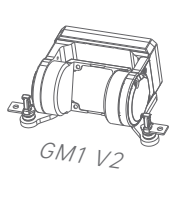
AVATAR GM V2 SERIES

QUICK START GUIDE

V1.1



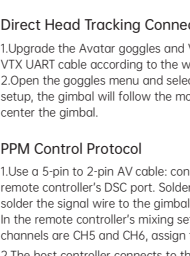
Introduction

This product is a mechanical stabilization gimbal designed to provide real-time image stabilization and camera angle adjustment. It is compatible with Walksnail Avatar HD series cameras with a mounting width of 19mm. 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

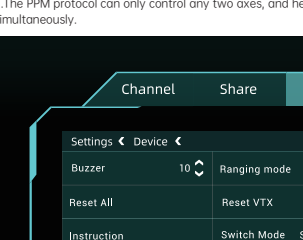
1.Ensure the external power supply to the gimbal is within the specified range (9~36V DC, 3S–6S LiPo battery). Operating outside this range may cause malfunction or damage.
2.Do not short-circuit the power and GND wires, as this will damage the device.
3.Make sure the coaxial cable connected to the gimbal 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.The gimbal's head-tracking feature is only supported when using Avatar V2 VTX, Avatar V2 (Dual) VTX, or Avatar Moonlight VTX.
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



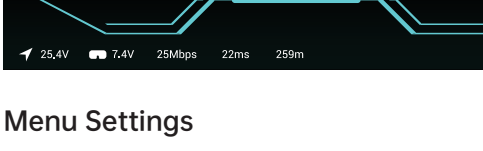
1.Use a Phillips screwdriver to remove the back cover of the camera.
2.Use tweezers to disconnect the coaxial cables from both sides of the camera's coaxial interface.
3.Connect the gimbal's coaxial cables to the camera.
4.Mount the camera onto the gimbal, rotating the cable outlet on the back cover 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

Accessories



GM1 V2-19 (HD)

1. 7Pin 7-Cable to 6Pin 2-Cable
3. 3Pin Cable
4. Head-Tracking Gimbal Upgrade PCBA Module
7. PM1.4*8 Screw

GM3 V2-19 (HD)

2. 8Pin 8-Cable to 6Pin 2-Cable
3. 3Pin Cable
4. Head-Tracking Gimbal Upgrade PCBA Module
7. PM1.4*8 Screw

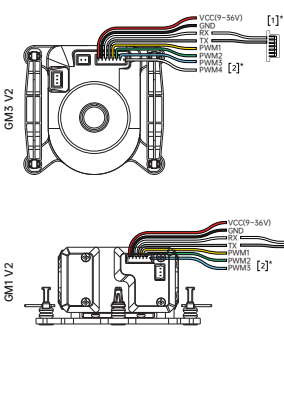
GM1 V2-19 (Analog)

1. 7Pin 7-Cable to 6Pin 2-Cable
3. 3Pin Cable
4. Head-Tracking Gimbal Upgrade PCBA Module
5. Back Cover 3D Printed Part
6. PM1.4*12 Screw

GM3 V2-19 (Analog)

2. 8Pin 8-Cable to 6Pin 2-Cable
3. 3Pin Cable
4. Head-Tracking Gimbal Upgrade PCBA Module
5. Back Cover 3D Printed Part
6. PM1.4*12 Screw

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

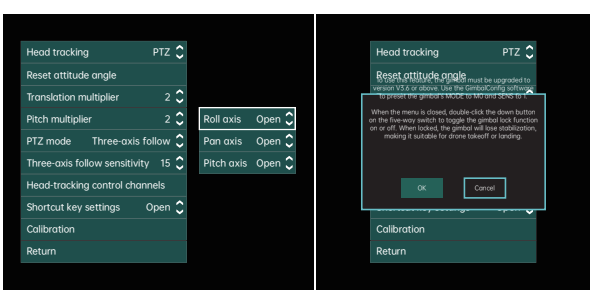
1.Use a 5-pin to 2-pin AV cable: connect the 5-pin end to the Goggles' AV IN port and the 2-pin end to the remote controller's DSC port. Solder the gimbal's Rx wire to the CRSF receiver's Tx pin (for SBUS receivers, solder the signal wire to the gimbal's PWM1 signal input). Set the PPM channels on the 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.

