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Xiamen Caimore CM550 RTU

Product Manual



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Product Outline Drawing:





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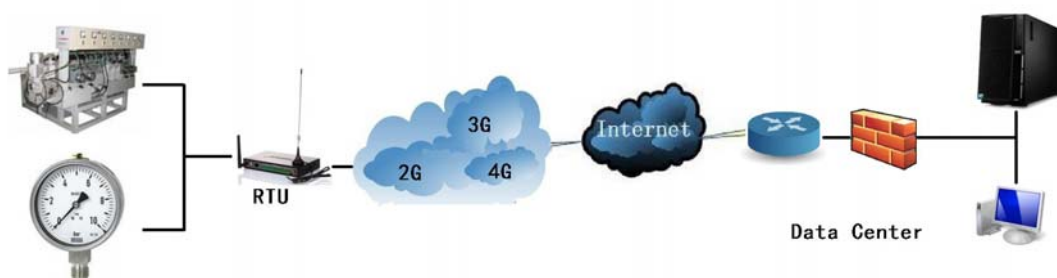
Chapter One Product Introduction

1.1 Product overview

Caimore CM550 series intelligent wireless remote terminal unit (abbreviation: RTU) is Xiamen Caimore's years of practice and engineering application result. The device is produced by independent research and development and has the functions of data collection, remote control and wireless communication. The series products integrate analog signals acquisition, digital input, digital output, count, wireless data communication, and it can directly access all kinds of analog signals, level signal, dry contact and pulse signal output by sensor, standard transducer signal, instrument etc., which is the best choice of implementing wireless monitoring.

CM550 series adopts high-performance industrial 32-bit communication processor and industrial wireless module. It is embedded with real-time operating system to provide on-line maintain technology for software support platform device. Meanwhile, it also provide RS232 and RS485 interface to achieve the acquisition of analog signal and digital signal.

RTU sets the router function, and for the detailed router function instructions, please refer to the Xiamen Caimore router instructions.



1.2 Product feature

Industrial application design

- Using high-performance industrial 2G/3G/4G wireless module
- Using high-performance industrial 32-bit communication processor



- Built-in real-time clock (RTC)
- Using metal shell achieves IP30 protection level. Metal shell and system security isolation is particularly suitable for industrial control field.
- Wide power input (DC 7~32V)

Stability and reliability

- WDT design ensures stable system.
- Using anti-dropped mechanism ensures digital terminal is always online.
- RS232/RS485 interface with built-in 15KV ESD protection
- SIM/UIM card interface with built-in 15KV ESD protection
- Power interface with built-in inverting protection and over-current protection
- Antenna interface, lightning protection (optional)

Easy to use

- Industrial terminal interface is particularly suitable for industrial field
- Standard RS232 and RS485 interface can be directly connected to serial device.
- TTL level serial is customizable.
- Intelligent data terminal, can access the state of data transmission once powered up.
- Provide powerful center management software (optional).
- Easy to use, flexible, various working mode selection
- Convenient to configure system and maintain interface
- Support remote maintenance and remote upgrade

Powerful function

- 8 ch analog input, resolution ratio 16bit,input voltage (-10V ~ 10V), input current (4mA-20mA), precision $<\pm 0.5\%$
- 4 ch relay output (dry contact) , drive capability 5A/30VDC,5A/250VAC
- 4 ch optical isolation digital output, open-collector output, max voltage 30V,max current 40mA, max power 125mW
- 2 ch PWM output, adjustable frequency and duty cycle
- 8 ch digital input, input range (low level 0-3.3V, high level 5-24V), including 6 ch count function (max counter frequency 1KHz)。
- Support dual data centers backup transmission and multiple data centers synchronous transmission (8 data centers). Support multiple centers and functions (for instance: one center can be MODBUS RTU protocol, and another is RTU extension protocol). Support to visit center according to domain name and IP address
- Support extension protocol: Unified protocol format is convenient for customer to develop.
- Support extension protocol: Achieve acquisition data report at intervals (8 ch analog input and digital input)
- Support extension protocol: The selection of data report channel can be network or SMS, also can be network first.
- Support extension protocol: Center takes active query to collect data.
- Support extension protocol: Achieve count function. Counter initial value can be set and count value can be read.
- Support extension protocol: Restart device remotely



- Support extension protocol: Configure parameters remotely
- Support extension protocol: Set remote upgrade parameter and upgrade remotely
- Industrial build-in clock can record acquisition time in real time
- Automatically connect to network with electrification, and reconnect when it is off line

Application fields

- Wireless power meter reading, wireless intelligent transportation, wireless warehouse monitoring, wireless water monitoring
- Wireless pipeline monitoring, wireless petrochemical measurement, wireless medical monitoring, wireless security alarm
- RFID data transmission, wireless smart home, wireless intelligent bus, wireless ordering system
- Wireless access control attendance, wireless machine room monitoring, wireless intelligent household, wireless oilfield measurement and control
- Wireless power measurement, wireless street lamp control, wireless three table set copy, wireless positioning system

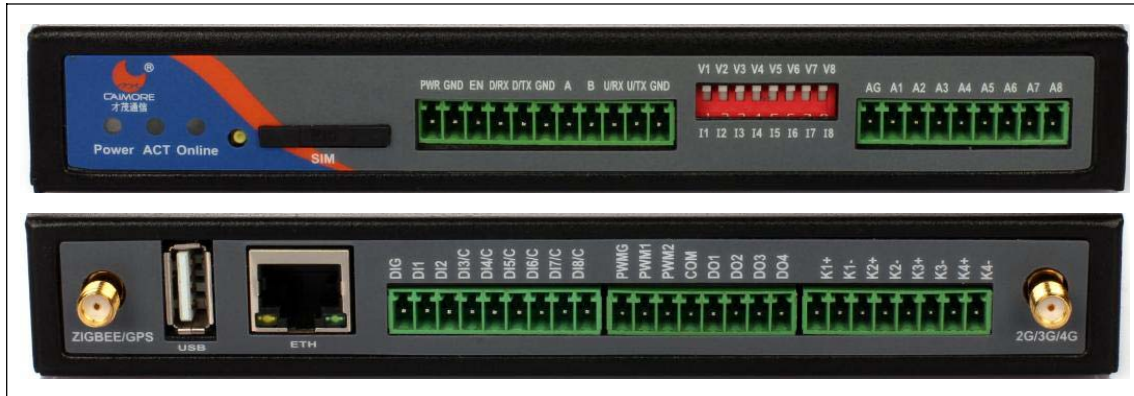
1.3 Product specifications

Hardware system

Item	Content
CPU	Industrial 32-bit ARM9 core processors AT91SAM9G25
NOR FLASH	16MB
SDRAM	128MB

