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User Manual
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# APG Serie bus gateway

PROFINETprotocol to barcode scanner
Model number： APG1508

# CATALOGUE

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# 1.Preface

## 1.1 Document Usage Instructions

This document describes the product's functional specifications, installation, operation, and settings, as well as relevant network protocol content. This document is only intended for use by trained electrical automation engineers.

**(1) Disclaimer**

The author has conducted necessary checks on the document. However, as the product evolves and upgrades, the document may contain technical parameter or editing errors. We reserve the right to make adjustments and modifications without prior notice to users.

**(2) Trademark**

PROFINET® is a registered trademark of the PI organization.

**(3) Patent Notice**

The designer of this product has applied for patent protection for the product's appearance and technical implementation methods. Any attempt to copy, imitate, or reverse engineer may violate the law.

**(4) Copyright**

Reproduction, distribution, and use of this document without the author's authorization are prohibited.

## 1.2 Safety matters

This product is a professional device for industrial use and can only be operated by personnel with electrical operation experience. Please read this manual carefully before use and follow the instructions to avoid personal injury or product damage.

This product is designed to meet the IP20 protection level. When in use, it must be installed in a distribution cabinet with dust-proof and moisture-proof functions.

Document History

## 1.3 Document History

《IEC11631-22007 Programmable controllers –Part 2:Equipment requirements and tests》;

《IEC/TR 61158 Industrial Communication Network - Fieldbus Specification》;

《IEC61784-1Industrial Communication Network - Industry Standards Part 1: Fieldbus Standards》;

《PNO-7.352, PROFINET IO Device Integration, Guideline for PROFINET, Version 1.0, October 2014,PROFIBUS & PROFINET International, Order Number 7.352》

# 2.Specification parameters

## 2.1 APG1508 Specification Parameter Table

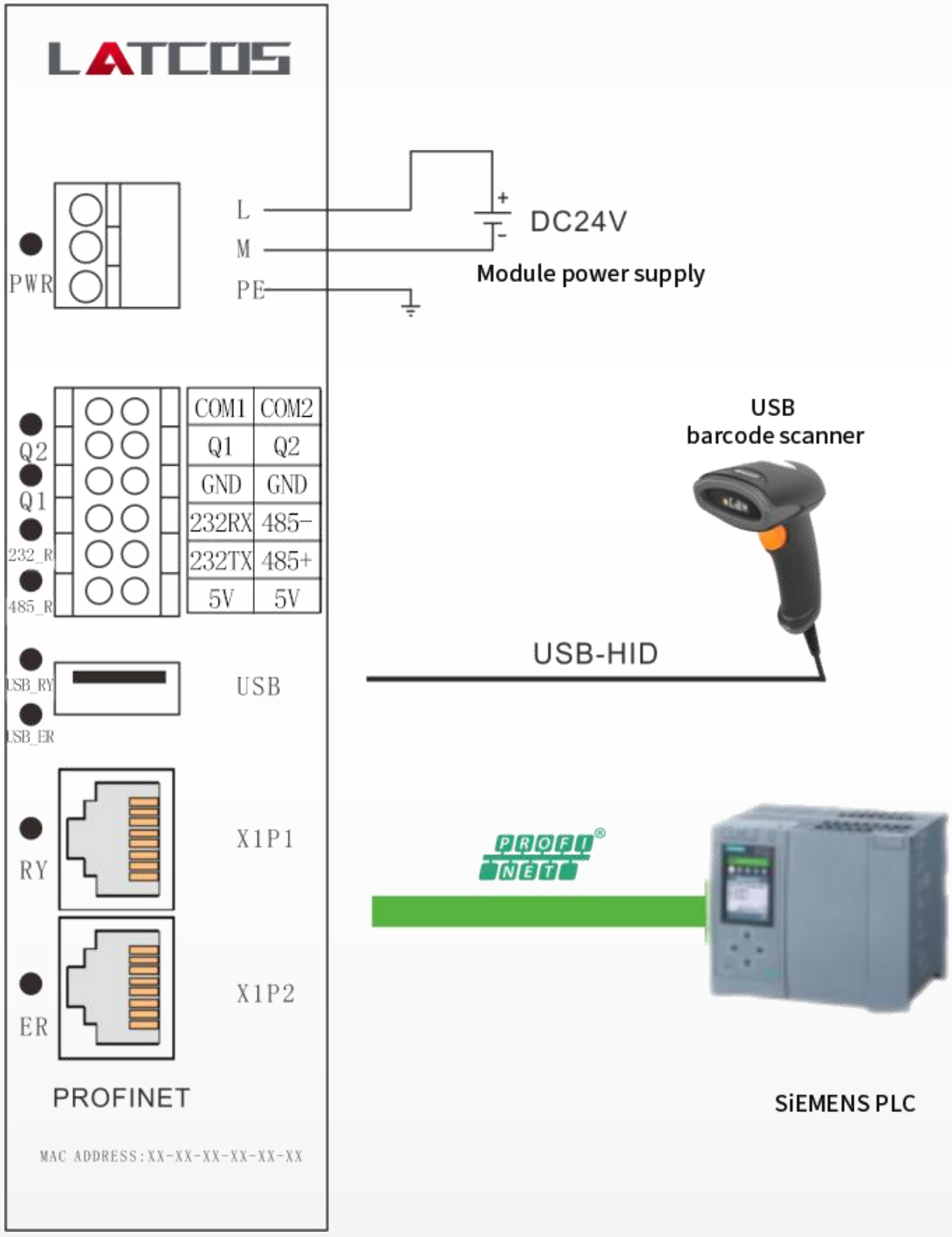
| PROFINET communication parameters | | |
|---|---|---|
| 序号 | Project | Parameters |
| 1 | Agreement | PROFINET RT（IEC 61158 Type3） |
| 2 | Transmission rate | 10/100 Mbaud，Automatic transmission speed recognition |
| 3 | Bus interface | With dual RJ45 switches (industrial Ethernet compliant with IEEE 802.xx standard, featuring auto-negotiation and auto-crossing functions) |
| 4 | Communication address | The only globally unique MAC address |
| 5 | Transmission cable | CAT5e shielded cable |
| 7 | Port protection | Transformer isolation，1500V DC（IEC61000-4-2） |
| **QR code scanner communication interface (USB)** | | |
| 1 | Agreement | USB-HID |
| 2 | Physical interface | USB Cow's head |
| **QR code scanner communication interface (485/232)** | | |
| 1 | Packets per second (kbps) | 2400,4800,9600,19200,38400,57600,115200 |
| **Other parameters** | | |
| 1 | Dimensions of the shape | （W）31*(H)118*（D）86mm |
| 2 | Installation method | DIN 35mm guide rail |
| 3 | Protection level | IP20 |
| 4 | Environmental temperature | Transportation and storage: -40℃ to +70℃ Operating temperature: -20℃ to +55℃ |
| 5 | Power supply voltage | 24 VDC(±20%) |
| 6 | Rated current | 110 mA (24 VDC) |

