iControl KE101

Network Serial Port Expander

User Manual V1.0



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Thank you for purchasing this product

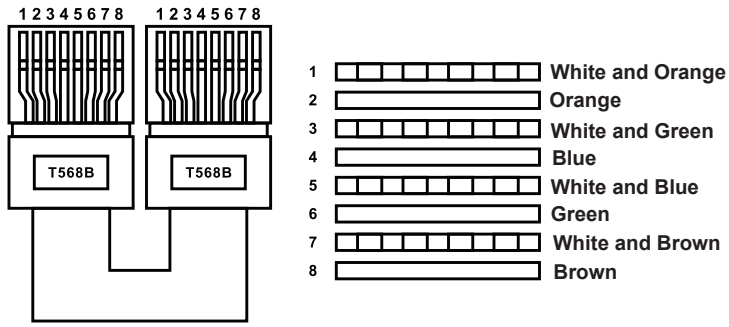
For optimum performance and safety, please read these instructions carefully before connecting, operating or adjusting this product. Please keep this manual for future reference.

Surge protection device recommended

This product contains sensitive electrical components that may be damaged by electrical spikes, surges, electric shock, lighting strikes, etc. Use of surge protection systems is highly recommended in order to protect and extend the life of your equipment.

Caution

The network cable connection method required for this product is direct connection. Please do not cross connect.



Direct Interconnection Method

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1. Introduction

This network serial port expander can communicate with the programmable central control system or PC to control multiple devices, and perform protocol conversion between various devices with different communication modes. It supports TCP/UDP protocol, and the output serial port supports RS-232/RS-485 protocol. IR output, GPIO input/output, RELAY control and PoE function are supported. The front panel of the expander is designed with LED indicators for power supply, serial port sending/receiving data, which can conveniently and quickly indicate the progress of data communication and equipment power failure.

2. Features

☆ 1x 100M Ethernet port, supporting TCP/UDP communication protocol
☆ 1x I/O port, supporting digital input or digital output
☆ 1x IR output port, supporting 20KHz~60KHz carrier output
☆ 1x RS-232/RS-485 bidirectional serial port, used to control matrix, projector, or other audio and video devices
☆ 2x low-voltage relays, used to control lighting, access control, curtains, etc
☆ Built-in web server, allowing users to access web pages through browser to configure the device
☆ Dual power supply modes, supporting DC (12-24V) or PoE power supply
☆ Built-in API commands, used to set devices
☆ Support factory reset

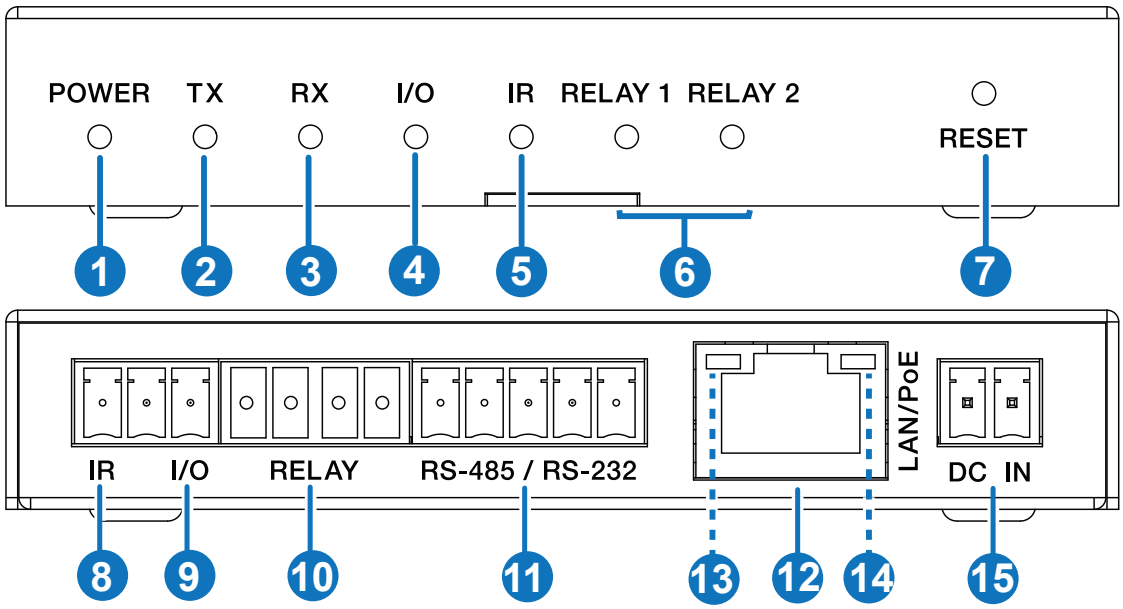
3. Package Contents

① 1x Network Serial Port Expander
② 1x 5pin-3.81mm Phoenix Connector (male)
③ 1x 4pin-3.81mm Phoenix Connector (male)
④ 1x 3pin-3.81mm Phoenix Connector (male)
⑤ 1x 2pin-3.81mm Phoenix Connector (male)
⑥ 2x Mounting Ear
⑦ 4x Machine Screw (KM3*4)
⑧ 1x User Manual

