InDTU332G

Guidance of typical solutions

Version: V1.0---20180928

InHand Networks

www.InHandNetworks.com

Preface

Thanks for choosing InDTU332G series industrial products! This article will introduce the usage in typical soultions.

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.

Technical Support

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Contents

1.Overview

For InDTU332G, the typical network topology is shown as below.

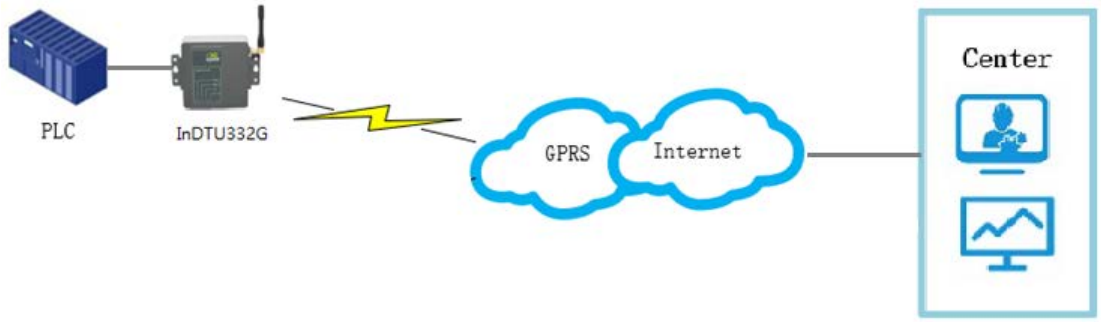

Figure 1-1 network topology

Under the above topologry, the DTU will work in differernt role/mode to meet the different soultions. The below working mode of DTU will be introduced in this article.

- Transparent transfer
- TCP server
- Modbus-Net-Bridge
- 101-to-104
- "Troy" mode
- "55 AA"command

2. Working mode and Examples

The below tools will be used to simulate the communiction node(PLC or center), the below table gives a brief introduction for these tools.

Tool	**Publisher**	**Function**
DTUTool.exe	InHandNetworks	Configure the InHand DTU modem.
sscom.exe		A professional communication software for serial port
ModScan32.exe		Simulate the Modbus slave device.
ModSim32.exe		Simulate the Modbus master device.
Mod_RSim.exe		Simulate the Modbus master device.
TCPUDP Debug.exe		Simulate the client or server for TCP/UDP.
TCP client server		Simulate the client or server for TCP

Tab 2-1 Tools list

2.1. Configuring Network Connection

Connect serial port 1 to the PC through a serial cable and power on the device.

Step 1: Launch and log in to the DTU configuration tool. Launch the configuration tool on the PC. 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 2-1.

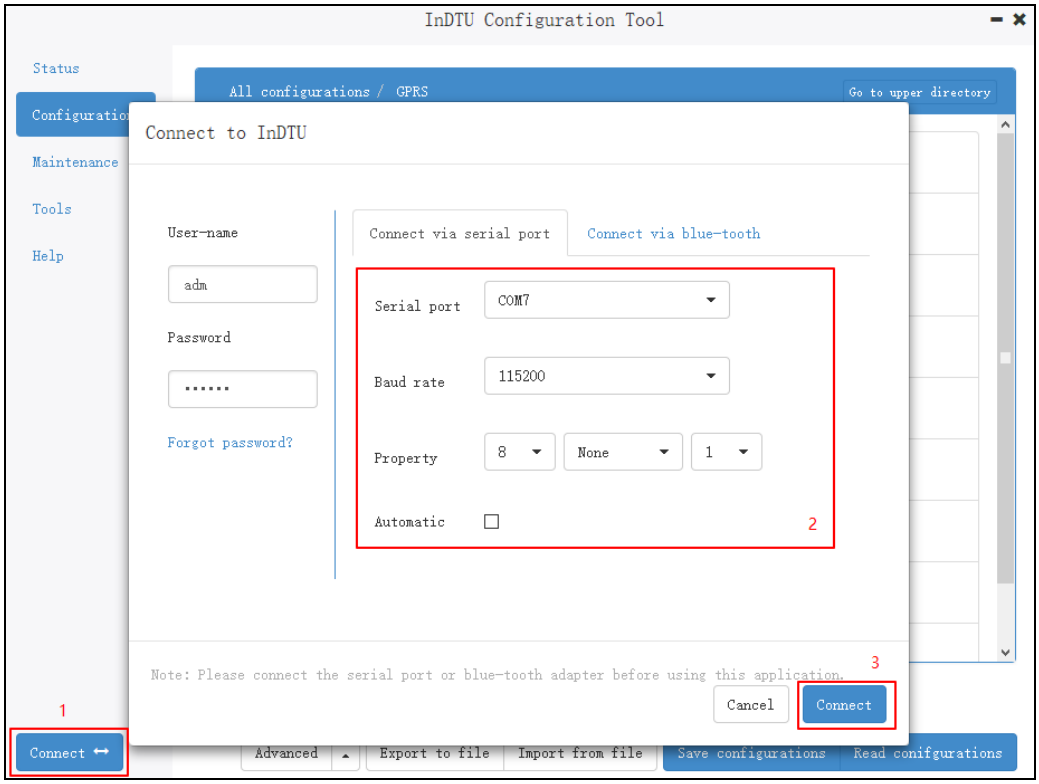

Figure 2-2 Login configuration tool

After a successful login, the device automatically reads the DTU parameters, and then sets 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 on the device connected to InDTU.

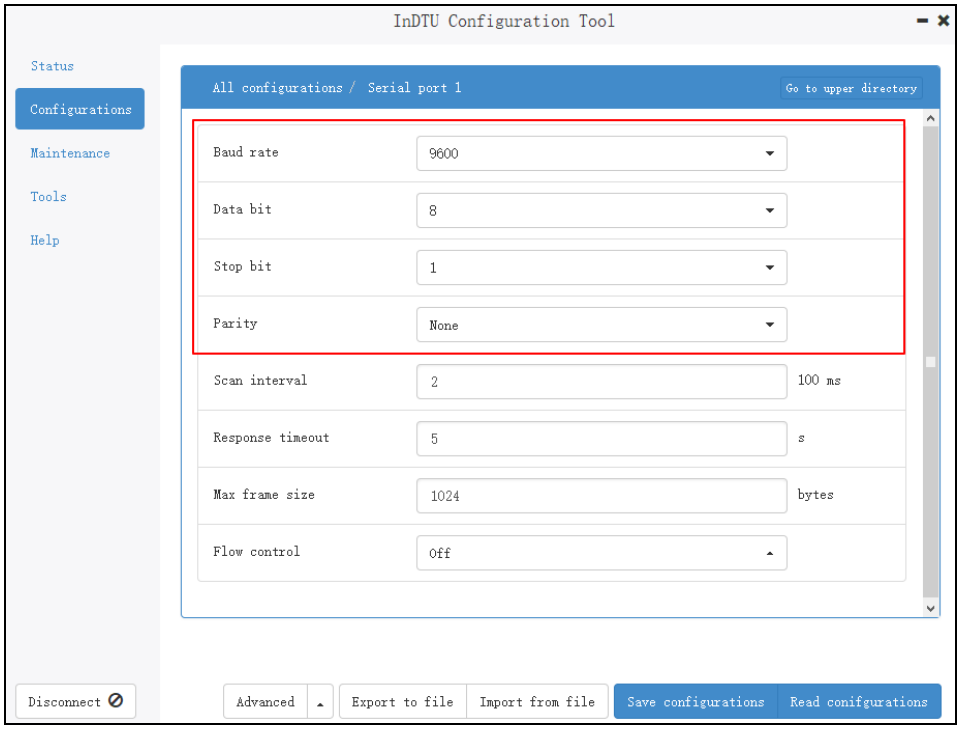

Figure 2-3 Setting local serial port parameters

Note

When the device functions as a client, set the local serial port parameters. When the device functions as a server, set local serial port 2 parameters.

Step 3: Click Configuration>>GPRS to modify parameter settings. For example, modify the Auto dial function, as shown in Figure 2-3. The default parameters are the public network dialing parameters. Do not modify the default parameter settings unless you are using a private network. For the private network, modify the APN, and user name/password for GPRS dialing.

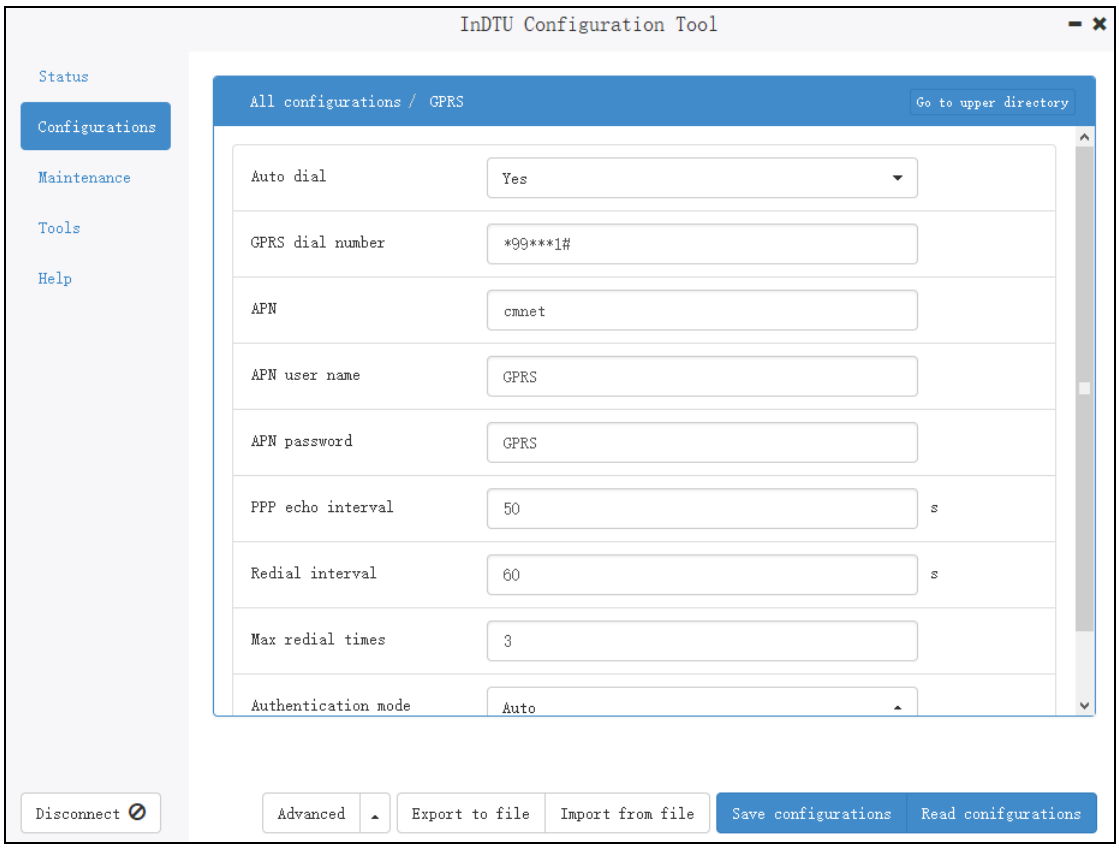

Figure 2-4 GPRS dialing parameters

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

2.2. Transparent TCP

The data of serial interface 1 will be pack as IP format(TCP or UDP), and sent to predefined application center. We use the TCP procotrol in this example.

