CADDXFPV GM2

Two-axis stabilization gimbal
for Walksnail Avatar 19 mm cameras – user manual



Read this manual carefully before installation and first use, especially the safety instructions in Chapter 1.

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Contents

1. Safety instructions

2. Product description

2.1 Introduction

2.2 Package contents

2.3 Specifications

3. Installation

3.1 Camera installation

3.2 Installation dimensions

3.3 Mounting and cable routing

4. Connection and use

4.1 Wiring

4.2 PWM channels

4.3 S.BUS / CRSF control

4.4 Control priority

5. Head tracking function

5.1 Connection options

5.2 Setup with the Avatar V2 VTX

5.3 Head Tracking menu in the goggles

6. GimbalConfig software and firmware

6.1 Firmware upgrade

6.2 Setup after the upgrade

6.3 Basic parameter configuration

6.4 Gimbal presets

6.5 Channel mapping

6.6 Mounting type

6.7 Tilt protection
6.8 Parameter tuning
6.9 Calibration and firmware upgrade in the software
6.10 MAVLink configuration
7. Maintenance and troubleshooting
7.1 Maintenance
7.2 Troubleshooting
8. Information for the EU and Czech Market
8.1 Importer and responsible person in the EU
8.2 Product conformity
8.3 Disposal of electrical equipment
9. Warranty and rights arising from defective performance

1. Safety instructions

Read this entire manual carefully before installation and first use, and keep it for future reference. The gimbal is an electromechanical camera stabilizer designed to be installed in models (FPV drones, RC aircraft, RC cars). Incorrect installation or wiring may damage the gimbal, the camera and the model.

- Power the gimbal only with a voltage in the range of **7–26 V**. Before connecting the power supply, check the polarity of the VCC and GND wires according to the diagram in Chapter 4.1.
- Make all connections and wiring changes only with the model's power supply disconnected.
- The gimbal contains motors that move on their own once powered. Do not touch the moving parts, do not obstruct their movement and do not put tools or fingers into them.
- The gimbal must be firmly attached to the carrier; a loose gimbal may fall off during operation or hit the propellers or other parts of the model.
- The gimbal and the camera must not collide with other parts of the model when moving, and the coaxial cable must not be taut (see Chapter 3.3).
- Protect the gimbal from water, moisture, dust, impacts and direct heat. Do not use a mechanically damaged gimbal.
- This product is not a toy. Keep it out of the reach of children; small parts (screws, damping balls) present a choking or swallowing hazard.
- When operating the model, observe the regulations of the country in which you operate it.

2. Product description

2.1 Introduction

The CADDXFPV GM2 is a mechanical anti-shake gimbal that achieves real-time anti-shake of the camera image and camera angle adjustment. It is suitable for **Walksnail Avatar HD** system cameras with a mounting width of **19 mm**. The GM2 is a two-axis model: it achieves anti-shake and adjustment of the camera **pitch** angle and **roll** angle.

Users need to design the mounting holes of the vehicle (model) by themselves and adapt them to the gimbal mounting bracket. The gimbal can automatically identify upright and inverted installations.

2.2 Package contents

Item	Qty
CADDXFPV GM2 gimbal	1×
Power cable	1×

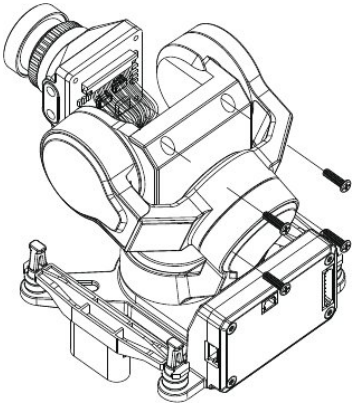
※ The package does **not** include a camera, video transmitter (VTX), FPV goggles or the CH340X upgrade board (sold separately).

2.3 Specifications

Parameter	GM2
Camera compatibility	Avatar 19 mm camera
Image stabilization	±0.005°
Max. controllable speed	±1500°/s
Max. controlled rotational range	Pitch: ±120° Roll: ±60°
Size	46.7 × 41.2 × 26.5 mm
Weight	30 g
Control mode	firmware V3.2: PWM / UART firmware V3.4: PWM / UART / S.BUS / CRSF / MAVLink
Head tracking control	supported
Voltage	7–26 V
Static power dissipation	1.2 W

3. Installation

3.1 Camera installation



Camera installation (manufacturer's drawing)

① Use a Phillips screwdriver to remove the camera cover.

