XINJE

A-BOX remote communication module

User manual

Wuxi Xinje Electric Co., Ltd.

Data No. MC12 20180914 1.0

Catalog

1. Introduction

1-1. Product overview

In order to solve the problem of information isolation of automatic equipment, ABOX series of products can realize remote download program and device data monitoring of PLC, HMI, intelligent instrument lamp and other products. The network configuration of ABOX product is simple, no need for professional technology, and easy to use.

■ Compatibility

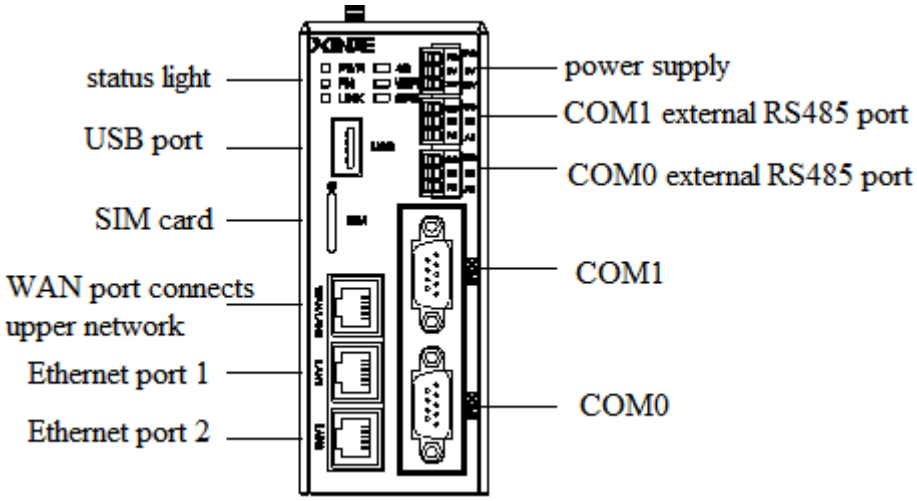
- Rich network access: 4G/WiFi/RJ45
- Up to 2 channels of RS232/485/422 serial port
- Up to 3 channels 10/100M adaptive RJ45 interface
- Provide RJ45/WiFi network environment, allow varity of network equipments
- Compatible with various mainstream controllers in the market

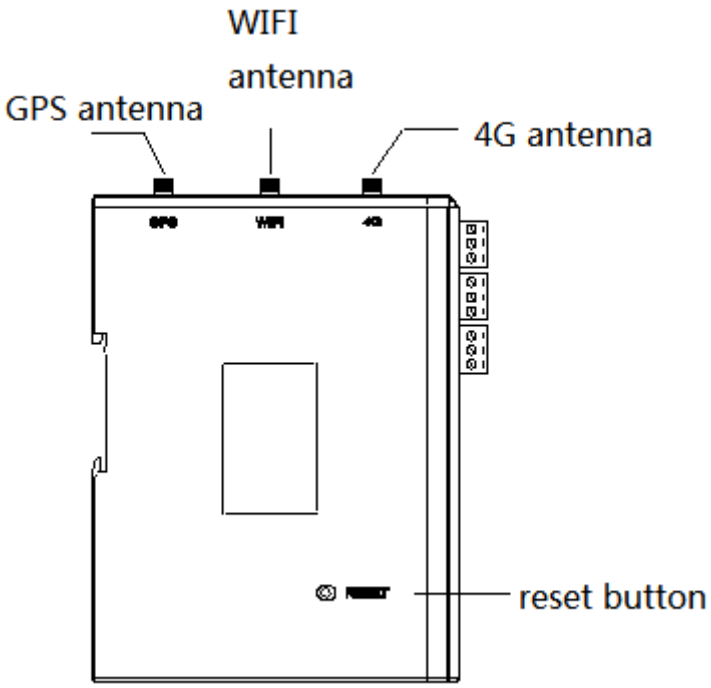
■ Performance features

- 4G fits all kinds of network
- GPS function
- Serial port transparent transmission
- Ethernet VPN technology
- Fit for global network environment
- Persistent online, redial and watchdog function

2. Performance parameters

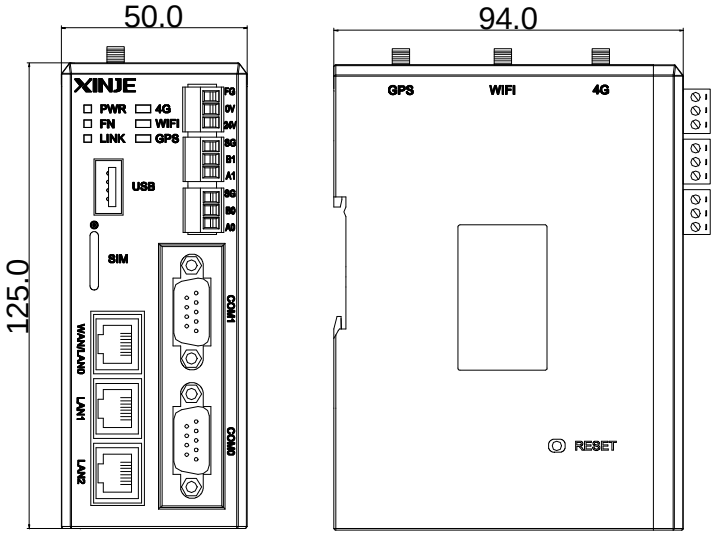
2-1. Structure





2-2. Dimension

The overall dimension is 50.0mm×125.0mm×94.0mm (W×H×D). Please install on the DIN46277(width is 35mm) rail.



Note:

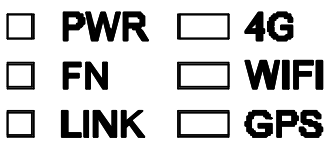
(1) during screw hole processing and wiring, please do not let the chip and wire chip fall into the module.

(2) before connecting, please confirm the specification of module and connecting equipment to ensure there is no error.

(3) when the connection is made, please note whether the connection is firm or not. If the connection falls off, the wrong data and short circuit will be caused. Installation, wiring, etc. shall be performed after the power supply is cut off.

2-3. Status light

After the module is powered, the indicator light will be lit according to the function. The meaning is as follows:



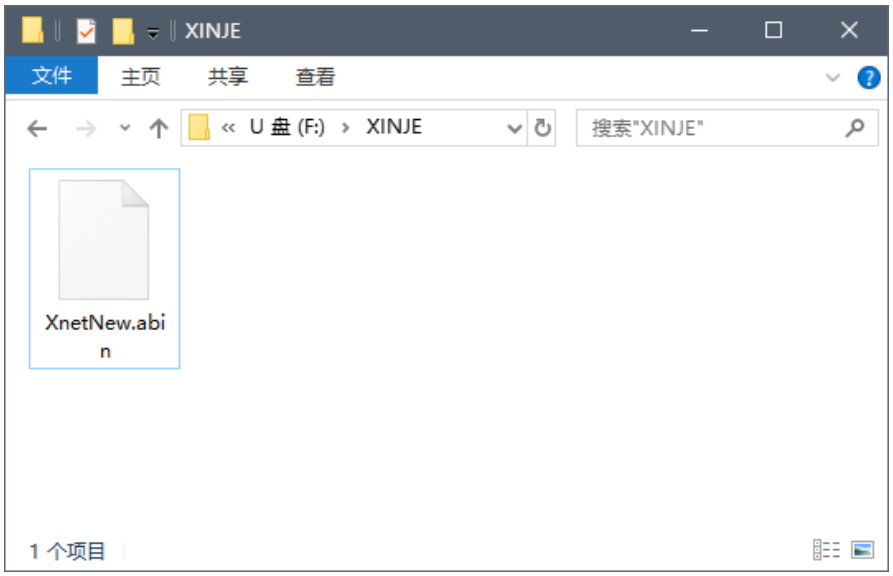
Light	Description
PWR	Power supply indicator, normally on when power is on
FN	Flashing fast when the flash disk is updating firmware Flashing slowly when exporting the historical data
LINK	Always lights when log on server succeeded Flashing in Virtual serial port/VPN mode
4G	Always lights when the SIM card is in, Flashing when the SIM card is not in
WIFI	Always lights in STA (station) mode Flashing in AP(hotspot) mode
GPS	Always lights when receiving the GPS information successfully

2-4. Flash disk

To do the following, make sure the flash disk file system format is FAT32, otherwise it may fail.

2-4-1. Update the firmware

1. Create a folder named XINJE in root directory of flash disk, please put the update file XnetNew.abin in this folder.



2. Connect the flash disk to the USB port of ABOX, and power on the ABOX again. FN light is flashing fast, it means ABOX is updating, ABOX will restart again automatically after update.

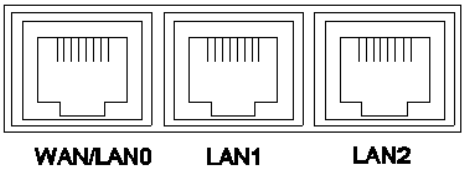
2-4-2. Export history

Create a folder named XINJE in root directory in flash disk, connect the flash disk to USB port of ABOX, click the reset button on the left side of ABOX to start historical data export. FN light will flash slowly when exporting, FN light will be off when the exporting process ends.

2-5. SIM card

- SIM card dimension is Nano SIM card
- Support all the telecom operators

2-6. Ethernet port



- 10M/100M adaptive port
- When the Internet mode is Ethernet port, the first port is WAN port
- When the Internet mode is 4G or WIFI, all the port is LAN port

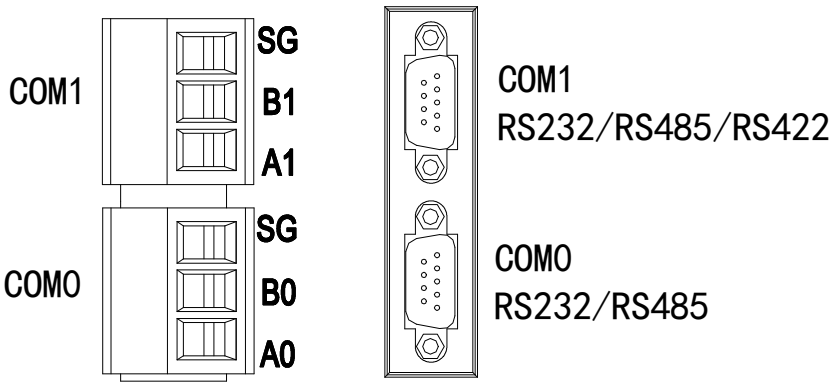
2-7. Power supply

FG
0V
24V

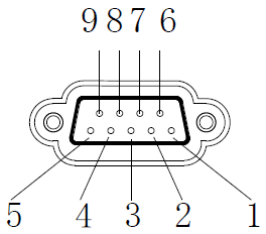
The module power supply is 24V DC, the allowable range is DC 21.6V~26.4V.

2-8. Communication port

Two serial ports, which are com0 and com1. com0 and com1 can be used at the same time. The RS232 and RS485/RS422 of the same port cannot be used at the same time.

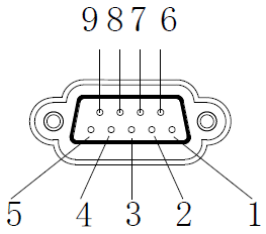


COM0 port pin definition:



Pin no.	Name	Meaning
1	NC	Empty
2	RXD	RS232 receive data
3	TXD	RS232 send data
4	A	RS485+
5	GND	Signal ground
6	BUSY	Busy signal
7	B	RS485-
8	NC	Empty
9	NC	Empty

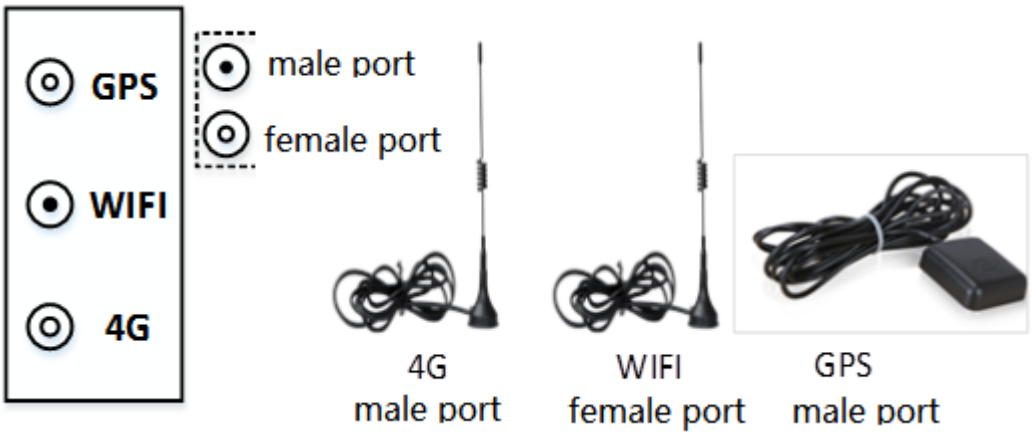
COM1 port pin definition:



Pin no.	Name	Meaning
1	TD+	RS422 send signal +
2	RXD	RS232 receive data
3	TXD	RS232 send data
4	A	RS485+
5	GND	Signal ground
6	TD-	RS422 send signal -
7	B	RS485-
8	RDD-	RS422 receive signal -
9	RDD+	RS422 receive signal +

2-9. Antenna

ABOX has three antenna interfaces which are 4G, WIFI, GPS, they are all extension antenna.



2-10. Reset button

Triggering mode	Function
0-5s	Start historical data export
5-15s	Restore factory initial setting
>15s	Factory mode

2-11. General specification

Item	Specification
Using environment	No corrosive gas
Environment temperature	0℃~60℃
Storage environment temperature	-20~70℃
Environment humidity	5~95%RH
Storage environment humidity	5~95%RH
Installation	Fix on the rail DIN46277 (width is 35mm) with M3 screw

2-12. Product features

Parameter	Descriptions
CPU	MT7628
FLASH	32MB SPI FLASH
ROM	256MB
Ethernet port	3 channels 10M/100M adaptive port
Communication port	COM0: RS232/RS485 COM1: RS232/RS485/RS422
USB port	USB Host
4G module	EC20 R2.0
4G working frequency	GSM/GPRS: 900/1800MHz EDGE: 900/1800MHz UMTS: CDMA2000(BC0), WCDMA(B1, B8), TD-SCDMA(1.9G, 2G) LTE: FDD(B1, B3, B8)TDD(B38, B39, B40, B41) GNSS: GPS, GLONASS
WIFI working frequency	2.4GHz
Max transmitting power	GSM/GPRS: 2W EDGE: 0.5W UMTS: 0.25W LTE: 0.25W
Working temperature	-10℃～50℃
Average standby current	<150mA 4W

3. Configuration environment

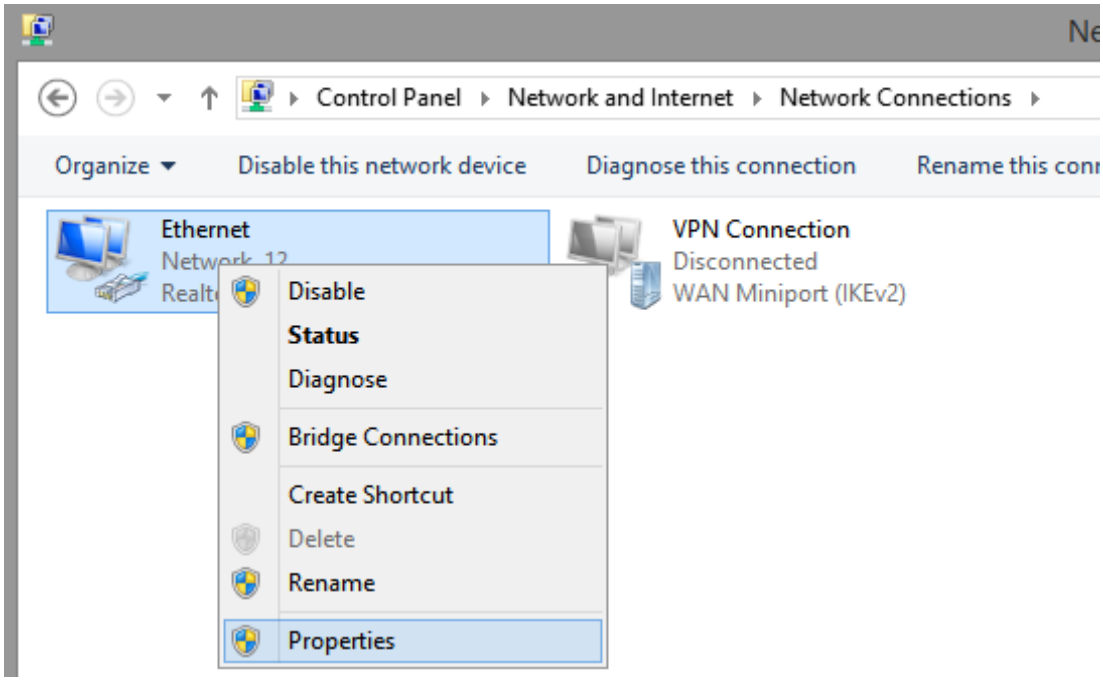
3-1. Preparation

ABOX has WAN and LAN configuration mode. LAN configuration uses Ethernet cable (UTP5) connecting to any LAN port. WAN configuration needs the module log on the server successfully. The defaulted parameters can be used, user no need to set the parameters.

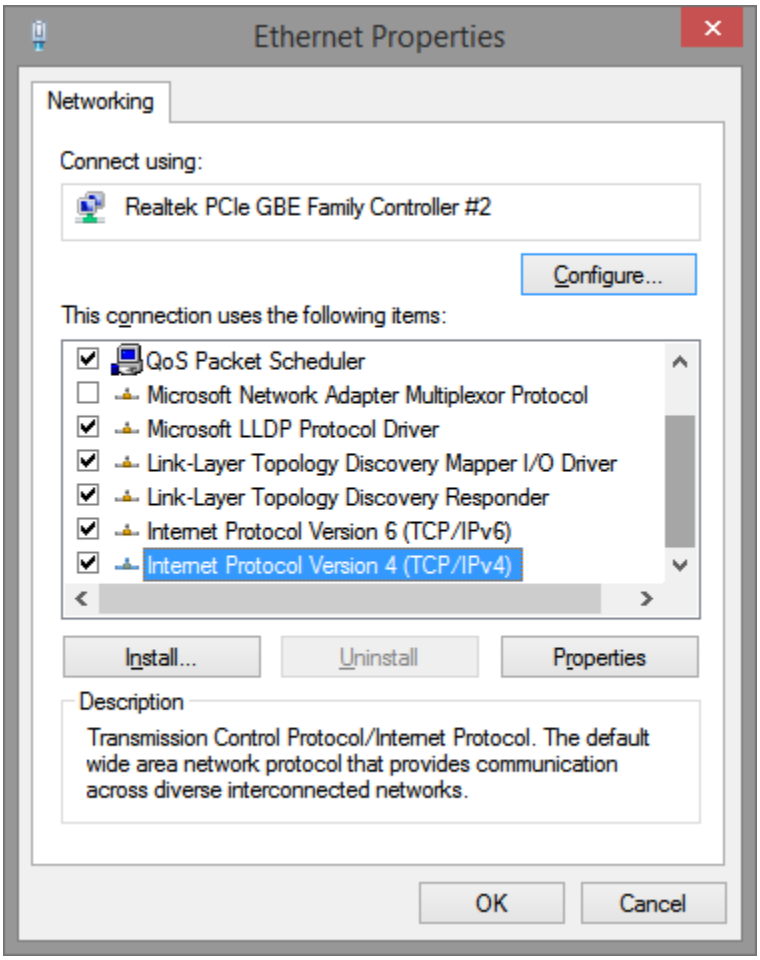
Version requirements	
Firmware	Configuration tool
V1.0.0 and up	V2.1.001(20180810)

3-1-1. LAN

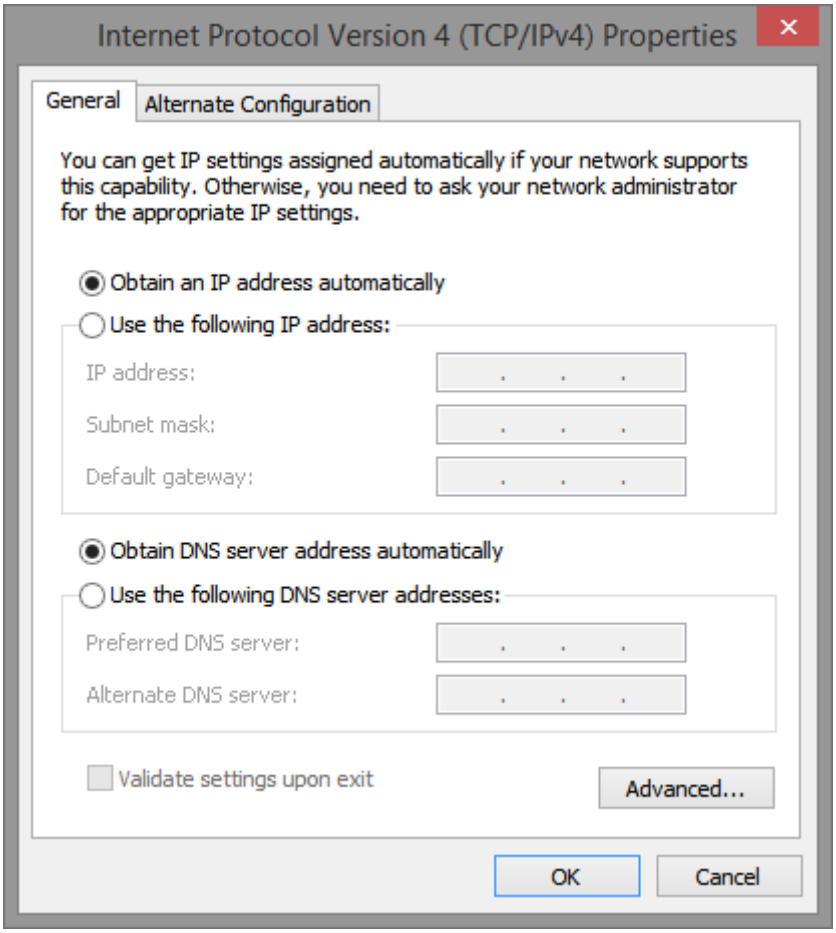
1. Connect the ABOX to PC with Ethernet cable, find the corresponding network card, right click the property, remember the network card name (in this example, the name is Ethernet) which will be used when configuring the ABOX adapter.



