InDTU332N
User Manual

InHand Networks
www.inhandnetworks.com

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Preface

Thanks for choosing InDTU332N series industrial products! This user manual will guide you in detail how to use this industrial cellular modem.

Readers

This manual is mainly intended for the following engineers:

- Network planner
- Field technical support
- Network administrators

Conventions

This manual uses the following conventions:

Conventions	Indication
Bold Characters	Window name, menu name and button name are in bold characters. For example, the pop-up window **New User**.
>	A multi-level menu is separated by the double brackets ">". For example, the multi-level menu **File > New > Folder** indicates the menu item **Folder** under the sub-menu **New,** which is under the menu **File.**

Symbols

The meanings of the symbols are as follows:

Caution

Means reader be careful. Improper action may result in loss of data or device damage.

Note

Notes contain detailed descriptions and helpful suggestions.

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Contents

1 Product Overview

1.1 System Application

InDTU332N uses the wireless cellular network to complete remote data collection and transmission, thus enabling remote monitoring in the industrial field. InHand Networks provides an integral solution that allows users to implement high production efficiency with minimal investment. The typical network topology is shown as below.

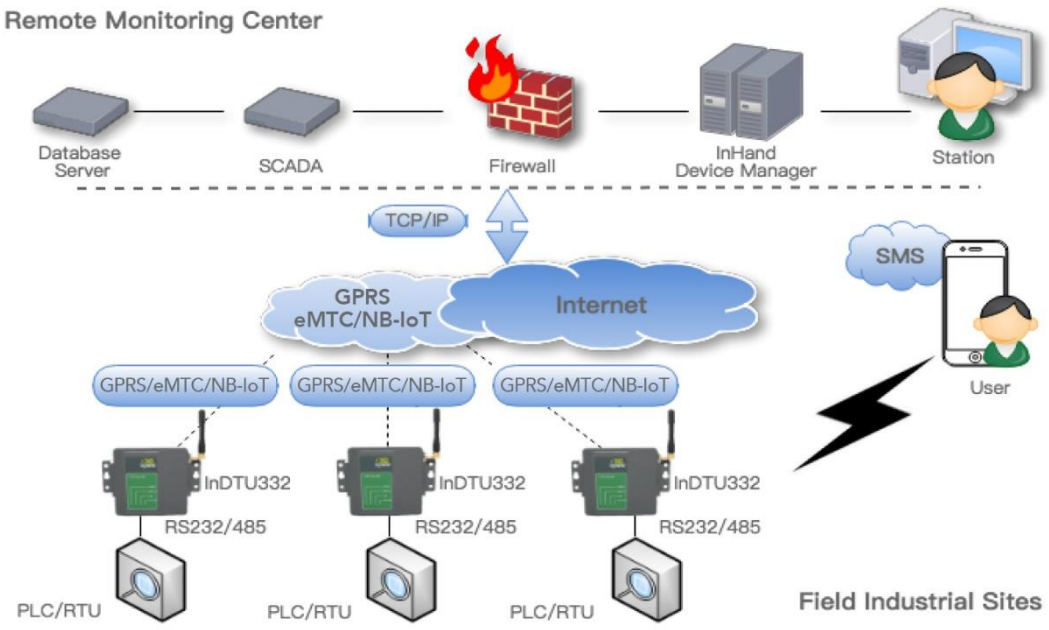

Figure 1-1 network topology

1.2 Function Description

1.2.1 Hardware

The InDTU332N is based on a high-performance microprocessor that integrates a wireless module for wireless communication. It supports a variety of industrial bus protocols, with good scalability. It is widely used in various fields such as remote data collection, remote monitoring, and field control.

It has the following features:

- Compact and easy-to-install design
- Moisture proof, anti-interference design
- Voltage range +5 to 35 V DC, meeting industry requirements
- Industry-level temperature range: -40℃ to +70℃

Figure 1-2 shows the hardware structure of InDTU332N.

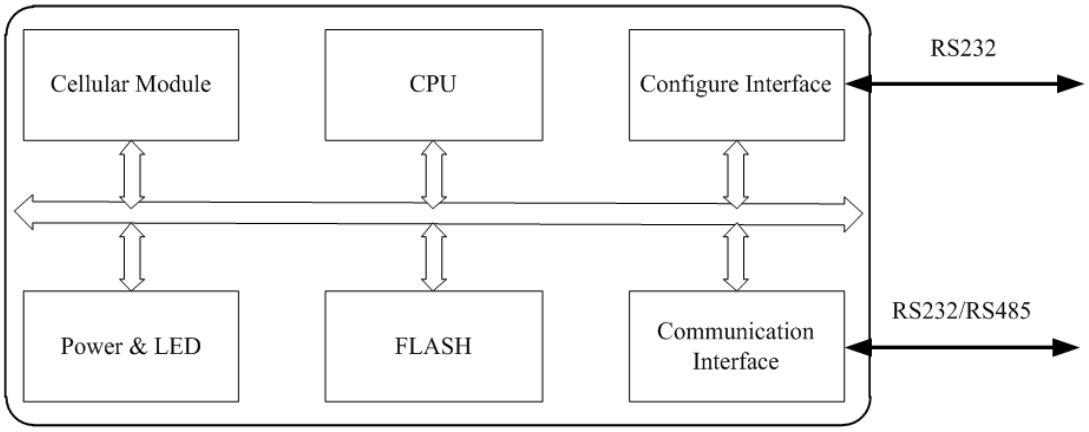

Figure 1-2 hardware structure

1.2.2 Software Functions

InDTU332N implements wireless data communication between the serial port device in the remote station and the central control system. The main functions are as follows:

Table **1-1** Basic functions

Function	Description
Network	InDTU332N support eMTC/NB-IoT (LTE Cat M1/NB1)
Serial port	Special configure tool is DTU Tool, can configure DTU by any of serial port
Status	Displays running status using LED.
Mounting mode	wall-mounting
Data transparent transmission	Transmits application data transparently in two directions.
Long connection	DTU will actively dial up and establish a PPP link.
Short connection	DTU does not actively dial up and establish a PPP link. According to different configurations, there will be different activation policies, and dialing and networking will start after activation.
Local data active	In short connection mode, the network can be activated via local data transmission when the device is in hibernation
Phone active	In short connection mode, when the device is in hibernation, the network can be activated by phone call. InDTU332N does not support this feature.

SMS active	In short connection mode, when the device is in hibernation, it can be activated by receiving SMS InDTU332N does not support this feature.
Auto active	Start timing when entering sleep mode, reach the scheduled time, then re-dial up
Auto offline	Start timing from the successful dialing, and when the scheduled time is reached, restart the communication module and enter the sleep mode.
Log	Enables the log function to output logs through the serial port, helping engineering personnel observe the device running status.
Multi-serial port communication speed	Baud rate: 1200-115200 bps
RS 232/485	Supports RS 232/485 communication. Depends on the device model.
Software watchdog	Prevents accidental crash.
Hierarchical user authentication	Supports two user levels: administrator and common user. Default administrator user name/password: adm/123456; Common user name/password: guest/123456.
Real-time clock	Upon power-off, a built-in super capacitance powers the RTC to avoid the loss of system time. The power must persist for more than two hours; otherwise, the clock is restored to the system time. Only some models support this function.
Factory settings restoration	Clears settings and writes default settings. This function is implemented by configuration program.

Table **1-2** Network functions

Function	Description
PPP	Point-to-point dialing protocol.
CHAP	Authentication mode.
PAP	Authentication mode.
Automatic authentication.	Uses PAP and CHAP in turn. When a client requests to go online, DTU performs PAP authentication first. If the authentication fails, DTU performs CHAP authentication. If the authentication fails again, DTU performs PAP authentication. The preceding procedures are repeated.
PPP echo	Maintains the connection between DTU and carrier network, preventing forcible dormancy and detecting the stability of dialing connection.
ICMP detection	Maintains the connection between DTU and peer host.
Application layer echo	Detects the connection with application server by monitoring the heartbeat at application layer. Eg. TCP keep-alive or user-define packet.

Table 1-3 Advanced functions

Function	Description
Upgrade	Locally upgrade by serial port or remotely upgrade by IP network
Import/export	Exports configuration to files or imports configure file to device.
Log storage	Stores key logs to the Flash memory, which can be read by using configuration tool or serial port.
DM remote network management	Once enables the DM function, Through the DM platform, you can read and update its configurations, read device status, perform remote upgrade, and locate the base station.
RTOOL	Remotely update the DTU firmware or configuration by RTool. The network should be accessed between RTool side and DTU when using this function.
55 AA command	Please refer the IHDMP user manual
Short message management	Supports remote configuration, forcible login, status query, and reboot.
Multi-center	Supports multiple IP centers in poll or parallel mode. The application cernter IP center must be configured firstly, and then configure the extended center in sequence.

Caution

The DM platform, for the use scenarios of the mainland and overseas, the corresponding domain names are http://c.inhand.com.cn and http://g.inhandnetworks.com; the platform also supports setup or install on the client's private server.

2 Install and Power on

2.1 InDTU332N Installation

InDTU332N is housed in a snap-type plastic shell. Figure 2-1 shows:

Figure 2-1

Open the case, slide the top cover, insert the SIM card correctly, and then close the top cover, as shown in Figure 2-2.

Figure 2-2 Installing SIM card into InDTU332N

Connect the antenna, the cables for serial interface and DC power cable, as shown in Figure 2-3.

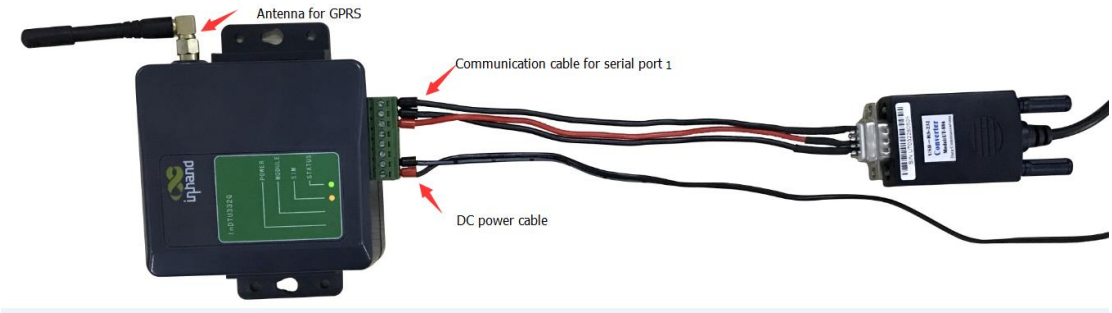

Figure 2-3 InDTU332N wiring

Table **2-1** Interface terminal description

Pin	Function	Remarks
GND	Digital ground	Provide serial port grounding.
TXD/485-	RS232 sending or RS485-	RS232 or RS485 depends by device
RXD/485+	RS232 receiving or RS485+	
RXD2	RS232 data receiving	
TXD2	RS232 data Transmiting	
GND	Digital ground	Provide serial port grounding.
V-	Power Negative	Support 5 V DC to 35 V DC input, with ripple wave lower than 100 mV.
V+	Power Positive	

The interface terminal of InDTU332N is shown as below:

Figure 2-4 InDTU332N interface

2.2 LED Indicator

After the device is powered on, the DTU will automatically run continuously according to the configuration, and complete related operations. During this process, the device's indicator light will indicate different operating states, as shown in the following table:

DTU status	Power	Modem	SIM indicator	Status indicator
Power on	On	Spare	Off	Off
Dialing..., no fault.	On		Off	Off
Dialing..., fault.	On		Off	On
Dialing is successful, and connecting center.	On		On	Off
Dialing is successful, but failed to connect to center.	On		On	On
Connected to the center.	On		Blinking slowly with the same frequency	
Short connection to be activated.	On		Off	Blinking slowly
SIM card is faulty.	On		Blinking slowly	On
In TROY mode.	On		Blinking fast alternatively	

3 Quick Start

3.1 View Real-Time Logs

Run the configuration tool DTU Tool and log into the device via serial port 2 of the DTU, as described in section 5.1.

Select the “Advance mode” in DTU Tool, then Click "Settings>>Other " to configure the Debug Level and Debug mode as shown below.

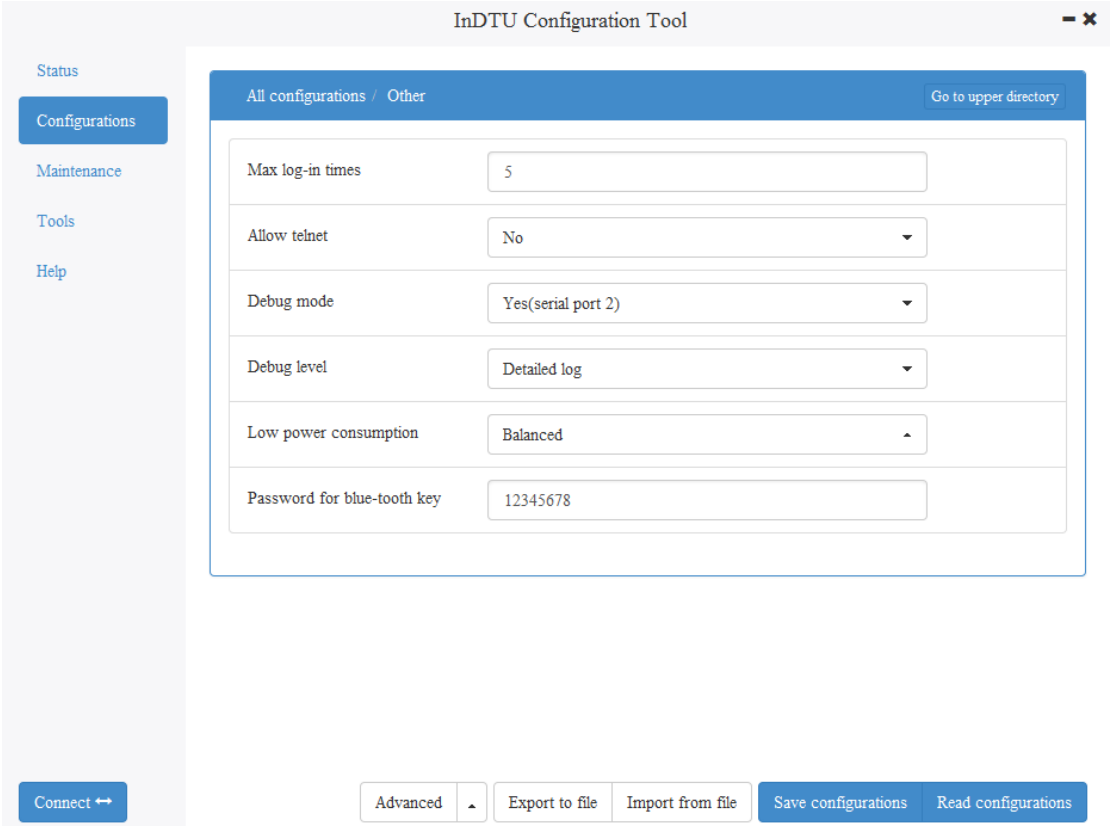

Figure 3-1 the configure about debug mode

Log in the configuration tool. Choose “Maintenance > Real-time log”. To display real-time logs, click “Start reading”. Wait for several seconds, and the logs are displayed. To stop updating the real-time logs, click “Stop reading”. To delete all displayed logs, click “Clear Screen”. To export displayed logs, click “Export log”, as shown in Figure 3-2.

