AVATAR KIT
QUICKSTART GUIDE

V1.0

Introduction

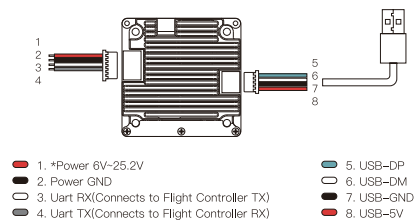|		
1. 6Pin Port	4. Link Button	7. Coaxial Cable
2. IPEX Antenna Ports	5. 25.5×25.5mm(m2 hole)	8. LED Indicator
3. Antenna	6. Camera	9. USB Port
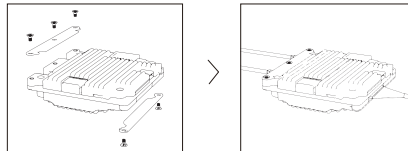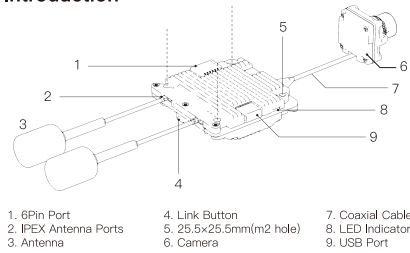
Please install the antenna and coaxial cable before power on

Connection

🔴 1. *Power 6V~25.2V		🔵 5. USB–DP
⬛ 2. Power GND		⚪ 6. USB–DM
⬜ 3. Uart RX(Connects to Flight Controller TX)		⬛ 7. USB–GND
⬛ 4. Uart TX(Connects to Flight Controller RX)		🔴 8. USB–5V

*When using a 6s battery, please be sure to weld a capacitor at the power input end,
it is recommended to use a capacitor with a specification above 50V / 47uF.

Linking
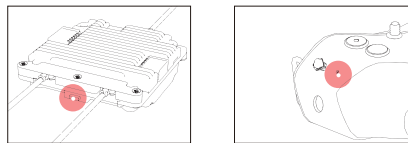
1. Connect the air unit and the power of the goggles.
2. Wait for the air unit to initialize and the green light flashes, and the status
   icon appears on the goggles.
3. Press the link button of the air unit and goggles respectively (as shown in
   the picture), when the air unit enters the pairing state The indicator light
   turns red, and the goggles end is a di... di... di...
4. After the pairing is successful, the indicator light on the air unit turns solid
   green, the beeping sound on the goggles stops and the screen is displayed.

upgrade

Please go to the official website to download the upgrade firmware, Avatar_Sky_X.X.X.img is the air unit file, Avatar_Gnd_X.X.X.img is the goggles file, copy it to the air unit or SD card, be careful not to change the file name. You need to turn on the power to use the U disk function.

1. Copy the upgrade file to the root directory of the air unit and the goggles, connect to the power supply and wait for the device to initialize(delete the old firmware file first if there in one)
2. Press the pairing button of the air unit and the goggle respectively for 8 seconds. When the air unit enters the upgrade status, the indicator turns on. It flashes red, and the goggles is beeping.....di..... di..... prompt sound (the upgrade time is long, please pay attention to the ambient temperature. do not cut off the power in the middle)
3. After the upgrade is successful, the indicator light of the air unit turns green and flashes, and the beeping sound stops after the goggles beeps for 5 seconds. After the upgrade is complete, please re-sync.

UART

The UART function enables the air unit communicate with the flight controller, allowing the air unit obtain the flight controller information. Take Betaflight Configurator as an example to introduce the UART setting method.

1. Solder the white and gray wires of the 6 pin cable to the flight controller (refer to the Connection page)

2. Connect the flight controller to the Betaflight Configurator, and open the corresponding UART port (UART1 in the following figure is an example) Check the MSP switch and click Save.

