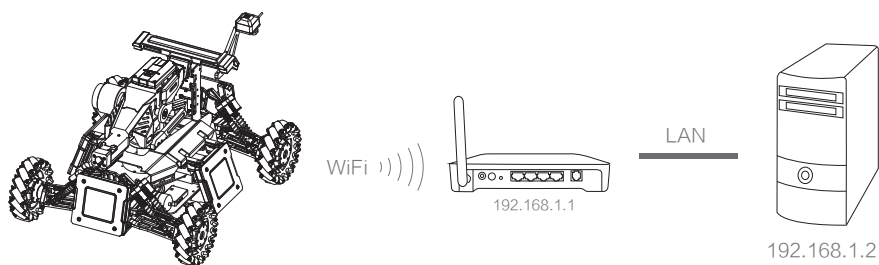


RoboMaster Referee System

User Manual

V1.1 2018.03



Disclaimer

Please read this disclaimer carefully before using this product. By using this product, you hereby signify that you have read and agree to all content herein. Please install and use this product properly and in strict accordance with the User Manual and product instructions, as well as any relevant laws, regulations, and policies. Users shall be responsible for the consequences resulting from their behavior while using this product. DJI™ Innovations (DJI™) shall not be liable for any losses incurred from using, installing, or modifying this product improperly.

DJI™ and RoboMaster™ are trademarks of SZ DJI Technology Co., Ltd and its affiliates. Names of products, brands, etc. herein are trademarks or registered trademarks of their respective owner companies. This product, the manual, and the software and driver that work with the Referee System (RoboMaster Client, RoboMaster Assistant, RoboMaster Server, RoboMaster Tools, and DJI WIN driver) are copyrighted by DJI with all rights reserved, and shall not be modified, reproduced, or transmitted in any form without the prior consent of DJI. DJI reserves the right of final interpretation of this disclaimer.

Warnings

The complexity of this product requires that users become familiar with the product features by reading the User Manual and have a basic understanding of relevant concepts before operation. Improper use of this product may cause serious injury, product damage or property damage. The complexity of this product requires that users familiarize themselves with its features and have a basic understanding of relevant concepts before operation. Taking into account the importance of the various modules of the Referee System in the competition, the Referee System has been fully tested in the factory and each module cannot be damaged easily. A user should not disassemble or modify any parts of the Referee System without authorization. Damage to the Referee System resulting from unauthorized disassembly will void the warranty. This product is not intended for children. Do not use parts that RoboMaster does not provide or recommend. Install and use this product in strict accordance with the guidelines provided by RoboMaster. Read all instructions and warnings contained in the User Manual carefully before installation, setup, and operation.

Product Usage Precautions

1. Please ensure that the wiring connections are correct before use.
2. Please ensure that the components are intact before use. Replace any worn or damaged components if necessary.

Reading Tips

Symbol Descriptions



Important Notes



Operation/Use Tips



Glossary & Reference

Related Documents

1. Referee System Module Instructions

It is recommended to read the aforementioned documents to understand the features and installation methods of the Referee System modules. Reserve any necessary installation holes and spaces so that each module on the Referee System's robot side may be correctly installed, and then read the User Manual to explore the functions of the Referee System.

Revision Log

Date	Version	Revision Records
2018.3.15	1.1	Update the download links

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Referee System Overview

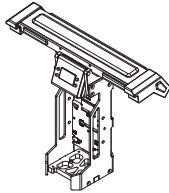
The Referee System is a fully autonomous electronic penalty system that can detect projectile attack damage and monitor chassis movement power as well as other robot parameters. The Speed Measurement Module monitors a robot's projectile launching speed and rate; the Camera Transmission Module provides the user with a first-person perspective of the robot; the RFID Interaction Module interacts with the battlefield; and the Localization Module provides a user with a real time high-precision mini-map. A user can use multiple Referee Systems to form a multi-robot combat system.

The Referee System is composed of the following:

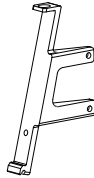
1. The robot side of the Referee System (hereinafter referred to as "Robot Side")
2. The PC client (hereinafter referred to as "Client") and the PC server (hereinafter referred to as "Server")

The Robot Side is composed of the following modules:

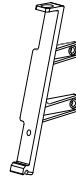
1. Main Control Module: the "brain" of the Robot Side. Automatically calculates damage according to data passed back from other modules. In addition, this module's light bar displays the status and HP of the Robot Side in real-time. The Small Armor Module can be mounted onto the rear of the Main Control Module by using Armor Mount A (left) and Armor Mount A (right).



Main Control Module

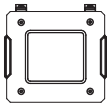


Armor Mount A (left)

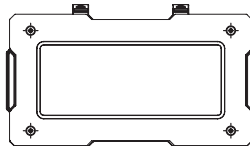


Armor Mount A (right)

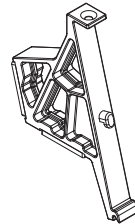
2. Armor Modules: the "skin" of the Robot Side. They include the Small Armor Module and the Large Armor Module. The Armor Modules can be mounted onto a robot by using Armor Mount B. The Armor Modules can detect external attacks, including attacks from 17mm projectiles and 42mm projectiles.



Small Armor Module

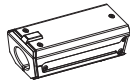


Large Armor Module

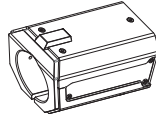


Armor Mount B

3. Speed Measurement Module: detects a robot's projectile launching speed and rate. This includes the Speed Measurement Module (17mm projectiles) and the Speed Measurement Module (42mm projectiles).



Speed Measurement Module
(17mm projectile)



Speed Measurement Module
(42mm projectile)

4. RFID Interaction Module: used by the Robot Side to interact with the battlefield. Part of a robot's HP can be replenished by using an RFID Interaction Module Regeneration Card.