Receiving type

Item	Content
Serial port	One RS232 interface, built-in 15KV ESD protection; Serial parameter as follows: Data bit: 5, 6, 7, 8 bit Stop bit: 1, 1.5, 2 bit Validation: No validation, odd validation, even validation, SPACE and MARK validation. Serial rate: 110~115200bits/s
Indicator light	“POWER”, “communication ACT” and “Online”
Antenna interface	Standard SMA female interface, 50 ohm
SIM/UIM interface	1.8V/3V/5V standard putter user card interface, built-in 15KV ESD protection
Power interface	Terminal interface, built-in inverting protection and over-current protection of power supply



Power supply

Item	Content
Standard power supply	DC 9V/1.5A
Power supply range	DC 7~32V

Power consumption

Item	Content
Communication status	0.2A@+9VDC
Standby mode	0.15A@+9VDC

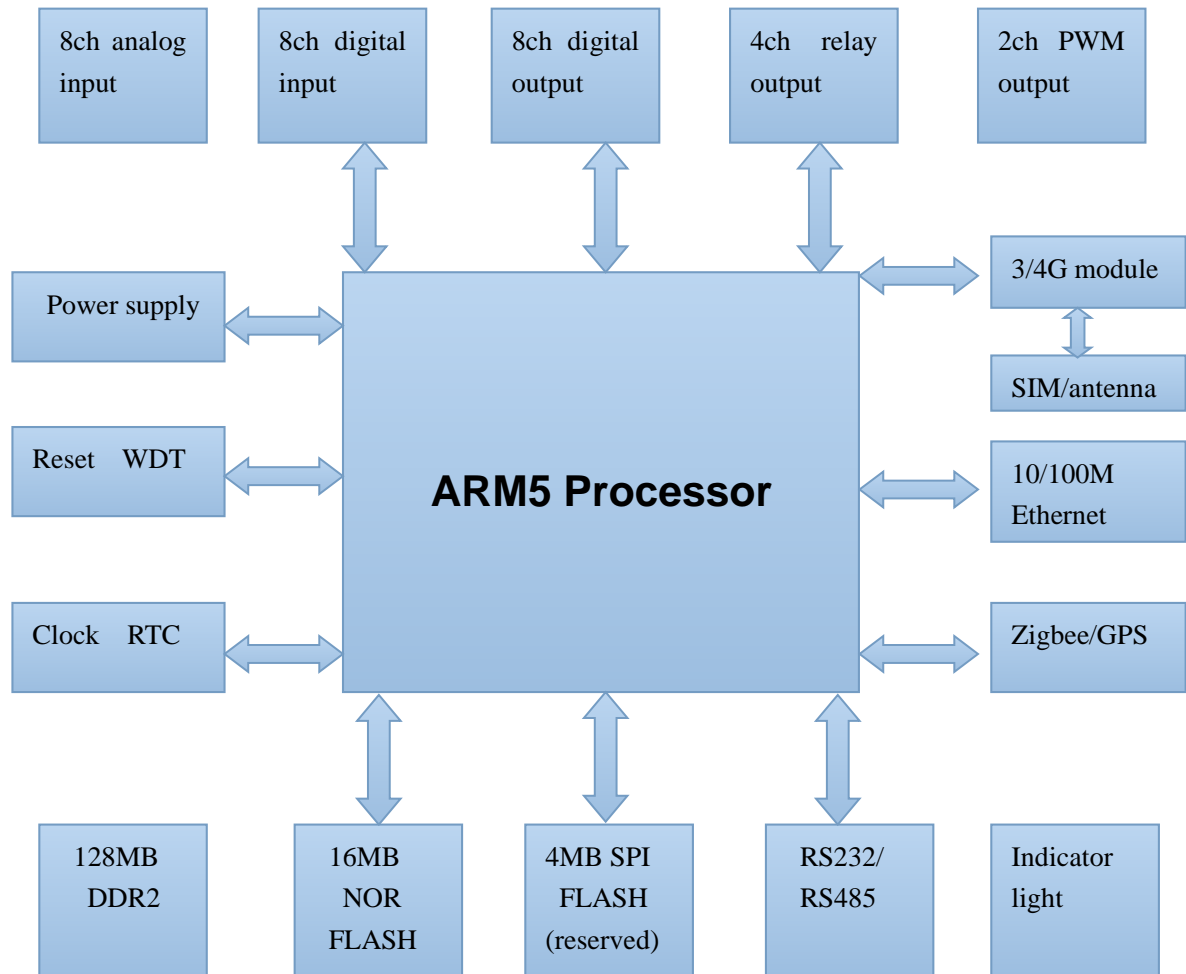
Physical features

Item	Content
Shell	Metal shell, IP30 protection level; security isolation between shell and system, especially for industrial control field.
Product dimensions	167*104*26mm (not including antennas and the fixed parts)
Weight	0.52Kg

Other parameters

Item	Content
Shell	Metal shell, IP30 protection level; security isolation between shell and system, especially for industrial control field
Operating Temperature	-25 °C ~+70°C
Storage Temperature	-40 °C ~+85°C
Humidity	95% (No condensation)

Functional block diagram



Chapter Two Installation

2.1 Overview

The device must be properly installed to achieve the design function and it is usually conducted under the guidance of qualified engineers approved by our company.

Note:

Please do not install DTU with electrical connector, also do not put and pull out card with electrical connector.

Installation diagram of back:



Installation diagram of front:



2.2 Unpacking

In order to have a safe transport, the devices should be in a rational packaging. When it is open, please keep the packing materials to use for next transportation.

2.2.1 CM550-51X standard parts list

NO.	Material NO.	Chinese name	Specifications and models	Quantity	Unit
1	WY.0081 WY.0001	Antenna	3G 1.5m sucker antenna 1M vehicle antenna-2G	1	PCS



	WY.0080		LTE 4G 1.5m sucker antenna		
2	PK.0015	Power adapter	Power adapter: 9V 1.5A (1CM tinning)	1	PCS
3	XL.0042	Data line	Single DB9 data line 1M (one side is DB9 and the other side is lead)	1	PCS
4	BP.0055	CD	CD	1	PCS
5	BP.0056	CD cover	CD cover	1	PCS
6	BP.0057	Certification	Certification	1	PCS
7	EZ.0002	Cutting ferrule	SIM drawer type cutting ferrule	1	PCS

2.2.2 CM550-52X standard parts list

NO.	Material NO.	Chinese name	Specifications and models	Quantity	Unit
1	WY.0081 WY.0001 WY.0080	Antenna	3G 1.5m sucker antenna 1M vehicle antenna-2G LTE 4G 1.5m sucker antenna	1	PCS
2	PK.0015	Power adapter	Power adapter: 9V 1.5A (1CM tinning)	1	PCS
3	XL.0042	Data line	Single DB9 data line 1M (one side is DB9 and the other side is lead)	1	PCS
4	XL0004	Data line	Ethernet straight-through line (RJ450RJ45) 1M	1	PCS
5	BP.0055	CD	CD	1	PCS
6	BP.0056	CD cover	CD cover	1	PCS
7	BP.0057	Certification	Certification	1	PCS
8	EZ.0002	Cutting ferrule	SIM drawer type cutting ferrule	1	PCS

