

V1.5

Using a 32-AH motor driver chip and
FPGA-based control (F502), the
RoboMaster C200 provides 100% motor
control for variable precision control over motor
torque.

Exclusively designed for the RoboMaster
series and RoboMaster C200, the motor driver
and motor control chip are integrated into
this ASIC. Assembly of the motor driver
and motor control chip is a two-step process.

RoboMaster System Expansion Module
RoboMaster System Expansion Module
RoboMaster System Expansion Module

RoboMaster System Expansion Module
RoboMaster System Expansion Module
RoboMaster System Expansion Module



ROBOMASTER

ROBOMASTER

UNIVERSITY SERIES

REFEREE SYSTEM

USER MANUAL

Prepared by the RoboMaster Organizing Committee
Updated on February, 2026

Disclaimer

Please read this disclaimer carefully before using this product. By using this product, you hereby signify that you have read and agreed 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, on-board module, RoboMaster Client, RoboMaster Engine, RoboMaster Tool 2, DJI Assistant 2 (RoboMaster Series) software 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.

Warning

Read the ENTIRE user manual to become familiar with the features of this product before operating. Failure to operate the product correctly can result in damage to the product or personal property and cause serious injury. This is a sophisticated product. It must be operated with caution and common sense and requires some basic mechanical ability. 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 use by children without direct adult supervision. DO NOT use with incompatible components or alter this product in any way outside of the documents provided by RoboMaster. Install and use this product in strict accordance with the guidelines provided by RoboMaster. It is essential to read and follow all of the instructions and warnings in the user manual, prior to assembly, setup or use.

Product Usage Precautions

1. Please ensure that the on-board module of the Referee System is installed correctly and firmly before use.
2. Please ensure that the wiring connection between each module on the Referee System's on-board module is correct before use.
3. Please ensure that the components are intact before use. Replace any worn or damaged components.

Using This Manual

Legend



Important



Hints and Tips



Reference

Related Documents

Specification of Each Referee System Module

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

Release Notes

Date	Version	Revision Record
Jan. 2019	v1.0	First Release
Mar. 2019	v1.1	Added VT02 & VT12 Video Transmitter Modules and Instructions
Jan. 2020	v1.2	Main Controller function to synchronously edit and delete VT01 & VT11 Video Transmitter Modules
Feb. 2022	v1.3	The functions of the Main Controller have been modified synchronously. Some of the links and descriptions have been updated.
Mar. 2025	v1.4	Revised descriptions of certain on-board module functions and RoboMaster Champion features to align with the new firmware version.
Mar. 2026	v1.5	Updated the function descriptions for the on-board module and the RoboMaster Engine. Removed introductions for VT02 & VT12 and added instructions for VT03 & VT13.

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Referee System Overview

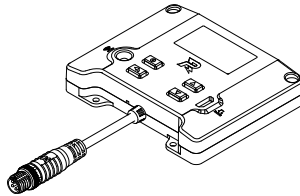
The Referee System is an integrated electronic judging system designed for robot competitions, combining computing, communication, and control functions. It is capable of monitoring robot power, projectile launching and damage, and automatically determining match results in accordance with the competition rules. The Speed Monitor Module monitors the robot's initial speed and speed; the Video Transmitter Module provides the user with a first-person view of the robot; the RFID Interaction Module interacts with the battlefield; and the Positioning System Module provides information on the robot's battlefield location. Users can establish a multi-robot combat system using the RoboMaster Champion and multiple on-board modules.

The Referee System is composed of the following:

1. The on-board module of the Referee System (hereinafter referred to as "on-board module")
2. The Referee System RoboMaster Champion (hereinafter uniformly referred to as the RoboMaster Champion) comprises three components: Server, Referee's Client and Player's Client.

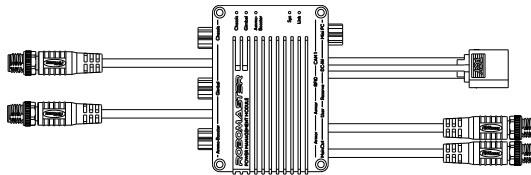
On-Board Module Modules

1. Main Controller Module (MC02): The Main Controller Module is the core control unit of the Referee System that monitors the operation of the entire system and includes human-machine interaction, wireless communication and status display features.



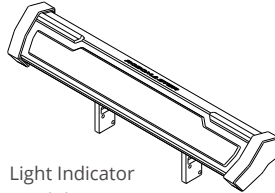
Main Controller Module (MC02)

2. Power Management Module (PM02): The Power Management Module functions control power to the chassis, gimbal, and launching mechanism, transmit data, detect the chassis power consumption, and automatically cut off power supply for propulsion when a robot's HP drops to zero.



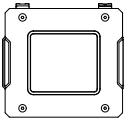
Power Management Module (PM02)

3. Light Indicator Module (LI01): The Light Indicator Module shows the current HP and status of your robot. By observing the status of the light indicator, you can identify the remaining HP and status of your robot.

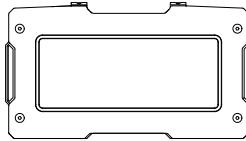


Light Indicator
Module (LI01)

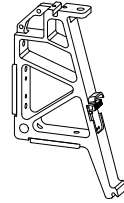
4. Armor Modules (AM02&AM12/AM03&AM13): The Armor Modules detect the status of incoming projectile attacks and collisions. They are divided into the Small Armor Module and the Large Armor Module.



Small Armor Mod-
ule (AM02/AM03)

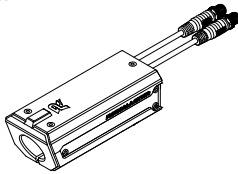


Large Armor Module
(AM12/AM13)

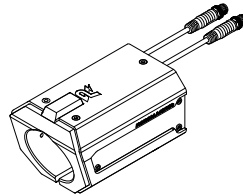


Armor Module Support
Frame A (AH02)

5. Speed Monitor Modules (SM01 & SM11): The Speed Monitor Modules detect the robot's initial speed and speed. This includes one Speed Monitor Module for 17mm projectiles and one for 42mm projectiles.



