Verolink P33 1.4Ghz 60km Wireless Data/Video Transmission System

User Manual

Version：20240701V7.1

Verolink

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Version history

Date	Version	Modification description
20230905	V1.0	Initial version
20230906	V2.0	Add version history
20230921	V3.0	Modified accessory small antenna gain Pictures and text in sections 5.3 and 5.6
20231031	V4.0	Added notes, SBUS function Modified the web serial port option
20231204	V5.0	Devices can communicate with each other's IP addresses. The IP addresses can be changed on the WEB side
20240315	V6.0	Modified 4.1 Power Supply, 5.4; 5,5; 5.7 Chapters
20240405	V7.0	Modified 4.1 Power Supply, 5.4; 5,5; 5.7 Chapters
20240701	V7.1	Modified interface description in 4.2 and section 5.4 to add SBUS configuration

Notes

1. Ensure that the correct voltage is used to power the device. 12V/24V is recommended.
2. Install the antenna before powering on the device to avoid circuit damage. Place the two antennas of the device at a distance greater than 15cm away from large metal structures to avoid communication obstruction caused by the preceding reasons.
3. Make sure that other electronic devices are not placed too close to the antenna. To avoid affecting the ground noise of the device.
4. Pull distance as far as possible to make the ground end antenna without obstacles. The height of the ground antenna is greater than 3 meters.
5. Before use, please ensure that all the connections are tight and reliable, and all the components work normally.
6. Please do not disassemble or modify, otherwise there will be no warranty. If the failure occurs during installation or testing. To solve the problem, please contact the original technical support.

Catalogue

Version history 2
Notes 2
1 Product overview 4
2 Product accessories 4
3 Product connection 6
3.1 Connection diagram(Air) 6
3.2 Air Connection 6
3.3 Connection diagram(Ground) 7
3.4 Ground Connection 7
4 Product use 8
4.1 Power supply 8
4.2 Wiring definition 8
4.3 Product indicator meaning 10
5 WEB Parameter configuration 12
5.1 Device IP 12
5.2 WEB Account number and password 13
5.3 System Settings 14
5.4 Serial Settings 15
5.4.1 Serial-to-Serial 15
5.4.2 SBUS configuration 17
5.4.3 Series-to-network / Network-to- series 18
5.5. Pairing Settings 20
5.6 IP configuration（Network Settings） 21
5.7 Wireless Status 22
5.8 Wireless Noise 23
5.9 Factory Reset 24
5.10 Software Upgrade 24
5.11 Products Info 25

1 Product overview

Verolink P33 is a TDD wireless transmission equipment. The product has the functi ons of real-time interference detection, adaptive frequency selection, adaptive stream, and automatic retransmission, automatic power control, which greatly improves the abi lity of anti-multipath and anti-interference. It has the characteristics of high reliability, good stability, and low delay.

This product is suitable for firefighting, inspection, monitoring, and other scenarios. In the case of good air-to-ground visibility, the transmission distance is up to 60KM+.

2 Product accessories

S1400-P33 Product list (2)			
No	**Product**	**Instructions**	**Num**
1	S1400-P33	TDD wireless transmission radio	2
2	J30J-25pin	30cm cable	2
3	Little glue stick antenna	Gain: 2.5dBi	2
4	Small antenna extension cable	1m cable	2
5	All-in-one ground terminal antenna kit (optional)	6dBi/9dBi Omnidirectional antennas	1
6		Omnidirectional antenna 3m extension cable	1
7		13dBi flat directional antenna	1
8		Directional antenna 4m extension cable	1
9		3m bracket + hand crank + U-shaped piece	1

Video&Data module

J30J-25pin

2.5dBi small antenna

Small antenna extension cable

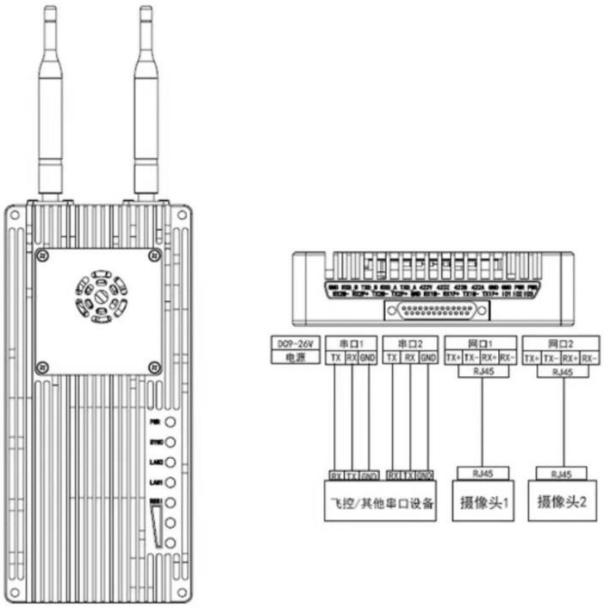
6/9dBi+13dBi antenna + bracket

Fiberglass antenna extension cable

Flat-panel directional antenna extension cable

3 Product connection

3.1 Connection diagram(Air)



3.2 Air Connection

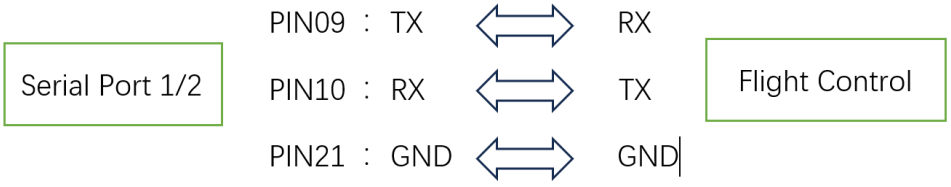
Step1: Connect antenna — The distance between the two antennas must be greater than 15cm.The tail is connected to the J30J-25PIN.

Step2: Connect serial port — It can be connected to flight control equipment or other serial devices. Note the serial port level.

