Moonlight Kit

Walksnail Avatar HD
Digital video transmitter with 4K camera



Install both antennas before connecting power for the first time. Operating without antennas may damage the transmitter.

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1. Safety instructions

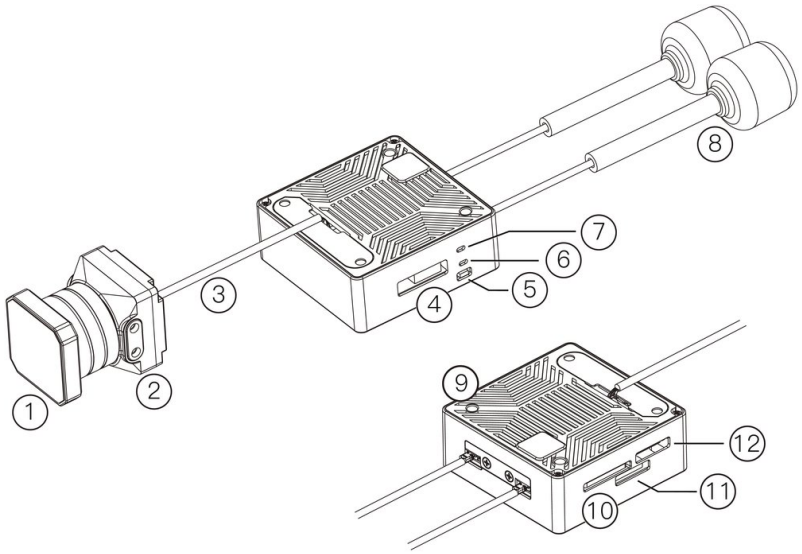
Read this entire manual carefully before installation and first use and keep it for future reference. The product is intended for installation in radio-controlled models (FPV drones) and may only be installed and operated by a person familiar with wiring electronics and with the rules for operating models.

- **Always install both antennas before connecting power.** Powering the transmitter without antennas may damage its components.
- Power the transmitter only with a voltage of **7.4–25.2 V**. Observe the correct polarity – the red wire is VCC (+), the black wire is GND (−).
- The product **generates a lot of heat** during operation, especially while recording. Ensure airflow around the transmitter, do not touch its housing immediately after switching off and do not place it near flammable materials.
- Use only the frequencies (channels) and transmitter power permitted in the country of operation – see chapter 6.3. The user is responsible for the correct settings.
- Do not cover the transmitter and protect it from moisture, water, dust and mechanical damage. Do not use a damaged product.
- Always wire and solder with the battery disconnected. When handling Li-Po batteries, follow the instructions of their manufacturer.
- Do not open or modify the product. Modifications of the electronics or firmware not described in this manual may damage the product.
- The product is not a toy. Keep it out of the reach of children.

2. Product description

The Walksnail Avatar HD Moonlight Kit is a set consisting of a digital video transmitter (VTX) with a recording board, a camera with a starlight sensor and two antennas for the Walksnail Avatar digital system. In addition to transmitting video to the goggles, it records video in up to 4K to a microSD card, supports built-in electronic image stabilisation (EIS) and saves gyro data for stabilisation in Gyroflow.

2.1 Introduction



Parts of the Moonlight Kit

1	ND Filter	7	REC LED
2	Camera	8	Antenna
3	Coaxial Cable	9	M2 Mounting Hole
4	Power Port	10	Micro SD Card Slot
5	Link Button	11	VTX USB Port
6	VTX LED	12	REC USB Port

2.2 VTX specification

Parameter	Value
Model	Moonlight Kit
Firmware name	AvatarMoonlight_Sky_X.X.X

Parameter	Value
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	JST 1.0 × 4 (power cable); JST 0.8 × 6 (USB); microSD card slot; IPEX-1
Sensor	Starlight sensor
FOV	max. 160°
Aperture	F2.1
Shutter	Rolling shutter
ISO	100–25600
Recording resolution	4K@30/60fps; 2.7K@30/60fps; 1080p@100/60fps; 720p@60fps
Max. recording bitrate	150 Mbps
Max. transmission bitrate	50 Mbps
Video format	MP4 (H.264)
3D DNR	supported
Gyroflow	supported
Built-in EIS	supported
Wide power input	7.4–25.2 V
Power consumption	12 V / 1.4 A; 8 V / 2.2 A
Memory card type	U3 microSD, max. 256 GB
Camera size	19.6 × 19 × 24 mm
VTX size	15.3 × 34.5 × 34.5 mm
VTX installation hole distance	20 × 20 mm / 25 × 25 mm (M2)
Weight	38.5 g (antenna not included)
OSD	Canvas mode
Latency	average delay 22 ms
Antenna	2 (IPEX)