4. Specifications

Technical	
RS-232	Support full duplex communication mode
RS-485	Support half duplex communication mode
Baud Rate	Support 2400, 4800, 9600, 14400, 19200, 38400, 56000, 57600 and 115200
LAN	100M Ethernet interface
GPIO	The detection accuracy can reach 10ms.
IR	Support 5V IR Blaster cable
ESD Protection	IEC 61000-4-2: ±8kV (Air-gap discharge) & ±4kV (Contact discharge)
Connection	
Input	1x LAN/PoE [RJ45, 8-pin female, supporting PoE] 1x DC IN [2pin-3.81mm phoenix connector]
Output	1x I/O&IR [3pin-3.81mm phoenix connector] 1x RS-485/RS-232 [5pin-3.81mm phoenix connector] 1x RELAY [4pin-3.81mm phoenix connector]
Mechanical	
Housing	Mental Enclosure
Color	Black
Dimension	95mm [W] × 68mm [D] × 17mm [H]
Weight	180g
Power Supply	Input: AC 100 - 240V 50/60Hz Output: DC 12-24V/1A
Power Consumption	0.96W
Operating Temperature	0°C ~ 40°C / 32°F ~ 104°F
Storage Temperature	-20°C ~ 60°C / -4°F ~ 140°F
Operating Humidity	20%~80% (Relative Humidity, non-condensing)
Storage Humidity	10%~90% (Relative Humidity, non-condensing)

5. Operation Controls and Functions

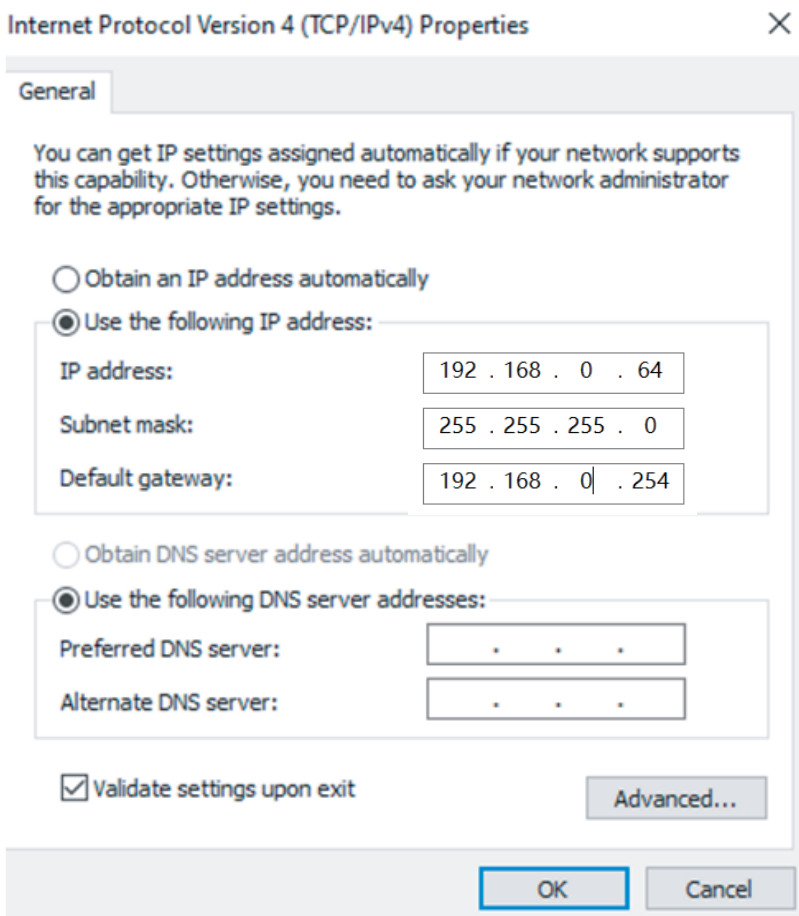


No.	Name	Function Description
1	POWER LED	The green light is on when the device is powered on.
2	TX LED	When the RS-485/RS-232 serial port is sending data, the TX LED flashes; When the RS-485/RS-232 serial port is not sending data, the TX LED is off.
3	RX LED	When the RS-485/RS-232 serial port is receiving data, the RX LED flashes; When the RS-485/RS-232 serial port is not receiving data, the RX LED is off.
4	I/O LED	The I/O LED status of the I/O port in input/output mode is as follows: 1. Input mode: The normal state is high level, and the LED is off; When the I/O port inputs a low level, the LED lights on. 2. Output mode: When the output is set to high level (5V), the LED is on; When the output is set to low level, the LED is off.
5	IR LED	When the IR port is sending data, the green light is on; When the IR port is not sending data, the green light is off.
6	RELAY 1/2 LED	When RELAY 1/2 is turned on, the RELAY 1/2 LED is on; When RELAY 1/2 is turned off, the RELAY 1/2 LED is off.

No.	Name	Function Description
7	RESET button	Press and hold the reset button for 5 seconds, then release it, the device will restore to the factory settings. After rebooting, the IP address of the device will restore to 192.168.0.101.
8	IR port	IR signal output port, supporting 20KHz~60KHz carrier output.
9	I/O port	1x I/O port, used for digital input and digital output. For digital input, it supports a maximum load capacity of 24VDC, 50mA; For digital output, it can output up to 5VDC, 100mA. 1. Input mode: Normally at high level, triggered by low input level. 2. Output mode: Normally at low level. The status is not saved after the device is powered off or restarted.
10	RELAY port	2 channel relays, normally open contacts, each group is independent and isolated. The maximum load capacity is 30VDC, 1A/125VAC, 0.3A. The status is not saved after the device is powered off or restarted.
11	RS-485/ RS-232 port	RS-485/RS-232 serial port, supporting mode switching: When selecting RS-232 mode, the RS-485 serial port is disabled; When selecting RS-485 mode, the RS-232 serial port is disabled.
12	LAN/PoE port	100M network communication port, supporting PoE.
13	Data Signal Indicator lamp (Yellow)	▪ Light flashing: There is data transmission. ▪ Light on: There is no data transmission, but the network connection is normal. ▪ Light off: There is no data transmission, and the network connection is abnormal.
14	Link Signal Indicator lamp (Green)	▪ Light on: The network cable is connected normally. ▪ Light off: The network cable is not connected well.
15	DC IN port	DC power input port, which is designed with a wide voltage range (12-24V). *Note: The expander is powered through PoE. If the network Switch does not support PoE, please connect the expander to an external power adapter.*

