

# 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	Window name, menu name and button name are in bold characters. For			
Characters	example, the pop-up window <b>New User</b> .			
	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 <b>New,</b> which is under the menu <b>File.</b>			

#### **Symbols**

The meanings of the symbols are as follows:



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

#### Note 0

Notes contain detailed descriptions and helpful suggestions.

#### **Technical Support**

For technical support, please contact: Tel: +1 (703) 348-2988 (USA) E-mail: <u>support@inhandneworks.com</u>

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# **1 Product Overview**

# **1.1System 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°C to +70°C

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:

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	The second because the strain of the transmission of the transmission of the strain of	
transmission	Transmits application data transparently in two directions.	
Long connection	DTU will actively dial up and establish a PPP link.	
	DTU does not actively dial up and establish a PPP link. According to	
Short connection	different configurations, there will be different activation policies, and	
	dialing and networking will start after activation.	
Local data activo	In short connection mode, the network can be activated via local data	
	transmission when the device is in hibernation	
	In short connection mode, when the device is in hibernation, the network	
Phone active	can be activated by phone call.	
	InDTU332N does not support this feature.	

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

#### Table 1-2 Network functions

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

Function			
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		
LOg Storage	configuration tool or serial port.		
DM remete network	Once enables the DM function, Through the DM platform, you can read		
Divi remote network	and update its configurations, read device status, perform remote		
management	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	Supports remote configuration, forcible login, status query, and reboot.		
management			
	Supports multiple IP centers in poll or parallel mode.		
Multi-center	The application cernter IP center must be configured firstly, and then		
	configure the extended center in sequence.		

#### Table 1-3 Advanced functions



#### l 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

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
V+	Power Positive	ripple wave lower than 100 mV.

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	On		On	Off
connecting center.			UII	UII
Dialing is successful, but	On		On	On
failed to connect to center.			Oli	Oli
Connected to the center.	On		Blinking slowly with the same frequency	
Short connection to be	On		Off	Plinking clowly
activated.			Oli	DIIIIKIIIg Slowly
SIM card is faulty.	On		Blinking slowly	On
In TROY mode.	On		Blinking fast alternatively	

# **3 Quick Start**

# **3.1View 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.

	In	DTU Configuration Too	1	- >
Status	All configurations / Other			Go to upper directory
Maintenance	Max log-in times	5		
Tools	Allow teinet	No		•
nep	Debug mode	Yes(serial port 2)		-
	Debug level	Detailed log		•
	Low power consumption	Balanced		•
	Password for blue-tooth key	12345678		
l				
Connect ++	Advanced	Export to file Import	from file Save configurations	Read configurations

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.

InDTU Configuration Tool			
Status	Victory los		
Configurations	(A)(2000)(0)2010 0 20 10:10:26 DTAL (CTW ) ( )	^	
Waintenance	<0/32007002016-6-23 10:10:30 DIAL :SIM not inserted <6><3211><0>2018-8-23 10:10:39 DIAL :SIM not inserted		
maintenance	<6><3214><0>2018-8-23 10:10:42 DIAL :SIM not inserted		
Tools	<6><3217><0>2018-8-23 10:10:45 DIAL :SIM not inserted		
	<pre>&lt;0&gt;&lt;322U&gt;&lt;0&gt;2018-8-23 10:10:34 DIAL :SIM not inserted (6)&lt;3233&gt;&lt;0&gt;2018-8-23 10:10:51 DIAL :SIM not inserted</pre>		
Help	<6><3226><0>2018-8-23 10:10:54 DIAL :SIM not inserted		
	<6><3229><0>2018-8-23 10:10:57 DIAL :SIM not inserted		
	<6><3232><0>2018-8-23 10:11:0 DIAL :SIM not inserted		
	<6><3235><0>2018-8-23 10:11:3 DIAL :SIM not inserted		
	<6><3238><0>2018-8-23 10:11:6 DIAL :SIM not inserted		
	<6><3241><0>2018-8-23 10:11:9 DIAL :SIM not inserted		
	<pre>(0)(3244)(0)2018-8-23 10:11:12 DIAL :SIM not inserted (6)(3247)(0)2018-8-23 10:11:15 DIAL :SIM not inserted</pre>		
	(5)(3247)(0)2018-8-23 10:11:15 DIAL .Module AT+CIMI timeout goto evit		
	<6><3258><0>2018-8-23 10:11:26 SYSWATCHER:Task dial sig handle, signo:3		
	<6><3258><0>2018-8-23 10:11:26 DIAL :Start		
	<6><3258><0>2018-8-23 10:11:26 DIAL :Args->dial.ppp_echo_interval:50		
	<6><3258><0>2018-8-23 10:11:26 DIAL :Args->dial.last_dial_ts:3258		
	<6><3258><0>2018-8-23 10:11:26 DIAL :Args->dial.apn:cmnet		
	<6><3258><0>2018-8-23 10:11:26 DIAL :Args->dial.number:*99***1#		
	<6><3258><0>2018-8-23 10:11:26 DIAL :Args->dial.name:GPRS		
	<pre>&lt;0/3238/0/2018-8-23 10:11:20 DIAL :Args-/dial.password:GPKS </pre>		
	<pre>(0/\3238/(0/2016-6-23 10:11:20 DIAL :Args-/sms.center:0013000100300 (6)(3258)(0)2018-8-2</pre>		
		~	
Disconnect Ø	Erase log on DTU Export log Start reading	Stop reading	