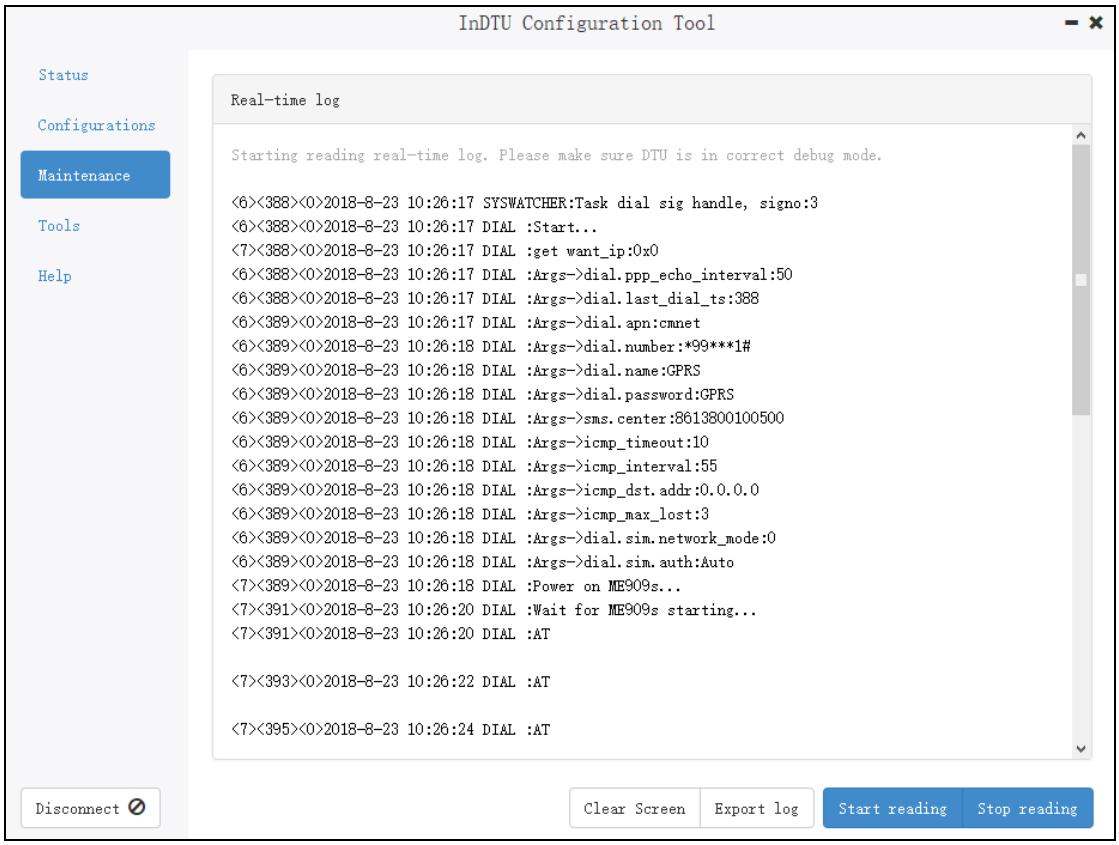

Figure 3-2 Viewing real-time logs

3.2View History Logs

Choose “Maintenance > History log”. To read the logs stored in Flash memory, click “Start reading”. To stop reading the logs stored in the Flash memory, click “Stop reading”. To delete all logs stored in the Flash memory, click “Erase log on DTU”. To export all logs stored in the Flash memory, click “Export log”, as shown in Figure 3-3.

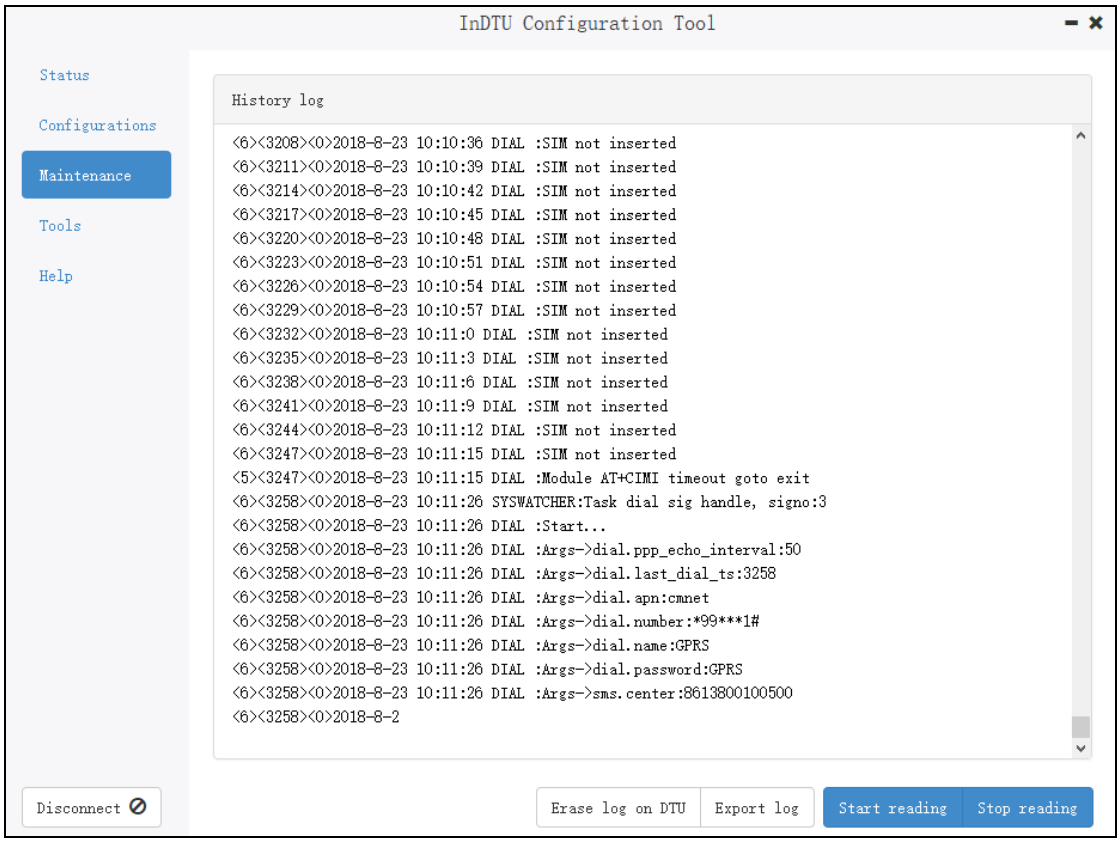

Figure 3-3 Viewing history logs

3.3Import/Export Configuration

DTU supports below 2 types configuration file:
The .ini file is a plain-text file with comments and easy to read/view.
The .cfg file is a binary file with a smaller file size.

After establishing a connection with the DTU through the configuration tool and logging in. Click the <Export to File> or <Import from File> button to export or import the configuration file, as shown in Figure 3-4.

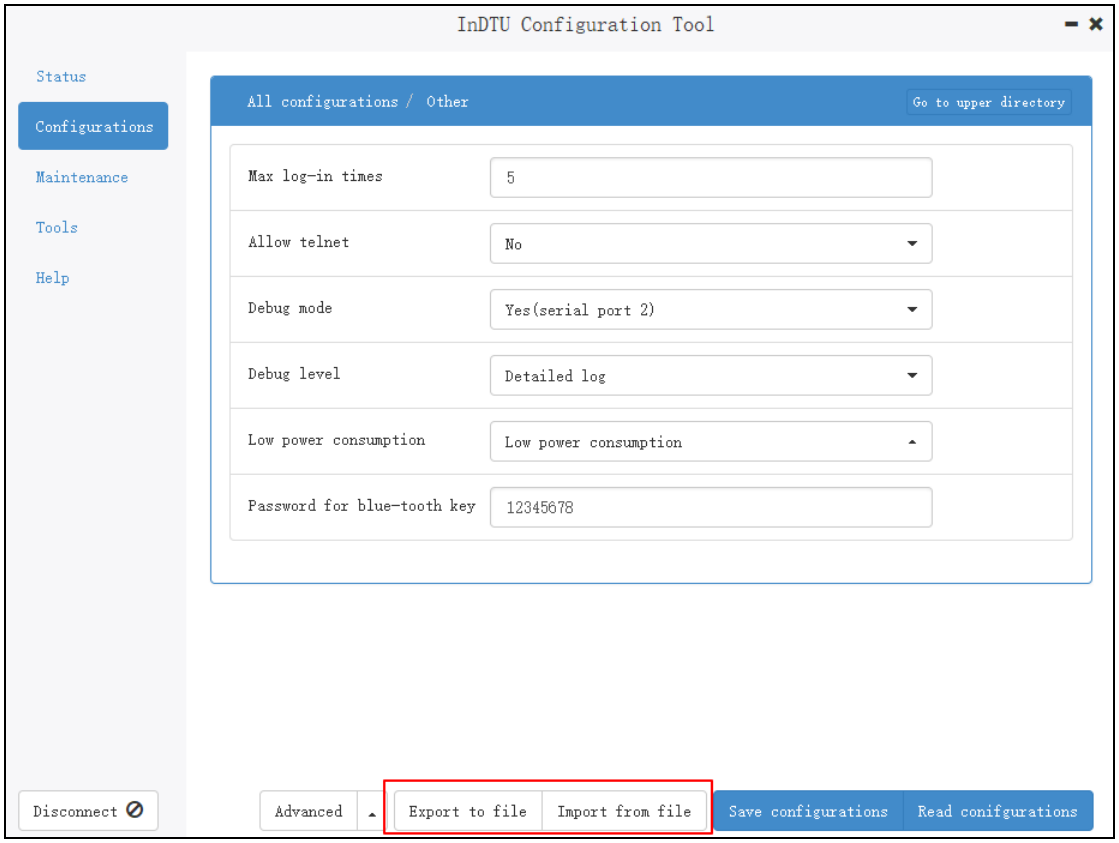

Figure 3-2 Importing/Exporting configuration

Note

After importing the configuration file, click **Save configurations**. The parameter settings take effect after a restart.

3.4Upgrade Device

Choose “Maintenance > Upgrade firmware”.

(1) Select a new DTU firmware to upload, as shown in Figure 3-4;

(2) Click the "Upgrade" button to start the upgrade, and its progress bar is displayed, as shown in Figure 3-5;

(3) Popup a message box to remind you restart the device, as shown in Figure 3-6;

(4) The DTU device will establish a connection with DTUTool again, log into the device, and check the firmware version currently in effect in the status bar to confirm whether the upgrade is successful, as shown in Figure 3-7.

