BETAFPV

模拟图传 | Analog VTX

Aquila20

FPV套装 | FPV Kit

使用说明书 | USER MANUAL

第 I 版　2025-10-30

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1. 产品清单

1 * Aquila20无刷整机（模拟图传）
1 * LiteRadio 4 SE遥控器
1 * VR04 FPV眼镜

下面为配件类清单:
2 * Aquila20 2S高压（HV）智能锂电池 1100mAh
1 * 2S高压电显充电器|电源线版（黑色）
1 * Type-C数据线
1 * 2218-3B 桨叶一套（备用）
1 * 取桨器
1 * 十字螺丝刀
1 * 快速入门手册
1 * 套装使用说明书
1 * 4Pin转接线
1 * USB Type-C转接板 （与4Pin转接线配合用于飞控连接上位机调参）
1 * 手提收纳包

2. 免责声明

本司无人机及其配套产品并非玩具，不适合年龄小于16岁的儿童使用，需要有一定的基础知识才能控制，需要循序渐进。在开始使用前，请特别留意说明书中的注意与警告，深圳市哈鸣科技有限公司（BETAFPV）保留更新本说明书的权利。

多旋翼飞行器，配备了动力强劲的电机和锋利的螺旋桨，具有极快的飞行速度，同时具有一定的危险性，操作时需谨慎使用，在电源正常工作及各部件未损坏的情况下将提供优异的飞行体验。

务必在使用产品之前仔细阅读本文档，了解您的合法权益、责任和安全说明，否则，可能带来财产损失、安全事故和人身安全隐患。 一旦使用本产品，即视为您已理解、认可和接受本文档全部条款和内容。使用者承诺对自己的行为及因此而产生的所有后果负责。使用者承诺仅出于正当目的使用本产品，并且同意本条款及BETAFPV可能制定的任何相关政策或者准则。

本产品的文档如有更新，恕不另行通知。请访问 https://betafpv.com/ 了解最新信息。

3. 安全使用指南

切勿使用非BETAFPV提供或建议的部件，必须严格遵守BETAFPV的指南安装和使用产品。

3.1 飞行警告

1. 恶劣天气下请勿飞行，如大风、雨雪、雷暴、有雾天气等。飞行器无防水防尘功能，请注意保护主板，避免浸水短路烧毁。
2. 飞行前请先确认当前场所是否开阔、安全，障碍物过多可能会影响遥控和图像信号传输，干扰飞行。远离人群、水面、高压电线、通讯基站、易燃易爆物等，避免在人员密集处飞行。
3. 目视飞行时，请保持飞行器在视线范围内控制。
4. 佩戴FPV眼镜飞行时，请尽可能减少飞行器与飞行员之间的障碍物；由于无法观察周围环境，请配备观察员，以便应对突发事件；请尽量保持坐姿飞行，不要随意走动。
5. 请勿在非固定平台进行起飞、降落，例如：手掌、行进中的汽车或船只等。
6. 切勿接触工作中的螺旋桨，否则可能受到严重的人身财产损害。
7. 飞行时如遭遇意外情况，应立刻按压SA按键使马达停转。
8. 飞行时操作油门杆请保持轻缓，避免飞机失控。

3.2 飞行前检查

每次飞行前，请优先确认如下事宜:
1. 飞行器、遥控器、视频眼镜电量充足，且对频正常。
2. 飞行器马达和螺旋桨是否正确、稳固安装。
3. 飞行器电池是否安装并连接稳固。
4. 视频眼镜头带安装正确，避免使用过程中脱落。
5. 选择空旷场地进行试飞，飞行员与飞行器保持一米以上距离。

3.3 电池

使用
1. 严禁使电池接触任何液体，切勿将电池浸入水中或将其弄湿。切勿在雨中或潮湿环境中使用电池。
2. 严禁使用鼓包、胀气、漏液的电池，并禁止对其充电。
3. 禁止用导线或其他金属物体直接连通电池正负极使电池短路。
4. 请在温度范围 0℃至 40℃之间的环境中使用电池，温度过高时会使电池停止工作，或导致自燃。

5. 请勿将电池投入火中或对其加热，禁止投掷、撞击电池，避免电池遭受机械冲击。
6. 请勿过度充电放电（电压高于 8.7V或低于 6.6V），否则会导致电池寿命减少，或导致电池鼓包、胀气。
7. 电池内部电解液具有强腐蚀性，如果不小心将电解液溅到眼睛或者皮肤，请立即用清水清洗至少15分钟，并立即就医。
8. 禁止以任何方式拆解、组装、刺破电池或者改变接线。
9. 如电池端子脏污，请在使用前用干布擦拭干净。避免因接触不良导致电池或飞行器损坏。

注意：刚结束使用或充电的电池有可能高温烫手!

充电

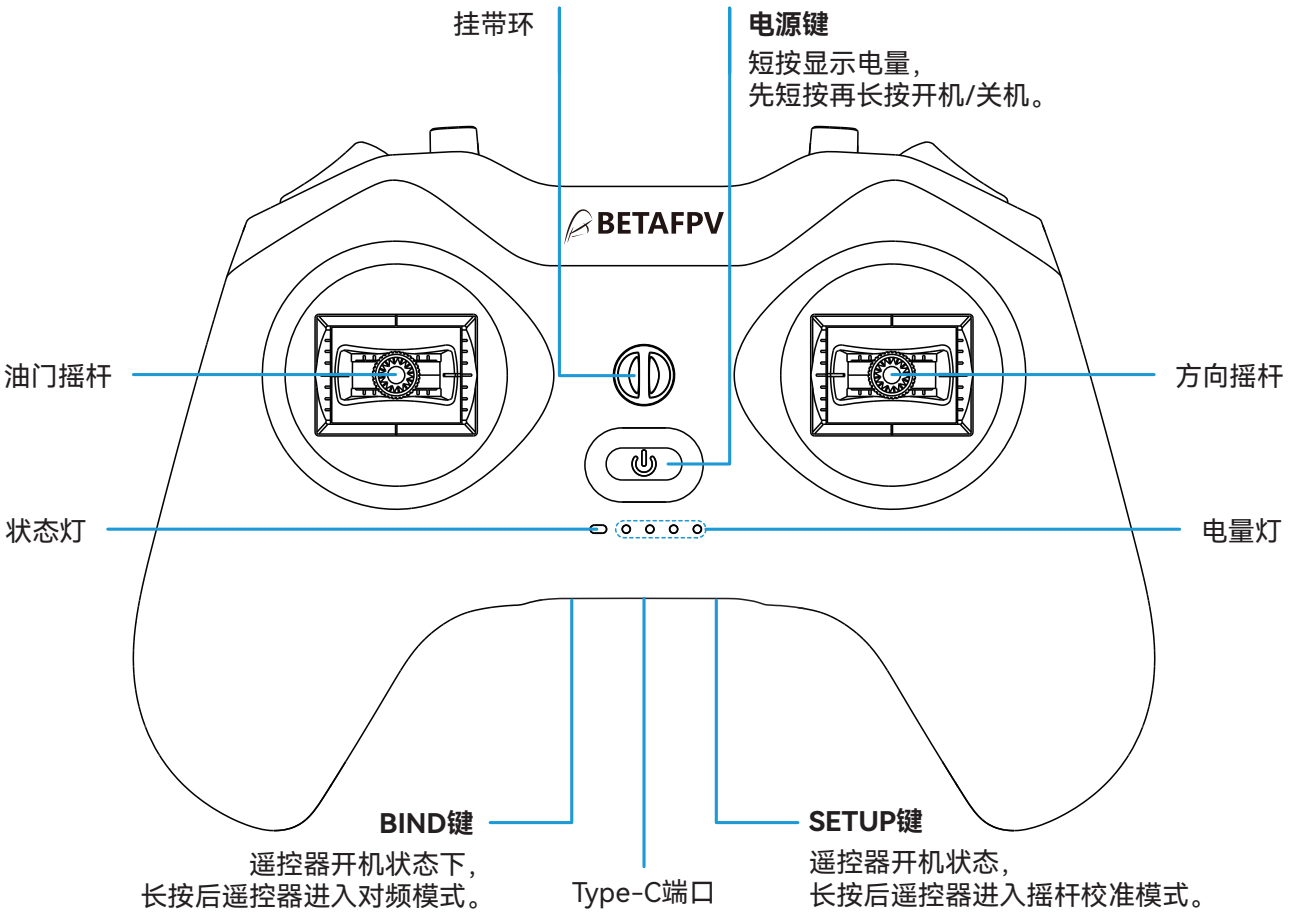
1. 充电时必须使用 BETAFPV 推荐的充电设备。
2. 请勿将电池和充电设备放置在易燃、可燃物（如化学液体、木制品）附近充电。
3. 刚结束使用的电池请降至室温后再充电。
4. 请在温度范围 0℃至 40℃之间的环境中充电。
5. 请勿在无人看管的情况下充电。
6. 充电完毕后，请断开充电设备与电池之间的连接。定期检查并保养充电设备，确认外观完好。切勿使用酒精或其他可燃剂清洁充电设备。切勿使用已损坏的充电设备。

存储、运输和废弃

1. 请将电池存放在儿童和宠物接触不到的地方。若不小心吞食电池应立即寻求医疗救助
2. 禁止将电池存放在热源（例如火炉）附近，或者高温环境内（例如夏天的汽车内）。最佳的存储环境温度为 20℃至 26℃ 。
3. 如长时间不使用，请将电池存放在阴凉、干燥、整洁的环境中。
4. 携带、运输电池时，请勿将电池直接置于物品较多的口袋、背包、或抽屉等空间内，以防与其他物品接触发生短路。
5. 电池是危险化学品，若需要丢弃电池，请将电池完全放电，并用绝缘胶带包裹电池端子，再弃置于专门的电池回收箱，严禁弃置于普通垃圾箱。
6. 若电池发出异味、发热、变形、变色或出现其他任何异常现象时，请停止充电，并联系BETAFPV或合作代理商，寻求帮助。

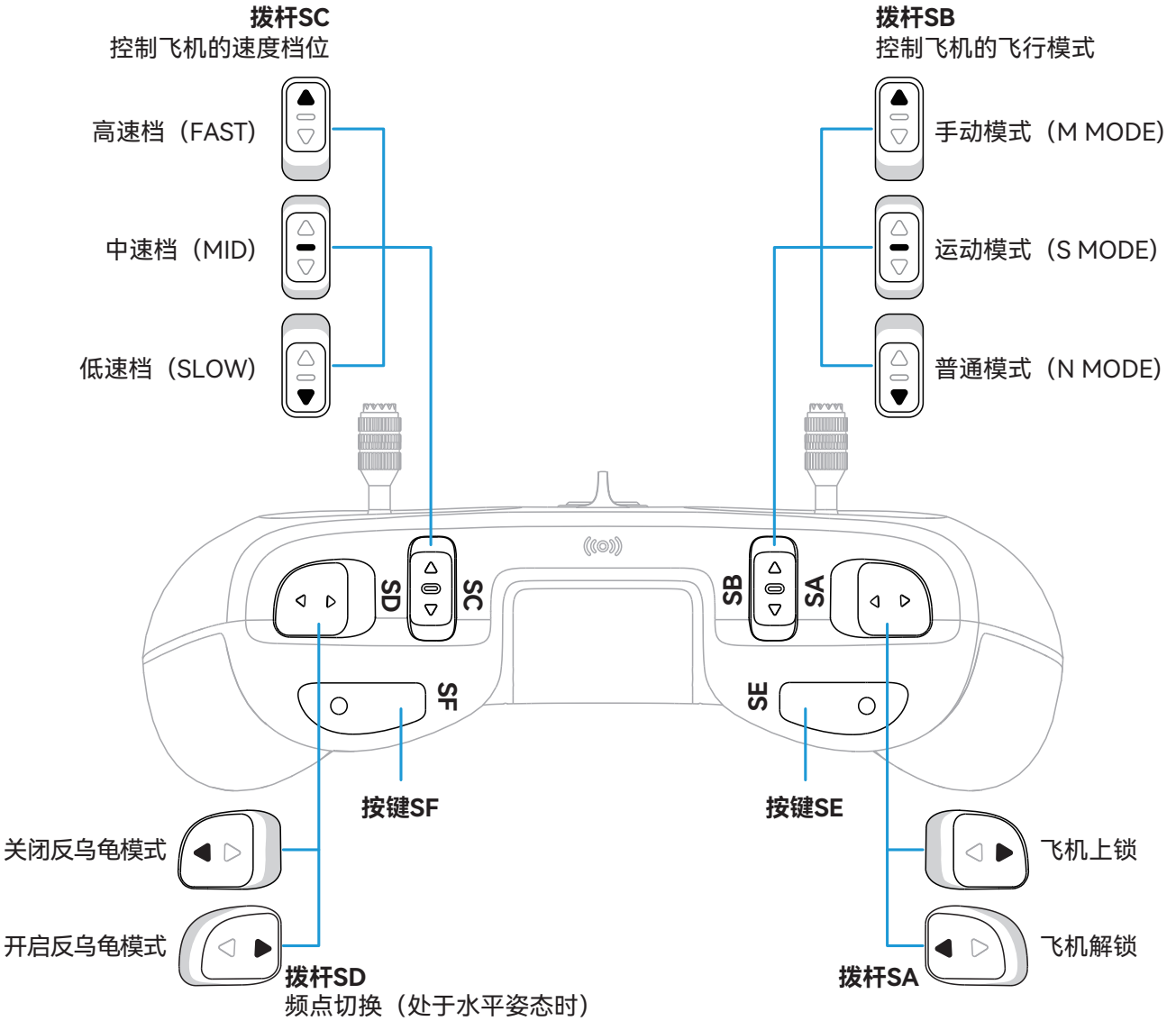
4. 遥控器操作

套装中的遥控器为LiteRadio 4 SE（ELRS 2.4G）型号。该遥控器的开关按键指示如下图所示



注意：请找官方获取LiteRadio 4 SE遥控器详细说明书，了解SETUP键摇杆校准模式的操作流程。如果误触SETUP键，又不知道如何校准摇杆，请直接关机重启。否则可能导致摇杆数据不正确。

遥控器前端有4个拨杆开关，分别为SA、SB、SC、SD，2个按键开关，分别是SE、SF，如下图所示。可以通过拨杆切换飞机的各种状态和参数。套装遥控器按键对应功能如下：



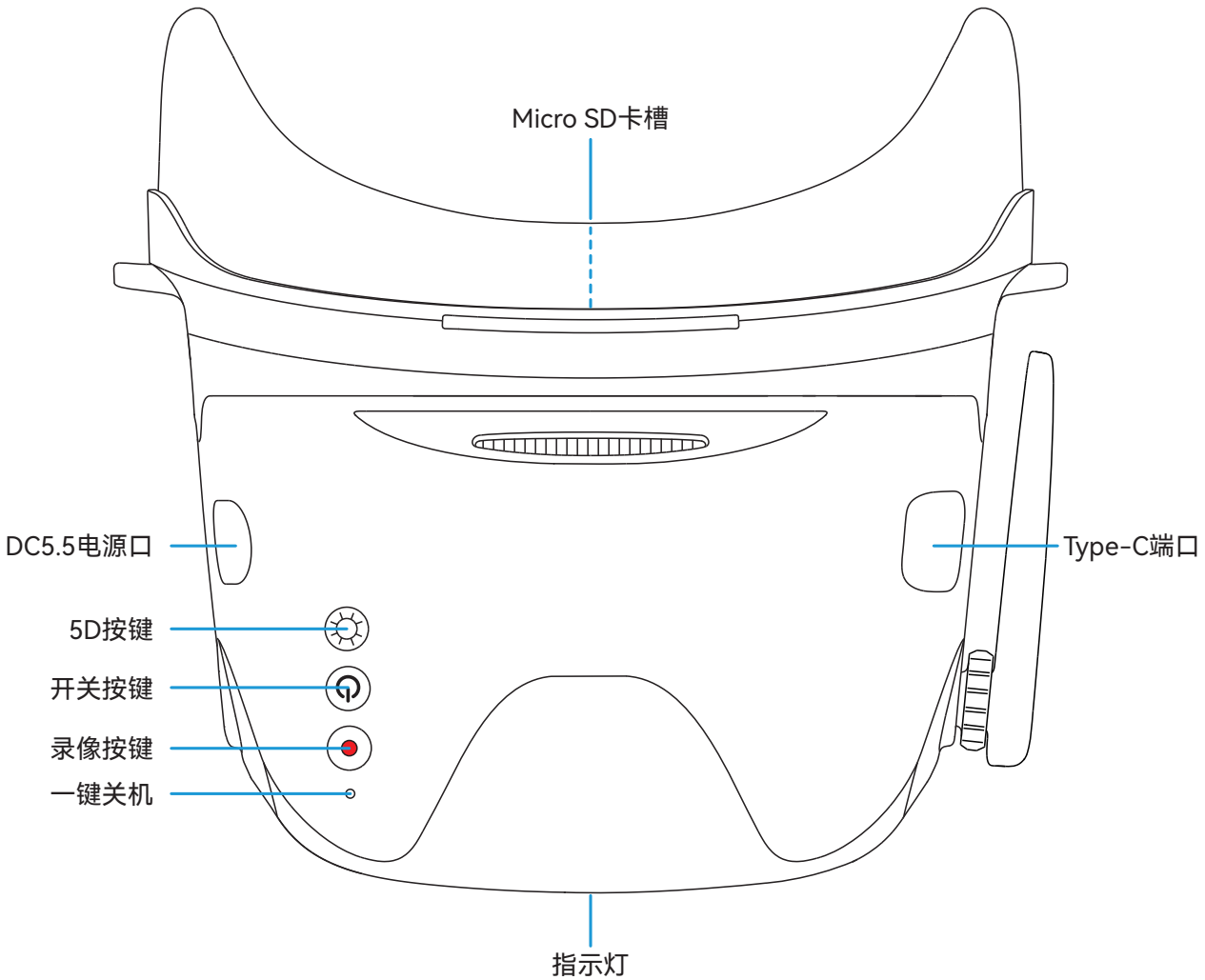
注意：

1. 只有遥控器和飞机成功连接，拨杆才能够起作用。
2. 飞机处于水平姿态时（指未处于翻转状态），拨动SD拨杆可切换一次频点。一共8个频点，切换到最后一个频点之后，循环到第一个频点重新开始。出厂时8个频点依次为：5733、5752、5771、5790、5809、5828、5847、5866
3. 按键SE和SF暂时未使用。