Speed Monitor Module for
17mm projectiles (SM01)



Speed Monitor Module for
42mm projectiles (SM11)

6. RFID Interaction Module (FI02): This module enables the On-board module to interact with the battlefield.

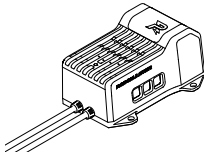


RFID Interaction Module (FI02)

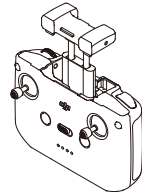


RFID Interaction Module

7. Video Transmitter Modules (VT03 & VT13): The Video Transmitter Modules provide the user with a first-person view. This includes the VTM Transmitter and the VTM Receiver. The transmitter of the VTM is installed on the on-board module, and the receiver of the VTM is connected to the computer running the player's Client.

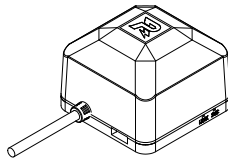


VTM Transmitter (VT03)



VTM Receiver (VT13)

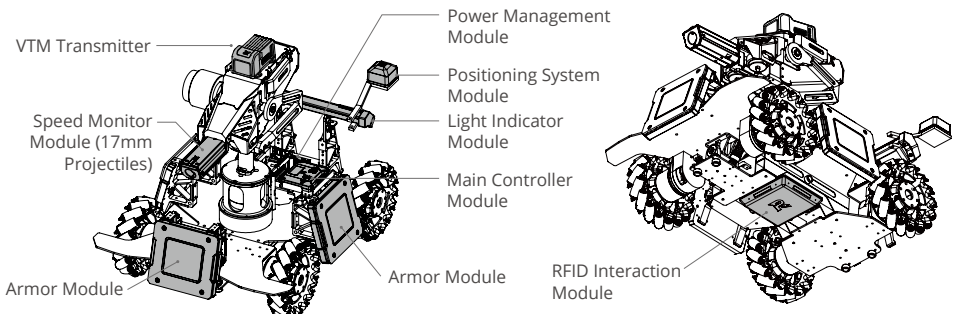
8. Positioning System Module (UW01): This module obtains the location of the robot on the battle-field.



Positioning System Module (UW01)

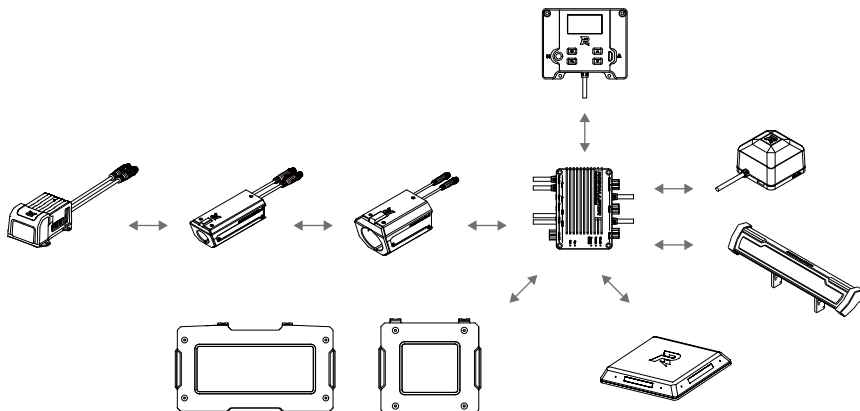
Installation of On-board Modules

The figure below shows the installation of each module of the on-board module.



Module Connection Diagram on the On-board module

The figure below shows the connection of each module of the on-board module.



* Module installation and use may vary for different robots. Please refer to the latest RoboMaster university series robot building specifications manual.

Download: <https://bbs.robomaster.com/wiki/20204847/804039>

RoboMaster Champion

RoboMaster Engine

The Engine is the control center of the entire Referee System. During competitions, it collects real-time battlefield data, visually presents the data to users, and automatically determines the outcome of the competition.

Go to <https://bbs.robomaster.com/wiki/20204847/804683> to download the engine.

The interface and functional area layout of the engine are shown in the figure below.



(Note: Different versions may vary slightly. Please refer to the version actually in use.)

RoboMaster Client

After the Client runs the first-person view application and connects to the server, the robot-related data uploaded by the Referee System can be viewed through the first-person view screen. Data includes the robot's current HP, real-time projectile initial speed and speed, real-time chassis status, thermal dynamics of launching mechanisms, power output, module connectivity, battlefield mini-map, and teammate information.

Go to <https://bbs.robomaster.com/wiki/20204847/804683> to download the Client.

The full UI page is shown in the figure below:



(Note: Different versions may vary slightly. Please refer to the version actually in use.)

Referee System Quick Start Guide

On-Board Module Configuration

Different types of robot can be set up through the Main Controller Module. At the same time, the type and quantity of robot Referee System Modules can also be customized on the Server. The table below shows the configuration of a single robot Referee System module. (The type and number of modules required depend on the robot type. For installation details, please refer to the latest RoboMaster university series robot building specifications manual.

Module Name	Quantity
Main Controller Module	1
Power Management Module	1
Light Indicator Module	0-1
Large and Small Armor Modules	0-6
Speed Monitor Module (17mm Projectiles)	0-4
Speed Monitor Module (42mm Projectiles)	0-1
RFID Interaction Module	0-1
VTM Transmitter	0-1
VTM Receiver	0-1

RoboMaster Engine Configuration

The computer host running the RoboMaster Engine Server must have its IP address set to 192.168.1.2, and all firewalls must be disabled. For other configurations, please refer to the RoboMaster Champion guide.

Run RoboMasterEngine.exe. After setting up the local IP configuration and successfully passing the external network connection tests, users can proceed to log in and access the main interface. The software will automatically start the Server and the logging system after login.

RoboMaster Champion Guide

For details, please visit:

<https://bbs.robomaster.com/wiki/20204847/804683>

Player's Client Configuration

To ensure that the Client can successfully connect to the Server, connect the computer host running the Client to the local area network where the competition Server is located, and set the IP address of the host to be obtained automatically.

1. Client Hardware Configuration

- a. VTM Receiver (outputs video signals and transmits remote control data).

- b. Robot Remote Controller (optional, user-supplied; only DT7 & DR16 remote control receiving systems are supported).
2. Client Software Configuration
- a. RoboMaster Remote Controller Driver (used to drive the robot remote controller)
- Download link:
<https://bbs.robomaster.com/wiki/20204847/814505>
- (Note: To install this driver, go to Control Panel > Clock and Region > Set Time and Date, and set the computer date to January 1, 2019 or earlier.)
- b. RoboMaster Client
- download link:
<https://bbs.robomaster.com/wiki/20204847/804683>
- c. DJI Driver (used to drive the VTM Receiver)
- Download link:
<https://bbs.robomaster.com/wiki/20204847/811832>
- For detailed usage instructions, please refer to the Manual below.
Download link: <https://bbs.robomaster.com/wiki/20204847/804683>

Robot Property Descriptions

The properties of different types of robots can be configured on the Server and synchronized to the Main Controller Module.

