Referee System Troubleshooting

1. Armor Module:
   1) Scenario: Both the red and blue indicator light bar of the Armor Module flash;
      Cause 1: Damaged sensor;
      Solution: Replace the Armor Module;
      Supplementary notes: The rated pressure resistance of the sensor equals to the pressure generated from golf ball strike at 16.5 m/s; during the use at ordinary times, the pressure generated from collision may be greater than that generated from golf ball strike at 16.5 m/s, so anti-collision structure must be enhanced when it is used at ordinary times.
      Cause 2: There is unreleased pressure when the Armor Module is powered on, for instance, the Armor Module is extruded by external forces when it is powered on;
      Solution: Eliminate external forces; if the Armor Module returns to normal when powered on again, then its use can be continued.
   2) Scenario: The red, blue and purple indicator lights of the Armor Module flash slowly, and meanwhile the Armor Module "offline" is displayed on the Main Controller Module;
      Cause: Incorrect setup of Armor Module ID;
      Solution: Reset the Armor Module ID;
      Supplementary notes: Different robots have different numbers of Armor Modules, and each Armor Module has its corresponding ID, for instance, Standard requires at least five Armor Modules, and the Armor Module IDs for Standard should be 0-4; if ID number 1 is missing, then the display screen of the Main Controller Module will display Armor Module 1 offline.
   3) Scenario: The indicator light bars of all Armor Modules display normally (the red robot is displayed as red, and the red light flashes when it strikes; the blue robot is displayed as blue, and the blue light flashes when it strikes), but the display screen of the Main Controller Module displays that the Armor Module is offline and the Main Controller Module goes into offline mode; no HP Deduction is displayed by the main controller when some Armor Modules are hit;
      Cause: If no HP Deduction is seen on the main controller when part of the Armor Modules are hit, then these Armor Modules may have an abnormal connection to the Main Controller Module;
      Solution: Check the connection of the Armor Module to the Main Controller Module and troubleshoot any abnormal connection;
   4) Scenario: The indicator light of the Armor Module is not lit when powered on, and the red onboard indicator light on the back of the Armor Module flashes quickly (5 HZ);
      Cause: The firmware of this Armor Module is damaged;
      Solution: Re-upgrade the firmware;
      Supplementary notes: When the firmware is upgraded in the referee system, if there are repeated Armor Module IDs, then some Armor Modules' firmware with repeated IDs can be damaged, for instance, when the out-of-factory Armor Module IDs are all No. 0, if ID is not set up, then upgrade it directly. If the firmware of multiple Armor Modules are damaged at the same time, then Armor Modules with repeated IDs should be disconnected, or only one Armor

Module should be connected to the Main Controller Module before update; by doing this, the repair can be completed.

5) Scenario: The green onboard indicator light on the back of the Armor Module flashes slowly (1 Hz), and the Main Controller Module goes into offline mode; normal HP Deduction can be seen on the Main Controller Module when this Armor Module is hit;
Cause: The indicator lights of this Armor Module are damaged;
Solution: Replace the Armor Module;

6) Scenario: the indicator light of the Armor Module is not lit when powered on, and the onboard indicator light on the back of the Armor Module is not lit;
Cause 1: abnormal power supply, power-on failure, or short circuits in the Armor Module;
Solution: Check the power supply lines of the Armor Module to troubleshoot abnormal lines;
Cause 2: Damaged Armor Module;
Solution: Replace the Armor Module;

7) Q: In this year, the wires of the armor are very difficult to plug and un-plug, how to deal with it?
A: In this year, the Armor Module is designed with a quick disassembly function, and frequent replacement of wires is unnecessary when you replace the module. If it is indeed necessary to replace the wires, it is recommended to take down the armor before you replace the wires, and this will very convenient.