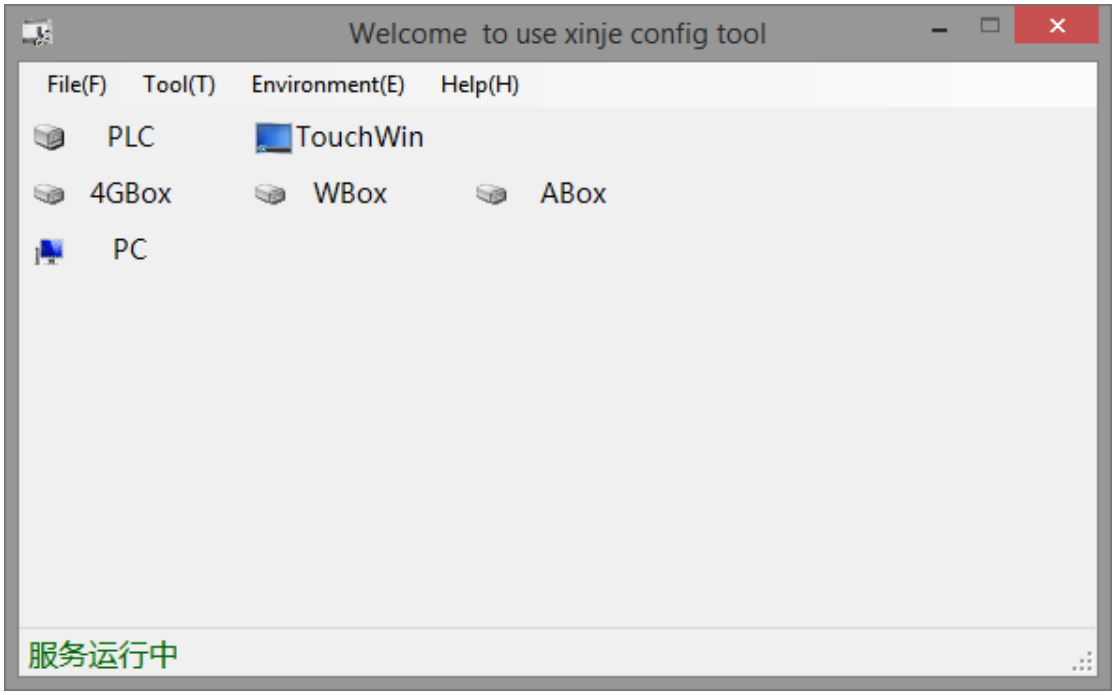
2. find the Internet protocol version 4(TCP/IPv4).

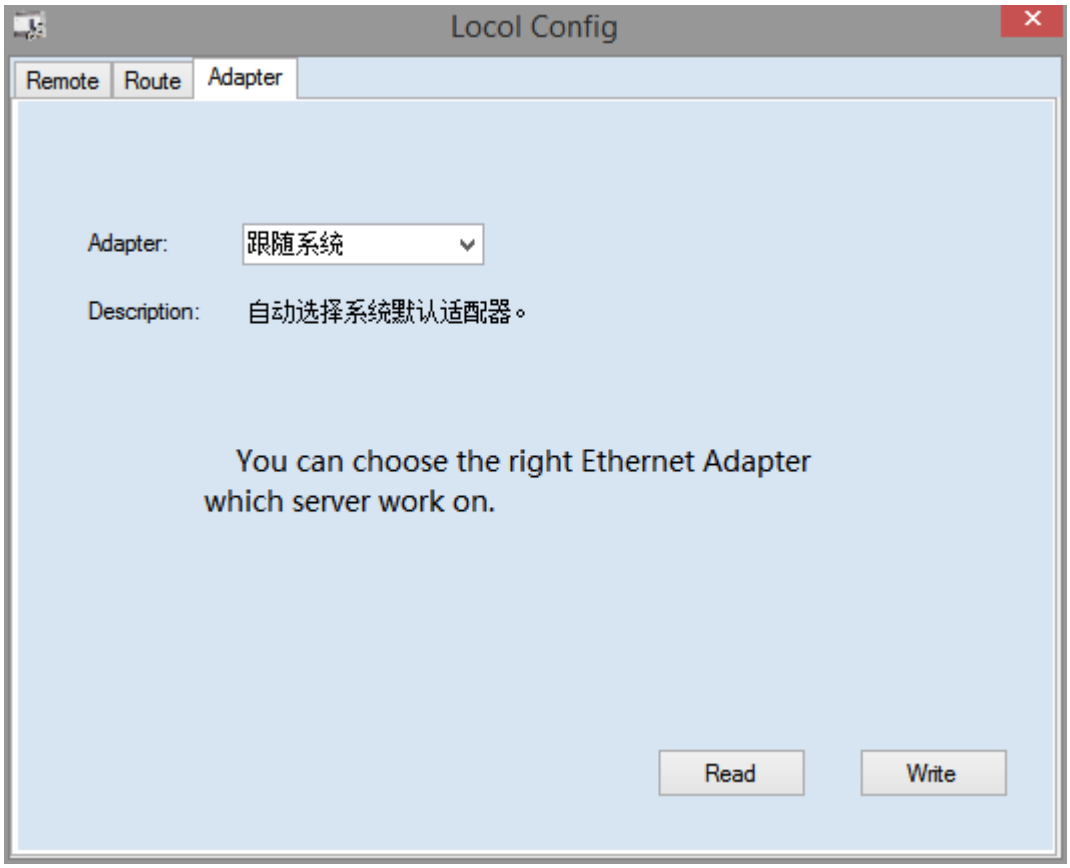


3. change the IP setting to obtain an IP address automatically

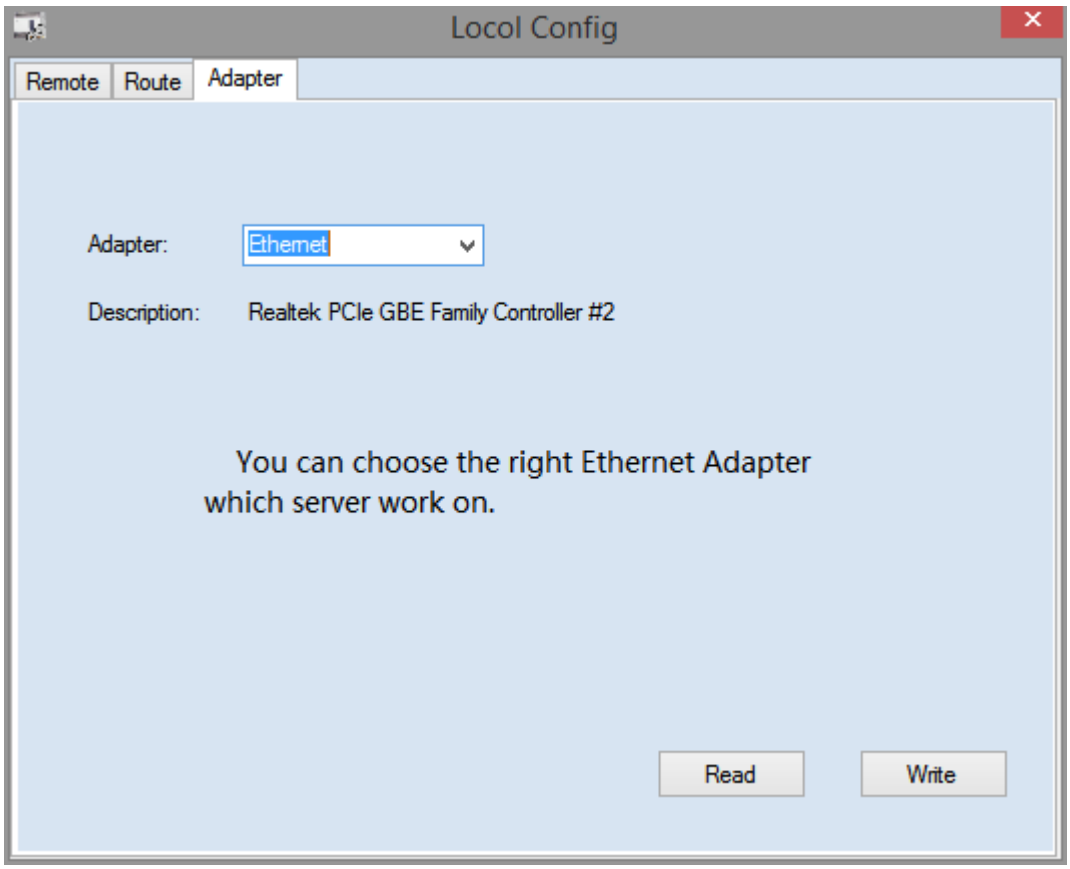


4. Open the configuration tool, find the adapter in my PC, click the adapter.

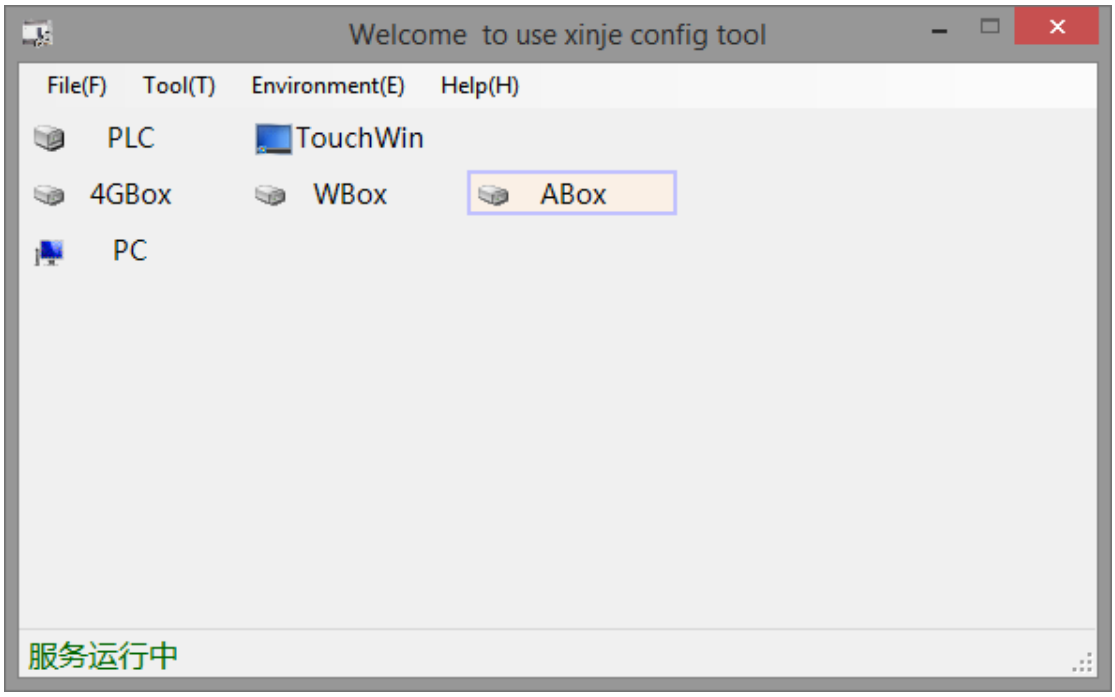




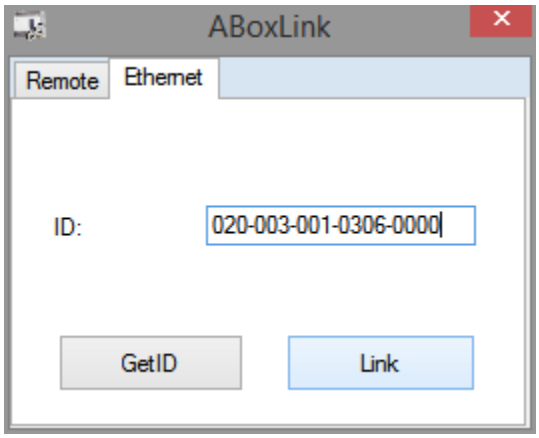
5. Change the adapter to the network card name connected before, refer to step 1, click write.

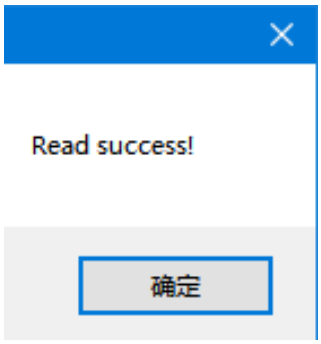


6. Click ABOX in the configuration tool.

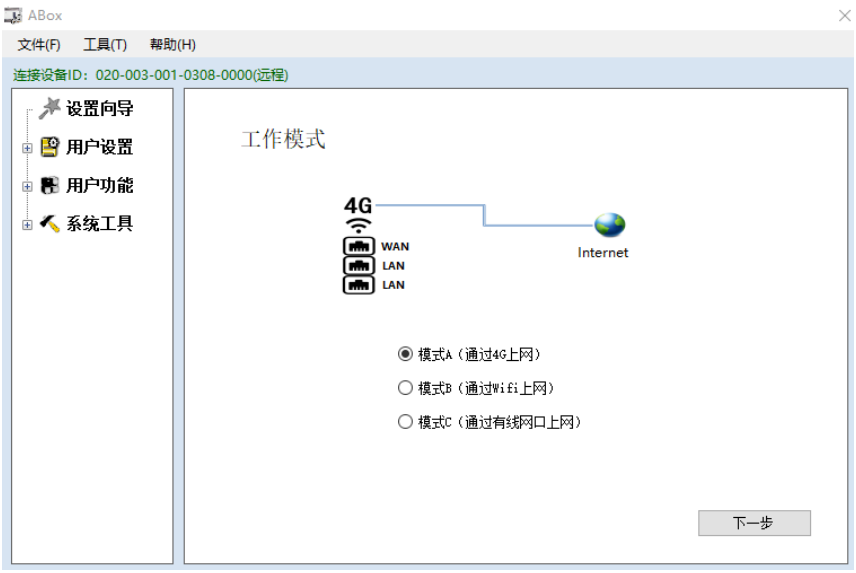


7. Click the LAN connection, input ABOX device ID(refer to ABOX label), or click get ID, click link, it will show read success after connection is successful.

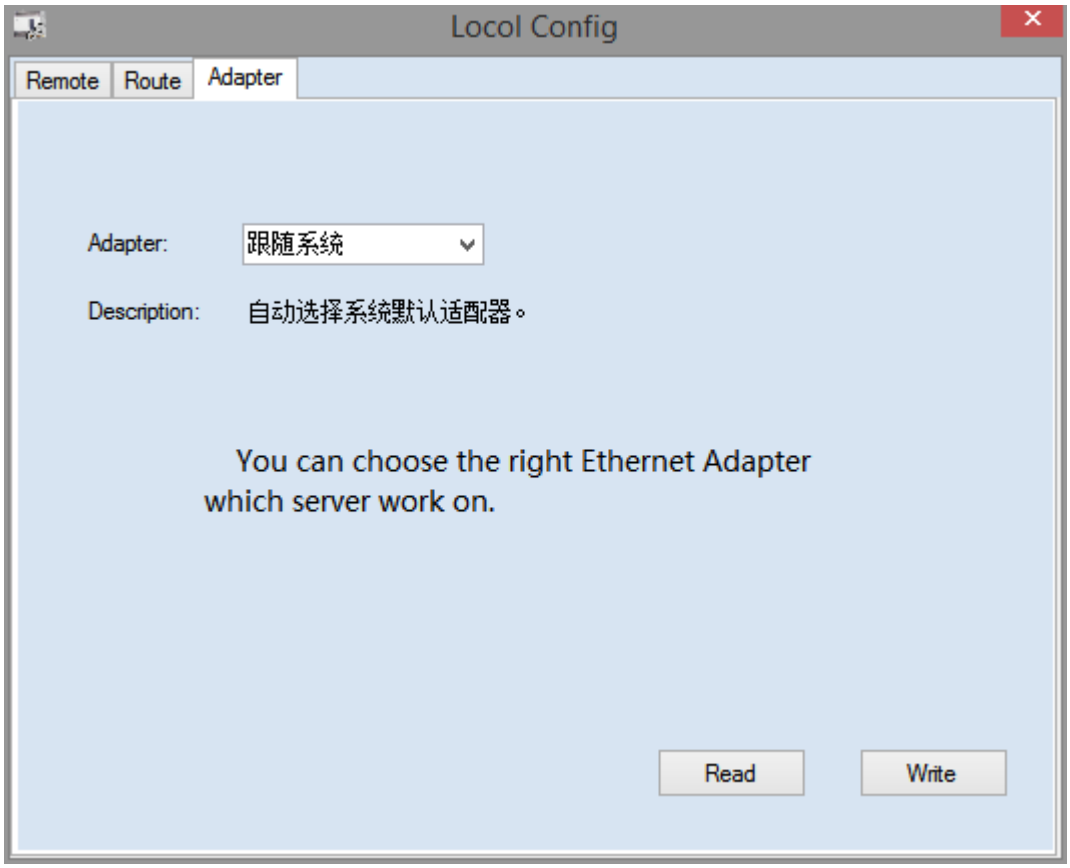




8. After the connection is successful, it will jump to configuration interface automatically.



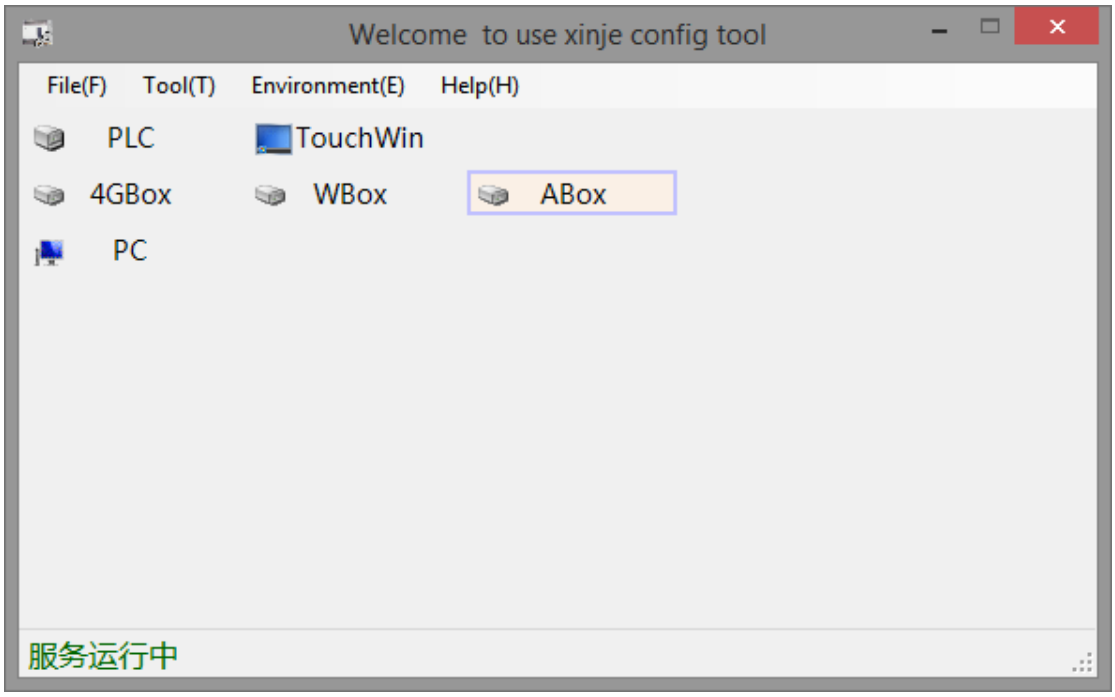
9. After the working mode is configured, the server is logged on successfully(the LINK light is always on), please change the adapter to follow system in configuration tool when remote connecting ABOX with configuration tool, and click write.