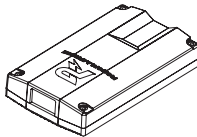


RFID Interaction Module

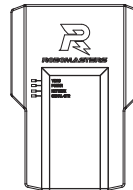


RFID Interaction Module test card

5. Camera Transmission Module: provides the user with a first-person perspective. This includes the VTM Transmitter and the VTM Receiver. The VTM Transmitter is mounted on the Robot Side, while the VTM Receiver is mounted on the Client.

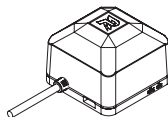


VTM Transmitter



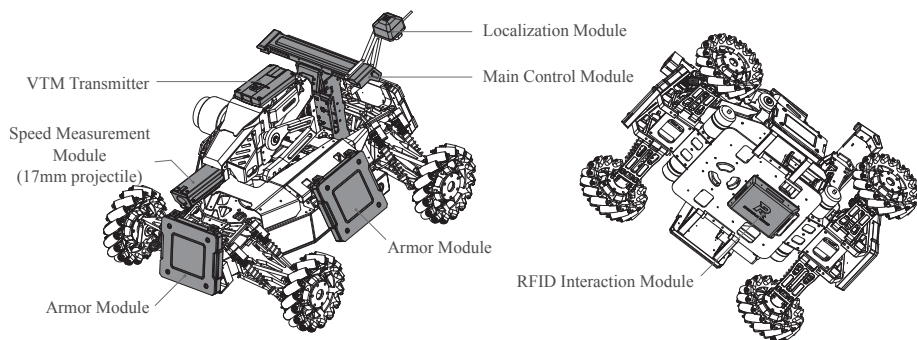
VTM Receiver

6. Localization Module: provides the user with real-time mini-map data and provides the robot with coordinate information.

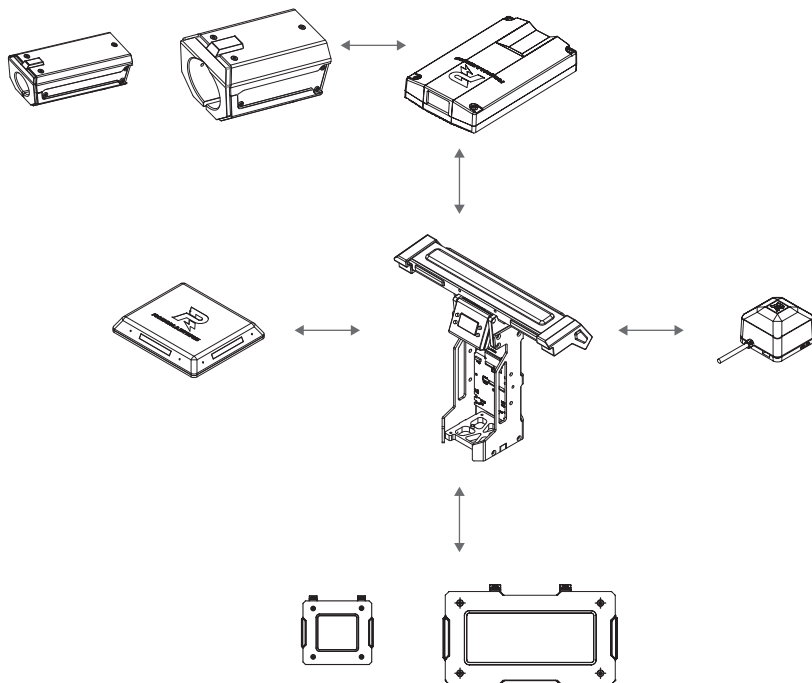


Localization Module

The figure below shows the correct installation of each module on the Robot Side:



The figure below shows the connection of each module on the Robot Side*:



*Modules to be installed vary between robot models. For details, please refer to the RoboMaster 2018 Referee System Specification Manual.

Download <https://www.robomaster.com/en-US/resource/pages/834?type=announcementSub>

The Client and Server are composed of the following parts:

1. Client: used to transmit keyboard and mouse data to a robot remote control so that various features of a robot can be controlled via the keyboard and mouse. The Client displays a user's first-person perspective, with the Client software UI superimposed onto the display. After logging on to the server, a user can check the HP of all Robot Sides in real time, and also view a mini-map, the competition countdown, and battlefield information. The following hardware and software should be installed to the Client to implement the features described above.

Required hardware:

- a. VTM Receiver (outputs an HDMI video signal);
- b. HD video capture card (user-supplied; captures video signals from the VTM Receiver);
- c. Robot remote control (user-supplied; only DT7 & DR16 remote control receiver systems are supported);

Required software:

- a. DJI WIN driver (drives the robot remote control)

Download link:

<https://www.robomaster.com/zh-CN/products/components/detail/122>

- b. RoboMaster Client software

Download

<https://www.robomaster.com/zh-CN/products/components/referee?index=1&position=57>

2. Server: calculates competition time, triggers the battlefield switch, and displays and transmits Robot Side parameters including HP, battlefield information, etc. to the Client; allows manual control of multi-level warnings and warns the Client of user violations; and automatically determines the outcome of the competition. The following software should be installed to the Server to implement the features above.

RoboMaster Server software

Download.

<https://www.robomaster.com/zh-CN/products/components/referee?index=1&position=58>

Referee System Quick Start Guide

Robot Side Configurations

Different types of robot can be set up on the Robot Side. At the same time, the type and quantity of robotic Referee System Modules can be customized on the Server. The table below shows the configuration of a single robotic Referee System module. (The type and number of modules required depend on the robot model (for details, please refer to the RoboMaster 2018 Referee System Specification Manual).