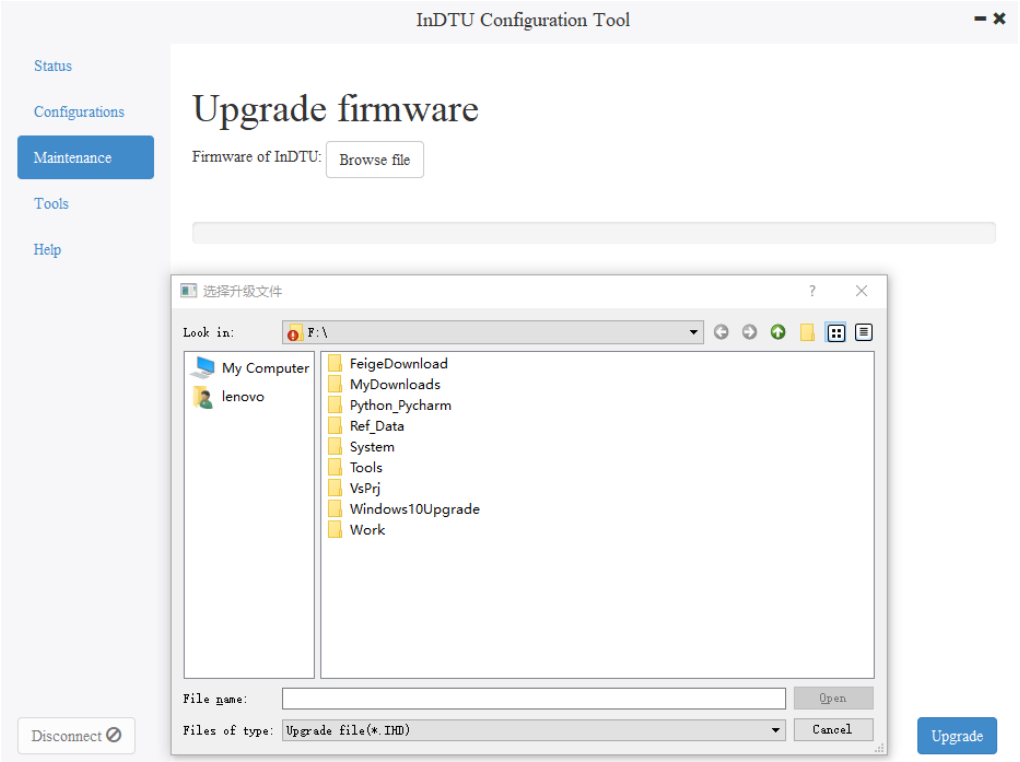

Figure 3-4 select firmware

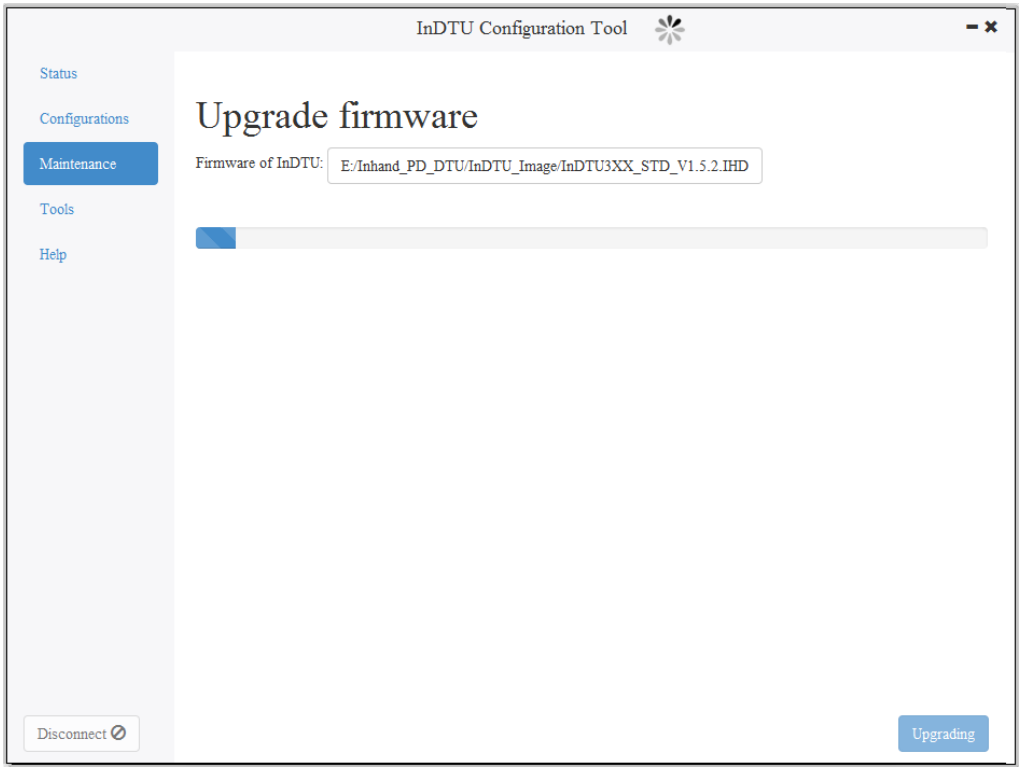

Figure 3-5 upgrade firmware

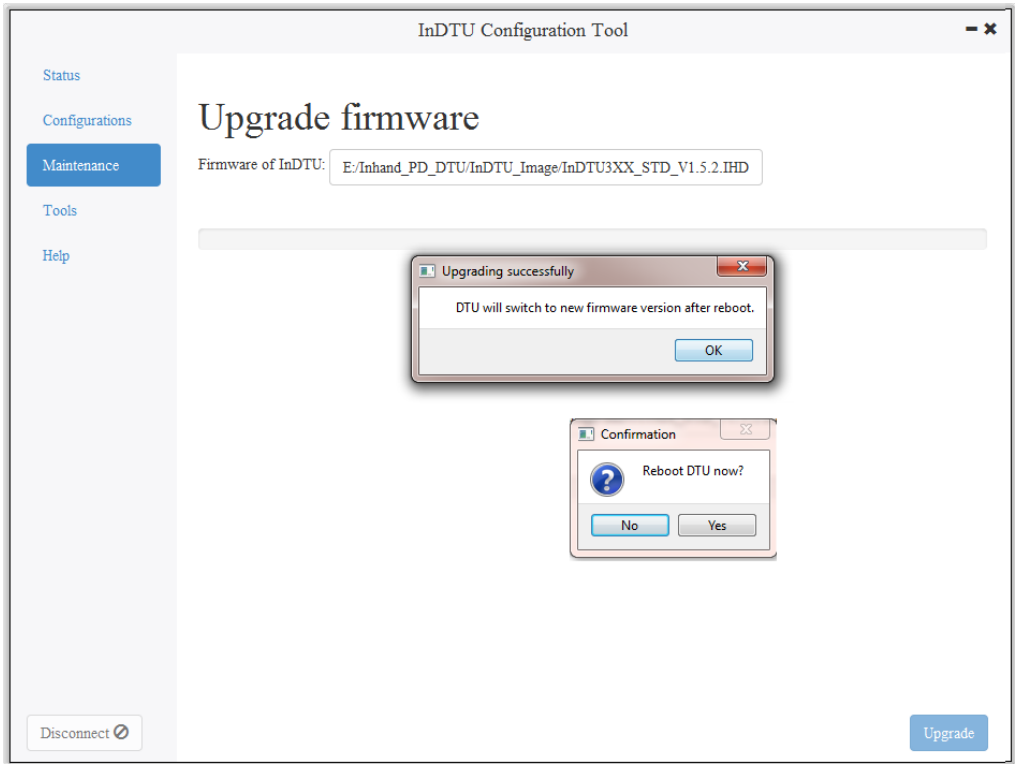

Figure 3-6 popup after upgrade

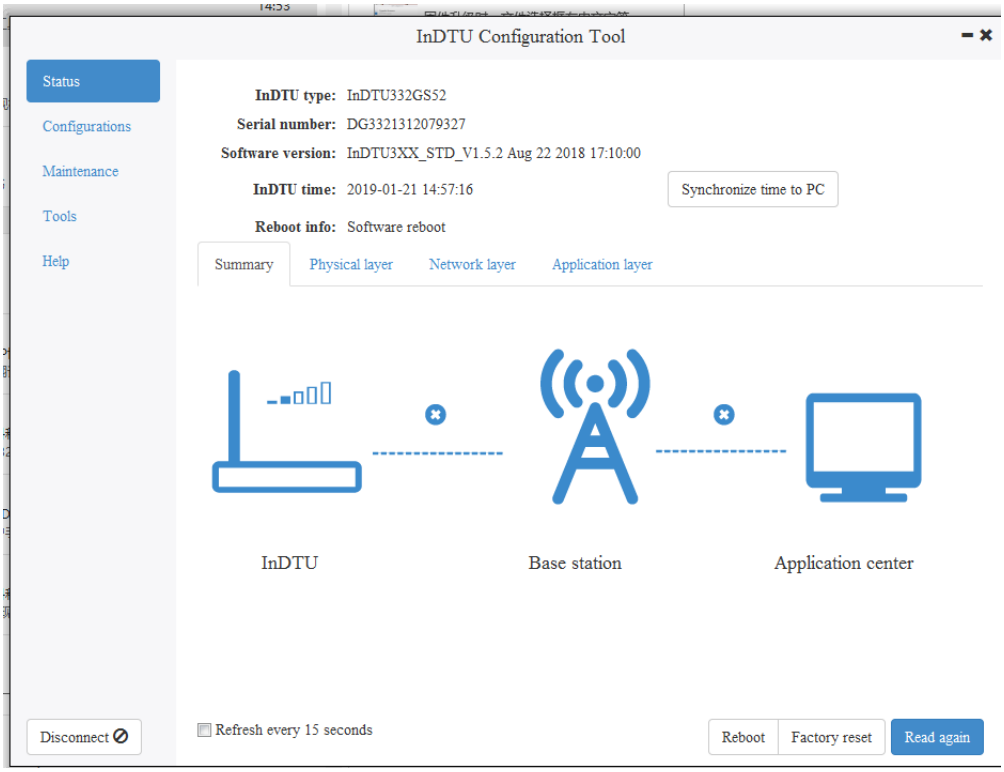

Figure 3-7 confirm the upgrade result

4 Parameter Settings

4.1 Local Serial Port/Serial Port 2

The DTU serial port parameters should be the same as the serial port parameters of the peer device connected to the serial port.

Table **4-1** Parameter settings for serial port

Parameters	Description	Default
Baud rate	1200, 2400, 4800, 9600, 14400, 19200, 38400, 57600, or 115200, in bps	9600
Data bit	5, 6, 7, or 8	8
Stop bit	1, 1.5, or 2	1
Parity	None/odd/even	None
Scan interval	Retain the default value.	2
Response timeout	Retain the default value.	5
Max frame size	1024 by default, range: (10-1024)	1024

4.2 Work Mode

According to the below table, set the parameters of the working mode of the DTU, such as the connection mode and activation mode.

Table **4-2** Setting DTU working mode

Parameters	Description	Default
Connection type	Long connection or short connection	Long connection
Phone active	Enable or disable phone active	Enabled
SMS active	Enable or disable SMS active	Enabled
Local data active	Enable or disable local data-flow active	Enabled
Auto active interval	5-1440 minute	0
Auto offline interval	0~60 minutes, the minimum setting time is 1 minute If set to 0, it will automatically adapt to the 1 minute.	0
GPRS/SMS	GPRS or SMS link.	GPRS
Transmit received SMS to serial port	Enable or disable the function. If enabled, received messages are transmitted to the working serial port.	Disabled
Configuration mode	Packet mode or stream mode.	Stream mode

4.3 GPRS Dialing

Table **4-3** Setting GPRS dialing parameters

Parameters	Description	Default
Auto dial	Enable or disable auto dial.	Yes
PPP echo interval	30 to 3600 seconds.	50
Redial interval	0 to 3600 seconds.	60
Max redial times	Once consecutive failed redial times reach to the predefined limit (1-10), the device will automatically hot restart.	3
Dual SIM mode	Enable this function before use SIM No.2. This parameter is invalid for single-card version of DTU	Close
Switchover card when fail to connect center	This parameter is invalid for single-card version of DTU	Close
SIM card	The associate parameters about each SIM	
GPRS dial number	The dial number to access the special cellular network	*99***1#
APN	Access Point Name	cmnet
APN user name	Account for login the APN	gprs
APN password	Password for login the APN	gprs
Authentication mode	Auto/PAP/CHAP	Auto
Network mode	Auto/4G/3G/2G	Auto
Local APN settings	Default setting about SIM, suitable for LTE 4G.	

4.4 Application Center

Table **4-4** Setting application center parameters

Parameters	Description	Default
DTU ID	Custom device identification number. It supports 11 digits number.	0001
Application center	The IP address, port number, and domain name of the center. If the IP and domain name are configured, configure one only.	0.0.0.0/ empty/0
Application center link mode	TCP, UDP, DCTCP, DCUDP, or Modbus bridge The custom heartbeat frame for link maintenance is recommnad when using UDP.	TCP
Max retransmit times	0 (TCP automatically retransmits data times)	5
Forced DC heartbeat	This function will take effect only for DC protorol. “OFF” means that heartbeat will sleep when transmitting data; “ON” means that heartbeat always work even transmitting data;	OFF

Application center heartbeat (min)	The value ranges from 1 to 60, The application center and extend center will share this parameter.	1
Application center heartbeat (s)		0
DNS IP1	The IP address of a dedicated DNS server.	8.8.8.8
DNS IP2		
SNTP service	Enable or disable the SNTP service. The default time 1970-1-1.	Disabled
SNTP server IP	IP address or domain name for SNTP server.	time.nist.gov
Exchange local serial ports	“OFF” means that serial port No.1 is working port, port No.2 is for debug; “ON” means that exchange the role of port 1 and port 2.	OFF
Local TCP server port	Set the listening port for the TCP server. If the value is 0, this feature (TCP server) is disabled.	8888

4.5 Multi-application Center

When using multi-application center, enter the IP addresses, domain name and port numbers. The connection types and heartbeat interval for extend application center will share same parameters with application center.

Caution

For unused extend application center, the IP address should be default,0.0.0.0, its domain name is empty.

In order to ensure the efficiency of the equipment, we recommend that no more than 3 centers are connected at the same time.

4.6 Multi-center mechanism

Table **4-5** Setting multi-connection policy parameters

Parameters	Description	Default
Min reconnect interval	Set the minimum interval at which TCP/UDP connection is set up again.	15
Max reconnect interval	Set the maximum interval at which TCP/UDP connection is set up again.	60
Poll/parallel	Parallel：sending data to each center simultaneously; Poll: the prioprity of excute, application center> application center 2> application center 3> application center 4> application center 5	Poll

4.7 Other Settings

Table **4-6** Setting application extension parameters

Parameters	Description	Default
Max log-in times	Max login times	5
Allow telnet	Enable or disable telnet funcation	No
Debug mode	Yes or no. If yes is selected, you can view the DTU running logs by using the serial port tool. This setting take effect immediately, the restart is unnecassary.	No
Debug level	detailed log, Chinese brief log, and English brief log.	Detailed log
Low power consumption	Low power consumption, balanced, and high performance. Only some models support the low power mode.	Low power consumption

Caution

Because DTU will generate real-time logs in debug mode , turn off this feature, the device will run better.

4.8 InHand Device Manager (DM) platform

Table **4-7** Setting platform parameters

Parameters	Description	Default
SN	Set a 15-bit character string for the network management platform to identify the device. It is defined when manufacture, cannot be modified.	Empty
DM mode	Only SMS, SMS + IP, or disabled.	Only SMS
White List	The trusted list for accessing DTU, the DTU will interact with white list phone number by SMS. If the list is empty, it will receive the SMS of anyone.	Empty
DM ID	Enter the device ID used by the platform to identify the device.	0
DM address	IP address 、 Doamin name and port number for DM	0.0.0.0/g.inhandnetworks.com/20003
Heart beat interval	Set the heartbeat interval between the DTU and the platform. The value ranges from 30 to 600 seconds.	120
Update interval	Set the update interval about DTU state information between the DTU and the platform. The value ranges from 1 to 65535 seconds.	3600

4.9 Administrator Account

Table **4-8** Setting administrator login parameters

Parameters	Description	Default
Administrator	Set the administrator account name.	adm
Administrator password	Set the password for the administrator account.	123456
Common user	Set the name of the common user.	adm
Common user password	Set the password for the common user.	123456

4.10 ICMP

Table **4-9** Setting ICMP parameters

Parameters	Description	Default
RRC link Miantance	Maintain the link between the communication module and the base station	Close
Detect interval when network broken	Range 10~120 seconds, only for dual-SIM DTU. If there is no communication data flow at this time interval, ICMP detection will start.	10
ICMP host	The destination IP address for ICMP If the IP is empty, the application center IP will be detected by ICMP.	0.0.0.0
Max lost packets	If the times of consecutive ICMP failure reaches this limit, DTU will redial.	3
ICMP detect interval	1 to 3600 seconds	55
Forced ICMP detect	“OFF” means that ICMP will sleep when transmitting data; “ON” means that ICMP always work even transmitting data.	OFF

4.11 User-Defined Packets

Packet types: ASCII, HEX, and DC.
ASCII type means that the packet uses ASCII characters.
HEX type means that the packet uses HEX characters.
DC type means that packet content will adopt the same format with DC message.

Table **4-10** Setting user-defined packet parameters

Parameters	Description	Default
Log-in	The data content and format of submitted packet form DTU to application center when login	Empty
Log-in ack	The data content and format of responsed packet form application center to DTU when login	Empty
Heartbeat	The data content and format of heartbeat packet form DTU to application center after connected	Empty
Heartbeat ack	The data content and format of heartbeat packet form application center to DTU after connected	Empty
Log-out	The data content and format of submitted packet form DTU to application center when log-out	Empty
Log-out ack	The data content and format of responsed packet form application center to DTU when log-out	Empty

Caution

The user-defined frame is valid only when the connection type is TCP or UDP. It is recommended that the login frame and the login ack frame must be used in pair. The heartbeat frame and the exit frame are same condition.

5 Common usage and Examples

5.1 Base Configuration

Connect serial port 2 to the PC through a serial cable and power on the device.

Step 1: Launch and log into the DTU via configuration Tool.

Click <Connect>. In the pop-up dialog box, enter the user name and password (initial user name and password are adm/123456). Select a serial port, set the serial port parameters such as baud rate, and click <Connect>, as shown in Figure 5-1.

