

WIZ-IP20 User Manual

V1.0

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Update history

Version	Date	Remarks
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Contact email:supports@wiznet.hk

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1 Introduction

1.1 Overview

The WIZ-IP20 serial port to Ethernet module supports two data transmission modes: transparent data transmission and AT command. It also supports TCP Server, TCP Client, UDP, and Modbus operating modes. The maximum baud rate of the serial port can reach 1.152Mbps. It is equipped with a matching upper computer configuration software and can also be easily configured via web pages or AT commands.

The WIZ-IP20 serial port to Ethernet module adopts the ARM Cortex-M3 core, making network communication faster, more stable and secure. Users can quickly complete the design of hardware circuits just by following the recommended reference design schematics in the manual, which reduces development difficulty and saves development time.

1.1.1 Functional features

The WIZ-IP20 serial port to Ethernet module features the following main functional and characteristics:

- Supports Modbus RTU/ASCII to Modbus TCP/UDP and Modbus over TCP/UDP conversion
- Supports two data transmission modes: data transparent transmission and AT command
- The baud rate setting range is 16 commonly used baud rate values between 1.2Kbps and 1.152Mbps
- Supports TCP Server, TCP Client, UDP, and Modbus working modes
- Features up to 2048-byte dual serial port receive buffer and 2048-byte network port receive buffer
- Integrates a full hardware TCP/IP protocol stack to ensure fast, secure, and stable data communication
- Flexible dual serial port data packet setting to meet diverse packetization requirements of users
- Supports Keep Alive function to ensure real-time network link availability
- Supports DHCP for automatic IP address acquisition
- Supports DNS function to meet users' needs for converter-server communication via domain names
- Supports NetBIOS function for easy device access by name
- Supports connection password verification to enhance communication security
- Supports configuration via dual serial port AT command mode, web page, and upper computer tools
- Supports local firmware upgrade via upper computer and web page

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1.1.2 Product features

- 32-bit ARM Cortex-M3 MCU
- Ethernet

  10/100M adaptive Ethernet
- Serial port

  3.3V TTL × 2: TXD, RXD, GND
- Serial communication parameters

  Baud rate: 16 commonly used baud rate values ranging from 1.2Kbps to 1.152Mbps

  Data bits: 7, 8

  Stop bits: 0.5, 1, 1.5, 2

  Parity: None, Even, Odd

  Flow control: None
- Input power supply

  WIZ-IP20: DC 3.3V
- Dimensions (Length × Width × Height)

  WIZ-IP20: 32.50 × 16.50 × 13.70 (mm)
- Operating temperature

  WIZ-IP20:-40℃ ~ +85℃
- Storage environment

  WIZ-IP20: -40℃ ~ +95℃, 5 ~ 95%RH

1.1.3 Parameter configuration method

The WIZ-IP20 serial port to Ethernet module offers three commonly used parameter configuration methods for users to choose from:

- Serial AT command configuration: Users can integrate the WIZ-IP20 into the mainboard of their own embedded products, and the main MCU can configure parameters by sending serial AT commands. Users can also directly configure the module through AT commands via the upper computer serial tool. For details, please refer to Chapter 7 AT Commands.
- Web browser configuration: Users can perform configuration through a web browser on a computer within the same local area network as the module. For details, please refer to Chapter 8 Web Page

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Configuration.

- WIZS2E ConfigTool upper computer software configuration: Users can configure using the WIZS2E ConfigTool upper computer software on a computer within the same local area network as the module. For details, please refer to Chapter 6 WIZS2E ConfigTool Software Configuration.

1.2 Product specifications

1.2.1 Electrical parameters

Unless otherwise specified, the following parameters refer to the values at Temp=25 ℃.

Voltage and current characteristics

Table 1-1 WIZ-IP20 Electrical characteristics

Symbol	Types	Ratings			
		Min	Typical	Max	Unit
VIN	Module voltage				V
IIN	Module current				mA

Current characteristics

Table 1-2 WIZ-IP20 Current characteristics

Module status	Test value(mA)	Module status	Test value(mA)
Standby		Communication	

1.2.2 Mechanical dimensions

If users need to integrate the WIZ-IP20 serial port to Ethernet module into their mainboards, they can refer to the following mechanical dimensions. Unit: mm.

Mechanical dimension drawing of WIZ-IP20

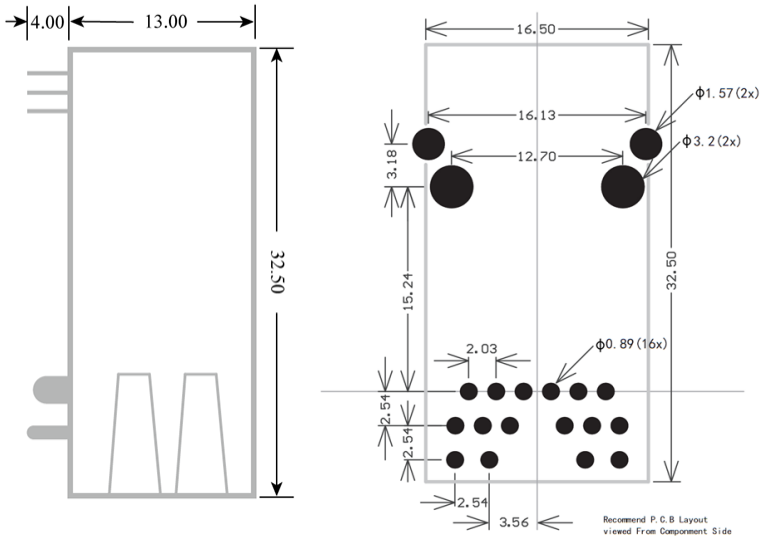


Figure 1-1 Mechanical dimension diagram of WIZ-IP20

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1.2.3 Temperature characteristics

Table 1-3 Temperature characteristics

Name	level	Working temperature	Storage temperature
WIZ-IP20	Industrial grade	-40℃ ～+85℃	-40℃ ～+95℃