2.2.1. Parameter Settings

Step 1: See chapter 2.1 Configuring Network Connection.

Step 2: Click **Application center**. Set **Application center link mode** (TCP), as shown in Figure 2-4.

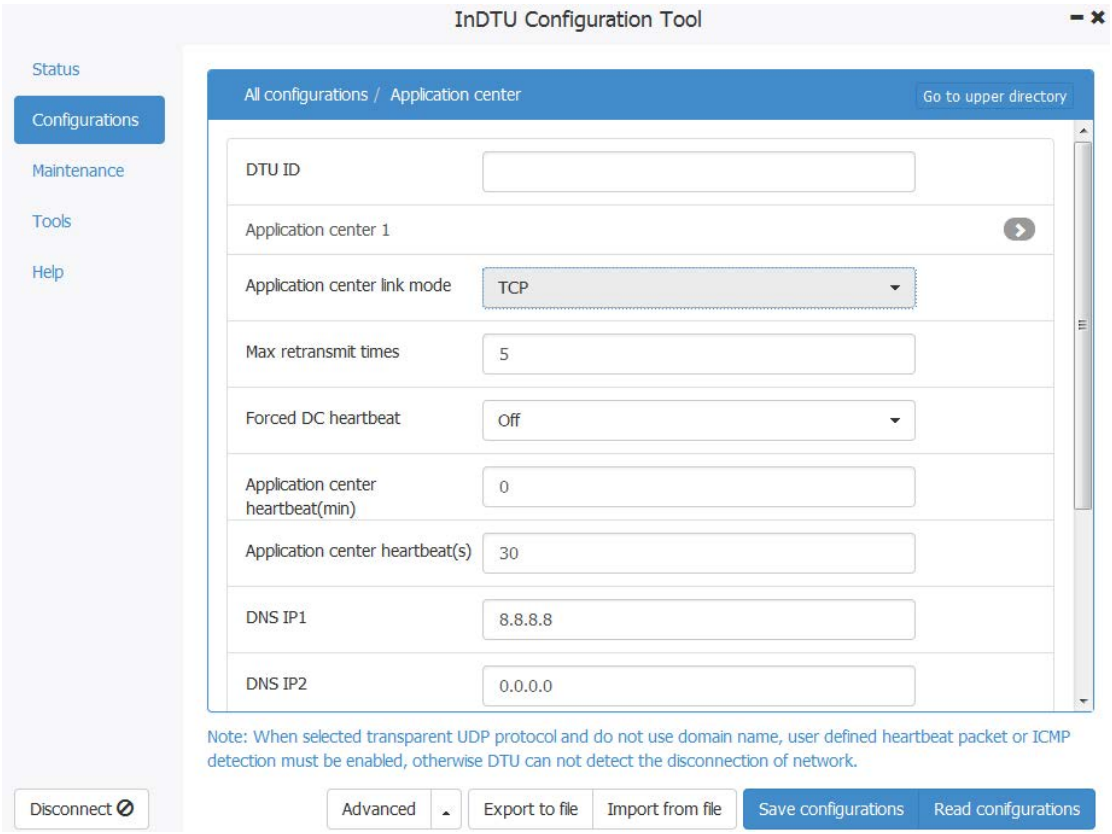

Figure 2-5 TCP setting 1

Step 3: Choose **All configurations** > **Application center**. Set **IP**, **Domain**, and **Port** (0 by default, meaning a random port of application center), as shown in Figure 2-5.

Note

The IP and Domain are both configured for application center, the IP will be effctive only.

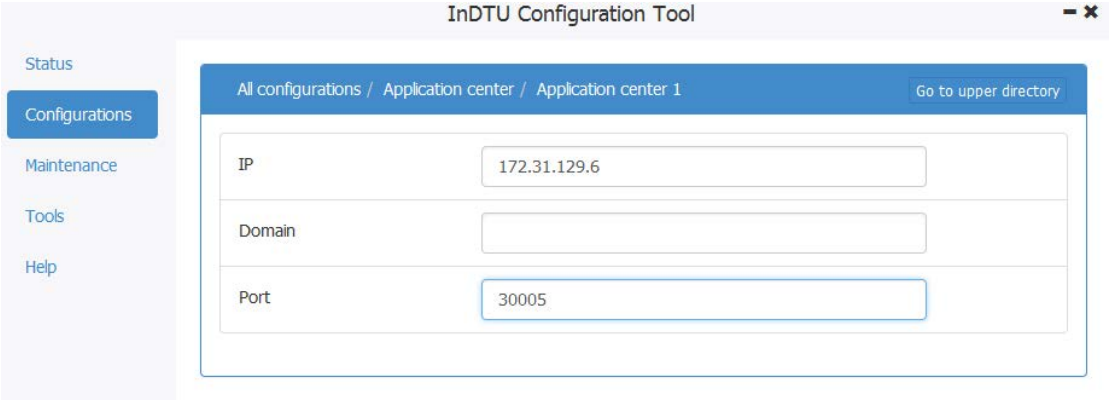

Figure 2-6 TCP setting 2

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

2.2.2. Test

Step 1: Launch "TCP client server " to create a server. Use the PC as the center. Enter the IP address and TCP port number of server and click **Listen**, as shown in Figure 2-6.

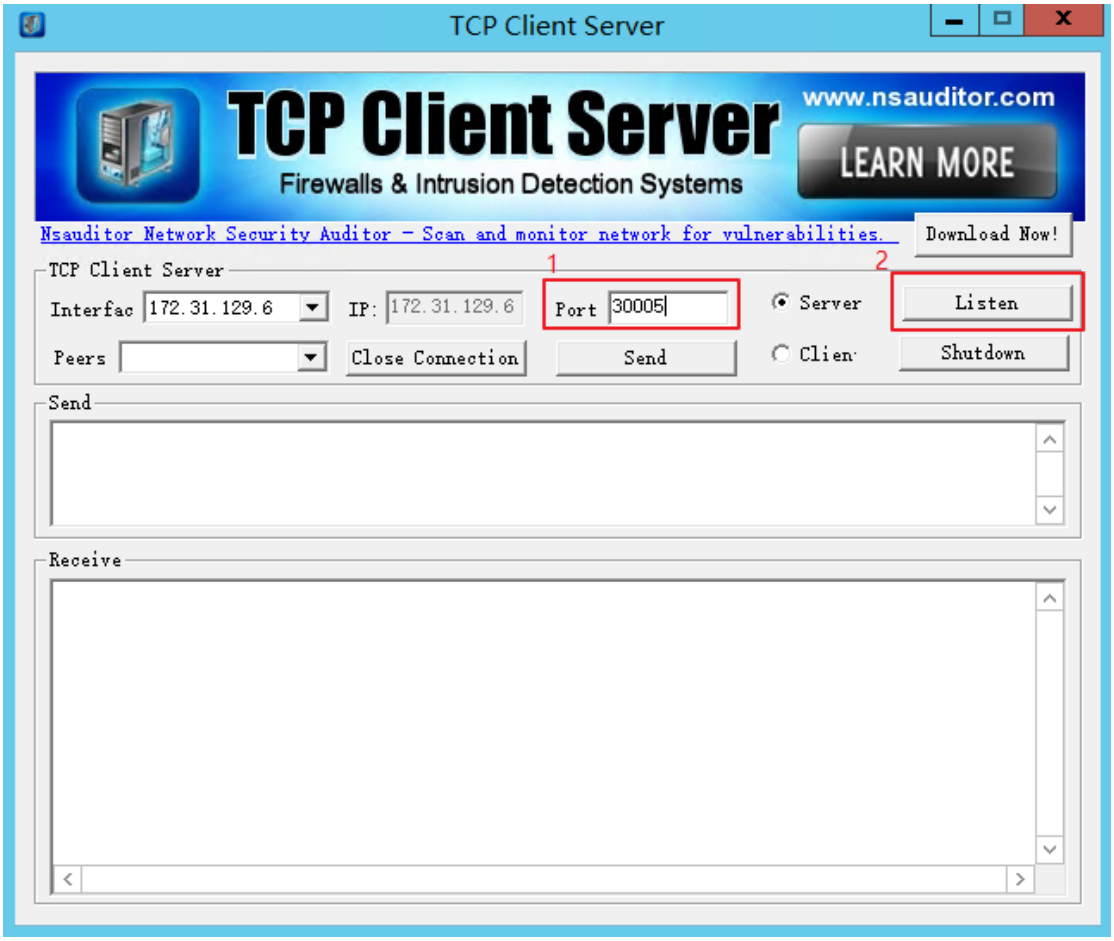

Figure 2-6 Setup TCP server

Step 2: 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 2-9. The center then sends data to the DTU.

