Avatar HD Goggles X

Walksnail · digital FPV goggles
User Manual



Before first use, read this entire manual carefully, especially the safety instructions, and keep it for future reference.

Rotorama, s.r.o. · www.rotorama.com · info@rotorama.cz

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1. Safety instructions

This is a sophisticated product. Failure to operate this product in a safe and responsible manner could result in injury or damage to the product or other property. It must be operated with caution and common sense and requires some basic mechanical knowledge.

- Before powering on, please **install all antennas** to avoid damage to components.
- Power the goggles only within the voltage range of **7–26 V** via the DC 5.5 × 2.1 mm port. Use the supplied XT60 – DC cable and observe the correct polarity.
- When powering from a LiPo battery, never leave it unattended, do not use a swollen or mechanically damaged battery, and protect it from short circuit, heat and moisture.
- Do not expose the lenses of the goggles to direct sunlight. The lenses concentrate light onto the screens and may damage them permanently. After use, store the goggles in the supplied storage box.
- Protect the goggles from water, dust, drops and extreme temperatures. Do not open the housing, except for replacing the antennas as described in Chapter 3.3.
- Do not use the goggles while walking, driving or during any other activity that requires watching your surroundings. When flying with FPV goggles, an **observer** must stand next to the pilot and keep the drone within direct visual line of sight (see Chapter 5.2).
- When using HDMI output, please make sure the monitor supports the set resolution and frame rate, otherwise it will cause abnormal display.
- It is recommended to upgrade the VTX and the goggles to the latest firmware before first use (Chapter 6.1).
- This product is not a toy. Keep it out of the reach of children.

2. Product description

2.1 Purpose of the goggles

The Walksnail Avatar HD Goggles X are digital FPV goggles of the **Avatar HD** system. They receive video from an Avatar video transmitter (VTX) in the 5.8 GHz band and display it on two OLED screens with a resolution of 1920 × 1080 and a refresh rate of 100 Hz. The goggles offer interpupillary distance (IPD) and diopter adjustment, video recording to a microSD card, HDMI output, HDMI input and analog video input (AV-IN).

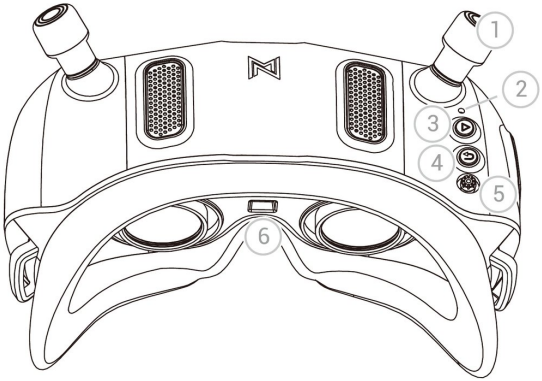
The proximity sensor detects whether you are wearing the goggles and automatically turns the screens on or off. The goggles also include Wi-Fi and Bluetooth.

2.2 Package contents

Item	Qty
Avatar HD Goggles X	1×
Wide foam (PU)	1×
Storage box	1×
XT60 to DC 5.5 × 2.1 mm power cable	1×
Lens cleaning cloth	1×

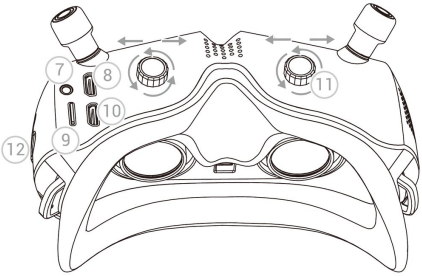
※ The video transmitter (VTX), battery and microSD card are not included.