6. Web GUI User Guide

The product supports Web GUI control, allowing users to directly log in to web pages and configure device parameters through the browser of various computers, tablets and mobile devices.
The operation steps are as follows:
Step 1, Connect the LAN port of the expander to PC, and set the PC's IP address to be in the same network segment with the expander (default IP address: 192.168.0.101). For instance, set the IP address to be 192.168.0.64 and Subnet mask to be 255.255.255.0, as shown in the figure below.

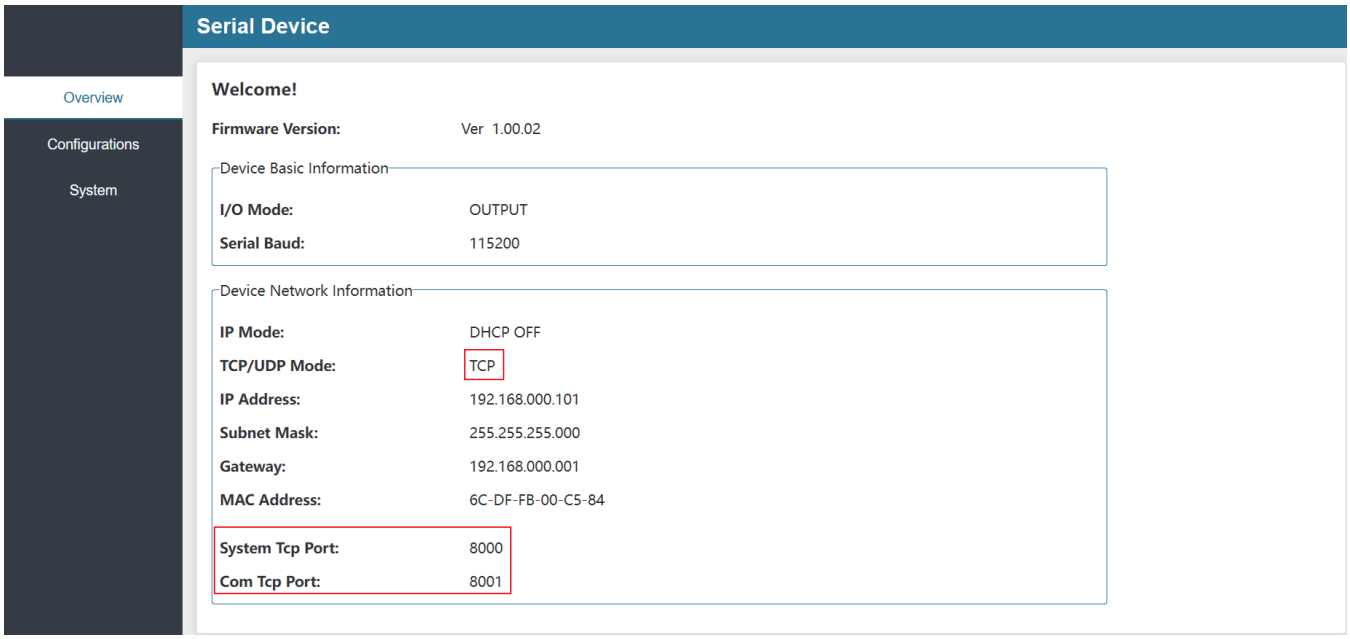


Step 2, Open the PC browser (Google Chrome is recommended), and enter the expander's default IP address 192.168.0.101 to access to the Web GUI page.