# 3.Hardware description

The APG1508 Gateway uses a physical interface with two RJ45 sockets for communication. The module itself has the function of a switch. They are respectively identified as X1P1 and X1P2.

## 3.1 Meaning of indicator lights

LED indicators are divided into three types. These include power indicator, scanner gun status indicator, and Profinet status indicator. The definitions are as shown in the table and the figure below.

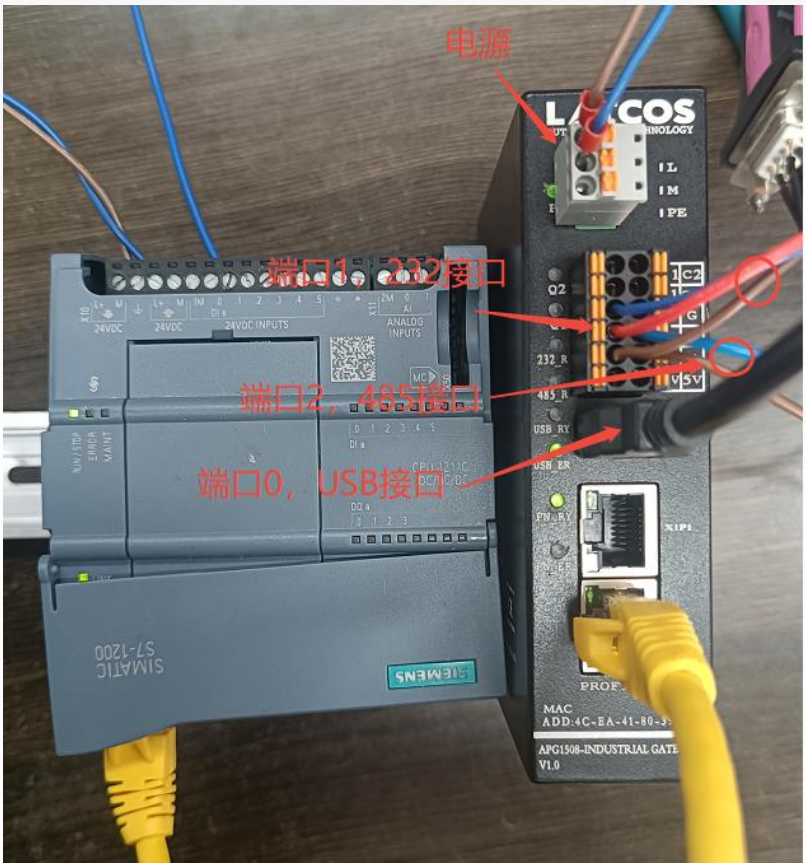


**LED Indicator Definition**

| Name | Colour | Description |
|---|---|---|
| PWR | green | Power indicator light |
| Q2 | green | Digital output point 2 |
| Q1 | green | Digital output point 1 |
| 232_R | red | 232 barcode scanner connection indicator light |
| 485_R | red | 485 Scanning Gun Connection Indicator Light |
| USB_RY | red | USB barcode scanner connection indicator light |
| USB_ER | green | USB barcode scanner error indicator light |
| RY_RY | green | Profinet bus communication is normal |
| ER_ER | red | The Profinet bus has not entered the correct mode: there are communication or operation errors, or the communication timing monitor (watchdog) has detected a communication timeout. |

