

InDTU300 series User`s Manual

This user`s manual is only applicable to InDTU331 332, 312, 314, 317 series products



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InDTU300 User's Manual

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Introduction to InDTU300 Series

1.1 Overview



The InDTU300 Series of industrial quad-band GSM/GPRS Digital Terminal Units (DTU) are designed to transmit serial data over GSM/ GPRS mobile networks. The modems are light-weighted, compact-designed modems combined with rich features of high performance, high security, and low power consumption. And they bases on professional industrial chip design capable to work robustly in harsh outdoor circumstances, for example, wide operation temperature ranging from -25°C to 70°C ($-13\sim 158^{\circ}\text{F}$), wide range power input from 5V to 35V and strict EMC conditions. The modems can support several management tools include handheld configuration tool, Device Manager, which significantly reduce the maintenance and installation cost for customers.

InDTU300 is well proven product approved by high end customers including Siemens, Schneider Electric, China State Grid and etc. And it is compliant with smart grid industrial DL/T 721-2000 Standard of tele-control in Power Grid automation system.

Important Safety Information

This product is not intended for use in the following circumstances

- Area(s) where radio transmission equipment (such as cell phone) are not permitted.
- Hospitals, health care facilities and area(s) where cell phones are restricted by law.
- Gas stations, fuel storage and places where chemical are stored.
- Chemical plants or places with potential explosion hazard.
- Any metal surface that may weaken the radio signal level.

RF safety distance

For GPRS router, the compliance boundary distance is $r=0.26\text{m}$ for GSM 900MHz and $r=0.13\text{m}$ for DCS 1800 M Hz.

Warning

This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

WEEE Notice

The Directive on Waste Electrical and Electronic Equipment (WEEE), which entered into force as European law on 13th February 2003, resulted in a major change in the treatment of electrical equipment at end-of-life.

The purpose of this Directive is, as a first priority, the prevention of WEEE, and in addition, to promote the reuse, recycling and other forms of recovery of such wastes so as to reduce disposal.

The WEEE logo (shown at the left) on the product or on its box indicates that this product must not be disposed of or dumped with your other household waste. You are liable to dispose of all your electronic or electrical waste equipment by relocating over to the specified collection point for recycling of such hazardous waste. Isolated collection and proper recovery of your electronic and electrical waste equipment at the time of disposal will allow us to help conserving natural resources. Moreover, proper recycling of the electronic and electrical waste equipment will ensure safety of human health and environment.



For more information about electronic and electrical waste equipment disposal, recovery, and collection points, please contact your local city centre, household waste disposal service, shop from where you purchased the equipment, or manufacturer of the equipment.

1.2 Package Checklist

We put each InDTU300 in a box with standard accessories. Additionally, there're optional accessories can be ordered. When you receive our package, please check carefully, if there're items missing or appearing to be damaged, please contact with InHand Networks sales representative.

Items in package include:

Standard Accessories:

Accessories	Description
InDTU300 Serials DTU	1
Antenna	1 Cellular Antenna
Block Terminal	1
Document and Software CD	1
Qualification Certificate and Guarantee Card	1

Optional Accessories:

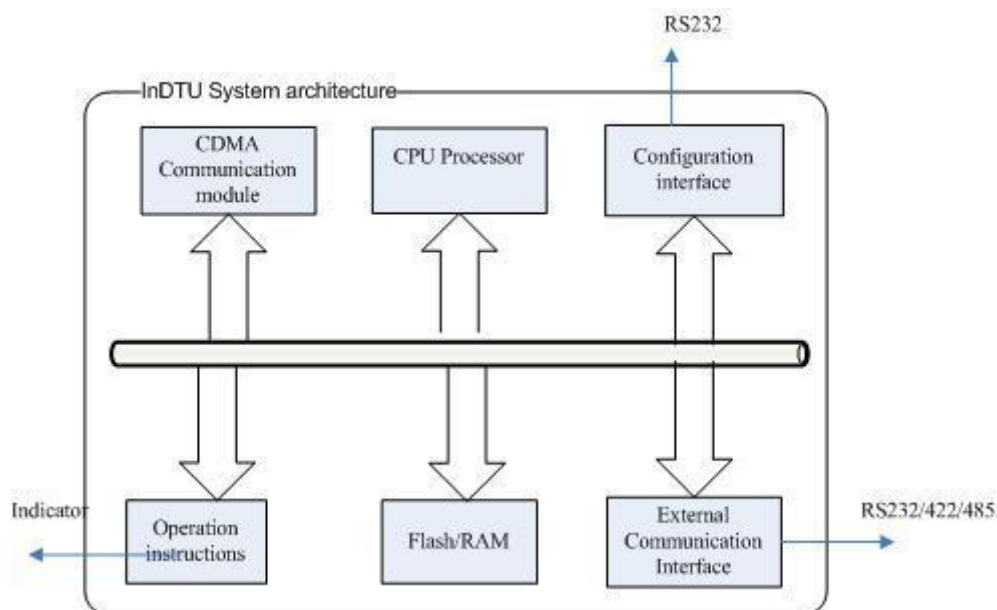
Accessories	Description
SMA antenna extension cord	1
Power Cord (12VDC 1000mA)	1
gain antenna	GPRS/CDMA

1.3 Product Features

1.3.1 Hardware Features

InDTU300 series works on the GPRS/CDMA data communication system; a GPRS/CDMA module is integrated in the hardware system to provide reliable communication with GPRS/CDMA mobile network. The hardware is constructed with high performance MPU and peripheral FLASH, enabled powerful processing capability. By supporting multiple standards of industrial bus, it also has good extendibility. The InDTU300 series have been widely used in remote and on-site data collection, remote monitoring, and on-site control in different industries.

Below is an illustration of the hardware structure of InDTU300:



Hardware Structure of InDTU300

Key features:

- ▶ Exquisite look with fast installation design;
- ▶ Moisture proof and anti-interference design;
- ▶ Industrial-grade wide voltage range: 5-35VDC;
- ▶ Industrial-grade temperature range: -20°C ~ +70°C.

1.3.2 Software Features

InDTU300 products realize wireless data communication between serial devices at remote control stations and the central control system. The main functions of InDTU300 are listed in Table below.

Category	Function	Description	Notes
Basic Functions	Support GPRS/CDMA	Support GPRS/CDMA network.	
	Serial-port Configuration	Configure via external serial-port.	
	Status Indication	LED indication of operation status.	
	Flexible Installation	Support wall or desk installation.	
	VPDN connection	Support Virtual Private Data Network.	
	Transparent Transmission	Transparent and two-way transmission of application data.	
	Protocol Conversion	DC(private protocol), MODBUS bridge. Self-defined UDP protocol.	
	Always Online Mode	Keep connected to the application server.	
	Connect on Demand Mode	Connect to the application server when triggered by configured activation method.	
	Trigger by COM Data	In Connect on Demand Mode, trigger hibernating InDTU300 to connect to the network by sending local COM data.	
	Trigger by Call	In Connect on Demand Mode, trigger hibernating InDTU300 to connect to the network by a phone call.	
	Trigger by SMS	In Connect on Demand Mode, trigger hibernating InDTU300 to connect to the network by DM.	
	Timed Online /Timed Offline	Set time to auto trigger InDTU300 to connect or get off the network.	
	Device Log	Export device log from the serial port, for the technical staff to check running status of InDTU.	
	Multiple Serial-port Communication Rate	Supported baud rate: 1200~115200bps.	
	RS232/485	Support RS232/485 communication.	Ports differ by product model.
	Soft Watch-dog	Watch-dog mechanism preventing system halt.	
	Authentication by User Grades	Support 2 user grades: administrator, and general user. Username and password are required to use local management functions.	Default administrator username: adm Password: 123456 General username: guest

			Password: 123456
	Real-time Clock	During a power outage, the internal super capacitance will supply power to RTC to keep the system time running.	Before the power outage, the super capacitance needs to be supplied with power for no less than 2 hours; otherwise the system will restore to the default time: 1970-1-1 0:0:0
	Restore Default	Write in default settings while erasing all current settings.	To implement through the configuration program.
Network Functions	PPP Protocol Support	Point to Point Dialing Protocol.	
	CHAP Certification	Certification method.	
	PAP Certification	Certification method.	
	PPP Layer Heartbeat	Maintain connection to the operator's network, preventing forced hibernation. May detect stability of the dial-up connection.	
	ICMP Detection	Maintain connection to the operator's network.	
	TCP Layer Heartbeat	Detect connection with application server on the TCP layer.	
	Application Layer Heartbeat	Detect connection with application server on the application layer.	
Advanced Functions	Upgrade	Upgrade through local serial port.	
	Configuration Import/Export	Export and save the configuration of InDTU300, or import the backup configuration file into InDTU300.	
	Log	Store key device log in the flash memory.	Read with the configuration program or control panel.
	Device Manager Function	Issue configuration, SMS trigger, and remote upgrade commands from DM platform management device.	
	TCP Console Function	Remote telnet with InDTU300 to check the operation status, read device log, and remote upgrade.	This function requires a SIM card that can get a public-network IP.