The table below shows the properties that can be configured:

Property Name	Property Information
Referee System module type and quantity	Refer to the "On-board module Configuration" section
Initial HP	0-65535
Maximum HP	The maximum HP 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 Initial Speed limit	Forced LM power disconnection will be triggered when the limit is exceeded.
42mm projectile Initial Speed limit	Forced LM power disconnection will be triggered when the limit is exceeded.
Robot's barrel heat limit	Forced LM power disconnection will be triggered when the limit is exceeded.
Robot's on-board module offline	HP will be deducted from the robot when some modules are offline
Robot chassis power consumption limit	Forced Chassis power disconnection will be triggered when the power limit is exceeded.

Competition Configuration

Multiple on-board modules can be combined to form a multi-robot combat mode. Users can choose to set up a local area network (LAN) for online combat based on their current status and conditions.

If a local area network (LAN) is set up, the Server must be used, and users must be able to check the HP and Referee System status of all On-board modules on the Server. Users may also use the Client, paired with the VTM Receiver, to operate a robot from a first-person view, check the HP and status of all On-board modules, and determine the outcome of the competition automatically with the aid of the Server.

If a LAN is not being used, a server is not required, but the outcome of the competition can only be determined by the HP displayed on the Light Indicator Module of the Referee System. Additionally, users may use the Client paired with the VTM Receiver to operate a robot from a first-person view, but cannot check HPs on the On-board module nor determine the outcome of the competition automatically.

Users can create LAN-based matches for “1v1” or “3v3” battles, customize match rules, and experience competitive gameplay. Example match modes include:

1v1 Battle

3v3 Team Battle

1v1 Mode

Users can select any two On-board module 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 can choose whether to set up a LAN or use a base for the 1v1 contest. (Note: Only the server of the Super RMUC rule version supports the use of a Base.)

The table below gives an example of a starting lineup:

Combatants	Robot type	Quantity	Remarks
Red team	Standard	1	/
Blue team	Standard	1	/

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

Module Name	Quantity	Remarks
Main Controller Module	2	/
Power Management Module	2	/
Light Indicator Module	2	/
Large Armor Module	0	/
Small Armor Module	0-8	/
Speed Monitor Module (17mm Projectiles)	0-2	Can be ignored if the launch initial speed and speed is unlimited
Speed Monitor Module (42mm Projectiles)	0	/
RFID Interaction Module	0-2	Can be ignored if no interaction with a battlefield is required
VTM Transmitter	2	/
VTM Receiver	2	/

3v3 Mode

You may arbitrarily select six sets of On-board module configurations according to the On-board module configuration table and install them to six robots respectively. Each set of On-board modules can be set as Red Team or Blue team. Make sure that three of them are set as Red team and the rest of them as Blue Team. The On-board module can choose whether to set up a LAN or use a base for the 3v3 contest. (Note: Only the server of the Super RMUC rule version supports the use of a Base.)

The table below gives an example of a starting lineup:

Combatants	Robot type	Quantity	Remarks
Red team	Standard	1	/
	Hero	1	/
	Sentry	1	/
Blue team	Standard	1	/
	Hero	1	/
	Sentry	1	/

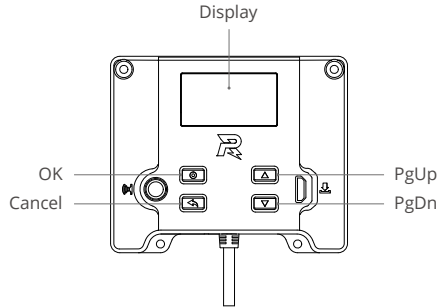
The table below shows the configurations of the Referee System modules required to set up the 3v3 combat system (except the base) above:

Module Name	Quantity	Remarks
Main Controller Module	6	/
Power Management Module	6	/
Light Indicator Module	6	/
Large Armor Module	0-8	/
Small Armor Module	0-16	/
Speed Monitor Module (17mm Projectiles)	0-4	Can be ignored if the launch initial speed and speed is unlimited
Speed Monitor Module (42mm Projectiles)	0-2	Can be ignored if the launch initial speed and 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	/

Description of On-Board Module Functions

On-Board Module 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 the corresponding function. Pressing and holding the same key will enable a different function.



Main Controller panel diagram

Homepage UI Description

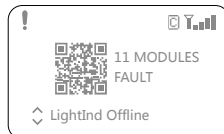
Homepage

This interactive webpage displays the initialization status of the Referee System. When the initialization is complete, the RoboMaster logo is displayed, as shown in the figure below:



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

 The QR codes shown in this section are examples. Please use the QR codes shown on the Main Controller panel during actual operation.



1. The "!" in the upper left corner indicates that the On-board module is not connected to the Server.
2. The "📶" in the upper right corner indicates the WiFi connection status and signal strength.
3. The "📶" in the upper right corner indicates the current WiFi connection type. The significance of the pattern descriptions is as follows:
 - a) : The currently connected WiFi is the User AP. A solid line means it is connected, and a dotted line means it is connecting.
 - b) : The currently connected WiFi is the Inspection AP. A solid line means it is connected, and a dotted line means it is connecting.
 - c) : The currently connected WiFi is the Competition AP. A solid line means it is connected, and a dotted line means it is connecting.

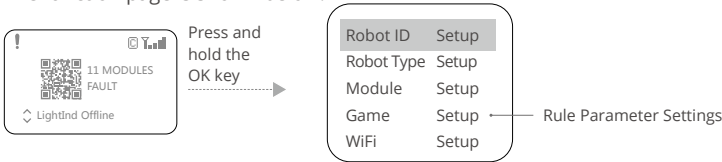
- 4. The QR code on the left from the center corresponds to the current fault. You can scan the QR code for a solution to the fault.
- 5. "11 MODULES FAULT" in the center means 11 modules are currently offline or defective.
- 6. "LightInd Offline" at the bottom means that the current Light Indicator Module is offline.
- 7. "↕" in the bottom left corner means that there is more than one defective module. By pressing the up or down keys, you can see the error information for the current offline or defective modules.