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.

	InD	TU Configuration Tool	L	- ×
Status Configurations	All configurations / Other			Go to upper directory
Maintenance	Max log-in times	5		
Tools	Allow telnet	No		•
Help	Debug mode	Yes(serial port 2)		•
	Debug level	Detailed log		•
	Low power consumption	Low power consumption		•
	Password for blue-tooth key	12345678		
Disconnect Ø	Advanced . Export to	file Import from file	Save configurations	Read conifgurations

Figure 3-2 Importing/Exporting configuration



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.

	InDTU Configuration Tool	- ×
Status Configurations Maintenance Tools Help	Upgrade firmware Firmware of InDTU: Browse file	
	Image: State       ? ×         Look in:       ? ? *         Image: State       ? ? *         Image: State       ? ? *         Image: State       ? *	
Disconnect Ø	Files of type: Upgrade file(*.IHD)	Jpgrade

Figure 3-4 select firmware



Figure 3-5 upgrade firmware

	InDTU Configuration Tool	- ×
Status Configurations Maintenance Tools	Upgrade firmware Firmware of InDTU: E:/Inhand_PD_DTU/InDTU_Image/InDTU3XX_STD_V1.5.2.IHD	
Help	Upgrading successfully         DTU will switch to new firmware version after reboot.         OK         OK         Reboot DTU now?         No         Yes	
Disconnect Ø		Upgrade

### Figure 3-6 popup after upgrade

2		14:53		
-			InDTU Configuration Tool	- ×
B	Status	InDTU type: InDTU	J332GS52	
	Configurations	Serial number: DG33	21312079327	
l	Maintanana	Software version: InDTU	J3XX_STD_V1.5.2 Aug 22 2018 17:10:00	
i	Maintenance	InDTU time: 2019-	01-21 14:57:16	Synchronize time to PC
	Tools	Reboot info: Softw	are reboot	
	Help	Summary Physical laye	er Network layer Application layer	
- 거방 · 북성 · D명 · 북과		InDTU	Base station	Application center
1	Disconnect Ø	Refresh every 15 seconds		Reboot Factory reset Read again



# **4** Parameter Settings

# 4.1Local 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.

Parameters	Description	Default
David nata	1200, 2400, 4800, 9600, 14400, 19200, 38400, 57600, or	9600
Bauurate	115200, in bps	
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	Retain the default value.	5
timeout		
Max frame size	1024 by default, range: (10-1024)	1024

Table 4-1 Parameter settings for serial port

### 4.2Work Mode

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

Table 4-2 Setting DTU working 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
	Once consecutive failed redial times reach to the	
Max redial times	predefined limit (1-10), the device will automatically	3
	hot restart.	
Dual SIM mode	Enable this function before use SIM No.2.	Close
Dual Silvi mode	This parameter is invalid for single-card version of DTU	CIUSE
Switchover card when	This parameter is invalid for single card version of DTU	Close
fail to connect center	This parameter is invalid for single-card version of DTO	CIUSE
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.	

