enter.



5. Scroll down to Bind, press Enter to enter the binding mode. Bind mode active.



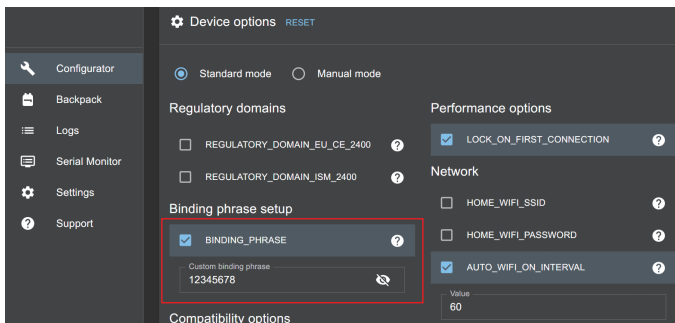
6. After binding, the blue LED on the receiver will turn to solid blue. Bind was successful.

[Caution]

1. Be quick with this process and set the receiver in binding mode first
2. After the binding process is completed, it's recommended to re-power receiver and transmitter.
3. The distance of receiver and transmitter should be more than 1m during the process.
4. The receiver firmware version should be consistent with the transmitter firmware version. If you can't bind your hardware, please try to update to the latest firmware.
5. If you can't bind your equipment, please try to reboot and several times if necessary.

2. Using Custom Binding Phrase

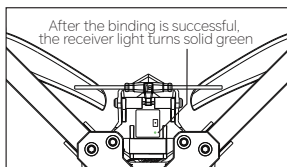
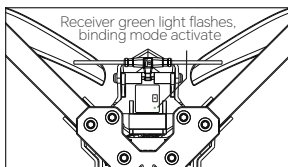
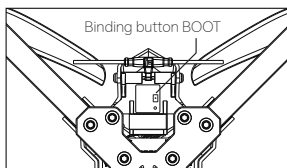
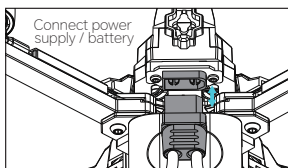
When flashing the latest ELRS firmware for Receiver and Transmitter, just set a unique custom binding phrase to automatically bind all your hardware. Do not set a too simple binding phrase, otherwise other pilot's devices with the same binding phrase might link up as well.



For more specific information please refer to the ELRS quick start tutorial on the official website.

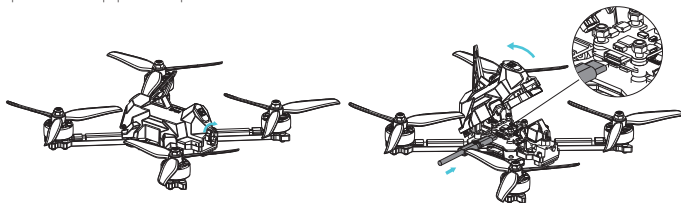
TBS Crossfire Binding Method: Using Button Binding

Power on the aircraft and after the aircraft completes self-check, use tweezers to short press the TBS Crossfire receiver BOOT button. If the green light flashes, it means binding mode activate. Enter the TBS Crossfire transmitter or TX module settings page, scroll down to [BIND], press the button to enter. After successful binding, the TBS Crossfire receiver indicator light will turn to solid green.



III. Betaflight Installation and Setup (FC Connection Diagram)

Turn the quick-release buckle 90° to the left or right and remove the buckle to open the canopy upwards for equipment replacement or maintenance.



Download Betaflight Configurator and connect to FC

a. Receiver Port/Protocol

ELRS/TBS Receiver: CRSF

Identifier	Configuration/MSP	Serial Rx	Telemetry Output
USB VCP	☒ 115200	☐	Disabled AUTO
UART1	☒ 115200	☐	Disabled AUTO
UART2	☐ 115200	☒	Disabled AUTO
UART3	☐ 115200	☐	Disabled AUTO
UART4	☐ 115200	☐	Disabled AUTO
UART5	☐ 115200	☐	Disabled AUTO
UART6	☐ 115200	☐	Disabled AUTO

Receiver

Serial (via UART)

Receiver Mode

• The UART for the receiver must be set to 'Serial Rx' (in the Ports tab)
• Select the correct data format from the drop-down, below:

CRSF

Serial Receiver Provider

Telemetry

☒ TELEMETRY

Telemetry output

b. Channel Map Setting

Receiver Channel Map: "AETR1234" Mode 1 Throttle, "TAER1234" Mode 2 Throttle

Setup

Ports

Configuration

Power & Battery

Presets

PID Tuning

Receiver

Modes

Motors

OSD

Video Transmitter

Blackbox

CLI

Preview

Roll [A]

Pitch [E]

Yaw [R]

Throttle [T]

AUX 1

AUX 2

AUX 3

AUX 4

AUX 5

AUX 6

AUX 7

AUX 8

AUX 9

AUX 10

AUX 11

AUX 12

Receiver

Serial (via UART)

Receiver Mode

• The UART for the receiver must be set to 'Serial Rx' (in the Ports tab)
• Select the correct data format from the drop-down, below:

CRSF

Serial Receiver Provider

Telemetry

☒ TELEMETRY

Telemetry output

RSSI (Signal Strength)

☐ RSSI_ADC

Analog RSSI input

Channel Map

AETR1234

Disabled

Stick Low Threshold

Stick Center

Stick High Threshold

1050

1500

1900

RC Deadband

Yaw Deadband

3D Throttle Deadband

0

0

50

RC Smoothing

☒ On

Smoothing Mode

Refresh

Save

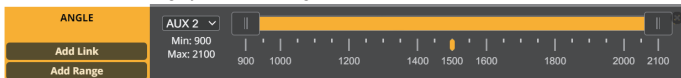
c. Mode Switch (Default Angle)

The default mode is Angle, and customers can also switch to other modes.

