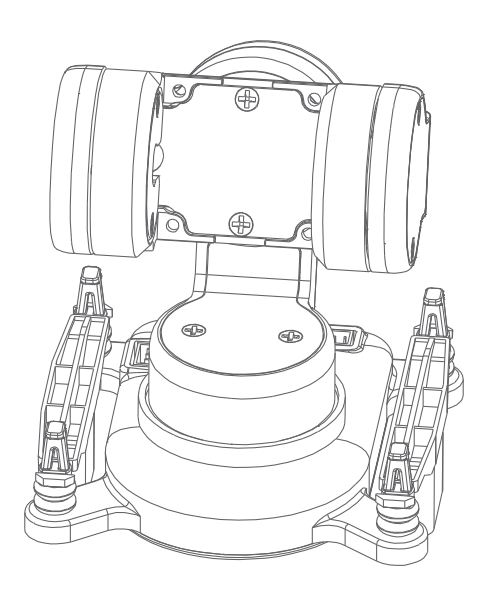
CADDX GM3 V2-20

QUICK START GUIDE

V1.3



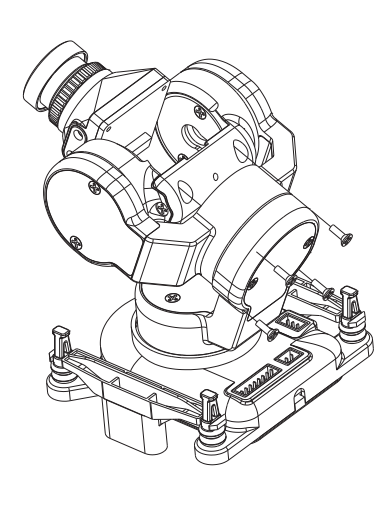
Introduction

This product is a mechanical stabilization gimbal designed to provide real-time image stabilization and camera angle adjustment. It is compatible with Walksnail Avatar/ Ascent series cameras with a mounting width of 20mm. The gimbal supports stabilization and adjustment along the pitch, roll, and yaw axes. Users need to design their own mounting holes on the vehicle to fit the gimbal mounting bracket. The gimbal can automatically recognize upright and inverted installations.

Product Precautions

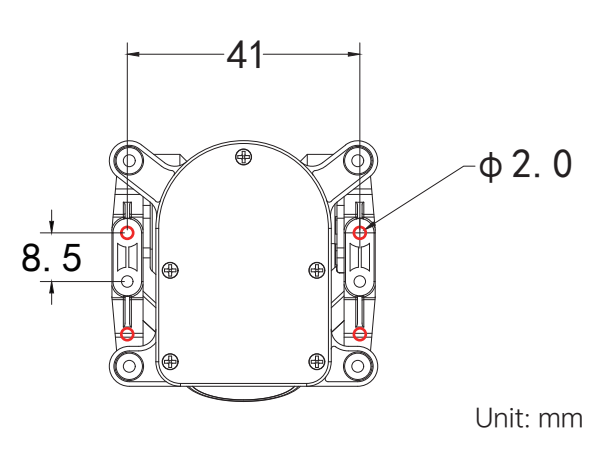
1.Ensure the external power supply to the gimbal is within the specified range (9~25.2V DC, 3S–6S LiPo battery). Operating outside this range may cause malfunction or damage.
2.Do not short-circuit the power and GND wires, as this will damage the device.
3.Make sure the coaxial cable connected to the gimbal is not fastened too tightly. Leave enough slack to allow free movement during the gimbal's damping and operation. The gimbal must not collide or interfere with other objects during self-check or movement after powering on.
4.When using the gimbal with the Moonlight camera, it must be paired with the Moonlight VTX.
5.When using the gimbal head-tracking feature, some Avatar/Ascent VTX units may not support it. Please refer to the corresponding VTX product manual for details.
6.The gimbal bracket must be securely mounted to the vehicle using the included damping balls or compatible third-party damping balls. Ensure the installation is stable.
7.The head-tracking UART cannot be controlled simultaneously by other protocols.

Camera Installation



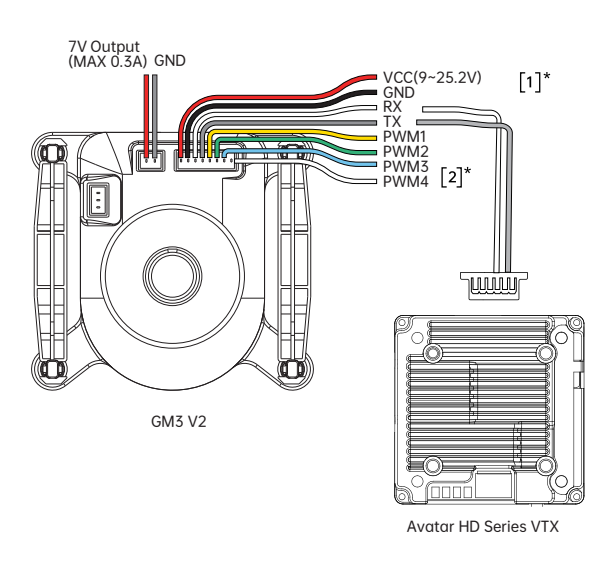
1.Use a Phillips screwdriver to remove the back cover of the camera.
2.Use tweezers to disconnect the coaxial cables from both sides of the camera's coaxial interface.
3.Connect the gimbal's coaxial cables to the camera.
4.Mount the camera onto the gimbal, rotating the cable outlet on the back cover of the camera by 90 degrees to align with the cable outlet direction of the gimbal. Make sure not to leave excessive length of the coaxial cable to avoid compressing it.
5.Secure the four screws and check whether the camera can smoothly rotate to its maximum pitch angle. If there is noticeable resistance, please reinstall the camera.
6.Installation is complete.

Installation Dimensions



Unit: mm

Connection and Use



[1]

To enable the head-tracking feature, connect the gimbal to the USB port of the Avatar V2 VTX and use it together with Avatar Goggles that support head tracking.

[2]

PWM1
The channel is used to select the gimbal's working mode. There are three modes available:
1.Translation Mode: Pitch and roll remain level, while the yaw axis follows.
2.Translation Roll Mode: Pitch remains level, while roll and yaw axes follow.
3.Three-Axis Follow Mode: Pitch, roll, and yaw axes all follow.

PWM2
The channel is used to adjust the gimbal follow sensitivity, controlling how fast or slow the gimbal responds. Please use the dial channel on the remote controller to make the adjustments.

PWM3
This channel controls the gimbal's pitch axis. Please use the dial switch on the remote controller to operate it. You can adjust the gimbal's rotation angle range by modifying the channel travel settings on the remote controller.

PWM4
This channel controls the gimbal's yaw axis. Please use the dial switch on the remote controller to operate it. You can adjust the gimbal's rotation angle range by modifying the channel travel settings on the remote controller.