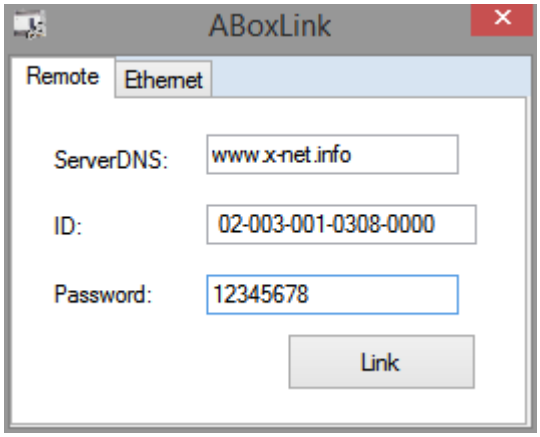
3-1-2. WAN

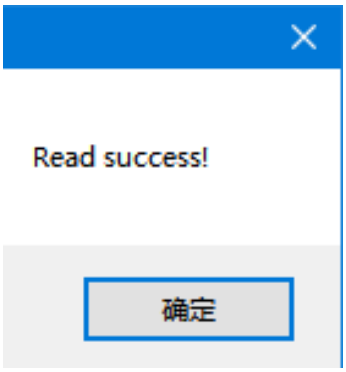
1. ABOX accesses to WAN successfully, make sure the PC can access the network before configuration. Open the configuration tool, click ABOX. The network configuration mode please

refer to setup wizard.

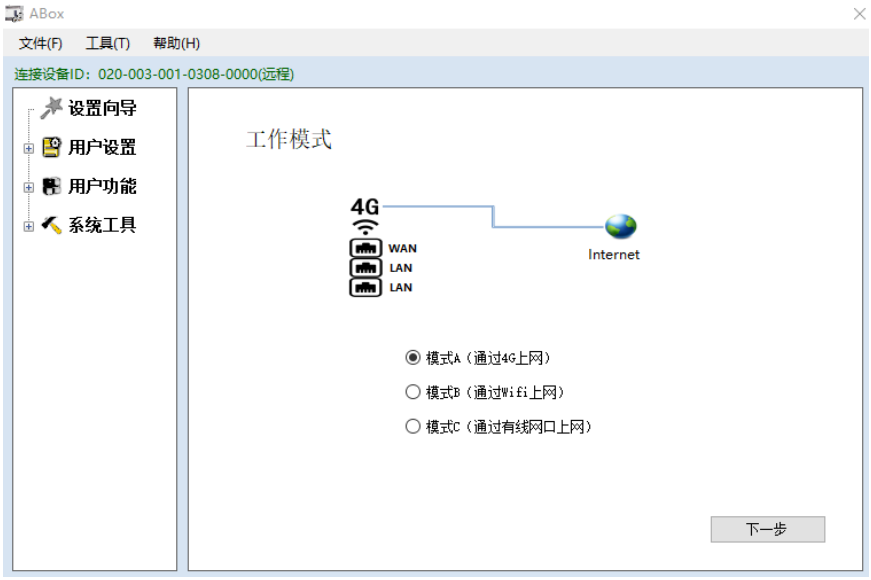


2. input ABOX device ID in remote connection(refer to the ABOX label), server domain name is www.x-net.info, defaulted password is 12345678. click link, it will show read success after successful connection. You can continue to operate.





3. After successful connection, it will jump to configuration interface automatically.

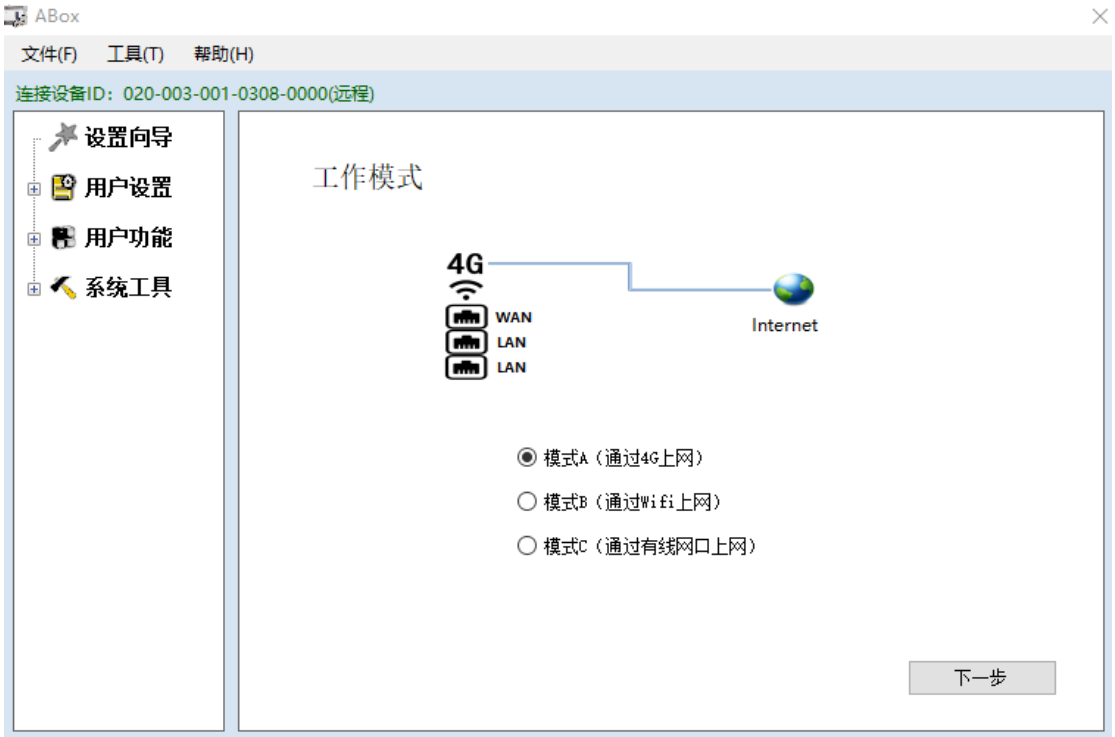


3-2. Setup wizard

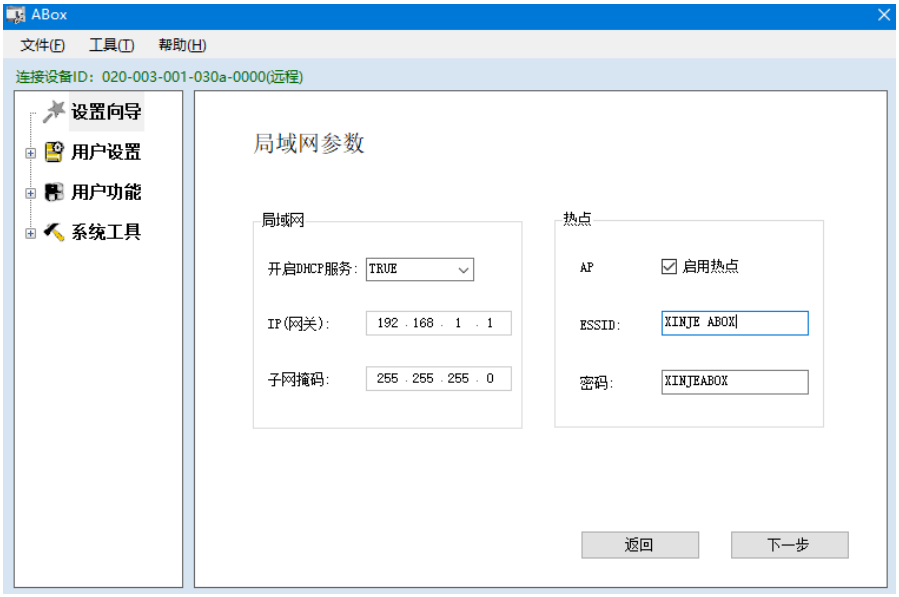
The network access mode includes 4G/WIFI/RJ45, using wizard configuration parameters. The defaulted mode is 4G

3-2-1. Mode A (access to Internet via 4G)

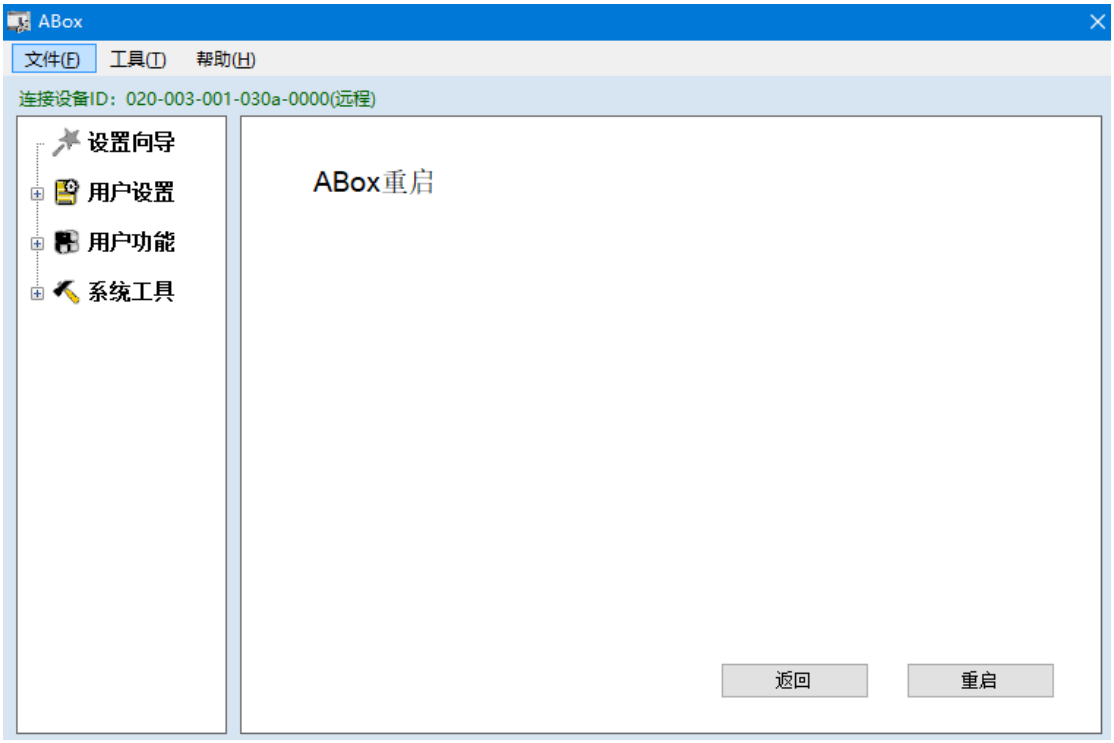
1. in working mode interface, choose mode A(access to Internet via 4G), click next.



2. Set the LAN port parameters. LAN port provides network access capability for other network devices, enabling wireless hotspot function, the defaulted WIFI name is XINJE ABOX, defaulted password is XINJEABOX. ABOX is equivalent to wireless router, which can provide hotspot for other devices.



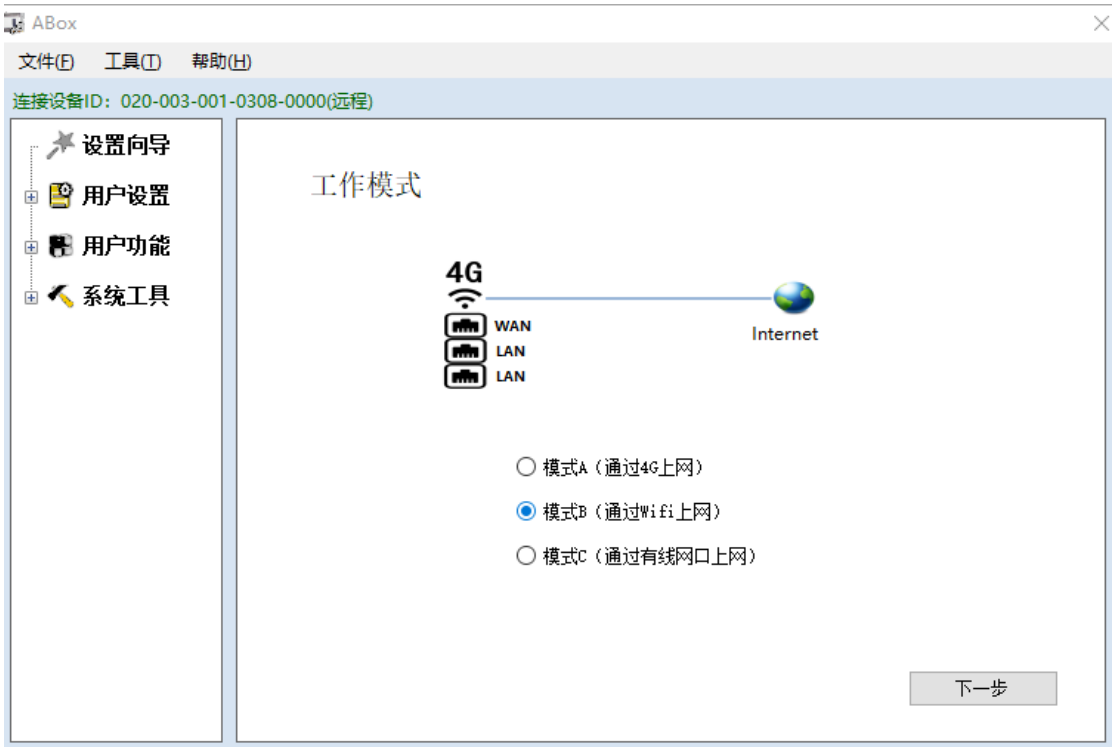
3. Click next, restart ABOX to make the settings effective.



4. When the power is cut off, power on after the module is insert with SIM card. Log on the server after the function is initialized. 4G light is always on, LINK light is always on, WIFI light is flashing.

3-2-2. Mode B (access to Internet via WIFI)

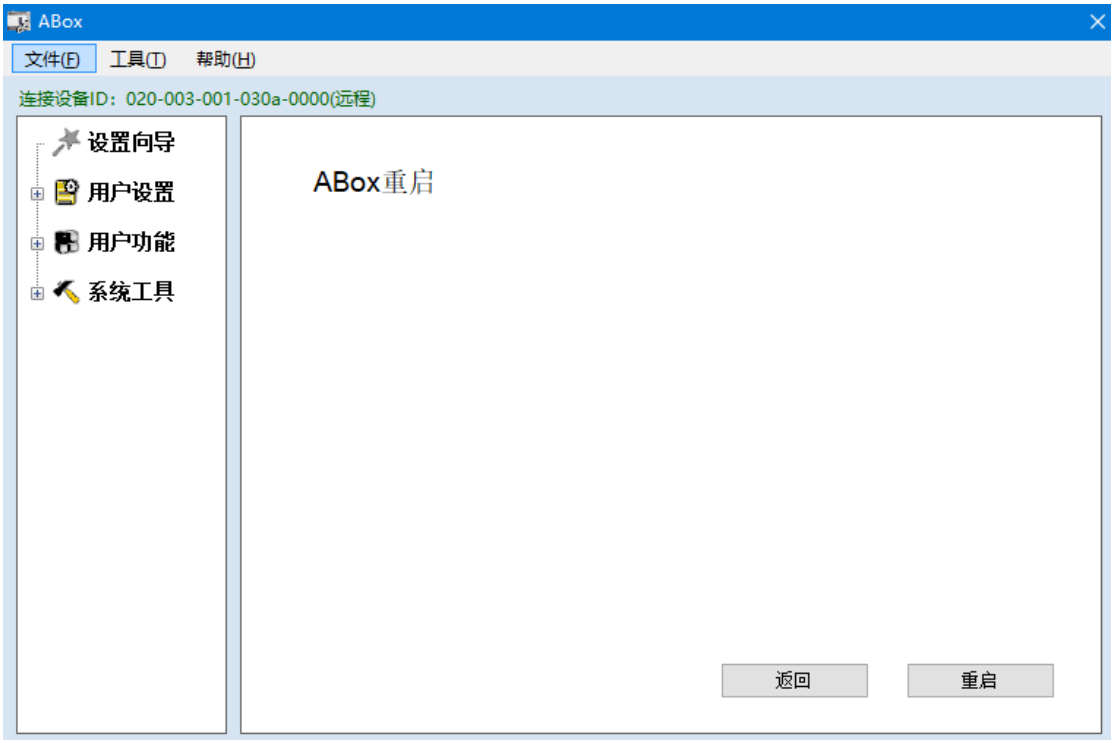
1. in working mode interface, choose mode B(access to Internet via WIFI), click next.



2. Set the network connection parameters, fill in the WIFI name and password. It is recommended to choose DHCP for WAN protocol.

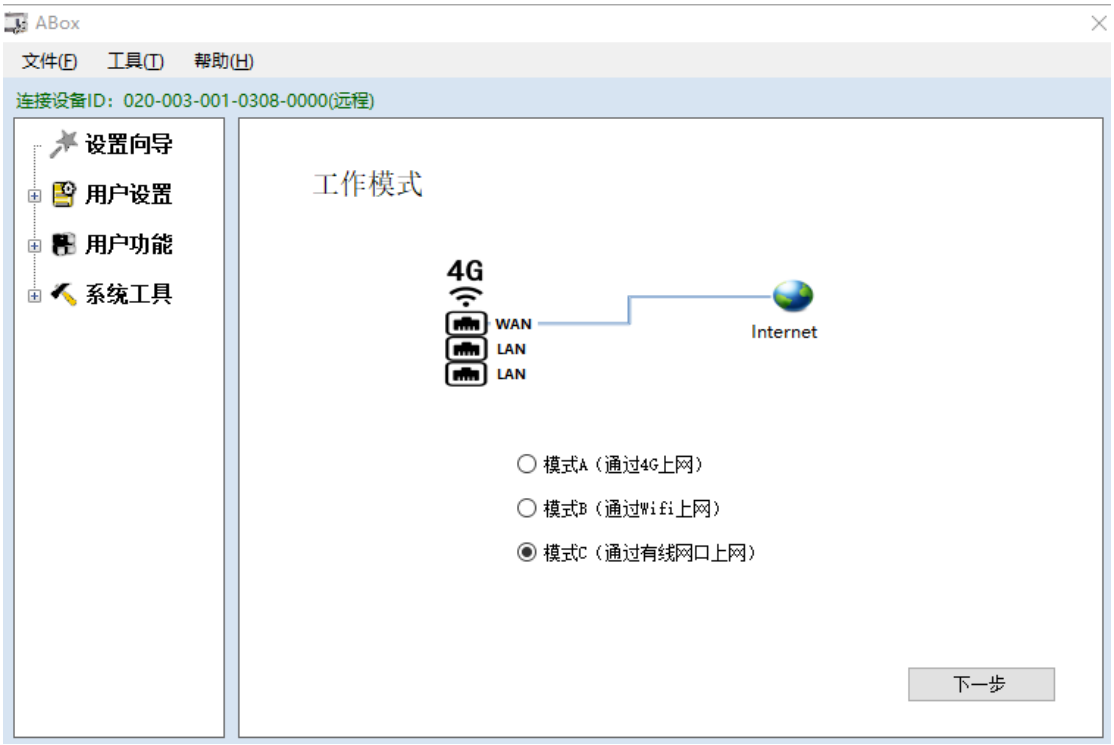
3. Click next, set the LAN parameters, it is recommended to enable the DHCP service. Mode B cannot provide hotspot.

4. Click next, restart the ABOX to make the settings effective. After log on the server successfully, LINK and WIFI light are always ON.



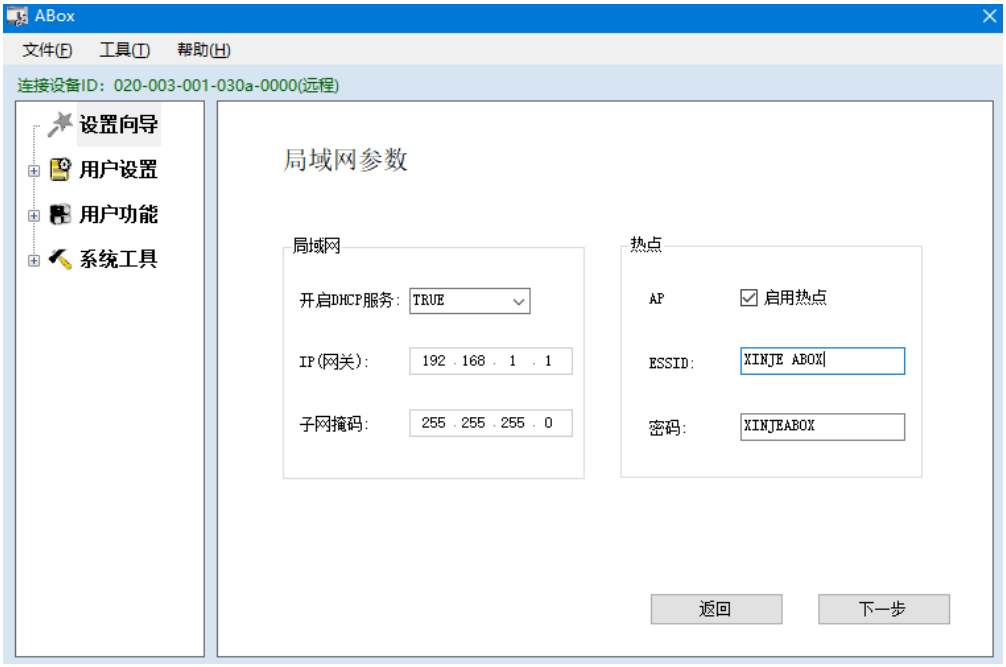
3-2-3. Mode C(access to Internet via Ethernet port)

1. in the working interface, choose mode C(access to Internet via Ethernet port), click next.

