

Referee System

Video Transmitter Module VT02&VT12

User Guide

使用说明

v1.0 2019.02



ROBOMASTER

Disclaimer

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Precautions

1. When the video transmitter module is operating, ensure that each interface is correctly connected as instructed to avoid malfunction or even damage.
2. When the video transmitter module is operating, avoid interference from wireless devices working at the 5 GHz frequency band so as not to affect the quality of the image transmission.
3. Not more than six video transmitter modules can concurrently operate in the same environment; otherwise, the quality of images may deteriorate or it may even cause crashes or a lost connection.
4. Before using the product, please download the RoboMaster 2019 Referee System User Manual from the official RoboMaster website to learn more about the product.

Introduction

The RoboMaster Video Transmitter Module (including the transmitter and the receiver) is a set of real-time high-resolution image collection and wireless transmission system working at the 5 GHz frequency band, with high resolution, high frame rate and low latency, and supports multiple video transmitter modules working simultaneously.

When operating, the video module of the VTM transmitter (hereinafter referred to as the transmitter) collects images in 1280 x 720 @ 60 Hz, and the collected images are transmitted in real time to the receiver of the VTM (hereinafter referred to as the receiver). USB Type-C is the image output interface of the receiver, through which the receiver is connected to your PC. Your PC can display the screen in real time after the required driver and display software are installed.

In The Box

For the receiver:

VTM Receiver x 1



Receiver Power Adapter x 1



For the transmitter:

VTM Transmitter x 1

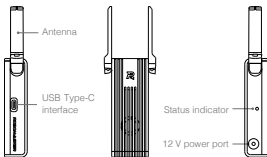


Aviation Cable x 1

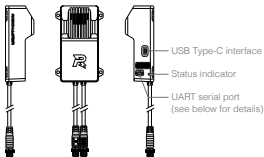


Description of Interfaces and Keys

VTM Receiver:



VTM Transmitter:



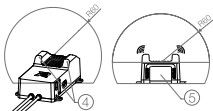
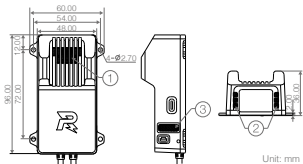
The line sequence of the UART serial port of the Transmitter:



Installation

Installation of the VTM Transmitter

Reserve mounting holes in the desired location by referring to the dimensions and interfaces of the VTM Transmitter below. Use four M2.5 screws to mount the VTM Transmitter to an appropriate location. After installation, use the provided aviation cable to connect the VTM Transmitter to the Power Management Module of the Referee System.

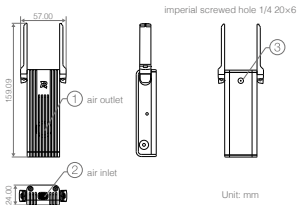


DO NOT block air inlets ① and ② and air outlet ③ of the VTM Transmitter during installation. As the top of antenna ④ module of the VTM Transmitter is being used, the top should not be blocked by any metal (⑤ in the figure is the camera in the front of the module). If the installation is not carried out as required, the quality of VTM images may deteriorate or it may even result in malfunction.

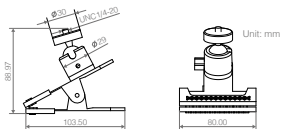
Installation of the VTM Receiver

1. The VTM Receiver can be fixed using the mounting clip. The receiver can be fixed on a display or other structure and must be no less than 1 m from the ground with no metal shielding, ensuring that air inlet and outlet ①② for heat dissipation are not blocked. Users can find the most suitable mounting location by checking the quality of the receiving image.
2. An antenna can be rotated between 0° and 190° . Do not fold it with excessive force. The center distance of an antenna is recommended to be not less than 60 mm.

The dimensions and explanations of the VTM Receiver are shown in the figure below:



The dimensions of the mounting clip to be used for the VTM Receiver are described as below:



Link and Instructions

1. Use the supplied aviation cable to connect the VTM Transmitter to the Power Management Module of the Referee System (please ensure that the Power Management Module has already been connected to the Referee System Main Controller Module). Wait for about 20 seconds until the status indicator of the VTM Transmitter changes from yellow to solid red, which indicates that the VTM Transmitter is started.
2. Use the power adapter of the VTM Receiver as its power source and wait for about 20 seconds until the status indicator of the VTM Receiver is solid green, which indicates that startup is completed. Use a USB Type-C cable (purchased separately) to connect the output of the VTM Receiver to your PC (the PC should be installed with DJI Phantom 4 Drivers_1.2_Installer in advance).
3. After startup, place the VTM Transmitter and Receiver within 5 meters from each other. Use the Main Controller Module to set the role of a robot and use the RoboMaster Client display software to set the role of the VTM Receiver. After roles are set, the status indicator of the VTM Transmitter will change to flashing red for 500 ms, indicating that it is trying to link.
4. Wait until the status indicator of the VTM Transmitter changes to green, indicating that the linking between them is completed. If no response occurs for a prolonged period of time, please power off and restart the VTM, and then repeat the link operation in step 3.
5. Check the display software (RoboMaster Client) connected to the computer of the VTM Receiver. If an image screen is displayed, the VTM Transmitter is properly connected to the VTM Receiver.