It is also possible to control the gimbal via a third-party head-tracking module by assigning the control channels to PWM3 and PWM4, enabling head-tracking control of the gimbal.

Control Method

The three-axis gimbal supports the following four control methods: direct head-tracking connection / S.BUS / CRSF control, PWM control, and Mavlink control. The priority of these control methods decreases in the order listed.。

Head Tracking Function

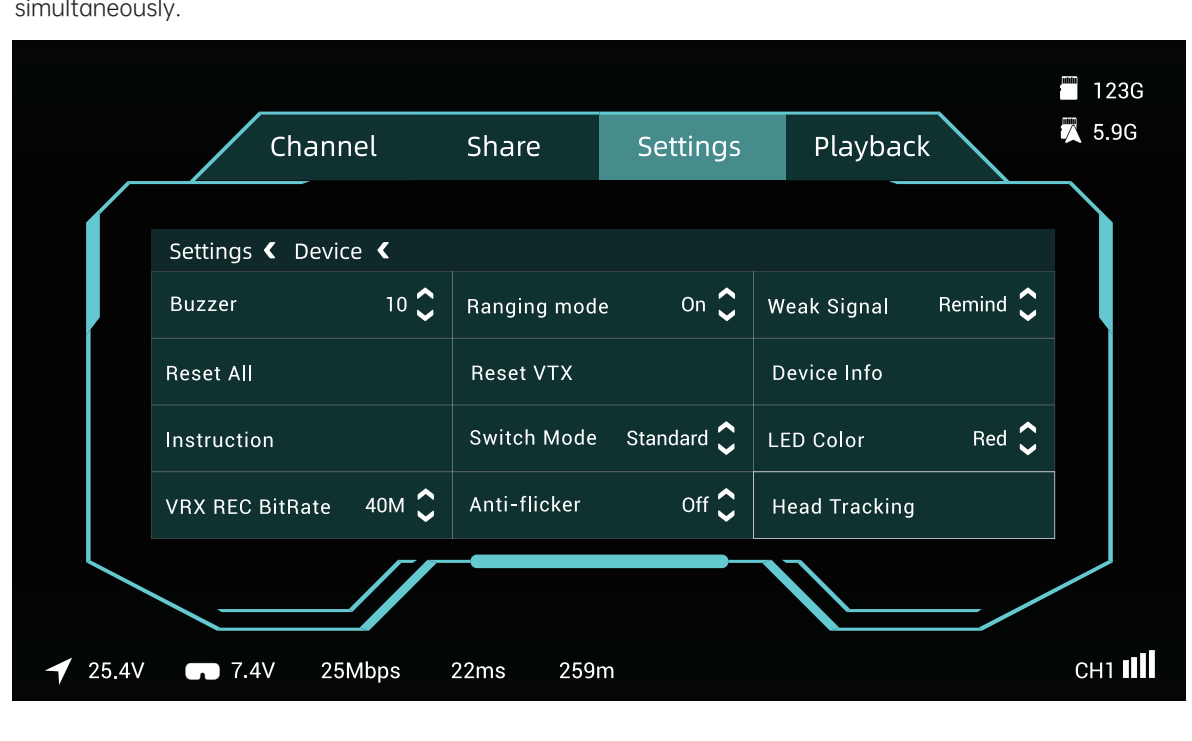
The gimbal supports head-tracking functionality via both UART and PPM control protocols.

Direct Head Tracking Connection (UART)

1.Upgrade the Avatar goggles and V2 VTX to version 38.43.14 or above. Connect the gimbal and Avatar V2 VTX UART cable according to the wiring diagram.
2.Open the goggles menu and select "Gimbal" for head-tracking: Settings > Head Tracking > Gimbal. After setup, the gimbal will follow the movements of the goggles. Quickly press the return button three times to center the gimbal.

PPM Control Protocol

1.Use a 5-pin to 2-pin AV cable: connect the 5-pin end to the Goggles' AV IN port and the 2-pin end to the remote controller's DSC port. Solder the gimbal's Rx wire to the CRSF receiver's Tx pin (for SBUS receivers, solder the signal wire to the gimbal's PWM1 signal input). Set the PPM channels on the goggles accordingly. In the remote controller's mixing settings, enable the corresponding TR channels (for example, if the PPM channels are CH5 and CH6, assign two switches mapped as TR5 and TR6).
2.The host controller connects to the gimbal and assigns remote control channels for gimbal mode and sensitivity settings.
3.The PPM protocol can only control any two axes, and head tracking cannot output all three axes simultaneously.



Gimbal Recenter /Axis Lock

1. Double-click the Goggles Return Button: Gimbal recenter, gimbal returns to mechanical center position.

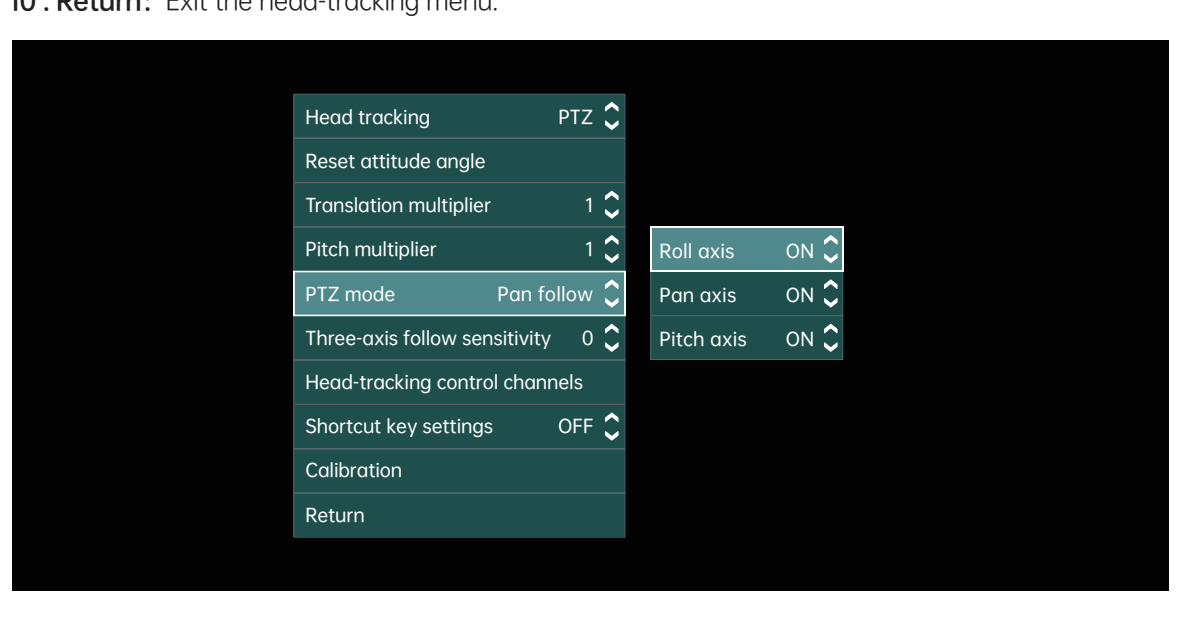


2. Push the 5D Button Backward Twice: Gimbal lock, gimbal attitude fixed, head tracking stops; push back -ward twice again to unlock.



