User Manual

---Apply to RT600 4G/3G RTU

V1.2

http://www.wlink-tech.com

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Caution

Due to product updates or functional upgrading, we may renew the content of this file, and this file only for reference. All statement, information, suggestion .etc in this file do not compose any form of guarantee and we WLINK reserves the right of final explanation.

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1 Product Introduction

1.1 Product Overview

RT600 offers two serial ports and I/O ports, enabling it to connect to a variety of fields devices. With PPP, TCP/IP protocol, it could convert user serial port data to mobile 4G/3G/2G IP network data and transmit the data to customer's data master via transparent TCP/UDP protocol. DI ports support various of digital signal such as door sensor and smoke detector. AI ports support 4~20mA/0~5V signal such as temperature sensor and humidity sensor. Especially, WL-RT600 is programmable for users to customize DI/AI ports and Modbus properties according to various application requirements.

1.2 Typical Application Diagram

RT600 4G/3G RTU widely used in Cold Chain Logisitcs, Oil&Gas, Power, Environment Protection, Water Conservancy and Lighting control monitoring and other industries fields.

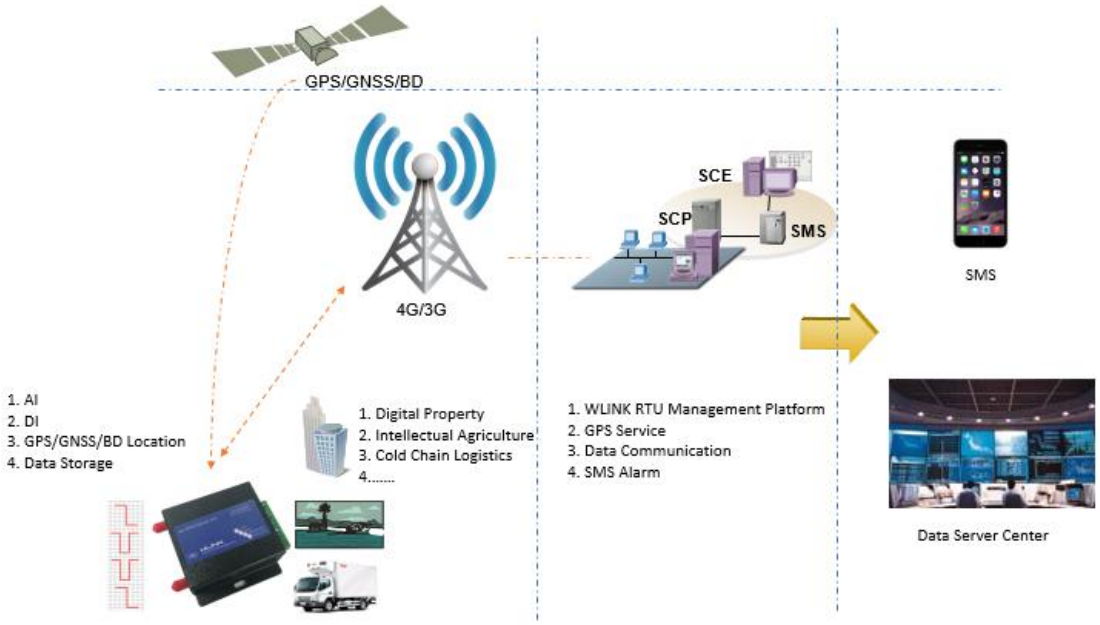


Figure 1-1 Network Topology

1.3 Features

- Integrated 4G/3G/2G cellular communication
- Support programmable function
- Standard PPP, TCP/UDP/IP and Modbus-RTU protocol
- Industrial pluggable terminal block
- RS232 port for Configuration
- RS485 port for data transmission
- 2 Analog inputs and 2 Digital inputs
- Memory data storage optional
- Built-in GPS optional
- Built-in RTC, support real-time clock
- Optimized EMC design
- Support APN and VPDN private network
- Support short message service (SMS)
- Support transparent data transmission
- Support data service center with dynamic IP address
- Support LED status indication
- Wide range voltage input
- External power on/off control

2 Hardware Installation

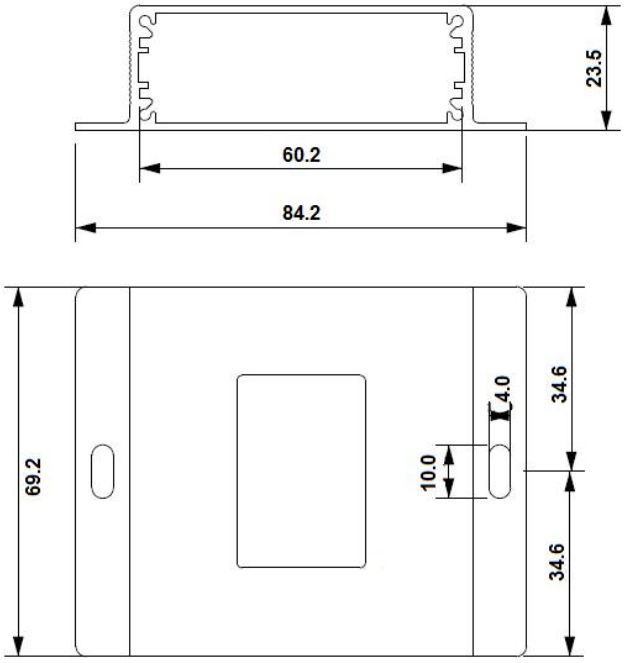
This chapter is mainly for installation introduction, there would be some difference between the scheme and real object. But the difference doesn't have any influence to products performance.

2.1 LED Status

LED indicator Status

silk-screen	color	status	Indication
NET	Red	Weak Signal	CSQ<21
	Green	Good Signal	CSQ≥21
		Fast Blinking	Self-checking
		Light on 1s,Light off 2s	Standby
		Light on 2s, Light off 1s	Online
PWR	Green	Light on	RTU running
GPS	Green	Light on	GPS enabled

2.2 Dimension



2.3 How to Install

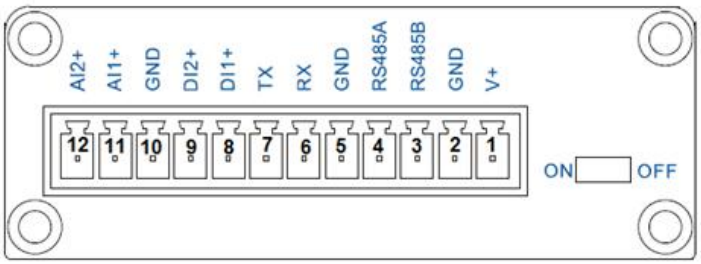
2.3.1 SIM/UIM card installation

Open SIM shelter by screw-driver, then insert SIM/UIM card.

CAUTION

Before connecting, please disconnect any power resource of RTU

2.3.2 Interfaces



Pin	Interface	Description
1	V+	Power Vin+, Anti reverse
2	GND	Power GND
3	RS485-B	RS485 B, 57600bps as default
4	RS485-A	RS485 A
5	GND	GND for RS232 communication
6	RX	RS232 RX, 57600bps as default
7	TX	RS232 TX
8	DI1+	Digital Input, Dry Contact
9	DI2+	Digital Input, Dry Contact
10	GND	Short to DI
11	AI1+	Analog Inputs, 4~20mA or 0~+5V, 12bits Resolution
12	AI2+	Analog Inputs, 4~20mA or 0~+5V, 12bits Resolution

2.3.4 Power Supply

In order to get high reliability, adapt wide voltage input: +7.5V～+32VDC, support hot plug and complex application environment.