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. For some function pages, the current settings can be saved.
- 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 select a function.
- 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.

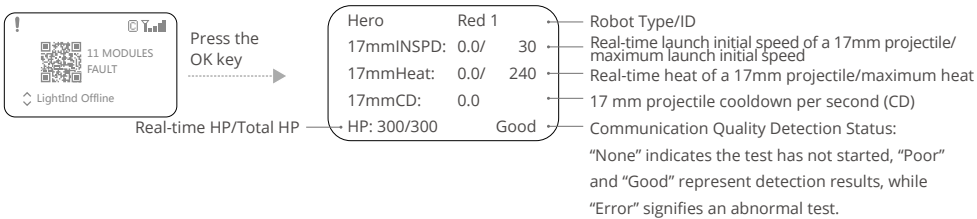
Function Page

The function page is used to display and set the robot functions, such as setting the Robot ID. The function page is shown below:



Real-time Information Page

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



Press the
PgDn key

▲ 0.0,0.0,0.0			Robot real-time coordinates; speed monitor orientation; UWB module orientation
42mmINSPD: 0.0/	16		Real-time launch initial speed of a 42mm projectile/ maximum launch initial speed
42mmHeat: 0.0/	200		Real-time heat of a 42mm projectile/maximum heat
42mmCD: 0.0			42 mm projectile cooldown per second (CD)
Ver: 12.0.0.1			Main controller version

Press the
PgDn key

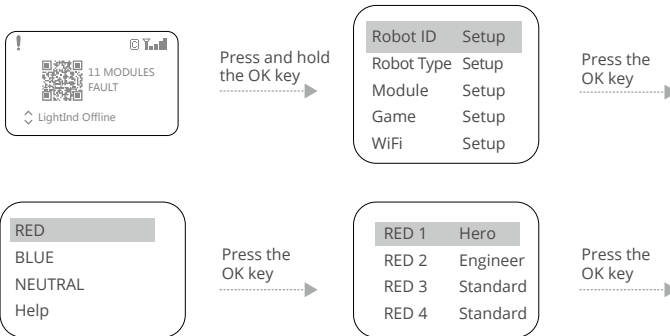
PowerBuf 0.0/	60		Real-time power buff energy level/Maximum power buff energy level
Power 0.0	80		Real-time power/Maximum power
Camera(Auto):Autot/0			Current channel/pre-set channel
Customer AP Connected			WiFi connection status
Can't find server			Server connection status

UI Function Descriptions

This chapter explains the actual use of the Main Controller UI, which includes functions such as the Robot ID settings, robot type settings, module settings, rule parameter settings, and WiFi settings.

Set Robot ID

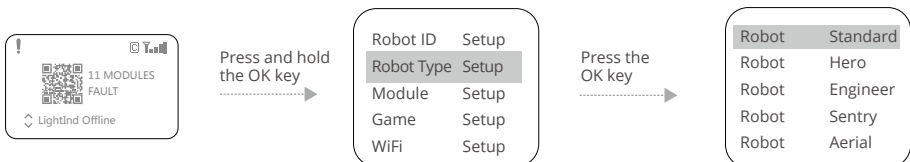
E.g. Set Robot ID to Red 1 Hero:



In the Robot ID setup, the Robot Type corresponding to the ID is the default setting. You can change the Robot Type in "Robot Type Setup".

Set Robot Type

E.g. Set Robot Type to Standard:



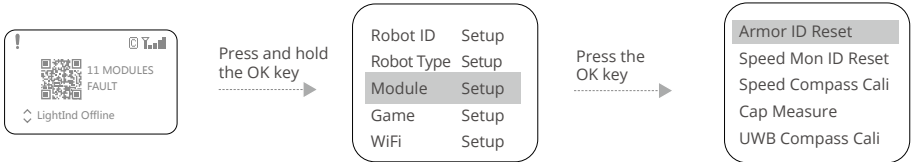
Module Settings

Set Armor Module ID

The Robot can have several Armor Modules, but they must have the correct ID settings.

The steps to configure the Armor Module ID are as follows:

- a. On the function page of the Main Controller Module, proceed as shown to enter the Armor ID Setup page:



- b. On this page, select “Armor ID Reset” to enter the Armor ID reset status. The panel light will flash at a certain frequency (for a red robot, the red light flashes; for a blue robot, the blue light flashes).
- c. 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 of the Armor Module that is hit first is 0, and the ID is sequentially incremented according to the order in which the modules are struck.
- d. 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.



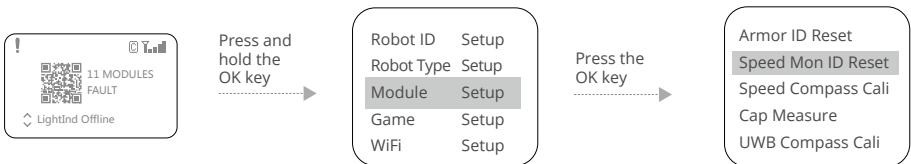
Be sure to set the ID of an Armor Module before use and ensure that the IDs of Armor Modules connected to the same Main Controller Module are not repeated. If there is a configuration error, the On-board module self-test will detect that the Armor Module is offline.

Set Speed Monitor Module ID

The Robot can have several Speed Monitor Modules, but they must have the correct ID settings. The Robot can distinguish between the detected projectile information and the module’s own angle information based on the Speed Monitor Module ID.