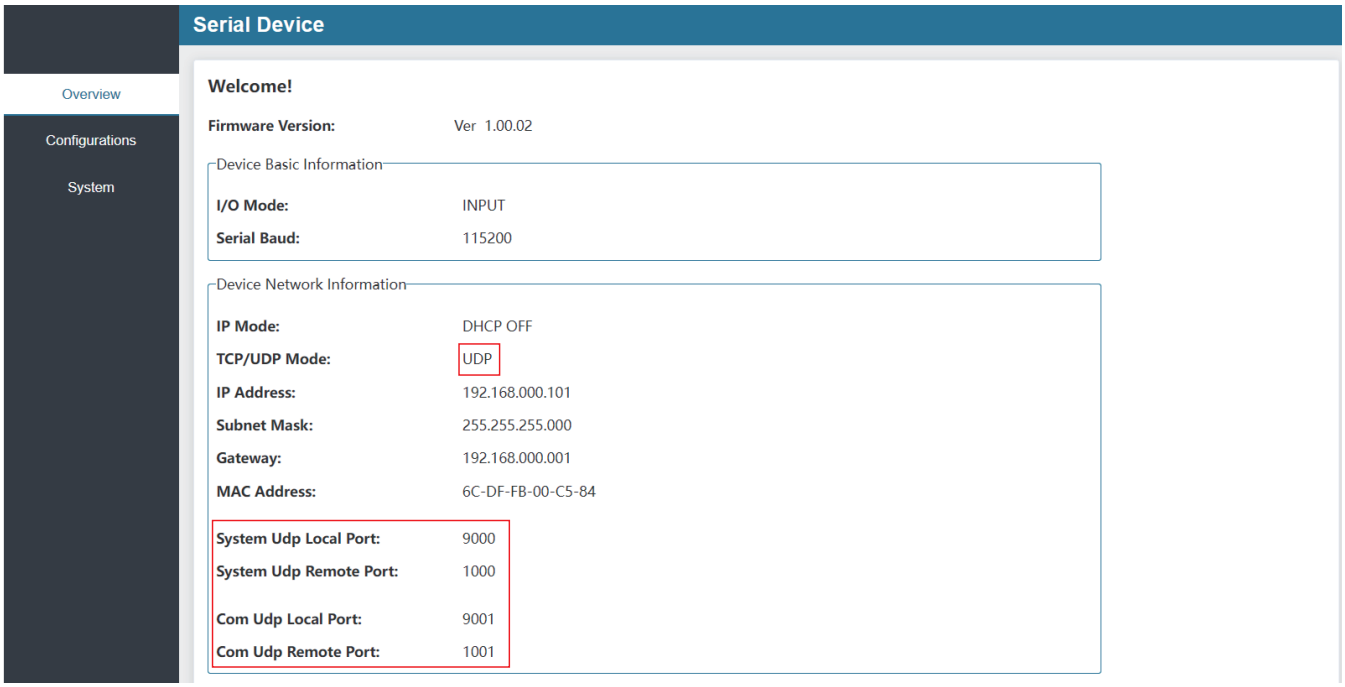


The Web GUI pages are shown as below:

■ Overview Page

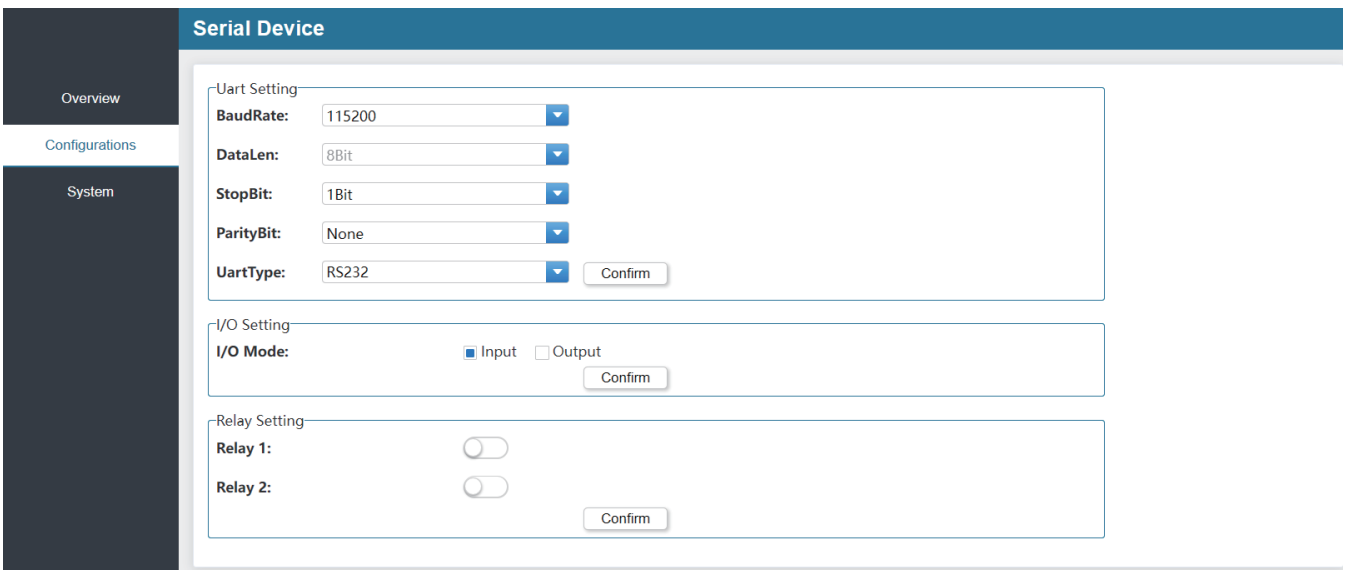


The Overview page provides information about the product as following:
① **Firmware Version:** The current firmware version of the product.
② **I/O Mode:** The mode of the external GPIO port (input mode by default).
③ **Serial Baud:** The baud rate of the RS-485/RS-232 serial communication port.
④ **IP Mode:** The IP mode of the device, static IP by default, can be set to dynamic IP.
⑤ **TCP/UDP Mode:** The data sending and receiving mode of the RS-485/RS-232 serial port and network port.
⑥ **IP Address:** The IP address of the device.
⑦ **Subnet Mask:** The subnet mask of the device.
⑧ **Gateway:** The gateway of the device.
⑨ **MAC Address:** The MAC address of the device.
⑩ **System Tcp Port:** The TCP port for device parameter configuration.
Com Tcp Port: The TCP port corresponding to the RS-485/RS-232 serial port.
Note: Only when the UDP Mode is selected on the System page, the System Udp Local/Remote Port parameters and the RS-485/RS-232 serial port's Com Udp Local/Remote port parameters will be displayed on the overview page.