2.3 VTX antenna

Parameter	Value
Model	Avatar V2 antenna
Polarization	LHCP
Frequency range	5600–6000 MHz
Average gain	1.9 dBi
VSWR	≤ 1.5
Interface	IPEX-1
Dimension	R15 × 45 mm (without cable)
Weight	2 g

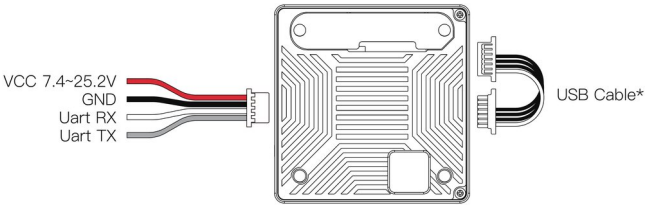
2.4 Package contents

- 1× Moonlight camera with video transmitter (connected by a coaxial cable)
- 1× ND8 filter
- 2× Avatar V2 antenna (IPEX-1 connector)
- 1× USB cable (for firmware upgrades)
- 1× set of screws

Not included: Walksnail Avatar goggles, microSD card, battery or power supply.

3. Installation and connection

3.1 Connection



Connection of the power cable and the USB cable

Wire	Function
red	VCC – power supply 7.4–25.2 V
black	GND – ground
white	UART RX – connect to TX of the selected flight controller (FC) UART
grey	UART TX – connect to RX of the selected flight controller (FC) UART

※ The **USB cable** connects the VTX port and the REC port. The white line aligns with the white circle connection. This cable **only needs to be connected when upgrading**.

Mount the transmitter using the M2 mounting holes with a spacing of 20 × 20 mm or 25 × 25 mm. The camera is connected to the transmitter with the coaxial cable commonly used with Avatar VTX; other lengths can be purchased for replacement. Connect the antennas to the IPEX-1 connectors before connecting power.

3.2 Power supply and cooling

- Power consumption: **12 V @ 1.4 A**; **8 V @ 2.2 A**. Please consider the capability of the power supply (e.g. the flight controller output or the power distribution board).
- When using **6S** batteries, it is recommended to solder capacitors at the power input.
- It generates a lot of heat during recording, so please pay attention to airflow for heat dissipation.

4. Linking with the goggles

Before first use, the transmitter must be linked with Walksnail Avatar goggles (or a receiver).

① Connect the power of the Moonlight Kit and of the goggles.

② Short press the linking buttons of the Moonlight Kit and of the goggles respectively. When the Moonlight Kit enters the pairing state, the VTX LED turns red and the goggles beep repeatedly.

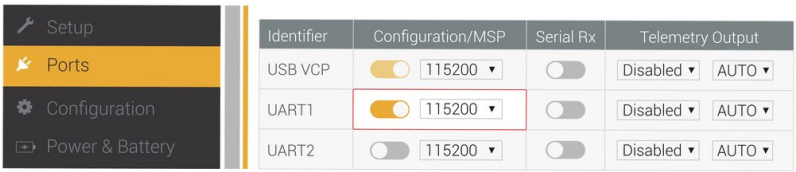
③ After the link is successful, the VTX LED turns solid green, the beeping of the goggles stops and the image is displayed.

5. Connecting to the flight controller (UART)

The UART function enables the VTX to communicate with the flight controller (FC), allowing the VTX to obtain flight controller information, e.g. for the OSD in the goggles. Betaflight Configurator is used as an example to introduce the UART setting method.

5.1 Basic procedure in Betaflight

① Solder the white and grey wires of the 4-pin cable to the flight controller (see chapter 3.1).



Ports tab – enabling MSP on UART1

② Connect the flight controller to Betaflight Configurator and on the *Ports* tab open the corresponding UART port (UART1 in the figure). Enable the *Configuration/MSP* switch and click *Save*.



Entering commands on the CLI tab

③ Open the *CLI* tab and enter the following commands:
set osd_displayport_device = MSP
set displayport_msp_serial = Y
save

※ Y is one less than the number of the serial port, e.g. Y = 2 for UART3.

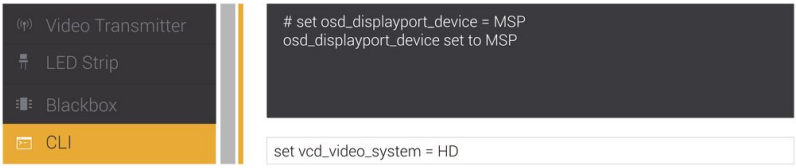
5.2 Betaflight 4.4 version settings

For Betaflight version 4.4, the manufacturer specifies the following procedure:



Ports tab – MSP and the VTX (MSP+Displayport) peripheral

① On the *Ports* tab, open the corresponding UART port (UART1 in the figure), enable the *Configuration/MSP* switch, select *VTX (MSP+Displayport)* in the *Peripherals* column and click *Save*.