3. Open the CLI command line and enter the content in red font
"set osd_displayport_device = MSP"
"set displayport_msp_serial = Y" (Where Y is one less than the number of the serial port. e.g. Y = 2 for serial 3)
"save"

Status indication

Goggles Buzzer Status	
In pairing state	di....di....di....
upgrade firmware	di......di......di...... di——
Upgrade failed	di..di..di..
VTX Indicator Status	
In pairing state	Steady red light
upgrade firmware	Red light rapidly flashes
Wireless connection, image output is normal	Steady green light
Wireless not connected	green light rapidly flashes
Wireless connection is normal, but the image is abnormal	green light slowly flashes

Operating channel

Central frequency(MHz)	Channel1	Channel2	Channel3	Channel4	Channel5	Channel6
FCC	5660	5695	5735	5770	5805	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 license may be needed in FCC regions when using channels 1,2,6or 7, as they are amateur frequency bands. Users who use the amateur frequency bands with a modified or cracked version or without a license may be punished for breaking local laws or regulations.

VTX Specification

Model	Avatar module
Dimensions	33 × 33 × 9.5 mm
Hole spacing	25.5 × 25.5 mm (m2孔)
Weight	16 g
Operating Frequency	5.660~5.839 GHz
Transmitter Power(EIRP)	FCC/SRRC/MIC: <30 dBm; CE: <14dBm
Min. Latency(end—to—end)	Low Latency Mode (720p 22ms); High Quality Mode (1080p 38ms)
Max. Transmission Distance	FCC/SRRC/MIC: <4 km; CE: 0.7 km
Video Format	MP4 (Video format: H.264)
I/O Interface	6pin, 4pin, IPEX
Operating Temperature Range	-10℃—40℃
Input Power	6—25.2 V (12V@700mAh±100mAh)

Camera parameters

Model	Avatar Nano Camera
Dimensions	17 × 14 × 14 mm
Weight	2.9 g
Image Ratio	16 : 9
Sensor	1/2.9″CMOS Aperture: F/2.0 iso: 100—25600
FOV	180°(D);160°(H);90°(V)

Model	Avatar Camera
Dimensions	21.8 × 19 × 19 mm
Weight	6.9 g
Image Ratio	16 : 9
Sensor	1/2.9″CMOS Aperture: F/2.1 iso: 100—25600
FOV	180°(D);160°(H);90°(V)

Antenna parameters

Model	Polar antenna
Dimensions	105 × 11.2 mm
Weight	1.5 g
bandwidth	5650—5950MHz
Polarization	LHCP
Average gain	2dbi
VSWR	<1.4
Efficiency	98%
Connector	U.FL

AVATAR KIT

快速入门指南

V1.0

简介

1. 6Pin 端口
2. IPEX 接口
3. 天线
4. 对频键
5. 25.5×25.5mm (m2孔)
6. 相机
7. 同轴线缆
8. LED 指示灯
9. USB 端口

通电前请固定好天线与同轴线接口

接线

1. *电源 6V~25.2V
2. 电源负极
3. Uart RX（连接飞控 TX）
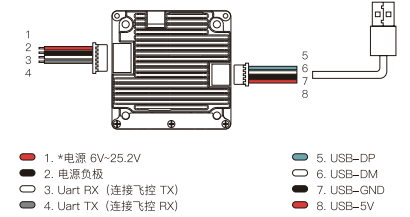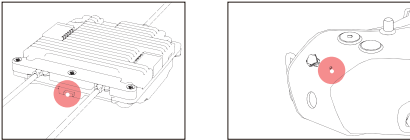4. Uart TX（连接飞控 RX）

5. USB–DP
6. USB–DM
7. USB–GND
8. USB–5V
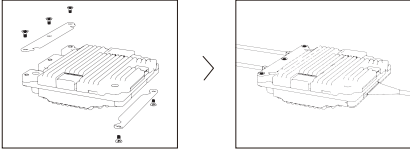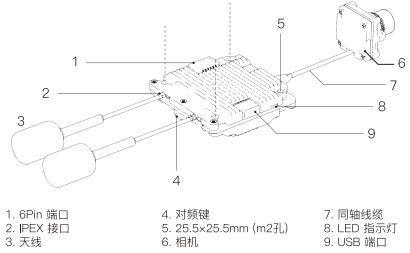
*使用6s电池请务必在电源输入端焊接电容
建议使用50V / 47uF以上规格电容

对频

1. 连接天空端与FPV眼镜电源
2. 等待天空端初始化绿灯闪烁，飞行眼镜出现状态图标
3. 分别按下天空端与眼镜对频按键（如图所示），当天空端进入对频状态
   指示灯变为红色，眼镜端为滴...滴...滴...提示音
4. 对频成功后，天空端指示灯变为绿色常亮，眼镜端提示音停止并显示画面