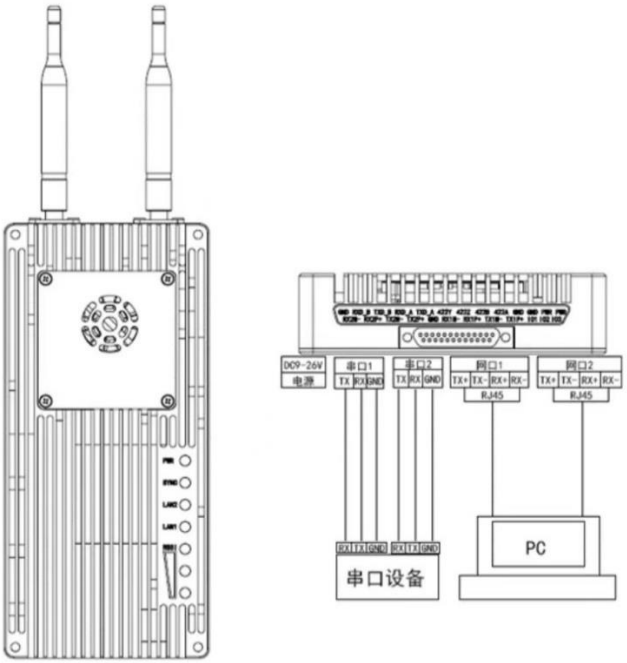
Step3: Connect network port — A single or dual network port will be used to connect the camera.

Step4: Connect power — Power the equipment DC9~26V, typical value: +12V.

Step5: SYNC light — After both the master and slave devices are powered on, check whether the SYNC indicator is steady on (synchronous).



3.3 Connection diagram(Ground)



3.4 Ground Connection

Step1: Connect antenna	The distance between the two antennas must be greater than 15cm.The tail is connected to the J30J-25PIN.
Step2: Connect serial port	It can be connected to the computer serial port tool or other serial port devices.
Step3: Connect network port	Connect the network to the computer, configure the IP address of the computer to be in the same network segment as the IP address of the device. Then use the WEB or host computer for parameter configuration and status query.
Step4: Connect power	Power the equipment DC9~26V, typical value: +12V.
Step5: SYNC light	After both the master and slave devices are powered on, check whether the SYNC indicator is steady on (synchronous).
Step6: Play video	Open the video player software. View live transmission video.

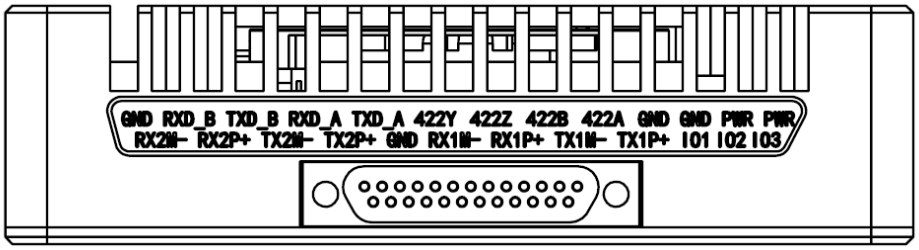
4 Product use

4.1 Power supply

The device uses DC 9~26V power supply, the typical value is +12V@3A. Under different voltages, the average current of the master and slave terminals working normally is shown in the following table. Slave power consumption ≤25W, master power consumption ≤10W

Supply voltage	Air(slave) Working current (A)	Ground(master) Working current (A)
12V	1.80A	0.80A
24V	0.90A	0.40A
26V	0.75A	0.37A
Remark：It is recommended that customers use the 12V@3A power supply for power supply.		

4.2 Wiring definition



The device adopts J30JZ-25pin aviation connector, and the product interface has a total of 1 power supply, 2 road ports and 5 serial ports. The serial port is divided into 1 RS-422, 2 RS232/TTL, and 2 SBUS, which can also be configured as TTL when SBUS is not in use.

J30J-25PIN Specific pin definition (S1400-P33)				
Linear order	Pin name	Interface definition	Interface description	Signal direction
1	PWR	Power DC 9~26V	Power+	I
2	PWR		Power+	I
3	GND		Power-	I
4	GND		Power-	I
5	422A	Serial 3 RS-422	Data RX+	I
6	422B		Data RX-	I
7	422Z		Data TX-	O
8	422Y		Data TX+	O
9	TXD_A	Serial 1 RS232/TTL	Data TX	O
10	RXD_A		Data RX	I
11	TXD_B	Serial 2 RS232/TTL	Data TX	O
12	RXD_B		Data RX	I
13	GND	GND	Serial 2 GND	O
14	SBUS/TTL TX	Serial 4 SBUS*2/TTL*1 (Note4、5)	SBUS only output (Air)	O
15	SBUS/TTL RX		SBUS only input (Ground)	I
16	TTL GND		TTL GND	O
17	TX1P+	100Mbps Ethernet 1	Data TX+	O
18	TX1M-		Data TX-	O
19	RX1P+		Data RX+	I
20	RX1M-		Data RX-	I
21	GND	GND	Serial 1 GND	O
22	TX2P+	100Mbps Ethernet 2	Data TX+	O
23	TX2M-		Data TX-	O
24	RX2P+		Data RX+	I
25	RX2M-		Data RX-	I

Note1：Signal direction I indicates radio input and direction O indicates radio output.

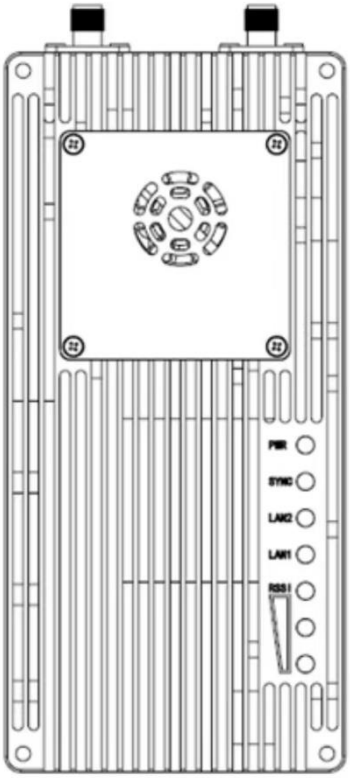
Note2：When using the device serial port 1/2, check whether it is TTL level or RS232 level.

Note3：The serial port level TTL or RS232 is determined by the factory hardware and cannot be modified by software.

Note4： SBUS 14 and 15 pins are in on the ground end, and SBUS14 and 15 pins are out on the air end.

Note 5: If you need to use 2-way SBUS, you need to configure 14-pin >-14pin for the air terminal SBUS mapping. 15pin->15pin。

4.3 Product indicator meaning



Power light PWR（green）

When the PWR light is on, the device is powered on.

SYNC（green）

Out of sync state, light flashing.

After synchronization, the light is steady on.

Network port light : LAN1, LAN2 (green)

The network port light blinks when data is being sent or received.