Module Name	Qty.
Main Control Module	1
Large and Small Armor Modules	1~15
Speed Measurement Module (17mm projectile)	0~1
Speed Measurement Module (42mm projectile)	0~1
RFID Interaction Module	0~1
VTM Transmitter	0~1
VTM Receiver	0~1
Localization Module	0~1

Robot Properties

The properties of different types of robots can be configured on the Server and synchronized to the Robot Side. The table below shows the properties that can be configured:

Property Name	Property Information
Referee System module type and quantity	Refer to the "Configurations on the Robot Side" section
Initial HP	0-65535
Max. HP	The maximum HP at a full level if the robot's level can be upgraded in competition: Initial HP - 65535
Damage from 17mm projectiles	HP deducted when the Armor Module receives attacks from 17mm projectiles: 0-Initial HP
Damage from 42mm projectiles	HP deducted when the Armor Module receives attacks from 42mm projectiles: 0-Initial HP
17mm projectile launching speed limit	HP will be deducted from a robot when it exceeds this limit.
42mm projectile launching speed limit	HP will be deducted from a robot when it exceeds this limit.
Robot Chassis Power Consumption Limit	HP will be deducted from a robot when it exceeds this limit.

Start Battle

Multiple Referee Systems can be combined to form a multi-robot combat mode. A user can choose to set up a local area network (LAN) for online combat.

If a local area network (LAN) is set up, the Server must be used, and a user must be able to check the HPs of all Robot Sides on the Server. A user may also use the Client, paired with the VTM Receiver, to operate a robot from a first-person perspective, check the HPs of all Robot Sides, and determine the outcome of the competition automatically with the aid of the server.

If a LAN is not being used, the outcome of the competition can be determined only by the HP displayed on the Main Control Module light bar of the Referee System. Additionally, a user may use the Client paired with the VTM Receiver to operate a robot from a first-person perspective, but cannot check HPs of the Robot Side nor determine the outcome of the competition automatically.

Users may opt to use base robots or customize competition rules for a more personalized experience. The examples below describe these situations in ascending order of complexity:

1. 1v1 Mode

1v1 Mode works as follows: A user may select any two Robot Side configurations from the configuration table to be applied to two robots respectively. One robot will be assigned to the Red team, and the other to the Blue team. You may choose whether to set up a LAN or use a base for the competition. The table below presents an example of a starting line-up:

Combatants	Robot type	Qty.	Remarks
Red	Standard	1	/
	Base	0~1	Optional
Blue	Standard	1	/
	Base	0~1	Optional

The table below shows the configurations of the Referee System modules required to set up the combat system above:

Module Name	Qty.	Remarks
Main Control Module	2	/
Large Armor Module	0	/
Small Armor Module	8	/
Speed Measurement Module (17mm projectile)	0~2	Can be ignored if the launching speed is not limited
Speed Measurement Module (42mm projectile)	0	/
RFID Interaction Module	0~2	Can be ignored if no interaction with a battlefield is required
VTM Transmitter	2	/
VTM Receiver	2	/
Localization Module	0~2	Can be ignored if robot localization data will not be used

2. 3v3 Mode

3v3 Mode works as follows: A user may select any 6 Robot Side configurations from the configuration table to be applied to 6 robots respectively. Robot Sides are divided evenly into a Red team and a Blue team. You may choose whether to set up a LAN or use a base for the competition. The table below presents an example of a starting lineup:

Combatants	Robot type	Qty.	Remarks
Red team	Standard	1	/
	Hero	1	/
	Engineer	1	/
	Base	0~1	Optional
Blue team	Standard	1	/
	Hero	1	/
	Engineer	1	/
	Base	0~1	Optional

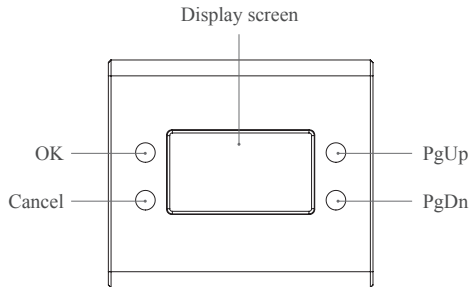
The table below shows the configurations of the Referee System modules required to set up the 3v3 combat system above:

Module Name	Qty.	Remarks
Main Control Module	6	/
Large Armor Module	8	/
Small Armor Module	12	/
Speed Measurement Module (17mm projectile)	0~4	Can be ignored if the launching speed is unlimited
Speed Measurement Module (42 mm projectile)	0~1	Can be ignored if the launching speed is unlimited
RFID Interaction Module	0~6	Can be ignored if no interaction with a battlefield is required
VTM Transmitter	6	/
VTM Receiver	6	/
Localization Module	0~6	Can be ignored if robot localization data will not be used

Description of Robot Side Functions

Robot Side Interaction Instructions

The human-computer interaction interface of the Referee System consists of a display screen and four keys, as shown in the figure below. Pressing a key will enable a corresponding function. Pressing and holding the same key will enable a different function.