2.3 Controls and ports



Top front view – items 1 to 6

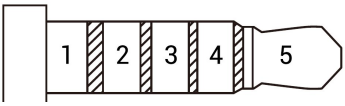
No.	Item	Function
1	Antenna	Receives and transmits the digital link signal.
2	Link button	Short press to enter the linking state; long press for 8 seconds to enter the upgrade state.
3	Record button	Press to start or stop video recording.
4	Back button	Press to return to the previous menu or exit the current mode. Press and hold for 5 seconds to switch to CVBS analog signal and HDMI input mode; it can be switched cyclically.
5	5D button	Toggle the button to scroll through the menu. Press the button to confirm.
6	Proximity sensor	Detects whether the user is wearing the goggles and automatically turns the screen on or off.



Bottom view – items 7 to 12

No.	Item	Function
7	AV-IN port	5-pin 3.5 mm audio port (Chapter 2.4).
8	HDMI input	Displays video from an external HDMI source.
9	Micro SD card slot	Card for video recording and firmware files.
10	HDMI output	Video output to a monitor. Not supported when the goggles are set to 1080p high frame rate.
11	IPD adjusters	Adjust pupil distance and diopter.
12	Power port	DC 5.5 × 2.1 mm, voltage range 7–26 V.

2.4 AV-IN port definition



Contact layout of the 5-pin 3.5 mm jack

Pin	Signal	Description
1	GND	Ground
2	CVBS	Connect to analog receiver video signal
3	RX	Data receive
4	TX	Data transmit
5	NC	Not connected

3. Getting started

3.1 Power supply

The goggles are powered via the DC 5.5 × 2.1 mm port (item 12) with a voltage of **7–26 V**, i.e. from a **2S to 6S** LiPo battery. To connect a battery with an XT60 connector, use the supplied power cable. All antennas must be installed before connecting power.

LiPo battery	Fully charged	Goggles warning
2S	8.4 V	below 7.0 V (3.5 V/cell)
3S	12.6 V	below 10.5 V (3.5 V/cell)
4S	16.8 V	below 14.0 V (3.5 V/cell)
6S	25.2 V	below 21.0 V (3.5 V/cell)

The goggles intelligently identify 2S, 3S, 4S and 6S batteries. When a single cell drops below 3.5 V, the voltage is displayed in red font and a buzzer alarm sounds. Replace or recharge the battery in time.

※ A fully charged 6S LiHV battery has 26.1 V (4.35 V/cell), which exceeds the upper supply voltage limit of 26 V. Do not use it.

3.2 Linking with the video transmitter (VTX)

① Connect the VTX and the power of the goggles.

② Press the link button of the VTX and the goggles respectively. When the VTX enters the pairing state, its indicator light turns red and the goggles beep (“Di... Di... Di...”).

③ After the link is successful, the indicator light on the VTX turns solid green, the beeping sound on the goggles stops and the image is displayed.

3.3 Installation of third-party antennas

Third-party antennas can be installed on the goggles instead of the supplied antennas.



Installing a third-party antenna (steps ① to ③ from left to right)

① Turn counterclockwise to remove the antenna.

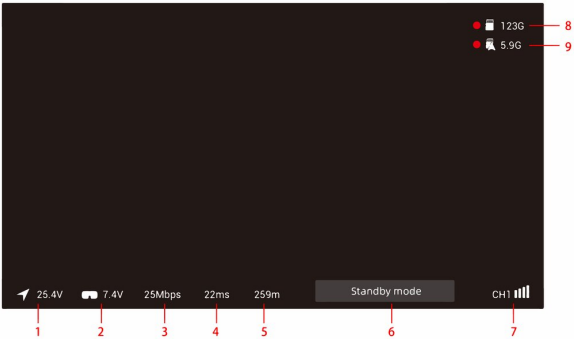
② Turn counterclockwise to remove the nut and remove the circular washer.

③ Turn the mounting nut clockwise. Install a third-party antenna.

4. Operation and menus

The menus are operated with the 5D button (toggle = scroll, press = confirm) and the Back button. Menu item names are given as displayed in the English interface of the goggles; the interface language can be switched between English and Chinese.