2.3.5 Review

After insert the Micro SIM/UIM card, connect serial cable, necessary antenna, then connect power cable.

CAUTION

Please connect the antenna before connect the power cable, otherwise because of impedance mismatching, the signal maybe poor.

Notice:

Step 1 Check antenna connection.

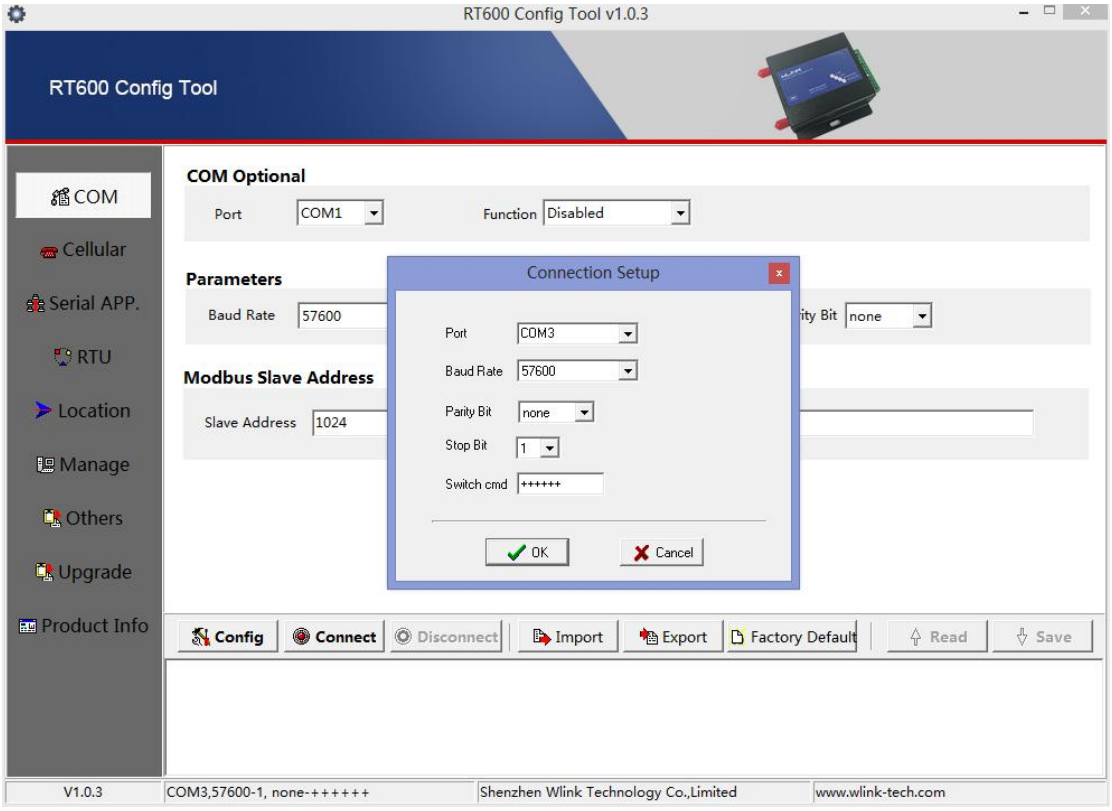
Step 2 Check Micro SIM/UIM card, configure SIM/UIM card is available.

Step 3 Power on RTU

3 RTU Configuration

3.1 RT600 Config Tool Serial Port Settings

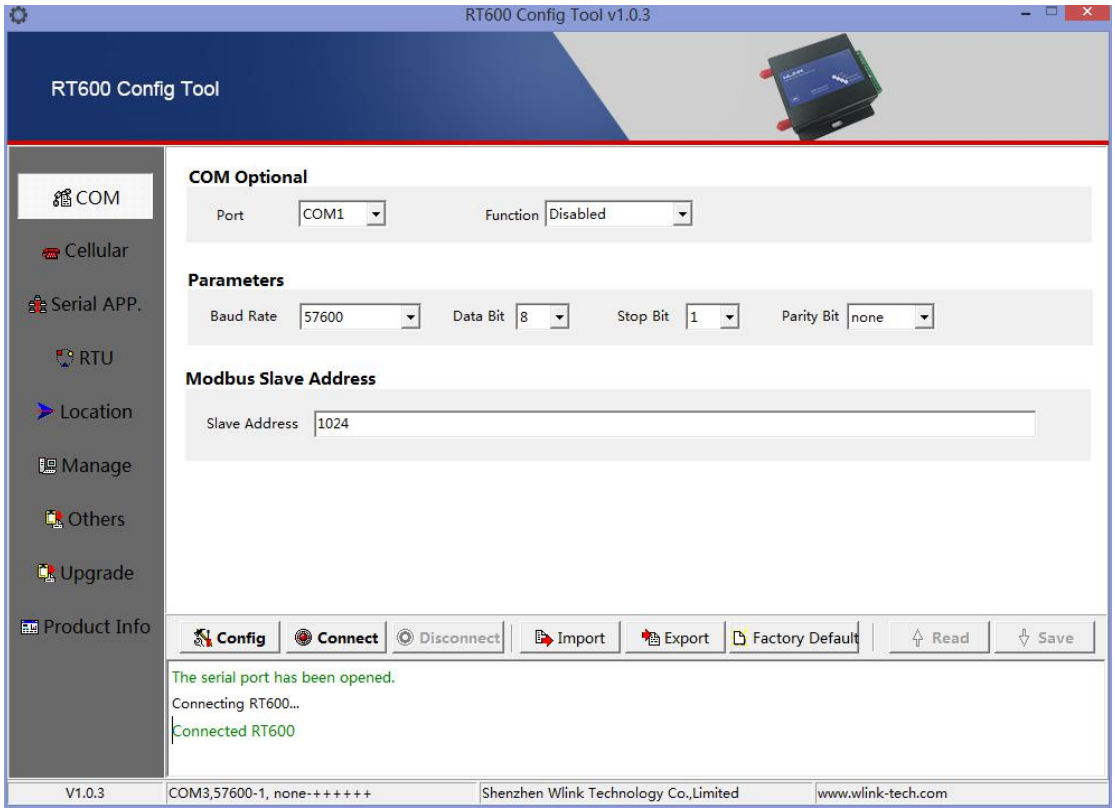
Run RTU Config Tool, click Config button to setup serial port parameters as below.