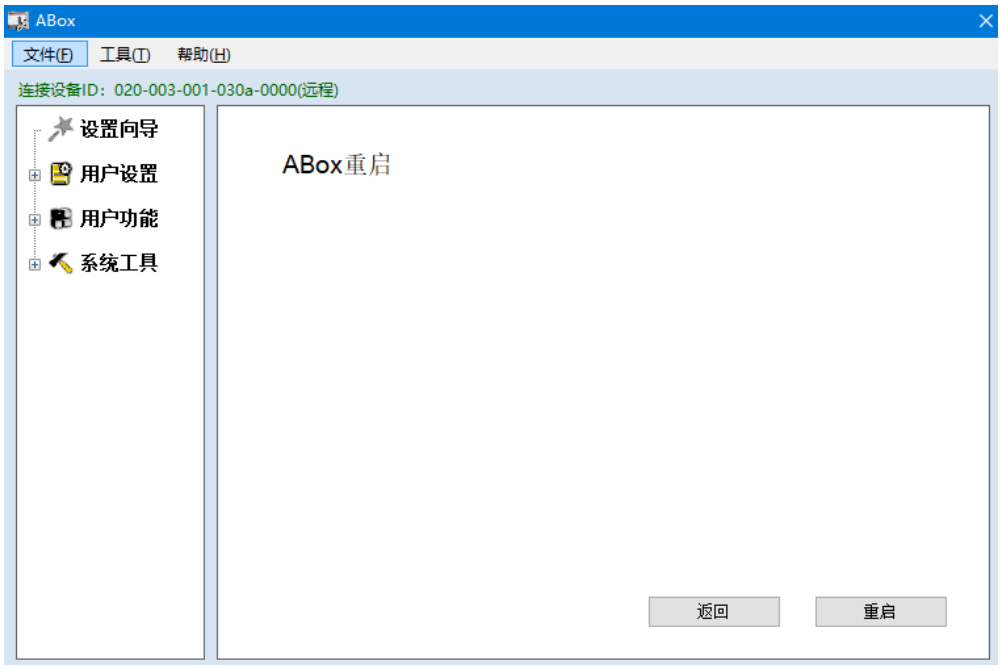


2. Set the WAN port parameters, choose DHCP(recommended) or static. Click next after setting.

3. Set the LAN port parameters, it is recommended to startup the DHCP service. WAN and LAN port network information is not allowed to conflict. LAN port provides network access capability for other network devices, enabling wireless hotspots function, defaulted WIFI name is XINJE ABOX, defaulted password is XINJEABOX. ABOX is equivalent to wireless router, which can provide hotspot for other devices.



4. Click next, restart the ABOX to make the settings effective. WAN accesses to the network with RJ45 port, after log on the server successfully, LINK light is always ON, WIFI light is flashing.



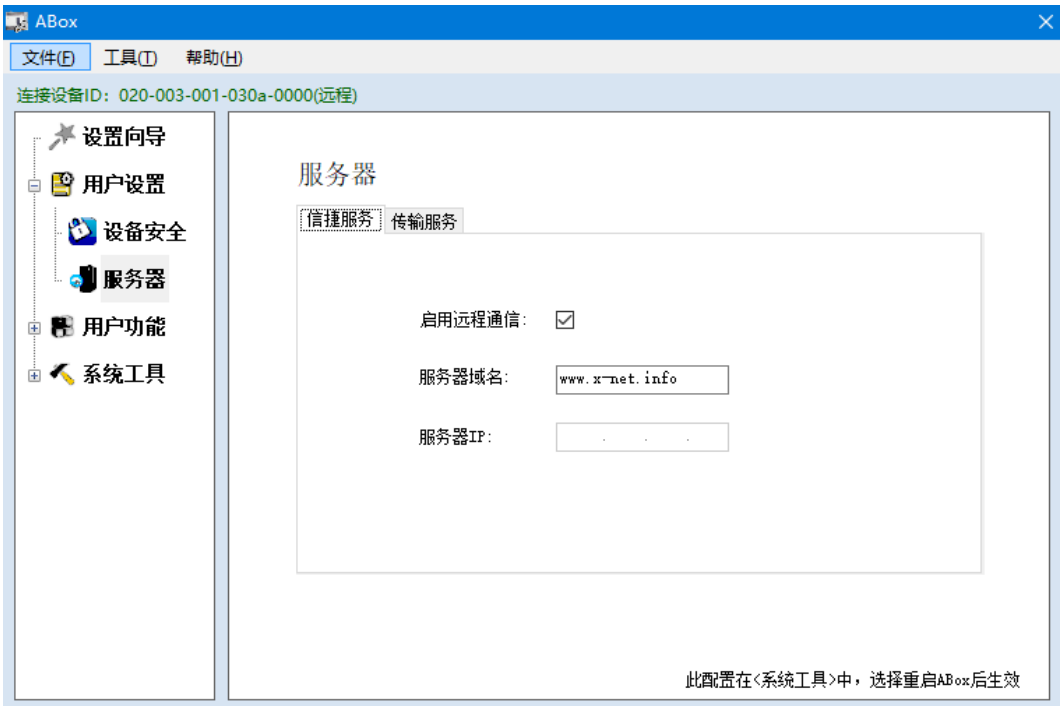
3-3. User setting

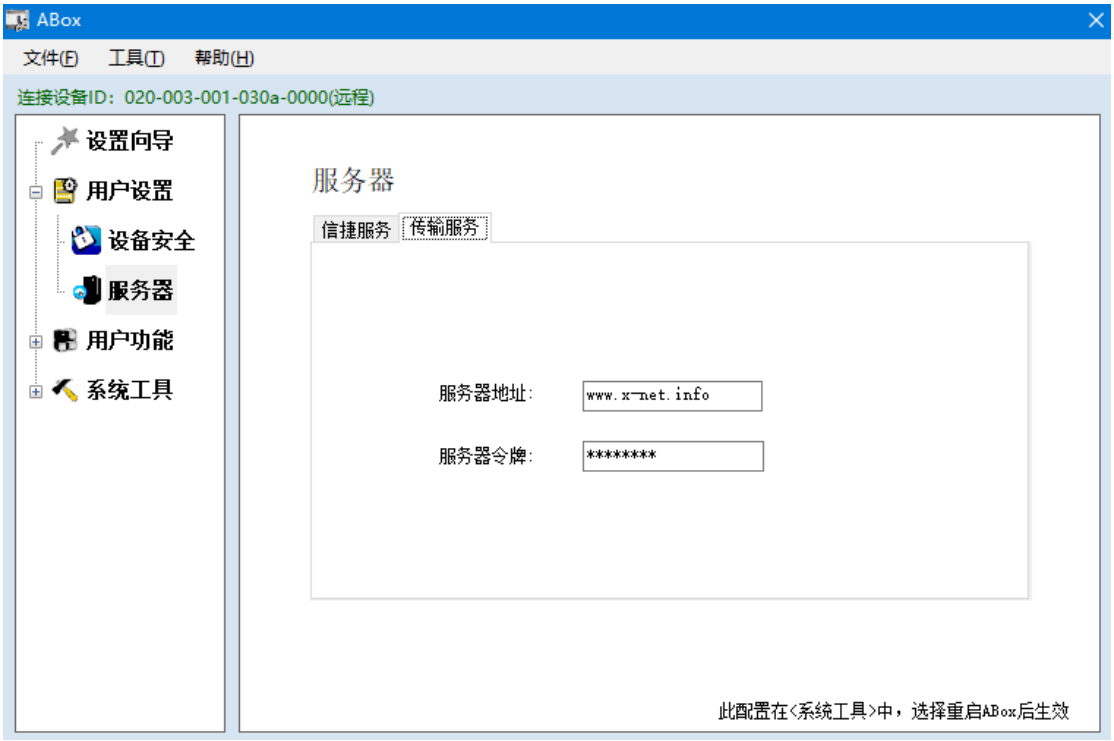
3-3-1. Device safety

The ABOX device password is used as the password verification for ABOX connection. The factory setting is 12345678. After initializing ABOX, the password is also 12345678. Password length is 8 bits, which can be letters, numbers, sensitive cased.

3-3-2. Server

The server is divided into XINJE service and transmission service. Do not modify it for non special use.





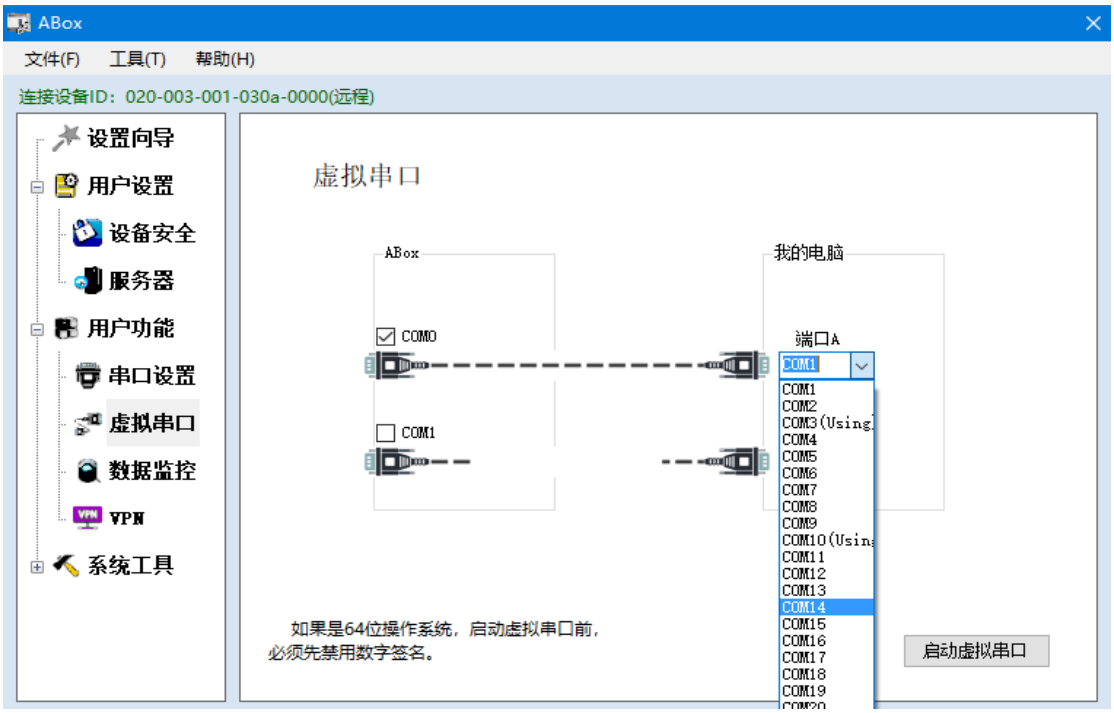
3-4. User function

3-4-1. Serial port

Set the com0, com1 parameters of ABOX. Com0 and com1 can be used at the same time. The RS232 and RS485/RS422 for the same port cannot be used at the same time. Write in the serial port parameters, the parameters will be effective immediately.

3-4-2. Virtual serial port

Transparent transmission, the transport network is only responsible for the transport of services to the destination node, while ensuring the quality of transmission. The virtual serial port enables the remote PC control the device which is connected ABOX via serial port. The virtual serial port supports LAN and WAN mode. Refer to chapter 4-1 for details.



3-4-3. VPN

VPN is virtual private network, which establishes a private network on public network for encrypted communication. Connect the network interface device to ABOX directly through the network cable, the remote PC can control the device with network interface through Ethernet network after VPN. Virtual gateway and virtual network segment need to be in the same network segment. Please refer to chapter 4-3 for details.

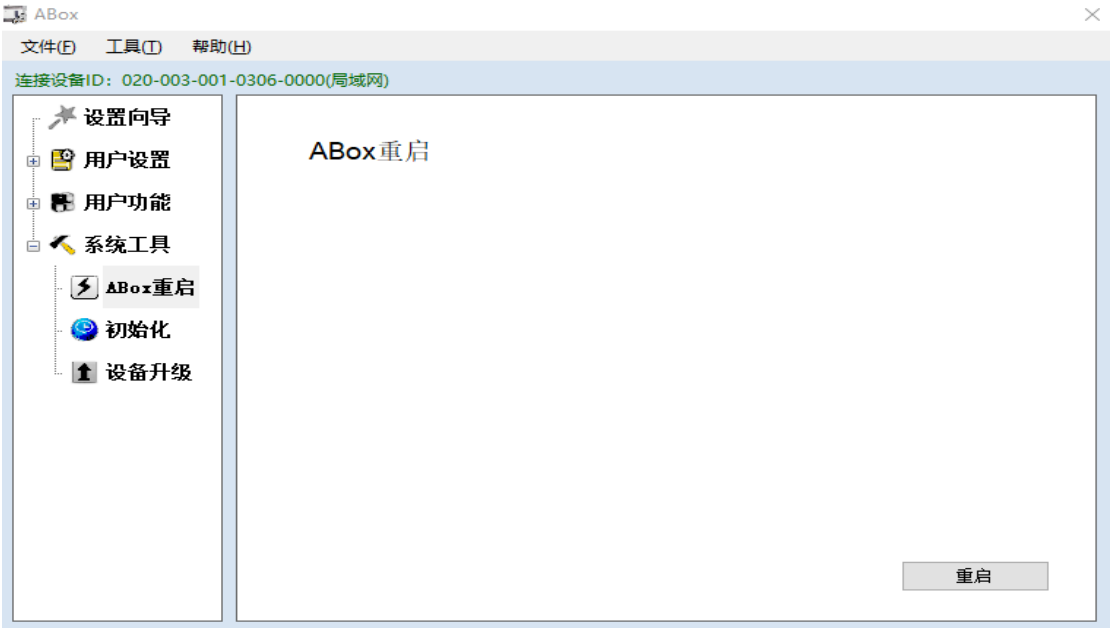
3-4-4. Data monitoring

Data monitoring needs to cooperate with XINJE Cloud platform. The address of different devices corresponds to the address of ABOX, so as to realize real-time monitoring of PLC data by Cloud platform. Please refer to chapter 4-2 for details.

3-5. System tools

3-5-1. ABOX restart

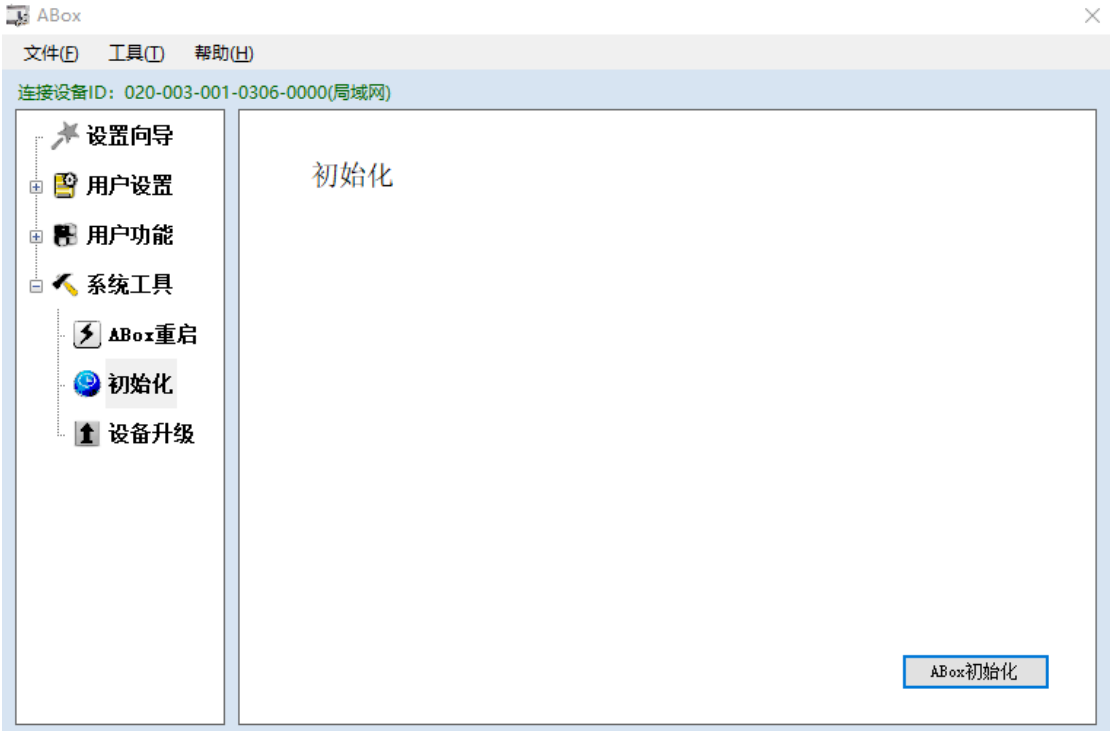
Click restart to restart the ABOX, the configuration parameters in configuration tool will be effective.



3-5-2. Initialization

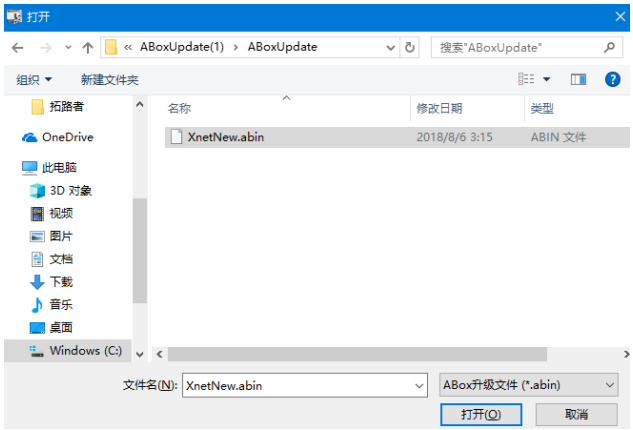
Click ABOX initialization, restore the ABOX parameters to factory default settings. This

operation will not change the ABOX firmware version.

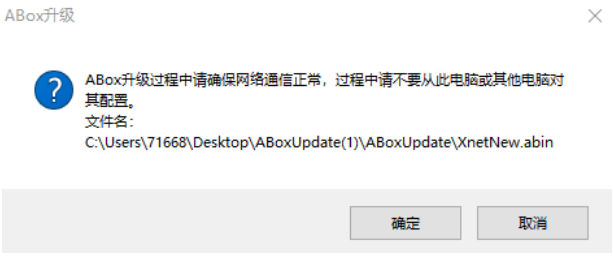


3-5-3. Device update

1. click ABOX update, choose the update file folder, click open.



2. Click OK.



3. After updating, restart the ABOX to make the new firmware effective.

3-6. Import and export

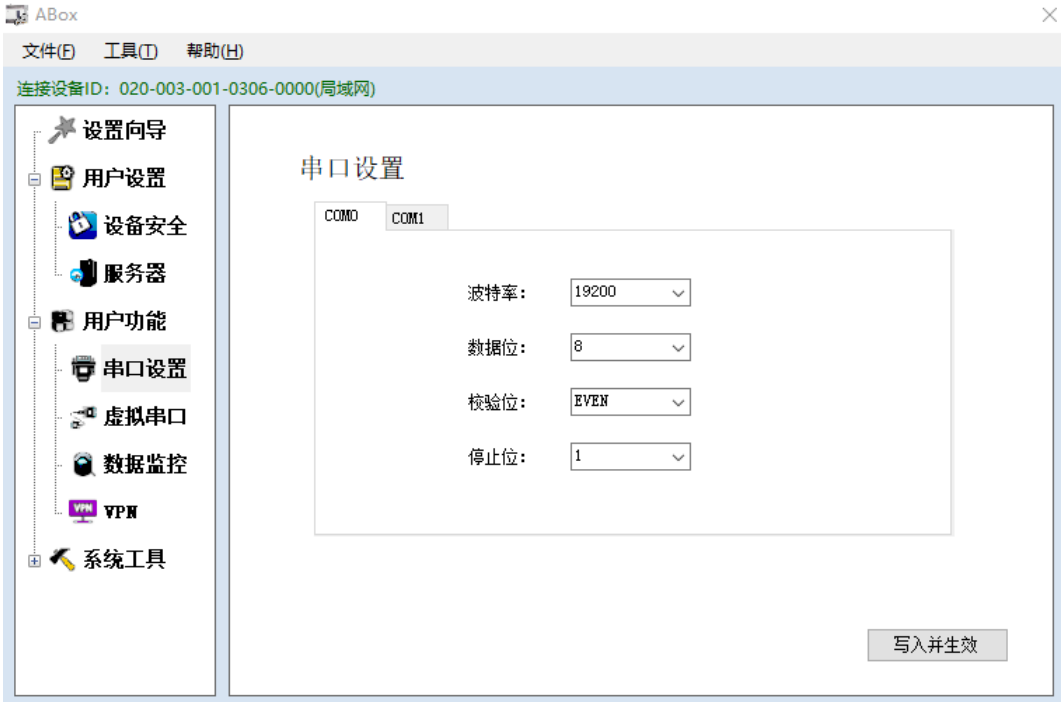
The configuration information of ABOX can be exported.