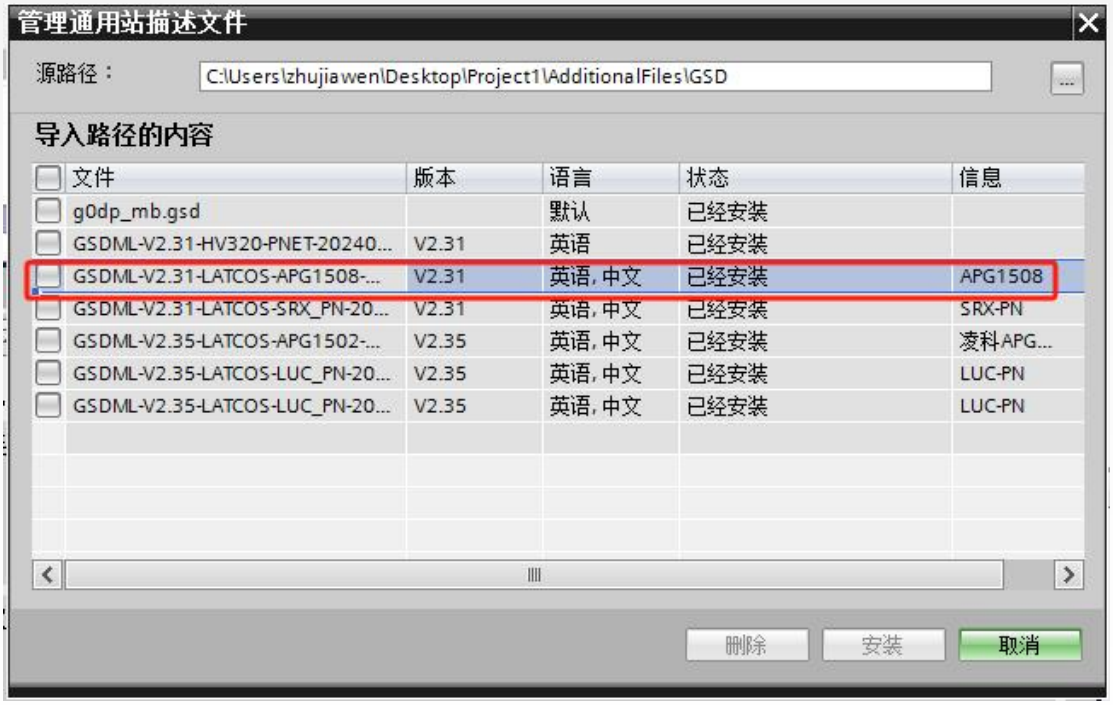
# 4.Product usage

## 4.1 Physical wiring diagram



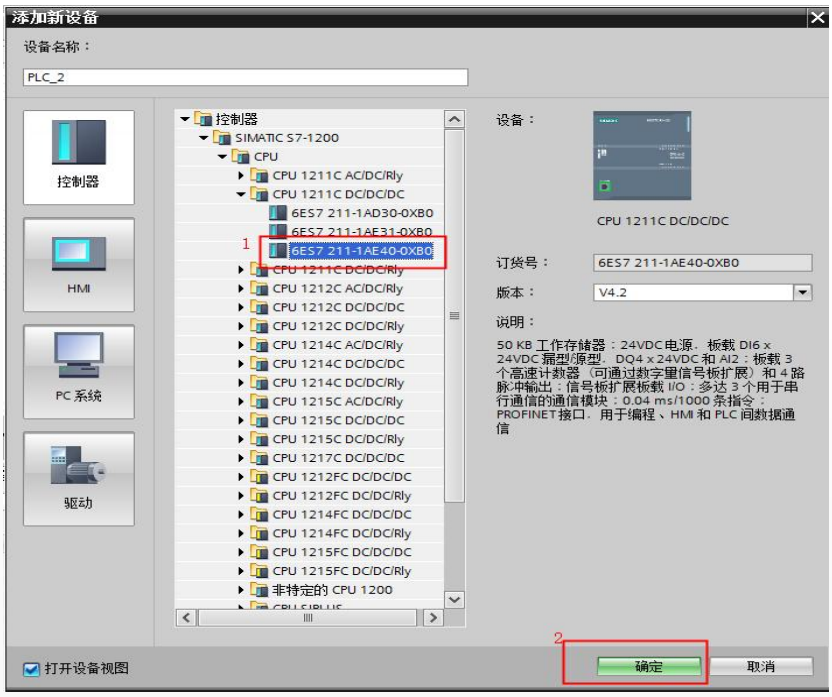

## 4.2 Installation of the GSDML file

In the drop-down menu of the B&R software, click "Options - Manage General Station Description File". Locate the directory where the gateway GSDML file is stored in the source path. Click "Install" and wait for the update of the hardware directory.