Baud Rate: 57600bps
Data Bit: 8bit
Parity: None
Stop Bit: 1bit

NOTE

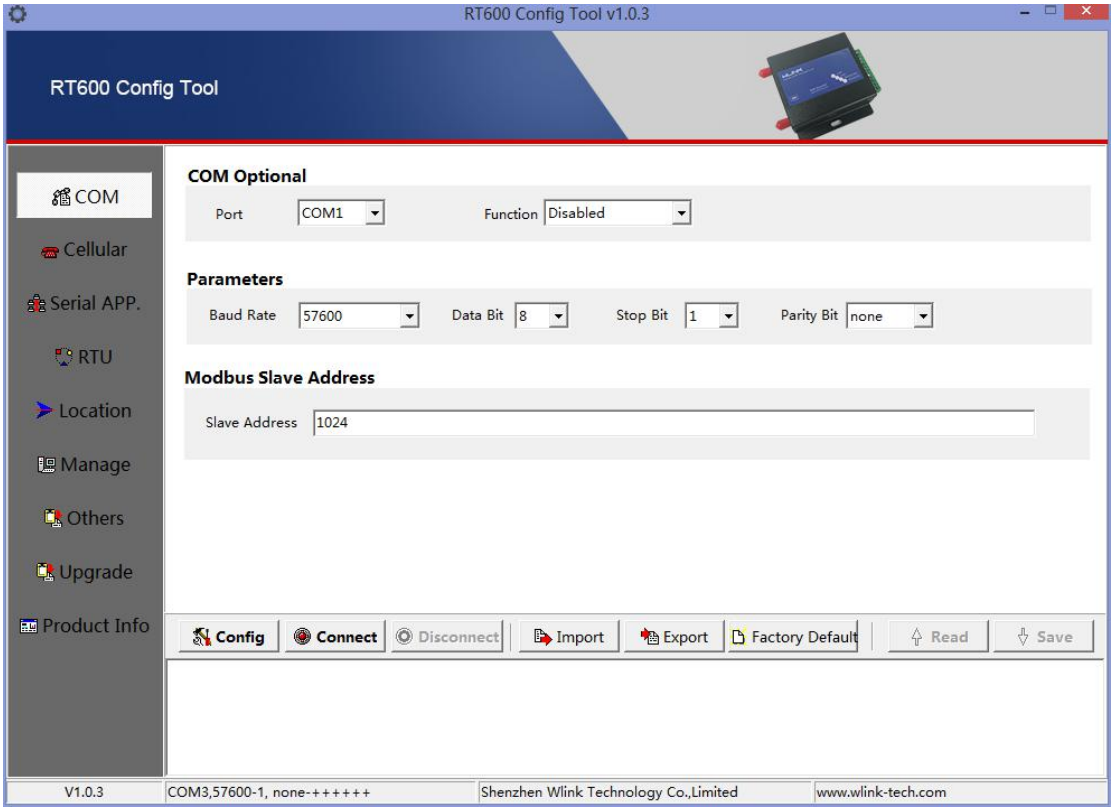
Click Connect button, RTU will be connected to the tool and enter configuration mode. If the connection is successful, it will display Connected RTU dialog box as below.



【Config】Tool Serial port configuration.
【Connect】Connect RTU.
【Disconnect】Close serial port to leave configuration mode.
【Import】Import configuration file into Config tool.
【Export】Export current settings to file. It's convenient for butch setup.
【Default】Setup RTU to default settings.
【Read】Inquiry current RTU setting.
【Save】Save settings to RTU.

3.2 RTU Configuration

3.2.1 RTU COM Settings

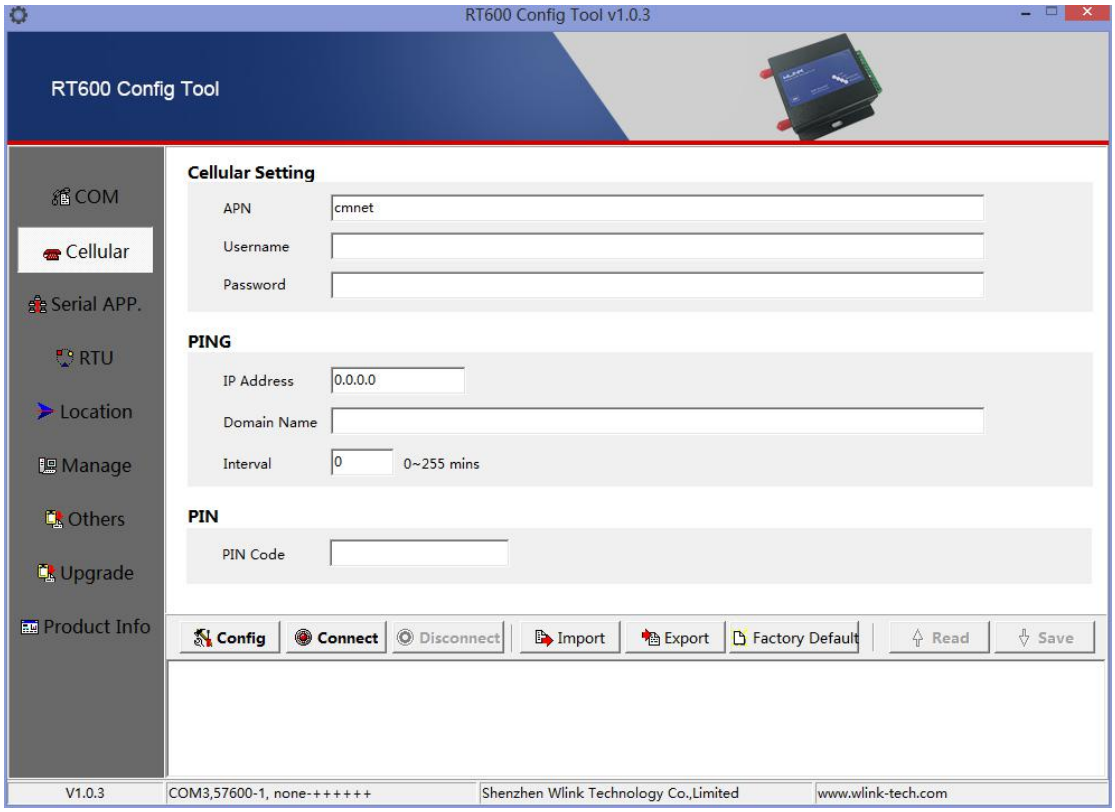


RTU Serial port settings instruction.

Parameters	Description	Instruction	Default
COM Options	RT600 supports one RS232 and one RS485. RS232 for Config and Debug as default, RS485 for data communication.	COM1 for RS232 COM2 for RS485	
Function Options	Supports data transfer and modus modes.		
Baud rate	Serial port properties	300/600/1200/2400/4800/9600/19200/38400/57600/115200 optional. RS232 Port for 57600bps as default. RS485 Port for 57600bps as default.	
Data bits		8	8
Stop bits		1/2	1
Parity		NONE/ODD/EVEN	NONE

Parameters	Description	Instruction	Default
Modbus Slave Address	The address for Modbus slave address which is connected to RT600	.	

