

DUAL CAMERA

AI + BetaFlight

2-in-1 flight controller

MANUAL

2-in-1 design - no separate FC required

Plug and play - replaces a standard FC

Standard interfaces; direct replacement for mainstream FCs; easy installation

Simple operation; no extra training required

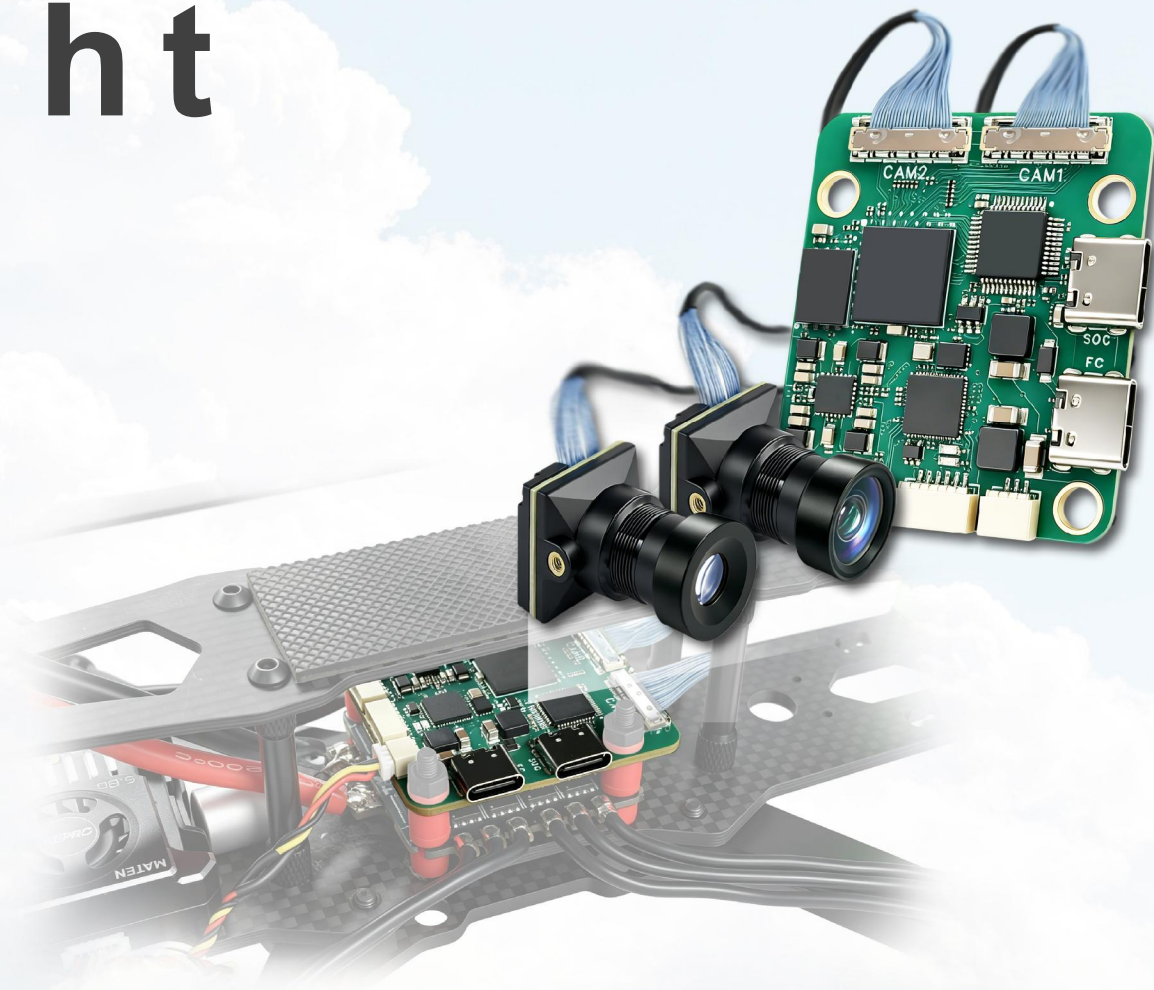
Built-in AI visual tracking engine

Autonomous target lock and tracking

Compatible with standard analog (CVBS) video

Highly integrated single-board design, low mass and power

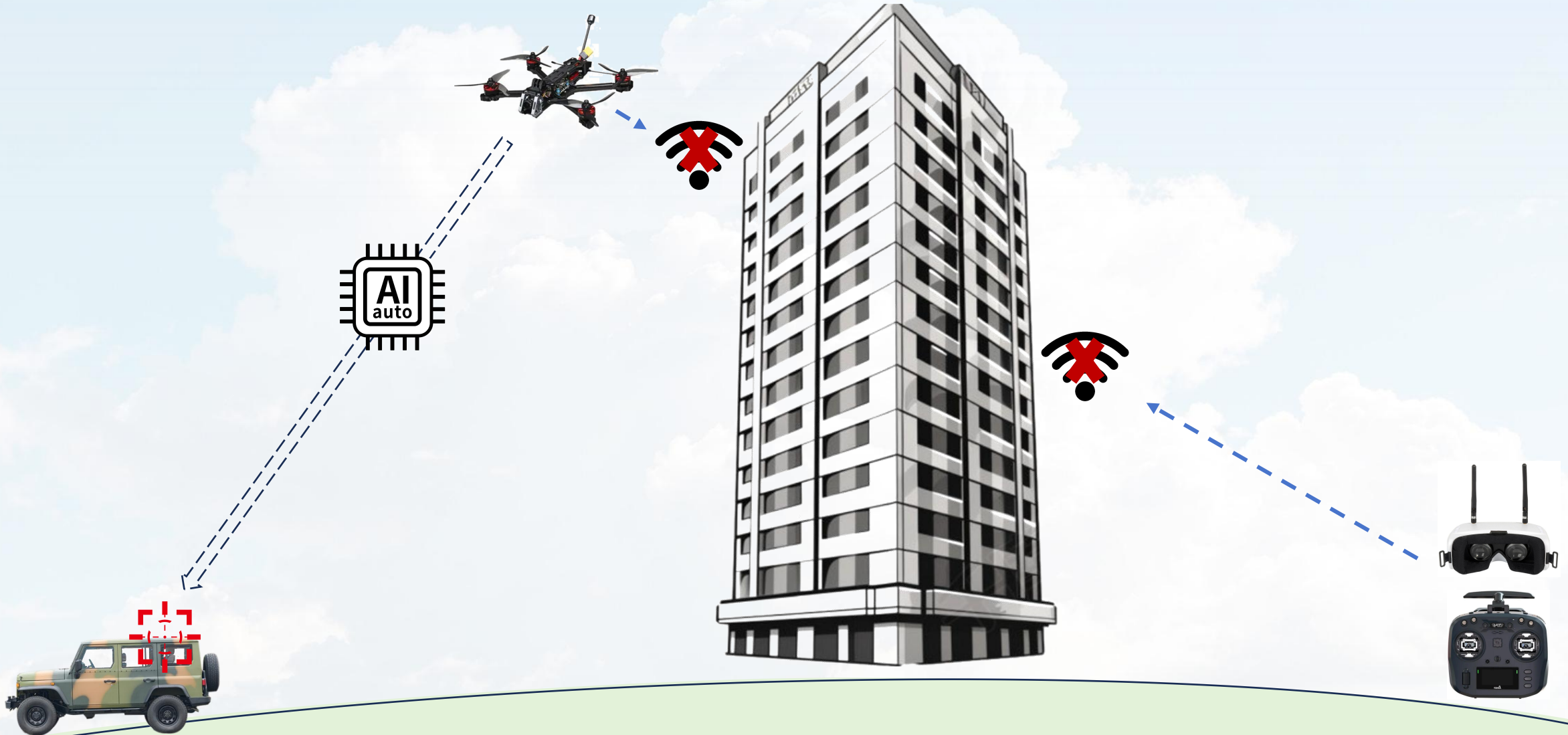
Excellent value



AI control through signal blind zones

The AI flight controller supports seamless pilot-machine cooperation. Before entering a signal blind zone, the pilot can switch to AI control.

If radio control and video are lost, onboard AI can continue approaching the captured target.

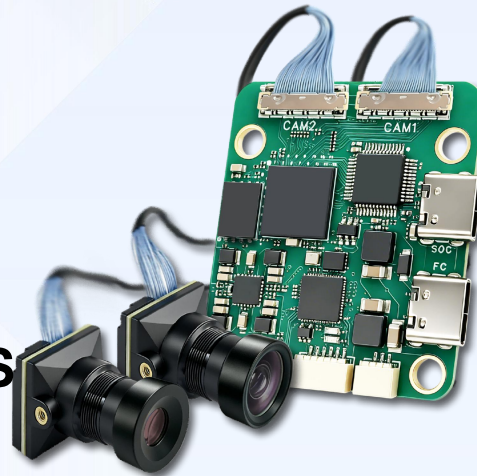


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PART 1

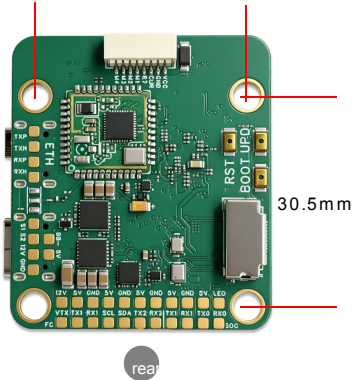