Menu Settings

1. Head Tracking: Select the output signal and choose the gimbal.
2. Reset Attitude Angle: Click to restore the gimbal orientation to its default neutral position.
3. Pan Rate: Adjust the gimbal's pan follow rate.
4. Tilt Rate: Adjust the gimbal's tilt follow rate.
5. Gimbal Mode: Three operation modes are available: (1) Tilt and roll remain level, yaw follows; (2) Tilt remains level, roll and yaw follow; (3) All three axes follow.
6. 3-Axis Follow Sensitivity: Higher sensitivity results in faster gimbal response to aircraft movement but reduces stabilization against aircraft vibration (effective only in 3-axis follow mode).
7. Head-Tracking Control Channels: Independently enable or disable head-tracking channels for the roll, pan, and tilt axes.
8. Hotkey Settings: This function requires upgrading the gimbal to firmware V3.6 or above and using the Caddx PC Tool software to set the gimbal preset to MODE = M0 and SENS = 1. When the menu is closed, double-press the lower direction on the 5- way button to enable/disable the gimbal lock. When locked, stabilization is disabled, suitable for takeoff and landing.
9. Calibration: Exit the head-tracking menu.
10 . Return: Exit the head-tracking menu.



Remote Gimbal Control

1.UART Control: Connect the gimbal's UART_Rx and UART_Tx to a UART port's Tx and Rx on the flight controller. The gimbal function can be enabled in the INAV firmware by selecting "gimbal" as the peripheral for that port. In the configuration, assign remote control channels for sensitivity, pitch, roll, and yaw. In the mode settings, find "gimbal" and assign remote control channels for the gimbal's three modes.
2.CRSF/S.BUS Control: Connect the gimbal's PWM1 to the receiver's S.BUS signal, or connect the gimbal's RX to CRSF_TX. Five channels are required to control the gimbal mode, follow sensitivity, pitch, roll, and yaw. Channel mapping can be configured using the gimbal tuning software Caddx PC Tool.
3.PWM Control: PWM1 to PWM4 correspond to the gimbal mode, three-axis follow sensitivity, gimbal pitch, and gimbal yaw control channels, respectively.
4.Mavlink Control: Connect the gimbal's UART_Rx and UART_Tx to a UART port's Tx and Rx on the flight controller. This method uses 5 channels to control gimbal mode, follow sensitivity, pitch, roll, and yaw. Channel mapping can be done via the Caddx PC Tool software. (Mavlink control is only supported on PX4/ArduPilot firmware).

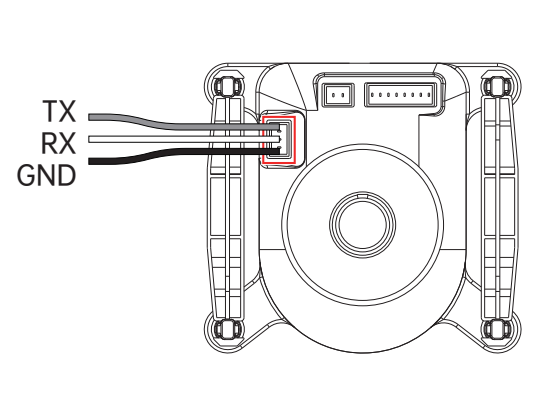
The ArduPilot configuration is as follows:

SERIAL1	
SERIAL1_BAUD	115
SERIAL1_OPTIONS	1024
SERIAL1_PROTOCOL	2

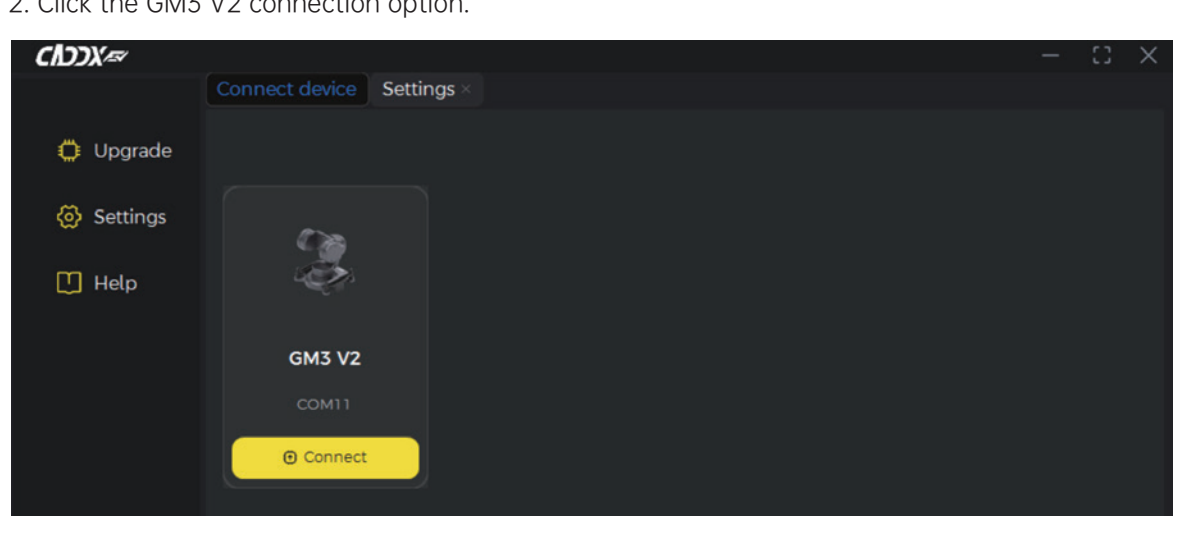
The PX4 configuration is as follows:

MavLink	
MAV_1_CONFIG	TELEM2
MAV_1_MODE	Custom/Gimbal
MAV_1_CONFIG	115200B/S
Serial	
SER_TEL2_BAUD	115200 8N1