Receiving signal energy light(RSSI 3 green lights)

The greater the number of energy lights, the greater the signal reception strength

The RSSI light represents the strength of the received signal	
Number of RSSI energy lights on	Received energy dBm
3 RSSI lights on	about -55dBm
2 RSSI lights on	about -80dBm
1 RSSI light on	about -95dBm

Module	Mode	S1400-P33 light status

type		PWR	SYNC	LAN 1 LAN 2	RSSI 123
master	Un-sync	Powered on	Flashing	Data sending and receiving, flashing	Off
master	Sync	Powered on	Steady on	Data sending and receiving, flashing	Proportional to the strength of the received signal
slave	Un-sync	Powered on	Flashing	Data sending and receiving, flashing	Searching
slave	Sync	Powered on	Steady on	Data sending and receiving, flashing	Proportional to the strength of the received signal

When the master and slave devices are not synchronized, the PWR indicator of the master and slave devices is steady on, the SYNC indicator is blinking, and the RSSI indicator of the master device is off. The RSSI of the slave device will always be in the search state. After the master/slave synchronization, the SYNC indicator of the master/slave is steady on. The master-slave RSSI lamp displays the received signal energy intensity. When the network port is sending or receiving data, the master and slave devices correspond to LAN1, LAN2 indicator blinks.

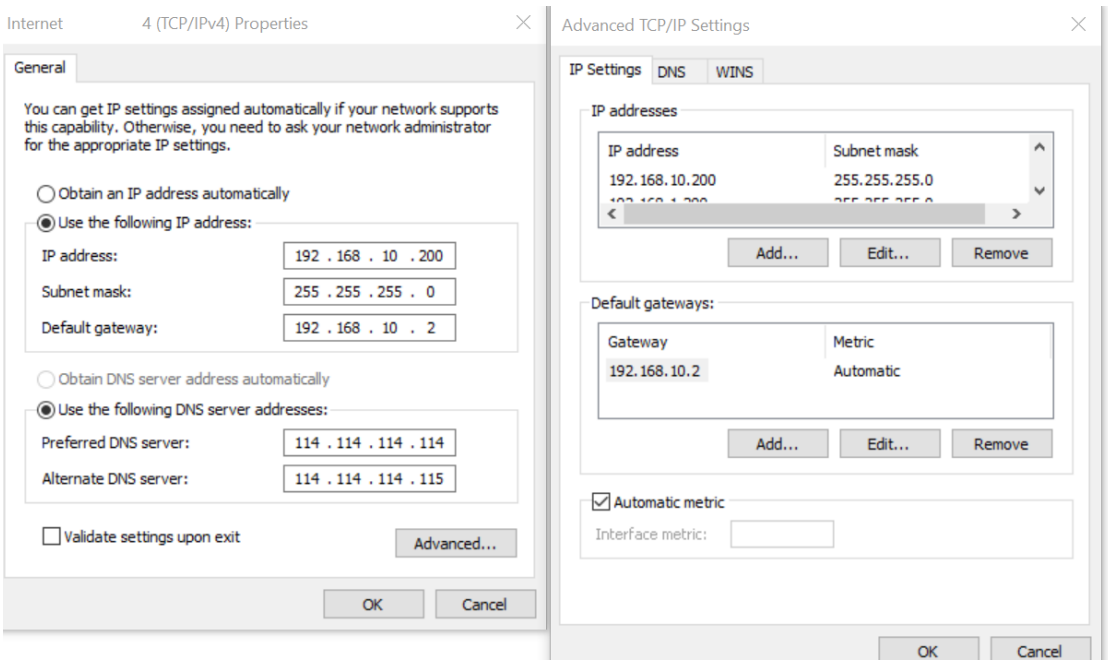
5 WEB Parameter configuration

5.1 Device IP

The default IP address of the master (ground) device is 192.168.10.250, the default IP address of the trunk device is 192.168.10.251, and the default IP address of the slave (airborne) device is 192.168.10.252. The alternate IP addresses are 192.192.192.192. The default IP address is the one that can be used and modified by the user. The alternate IP, 192.192.192.192, cannot be modified. If you forget the IP address, you can use the standby IP address to log in to the WEB page for parameter query and configuration.

- Configure the network segment of the PC(192.168.10.xxx)

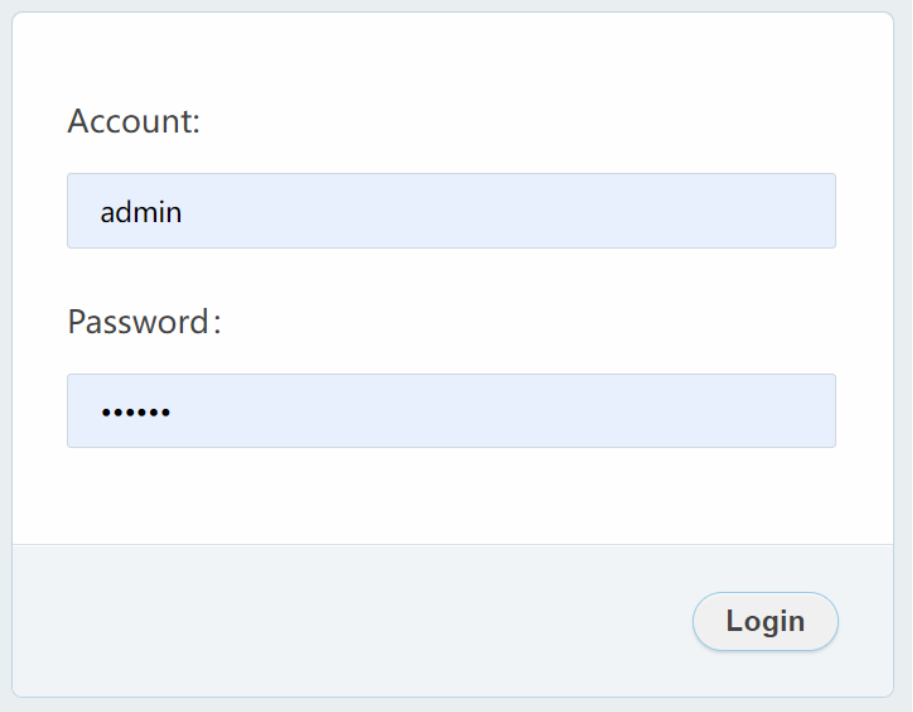
Open computer network connection and right-click properties. Open the TCP/IPv4 properties as shown in the following figure. Click Advanced, add IP, computer IP can add multiple IP at the same time. The same computer can work in different network segments. For example, add IP address 192.168.10.123 and IP address 192.168.1.123 at the same time. Complete the PC IP configuration and click OK to save the configuration.