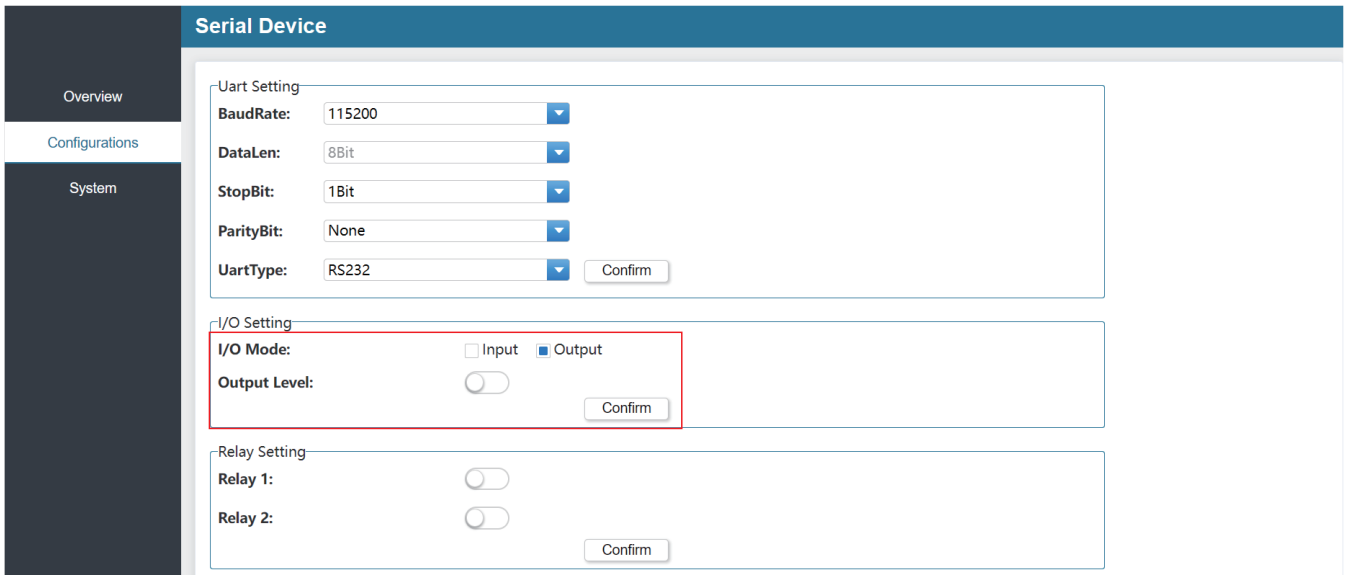


System Udp Local Port: The UDP local port for device parameter configuration.
System Udp Remote Port: The UDP remote port for device parameter configuration.
Com Udp Local Port: The UDP local port corresponding to the RS-485/ RS-232 serial port.
Com Udp Remote Port: The UDP remote port corresponding to the RS-485/RS-232 serial port.

■ Configurations Page

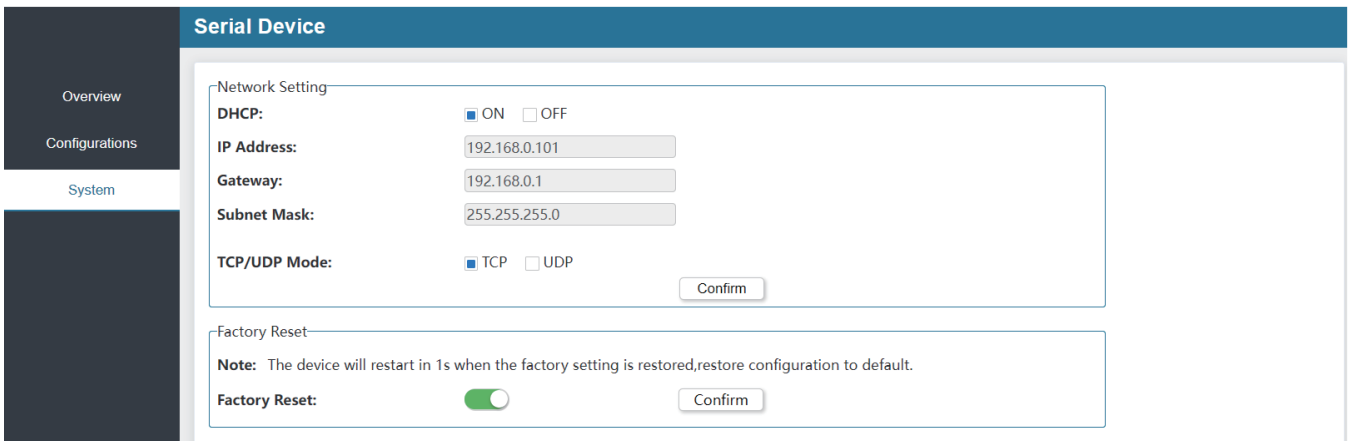


On this page you can do the following operations:
① **Uart Setting:** Click the drop-down menu to set the BaudRate, DataLen, StopBit, ParityBit and UartType of the RS-485/RS-232 serial port respectively.
After setting, please click “Confirm” to save the setting and take effect.
② **I/O Setting:** Check to select the I/O mode. Input is the default mode. You can also select the Output mode and click “Confirm” to confirm and save.
Note: When Output is selected as the I/O mode, the output level will be displayed. Click the switch to turn on/off the output level, as shown in the figure below.