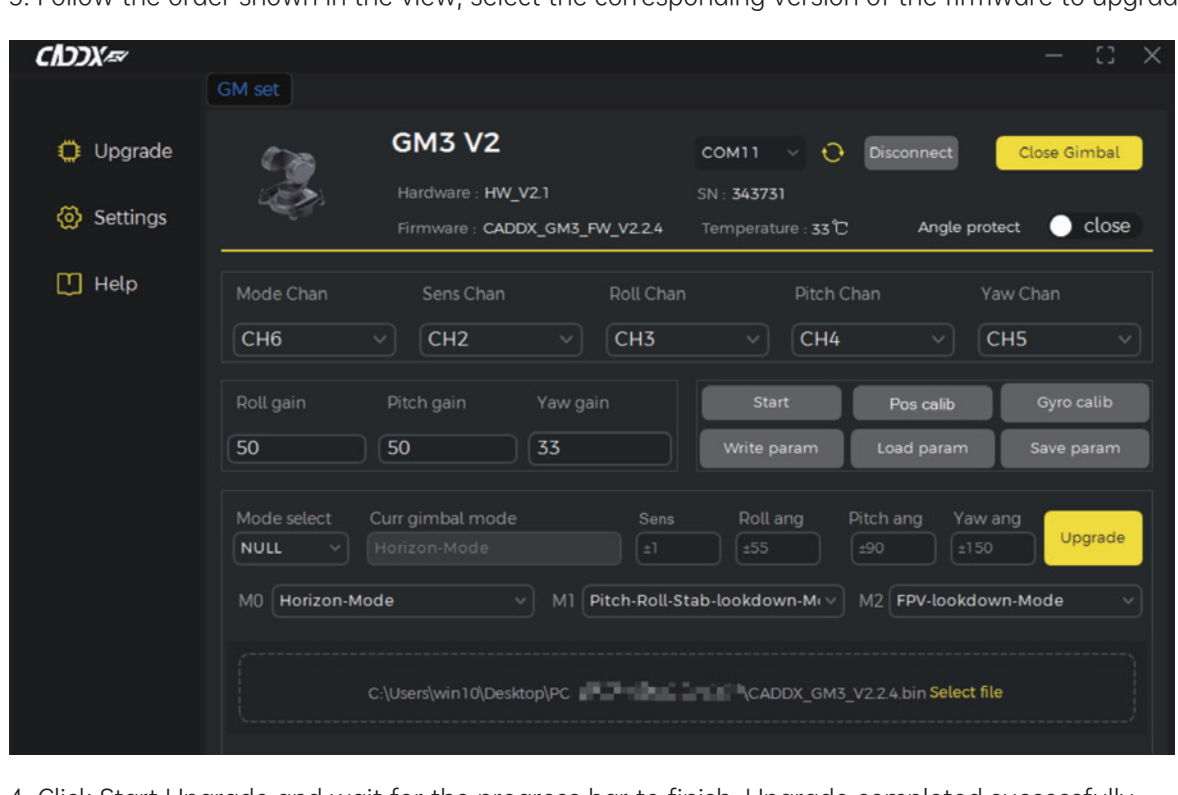
Upgrade and Controller Setup



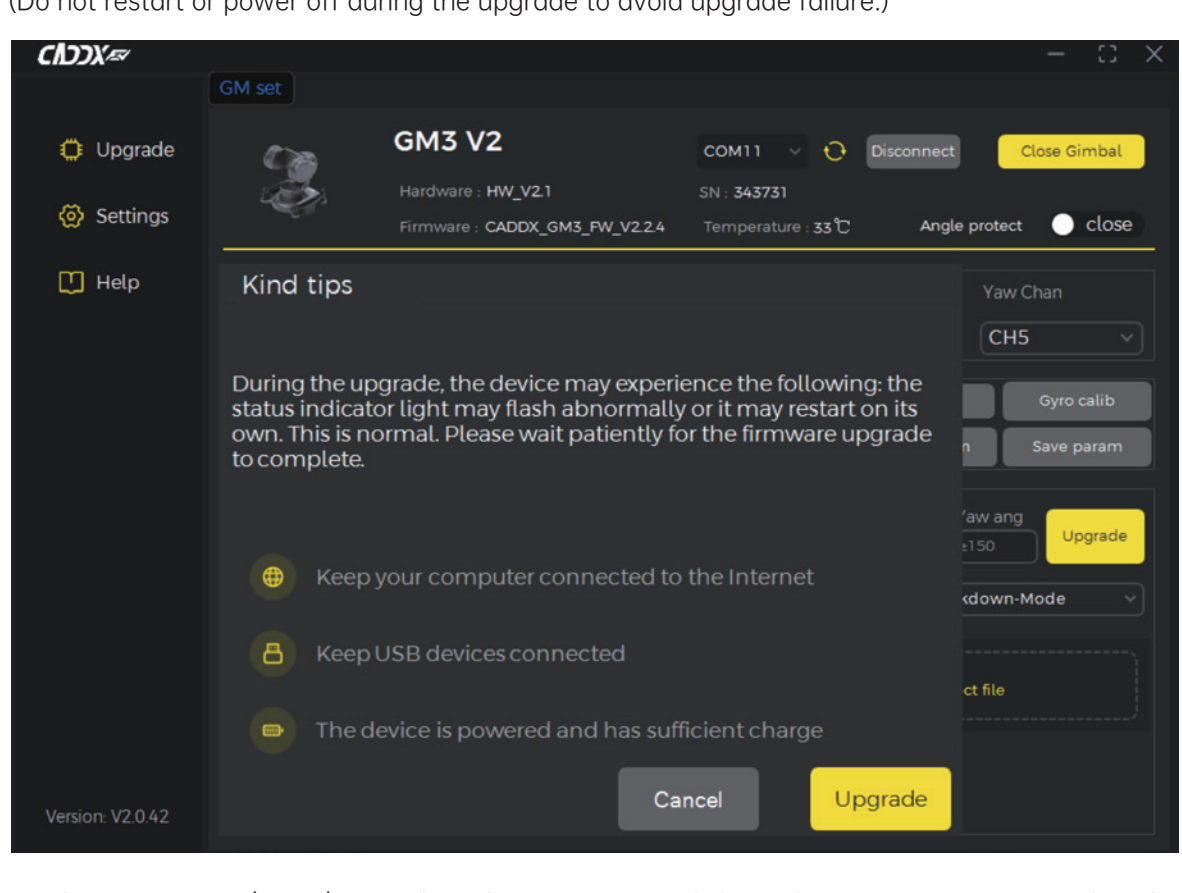
1. Connect the upgrade cable to the upgrade port, and connect the other end to your computer. Open the upgrade tool Caddx_PC_Tool.
2. Click the GM3 V2 connection option.