2. Main Controller Module:
Main Controller Module Error Code List:

Related modules	Default error code (DEC)	Implication
Armor Module	80	Self-detection failure
	81	Damaged sensor
	82	Conflicted armor IDs
	83	Abnormal sensor data history
Power Management Module	96	Chassis overload
	97	Gimble overload
	98	Ammo-Booster overload
	99	Chassis self-detection error
	100	Gimble self-detection error
	101	Ammo-Booster self-detection error
Speed Monitor Module	112	Sensor error

Video Transmitter Module)	160	HDVT not started (connection not established)
	161	HDVT not enabled (connection not established)
	162	HDVT not connected (connection not established)
	163	HDVT not activated (connection not established)
	Others	Unknown error

1) Scenario: The progress bar of the light bar is incomplete when the referee system is not logged into the server, and HP Deduction cannot be achieved when striking the armor plate; the Speed Monitor Module can only read the Launch Speed, while the Launch Frequency and the barrel heat value remain as 0.
   Cause: The Main Controller Module is offline to online mode, neither offline logic calculation nor online logic calculation is performed, which is a normal scenario;
   Solution: When you have it into offline mode manually, normal HP Deduction and heat calculation can be performed; or when you log into the server and enter the online mode, the normal state can be recovered, too;
2) Q: If the Main Controller Module is installed inside the robot, and 70 mm unmasking is also met, is this ok?
   A: The Main Controller Module should be installed according to the specifications; as it has wireless communication inside itself, the communication can still be interfered when the Module is installed inside the robot, even if there is 70 mm unmasking. One needs to ensure by himself/herself that the communication is normal. Any consequence resulted from abnormal communication caused by improper installation of the main controller control is your own responsibility.

3. Power Management Module

1) Scenario: The red SYS indicator light flashes slowly at 1 Hz, and the green Link light flashes slowly; the Chassis/Gimbal/Ammo-Booster light is abnormally off and the corresponding interface output is abnormally interrupted during operation of the robot.
   Cause: Chassis/Gimbal/Ammo-Booster overload protection;
   Solution: Check if the robot load exceeds the limit, inspect the robot lines for short circuits or damages, and adjust the load and optimize the lines to resolve the problem.
   Supplementary notes: By reference to the "RM2019 Referee System Specification Manual", overload protection will be triggered when the power output interface of the Power Management Module reaches the hardware limit; therefore, it is recommended that the chassis and the gimbal should be supplied with power separately for all robots, so as to avoid triggering hardware protection and thus affecting the competition.
2) Scenario: The red SYS indicator light flashes slowly at 1 Hz, and the green Link light flashes slowly; the Main Controller Module goes into the offline

mode and the Chassis/Gimbal/Ammo-Booster indicator light is not lit.
Cause: Damaged Chassis/Gimbal/Ammo-Booster interface modules;
Solution: Replace the Power Management Module, meanwhile, check if the robot load exceeds the limit, inspect the robot lines for short circuits or damages, and adjust the load and optimize the lines to resolve the problem.

3) Scenario: The power detection value of the Power Management Module is close to the limited power value, with a deviation greater than ±5%: Standard and Hero have a deviation greater than ±4 W at a load of 80 W, while Sentry has a deviation greater than ±1 W at a load of 20 W.
Cause: The load power is less than 10 W; as the electric current is small, inaccurate detection is likely to happen, which is a normal scenario, however, some Power Management Modules may have greater errors due to loss of calibration parameters or hardware differences.
Solution: For constant load (power resistance or robot static load), comparative measurement using the power meter is conducted; for any Power Management Module with a measured deviation exceeding 5%, you can contact the after-sales for replacement, or replace it at the Inspection Area during competition;
Supplementary note 1: In the absence of power meter, you can use a multi-meter to measure the load voltage; the load voltage and load current values can be obtained easily and conveniently when a power box with current display functions is used to supply power; using P = UI to calculate the power and the power value measured by the Power Management Module for comparison;
Supplementary note 2: In the absence of power meter, you can also go to the Inspection Area and find the inspection staff for assistance, or borrow the electronic load meter for measurement during the competition;
Supplementary note 3: In case of a greater measurement deviation in modules passing the inspection, this cannot be used as the appeal reason for the competition, and if there are similar problems, the participating team needs to confirm that the module is properly functioning before inspection.
Q: What is the difference in logics of power measurement in the offline and online modes?
A: The power and residual energy values in the offline and online modes are measured and calculated by the Power Management Module, and the power limit value and the maximum value of buffer energy are synchronized by the server to the robot. In the online mode, the server performs the logic calculation of HP Deduction according to the parameters, while in the offline mode, the main controller performs the logic calculation of HP Deduction according to the parameters synchronized in the previous online mode;

4) Q: Is it possible for the power of the unmanned aerial vehicle not connected to the Power Management Module?
A: Yes, a unmanned aerial vehicle have a greater power, and it is not recommended to pass through the Power Management Module; you only need to ensure that the power of the launching mechanism can be controlled by the Power Management Module;

5) Scenario: The initial power of the Power Management Module is not 0.
Cause: As the current used for power within 10 W is relatively small, measurement deviation can occur, but is a normal scenario.