	TCP Server Function	Allow TCP client to connect to InDTU300. Now InDTU300 and the TCP client form a bridge.	Convenient for remote debugging of user's equipment. This function requires a SIM card that can get a public-network IP.
	SMS modem	InDTU can serve as a SMS modem.	This function need a special firmware.

1.4 Technical Parameters

1.4.1 Standard Parameters

Function Description	Support GPRS/CDMA network, realize wireless data communication between remote serial devices and central control system.
Serial Port	RS232\RS485
Antenna	SMA 50 Ω
SIM/UIM Card Slot	Flip
Working Voltage	5-35VDC
Working Current	Standby: 12mA@12VDC, Communication: 45mA@12VDC, Peak Consumption: 100mA@12VDC Notes: Above data is the test result in a particular network. In different networks, standby current ranges between 8~14mA@+12VDC, communication current ranges between 35~55mA@+12VDC.
Recommended Power Supply	1000mA@12VDC
Networking	Support serial port bridge mode, maintaining two-way data transmission.
Protocol Support	TCP \UDP, DCUDP\DCTCP, MODBUS bridge
Diagnosis	LEDs (power supply, network connection), device log
Alarm	LEDs
Working Temperature	-20 °C ~ +70 °C
Storage/Transportation Temperature	-40 °C ~ +85 °C
Working Humidity	5%~95% (non-condensing)

1.4.2 Serial Ports

- Port Type: RS232 or RS485
- Data Bit: 8
- Stop Bit: 1
- Check Bit: N/O/E
- Baud Rate: 1200/2400 / 4800 / 9600 / 14400/19200 / 38400/ 57600 / 115200
- Flow Control: None

1.4.3 SIM Card Connector

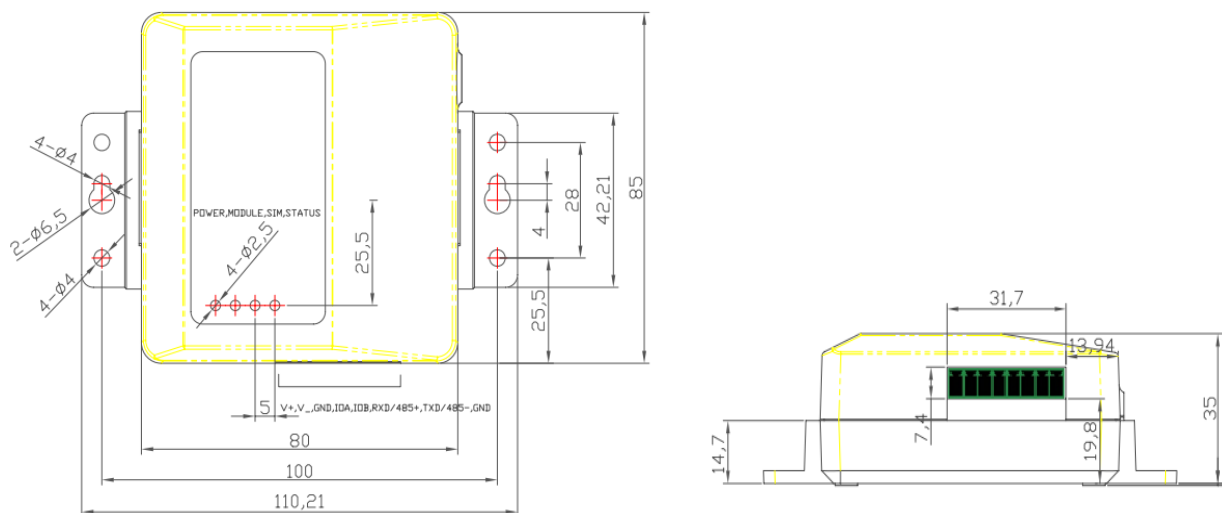
- Working Voltage: 3V/1.8V
- Slot Form: Flip

1.4.4 Housing

Dimensions: length x width x height - 110 X 85 X35 mm (Please refer to the below illustration.)




Installation: fast fixing, quick and convenient

Anti-shock: minimum number of connectors, excellent anti-shock performance



Product Dimensions

1.5 Product Models

Name	Power supply	Serial	Panel
InDTU311GT68-232D	5-35V DC	RS-232DB9 connector	
InDTU331GS37-232D	5-35V DC	RS-232DB9 connector	
InDTU331GS37-232P	5-35V DC	RS-232Pin9 connector	
InDTU332GS55-232	5-35V DC	RS-232 terminal	
InDTU332GS55-485	5-35V DC	RS-485 terminal	
InDTU332GS37-232	5-35V DC	RS-232 terminal	
InDTU332GS37-485	5-35V DC	RS-485 terminal	
InDTU332GS52-232	5-35V DC	RS-232 terminal	
InDTU332GS52-485	5-35V DC	RS-485 terminal	
InDTU332CH23-232	5-35V DC	RS-232 terminal	
InDTU332CH23-485	5-35V DC	RS-485 terminal	
InDTU312GT68-232	5-35V DC	RS-232 terminal	
InDTU312GT68-485	5-35V DC	RS-485 terminal	
InDTU314GT68-TTL	5-26V DC	TTL 5V Pin20 connector	
InDTU314GT68-232	5-26V DC	RS-232 Pin20 connector	
InDTU317GN59-TTL	5-26V DC	TTL 5V Pin20 connector	
InDTU317GN59-232	5-26V DC	RS-232 Pin20 connector	

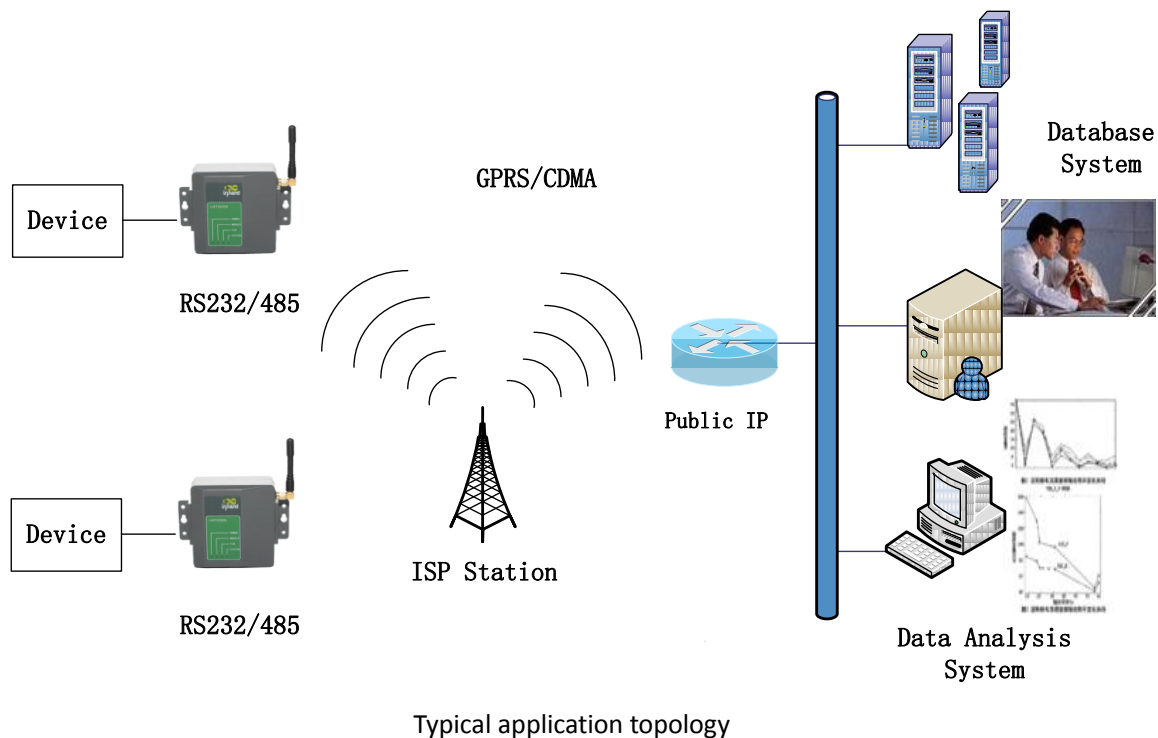
Notice:

The all InDTU300 series most have the same function, this guide`s manual compiled according to InDTU300 common configuration. The difference in different model of product will be marked in the corresponding location.