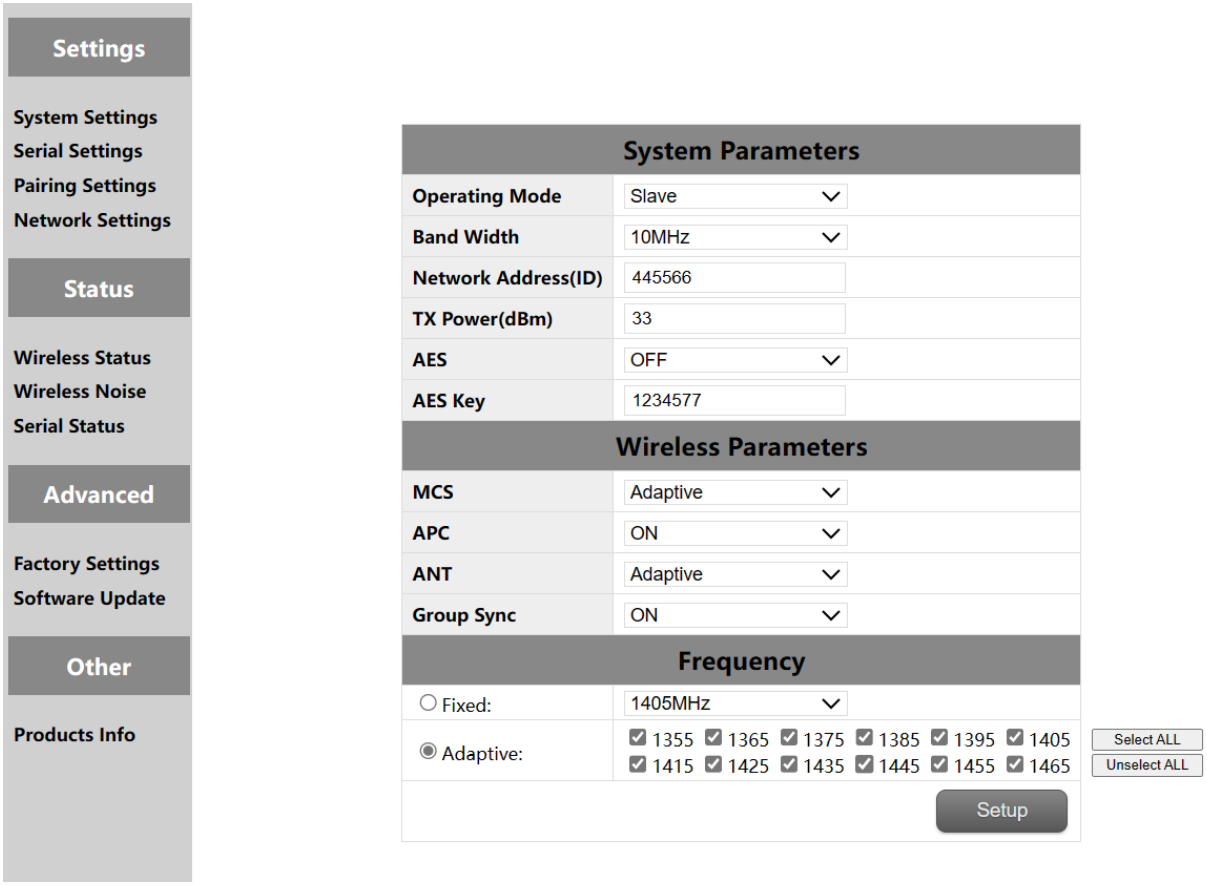
5.2 WEB Account number and password

The default WEB address of the primary (ground unit) device is 192.168.10.250. The default Web input is 192.168.10.251 on the trunk (relay unit)device and 192.168.10.252 on the secondary (air unit) device.

Account: admin; Password: 123456



5.3 System Settings

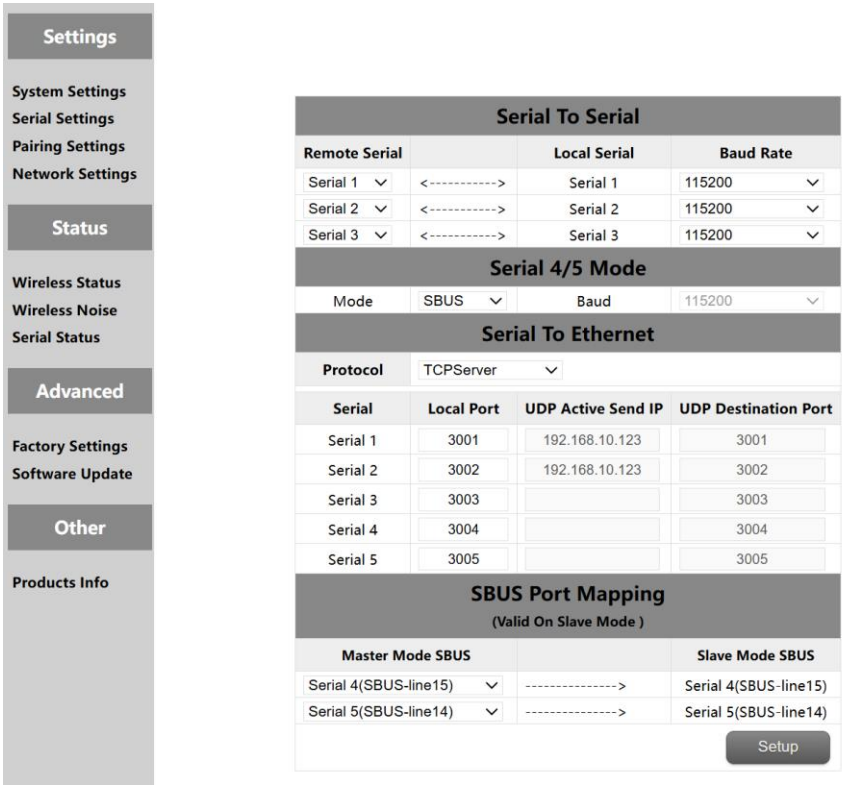


No.	Function	Instructions
1	Operation mode	Configure the device as the master or slave end
2	Band Width	Channel bandwidth: 10MHz
3	Network ID	Network ID number: The same ID number is used for the same group.
4	TX Power(dBm)	Up to 33dBm
5	AES	AES Encryption switch
6	AES Key	AES Secret key
7	MCS	Automatic stream control (optional adaptive mode or fixed mode)
8	APC	Automatic power control (optional on or off)
9	ANT	Automatic selection of two antennas (fixed antenna 1 or antenna 2)
10	Multiple sets coexist	Multiple sets of coexisting switches enable multiple sets of devices to be used simultaneously
11	Frequency	Automatic frequency selection (optional adaptive or fixed)

Multiple sets of coexistence: When the switch is turned on, a maximum of six pairs of devices can work at the same time, but they need to be used at a fixed frequency.