③ **Relay Setting:** Click the switch to turn on/off Relay 1/2, then click “Confirm” to confirm the setting.

■ System Page

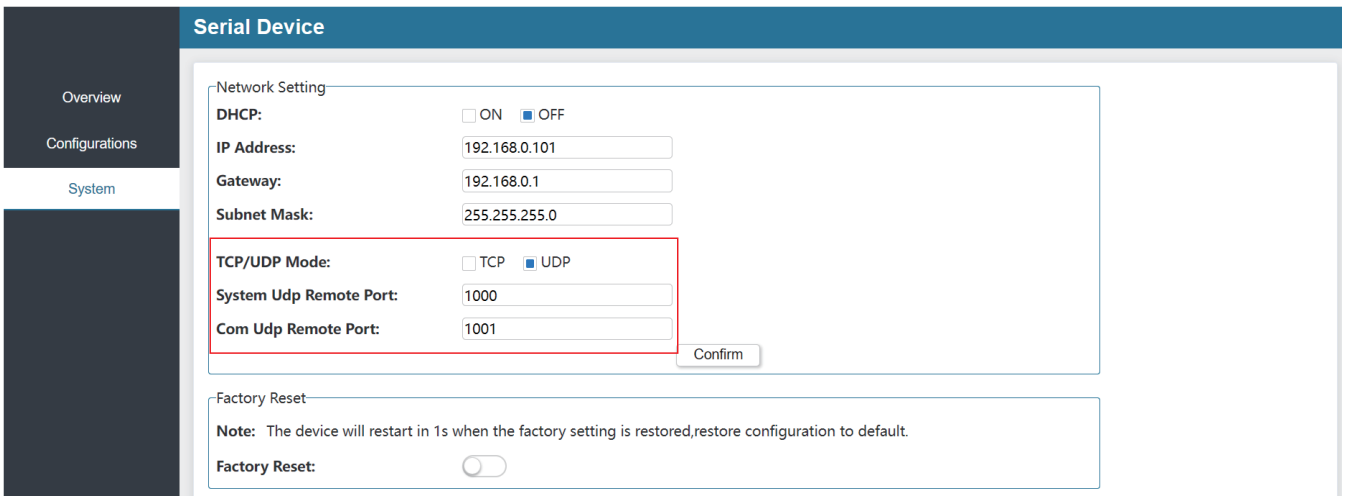


On this page you can do the following operations:

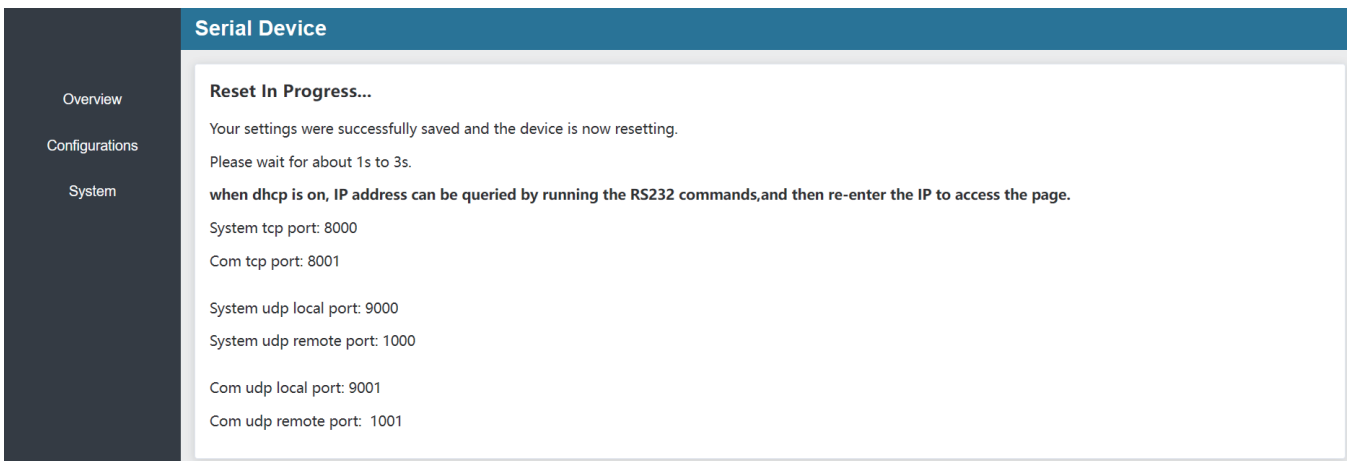
① **Network Setting:** If DHCP is set to OFF, you can manually set the IP address, gateway and subnet mask as required; If DHCP is set to ON, the system will automatically fill in the IP Address, gateway and subnet mask assigned by the router, which is unmodifiable. If TCP/UDP is selected, you can set the data sending and receiving mode of the RS-485/RS-232 serial port and network port.