The function the manual mentioned maybe change with continuous product upgrades, without notice.

1.6 Typical Application

InDTU300 series uses GPRS/CDMA network as bearer network to carry out remote data collection and transmission, and implement remote monitoring in industry. A complete solution will enable the customer to gain utmost production and operation efficiency while with minimal investment. Below is an illustration of the typical network pattern of InDTU300.



Product Installation

The installation of the product includes: Hardware installation and Software installation (optional).
We give example by InDTU332.

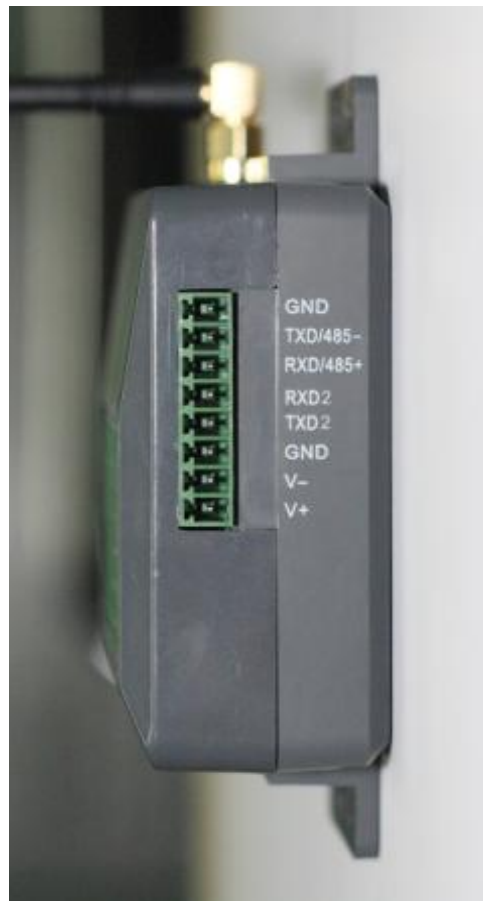
2.1 Hardware Installation

Note: Please do not install this product when power supply is connected.

2.1.1 Fixing and Power Connection

InDTU332 is hold in a plastic housing. On the bottom of the housing, there are screw holes for fixing the InDTU332.

- Connectors on the housing are listed in the following table:



Connectors	Description	Notes
GND	Digital ground	Provide serial port ground connection
TXD/485-	232 sending, 485-	
RXD/485+	232 receiving, 485+	
RXD2	Configure serial receiving,	

	support 232 only	
TXD2	Configure serial sending, support 232 only	
GND	Digital ground	Provide serial port ground connection
V-	Cathode	
V+	Anode	

2. SIM Card Installation



Slide and open the upper cover as shown in above picture, insert the SIM card into the slot properly, Then slide back the upper cover to close the housing.

3. Antenna Installation

Put the enhanced antenna's connector into the antenna opening on the housing, screw tightly. Place the amplifier of the enhanced antenna at a place where it can receive GPRS/CDMA signal.



2.1.2 Power Supply

Support 5-35V DC power input, ripple wave is smaller than 100mV. Connect anode of the DC power to V+ terminal, cathode to V- terminal.

2.1.3 Check Network Connection

After the SIM card is put in and antenna is installed, connect the power cord of InDTU332 to a power supply, make sure it is connected properly, and then switch on InDTU332. If the MODULE LED flashes (- the indication of On, Off, Flash will differ by the module), it indicates a network has been found.

Refer to Section 4.3 for LED indications.

2.2 Software Installation

To deploy a complete remote monitoring system, the user needs to install corresponding software on the centre, or develop own centre software with the development kit we provide. If applied InHand private protocol, InHand can provide the necessary testing tool, please check in the tool kit for it.

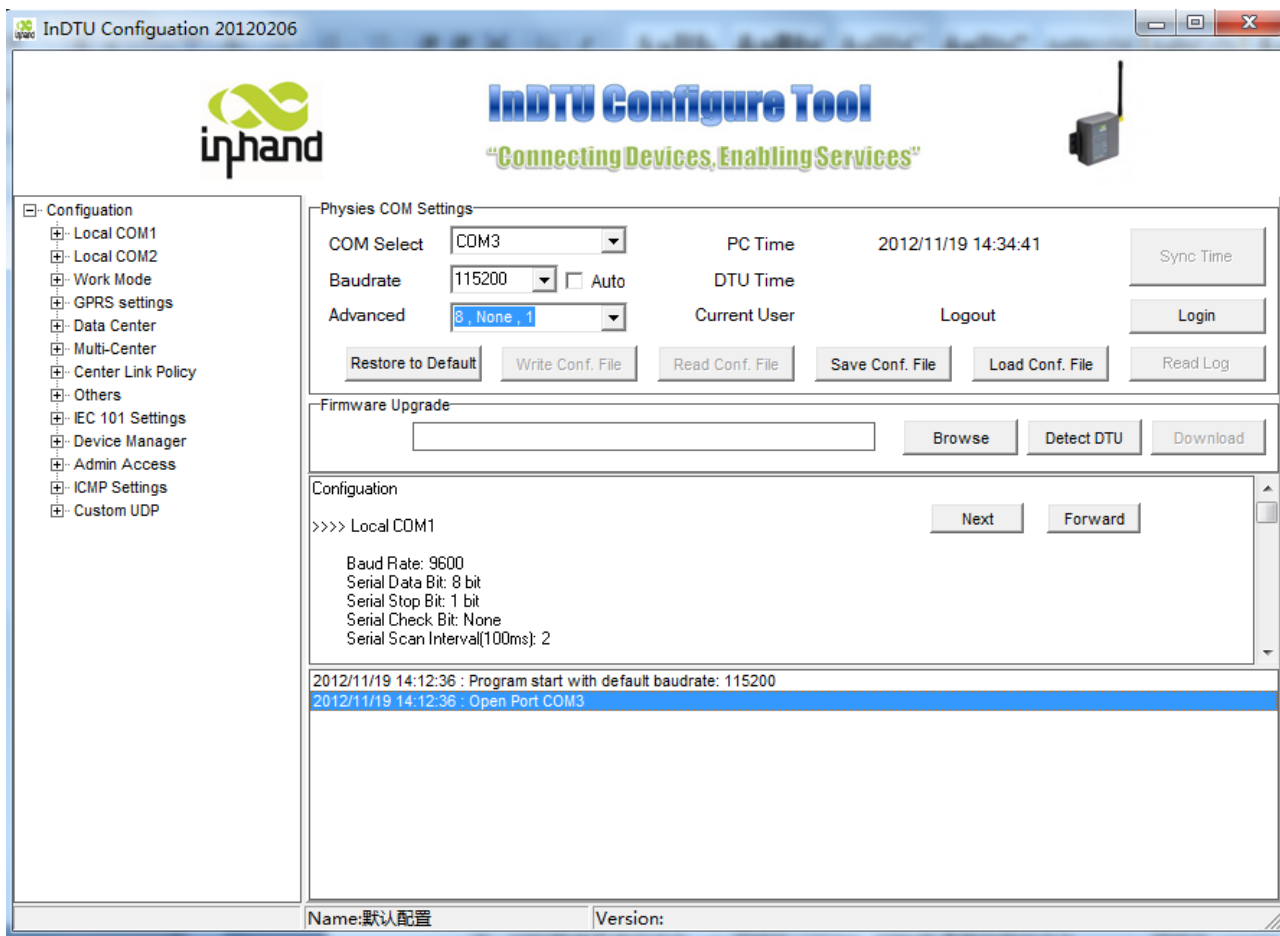
You can use the "InDTU configuration tool" to configure InDTU332. Please check in the tool kit.