# **4.4Application Center**

Table 4-4 Setting application center parameters

Parameters	Description	Default	
DTUUD	Custom device identification number. It supports 11	0001	
טוטוט	digits number.	0001	
	The IP address, port number, and domain name of	0000/	
Application contor	the center.	0.0.0/	
Application center	If the IP and domain name are configured, configure	omety/0	
	one only.	empty/0	
Application contor	TCP, UDP, DCTCP, DCUDP, or Modbus bridge		
Application center	The custom heartbeat frame for link maintenance is	ТСР	
link mode	recommnad when using UDP.		
Max retransmit times	0 (TCP automatically retransmits data times)	5	
	This function will take effect only for DC protorol.		
	"OFF" means that heartbeat will sleep when		
Forced DC heartbeat	transmitting data;	OFF	
	"ON" means that heartbeat always work even		
	transmitting data;		

Application center heartbeat (min)	The value ranges from 1 to 60,	1
Application center heartbeat (s)	this parameter.	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	Set the minimum interval at which TCP/UDP connection is	15	
interval	set up again.		
Max reconnect	Set the maximum interval at which TCP/UDP connection is	60	
interval	set up again.	00	
Poll/parallel	Parallel : sending data to each center simultaneously; Poll: the prioprity of excute, application center> application center 2> application center 3> application	Poll	
	center 4> application center 5		

# **4.7Other Settings**

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

Table 4-6 Setting application extension parameters



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

# 4.8InHand Device Manager (DM) platform

#### Table 4-7 Setting platform parameters

Parameters	Description	Default
	Set a 15-bit character string for the network	
SN	management platform to identify the device.	Empty
	It is defined when manufacture, cannot be modified.	
DM mode	Only SMS, SMS + IP, or disabled.	Only SMS
	The trusted list for accessing DTU, the DTU will interact	
White List	with white list phone number by SMS.	Empty
	If the list is empty, it will receive the SMS of anyone.	
51415	Enter the device ID used by the platform to identify the	0
טו וייוט	device.	0
		0.0.0.0/g.inhandnet
DM address	IP address 、 Doamin name and port number for DM	works.com/
		20003
Heart beat	Set the heartbeat interval between the DTU and the	120
interval	platform. The value ranges from 30 to 600 seconds.	120
Lindata	Set the update interval about DTU state information	
interval	between the DTU and the platform. The value ranges	3600
Interval	from 1 to 65535 seconds.	

### **4.9Administrator Account**

Parameters	Description	Default	
Administrator	Set the administrator account name.	adm	
Administrator	Set the password for the administrator account	122456	
password	Set the password for the administrator account.	123450	
Common user	Set the name of the common user.	adm	
Common user	Set the password for the common user	122456	
password	Set the password for the common user.	123456	

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

# 4.10 ICMP

Table	10	Catting		noromotoro
Iable	4-3	Jetting	ICIVIE	parameters

Parameters	Description	Default
DDC link Mightoneo	Maintain the link between the communication module and	Close
	the base station	Close
Detect interval when	Range 10~120 seconds, only for dual-SIM DTU.	
Detect interval when	If there is no communication data flow at this time interval,	10
Hetwork broken	ICMP detection will start.	
	The destination IP address for ICMP	
ICMP host	If the IP is empty, the application center IP will be detected	0.0.0.0
	by ICMP.	
Max lost packate	If the times of consecutive ICMP failure reaches this limit,	2
Max lost packets	DTU will redial.	5
ICMP detect interval	1 to 3600 seconds	55
Forced ICMD datest	"OFF" means that ICMP will sleep when transmitting data;	
Forced ICIVIP delect	"ON" means that ICMP always work even transmitting data.	UFF

# **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.

Parameters	Description	Default	
Login	The data content and format of submitted packet form DTU to	Empty	
LOG-III	application center when login	Еттрту	
Log in ack	The data content and format of responsed packet form	Empty	
LUg-III ack	application center to DTU when login	Еттрту	
l le anthe ant	The data content and format of heartbeat packet form DTU to	Empty	
пеатреат	application center after connected	Еттрту	
Heartbeat ack	The data content and format of heartbeat packet form	Empty	
	application center to DTU after connected	Еттрту	
log out	The data content and format of submitted packet form DTU to	Empty	
Log-out	application center when log-out	Еттрту	
Log out ack	The data content and format of responsed packet form	Empty	
Log-out ack	application center to DTU when log-out	спрту	

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



#### 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

# **5.1Base 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.

	InDTU Configuration Tool	- ×
Status Configuratio	All configurations / GPRS Go to upper dis	ectory
Maintenance	Connect to InDTU	
Help	User-name Connect via serial port Connect via blue-tooth adm Serial port COM7 -	
	Password Baud rate 115200 -	
	Forgot password? Property 8 - None - 1 -	
	Automatic 2	_
	Note: Place encode the encirl and an blue took eductor before using this application 3	*
1	Note. Flease connect the serial port of blue-tooth adapter before using this application.           Cancel         Connect           Advanced         Furget to file         Sam configurations         Read on if a	rationa
Connect	Advanced A Export to file import from file Save configurations Asad configu	rations .

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.