5. FPV眼镜操作

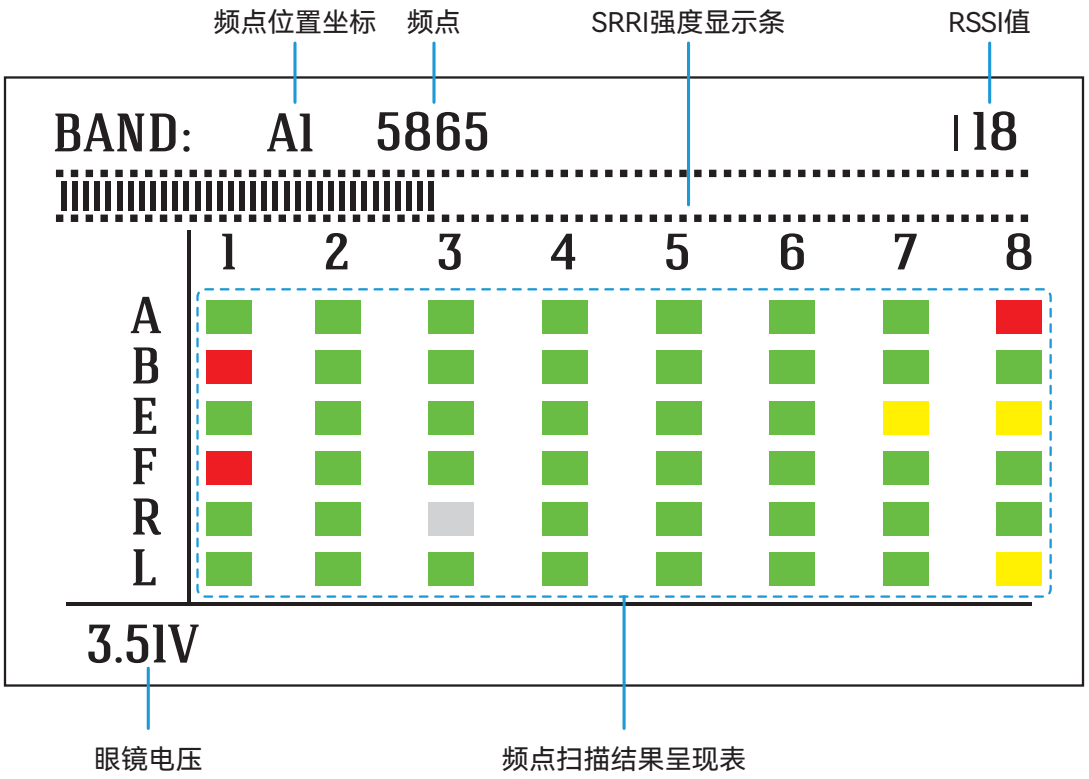
套装使用的FPV眼镜为VR04型号。该FPV眼镜使用可折叠单天线接收，并且支持DVR卡录功能。

5.1 按键操作说明



● 开关按键
长按按键5秒，可开启/关闭眼镜；
● 5D按键
快速搜频：长按5D按键2-3秒钟，开始搜频；搜频结束后发出滴的一声提示音，并显示对应的FPV穿越机画面，快速搜频完成。

频点扫描：短按5D按键，进入扫频界面，如下图所示。再长按2-3秒钟启动搜频，搜谱结束后会用绿黄红三种颜色标识该频点的信号情况。可以上下左右拨动5D按键，手动选择频点；再次短按5D按键，退出扫频界面。



绿黄红三种颜色标识该频点的信号的强度：

- 绿色：0<RSSI<20，该频点没有占用。
- 黄色：20<RSSI<70，该频点有干扰或者被占用，信号较弱。
- 红色：70<RSSI，该频点有有飞机占用，信号较强。
- 白色：当前FPV眼镜所接收的频点。

- 录像按键

短按一次，开启录像，屏幕左上角出现红点闪烁；再短按一次，关闭录像，红色闪烁熄灭。

- 一键关机按键

当出现无法关机时，可通过镊子轻触一键关机键进行关机。

- DC5.5电源口

支持2-6S（8.4-25.2V）外部电源供电。

注意：使用前应确认电量充足，建议电压在3.7V以上（短按5D键查看），将头带正确安装，并调整到个人舒适的尺寸。

5.2 频点选择

该FPV眼镜支持完整的5.8G图传频点的接收。即有6个频段（Band，分别为Band-A、Band-B、Band-E、Band-F、Band-R、Band-L）、有8个频道（Channel、CH-1、.....、CH-8），一共48个频点，如下图完整的频点表所示。

本套装出厂飞机默认只使用到了频段B（Band-B）的8个频点，即下表中第二行。

	CH 1 (MHZ)	CH 2 (MHZ)	CH 3 (MHZ)	CH 4 (MHZ)	CH 5 (MHZ)	CH 6 (MHZ)	CH 7 (MHZ)	CH 8 (MHZ)
A	5865	5845	5825	5805	5785	5765	5745	5725
B	5733	5752	5771	5790	5809	5828	5847	5866
E	5705	5685	5665	5645	5885	5905	5925	5945
F	5740	5760	5780	5800	5820	5840	5860	5880
R	5658	5695	5732	5769	5806	5843	5880	5917
L	5362	5399	5436	5473	5510	5547	5584	5621

5.3 DVR录像功能

FPV眼镜支持录像功能，短按录像键即可开始与停止录像。

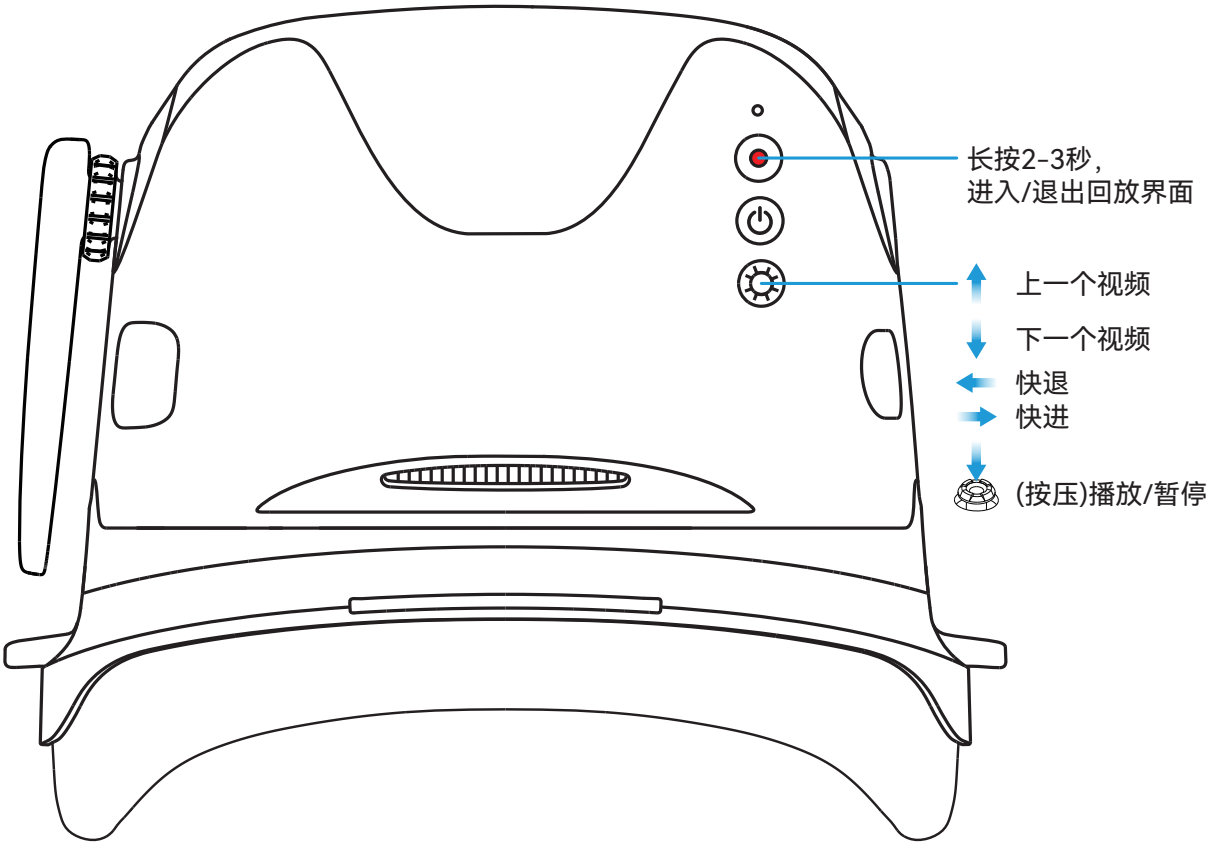
- 在Micro SD卡槽插入Micro SD卡（只支持FAT32系统，且最大支持64G）；
- 短按录像键后，视频左上角会出现一个红点，并且发出滴滴两声；
- 等待8秒后视频左上方红点开始闪烁，红色录像指示灯开始闪烁，同时一行红色的数字并开始计时，表示开始录像；
- 短按录像按键，2-3秒之后视频左上角红点停止闪烁，计时数字消失，红色录像指示灯熄灭，表示录像停止。

注意:

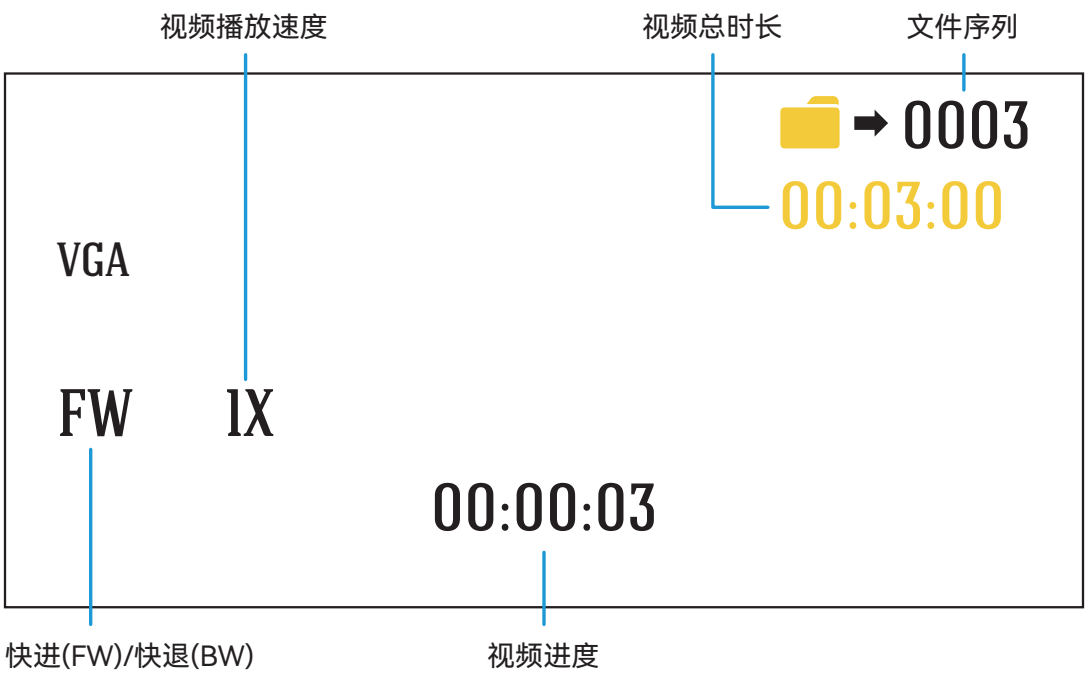
1. 按下录像键后大约需要8-10秒启动录像，请耐心等待。
2. 每段录像的时间最长为10分钟，单次录像超过10分钟时，会自动建立一个新的录像文件。

FPV眼镜支持录像回放功能，操作步骤如下:

- 首先保证插入了SD卡，且卡内有录制的视频文件；
- 长按录像按键2-3秒，发出滴滴滴三声，并且界面出现LOADING DVR...字样；
- 根据视频文件的多少，等待8-10秒加载完成，进入视频回放界面；
- 进入录像界面后，按键的功能改变，如下图所示；
- 再次长按录像按键2-3秒，可以退出视频回放界面。



使用上述按键可以在DVR界面进行录像切换、播放/暂停、快进/快退等操作。



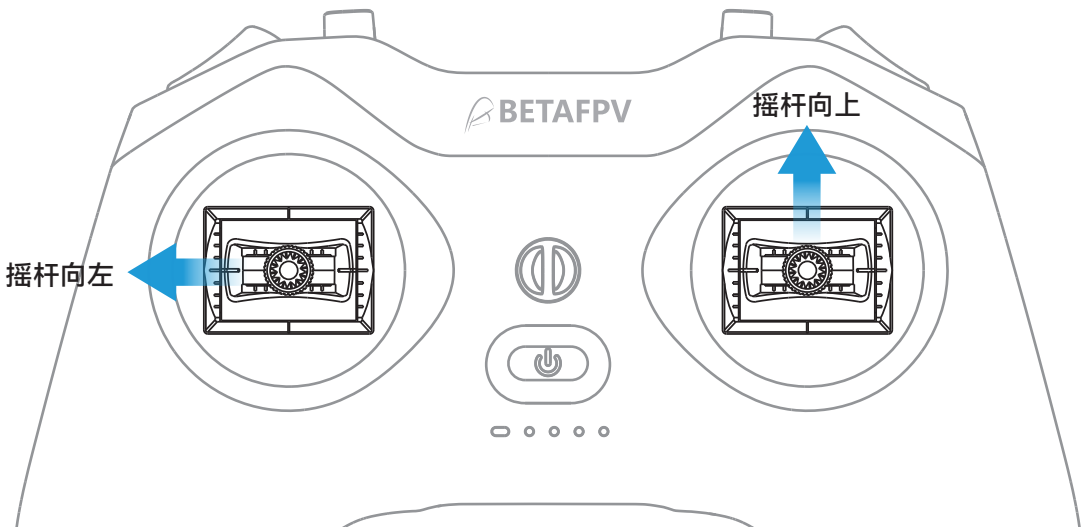
注意：长按录像键后大约需要8-10秒的时间载入视频回放界面（DVR界面），请耐心等待。

6. OSD菜单操作

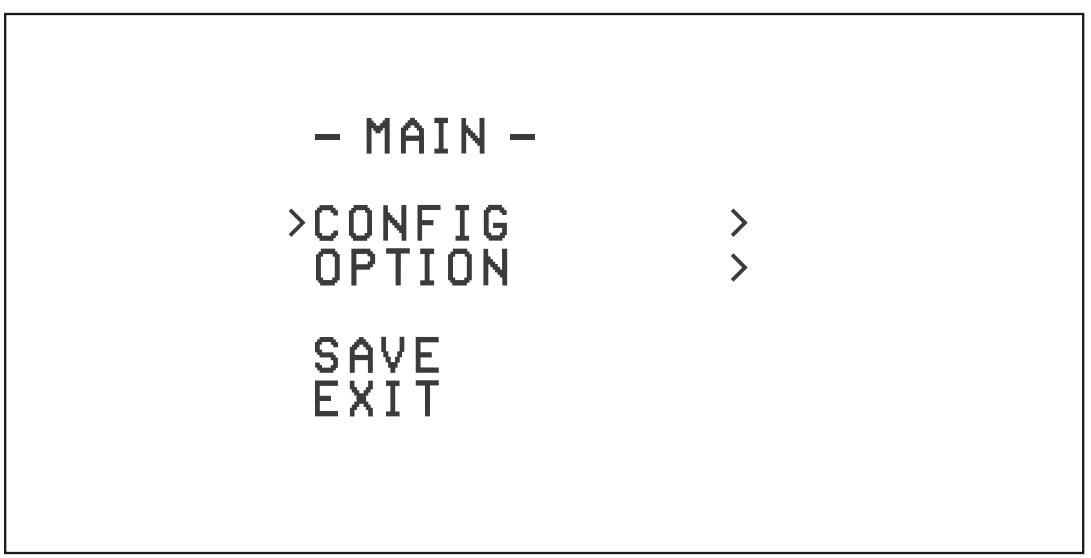
OSD菜单界面是在OSD飞行界面的基础上，设计的一套用于修改飞机配置的操作界面。常用的功能为，修改图传的频点，发射功率等。