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2 Hardware description

2.1 Interface description

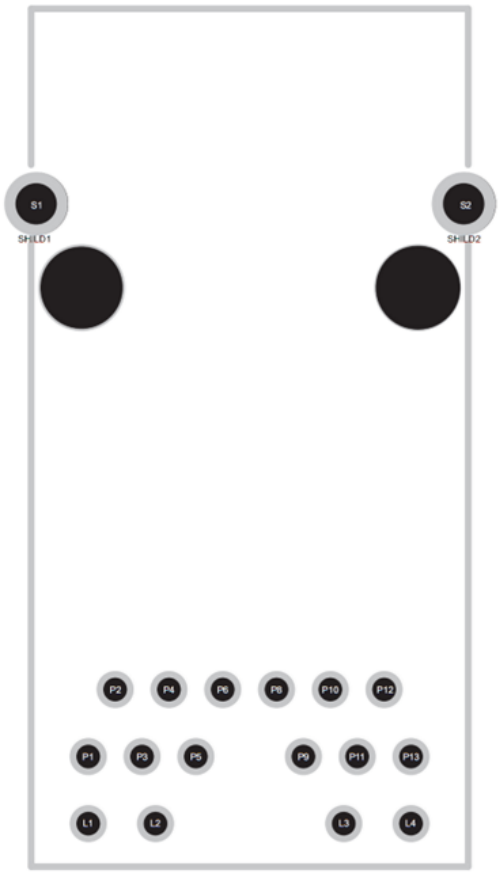


Figure 2-1 WIZ-IP20 pinout diagram

Table 2-1 WIZ-IP20 pin description

Pin Number	Pin Name	Pin Type	Description
P1	ACT	RJ45 LED Control Pin	RJ45 Interface data status LED control
P2	NC	-	-
P3	RXD	Serial Port	3.3V TTL serial port receive pin.
P4	NC	-	-
P5	TXD	Serial Port	3.3V TTL serial port transmit pin.
P6	NC	-	-
P8	RESET	Reset Pin	The entire module is reset when a low - level signal is received.
P9	GND	Power Ground	Module power ground
P10	NC	-	-
P11	VCC	Positive Power Supply Pin	Module power supply positive, default DC 3.3V
P12	NC	-	-
P13	LINK	RJ45_LED Control Pin	RJ45 Interface connection status LED control.
L1	D1-	RJ45_LED	The negative pole of the RJ45 interface connection status LED is defaultly connected to the ACT pin
L2	D1+	RJ45_LED	The positive pole of the RJ45 interface connection status LED is defaultly connected to 3.3V power supply.
L3	D2+	RJ45_LED	The positive pole of the RJ45 interfacet data status LED is defaultly connected to the 3.3V power supply.
L4	D2-	RJ45_LED	The negative pole of the Ethernet port data status LED is defaultly connected to the LINK pin.

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2.2 Introduction to the Evaluation Board

The WIZ-EVB evaluation board enables users to test and evaluate the serial-to-Ethernet modules of the WIZ-IP32,WIZ-IP75 and WIZ-IP20 models.The interface diagram of the WIZ-EVB is shown in Figure 2-2.

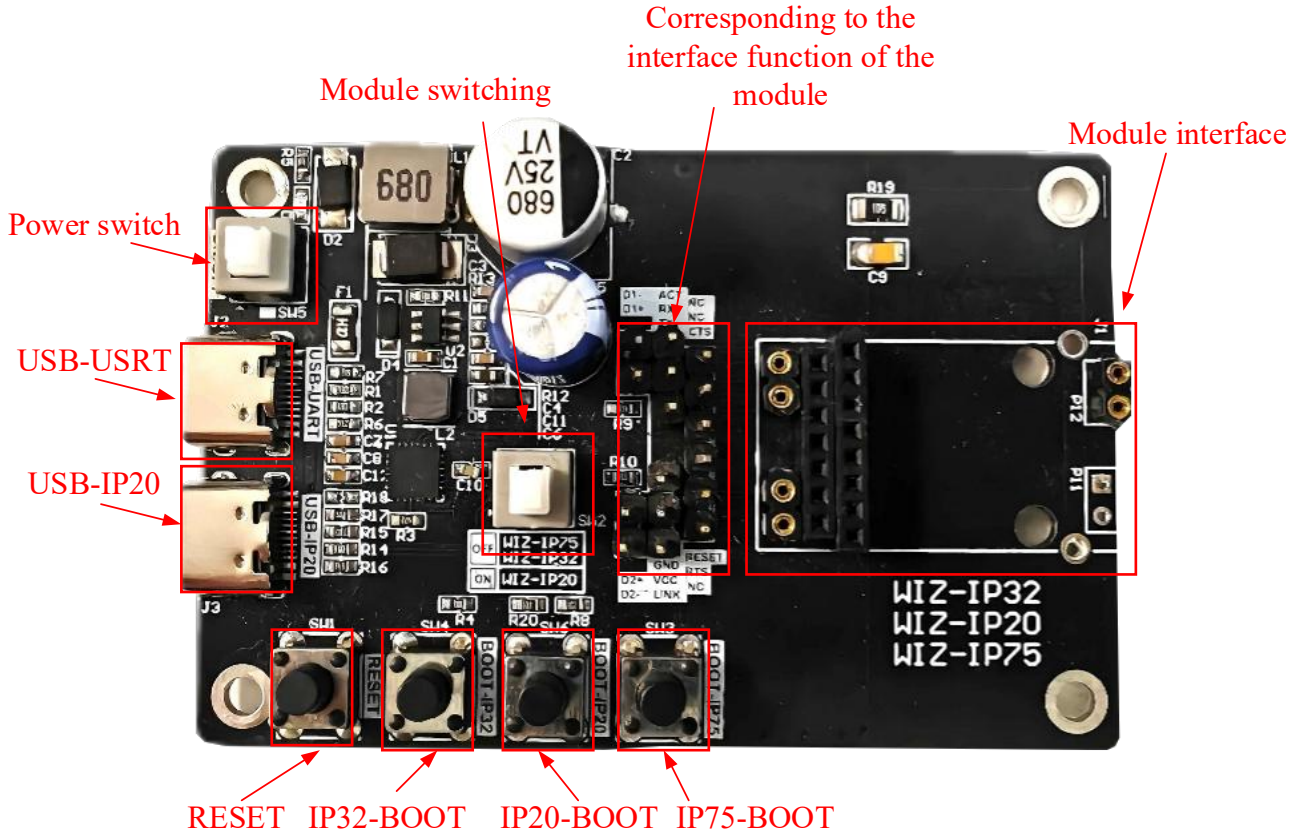


Figure 2-2 WIZ- EVB Evaluation Board Schematic Diagram

- **Power Switch:**Used to control the power on/off of the entire circuit board, determining whether to supply power to the circuit board.
- **USB-UART:**USB to UART interface, providing 5V power supply to the circuit board and modules, enabling data conversion between USB and serial communication interfaces, used for AT command configuration and serial data transmission.
- **USB-IP20:**For firmware burning purposes.
- **RESET:**Reset button, when pressed, can make the circuit board or related functional modules restart and return to the initial state.
- **Module Switch:**When the button is pressed, it is configured to use the WIZ-IP20 mode; when released, it is configured to use the WIZ-IP75 or WIZ-IP32 mode.
- **IP32-BOOT:**Controls the startup mode of the hardware WIZ-IP32, used to force the module to enter the boot mode for firmware upgrade, debugging or fault recovery.
- **IP75-BOOT:**Controls the startup mode of the hardware WIZ-IP75, used to force the module to enter the boot mode for firmware upgrade, debugging or fault recovery.
- **IP20-BOOT:**Controls the startup mode of the hardware WIZ-IP20, used to force the module to enter the boot mode for firmware upgrade, debugging or fault recovery.