3.2.2 Cellular Settings

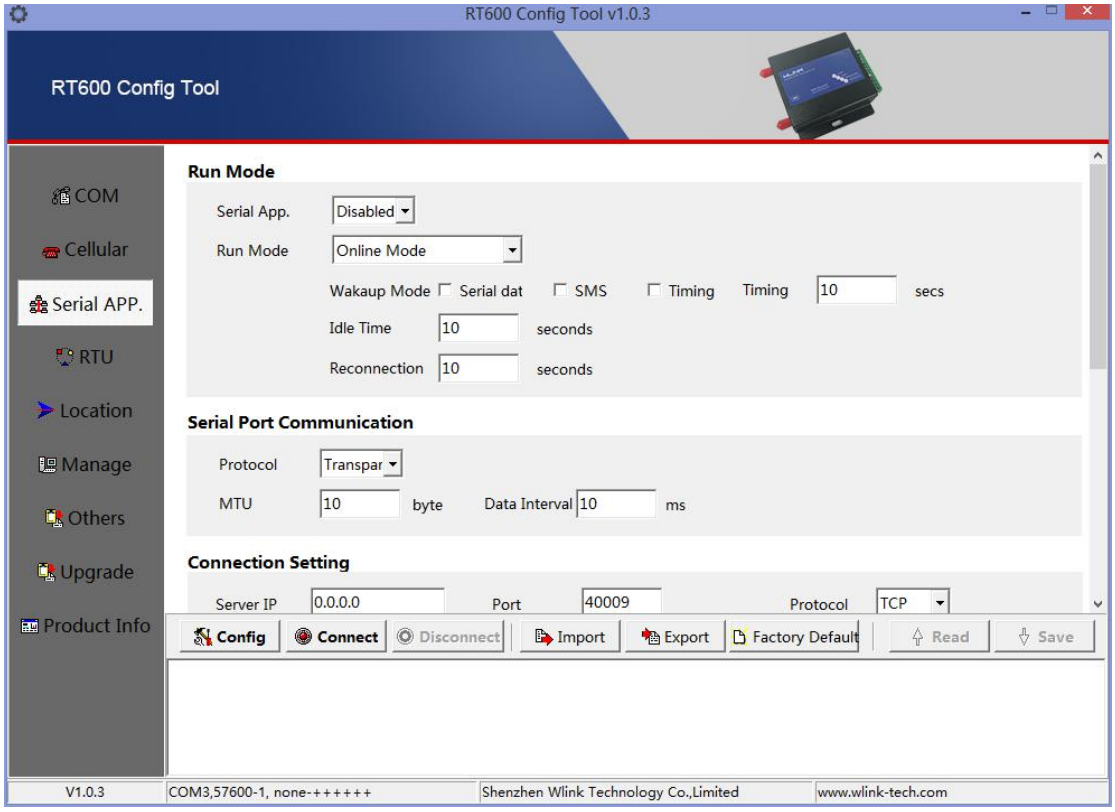


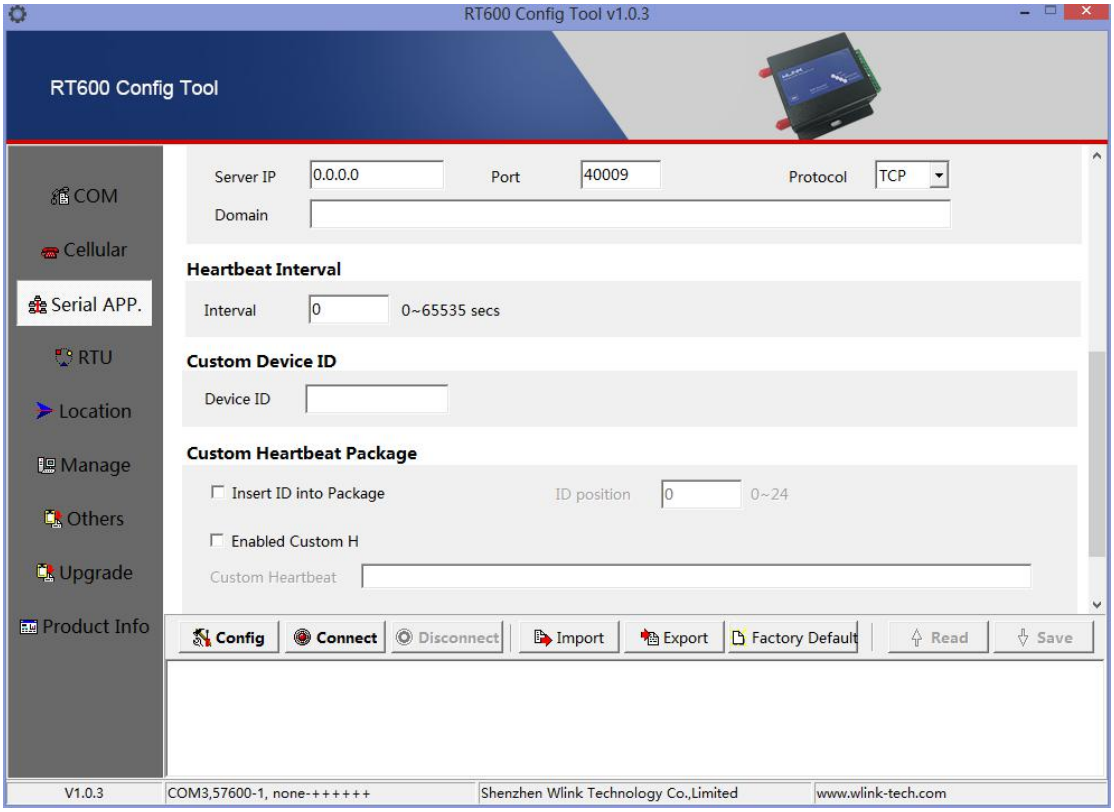
RTU Network settings instruction

Parameters	Description	Instruction	Default
APN	SIM information for dial up	1~63bytes	cmnet
User name		0~63bytes	NULL
Password		0~63bytes	NULL
Ping IP address	Check destination IP address		0.0.0.0
Ping Domain Name	Check destination domain name. If IP 0.0.0.0 and domain name is null, Ping is disable.	0~63byts	NULL
Interval	PING check interval when idle.	0~255mins 0 indicates PING is disable status.	0
PIN Code	SIM card PIN Lock	If SIM card is configured PIN Code, it need to configure PIN code so in RTU so that RTU can identify SIM card.	

Parameters	Description	Instruction	Default
		It need to check PIN code correctly, if not, the SIM card will be damaged if configure error PIN code.	