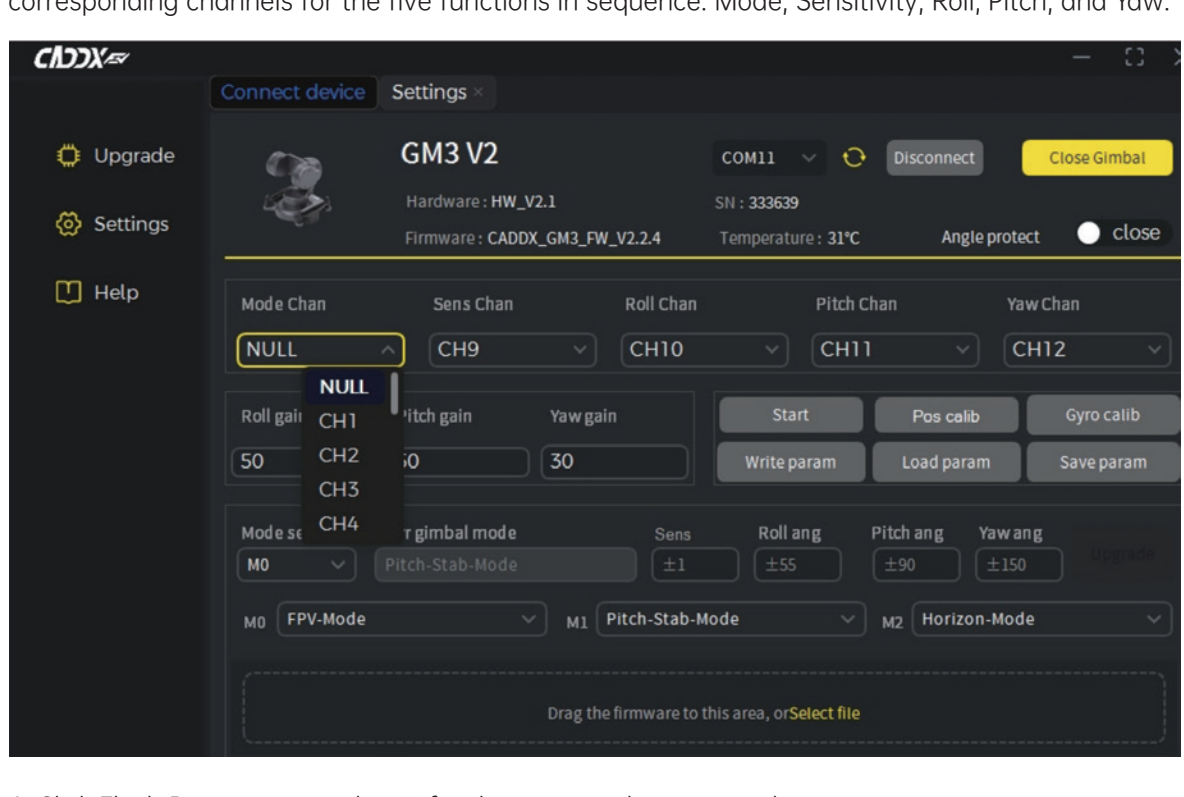
3. Follow the order shown in the view, select the corresponding version of the firmware to upgrade.



4. Click Start Upgrade and wait for the progress bar to finish. Upgrade completed successfully. (Do not restart or power off during the upgrade to avoid upgrade failure.)



5. When using CRSF/SBUS/MAVLink, in the remote control channel assignment settings, select the corresponding channels for the five functions in sequence: Mode, Sensitivity, Roll, Pitch, and Yaw.