Frequency selection: Fixed frequency or adaptive frequency can be selected. The adaptive frequency points can be selected all, or you can select any of the frequency points to use.

5.4 Serial Settings



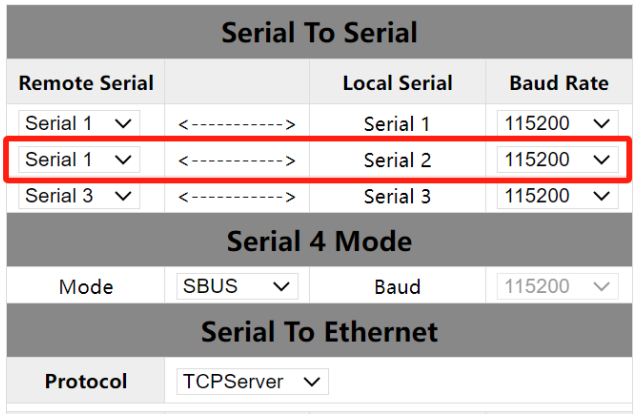
The device has four serial ports, among which serial port 1 and serial port 2 are RS232 or TTL level, and serial port 3 is RS-422 interface. Serial port 4 is SBUS/TTL. When serial port 4 is configured with TTL, you can change its baud rate. The device supports the function of serial port to serial port and serial port to network port. At the same time, the status of the serial port can be viewed in real time to help customers determine whether the function of the serial port is normal.

5.4.1 Serial-to-Serial

The mapping between the remote serial port and the local serial port can be flexibly configured. By default, remote serial port 1 is paired with local serial port 1, remote serial port 2 is paired with local serial port 2, and remote serial port 3 is paired with local serial port 3. You can also configure different mapping relationships based on your requirements, so that the local serial port can communicate with any remote serial port. The series-to-series function also supports asymmetric transmission of serial port

numbers, that is, the input of serial port 1 at the sky end and the output of serial port 2 or serial port 3 at the ground end. Sky serial port 2 Input. Output from serial port 1 or serial port 3 on the ground. Input from serial port 3 on the sky end and output from serial port 1 or 2 on the ground end.

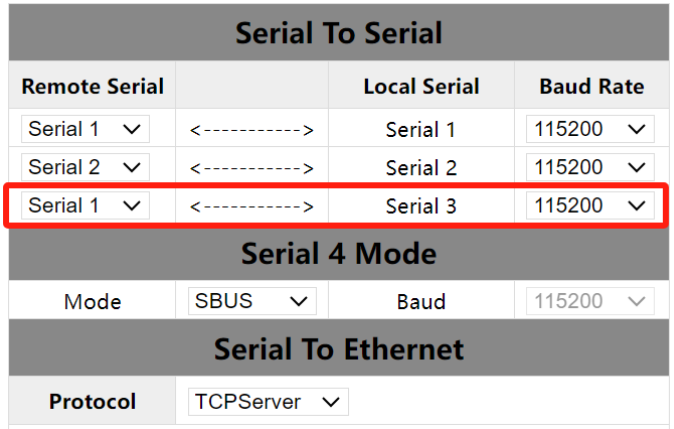
Example 1: Input from serial port 1 on the sky (slave) and output from serial port 2 on the ground (master).



Step 1: Open the terrestrial web page - Serial Port Settings bar

Step 2: Change serial port 2 in the second column to remote serial port 2< - > local serial port 2. Remote serial port 1< - > Local serial port 2. Indicates that the input of serial port 1 on the sky side corresponds to the ground. Output from serial port 2 of end. Change the baud rate of serial port 2 to be output.

Example 2: Input from serial port 1 on the sky (slave) and output from serial port 3 on the ground (master).



Step 1: Open the terrestrial web page - Serial Port Settings bar

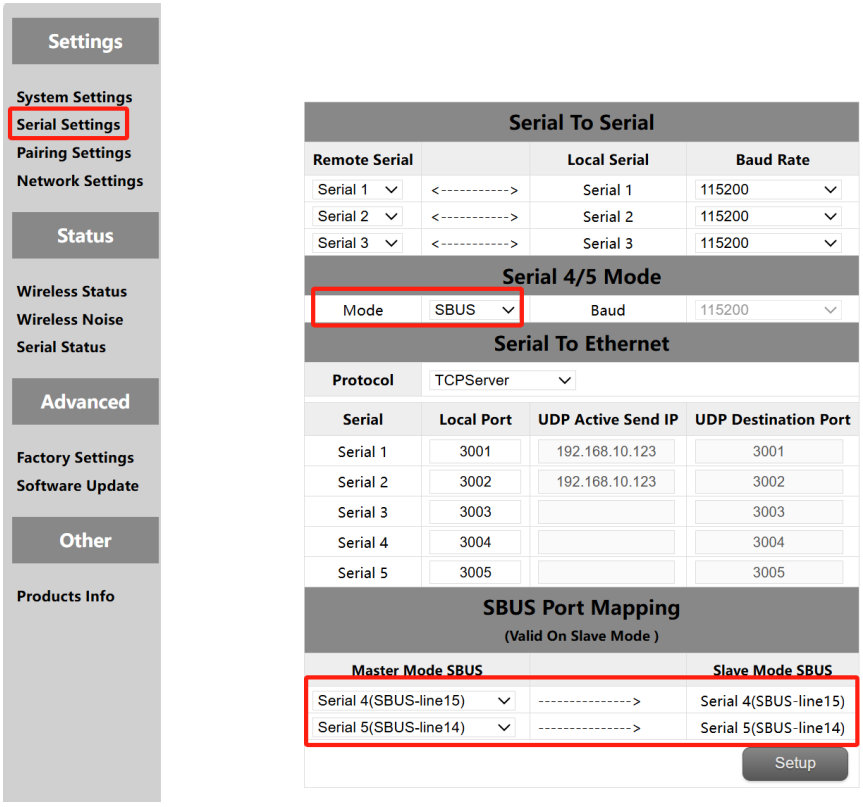
Step 2: Change serial port 3 in the third column to remote serial port 3< - > Local serial port

3 to remote serial port 1< - > local serial port 3. Indicates that the input of serial port 1 at the sky end corresponds to the output of serial port 3 at the ground end. Change the baud rate of serial port 3 to be output.