Display Screen Pages

1. Home page: displays the initialization status of the Referee System. If the initialization is completed, the RoboMaster logo is displayed, as shown in the figure below:



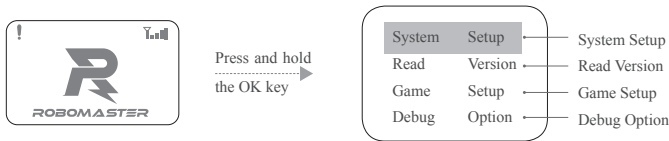
Otherwise, the quantity and names of offline modules are displayed, as shown in the figure below:



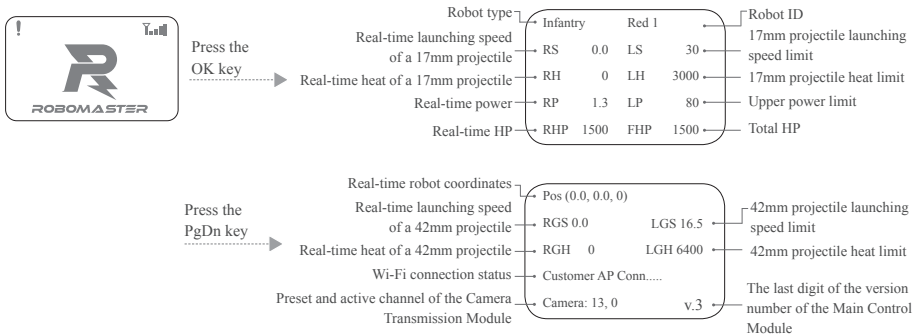
You can press the PgUp or PgDn key to display the next offline module. If only one module is offline, pressing the PgUp or PgDn key will have no effect.

The "!" on the upper left indicates that a Robot Side is not connected to the Server; the "Wi-Fi signal strength" on the upper right indicates the Wi-Fi connection status and signal strength.

2. Function page: used to display and set robot property parameters, such as robot type. The Function page is shown below:



3. Real-time information display page: displays real-time parameters of a robot, such as robot chassis power. The real-time information display page is shown below:



Descriptions of Key Functions

Press and hold the OK key: On the homepage or real-time information display page, press and hold the OK key to enter the robot function page. The current settings can be saved for some pages.

Press the OK key: On the homepage, press the OK key to enter the real-time information display page. On the Function page, if there is a page link in the selected line on the current page, pressing the OK key will direct you to the linked page; otherwise, pressing the OK key will carry out a function operation.

Press and hold the Cancel key: On a page other than the homepage, pressing and holding the Cancel key will bring you back to the homepage. On the homepage, pressing and holding the Cancel key will refresh the screen display.

Press the Cancel key: return to the previous page.

Press or press and hold the PgUp key: On the function page, press the PgUp key to move up one line. On other pages, press the PgUp key to move up one page.

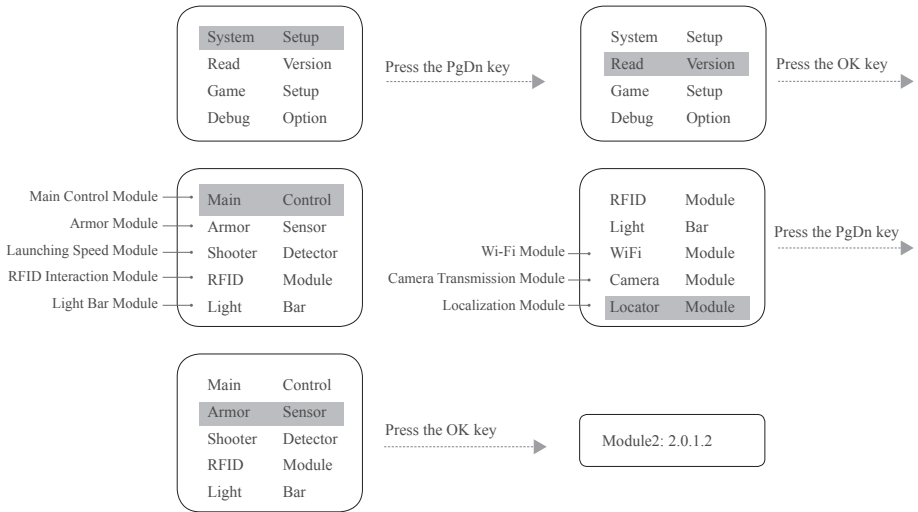
Press or press and hold the PgDn key: On the function page, press the PgDn key to move down one line. On other pages, press the PgDn key to move down one page.

On a page other than the homepage, if no keys are pressed during a 30-second period, you will be automatically directed to the homepage.

Examples

1. Reading Referee System module versions

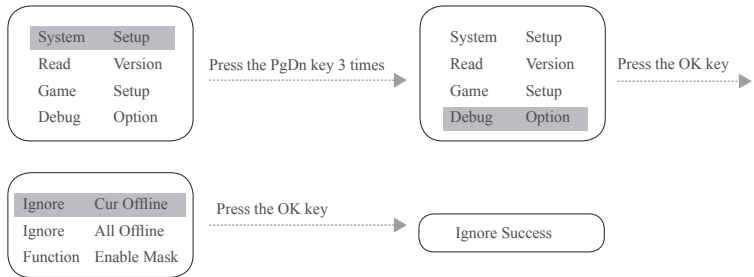
On the interaction interface, you can check the version number of each module on the Robot Side and enter the function page of the Main Control Module. The example below shows how to check the version of the Armor Module:



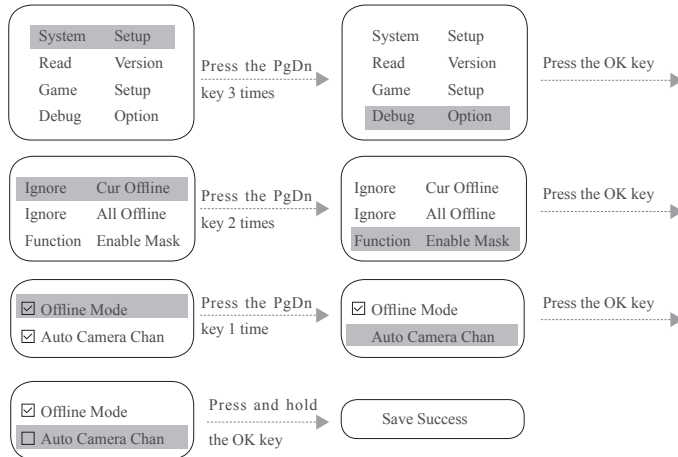
2. Using the debug function of the Referee System