Product Configuration

3.1 The Configuration Interface

After the installation is completed with InDTU300 powered off, connect InDTU300 to a PC with a RS232 serial cable. Then power on InDTU300 and start to configure it through the local serial port.

Run “InDTU_Confignuation.exe” and the configuration window will pop up as below.



At each launch, the configuration program will auto run a hardware check. If the result of the hardware check is normal, the login box will pop up, requiring the user to input username and password (default: adm/123456).

Input username in the username dialog box, click “OK”; then input password in the password dialog box, click “OK”. The “Login success” box will pop up if the login succeeds, otherwise the “Login failure” box will pop up. When login succeeds, the username will appear at “Current User” in the “Physics COM Settings” section.

If the user would not login at the beginning, just click “Cancel” and login anytime after by clicking the login button. After logged in, the login button will change to logout, user may also click the logout button anytime to cancel the login status.

Note:

Default username of administrator is “adm”, password is “123456”.

Default username of general user is “guest”, password is “123456”.

Both username and password distinguish capital and small letters.

Now let’s look at the main configuration interface:

In the “Physics COM Settings” section on the top, user may select COM, baud rate, and serial port parameters.

The configuration tool will auto identify available COMs on current PC, these COMs will then appear in the drop-down list of “COM Select” (the auto identification of available COMs will take a while, after clicking on this item, please wait for the COM list to appear) , please select the COM that connect with InDTU300.

2. After the right COM is selected, user may click “Write Conf. File” or “Read Conf. File” to write or read the configuration of InDTU300. Or click “Save Conf. File” to export the configuration as a text file; click “Load Conf. File” may import the saved configuration file back into the configuration tool.

3. The bottom information window displays current operation and whether the operation is successful.

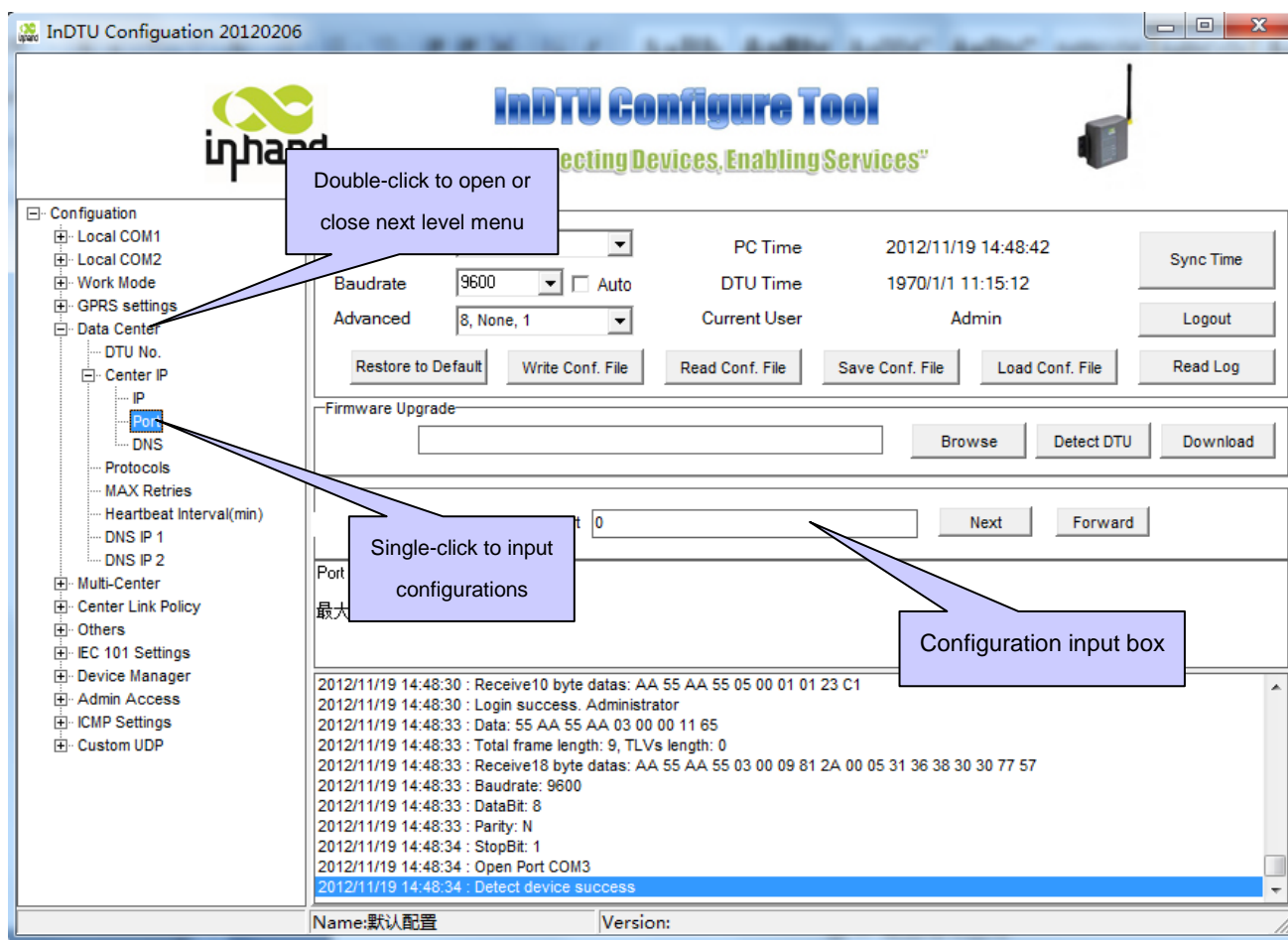
4. The “Sync Time” button will set system time of the device to the current time of the PC, after clicking “Sync Time”, the configuration tool will auto read the device time and display it at “DTU time” in the “Physics COM Settings” section.

5. User may upgrade the firmware through a serial port by the “Firmware Upgrade” option. Detailed upgrade steps are introduced in Section 3.5 “Firmware Upgrade”.

6. When reading and writing of the configuration is successful, the software version of InDTU300 will display at “Version” on the bottom bar.

7. Click an item in the menu tree on the left, the information window on the right will display the configurations under this menu item. Click on an item in the 1st-level menu, all the configurations under this item will display in the information window, user may review the configurations by rolling through the drop-down list. Click on one of item in the menu tree will open the next level menu. Click on the 3-rd level menu, it will enter the configuration input window. Please refer to the picture below.

8. “write Conf” and “Download(Firmware)” can only be accessed by the administrator; general user can’t change the configuration or firmware of InDTU300.



3.2 The Configuration menu

This part will introduce the configuration menu of InDTU300.

3.2.1 “Local COM1”

Baud Rate: 1200, 2400, 4800, 9600, 14400, 19200, 38400, 57600, or 115200 bps

Serial Data Bit: 8 bit

Serial Stop Bit: 1, 1.5, or 2 bit

Serial Check Bit: None/Odd/Even

Serial Scan Interval (100 ms): may just set to the default 10

Serial Timeout (s): may just set to the default 5

Frame Size (Byte): default is 1024, may set to any value between 10~1024

3.2.2 “Local COM2”

Baud Rate: 1200, 2400, 4800, 9600, 14400, 19200, 38400, 57600, or 115200 bps

Serial Data Bit: 8 bit

Serial Stop Bit: 1, 1.5, or 2 bit

Serial Check Bit: None/Odd/Even

Serial Scan Interval (100 ms): may just set to the default 10

Serial Timeout (s): may just set to the default 5

Frame Size (Byte): default is 1024, may set to any value between 10~1024

3.2.3 “Work Mode”

You can select the work mode of InDTU.

Link Mode: Always Online, Connect On Demand.

- In “Always Online” mode, InDTU300 keeps staying online and will auto reconnect whenever dropped off. The Trigger by Call/SMS/COM data and Timed Activation functions are effective only in the “Connect on Demand” mode.