4. Typical function application

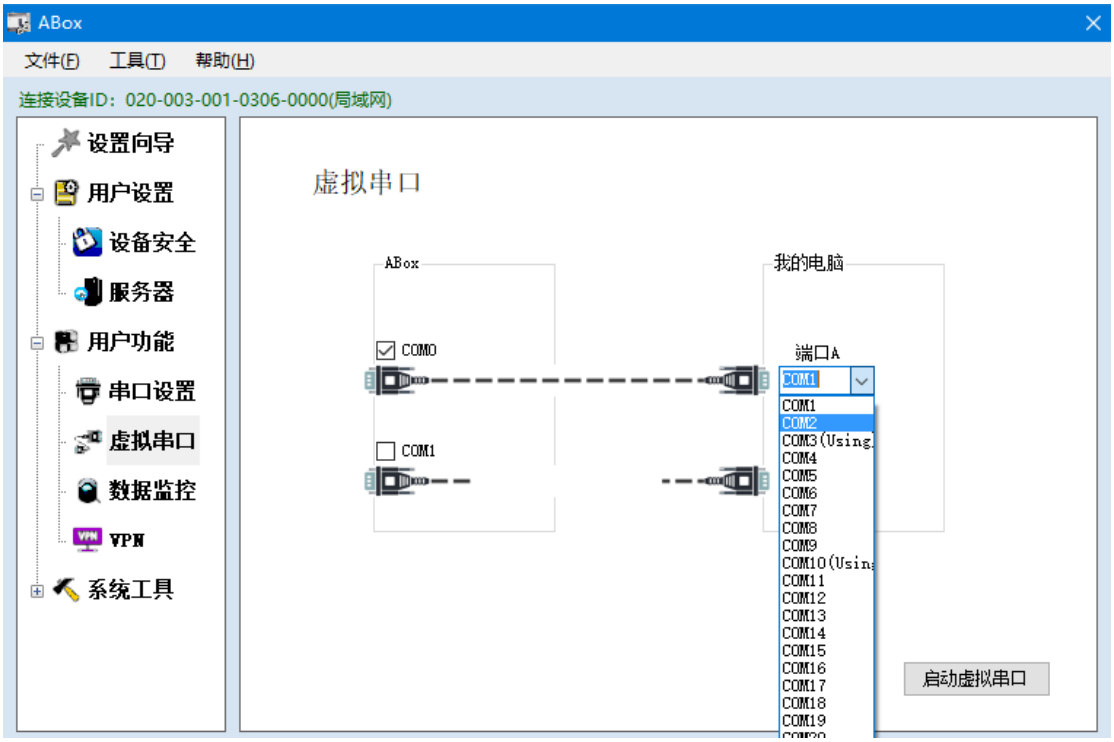
4-1. Virtual serial port

This application uses XINJE PLC XDE-30T4.

1. Make sure the serial port parameters are consistent for PLC and ABOX.



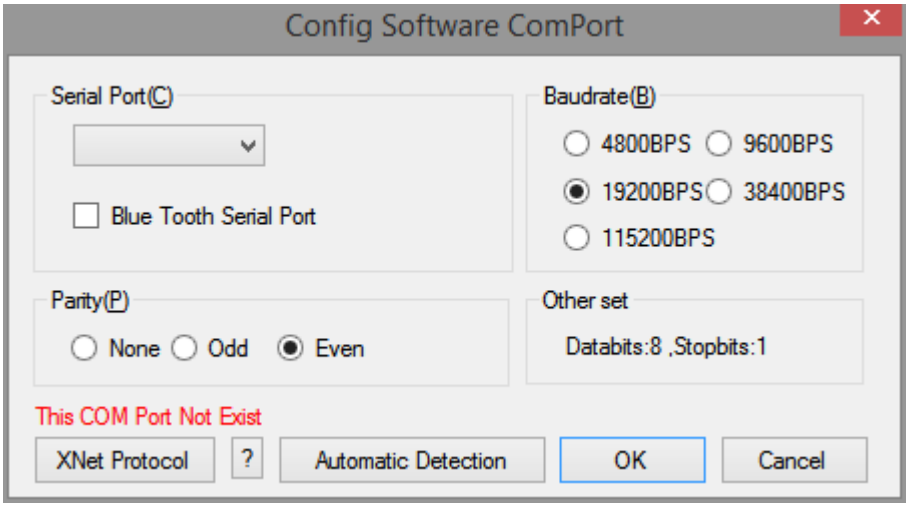
2. Click virtual serial port, choose the com port used by ABOX, choose the idle com port in my PC. Click startup the virtual serial port.



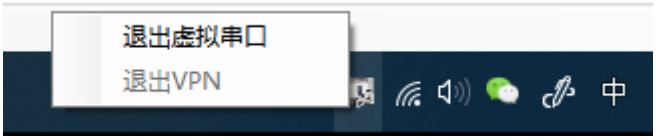
3. After the process of statup virtual serial port is completed, it will show the message “virtual serial port is running”.

4. After creating the virtual serial port, open the PLC programming software, choose the virtual com port to build the connection, to realize the function of remote PLC program downloading, uploading and monitoring, debugging.

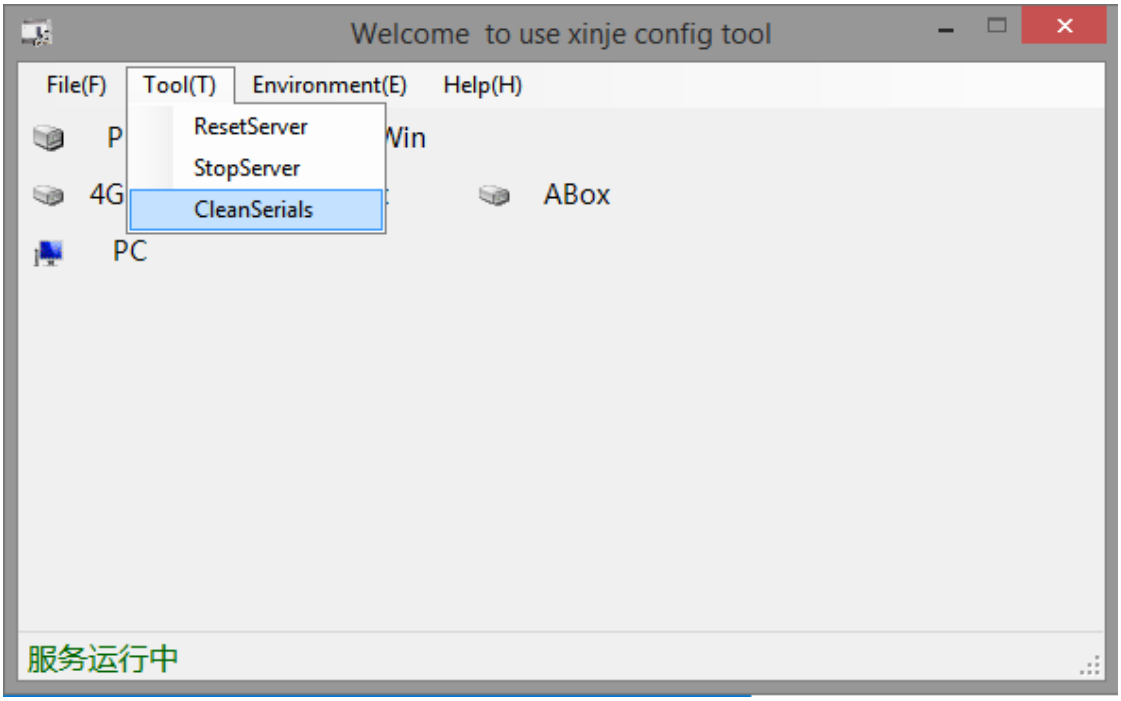
Note: please choose Bluetooth virtual serial port in the XC and XD series PLC software.



5. After finishing the use of virtual serial port, right click the XINJE software icon on the right bottom of PC to exist the virtual serial port.



6. Some computers may show that the serial port is still occupied after it is released. At this time, please open the configuration tool, click tool→cleanserials to release the serial port.

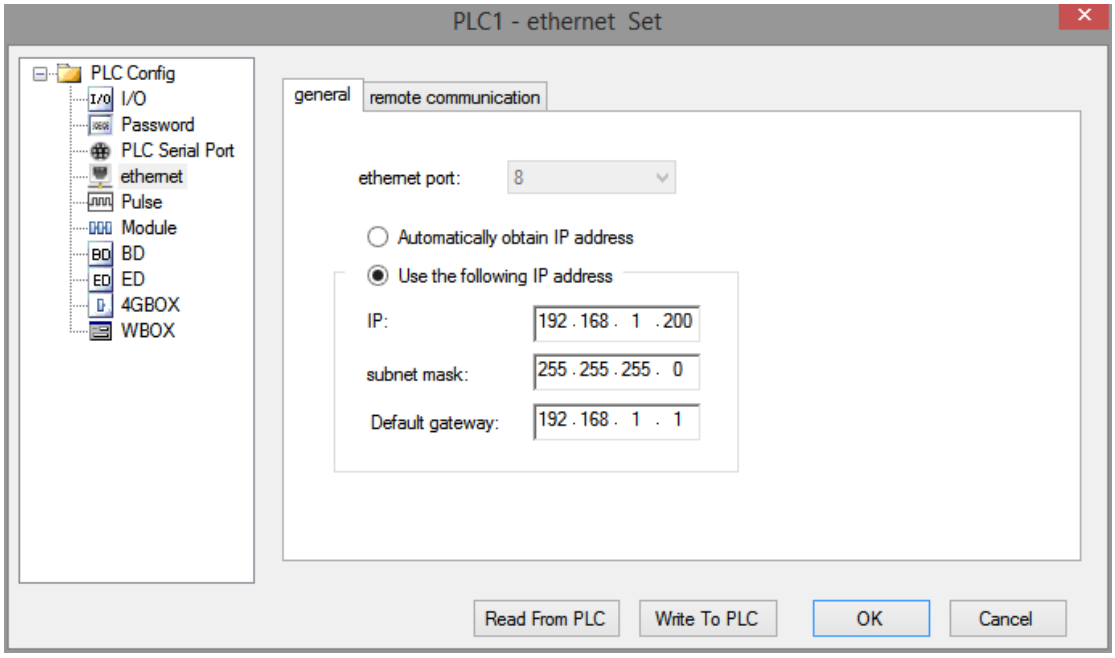


4-2. VPN

VPN is virtual private network, which establishes private network on public network for encrypted communication. PLC is connected to ABOX through Ethernet port, the remote PC can download to PLC directly through the Ethernet network.

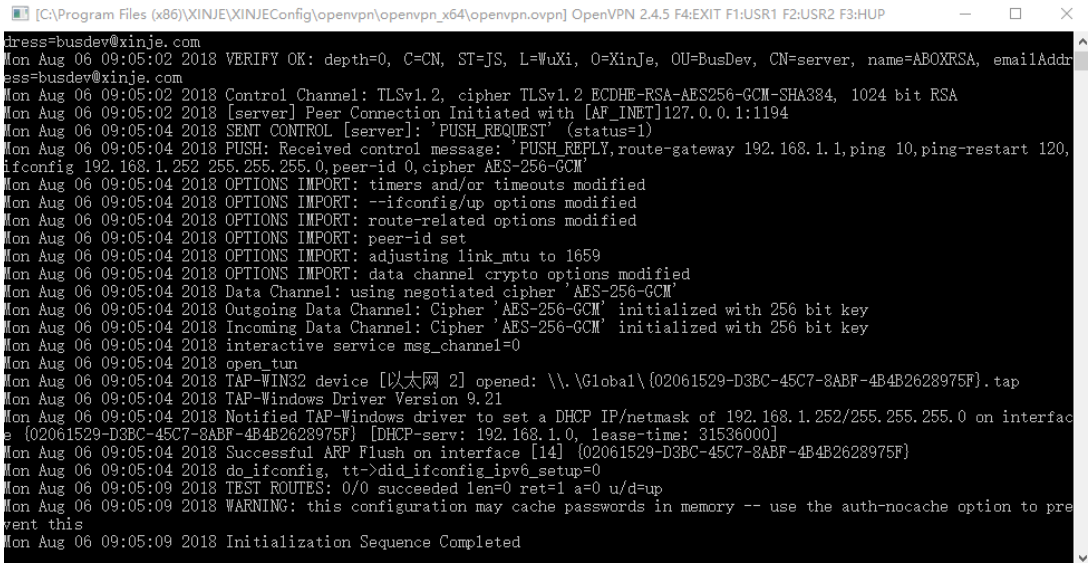
1. Connect the ABOX with configuration tool, and check the LAN parameters of ABOX. Confirm the ABOX LAN port gateway, the defaulted value is 192.168.1.1, the subnet mask is 255.255.255.0. VPN only can be used for remote logging on.

2. Fix the IP address of PLC Ethernet port which needs to VPN, the PLC IP address should be in the same gateway of ABOX, take the defaulted gateway as an example, PLC IP is 192.168.1.XX(XX range is 2~251). XINJE XDE series settings are shown as below:

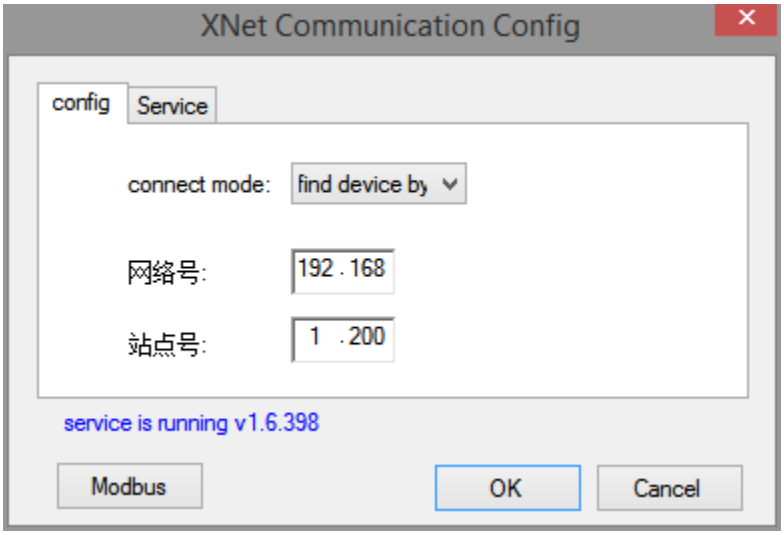


3. After configuring the PLC IP, connect the Ethernet cable to the ABOX LAN port, open the configuration tool after logging on the server successfully, connect the present ABOX, open user function/VPN, click write in to startup the VPN.

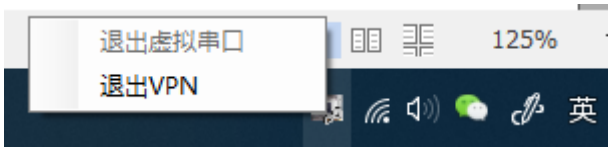
4. When it shows the following image “Initialization Sequence Completed”, it means the connection is successful, it can make the transparent transmission.



5. Do not close the above window when VPN transparent transmission, open the PLC software, connect to the PLC IP address, remote PLC program uploading and downloading can be done.



6. After the VPN ends, right click the configuration tool icon to exsit.



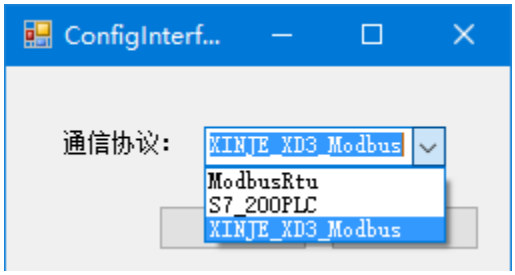
4-3. Data monitoring

Data monitoring needs the XINJE Cloud platform. Map the device address to ABOX internal address to realize real-time monitoring of PLC data by cloud platform.

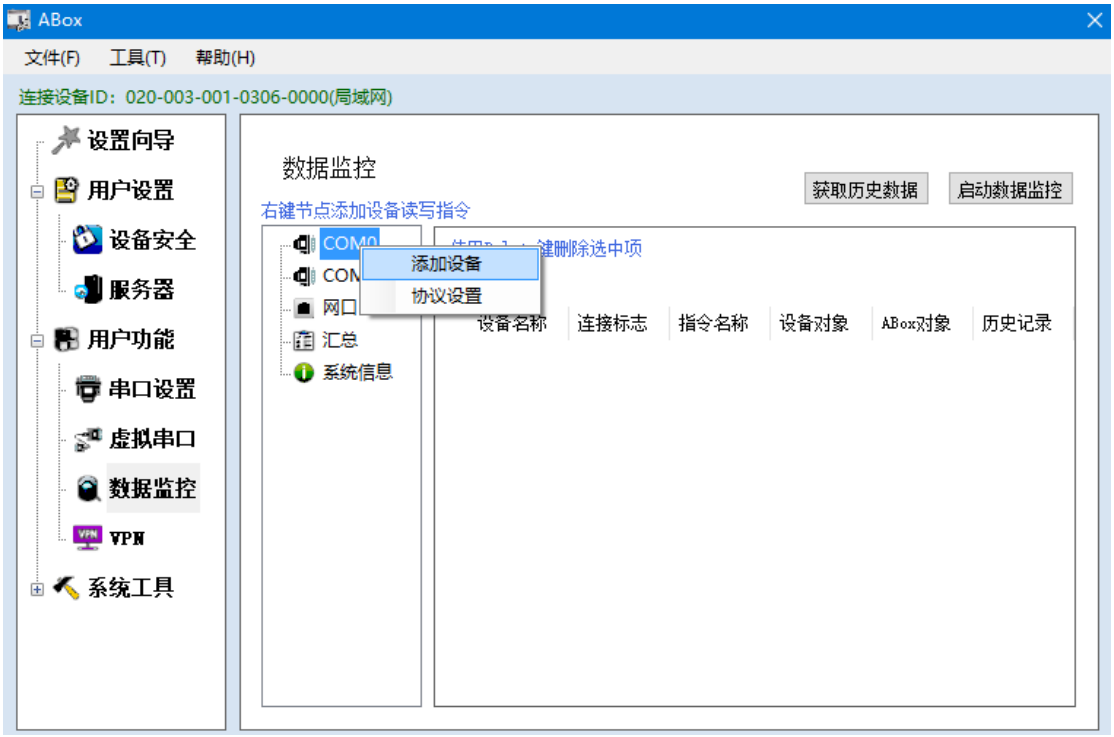
1. After connecting the ABOX, click data monitor, it supports serial port and Ethernet port devices. Take serial port com0 connecting PLC as an example.

2. Right click com0, click protocol setting.

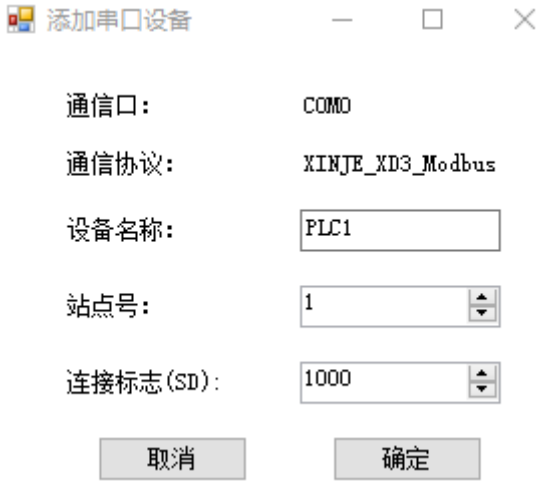
3. Choose “XINJE_XD3_Modbus” protocol.



4. Right click “COM0”, click add device.



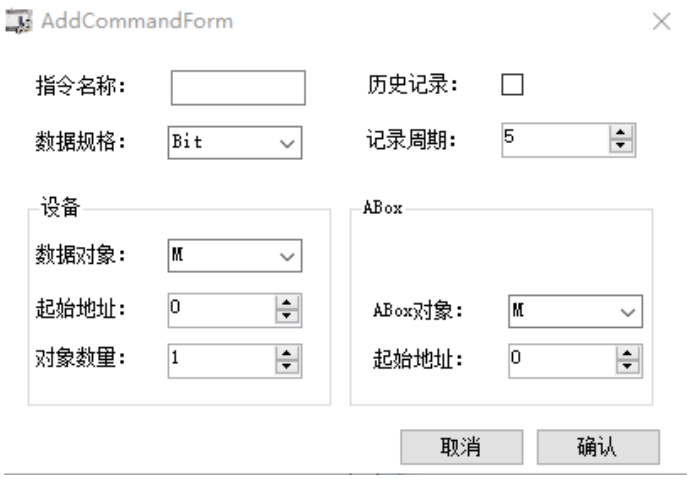
5. Fill in the PLC station no., the connection flag range is SD1000-SD2000, please note different PLC address cannot be conflict.



6. Right click the new device PLC1, click add instruction.

7. Instruction name:

- Data specification: Bit(coil) or word(register)
- Data object: PLC internal address
- Start address: specify the PLC start address
- Object quantity: specify the PLC address length
- ABOX object: corresponds to ABOX internal address type, M is coil, D is register, SD is special register
- Start address: specify the ABOX object start address
- Historical records: choose whether save the data in ABOX local historical record, after choosing this item, the object quantity only can be 1.
- Recording period: set the sampling period of historical data, unit is second, the value must be a multiple of 5.



8. The instruction is shown as below, please note ABOX object address cannot be conflict. After creating the data instruction, click startup data monitoring to apply the settings.