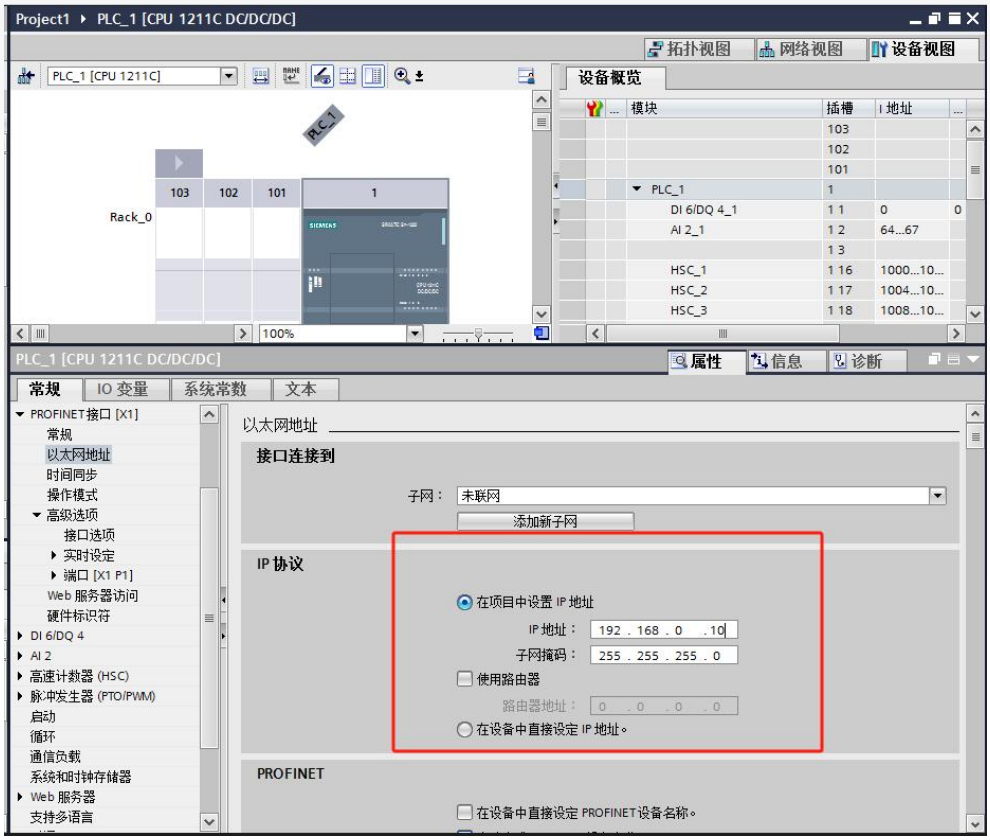



## 4.3 Hardware configuration

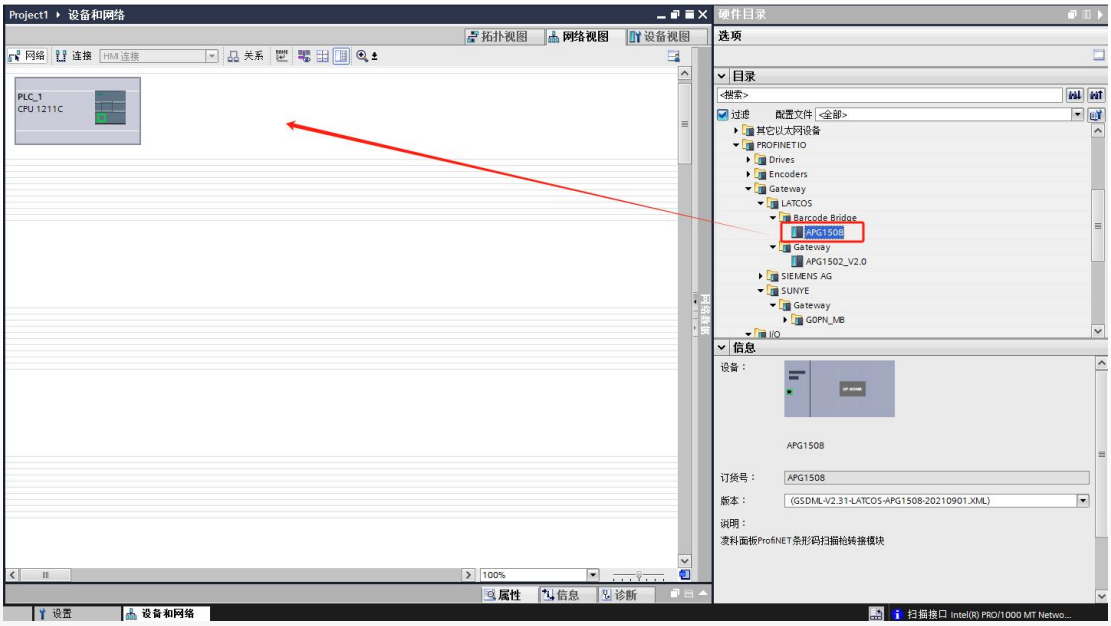
①Take S7-1200 as an example. First, click on "Add New Device", then add a 1211C CPU in SIMATIC S7-1200, and finally click "OK".

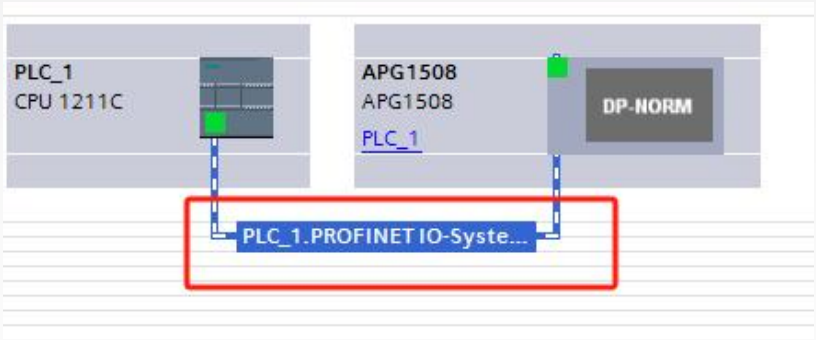


②Click on "Add New Subnet", and the IP address must be the same as the CPU address. Here, the 1200 address is 192.168.0.10.