- To download DJI Phantom 4 Drivers_1.2_Installer and RoboMaster Client, go to the official RoboMaster website.
 - The Video Transmitter Module (VTM) should be activated before initial use. For activation methods and more information about the VTM, refer to the RoboMaster 2019 Referee System User Manual on the official RoboMaster website.
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Status Indicator Description of the VTM Receiver

The status indicator for the VTM receiver is only used for indicating that startup is completed. The indicator is solid green when startup is completed.

Status Indicator Description of the VTM Transmitter

| Status | Description |
|------------------------|--|
| Solid yellow | The VTM transmitter software is starting |
| Solid red | Started but unconnected |
| Flashes red for 500 ms | Linking to the VTM receiver |
| Solid green | Connected to the VTM receiver |

Technical Specifications

| | |
|---|------------------------------------|
| Power supply voltage of Transmitter | 12 V |
| Working current of Transmitter | 650 mA |
| Power supply voltage of Receiver | 12 V |
| Working current of Receiver | 400 mA |
| Operating wireless frequency (Mainland China) | 5732 MHz to 5842 MHz |
| Operating wireless frequency (Japan) | 5150 to 5250 MHz, 5650 to 5755 MHz |
| Transmission image size | 1280 × 720 |
| Transmission image frame rate | 60 Hz |
| Image output interface of Receiver | USB Type-C |
| Image output frame rate of Receiver | 60 Hz |
| Image transmission delay | < 110 ms |
| Max. transmission distance (Mainland China) | 500 m unblocked |

| | |
|------------------------------------|-----------------|
| Max. transmission distance (Japan) | 150 m unblocked |
| Weight of Transmitter | About 125 g |
| Weight of Receiver | About 137 g |

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感谢您购买 RoboMaster™ 相机图传模块。在使用之前，请仔细阅读本声明，一旦使用，即被视为对本声明全部内容的认可和接受。请严格遵守手册、产品说明和相关的法律法规、政策、准则安装和使用该产品。在使用产品过程中，用户承诺对自己的行为及因此而产生的所有后果负责。因用户使用不当、安装、改装造成的任何损失，DJI™ 将不承担法律责任。

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产品使用注意事项

1. 相机图传模块在使用过程中，请确保各接口按照说明正确连接，以免模块工作异常，甚至导致模块损坏。
2. 相机图传模块在使用过程中，请注意避开 5 GHz 频段无线设备的干扰，以免影响图像传输的质量。
3. 同一环境下最多可同时使用 6 套相机图传模块，否则可能导致图像质量下降，甚至发生卡顿或掉线。
4. 使用前请前往 RoboMaster 官网下载《RoboMaster 2019 裁判系统用户手册》了解产品的详细功能。

简介

RoboMaster 相机图传模块（包括发送端和接收端）是一套工作在 5 GHz 频段的实时高清图像采集和无线传输系统，具有高清晰度、高帧率、低延迟的特点，并且支持多套相机图传模块同时工作。

工作时，相机图传模块发送端（以下简称发送端）的相机模组采集 1280 x 720@60Hz 的图像，然后将采集到的图像实时传送到相机图传模块接收端（以下简称接收端）。接收端的图像输出接口为 USB Type-C，通过该接口和计算机连接，当计算机安装好对应的驱动程序和显示软件后即可显示实时画面。

物品清单

接收端物品清单：

相机图传模块接收端 × 1



接收端电源适配器 × 1



发送端物品清单：

相机图传模块发送端 × 1

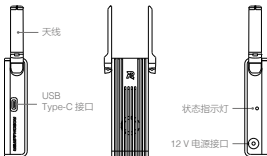


航空转接线 × 1

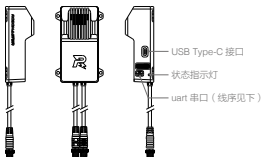


接口及按键说明

接收端：



发送端：



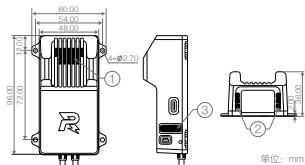
发送端 uart 串口线序：

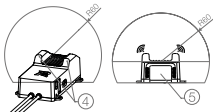


安 装

安装发送端

参考下面的发送端结构尺寸和安装接口图，在所需位置预留安装孔位。安装时，请使用 4 颗 M2.5 螺丝固定发送端至适当位置。安装固定后，使用包装内附带的航空转接线，将发送端连接到裁判系统的电源管理模块。