From the interaction interface, access the "Debug Option" menu, where you can modify the advanced settings of the Referee System, as shown below:

- a. Change the module initialization mode to "Ignore All Offline" or "Ignore Current Offline" for the convenience of supplying the power to the chassis and gimbal during debugging. The following presents an example of the initialization process on the function page of the Main Control Module when ignoring current offline modules:

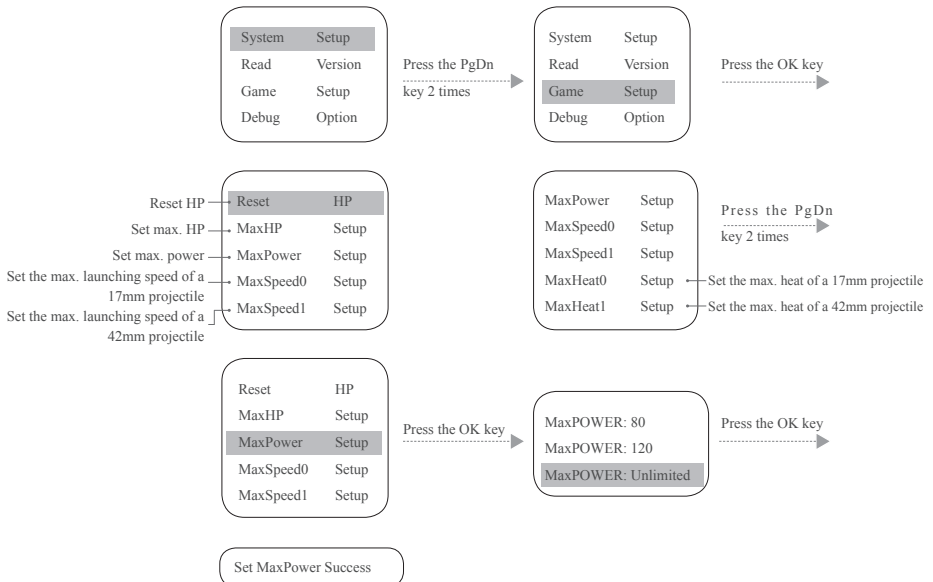


b. Change the pairing mode of the Camera Transmission Module to "Manual pairing" or "Auto pairing" to allow a user to freely select the connection method for the Camera Transmission module when debugging. The Referee System is set to "Auto pairing" by default. After this parameter is set, you can press and hold the OK key to save it. The setting remains valid even after the robot is powered on again. For details about the two modes, refer to "Camera Transmission Module Instructions". On the function page of the Main Control Module, change the pairing mode to "Manual pairing", as shown below:



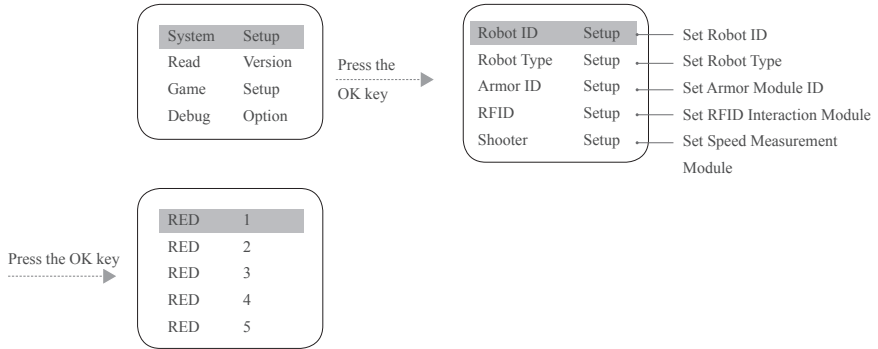
3. Setting competition-specific parameters

On the interaction interface, you can set the parameters of a robot, including its maximum HP, maximum speed and maximum heat. The following example shows how to set a robot's power limit as unlimited on the function page of the Main Control Module:



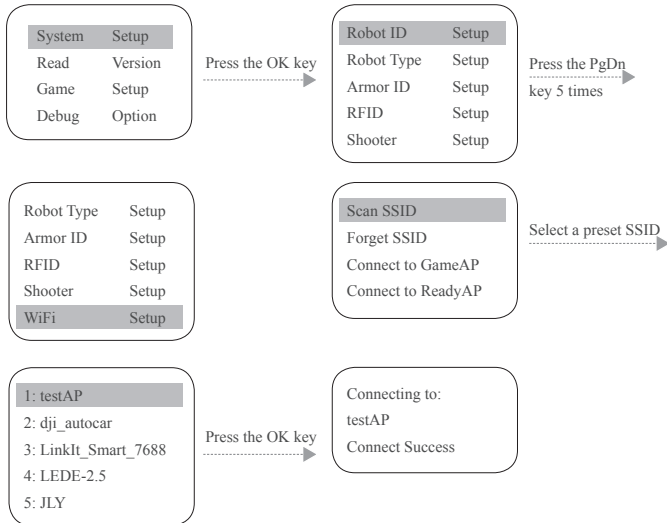
4. Setting the robot type and ID

On the interaction interface, you can set the robot type and ID. The following example shows how to set the Robot ID to Red 1 on the function page of the Main Control Module:



5. Connecting to a wireless access point (AP)

On the interaction interface, a Robot Side can choose a preset SSID to connect to and communicate with the Server, as shown below:



After the SSID is scanned, press and hold the OK key to remember this SSID. A Robot Side will automatically connect to this SSID upon startup. Clicking "Forget SSID" will ignore the remembered SSID;

After connection, the homepage will display the Wi-Fi signal strength.