		InDTU Config	uration Tool	l	- ×
Status Configurations	All configurations / S	erial port 1			Go to upper directory
Maintenance	Baud rate	9600		•	
Tools	Data bit	8		•	
Help	Stop bit	1		•	
	Parity	None		•	
	Scan interval	2			100 ms
	Response timeout	5			5
	Max frame size	1024			bytes
	Flow control	Off		•	
					~
Disconnect 🖉	Advanced _ Exp	ort to file Imp	ort from file	Save configurations	Read conifgurations

Figure 5-2 Local serial port parameters



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.

		InDTU Configuration Tool	- ×
Status Configurations	All configurations / GPRS	1	Go to upper directory
Maintenance	Auto dial	Yes	•
Tools	GPRS dial number	*99***1#	
Неїр	APN	cmnet	
	APN user name	GPRS	
	APN password	GPRS	
	PPP echo interval	50	s
	Redial interval	60	s
	Max redial times	3	
	Authentication mode	Auto	•
Disconnect 🖉	Advanced _ Export	to file Import from file Sav	ve configurations Read conifgurations

Figure 5-3 Dialing parameters

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



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 <u>5.1 Base Configuration</u>.

Step 2: Click "Confgigurations>>Application center", Select TCP for the "Application center link mode", as shown in Figure 5-4.

	All configurations / Application c	enter	Go to upper direc
figurations	(		
ntenance	DTU ID		
ls	Application center 1		Ø
)	Application center link mode	ТСР	-
	Max retransmit times	5	
	Forced DC heartbeat	Off	•
	Application center heartbeat(min)	0	
	Application center heartbeat(s)	30	
	DNS IP1	8.8.8.8	
	DNS IP2	0.0.0.0	
No	bte: When selected transparent UD	P protocol and do not use domain name, user	defined heartbeat packet or I

Figure 5-4 TCP setting 1

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

		InDTU Configuration Too	1	- ×
Status Configurations	All configurations / App	plication center / Application	center 1 c	Go to upper directory
Maintenance	IP	52.80.48.255		
Tools	Domain			
нетр	Port	30006		
Disconnect Ø	Advanced _ Expor	t to file Import from file	Save configurations	Read conifgurations

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 <u>5.2.1 Parameter Settings</u>. 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.

3	TCP Cli	ent Server		- 🗆 X
TCP Firew	Clien	t Serve		auditor.com N MORE
Nsauditor Network Security Au	ditor - Scan and mo	nitor network for vu	lnerabilities.	Download Now!
TCP Client Server Interfac 172.31.129.6	IP: 172.31.129.6	Port  30005	© Server	Listen
Peers 💌	Close Connection	Send	○ Clien	Shutdown
Receive				
				>

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.

0	TCP Clie	ent Server		- 🗆 X
TCP Firew	Client ralls & Intrusion D		LEAR	auditor.com N MORE
Nsauditor Network Security Au	ditor - Scan and mor	nitor network for v	ulnerabilities	Download Now!
TCP Client Server			_	
Interfac 172.31.129.6 💌	IP: 172.31.129.6	Port 30005	Server	Listen
Peers 119.4.253.24-3823 💌	Close Connection	Send	C Clien	Shutdown
Send [123456789 Receive Time:10:12:49 - New Connecti	on Detected: 119.4.	253. 24-38234		
<				× >

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.

Untitled - Serial Port Utility		- 🗆 X	¢
File Edit View Tools Help			
] 🖹 ∞ 🕨 🚺 🔳 O-   +	· — 🛅 🎲		
Serial Port Setting Port USB Serial Port(COM 💌	UK <7><169><0>2018-8-31 10:14:4 TCPIP in pbuf len=49	• :pppInput[0]: ip	E
Baudrate 115200 💌 Data Bits 8 💌	<pre>&lt;7&gt;&lt;169&gt;&lt;0&gt;2018-8-31 10:14:4 TCPIP 52.80.48.255,len=49</pre>	':Rcv IP pkt from:	
Parity None	<pre>&lt;7&gt;&lt;169&gt;&lt;0&gt;2018-8-31 10:14:4 TCPIP 0x fcf25ad8</pre>	' :tcp_input_seqno:	
Flow Type None	<pre>&lt;7&gt;&lt;169&gt;&lt;0&gt;2018-8-31 10:14:4 APP 313233343536373839 </pre>	:App net read 9B	
Receive Setting	<pre></pre> <pr< td=""><td>App serial write</td><td></td></pr<>	App serial write	
⊙ Text C Hex ☐ Auto Feed Line	313233343536373839 <7><170><0>2018-8-31 10:14:4 TCPIP 52.80.48.255.1en:20	':send pkt to	
☐ Display Send ☐ Display Time	<pre>&lt;7&gt;&lt;170&gt;&lt;0&gt;2018-8-31 10:14:4 TCPIP &lt;7&gt;&lt;170&gt;&lt;0&gt;2018-8-31 10:14:4 TCPIP &lt;7&gt;&lt;170&gt;&lt;0&gt;2018-8-31 10:14:4 TCPIP &lt;7&gt;&lt;180&gt;&lt;0&gt;2018-8-31 10:14:15 TCPIP</pre>	Υakeup modem Υ:Wakeup failed! Γ :popWrite[0]:	-
Send Setting			
Loop 1000 ms			
			-
COM7 OPENED, 115200, 8, NONE, 1, O	FF Rx: 47,814 Bytes Tx: 0 Bytes		