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2.3 WIZ-IP20-EVB schematic diagram reference

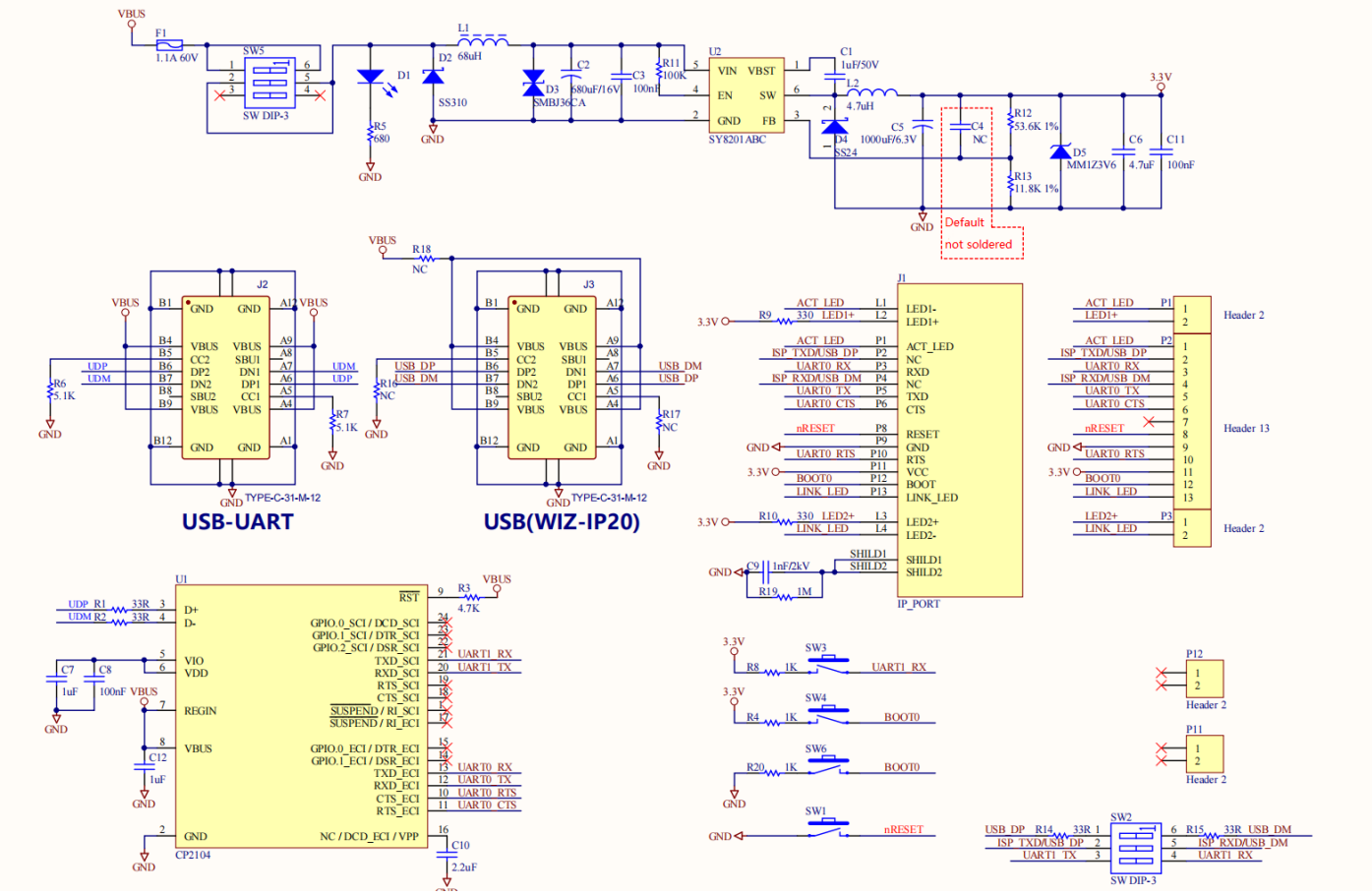


Figure 2-3 WIZ-IP20-EVB schematic diagram

2.3 Quick evaluation wiring instructions

By integrating the WIZ-IP20 serial to Ethernet module, users can quickly upgrade the serial port of their modules to an Ethernet interface. Before doing so, it is recommended that users test and evaluate the WIZ-IP20 serial - to - Ethernet module through the WIZ-IP20-EVB evaluation board.

As shown in the figure below, to test the data conversion from the serial port to Ethernet, it is necessary to install the WIZ-IP20 on the WIZ-IP20-EVB first. Then, connect the serial port of the WIZ-IP20-EVB to the USB port of the computer via a USB to serial module, and connect the network port of the WIZ-IP20-EVB to network modules such as routers or switches. At the same time, the user's computer should also be connected to this local area network. In this way, a simple network environment between the computer and the serial port module is set up. Then, as described in the subsequent chapters, the user's serial port module can realize data communication with the computer through Ethernet, and the WIZ-IP20 acts as a bridge for conversion between the serial port protocol and the Ethernet protocol.