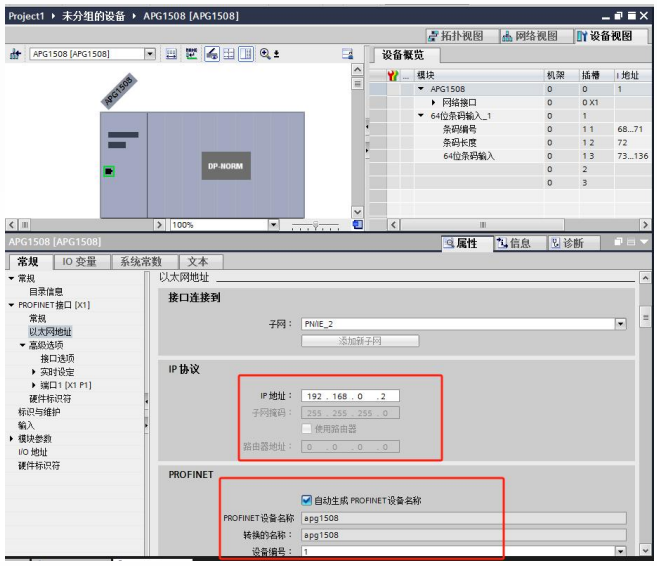



③In the network view, click on other on-site devices. Under PROFINET IO, select IO/GateWay/LATCOS/Barcode Bridge/APG1508. Drag APG1508 into the network view. Then right-click on "Unallocated" and assign it to the new I/O controller.



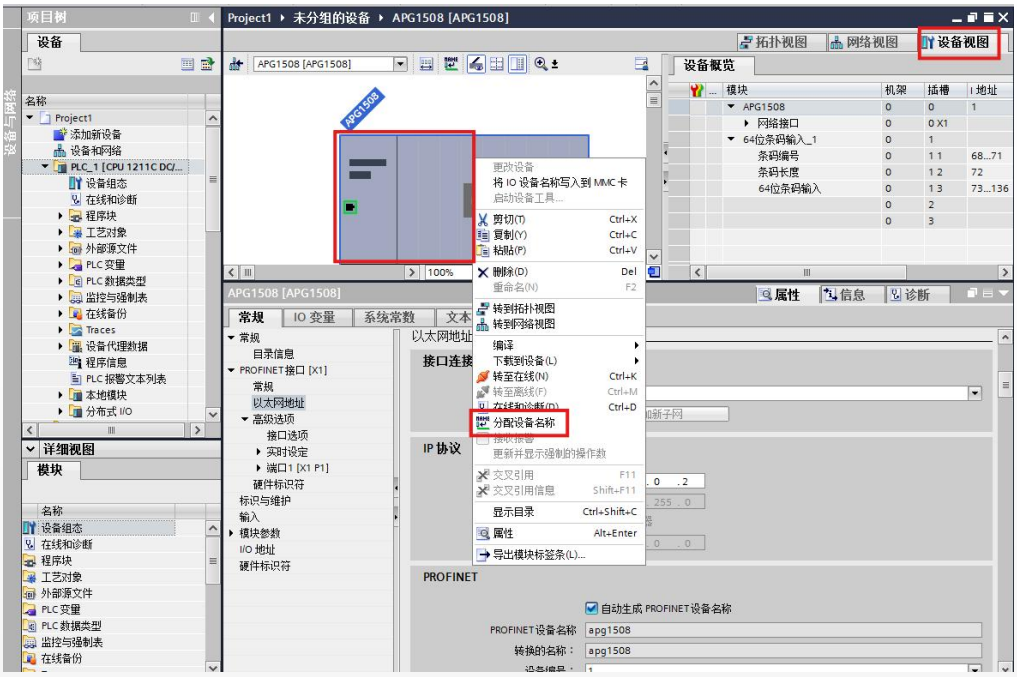



④ Distributed IO name allocation. Click on "Properties", then after opening the properties, in the Ethernet address section, view the IP address and Profinet device name, as shown in the following picture.



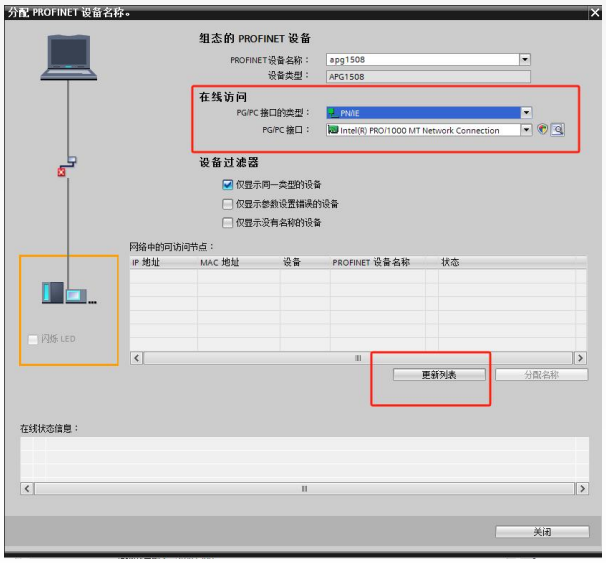

⑤Set the name of the remote IO device

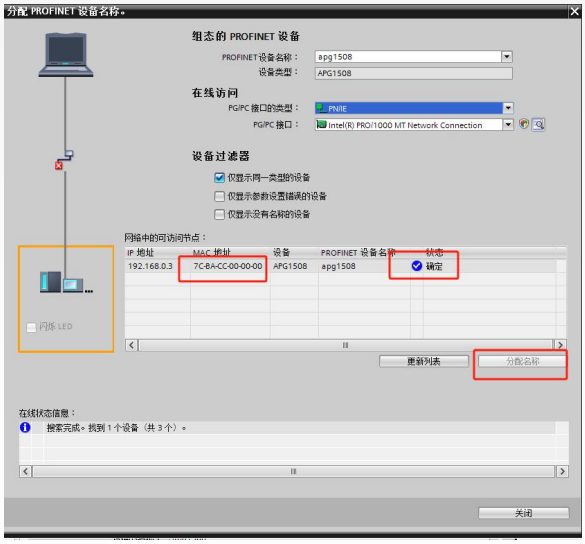
Assign the device name directly through the module of the network view.