3.2.3 Serial App. Settings





RTU Connection settings instruction

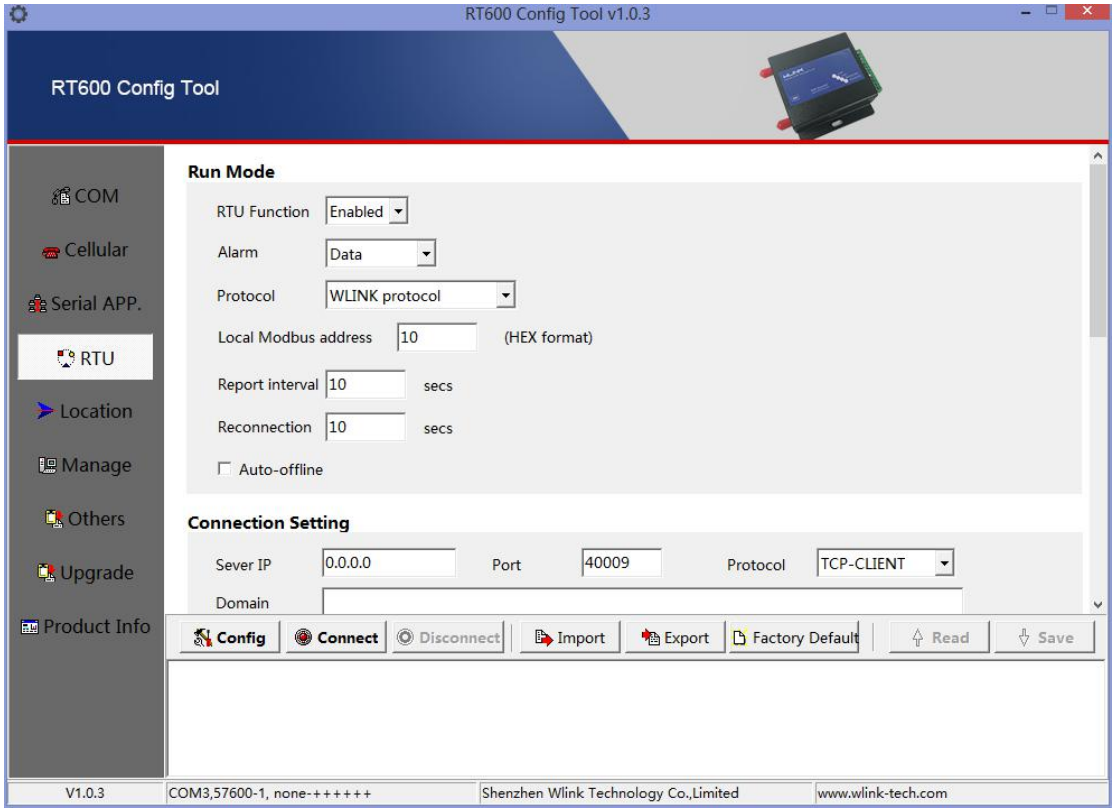
Serial APP. is used for the communication between RS485 and data server.

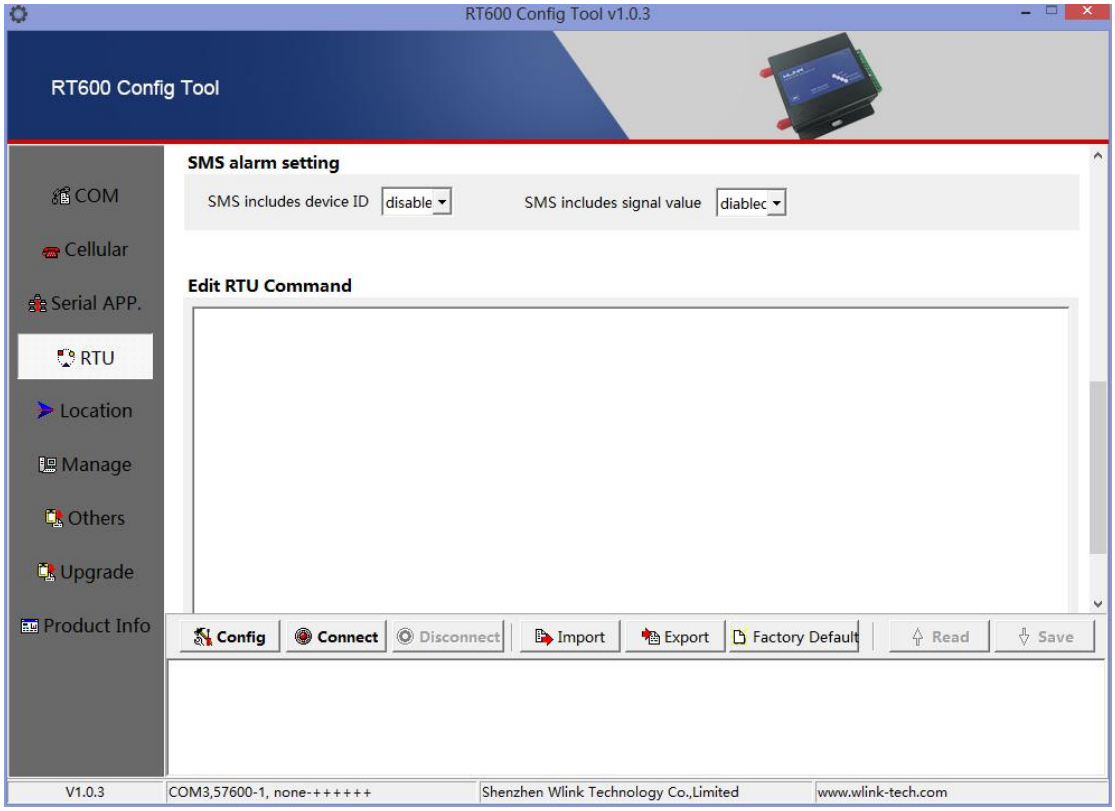
Parameters	Description	Instruction	Default
Serial APP	Disable and enable options	Serial port to IP communication application	disable
Run Mode	ONLINE/WAKEUP	**[ONLINE]** After powered on, RTU automatically connect and reconnect to data center server to keep online always **[WAKEUP]** After Powered on, RTU will work at standby mode. Once RTU received wakeup command such as SMS, serial data triggering or counted timing time, RTU will dial up and connect to data center server. After idle time, RTU will re-enter wake up mode.	ONLINE
Idle Time	RTU will enter standby status after idle time.	Idle time is only suitable for wakup mode. 0~65535s	10s
Reconnect	RTU reconnect to data center server after interval time when connection is failed.	0, 5~65535s 0 for Immediate reconnection	10s
Serial Port Communication	At present, only Transparent Mode available.		

Parameters	Description	Instruction	Default
MTU	The max transmission unit. Once data package length exceed to MTU, DTU will split data package as MTU.	10~1024 bytes	10 bytes
Data Interval	The Data Interval is the waiting time interval for transmitting the data package that is less the MTU. If the last package equals to the MTU, DTU will transmit it immediately.	10~1000 ms	10 ms
Server IP	Data server center IP address(static IP address)		
Port		0~65535	40009
Protocol	UDP/TCP optional		UDP
Domain	Used for dynamic IP address in HQ.	Only setup server IP as 0.0.0.0, it's available.	N/A
Heartbeat Interval	0~65535s	RTU will automatically send heartbeat to server in order to keep connection. 0 means no heartbeat.	0
Custom Device ID	Identify DTU in data server center	4byte length	0
ID Position	ID insert data package in order to identify which RTU sent data.	0~24bytes	1
Custom Heartbeat Package	RTU log in data center server and keep connection.	0~24bytes	NULL
Custom ACK Package	RTU receive ACK after sent heartbeat. If no ACK 3times in succession, DTU will reconnect to data center server.	0~24bytes	NULL

3.2.4 RTU Settings

RTU. is used for data collection from AI and DI interface.