Entering commands on the CLI tab

② Open the *CLI* tab and enter the following commands:
set osd_displayport_device = MSP
set vcd_video_system = HD
save

6. Operation

6.1 Recording and precautions

① It generates a lot of heat during recording, so please pay attention to airflow for heat dissipation.

② When using the built-in EIS or gyro data, please provide shock absorption for the camera bracket to avoid stabilisation failure.

③ Recording stops automatically when the chip core temperature exceeds 100 °C.

④ With the high frame rate menu setting, 2.7K/4K recording is not supported; with the standard frame rate, 1080p@100fps recording is not supported.

⑤ Recording is not possible in standby mode.

⑥ Please use a high-speed U3 or faster microSD card.

⑦ Before powering on, please install all antennas to avoid damage to components.

⑧ When standby mode is on, the power is limited to 10 mW. Before take-off, you need to Arm the flight controller or turn off standby mode.

⑨ If you use it with other 5.8 GHz devices at the same time, please choose a different channel.

6.2 Status indication

Status	REC LED
USB cable not connected	steady blue light
Upgrading firmware	red light rapidly flashes and steady red light
Working fine	steady green light
Recording	green light slowly flashes
Camera not detected	blue light slowly flashes

Status	VTX LED
Binding	steady red light
Upgrading firmware	red light rapidly flashes and steady red light
Works fine, wireless not connected	green light rapidly flashes
Works fine, wireless connected	steady green light
Device overheated	red and green lights flash alternately quickly
REC board signal not recognised	green light slowly flashes

6.3 Operating channels

Central frequencies of the channels (MHz) by region as specified by the manufacturer:

Region	CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8
FCC	5660	5695	5735	5770	5805	5878	5914	5839
CE/SRRC	5735	5770	5805	–	–	–	–	5839
MIC	5660	5700	–	–	–	–	–	5745

Make sure you fully understand and abide by local laws and regulations before using this product. An amateur radio licence may be needed in FCC regions when using channels 1, 2, 6 or 7, as they are amateur frequency bands. Users who use the amateur frequency bands with a modified or cracked version or without a licence may be punished for breaking local laws or regulations.

▶ Operation in the Czech Republic and the EU

Radio equipment is subject to Directive 2014/53/EU (RED) throughout the European Union, but the permitted frequency bands and maximum transmitter powers are set by national regulations and differ from country to country. The information in this chapter describes the situation in the Czech Republic. If you operate the product in another country, you must comply with the regulations of the country in which you operate it.

- In the Czech Republic, general authorisation **VO-R/10** of the Czech Telecommunication Office (Art. 3 (k)) permits the band **5725–5875 MHz** for short-range devices with a maximum power of **25 mW e.i.r.p.**
- In the EU, use only the settings corresponding to the **CE** region – channels 1, 2, 3 and 8 (5735, 5770, 5805 and 5839 MHz) with a power below 14 dBm.
- Frequencies outside the 5725–5875 MHz band (channels 1, 2, 6 and 7 in FCC mode) are not permitted in the Czech Republic under the general authorisation.
- Use only antennas specified by the manufacturer and no external amplifiers. The user is responsible for the channel and power settings.

7. Firmware upgrade

Please go to the official website www.caddxfpv.com to download the upgrade firmware. **AvatarMoonlight_Sky_X.X.X.img** is the Moonlight camera file. Copy it to the microSD card and **be careful not to change the file name**. Before upgrading, you need to connect the REC port and the VTX port using the USB cable included in the package.

7.1 Upgrade procedure

① Connect the REC port and the VTX port with the USB cable (as shown in the connection diagram in chapter 3.1).

② Copy the upgrade file to the root directory of the microSD card (delete old firmware files if there are any), connect the power and wait for the green VTX light to flash.

③ Press and hold the linking button for 8 seconds. When the indicator light turns red and flashes, release the button (it is normal for the indicator light to go out during the upgrade process). **Do not cut off the power during the upgrade process!**

④ The upgrade takes about 50 seconds. After a successful upgrade, the VTX indicator light flashes green or stays on and the REC indicator light turns solid green.

7.2 Solutions to abnormal situations

- **The REC indicator light turns solid blue during the upgrade:** the USB cable connection is abnormal. Please check whether the USB cable is connected properly or replug it.
- **The VTX indicator light changes to flashing or solid green after long pressing the linking button, without flashing red:** please check whether the firmware is correct and whether the SD card is detected.

Manufacturer support: CADDXFPV Support, e-mail support@caddxfpv.com. This content is subject to change; download the latest version from www.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 (Moonlight Kit) and the serial number are given on the product or on its packaging.

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.