6.1 进入/操作OSD设置菜单

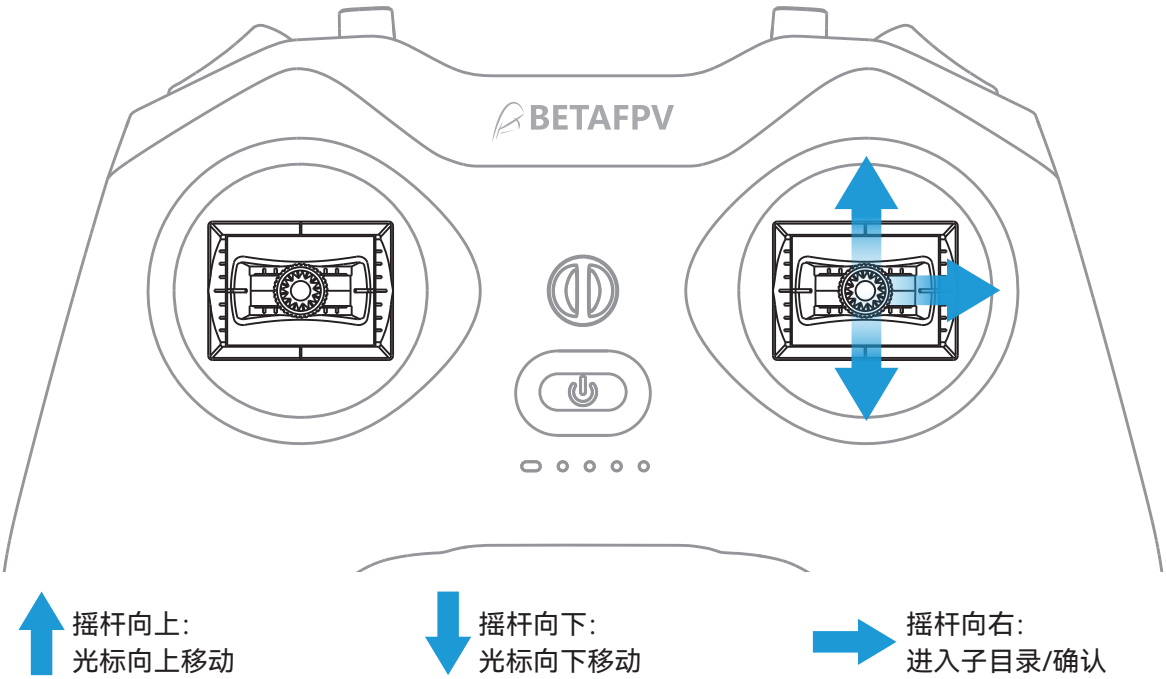
进入OSD设置菜单的打杆方式如下图所示，油门摇杆在中位向左打杆到底，方向摇杆同时向上打杆到底。注意，必须确保飞机是在上锁状态才能进入OSD菜单。



进入OSD菜单之后，可以在FPV图像中看到如下图所示的主菜单界面。



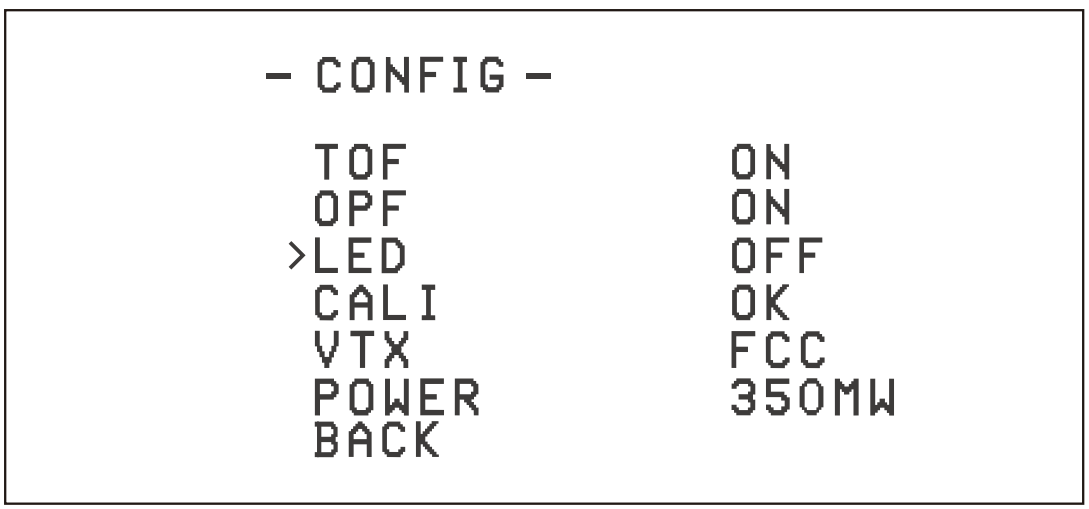
可以通过方向摇杆控制OSD菜单光标，从而进行OSD界面操作：



6.2 修改飞机彩灯/图传功率

在正常飞行时，飞机的状态灯出厂默认为蓝色常亮，图传发射功率为25mW。也可以开启彩色循环闪烁的方式，切换到其他发射功率。操作步骤如下：

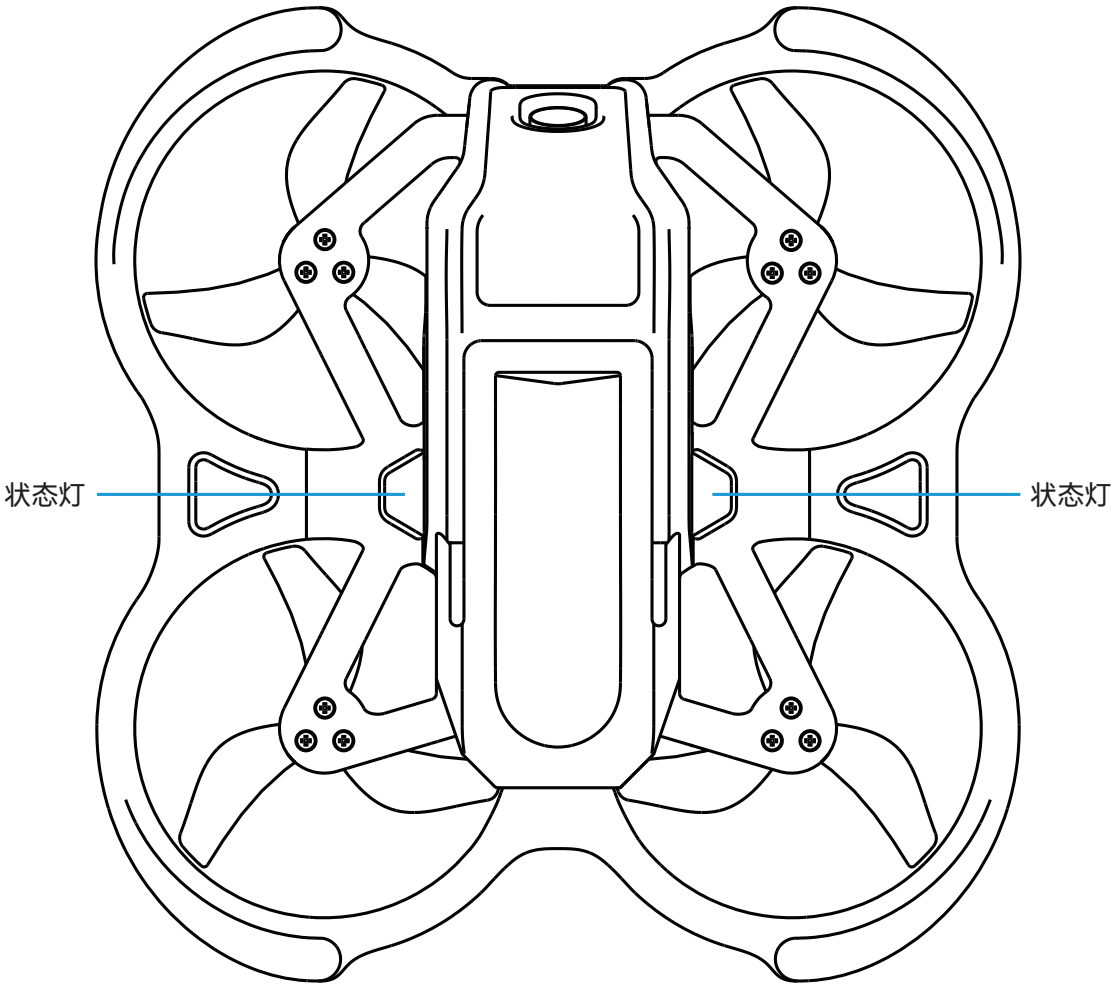
- 在MAIN主界面，选中CONFIG并进入CONFIG界面，如下图所示；
- 选中LED，修改为OFF（蓝色常亮）/ON（彩色闪烁）；
- 选中POWER，修改飞机图传的发射功率，如25mW，350mW等；
- 然后选中BACK退出CONFIG子菜单；
- 在MAIN界面中选中SAVE退出OSD设置界面。



7. 灯光、声音提示和充电

7.1 飞机

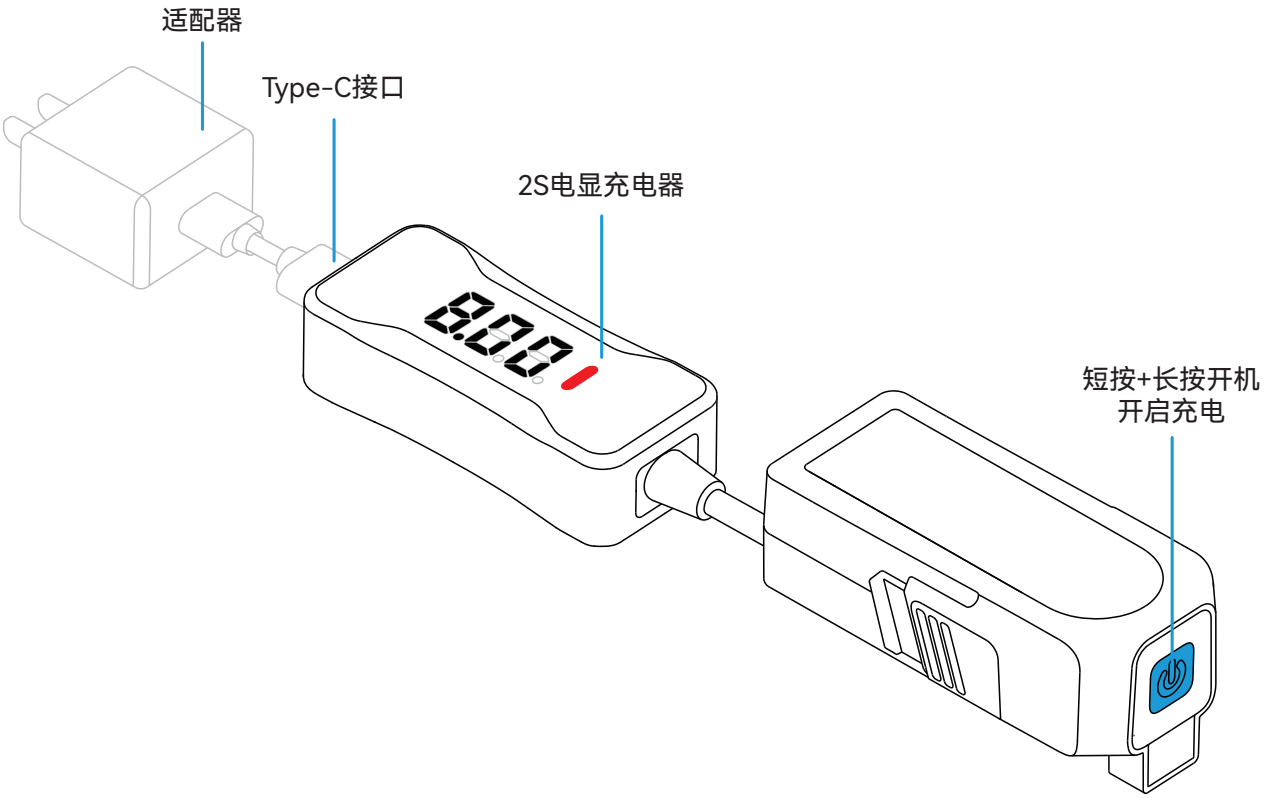
飞机顶部有两颗彩色的状态灯（RGB灯）。用于提示飞机是否正常上电和飞机的各种状态情况。



状态灯颜色	状态	状态说明	解决办法
——	熄灭	飞机上电不正常	更换电池重新上电
红色	慢闪	飞机电池低电压	需要更换电池
蓝色	常亮	飞机和遥控器连接成功	
蓝色	快闪	飞机水平校准中	飞机平放地面，等待片刻
紫色	常亮	飞机进入OSD菜单	
绿色	快闪	飞机进入对频状态	
白色	快闪	解锁时遥控器油门杆 未处于最低处	上锁后将油门杆置于 最低处再解锁
琥珀色	慢闪	飞机丢失遥控信号	重新建立和遥控器的连接

套装配备的Aquila20智能电池容量为1100mAh，可以飞行10分钟左右。当OSD飞行界面上显示LOW VOL，表示飞机电池电量过低，需要充电。该电池充满需要40分钟左右，充电步骤如下：

1. 使用适配器的Type-C接口连接充电器，将适配器接入电源中；
2. 然后将Aquila20智能电池的接口连接充电器，短按+长按开机智能电池，充电器即可对2S电池进行充电；
3. Aquila20智能电池上蓝色灯开始呼吸，标识正在充电中。充电器数码管显示电池电压，红灯常亮，电池正在充电；
4. 当充电器上数码管显示矩形符号，红灯熄灭，电池已经充满，充电结束。



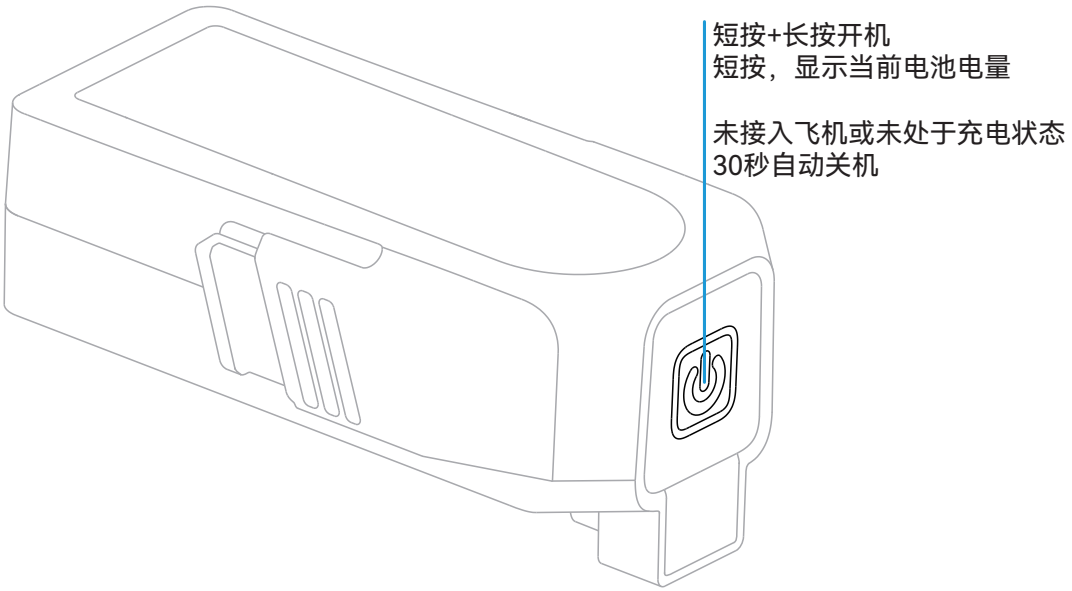
注意：

1. 充电结束30秒后，Aquila20智能电池自动关机，蓝色灯熄灭。充电器上数码管显示矩形旋转；
2. 请注意设备上的正负极标示，勿将电池端口正负极反向连接充电器；
3. 本充电器支持高压2S电池充电（8.7V），使用本充电器给普压2S电池（8.4V）充电存在过充的危险，请注意分辨电池类型；
4. 充电中，若数码管显示电压超过8.7V（例如9V），需及时断电，检查电池和充电器是否异常；

充电器的数码管及红灯，用于指示充电器的工作状态：

数码管	指示灯	状态说明
围绕矩形流动	红灯熄灭	未充电
总电压	红灯常亮	正在充电
矩形符号	红灯熄灭	已充满
无显示	红灯闪烁	电池异常

Aquila20智能电池，为2S高压电池，容积为1100mAh。通过短按+长按开机；短按时颜色代表当前的电量；当未接入飞机或者未处于充电状态时，30秒自动关机。



	**淡蓝色**	电量剩余75%以上
	**绿色**	电量剩余50%至75%
	**黄色**	电量剩余20%至50%
	**红色**	电量剩余20%以下

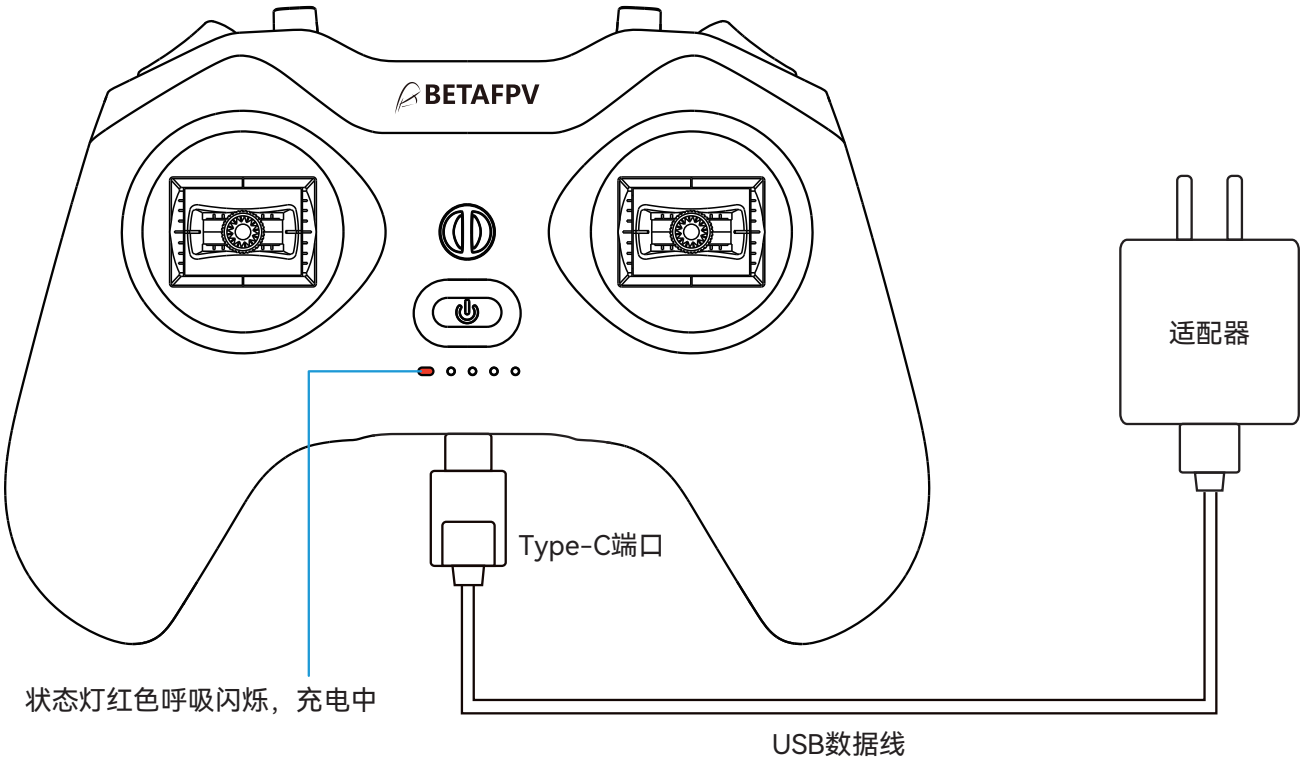
7.2 遥控器

遥控器正面有一颗状态灯和四颗电量灯，并内置了蜂鸣器，用于提示遥控器的电量和各种状态情况。四颗电量灯亮起数量对应当前遥控器电量，例如亮起三颗，表示还有75%左右电量。下面为遥控器状态灯和蜂鸣器的功能说明。