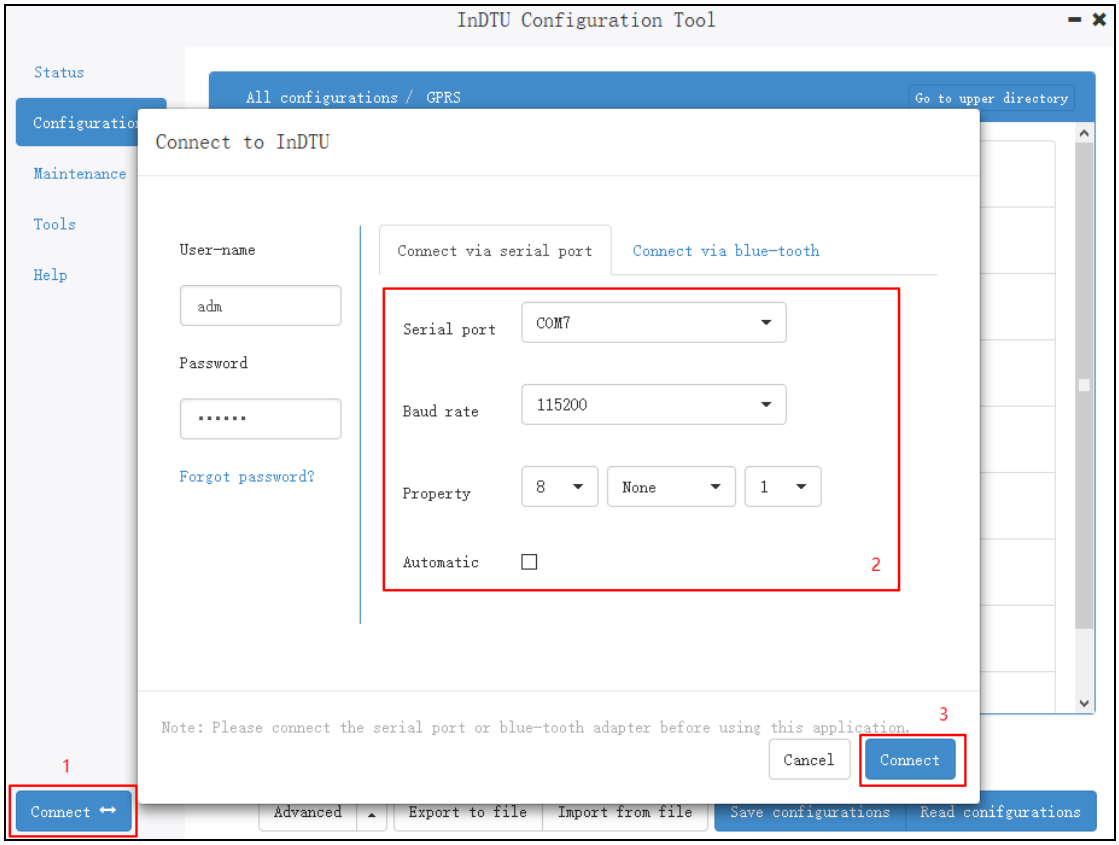

Figure 5-1 Login DTU

After a successful login, the device automatically reads the DTU parameters, and then we can start to set the parameters.

Step 2: Set the local serial port parameters.
Ensure that the local serial port parameters are the same as the serial port parameters of the device connected to DTU.

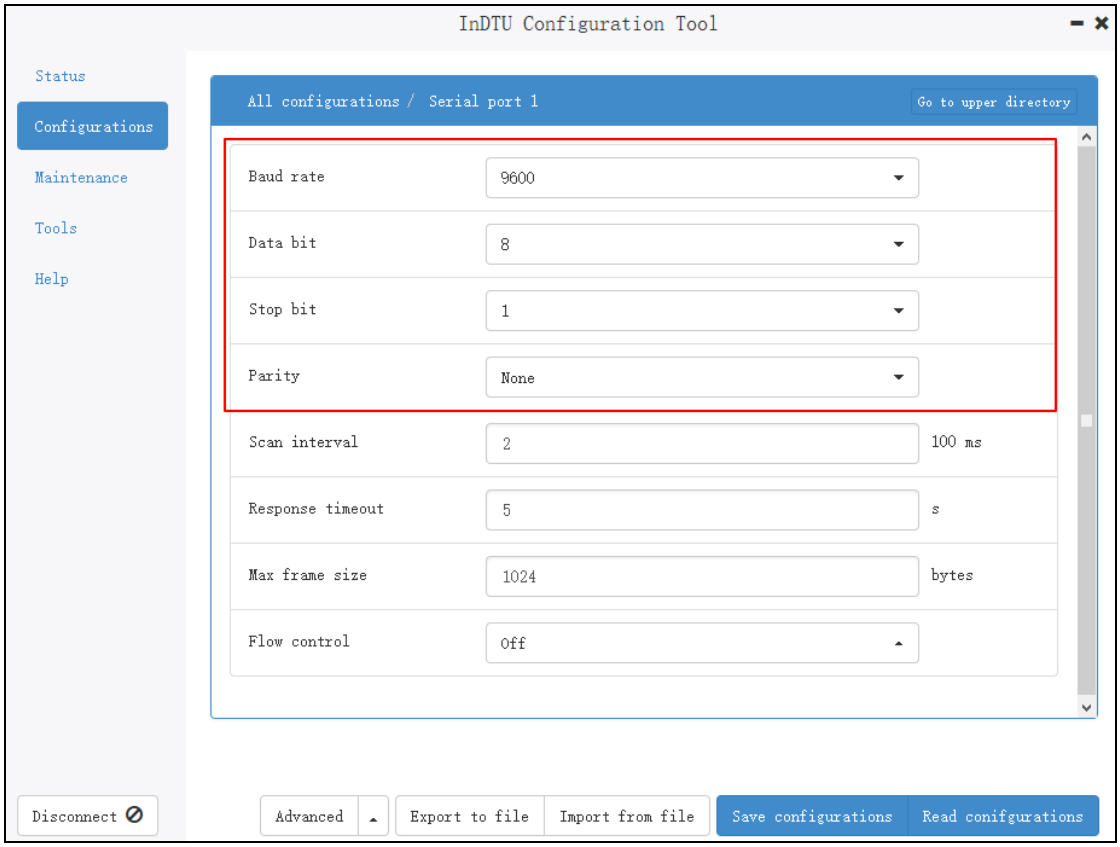

Figure 5-2 Local serial port parameters

Note

When the device act as a client, set the parameters of local serial port. When the device act as a TCP server, set the parameters of local serial port No.2.

Step 3: Click “Configuration>>GPRS” to modify parameter settings.
For example, the APN, and user name/password for dialing.

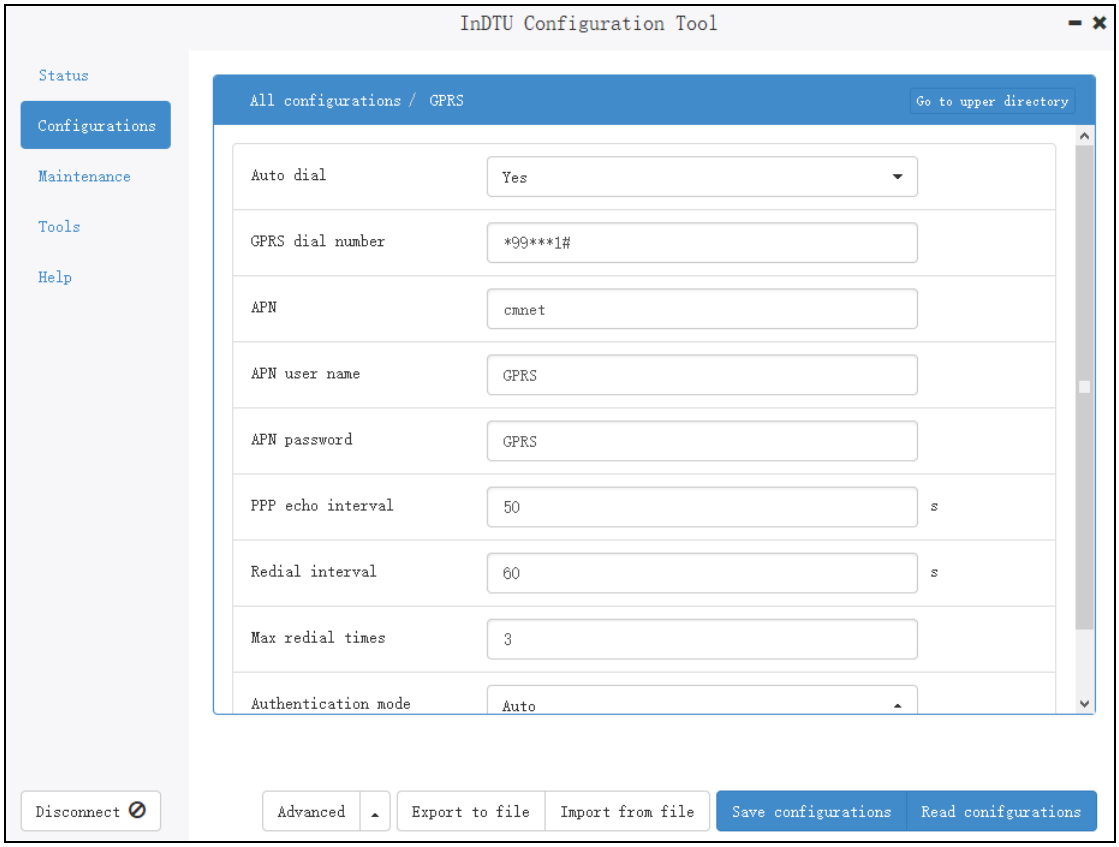

Figure 5-3 Dialing parameters

Step 3: After the parameters are set, click <Save configurations>. The parameter settings take effect after restart.

Note

1. After a login, you can start to modify parameters only when the system prompts that the configuration is successfully read.
2. After setting parameters, click “Save configurations” and restart the device. The parameter settings change will take effect after a restart.

5.2 Transparent TCP

5.2.1 Parameter Settings

Step 1: See chapter 5.1 Base Configuration.
Step 2: Click “Confgigurations>>Application center”, Select TCP for the “Application center link mode”, as shown in Figure 5-4.

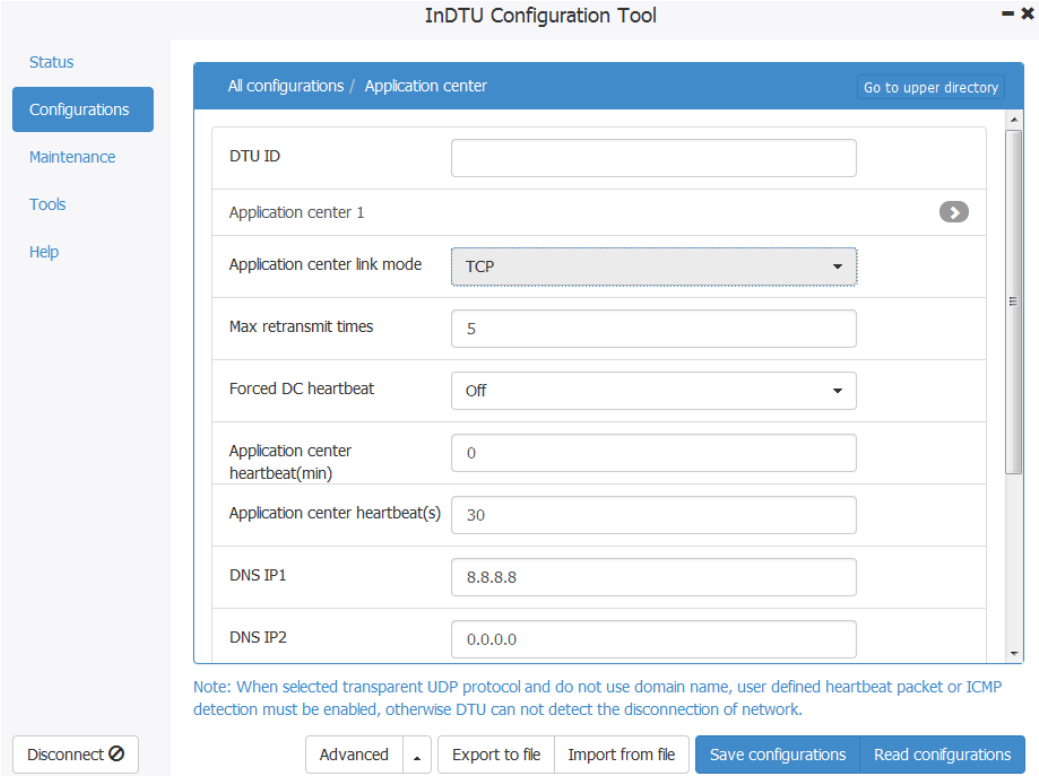

Figure 5-4 TCP setting 1

Step 3: Choose “Confgigurations>>Application center”. Set IP, Domain name, and Port, as shown in Figure 5-5.

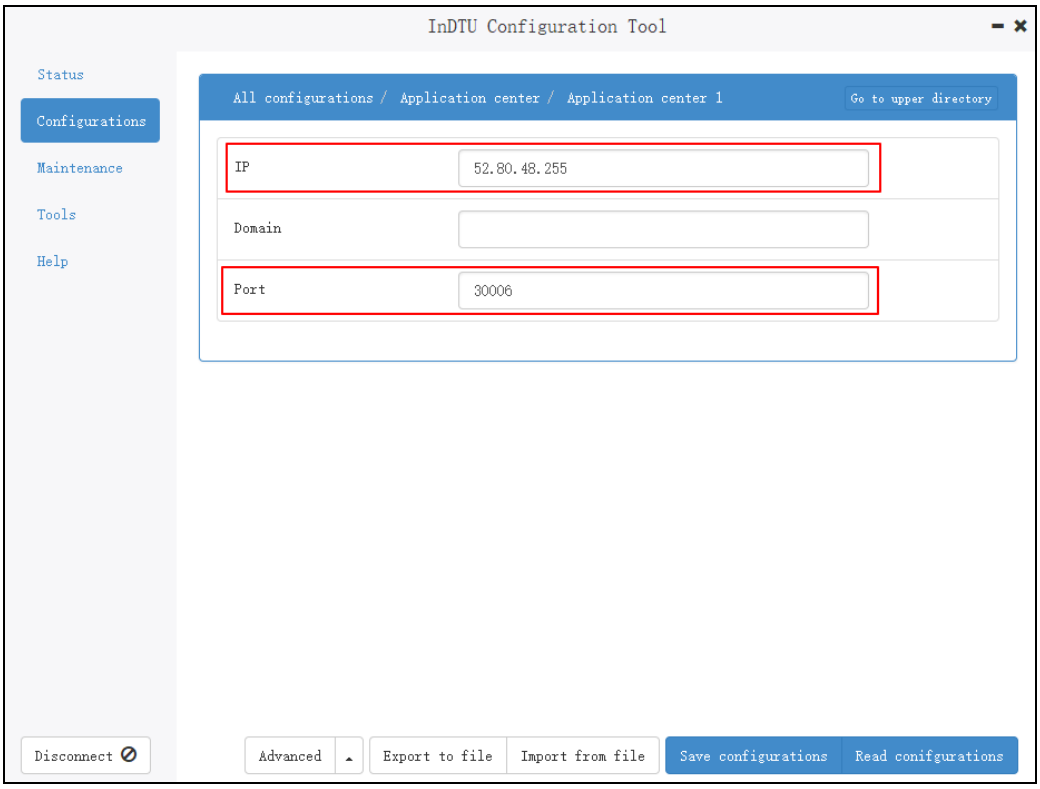

Figure 5-5 TCP setting 2

Step 4: After the parameters are set, click <Save configurations>. The parameter settings take effect after a restart.