② Use tweezers to remove the coaxial cable from both sides of the coaxial cable interface.

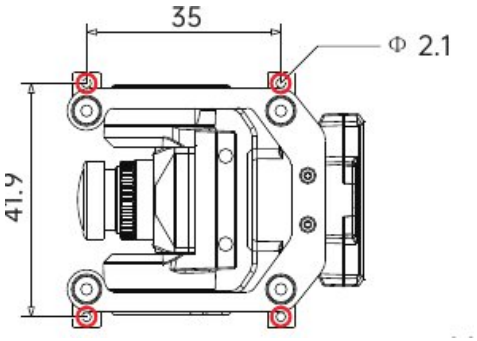
③ Install the gimbal's coaxial cable to the camera.

④ Install the camera on the gimbal; note that the coaxial cable needs to be placed in the internal groove.

⑤ Tighten the four screws and check whether the camera can rotate smoothly to the maximum tilt angle. If there is obvious resistance, reinstall the camera.

⑥ The installation is complete.

3.2 Installation dimensions



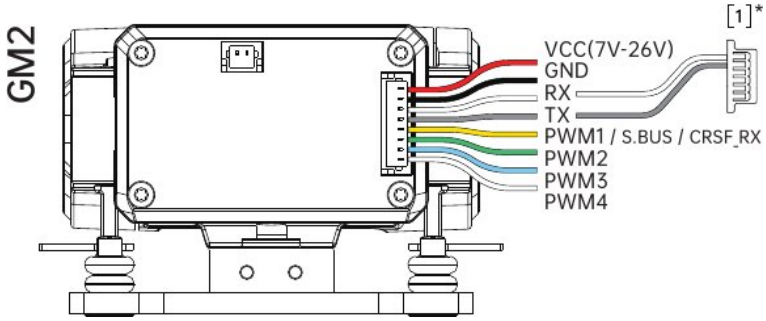
GM2 mounting hole spacing according to the manufacturer's drawing (in mm)

3.3 Mounting and cable routing

- The gimbal bracket must be fixed with the shock-absorbing balls and carrier provided in the package or by a third party; make sure it is firmly installed.
- Be careful not to fix the coaxial cable too tightly. Make sure that the coaxial cable can move freely within the gimbal's shock absorption range.
- The gimbal must not collide or interfere with other objects when working.

4. Connection and use

4.1 Wiring



GM2 gimbal cable wiring

Wire	Function
VCC (7V–26V)	power supply 7–26 V
GND	ground
RX, TX	serial port (UART)
PWM1 / S.BUS / CRSF_RX	working mode selection; S.BUS / CRSF input
PWM2	follow sensitivity
PWM3	pitch axis control
PWM4	yaw axis control

[1] Connect connector [1] to the USB port of the **Avatar V2 VTX**. Avatar Goggles that support head tracking are needed to realize the wireless head tracking function.

4.2 PWM channels

▶ PWM1 – working mode

This channel is for gimbal working mode selection. There are three working modes in total:

① Pitch and roll keep level, yaw axis follows.

② Pitch axis keeps level, roll axis and yaw axis follow.

③ Three-axis follow.

▶ PWM2 – follow sensitivity

This channel is for the gimbal follow sensitivity setting. It adjusts the response speed of the gimbal follow. Please use the knob channel on the remote control to control it.

▶ PWM3 – pitch axis

This channel is the gimbal pitch axis control channel. Please use the rotary switch on the remote control to control it. The gimbal rotation angle range can be changed by modifying the channel range of the remote control.

▶ PWM4 – yaw axis

This channel is the gimbal yaw control channel. Please use the wave wheel switch on the remote control to control it. The gimbal rotation angle range can be changed by modifying the channel range of the remote control.

※ The GM2 is a two-axis gimbal (pitch and roll, see Chapter 2.3) and has no motor of its own for the yaw axis.

4.3 S.BUS / CRSF control

To use S.BUS / CRSF control, you need to upgrade the gimbal firmware to **V3.4 or above**. Connect PWM1 to the S.BUS or CRSF_TX output of the receiver. Channel mapping can be done in the *GimbalConfig* software (Chapter 6.5).