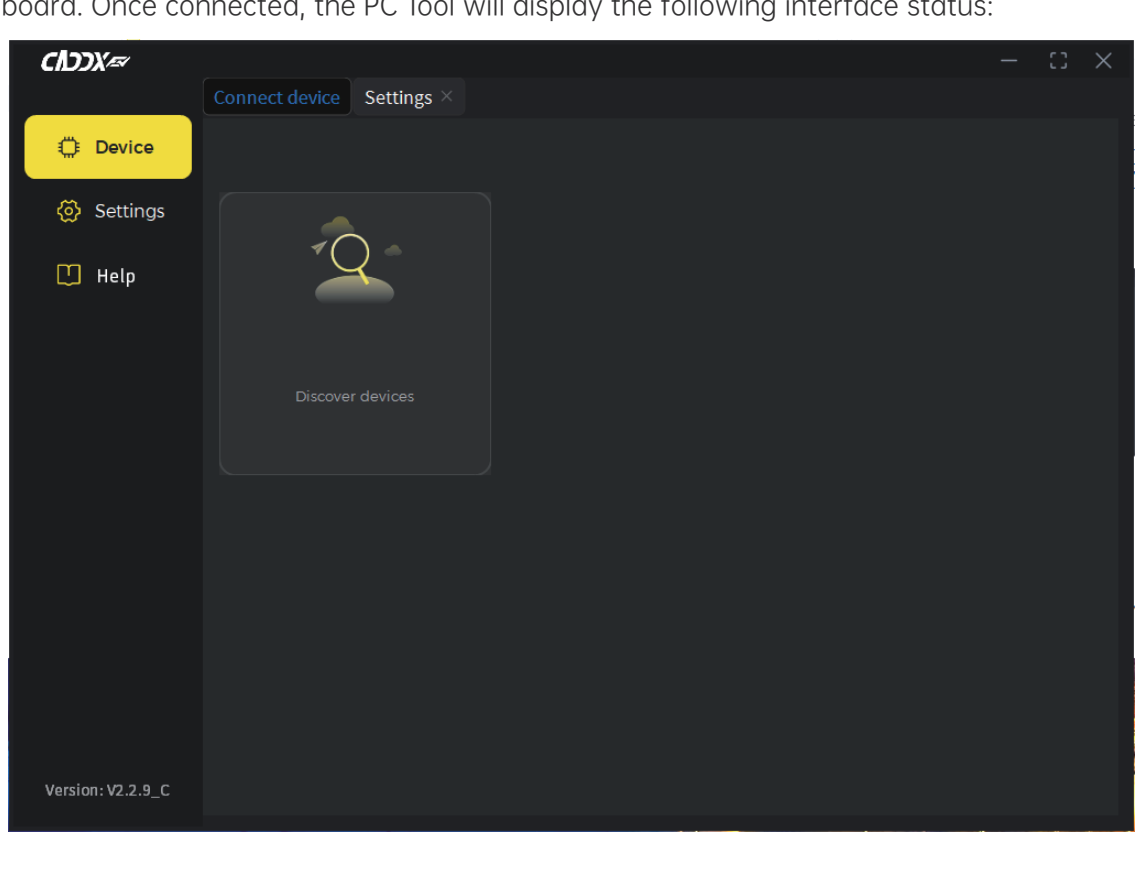


6. Click Flash Parameters and wait for the progress bar to complete.

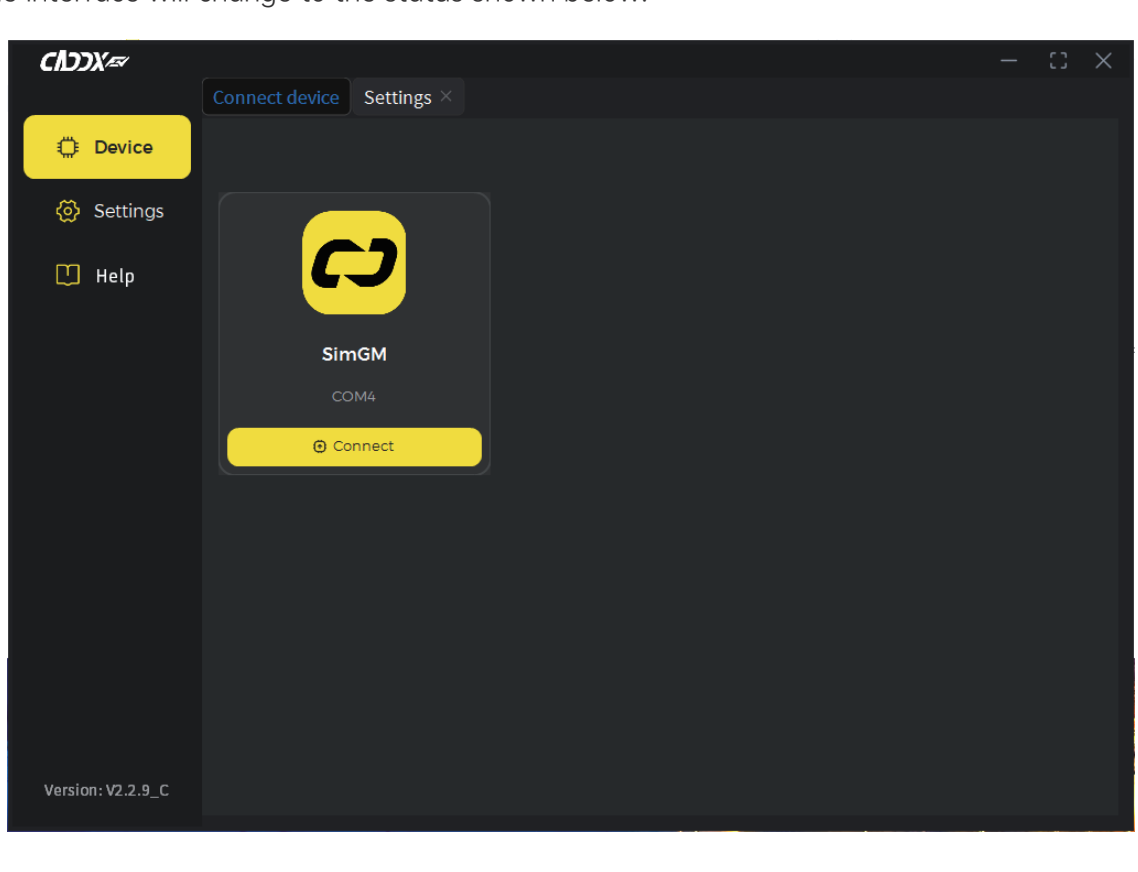
GM3 V2 Gimbal Firmware Upgrade Failure Troubleshooting

If the GM3 V2 firmware upgrade fails due to abnormalities (power loss, poor connection, etc.), please follow the steps below:

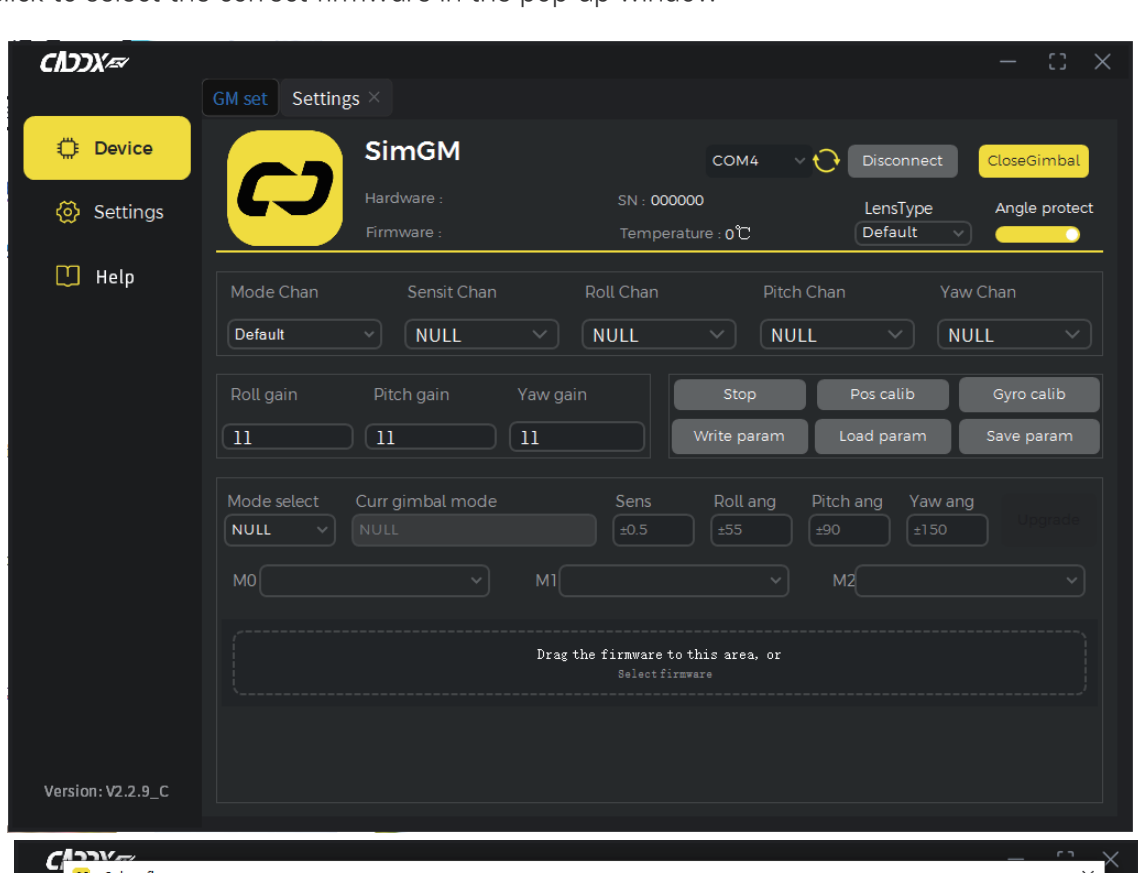
1. With the GM3 V2 gimbal powered off, connect the gimbal to the PC Tool via the tuning board. Once connected, the PC Tool will display the following interface status:

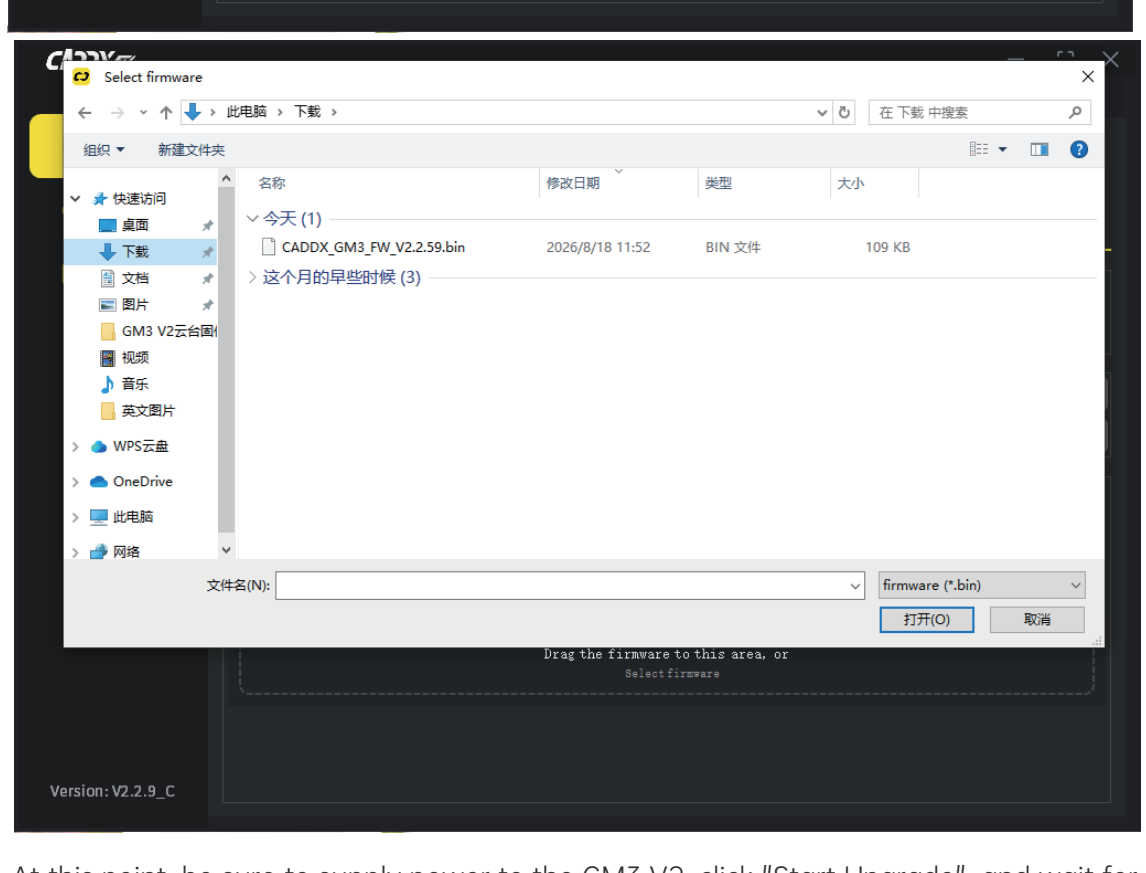


2. Wait for about 20 seconds; the device will automatically enter the boot upgrade stage, and the interface will change to the status shown below:

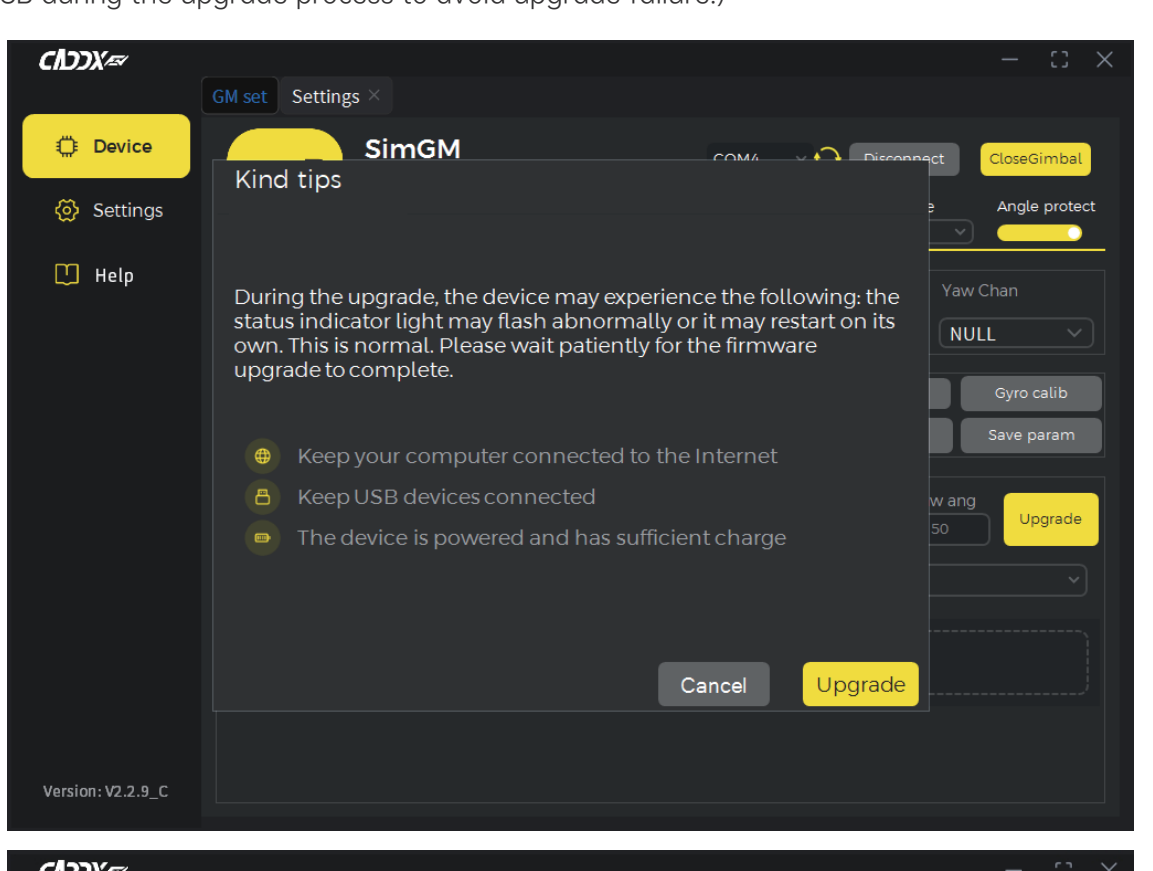


3. Click "Connect" to enter the interface shown below, then click "Select Firmware" and double -click to select the correct firmware in the pop-up window





4. At this point, be sure to supply power to the GM3 V2, click "Start Upgrade", and wait for the progress bar to complete for a successful upgrade. (Do not restart, power off, or unplug the USB during the upgrade process to avoid upgrade failure.)