状态灯	蜂鸣器	状态说明
蓝色常亮	/	遥控器处于正常工作状态
红色常亮	/	油门杆不在最低位，需要将油门杆拨到最低位
紫色常亮	/	遥控器处于蓝牙工作模式
绿色常亮	/	遥控器处于Wi-Fi工作模式
橙色快闪4次	伴随“滴滴滴滴”声	电池电量过低，需要给遥控器充电
红色快闪2次	伴随“滴滴”声	遥控器在对频过程中
/	“滴滴“声（一短一长）	接收机连接成功
/	“滴滴”声（一长一短）	接收机连接中断，需要重新连接/对频

遥控器内置了2000mAh的电池，充满电的遥控器可使用4-5小时。当状态灯橙色快闪4次、电量灯全部熄灭，同时蜂鸣器发出“滴滴滴滴”声响时，表示遥控器电池电量低，需要重新充电。充电方式如下：

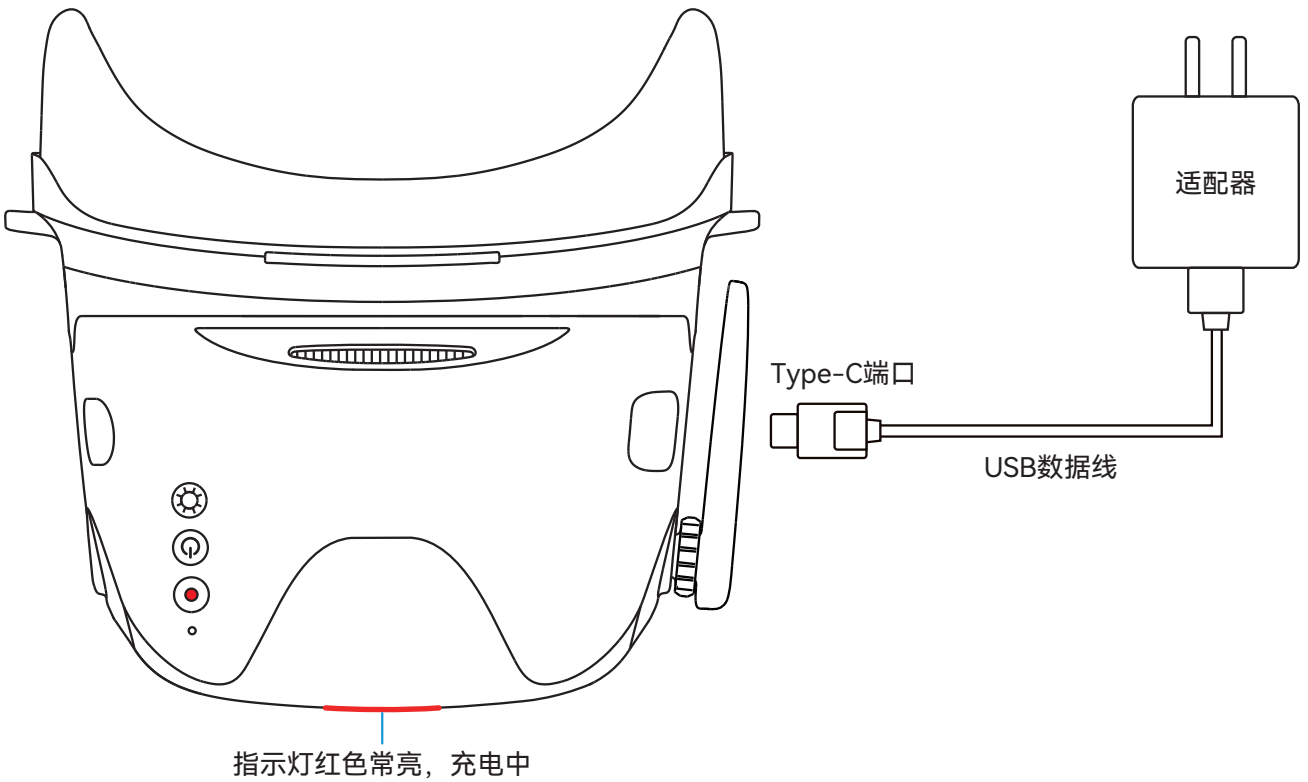
- 关闭遥控器；
- 使用Type-C线连接遥控器和适配器（5V输出的适配器即可，例如手机充电器）；
- 状态灯红色呼吸闪烁、电量灯逐个点亮，表示正在充电中；
- 状态灯绿色呼吸闪烁、电量灯全部常亮，表示充电结束；
- 充电完成后请尽快断开适配器。



7.3 FPV眼镜

FPV眼镜内置2000mAh电池，当电压在低于3.4V时每隔10秒发出一次提示音，即表示需要重新充电。充电方式如下。

- 关闭FPV眼镜;
- 使用Type-C线连接FPV眼镜和适配器（5V输出的适配器即可，例如手机充电器）;
- FPV眼镜上电源指示灯红色常亮，表示正在充电中；电源灯熄灭，表示充电结束;
- 充电完成后请尽快断开适配器。



注意：该FPV眼镜支持通过DC5.5电源口接入外部电源供电。支持的电压范围为2-6S（8.4-25.2V）。使用外部电源供电时，会同时给FPV眼镜的内置电池充电。

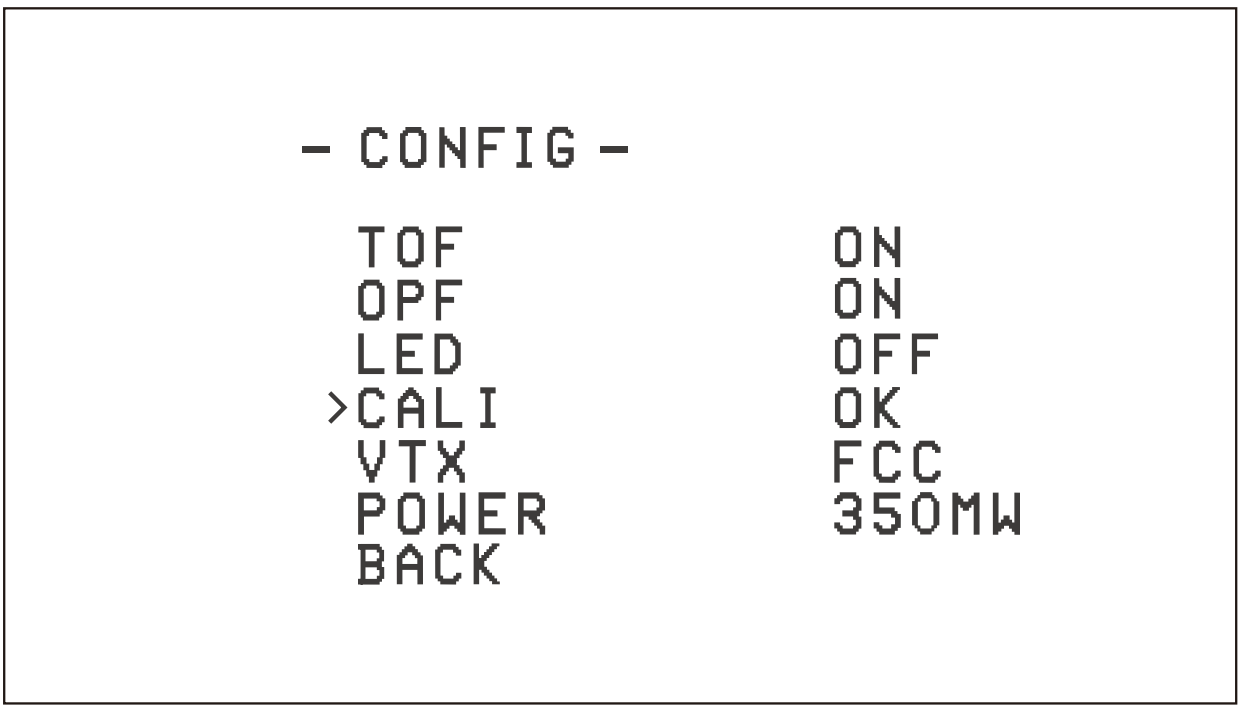
8. 高级功能

高级功能指只有在特殊情况下才需要操作的功能。

8.1 飞机水平校准

飞机在多次起落之后，可能会出现飞机陀螺仪数据偏移的问题，表现为飞机飞起来之后，朝单一方向倾斜。这个时候，可以将飞机进行陀螺仪数据校准。校准步骤如下：

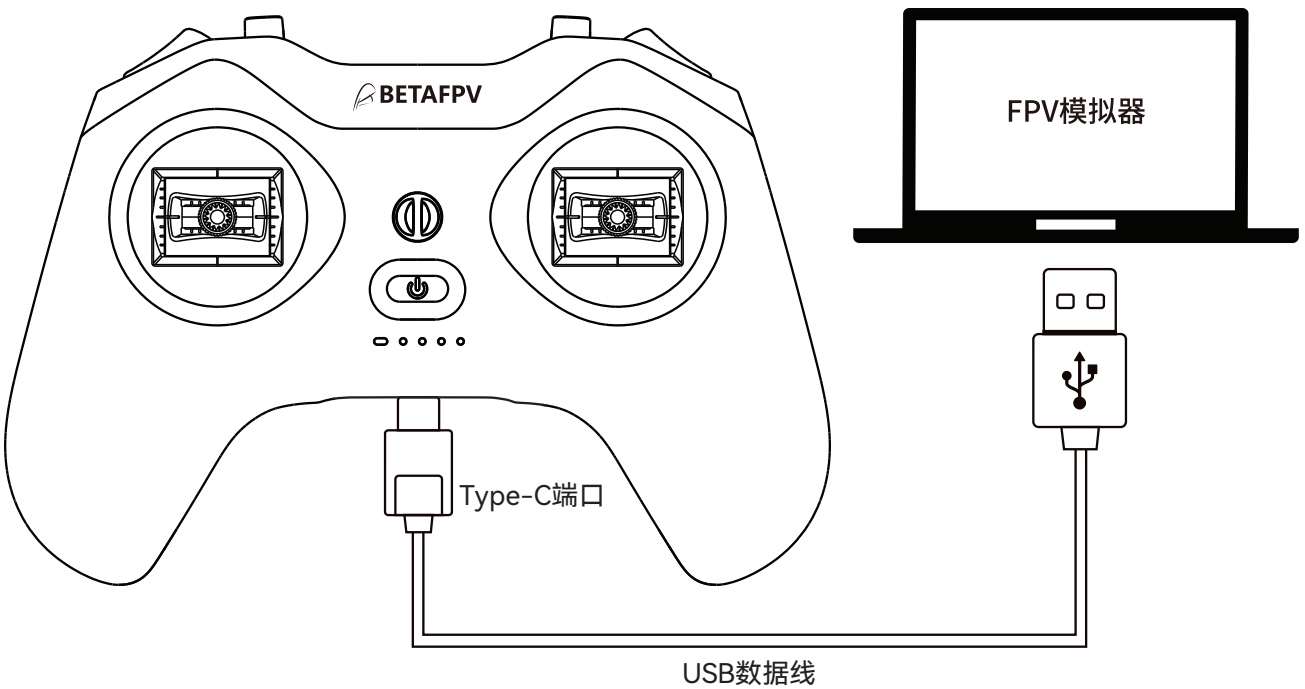
- 将飞机和遥控器开机，并且确保连接成功；
- 将飞机放置于水平平面上；
- 通过遥控器操作，进入OSD设置菜单；
- 在MAIN主界面，选中CONFIG并进入CONFIG界面，并且将光标移动到CALI所在行。如下图所示；
- 向右打方向摇杆，进入飞机水平校准，飞机蓝灯闪烁；
- 当后面出现OK提示，飞机恢复蓝灯常亮时，校准完成，退出OSD菜单即可。



注意：设置OSD菜单请参考说明书“OSD设置菜单操作”章节。

8.2 遥控器如何玩FPV模拟器

对于FPV飞行新手来说，使用模拟器是最安全和快速的入门方式。套装中的LiteRadio 4 SE遥控器支持市面上绝大多数FPV模拟器，而且使用配置也很方便。



使用数据线JoyStick模式练习常见的FPV模拟器（例如黑羊模拟器、UNCRASHED、DRL、DCL、LIFTOFF、TryPFPV、FeelFPV、FPV Freerider、凌动模拟飞行、STEAM平台上的无人机模拟器软件），基本操作如下：

- 关闭遥控器；
- 使用USB数据线连接遥控器和电脑即可；
- 此时LiteRadio 4 SE遥控器可被识别为“BETAFPV Joystick”。

注意：

1. 在开机状态下，遥控器的USB没有信号输出，无法使用JoyStick模式。
2. 该遥控器也支持数据线Xbox模式，操控DJI大疆虚拟飞行；加密狗模式，操控凤凰模拟器；具体操作方式，请找官方获取LiteRadio 4 SE遥控器详细说明书；

9. 法律规范与使用限制

9.1 警告

为避免违法行为，可能的伤害和损失，务必遵守以下各项：
1. 禁止将飞行器进行任何改装或用于其他非法用途。
2. 切勿在载人飞机附近飞行，必要时立即降落。
3. 禁止在大型活动现场使用飞行器。这些场地包括但不限于：体育比赛场馆、演唱会。
4. 切勿在当地法律禁止的区域飞行。
5. 确保飞行器飞行时不会对航线上的大型载人飞行器造成影响，时刻保持警惕，并躲避其他飞行器。

9.2 建议

为避免违法行为，可能的伤害和损失，务必遵守以下各项：
1. 禁止操控飞行器使之进入法律法规规定的禁飞区，禁飞区包括但不限于：机场、边境线以及主要城市和临时举行活动区域。
2. 禁止在超过限定高度的空域飞行。
3. 确保飞行器在您的视距范围内飞行，若有必要可安排观察员帮助您监控飞行器位置。
4. 禁止使用飞行器搭载任何违法危险物器。

9.3 注意

1. 确保您已清楚了解飞行活动的类别（例如：娱乐、公务或商务），在飞行前务必获取相关部门颁发的许可证。如有必要，可向当地政府主管部门咨询飞行活动类别的详细定义说明。请注意，在某些地区和国家禁止使用飞行器进行任何形式的商业行为。
2. 禁止在敏感建筑设施，例如：发电站、水电站、监狱、交通要道、政府大楼以及军事设施附近使用飞行器。

10.出口管制

10.1 遵守出口管制法律

本产品的出口、再出口或转移受中国的出口管制法律及其他适用的出口管制法律管控。除非适用的出口管制法律允许，或者获得相关出口管制主管机构的许可，您对本产品的使用、销售、转让，出租或者其他行为需要确保；
1. 不违反适用出口管制法律的禁运政策。
2. 不与适用出口管制法律禁止的最终用户进行交易。
3. 仅用作民用用途，禁止直接或间接将BETAFPV产品用于以下内容或与其有关的（1）任何军事战斗目的或军事战斗相关用途；（2）恐怖主义活动；（3）其他刑事犯罪行为。采购方也应要求其客户或最终用户遵守前述要求。

10.2 出口合规免责声明

您需要遵守适用中国及其他国家或地区适用的出口或进口管制法律，任何由于您使用、销售、转让、出租本产品或其他行为导致违反前述适用的出口或进口管制法律的情形下，您将独立承担相应法律责任。BETAFPV在任何情况下均不对您违反适用的出口或进口管制法律的行为负责，并且您还应保障BETAFPV及其附属机构、管理人员、员工、代理商、代表人不因您的前述行为而遭受任何法律责任和损害。如发生前述情况，您将承担相关费用，包括但不限于赔偿款、诉讼费，律师费、差旅费等。

1. Product List

1 * Aquila20 Brushless Whoop Quadcopter (Analog VTX Version)
1 * LiteRadio 4 SE Radio Transmitter
1 * VR04 FPV Goggles

Components List:
2 * Aquila20 2S High-Voltage (HV) Smart Lipo Battery 1100mAh
1 * 2S HV Battery Charger and Voltage Tester / Power Cable (Black)
1 * Type-C Data Cable
1 * 2218 3-Blade Propeller Set (Spare Set)
1 * Propeller Removal Tool
1 * Phillips Screwdriver
1 * Quick Start Guide
1 * User Manual
1 * 4-Pin Adapter Cable
1 * USB Type-C Adapter Board (Used with 4Pin Adapter Cable for parameter tuning on BETAFPV Configurator)
1 * Portable Storage Bag

2. Disclaimer

Quadcopters and related products are not ordinary toys and are not recommended for children under the age of 14. Basic flight control skills are required, and a gradual learning process is recommended. Before use, please carefully read all the cautions and warnings in this manual. Shenzhen Baida Moxing Co., Ltd. (BETAFPV) reserves the right to update this manual at anytime.