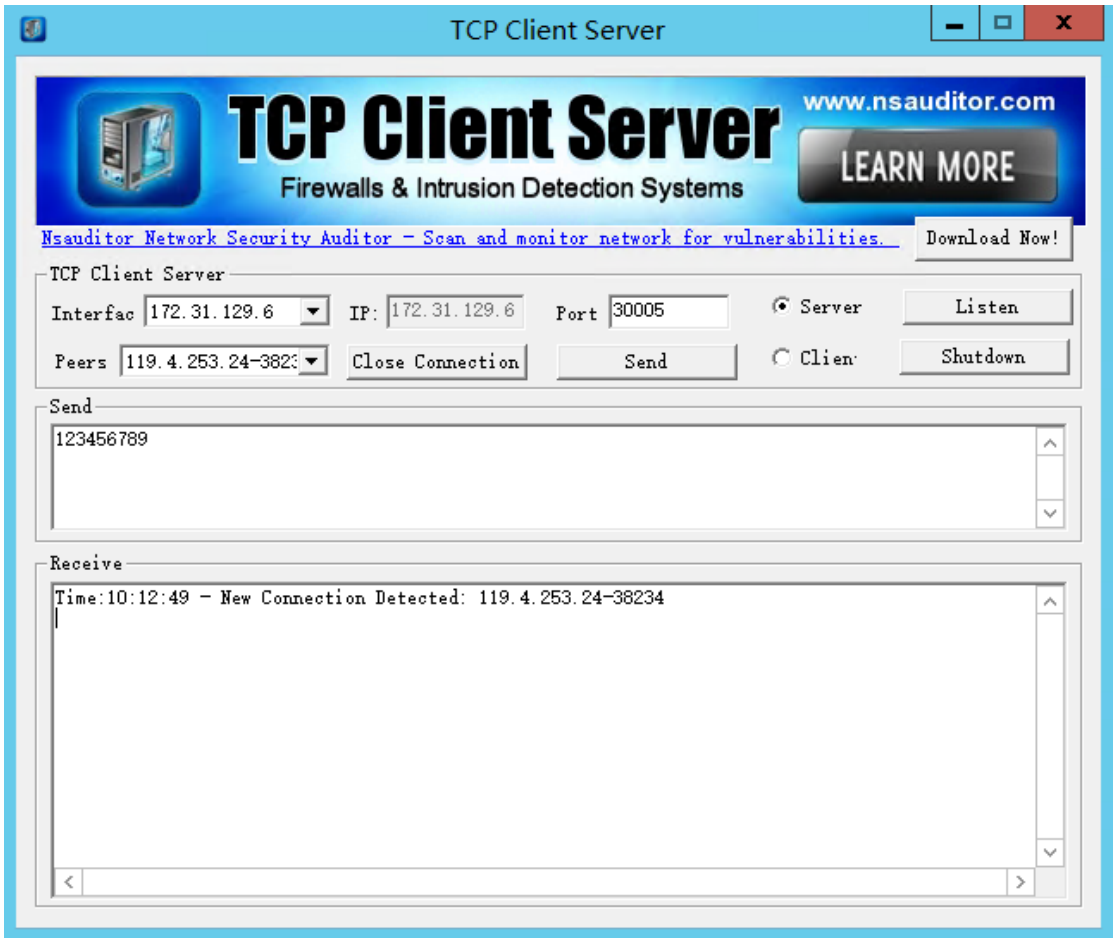

Figure 2-7 TCP server connected with DTU

Step 3: Connect serial port 2(Communication interface) 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 2-8.

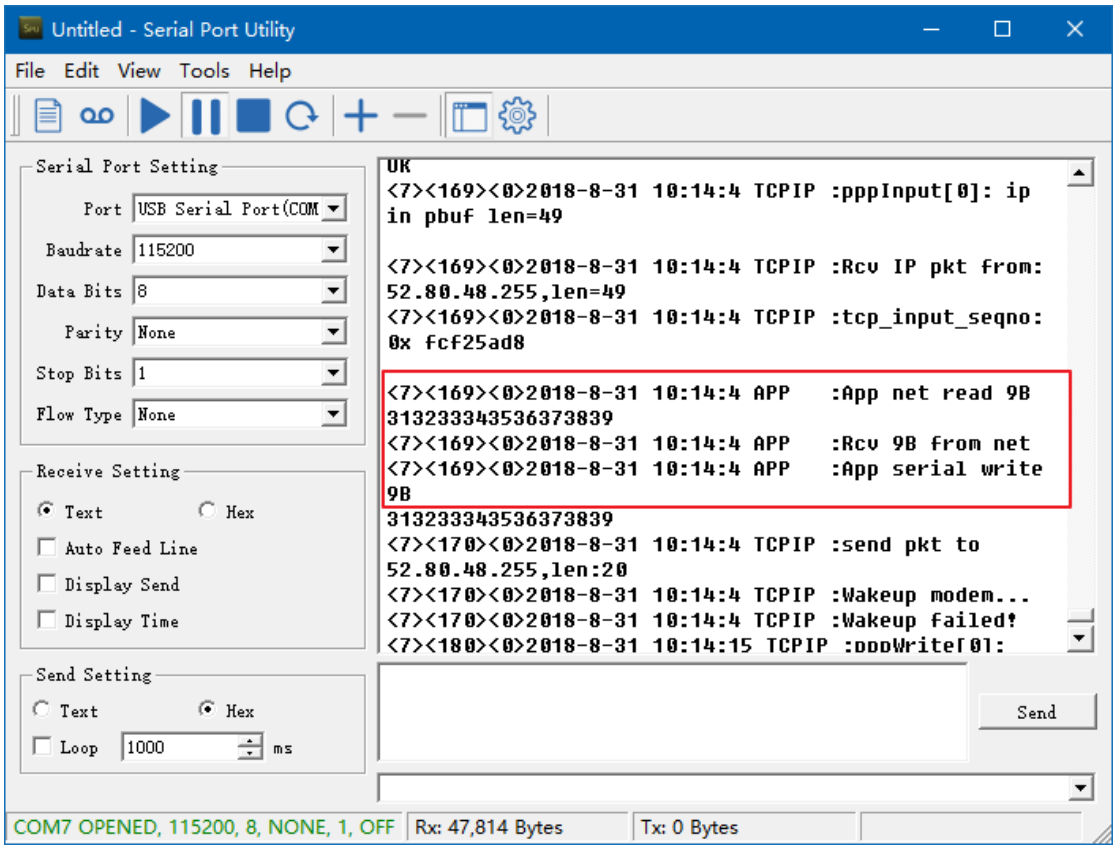

Figure 2-8 Check the received data on serial port

2.3. TCP Server

When the DTU work in "TCP server" mode, the DTU will act as TCP server, and the center act as TCP client. The IP address of DTU should be accessed from center side. That's to say,

- The DTU should have a public IP address,
- Or the DTU and center locate in one virtual private dialup network(VPDN).

2.3.1. Parameter Settings

Step 1: See chapter 2.1 Configuring Network Connection.

Step 2: Click **All configurations** and set Local TCP server port, which is set to 20011 in this example, as shown in Figure 2-9.

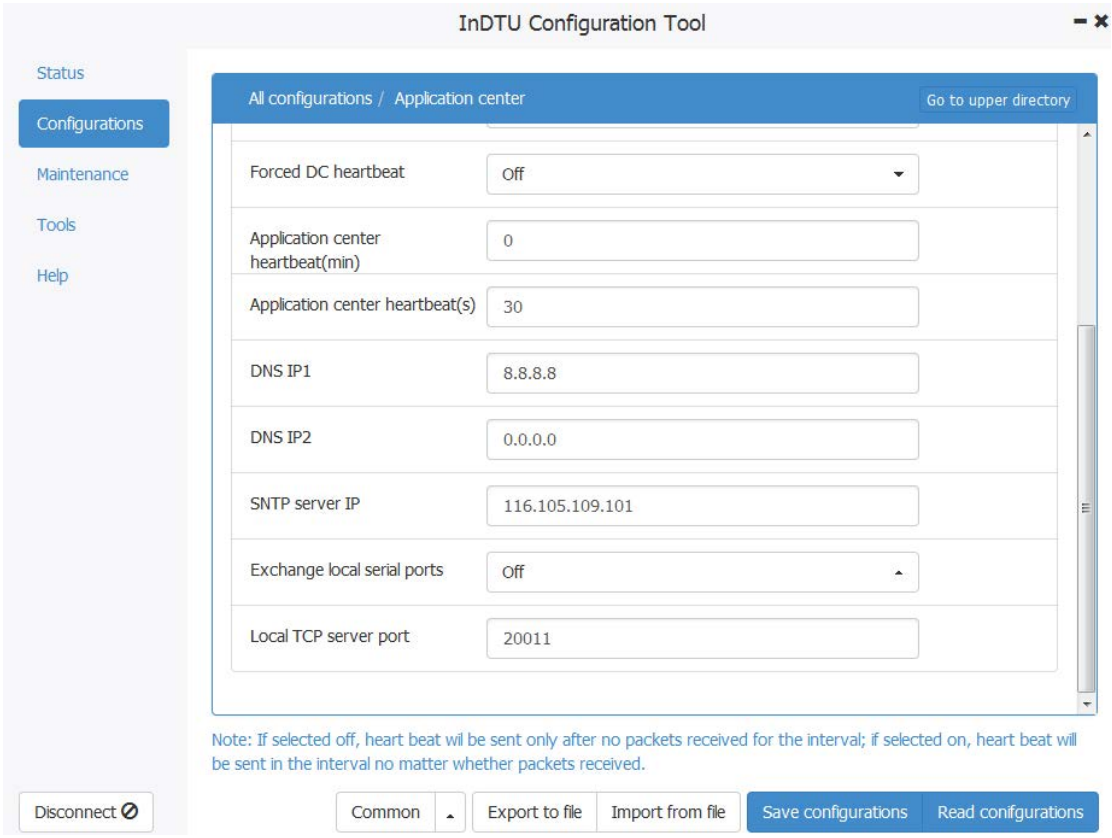

Figure 2-9 TCP port of TCP server

Note

The communication interface will be serial port 2 under TCP server mode.

Step 3:(optional) Choose **All configurations** > **ICMP**, and set the ICMP options. Figure 2-10 shows a configuration example. The ICMP host address must be successfully pinged in 7/24 hours .