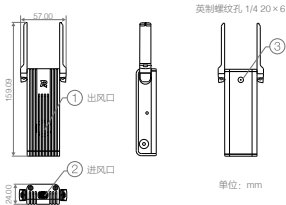


安装时，不能遮挡发送端的进风口①，②与出风口③。发射端的天线④位于模块顶部，因此顶部不能有任何金属遮挡（图示中⑤为相机，位于模块前方）。如果不按要求安装，可能会导致相机图传模块图像质量下降，甚至工作异常。

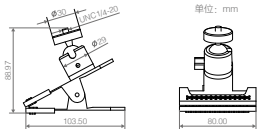
安装接收端

1. 相机图传模块的接收端可以使用安装夹进行固定。固定的位置可以是显示器或者其它支撑物，需要保证固定位置离地高度不低于 1m，没有金属遮挡，并确保散热进风口①②不被遮挡。用户可以通过查看接收图像质量确认具体的安装位置。
2. 天线可旋转角度 0° - 190° ，切勿暴力收折。建议天线中心点距离 $\geq 60\text{mm}$ 。

接收端尺寸、说明如下图所示：



接收端推荐使用的安装夹尺寸如下：



对频连接及使用说明

1. 将发送端用自带的航空转接线连接到裁判系统电源管理模块（请确保此时电源管理模块已连接至裁判系统主控模块）。等待 20s 左右，直到发送端状态指示灯由黄色变为红色常亮，表示发送端启动完成。
2. 使用接收端电源适配器为接收端供电，等待 20s 左右，直到接收端状态指示灯为绿色常亮，表示启动完成。将接收端的输出使用 USB Type-C 线（需用户自行购买）连接到电脑上（电脑需提前安装 DJI Phantom 4 Drivers_1.2_Installer 驱动）。
3. 启动完成以后，将发送端和接收端置于相距 5m 以内的地方，通过主控模块设定机器人的角色并通过 RoboMaster Client 显示软件设定接收端的角色。角色设定好后，发送端的状态指示灯会变为红色 500ms 闪烁，表示正在尝试对频。
4. 待发送端的状态指示灯变成绿色，表示两者对频已经完成。如果长时间没有反应，请断电重启相机图传模块，重复执行第 3 步的对频操作。
5. 观察连接接收端电脑的显示软件（RoboMaster Client），若出现显示图像画面，说明发送端和接收端的连接正常。



- 用户需前往 RoboMaster 官网，下载 DJI Phantom 4 Drivers_1.2_Installer 驱动和 RoboMaster Client 显示软件。
- 用户首次使用图传模块时，需对图传模块进行激活，激活方式及更多关于图传模块的详细信息请参考 RoboMaster 官网《RoboMaster 2019 裁判系统用户手册》。

接收端灯效说明

接收端状态指示灯仅用于指示开机启动完成，启动完成为绿色常亮。

发送端灯效说明

| 灯效 | 说明 |
|-------------|-----------|
| 黄灯常亮 | 发送端软件启动中 |
| 红灯常亮 | 启动完成未建立连接 |
| 红灯 500ms 闪烁 | 与接收端对频中 |
| 绿灯常亮 | 已与接收端建立连接 |

产品性能参数

| | |
|-------------|------------------------------|
| 发送端供电电压 | 12 V |
| 发送端工作电流 | 650 mA |
| 接收端供电电压 | 12 V |
| 接收端工作电流 | 400 mA |
| 工作时无线频率（中国） | 5732 MHz~5842 MHz |
| 工作时无线频率（日本） | 5150~5250 MHz, 5650~5755 MHz |
| 传输图像大小 | 1280 × 720 |
| 传输图像帧率 | 60 Hz |
| 接收端图像输出接口 | USB Type-C |
| 接收端图像输出帧率 | 60 Hz |
| 图传传输延时 | <110 ms |
| 最大传输距离（中国） | 无遮挡 500 m |
| 最大传输距离（日本） | 无遮挡 150 m |
| 发送端重量 | 约 125 g |
| 接收端重量 | 约 137 g |



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Weibo



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