Figure 5-8 TCP Example 3

### 5.3Transparent UDP

### 5.3.1 Parameter Settings

Select UDP for the "Application center link mode", the other configuration are same with section <u>5.2.1 Parameter Settings</u>.

### 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 <u>5.3.1 Parameter Settings</u>.

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.

		InDTU Co	onfiguration Tool	1	- ×
Status Configurations	All configuratio	ms / User defined p	packets / Log-in		Go to upper directory
Maintenance	Packet type	HEX			•
Tools	Packet body	3132	33		
нетр					
Connect ↔	Advanced	Export to file	Import from file	Save configurations	Read conifgurations

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.

		InDTU Co	onfiguration Too	1	- ×
Status	All configuration	s / User defined p	packets / Heart beat	:	Go to upper directory
Maintenance	Packet type	ASCI	I		•
Tools	Packet body	abc			
нетр					
Connect ↔	Advanced 🔺	Export to file	Import from file	Save configurations	Read conifgurations

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.

2	UDP Client Server	= - X
	Network Utility for Testing Network Programs	www.nsauditor.com
<u>Nsaudite</u> _WDP Cli	n Network Security Auditor - Scan and monitor network for vulne ent Server	rabilities. Download Now!
Interf	ue 172.31.129.6 • IP: 172.31.129.6 1 Port 30005	
2	Start Server Shutdown Send Text	Send Binary Data
Send-		^ ~
Receive		
<		>

Figure 5-11 UDP Example 3

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

Ucip Client Server       www.nsauditor.com         Network Utility for Testing Network Programs       LEARN MORE         Nsauditor Network Security Auditor - Scan and monitor network for vulnerabilities.       Download No         VDP Client Server       Interfac 172.31.129.6       IP: 172.31.129.6         Port 30005       IP: 172.31.129.6       Port 30005	s !
Send Binary Data	<u> </u>
Receive	
0000: 61 62 63 abo	-
123	
	~

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 <u>5.1 Base Configuration</u>.

Step 2: Click "Confgigurations>>Application center", set special port number for "Local TCP server port", as shown in Figure 5-13.

All configurations / Application center Go to upper director Forced DC heartbeat Off  Application center 1 heartbeat(min) Application center 0 heartbeat(s) DNS IP1 8.8.88 DNS IP2 0.0.0.0 SNTP server IP 116.105.109.101 Exchange local serial ports Off  Local TCP server port 21022			
Forced DC heartbeatOffApplication center1heartbeat(min)0Application center0heartbeat(s)8.8.8.8DNS IP18.8.8.8DWS IP20.0.0.0SNTP server IP116.105.109.101Exchange local serial portsOffLocal TCP server port21022	All configurations / Appl	ication center	Go to upper director
Application center heartbeat(min)1Application center heartbeat(s)0DWS IP18.8.8.8DWS IP20.0.0.0SNTP server IP116.105.109.101Exchange local serial portsOffLocal TCP server port21022	Forced DC heartbeat	Off	•
Application center       0         heartbeat(s)       0         DNS IP1       8.8.8.8         DNS IP2       0.0.0.0         SNTP server IP       116.105.109.101         Exchange local serial ports       Off         Local TCP server port       21022	Application center heartbeat(min)	1	
DNS IP1       8.8.8.8         DNS IP2       0.0.0.0         SMTP server IP       116.105.109.101         Exchange local serial ports       Off         Local TCP server port       21022	Application center heartbeat(s)	0	
DNS IP2       0.0.0.0         SMTP server IP       116.105.109.101         Exchange local serial ports       Off         Local TCP server port       21022	DNS IP1	8.8.8.8	
SNTP server IP     116.105.109.101       Exchange local serial ports     Off       Local TCP server port     21022	DNS IP2	0.0.0.0	
Exchange local serial ports Off   Local TCP server port 21022	SNTP server IP	116. 105. 109. 101	
Local TCP server port 21022	Exchange local serial por	ts Off	•
	Local TCP server port	21022	

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.