2.2.3 CM550-53X standard parts list

NO.	Material NO.	Chinese name	Specifications and models	Quantity	Unit
1	WY.0081 WY.0001 WY.0080	Antenna	3G 1.5m sucker antenna 1M vehicle antenna-2G LTE 4G 1.5m sucker antenna	1	PCS
2	WY.0047	Antenna	3M GPS antenna	1	PCS
3	PK.0015	Power adapter	Power adapter: 9V 1.5A (1CM tinning)	1	PCS
4	XL.0042	Data line	Single DB9 data line 1M (one side	1	PCS

			is DB9 and the other side is lead)		
5	BP.0055	CD	CD	1	PCS
6	BP.0056	CD cover	CD cover	1	PCS
7	BP.0057	Certification	Certification	1	PCS
8	EZ.0002	Cutting ferrule	SIM drawer type cutting ferrule	1	PCS

2.2.4 CM550-54X standard parts list

NO.	Material NO.	Chinese name	Specifications and models	Quantity	Unit
1	WY.0081 WY.0001 WY.0080	Antenna	3G 1.5m sucker antenna 1M vehicle antenna-2G LTE 4G 1.5m sucker antenna	1	PCS
2	PK.0015	Power adapter	Power adapter: 9V 1.5A (1CM tinning)	1	PCS
3	XL.0042	Data line	Single DB9 data line 1M (one side is DB9 and the other side is lead)	1	PCS
4	BP.0055	CD	CD	1	PCS
5	BP.0056	CD cover	CD cover	1	PCS
6	BP.0057	Certification	Certification	1	PCS
7	EZ.0002	Cutting ferrule	SIM drawer type cutting ferrule	1	PCS
8	WY.0069	Antenna	2.4G 1.5m small sucker antenna (dedicated for ZigBee)	1	PCS

2.2.5 CM550-55X standard parts list

NO.	Material NO.	Chinese name	Specifications and models	Quantity	Unit
1	WY.0081 WY.0001 WY.0080	Antenna	3G 1.5m sucker antenna 1M vehicle antenna-2G LTE 4G 1.5m sucker antenna	1	PCS
2	PK.0015	Power adapter	Power adapter: 9V 1.5A (1CM tinning)	1	PCS
3	XL.0042	Data line	Single DB9 data line 1M (one side is DB9 and the other side is lead)	1	PCS
4	BP.0055	CD	CD	1	PCS
5	BP.0056	CD cover	CD cover	1	PCS

6	BP.0057	Certification	Certification	1	PCS
7	EZ.0002	Cutting ferrule	SIM drawer type cutting ferrule	1	PCS
8	WY.0047	Antenna	3M GPS antenna	1	PCS
9	XL.0004	Data line	Ethernet straight-through line (RJ45-RJ45) 1M	1	PCS

2.2.6 CM550-56X standard parts list

NO.	Material NO.	Chinese name	Specifications and models	Quantity	Unit
1	WY.0081 WY.0001 WY.0080	Antenna	3G 1.5m sucker antenna 1M vehicle antenna-2G LTE 4G 1.5m sucker antenna	1	PCS
2	PK.0015	Power adapter	Power adapter: 9V 1.5A (1CM tinning)	1	PCS
3	XL.0042	Data line	Single DB9 data line 1M (one side is DB9 and the other side is lead)	1	PCS
4	BP.0055	CD	CD	1	PCS
5	BP.0056	CD cover	CD cover	1	PCS
6	BP.0057	Certification	Certification	1	PCS
7	EZ.0002	Cutting ferrule	SIM drawer type cutting ferrule	1	PCS
8	WY.0069	Antenna	2.4G 1.5m small sucker antenna (dedicated for ZigBee)	2	PCS
9	XL.0004	Data line	Ethernet straight-through line (RJ45-RJ45) 1M	1	PCS

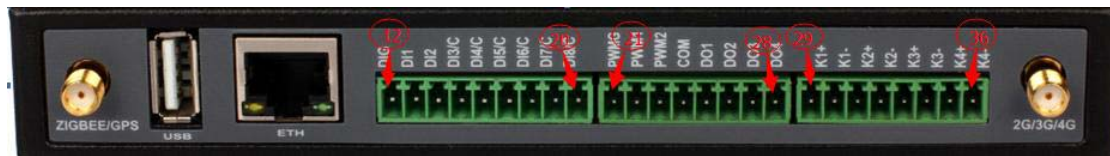
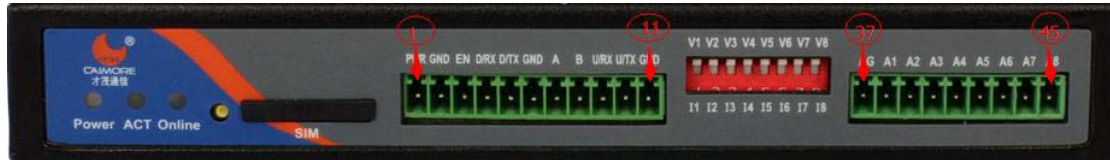
2.3 Installation and Cable Connection

Antenna and SIM Installation:

The antenna interface is SMA female outlet. Screw the male port into the antenna interface, ensuring it is tight enough and prevent it from bad signal.

When you fix or remove the SIM card, please insert the left yellow point of SIM with a spike and then SIM slot will pop-up. When you fix the SIM card, please put into the SIM card, ensuring the metal interface of SIM card is outward, and then pushes the slot to the right place.

Interface signal number as follows:



The definition of interface signal instruction:

Interface NO.	Functional classification	Interface name	Default functions	Expanded functions
1	Power supply	PWM	Anode of mains input	no
2		GND	Cathode of mains input	no
3	Enable pin	EN	Low or hovering 3.3v power on	no
4	RS232	DRX	RS232 data receiving	no
5		DTX	RS232 data sending	no
6		GND	RS232 ground	no
7	RS485	A	RS485 communication interface anode	no
8		B	RS485 communication interface cathode	no
9	RS232	U/RX	RS232 data receiving	no
10		U/TX	RS232 data sending	no
11		GND	RS232 ground	no
12	Digital input	DIG	Digital input ground	Counter input ground
13		DI1	Digital input 1	no
14		DI2	Digital input 2	no

15		DI3/C	Digital input 3	Counter channel 1
16		DI4/C	Digital input 4	Counter channel 2
17		DI5/C	Digital input 5	Counter channel 3
18		DI6/C	Digital input 6	Counter channel 4
19		DI7/C	Digital input 7	Counter channel 5
20		DI8/C	Digital input 8	Counter channel 6
21	PWM	PWMG	PWM ground	no
22		PWM1	PWM output 1	no
23		PWM2	PWM output 2	no
24	Optocoupler output	COM	Common land	no
25		DO1	Optocoupler output 1	no
26		DO2	Optocoupler output 2	no
27		DO3	Optocoupler output 3	no
28		DO4	Optocoupler output 4	no
29	Relay output	K1+	Relay 1+	no
30		K1-	Relay 1-	no
31		K2+	Relay 2+	no
32		K2-	Relay 2-	no
33		K3+	Relay 3+	no
34		K3-	Relay 3-	no
35		K4+	Relay 4+	no
36		K4-	Relay 4-	no
37	Analog input	AG	Analog input ground	no
38		A1	Analog input 1	no
39		A2	Analog input 2	no
40		A3	Analog input 3	no
41		A4	Analog input 4	no