5.4.2 SBUS configuration

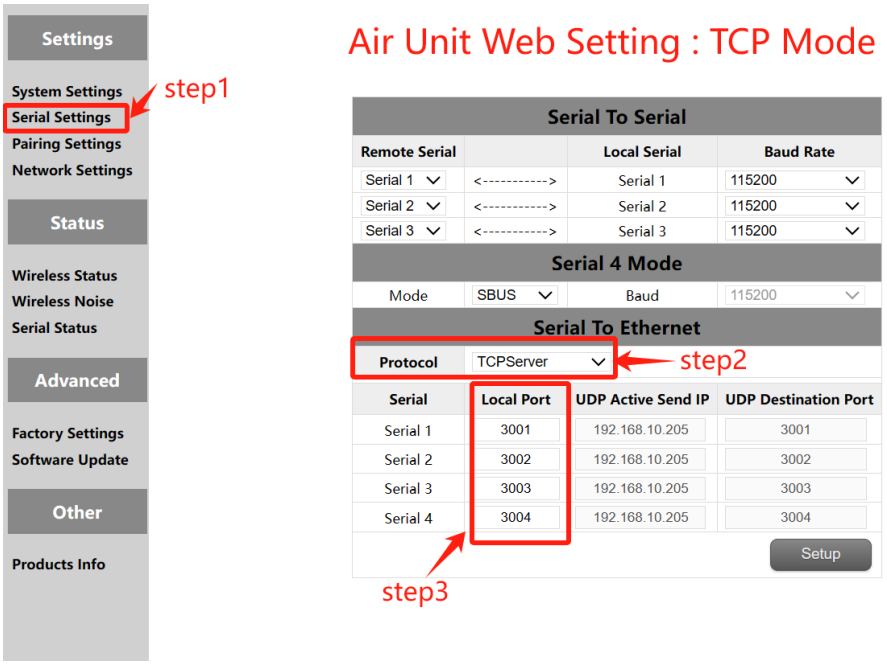
1) Open the WEB of the Air Unit and click Serial Port Configuration on the left. (The configuration of the ground terminal is invalid)
2) Modify the mode to SBUS mode.
3) Input PIN 15 corresponds to PIN15 output, and input PIN 14 corresponds to PIN14 output.

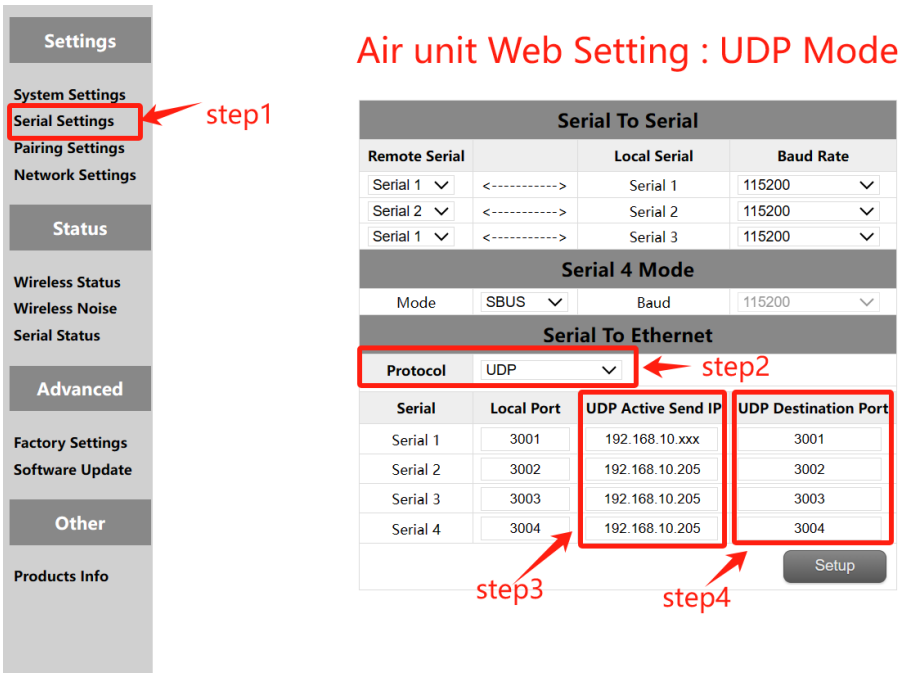
The SBUS configuration is valid only if the serial port configuration of the air terminal web is configured. The SBUS configuration of the ground unit is invalid. The module supports two-channel SBUS operation. And the 14 pins and 15 pins on the ground side are SBUS inputs. The 14-pin and 15-pin of the air terminal are both SBUS outputs. and the 14 pins of the air terminal correspond to the 14 pins of the ground terminal. The 15 pins of the air terminal correspond to the 15 pins of the ground terminal.



5.4.3 Series-to-network / Network-to- series

The function of serial switching, or network switching is mainly serial port input, network port output or network port input, serial port output, etc. The serial port on the sky end is configured as TCP or UDP for transmission. The following is an example of a Mission Planner ground station performing TCP/UDP protocol transmission.





MissionPlanner (TCP mode)

TCP configuration (Air serial port)

Step 1: Open the - Serial Settings bar of the sky side web page

Step 2: Change the serial-to-network protocol to TCP server

Step 3: Determine the port number. The default port number of serial port 1 is 3001, serial port 2 is 3002, and serial port 3 is 3003. Finally click the Settings button.

MissionPlaner TCP configuration

Step 1: Open the Mission Planner

Step 2: MP Select TCP mode, do not use the serial port baud rate, click the Connect button. Enter host name/IP: 192.168.10.252(Default IP address of the sky end). Enter remote port: 3001 (serial port 1). 3002 (serial port 2); 3003 (Serial port 3).

MissionPlanner (UDP mode)

UDP configuration (Air serial port)

Step 1: Open the - Serial Settings bar of the sky side web page.

Step 2: Change the serial-to-network protocol to UDP server.

Step 3: Enter the active UDP IP address of the serial port. It is the IP address of the computer on which MP is installed.