Menu Settings

1.Head Tracking: Select the output signal; choose "PTZ."
2.Reset Attitude Angle: Clicking this will restore the gimbal to the default neutral position.Pressing the return button three times quickly will also reset to the default neutral point.
3.PTZ Mode: The gimbal has 3 working modes to choose from:
1.Pitch and rol keeplevel, yaw axis folows.
2.Pitch axis keeps level, roll axis and yaw axis follow.
3.Three-axis follow.
4.Three-Axis Follow Sensitivity: Adjust the three-axis follow mode and the gimbal's motion response speed. The sensitivity setting only affects the response speed in follow mode and does not apply to other modes.
5.Calibration: Normally, do not perform calibration. If the gimbal shows angle deviations over a long period, please follow the prompts to calibrate the gyroscope, accelerometer, and magnetometer.
6. Head-Tracking Control Channels: Allows enabling or disabling commands for any individual axis.
7. Shortcut Key Settings: Set the gimbal's host controller to M0 mode (Three-Axis Follow) with the sensitivity set to 1.0 (maximum). After completing these settings, enable the shortcut key function in the goggles' menu. By pressing the five-way button down twice consecutively, the gimbal will switch from any mode to Three-Axis Follow mode without stabilization, meaning the gimbal responds at maximum speed and temporarily disables the head-tracking function. Pressing the five-way button down twice again will cancel the lock and restore the previous default settings.
8. Translation/Pitch Multiplier: Increasing this value raises the gimbal's rotation speed; 1× is the slowest, and 3× is the fastest.
9. 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 gimbalSetting.
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 GimBalSetting software. (Mavlink control is only supported on PX4/ArduPilot firmware).

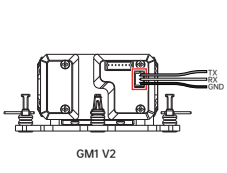
The ArduPilot configuration is as follows:

SERIAL1	
SERIAL1_BAUD	115
SERIAL1_OPTIONS	1024
SERIAL1_PROTOCOL	2

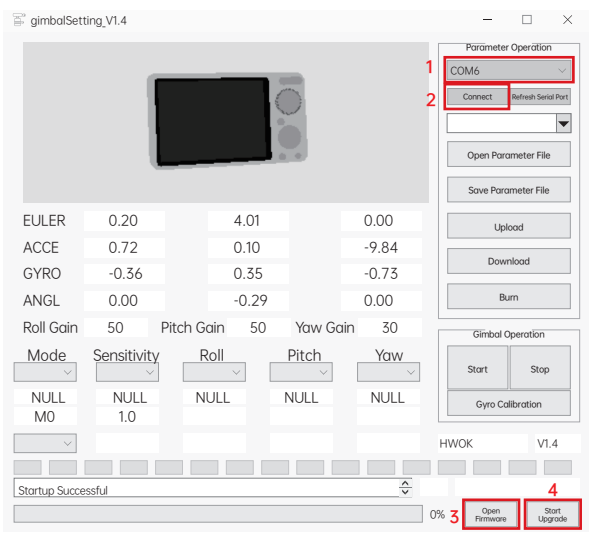
The PX4 configuration is as follows:

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

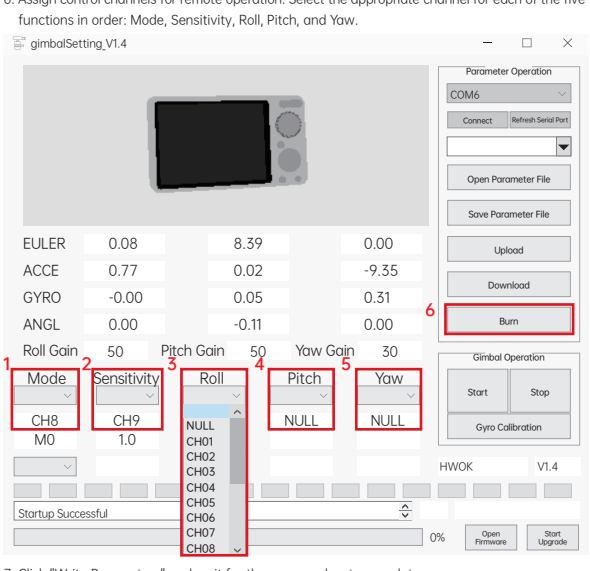
Upgrade and Controller Setup



1.Connect the upgrade cable to the upgrade port, and connect the other end to the PC. Then download the GimBalSetting.exe software from the official website: www.caddxfpv.com.
2.Power on the GM gimbal, then launch the gimbalSetting software.



3..Select the correct COM port and click "Connect"; then click "Open Firmware."
4.Select the CADDX_GimBal_v2.0.bin firmware file from the same folder.
5.Click "Start Upgrade" and wait for the progress bar to complete. The upgrade will be successful once the process finishes.
6. Assign control channels for remote operation. Select the appropriate channel for each of the five functions in order: Mode, Sensitivity, Roll, Pitch, and Yaw.



7. Click "Write Parameters" and wait for the progress bar to complete.

Specifications

Model	GM1 V2-19
Camera Compatibility	Avatar 19mm Camera
Stabilization Accuracy	±0.005°
Maximum Controllable Speed	±1500°/s
Controllable Rotation Range	Pitch: ±120°
Control Method	Uart/ S.bus/ Crsf/ Mavlink/ PWM
Head Tracking Control	Supports
Static Power	1W
Stall Power	7.5W
Dimensions	43x46.4x56.9mm
Weight	32g

Model	GM3 V2-19
Camera Compatibility	Avatar 19mm 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	45.6×47×58.9mm
Weight	56g

CADDXFPV SUPPORT
email: support@caddxfpv.com