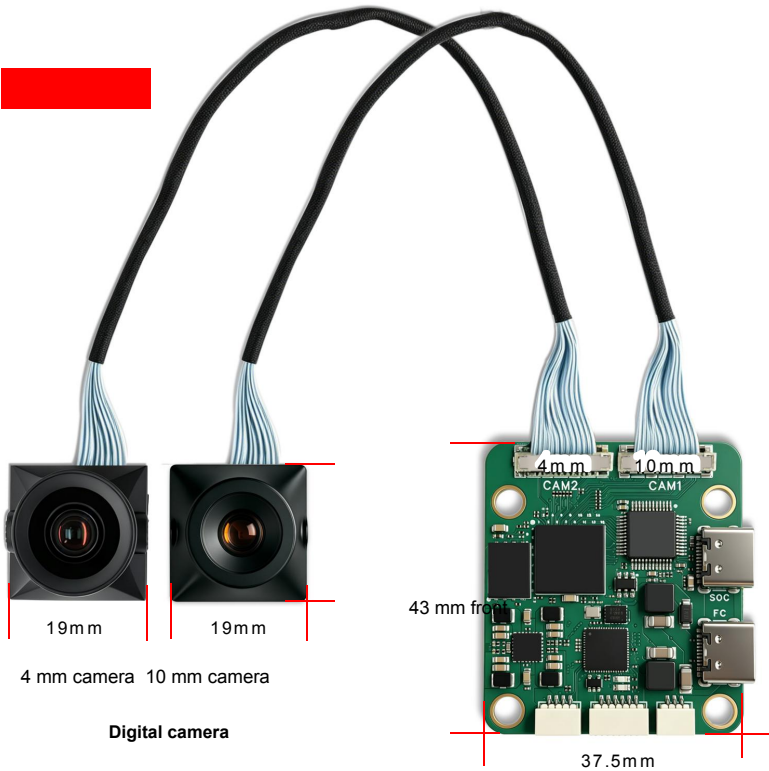
MAIN SPECIFICATIONS





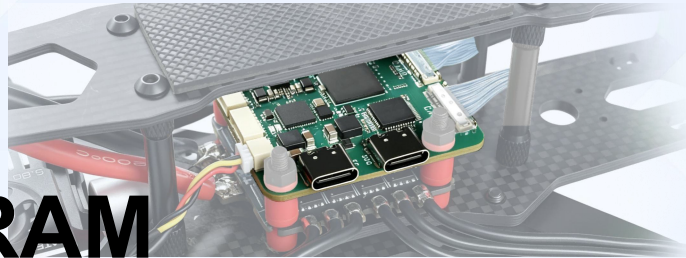
1 - Main specifications - dual camera

Category Parameter	Value Dimensions	
Basic Supported aircraft 5-18 in quadcopters		
	Built-in firmware Betaflight (no separate FC required)	
	Operating voltage 4S-8S LiPo	
	Module power 2 W	
	Mass 10 g	
Camera 1080P digital camera		
	Focal length 4 mm / 10 mm	
	Frame rate 60 FPS	
	Installation angle 20-60°	
	Field of view (FOV) 96° / 39.7°	
	Video output CVBS	
	Low-light night vision Yes	
AI Lock distance 4 mm: vehicle 450 m, person 150 m; 10 mm: vehicle 800 m+, person 250 m+		
	Minimum target size 16 x 16 pixels	
	Maximum target speed >80 km/h	
	AI guidance modes	Mode 1 CH10 assisted lock: AI box snaps to vehicles and people Mode 2 CH11 forced crosshair lock for any moving or stationary target
Connectivity Receiver ELRS (CRSF)		
	ESC protocol DSHOT 300/600	
	Servo 2 PWM control outputs	
Environment Temperature -25°C to +55°C		