Select the correct network card and then update the directory

Choose the corresponding module allocation device name based on the MAC code

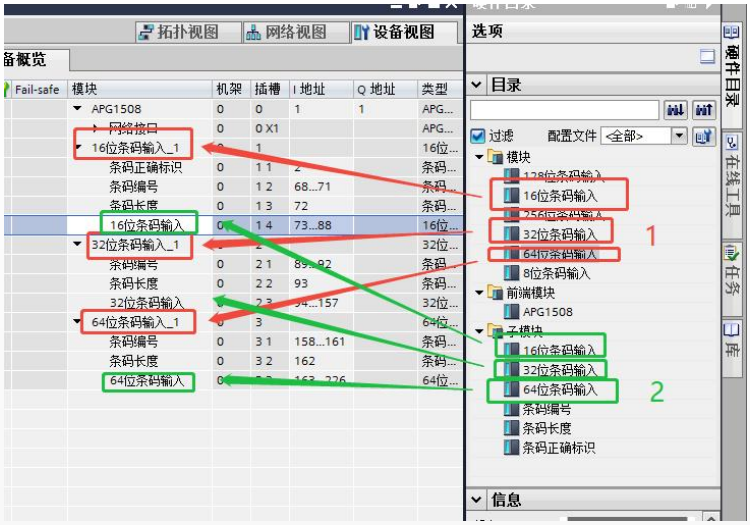


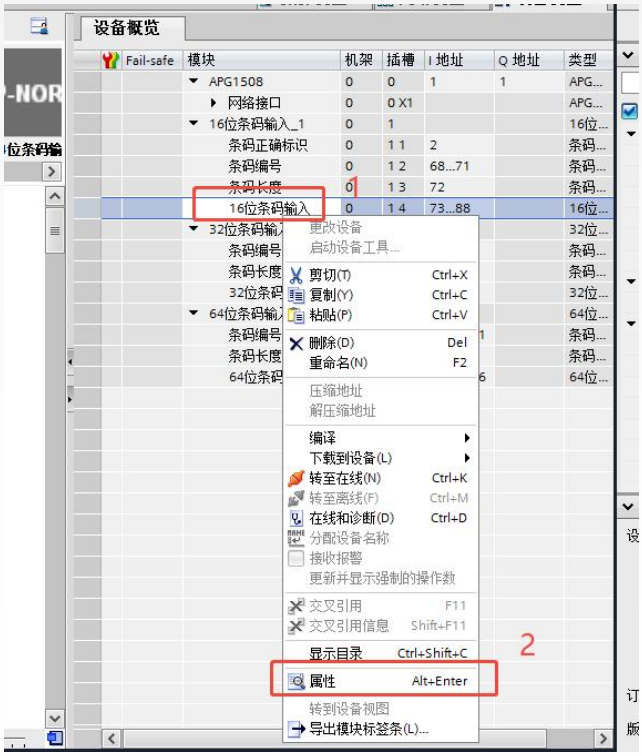

After the setting is completed, when the PLC is powered on, it will allocate IP addresses based on the names assigned by the devices in the network.It is essential to ensure that the names of the hardware devices are consistent with those of the software.

## 4.4 Add and set the parameters for the barcode scanner by enabling 232, 485 and USB simultaneously.

In the device view, drag the modules from the hardware directory to the corresponding slots of APG1508. Drag the 16-bit, 32-bit and 64-bit barcodes from the module directory, and then set the corresponding sub-module barcodes.



Select the sub-module barcode input, and right-click on the properties




Select the module parameters and perform the port settings.

Set port 1 as RS232, with a baud rate of 9600, 8 data bits, no parity bit, and 1 stop bit.


Set port 2 as RS485, with a baud rate of 9600, 8 data bits, no parity bit, and 1 stop bit.

Set port 0 as USB


When adding APG1508, the default is 64-bit barcode input.

Set the port parameters as follows:

Port: Port 0 - USB (default), Port 1 - RS232, Port 2 - RS485

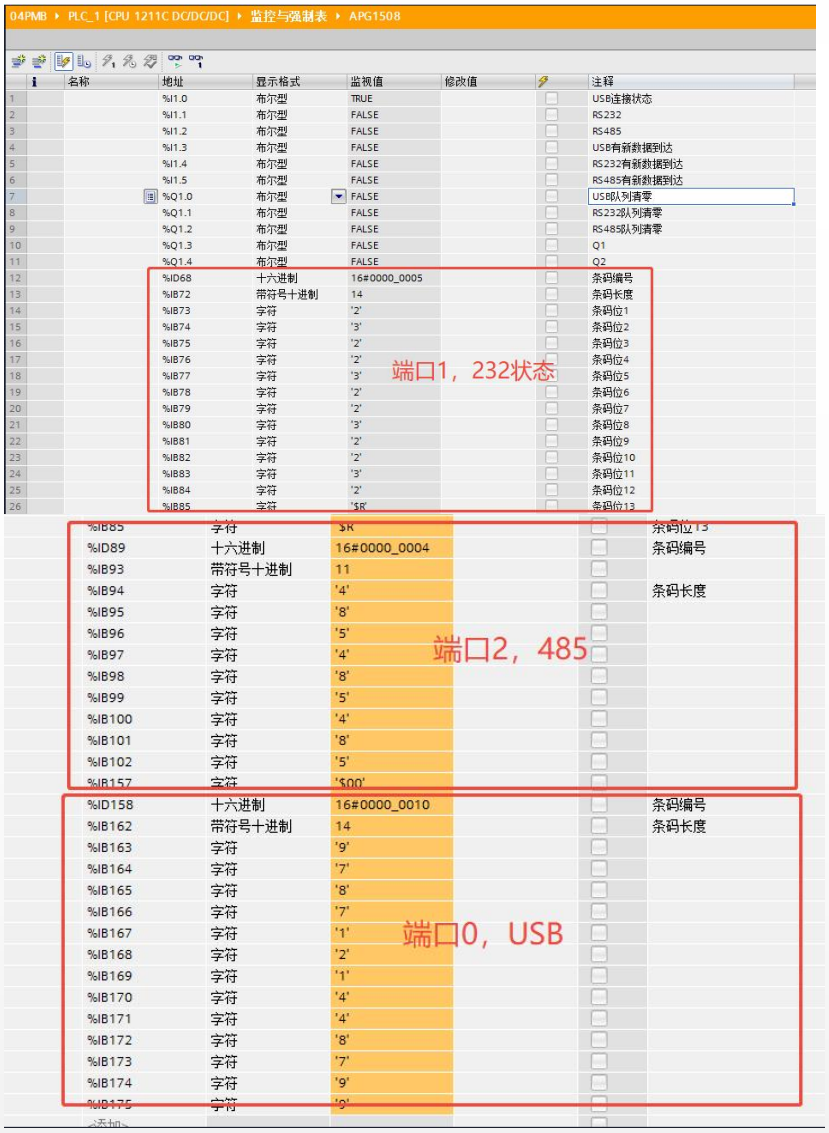
Baud rate: 2400, 4800, 9600, 19200, 38400, 57600, 115200 (default) USB does not require setting this parameter

Data bits: 7, 8 (default), 9 USB does not require setting this parameter

Parity: None, Even (default), Odd USB does not require setting this parameter

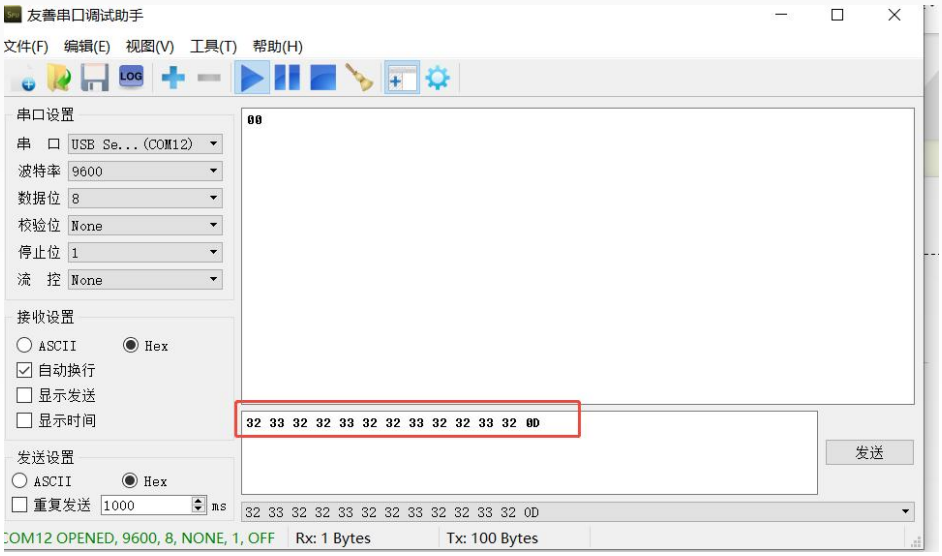
Stop bits: 1 (default), 1.5, 2 USB does not require setting this parameter

# 4.5 Download the program and add the monitoring table



# 4.6 Communication Series

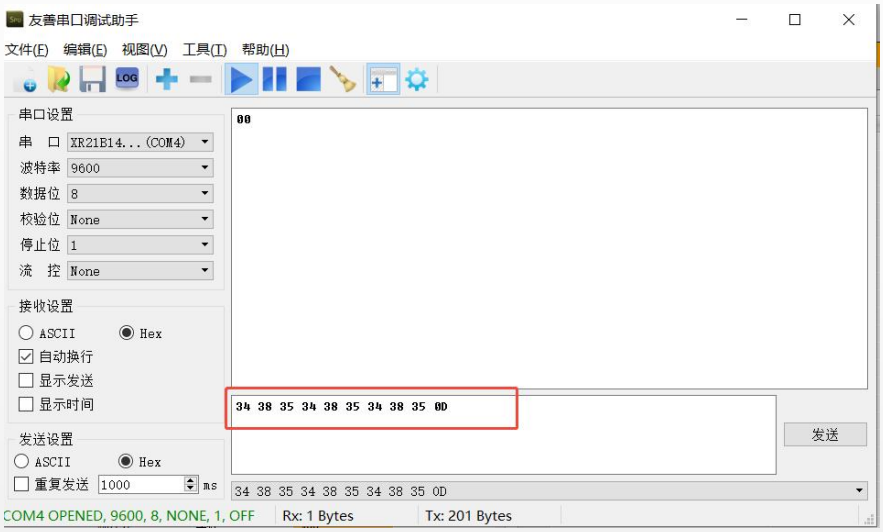
Use the friendly serial port debugging tool to test RS-232. Send the sequence 32 33 32 32 33 32 32 33 32 32 33 32 0D. The ASCII codes corresponding to the control characters 0 to 9 are 48 to 57, and converted to hexadecimal they become 16#30 to 16#39. For more details, please refer to the ASCII code table.