Trigger by Call: open, close.

- Generally should set to “open”, so in the “Connect On Demand” mode, any incoming phone call will trigger InDTU300 to connect to the network.

Trigger by SMS: open, close.

- If set to “open”, in the “Connect On Demand” mode, any incoming short message from DM will trigger InDTU300 to connect to the network.

Trigger by COM Data: open, close.

- Generally should set to “open”, so in the “Connect on Demand” mode, any incoming data through the local serial port will trigger InDTU300 to connect to the network.

Timing Active Interval (m): Time interval to reconnect to the network whenever after InDTU300 enters sleep mode, value range is between 0~1440.

Timing Offline (m): Time interval to get offline and restart, value range is 0~60. If the value is 0, the interval is infinitely long. Usually should set to 0.

Device Data/Control Flow: Yes

Note: When set to “Connect on Demand” mode, please at least turn on 1 of the 3 trigger mechanisms.

3.2.4 “GPRS/CDMA Settings”

Auto Dialup: on, off.

On: dialup automatically after configuration

Off: dialup on demand (triggered by SMS/Call/Serial Data)

Dialup Number, default: *99***1#, provided by local mobile operator.

APN/Username/Password : provided by local mobile operator

PPP Heartbeat Interval : the heartbeat to keep link alive

Redial Interval: when ppp dialup failed, after this interval, InDTU300 will redial

MAX Retries: after MAX Retries and no dialup successful, InDTU300 will reboot

3.3.5 “Data Center”

Configure your data center IP address and the service port.

DTU Number: DTU identification number (only when using DC protocol, it need to configure)

Center IP: input the data center server IP address, port number, and DNS (the IP address must be a fixed IP, if you have DNS only, just set it blank and turn to DNS).

Protocols: TCP/UDP client, Modbus Bridge. For Kingview SCADA, you can also set DC UDP protocols. The DC protocol is InHand private protocol, it apply for marking different DTU which own a private IP address. We can provide the SDK if you want to use it.

MAX Retries: Maximum resend times when transmission failed. 0 (TCP protocol can auto resend).

Heartbeat Interval (m): The interval of heartbeat pack, value range is 1~60

DNS IP 1: 0.0.0.0 (or the DNS address of your private address.

DNS IP 2: 0.0.0.0 (or the DNS address of your private address.

3.3.6 “Multi Center”

If enabled Multi Center pattern, the field data can be sent to at most 5 data center. User needs to fill in the IP address, port number, domain name for every center.

Leave it blank if Single Center pattern is selected.

Note: If Multi Center not enabled, please set the IP address and port number of all the non-centers to zero.

3.3.7 “Center Link Policy”

MIN Re-link Interval (s): the minimum interval to re-link after connection fails in TCP

MAX Re-link Interval (s): the maximum interval to re-link after connection fails in TCP; when you set “tory” here without other configuration, InDTU can serve as a SMS modem. Please see the detailed introduction in Section 5.2 “InDTU300 as a SMS modem”.

Roll Mode: in Multi Center pattern, set the multi center connection to roll mode or concurrency mode.

Input “Y” or “y” to set it to the roll mode, any other input will set it to the concurrency mode.

TCP Server/UDP Source Port: interception port when working as TCP Server. Fill in “0” to close the TCP Server function.

3.3.8 “Others”

MAX Login Times: may just keep the default 10

Allow Telnet: default is No

Debug: Yes or No. If select “Yes”, user will be able to see InDTU operation log through the serial tool. This setting will take effect immediately after set.

3.3.9 “IEC 101 Settings”

The InDTU300 support IEC101 protocol conversion. It needs special firmware if you want to use this function. You can contact InHand technical engineer to ask for the firmware.

3.3.10 “Device Manager”

Device Manager is Inhand remote device manage platform, you can remote manage InDTU via the platform.

Product SN: product serial number, the identifying that Device Manager Identify InDTU. Defined in factory and cannot be changed.

Work Mode: SMS, SMS+IP, and Disable

Trusted Phone List: the DM function of InDTU300 only accepts SMS sent from trusted phone numbers. If the list is empty, it will accept SMS sent from any number.

Device ID: identification of the Device Manager. Defined in factory and cannot be changed.

Platform Address: IP address and port number of Device Manager.

Heartbeat Interval (s): heartbeat interval with Device Manager, range is 30~600

3.3.11 “Admin Access”

Administrator Account: to set username of the administrator account

Administrator Password: to set password of the administrator account

User Account: to set username of the general user account

User Password: to set password of the general user account

3.3.12 “ICMP Settings”

Detection Host: detect whether the PPP connection is normal. Input IP address which always on line.

MAX Package Lost: redial if fail to receive data package after sending ICMP for the maximum times.

Idle Time (s): send ICMP detection package if not receiving network data for a period over this time, range is 30~3600.

3.3.13 “Custom UDP”

UDP Type: ASCII or HEX. ASCII type uses ASCII character, HEX type uses HEX character.

UDP Login Frame: login frame when the connection pattern of data center is transparent UDP.

UDP Login ACK Frame: login ACK frame when the connection pattern of data center is transparent UDP.

UDP Heartbeat Frame: heartbeat frame when the connection pattern of data center is transparent UDP.

UDP Heartbeat ACK Frame: heartbeat ACK frame when the connection pattern of data center is transparent UDP.

UDP Logout Frame: logout frame when the connection pattern of data center is transparent UDP.

UDP Logout ACK Frame: logout ACK frame when the connection pattern of data center is transparent UDP.

Note: This setting is effective only when the connection pattern of data center is transparent UDP. The login frame and login ACK frame must both be configured, so are the other frames.

3.3 Read and Write Configuration

After completing the input of the configuration, power on InDTU300 and make sure the hardware check result is normal, then login with the administrator account, click “Write Conf.” to download the inputted configuration into InDTU300.

The operation result - whether writing is successful, will appear in the bottom information window; meanwhile, the “Write Conf. Success” dialog box will pop up if the writing is successful, or the “Write Conf. False” dialog box will pop up.

In the same way, power on InDTU300 and login, click “Read Conf.” will read the configuration in InDTU300 into the configuration program. If reading is successful, the “Read Conf. Success” dialog box will pop up; otherwise, the “Read device config false” box will pop up.

3.4 Modify Configuration

To modify the configuration of InDTU300, user may first read the previous configuration of InDTU300 into the configuration program; modify the parameters whereas needed, then write the updated configuration back into InDTU300, the corresponding settings will then be changed.

User may also export and save the configuration file of InDTU300 after inputting. When modification is needed, import the saved file and modify whereas necessary, then write the updated configuration back into InDTU300.

Each InDTU is loaded with default configuration when leaving the factory. User need to read the loaded configuration and make modifications whereas necessary, e.g. the IP address and port number of center end have to be input by the user so InDTU300 could connect to the user’s central control system.

3.5 Firmware Upgrade

1. Connect InDTU300 to a PC with a RS232 serial line. With InDTU300 powered off, copy the upgrade code file that InHand provides under a non-Chinese directory on PC; then click “Read File” on the configuration interface to read the path of the code file into the input box of “Send File”. Power on InDTU300 and click “Check Hardware”, if the hardware status is normal, the “Hardware Check Success” box will pop up, InDTU300 is now ready for serial upgrade.

If the “Hardware Check Failure” box pops up, please check whether the serial cable is properly connected and if serial parameters are correctly configured, then run “Check Hardware” again.

2. After hardware check is successful, login with the administrator account and click “Download Program” to start to upgrade the program. The lower information window will display the upgrading progress.

3. When the upgrading is completed, a “Serial Upgrade Success” box will pop up as below, click “OK” to quit; then the “Restart Device?” box will pop up, select “YES” to restart the device and start to use updated firmware.

If the serial upgrade fails, please check the hardware connection and port selection, then run “Check Hardware” and “Download Program” again.

Note: Device log is recommended to be closed during the serial upgrade. If device log is open during the upgrade, the large amount of serial data may impact resending of upgrade data and delay the upgrading progress.

3.6 Read Device Log

Connect InDTU300 to a PC with a RS232 serial cable (TXD/RXD or TXD2/RXD2), open the configuration tool and click “Read Device Log”, the real-time device log will display in the window.