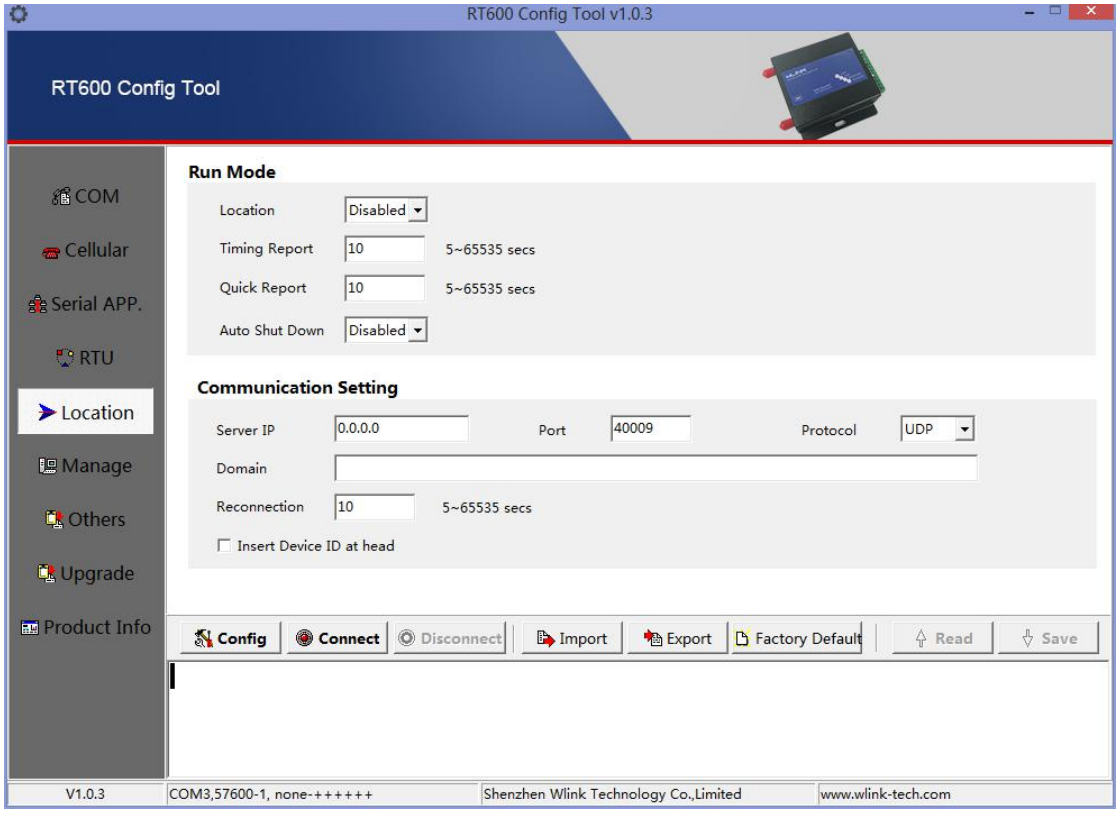




RTU Settings

Parameters	Description	Instruction	Default
RTU Function	Disable/ Enable	RTU. is used for data collection from AI and DI interface	NULL
Alarm	Data, SMS, Data +SMS modes options	**[Data Alarm]** Edit data alarm settings via RTU command in Config tool **[SMS Alarm]** Edit SMS alarm settings via RTU command in Config tool **[Data+SMS Alarm]** Edit data/SMS alarm settings via RTU command in Config tool	
Protocol	WLINK protocol, Modbus-RTU, SMS only and custom options	**[WLINK Protocol]** WLINK Protocol **[**Modbus-RTU**]**	
Local Modbus Address	Local device Modbus address	Hex	NULL
Report Interval	Send collection data to server as interval time	0~65535s	10s
Reconnection	Reconnection interval when connection is failed to server.	5~65535s	10s
Auto Offline	RTU will be automatically offline after completed data collection.		Unavailable now
Server IP	Transmit collection data to defined IP address		
Port	Transmit collection data to defined port		
Protocol	Transmit collection data to defined protocol		
Domain	Used for dynamic IP address in HQ.	Only setup server IP as 0.0.0.0, it's available.	N/A
Heartbeat Interval	0~65535s	RTU will automatically send heartbeat to server in order to keep connection. 0 means no heartbeat.	0
SMS Alarm	Disable/Enable	Add device ID in SMS. Device ID must be unique Add AI/DI signal value in SMS	
Edit RTU Command	RTU commands are programmable to collect AI/DI and serial port Modbus data.	Different sensor with different type AI/DI. So the command script will be different. Chapter No.4 includes an instance for temperature sensor Command script as reference.	

3.2.5 GPS Location Settings

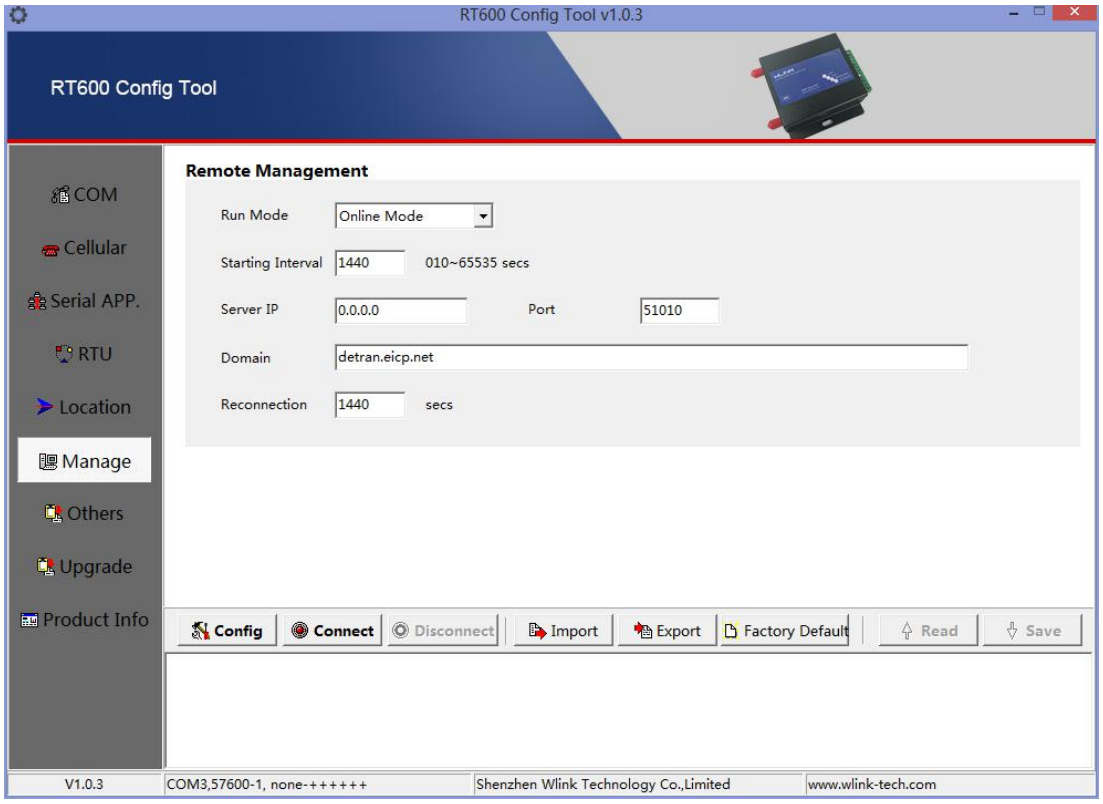


GPS Location settings instruction

Parameters	Description	Instruction	Default
Location	Disable/Enable		Disable
Timing Report	Send GPS data as timing report time. This feature is pointed at fixed location. Suggest configure value more than 600s to save data traffic.	5~65535s	10s
Quick Report	Send GPS data as quick report time. This feature is pointed at moved location. Once the location is moved more than 50m, RT600 will report	5~65535s	10s

Parameters	Description	Instruction	Default
	current GPS data to server traffic.		
Auto Shut Down	Unavailable now		
Server IP	Transmit GPS data to defined IP address	Enable/Disable	Disable
Port	Transmit GPS data to defined port	6 visible characters	
Protocol	Transmit GPS data to defined protocol		
Domain	Used for dynamic IP address in HQ.	Only setup server IP as 0.0.0.0, it's available.	
Insert ID	Insert device ID into GPS data package in order to identify which RTU.		