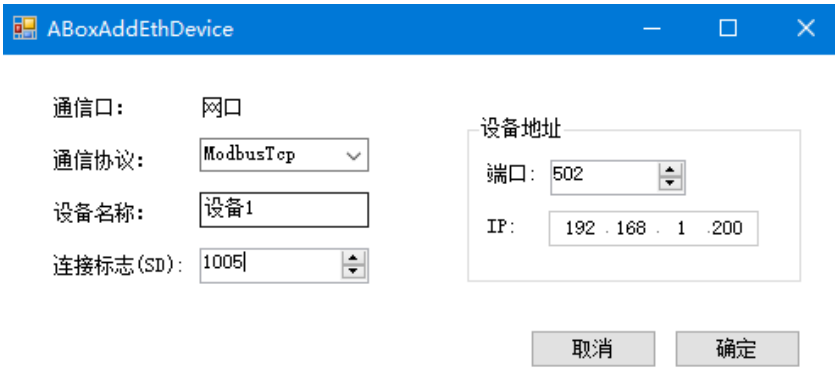
9. Open the Cloud platform in IE, fill in the user name and password.

10. When creating new device, please input the ABOX ID and password.

11. When creating the configuration table, the data block data is the object of ABOX.

12. After configuring the data, click apply configuration.

13. If it is Ethernet port communication, please confirm the Ethernet port device IP and port. Generally, Modbus-TCP port is 502, XINJE XDE series PLC port is 531. The same ABOX Ethernet port supports multiple protocols for simultaneous use.



5. Transparent transmission application

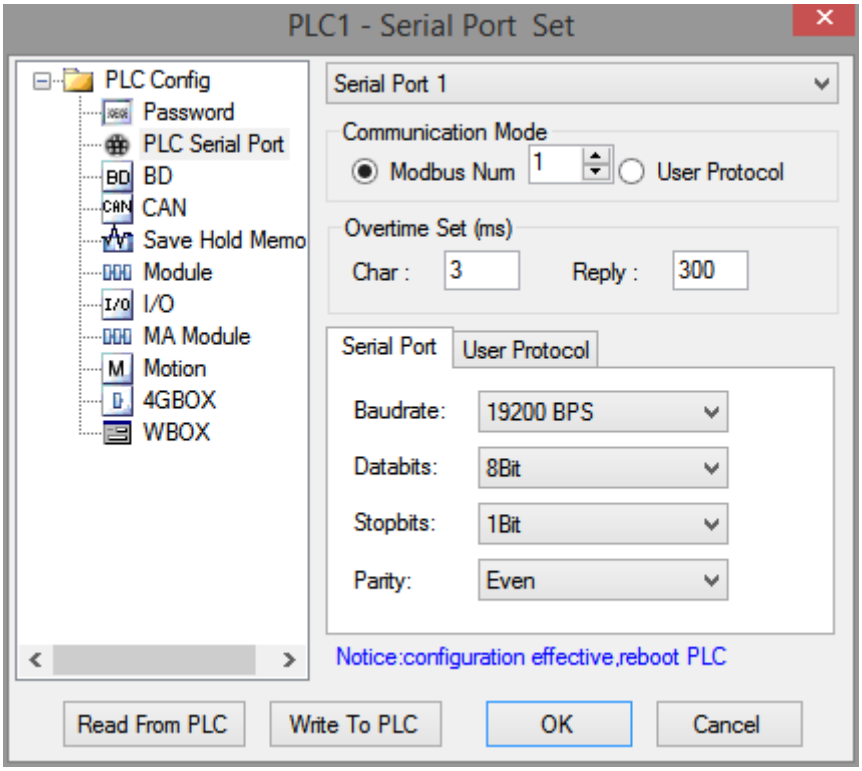
ABOX transparent transmission is compatible with all brands of PLC, HMI and other serial port or ethernet port devices, please refer to chapter 4 for details. The tested brands are shown as below:

Brand	Series	Serial port transparent transmission	VPN transparent transmission
XINJE	XC	Support	-
	XD/XL/XG	Support	Ethernet port PLC support
	HMI(version 2.e and up)	-	(-ET) support
Mitsubishi	FX	Support	-
	FX3U/G	Support	Support
	FX5U	Support	-
	L	-	Support
	Q	-	Support
Omron	CP1E	Support	-
	CP1H	Support	Support
	CJ-CS	Support	-
	CJ (Ethernet)	-	Support
	CPM/CQM	Support	-
Siemens	S7-200	Support	-
	S7-300	Support	Support
	S7-200 SMSRT	Support	Support

	S7-1200	-	Support
	S7-1500	-	Support
Weinview	MT8071iE	-	Support
Delta	DVP	Support	Support
	AH	Support	Support
	AS	Support	Support
Schneider	Modicon Micor	Support	-
	Modicon M221	-	Support
	Modicon Twido	Support	-
ABB	AC500	-	Support
Yaskawa	MP	-	Support
Keyence	KV5000/KV7500	-	Support
Koyo	S	Support	-
	DL	Support	-
	Click	Support	-

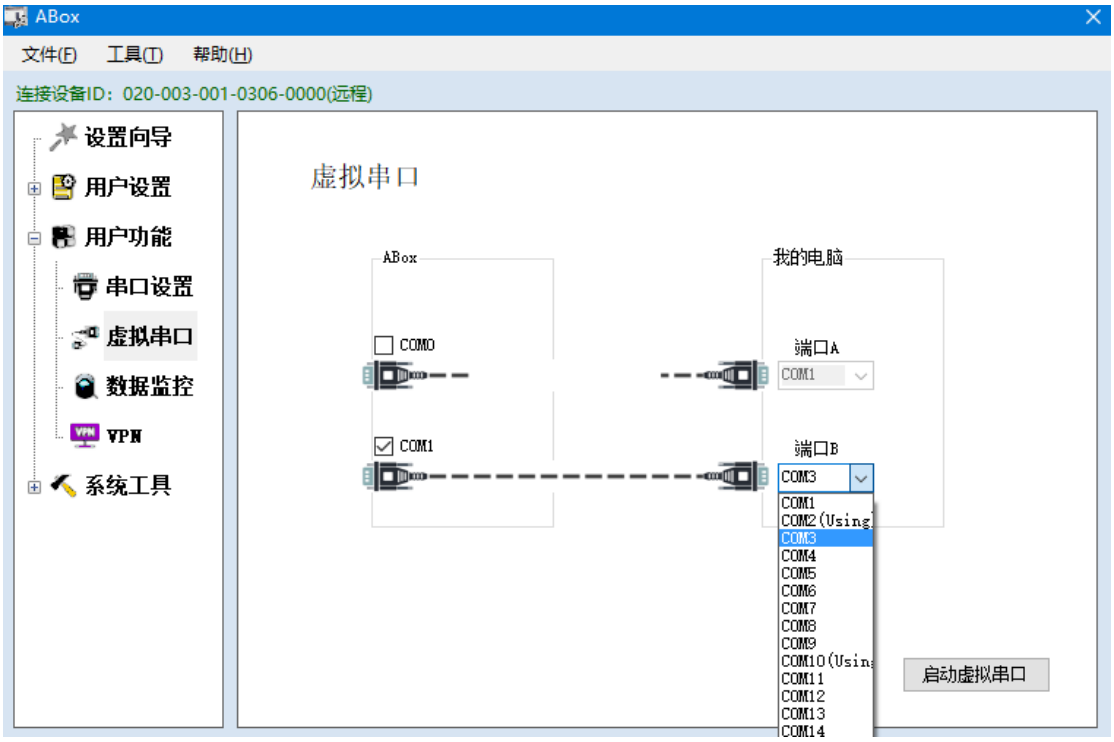
5-1. XINJE XC series serial port transparent transmission

1. XINJE XC series serial port transparent transmission supports RS232 and RS485. XC series PLC defaulted serial port parameters are 19200, 8, 1, E.



2. ABOX module COM0 and COM1 defaulted parameters are 19200, 8, 1, E. it only needs to connect ABOX and XC through RS232 or RS485.

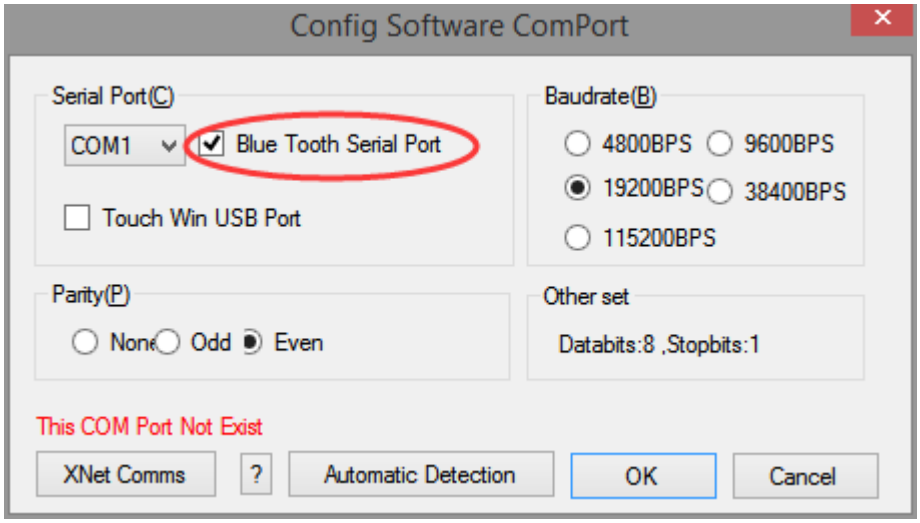
3. Link the ABOX with the configuration tool, click user function→virtual serial port, choose the com port of ABOX, choose the idle com port in my PC, click startup virtual serial port.



4. When the virtual serial port process is completed, it will show “virtual serial port is running”.

5. after creating the virtual serial port, open the PLC software, choose this virtual serial port to connect. It can realize remote PLC program downloading uploading and monitoring, debugging.

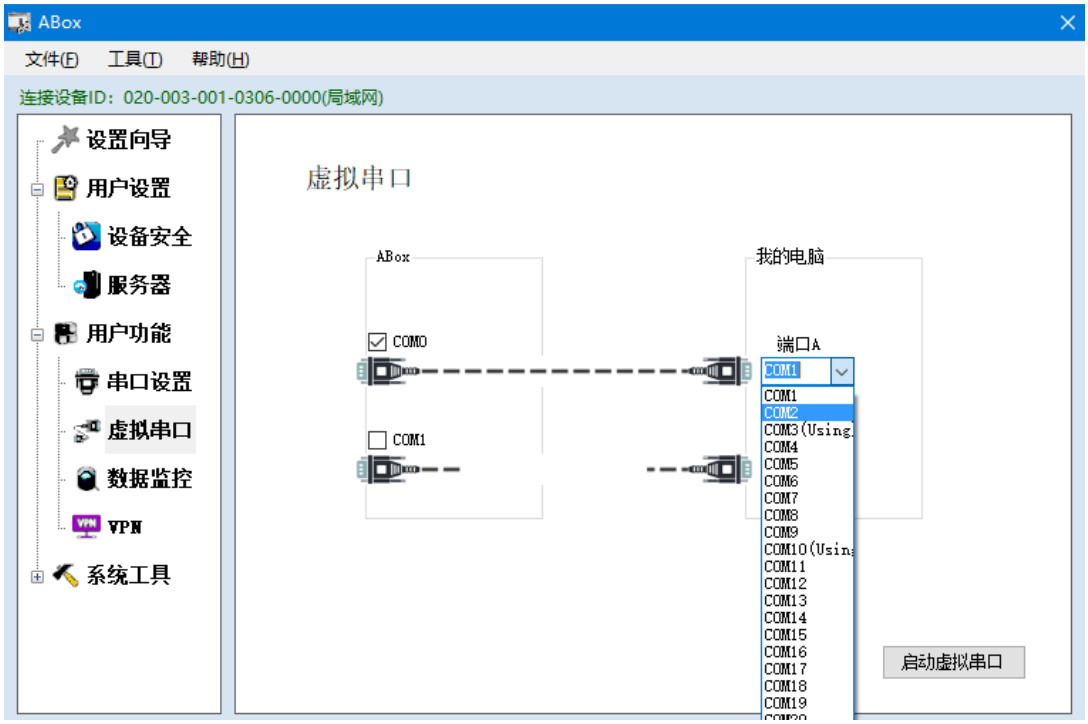
Note: for XC series software, please choose blue tooth serial port when using virtual serial port.



5-2. XINJE XD series PLC serial port transparent transmission

1. The configuration method is same to chapter 5-1. Make sure the PLC and ABOX serial port parameters are consistent.

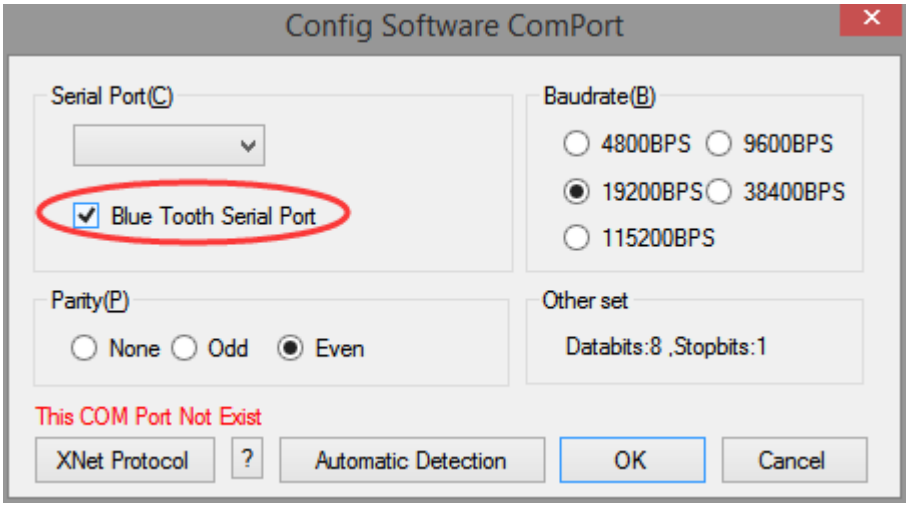
2. Click the virtual serial port, choose the com port of ABOX, choose idle com port in my PC. Click startup virtual serial port.



3. When the virtual serial port process is completed, it will show “virtual serial port is running”.

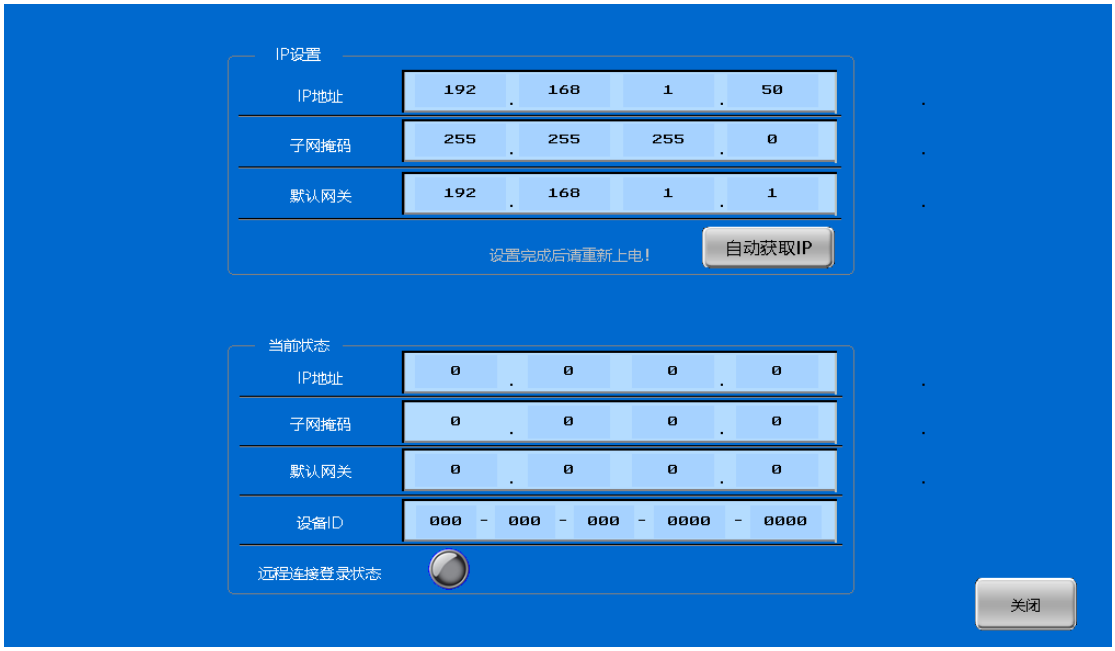
4. after creating the virtual serial port, open the PLC software, choose this virtual serial port to connect. It can realize remote PLC program downloading uploading and monitoring, debugging.

Note: for XD series software, please choose blue tooth serial port when using virtual serial port.



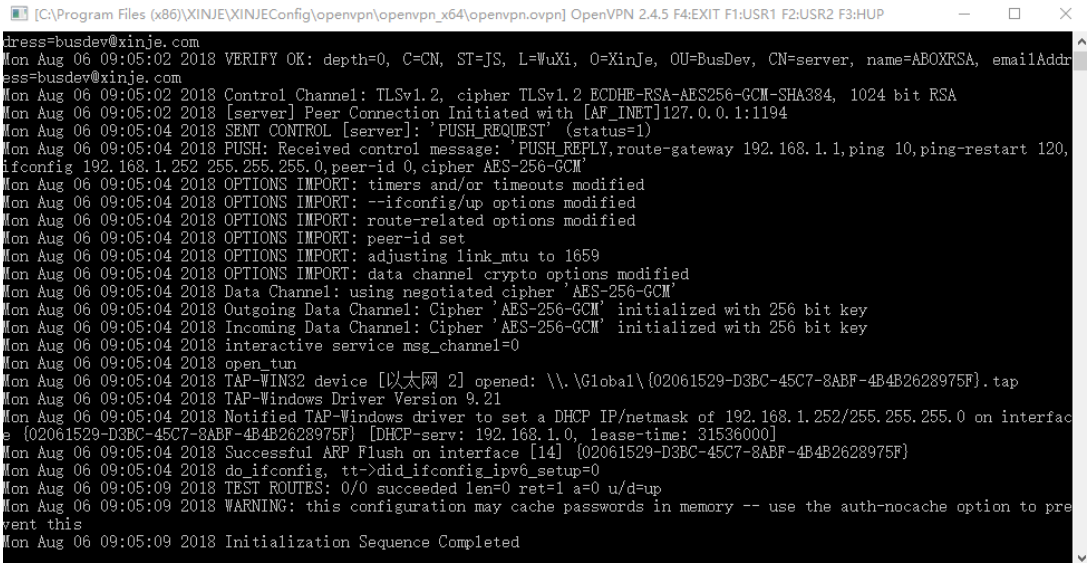
5-3. XINJE HMI(v2.e and up)

1. Turn on switch 3 of HMI, power on the HMI again, set the HMI IP to 192.168.1.50.

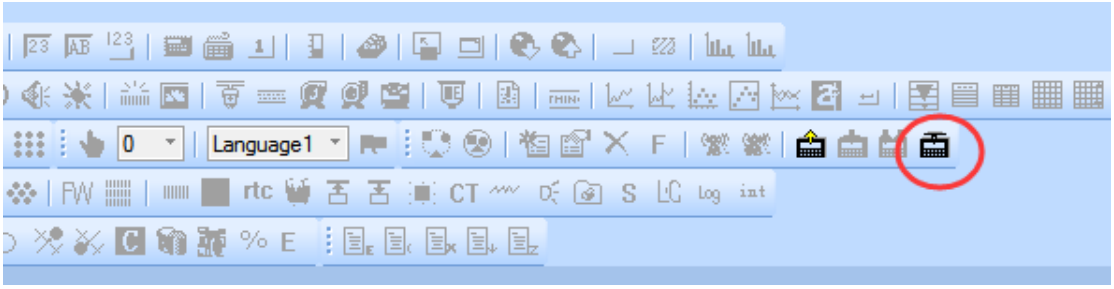


2. Link the ABOX with configuration tool. Click user function→VPN, click write to start the VPN.

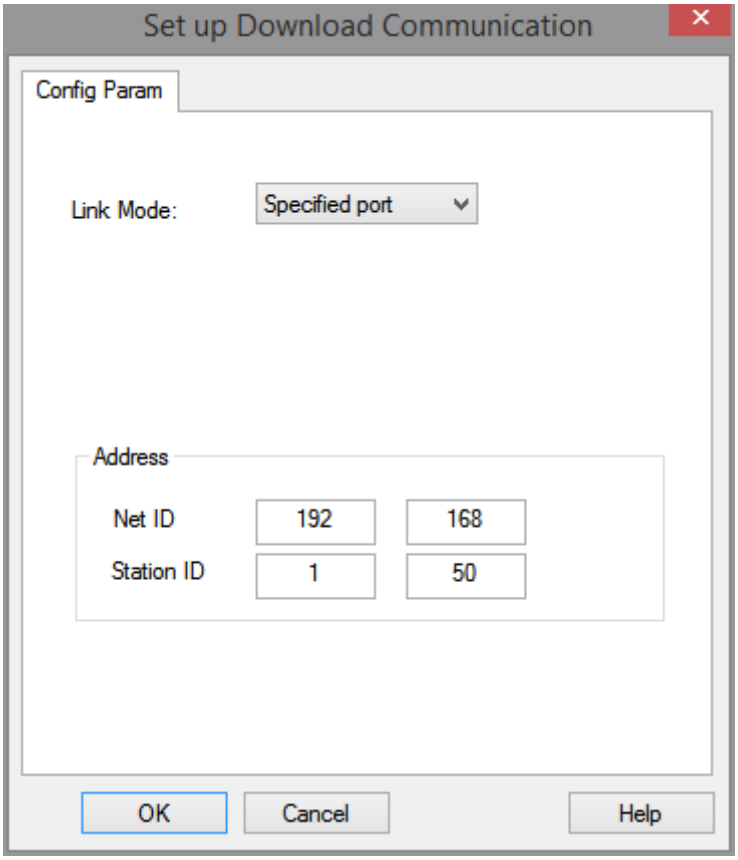
3. When it shows the following image “Initialization Sequence Completed”, it means the connection is successful, user can make the transparent transmission.