The steps to configure the Speed Monitor Module ID are as follows:

- a. On the function page of the Main Controller Module, proceed as shown to enter the Speed Monitor ID Setup page:



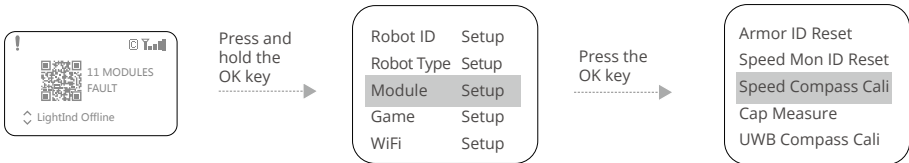
- b. On this page, select “Speed Mon ID Reset” to enter the Speed Monitor Module ID reset status. The side light panel of the Speed Monitor Module will flash red and blue at a set frequency.
- c. Insert opaque objects into the muzzle of the speed monitoring module sequentially from the front end to trigger the infrared sensor on the front end of the module. The side light panel will flash yellow, then go out and restart. Configuration of the Speed Monitor Module ID is now complete. The ID of the first 17mm-projectile Speed Monitor Module triggered is set to 0, and for each 17mm-projectile Speed Monitor Module triggered after that, this goes up in increments of 2: 2, 4, 6, etc. The ID of the first 42mm-projectile Speed Monitor Module triggered is set to 1, and for each 42mm-projectile Speed Monitor Module triggered after that, this goes up in increments of 2: 3, 5, 7, etc.
- d. After completing the above operations, check whether the Speed Monitor ID has been set successfully by looking up the version number of the Speed Monitor Module. If the read number of effective Speed Monitor Modules is the same as the number of Speed Monitor Modules installed, the Speed Monitor Module ID configuration is complete.

Speed Monitor Module Compass Calibration

The compass on the Speed Monitor Module can be calibrated through the interactive interface. This provides data for the On-board module and the Server to help determine the robots destroyed.

The steps to calibrate the Speed Monitor Module are as follows:

- a. On the function page of the Main Controller Module, proceed as shown to enter the Speed Monitor Module Calibration Setup page.



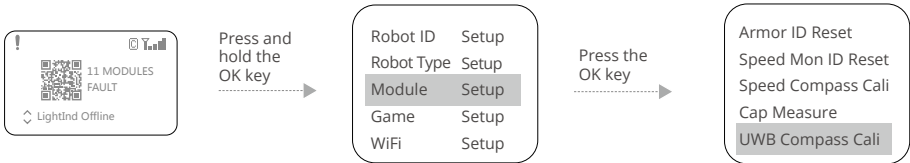
- b. On this page, select “Speed Compass Cali” to enter the Speed Monitor Module calibration status. The side light panel of the Speed Monitor Module will show a row of green lights, which is the horizontal calibration progress bar.
- c. Keep the barrel of the Speed Monitor Module horizontal (the angle of the Pitch and Roll axes should be less than 10°), and on the same spot, rotate 360° along the Yaw axis of the Speed Monitor Module. The horizontal calibration progress bar indicated by the side light panel of the Speed Monitor Module will gradually fill until the horizontal calibration is complete.
- d. When the horizontal calibration is complete, the side light panel of the Speed Monitor Module will show a row of purple lights, which is the vertical calibration progress bar.
- e. Keep the barrel of the Speed Monitor Module in the positive or negative direction of gravity (the angle difference should be less than 10°), and on the same spot, rotate 360° along the Roll axis of the Speed Monitor Module. The vertical calibration progress bar indicated by the side light panel of the speed measurement module will gradually fill until the vertical calibration is complete.
- f. If the calibration is unsuccessful, please repeat the above steps, or refer to the Speed Monitor Module installation guidelines in the the latest RoboMaster university series robot building specifications manual to check whether the Speed Monitor Module has been installed correctly.

Positioning Module Compass Calibration

Through the interactive interface, the compass on the positioning module can be calibrated to provide orientation data for the server.

Operation steps:

- a. On the Main Controller Module's function page, navigate to the positioning module calibration settings page.



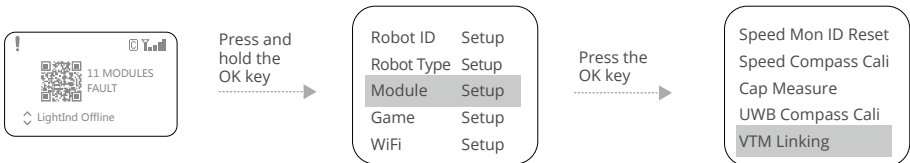
- b. Select "UWB Compass Cali" to enter the calibration status.
c. Keep the module horizontally aligned (the angle of the Pitch and Roll axes should be less than 10°) and rotate it 360° around the Yaw axis.
d. Upon successful calibration, the SYS indicator light will flash green rapidly (2Hz). If it flashes green slowly (1Hz), calibration failed.
e. If the calibration is unsuccessful, please repeat the above steps, or refer to the Speed Monitor Module installation guidelines in the the latest RoboMaster university series robot building specifications manual to check whether the Speed Monitor Module has been installed correctly.

VTM Linking

Via the interface, VTM transmitter and receiver linking can be performed via the interface. This is primarily to uniquely bind the VTM transmitter and receiver, enabling automatic connection upon power-on.

The operating steps for VTM linking are as follows:

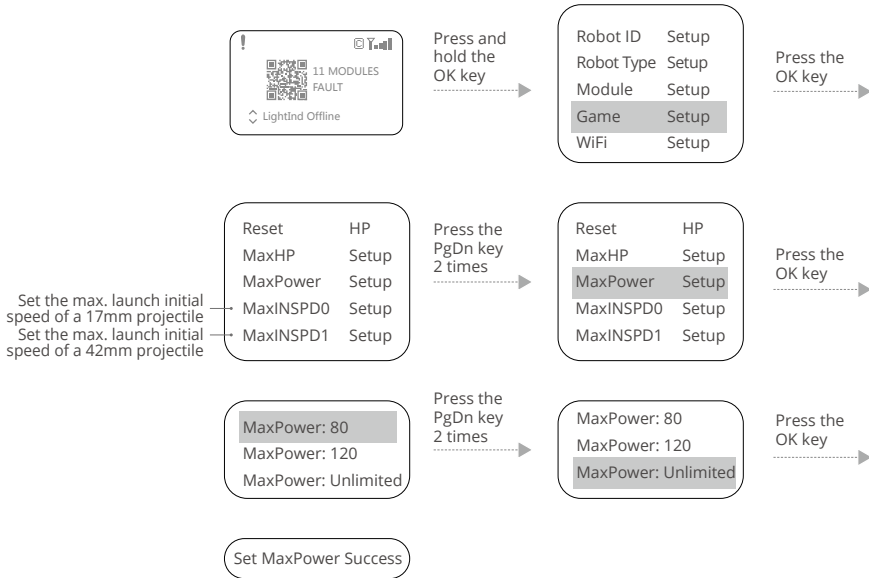
- a. Under the Main Controller's functional page, perform the following operations to enter the VTM linking settings interface.
b. On this page, select VTM Linking, and the VTM transmitter will enter linking state.
c. For detailed VTM linking steps, please refer to the latest version of the Video Transmitter Module (VT03&VT13) User Manual.