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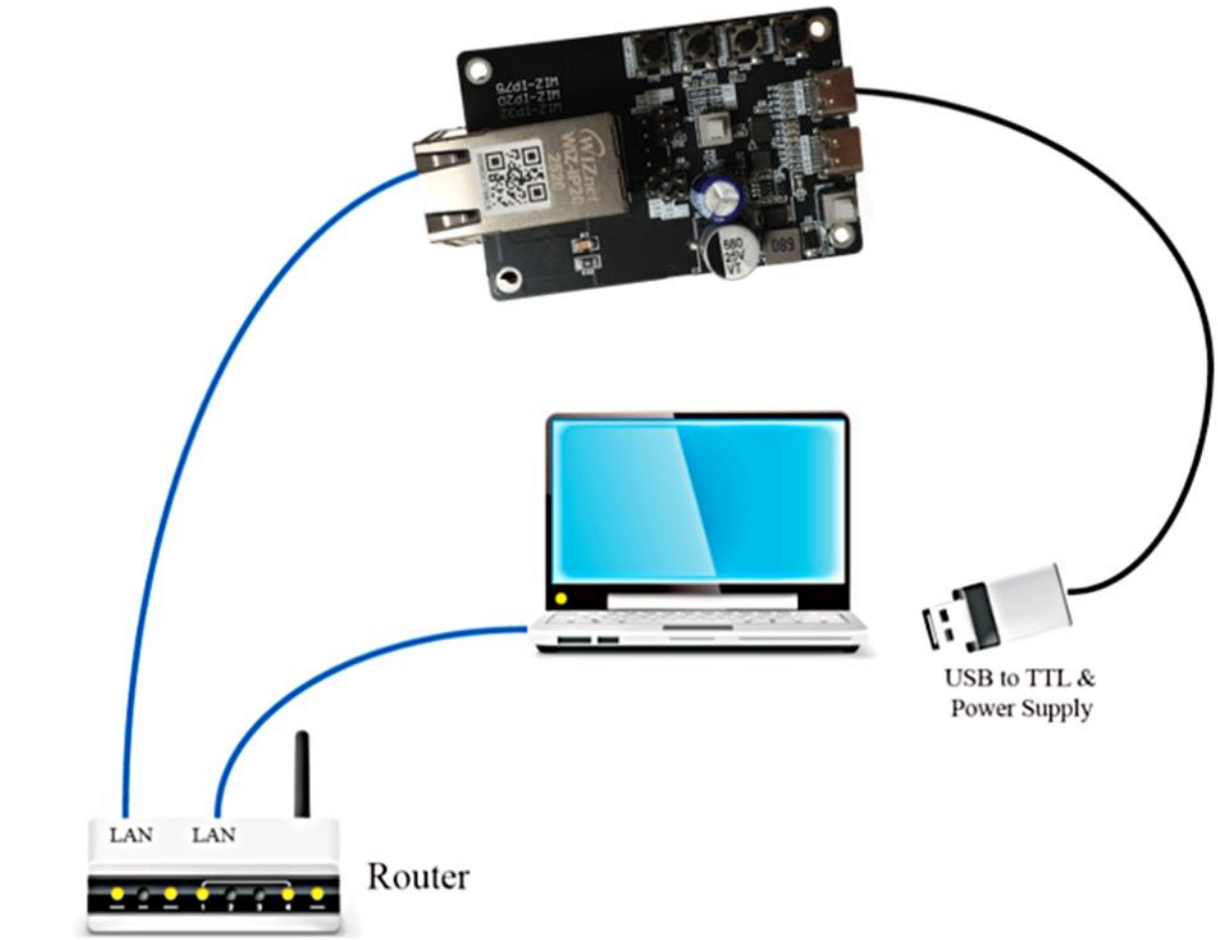


Figure 2-4 WIZ-IP20 wiring diagram

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3 Operating modes

WIZ-IP20 serial to Ethernet modules support TCP Server, TCP Client, UDP, and Modbus working modes, which will be briefly explained below.

3.1 TCP server mode

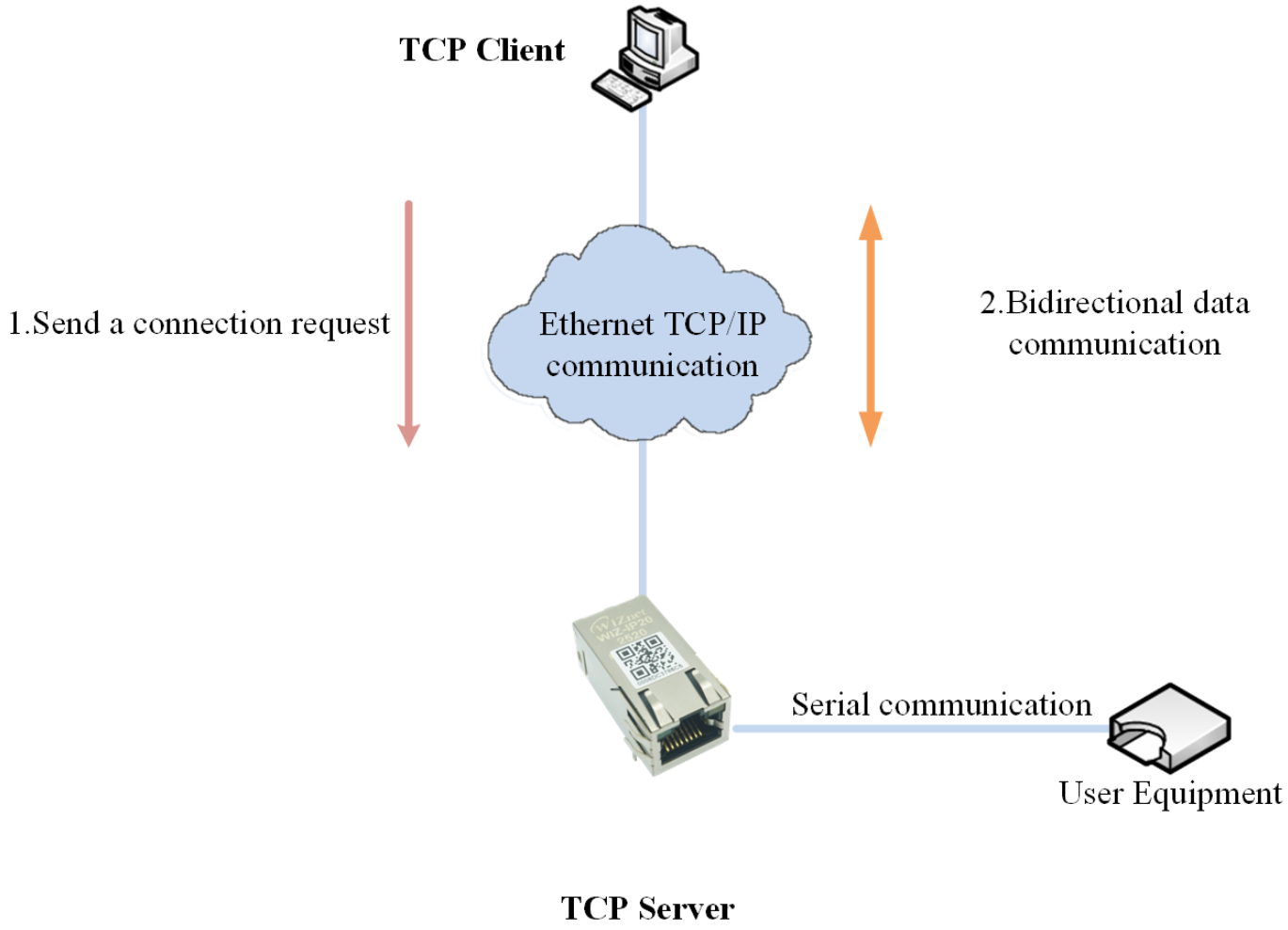


Figure 3-1 Schematic diagram of TCP server mode

As shown in Figure 3-1, in TCP Server mode, the WIZ-IP20 opens a local port for listening, with the default port number being 5000, waiting for connections from clients. Once a TCP connection is established with a client, bidirectional data communication can be carried out.