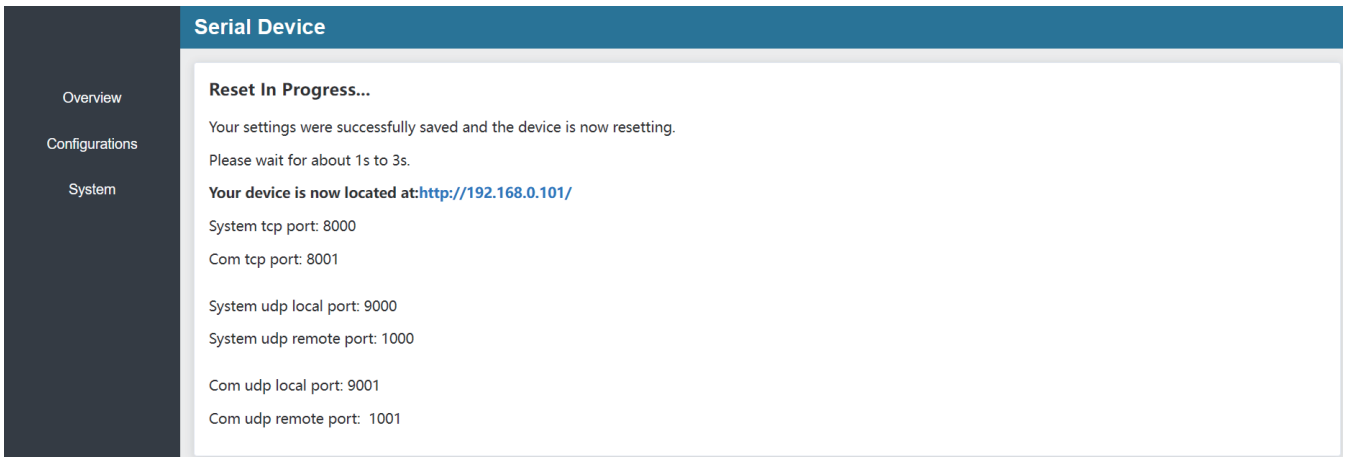
After setting, please click “Confirm” to save the setting and take effect.

Note: When UDP Mode is selected, you can set the System Udp Remote Port and the Com Udp Remote Port corresponding to the RS-485/RS-232 serial port, as shown in the figure below.



② **Factory Reset:** Click the Factory Reset switch to turn it on, and a “Confirm” button will appear on the right side. Click this button, the device will reboot and restore to the factory default settings. In DHCP ON/OFF mode, the reset interfaces are respectively as following.





7. API Commands

The product also supports API commands control. Connect the product to a PC and open a Serial Command tool on PC to send ASCII commands to control the product.
Here is the ASCII command list about the expander.

ASCII Commands				
Default com protocol: Baud rate->115200 (default) Data bits->8 Stop bits->1 Parity->none Flow control->none Serial protocol->RS-232				
Default network information: IP address->192.168.0.101 Subnet mask->255.255.255.0 Gateway->192.168.0.1 IP mode->dhcp off				
Default Ethernet type: TCP/UDP mode->tcp				
Ethernet port information: System TCP port->8000 Com TCP port->8001 System UDP local port->9000 System UDP remote port->1000 Com UDP local port->9001 Com UDP remote port->1001				
x, y, z, XXX are parameters Error Code description: E00 -> unknown command E01 -> parameter out of range E03 -> This feature is not supported				
Boot version: V1.00.02 App version: V1.00.02				
RS-232 Function Switch				
fa ae ea 08 B0 00 00 00 00 00 00 00 00 00 00 00 00 00 4A	Set RS232 not to support API (hex command). The restart status is not saved, the API is not supported by default.	fa ae ea 08 B0 00 00 00 00 00 00 00 00 00 00 00 00 00 4A	fa ae ea 08 B0 00 00 00 00 00 00 00 00 00 00 00 00 00 4A	
fa ae ea 08 B1 00 00 00 00 00 00 00 00 00 00 00 00 00 4B	Set RS232 support API (hex command). The restart status is not saved, the API is not supported by default.	fa ae ea 08 B1 00 00 00 00 00 00 00 00 00 00 00 00 00 4B	fa ae ea 08 B1 00 00 00 00 00 00 00 00 00 00 00 00 00 4B	

Command Code	Description	Example	Feedback	Default Setting
System Settings				
help!	Get the API information supported by the system.	help!	help! cs reboot! cs reset! cr fw version! ……	
cs reboot!	Reboot the device.	cs reboot!	reboot…	
cs reset!	Reset to factory defaults.	cs reset!	reset to factory defaults	
cs device hostname [xxx]!	Change the device hostname name. xxx:A maximum of 16 characters are supported	cs device hostname serial device!	device hostname: serial device!	device hostname: serial device!
cr device hostname!	Query the hostname name of the device.	cr device hostname!	device hostname: serial device!	device hostname: serial device!
cr fw version!	Get firmware version.	cr fw version!	boot version:v1.xx.xx app version:v1.xx.xx	
cr status!	Get the product all status: version, I/O, com and network.	cr status!	boot version:v1.xx.xx app version:v1.xx.xx baud rate:115200 data len:8bit parity bit:none stop bit:1bit output type:rs232 …	
Serial Port Settings				
cs com baudrate [x]!	Serial port baud rate settings, x = {1-9}, 1->115200, 2->57600, 3->56000, 4->38400, 5->19200 6->14400, 7->9600, 8->4800, 9->2400.	cs com baudrate 1!	com baudrate: 115200	com baudrate: 115200
cs com datalen [x]!	Serial port data length settings, x = 1, 1->8bit	cs com datalen 1!	com datalen:8 bit	com datalen: 8 bit
cs com stopbit [x]!	Serial port stop bit settings, x = {1-2}, 1->1bit, 2->2bit.	cs com stopbit 1!	com stopbit:1 bit	com stopbit: 1 bit