4.4 Control priority

The GM gimbal supports UART head tracking control, S.BUS / CRSF control, PWM control and MAVLink control, with the priority of these four control methods decreasing in this order – UART head tracking has the highest priority.

5. Head tracking function

5.1 Connection options

The gimbal supports UART and PWM control protocols to achieve the head tracking function:

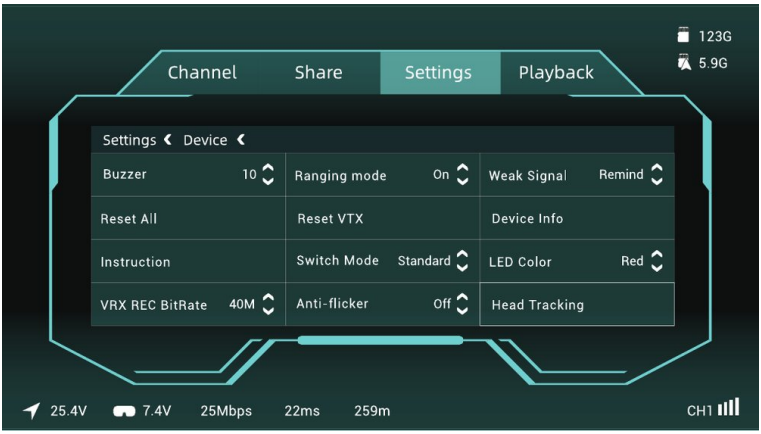
- **UART** – requires an Avatar V2 (Dual) VTX, Avatar V2 VTX or Moonlight VTX and goggles that support the Avatar head tracking function.
- **PWM** – requires a third-party head tracking module. Connect the gimbal PWM3 and PWM4 channels to the pitch and direction channels of the head tracking receiver.

※ The UART head tracking function only supports the Avatar V2 VTX, Avatar V2 (Dual) VTX and Avatar Moonlight VTX. When the gimbal is equipped with a Moonlight camera, it can only be used with the Moonlight VTX.

5.2 Setup with the Avatar V2 VTX

① Upgrade the Avatar goggles and V2 VTX to version **38.43.4 or above**, and connect the serial port cable of the gimbal and the Avatar V2 VTX according to the wiring diagram (Chapter 4.1).

② Open the goggles menu and select *Gimbal* for head tracking: *Settings* → *Head Tracking* → *Gimbal*. After the setting is completed, the gimbal will follow the goggles' posture movements. Quickly click the return key 3 times to return the gimbal to the center.



Avatar goggles menu – Head Tracking item

5.3 Head Tracking menu in the goggles

① **Head Tracking** – output signal selection; select *PTZ*.

② **Reset Attitude Angle** – resets the gimbal to the neutral point.

③ **Pan Ratio** – adjusts the follow ratio in the pan direction.

④ **Tilt Ratio** – adjusts the follow ratio in the tilt direction.

⑤ **PTZ Mode** – the gimbal has 3 working modes to choose from: 1. tilt and roll keep level, pan axis follows; 2. tilt axis keeps level, roll axis and pan axis follow; 3. three-axis follow.

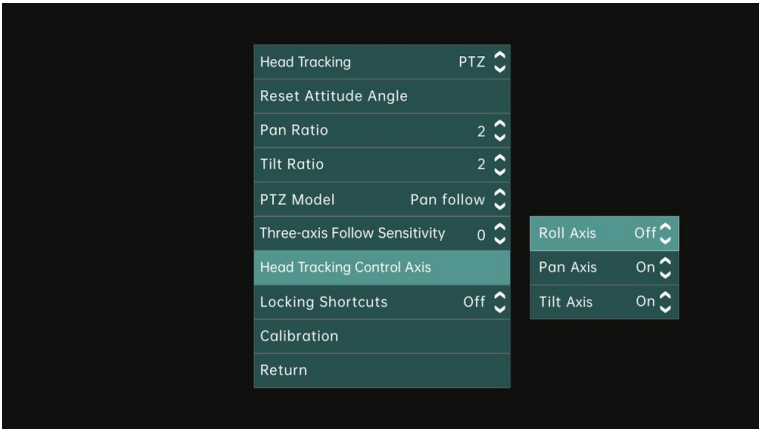
⑥ **Three-axis Follow Sensitivity** – the higher the sensitivity, the quicker the response of the gimbal to follow the motion of the carrier, but the less it eliminates the carrier's wobble. Only effective in three-axis follow mode.