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3.2 TCP client mode

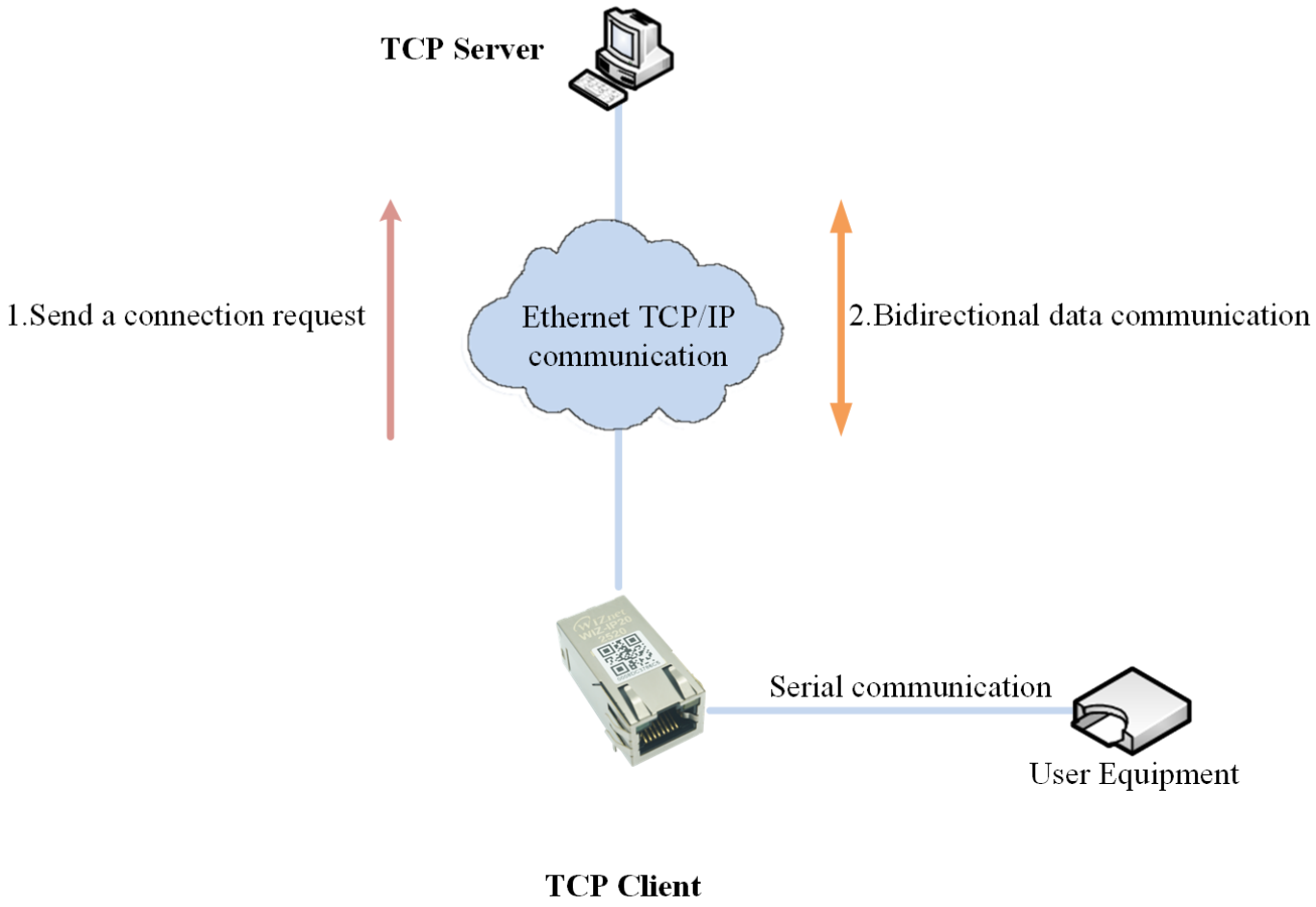
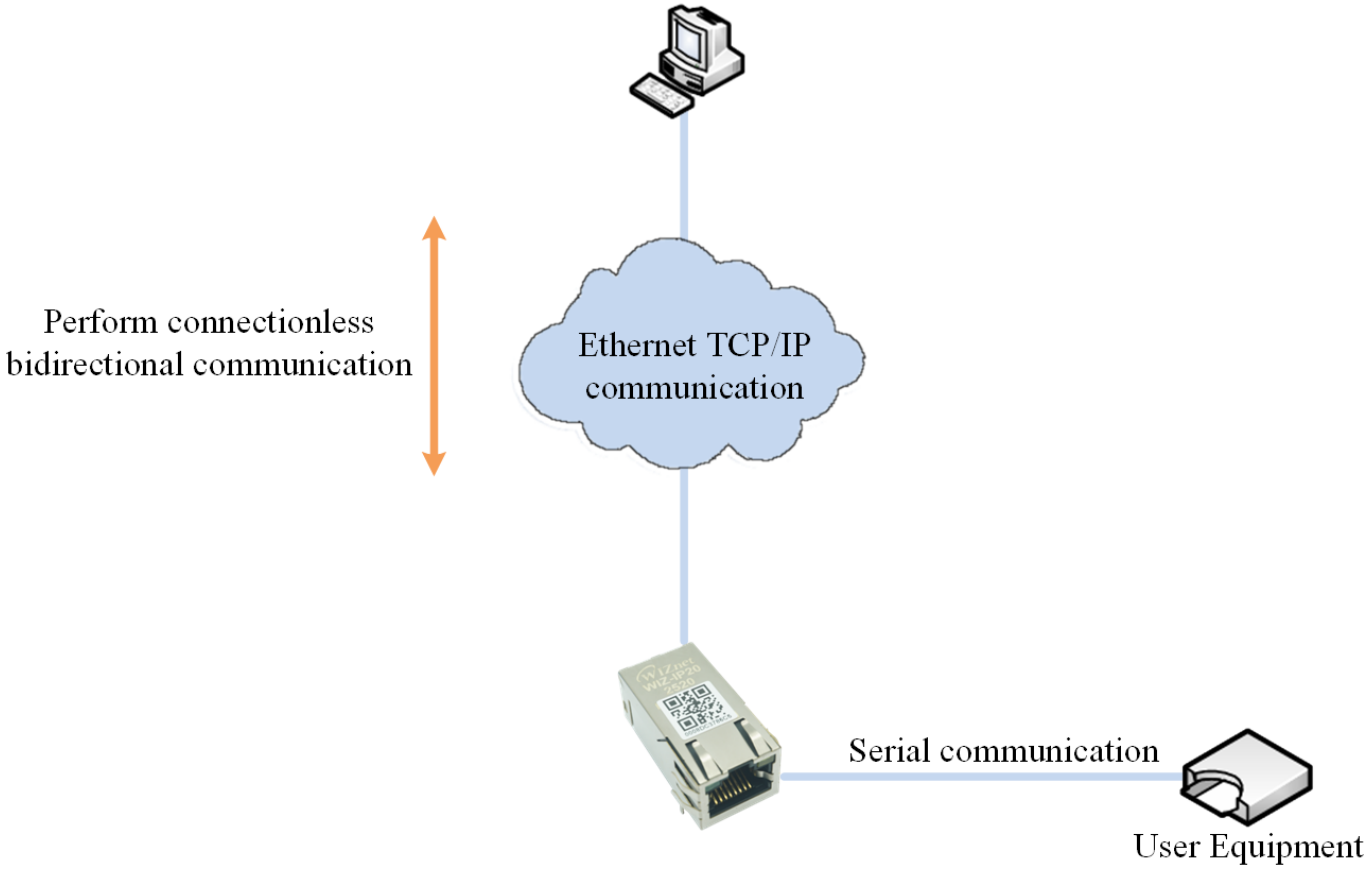