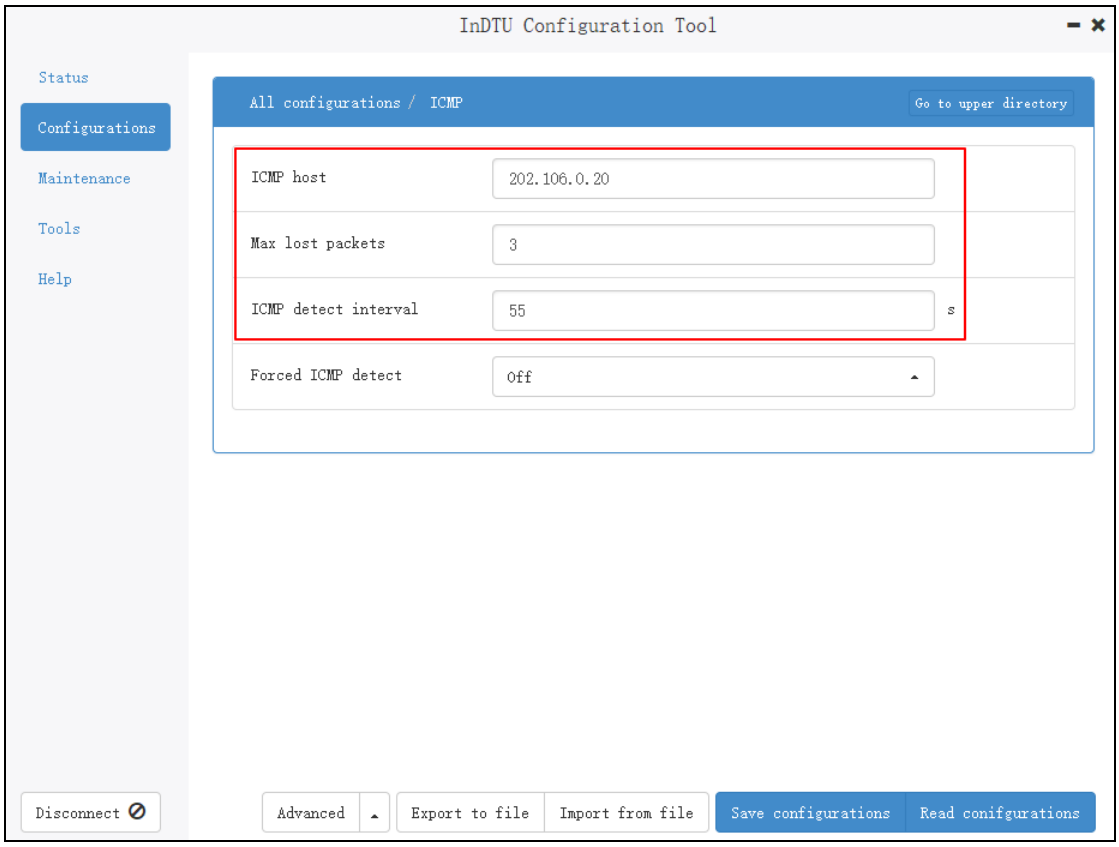

Figure 2-10 ICMP parameters

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

2.3.2. Test

Step 1:Connect the serial cable with serial port 2. Run SSCOM to monitor data value of the serial port 2.

Step 2:Click Status>Network layer to check the IP address of DTU.

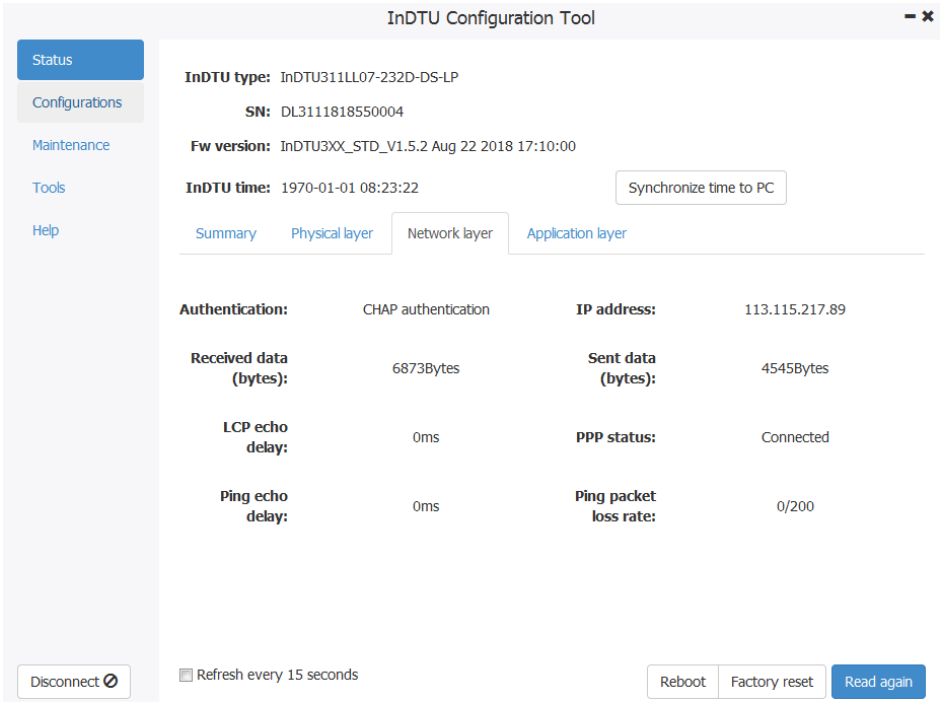

Figure 2-11 IP address of DTU modem

Step 3: Run the "TCP Client Server", set **IP Address** to the IP address of DTU and **Service** to pre-defined port number, shown as below.

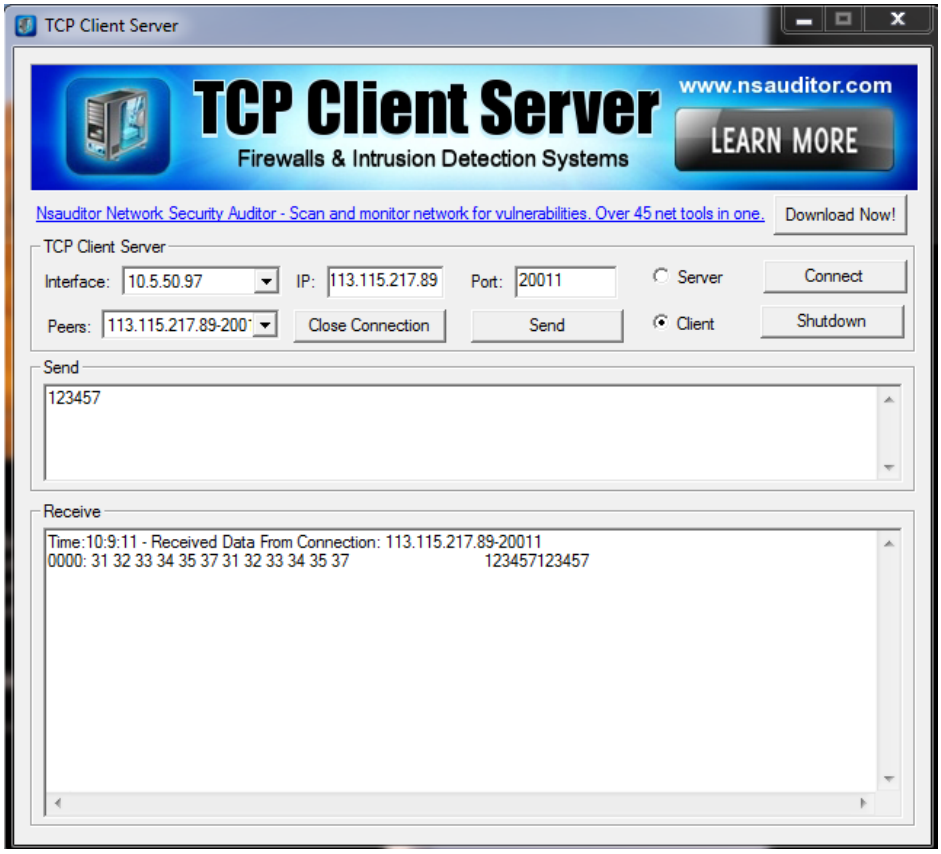

Figure 2-12 Connect with TCP server

2.4. Modbus-Net-Bridge

2.4.1. Parameter Settings

Step 1: See chapter 2.1 Configuring Network Connection.

Step 2: Click **Application center**. Set **Application center link mode** (Modbus-Net -Bridge), as shown in Figure 2-13.