⑦ **Head Tracking Control Axis** – the head tracking channel for the roll axis, pan axis and tilt axis can be turned on or off individually.

⑧ **Locking Shortcuts** – requires gimbal firmware **V3.6 or above** and the gimbal preset MODE set to M0 and SENS set to 1 in the *GimbalConfig* software. When the menu is closed, double-click the down button of the 5D button to turn the gimbal lock function on or off. After the gimbal is locked, the stabilization function is lost; this is suitable for drone take-off and landing.

⑨ **Calibration** – do not perform calibration under normal circumstances. If the gimbal has an angle deviation for a long time, complete the calibration of the gyroscope, accelerometer and magnetometer according to the prompts.

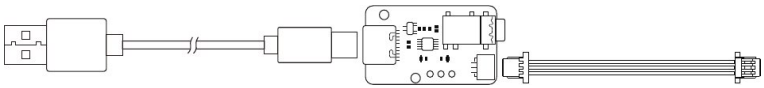
⑩ **Return** – exits the head tracking menu.



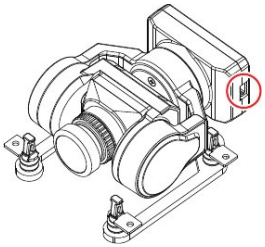
Head Tracking menu in the Avatar goggles

6. GimbalConfig software and firmware

6.1 Firmware upgrade



Left: connection to the PC; centre: CH340X upgrade board (sold separately); right: connection to the gimbal



GM2 gimbal upgrade port (circled)

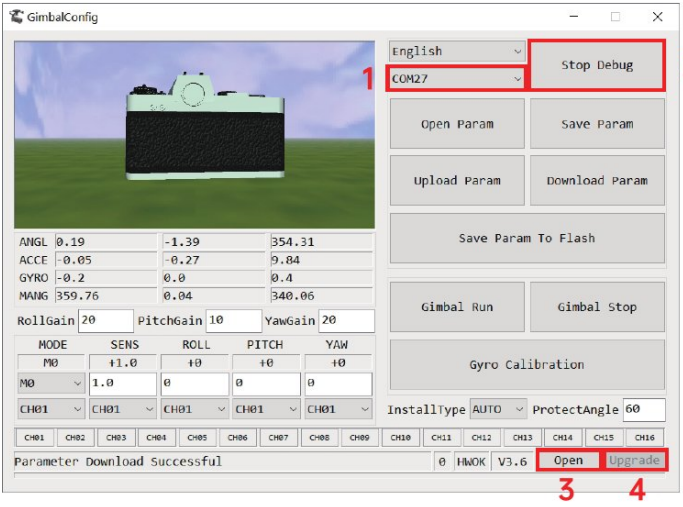
① Use the CH340X upgrade board to connect to the upgrade port of the gimbal and connect the other end to the PC. Go to www.caddxfpv.com to download the *GimbalConfig.exe* software.

② Open the *GimbalConfig* software and power on the gimbal.

③ Select the correct COM port, click *Open Port* and then click *Open Firmware*.

④ Select the *CwGimbalZGV2Main_VX.X.cahf* firmware in the same folder.

⑤ Click *Start Upgrade* and wait for the progress bar to complete.



GimbalConfig software – the numbers correspond to steps ① to ④

※ The goggles need to be upgraded with the head tracking firmware in the same folder at the same time. Please refer to the manual of the corresponding product for the upgrade procedure.

※ With some USB-C to USB-C cables, the computer may not recognize the CH340X board. In that case, use a USB-A to USB-C cable.

6.2 Setup after the upgrade

After upgrading to firmware **V3.6**, you must set all unused control channels from *NULL* to *CH01* to enable the head tracking function.

6.3 Basic parameter configuration

① After the gimbal is connected, the *GimbalConfig* software automatically downloads the parameters from the gimbal; you can also click *Download Param* to download them.