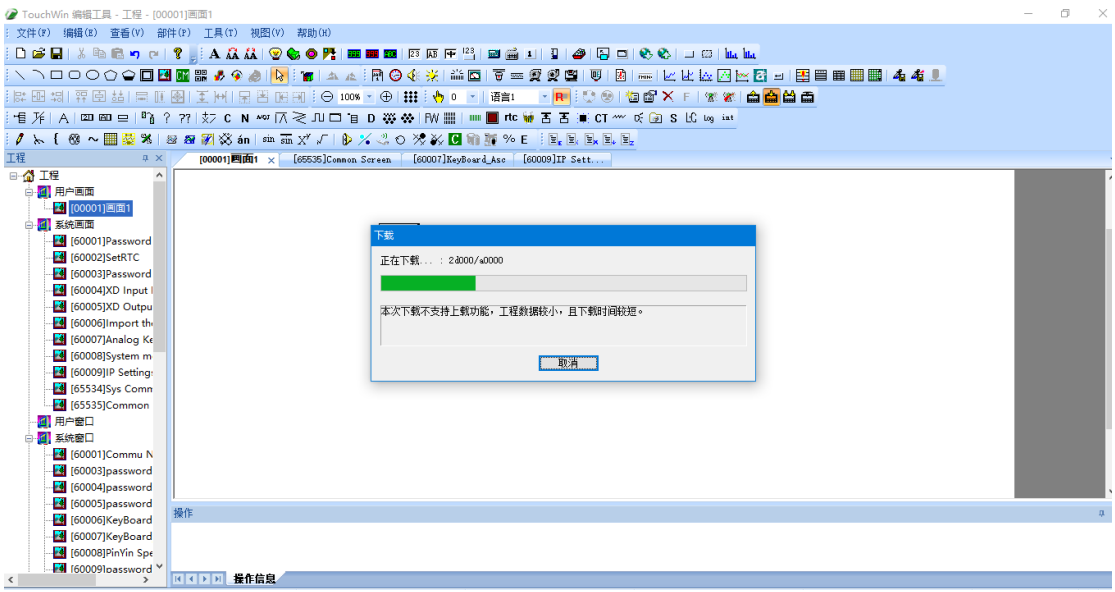
4. Open the HMI software (v2.e and up), click the following button.



5. The link mode is specified port, the net ID and station no. is HMI IP address 192.168.1.50.



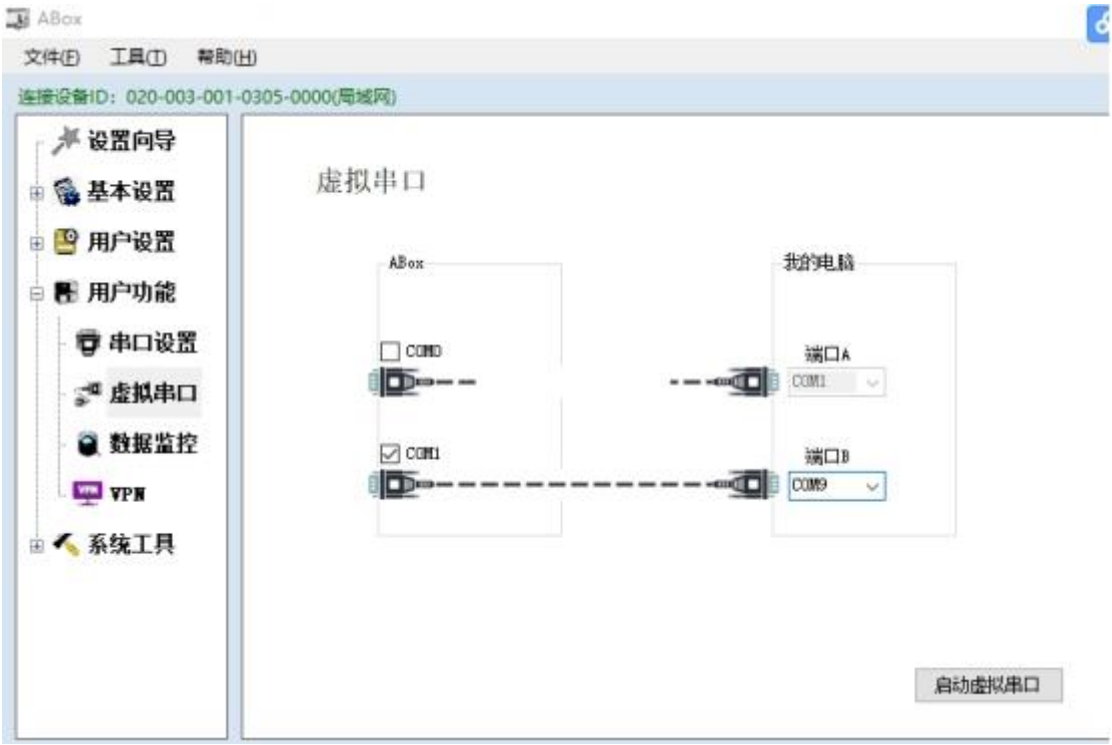
6. Click download button.



5-4. Mitsubishi Fx3U series PLC serial port transparent transmission

1. Connect ABOX to FX3U RS422 port with FX cable. Set the ABOX com1 serial port parameters to 9600, 7, 1, E. COM0 cannot support RS422, so we use COM1.

2. After write in and being effective, click virtual serial port, virtual com1 corresponds to local port com9 for example.



3. Enable the virtual serial port.

4. Open Mitsubishi programming software GX Works2, create a new project.

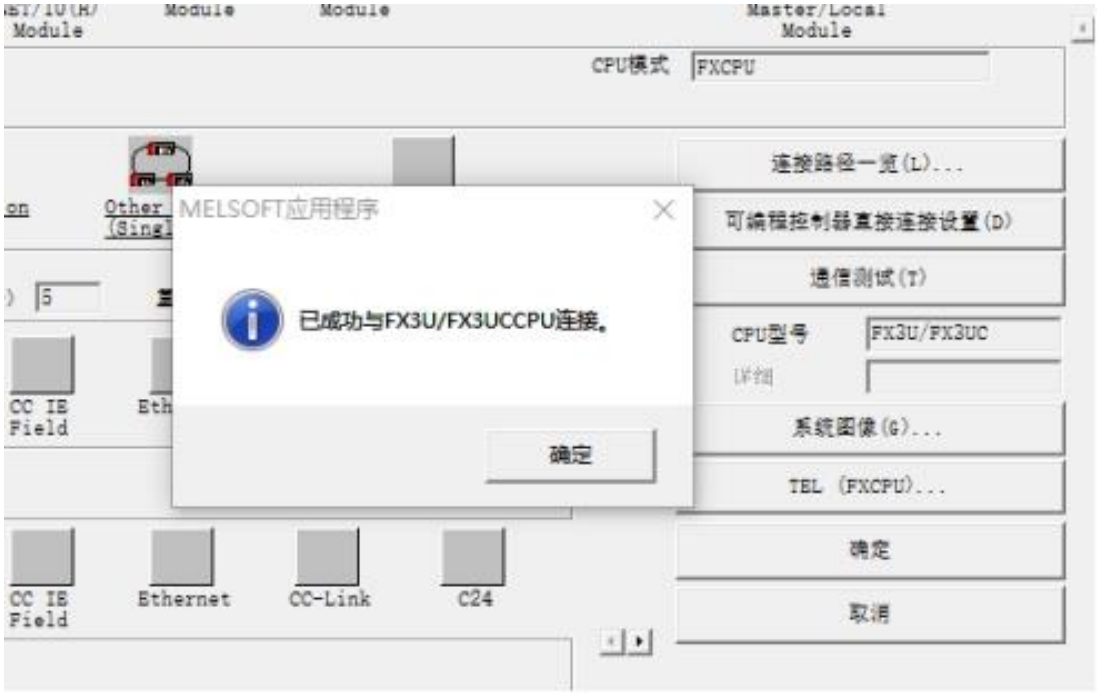
5. Click the link target, click the above present connection target.

6. 

6. click serial USB and set the parameters.

7. Choose RS232C, com9, transmission speed is 9600, and set the parity mode, data bit and stop bit.

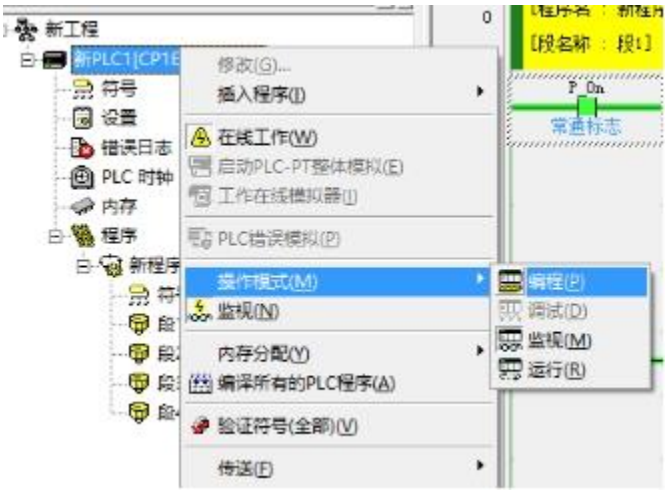
8. Click communication test, it will show the connection is ok.



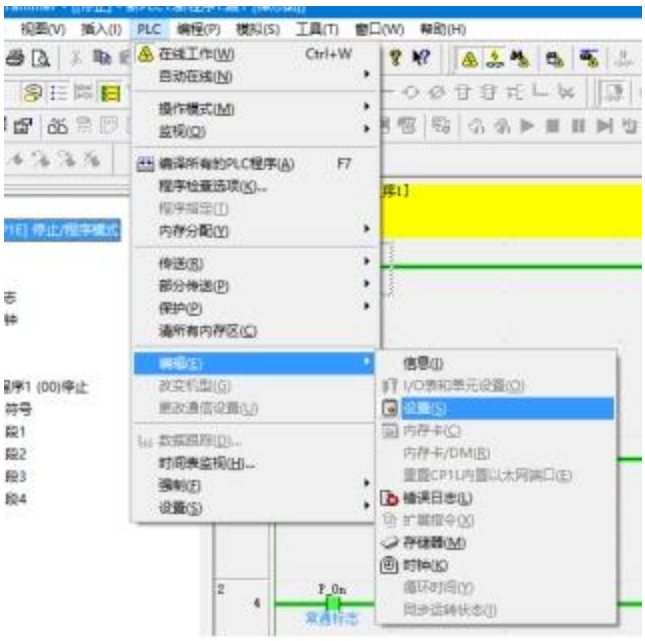
5-5. Omron CP1E series PLC serial port transparent transmission

1. Connect CX-programmer and PLC with USB cable.

2. Set the Omron PLC to programming mode.

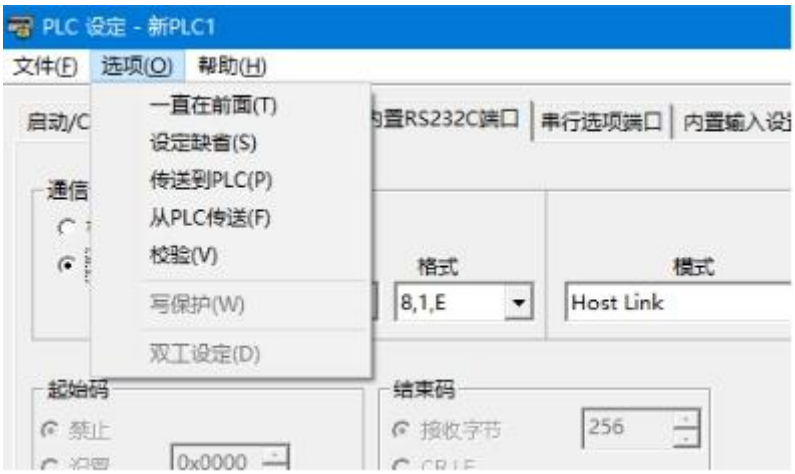


3. Open the configuration interface.



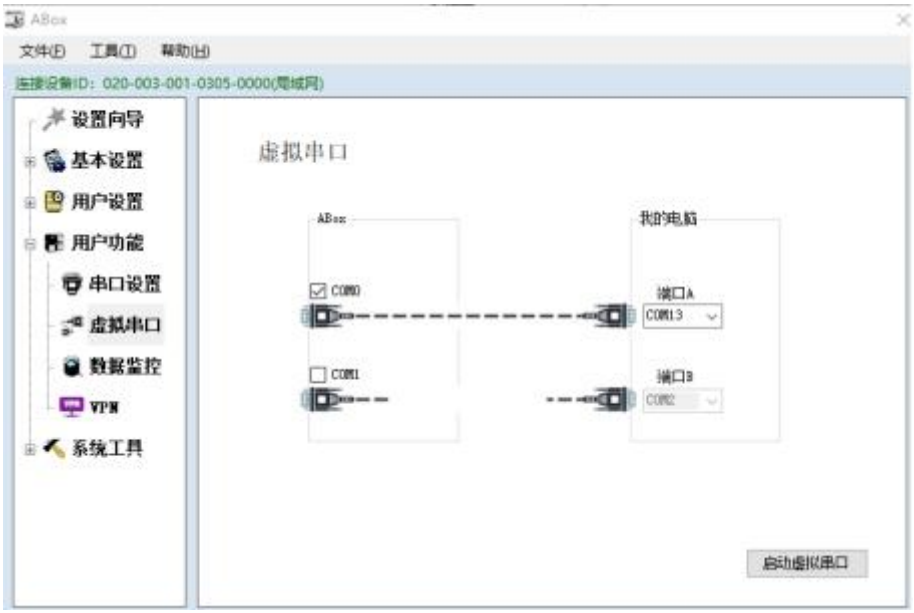
4. Set the PLC RS232C serial port parameters to 19200, 8, 1, E. the protocl is Host Link.

5. Write the parameters in PLC.



6. Connect Omron PLC to ABOX com0/com1 with CPM cable, set the COM0/COM1 parameters to 19200, 8, 1, E.

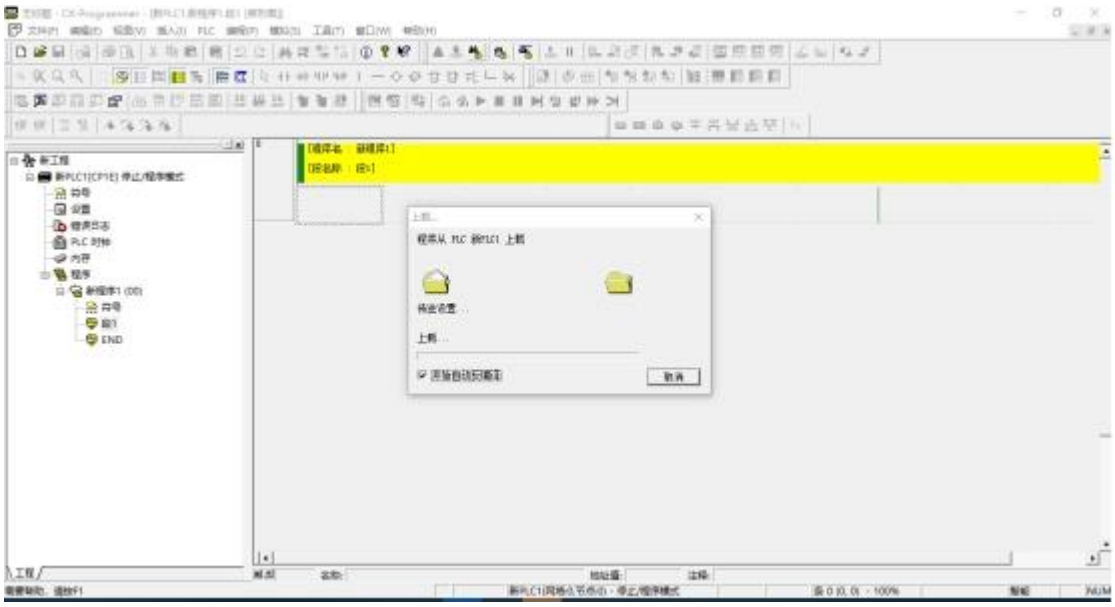
7. After write in, virtual serial port com0 corresponds to local serial port com13 for example.



8. enable the virtual serial port.

9. Serial port connection, choose the virtual com port.

10. The connection is successful.

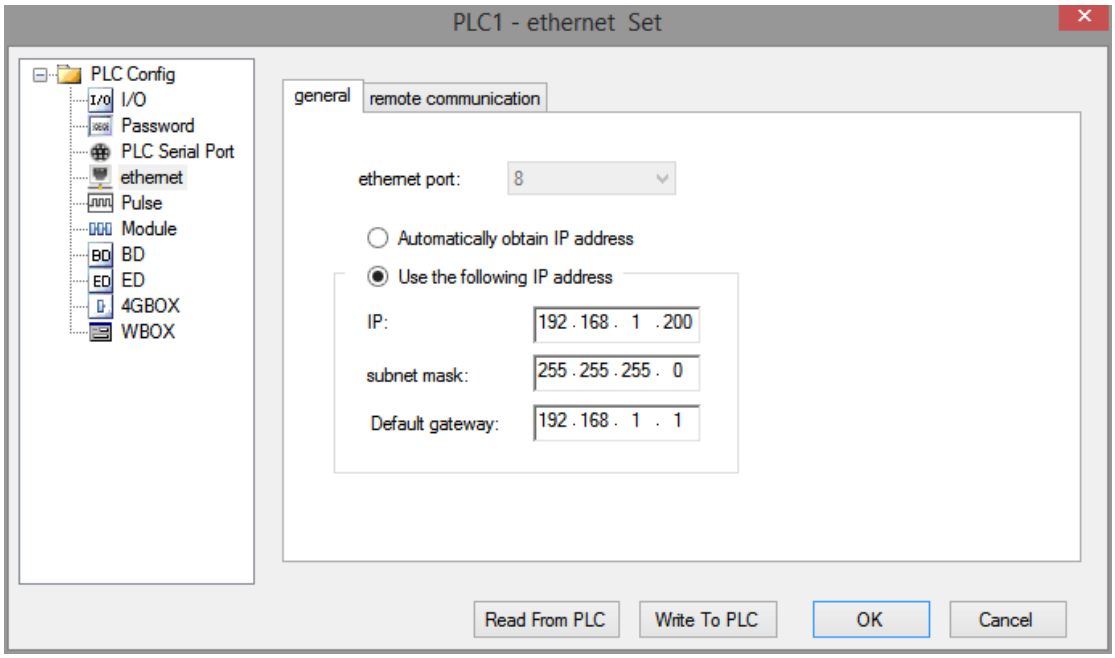


5-6. XINJE XDE/XG/XLE series PLC Ethernet port VPN transparent transmission

1. Connect the ABOX with configuration tool, and check the ABOX LAN parameters, confirm the ABOX LAN gateway, the defaulted value is 192.168.1.1, subnet mask is 255.255.255.0. VPN only can be used for remote login.

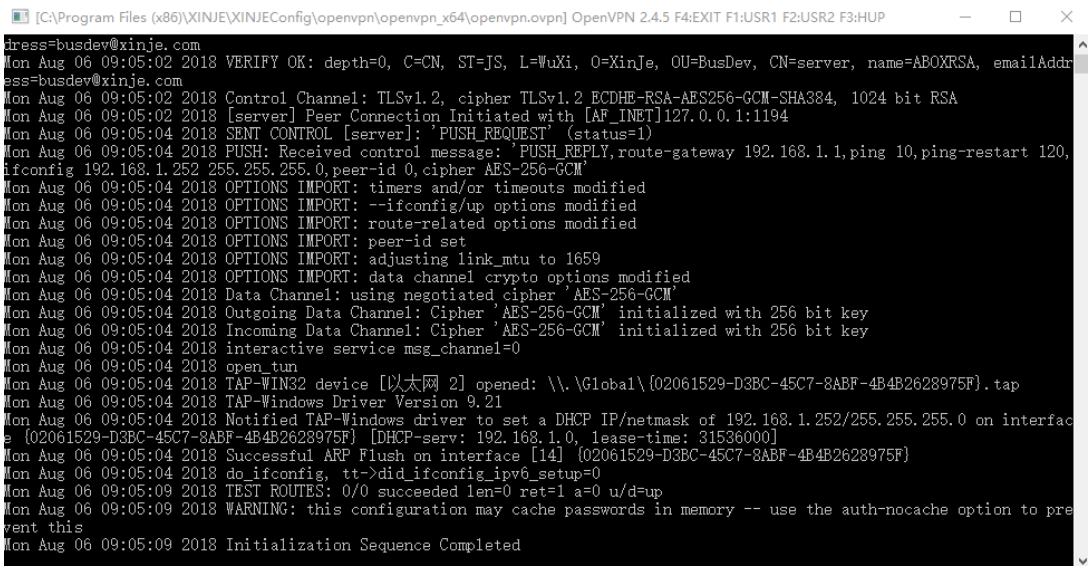
2. Fix the PLC Ethernet port IP which needs to VPN, PLC IP must be in the same gateway of ABOX, take the default gateway as an example, PLC IP is 192.168.1.XX(XX range is

2~251). XINJE XDE configuration is shown as below:

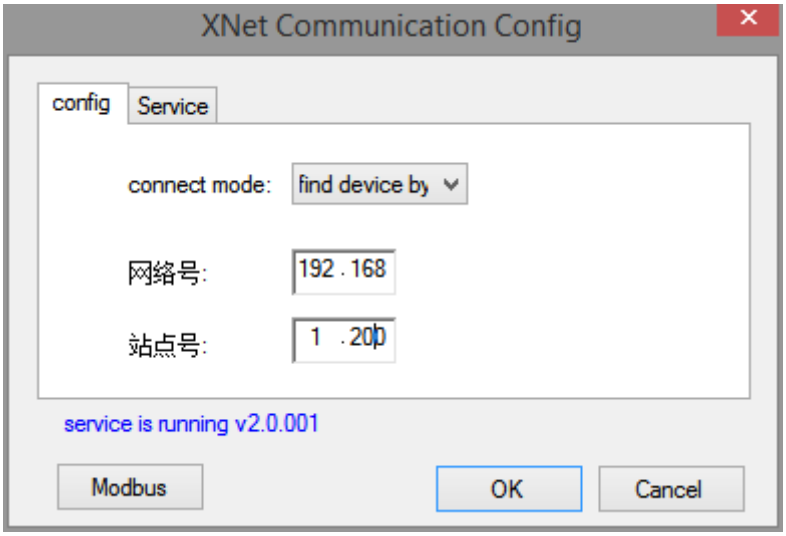


3. After setting the PLC IP, connect the Ethernet cable to the ABOX LAN port, after ABOX logging on the server successfully, open the configuration tool to link the present ABOX, click user function→VPN, click write to start VPN.