6) Q: After the chassis and other output interfaces of the Power Management Module are supplied with power, the power detection can be inaccurate, is this operation allowed?
A: It is not allowed. During competition, connection lines of the chassis load will be randomly checked at the Competition Area and the Inspection Area. If any violating connection or any behavior of evading the Power Management Module detection is found at the Competition Area, it will be handled as a cheating behavior!

4. Speed Monitor Module:

1) Scenario: The red and blue side light bars of the Speed Monitor Module flash;
Cause: The hole position of the sensor is not aligned, and is masked; the self-detection of the Speed Monitor Module is not passed;
Solution: Adjust the position of the Speed Monitor Module and the hole position of the sensor, check if there is any foreign matter on the sensor and troubleshoot any masking of the sensor;

2) Scenario: The green side light bar flashes quickly for five times when the Speed Monitor Module is started;
Cause: The Speed Monitor Module is not calibrated;
Solution: Refer to the User Manual and enter the setup menu of the Main Controller Module to complete the calibration;
Supplementary notes: The built-in magnetometer of the Speed Monitor Module is used to collect the launching angle of the projectile during launching, so calibration needs to be done, otherwise, hit detection error by the server can be triggered; the Speed Monitor Module should be installed far away from the magnetic field interference, otherwise calibration failure can be easily caused;

3) Scenario: The display screen of the Main Controller Module displays that the Speed Monitor Module is offline, and the green side light bar of the Speed Monitor Module flashes about once every 3 seconds;
Cause: Abnormal communication of the Speed Monitor Module;
Solution: Check the connection lines; in case of any damage to the aviation wire, replace the aviation wire; if the aviation wire on the Speed Monitor Module is damaged, then replace the Speed Monitor Module to troubleshoot abnormal connection lines;
Supplementary notes: The position of the Speed Monitor Module is closer to the friction wheel, and the module can be easily damaged by the friction wheel, so pay attention to its protection. In addition, when using the aviation plug, you should also keep in mind to twist the threaded part of the casing instead of the wire directly; wires inside the aviation plug can be broken in case of improper use;

4) Scenario: The display screen of the Main Controller Module displays offline Speed Monitor Module. The side light bar is not lit when the Speed Monitor Module is started. At this time, the side light of the Speed Monitor Module is still not lit when any sensor in Speed Monitor Module is masked, but there exists voltage on the input terminal of this module when a multi-meter is used for measurement;
Cause 1: The firmware of the Speed Monitor Module is damaged;
Solution: Re-upgrade the firmware of the Speed Monitor Module;
Cause 2: The Speed Monitor Module is damaged;
Solution: Replace the Speed Monitor Module;

5) Scenario: The Speed Monitor Module is not accurate in speed measurement; The Launching Mechanism launches projectiles continuously when it operates steadily and the projectile speed change amplitude is abnormal;
Cause 1: The sensor is contaminated and dusty;
Solution: Check the sensor and try to wipe and clean its surface with alcohol after power failure;
Supplementary notes: The dust generated by projectile wear will be attached on the surface of the sensor, affecting detection. Therefore, the surface of the

sensor needs to be cleaned and maintained periodically or after a certain amount of projectiles are launched.
Cause 2: The Speed Monitor Module may be fixed insecurely, and the Speed Monitor Module should be excluded from loosening by securing it or adjusting its installation method;
Supplementary notes: If the Speed Monitor Module is poorly fixed, the vibration generated as a result of projectile launching will cause failed alignment of the holes of the sensor in the Speed Monitor Module, thus triggering false detection of the sensor; in addition, the diameter of the pre-drilled sensor hole on the gun barrel is smaller, which will also easily cause failed alignment of the sensor holes due to vibration, thus triggering false detection and inaccurate speed measurement;