Figure 3-1 Schematic diagram of TCP client mode

As shown in Figure 3-2, in TCP Client mode, WIZ-IP20 will actively initiate connection requests to pre-set TCP servers. After establishing a TCP connection, bidirectional data communication can be carried out.

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3.3 UDP mode



UDP

Figure 3-2 UDP mode diagram

As shown in Figure 3-3, the UDP mode does not require connection establishment. UDP communication can be realized by setting the IP addresses and port numbers of the WIZ-IP20 and the remote module.

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3.4 Modbus mode

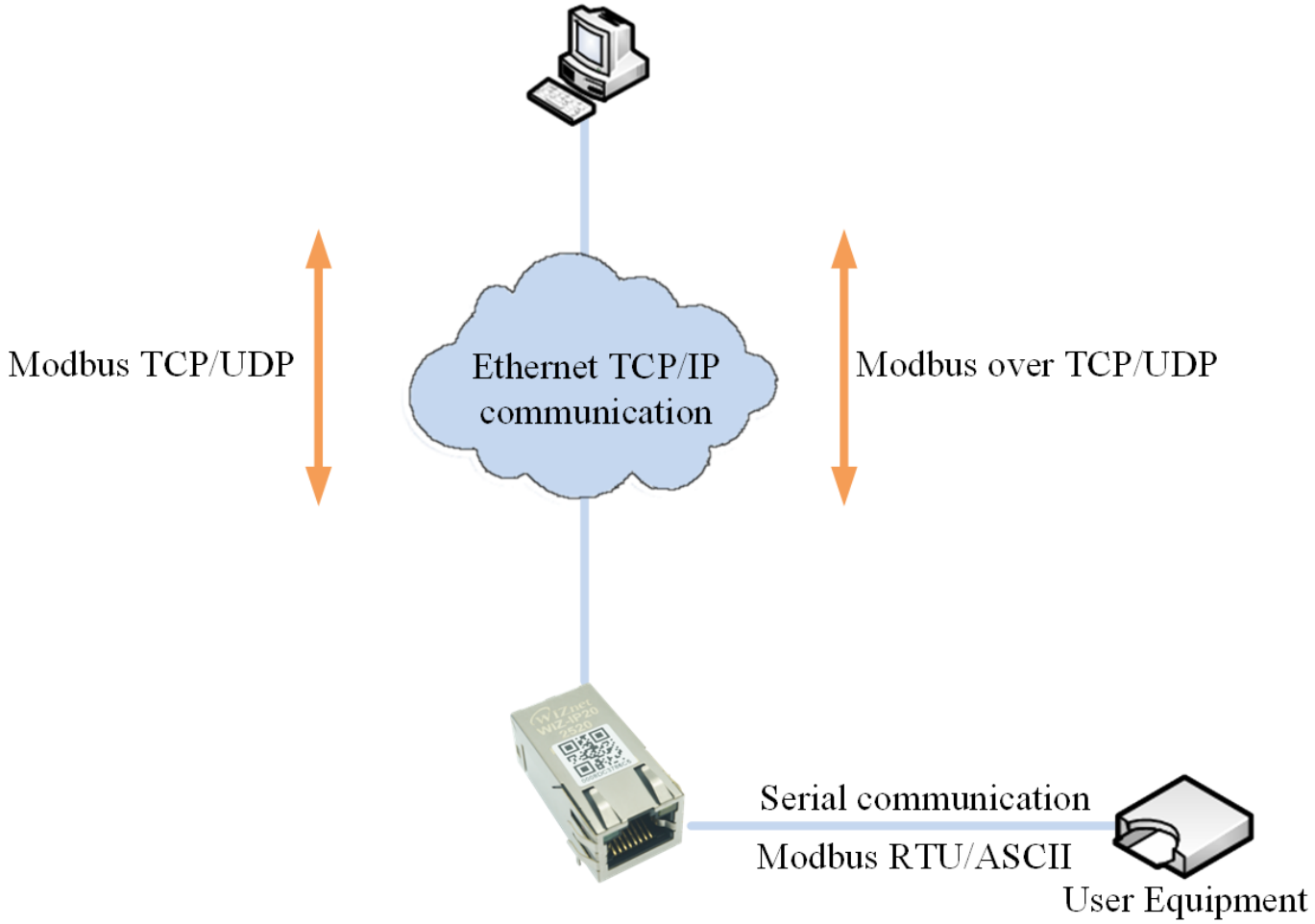


Figure 3-3 Modbus mode diagram

As shown in Figure 3-4, in Modbus mode, the WIZ-IP20 can realize the mutual conversion between Modbus RTU/ASCII protocols and Modbus TCP/UDP protocols. Meanwhile, the WIZ-IP20 also supports Modbus over TCP/UDP transmission.