42		A5	Analog input 5	no
43		A6	Analog input 6	no
44		A7	Analog input 7	no
45		A8	Analog input 8	no

Cable installation:

RTU adopts industrial terminal interface, and the suggested power wire rod and data wire rod is 28-16AWG. The instruction of standard configuration and data line as follows:

Power supply (12VDC/0.5A output):

Color of wire rod	Polarity of power supply
Black alternating with white	Anode
Black	Cathode

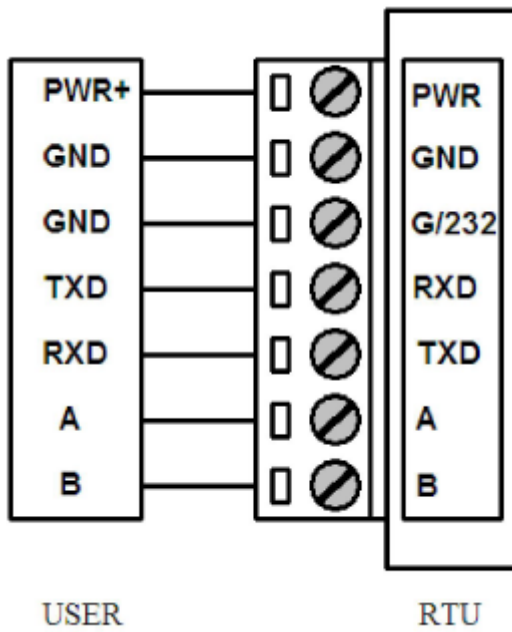
RS232 wire (one side is DB9 female):

Color of wire rod	Corresponding DB9 female pin
Brown	2
Blue	3
Black	5

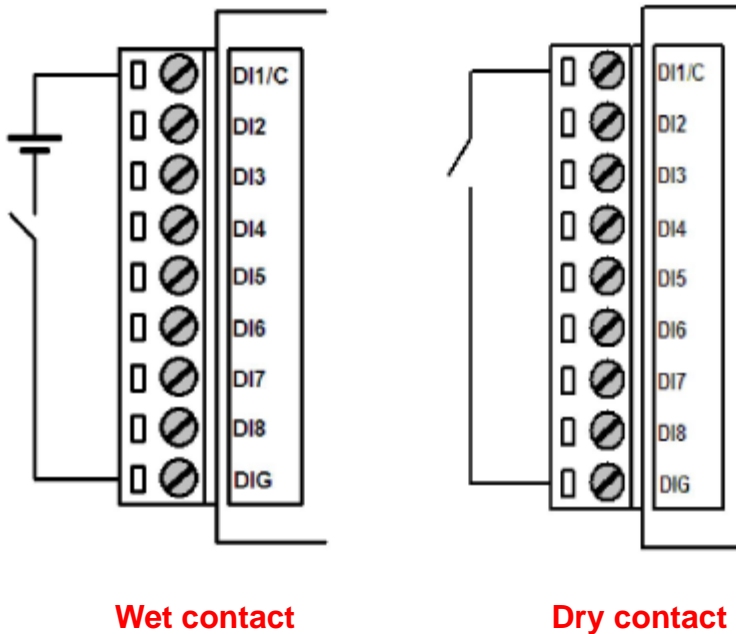
RS485 wire (optional):

Color of wire rod	Definition of signal
Red	RS485 anode (A)
Black	RS485 cathode (B)

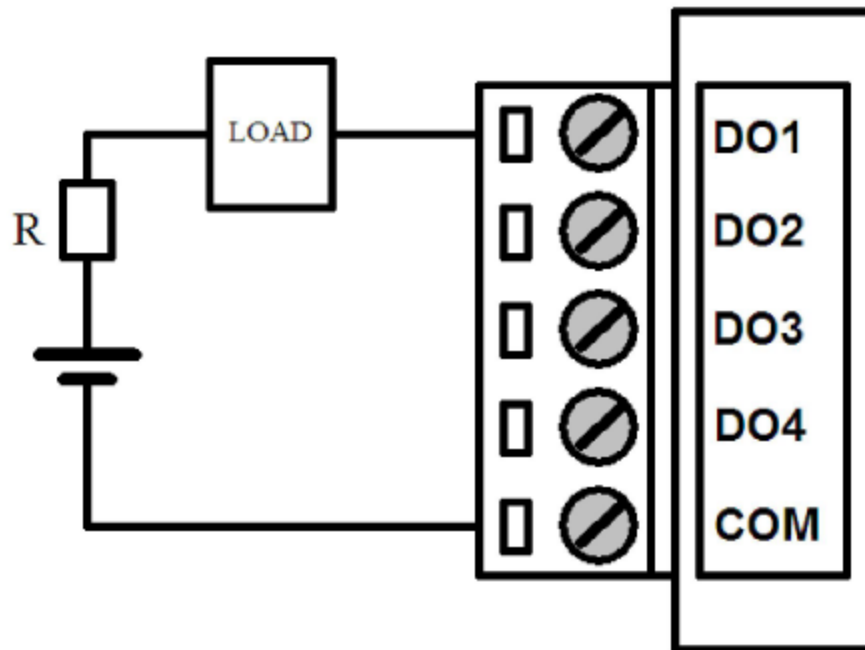
Sketch map of the connection between power supply and data interface wire:



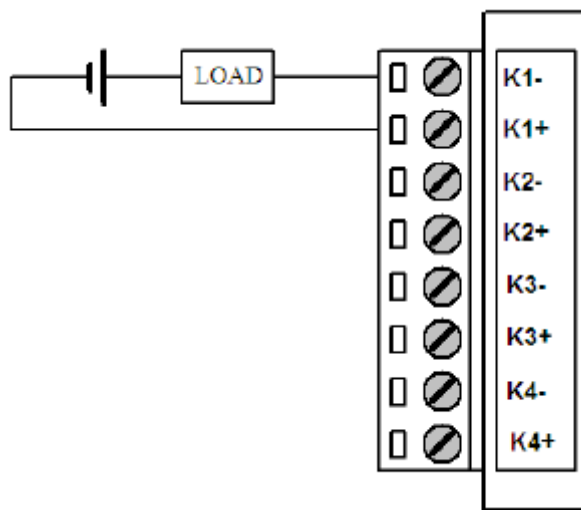
Wiring diagram of digital input:



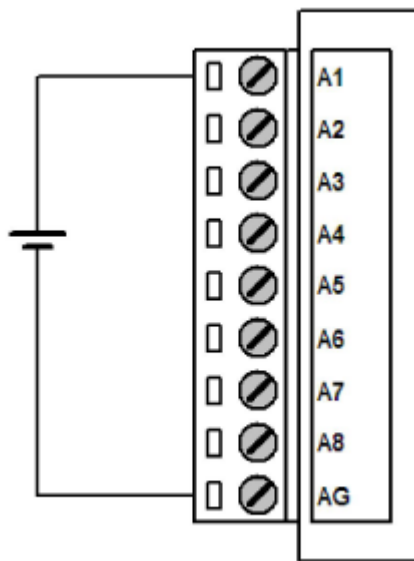
Wiring diagram of optocoupler output:



Wiring diagram of relay output:



Wiring diagram of analog input:



2.4 Power instructions

The devices usually apply in the complicated external environment. To adapt to the complication application environment, improving the stability of system, our devices adopt advanced power supply technology. Users can supply the power for device with standard +9VDC/1.5A power adapter, or with the 7~35V direct current. When users supply the power with additional power supplier, they must guarantee the stability of power supply (the ripple wave is less than 300mV, and ensure the transient voltages is less than 30V), and please ensure the power is more than 4W.

Recommend the standard +9VDC/1.5A power supply.

2.5 Indicator light instructions

Our devices support 3 indicator lights: "Power", "ACT" and "Online". Indicating state as follows:

Indicator	State	Description
Power	Off	Power off
	On	Power is normal
ACT	O	No data communication
	On	Data communication
Online	Off	Haven't dialed
	Flash once a second, then off for a second	Can't find a card
	Flash twice a second, then off for a second	Dial-up failure
	Flash triple a second, then off for a	Dial-up success



	second	
	On for a second, off for a second	Connecting to the center
	On	Connection successful to the center

Chapter 3 RTU function

RTU can achieve the acquisition of analog signal and digital input, figure signal output control (including 4 optocoupler output, 2 PWM output and 4 relay output) and 6 channel counters, on the basis of data transparent transmission (functions of DTU) and router.

Following are the main functions:

Support multiple data centers synchronous data transmission (8 data centers); support to access the centers according to domain name and IP address.

Devices connect to the network automatically after power-on, and reconnect automatically after power-off.

Support RTU platform protocol, and the format of protocol is unified for customers' convenience.

4. Support local WEB configuration parameters, remote data center configuration parameters.
5. Support remote upgrade.
6. Support the acquisition of analog signal and digital input, figure signal output control.

3.1 Support multiple centers and functions

RTU supports multiple centers (8 centers at most), that is to say, it supports to connect 8 centers simultaneously, and each center can support control or information acquisition of RTU independently. The connection protocol of each center can be set independently. More details, please refers to 4.1.3.2 Server Parameters Configuration.

3.2 Support 8 ch analog inputs

RTU support 8 analog inputs acquisition, and it can acquire voltage/current, AD conversion chip built-in, the resolution ratio can be 16bit while the input voltage is -10V-10V, input current is 4-20mA, and precision is less than $\pm 0.5\%$. More detailed functions, please refers to 4.1.3.10 Analog Input Configuration.

3.3 Support 8 ch digital inputs

RTU supports 8 digital inputs, the input range is from 0-3.3V (low level) to 5-24V (high level). And among these channels, 6 channel can be counter (the counting frequency is 1 KHz). More detailed functions, please refers to 4.1.3.7 8 Channel IO Working Mode Choice.

3.4 Support 6 ch counter input

RTU supports 6 channel counter inputs, the inputs range is from 0-3.3V (low level) to 5-24V (high level), the counting frequency is 1 KHz). And 6 channel counter input pin can be digital input. More detailed functions, please refers to 4.1.3.7 8 Channel IO Working Mode Choice.

3.5 Support 4 ch optocoupler output

RTU supports 4 optical isolation digital outputs, open-collector output, and the maximum support is 30V, the maximum current is 40mA and the maximum power is 125mW. More detailed functions, please refers to 4.1.3.10 Digital Output Configuration.

3.6 Support 4 ch relay output

RTU supports 4 relay output (dry contact), the drive capability is 5A/30VDC, 5A/250VAC. More detailed functions, please refers to 4.1.3.6 Relay Output Parameters Configuration.

3.7 Support 2 ch PWM output

RTU supports 2 PWM outputs, the maximum support is 30V, the maximum current is 40mA, the maximum power is 125mW, the output frequency is 0-1KHz, and the duty cycle can be adjustable. More detailed functions, please refers to 4.1.3.5 PWM Output Parameters Setting.

3.8 Support RTU extension protocol

Following are the main functions of RTU extension protocol support:

1. Achieve the acquisition of analog and voltage/current
2. Achieve data acquisition of digital inputs, high/low level
3. Achieve acquisition of counter inputs
4. Achieve control of relay off/on
5. Achieve control of digital outputs and high/low level
6. Achieve control of PWM output and frequency
7. Modify RTU configuration parameters remotely
8. Upgrade RTU program remotely
9. Reboot device remotely// (it is not currently supported)

More details please refers to “Xiamen Caimore LED Information Release System, RTU Management Interface Technology Standard”

3.8 Remote parameter settings

RTU supports remote parameter setting, and the parts of parameters take effect after reboot, and other parameters take effect in real-time. More information, please see RTU Platform Instructions.

3.9 Remote upgrade

RTU can upgrade applications remotely. Firstly the device is online, and users need to send the update request to RTU in the RTU management platform. RTU can connect with the upgrade server, downloading the upgrade package, and then upgrade the applications.

Chapter 4 Parameter Configuration

RTU parameters support the configuration of local serial port, SMS remote and extension protocol. Following are the details of these configurations.

4.1 Local WEB configuration parameter

Before the configuration, users need to connect the RTU with the computers by reticle, logging in the web configuration page of RTU in browser. The initial account and password is admin. The detailed parameter configuration as follows:

4.1.1 Parameter configuration method introduction

There are two kinds of parameter configuration methods:

Local Web configuration: after the device is power on, users connect the PC that is used for configuration by reticle, and log in web in browser (the default RTU IP is 192.168.1.2). After inputting the account and password, you can modify and configure the parameter of web page.

Remote data center configuration: After RTU connects the centers, users log in management server by browser (every user will be allocated with an account). The detailed parameter configuration, please see "Xiamen Caimore RTU Management Platform Manual"

4.1.2 Entering WEB configuration

After RTU is power on, users connect the PC by reticle, inputting IP 192.168.1.2 in browser to enter the configuration page. If forget the IP address that was modified before, users can log in shell terminal with serial port, and input the account and password: admin. After that, users execute ifconfig to search the current IP address. In addition, if users need to modify the IP address of RTU, please be not conflict with other IP of intranet.