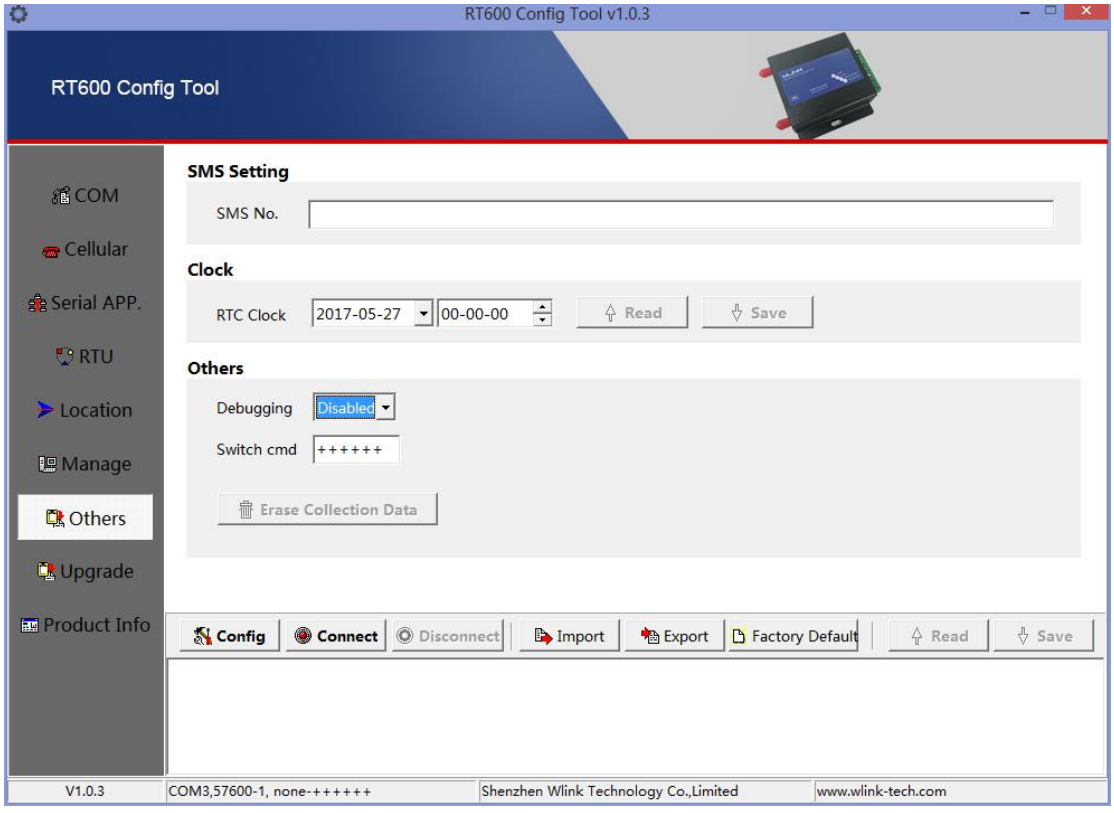
3.2.6 RTU Remote Management Settings



RTU Remote management settings instruction

Parameters	Description	Instruction	Default
Run Mode	Disable/Enable		
Start Interval	RT600 will connect to remote management software as this start interval time.	0 means this function is invalid.	
Remote IP	Remote management software static IP address		0.0.0.0
Port		0~65535	40001
Domain Name	Used for dynamic IP in HQ.	Domain name is available when the IP address is setup 0.0.0.0	NULL
Reconnection	RT600 will reconnect to remote management software as this interval time when the connection is down.	0~65535s	

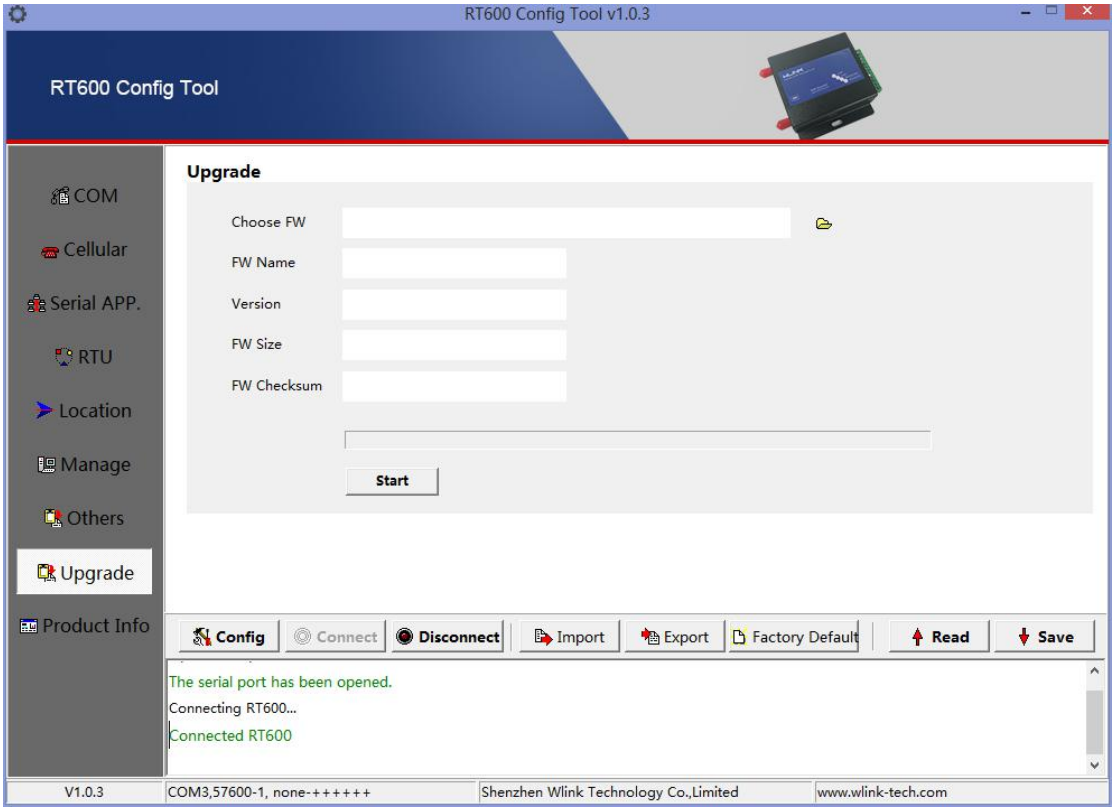
3.2.7 RTU Others Settings



RTU Other Settings instruction

Parameters	Description	Instruction	Default
SMS Function	SMS function is for SMS alarm and SMS RTU configuration only		
SMS No.	Support to configure 11 phone number as Max	The first number acts as administration which might manage other numbers.	
RTU Clock	Configure Clock by manual		
Debugging	RTU debugging information		
Switch CMD	RT600 will be switched to configuration mode from transmission mode. After switched to configuration mode, The RT600 will enter command mode to communicate with end device.		Unavailable now
Erase Collection Data	Erase collection data in Flash		