② Click *Save Param* to save the currently displayed parameters as a local file. Click *Open Param* to read a locally saved parameter file.

③ After selecting a new option in a drop-down box, the parameter is automatically uploaded to the gimbal and takes effect. After entering a new value in a parameter field, press *Enter* or click *Upload Param*.

④ After the parameters are uploaded, click *Save Param To Flash* to store them permanently in the gimbal.

※ The gimbal sensitivity only applies to the axes that follow the motion of the carrier.

6.4 Gimbal presets

① The gimbal works according to the preset values when there is no signal input or no mapped channel assigned. After the signal input is restored, the gimbal exits the preset state. The gimbal presets are invalid in MAVLink control.

② Preset gimbal mode: **M0** – FPV mode, **M1** – Pitch-lock mode, **M2** – Horizon mode.

③ Preset gimbal sensitivity: setting range −1.0 to 1.0, resolution 0.1.

④ Preset roll, pitch and yaw angle: setting range −180° to 180°, resolution 1°.

※ The actual effective preset angles are limited by the maximum rotation range of the gimbal. If you want to always use the preset values for some channels, map the corresponding channels to NULL.

6.5 Channel mapping

Select the channels corresponding to the gimbal mode, gimbal sensitivity, roll, pitch and yaw. For direct head tracking control (through a datalink or air unit), all channels should be mapped to *CH01*.

6.6 Mounting type

The mounting type of the gimbal is *AUTO* by default: at power-on, the gimbal automatically switches to *DOWN* or *UP* mode according to its attitude. The mounting type can also be set manually to *DOWN* or *UP*.

※ For tail-sitter VTOL aircraft, place the fuselage in a level flight attitude before powering up, or set the mounting type manually. After setting it manually, make sure the actual mounting matches the setting, otherwise the gimbal will enter the protection state.

6.7 Tilt protection (Pitch-lock and Horizon modes)

① When the tilt of the gimbal mounting plane exceeds the protection angle, the gimbal enters the protection state: it is neutralized and cannot be controlled. When the tilt is smaller than the protection angle, the gimbal automatically exits the protection state. Tilt protection is effective in Pitch-lock and Horizon modes, not in FPV mode.

② The protection angle can be modified according to actual use. The setting range is 0° to 90° with a resolution of 1°. A value below 15° disables tilt protection.

※ After disabling tilt protection, the gimbal may work abnormally when the attitude angle of the carrier is large.

6.8 Parameter tuning

Cameras with a larger moment of inertia may cause the gimbal to shake when mounted on it. In such cases, increasing the gain value (*RollGain*, *PitchGain*, *YawGain*) can enhance the stabilization effect.

※ It is strongly recommended to use the default gain parameters unless necessary.

6.9 Calibration and firmware upgrade in the software

① Calibration: keep the gimbal static, click *Gyro Calibration* and wait for the calibration to complete.

② Firmware upgrade: click *Open Firmware*, select the firmware file, click *Start Upgrade* and wait for the upgrade to complete.

※ If the gimbal tilts or drifts slowly when there is no control signal input, the gimbal needs to be calibrated.

6.10 MAVLink configuration

▶ ArduPilot

Parameter	Value
SERIAL1_BAUD	115
SERIAL1_OPTIONS	1024
SERIAL1_PROTOCOL	2
SR1_ADSB	0 Hz
SR1_EXIT_STAT	0 Hz
SR1_EXTRA1	0 Hz
SR1_EXTRA2	0 Hz
SR1_EXTRA3	0 Hz
SR1_PARAMS	0 Hz
SR1_POSITION	0 Hz
SR1_RAW_CTRL	0 Hz
SR1_RAW_SENS	0 Hz
SR1_RC_CHAN	0 Hz

※ The serial port number can be changed according to the actual situation.

▶ PX4

Parameter	Value
MAV_1_CONFIG	TELEM2
MAV_1_MODE	Custom / Gimbal
MAV_1_RATE	115200 B/s
SER_TEL2_BAUD	115200 8N1

※ Custom is recommended for MAV_1_MODE.

7. Maintenance and troubleshooting

7.1 Maintenance

- After each use, check the gimbal mounting, the condition of the damping balls and the free movement of the camera in all axes.
- Check that the coaxial cable and wires are not pinched, chafed or taut.
- Remove dirt with a dry soft brush or cloth. Do not use water or solvents.
- Store the gimbal in a dry place, protected from impacts and dust.