Command Code	Description	Example	Feedback	Default Setting
cs com paritybit [x]!	Serial port data verification settings, x = {1-3}, 1->none, 2->even, 3->odd.	cs com paritybit 1!	com paritybit: none	com paritybit: none
cs com output type [x]!	Serial output type settings, x = {1-2}, 1->rs232, 2->rs485.	cs com output type 1!	com output: rs232	com output: rs232
cr com config!	Read the serial port configuration information.	cr com config!	baud rate:115200 data len:8bit parity bit:none stop bit:1bit output type:rs232	
Network Port Settings				
cs ip addr xxx.xxx.xxx.xxx!	Set network ip address. ip range: 1.0.0.1~223.255.255.254 Note: dhcp does not support modifying ip information and the device will reboot.	cs ip addr 192.168.0.100!	ip address: 192.168.0.100	192.168.0.101
cs subnet xxx.xxx.xxx.xxx!	Set network subnet mask. xxx=255|254|252|248|240|224|192|128|0 Note: dhcp does not support modifying subnet information and the device will reboot.	cs subnet 255.255.254.0!	subnet mask: 255.255.254.0	255.255.255.0
cs gateway xxx.xxx.xxx.xxx!	Set network gateway. gateway range: 1.0.0.1~223.255.255.254 Note: dhcp does not support modifying gateway information and the device will reboot.	cs gateway 192.168.0.254!	gateway: 192.168.0.254	192.168.0.1
cs ip mode [x]!	Set ip mode, x={0-1} 0=dhcp off, 1=dhcp on. Note: The device will reboot.	cs ip mode 0!	ip mode:dhcp off	dhcp off
cs tcp/udp mode [x]!	Set serial data transparent way, x={1-2} 1=tcp, 2=udp. Note: The device will reboot.	cs tcp/udp mode 1!	tcp/udp mode:tcp	tcp
cs remote sys udp port [x]!	Set the system configures the remote udp port. x ={1~65535} Note: The device will reboot.	cs remote sys udp port 1000!	system udp remote port:1000	1000

Command Code	Description	Example	Feedback	Default Setting
cs remote com udp port [x]!	Set the remote udp port for transparent data transmission over the serial port. x ={1~65535} Note: The device will reboot.	cs remote com udp port 1001!	com udp remote port:1001	1001
cr ipconfig!	Network configuration query.	cr ipconfig!	network config info: ip mode:dhcp off tcp/udp mode:tcp system tcp server port:8000 serial tcp server port:8001 system local udp port:9000 serial local udp port:9001 system remote udp port:1000 serial remote udp port:1001 ip:192.168.0.101 subnet mask:255.255.255.0 gateway:192.168.1.1 mac address:xx:xx:xx:xx:xx:xx	
IO Settings				
cs i/o mode [x]!	Set the I/O port mode, x={1-2} 1=input, 2=output.	cs i/o mode 1!	i/o mode: input gpio input 0/1	i/o mode: input gpio input 0/1
cr i/o mode!	Read the I/O port mode.	cr i/o mode!	i/o mode:input/output	
cs i/o output level [x]!	Set the I/O output level, x={0-1} 0=low level, 1=high level. Note: This parameter is valid when I/O is in output mode.	cs i/o output level 0!	i/o output level: low	i/o output level: low
cr i/o output level!	Read the IO output level. Note:This parameter is valid when I/O is in output mode.	cr i/o output level!	i/o output level: low/high	
	If I/O is in input mode and a low level is detected, report "gpio input 0".		gpio input 0	
	If I/O is in input mode and a high level is detected, report "gpio input 1".		gpio input 1	

Command Code	Description	Example	Feedback	Default Setting
Relay Settings				
cs relay [x] to [y]!	relay switch x={1-2} 1->relay port 1 2->relay port 2 y={0-1} 0->off 1->on	cs relay 1 to 1!	relay 1:on	relay 1:off
cr relay [x]!	relay inquiry 0->all relay 1->relay 1 status 2->relay 2 status	cr relay 1!	relay 1:off	
IR CCF Send				
cs ccf data xxxx xxxx end!	Send the ccf code. xxx: ccf code.	cs ccf data 0000 006d 0000 0025 00af 00af 0016 0015 0016 0041 0016 0041 0016 0041 0016 0015 0016 0015 0016 0015 0016 0015 0016 0015 0016 0041 0016 0041 0016 0041 0016 0015 0016 0015 0016 0015 0016 0015 0016 0015 0016 0041 0016 0015 0016 0041 0016 0015 0016 0015 0016 0041 0016 0041 0016 0015 0016 0041 0016 0041 0016 072c 00b0 00ae 0016 0041 0016 017a end!	ccf is send ok	
cs ccf repeat [z] data xxxx xxxx end!	Send the ccf code. z={0-99} IR number of times to repeat the code xxx: ccf code.	cs ccf repeat 5 data 0000 006d 0000 0025 00af 00af 0016 0015 0016 0041 0016 0041 0016 0041 0016 0015 0016 0015 0016 0015 0016 0015 0016 0041 0016 0041 0016 0041 0016 0015 0016 0015 0016 0015 0016 0015 0016 0015 0016 0041 0016 0015 0016 0041 0016 0015 0016 0015 0016 0041 0016 0041 0016 0015 0016 0041 0016 0041 0016 072c 00b0 00ae 0016 0041 0016 017a end!	ccf is send ok	

8. Application Example