Chapter 4 Application of Product

For InDTU300 to work properly, please make sure the following conditions are met:

1. Power supply is normal
2. InDTU300 is inserted with a valid SIM/UIM card that supports data service
3. InDTU300 is placed where it can receive GPRS/CDMA signal
4. InDTU300 is correctly configured, e.g. IP address and port number of the data center that InDTU300 should call on, communication protocol, etc.

Work Principle of InDTU300: Power on InDTU300 and dial in the GSM/CDMA network. After InDTU300 obtained an IP address, register to the data center - pointed to by the “IP Address” and “Port Number” of the Data Center configured in InDTU300. When registered successfully, InDTU300 is ready for data transmission between serial devices and the data center.

Function of InDTU300: InDTU300 functions as the communication bridge between serial devices (e.g. RTU, PLC, etc.) and the data center, package the serial data from serial device sending to InDTU300 into network data pack and delivering to the data center, and delivering the serial data from data center to serial devices through the serial port.

4.1 DC Mode Introductions

We provide a development kit “demo” to user, which is a simple developable application program allowing the user to develop and expand. For the function and usage of API, please refer to 《IHDC Development Help Document》.

After development is completed, run the program and monitor the service port through which InDTU300 transmits data to and from the center. We also provide the corresponding test software (GPRS demo).

4.2 Link Mode

4.2.1 Always Online

To use the “Always Online” mode, set the parameters of InDTU300 as below:
Link Mode: Always Online

Trigger by Call: Open or Close

Trigger by COM Data: Open or Close

Timed Active Interval (m): 0

Timed Offline: 0

Divide Data/Control Flow: Yes

In the “Always Online” link mode, InDTU300 keeps staying online, and will auto redial whenever drops. InDTU300 transfers the serial data it receives to center end; when there is no serial data coming in, InDTU300 will send heartbeat pack to center end according to configured time interval to make sure the link is connected.

4.2.2 Connect on Demand

To use the “Connect On Demand” mode, set the parameters of InDTU300 as below:

Link Mode: Connect on Demand

Trigger by Call: Open or Close

Trigger by COM Data: Open or Close

Timed Active Interval (m): 0-1440 “0” means to trigger at once after it drops offline, i.e. do not enter hibernation mode.

Timed Offline (m): 1~60

Divide Data/Control Flow: Yes

Note: In this link mode, please turn on at least 1 of the 3 trigger mechanisms.

In this link mode, user may set when InDTU300 should connect to the network and when to disconnect. For example, set “Timed Offline (m)” to 2, “Timed Active Interval (m)” to 720, “Trigger by Call” to Open, and “Trigger by COM Data” to Close, the InDTU300 will get offline and enter standby mode when there’s no data transmission for over 2 minutes, then user can trigger it to get online by a phone call, or it will auto reconnect after 720 minutes.

So user may choose to set to trigger InDTU300 to get online by a phone call, or after a given interval, or when a lower end device sends data (any data) to its serial port.

Note: When to be triggered by COM data, after the triggering data pack is sent, InDTU300 will need a while - within 20seconds, to connect up with the center. The cache of InDTU300’s serial port is 4K, if data sent during this period is smaller than 4K, these data will be sent after InDTU300 connects with the center; if data sent during this period is more than 4K, the exceeding part will be abandoned.

4.3 Check System and Connection status

User may observe the system and connection status of InDTU300 from the LED indications on the front panel.

LED Indications

POWER	MODULE	SIM	STATUS	Description
On	X	Fast Flash Alternatively		Start Module
On	X	Off	Slow Flash	Initial Module by AT command
On	Fast Flash	Off	Slow Flash	PPP Dialup to Internet
On	X	Slow Flash	Off	Wait for dialup trigger (for connection on demand only)
On	X	Slow Flash Alternatively		Successful PPP Dialup to Internet, wait for connect to User Data Center

Note:

On means to be constantly on, i.e. keep on without flashing for at least 3 seconds.

Off means to be constantly off, i.e. keep off without flashing for at least 3 seconds.

Slow flash means to flash at a rate around 1Hz

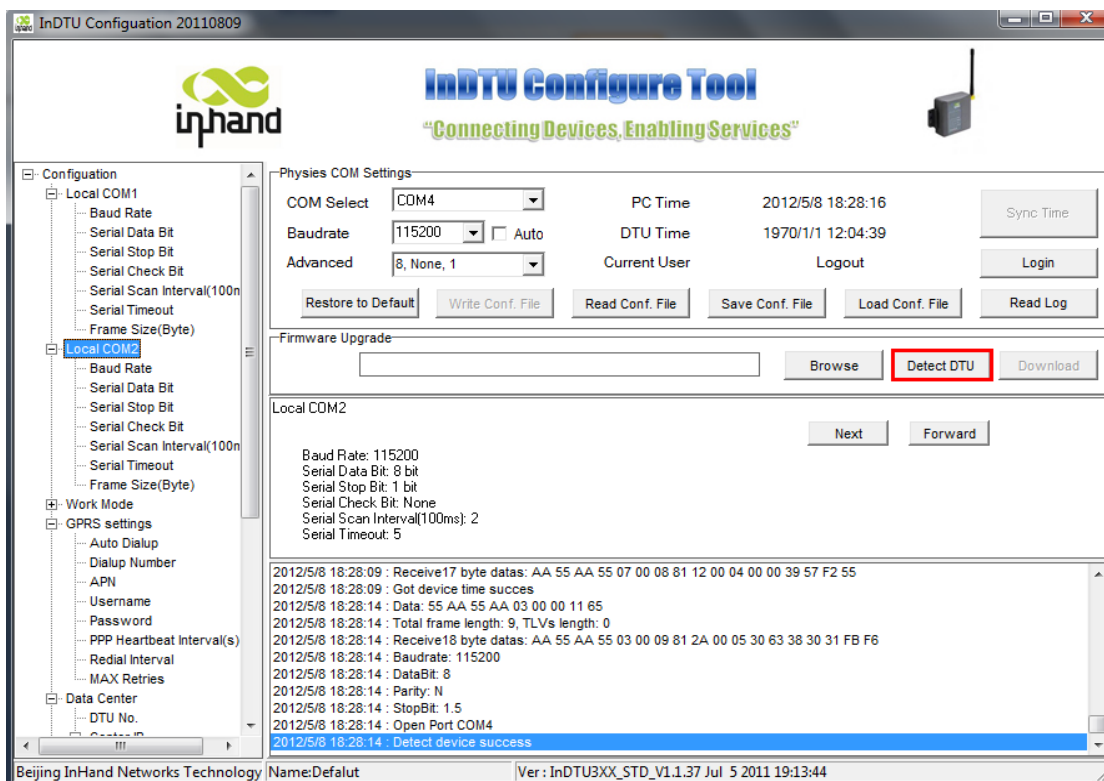
Quick flash means to flash at a rate around 5Hz

Chapter 5 Configuration guide

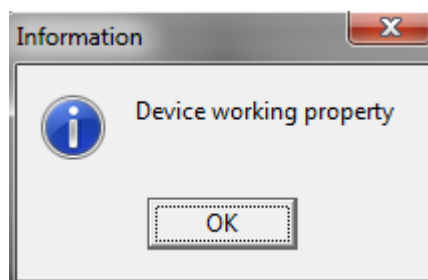
5.1 InDTU300 as a TCP client

In this chapter, we will briefly introduce how to configure when InDTU300 as a TCP client.