Rule Parameter Settings

In offline mode, through the interactive interface, you can set the robot's maximum HP, the maximum projectile initial speed, and the barrel heat limit.

For example, you can set the robot's power limit to infinite:



Based on the procedures above, you can also configure the following functions:

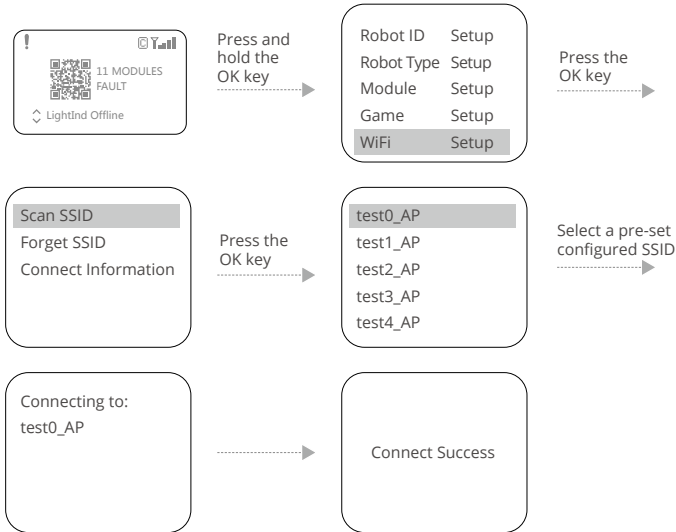
1. Reset HP
2. Set max. HP
3. Set max. power
4. Set max. launch initial speed of a 17mm projectile
5. Set max. launch initial speed of a 42mm projectile
6. Set max. heat of a 17mm projectile
7. Set max. heat of a 42mm projectile

Note: The upper limit may vary according to the competition rules; please refer to the actual display.

WiFi Settings

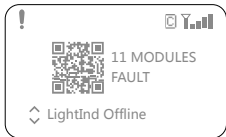
WiFi Connection

Through the interaction interface, users can choose a pre-set SSID configuration (the WiFi name) on the Main Controller Module to connect and communicate with the Server, as shown below:



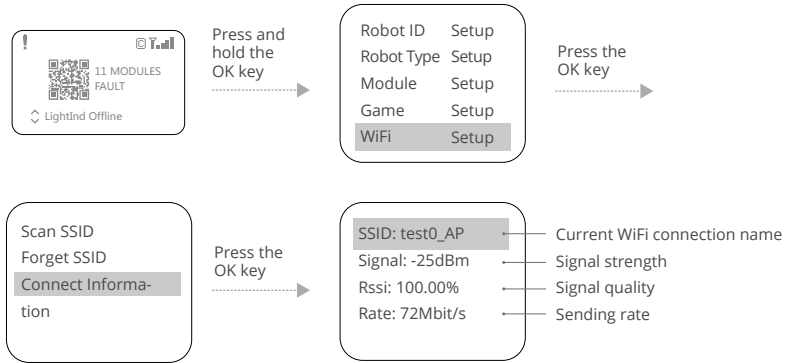
After scanning the SSID, select it, and press and hold the OK key to remember it. The Main Controller Module will automatically connect to this SSID upon startup. Click "Forget SSID" to ignore the remembered SSID.

After connection, the main interface will display the WiFi signal strength, as shown below.



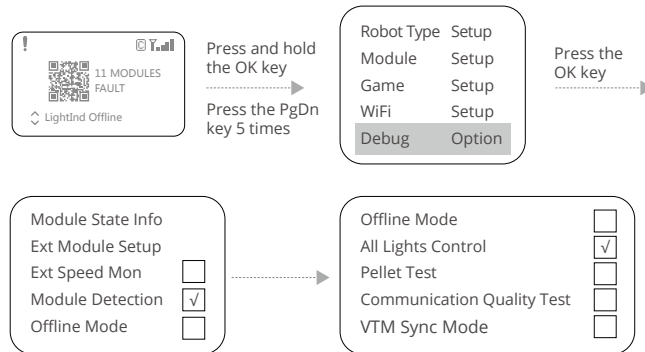
WiFi Information Search

Through the interaction interface, you can check the WiFi information for the current connection on the Main Controller Module, as shown below:



Debug Function

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



Ext Speed Mon indicates that the robot is equipped with an extra 17mm-projectile Speed Monitor Module. This setting is saved when powered off.

Module Detection can test whether the module is offline. If the module is offline, the Light Indicator Module will display the offline light and the UI will display the offline information. This setting is not saved when powered off.

In Offline Mode, the On-board module is offline. One of its features enables the "Chassis", "Gimbal", and Ammo-Booster power output ports of the Power Management Module to have normal power supply. This setting is saved when powered off.

All Lights Control: The robot indicator lights show that this function is enabled. This setting is not saved when powered off.

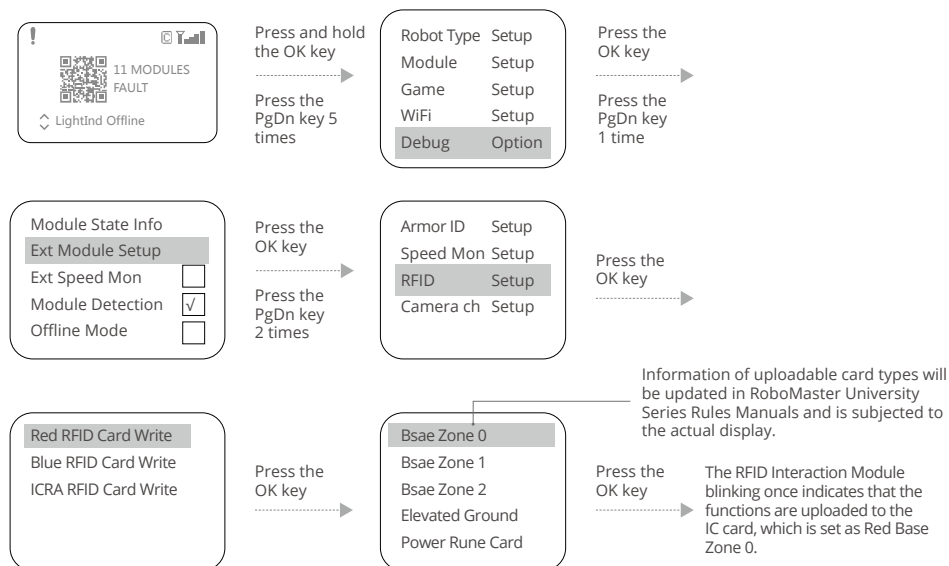
Pellet Test: The 17mm-projectile Speed Monitor Module is used for a fluorescent projectile brightness test. This setting is not saved when powered off.