The characters received by the PLC are 232232232232.

| | | | |
|---|---|---|---|
| %ID68 | 十六进制 | 16#0000_0005 | 条码编号 |
| %IB72 | 带符号十进制 | 14 | 条码长度 |
| %IB73 | 字符 | '2' | 条码位1 |
| %IB74 | 字符 | '3' | 条码位2 |
| %IB75 | 字符 | '2' | 条码位3 |
| %IB76 | 字符 | '2' | 条码位4 |
| %IB77 | 字符 | '3' | 条码位5 |
| %IB78 | 字符 | '2' | 条码位6 |
| %IB79 | 字符 | '2' | 条码位7 |
| %IB80 | 字符 | '3' | 条码位8 |
| %IB81 | 字符 | '2' | 条码位9 |
| %IB82 | 字符 | '2' | 条码位10 |
| %IB83 | 字符 | '3' | 条码位11 |
| %IB84 | 字符 | '2' | 条码位12 |

Use the friendly serial port debugging tool to test RS-485. Send the sequence 34 38 35 34 38 35 34 38 35 34 38 35 0D. The ASCII codes corresponding to the characters 0 to 9 are 48 to 57, and converted to hexadecimal they become 16#30 to 16#39. For more details, please refer to the ASCII code table.



The characters received by the PLC are 485485485485.

| | | | | | |
|---|---|---|---|---|---|
| %ID89 | 十六进制 | 16#0000_0004 | | | 条码编号 |
| %IB93 | 带符号十进制 | 11 | | | |
| %IB94 | 字符 | '4' | | | 条码长度 |
| %IB95 | 字符 | '8' | | | |
| %IB96 | 字符 | '5' | | | |
| %IB97 | 字符 | '4' | | | |
| %IB98 | 字符 | '8' | | | |
| %IB99 | 字符 | '5' | | | |
| %IB100 | 字符 | '4' | | | |
| %IB101 | 字符 | '8' | | | |
| %IB102 | 字符 | '5' | | | |
| %IB157 | 字符 | '$00' | | | |

Connect the USB using the scanner and scan the following barcode


The characters received by the PLC are 978-7-121-44879-9

| | | | | | |
|---|---|---|---|---|---|
| %ID158 | 十六进制 | 16#0000_0010 | | | 条码编号 |
| %IB162 | 带符号十进制 | 14 | | | 条码长度 |
| %IB163 | 字符 | '9' | | | |
| %IB164 | 字符 | '7' | | | |
| %IB165 | 字符 | '8' | | | |
| %IB166 | 字符 | '7' | | | |
| %IB167 | 字符 | '1' | | | |
| %IB168 | 字符 | '2' | | | |
| %IB169 | 字符 | '1' | | | |
| %IB170 | 字符 | '4' | | | |
| %IB171 | 字符 | '4' | | | |
| %IB172 | 字符 | '8' | | | |
| %IB173 | 字符 | '7' | | | |
| %IB174 | 字符 | '9' | | | |
| %IB175 | 字符 | '9' | | | |
| <添加> | | | | | |

## 4.7 ASCII code table

| ASCII value | Control character | ASCII value | Control character | ASCII value | Control character | ASCII value | Control character |
|---|---|---|---|---|---|---|---|
| 0 | NUT | 32 | (space) | 64 | @ | 96 | ` |
| 1 | SOH | 33 | ! | 65 | A | 97 | a |
| 2 | STX | 34 | ″ | 66 | B | 98 | b |
| 3 | ETX | 35 | # | 67 | C | 99 | c |
| 4 | EOT | 36 | $ | 68 | D | 100 | d |
| 5 | ENQ | 37 | % | 69 | E | 101 | e |
| 6 | ACK | 38 | & | 70 | F | 102 | f |
| 7 | BEL | 39 | . | 71 | G | 103 | g |
| 8 | BS | 40 | ( | 72 | H | 104 | h |
| 9 | HT | 41 | ) | 73 | I | 105 | i |
| 10 | LF | 42 | * | 74 | J | 106 | j |
| 11 | VT | 43 | + | 75 | K | 107 | k |
| 12 | FF | 45 | . | 76 | L | 108 | l |
| 13 | CR | 46 | - | 77 | M | 109 | m |
| 14 | S0 | 47 | . | 78 | N | 110 | n |
| 15 | SI | 48 | / | 79 | O | 111 | o |
| 16 | DLE | 49 | 0 | 80 | P | 112 | p |
| 17 | DCI | 50 | 1 | 81 | Q | 113 | q |
| 18 | DC2 | 51 | 2 | 82 | R | 114 | r |
| 19 | DC3 | 52 | 3 | 83 | S | 115 | s |
| 20 | DC4 | 53 | 4 | 84 | T | 116 | t |
| 21 | NAK | 54 | 5 | 85 | U | 117 | u |
| 22 | SYN | 55 | 6 | 86 | V | 118 | v |
| 23 | TB | 56 | 7 | 87 | W | 119 | w |
| 24 | CAN | 57 | 8 | 88 | X | 120 | x |
| 25 | EM | 58 | 9 | 89 | Y | 121 | y |
| 26 | SUB | 59 | : | 90 | Z | 122 | z |
| 27 | ESC | 60 | ; | 91 | [ | 123 | { |
| 28 | FS | 61 | < | 92 | / | 124 | \| |
| 29 | GS | 62 | = | 93 | ] | 125 | } |

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