4.1.3 Parameter configuration

4.1.3.1 Serial parameter configuration

Serial configure

Baudrate	<input type="text" value="115200"/>	(100~1440byte)
Databits	<input type="text" value="8"/>	(1~10000ms)
Parity	<input type="text" value="NONE"/>	
Stopbits	<input type="text" value="1"/>	
Packet size	<input type="text" value="700"/>	(100~1440byte)
Interval of Port	<input type="text" value="100"/>	(1~10000ms)

After the device is power on, the default parameter of serial port: (these serial ports are invalid in current RTU version)

Baud rate: 115200

Data bits: 8 bits

Parity bit: no

Stop bit: 1 bit

Packet size: 700

Interval of Port: 100ms

The maximum data package is the maximum length of sending data package by setting the network, the suggestive value is 700-800 byte.

The receiving interval of serial port is the packet interval of setting serial port. If this configuration is set much, it is easy to be stuck. Users can configure according to their actual demand.

Save the configuration of serial port after finishing the setting, the configuration take effect after the device reboot.

4.1.3.2 Server parameter configuration

Server parameter configure

NO	Server IP address	PORT	Network protocol	Data center protocol	Local Port	Enable	Edit
1	bbs.nju.edu.cn	23	TCP	RTU management platform	0	YES	Edit
2		0	TCP	RTU management platform	0	NO	Edit
3		0	TCP	RTU management platform	0	NO	Edit
4		0	TCP	RTU management platform	0	NO	Edit
5		0	TCP	RTU management platform	0	NO	Edit
6		0	TCP	RTU management platform	0	NO	Edit
7		0	TCP	RTU management platform	0	NO	Edit
8		0	TCP	RTU management platform	0	NO	Edit

NO

Server IP address

PORT

Network protocol

Data center protocol

Local Port

Enable

Parameter instructions:

Server IP address: Server IP that wants to connect, and fill the IP address according to the format as picture. Server's domain name is acceptable.

Port : the server port that users want to connect (0-65535), and the suggested value is more than 1024.

Networking protocol: TCP/UDP connection protocol, and different centers can chose different protocol to connect.

Data center protocol: The upper layer protocol between RTU and server center communication, currently support RTU management platform protocol and MODBUS protocol with the way of TCP.

Local port: Bind the port number of clients, and 0 shows it is allocated randomly by program.

Enable: Please choose YES after configuring the parameters, and then the server parameter will take effect.

Configuration method:

Click Edit on the right side, and all parameters of this server will be showed below, clicking the corresponding edit box to edit them. After finishing the edit, please click to save them.

Please save the parameters after finishing them, and they will take effect after rebooting the device.

4.1.3.3 Basic parameter configuration



Basic parameters configurate

reconnect frequency	<input type="text" value="0"/>	(0~0)
reconnect interval time	<input type="text" value="15"/>	(1~3600s)
heartbeat time	<input type="text" value="60"/>	(30~300s)
server heartbeat time	<input type="text" value="120"/>	(30~300s)
server heartbeat switch	<input type="button" value="Disable"/>	

Parameter instructions:

Reconnect frequency: it means that the times of attempts to reconnect center server when the device is power off. When the times that fails to connect center server reach the specified times, RTU will hang up the connection and dial up again. This figure should not be too big; otherwise it will take a long time to connect with server once the network is unusual. The default is suggested. (The parameter is not supported in current version. The current version adopts the mechanism that RTU will try to connect with data center continuously till the success as long as RTU is power on)

Reconnect interval time: it means the time interval of two-time reconnections when RTU disconnects any center servers or center server connects unsuccessfully or linkage interrupt. The default is suggested.

Heartbeat time: It specifies how often the device sends the heartbeat to center server. (This parameter is invalid when use RTU platform protocol)

Server heartbeat time: It specifies how often the center server sends the heartbeat to the device. (This parameter is invalid when use RTU platform protocol)

Server heartbeat switch: If enables the mechanism that the server sends the heartbeat to the device. (This parameter is invalid when use RTU platform protocol)

Configuration method:

Click the corresponding right edit box, inputting the figure or the option that is to be set. After finishing the edit, click to save them.

Click to save after setting the server parameters, which will take effect after rebooting the device.

4.1.3.4 RTU identity information



RTU Identity

RTU ID	<input type="text" value="66666666"/>
MODBUS ID	<input type="text" value="01"/> (Hex:01~F7)
SIM number	<input type="text" value="13888888888"/>

Parameter instructions:

RTU ID: the identification of device, limiting 8 byte and 16 decimal, for example: 00000001, 0000000A. The figure of multiple RTU that connect the same server cannot be the same; it must be the only one. After RTU connects with server, server will get this identification for the convenience of managing multiple devices.

MODBUS ID : RTU recognizes different slave units from the ID of device.

SIM/UIM number: phone number of SIM/UIM card.

Configuration method:

Click the corresponding right edit box, inputting the figure or the option that is to be set. After finishing the edit, click to save them.

Click to save after setting the server parameters, which will take effect after rebooting the device.

4.1.3.5 ETCP protocol parameter settings

ETCP protocol parameter configuration

Custom register package	<input type="text"/>
The response of custom register package	<input type="text"/>
Custom heartbeat	<input type="text"/>
The response of custom heartbeat	<input type="text"/>

Parameter instructions:

Custom registr package: it is for users to define their needed log-on message. (This parameter is not supported in current version)

The response of custom register package: it is for users to define their needed echo packets of log-on message. (This parameter is not supported in current version)

Custon heartbeat: it is for users to define their needed heartbeat information. (This parameter is not supported in current version)

The response of custom heartbeat: it is for users to define their needed echo packets of

heartbeat information. (This parameter is not supported in current version)

Configuration method:

Click the corresponding right edit box, inputting the figure or the option that is to be set. After finishing the edit, click to save them.

Click to save after setting the server parameters, which will take effect after rebooting the device.

4.1.3.6 PWM output parameter settings

PWM output configuration

NO	Frequency (0~1000HZ)	Duty cycle(%)	Enable
1	<input type="text" value="0"/>	<input type="text" value="0"/>	NO <input type="button" value="v"/>
2	<input type="text" value="0"/>	<input type="text" value="0"/>	NO <input type="button" value="v"/>

Parameter instructions:

Frequency: set the frequency of PWM output square wave

Duty cycle: set the duty cycle of PWM output square wave (time scale of high level)

Enable : enable or disable PWM. If no, the above parameters are invalid, and there is no wave out in the corresponding 2 channel of device.

Configuration method:

Click the corresponding right edit box, inputting the figure or the option that is to be set. After finishing the edit, click to save them.

Click to save after setting the server parameters, which will take effect after rebooting the device.