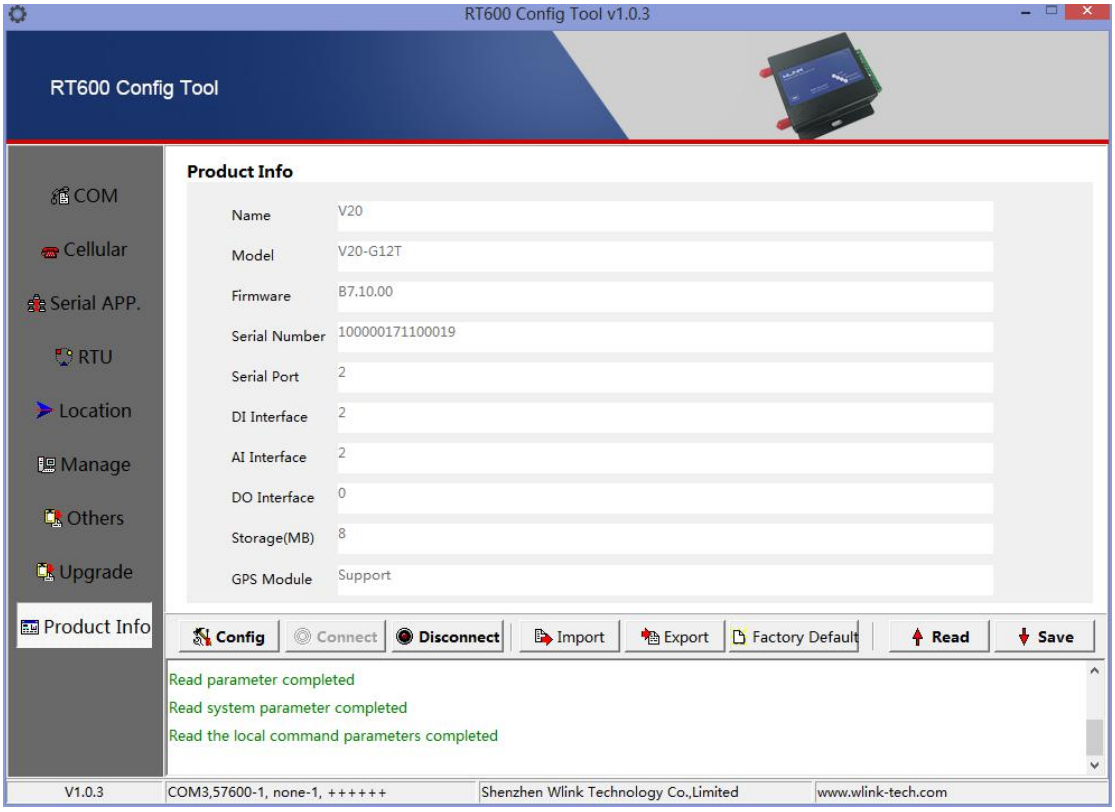
3.2.8 RTU Upgrade



RTU Upgrade instruction

Parameters	Description	Instruction	Default
Choose Firmware	Choose firmware		
Firmware Name	Firmware name		
Version	Firmware version		
Firmware Size	Firmware size		
Firmware Checksum	Firmware Verification		

3.2.9 RTU Information

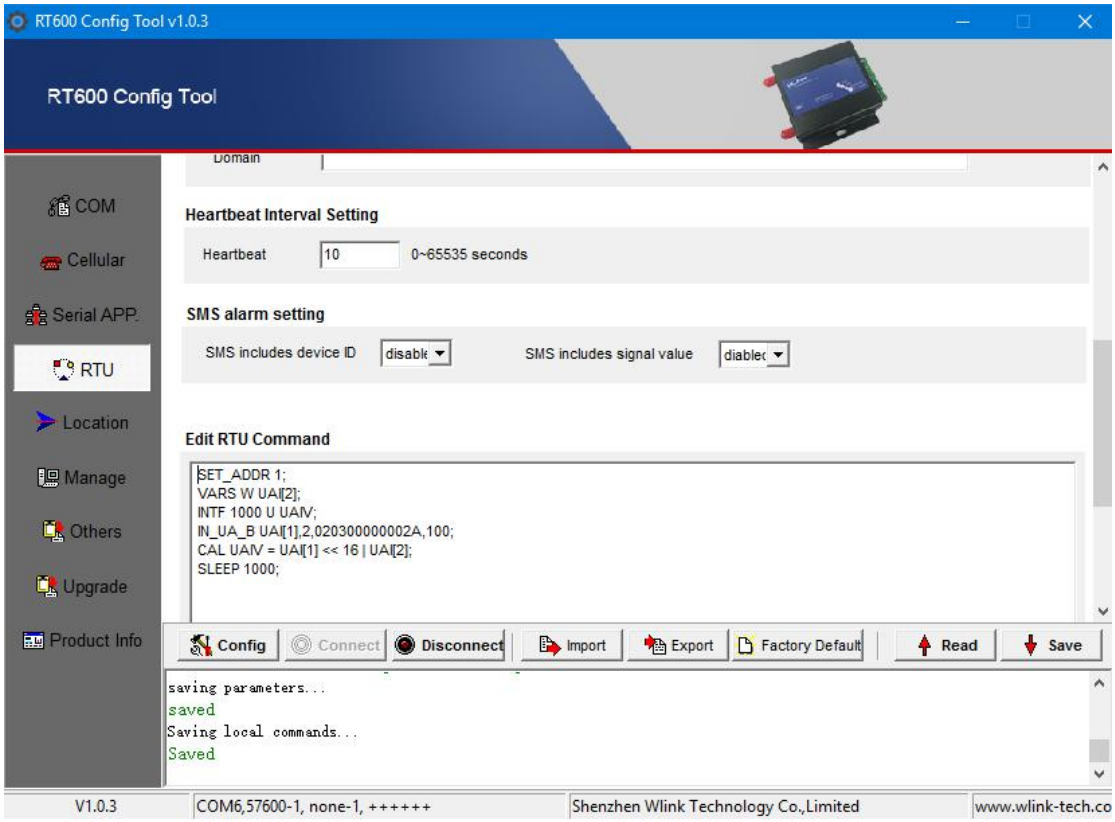


RTU Information instruction

Parameters	Description	Instruction	Default
Name			
Model			
Firmware			

Parameters	Description	Instruction	Default
Serial Number			
AI Interface			
DI Interface			
DO Interface			
Storage(MB)			
GPS Module			

4 Programmable Command Demo



SET_ADDR 1; // *Configured INTF variable Slave address for 1*

VARS W UAI[2]; // *Defined double-byte integer array for 2*

INTF 1000 U UAIV; // *Defined Unsigned four-byte integer, no vaule, register address 1000. Keep the register address 1000 as the same as RTU management platform.*

IN_UA_B UAI[1],2,020300000002A,100; // *Read 2 Analog, then save them to specified position space which is from UAI[1]. Timeout 100ms.*

CAL UAIV = UAI[1] << 16 | UAI[2]; // *calculate formula*

Introduce parameter as below.

UAI[1] First Analog variable

2 read 2 analog in succession.

020300000002A Modbus command without CRC checksum.

100 Timeout, unit is ms. No wait if remove this value.