Multirotor quadcopters are equipped with powerful motors and sharp propellers, enabling extremely high speed flight while also posing certain risks. Caution must be exercised during operation. When the power supply is functioning normally and all components remain intact, it will deliver an exceptional flight experience.

Before using the product, please read this document carefully to understand your legal rights, responsibilities, and safety guidelines. Failure to do so may result in property damage, accidents, or personal injury. By using this product, you are deemed to have understood, acknowledged, and accepted all terms and conditions herein. Users agree to take full responsibility for their own actions and all consequences arising therefrom. Users agree to use this product only for legitimate purposes and agree to these Terms and Conditions and any relevant policies or guidelines that established by BETAFPV.

This product documentation may be updated at any time without prior notice. Please visit https://betafpv.com/ for the latest information.

3. Safety Guidelines

Only Parts provided or recommended by BETAFPV may be used for this kit. You must strictly follow BETAFPV's guidelines to install and use the product.

3.1 Flight Warning

1. Do not fly in adverse weather conditions such as high winds, rain, snow, thunderstorms, or fog. The quadcopter is not waterproof or dustproof, so please protect the main board from water, short circuits, or burnout.
2. Before flying, ensure the area is open and safe. An excessive number of obstacles may affect the transmission of the remote control radio transmitter and image signal, interfering with the flight performance. Maintain a safe distance from crowds, water, high-voltage power lines, communication towers, and flammable or explosive materials. Avoid flying in densely populated areas.
3. When flying without wearing FPV goggles, always keep the quadcopter within visual line of sight (VLOS).
4. When flying with FPV goggles, minimize obstacles between the quadcopter and the pilot. Since you cannot observe the surrounding environment, have an observer present to handle potential emergencies. Remain seated while flying and avoid moving around.
5. Do not take off from or land on unstable or non-stationary surfaces, such as hands, moving vehicles, or boats.
6. Never touch the propellers while they are spinning, as this may cause serious injury or property damage.
7. If an unexpected situation occurs during flight, immediately press the SA button to stop the motors.
8. Operate the throttle stick gently and smoothly to prevent loss of control.

3.2 Preflight Checks

Before each flight, please prioritize confirming the following:
1. The quadcopter, remote control radio transmitter and FPV goggles are fully charged and bound successfully.
2. The quadcopter's motors and propellers are properly and securely installed.
3. The quadcopter's battery is installed and securely connected.
4. The FPV goggles' headband is properly installed to prevent it from falling off during use.
5. Choose an open area for test flights, and maintain a distance of at least one meter between the pilot and the quadcopter.

3.3 Battery

Use

1. Never expose the battery to any liquid. Do not submerge the battery in water or allow it to get wet. Do not use the battery in rain or in humid environments.
2. Never use batteries that are bulging, swollen, or leaking. Do not attempt to charge such batteries.
3. Do not connect the positive and negative terminals of the battery directly with wires or other metal objects, as this may cause a short circuit.
4. Use the battery within the temperature range of 0℃ to 40℃. Excessively high temperatures may cause the battery to cease functioning or result in spontaneous combustion.
5. Do not throw the battery into fire or expose it to excessive heat. Prohibit throwing, striking, or subjecting the battery to mechanical impact.
6. Avoid overcharging or over-discharging (voltage above 8.7V or below 6.6V), as this may reduce battery lifespan or cause swelling or inflation.
7. The internal electrolyte inside is highly corrosive. If it accidentally splashes into eyes or onto skin, immediately rinse with clean running water for at least 15 minutes and seek prompt medical attention.
8. Do not disassemble, reassemble, pierce, or tamper the wiring of the battery in any manner.
9. If battery terminals are dirty, wipe with a dry cloth before use. Poor contact may damage the battery or quadcopter.

Caution: Batteries may be extremely hot immediately after use or charging! Handle with care.

Charging

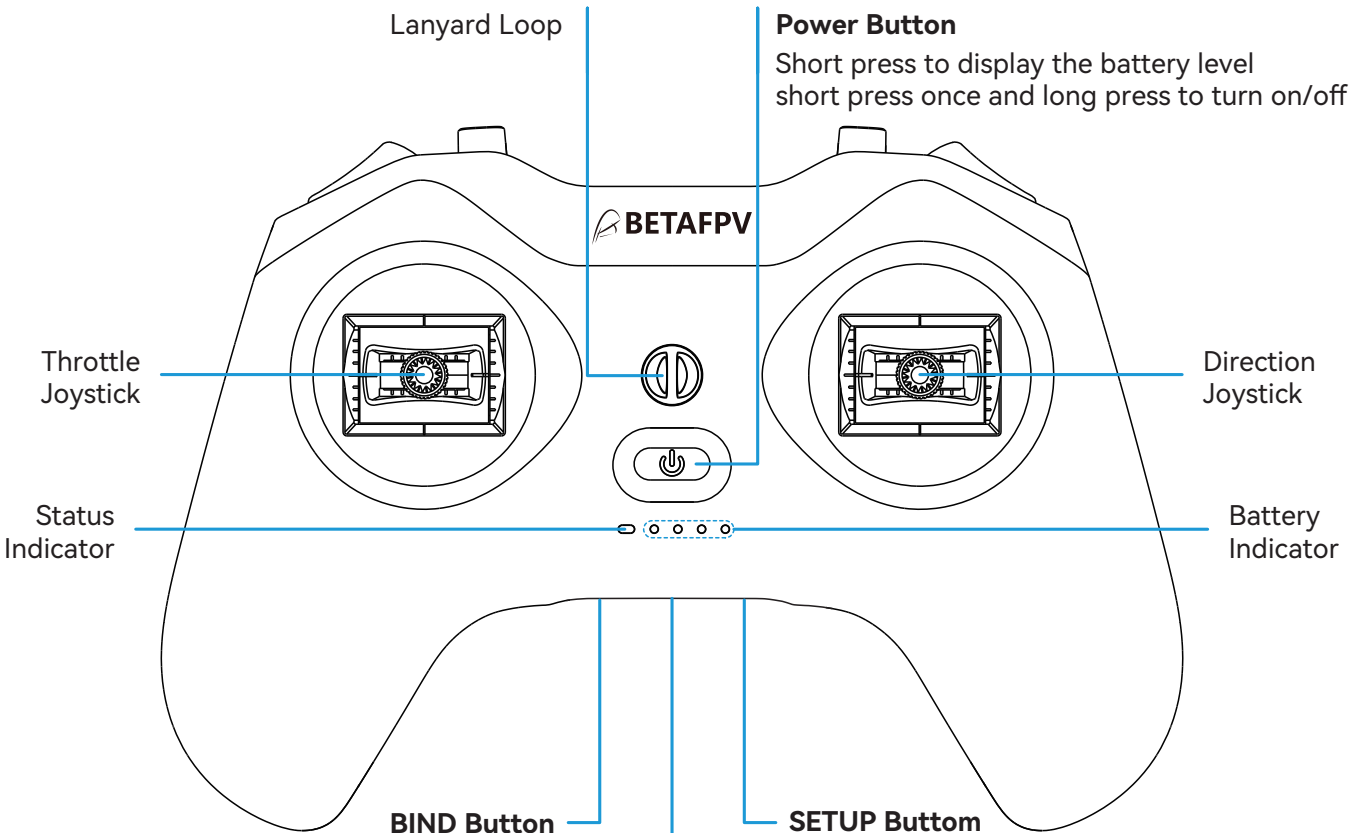
1. Only use charging equipment recommended by BETAFPV.
2. When charging the battery, away from flammable or combustible materials (e.g., chemical liquids or wooden objects).
3. Allow the battery to cool to room temperature after use before charging.
4. Charge in an environment with a temperature between 0℃ and 40℃.
5. Never leave batteries charging unattended.
6. After charging, disconnect the charging equipment from the battery. Regularly inspect and maintain the charging equipment to ensure it remains in good condition. Do not clean charging equipment with alcohol or other flammable agents. Do not use a damaged charger.

Storage, Transportation, and Disposal

1. Keep batteries out of reach of children and pets. If a battery is accidentally swallowed, seek immediate medical attention.
2. Do not store batteries near heat sources (e.g., stoves) or in high-temperature environments (e.g., inside a car during summer). The optimal storage temperature is 20℃ to 26℃.
3. For long-term storage, keep batteries in a cool, dry, and clean environment.
4. When carrying or transporting batteries, avoid placing them directly in crowded pockets, backpacks, or drawers to prevent contact with other items that could cause short circuits.
5. Batteries are hazardous chemicals. For disposal, fully discharge them, wrap the terminals with insulating tape, and take them to a designated battery recycling facility. Do not dispose of in ordinary trash.
6. If the battery emits an unusual odor, overheats, deforms, changes color, or has any other abnormalities, stop use immediately and contact BETAFPV or your authorized dealer for assistance.

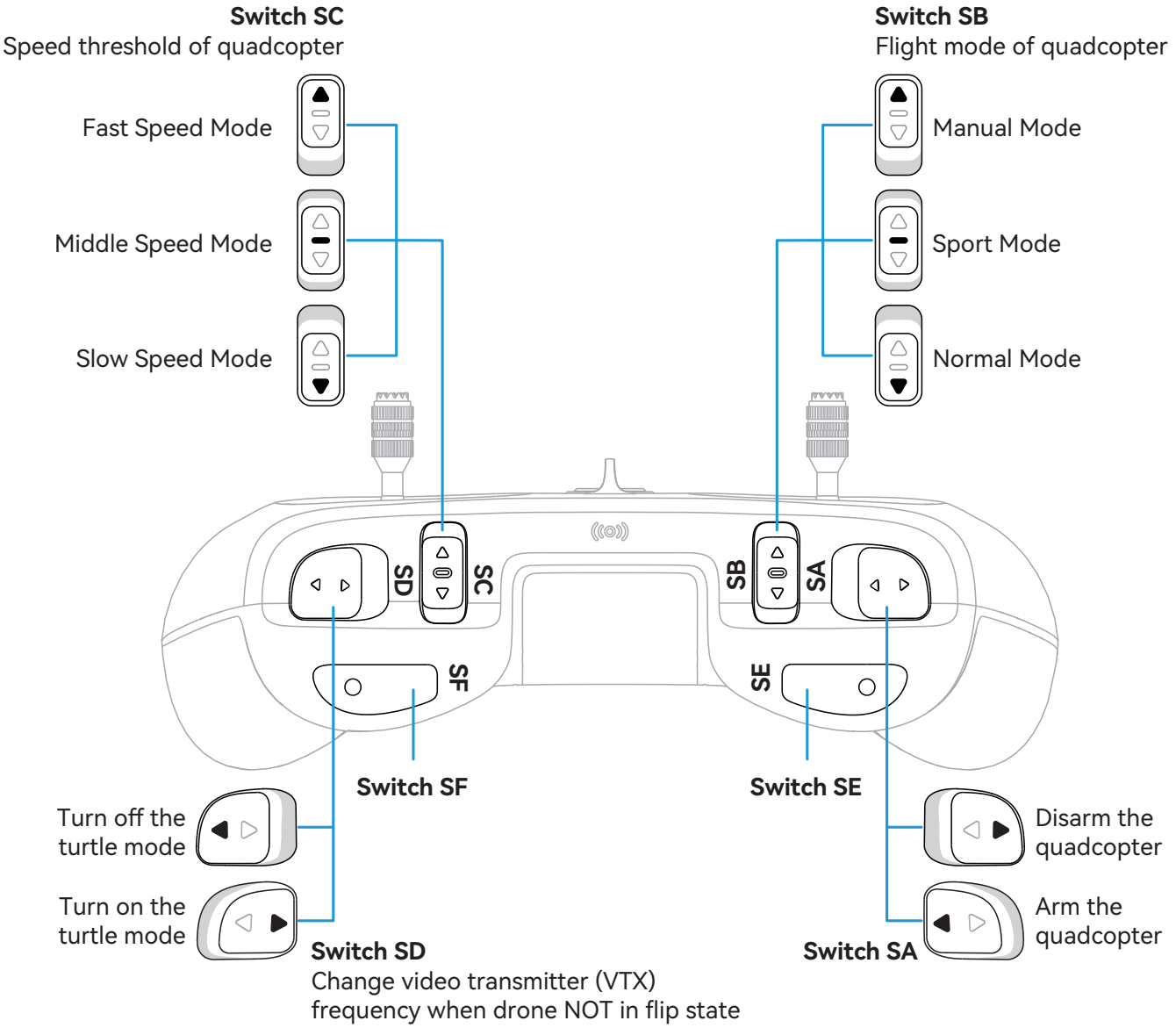
4. Remote Control Radio Transmitter Operation

The remote control radio transmitter included in the kit is the LiteRadio 4 SE (ELRS 2.4G). Instructions of its switches are shown below:



Note: For instructions on joystick calibration with the SETUP Button, please request the LiteRadio 4 SE User Manual from BETAFPV customer support. If the SETUP Button was pressed accidentally and you are unsure how to calibrate, power it off immediately to avoid incorrect joystick data.

Four switches are provided on the front of the remote control radio transmitter: switch SA, switch SB, switch SC, and switch SD, along with two push-button switches, SE and SF, as shown below. Pilot can change different modes and parameters of the quadcopter with these switches. The corresponding functions of the remote control radio transmitter switches are as follows:



Switch SD: Change Video Transmitter (VTX) frequency

Each time the switch SD is toggled, the quadcopter's video transmitter (VTX) frequency will switch to the next one. 8 frequencies are available. After switching to the last frequency(5866), frequency will cycle to the first one(5733) and start again.

The factory default frequencies are 5733/5752/5771/5790/5809/5828/5847/5866 in sequence.

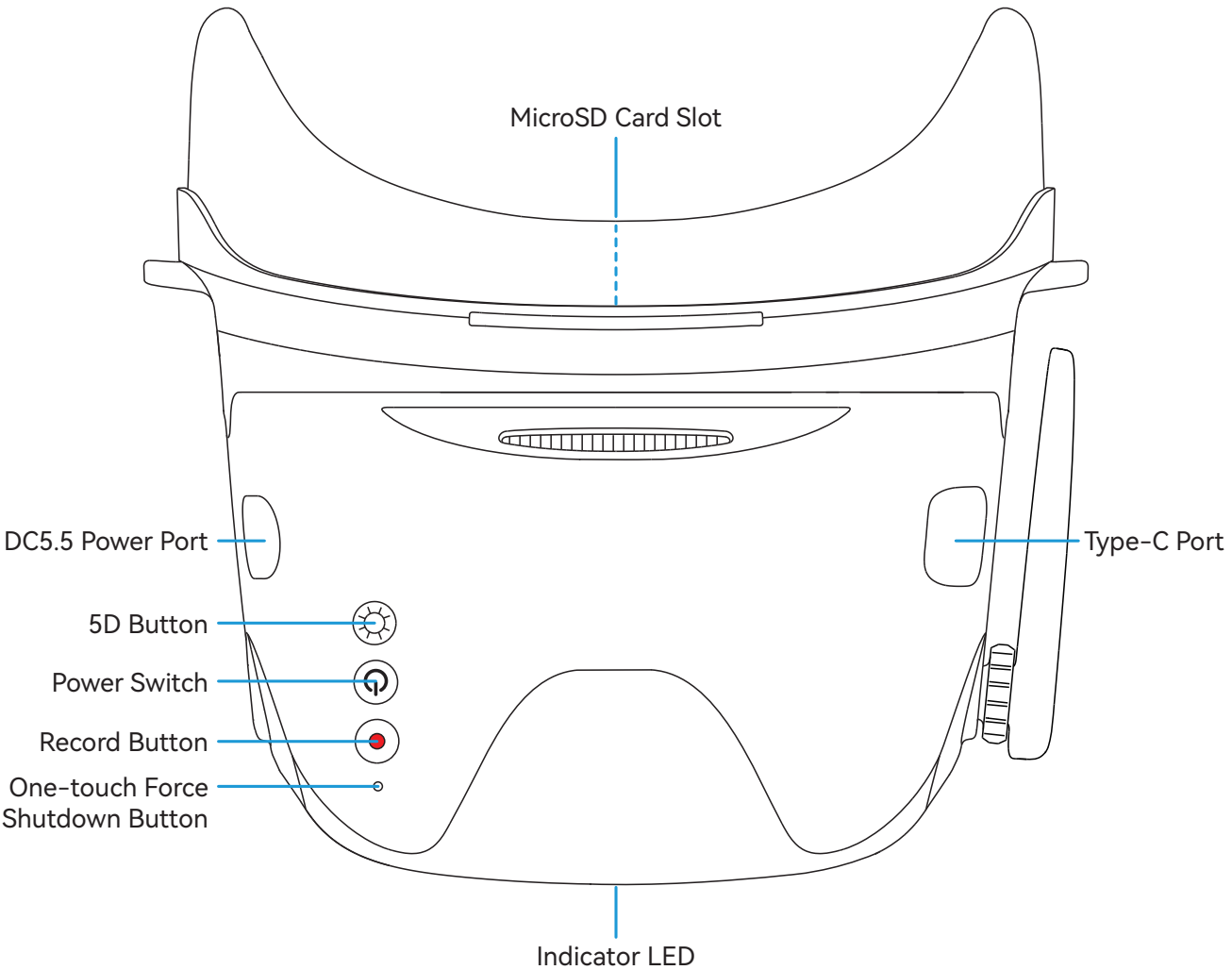
Notes:

1. The joystick will only function once the remote control and quadcopter have successfully connected.
2. The SE and SF switches remain unused.

5. FPV Goggles

The FPV goggle included in the kit is VR04 model. The goggles use a foldable single-antenna receiver and support DVR recording.