升级

请到官方网址下载升级固件, Avatar_Sky_X.X.X.img为天空端文件, Avatar_Gnd_X.X.X.img为眼镜端文件, 拷贝到天空端或者SD卡中, 注意不要更改文件命名, 天空端需要开启电源才可使用U盘功能。

1. 将升级文件拷贝到天空端与眼镜端根目录中，连接电源等待设备初始化（如有旧的固件文件请删除）
2. 分别按下天空端与眼镜端对频按键8秒，当天空端进入升级状态指示灯变为红色闪烁，眼镜端为滴.....滴.....滴.....提示音(升级时间较长请注意环境温度，请勿中途断电)
3. 升级成功后，天空端指示灯变为绿色闪烁，眼镜端长响5秒后提示音停止，升级完成后请重新对频。

UART

UART功能可以使天空端与飞控相互通信，让天空端获取飞控信息，以Betaflight Configurator为例，介绍UART设置方法。

1. 把6pin线缆的白色与灰色线焊接到飞控（参考接线页面）
2. 飞控连接Betaflight地面站，打开对应的UART（以下图UART1为例）勾选MSP开关，点击保存。

3. 打开CLI命令行，输入红色字体内容
  "set osd_displayport_device = MSP"
  "set displayport_msp_serial = Y" (Where Y is one less than the number of the serial port. e.g. Y = 2 for serial 3)
  "save"

状态指示

眼镜端蜂鸣器状态	
对频状态中	滴....滴....滴....
升级固件	滴......滴......滴...... 滴——
升级失败	滴..滴..滴..
VTX指示灯状态	
对频状态中	红灯常亮
升级固件中	红灯快闪
无线连接、图像输出正常	绿灯常亮
无线未连接	绿灯快闪
无线连接正常，图像异常	绿灯慢闪

工作频道

Central frequency(MHz)	Channel1	Channel2	Channel3	Channel4	Channel5	Channel6
FCC	5660	5695	5735	5770	5805	5839
CE/SRRC	5735	5770	5805	-	-	5839
MIC	5660	5700	-	-	-	5745

使用本产品时需要充分了解并尊重当地的法律法规，避免违规使用。在FCC地区，使用频道1/2/6/7（业余无线电频道）时，需要持有业余无线电执照才能操作，如果无执照使用业余无线电频道或者通过改装、破解等手段迫使设备工作在该频段可能会由于违规当地法规而遭受到处罚。

VTX规格

型号	Avatar module
外形尺寸	33 × 33 × 9.5 mm
安装孔距	25.5 × 25.5 mm (m2孔)
重量	16 g
通信频率	5.660-5.839 GHz
发射功率（EIRP）	FCC/SRRC/MIC: <30 dBm; CE: <14dBm
端到端最低延时	低延时模式 (720p 22ms); 高画质模式 (1080p 38ms)
最大传输距离	FCC/SRRC/MIC: <4 km; CE: 0.7 km
录像格式	MP4（视频格式: H.264)
接口	6pin, 4pin, IPEX
工作环境温度	−10℃−40℃
输入电源	6−25.2 V (12V@700mAh±100mAh)

相机规格

型号	Avatar Nano Camera
外形尺寸	17 × 14 × 14 mm
重量	2.6 g
图像比例	16 : 9
传感器	1/2.3"CMOS 光圈: F/2.0 iso: 100−25600
FOV	180°(D);160°(H);90°(V)

型号	Avatar Camera
外形尺寸	21.8 × 19 × 19 mm
重量	6.9 g
图像比例	16 : 9
传感器	1/2.3"CMOS 光圈: F/2.0 iso: 100−25600
FOV	180°(D);160°(H);90°(V)

天线规格

型号	Polar antenna
外形尺寸	105 × 11.2 mm
重量	1.5 g
工作频段	5650−5950MHz
极化方式	LHCP
平均增益	2dbi
驻波比	VSWR<1.4
发射效率	98%
接口	U.FL

FCC WARNING

FCC Caution: Any changes or modifications not expressly

approved by the party responsible for compliance could void the user's authority to operate this equipment. This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1)This device may not cause harmful interference, and

(2)this device must accept any interference received, including interference that may cause undesired operation. This device and its antenna

(s) must not be co-located or operating in conjunction with any other antenna or transmitter.