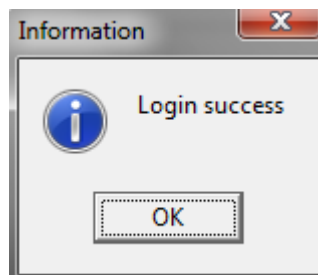
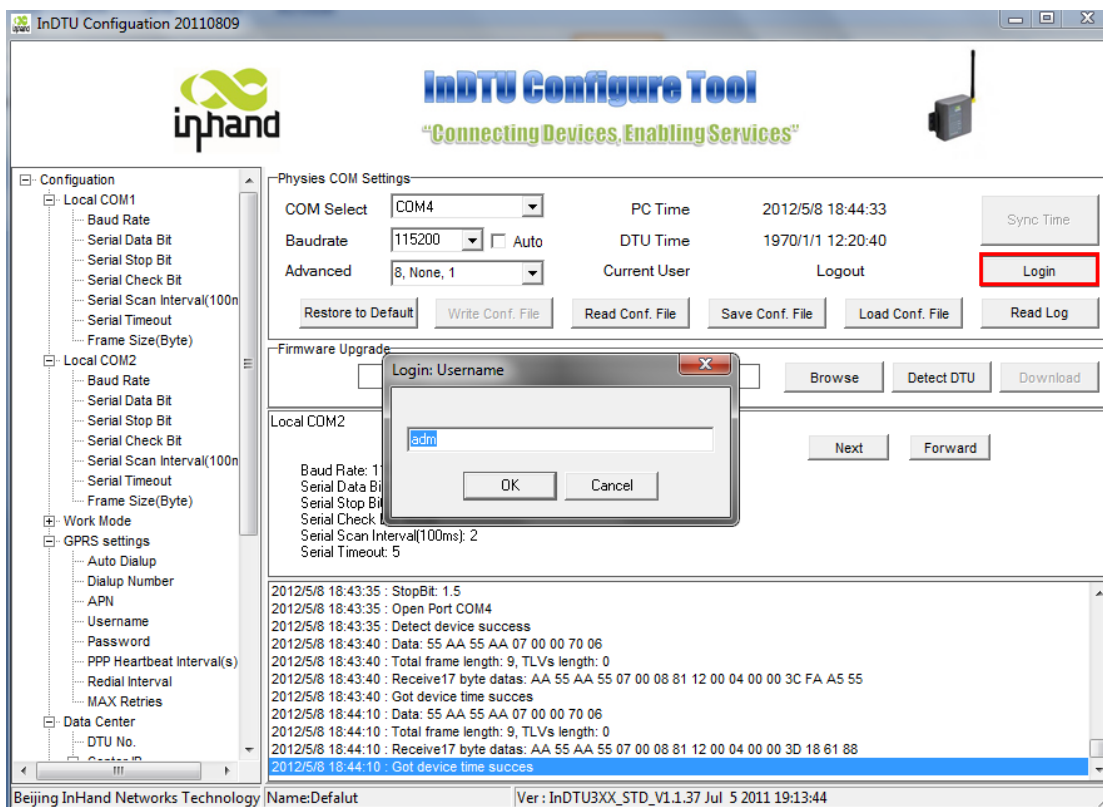
- 1) After correctly link InDTU300 to PC, open the configure software, select the right COM port and enable “Auto” to let software auto detect InDTU300 or click the “**Detect DTU**” to check if connection is correctly.



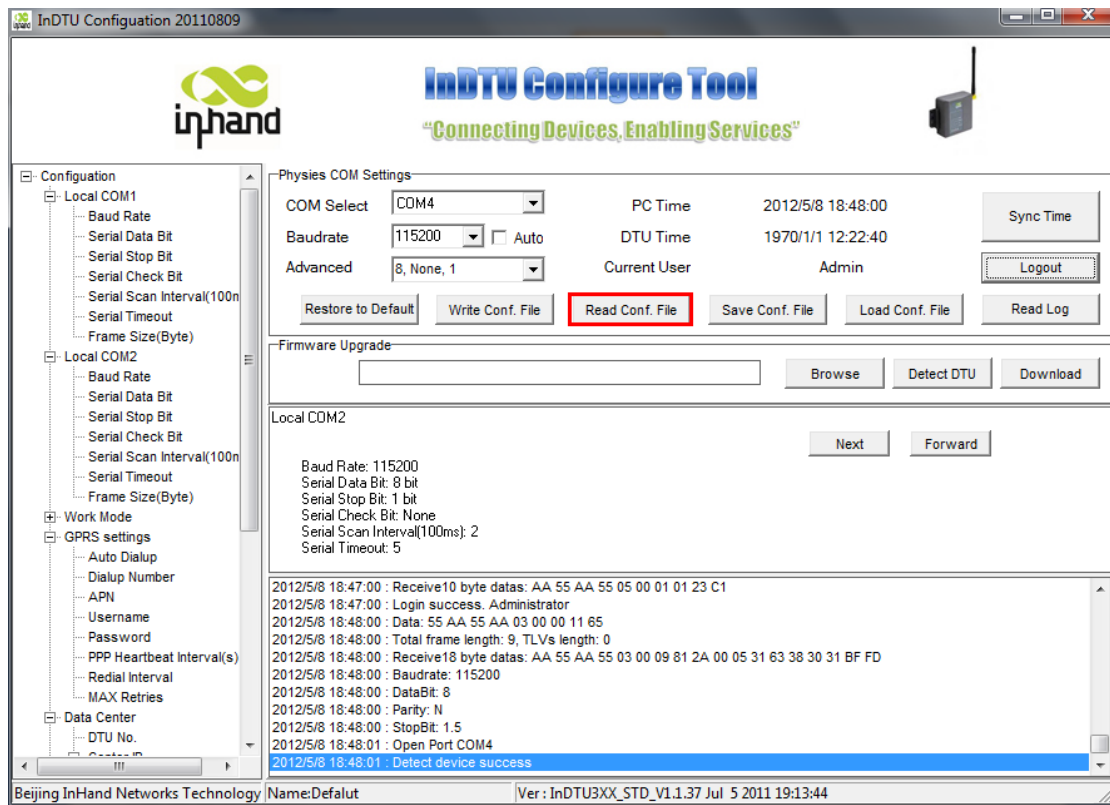
If you see the following prompt, then you can continue your operations, if not, you have to check your connection and serial parameters again.



- 2) Then there'll be a window display, you should input **adm/123456** to login.

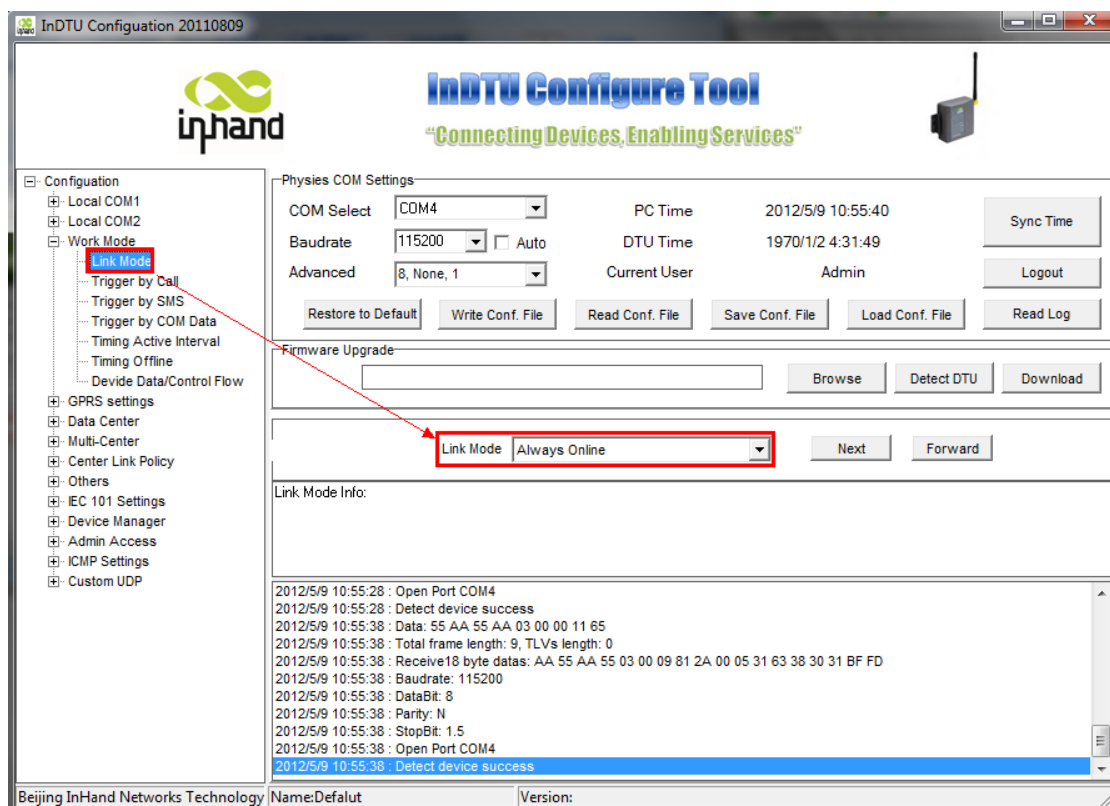


3) Before configure InDTU300, you'd better read the conf file first. Click “**Read Conf. File**” button to get the configure file of InDTU300.