5.1 Button Operation



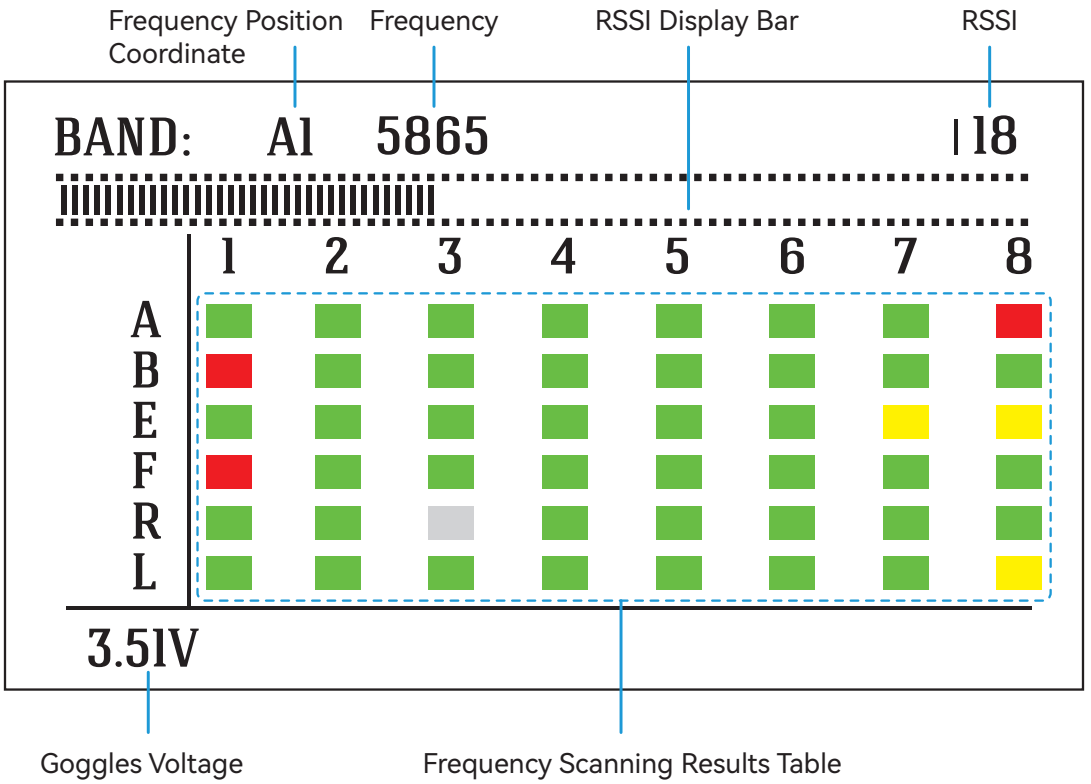
● Power Switch

Press and hold the button for 5 seconds to turn the goggles on or off.

● 5D Button

Quick frequency search: Press and hold the 5D button for 2-3 seconds to activate frequency search. There will be a beep after 3 seconds, and the best available frequency will be selected automatically. Quick frequency search is completed.

Frequency scan: Short press the 5D button to enter frequency scan interface as shown below. Long press the button for 2-3 seconds to scan, signal quality is indicated by color: red, yellow and green. Slide the 5D button up, down, left, or right to manually select the frequency. Short press again to exit.



Signal quality of each frequency is indicated by red, yellow and green:

- Green (0<RSSI<20): Frequency is available.
- Yellow (20<RSSI<70): Frequency has moderate interference from another transmitter.
- Red (70<RSSI): Frequency is completely in use by a transmitter.
- White: The strongest signal which the goggles received in this scan.

- Record Button

To start recording, short press the record button once. A red dot will flash in the upper-left screen corner. Short press the button again to stop recording.

- One-touch Force Shutdown Button

When it cannot be shut down, please use tweezers to gently press the one-touch force shutdown button.

- DC5.5 Power Port

Supports 2-6S (8.4-25.2V) external power supply.

Note: Before use, please make sure that the battery is fully charged. The recommended voltage is 3.7V or above, short press the 5D button to check the voltage. Install the headband correctly and adjust it for a comfortable fit.

5.2 Frequency Selection

The FPV goggles can receive 48 frequency in the 5.8GHz spectrum, distributed across 6 bands (A, B, E, F, R, and L) of 8 channels (CH-1, ……, CH-8), as shown below:

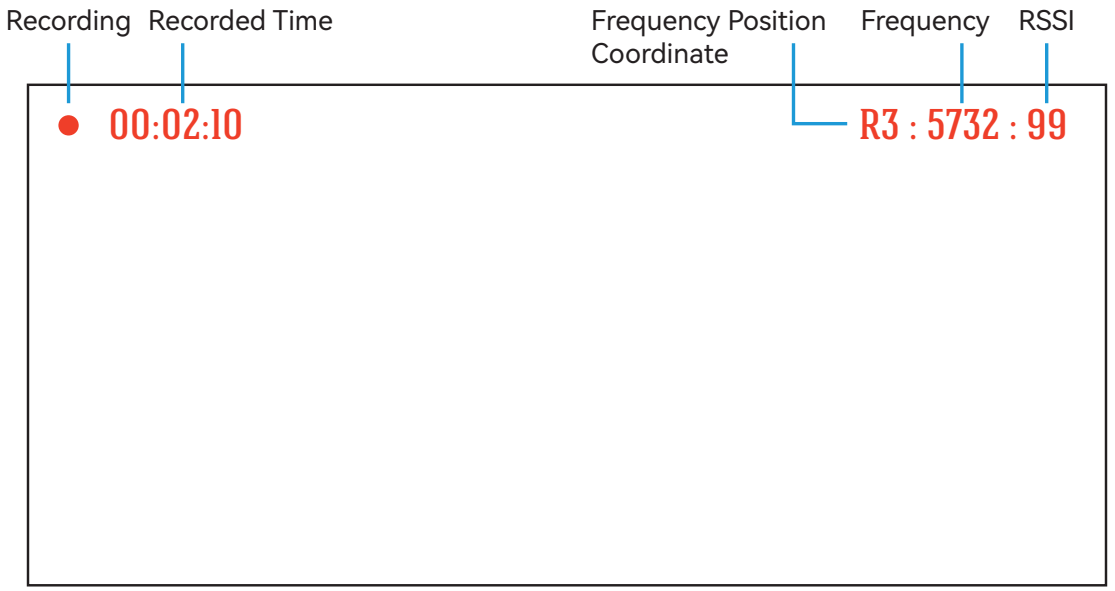
The stock quadcopter included in this kit only uses 8 frequency bands of band B, which is the second row in the table below:

	CH 1 (MHZ)	CH 2 (MHZ)	CH 3 (MHZ)	CH 4 (MHZ)	CH 5 (MHZ)	CH 6 (MHZ)	CH 7 (MHZ)	CH 8 (MHZ)
A	5865	5845	5825	5805	5785	5765	5745	5725
B	5733	5752	5771	5790	5809	5828	5847	5866
E	5705	5685	5665	5645	5885	5905	5925	5945
F	5740	5760	5780	5800	5820	5840	5860	5880
R	5658	5695	5732	5769	5806	5843	5880	5917
L	5362	5399	5436	5473	5510	5547	5584	5621

5.3 DVR Functions

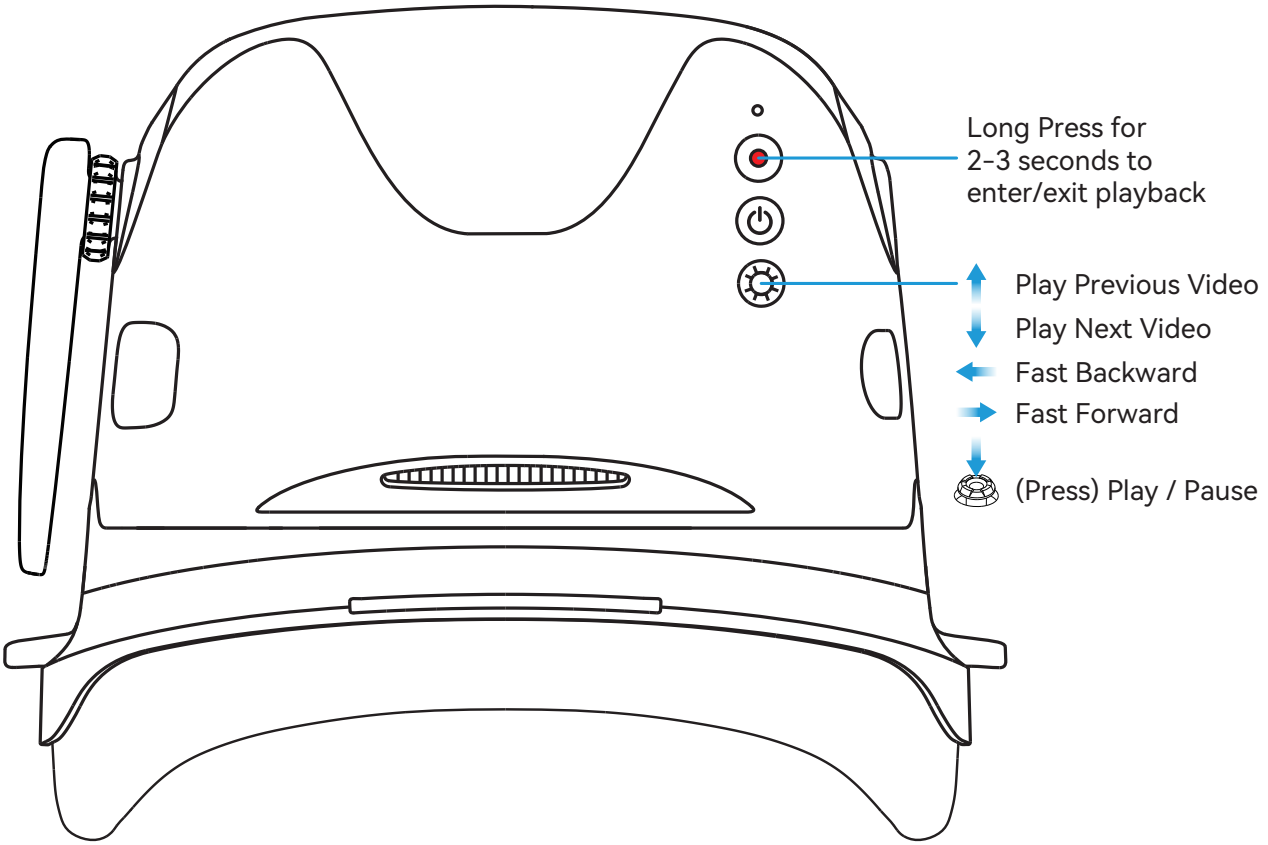
VR04 FPV goggles support video recording function, short press the record button to start or stop video recording.

- Insert a microSD card into the card slot, FAT32 format only and maximum 64G;
- After short pressing the record button once, a red dot will appear in the upper left corner, and there will be a "beep-beep" sound from FPV goggles;
- Wait for 8 seconds, the red dot and the recording LED indicator will start flashing. At the same time, a timer appears on the screen, indicating the start of recording;
- Short press the record button once. After 2-3 seconds, the red dot on the upper left corner stop flashing, the timer disappears, and the red record LED indicator turns off. This indicates the goggles has stopped recording.

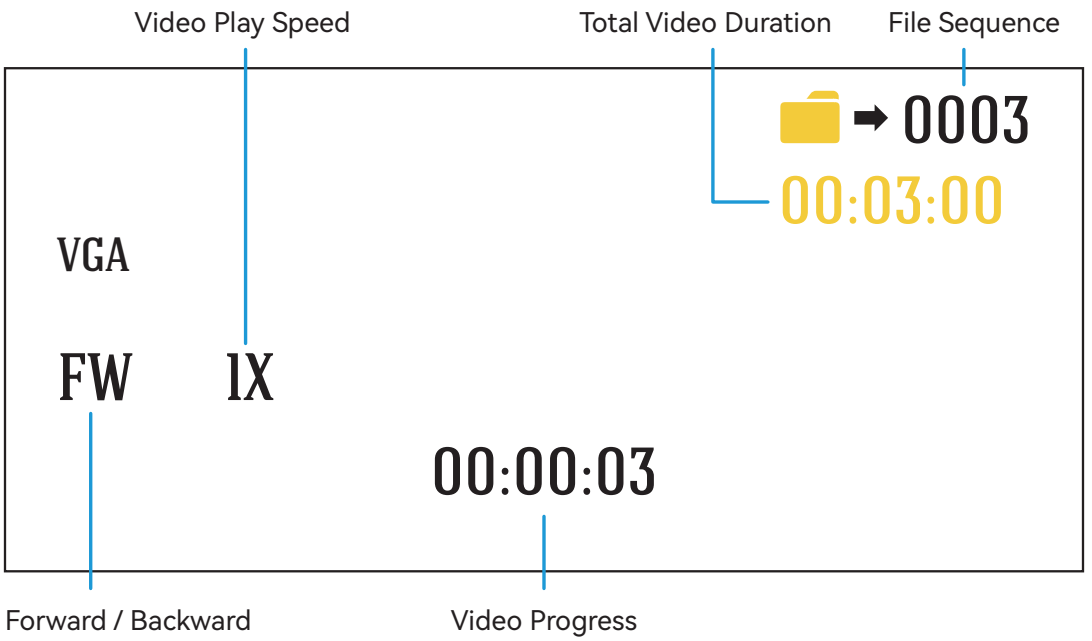


Notes:
1. After pressing the record button, the DVR recording function will take about 8-10 seconds to be activated, please wait in patience.
2. The maximum length of each recording is 10 minutes. When a recording exceeds 10 minutes, a new recording file will be created automatically.

VR04 FPV goggles support DVR replay function, operating steps are as follows:
● Ensure a microSD card with recorded files has been inserted into the slot;
● Long press the record button for 2-3 seconds until you hear three beeping sounds and see "LOADING DVR..." on the screen;
● Wait about 8-10 seconds (depending on the file size) to finish loading and enter the DVR interface;
● After entering the DVR interface, button functions are redefined and explained by image shown below;
● Long press the record button for 2-3 seconds in the DVR interface again to exit.



Use the buttons as illustrated in the image above to play, pause, fast forward or fast backward your recordings.



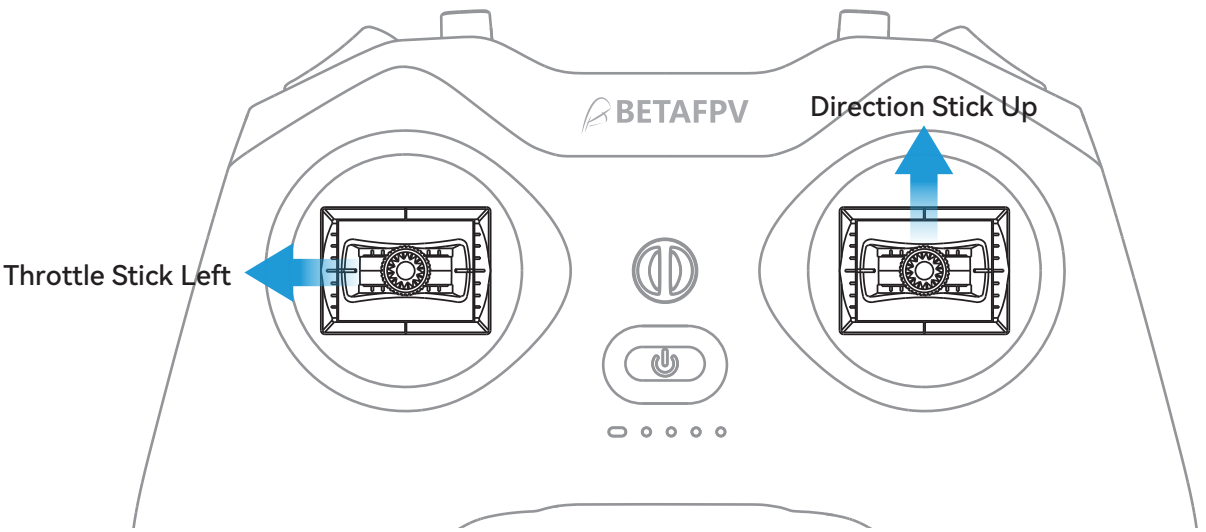
Note: After pressing the record button, the playback (DVR) interface will take about 8-10 seconds to be activated, please wait in patience.

6. OSD Menu Operation

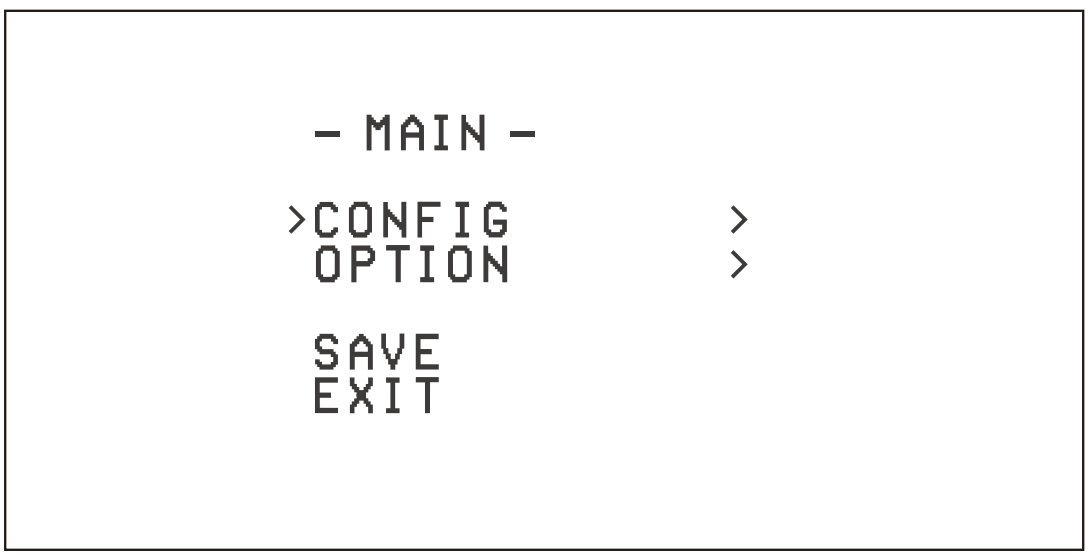
The OSD menu is a set of operation interfaces designed to modify the configuration of the quadcopter. Common configurations include changing the video transmitter (VTX) frequency and output power.