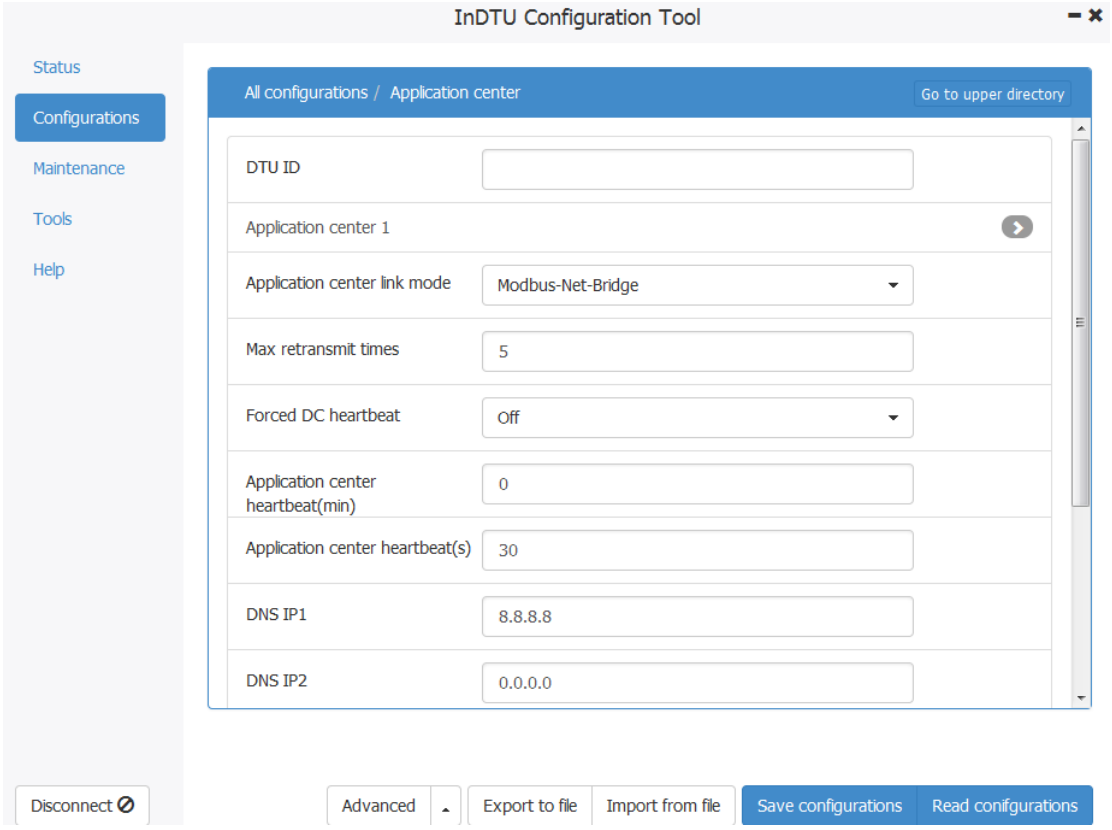

Figure 2-13 Modbus-Net-Bridge

Note

The communication port will be 502 under modbus-net-bridge mode.

Step 3:(optional) Choose **All configurations** > **ICMP**, and set the three ICMP options. The ICMP host address must be successfully pinged in 7/24 hours.

2.4.2. Test

Step 1:Connect the serial cable with serial port 2

Step 2:Status>Network layer to check the IP address which assigned to DTU.

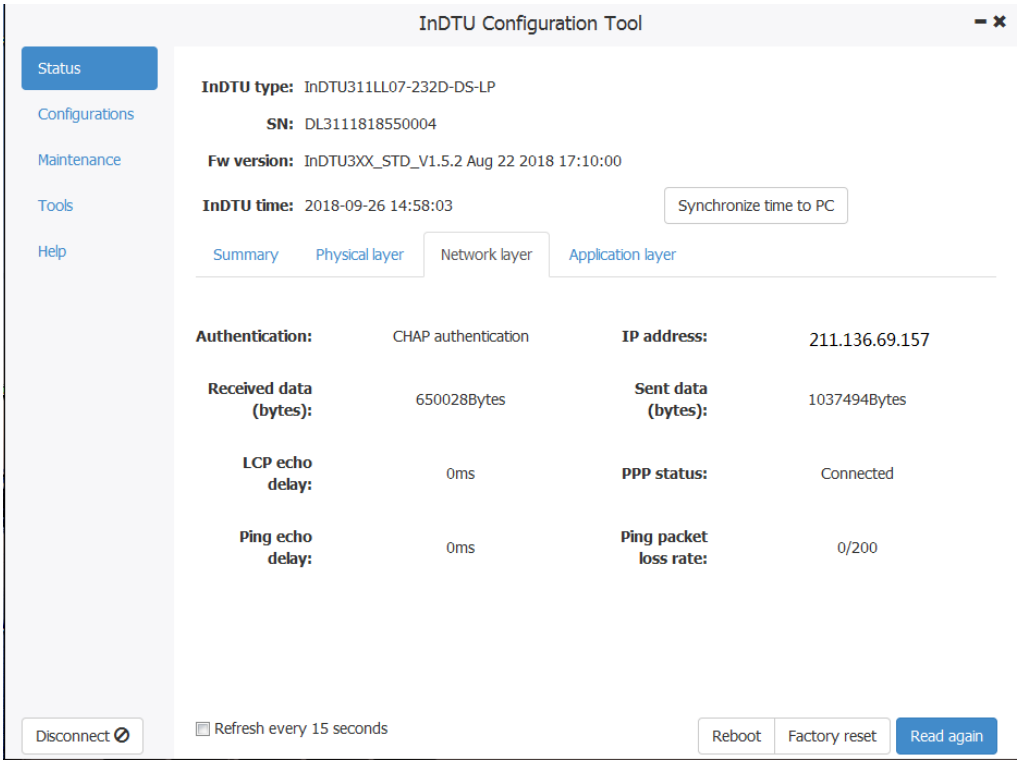

Figure 2-14 IP address of DTU modem

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 2-15.

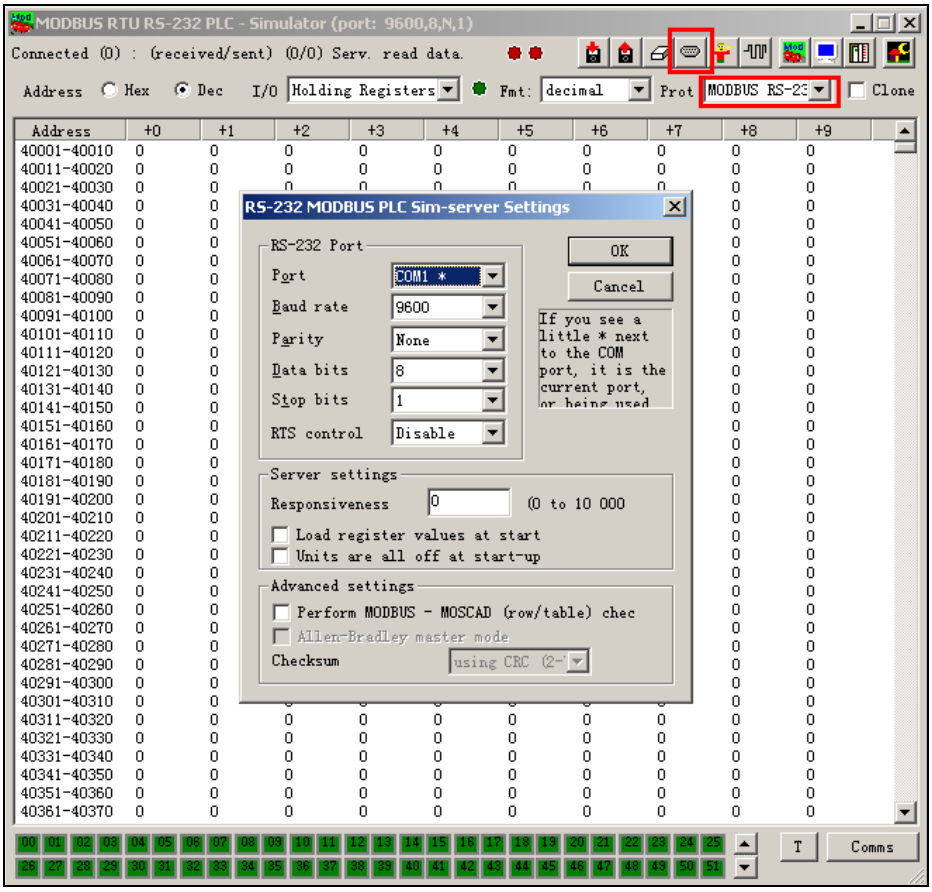

Figure 2-15 Modbus salve connect with serial port

After the settings are complete, data transmission starts, as shown in Figure 2-16.

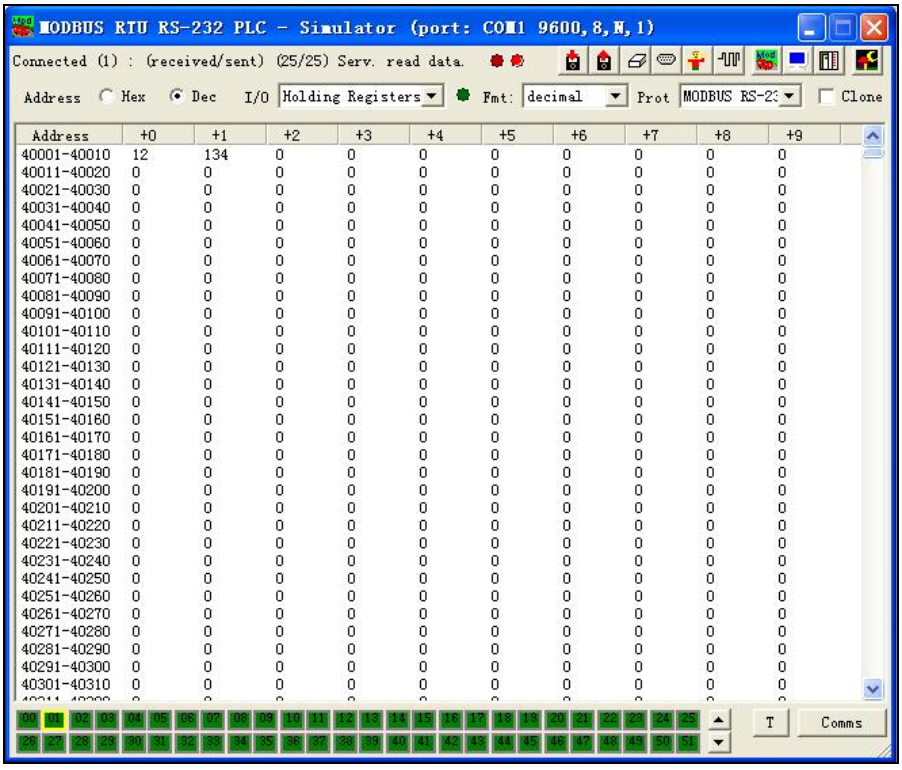

Figure 2-16 Modbus salve simulate data value

Step 4: Run the ModScan32.exe tool, choose **Connection** > **Connect**. In the pop-up dialog box, set **IP Address** to the IP address of DTU and **Service** to 502, as shown in Figure 2-17.