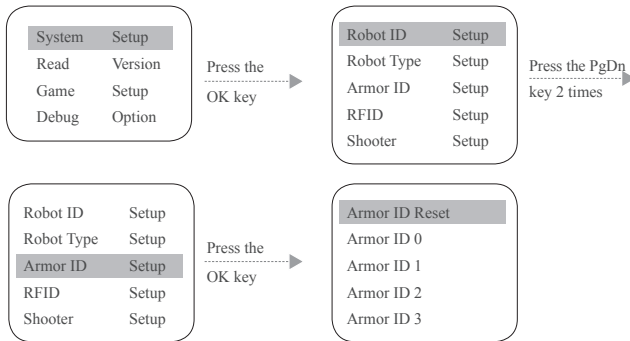
Introduction to the Robot Side Module Initialization

To ensure fair competition, it is important that all of the Referee System modules are working properly. Therefore, a Robot Side will initialize each module after powering up. If the initialization process fails, the Main Control Module light bar will be steadily lit in yellow.

Setting Armor Module IDs

A Robot Side can have multiple armor modules. They should be numbered so that the Robot Side can easily identify which armor is being attacked. The following shows how to number armor modules:

1. On the function page of the Main Control Module, proceed as shown to enter the Armor ID Setup page:



2. On this page, select "Armor ID Reset" to make the system enter the Armor ID Reset status:

At this point, the armor light bar flashes at a certain frequency (if the Robot ID is on the Red team, the red indicator light flashes; if the Robot ID is on the Blue team, the blue indicator light flashes).

3. Strike each Armor Module in succession with a consistent amount of force. If the armor light goes off and then comes back on, the armor ID has been set successfully. The ID number of the Armor Module that was hit first is 0, and the ID number is sequentially incremented according to the order in which the modules were struck.
4. After completing the above operations, check whether the armor ID has been set successfully by looking up the version number of the Armor Modules. If the read number of effective Armor Modules is the same as the number of Armor Modules installed, the procedure is complete.
5. On the Armor ID Setup page, if you select "Armor ID 0," the IDs of all Armor Modules connected to the Main Control Module will be set to 0. This function is mainly used to set an armor module to a specified ID.



- Be sure to set the ID of an Armor Module in advance of using the Referee System, and ensure that the IDs of Armor Modules connected to the same Main Control Module are not repeated. If not set properly, the Armor Module ID will be detected as missing during the Robot Side initialization, and will be identified as Offline during use. The power output of the Robot Side will not be possible to enable, and the Main Control Module light bar will be displayed as yellow.

Camera Transmission Module Instructions

The Camera Transmission Module is divided into the VTM Transmitter and the VTM Receiver, which use "Auto pairing" and "Manual pairing" as their respective connection methods.

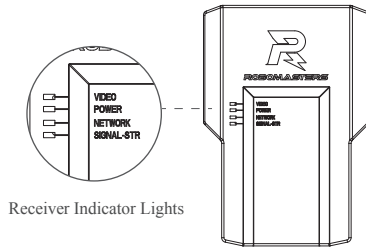
1. "Auto pairing": As the transmitter ID is bound to the Robot ID, videos and images can be properly transmitted only when IDs are matched between the transmitter and the receiver. The table below shows the matching relationship between the transmitter and the receiver:

Robot ID (VTM Transmitter)	VTM Receiver
Red 1	1
Red 2	2
Red 3	3
Red 4	4
Red 5	5
Red Base (corresponding to the VTM Transmitter ID of the Red team Aerial)	6
Blue 1	7
Blue 2	6
Blue 3	5
Blue 4	4
Blue 5	3
Blue Base (corresponding to the VTM Transmitter ID of the Blue team Aerial)	2

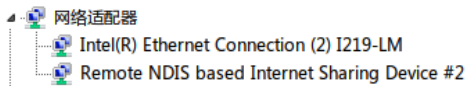
"Auto pairing" works as follows:

1. From the "Debug Option" menu of the Main Control Module, set the connection mode of the Camera Transmission Module to "Auto pairing" (default). For details, please refer to the "Robot Side Interaction Instructions" section of "Functional Descriptions of Robot Sides".
2. Connect the VTM Transmitter to the Main Control Module and set the Robot ID. For details, please refer to the "Robot Side Interaction Instructions" section of "Functional Descriptions of Robot Sides".
3. The VTM Receiver ID must be set by using "RoboMaster Tools" on the PC side, as follows:
 - a. Install the driver for the Camera Transmission Module:

Use a power adapter to power the VTM Receiver. Wait about 20 seconds until the POWER indicator is steadily lit in green and the SIGNAL-STR indicator is steadily lit in red, which indicates that the Receiver has started up. Use a USB cable to connect to the Receiver.

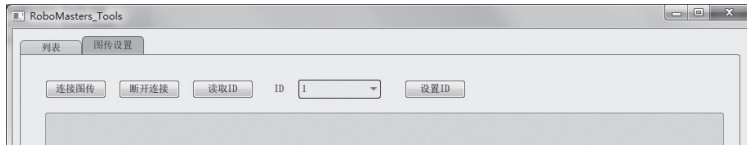


Open the Device Manager of your PC and expand the Network Adapter submenu to check for a "Remote NDIS based Internet Sharing Device", as shown in the figure below:



In general, for Windows 7 and Windows 10 operating systems, this driver will be automatically installed. If it is not, check the network settings of your PC or look for a third-party driver to ensure that this device is available;

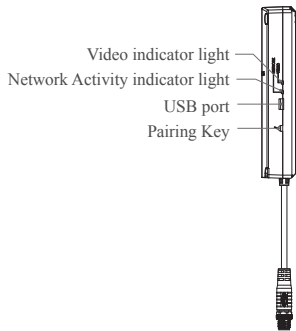
- b. Open "RoboMaster Tools" and select the "Camera Transmission Module Setup" page, as shown in the figure below:



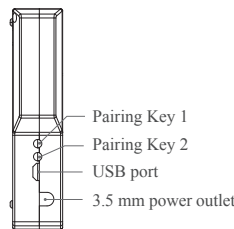
Download the "RoboMaster Tools" software.