5.2.2 Demonstration

Use a PC as the center to demonstrate the communication between DTU and center.

Step 1: Set parameters according to 5.2.1 Parameter Settings.
Step 2: Launch **TCP Client Server** to create a server. Use the PC as the center. Enter the TCP port number of the PC in **Port** and click **Listen**, as shown in Figure 5-6.

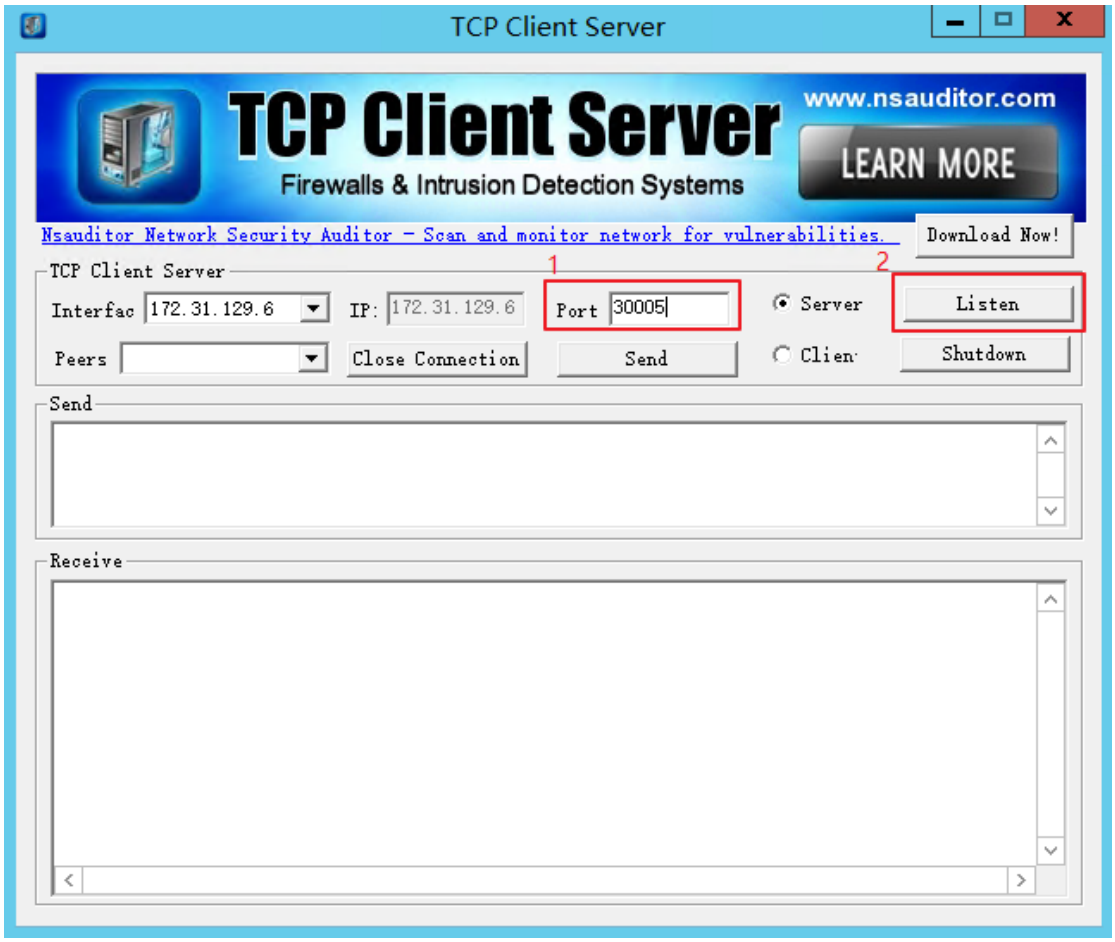

Figure 5-6 TCP Example 1

Step 3: You can see that the device is successfully connected on the TCP Client Server page. Enter content in the Send box and click Send, as shown in Figure 5-7. The center then sends data to the DTU.

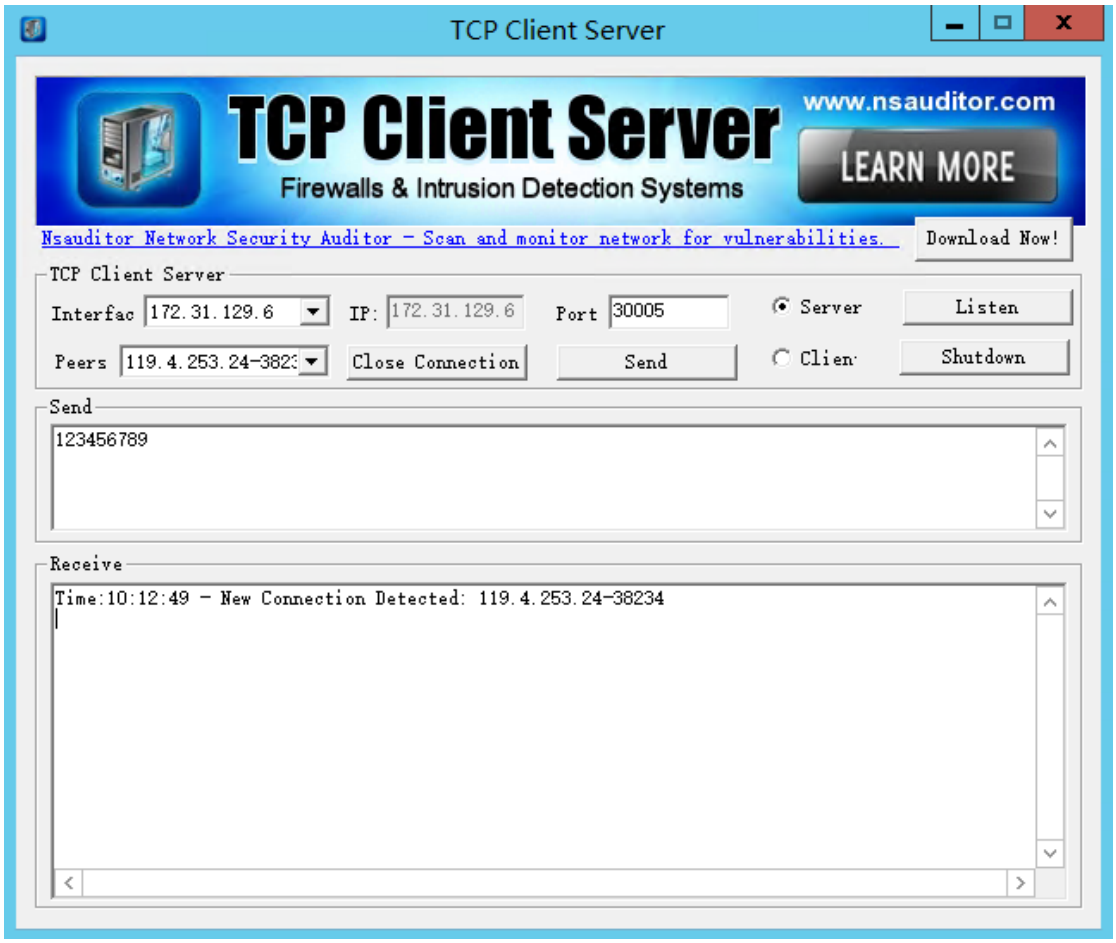

Figure 5-7 TCP Example 2

Step 4: Connect serial port 2 to the PC with a serial cable. Run a serial port tool, such as Serial Port Utility, on the PC to view the content received from the center, as shown in Figure 5-8.

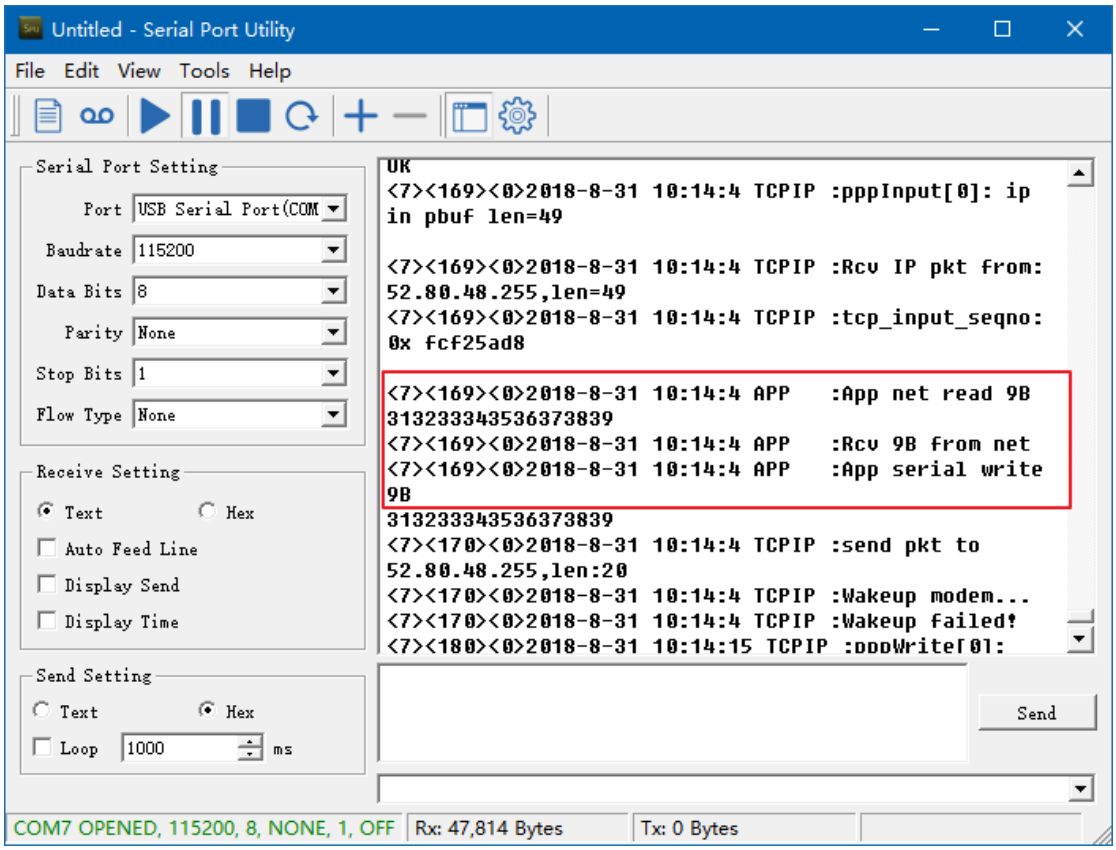

Figure 5-8 TCP Example 3

5.3 Transparent UDP

5.3.1 Parameter Settings

Select UDP for the “Application center link mode”, the other configuration are same with section 5.2.1 Parameter Settings.

5.3.2 Demonstration

UDP is a connectionless transmission protocol. To enable the device to successfully connect to the server, configure the login packet and heartbeat packet.

Step 1: See chapter 5.3.1 Parameter Settings.
Step 2: Configure login packet. Choose “Configuration>>User defined packets > Log-in”. Select the packet type and enter the packet body, as shown in Figure 5-9.

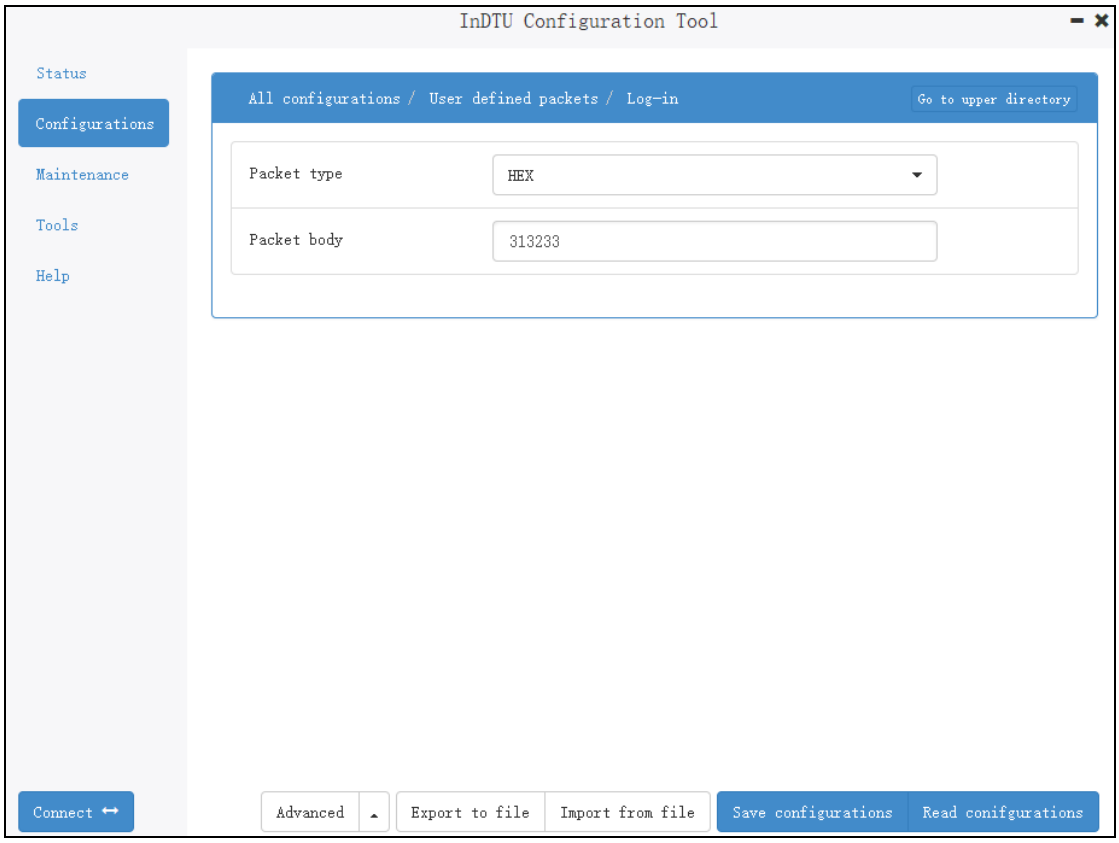

Figure 5-9 UDP Example 1

Step 3: Configure heartbeat packet. Choose “Configuration > User defined packets > Heart beat”. Select the packet type and enter the packet body, as shown in Figure 5-10.