6.1 How to Access/Operate OSD Setting Menu

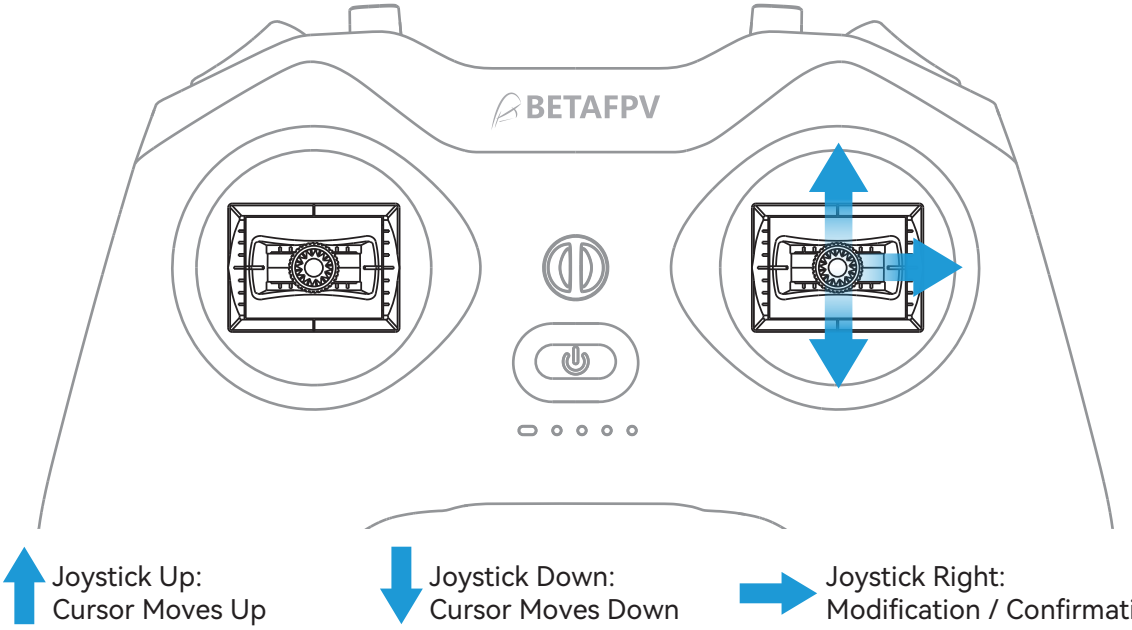
To access the OSD setting menu, move the throttle joystick fully to the left and the direction joystick fully upward as shown below. Make sure the quadcopter is disarmed before accessing the OSD menu.



After accessing the OSD menu, the following interface will be displayed on the screen.



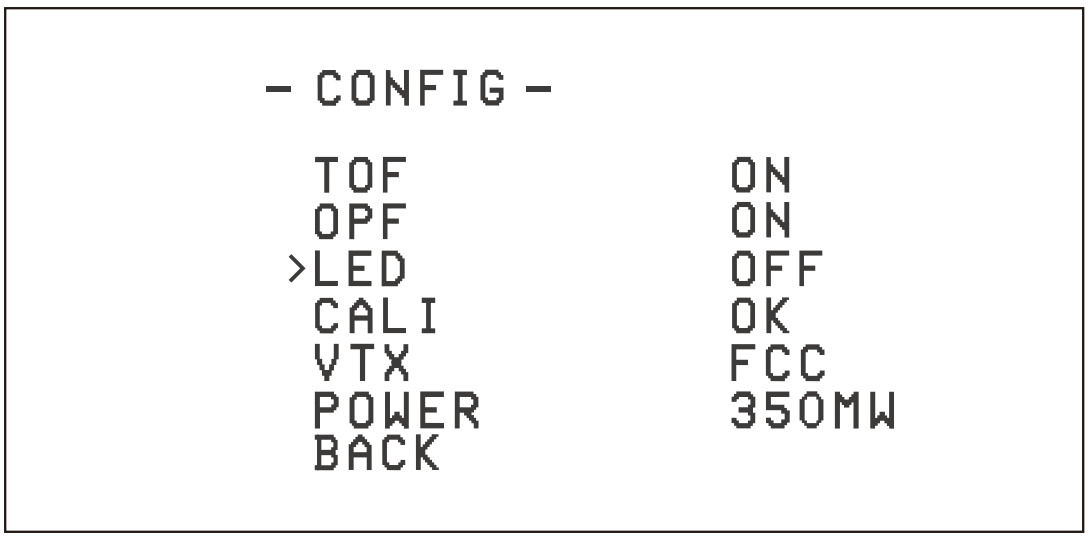
Use the right joystick to navigate the OSD menu:



6.2 Change Quadcopter RGB LED / VTX Power

By default, the quadcopter status LED light is solid blue during flight and the VTX operates at 25mW. To enable a RGB color cycling effect or change the output power, follow the steps below:

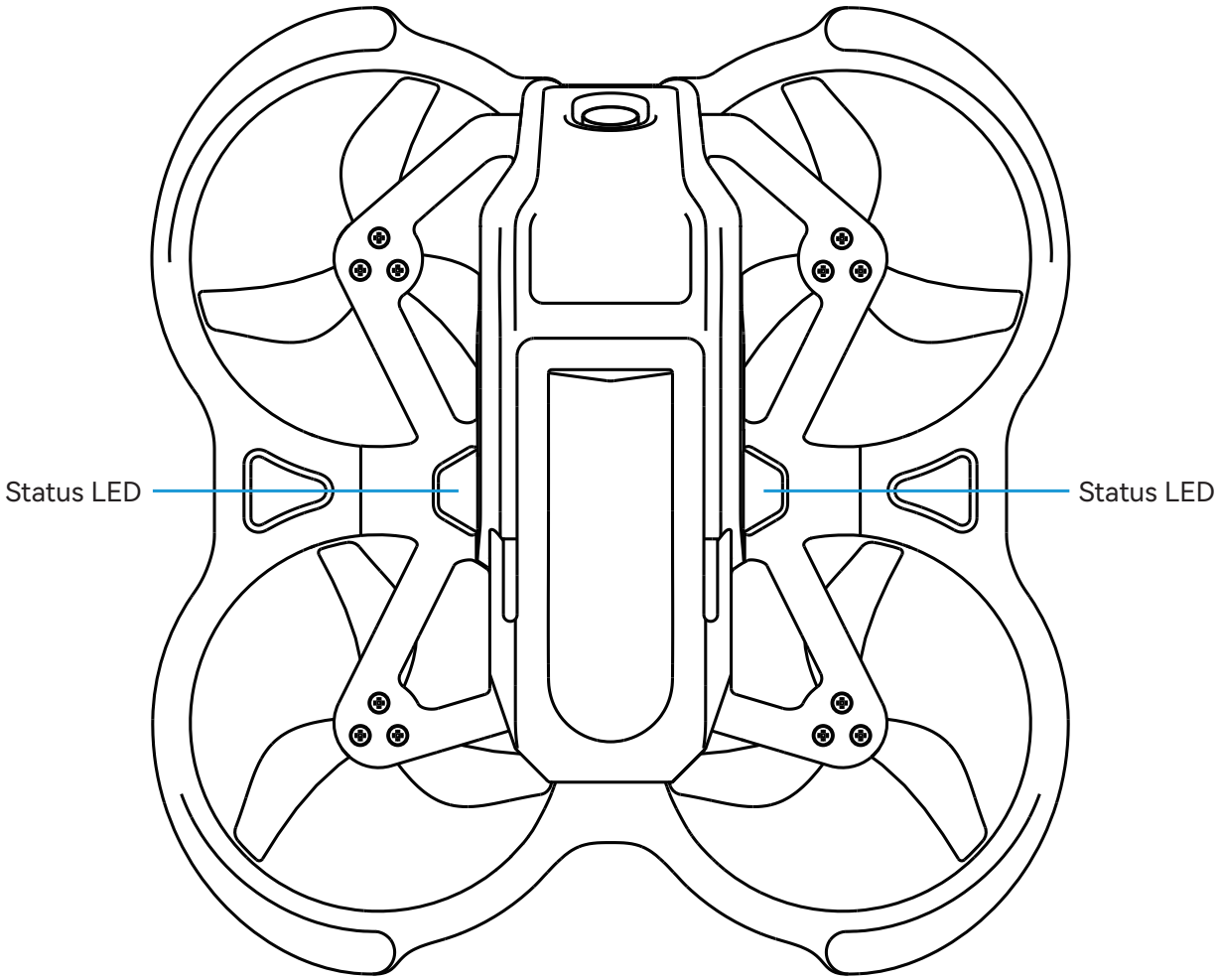
- In the MAIN menu, select CONFIG and enter the CONFIG menu, as shown below;
- Select LED to choose OFF (for solid blue) or ON (for RGB color cycling effect);
- Select Power to adjust VTX power (e.g., up to 350mW);
- Select BACK to exit CONFIG sub-menu;
- Select SAVE in the MAIN menu to save changes and exit the OSD.



7. LED Light/Beep Status Codes/Charging

7.1 Quadcopter

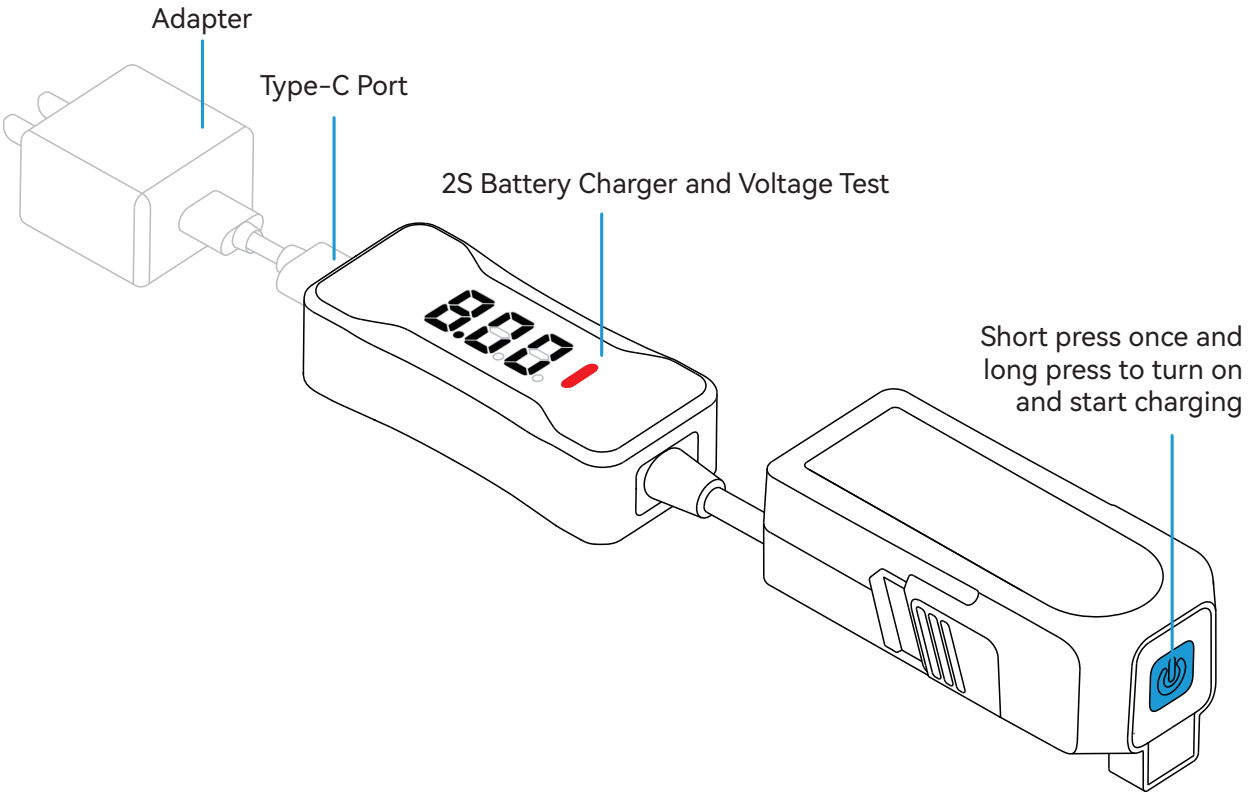
There are two RGB status LEDs on the top of the quadcopter to indicate whether the quadcopter is powered on normally and display various quadcopter status.



Status LED Color	Status	State Description	Solution
——	Off	The power on the quadcopter is abnormal	Replace the battery and power on again
Red	Flashing slowly	Quadcopter battery voltage is low	Replace the battery
Blue	Solid on	The quadcopter is connected with the remote control radio transmitter	
Blue	Flashing fast	Quadcopter is horizontal calibrating	Place the quadcopter on a horizontal surface and wait for a while
Purple	Solid on	Quadcopter accessed the OSD menu	
Green	Flashing fast	Quadcopter is in binding mode	
White	Flashing fast	Arming failed, because the throttle joystick was not at the lowest position when arming	Disarm, and place the throttle joystick at the lowest position
Brown	Flashing slowly	Loss remote control signal	Re-establish the connection with the remote control radio transmitter

The battery has a capacity of 1100mAh. Each battery provides about 10 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 40 minutes. Charging steps are as follows:

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 Aquila20 smart battery to the charger, and short press once and then long press to turn on the smart battery;
3. The blue light on the Aquila20 smart battery starts to flash, indicating that it is charging. And when the LED digital display shows the battery voltage and indicator stays solid red, the battery is charging;
4. When the LED digital display on the charger shows a rectangle symbol and the red light turns off, the battery is fully charged and charging completed.

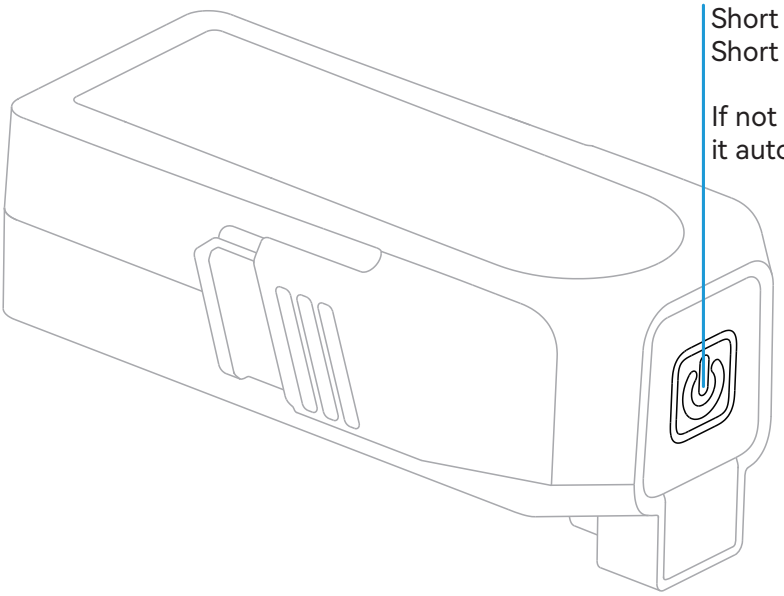


Cautions:
1. When charging is completed, the Aquila20 smart battery automatically shuts down after 30 seconds and the blue light turns off. LED digital display on the charger is circling rectangular display;
2. Please pay attention to the positive and negative pole signs labeled on the charger. Please do not charger with the reversed pole;
3. This charger supports high-voltage 2S batteries charging (8.7V). 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;
4. 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.

The LED digital display and red light of the charger are used to 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

Aquila20 smart battery is a 2S High Voltage LiPo (LiHV) batteries with a capacity of 1100mAh. It powers on with a short press once and a long press. The color represents the current battery level while short pressing. If not connected to a quadcopter or not charging, it automatically powers off after 30 seconds.