	I	nDTU Configuration Too	1	- ×
Status	All configurations / ICMP			Go to upper directory
Maintenance	ICMP host	202.106.0.20		
Tools	Max lost packets	3		
Help	ICMP detect interval	55		S
	Forced ICMP detect	Off		•
Disconnect ⊘	Advanced . Export	to file Import from file	Save configurations	Read conifgurations

#### 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 <u>5.1 Base Configuration</u>.

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.

	InDTU Configuration Tool	-
Status	All configurations / Application center	Go to upper directory
Maintenance	DTU ID	
Tools	Application center 1	Ø
Help	Application center link mode Modbus-Net-Bridge	•
	Max retransmit times 5	
	Forced DC heartbeat Off	•
	Application center 0 heartbeat(min)	
	Application center heartbeat(s) 30	
	DNS IP1 8.8.8.8	
	DNS IP2 0.0.0.0	
Disconnect 🖉	Advanced Lexport to file Import from file Save	configurations Read conifgurations

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 <u>5.5.1 Parameter Settings</u>. Step 2: Status>Network layer to check the IP address which assigned to DTU.

		InDTU Configu	ration Tool		- ×				
Status Configurations Maintenance Tools	InDTU type:       InDTU311LL07-232D-DS-LP         SN:       DL3111818550004         Fw version:       InDTU3XX_STD_V1.5.2 Aug 22 2018 17:10:00         InDTU time:       2018-09-26 14:58:03         Synchronize time to PC								
Help	Summary Physical la	Network layer	Application layer						
	Authentication: Received data (bytes):	CHAP authentication 650028Bytes	IP address: Sent data (bytes):	: 113.115.211.41					
	LCP echo delay:	Oms	PPP status:	Conne	cted				
	Ping echo delay:	Oms	Ping packet loss rate:	0/20	00				
Disconnect 🖉	Refresh every 15 second	S		Reboot Factory res	et Read again				

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.

MODBUS RTU RS-232 PLC - 9	5imulator (port: 9600,8,N,1)			<u> </u>
Connected (0) : (received/ser	ut) (0/0) Serv. read data.	•• 🛕 🖬 🗗	<u> </u>	11 🚹
Address 🔿 Hex 💿 Dec	I/O Holding Registers 💌 4	Fmt: decimal 💌 Pr	ot MODBUS RS-23 💌 🛙	Clone
Address +0 +1	+2 +3 +4	+5 +6 +	7 +8 +9	
40001-40010 0 0	0 0 0	0 0 0	0 0	
40011-40020 0 0	0 0 0	0 0 0	0 0	
40021-40030 0 0	<u> </u>	<u> </u>		
	S-232 MODBUS PLC Sim-serv	ver Settings		
40041-40050 0 0	PG 000 P			
40061-40070 0 0	-K5-232 Fort	OK		
40071-40080 0 0	Port COM1 *	-	l õ õ	
40081-40090 0 0	Bund mater	Lancel	0 0	
40091-40100 0 0	Daud rate  9600	If you see a	0 0	
40101-40110 0 0	Parity None	little * next	0 0	
40111-40120 0 0		to the COM	0 0	
40121-40130 0 0	Data bits 8	port, it is the average port		
40131-40140 0 0	Stop bits 1	<ul> <li>or being used</li> </ul>		
40151-40160 0 0		=		
40161-40170 0 0	KIS control Disable	<b>_</b>	ŏ ŏ	
40171-40180 0 0			0 0	
40181-40190 0 0	Server settings		0 0	
40191-40200 0 0	Responsiveness 0	(O to 10 000	0 0	
40201-40210 0 0		1 -1	0 0	
40211-40220 0 0	Load register values a	it start		
40221 40230 0 0	Units are all off at s	tart-up		
40241-40250 0 0	-Advanced settings		o o	
40251-40260 0 0	Perform MODBUS - MOSC#	AD (row/table) chec	0 0	
40261-40270 0 0	L Allen-Bredley moster a	ade.	0 0	
40271-40280 0 0	Charlens Draubey master i	and (o : -	0 0	
40281-40290 0 0	Unecksum Jusin	ng UKU (2- 🔽	0 0	
40291-40300 0 0	-			
40301 40310 0 0 -	0 0 0	0 0 0	- 0 0	
40321-40330 0 0	ŏ ŏ ŏ	ŏ ŏ ŏ	õ õ	
40331-40340 0 0	o o o	ō ō ō	ō ō	
40341-40350 0 0	0 0 0	0 0 0	0 0	
40351-40360 0 0	0 0 0	0 0 0	0 0	
40361-40370 0 0	0 0 0	0 0 0	0 0	-
00 01 02 03 04 05 06 07 08	09 10 11 12 13 14 15 16	17 18 19 20 21 22 23	24 25 🔺 T 👔	
26 27 28 29 30 31 32 33 34	85 36 37 38 39 40 41 42	43 44 45 46 47 48 49	50 51 🔽	