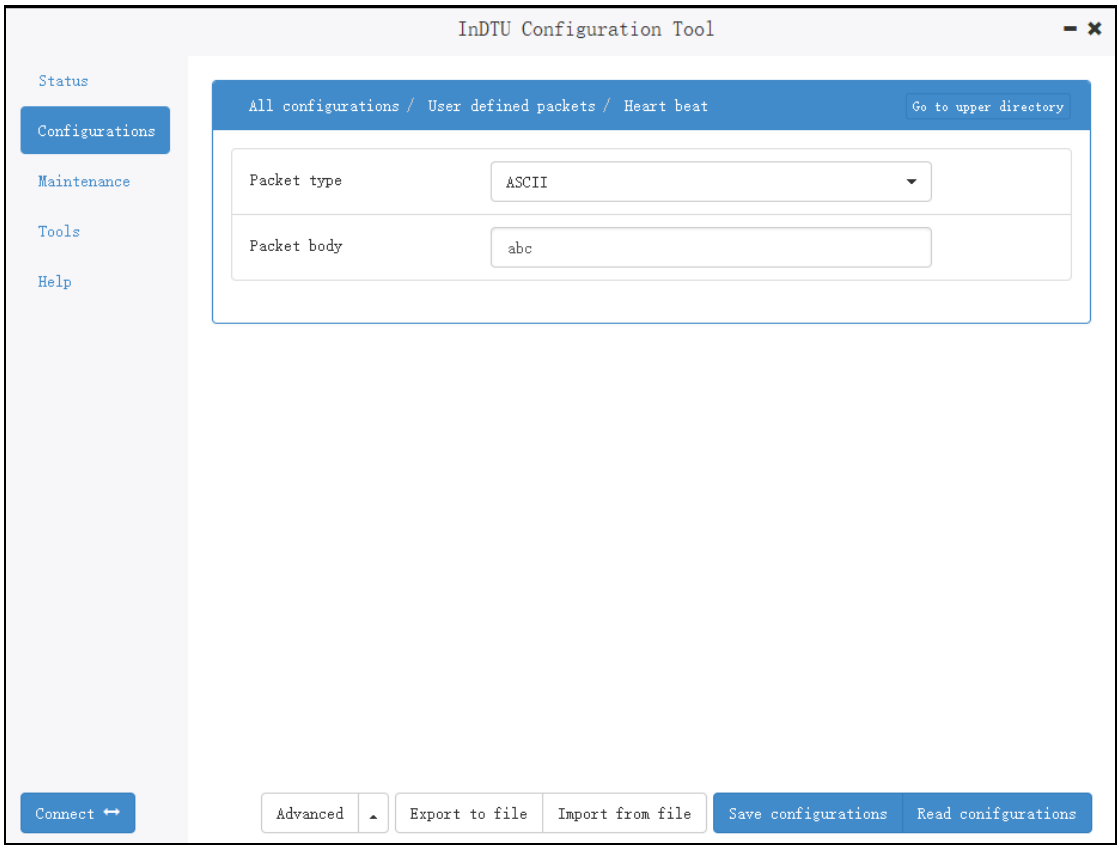

Figure 5-10 UDP Example 2

Step 4: After the parameters are set, click <Save configurations>. The parameter settings take effect after a restart.

Step 5: Launch **UDP Client Server** to create a server. Use the PC as the center. Enter the UDP port number of the PC in **Port** and click **Start Server**, as shown in Fig 5-11.

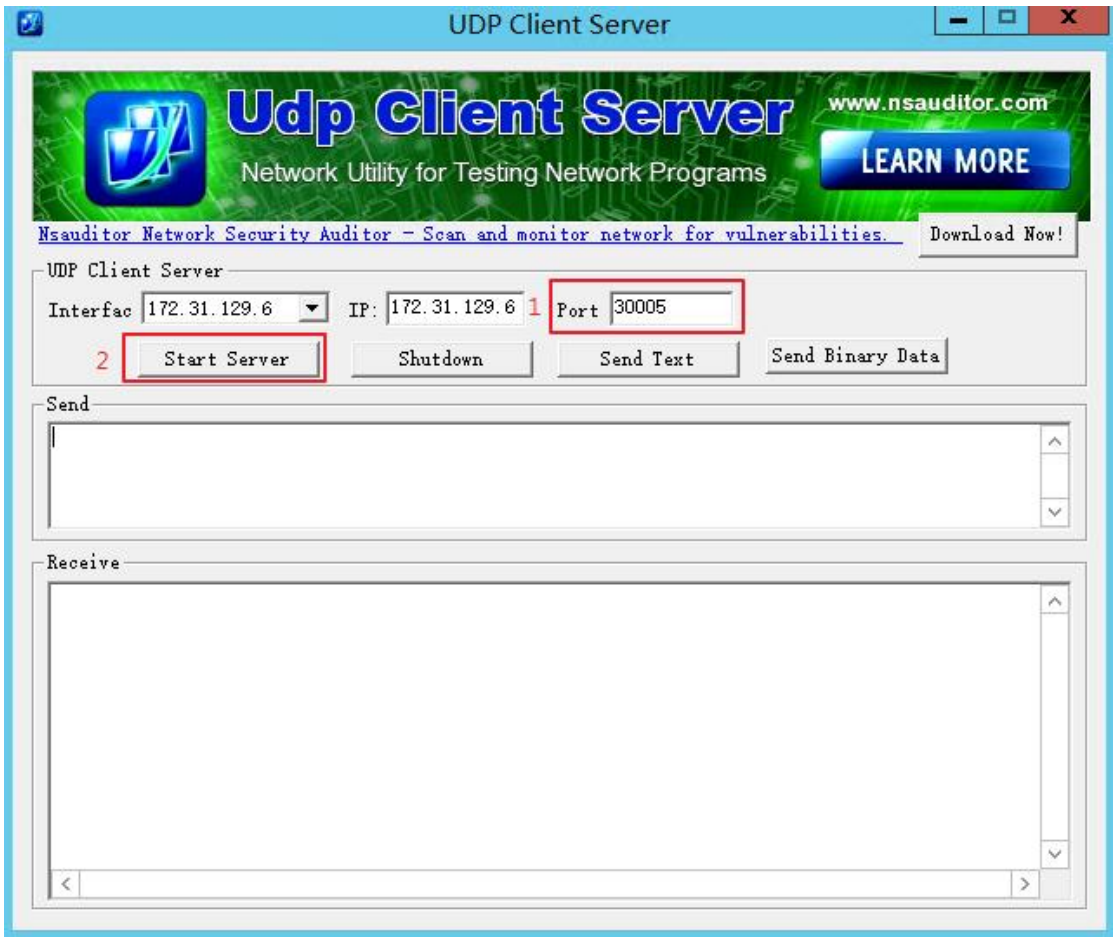

Figure 5-11 UDP Example 3

Step 6: The packets from DTU are received in **UDP Client Server**, as shown in Figure 5-12.

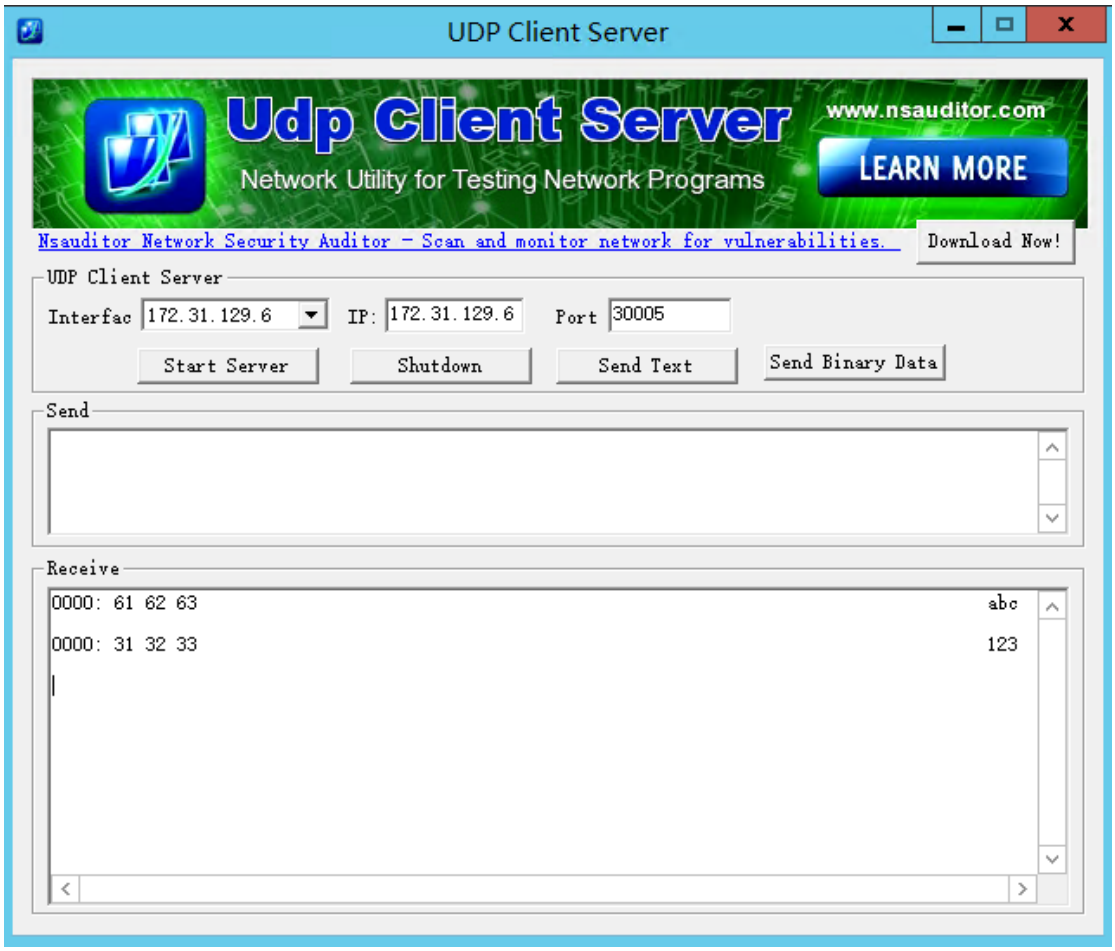

Figure 5-12 UDP Example 4

5.4 TCP Server

When the DTU act as a TCP server, note that:

- The DTU must have a fixed IP address. That is, the wireless DDN private network service is required.
- The DTU detects link availability by monitoring the wireless side data. If there is no data from the wireless side in two hours (this interval is fixed in firmware), DTU will tear down the PPP link and redials.

5.4.1 Parameter Settings

Step 1: See chapter 5.1 Base Configuration.
Step 2: Click “Confgigurations>>Application center”, set special port number for “Local TCP server port”, as shown in Figure 5-13.

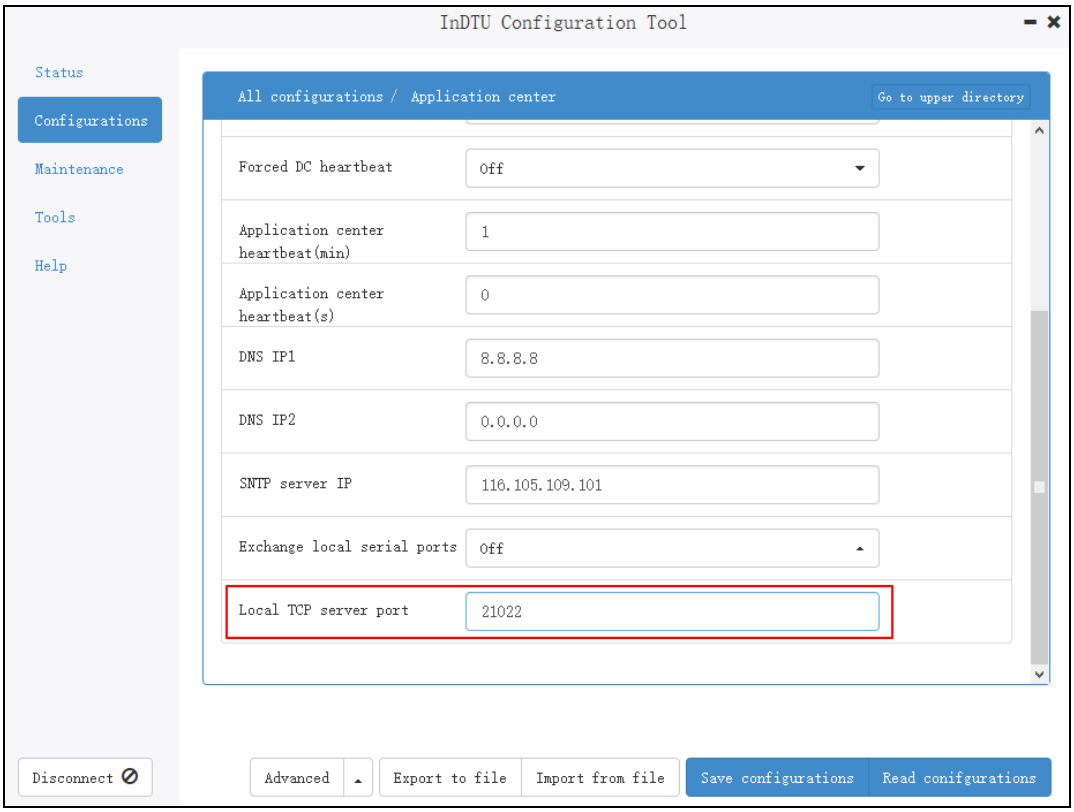

Figure 5-13 TCP server communication port

Step 3: Choose “configurations >> ICMP”, set the ICMP three options. Figure 5-14 shows a configuration example. Enable ICMP to keep-alive the wirless communication link.