VTM Sync Mode: When VTM Sync Mode is enabled and used in conjunction with the Video Transmission Synchronization Hub, it can improve video transmission performance and reduce interference when multiple VTMs are used simultaneously. This setting will be saved even after power-off.

Tap “Communication Quality Test” to initiate testing. The robot will perform predefined actions in a simulated competition environment. The on-board module will detect communication quality between the speed measurement module and Main Controller Module, with real-time test results displayed on the interface.

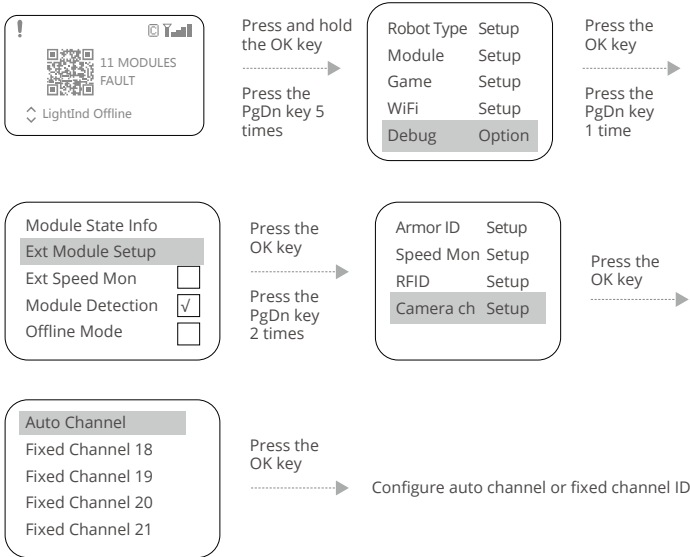
You can use the RFID Interaction Module to upload functions onto the IC card in “Ext Module Setup” as follows:

First, connect the Main Controller Module, Power Management Module and RFID Interaction Module, and place the IC card in the identification area of the RFID Interaction Module. As the light of the RFID Interaction Module blinks red/blue, operate the interactive interface as follows.



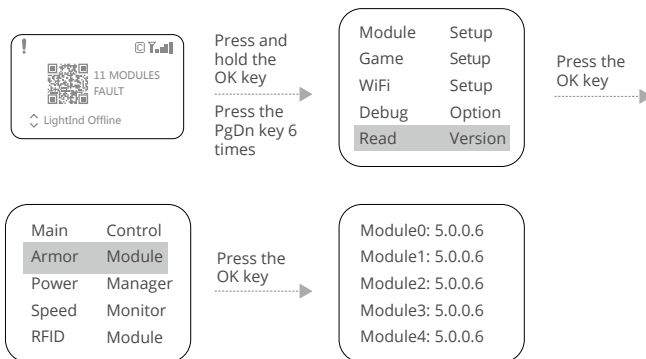
To change the IC card in the identification area of the RFID Interaction Module as needed, select the card type again, and upload functions onto the card.

Users can configure the video transmission channel from the “Ext Module Setup” menu and select either Auto or Fixed channel mode. The steps are as follows:



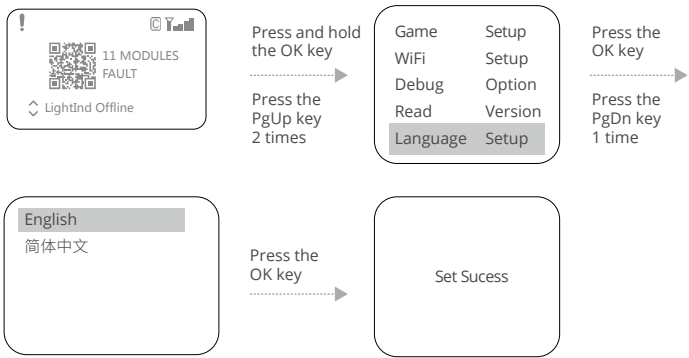
View Version Information

Through the interaction interface, you can check the version number of each module on the On-board module and check the Armor Module version information, as shown below:



Language Setting

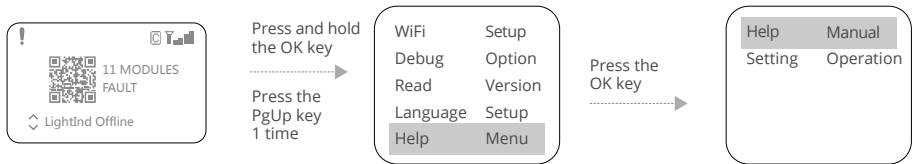
You can change the display language through the interactive interface. The settings are as follows:



Language settings are automatically saved, and the robot will display information in this language after it is powered on next time.

Help Menu

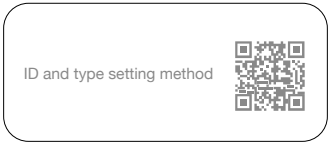
After entering "Help Menu" through the interactive interface, you can view common operations, manuals, etc., as follows:



"Help Manual" contains the QR codes linked to the RoboMaster University Series Robot Building Specifications Manual and the manuals for the Referee System. Users can scan the codes to view them.

Users can scan the QR codes for common settings assistance under "Setting Operation" .

Users can click on the Help pages under some menus on the interactive interface to access relevant information for assistance. Operational tips and QR codes for help links may also pop up during certain steps. Users may follow the instructions or scan the codes for assistance. For example:



Introduction to the On-Board Module Initialization

To ensure fair competition, it is important that all of the Referee System modules are working properly. Therefore, the On-board module will initialize each module after powering up. For robots equipped with armor modules or super-capacitor management modules, when any of the aforementioned modules fails its self-check, the light indicator module will remain solid yellow.

Camera Video Transmitter Module (VT03 & VT13) Auto / Fixed Channel Output Guide



This function is not supported in Japan.