<https://www.robomaster.com/zh-CN/products/components/detail/145>

- c. Click "Connect" to receive a "Connected" message, and then select the ID and click the "Set ID" button to receive an "ID Set Successfully" message.
 - d. Use an HDMI cable (not supplied) to connect the output from the VTM Receiver to a monitor that supports a 1920 × 1080 60 Hz display or a PC provided with a video capture card.
 - e. The Transmitter is successfully connected to the Receiver when their Network Activity indicator lights are steadily lit in green. If they are not connected for a prolonged period of time, please reboot the Camera Transmission Module and check whether the Robot ID and the VTM Receiver ID are set correctly.
2. "Manual pairing": In this mode, images can be transmitted only when the Transmitter is connected to the Receiver via manual pairing. Pairing steps are as follows:
1. From the "Debug Option" menu of the Main Control Module, set the connection mode of the Camera Transmission Module to "Manual pairing". For details, please refer to the "Robot Side Interaction Instructions" section of "Functional Descriptions of Robot Sides".
 2. Connect the VTM Transmitter to the Main Control Module. Wait about 20 seconds after the VTM Transmitter is powered up until the Network Activity indicator light is steadily lit in green, which indicates that the Transmitter has been started up.



VTM Transmitter



VTM Receiver

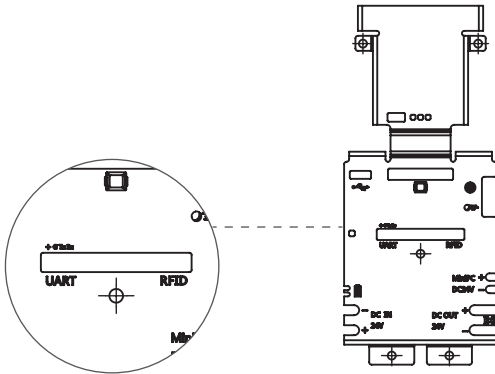
3. Use a power adapter to power the VTM Receiver. Wait about 20 seconds until the POWER indicator is steadily lit in green and the SIGNAL-STR indicator is steadily lit in red, which indicates that the Receiver has started up. Use an HDMI cable (user-supplied) to connect the output from the VTM Receiver to a monitor that supports a 1920*1080@60Hz display or a PC provided with a video capture card. After the VTM Receiver is started up, ensure that it is less than 2 m away from the VTM Receiver. Press the Pairing key on the Transmitter and the Pairing Key 1 on the Receiver (The order does not matter. On the Receiver, Pairing Key 1 is equivalent to Pairing Key 2). After the Pairing key is pressed, the Network Activity indicator lights on the Receiver and Transmitter will be steadily lit in red.

4 The Transmitter is successfully paired with the Receiver when their Network Activity indicator lights become steadily lit in green. If they still have not been paired after a prolonged period of time, please reboot the Camera Transmission Module and repeat step 3 to pair them again.

- ⚠ To receive videos and images using a Client, the PC side should be installed with a video capture card. If no card is available, the VTM Receiver can be directly connected to a monitor via an HDMI cable for display.
- Only seven camera transmission channels are open for user debugging. When more than seven camera transmission modules work at the same time, transmission interference may occur. Therefore, you can select only the Red team or only the Blue team for debugging. During combat, it is recommended to set to Red 1-Red 3 and Blue 1-Blue 3 to avoid conflict.

Introduction to the Main Control Module User Interface

To allow users to better carry out automatic control and obtain real-time competition data, a UART I/O interface is open on the Robot Side to output Robot Side data. Output data includes the remaining time in the competition, the robots' remaining HP, and real-time current and voltage value output from the chassis. In addition, user-customized data can be uploaded to the Client and will be displayed on the operator UI. A user can check the interface protocol instructions to implement this feature according to different competition specification manuals.

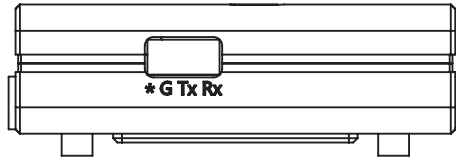


Descriptions of line sequence:

1. +: NONE, this line is vacant and not connected
2. G: GND, GND line for serial communication
3. Tx: transmission line for serial communication data
4. Rx: receiving line for serial communication data

Introduction to Robot Side Module Updates

1. Connect the serial communication module to the UART interface of the Referee System interaction screen. The interface is defined in the figure below:



Descriptions of line sequence:

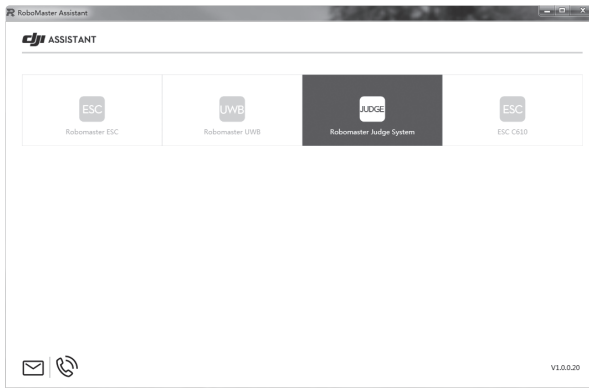
- a. *: NONE, this line is vacant and not connected
- b. G: GND, GND line for serial communication
- c. Tx: transmission line for serial communication data
- d. Rx: receiving line for serial communication data

A baud rate of 921600 is used when updating the Referee System. Ensure that the serial communication module can function reliably at this communication rate; otherwise, updating may be slow or even fail.