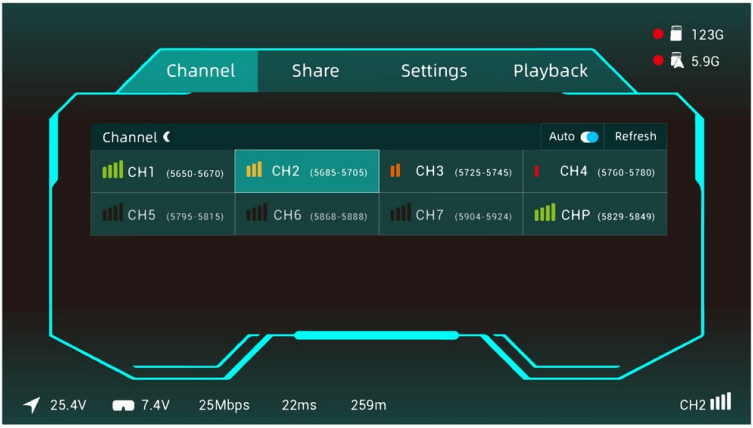
4.1 Main interface



Information shown on the main interface

No.	Item	Description
1	VTX input voltage	Detects the VTX voltage; identifies 2S, 3S, 4S and 6S LiPo; alarms below 3.5 V per cell, red font when the voltage is too low.
2	Goggles input voltage	Identifies 2S, 3S, 4S and 6S LiPo; below 3.5 V per cell, red font and buzzer alarm.
3	Real-time bit rate	Displays the real-time transmission bit rate; two display modes: 25.0 Mbps and 50.0 Mbps.
4	Time delay	Total delay from the image captured by the VTX camera to the ground end.
5	Ranging mode	Distance from the goggles to the VTX calculated from the wireless transmission delay. Signal interference amplifies the error.
6	Status prompt	Text prompt about information that needs attention in the current state (e.g. *Standby mode*).
7	Current channel	The currently set channel; the signal indicator has 5 states: 4, 3, 2, 1 bars and blank.
8	Goggles SD card status	Goggles SD card status and capacity. Red circle flashes when recording; no card: NO SD; full: “–”.
9	VTX storage status	VTX storage status and capacity. Red circle flashes when recording; not detected: NO SD; full: “–”.

4.2 Channel menu

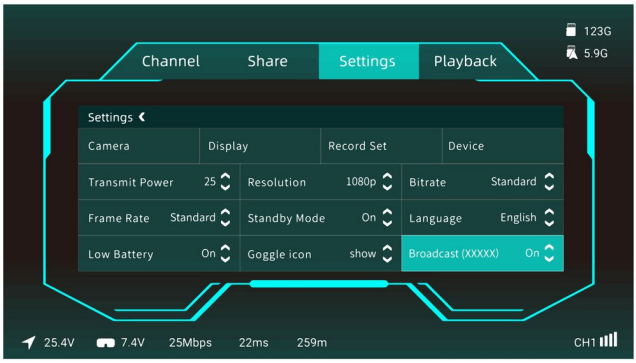


Channel menu – channel selection

- Displays the interference situation of each channel. The signal strength is shown as 4, 3, 2, 1 bars or blank. An occupied channel cannot be selected. The white stroke is the selection box; press the middle button to confirm the current channel and highlight it.
- When switching between standard bit rate and high bit rate, the current channel is set to **CHP** and the channel needs to be reselected. CHP is a public channel that is easily interfered with and is **not recommended for flying**.
- *Auto* – automatically refreshes the interference situation of all channels; *Refresh* – manual refresh.
- The number of channels depends on the regional mode: FCC displays 8 channels (CH1–CH7 and CHP), CE/SRRC 4 channels (CH1, CH2, CH3, CHP), MIC 3 channels (CH1, CH2, CHP). The high bit rate mode can only be turned on in FCC mode; the 8 channels then become 4 channels (CH1, CH2, CH3, CHP).

※ In the Czech Republic and the EU, use the CE mode only (see Chapter 5).