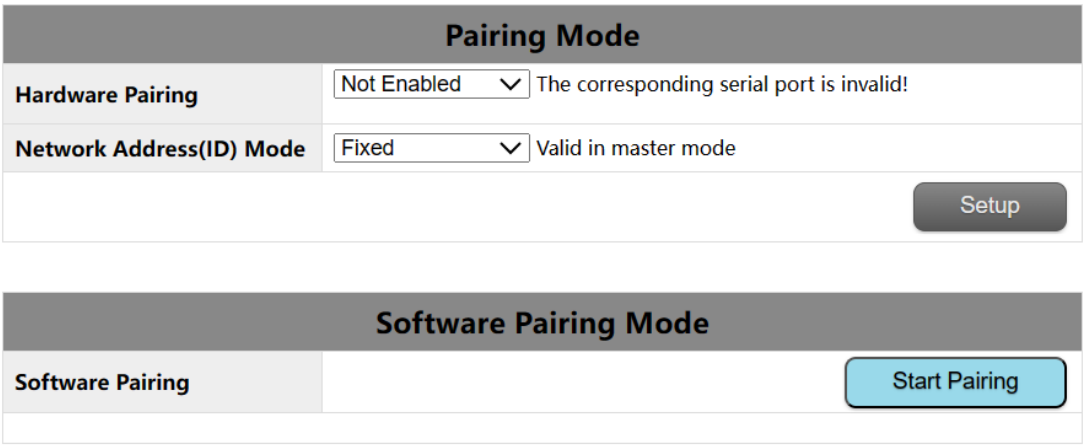
Step 4: Determine the UDP target port number. The default target port number of serial ports 1 to 4 is 3001-3004. You can also set the target port number to different ones based on customer requirements. Finally click the Settings button.

MissionPlaner UDP configuration

Step 1: Open the Mission Planner ground station

Step 2: MP select UDP mode, the serial port baud rate is not required, click the Connect button. Enter Local port: 3001 (serial port 1). 3002 (serial port 2); 3003 (Serial port 3).

5.5. Pairing Settings



The pairing function can be realized by hardware configuration and software configuration. The ID number can be configured on the primary end to determine whether to use the random ID number or the fixed ID number of the original primary end for automatic pairing. This parameter is invalid for configuring ID mode on the secondary end.

Pairing premise:

The pair device can be paired only when it is a primary device and a secondary device. If both devices are primary devices or secondary devices, the pair cannot be paired.

Hardware pairing conditions:

1. Effective within 60 seconds after starting, invalid after 60 seconds.
2. Invalid in connected (synchronized) state.
3. The pairing mode has been entered once after startup, and it is invalid even if the time is still within 60s.

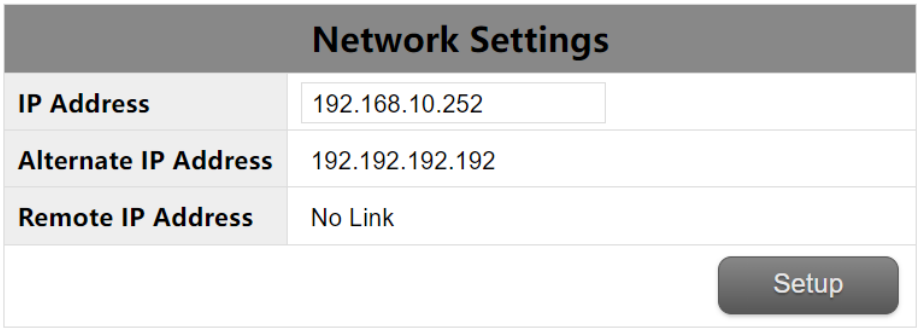
Hardware pairing Settings: (The Air unit and the ground unit are configured independently)

- Web configuration: Select serial port 1 or serial port 2 or serial port 4 as the paired serial port.
- After the configuration, short connect the TX and RX of the corresponding serial port for at least 2 seconds. Customers can solder a switch button themselves by long pressing it for more than 2 seconds. TX and RX can also be looped together.
- If the RSSI indicator blinks and turns off, the device enters the pairing mode. Wait until the peer device also enters the pairing mode.

Software pairing Settings:

Click the "Start Pairing" button inside the page to start pairing. After 2 minutes, if the pairing fails, the device displays the status before the pairing again.

5.6 IP configuration（Network Settings）



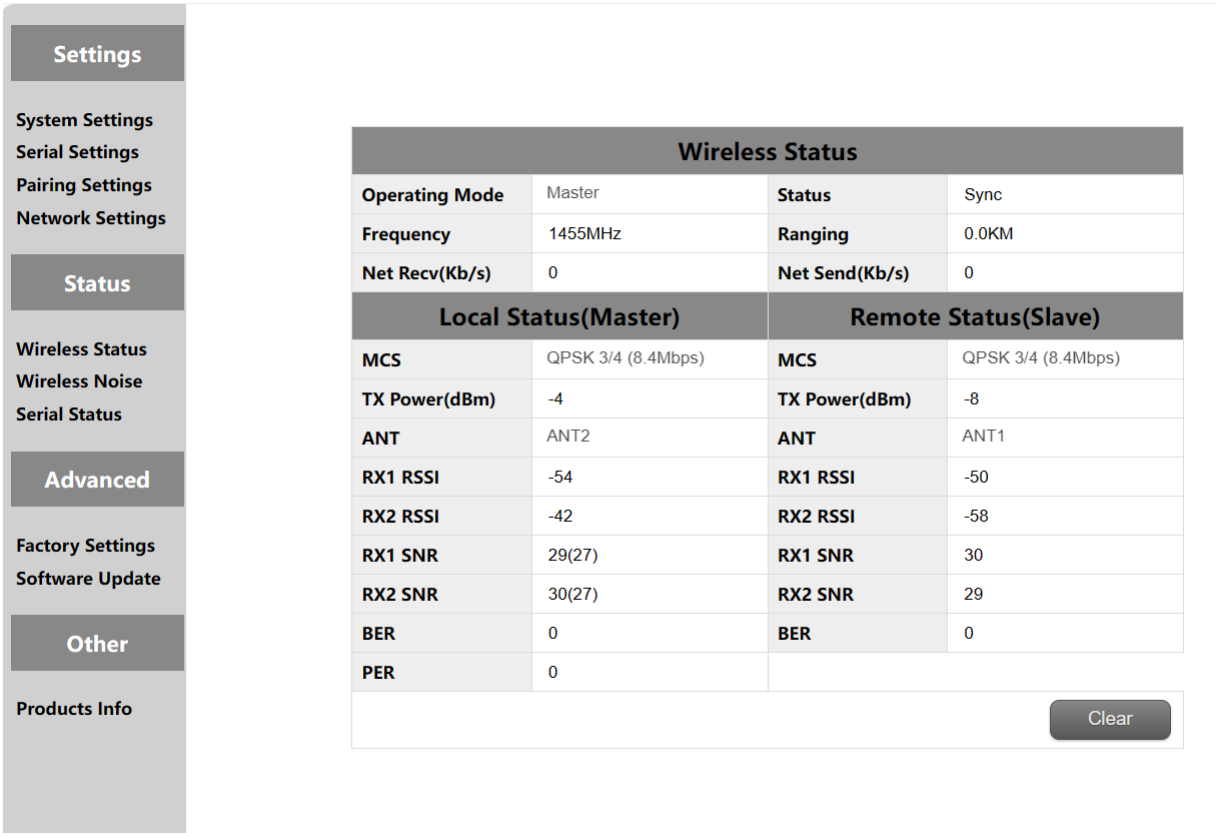
1.The default local IP address of the primary node is 192.168.10.250.