Note: The Modbus function of the WIZ-IP20 is only valid in the data transparent transmission mode, and the Modbus function is not supported when transmitting data via AT commands.

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4 Data transfer mode

WIZ-IP20 serial to Ethernet modules support two data transmission modes for users to choose from: data transparent transmission mode and AT command transmission data mode.

4.1 Data transparent transmission mode

The data transmission mode of WIZ-IP20 has the following characteristics:

1 When using MCU to configure WIZ-IP20 for data transmission and receive, in general, before entering data transmission mode, it is necessary to configure parameters in AT command mode and then switch to data transmission mode;

2 After entering data transmission mode, the module will operate according to the configured working mode:

2.1 When the module is in TCP Server mode, it will immediately establish listening until a client establishes a connection with it;

2.2 When the module is in TCP Client mode, it will immediately request a connection from the server until a successful connection is established;

2.3 When the module is in UDP mode, there is no need to establish a connection and wait for user data;

3 After establishing a TCP or UDP connection, there is no need for any AT command operation, and the module can automatically send and receive data at any time, achieving transparent transmission of data;

4 If the TCP connection is disconnected normally, the module will perform the following actions:

4.1 When the module is in TCP Server mode, it will re-establish listening;

4.2 When the module is in TCP Client mode, it will reapply for a connection to the server;

5 When configuring WIZ-IP20 to send and receive data using MCU, if you need to modify the configured parameters, you need to exit the data transmission mode and enter the AT command mode for parameter configuration.

4.2 AT data transfer command mode

The AT command transmission data mode of WIZ-IP20 has the following characteristics:

1 Configure in AT command mode and perform data transmission in AT command mode without switching operating modes;

2 After configuring parameters in AT command mode, relevant AT data transmission commands can be directly called for TCP or UDP communication;

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2.1 When configuring the module to TCP Server mode, the module will immediately establish listening until a client establishes a connection with it;

2.2 When configuring the module to TCP Client mode, the module will immediately apply to the server for a connection. If the connection cannot be successfully established within 3 seconds, a new command needs to be sent to apply for a connection;

2.3 When configuring the module in UDP mode, the module does not need to establish a connection and waits for user data;

3 After establishing a TCP connection or UDP, sending or receiving data requires corresponding AT commands for operation, and only one data packet can be sent/received at a time;

4 If a TCP connection disconnection is detected, the relevant AT data transmission command needs to be called again to establish the connection;

5 If you need to modify the configuration parameters, you can directly call the AT command for configuration.

4.3 How to enter “Data pass-through mode”

Users can enter data transmission mode through three ways:

1 AT command (see Chapter 7 "RESET" and "EXIT" commands for details);

2 Web pages (see "Start Mode" option in Chapter 8 "Basic Settings" tab for details);

3 WIZS2E Config Tool configuration tool (see "Enter... Mode when power on or reset" option in Chapter 6 "Additional Functions" for details).

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5 WIZ-IP20's IP address

Before using WIZ-IP20, we need to know its IP address and other parameters. WIZ-IP20 supports two IP acquisition methods: "static configuration" and "dynamic acquisition". Static configuration "refers to the need for users to manually configure parameters such as IP address, subnet mask, and gateway. It should be emphasized that the module IP address cannot be the same as the IP address of other modules in the same local area network, otherwise communication cannot be achieved; Dynamic acquisition "refers to the module using the DHCP protocol to automatically obtain information such as IP address, subnet mask, and gateway from the DHCP server.

5.1 Factory setting of module IP address

The default IP address for WIZ-IP20 serial to Ethernet modules at the factory is 192.168.1.88.

5.2 Obtain module IP information

WIZ-IP20 has two methods to obtain module IP addresses:

1 WIZS2E Config Tool upper computer software, refer to the instructions in Chapter 6.1 for details;

2 AT command query, please refer to Chapter 7 "IP" query command for details

5.3 Method for determining if modules and computers are on the same network segment

Before using a computer to communicate with WIZ-IP20, users need to ensure that their computer is on the same network segment as WIZ-IP20. WIZ-IP20 is set with a default IP address (192.168.1.88) and network mask (255.255.255.0) at the factory. Users can check whether the module is on the same subnet as their computer according to the process shown in the following figure.

If in the same subnet, WIZ-IP20 modules can be directly used for communication. If they are not on the same subnet, it is necessary to set the IP address of the computer.

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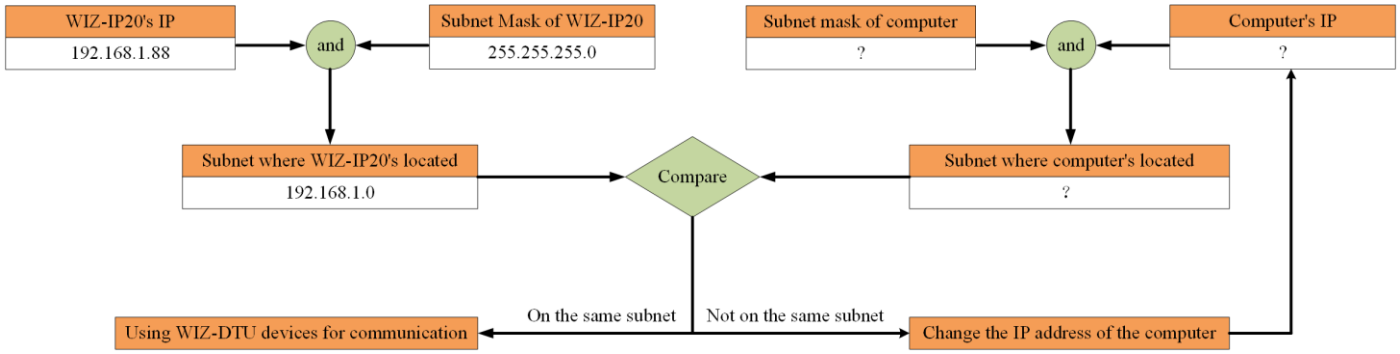


Figure 5-1 WIZ-IP20 and computer IP address same subnet detection

5.4 Computer IP setting method

Taking the Windows 10 operating system as an example for explanation.

Start → Control Panel → Network Sharing Center → Change Adapter Settings → Local Area Connection → Right click Properties → Double click Internet Protocol Version 4 (TCP/IPv4) to obtain the page shown in the following figure. Select 'Use the following IP address' and fill in the IP address, such as 192.168.1.99, subnet mask 255.255.255.0, default gateway 192.168.1.1, DNS section can be left blank, click' OK 'to complete the configuration. You can now communicate with WIZ-IP20 modules.