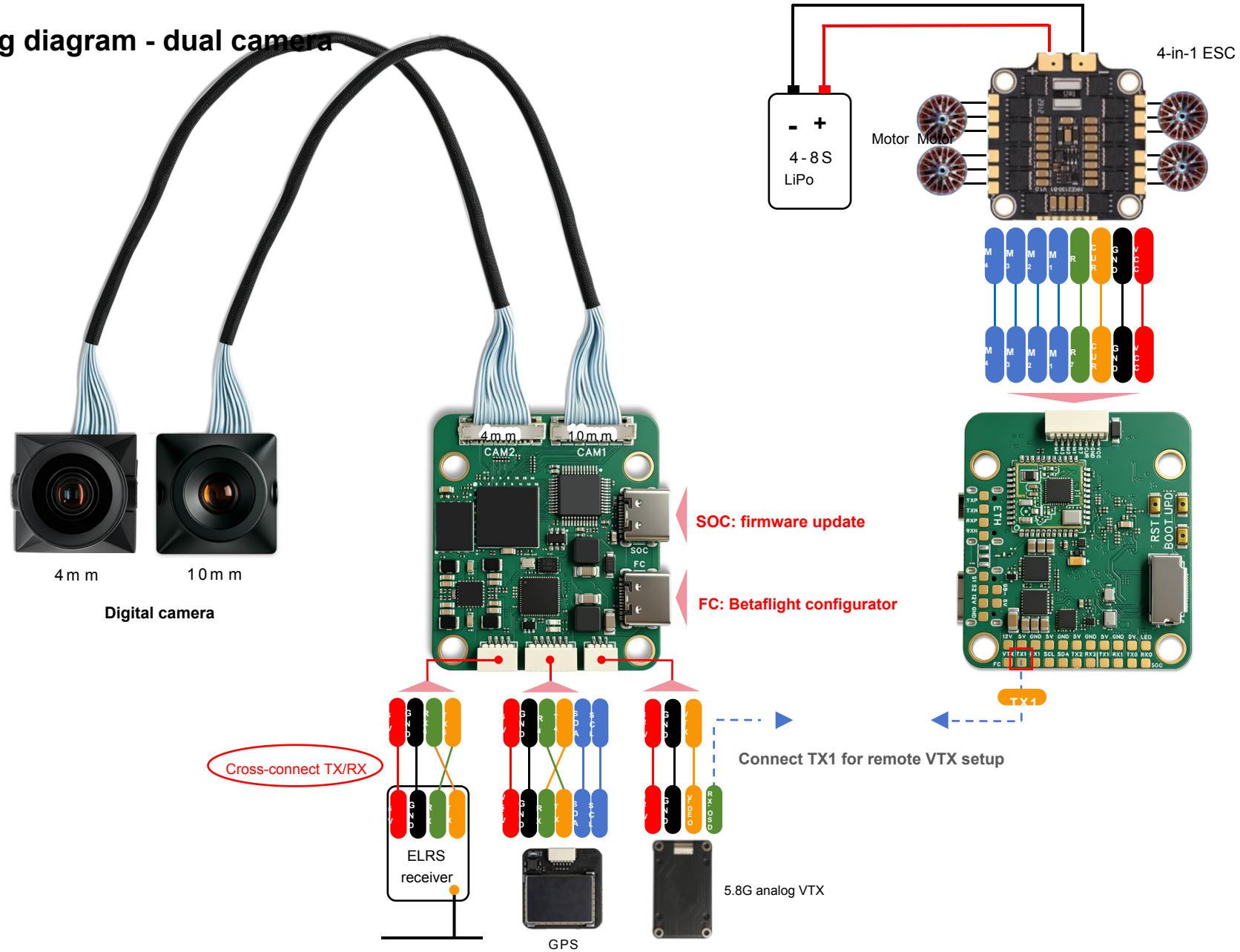
PART 2

WIRING DIAGRAM





2 - Wiring diagram - dual camera



PART 3

INITIAL SETUP AND CALIBRATION

*** Use the Betaflight configurator**





3 - Initial setup and calibration (Betaflight configurator)

Step 1: Connect to Betaflight

IMPORTANT: Configure BF 4.6 only with the official web configurator at <https://betaflight.am32.ca/> in Chrome or Edge; the desktop configurator is no longer supported.

If connection fails, check the USB data cable, controller power and driver installation.

The screenshot shows the Betaflight web configurator interface. On the left, a sidebar contains a list of COM ports: '蓝牙外围设备 (COM196)', 'WCH-Link (COM64)', 'Betaflight Flight Controller (COM65) - 已配对', and 'MicoAir743v2-96577'. The 'Betaflight Flight Controller (COM65) - 已配对' option is highlighted with a red box. Below this list are buttons for '连接' (Connect) and '取消' (Cancel). A red arrow points from the '连接' button to a text box that says '2. Select the controller COM port, then click Connect'. On the right side of the interface, there is a '选择你的设备' (Select your device) dropdown menu. Below it, there are four options: '--- 找不到我的 USB 设备 ---', '--- 找不到我的 蓝牙 设备 ---', and '--- 找不到我的 DFU 设备 ---'. A red box highlights the first option, and a red arrow points from it to a text box that says '1. Connect the FC port to the computer with a USB data cable, open <https://betaflight.am32.ca/> select 'USB device not found' if required'. Another red arrow points from the '连接' button to a text box that says '3. Click Connect; wait for communication'. In the center of the interface, there is a large image of a Betaflight flight controller board. A red circle highlights the 'FC' port on the board, and a red arrow points from it to a text box that says 'Connect to the FC port'. At the bottom of the interface, there is a status bar showing various system metrics: '端口利用率: 下:0%-上:0%', '数据包错误: 0', 'I2C 错误: 0', '循环时间: 0', 'CPU 负载: 0%', and '应用版本: 2025.12.0-beta (0fa6ca3f)'.