2.The default local IP address of the repeater node is 192.168.10.251.

3.The default local IP address of the slave node is 192.168.10.252.

4.The Alternate IP address is 192.192.192.192.(cannot be changed)

5.7 Wireless Status



Wireless status is mainly to display channel information, such as master and slave nodes, whether to synchronize, working frequency points, distance display and network data volume statistics. It also displays the status of the local device and some information about the remote device. For example, MCS (stream mode), transmit power, two-channel received energy, two-channel received signal-to-noise ratio and error packet PER display.

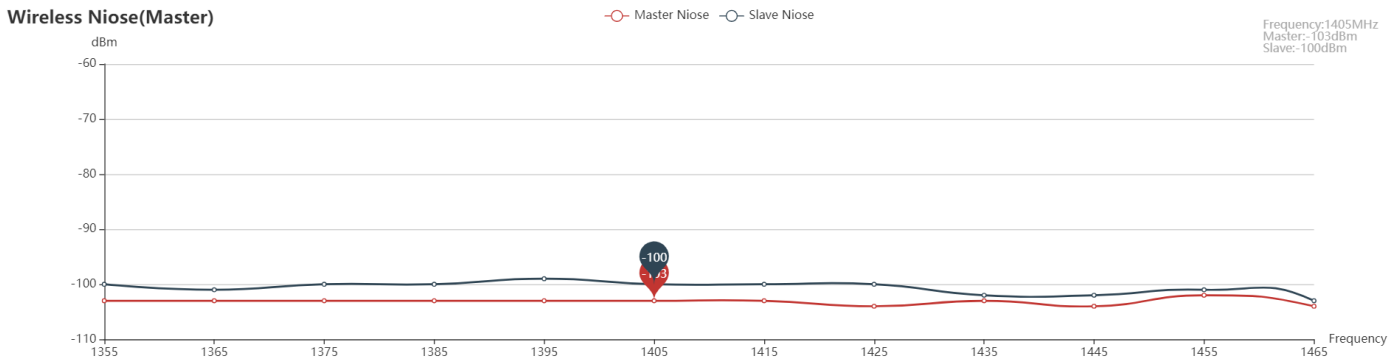
The distance display can only be displayed by the master. The detection of background noise is carried out when the master is powered on. The slave does not detect background noise before synchronization. The slave detects background noise only after synchronization.

The network transmission of the master indicates the amount of data sent by the master to the PC. The network reception of the slave indicates the amount of data received by the slave from the camera.

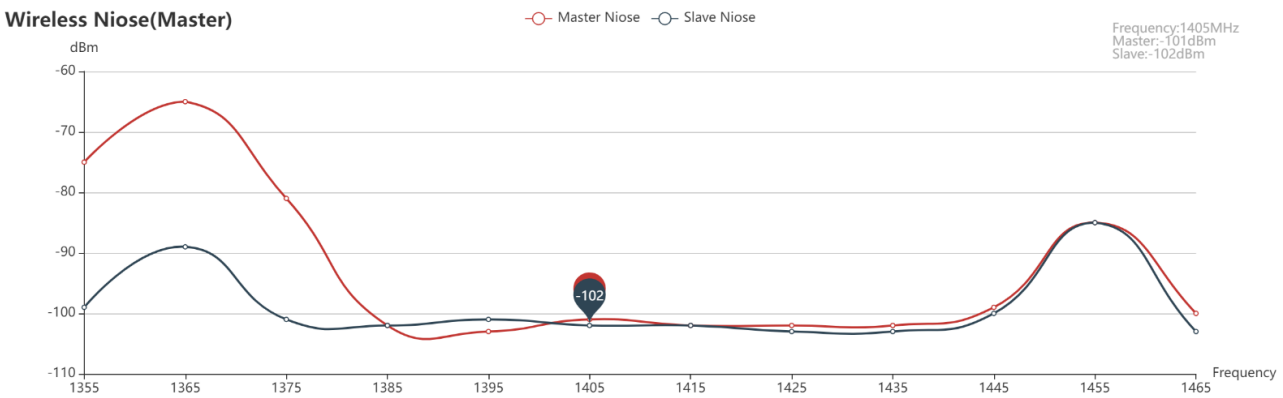
5.8 Wireless Noise

Background noise detection is mainly used to detect ambient interference of master and slave equipment. The red line represents the bottom noise at the primary end and the blue line represents the bottom noise at the secondary end. And the lower the absolute value, the cleaner the floor noise, that is, the smaller the interference source. For example, -100dBm is better than -90dBm. Floor noise detection can quickly help customers determine whether there is interference in the test environment.

- **Floor noise detection in clean environments**



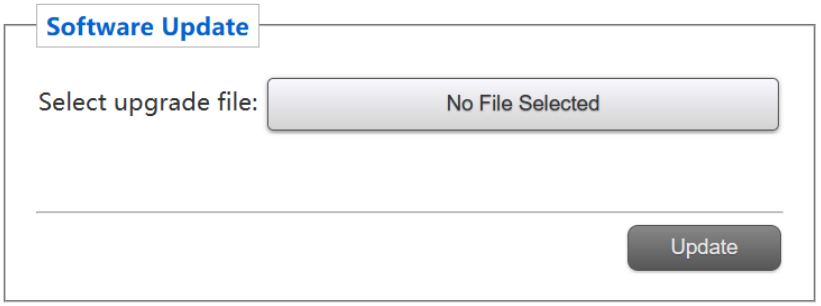
- **Floor noise detection when there is interference**



5.9 Factory Reset

The default factory Settings of the device are the secondary (airborne) parameters, and the default network IP address after factory restoration is 192.168.10.250.

5.10 Software Upgrade



System update, for customers to update the firmware, click select file, select the corresponding burn file, after the successful upgrade, please power on again. Do not power off during the upgrade to avoid firmware loss.

5.11 Products Info

Products	
Product Type	S01A-B060-J33
Serial Number	202310240034
Hardware Version	169C-S01AB060J33STT4
Software Version	PB240612
Firmware Version	20240722vB060v0200

This section describes the serial number, software, and hardware version number of the device.