4.1.3.7 Relay output parameter settings

Relay output configuration

NO	MODBUS level logic	The default output level when start	Enable
1	0-OFF 1-ON <input type="button" value="v"/>	OFF <input type="button" value="v"/>	NO <input type="button" value="v"/>
2	0-OFF 1-ON <input type="button" value="v"/>	OFF <input type="button" value="v"/>	NO <input type="button" value="v"/>
3	0-OFF 1-ON <input type="button" value="v"/>	OFF <input type="button" value="v"/>	NO <input type="button" value="v"/>
4	0-OFF 1-ON <input type="button" value="v"/>	OFF <input type="button" value="v"/>	NO <input type="button" value="v"/>

Parameter instructions:

MODBUS level logic: set the corresponding state of relay for high/low level. (RTU platform protocol doesn't support this parameter, which is exclusively used in MODBUS protocol)

The default output level when start: set the initialized state after relay is power on. (RTU platform protocol doesn't support this parameter, which is exclusively used in MODBUS protocol)

Enable: It can operate or collect interface data after enabling data center.

Configuration method:

Click the corresponding right edit box, inputting the figure or the option that is to be set. After finishing the edit, click to save them.

Click to save after setting the server parameters, which will take effect after rebooting the device.

4.1.3.8 8 ch IO working mode selection

8 IO mode selection

IO NO	Switch/Count
3	Switch
4	Switch
5	Switch
6	Switch
7	Switch
8	Switch

Apply

Parameter instructions:

Mode selection of digital counter: there are 6 channels of 8 channel IO input are reused with counter, and that is 3~8 channel. You can choose counter functions or IO output functions. (The input range is: 0-3.3V is low level and 5-30V is high level)

Configuration method:

Click the corresponding right edit box, inputting the figure or the option that is to be set. After finishing the edit, click to save them.

Click to save after setting the server parameters, which will take effect after rebooting the device.

4.1.3.9 Digital Input Configuration

Switch input configuration

IO NO	MODBUS level logic	Acquisition updated time	Work Type	Alarm trigger conditions	Mobile phone number for alarm	Alarm contents	Enable	Edit
1	0-low 1-high	0	Query	low level	...	...	NO	Edit
2	0-low 1-high	0	Query	low level	...	...	NO	Edit
3	0-low 1-high	0	Query	low level	...	...	NO	Edit
4	0-low 1-high	0	Query	low level	...	...	NO	Edit
5	0-low 1-high	0	Query	low level	...	...	NO	Edit
6	0-low 1-high	0	Query	low level	...	...	NO	Edit
7	0-low 1-high	0	Query	low level	...	...	NO	Edit
8	0-low 1-high	0	Query	low level	...	...	NO	Edit

IO NO

MODBUS level logic

Acquisition updated time (0~0)

Work Type

Alarm trigger conditions

Enable

Mobile phone number for alarm(up to 10, with

Alarm contents (up to 140 bytes)

Parameter Instructions:

MODBUS level logic: set the corresponding relationship among the level value 0, 1 and afferent high/low level of MODBUS protocol. (This parameter is used for MODBUS Protocol only instead of RTU platform Protocol.)

Acquisition Update Time: Collect the input frequency and update it. (This parameter is invalid in current version)

Working mode: there are 4 types: query, query + alarm, query + report and query + alarm + report.

Alarm triggering condition: there are 4 types: upper limit exceeding alarm, lower limit exceeding alarm, alarm between upper limit and lower limit, alarm except upper limit and lower limit.

Enable : interface data can be operated or acquired after enabling data center

Alarm phone number: It will send to a phone number when generate an alarm.

Alarm Content: It will send alarm content which supports in Chinese and English when

generate an alarm

Configuration Method:

Click the corresponding Edit box directly, then enter the value or select the item to set, when editing is complete, please click to save.

Click to save after finishing the setting of server parameters, it will take effect after reboot.

4.1.3.10 Counter input Configuration

Counter input configuration

IO NO	Count increasing type	Work Type	Alarm or no	Limit alarm threshold	Mobile phone number for alarm	Alarm contents	Enable	Edit
3	rising edge	Query	NO	0	...	...	NO	Edit
4	rising edge	Query	NO	0	...	...	NO	Edit
5	rising edge	Query	NO	0	...	...	NO	Edit
6	rising edge	Query	NO	0	...	...	NO	Edit
7	rising edge	Query	NO	0	...	...	NO	Edit
8	rising edge	Query	NO	0	...	...	NO	Edit

IO NO

Count increasing type

Work Type

Alarm or no

Limit alarm threshold

Enable

Mobile phone number for alarm(up to 10, with

10, with

Alarm contents (up to 140 bytes)

Parameter instructions:

Calculator adding mode: Three conditions of calculated value increasing: rising edge, falling edge and both edges.

Alarm or not: Enable or Disable the Alarm when it exceeds the limit.

alarm overrun threshold: An alarm signal will be generated when the calculated value exceeds the threshold.

Enable the counter: To operate the data center and collect data from the port, the counter should be enabled.

Alarm phone number: It will send to a phone number when generate an alarm.

Alarm Content: It will send alarm content which supports in Chinese and English when generate an alarm

Configuration Method:

Click the corresponding Edit box directly, then enter the value or select the item to set, when editing is complete, please click to save.

Click to save after finishing the setting of server parameters, it will take effect after reboot.

4.1.3.11 Digital output configuration

Digital output configuration

NO	MODBUS level logic	The action of MODBUS Logic of 0	The action of MODBUS Logic of 1	The default output level of starting	square wave cycle	Enable	Editor
1	0-low 1-high	continue high level	continue high level	Low level	0	NO	Edit
2	0-low 1-high	continue high level	continue high level	Low level	0	NO	Edit
3	0-low 1-high	continue high level	continue high level	Low level	0	NO	Edit
4	0-low 1-high	continue high level	continue high level	Low level	0	NO	Edit

NO

MODBUS level logic

The action of MODBUS Logic of 0

The action of MODBUS Logic of 1

The default output level of starting

square wave cycle

Enable

Parameter Instructions:

MODBUS level logic: set the corresponding relationship among the level value 0, 1 and afferent high/low level of MODBUS protocol. (This parameter is used for MODBUS Protocol only instead of RTU platform Protocol)

MODBUS logic 0 actions: set the corresponding actions in this output channel of level value 0 of MODBUS protocol, which can be high level, low level, square wave, rising edge and falling edge. (This parameter is used for MODBUS Protocol only instead of RTU platform Protocol) (This parameter is invalid in current version)

MODBUS logic 1 actions: set the corresponding actions in this output channel of level value 1 of MODBUS protocol, which can be high level, low level, square wave, rising edge

and falling edge. (This parameter is used for MODBUS Protocol only instead of RTU platform Protocol)

Default output level when enabling: the default level value of this output channel after the device is power on. (This parameter is invalid in current version)

Cycle of square wave: it needs to set the cycle of square wave if the square wave is generated.

Enable: interface data can be operated or acquired after enabling data center.

Configuration method:

Click Edit on the right side, and all parameters of this server will be showed below, clicking the corresponding edit box to edit them. After finishing the edit, please click to save them.

Please save the parameters after finishing them, and they will take effect after rebooting the device.