2. Select the controller COM port, then click Connect

1. Connect the FC port to the computer with a USB data cable, open <https://betaflight.am32.ca/> select 'USB device not found' if required

Connect to the FC port

3. Click Connect; wait for communication

端口利用率: 下:0%-上:0% 数据包错误: 0 I2C 错误: 0 循环时间: 0 CPU 负载: 0% 应用版本: 2025.12.0-beta (0fa6ca3f)



3 - Initial setup and calibration (Betaflight configurator)

Step 2: Setup

The Setup page shows controller information, sensor status and aircraft attitude.



应用版本: 2025.12.2 (a2d0f50)
固件: 4.6.0 BTFL

2026-04-16 @09:26:53 - 禁止解锁

设置

校准加速度计

校准磁力计

清除设置

激活启动引导程序/DFU

把飞控或者飞机水平放置，再执行加速度计校准。校准过程中切勿移动飞控或者飞机。

将飞行器在所有轴向上都移动至少360度。你有30秒的时间可供进行这项操作。

将飞行器的制器重置为 未配置状态。

重新启动飞行器的启动引导程序/DFU 模式。

俯航: 358 度
俯仰: -0.2 度
横滚: 0 度

重置 Z 轴, 补偿: 0 度

1. Keep the board or aircraft level and still, then click Calibrate Accelerometer



Attitude display check
After calibration, check the attitude display:

- The model should be level when the controller is level
- Pitch and Roll should be close to 0°
- The model should follow slow controller movement
- If direction is wrong, correct board alignment on the Configuration page

24.36V (6S)

陀螺仪 加速度计 磁力计 气压计 GPS 声响

Dataflash: free 0B

更新固件 断开连接

启用专家模式

显示日志

仪表



GPS

3D 定位: 0
Number of Satellites: 0
Latitude: 0.0000 deg
Longitude: 0.0000 deg

系统信息

禁止解锁标志:	RX_FAILSAFE
电池电压:	24.36 V
已用容量:	146 mAh
耗电电流:	1.65 A
RSSI:	0 dBm
MCU:	CH32H415
CPU 温度:	72 °C

传感器信息

陀螺仪:	ICM42688P
加速度计:	未检测到或已禁用
磁力计:	未检测到或已禁用
气压计:	未检测到或已禁用
声响:	未检测到或已禁用
光流计:	未检测到或已禁用

固件信息

MSP API:	1.47.0
构建日期:	Apr 3 2026 09:55:01
构建类型:	本地构建
构建信息:	没有可用的构建信息
固件:	

网络信息

状态:	在线
应用版本:	2025.12.2 (a2d0f50), 固件: 4.6.0 BTFL

端口利用率: 下:18%-上:2% 连接: 00:02 数据包错误: 0 I2C 错误: 1 循环时间: 124 CPU 负载: 25%



3 - Initial setup and calibration (Betaflight configurator)

Step 3: Ports

Assign each UART function on the Ports page. Correct port settings are required for peripherals.

BETAFLIGHT
应用版本: 2025.12.2 (a2d0f50)
固件: 4.6.0 BTF.L

2025-05-11 @09:51:27 - 禁止解锁

24.54V (6S)
陀螺仪 加速度计 磁力计 气压计 GPS 声响
Dataflash: free 0B
启用专家模式 更新固件 断开连接 显示日志

端口

注意: 不是所有的组合都是有效的。如果飞行检查到某组合不能同时工作, 对应端口的设置将会被重置。
注意: 不要关闭第一个端口的MSP选项。否则你可能要重新烧录固件并清空 (丢失) 所有设置。

标识符	设置/MSP	串行接收机	遥测输出	传感器输入	外设
USB VCP	☒ 115200	☐	已禁用 AUTO	已禁用 57600	已禁用 115200
UART1	☐ 115200	☐	已禁用 AUTO	已禁用 57600	已禁用 115200
UART2	☐ 115200	☐	已禁用 AUTO	已禁用 57600	已禁用 115200
UART3	☐ 115200	☐	已禁用 AUTO	已禁用 57600	已禁用 115200
UART4	☐ 115200	☐	已禁用 AUTO	已禁用 57600	已禁用 115200
UART5	☐ 115200	☐	已禁用 AUTO	已禁用 57600	已禁用 115200
UART6	☐ 115200	☒	已禁用 AUTO	已禁用 57600	已禁用 115200
UART7	☐ 115200	☐	已禁用 AUTO	已禁用 57600	已禁用 115200
UART8	☒ 500000	☐	已禁用 AUTO	已禁用 57600	已禁用 115200

1. Select the protocol required by the VTX

已禁用
已禁用
黑盒日志记录
摄像头(RunCam协议)
图传(RC Tramp)
图传(TBS SmartAudio)
Benevake LIDAR
OSD (FrSky 协议)
VTX (MSP + Displayport)

已禁用
已禁用
电调
GPS

2. Save and reboot after changing port settings

保存并重启

端口利用率: 下:15%-上:1% 连接: 00:12 数据包错误: 0 I2C 错误: 1 循环时间: 123 CPU 负载: 20%

应用版本: 2025.12.2 (a2d0f50), 固件: 4.6.0 BTF.L



3 - Initial setup and calibration (Betaflight configurator)

Step 4: Configuration

The Configuration page contains PID loop, feature and other core settings.

BETAFLIGHT

应用版本: 2025.12.2 (a2d0f50)

固件: 4.6.0 BTF1

2025-04-16 @09:29:22 - 禁止解锁

设置

端口

配置

动力 & 电池

失控保护

预设

PID 调校

接收机

模式

调整

舵机

GPS

电机

OSD

视频发送

LED 灯带

传感器

线传日志

黑盒子

CLI

配置

注意: 不是所有的功能都能同时被启用。当飞控检测到有冲突时会禁用相应的功能。
注意: 先设置串口, 再启用需要用到串口的功能。

系统设置

注意: 确保你的飞控有能力运行在这些频率上! 检查 CPU 以及循环时间是否稳定。改变频率可能需要重新调校 PID。提示: 关闭加速度计和其他传感器可以节省运算资源以获得更高性能。

8.00 kHz Gyro update frequency

8.00 kHz PID 循环更新频率

加速度计

气压计 (如有)

磁力计 (如有)