15.105 Information to the user.

(b) For a Class B digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:

Note: This equipment has been tested and found to comply

with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and

can radiate radio frequency energy and, if not installed and used in

accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful

interference to radio or television reception, which can be determined by

turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

—Reorient or relocate the receiving antenna.

—Increase the separation between the equipment and receiver.

—Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

—Consult the dealer or an experienced radio/TV technician for help.

This equipment complies with FCC radiation exposure limits set forth for an uncon-trolled environment. This equipment should be installed and operated with minimum distance 20 cm between the radiator and your body.

Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.

This transmitter must not be co-located or operating in conjunction with any other

antenna or transmitter.

The availability of some specific channels and/or operational frequency bands are country dependent and are firmware programmed at the factory to match the intended destination.   The firmware setting is not accessible by the end user.

The final end product must be labelled in a visible area with the following: "Contains Transmitter

Module " 2A78Z-AVATAR   "

Requirement per KDB996369 D03

2.2 List of applicable FCC rules

List the FCC rules that are applicable to the modular transmitter. These are the rules that specifically establish the bands of operation, the power, spurious emissions, and operating fundamental frequencies. DO NOT list compliance to unintentional-radiator rules (Part 15 Subpart B) since that is not a condition of a module grant that is extended to a host manufacturer. See alsoSection 2.10 below concerning the need to notify host manufacturers that further testing is required.3

Explanation: This module meets the requirements of FCC part 15C (15.407).it Specifically identified AC Power Line Conducted Emission, Radiated Spurious emissions, Band edge and RF Conducted Spurious Emissions, Conducted Peak Output Power, Bandwidth, Power Spectral Density, Antenna Requirement.

2.3 Summarize the specific operational use conditions

Describe use conditions that are applicable to the modular transmitter, including for example any limits on antennas, etc. For example, if point-to-point antennas are used that require reduction in power or compensation for cable loss, then this information must be in the instructions. If the use condition limitations extend to professional users, then instructions must state that this information also extends to the host manufacturer's instruction manual. In addition, certain information may also be needed, such as peak gain per frequency band and minimum gain, specifically for master devices in 5 GHz DFS bands.

Explanation: The antenna of this product is CADDX snail antenna, antenna length 11CM, width 1CM, gain 2dBi

2.4 Limited module procedures

If a modular transmitter is approved as a "limited module," then the module manufacturer isresponsible for approving the host environment that the limited module is used with. The manufacturer of a limited module must describe, both in the filing and in the installation instructions, the alternative means that the limited module manufacturer uses to verify that the host meets the necessary requirements to satisfy the module limiting conditions.

A limited module manufacturer has the flexibility to define its alternative method to address the conditions that limit the initial approval, such as: shielding, minimum signaling amplitude, buffered modulation/data inputs, or power supply

regulation. The alternative method could include that the limited

module manufacturer reviews detailed test data or host designs prior to giving the host manufacturer approval.

This limited module procedure is also applicable for RF exposure evaluation when it is necessary to demonstrate compliance in a specific host. The module manufacturer must state how control of the product into which the modular transmitter will be installed will be maintained such that full compliance of the product is always ensured. For additional hosts other than the specific host originally granted with a limited

module, a Class II permissive change is required on the module grant to register the additional host as a specific host also approved with the module.

Explanation: The module is a single module.

2.5 Trace antenna designs

For a modular transmitter with trace antenna designs, see the guidance in Question 11 of KDB Publication 996369 D02 FAQ – Modules for Micro-Strip Antennas and traces. The integration information shall include for the TCB review the integration instructions for the following aspects: layout of trace design, parts list (BOM), antenna, connectors, and isolation requirements.