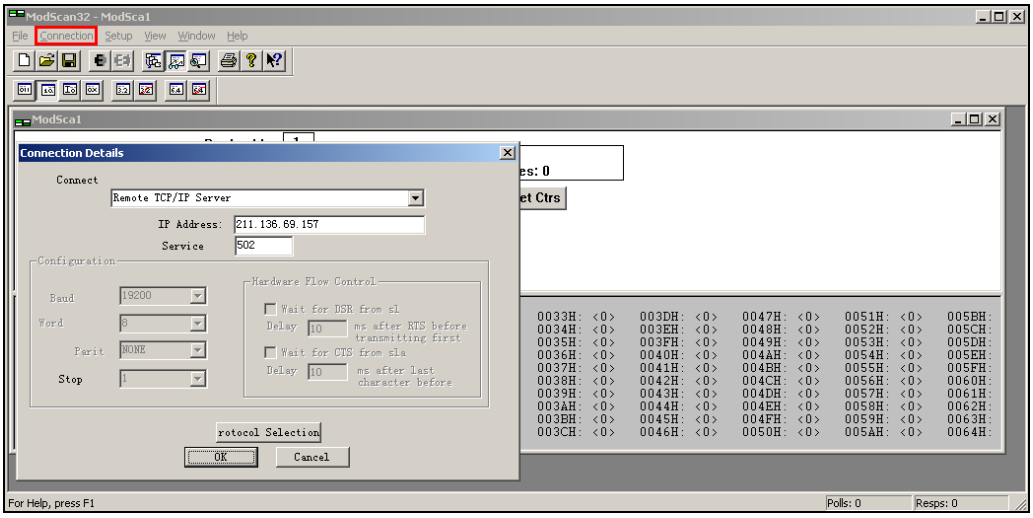

Figure 2-17 Modbus master connect with TCP server

After the settings are complete, ModScan32.exe starts to receive data, shown as below.

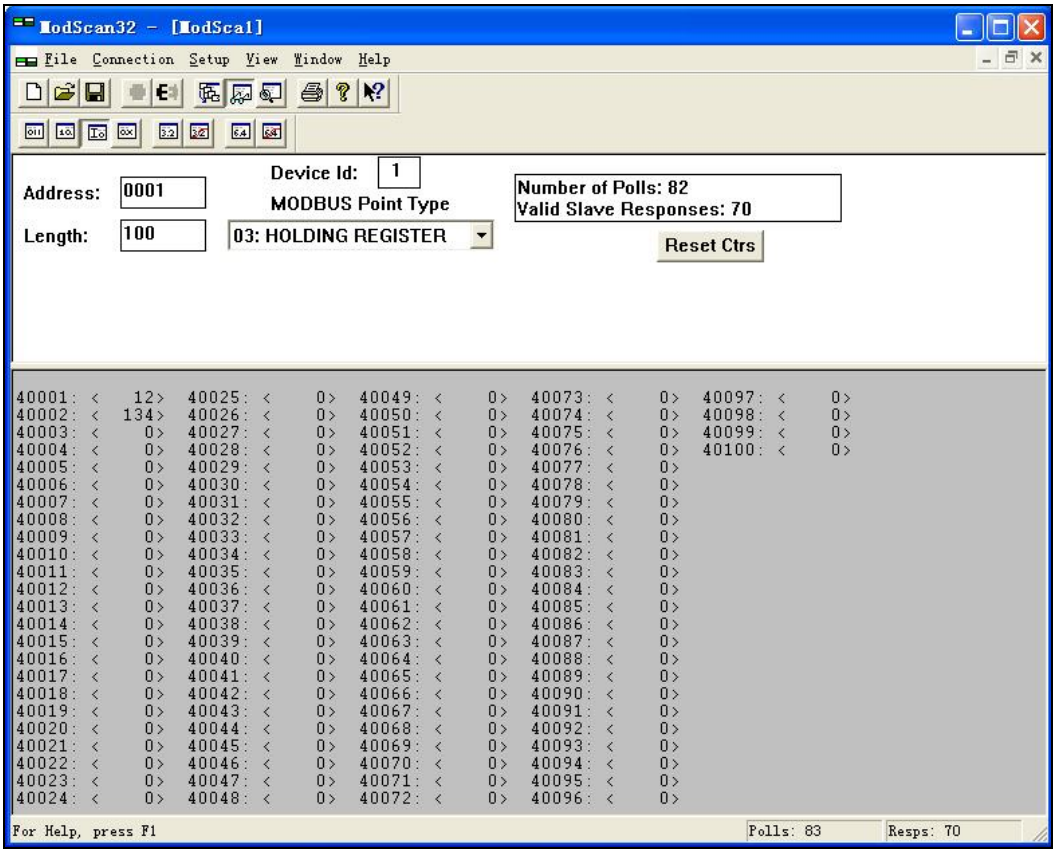

Figure 2-18 Modbus master receive data

2.5. Setting 101-to-104

2.5.1. Parameter Settings

Step 1: See 2.1 Configuring Network Connection.

Step 2: Choose **101 parameters** > **101 to 104 protocol**, and set parameters, as shown in Figure 2-19. It is recommended to retain the default parameter settings.

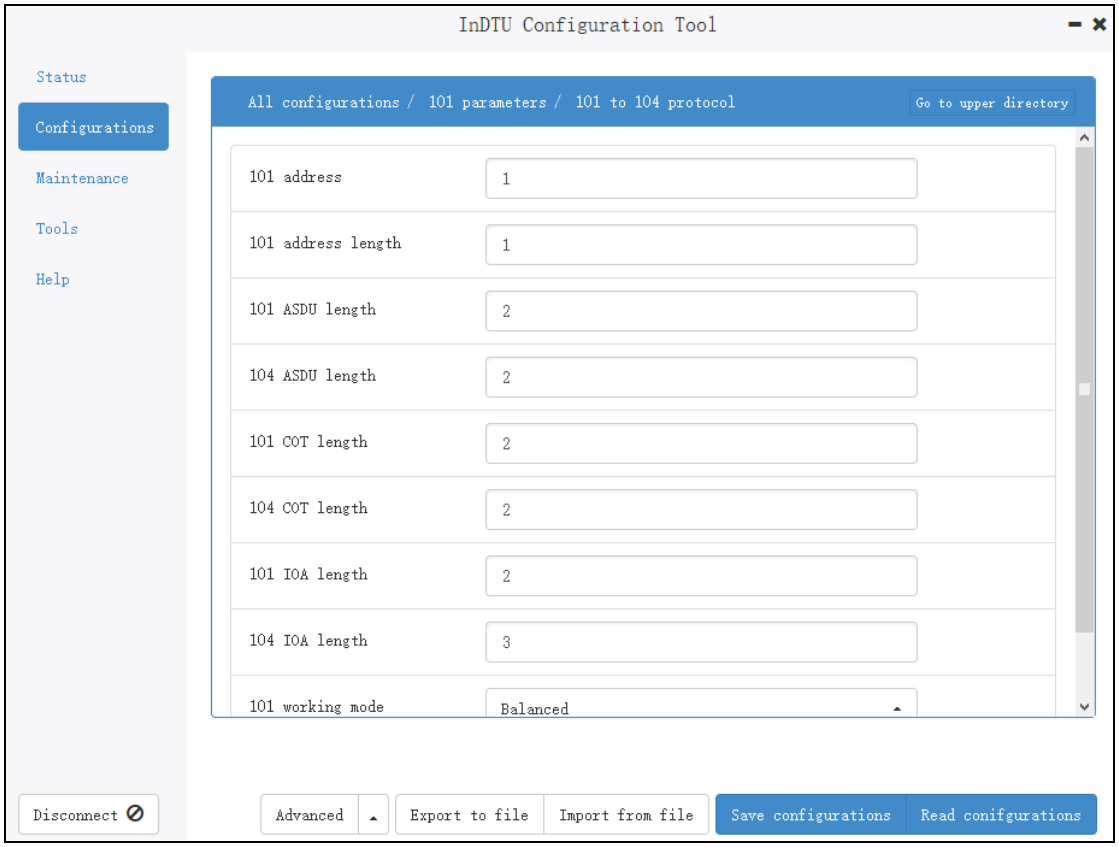

Figure 2-19 101-to-104 setting 1

Step 3: Choose **All configurations** > **GPRS**, and set **APN**, as shown in Figure 2-29. The following figure shows an example for private network, in which the APN is in Beijing. Modify the settings according to your region.