4.3 Settings menu

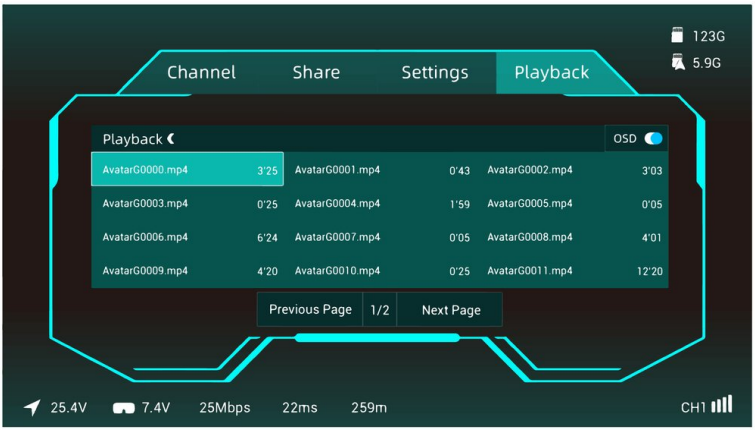


Settings menu

Item	Description
Camera	Scene preset, EV value, saturation, sharpness, white balance, rotate, ratio, 3D DNR, shutter and max ISO settings.
Display	Debug, brightness, focalization mode, custom OSD, OSD position, font upgrade, custom font, viewfinder and viewfinder edit settings.
Record Set	VTX REC resolution, REC device, takeoff REC, REC loop, format SD card, format VTX, built-in EIS, REC time, REC format, color, saturation, sharpness.
Device	Buzzer volume, ranging mode, weak signal, reset all, device information, instruction and switch mode.
Transmit Power	Transmit power: 25 mW, 200 mW, 500 mW, 700 mW. In the Czech Republic, a maximum of 25 mW e.i.r.p. is permitted (Chapter 5.2).
Resolution	720p or 1080p.
Bitrate	Standard or high bit rate for different image quality; high bit rate can only be enabled in FCC mode.
Frame Rate	Standard or high frame rate for different latency experiences.
Standby Mode	In standby mode, the transmission power of the VTX and the goggles is only 10 dBm (10 mW); the set transmission power is output only after exiting standby mode or turning the switch off. Standby mode requires the air unit serial port to be correctly connected to the flight controller (FC); when the goggles receive the Arm signal, they automatically exit standby mode. Without flight controller support, turn this function off.
Language	Language switching: English / Chinese.
Low Battery	Goggles low battery alarm: identifies 2S, 3S, 4S and 6S, alarm below 3.5 V per cell, red font and buzzer alarm.

Item	Description
Goggle icon	Display or hide the icons on the main interface.
Broadcast	When turned on, others can receive your video transmission through the Avatar system. The 6 characters in brackets are the unique identification number of the VTX.

4.4 Playback menu



Playback menu – playing recordings

- The *OSD* switch can be turned on or off. When it is on, the flight controller OSD information (if any) and the flight information of the main interface are superimposed on the played video.
- When the selection box is in the video list, press and hold the confirmation key to open the multi-selection function; the menu offers *delete*, *select all* and *cancel*. Press the Back button again to exit the multi-selection mode.
- During playback, press the middle button to pause/play and use the left and right directions to rewind/fast forward.

5. Frequencies and transmit power

5.1 Operating channels

Each channel has a bandwidth of 20 MHz. The default channel after power-on is the public channel CHP (channel 8). The channel can be changed manually to avoid interference from other devices. Central frequencies of the channels in MHz:

Mode	CH1	CH2	CH3	CH4	CH5	CH6	CH7	CHP
FCC	5660	5695	5735	5770	5805	5878	5914	5839
CE/SRRC	5735	5770	5805	–	–	–	–	5839
MIC	5665	5705	–	–	–	–	–	5750

In FCC regions, an amateur radio license may be needed when using channels 1, 2, 6 or 7, as they are amateur frequency bands. Using the amateur frequency bands with a modified or cracked version or without a license is against the law.