个性化

飞行器名称

飞行员名称

摄像头

0 FPV摄像头角度 [degrees]

解锁

180 最大允许解锁角度 [degrees]

第一次解锁时校准陀螺仪

其他功能

AIRMODE

CHANNEL_FORWARDING

INFLIGHT_ACC_CAL

LED_STRIP

OSD

SERVO_TILT

永久启用 Airmode

转发 Aux 通道信号到舵机输出

实时水平校准

彩色 RGB LED灯带

OSD

舵机云台

飞控板校准

0 横滚度

0 俯仰度

270 偏航度

激活 IMU

Sensor Configuration

NONE 声响

NONE 光流计

加速度计微调

0 加速度计横滚微调

0 加速度计俯仰微调

Dshot 信标配置

1 信标音调

全部启用 全部禁用

已启用

功能

说明

RX_LOST

RX_SET

遥控器关闭或信号丢失时持续鸣叫直到信号恢复

通过辅助通道发出蜂鸣音

蜂鸣器配置

全部启用 全部禁用

已启用

功能

说明

GYRO_CALIBRATED

RX_LOST

RX_LOST_LANDING

DISARMING

ARMING

ARMING_GPS_FIX

RAT CRIT LOW

陀螺仪校准完成后鸣叫

遥控器关闭或信号丢失时持续鸣叫直到信号恢复

解锁后遥控器关闭或信号丢失 (自动降落/自动稳定) 时鸣叫 SOS 信号

锁定飞控时鸣叫

解锁飞控时鸣叫

GPS 定位成功后解锁飞控时鸣叫特殊音调

当电池电压严重偏低时持续长鸣

保存并重启

端口利用率: 下:14%-上:0% 连接: 00:20 数据包错误: 0 I2C 错误: 1 循环时间: 125 CPU 负载: 24%

应用版本: 2025.12.2 (a2d0f50), 固件: 4.6.0 BTF1

If mounting orientation changes, set board alignment to match the actual installation

Save and reboot

保存并重启



3 - Initial setup and calibration (Betaflight configurator)

Step 5: Power and battery

Use this page for battery parameters, voltage calibration and current sensing.

The screenshot shows the Betaflight configurator interface. The left sidebar has a red box around '动力 & 电池' (Power & Battery). The main area is titled '动力 & 电池'. A modal window '校准管理器' (Calibration Manager) is open, displaying instructions in Chinese and English. A red arrow points from the text '2. Enter the voltage measured with a multimeter and click Calibrate;' to the '测量电压' (Measure Voltage) input field, which contains the value '4'. Another red arrow points from the text '1. Click Calibrate' to the '校准' (Calibrate) button. A third red arrow points from the text '3. Save after calibration' to the '保存' (Save) button. The '校准' button is highlighted with a red box.

2. Enter the voltage measured with a multimeter and click Calibrate;
the controller adjusts the scale to match the multimeter

1. Click Calibrate

3. Save after calibration



3 - Initial setup and calibration (Betaflight configurator)

Step 6: Receiver

Configure receiver protocol, channel mapping and signal processing here.



应用版本: 2025.12.2 (a2d0f50)
固件: 4.6.0 BTFLL

2025-04-16 @09:35:16 -- 禁止解锁

设置

端口

配置

动力 & 电池

失控保护

预设

PID 调试

接收机

模式

调整

舵机

GPS

电机

OSD

视频发送

LED 灯带

传感器

线传日志

黑盒子

CLI

接收机

预览



横滚 [A]

1500

俯仰 [E]

1500

方向 [R]

1500

油门 [T]

885

AUX 1

1675

AUX 2

1500

AUX 3

1500

AUX 4

1500

AUX 5

1500

AUX 6

1500

AUX 7

1500

AUX 8

1500

AUX 9

1500

AUX 10

1500

AUX 11

1500

AUX 12

1500

接收机

串行 (通过 UART)

接收机模式

CRSF

Serial Receiver Provider

Some Receiver Providers are not supported by current Build Configuration.

遥测

TELEMETRY

遥测输出

RSSI (接收机信号强度)

RSSI_ADC

模拟 RSSI 输入

RSSI 通道

已禁用

通道映射

AETR1234

摇杆低位 阈值

1050

摇杆中点

1500

摇杆高位 阈值

1900

RC 死区区间

0

Yaw 死区区间

0

3D 油门死区

50

RC 平滑

RC 平滑

自动

设定点截止类型

30

Setpoint Auto Factor

自动

Throttle Cutoff Type

接收机校准

刷新

保存

应用版本: 2025.12.2 (a2d0f50), 固件: 4.6.0 BTFLL

1. Pair the receiver and transmitter, then verify the channel monitor.

Move each stick and verify its channel bar

Verify Roll/Pitch/Yaw directions

Verify minimum throttle

Operate each switch and verify AUX channels

2. Save



Step 7: Modes

Assign flight modes to transmitter channels on this page.

Beginners should start in ANGLE mode, then use ACRO after gaining control. ANGLE limits tilt and self-levels when sticks are released.