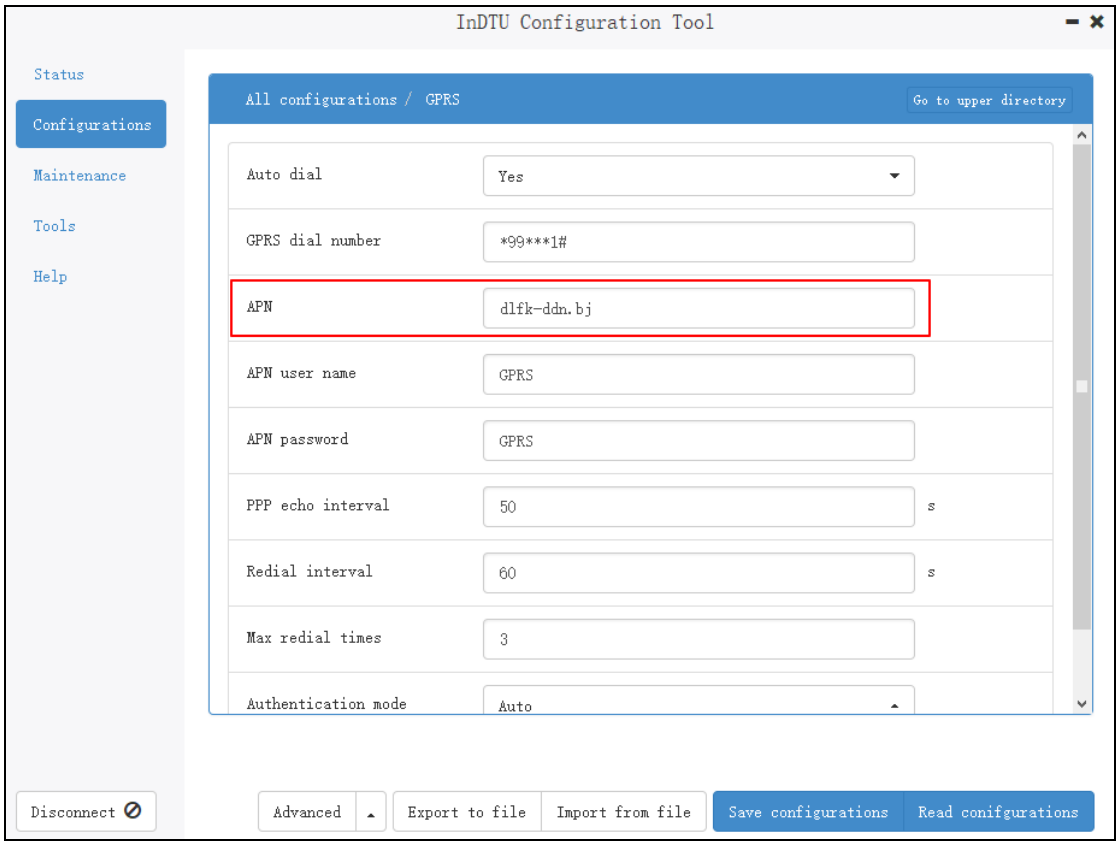

Figure 2-20 101-to-104 setting 2

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

2.5.2. Setting 101 Slave Station: DTU is the 101 Master Station

1) InDTU, which functions as the 101 master station, is connected to the 101 slave station through the serial port. Therefore, the baud rates, stop bits, parities, and data bits on the 101 slave and master stations must be identical. Set the **Link Transmission Procedure** value (choose **101 parameters** > **101 to 104 protocol**) of the DTU to **Balanced Transmission**, which must be the same as that on the 101 slave station. Set the 101 link address length (choose **101 parameters** > **101 to 104 protocol**) of the DTU to 1, which also must be the same as that on the 101 slave station, as shown in Figure 2-21.

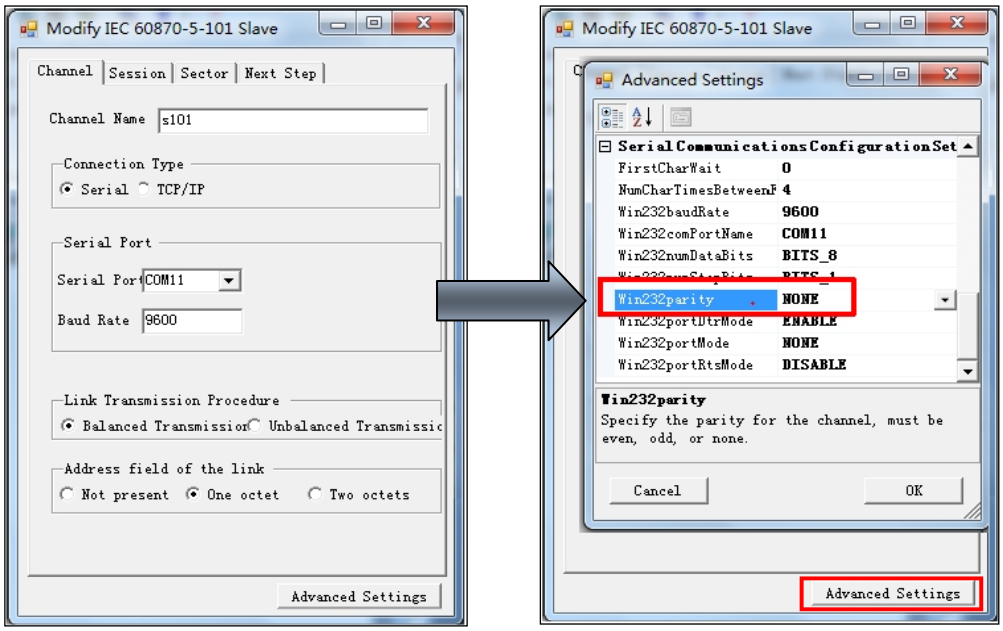

Figure 2-21 101 slave station setting 1

2) Choose **101 parameters** > **101 to 104 protocol**. Set **Link address** to be the same as the 101 link address. Set the 101 ASDU address size to 2, 101 COT size to 2, and 101 IOA size to 2, which must be the same as the settings on the 101 slave station, as shown in Figure 2-22.

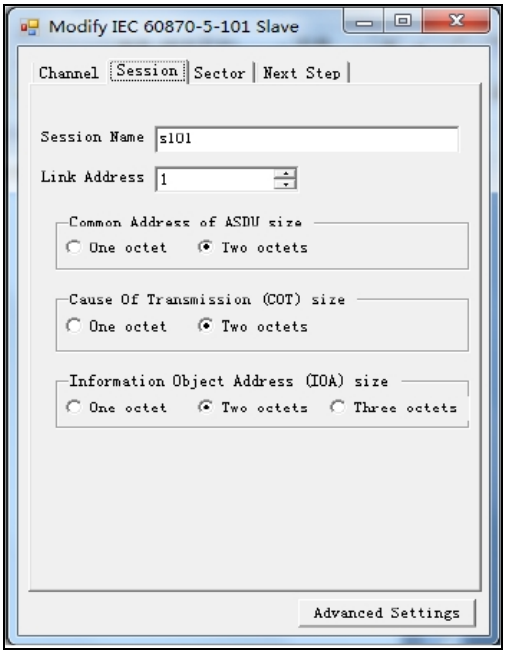

Figure 2-22 101 slave station setting 2

3) Choose **101 parameters** > **Other**. Set the common 101 address to be the same as the ASDU address of the 101 slave station, as shown in Figure 2-23.

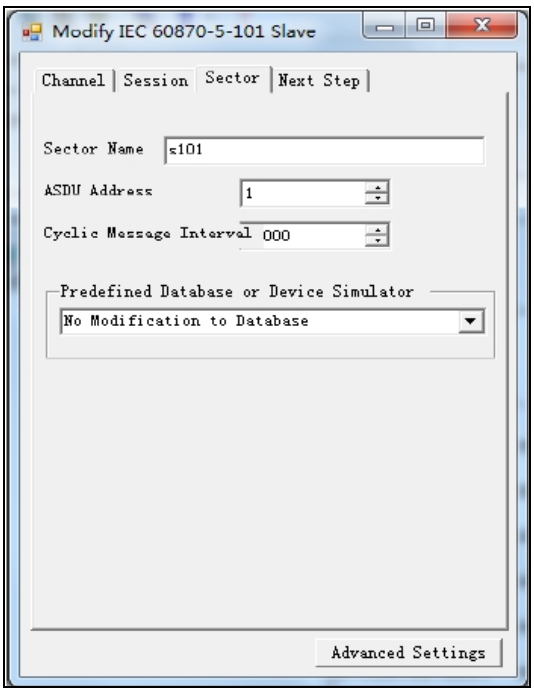

Figure 2-23 101 slave station setting 3

4) Successful connection log is shown in Figure 2-24.

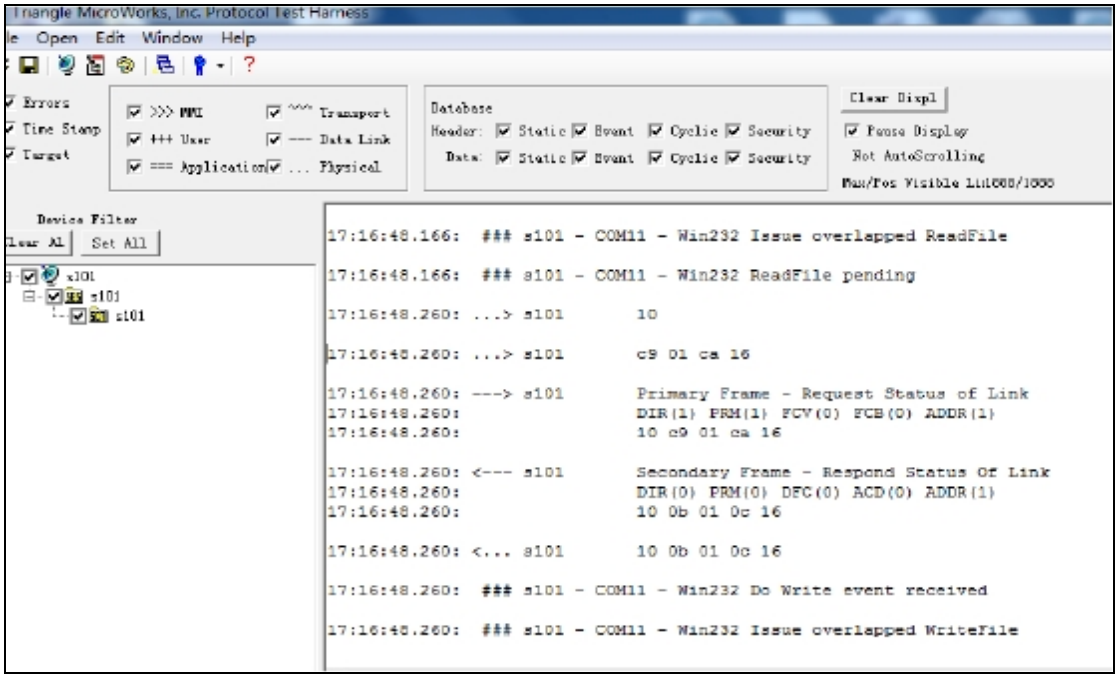

Figure 2-24 Successful configuration log

2.5.3. Setting 104 Master Station: DTU Is the 104 Slave Station

1) Set **Host** to the private network IP address obtained by DTU, enter the fixed value 2404 into **Port**, and set **Local IP** to the IP address of the PC running the 104 software, as shown in Figure 2-25.