6) Scenario: Some projectiles are not measured when the Speed Monitor Module operates normally: No data of speed available when a projectile passes by the Speed Monitor Module;
Cause: Two projectiles are too close to each other when passing by the Speed Monitor Module, for example, two projectiles adhere together or the Launch Frequency is too high;
Solution: Pay attention to cleaning the projectiles and controlling the Launch Frequency to exclude the scenario where two projectiles are too close;

7) Q: Is it OK to install an industrial camera on the Speed Monitor Module?
A: It can be installed as long as it is not magnetic conductive. A magnet adsorption test can be simply performed. For a magnetic conductive device, the distance of 70 mm from the module is required;

8) Q: Is the heat at the barrel measured at home same as that measured on the Competition Area?
A: In the online mode, the calculation of heat is performed on the server side and the results are identical at stable communication; however, in an environment of commercial router set up by yourself, you should ensure a stable communication by replacing with a higher-performance router or reducing the number of simultaneously online robots.

9) Q: Is the 17mm Speed Monitor Module for the Hero required to be installed if you do not use it?
A: The server is unable to identify whether a participating team is using small-size gun barrels, so you must install it; otherwise, you will have you HP lost until defeat due to offline module in the competition.

5. Video Transmitter Module (VTM) (VT02 & VT12):

1) Scenario: The VTM Transmitter failed to be connected to the VTM Receiver end;
Cause 1: The VTM Transmitter or Receiver is not activated.
Solution: Activate the VTM Transmitter and Receiver respectively by reference to the VTM (VT02&VT12) Instruction in the RM2019 Referee System - User Manual.
Cause 2: In the setting panel interface of RoboMaster Client software, the serial port light is not lit and the serial port of the VTM is not identified at the VTM Receiver status.
Solution: Download and install DJI Phantom 4 Drivers_1.2_Installer driver by reference to the section on activation of the Receiver in the RM2019 Referee System - User Manual. Once it is installed successfully, open "Device Manager" in the computer to confirm that the com port of the Receiver can be

identified correctly.
Cause 3: The client software supporting for VTM VT02 is not applied.
Solution: Download and use RoboMaster Client_Vx.x.x.x (VT02) software from RoboMaster official website.
Cause 4: The roles of robots installed at the Transmitter and Receiver are different.
Solution: The robots at the Transmitter and Receiver are set up with the same role through the Main Controller Module and RoboMaster Client, respectively.
Cause 5: The roles of robots set up at the Transmitter and Receiver are identical, but the channel IDs are different. (see Page 2 of information display pages for onboard-terminal Main Controller Module, operation mode: Press "confirm" button once and then "page down" key at the home page of the Main Controller Module)
Solution: Update the firmware of the Main Controller Module to the latest version through "RoboMaster Tool 2". (v5.0.1.11 or above)

2) Scenario: The speed but not image can be seen at the Receiver after the connection to VTM is established;
Cause 1: No network card drive corresponding to the Receiver is installed in PC, or the setting of network card IP address corresponding to the Receiver is incorrect.
Solution: Open the "Device Manager" in PC to expand the submenu of network adapter and check if there is "Romote NDIS based Internet Sharing Device" (a virtual network interface card is created by this device in system); if no, please make sure that USB is connected to PC and the driver is installed automatically through network connection. After the driver is installed, check that the IP address of the virtual network interface card in the device is 192.168.42.105; if not, please set IP address as the address manually, and then restart the VTM Receiver. (Note 1: The network interface card of "Romote NDIS based Internet Sharing Device" rather than that included in PC needs to be set; Note 2: For Win10 system, please use the right of administrator to open the client software; otherwise, the ability of client to automatically set the IP address at the Receiver will be disabled)
Cause 2: The firewall in the PC is open to prevent image transmission.
Solution: Close the firewall in PC.

3) Scenario: There is mosaic in the images sent back by the Video Transmitter Module and severe delay occurs;
Cause 1: CPU and graphics card in PC are configured at low levels. When too many resources are occupied in decoding, CPU and graphics card cannot deal with them, leading to frame loss.
Solution: Select and use a desktop computer with high-level configuration of CPU and graphics card rather than laptop as practicable as possible; open RoboMaster Client software, select proper refresh frame rate in pop-up Graphics quality configuration page to ensure no display of images affected by mosaic. "Overall" represents unlimited image refresh frame rate; 60 fps represents 60 fps of image refresh frame rate; 30 fps represents 30 fps of image refresh frame rate. A higher refresh frame rate indicates a shorter delay of image transmission, but more resources are occupied by CPU and graphics card. 30fps is recommended for a computer with low-level configuration.