Figure 5-17 Modbus-Net-Bridge example 2

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

🚟 LODBUS 1	RTU	RS-232 PL	C – Si	mulator	(port:	C011	9600, 8	, N, 1)			
Connected (1)	: (r	eceived/sent	.) (25/25	) Serv. r	ead data.		<b>a</b> 6	80	÷ 100	<b>8</b>	
Address C	Hex	🖲 Dec 🛛 I,	/O Holdi	ng Regist	ers 🔻 🏶	Fmt: d	ecimal	💌 Prot	MODBUS R	S-23.▼	└ Clone
Address	+0	+1	+2	+3	+4	+5	+6	+7	+8	+9	
40001-40010	12	134	0	0	0	0	0	0	0	0	
40011-40020	0	0	0	0	0	0	0	0	0	0	
40021-40030	0	0	0	0	0	0	0	0	0	0	
40031-40040	0	0	0	0	0	0	0	0	0	0	
40041-40050	0	0	0	0	0	0	0	0	0	0	
40051-40060	0	0	0	0	0	0	0	0	0	0	
40061-40070	0	0	0	0	0	0	0	0	0	0	
40071-40080	0	0	0	0	0	0	0	0	0	0	
40081-40090	0	0	0	0	0	0	0	0	0	0	
40091-40100	0	0	0	0	0	0	0	0	0	0	
40101-40110	0	0	0	0	0	0	0	0	0	0	
40111-40120	0	0	0	0	0	0	0	0	0	0	
40121-40130	0	0	0	0	0	0	0	0	0	0	
40131-40140	0	0	0	0	0	0	0	0	0	0	
40141-40150	0	0	0	0	0	0	0	0	0	0	
40151-40160	0	0	0	0	0	0	0	0	0	0	
40161-40170	0	0	0	0	0	0	0	0	0	0	
40171-40180	0	0	0	0	0	0	0	0	0	0	
40181-40190	0	0	0	0	0	0	0	0	0	0	
40191-40200	0	0	0	0	0	0	0	0	0	0	
40201-40210	0	0	0	0	0	0	0	0	0	0	
40211-40220	0	0	0	0	0	0	0	0	0	0	
40221-40230	0	0	0	0	0	0	0	0	0	0	
40231-40240	0	0	0	0	0	0	0	0	0	0	
40241-40250	0	0	0	0	0	0	0	0	0	0	
40251-40260	0	0	0	0	0	0	0	0	0	0	
40261-40270	0	0	0	0	0	0	0	0	0	0	
40271-40280	0	0	0	0	0	0	0	0	0	0	
40281-40290	0	0	0	0	0	0	0	0	0	0	
40291-40300	0	0	0	0	0	0	0	0	0	0	
40301-40310	0	0	0	0	0	0	0	0	0	0	×
40044 40000	-		-	-	-	~	-	0	-	-	
00 01 02 03	04 0	5 06 07 03	99 19 11	12 13 1	4 15 16	18 18 13	20 21	22 23 24		T	Comms
26 27 28 29	30 3	1 32 33 34	35 36 37	38 139 1	10 41 42	13 44 45	46 47	48 49 50	51 -		
Stores income discont discont	Concerning Street, or other		and the second second		Contraction of Contract of Contract	and benched have		and a second linear s			

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.