Now, you can configure what you want.

- 4) Click "Work Mode→Link Mode" and set as Always Online.



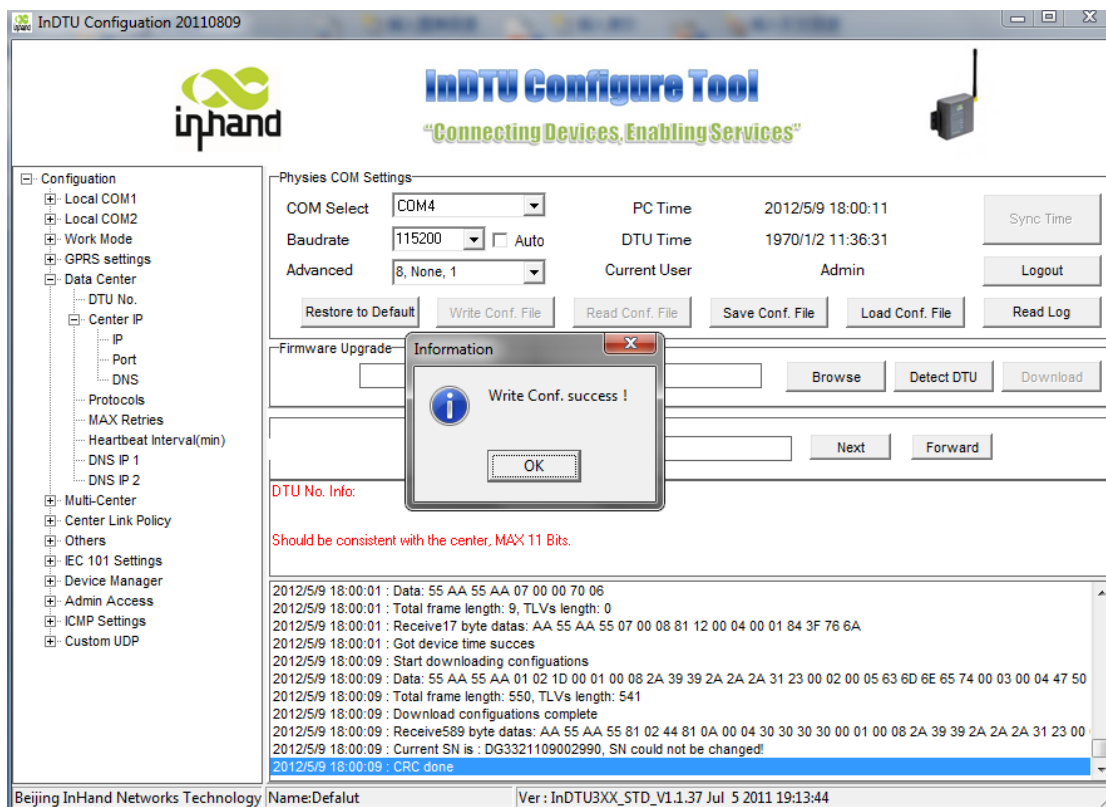
- Click **GPSS setting** then input the right parameters you get from local mobile operator.

The screenshot shows the InDTU Configure Tool interface. On the left, the 'Configuration' tree has 'GPSS settings' highlighted with a red box. The main area shows 'Physics COM Settings' with 'COM Select' set to 'COM4', 'Baudrate' set to '115200', and 'Advanced' set to '8, None, 1'. Below this, the 'GPSS settings' section is highlighted with a red box, showing 'Auto Dialup: YES', 'Dialup Number: *99***1#', 'APN: cmnet', 'Username: GPRS', 'Password: GPRS', and 'PPP Heartbeat Interval(s): 50'. The bottom status bar shows 'Beijing InHand Networks Technology Name:Defalut Ver: InDTU3XX_STD_V1.1.37 Jul 5 2011 19:13:44'.

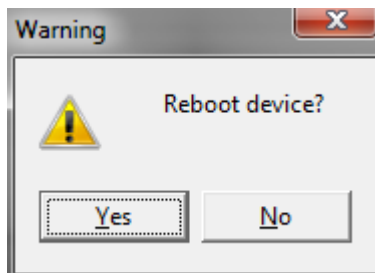
- Click **“Data Center”** to configure the details of where InDTU300 send data to.

The screenshot shows the InDTU Configure Tool interface. On the left, the 'Configuration' tree has 'Data Center' highlighted with a red box. The main area shows 'Physics COM Settings' with 'COM Select' set to 'COM4', 'Baudrate' set to '115200', and 'Advanced' set to '8, None, 1'. Below this, the 'Data Center' section is highlighted with a red box, showing 'DTU No.: 0001', 'Center IP: 203.86.63.238:3700 Domain', 'Protocols: TCP', 'MAX Retries: 5', 'Heartbeat Interval(min): 1', and 'DNS IP 1: 8.8.8.8'. The bottom status bar shows 'Beijing InHand Networks Technology Name:Defalut Ver: InDTU3XX_STD_V1.1.37 Jul 5 2011 19:13:44'.

- Finished configuration, click **“Write Conf. File”** to save the configuration into InDTU300



- 8) You should reboot InDTU300 after write conf file.



Until now, the configuration is complete.

5.2 InDTU300 as a SMS modem

InDTU300 series can serve as a SMS modem. You just set "Max Re-link interval" as "troy" in "Center Link Policy" directory. The InDTU300 will become a SMS modem.

The screenshot displays the InDTU Configuration Tool interface. On the left, a sidebar contains a tree view with the following items: Configuration, Local COM1, Local COM2, Work Mode, GPRS settings, Data Center, Multi-Center, Center Link Policy, Min Re-link Interval, Max Re-link Interval (highlighted with a red box), Roll Mode, TCP Server/UDP Source Port, Others, MAX Login Times, Allow Telnet, Debug, IEC 101 Settings, Device Manager, Admin Access, ICMP Settings, and Custom UDP. The main window is titled 'InDTU Configure Tool' with the tagline 'Connecting Devices, Enabling Services'. It features a 'Physics COM Settings' section with a 'COM Select' dropdown, 'Baudrate' set to 115200, and 'Advanced' settings set to 8, None, 1. It also shows 'PC Time' as 2012/11/20 12:20:45 and 'DTU Time'. Below this is a 'Firmware Upgrade' section with a file input field and buttons for 'Browse', 'Detect DTU', and 'Download'. The 'Max Re-link Interval' is set to 15, with 'Next' and 'Forward' buttons. A status bar at the bottom shows '2012/11/20 12:14:58 : Program start with default baudrate: 115200'.

FAQ

- **Power LED is not on?**
 - a. Please check if power supply is normal, and whether the electrodes are correctly connected.
- **Cannot configure InDTU300?**
 - a. Please check if the serial cable is in good condition, whether the PC's serial port works properly, and if the ports are correctly set in InDTU300's configuration.
- **InDTU300 is powered on, but cannot connect with the remote data server?**
 - a. Check if the parameters of InDTU300 are correctly configured;
 - b. Check if the SIM card is properly inserted in InDTU300, and make sure the SIM card is in service
 - c. If the remote data server is inside a LAN, check if the firewall configuration of port mapping is correct.
- **InDTU300 is connected with server end data management program, but cannot send data to the field control device?**
 - a. Please check the cable connection, whether TXD, RXD, and GND are correct, and whether the devices are using three-line communication in RS-232 communication;
 - b. Check if the communication parameters are correctly configured, e.g. baud rate, check bit, etc.
- **Cannot upgrade InDTU300 through serial port?**
 - b. Please check if the serial cable is in good condition, whether the PC's serial port works properly, and if the ports are correctly set in InDTU300's configuration.

Support

In case you have problems with the installation and use, please address them to us by e-mail:
support@inhandnetworks.com.



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