4) Scenario: The Video Transmitter Module can normally display images at the beginning, but after a while, the images are stuck for more than 10 seconds and then return to normal;
Cause: Check that the fans at the Transmitter are not rotating to cause severe heat at the Transmitter, requiring restart.
Solution: Replace the module.

5) Scenario: The images sent back by the Video Transmitter Module are obscure;
Cause 1: There is protective film not removed from glass of camera;
Solution: Remove the protective film;
Cause 2: The lens is out of focus;
Solution: Replace the module;
Supplementary notes: Long-term strenuous vibration or violent impact will cause looseness and defocus of lens, so please pay attention to protection when in use and damping during its installation;

6) Scenario: The images sent back by the Video Transmitter Module are stuck;
Cause 1: There is severe ambient interference;
Solution: Check the surrounding wireless devices, or turn off other Video Transmitter Modules; if the images recover, the cause is interference, and then the interference sources are excluded;
Cause 2: Internal antenna is damaged or the antenna is loose
Solution: Replace the module
Supplementary notes: Long-term strenuous vibration or violent impact will cause looseness of antenna, so please pay attention to protection when in use and damping during its installation;

7) Scenario: The setting of Receiver channel in the Video Transmitter Module is correct. However, the images are stuck in normal use or are connected to the Transmitters in Video Transmitter Modules of other robots;
Cause: There are conflicts in robot IDs;
Solution: Reset the robot IDs to exclude the conflicts of robot IDs.

8) Scenario: In case of normal output of images from the Video Transmitter Module, the startup of high-power interphone in a range of one meter around the Receiver could cause stuck images;
Cause: There is no shielding layer for USB connected to the Receiver, the signal was received and amplified by the Receiver when the high-power interphone is started, which exceeds the limit, causing the down of the Receiver.
Solution 1: Do not start high-power interphone around the Receiver.
Solution 2: Replace with a high-quality type-C USB cable with a shielding layer inside.

6. RFID Module:

1) Scenario: When the module is not installed on the body of the robot, the module can detect over 10 cm after it is powered on; when it is installed on the body of the robot, the detection distance is significantly shorter and less than 5 cm;
Cause: There is severe electromagnetic interference around the module.

Solution: Check whether the RFID Module is closer to motor or whether there are large-current wires and high-frequency signal lines passing over the module, including power lines of motor or RM center plate and Can signal lines; reroute to exclude the interference sources;
Supplementary notes: RFID Module is a module sensitive to electromagnetic environment, and the electromagnetic interference will seriously affect the detection distance of the module; rapidly changing current and signal may cause strong electromagnetic interference signal;

2) Scenario: When the module is not installed on the body of the robot, the detection distance is shorter than 5 cm when it is powered on;
Cause: The antenna of this module is damaged;
Solution: Replace the module;

3) Scenario: The indicator light bar of the module is not lit;
Cause 1: The power supply lines are abnormal: No power or short circuit;
Solution: Check the power supply lines to exclude wiring abnormality;
Cause 2: The firmware is damaged;
Solution: Re-upgrade the firmware;

4) Scenario: When the test card is used for testing, the yellow, red or blue indicator light bar of the module is steadily lit.
Cause: The test card is damaged;
Solution: Replace the test card.

7. Positioning System Module

1) Q: In common form, UWB is not masked, but will be momently masked when landing on the island and getting the projectiles as the frame is lifted, is it qualified?
A: Short-time masking when landing on the island and getting the projectiles is allowed.