ModScan32 - ModSca1	
Elle Connection Setup View Window Help	
ModSca1	
	ee' fl
Connect	
Remote TCP/IP Server	et Ctrs
IP Address: 211.136.69.157	
Service 502	
Configuration	
Hardware Flow Control	
Band 19200 V Wait for DSR from sl	
Word 8 🔽 Delay 10 ms after RTS before	0033H: <0> 003DH: <0> 0047H: <0> 0051H: <0> 0052H: <0> 0052H: <0> 005CH: <0>
Parit NONE	0035H: <0> 003FH: <0> 0049H: <0> 0053H: <0> 0050H: 0025H: <0> 0050H: <0> 0050
Delay 10 ms after last	0037H: <0> 0040H: <0> 0040H: <0> 0055H: <0> 0055H: <0> 005FH:
Stop 1 y character before	0038H: <0> 0042H: <0> 004CH: <0> 0056H: <0> 0060H: 0039H: <0> 0043H: <0> 004DH: <0> 0057H: <0> 0061H:
	003AH: <0> 0044H: <0> 004EH: <0> 0058H: <0> 0062H:
rotocol Selection	003EH: <0> 0045H: <0> 004FH: <0> 0059H: <0> 0063H: 003CH: <0> 0046H: <0> 0050H: <0> 0054H: <0> 0064H:
UK UK	
For Help, press F1	Polls: 0 Resps: 0

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.

= LodSc	an32 -	[LodSca1]							
💼 <u>F</u> ile (	Connection	. <u>S</u> etup <u>V</u> iew Y	<u>ľ</u> indow <u>H</u> elp						_ 8 ×
	a e e		a ? N						
		Dev	vice ld: 1		·			101	
Address	0001	NO			Number of Pol	ls: 82			
1967 B	100		овоз Рошатуре		Valid Slave Re	spon	ses: 70		
Length:	100	03: HOL	DING REGISTER	-		Re	set Ctrs		
40004	1.0.0	10005			40000		10000		
40001: <	134	40025: <	0> 40049: <	0 >	40073: <	0.5	40097: <	0>	
40002.	134/	40020. (	0> 40050. (	02	40074.	02	40090. (	02	
40004 <	Ŭ,	40028: <	0> 40052: <	ŏ	40076: <	ŏź	40100 . <	Ő,	
40005: <	0>	40029: <	0> 40053: <	Ū,	40077: <	0>			
40006: <	0>	40030: <	0> 40054: <	0>	40078: <	0>			
40007: <	0>	40031: <	0> 40055: <	0>	40079: <	0>			
40008: <	0>	40032: <	0> 40056: <	0>	40080: <	0 >			
40009: <	0>	40033: <	0> 40057: <	0>	40081: <	0 >			
40010: <	0>	40034: <	0> 40058: <	0>	40082: <	0 >			
40011: <	0>	40035: <	0> 40059: <	0>	40083: <	0>			
40012: <	0>	40036: <	0> 40060: <	0>	40084: <	0 >			
40013: <	0>	40037: <	0> 40061: <	0>	40085: <	0 >			
40014: <	0>	40038: <	0> 40062: <	0>	40086: <	0 >			
40015: <	0>	40039: <	0> 40063: <	0>	40087: <	0>			
40016: <	0>	40040: <	0> 40064: <	0>	40088: <	0 >			
40017: <	0>	40041: <	0> 40065: <	0>	40089: <	0 >			
40018: <	0>	40042: <	0> 40066: <	0>	40090: <	0 >			
40019: <	0>	40043: <	0> 40067: <	0>	40091: <	0>			
40020: <	0>	40044: <	0> 40068: <	0>	40092: <	0 >			
40021: <	0>	40045: <	0> 40069: <	0>	40093: <	0 >			
40022: <	0>	40046: <	0> 40070: <	0>	40094: <	0 >			
40023: <	0>	40047: <	0> 40071: <	0>	40095: <	0 >			
40024: <	0>	40048: <	0> 40072: <	0>	40096: <	0 >			
For Help, p	press F1						Polls: 4	33	Resps: 70

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.

InDTU Configuration Tool - ×								
Status Configurations 2		All configurations / Other	3		Go to upper directory			
Maintenance		Max log-in times	5					
Tools	-	Allow telnet	No		•			
Неір	4	Debug mode	Yes(serial port 2)		•			
	5	Debug level	Detailed log		•			
		Low power consumption	Low power consumption		•			
		Password for blue-tooth key	12345678					
Connect ↔	1	Advanced _ Export to	file Import from file	Save configurations	Read conifgurations			

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.

🧧 Untitled - Serial Port Utility		-		×					
File 3Edit View Tools Help									
🗎 🚥 🕨 📗 🖪 🗘	+ - 🛅 🕸								
Serial Port Setting 1 Port USB Serial Port(COM Baudrate 115200 Data Bits 8 Parity None Stop Bits 1 Flow Type None									
Receive Setting									
anto Feed Line									
Display Send									
Display Time									
Send Setting									
C Text @ Hex			Ope	n					
□ Loop 1000 ÷ ms									
				•					
COM7 CLOSED Rx: 0	Bytes Tx: 0 Bytes								

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.