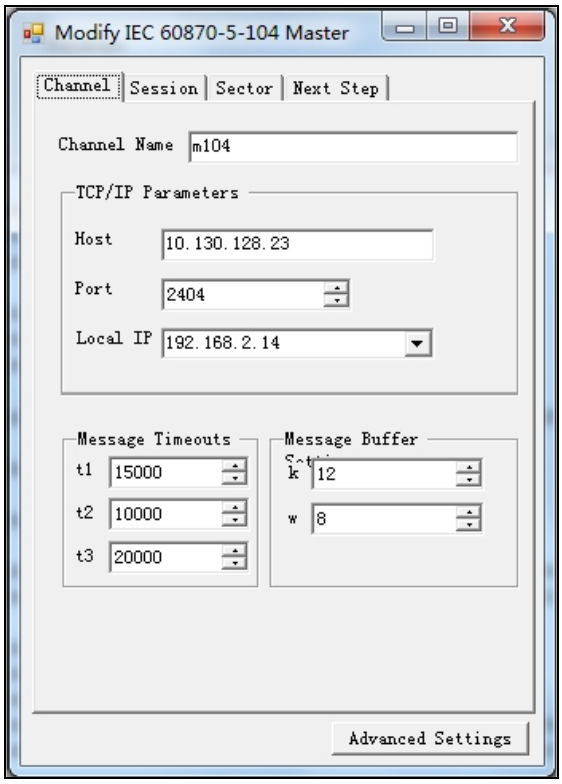

Figure 2-25 104 master station setting 1

2) Set **101 parameters** > **101 to 104 protocol** > **104 COT size** to 2, which must be the same as that on the 104 master station, as shown in Figure 2-26.

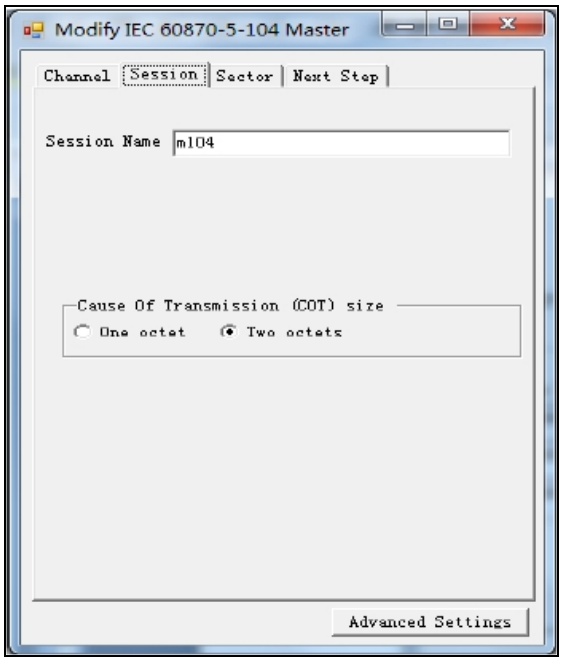

Figure 2-26 104 master station setting 2

3) Set ASDU Address to be the same as that on the 101 slave station (choose **101 parameters** > **Other**. The common 101 address must be the same as the ASDU address of the 101 slave station), as shown in Figure 2-27.

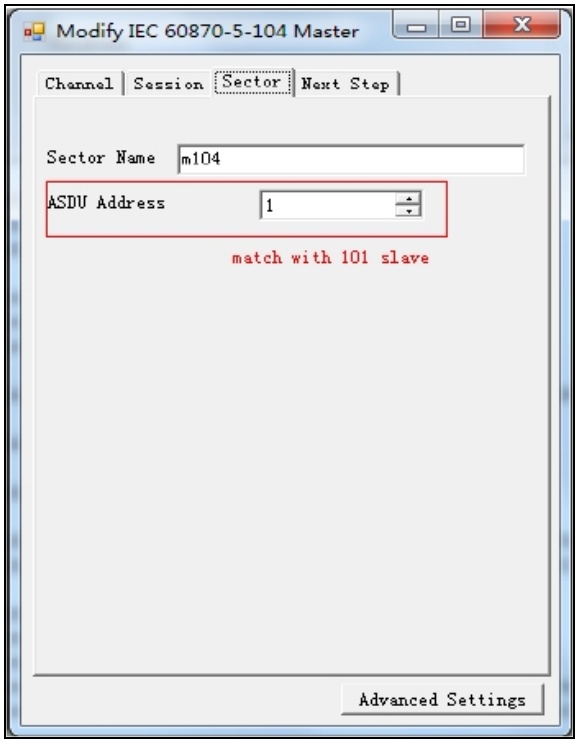

Figure 2-27 104 master station setting 3

4) Successful connection log is shown in Figure 2-28.

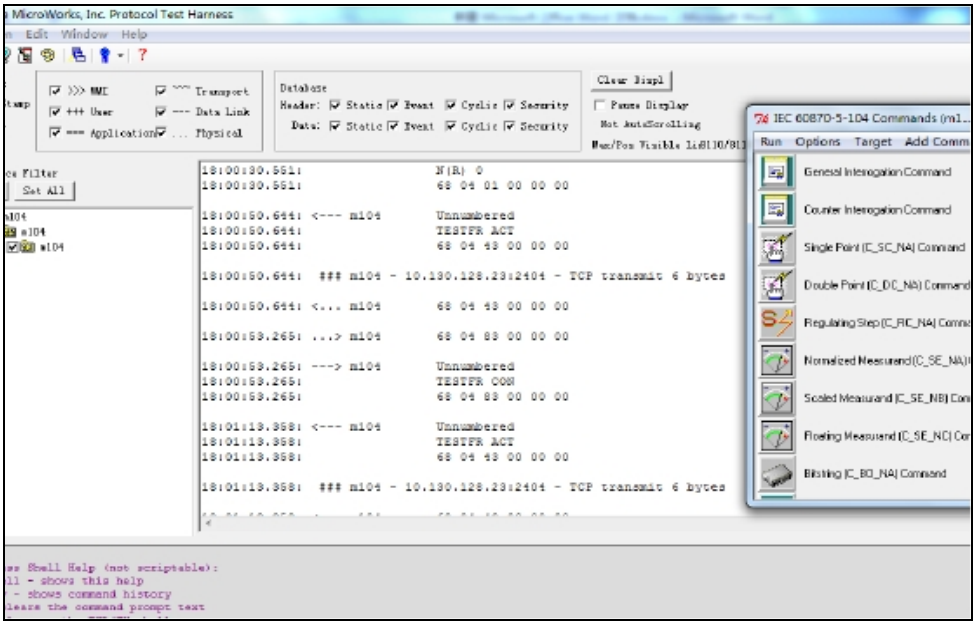

Figure 2-28 Successful configuration log

2.6."Troy" mode

Select the "Advanced mode" in DTU Tool, Click Configurations>All configurations>Muti-center machanism, Set Max reconnect interval as "troy", then

save configuration and restart it, as shown in Figure 2-29. When the DTU work in "troy" mode. The LED "Status" and "SIM" will blink fast alternatively.

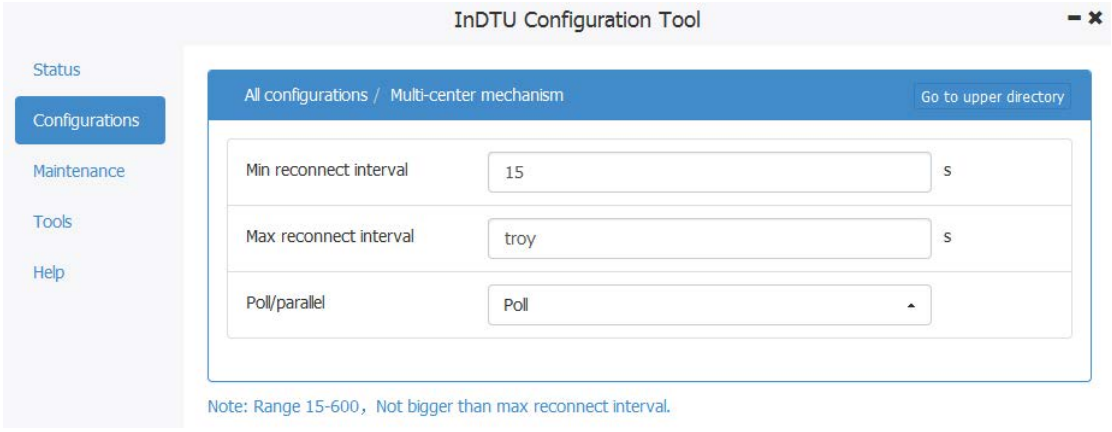

Figure 2-29 "Troy" mode

In "troy" mode, we can interaction with modem by AT command in serial port 1. For detail about the AT command about Siemens MC55iR3, please refer to the article which named as MC55i AT Command set. The DTU Tool still can interaction with DTU by the serial port 2.

[11:36:49.304] at
OK //The modem response "OK" for AT
[11:37:00.705] at+CSQ
+CSQ: 19,7 //The modem response singnal strength
[11:37:14.363]at+IPR?
+IPR: 115200 //The modem response baud rate of serial port
OK

[11:37:15.361]exit //exit the "troy" mode

2.6.1.Send SMS by standard AT command

[14:45:03.599]AT
OK //Test the communication with modem.

[14:45:09.589] AT+CSQ
+CSQ: 31,99
OK //The modem response singnal strength

[14:45:12.599] AT+CREG?
+CREG: 0,1
OK //The modem register into local celluar network.

[14:45:05.729]AT+CMGF? //Check the SMS mode, 1--means text mode.
+CMGF: 1

OK

[14:46:08.190]IN←◆AT+CMGS="18375794875"

> Hello from standard AT
> 0x1a //send 0x1a with hex style

+CMGS: 32 //send SMS scucessfully, and return a mark id(0-255)
OK

2.7."55AA" command

For the DTU, InHand Networks provide a serial command to driver the DTU in serail interfaces. These command have a prefix "55 AA". These command will be sent to DTU with Hex format.For the detail information, please refer to the article which named as the command interface based on DTU serial port.

The SSCOM simulate the PLC to connect with the serial interface of DTU.

2.7.1.Send SMS

Send one SMS "1324" to phone number "13219096546" from the DTU.

[17:12:50.395]OUT→◇55 AA 55 AA 13 00 1E 81 80 00 0B 31 33 32 31 39 30 39 36 35 34 36 81 81 00 01 02 81 82 00 06 31 33 32 44 54 55 E8 09
[17:12:50.656]IN←◆AA 55 AA 55 17 00 05 81 89 00 01 02 38 72
[17:12:57.519]IN←◆AA 55 AA 55 17 00 05 81 89 00 01 01 A3 40

Figure 2-30 Send SMS by "55AA" command