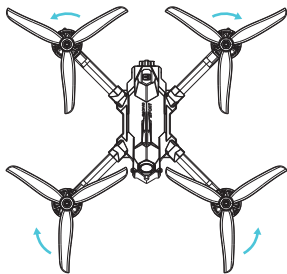
ARM: ARM/DISARM channel switch for arm and disarm the aircraft, default factory setting is AUX1, low range for disarm, high range for arm, The icon is lit to indicate arm, the icon is grey to indicate disarm.



ANGLE: Angle channel switch, used to turn on the Angle flight mode, the default factory setting is AUX 2, this mode remains on throughout the flight. The icon is illuminated to indicate Angle mode is on, the icon is grey to indicate Angle mode.



IV. Propellers Installation – Diagram



Identify CW & CCW propellers and install them correctly on the aircraft.

V. Pre-Flight Check

1. Make sure the aircraft batteries are fully charged and there is no obvious damage, deformation or leakage in the battery.
2. Make sure the battery model is compatible with the aircraft and the voltage specification is correct (e.g. for 6S battery, it should be about 22.2V).
3. Make sure the aircraft battery is properly connected and secure, there is no looseness, dirt or damage.
4. Make sure the transmitter is powered on and linked to the aircraft, and make sure the receiver indicator light flashes normally or shows connected.
5. Make sure the motor rotates in the right direction, take off the propellers and connect the aircraft to Betaflight Configurator, then push the throttle to confirm the rotation on the motor page.
6. Make sure propellers are in good condition and mounted onto the motors correctly and securely

7. Only fly in open areas without tall buildings and large metal structures around. Buildings with a large number of concrete irons will affect the signal and interfere with the flight. It is recommended to fly at least 10m away from buildings, poles, obstacles, etc.
8. If it is the first flight or after a major upgrade, it is recommended to conduct a ground test first to make sure all functions are normal before flying in the air. These preventive inspections can effectively reduce flight accidents caused by negligence and ensure the safe operation of FPV drones..

VI. Takeoff/Landing

Takeoff Procedure:

Start by pushing the throttle to the lowest position, then gradually increase it to lift the aircraft approximately 10-20 centimeters off the ground. Once the aircraft's attitude is stable, throttle down and disarm the remote controller. Put on FPV goggles or face the monitor (such as a handheld monitor), arm the remote controller and slowly increase the throttle to smoothly ascend.

Landing Procedure:

1. Decrease altitude, before landing, gradually lower the aircraft to an appropriate altitude, maintaining a stable flight speed and attitude.
2. Approach landing spot, control the aircraft to slowly approach the pre-selected landing area, preferably using a gliding approach to better control the distance.
3. Reduce throttle, slowly decrease throttle output to allow the aircraft to land slowly.
4. Disarm the aircraft when it touches the ground or is 5-10cm away from the ground, be careful to avoid hard landings that could cause damage.
5. After landing, immediately unplug the battery to power off the device to avoid injury.

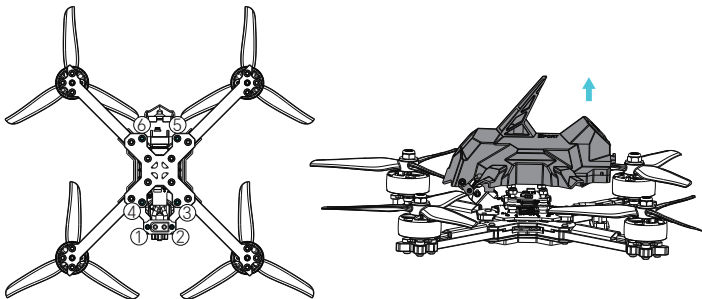
Precautions:

- Monitor battery level: During flight, check the OSD battery level display on FPV goggles or monitor. Judge based on flight distance (the farther the distance, the earlier the return) and consider returning for landing when single cell voltage drops to 3.7V.
- Observe surroundings: Before landing, double-check the surrounding environment for safety, ensuring no people or animals are in the landing area.
- Disconnect battery: After landing, unplug the battery immediately to power off the device and avoid accidentally triggering the remote controller switch, which could lead to dangerous situations. Ensure the throttle on the remote controller is at zero and the connection to the aircraft is disconnected before removing the battery.

VII. Possible Reasons for Successful Binding but Failure to Disarm

1. Check if the actual wiring of the serial port and receiver protocol settings match the serial port connected to the receiver.
2. Conflicting mode settings leading to arm failure, verify the mode settings on Betaflight Configurator.
3. Verify if the motor options are set to bidirectional DShot and if the ESC supports bidirectional DShot on Betaflight Configurator.
4. Make sure the receiver channel presets match those of the transmitter.
5. Aircraft may be unable to arm at tilted angles, check the maximum arm angle setting on the Betaflight configuration page.
6. Aircraft with GPS pre-installed may fail to arm due to unsuccessful satellite acquisition, check if GPS rescue in the fail-safe settings is enabled.

VIII. Steps to Replace the Canopy with Carbon Top Plate



Remove the six screws at the bottom , open the top cover of the canopy and disconnect the wires from the camera, receiver, and VTX antenna.

Remove the electronic components, including the camera, receiver, and VTX antenna. Replace them with the screws pack from the carbon top plate kit, following the standard Mach R5 Sport installation procedure. Refer to the video for specific instructions.



IX. Disclaimer

This product is not a toy and requires a certain level of knowledge to control, so it should be approached gradually. Before using, please pay special attention to the notices and warnings in the <iFlight Disclaimer and Safety Guidelines>.

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