	Light blue	The remaining power is more than 75%.
	Green	50% to 75% battery remaining
	Yellow	20% to 50% battery remaining
	Red	The remaining power is less than 20%

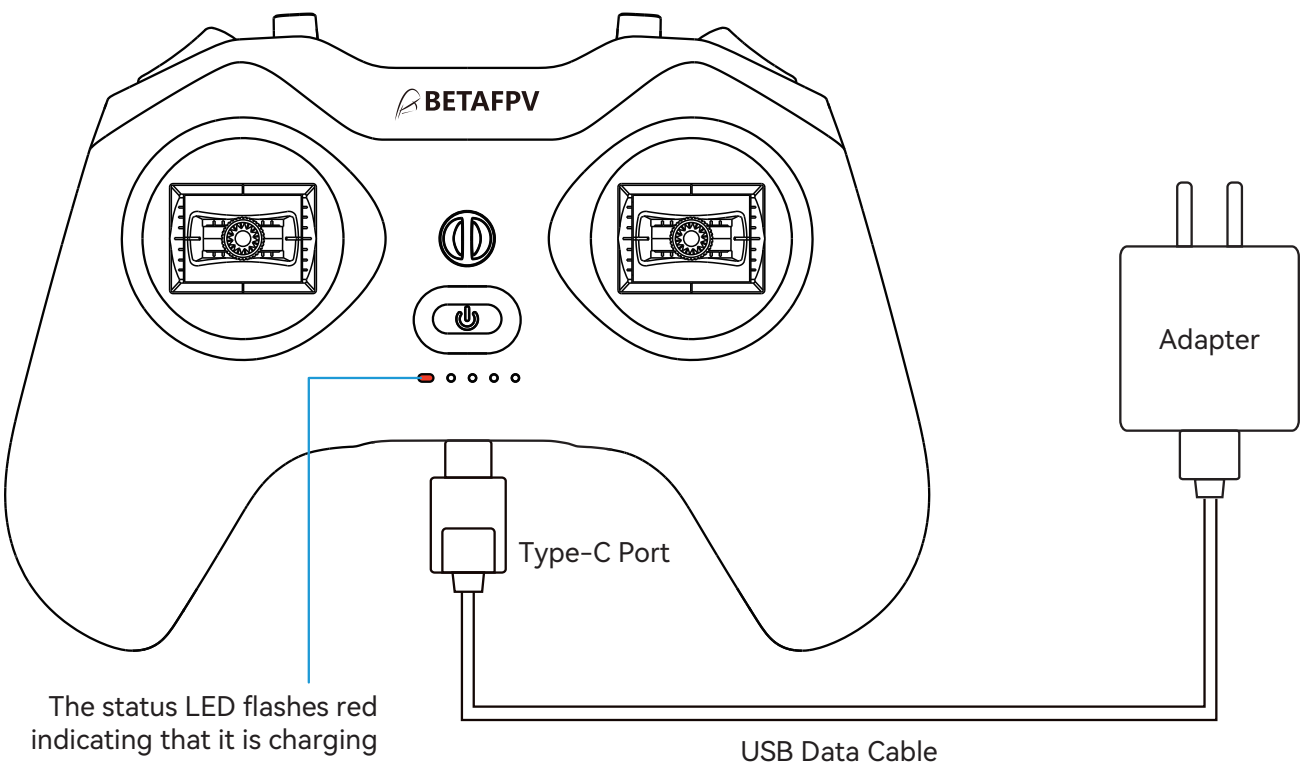
7.2 Remote Control Radio Transmitter

There is a status LED and four battery indicators on the front of the remote control radio transmitter, and a built-in buzzer to indicate the battery level and various status of the remote control radio transmitter. The number of battery indicators that light up corresponds to the current battery level of the remote control radio transmitter. For example, if three battery indicators are on, it means there is about 75% battery left. The following is the description of the remote control radio transmitter's status LEDs and buzzers

Status LED Color	**Buzzers**	**State Description**
Blue light solid on	/	Working
Red light solid on	/	The throttle joystick is not at the lowest position. Please press the throttle joystick to the lowest position
Purple light solid on	/	Bluetooth mode
Green light solid on	/	Wi-Fi mode
Orange light flashes four times	The buzzer alarms four times: beep-beep-beep- beep	Batteries are too low, The remote control radio transmitter needs to be charged
Red light flashes twice	The buzzer alarms twice: beep-beep	The remote control radio transmitter is in binding mode
/	The buzzers alarms twice: beep! beep —— (one short and one long)	Binding completed
/	the buzzer alarms twice: beep—— beep! (one long and one short)	The receiver connection is interrupted and needs to be reconnected/bound

The remote control radio transmitter has a built-in 2000mAh battery, and a fully charged remote control radio transmitter can be used for 4-5 hours. When the orange light flashes fast four times, and battery indicators are all off, with the sound of "beep-beep-beep- beep ", it indicates that the remote control radio transmitter is low battery and needs to be re-charged. The Charging methods are as follow:

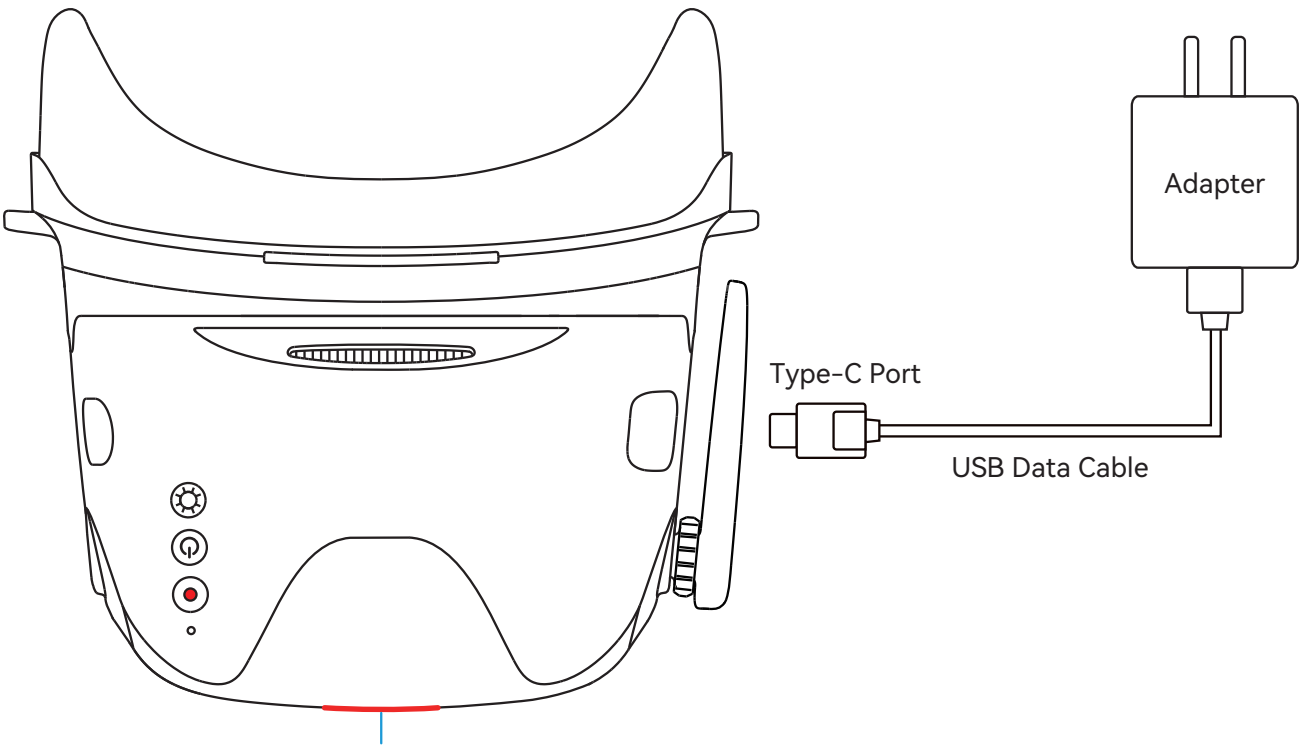
- Turn off the remote control radio transmitter;
- Connect remote control radio transmitter and adapter with the Type-C cable. (5V output adapter is allowed, such as mobile phone charger);
- The status LED flashes red and battery indicators are lit one by one, indicating that it is charging;
- The status LED flashes green and battery indicator are solid on, indicating that charging is complete;
- Disconnect the adapter as soon as possible after charging is complete.



7.3 FPV Goggles

The FPV Goggles have a built-in 2000mAh battery. When voltage is below 3.4V, there will be a beep every 10s and this indicates the battery needs to be recharged. Steps to charge the goggles battery are as follows:

- Turn off the FPV goggles;
- Connect FPV goggles and adapter with the Type-C cable (5V output adapter is allowed, such as mobile phone charger);
- The power light will be solid red when charging and lights off when fully charged;
- Disconnect the adapter as soon as possible after charging is complete.



The indicator light is solid red, indicating charging status

Note: The goggles support an external power input via the DC5.5 port, compatible with 2-6S batteries (8.4-25.2V). When connected to external power, the built-in battery will charge simultaneously.

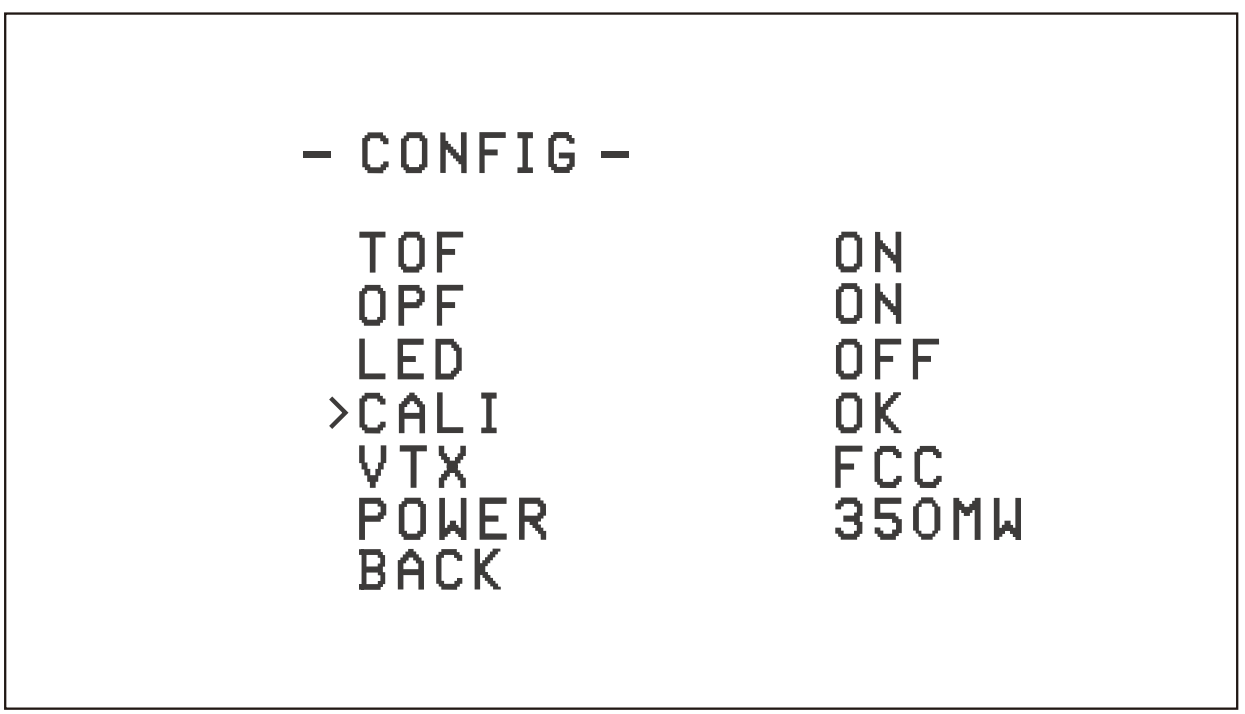
8. Advanced Settings

Additional advanced settings are available in case of special occasions.

8.1 Quadcopter Level Calibration

After the quadcopter has taken off and landed several times, the quadcopter gyroscope may become offset. This will cause the quadcopter to always tilt in the same direction during a flight. To fix up it, the quadcopter gyroscope can be recalibrated. The steps are as follows:

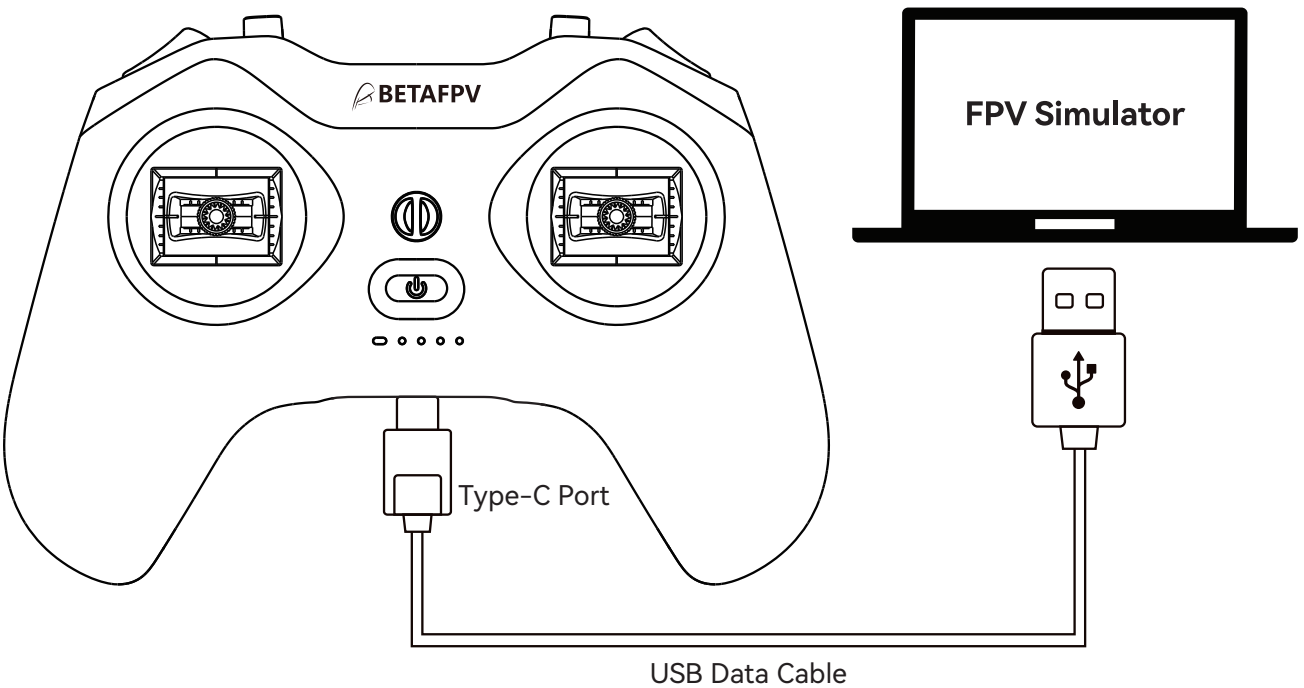
- Turn on the quadcopter and the remote control radio transmitter, and ensure that the connection is successful;
- Place the quadcopter on a horizontal plane;
- Enter the OSD menu (Refer “OSD Menu Operation")
- In the MAIIN menu, select CONFIG, then CALI;
- Move the direction joystick to the right to enter level calibration mode. Quadcopter's status LED flashes blue;
- When the OK prompt appears and the status LED returns to solid blue, the calibration is complete. Pilot can exit the OSD menu



Note: For more information about how to access and operate OSD menu, please refer to the Chapter "OSD Menu Operation”.

8.2 How to Use FPV Simulator with Remote Control Radio Transmitter

Using an FPV simulator is the safest and fastest way for beginners to get started. The included LiteRadio 4 SE Radio Transmitter supports most FPV simulators on the market and is easy to use and configure.



To practice with common FPV simulators (e.g., VelociDrone, UNCRASHED, DRL, DCL, Liftoff, TRYP FPV, FeelFPV, FPV Freerider, RaceFly, and others on STEAM) on JoyStick Mode via data cable:

- Turn off the remote control radio transmitter;
- Use the USB cable to connect the remote control radio transmitter to your computer;
- The LiteRadio 4 SE Radio Transmitter can be identified as a "BETAFPV Joystick".

Notes:

1. In the power-on state, there is no signal output from the USB of the remote control radio transmitter, and the joystick mode can't be used.
2. LiteRadio 4 SE Radio Transmitter also supports data cable Xbox mode (for use with DJI Virtual Flight); dongle mode (for use with Phoenix simulator). For detailed instructions for these modes, please contact our customer service.

9. Regulations

9.1 WARNING

To ensure safe and legal operation, and to prevent potential injury and property damage, please observe the following rules:
1. DO NOT modify the quadcopter or use it for any illegal purposes.
2. DO NOT operate near manned aircraft. If necessary, land immediately.
3. DO NOT fly the quadcopter over or near large public gatherings, including but not limited to sports events and concerts.
4. DO NOT fly the quadcopter in areas prohibited by local laws.
5. Remain well clear of and DO NOT interfere with manned aircraft operations. Be aware of and avoid other aircraft and obstacles at all times.

9.2 CAUTION

To ensure safe and legal operation, and to prevent potential injury and property damage, observe the following rules:
1. DO NOT fly the quadcopter near or inside restricted zones specified by local laws and regulations, including but are not limited to: airports, borders between two sovereign countries or regions, major cities, and areas where temporary events or activities are being held.
2. DO NOT fly the quadcopter above the authorized altitude limit.
3. Make sure to keep your quadcopter within VLOS. Use an observer to assist if needed.
4. DO NOT use the quadcopter to carry illegal or dangerous materials.

9.3 NOTICE

1. Make sure you understand the nature of your flight operation (recreational, public, or commercial) and have obtained corresponding approval and clearance from the related government agencies before flight. Consult with your local regulators for comprehensive definitions and specific requirements. Note that quadcopter for commercial use may be prohibited in some countries and regions.
2. DO NOT fly over or near sensitive infrastructure or property, including power stations, water treatment facilities, correctional facilities, heavily traveled roadways, government facilities, and military zones.

10. Export Controls

10.1 Comply with Applicable Export Control Laws

The export, re-export, or transfer of this product is governed by China's export control laws and other applicable export control regulations and sanctions. Unless explicitly permitted by applicable export control laws or authorized by relevant export control authorities, any use, sale, transfer, lease, or other activities involving this product must ensure compliance with the following requirements:
Adherence to embargo policies stipulated by applicable export control laws;
1. There will be no infringement of an embargo imposed by the Export Control Laws;
2. The Products will not be provided to the entities, persons, and organizations listed in all applicable sanctioned party lists;
3. It is only for civilian use, and it is forbidden to directly or indirectly use BETAFPV products for or related to the following content (1) any military combat purpose or military combat-related purposes;(2) terrorist activities; (3) other criminal acts. The purchaser shall also require its customers or users to comply with the aforementioned requirements.

10.2 Export Compliance, Disclaimer & Indemnity

You must comply with applicable export or import control laws of China and other countries or regions. In the event of any violation of the aforementioned applicable export or import control laws arising from your use, sale, transfer, lease of this product, or any other actions, you shall be solely liable for the corresponding legal consequences. Under no circumstances shall BETAFPV be held responsible for your breach of applicable export or import control laws. Furthermore, you shall indemnify BETAFPV, its affiliates, officers, employees, agents, and representatives against any legal liabilities or damages incurred as a result of such actions. In such cases, you shall bear all related expenses, including but not limited to compensation, litigation costs, legal fees, and travel expenses.

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