7.2 Troubleshooting

Problem	Cause and solution
The camera does not rotate smoothly to the maximum tilt	The camera is not seated correctly – reinstall it (Chapter 3.1) and place the coaxial cable in the groove.
The gimbal tilts or drifts slowly without a signal	Perform *Gyro Calibration* (Chapter 6.9).
The gimbal keeps an angle deviation for a long time	Perform calibration from the goggles menu (Chapter 5.3, item ⑨).
The gimbal shakes	Camera with a larger moment of inertia – increase the gain (Chapter 6.8).
Head tracking does not work after upgrading to V3.6	Set unused channels from *NULL* to *CH01* (Chapter 6.2).
The gimbal returns to the centre and does not respond	Protection state – the tilt protection angle has been exceeded or the manually set mounting type does not match reality (Chapters 6.6 and 6.7).
The computer does not recognize the CH340X board	Use a USB-A to USB-C cable (Chapter 6.1).

8. Information for the EU and Czech Market

8.1 Importer and responsible person in the EU

The product is placed on the European Union market by the importer stated below, who is at the same time the responsible person within the meaning of Article 16 of Regulation (EU) 2023/988 of the European Parliament and of the Council on general product safety (GPSR).

Importer / responsible person in the EU	Rotorama, s.r.o.
Company ID (IČO)	051 57 692
VAT ID (DIČ)	CZ05157692
Registered office	Okrajová 1351, 674 01 Třebíč, Czech Republic
E-mail	info@rotorama.cz
Phone	+420 252 252 098
Website	www.rotorama.com

8.2 Product conformity

CE

- The product bears the **CE** marking and complies with the requirements of the applicable European Union harmonisation legislation.
- A copy of the **EU Declaration of Conformity** is available from the importer at the address stated above or at the e-mail address info@rotorama.cz.
- **Product identification:** the type designation (**CADDXFPV GM2**) is given on the product or its packaging; the gimbal firmware version is shown in the *GimbalConfig* software once the gimbal is connected.

8.3 Disposal of electrical equipment



- The crossed-out wheeled bin symbol on the product, its packaging or in the documentation means that at the end of its service life the product **must not be disposed of together with mixed municipal waste**.
- Hand it over at a take-back point for electrical equipment – at a collection yard, at a take-back point of a collective system, or at the retailer when purchasing a new equivalent product. Take-back is free of charge for the end user.
- The obligations under Act No. 542/2020 Coll., on end-of-life products, are fulfilled by the importer through a collective take-back system.
- Proper disposal helps prevent negative impacts on the environment and human health and contributes to the reuse of secondary raw materials.

Through its contractual partner **ASEKOL a.s.**, the company ensures the take-back of waste electrical equipment from households and the separate collection of waste electrical equipment, batteries and accumulators in accordance with the applicable legislation. The customer is entitled to hand over old electrical equipment or a battery or accumulator at any collection point of the above contractual partner. The addresses of these take-back points are listed at www.asekol.cz, www.ecobat.cz and also https://visoh2.mzp.cz/RegistrMistZO/RegistrMistZOPublic/MapaMistZpetOdberu.

9. Warranty and rights arising from defective performance

The rights and obligations of the contracting parties are governed by Czech law, in particular by Act No. 89/2012 Coll., the Civil Code, and Act No. 634/1992 Coll., on consumer protection.

- The seller is liable to the buyer for the product being free of defects on receipt. If the buyer is a consumer, a defect may be notified **within two years of receipt** of the product (Section 2165 of the Civil Code).
- If a defect appears within **one year** of receipt, the product is deemed to have been defective already at the time of receipt (Section 2161(5) of the Civil Code).
- When purchasing online, a consumer has the right to **withdraw from the contract within 14 days** of receiving the goods without giving a reason (Section 1829 of the Civil Code).
- Claims should be made with the retailer from whom you purchased the product. The importer's contact details are given in Chapter 8.1.
- The competent body for out-of-court settlement of consumer disputes is the **Czech Trade Inspection Authority**, Štěpánská 796/44, 110 00 Prague 1, www.coi.cz.