5.2 Operation in the Czech Republic and other countries

Frequency bands and transmit powers are regulated by national rules in each country. The information in this chapter describes the situation in the Czech Republic. If you use the goggles in another country, you must comply with the regulations of the country in which you use them.

Radio part	Frequency band	Max. power (e.i.r.p.) per manufacturer
Digital video link	5725–5850 MHz	CE: < 14 dBm
Wi-Fi (IEEE 802.11b/g/n/ax)	2.4 GHz	< 20 dBm
Bluetooth (BLE 5.2)	2.4 GHz	< 8 dBm

- In the Czech Republic, the **5725–5875 MHz** band is permitted for short-range devices with a maximum power of **25 mW e.i.r.p.** (ČTÚ general authorisation No. VO-R/10). Wi-Fi in the 2400–2483.5 MHz band is permitted with a maximum power of 100 mW e.i.r.p. (VO-R/12).
- In the Czech Republic and the EU, use the **CE** mode only (channels CH1, CH2, CH3 and CHP). The FCC mode channels 5660, 5695, 5878 and 5914 MHz lie outside the permitted band.
- The user is responsible for the VTX transmit power setting (*Transmit Power*). In the Czech Republic, do not set more than 25 mW.
- When flying with FPV goggles, Regulation (EU) 2019/947 requires an observer next to the pilot who keeps the drone in direct visual line of sight without optical aids.

6. Firmware upgrade and status indication

6.1 Firmware upgrade

Please go to the official website of the manufacturer to download the upgrade firmware. **AvatarX_Gnd_X.X.X.img** is the goggles file; be careful not to change the file name. Download link: caddxfpv.com/pages/download-center

① Copy the upgrade file to the root directory of the SD card (delete the old firmware file first if there is one), insert the card into the goggles, connect the power supply and wait for the device to initialize.

② Press and hold the link button on the goggles for 8 seconds. The goggles automatically restart and beep. Do not power off during the upgrade process; the upgrade time on the goggles is about 6 minutes.

③ After the upgrade is successful, the goggles beep for 5 seconds and then the beeping stops.

※ Never power off the goggles during the firmware upgrade.

6.2 Status indication

Goggles buzzer status	Sound
Link state	Di.... Di.... Di.... Di....
Upgrade firmware	Di..... Di..... Di..... Di——
Upgrade failed (no SD card or firmware detected)	Di.. Di.. Di.. Di..
Boot failure (reboot or re-upgrade)	Di.. Di..... Di.. Di.....

7. Specifications

Parameter	Value
Model	Avatar HD Goggles X
System	Avatar HD
Communication frequency	5.725–5.850 GHz
Transmitter power (EIRP)	FCC: < 30 dBm; CE: < 14 dBm; SRRC: < 20 dBm; MIC: < 25 dBm
I/O interface	HDMI out, HDMI input, 5-pin 3.5 mm audio port, DC 5.5 × 2.1 mm port, micro SD card slot
Transmission resolution	1080p 100 fps, 1080p 60 fps, 720p 100 fps, 720p 60 fps
Code rate	max. 50 Mbps
Latency	average 22 ms
Average gain	1.5 dBi
Polarization	LHCP
Transmission distance	> 4 km
Channels	8
Screen resolution	1920 × 1080 / 100 Hz
Screen material	OLED
IPD mechanical range	57–72 mm
Adjustable focus range	+2.0 to −6.0 diopter
FOV	50°
Power input	7–26 V (2S–6S)
SD card	microSD up to 256 GB
Weight	290 g
Wi-Fi	IEEE 802.11b/g/n/ax, 2.4 GHz, < 20 dBm EIRP
Bluetooth	BLE 5.2, < 8 dBm EIRP

CaddxFPV support: **support@caddxfpv.com**

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 (Avatar HD Goggles X) and the serial number are given on the product or its packaging; the firmware version can be found in *Settings → Device → Device information*.

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.