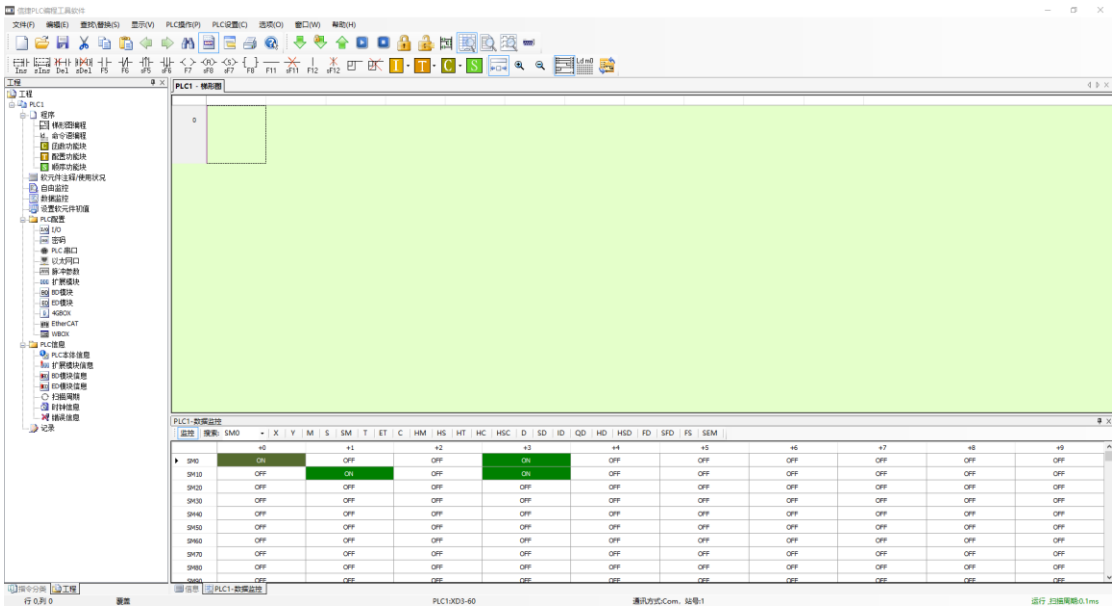
4. When it shows the following image “Initialization Sequence Completed”, it means the connection is successful, it can make the transparent transmission.



5. In the process of VPN transparent transmission, please do not close the above window. Open the PLC software, connecting the PLC IP can remote downloading program to the PLC.

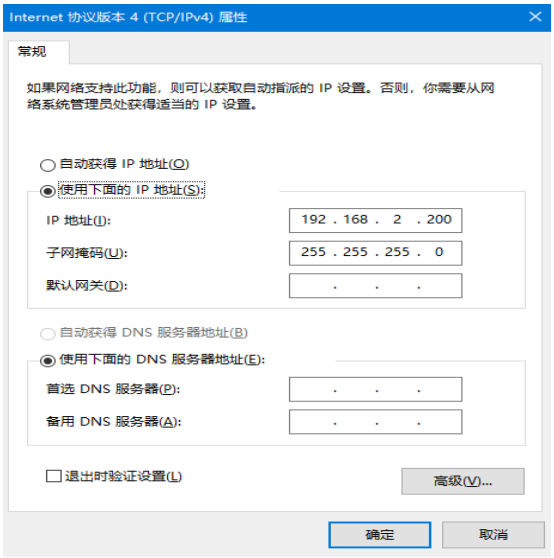


6. The connection is successful.



5-7. Siemens 200-SMART series PLC Ethernet port VPN transparent transmission

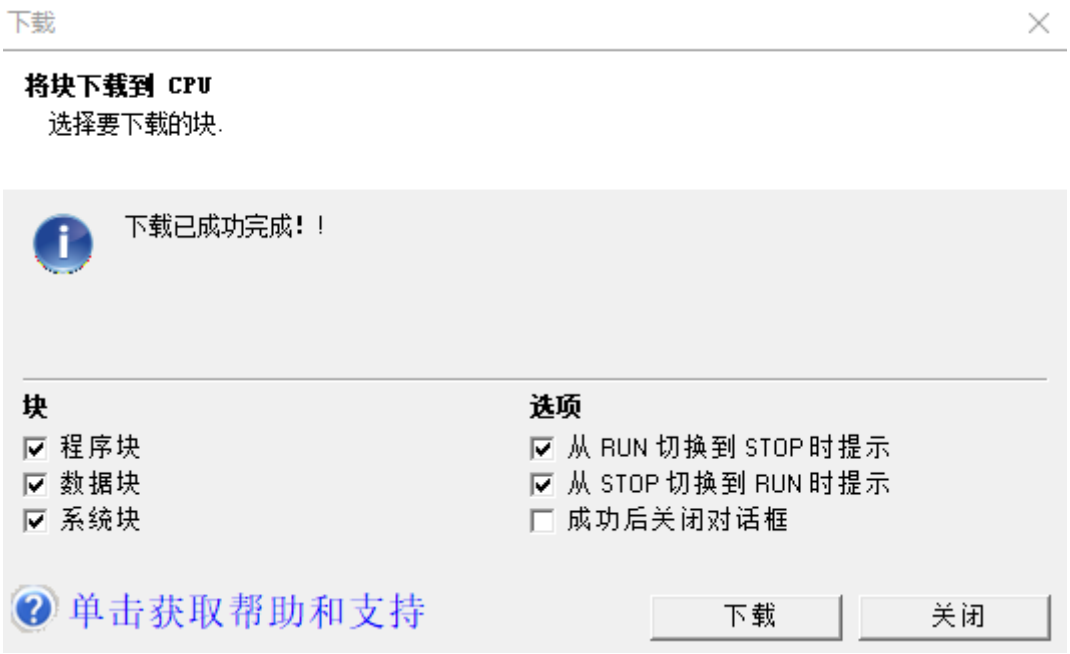
1. Siemens S7-200-SMART series PLC Ethernet port defaulted IP is 192.168.2.1, connect the PLC with PC through Ethernet cable, set the PC IP to 192.168.2.xxx(eg. 192.168.2.200).



2. Open Siemens 200-SMART software, link the PLC.

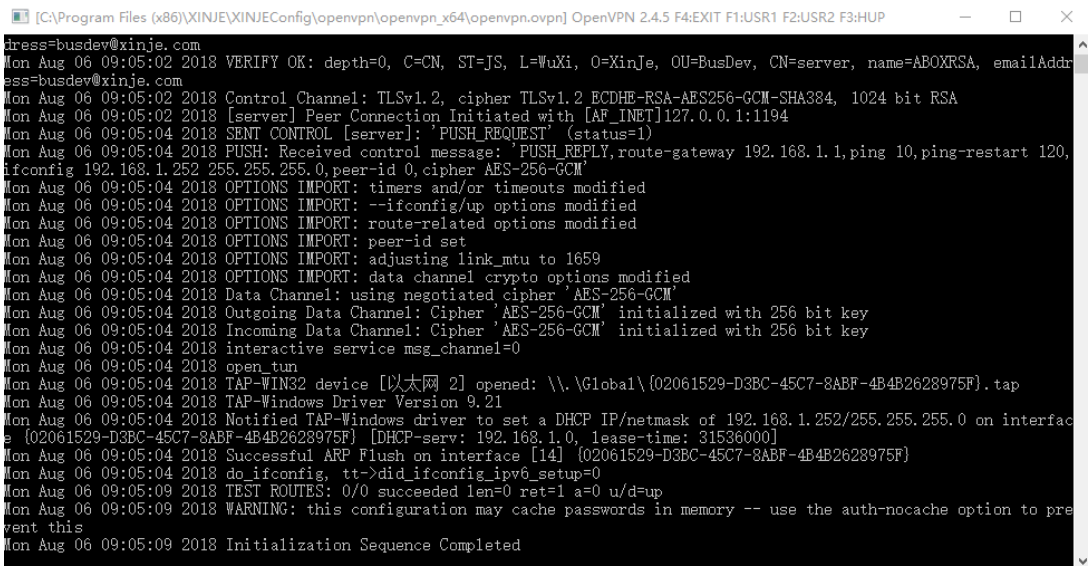
3. ABOX defaulted gateway is 192.168.1.1, set the Siemens PLC IP to 192.168.1.xxx.

4. Download the parameters to the PLC.

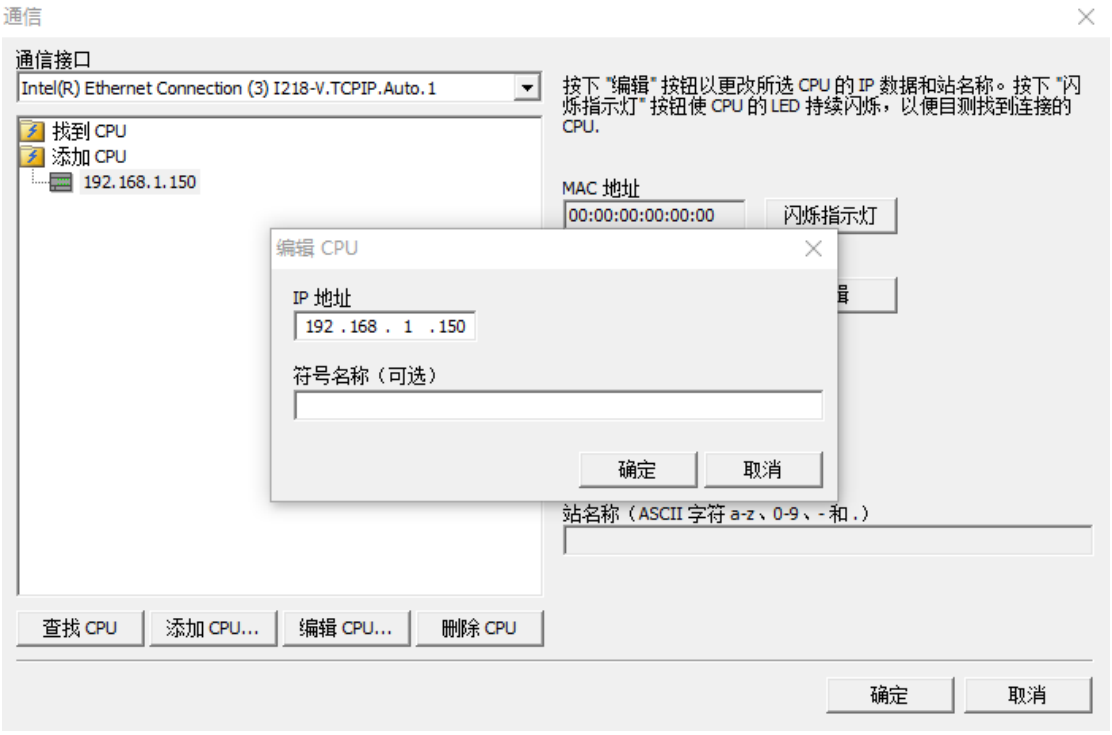


5. Connect the PLC and ABOX LAN port with Ethernet cable. After ABOX logging on the server, link the present ABOX with configuration tool. Click user function→VPN, click write to startup the VPN.

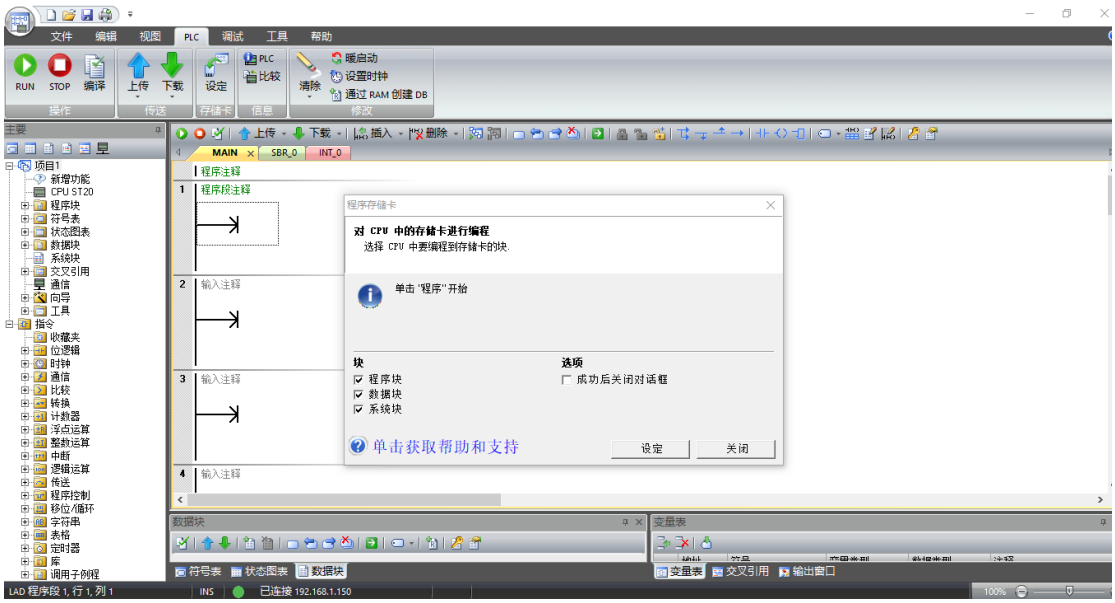
6. When it shows the following image “Initialization Sequence Completed”, it means the connection is successful, it can make the transparent transmission now.



7. Do not close the above window in the process of VPN transparent transmission, open Siemens PLC software, click add CPU in PLC—setting, fill in the PLC IP 192.168.1.150.



8. Click ok to connect the PLC successfully.



5-8. Weinview MT8071iE HMI VPN transparent transmission

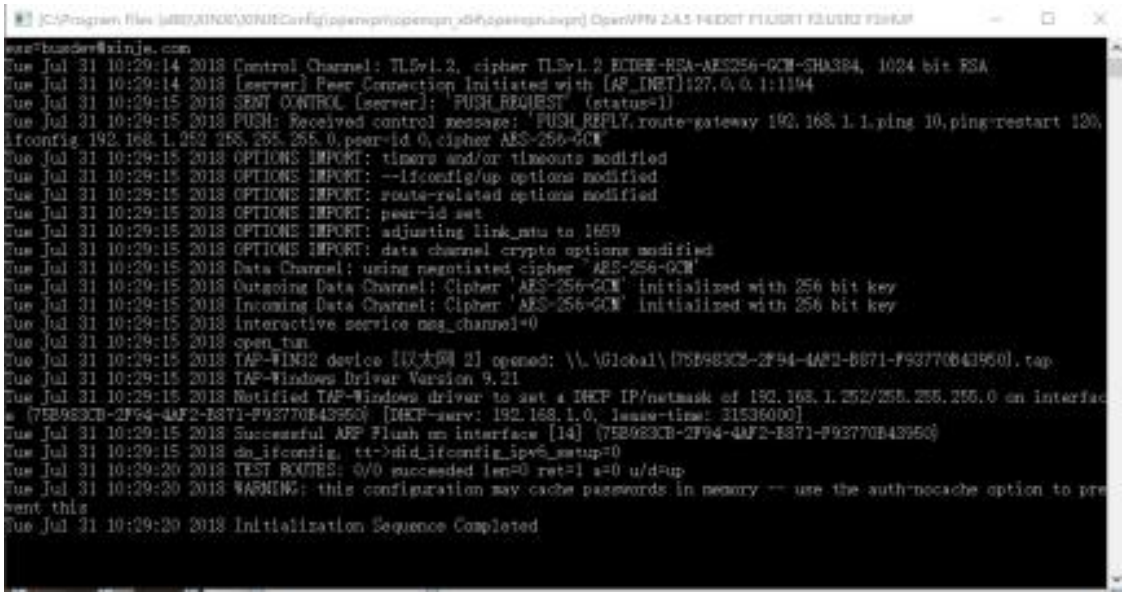
1. Touch the right bottom button to set the HMI IP.

2. Press the set button, fill in the password to enter IP setting interface.

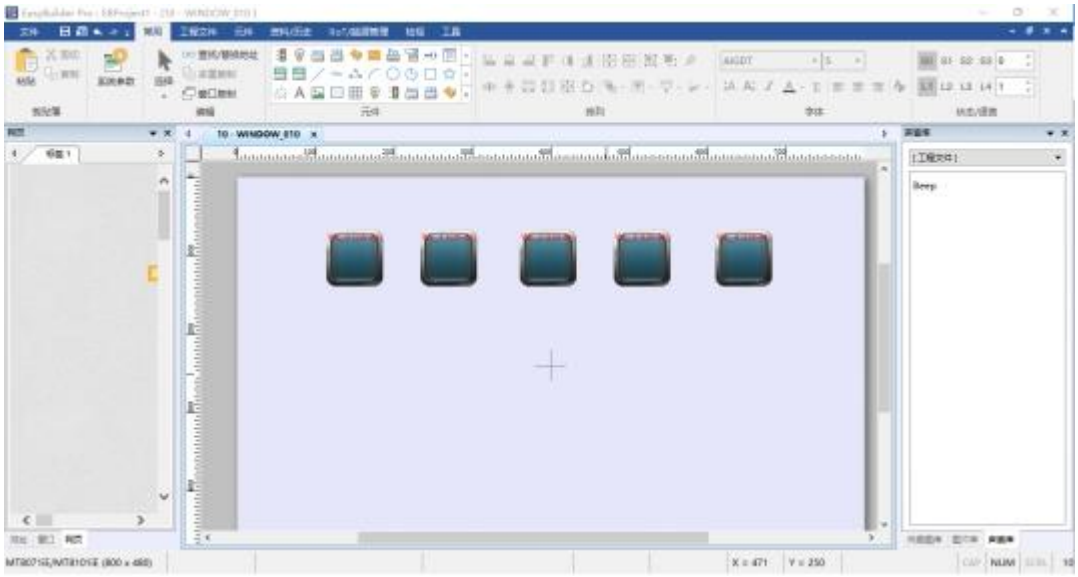
3. Set the HMI IP address, make the HMI IP and ABOX IP in the same gateway.

4. Open the ABOX configuration interface, click user function→VPN, click write, startup VPN.

5. After the VPN is successful, cannot close the following window.



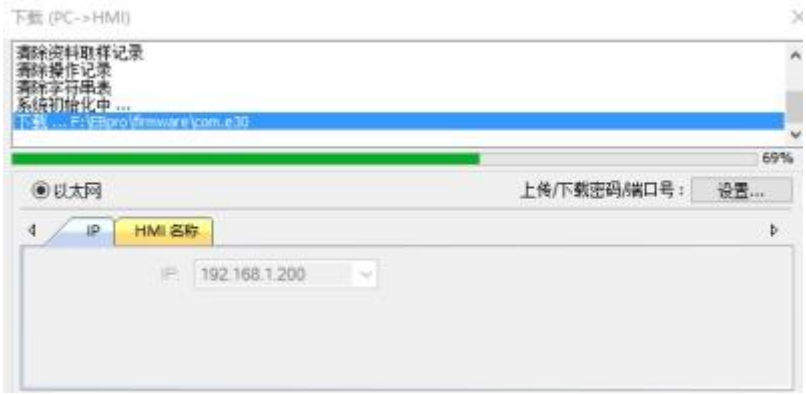
6. Open the Weinview HMI software, create a new project.



7. Click download in project file (PC->HMI).

8. after the compiling is passed, set the HMI IP to 192.168.1.200.

9. click download.



10. The downloading process is finished.

WUXI XINJE ELECTRIC CO., LTD.

4th Floor Building 7,Originality Industry park, Liyuan Development Zone, Wuxi City, Jiangsu Province 214072

Tel: 400-885-0136

Fax: (510) 85111290