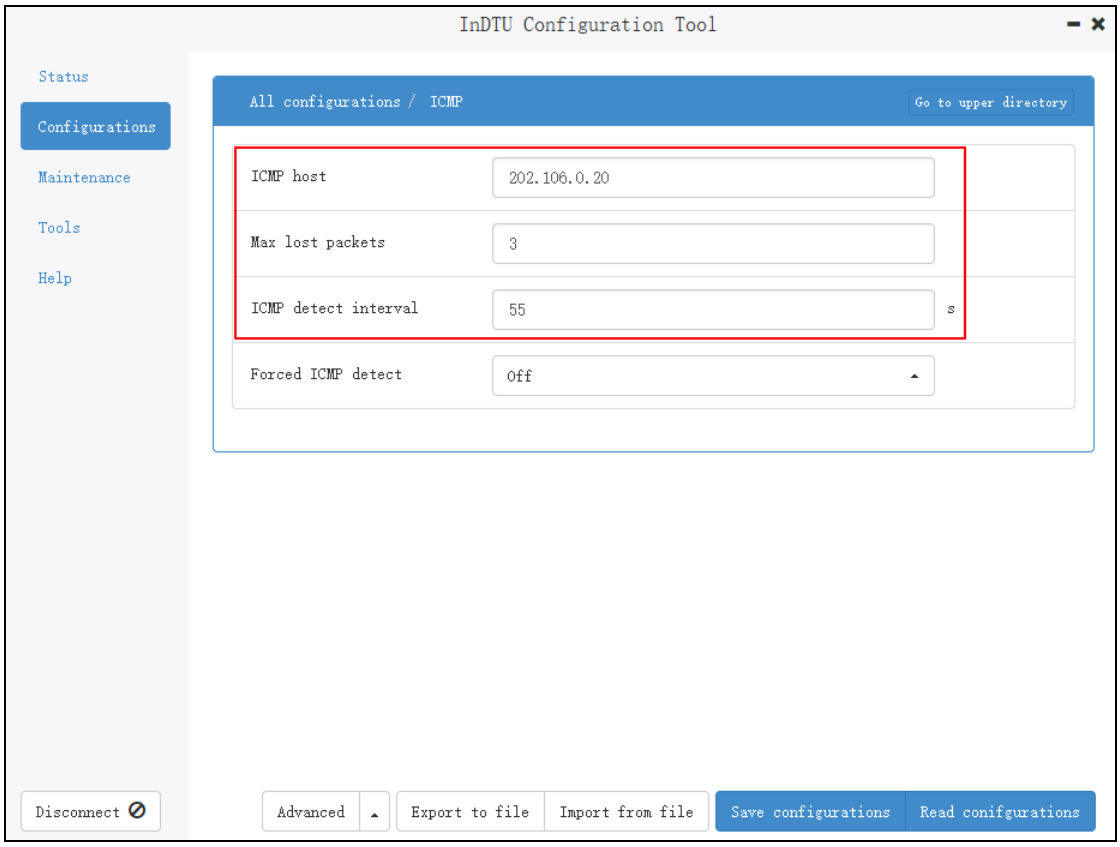

Figure 5-14 ICMP setting

Step 4: (Optional)Choose “configurations > Application center”. Set the IP address in 0.0.0.0 format, the DTU does not actively connect to the application center anymore.

Step 5: (Optional)Choose “configurations > GPRS”, set special APN if necasscary.

Step 6: After the parameters are set, click <Save configurations>. The parameter settings take effect after restart.

5.5 Modbus-Net-Bridge

5.5.1 Parameter Settings

Step 1: See chapter 5.1 Base Configuration.

Step 2: Click “configurations > Application center”. Select Modbus-Net -Bridge for the “Application center link mode”, as shown in Figure 5-15. The port number is 502 for Modbus-net-bridge, it’s fixed.

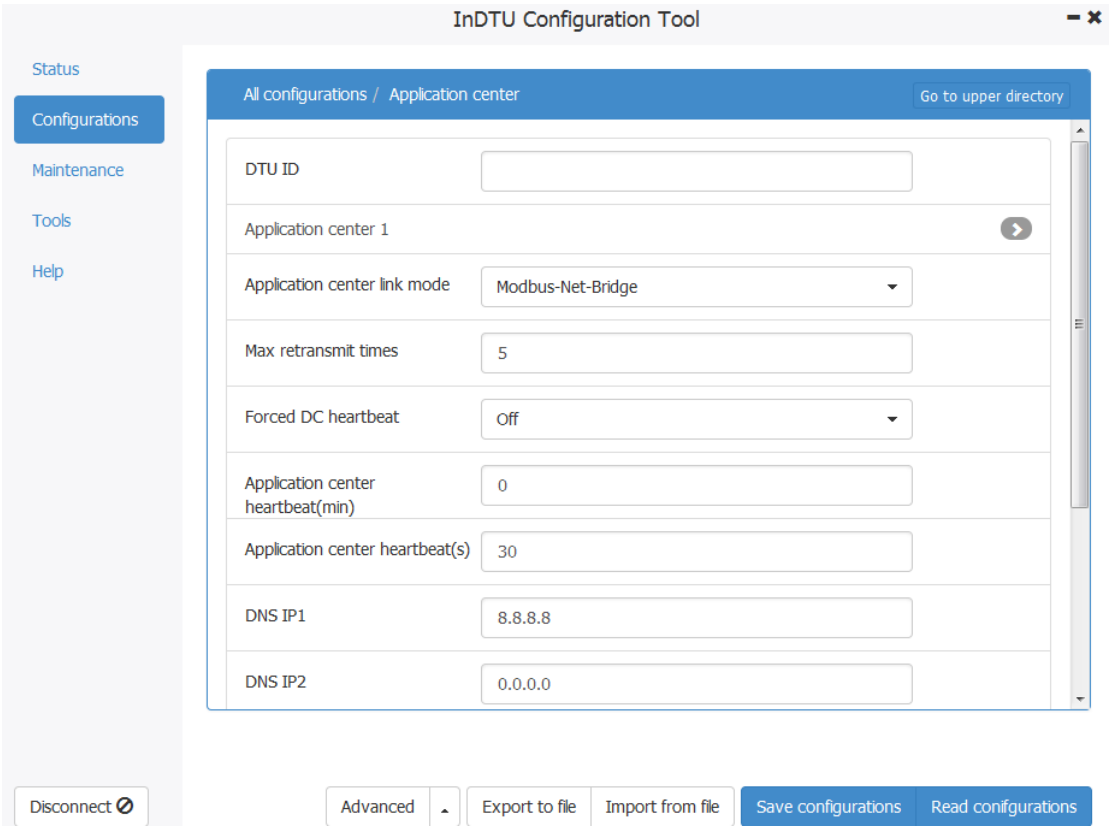

Figure 5-15 Modbus-Net-Bridge setting 1

Step 3: Choose “configurations >> ICMP”, set the ICMP three options. Enable ICMP to keep-alive the wirless communication link.

Step 4: After the parameters are set, click <Save configurations>. The parameter settings take effect after restart.

5.5.2 Demonstration

Step 1: Set parameters according to 5.5.1 Parameter Settings.
Step 2: Status>Network layer to check the IP address which assigned to DTU.

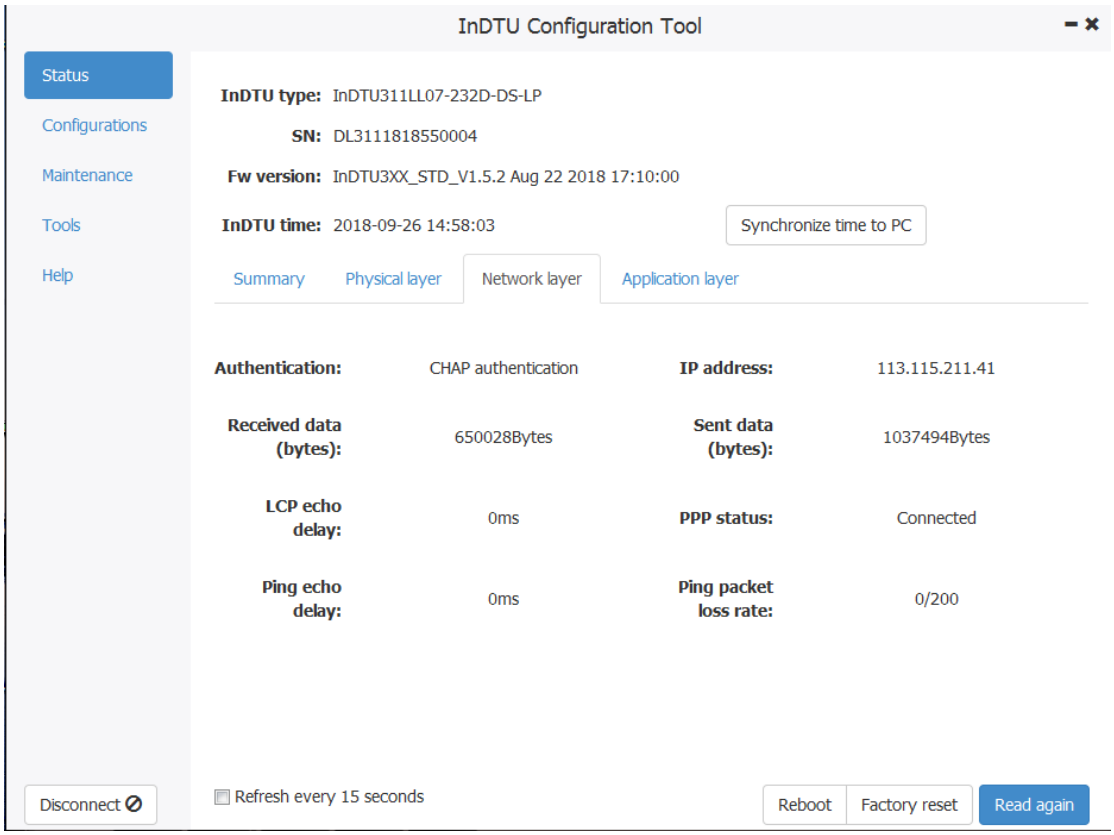

Figure 5-16 The assigned IP address

Step 3: Run the mod_RSsim.exe tool, and set correct values for **Port**, **Baud rate**, **Data bits**, **Stop bits**, and **Parity**, as shown in Figure 5-17.

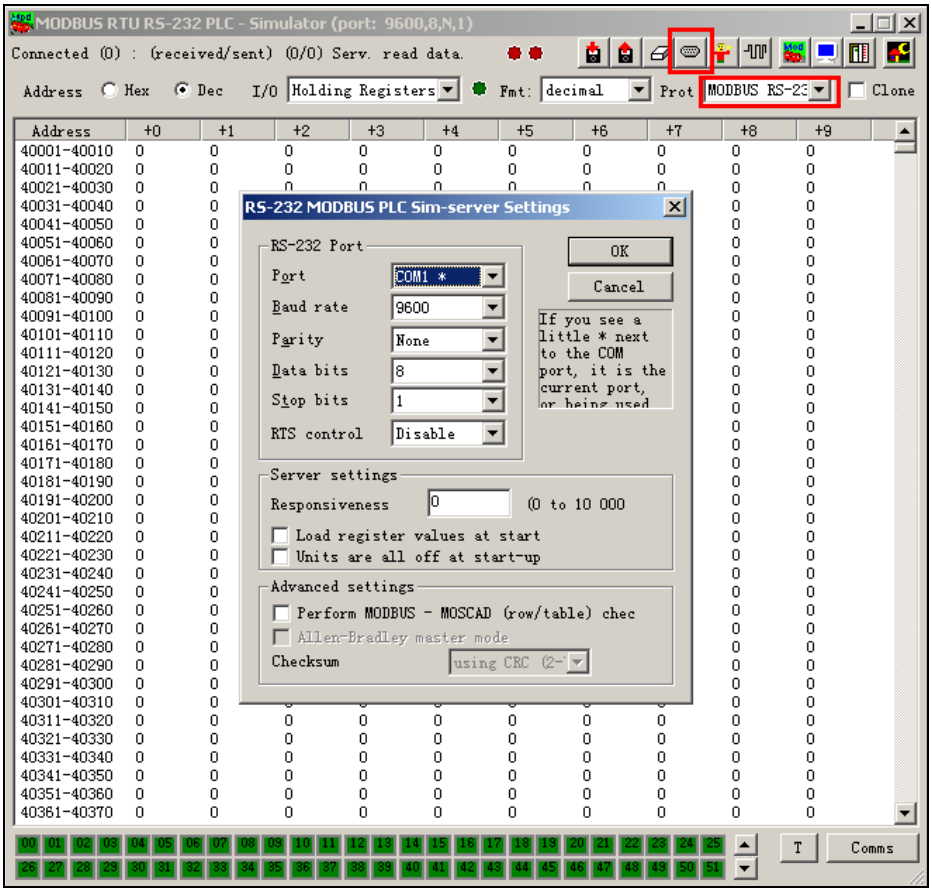

Figure 5-17 Modbus-Net-Bridge example 2

After the settings are complete, data transmission starts, as shown in Figure 5-25.

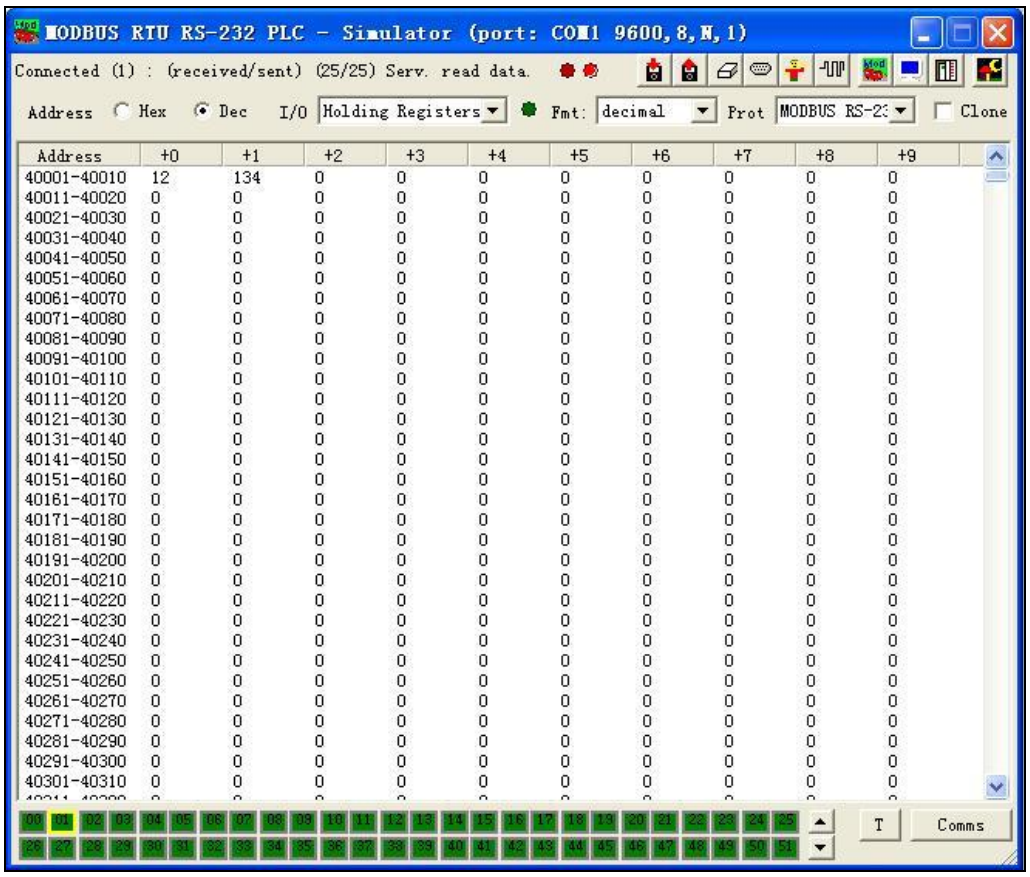

Figure 5-18 Modbus-Net-Bridge example 3

Step 4: Run the ModScan32.exe tool, choose **Connection** > **Connect**. In the pop-up dialog box, set **IP Address** to the **Local IP** of DTU and **Service** to 502, as shown in Figure 5-19.