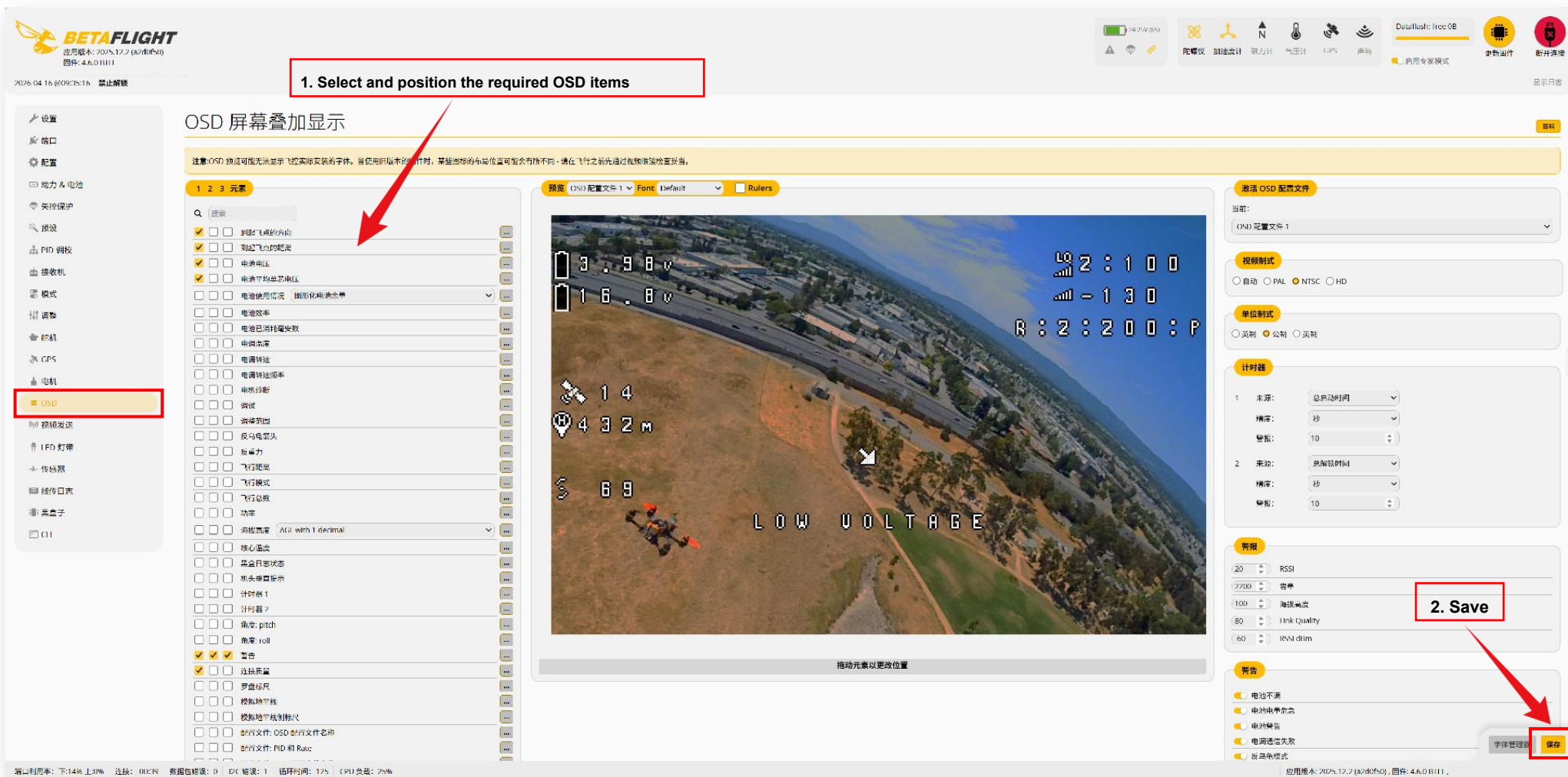
15



3 - Initial setup and calibration (Betaflight configurator)

Step 9: OSD

Use OSD to place essential flight information on the FPV image.





3 - Initial setup and calibration (Betaflight configurator)

Step 10: Video transmitter

Configure VTX band, channel, frequency and power level on this page.

BETAFLIGHT

应用版本: 2025.12.2 (a2d0f50)

固件: 4.6.0 BTFL

2026-04-17 @17:50:56 - 禁止解锁

设置

端口

配置

动力 & 电池

失控保护

预设

PID 调校

接收机

模式

调整

舵机

GPS

电机

OSD

LED 灯带

传感器

线传日志

黑盒子

CLI

视频发送

Here you can configure the values for your Video Transmitter (VTX). You can view and change the transmission values, including the VTX Tables, if the flight controller and the VTX support it.
To set up your VTX use the following steps:
1. Go to [this](#) page;
2. Find the appropriate VTX configuration file for your country and your VTX model and download it;
3. Click '从文件加载' below, select the VTX configuration file, load it;
4. Verify that the settings are correct;
5. Click '保存' to store the VTX settings on the flight controller.
6. Optionally click '保存 Lua 脚本' to save a lua configuration file you can use with the betafight lua scripts (See [more](#) here.)

选择模式

直接输入频率

RACEBAND

频道 3

1W6

维修站模式(Pit Mode)

0

关闭

图传表

8

8

名称	字母	1	2	3	4	5	6	7	8	
BOSCAM	A	5865	5845	5825	5805	5785	5765	5745	5725	频段 1
BOSCAM	B	5733	5752	5771	5790	5809	5828	5847	5866	频段 2
BOSCAM	E	5705	5685	5665	5645	5885	5905	5925	5945	频段 3
FATSHARK	F	5740	5760	5780	5800	5820	5840	5860	5880	频段 4
RACEBAND	R	5658	5695	5732	5769	5806	5843	5880	5917	频段 5
BAND_L	L	5362	5399	5436	5473	5510	5547	5584	5621	频段 6
BAND_U	U	5325	5348	5366	5384	5402	5420	5436	5456	频段 7
BAND_O	O	5474	5492	5510	5528	5546	5564	5582	5600	频段 8

4

当前值

设备准备就绪

图传类型

频段

频道

频率

功率

维修站模式(Pit Mode)

维修站模式频率

低功率上锁

True

Tramp

RACEBAND

3

5732

1W6

否

0

关闭

Device ready: True confirms communication between the controller and VTX

保存

从剪贴板加载

从文件加载

保存到文件

保存 Lua 脚本

VTX setup:

1. Find the VTX control wire marked RX/DATA/IRC;
connect it to the UART1 TX pin on the controller.

2. Select the VTX protocol on the Ports page.

3. Import the manufacturer's VTX table.

4. Save

端口利用率: 下:14%-上:0%

连接: 00:54

数据包错误: 0

I2C 错误: 1

循环时间: 124

CPU 负载: 25%

应用版本: 2025.12.2 (a2d0f50), 固件: 4.6.0 BTFL

PART 4

INTELLIGENT ASSISTED LOCK (CH10)

* Assign a transmitter switch to CH10



Use ACRO mode before target lock;
ANGLE/HORIZON modes are not supported

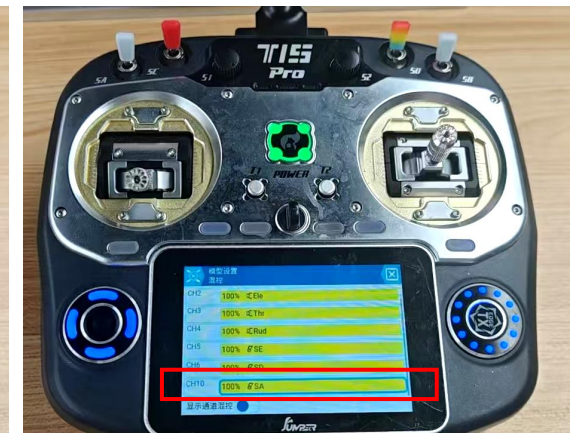


4 - Assign a transmitter switch to CH10 assisted lock

* Jumper T15Pro example; use equivalent settings on other radios.