Auto channel is recommended for general use. In this mode, the system automatically selects an optimal channel based on current RF conditions. In venues with heavy wireless interference, automatic channel allocation may result in multiple video transmitter modules operating on the same channel due to channel congestion. This can lead to image blurring or video stuttering. In such cases, users are advised to manually assign different Fixed channels to each device according to on-site conditions to avoid co-channel interference and ensure stable video output. When multiple sets of video transmitter modules are used simultaneously, enabling Sync Mode is recommended to further reduce interference between video transmission links. For detailed instructions, refer to the Camera Video Transmitter Module (VT03 & VT13) User Manual.

Auto Channel Output Configuration

Step 1: Preparation

1. Linking

Complete linking between the transmitter and receiver of the VTM.

For detailed linking instructions, refer to the VTM Linking section in the UI Function Description.

Note: After the initial linking is completed successfully, the devices will automatically reconnect during subsequent use without the need for re-linking.

2. Driver Check

Ensure that the DJI Driver required for the VTM is correctly installed on the computer.

Step 2: Connection and Video Display

1. Use a USB-C cable to connect the VTM receiver to the computer.

2. Launch the RoboMaster Client. Once the connection is established, real-time video output will be displayed, with Auto Channel enabled by default.

Step 3: Configure Auto Channel (Choose One Method)

Method 1: Configure via Main Controller

In the Main Controller interface, navigate to Debug> Ext Module Setup > Camera ch, then select Auto channel. The configuration is saved automatically.

Note: For detailed menu paths, refer to the Debug Function section in the UI Function Descriptions.

Method 2: Configure via RoboMaster Client

In the channel configuration interface of RoboMaster Client, select Auto channel. After the configuration takes effect, the information is automatically synchronized to the Main Controller and saved. For details of the channel configuration interface, refer to the RoboMaster Client settings shown in the next section, "Fixed Channel Output Configuration".

Fixed Channel Output Configuration

Step 1: Preparation

1. Confirm Linking

Ensure that linking between the transmitter and receiver of the VTM has been completed.

2. Driver Check

Ensure that the DJI Driver required for the VTM is correctly installed on the computer.

Step 2: Connection and Video Display

1. Use a USB-C cable to connect the VTM receiver to the computer.

2. Launch the RoboMaster Client. Once the connection is established, real-time video output will be displayed.

Step 3: Configure Fixed Channel ID (Choose One Method)

Method 1: Configure via Main Controller

In the Main Controller interface, navigate to Debug> Ext Module Setup > Camera ch, then select the required Fixed Channel ID. The configuration is saved automatically.

Note: For detailed menu paths, refer to the Debug Function section in the UI Function Descriptions.

Method 2: Configure via RoboMaster Client

In the channel configuration interface of RoboMaster Client, select the Fixed Channel ID. Once the configuration takes effect, the settings are automatically synchronized to the Main Controller and saved.



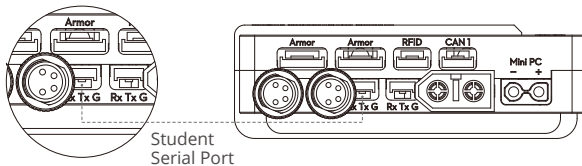
RoboMaster Referee System User Interface Guide

To help users carry out automatic control and obtain real-time competition data, a UART interface is available on the On-board module to output On-board module data.

Output data includes the remaining time in the competition and the robots' remaining. In addition, user-customized data can be uploaded to the Client and will be displayed on the operator UI. For more information about the Referee System Serial Port Protocol, refer to the document at the following URL:

<https://bbs.robomaster.com/wiki/20204847/804039>

The Referee System user interface is part of the Power Management Module. The exact location is shown below:



Line sequence descriptions:

1. Rx: receiving line for serial communication data
2. Tx: transmission line for serial communication data
3. G: GND line for serial communication

Checking Functions on the On-Board Module

After the On-board module is installed, follow the instructions to connect each module and carefully read all the usage instructions mentioned above.

On first power-up, carry out the following checks:

1. Check that the supply voltage is correct and whether the polarity of the power supply is reversed (the input voltage for the Referee System must not exceed 24 V).
2. Ensure that the wires are firmly connected to each module and that there is no risk of them being entangled in a moving mechanism.
3. Turn on the battery power, wait until the Main Controller Module of the Referee System has started up (startup may take about 20 seconds), and then check the color of the bar on the Light Indicator Module. When the Main Controller 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 Controller Module is not connected to the Server.
4. Set the Armor Module IDs (for details, refer to "Set Armor Module ID").
5. Normally, when the above operations are complete and all the On-board module modules are connected, the Main Controller Module light bar will change from yellow to red or blue. If the robot is in offline mode, the chassis, gimbal and launch ports will have voltage output. If the yellow light does not change color, view the message on the interactive OLED screen to check whether the faulty module is properly connected. Refer to the "On-board module Interaction Instructions" and "Robot Property Descriptions" to set the correct robot type. The features of the Referee System can be further checked once the Referee System displays normally.
6. Tap the armor modules in succession, and check whether the deducted HP value on the real-time data display page of the Main Controller Module interactive OLED screen is correct.
7. Launch a projectile and check whether the launch initial speed/speed values are displayed on the Main Controller Module interaction screen.
8. Use an RFID Interaction Module card to test the features and detection distance of the RFID Interaction Module. If the RFID Interaction Module card data can be read correctly, the module's light bar will flash red or blue, depending on the robot. (Pay attention to the detection distance. If the RFID Interaction Module and 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 latest version of VTM module (VT03&VT13) User Manual). After setup is complete, check the video data of the VTM Receiver.
10. Read the user interface data of the Main Controller Module of the Referee System and check whether the data is correct.

After the On-board module is installed, you may proceed to the function debugging of the Referee System.

RoboMaster Tool 2 Guide

RoboMaster Tool 2 (RMTool 2) is a utility used to configure and maintain Referee System-related devices. Its primary functions include firmware upgrading and switching for Referee System on-board modules, switching the synchronization hub mode for the VT03 video transmitter module (transmitter), and remote controller calibration for the VT13 video transmitter module (receiver). For detailed operating instructions, refer to the RoboMaster Tool 2 Guide.

Download link:

<https://bbs.robomaster.com/wiki/20204847/811111>

The main interface of RMTool 2 is shown below.



(Note: Different versions may vary slightly. Please refer to the version actually in use.)



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