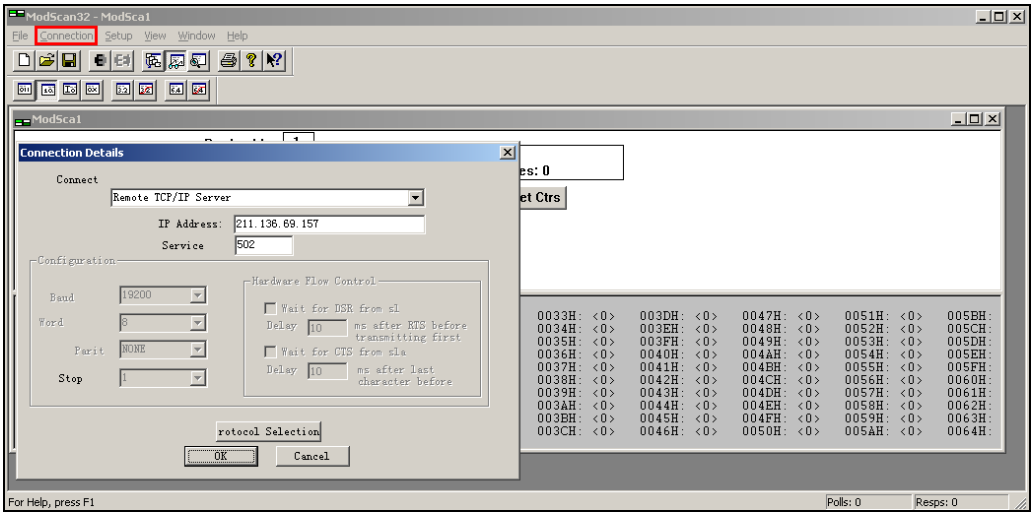

Figure 5-19 Modbus-Net-Bridge example 4

After the settings are complete, ModScan32.exe starts to receive data, as shown in Figure 5-20.

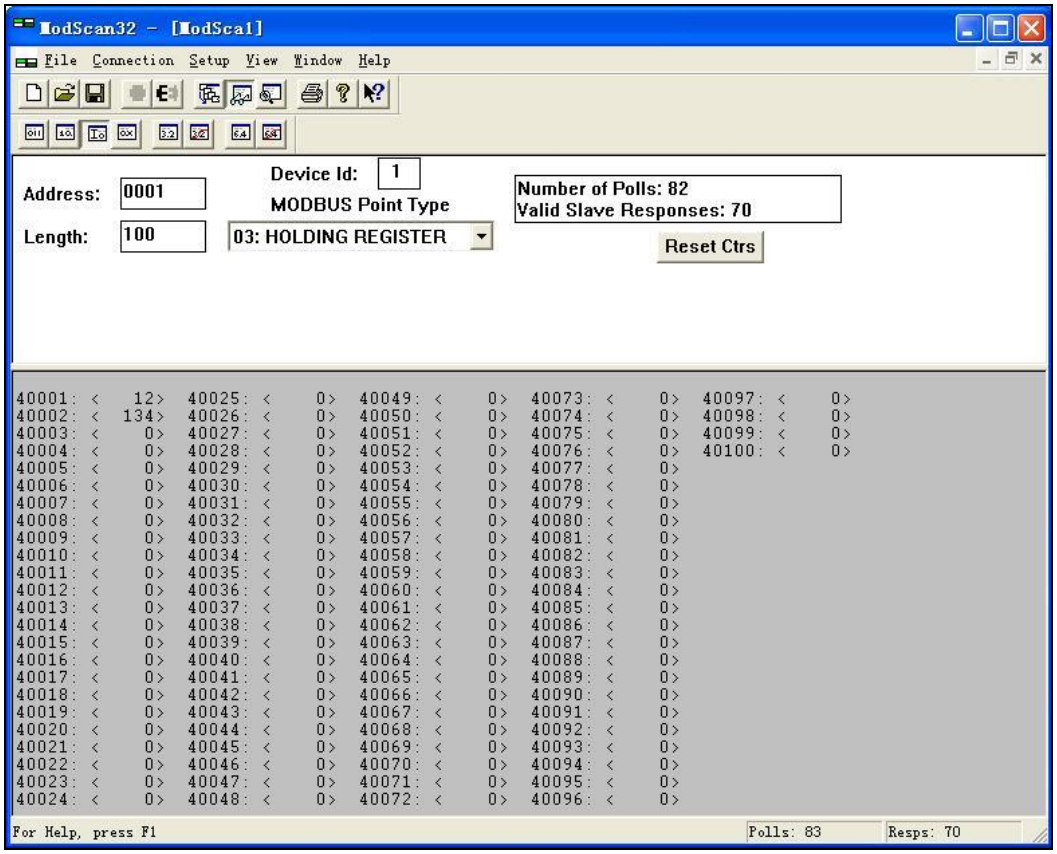

Figure 5-20 Modbus-Net-Bridge example 5

5.6 IHDMP Usage Example

DTU can be managed not only through the dedicated configuration tool DTU Tool, but also based on proprietary protocols, IHDMP. For example, send SMS, get the configuration of the DTU, and so on. For more details of IHDMP protocol, please refer to the "DTU Device Management Protocol user manual"

Serial Port Utility simulates the serial device to interact with the DTU, control the DTU based on the private IHDMP protocol, and send the SMS “1234” to one mobile phone number “13912345678”.

Open the serial port utility Serial Port Utility and select the Hex mode to send/receive data.

Serial Port Utility (send): 55 AA 55 AA 13 00 1C 81 80 00 0B 31 33 39 31 32 33 34 35 36 37 38 81 81 00 01 02 81 82 00 04 31 32 33 34 FC DE

After the DTU receives the above message, if the packet is invalid, the DTU will not return anything.

If the paket conforms to the standard (header, command word identifier, data encapsulation format, and CRC), the corresponding reply from DTU is as follows:

Serial Port Utility (received): AA 55 AA 55 17 00 05 81 89 00 01 02 38 72

The content of the packet is 1 byte, and 0x02 indicates that the correct short message data is received.

6 Appendix

Capturing DTU Logs

The storage space on DTU is limited. If you need to capture device running logs for a long time for troubleshooting, you can use other software. In this example, the Serial Interface Version1.0 software is used. You can download it from the Internet.

Connect the DTU to PC and launch the DTU configuration tool.

Step 1: Enable the DTU debugging mode, as shown in Figure 6-1.

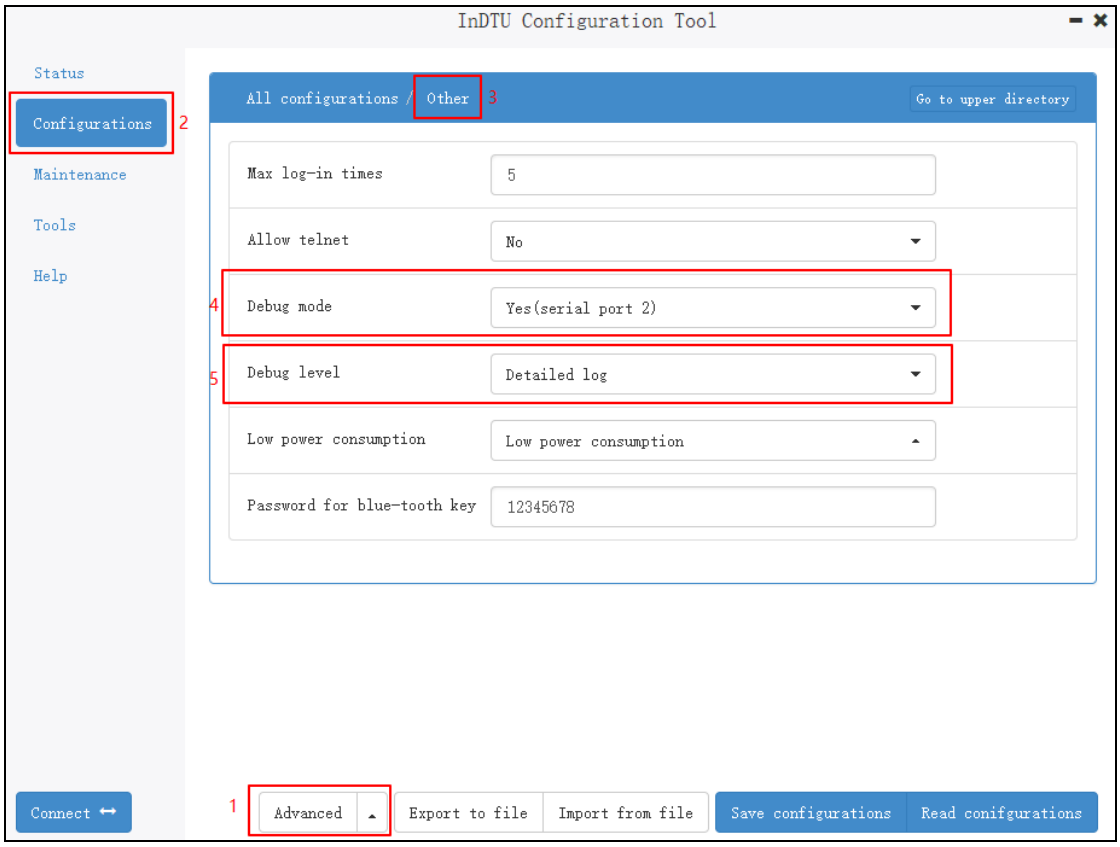

Figure 6-1

Step 2: Configure the software.

After configuring the DTU tool, disconnect the device.

Run Serial Port Utility, configure the serial port and baud rate for log capturing, and select the received file type. Click **File** to save the logs, and open the serial port, as shown in Figure 6-2. The logs printed in window will be automatically saved to the created log file.

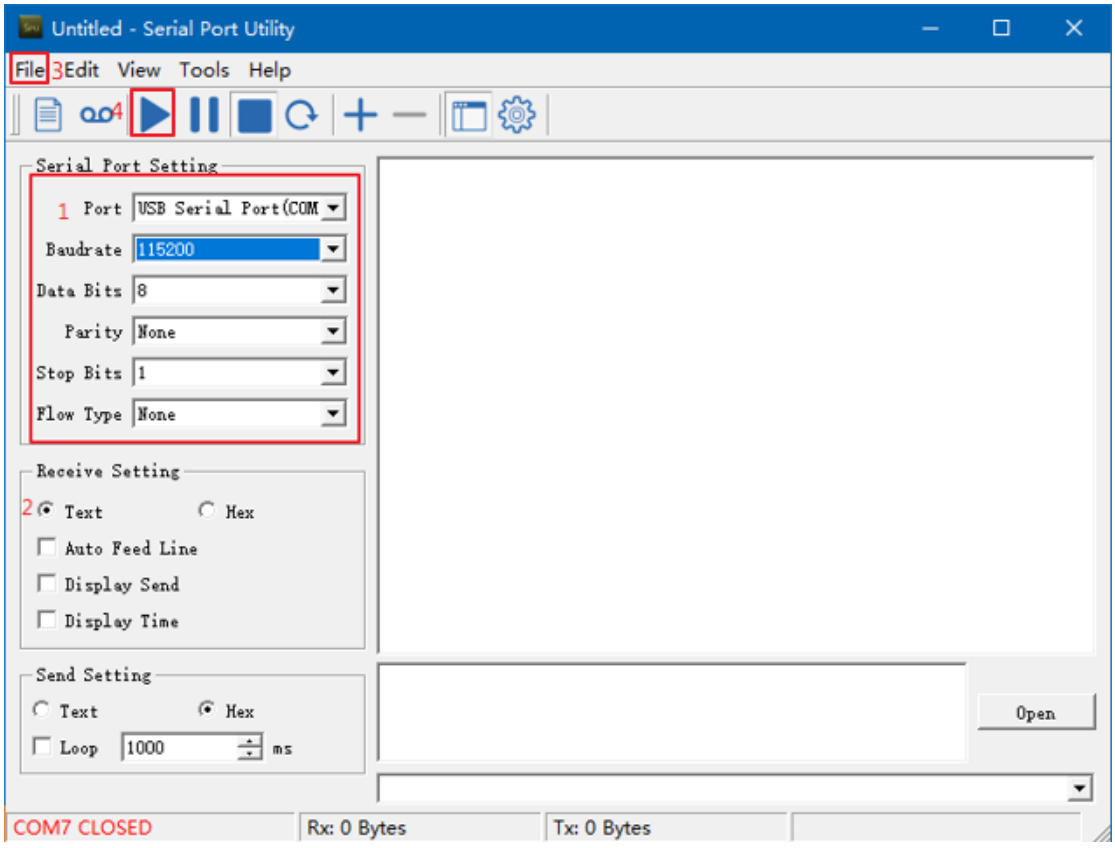

Figure 6-2

FAQ

1) InDTU332N reboots frequently.

Troubleshooting procedure:

1. Check whether the device can go online by dialing.
2. Check whether the UIM/SIM/USIM card is correctly inserted into the DTU.
3. Check whether the UIM/SIM/USIM card is suspended for arrears, or damaged.
4. Check whether the dialing parameters (such as dial number, access point parameter, account, and password) are correct.
5. Check whether wireless signal strength is lower than 20. Move the DTU to a place with stronger signal strength and power on it to retry.
6. Check whether the power supply to the DTU is normal.

2) InDTU332N is powered on, but power indicator is off.

Troubleshooting procedure:

1. Check whether the DTU is securely connected to the power converter.
2. Check that the 100 V AC to 240 V AC power supply can be provided.
3. Check whether the power converter of DTU can output 5 V DC to 35 V DC voltage.
4. Check whether the indicator is burned. If so, contact the sales representative of InHand.

3) Failed to configure DTU3xx.

Troubleshooting procedure:

1. Check the serial port cable, whether the PC serial port works normally, and whether the port selected by software is correct.
2. Check whether the output voltage can reach 5 V DC to 35 V DC and whether the polarity is correct.

4) Failed to upgrade the DTU through serial port.

Troubleshooting procedure:

1. Check the serial port cable, whether the PC serial port works normally, and whether the port selected by software is correct.
2. Check whether the output voltage can reach 5 V DC to 35 V DC and whether the polarity is correct.

FCC Warning

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

The user manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. In cases where the manual is provided only in a form other than paper, such as on a computer disk or over the Internet, the information required by this section may be included in the manual in that alternative form, provided the user can reasonably be expected to have the capability to access information in that form.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

—Reorient or relocate the receiving antenna.
—Consult the dealer or an experienced radio/TV technician for help.
—Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
— Consult the dealer or an experienced radio/TV technician for help.

FCC ID: 2AANYINDTU3XXN, contains FCC ID: XPY2AGQN4NNN

RF exposure warning

This equipment must be installed and operated in accordance with provide instructions and the antenna used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operation in conjunction with any other antenna or transmitter.
End-users and installers must be provide with antenna installation instructions and transmitter operating conditions for satisfying RF exposure compliance.