8. Set up a local area network:

1) Scenario: When the referee system robot side is manually connected to the wireless AP, the Main Controller Module cannot search the hotspot of the wireless AP, but this hotspot can be searched with the WiFi feature of a phone; when the display screen of the Main Controller Module is used to search the version of the main controller, the correct Mac address fails to be displayed;
Cause: Faulty WiFi module inside the Main Controller Module;
Solution: Try to reboot the referee system, manually connect the robot side to the wireless AP after 20 seconds of booting. If it is not solved, please replace the Main Controller Module;
Supplementary notes: The power-on initialization of WiFi module inside the Main Controller Module takes about 15 seconds;

2) Scenario: When the referee system robot side is manually connected to the wireless AP, the Main Controller Module cannot search the hotspot of the wireless AP, but this hotspot can be searched with the WiFi feature of a phone; when the display screen of the Main Controller Module is used to search the version of the main controller, the correct Mac address is displayed;

Cause: Faulty antenna of WiFi module inside the Main Controller Module;
Solution: Replace the Main Controller Module;

3) Scenario: When the referee system robot side is manually connected to the wireless AP, the Main Controller Module reboots automatically;
Cause: The version of the Main Controller Module is too low;
Solution: Upgrade the firmware of the Main Controller Module;
Supplementary notes: There are less than five ssid signals around the old version of firmware, and the scanning of signal by the Main Controller Module will reboot the main controller;

4) Scenario: When the referee system robot side is manually connected to the wireless AP, the hotspot of the wireless AP cannot be searched or searched with the WiFi feature of a phone; when the display screen of the Main Controller Module is used to search the version of the main controller, the correct Mac address is displayed;
Cause: The wireless AP does not work normally;
Solution: Check whether the wireless AP works normally, and ensure that the wireless AP can be searched using a phone;

5) Scenario: When the referee system robot side is manually connected to the wireless AP, the hotspot of the wireless AP can be searched, and the home page of the display screen of the Main Controller Module displays no signal; this hotspot can be searched with the WiFi feature of a phone, but it cannot be connected using the password of 12345678;
Cause: Configuration error in the wireless AP;
Solution: Check whether the password of the wireless AP is 12345678 and whether the DHCP feature is enabled, and ensure that the phone can connect to this hotspot;

6) Scenario: When the robot side is manually connected to the wireless AP, the home page of the display screen of the Main Controller Module displays no signal, and the WiFi feature of a phone can connect to this hotspot with the password of 12345678;
Cause: Setting error in the frequency band of the wireless AP;
Solution: Check whether the wireless AP supports 2.4G frequency band and whether the setting frequency band is 2.4G;

7) Scenario: When the robot side is manually connected to the wireless AP, the home page of the display screen of the Main Controller Module displays signal, but the connection is unstable and the signal is less than three bars; the WiFi feature of a phone can connect to this hotspot with the password of 12345678, with the signal of full bars;
Cause: Faulty antenna of WiFi module inside the Main Controller Module;
Solution: Please replace the Main Controller Module;

8) Scenario: When the robot side is manually connected to the wireless AP, the home page of the display screen of the Main Controller Module displays signal, the server side cannot check the robot's HP by running RoboMaster Server software, and the management page of the wireless AP can be opened using the server computer;
Cause: configuration error in the server side;
Solution: Refer to the RM2019 Referee System User Manual to check whether the server IP address contains 192.168.1.2, do not configure the gateway,

use the automatically generated 255.255.255.0 as the subnet mask, and check whether the setting IP address works;

9) Scenario: When the robot side is manually connected to the wireless AP, the home page of the display screen of the Main Controller Module displays signal, the server side cannot check the robot's HP by running RoboMaster Server software, and the management page of the wireless AP cannot be opened using the server computer;
   Cause: Error in the connection of the server computer to the wireless AP;
   Solution: Check whether the connection of sever to the wireless AP is local area network connection, whether the network cable is properly attached and whether the network cable is reliable;

10) Scenario: When the robot side is manually connected to the wireless AP, the home page of the display screen of the Main Controller Module displays signal; when the server side runs RoboMaster Server, an exclamation mark is displayed on the upper left corner of the home page of the main controller and RoboMaster Server software cannot check the robot's HP; at this moment when the Main Controller Module version is checked from the Main Controller Module, the IP address of the Main Controller Module is displayed as 192.168.1.x;
    Cause: The robot whose ID and type do not meet the competition specifications cannot log in to the server;
    Solution: reset the ID of the robot;

11) Scenario: After the robot side is connected to the server, the server side can check the robot's HP by running RoboMaster Server software, but the Client cannot display the robot's HP and the LOGIN indicator light on the lower left corner of the client is red;
    Cause: the Client fails to log in to the server;
    Solution: Log in the client manually, and ensure that the client logs in to the server;