Specifications

Model	GM3 V2-20
Camera Compatibility	Avatar/Ascent Series 19/20mm Camera
Stabilization Accuracy	±0.005°
Maximum Controllable Speed	±1500°/s
Controllable Rotation Range	Yaw: ±160° Pitch: ±120° Roll: ±60°
Control Method	Uart/ S.bus/ Crsf/ Mavlink/ PWM
Head Tracking Control	Supports
Static Power	1.6W
Stall Power	18W
Dimensions	61.5x47x46mm
Weight	48g

CADDXFPV SUPPORT
email: support@caddxfpv.com

CADDX GM3 V2-20

快速入门指南

V1.5



简介

此产品为机械模型组合，可实现模拟机器臂运动和为相机角度调整，提配安装支架为 20mm 和 Walksnail Avatar 两种规格，可实现相机角度的多种调整，用户既可以手动调整相机角度，又可以安装支架来固定，从而导出运动记录，数据等。

产品注意事项

1. 确保连接所有螺丝连接的完整性（M-2X12C，M-4X5 等螺丝），否则可能导致设备工作异常或损坏。
2. 应用场景有限 GM3 等，不具备导航或避障功能。
3. 注意保持舵机与活动关节部位的干净和润滑状态，避免有一些灰尘进入舵机，影响其运动顺畅与准确性。
4. 在使用过程中，避免过度拉伸或扭曲连接线，以免造成损坏或断开。
5. 与主机连接支持 Betaflight/INAV/ArduPilot 等飞控协议，可以通过 Betaflight 配置。
6. 使用前请务必仔细阅读本说明书，以确保正确安装和操作。
7. 如遇到任何问题或疑问，请及时联系我们的客户支持团队。

相机安装



1. 使用 T 型螺丝刀拆卸相机支座。
2. 按照图片说明安装相机至三脚架下部相机。
3. 相机支座的相机安装方向可调节。
4. 将相机支座装回主机，相机支座连接口需要对应相机支座连接孔位，注意对相机和下摄像头进行，避免相机与下摄像头，主机上螺丝钉，发现相机的镜头有污染或者损坏，及时清洁或更换。
5. 安装完成后，检查相机的稳定性，确保相机不会松动或晃动。

单位: mm

安装尺寸



单位: mm

连接及使用



[1]

PWM

PWM 输出可以与 FPV 飞行控制器连接，以控制舵机的运动。

Pitch

Pitch 输出可以与 FPV 飞行控制器连接，以控制俯仰舵机的运动。

Roll

Roll 输出可以与 FPV 飞行控制器连接，以控制横滚舵机的运动。

Yaw

Yaw 输出可以与 FPV 飞行控制器连接，以控制偏航舵机的运动。

[2]

PWM

PWM 输出可以与 FPV 飞行控制器连接，以控制舵机的运动。

Pitch

Pitch 输出可以与 FPV 飞行控制器连接，以控制俯仰舵机的运动。

Roll

Roll 输出可以与 FPV 飞行控制器连接，以控制横滚舵机的运动。

Yaw

Yaw 输出可以与 FPV 飞行控制器连接，以控制偏航舵机的运动。

控制方式

三轴云台支持以下四种控制方式，头盘遥控器(无头)/ELRS/PWM，PWM/SBUS/Auto/模拟云台控制模式的详细说明如下：

头部跟踪功能

启动支持 Avi/VEP/VRR/VRR 控制协议实现头部跟踪功能

头盘激活 (Uart)

将 Betaflight 调整到 115200 波特率以与模拟云台通讯，将摄像机连接至云台的 Avatar V2 VTX 的串口接，之后开始配置并将头盘跟踪选项为"启动"，选择一头部跟踪一协议，设置完成后云台将会根据摄像机姿态进行，带来更为流畅的跟踪体验。

PPM/SBUS

1.将云台接入接收机，与pin脚Toggle/Bind/Rx/+/GND（2pin连接器或者3和5V/GND），云台的心跳信号将发送到摄像机以与之匹配。

2.将摄像机连接至模拟视频接收器至云台的VTX接收器上，将图VTX的频道设置为相同，确保视频信号的稳定传输。

3.云台将会根据接收到的 PPM/SBUS 信号，调整其姿态，以实现相应的运动。

4.PPM/SBUS 的跟踪功能可以通过调整通道映射和灵敏度来进行优化，以适应不同的飞行风格和需求。

5.云台的心跳信号将用于确保与摄像机的连接稳定，如果连接中断，云台将自动进入安全模式，以防止损坏。

菜单设置说明

1. **云台控制：**选择云台的工作模式，如手动控制或自动跟踪。
2. **重启设备：**选择此项将重启云台和摄像机以及天线。
3. **手柄设置：**配置遥控器的通道映射和灵敏度。
4. **参数管理：**调整云台的各项参数，如速度、加速度和限位。
5. **云台模式：**选择云台工作模式选项，如 2D 模式或全景模式等。不同模式下，云台的行为和响应方式不同。
6. **无头跟随灵敏度：**调整云台跟随头部运动的灵敏度。较高的灵敏度将使云台更快地响应头部运动，而较低的灵敏度则会使云台响应更为平滑。
7. **头盘控制速度：**调整云台响应头部运动的速度。较高的速度将使云台更快地响应头部运动，而较低的速度则会使云台响应更为平滑。
8. **头盘控制加速度：**调整云台响应头部运动的加速度。较高的加速度将使云台更快地响应头部运动，而较低的加速度则会使云台响应更为平滑。
9. **参数恢复：**将所有设置恢复为出厂默认值。此选项将重置所有参数，并将其恢复为初始状态。
10. **固件：**显示云台的固件版本。



通过遥控器控制云台

1. **Low/Mid/High：**在此 UART1 为 SBUS 设置为"控制"→"接收机"的 To 为 Rx，可在Mode选择中将模式通过自定义，确定好通道的PWM值，配置遥控器的云台后，为测量值，例如，模拟量为低/中/高值，可调整，可通过遥控器的开关或旋钮来控制云台的模式。
2. **CRSF/SBUS/AUTO/模：**确定在BF/INAV选项卡的UART1为云台设置的通讯协议的设置为CRSF为，默认为 SBUS，可通过遥控器的开关或旋钮来控制云台的模式。
3. **PPM/SBUS：**PWM 和 SBUS 信号的选择，用于控制云台的运动。
4. **Mode选择：**在 UART1 为 SBUS 设置为"控制"→"接收机"后为 Rx，通过Mode下通道，分别控制云台的模式，如模式选择通道，舵机，模式为低/中/高值，可调整，可通过遥控器的 Gimbal PC Tool 进行通道的设置，Gimbal PC工具可从GitHub上下载。

Ardupilot 配置如下：

SERIAL1	
SERIAL1_BAUD	115
SERIAL1_PROTOCOL	23
SERIAL1_PROTOCOL	2

PX4 配置如下：

MAV_1_CONFIG	TELEM2
MAV_1_MODE	Custom/Default
MAV_1_CONFIG	TELEM2
MAV_1_RATE	0
SER_TEL2_BAUD	115200 Bd

云台固件升级及遥控配置



1. 将事件传感器单独接口，在一键连接电脑将固件文件拷贝至之Gimbal_PC_Tool。
2. 将固件打开以将将固件。



3. 将将固件连接将将固件，连接将连接至固件进行升级。



4. 成功升级后，将将将将连接至将将将将