1. Menu 2. Model Settings 3. Mixing 4. Press + to add a channel

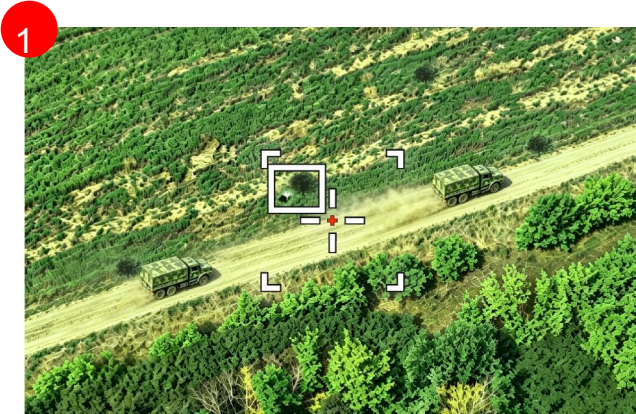


5. Select CH10 6. Assign switch SA 7. Confirm and return 8. Verify SA in the list



4 - Intelligent assisted lock (CH10)

Use ACRO mode before target lock
ANGLE/HORIZON modes are not supported



Place the recognition box over the target
The system searches near the crosshair and snaps to a target



When the correct target is selected, move CH10 down to enter assisted lock



White recognition box -> purple tracking box | Release sticks | Target reached



PART 5

AI FORCED LOCK (CH11)

* Assign a transmitter switch to CH11



Use ACRO mode before target lock;
ANGLE/HORIZON modes are not supported



5 - Assign a transmitter switch to CH11 forced lock

* Jumper T15Pro example; use equivalent settings on other radios.



1. Menu 2. Model Settings 3. Mixing 4. Press + to add a channel



5. Select CH11 6. Assign switch SB 7. Confirm and return 8. Verify SB in the list

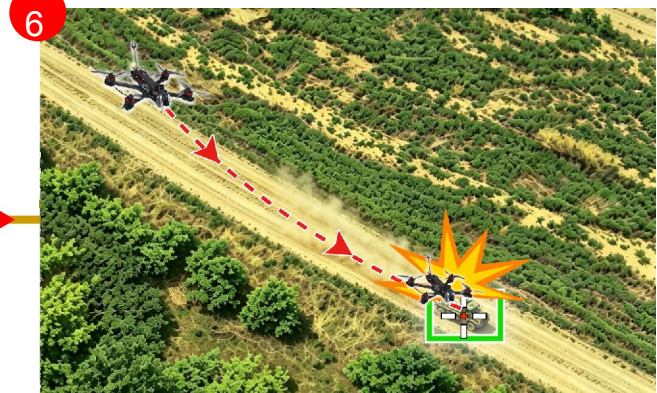


5 - AI forced lock (CH11) - moving or stationary targets

Use ACRO mode before target lock



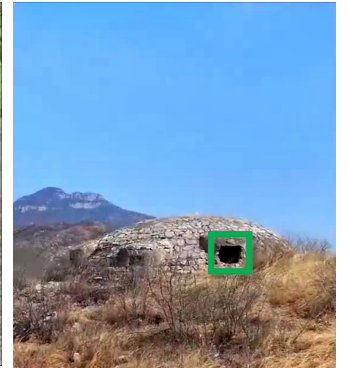
Aim the crosshair | Align with target | Move CH11 down to enter forced lock



Green forced-lock box appears | Release sticks | Target reached



5 - Forced lock - any moving or stationary target





Accelerometer calibration from transmitter



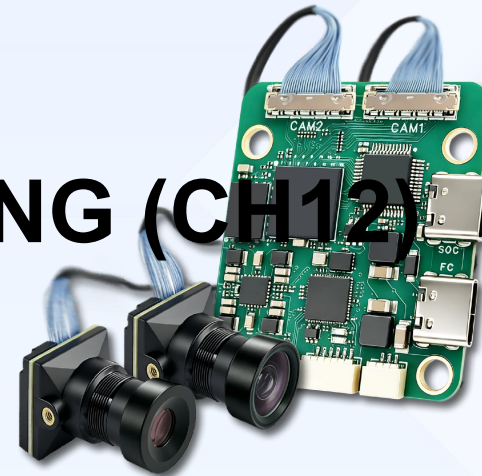
Video image

Place the aircraft level. ACC CAL and a countdown indicate calibration.
Activate CH10 and CH11 together. Calibration is complete when the countdown ends.

PART 6

DUAL-CAMERA SWITCHING (CH12)

* Assign a transmitter switch to CH12



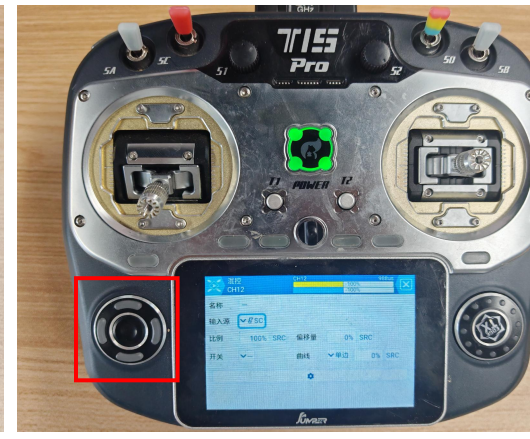


6 - CH12 camera switching

* Jumper T15Pro example; use equivalent settings on other radios.



1. Menu 2. Model Settings 3. Mixing 4. Press + to add a channel



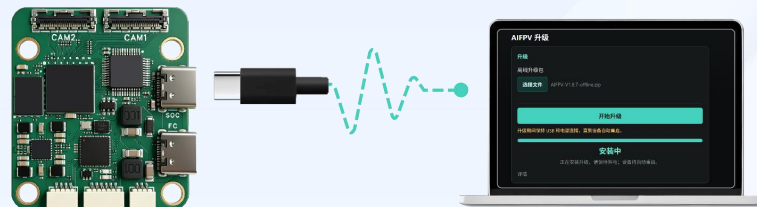
5. Select CH12 6. Assign switch SC 7. Confirm and return 8. Verify SC in the list

PART 7

FIRMWARE UPDATE

Address: 192.168.32.1:8080/

Recalibrate Betaflight after updating firmware!