12) Scenario: After the robot side is connected to the server, the server side can check the robot's HP by running RoboMaster Server software, but the client fails to log in to the server and displays failure of TCP connection;
    Cause 1: Configuration error in the client;
    Solution: Refer to the RM2019 Referee System User Manual to check whether the IP address of the client is set as static IP and whether the IP address is in a range of 192.168.0.100~192.168.0.200, and check whether the subnet mask of the client is 255.255.255.0;
    Cause 2: Error in the network cable connection between the client and the server;
    Solution: Use the ping command in the command window of the client to check whether the connection to the server is normal, and ensure that the physical connection is normal and the IP address is properly set.
    Cause 3: The firewall or antivirus software of the client or the server occupies the communication port
    Solution: Close the antivirus software and firewall, and try to reboot the software.

13) Scenario: After the robot is connected to the server and logs in successfully, the connection of the robot is unstable with a high probability of lost connection, but it can be connected again;
    Cause 1: The wireless AP is unstable, with much interference in the surrounding environment
    Solution 1: Select the communication channel of the wireless AP manually and switch to a stable communication channel, with xx communication channel as a recommendation;

Solution 2: Replace a wireless AP that is more reliable in quality and stronger in signal;
Cause 2: There are too many robots connecting to the current wireless AP
Solution: Reduce the number of simultaneously online robots. A higher number of robots means higher requirements for performance of the wireless AP; an incomplete test shows an ordinary household AP can only support six robots to stay online stably at the same time;
Cause 3: The main controller antenna of the robot is abnormal, and the signal displayed on the main controller is less than three bars;
Solution: Replace the Main Controller Module or bring the robot closer to the wireless AP;
Supplementary notes: The wireless AP used in the competition is customized by the Organizing Committee, and the unstable connection will not occur. The participating teams need to set up an applicable wireless environment when practicing in their schools.

9. Server
   1) Scenario: The robot is lack of important modules. After connection to the server, the HP will be lost frantically from a robot once the competition begins, which will affect the debugging;
      Cause: The robot is lack of important modules, which triggers the off-line HP Deduction logic of the server module;
      Solution 1: Complement the missing modules;
      Solution 2: Modify the configuration table of the server, with the file path of the configuration table as:
      Server->config->Standard->RobotModuleConfig.csv; save the modification and then reboot the server;
10. Client
   1) Scenario: After the robot's remote controller is connected to the client PC, the indicator light of the remote controller on the lower left corner of the client is not lit; open the PC's device manager and find abnormity in the driver of the remote controller;
      Cause: The client fails to open the serial port of the remote controller;
      Solution 1: Check whether the USB cable connection of the remote controller is normal; if the device is detected but the driver is abnormal, it is necessary to download the driver of the remote controller, update the driver, and reboot the client to solve the problem;
   2) Scenario: After the robot's remote controller is connected to the client PC, the indicator light of the remote controller on the lower left corner of the client is not lit; open the PC's device manager and find that the driver of the remote controller is normal;
      Cause: The client fails to open the serial port of the remote controller;
      Solution 1: Check if any other software in the client PC occupies the serial port of the remote controller, reboot the client after disabling the software to solve the problem; for parts of win10 systems, an old version of client cannot identify the serial driver automatically installed by the system, so it is necessary to update the version of the client to a version higher than 5.0.1.2;
   3) Scenario: The user interface data display screen of the client fails to display data;
      Cause: 1.Incomplete function of client student interface with a lower version; 2.The user and reserved interfaces of the Power Management Module are designed without fool-proofing feature and are thus easy to be inserted improperly; 3.Error in the protocol sent by the serial port;
      Solution: 1.Ensure the version of the client is higher than version 5.0.1.14; 2.Check whether the interface is correct; 3. Ensure that the data are sent from the

serial port using the serial debugging assistant and that the protocol is correct according to the protocol manual;