2. RoboMaster Assistant is used to update the Referee System modules. Download link:

<https://www.robomaster.com/zh-CN/products/components/assitant>

3. Run the update tool as shown in the figure below:



Click "JUDGE" to enter the update interface.

Precautions: This update tool must be connected to the Internet to download firmware required for module updates.

The software update interface is shown below:



1. Help page

On the update interface, the Help page shows software use instructions.

Note: If the Referee System modules fail to update, please try again. If the problem persists, reboot the Robot Side and try again, and check whether the serial communication module in use functions reliably at a baud rate of 921600.

RoboMaster Server

The Server is the service center of the entire Referee System. It collects data from all robots and Clients during the competition and visualizes it for users, and automatically determines the outcome of the competition. Download the Server, <https://www.robomaster.com/zh-CN/products/components/referee?index=1&position=58>.

When running the RoboMaster Server, the entire page appears as shown in the figure below:



On the software interface, press F1 to enter the Help page to obtain software use instructions.

Server Configurations

The computer host on which the RoboMaster Server is running must have the IP address set to 192.168.1.2 or 192.168.0.8 and the firewall must be disabled. For other configurations, refer to "Setting up a LAN".

RoboMaster Client

The Client is the first-person perspective application for an operator. With a capture card installed and a self-built Server connected, robot-related data uploaded from the Referee System can be viewed from a first-person perspective. This includes a robot's current HP, real-time projectile launching speed/rate, the battlefield mini-map, real-time chassis power output and teammate information. Download the Client, <https://www.robomaster.com/zh-CN/products/components/referee?index=1&position=57>.

The full UI page is shown in the figure below:



On the software interface, press F1 to enter the Help page to obtain software use instructions.

Client Configurations

To connect the Client to the competition server, the PC host on which the Client is running must work in the same LAN as the Server. Therefore, the static IP address of the PC host on which the Client is running is 192.168.0.100–200. If you run multiple Clients, a unique IP address should be used for each one.

Checking Functions on the Robot Side

After a Robot Side is installed, follow the instructions to connect each module and read and understand all usage instructions mentioned above.

1. Ensure that the supply voltage is correct and that the polarity of the power supply is reversed (rated input voltage for the Referee System is 12 V).
2. Ensure that wires are firmly connected to each module and that there is no risk of them being tangled into a movement mechanism.
3. Turn on the battery power, wait until the Main Control Module of the Referee System has started up (startup may take about 20 seconds), and then check the color of the light bar. If the Main Control Module of the Referee System is powered on for the first time after installation, a yellow light is displayed after startup. As the Armor Module IDs have not been set, the Main Control Module is not connected to the Server.

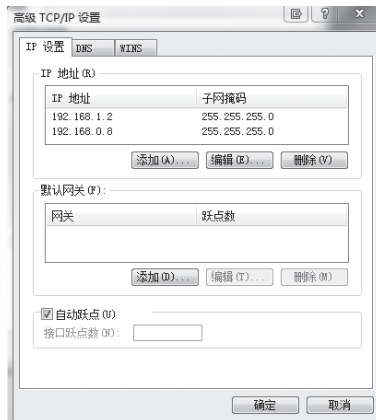
4. Set the Armor Module IDs (for details, refer to Setting Armor Module IDs).
5. In general, after the above operations have been completed, the Main Control Module light bar on the Robot Side will change from yellow to red or blue, and voltage will be output from the chassis and gimbal power output port. If the yellow light does not change color, view the message on the interaction screen to check whether the faulty module is properly connected. Refer to the "Robot Side Interaction Instructions" and "Robot Property Instructions" to set the correct robot type. The features of the Referee System can be further checked once the Referee System displays normally.
6. Tap armor modules in succession, and check whether the deducted HP value on the real-time data display page of the Main Control Module interaction screen is correct.
7. Launch a projectile and check whether the launching speed/rate values are displayed on the Main Control Module interaction screen.
8. Use an RFID Interaction Module test card to test the features and detection distance of the RFID Interaction Module. If the RFID Interaction Module data can be correctly read, its light bar will flash in red or blue depending on the robot. The direct effect of the RFID Interaction Module test card is to regenerate a robot's HP. (Pay attention to the detection distance. If the RFID Interaction Module and test card come into contact with a magnetic object, the detection distance and detection accuracy will be affected)
9. Set the VTM Receiver and the VTM Transmitter (for details, refer to the Camera Transmission Module Instructions). After setup is complete, check the video data of the VTM Receiver.

After the Robot Side is installed, you may proceed to the function debugging of the Referee System.

Setting up a LAN

When the Main Control Module on the Robot Side and the Server are using the same LAN, the Robot Side can be connected to the server for online combat. The following steps demonstrate how to set up a LAN:

1. Use a 2.4G (the Referee System supports only 2.4G) wireless AP with a LAN port (a home router can be used). Set the AP's IP address to 192.168.1.1, customize the SSID, set the password to 12345678, select WPA2 for the encryption method, and enable the DHCP function.
2. Connect the host on which RoboMaster Server is running to the wireless AP via a network cable and set the static IP address of the host to 192.168.1.2.
3. Under "Advanced Settings", click "Add" and add the IP address 192.198.0.8. See the figure below:



4. Connect the host on which the RoboMaster Client is running to the wireless AP via a network cable and set the static IP address of the host to 192.168.0.100–200.
5. Power a robot on to supply power to the Referee System. Following the “Robot Side Interaction Instructions”, connect the Robot Side to the wireless AP. After connection, the Robot Side will be in the same LAN as the Server via Wi-Fi.
6. The RoboMaster Server runs on the Server PC. You may check the connection status of the robot on the Server side. If a LAN is set up, you can check Robot Side related data on the Server side.

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