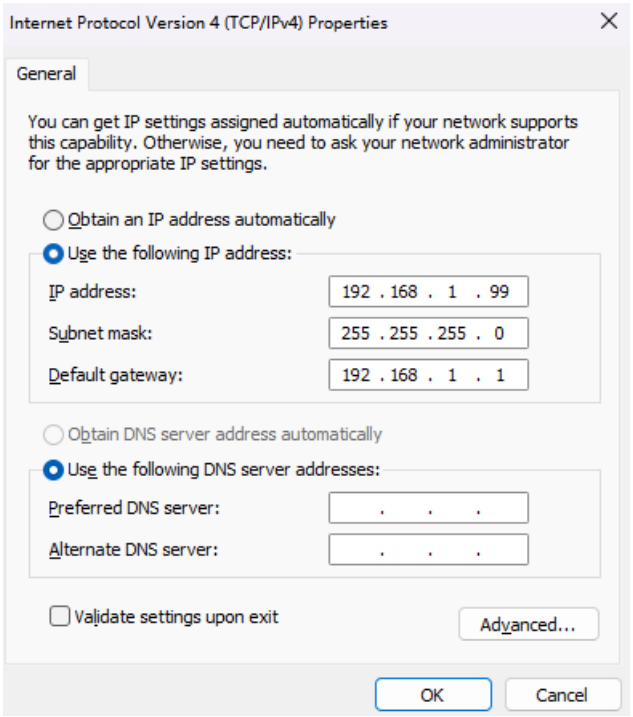


Figure 5-1 Windows 10 IP address setting interface

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6 WIZS2E Config Tool software configuration

WIZS2E Config Tool is a upper computer configuration software that runs on the Windows operating system and is compatible with WIZ-IP20 and W5500S2E series serial port to Ethernet modules. Users can easily search, view, and configure various functions and information of the WIZ-IP20 serial port to Ethernet module through WIZS2E ConfigTool.

Note: It is recommended to turn off the firewall before configuration and ensure that the IP addresses of all modules in the local area network do not conflict.

6.1 Obtain module configuration information

6.2 Modify module configuration information

6.3 Reset module

6.4 Practical functions

6.4.1 Switch network card

6.4.2 Right mouse button

6.5 Factory reset

If users need to restore the WIZ-IP20 serial to Ethernet converter to its factory settings, there are three methods:software mode, AT command mode and web page.

6.5.1 Restore software to factory settings

6.5.2 Restore factory settings through AT command

Refer to Chapter 7 for details on the "DEFAULT" command.

6.5.3 Web page format

Please refer to Chapter 8.5 for an introduction to the module management interface.

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7 Introduction of AT commands

7.1 AT command overview

The AT command supported by WIZ-IP20 serial to Ethernet modules is a standard interface that is not case sensitive and always starts with "AT" and ends with "\r\n". The format of its commands, return values, and parameters is fixed. Generally speaking, AT commands have the following formats:

7.2 AT command responds

According to the different AT commands input by the user, WIZ-IP20 will reply with the execution results of the commands, as shown in Table 7-1.

7.3 Entering AT command Mode.

There are two operating modes for WIZ-IP20 serial to Ethernet modules: AT command mode and data transmission mode. In AT command mode, users can use serial tools or configure various parameters of the module through their MCU, and also support data transmission under AT commands.

Note: If a TCP connection is established before entering AT command mode, the connection will be closed when entering AT command mode.

When WIZ-IP20 is in AT command mode, input the terminal detection command "AT\r\n" to its serial port. If the module correctly receives "AT\r\n", it will reply with "OK\r\n".

When WIZ-IP20 is in data transmission mode, any AT command input to the serial port is invalid. At this point, input "+++" to the serial port, and WIZ-IP20 will switch to AT command mode.

Input rule for "+++": Three "+" must be sent continuously to the serial port at once, and there must be no other characters within 1 second before and after the "+++" in order for WIZ-IP20 to respond correctly and switch to AT command mode.

Note: The default operating mode of WIZ-IP20 at the factory is AT command mode.

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7.4 AT command list

7.4.1 AT settingcommand list

7.4.2 AT Data Transmission Command List

7.5 Detailed description of AT configuration command

7.5.1 Control command

7.5.2 module information configuration command

7.5.3 Serial port information configuration command

7.5.4 Management commands

7.6 Detailed description of AT data transmission command

7.7 AT command script examples

7.7.1 TCP server mode script example

7.7.2 TCP client AT command mode script example.

8 Web configuration

8.1 Login page

8.2 Basic settings

8.3 Channel configuration

8.4 Firmware information

8.5 Module management

9 Restore factory settings

9.1 Upper computer software mode

9.2 AT command mode

9.3 Web page format

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10 Firmware upgrade

10.1 Firmware upgrade by WIZS2E ConfigTool

10.2 Firmware upgrade by web page

11 Appendix

11.1 Default list of occupied ports in Ethernet protocol

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Product Repair Procedure

WIZnet HK promises to provide a one-year free warranty service for WIZ-IP20 equipment. Within one year from the date of purchase of WIZ-IP20 equipment, if there are any product quality problems during normal use, users can repair them through the following procedures:

1 Provide proof of purchase.

2 Obtain repair permit from WIZnet HK or distributor.

3 Fill out the product problem report form and provide as much detailed information as possible about the reason for repair and the symptoms of the malfunction, in order to reduce repair time.

4 Pack the equipment, send it to the designated repair address, and attach the product problem report form.

The following are not covered by the warranty. For damages caused to the product that are not covered by the warranty, we will only charge the cost of the components appropriately:

1 Damage to the product caused by human or force majeure factors.

2 Unable to provide proof of product purchase.

3 products with a warranty period exceeding one year.

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Product Problem Report Form

Corporate name			
Contacts		Contact Number	
Email		purchasing date	
PRODUCT MODEL		serial number	
notes			

Problem description: (Please provide a detailed description of the problem that occurred and list all the error messages you have seen in detail)

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WIZ-IP20 modules are high-tech products that may contain certain design defects or undiscovered errors. Once discovered, they will be included in the errata and may result in differences between the product and published specifications. If requested by the customer, the latest errata sheet can be provided.

Before ordering products, please purchase from WIZnet HK or designated distributor through the contact information provided on the "Sales and Service" page of this document and obtain the latest specifications.

For more relevant information, please visit the official website of WIZSE S2E at:https://wizse.com/

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Declaration

Application Information

The cases or intentions in this application information are hypothetical and only intended to help users familiarize themselves with the product's features and usage methods. Customers must make modifications and validate based on the characteristics of their product before developing it.

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