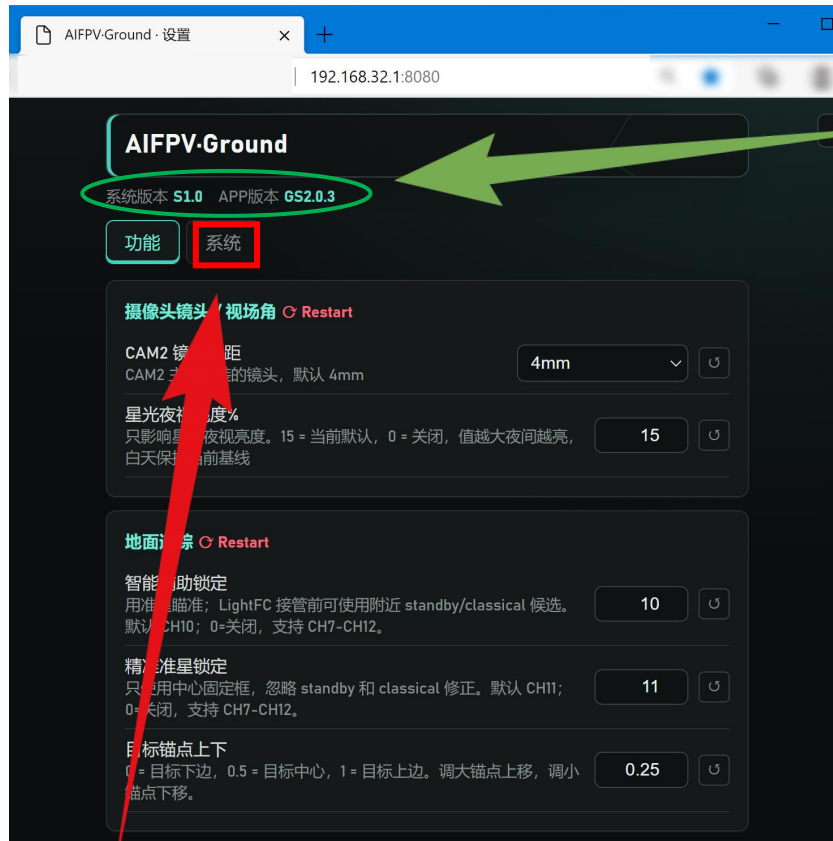




7 - Firmware update procedure

192.168.32.1:8080/

Recalibrate Betaflight after updating firmware!



1. Connect SOC to the computer by USB

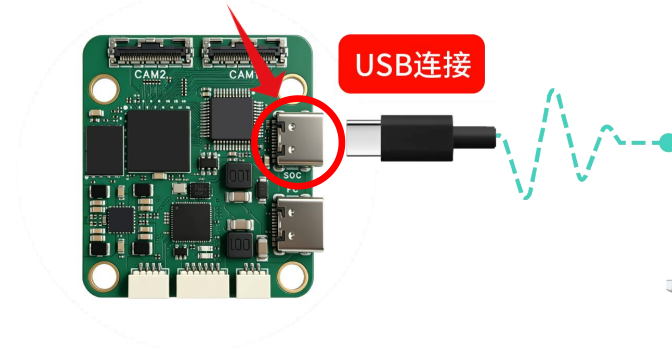
2. Open <http://192.168.32.1:8080/> and select System

3. Select and upload the firmware file

4. Click Start Update

5. Wait for the progress bar to finish

Connect to the SOC port



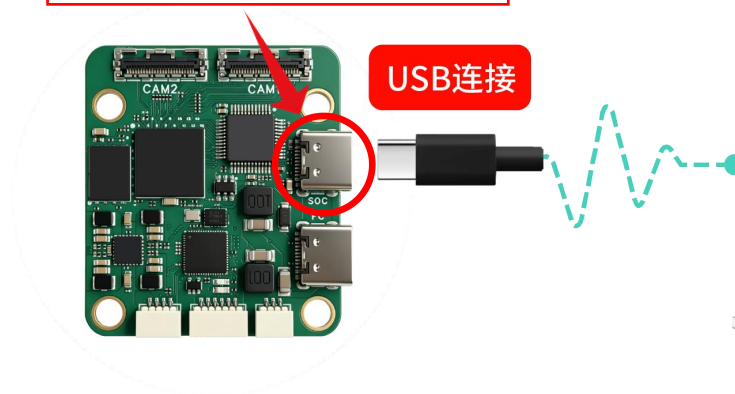
After a successful update, the latest system and app versions are shown





7-1 Additional function

Connect to the SOC port



Computer

192.168.32.1:8080/

AIFPV 设置

星光夜视亮度

星光夜视亮度%

只影响星光夜视亮度。15 = 当前默认，0 = 关闭，值越大夜间越亮，白天保持当前基线

15

Select night-vision brightness for night flight

升级

打开升级页面

PART 8

TROUBLESHOOTING





8 - Troubleshooting

Common problems and solutions are listed below.

Problem Possible cause Solution	
Cannot connect Wrong USB cable Replace with a USB data cable	
Cannot connect Port in use Close other serial software	
No receiver signal Wrong protocol Select the correct receiver protocol	
No receiver signal Wrong UART setup Check Ports configuration	
Channel reversed Wrong mapping Correct channel mapping	
Motor does not run ESC protocol mismatch Set DSHOT 300/600	
Motor reversed Wiring/direction error Select Reverse	
No OSD Video format mismatch Set Auto or matching format	
No OSD OSD disabled Enable OSD in Configuration	
Cannot control VTX Control wire missing/wrong Connect it to the UART TX pin	
Cannot control VTX UART protocol missing Configure VTX Tramp	
Wrong battery voltage Meter not calibrated Calibrate with a multimeter	
Cannot arm Safety condition not met Check minimum throttle	
ESC keeps self-testing Loose connection Check wiring and plugs	
Aircraft moves sideways after lock Wrong camera angle Install camera at 20-60°	
Aircraft levels when lock starts Switch conflict Check duplicate channel assignment	