a) Information that includes permitted variances (e.g., trace boundary limits, thickness, length, width, shape(s), dielectric constant, and impedance as applicable for each type of antenna); b) Each design shall be considered a different type (e.g., antenna length in multiple(s) of frequency, the wavelength, and antenna shape (traces in phase) can affect antenna gain and must be considered); c) The parameters shall be provided in a manner permitting host manufacturers to design the printed circuit (PC) board layout; d) Appropriate parts by manufacturer and specifications; e) Test procedures for design verification; and f) Production test procedures for ensuring compliance The module grantee shall provide a notice that any deviation(s) from the defined parameters of the antenna trace, as described by the instructions, require that the host product manufacturer must notify the module grantee that they wish to change the antenna trace design. In this case, a Class II permissive change application is required to be filed by the grantee, or the host manufacturer can take responsibility through the change in FCC ID (new application) procedure followed by a Class II permissive change application

Explanation: The antenna of this product is CADDX snail antenna, antenna length 11CM, width 1CM, gain 2dBi

2.6 RF exposure considerations

It is essential for module grantees to clearly and explicitly state the RF exposure conditions that permit a host product manufacturer to use the module. Two types of instructions are required for RF exposure information: (1) to the host product manufacturer, to define the application conditions

(mobile, portable – xx cm from a person's body); and (2) additional text needed for the host product manufacturer to provide to end users in their end-product manuals. If RF exposure statements and use conditions are not provided, then the host product manufacturer is required to take responsibility of the module through a change in FCC ID (new application).

Explanation: The module complies with FCC radiofrequency radiation exposure limits for uncontrolled environments. The device is installed and operated with a distance of more than 20 cm between the radiator and your body." This module follows FCC statement design, FCC ID : 2A78Z-AVATAR

2.7 Antennas

A list of antennas included in the application for certification must be provided in the instructions. For modular transmitters approved as limited modules, all applicable professional installer instructions must be included as part of the information to the host product manufacturer. The antenna list shall also identify the antenna types (monopole, PIFA, dipole, etc. (note that for example an "omni-directional antenna" is not considered to be a specific "antenna type").

For situations where the host product manufacturer is responsible for an external connector, for example with an RF pin and antenna trace design, the integration instructions shall inform the installer that unique antenna connector must be used on the Part 15 authorized transmitters used in the host product.

The module manufacturers shall provide a list of acceptable unique connectors.

Explanation: The antenna of this product is CADDX snail antenna, antenna length 11CM, width 1CM, gain 2dBi

2.8 Label and compliance information

Grantees are responsible for the continued compliance of their modules to the FCC rules. This

includes advising host product manufacturers that they need to provide a physical or e-label stating "Contains FCC ID" with their finished product. See Guidelines for Labeling and User Information for RF Devices – KDB Publication 784748.

Explanation: The host system using this module, should have label in a visible area indicated the following texts: "Contains FCC ID: 2A78Z-AVATAR

2.9 Information on test modes and additional testing requirements5

Additional guidance for testing host products is given in KDB Publication 996369 D04 Module Integration Guide. Test modes should take into consideration different operational conditions for a stand-alone modular transmitter in a host, as well as for multiple simultaneously transmitting modules or other transmitters in a host product.

The grantee should provide information on how to configure test modes for host product evaluation for different operational conditions for a stand-alone modular transmitter in a host, versus with multiple, simultaneously transmitting modules or other transmitters in a host.

Grantees can increase the utility of their modular transmitters by providing special means, modes, or instructions that simulates or characterizes a connection by enabling a transmitter. This can greatly simplify a host manufacturer's determination that a module as installed in a host complies with FCC requirements.

Explanation: Walksnail Innovation Technology(Shenzhen)Co.,Ltd. can increase the utility of our modular transmitters by providing instructions that simulates or characterizes a connection by enabling a transmitter.

2.10 Additional testing, Part 15 Subpart B disclaimer

The grantee should include a statement that the modular transmitter is only FCC authorized for the specific rule parts (i.e., FCC transmitter rules) listed on the grant, and that the host product manufacturer is responsible for compliance to any other FCC rules that apply to the host not covered by the modular transmitter grant of certification. If the grantee markets their product as being Part 15

Subpart B compliant (when it also contains unintentional-radiator digital circuity), then the grantee shall provide a notice stating that the final host product still requires Part 15 Subpart B compliance testing with the modular transmitter installed.

Explanation: The module without unintentional-radiator digital circuity, so the module does not require an evaluation by FCC Part 15 Subpart B. The host shoule be evaluated by the FCC Subpart B.