Appendix: Summary Table of Referee System Module Light Effects

Major function	**Sub-function**	**Main light of the light bar**	**Auxiliary light bars on both sides**	**RFID light**	**Armor light**	**Speed Monitor Module light**	**Power Management Module**	**Priority**
Normal status	Default state during normal startup	Display current HP	With levels + in competition Periodically flash for N times No levels or not in competition: Red/blue light steadily lit	Red/blue light steadily lit	Red/blue light steadily lit	Ordinary robot: Display the percentage of current heat/current heat upper limit Unmanned aerial vehicle: Red/blue light steadily lit (display one bar only)		0
	Initialization	Red/blue progress bar	Red/blue light steadily lit					6
	HP recovery	Red and blue HP bar + green bar rolling Notes: The project robot is not hit for	Red/blue light steadily lit					14

		consecutive 30 seconds + green bar rolling						
Base	When the seven-minute match begins, no first blood occurs				Purple light steadily lit for Armors 0, 1 and 2, and it does not flash when they are hit			17
Overheat and speed exceeded	Overheat					Purple light fades in and out		8
	Speed exceeded					Red/blue light flashes once		7
Module offline	Not in competition; critical module offline	Yellow light steadily lit	Yellow light flashes					2
	Not in competition; general module offline	Display HP	Yellow light steadily lit					1

	Non-critical module offline during the competition	Display HP	Yellow light steadily lit					9
	Critical module offline in the match	Display HP	Yellow light flashes					10
buff bonus	Attack bonus (large and small energy trigger)	Display HP	White light flashes quickly	Flash quickly in its own color				12
	Defense/heat buff			Flash quickly in its own color				11
	Unbeatable	The whole HP bar is green	Green					18
	Big buff + defense/cooling buff		White light flashes quickly	Flash quickly in its own color				13
Attack and destroy	Attack with 42mm large projectile	White light flashes	White light flashes	Flash quickly in	Appropriate armor light flashes			16

				its own color				
	Attack with 17mm small projectile			Flash quickly in its own color	Appropriate armor light flashes			15
	Revive	The colored light moves from the center to both sides	Red/blue light steadily lit					19
	Revive progress bar	Green bar moves quickly, with green progress bar	Red/blue light steadily lit	Red/blue light steadily lit	Off	Red/blue light steadily lit		22
	Destroyed	Off	Red/blue light steadily lit	Red/blue light steadily lit	Off	Red/blue light steadily lit		21
	Ejected	Off	Off	White light steadily lit	Off	Off		23
	Warning	Yellow light steadily lit	Red/blue light steadily lit					20

Functional support	Module upgrade (the light's effect priority is uncontrollable as the loader directly send the progress bar to the Light Indicator Module)	Green progress bar	Red/blue light steadily lit					0xFFFFFFFE
	Search command	Green light flashes	Green light flashes					0xFFFFFFFD
	All off (final makeup image) (the light effect's priority is the highest)	Off	Off	Off	Off	Off		0xFFFFFFFF
Armor abnormality detection	Armor ID setting				Red/blue light flashes slowly			
	Armor sensor damaged				Red light and blue light flash alternately			

	Failure of armor to successfully communicate with the Referee System after being powered on				Purple light flashes slowly at 1 Hz			
	Armor module ID conflict				Red light, blue light and purple light flash alternately			
	Failed communication of armor to the main controller				Purple light flashes quickly at 5 Hz			
Power Management Module	Normal system function						SYS red light flashes slowly at 1 Hz	
	Firmware damaged						Sys red light	

							flashes quickly at 3 Hz	
	Connection to main controller						Link green light flashes at 1 Hz	
	Chassis/gimble/ammo-booster powered on						chassis/gimbal/ammo-booster green light steadily lit	
Light Indicator Module abnormality	Failed communication of Light Indicator Module to the main controller	Yellow light flashes slowly	Yellow light flashes slowly					
RFID module	Successfully card writing			White light steadily lit				

	Invalid IC card detected			Yellow light flashes				
	Radio-frequency signal been interfered			Yellow light steadily lit				
Speed Monitor Module	Valid infrared command detected by main controller					A row of red/blue lights flash once at the end of barrel of the Speed Monitor Module		
	Sensors masked or damaged					Red light and blue light flash alternately		
	Power-on self-inspection passed					Off after green light is steadily lit for 0.5 seconds		
	Failed communication with Main Controller Module					Green light flashes slowly		

	Projectile launching detected					Arrow waterfall light for once		