4.1.3.12 Analog input configuration

The analog input configuration

Edit	NO	Enable	Analog type	Unit	The relative voltage/current of the top range	The real voltage/current of the top range	The relative voltage/current of the below range	The real voltage/current of the below range	Acquisition updated time
Edit 1	NO		Voltage	V	0	0	0	0	0
Edit 2	NO		Voltage	V	0	0	0	0	0
Edit 3	NO		Voltage	V	0	0	0	0	0
Edit 4	NO		Voltage	V	0	0	0	0	0
Edit 5	NO		Voltage	V	0	0	0	0	0
Edit 6	NO		Voltage	V	0	0	0	0	0
Edit 7	NO		Voltage	V	0	0	0	0	0
Edit 8	NO		Voltage	V	0	0	0	0	0



NO	<input type="text"/>
Enable	YES <input type="button" value="v"/>
Type	Voltage <input type="button" value="v"/>
Unit	V <input type="button" value="v"/>
The relative voltage/current of the top range	<input type="text"/>
The real voltage/current of the top range	<input type="text"/>
The relative voltage/current of the below range	<input type="text"/>
The real voltage/current of the below range	<input type="text"/>
Acquisition updated time	<input type="text"/> (0~0ms)
Work type	Query <input type="button" value="v"/>
Alarm trigger conditions	Less than or equal to alarm limit <input type="button" value="v"/>
Alarm top limitation	<input type="text"/>
Alarm below limitation	<input type="text"/>
The mobile phone number for alarm (up to 10)	<input type="text"/>
Alarm contents (no more than 140 bytes)	<input type="text"/>

Parameter instructions:

Enable or disable: interface data can be operated or acquired after enabling data center

Analog type: choose if you measure the voltage or current.

Measurement unit: voltage: V/mV/uV, current: A/mA/uA. The measurement unit will influence the unit of “the corresponding voltage/current of top range” and” the corresponding voltage/current of low range”

Corresponding voltage/current of top range: upper limit of voltage or current

True value of top range: the corresponding true data of upper limit voltage or current, such as temperature, humidity, etc.

Corresponding voltage/current of low range: lower limit voltage or current

True value of low range: the corresponding true data of lower limit voltage or current, such

as temperature, humidity, etc. For example:

Corresponding voltage/current of top range=5V, true value of top range=5℃

Corresponding voltage/current of low range=5V, true value of low range=-5℃

Acquisition update time: Acquisition Update Time: Collect the input frequency and update it.

(This parameter is invalid in current version)

Working mode: there are 4 types: query, query + alarm, query + report and query + alarm + report.

Alarm triggering condition: there are 4 types: upper limit exceeding alarm, lower limit exceeding alarm, alarm between upper limit and lower limit, alarm except upper limit and lower limit.

Upper limit of alarm: the upper limit value of alarm, or the maximum value of limitation.

Lower limit of alarm: the lower limit value of alarm, or the maximum value of limitation.

Number of alarm: when alarm generates, the phone number that alarm is sent to.

Alarm content: when alarm generates, the alarm content that alarm is sent to. Chinese or English is supported.

Configuration method:

Click Edit on the right side, and all parameters of this server will be showed below, clicking the corresponding edit box to edit them. After finishing the edit, please click to save them.

Please save the parameters after finishing them, and they will take effect after rebooting the device.

4.1.3.13 Alarm configuration

Alarm configuration

Alarm Way	<input type="text" value="Only Network"/>
Alarm interval time	<input type="text" value="60"/> (3~3600s)
Alarm Times	<input type="text" value="1"/> (0~255)
Alarm receiving mobile phone number(up to 10, with	<input type="text"/>
<input type="button" value="Apply"/> <input type="button" value="Reset"/>	

Parameter instructions:

Alarm Mode: After setting alarm, the course of alarm content is network or SMS.

Alarm interval: it means the time interval between two alarms and it is related to the

following parameters. If the alarm number is set 1, the interval is invalid. When it is back to a normal value, the alarm value will be reset.

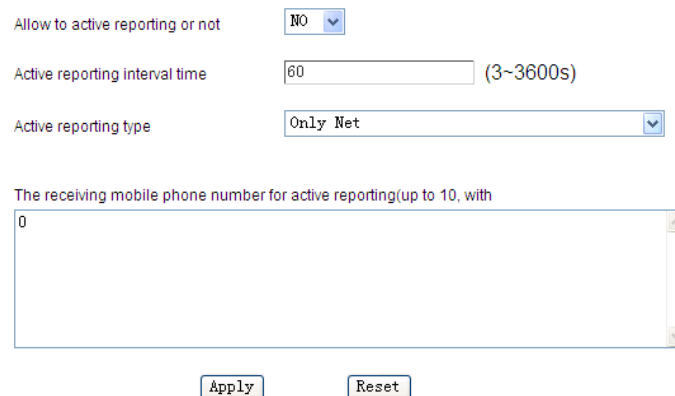
Alarm number: once the alarm is triggered, it needs to send alarm content to destination for several times and the time interval is set by above parameter.

Phone number received from alarm: when making alarm, it needs to send the aim phone number.

Configuration methods: click directly on the corresponding edit box; input the value or option that needs to be set; after editing, click saving; after setting server parameter, click saving and the parameters will take effect after the restart.

4.1.3.14 Active Report Settings

Active reporting configuration



Allow to active reporting or not

Active reporting interval time (3~3600s)

Active reporting type

The receiving mobile phone number for active reporting(up to 10, with)

Parameter instructions:

Allow the active report or not: it means whether allow to actively report the acquisition data of analog input

Active report intervals: after allowing the above parameter settings, the parameter settings take effect. It means how long it will take to report the collection data a time

Active report mode: only network; only SMS; SMS without network on.

Phone number received from active report: when making alarm and active report mode is only by SMS or by SMS without network on, it needs to send phone number.

Configuration methods: click directly on the corresponding edit box; input the value or option that needs to be set; after editing, click saving. After setting server parameter, click saving and the parameters will take effect after the restart.

4.1.3.15 Other settings



Other

Work Mode	<input type="text" value="NET Work Mode"/>
Run Time	<input type="text" value="1440"/> (800-2880min)
Debug_Info_To_serical_Port	<input type="text" value="No"/>
Debug Level	<input type="text" value="1"/>

Parameter instructions:

RTU working mode: NET working mode; TRNS working mode.(The parameter of this version is invalid)

The maximum running time of RTU: RTU maintenance time of automatic restart will ensure that the device can be without people to recover when it is at failure. Its unit is min and it is counted from electrifying time. When it arrives the time, RTU will automatically restart to maintain it.

Printe the debugging information to serial port: the button to print the serial debugging information.

Debugging level: the printing level of debugging information.

Configuration methods: click directly on the corresponding edit box; input the value or option that needs to be set; after editing, click saving.

After setting server parameter, click saving and the parameters will take effect after the restart.

Chapter Five Appendix

Appendix 1: The operator network parameter information

Operator	Network	Parameters	Value
China Mobil	GPRS	APN Access Point	cmnet
		Dial-up Center	*99***1#
		User Name	None
		Passowrd	None
	TD-SCDMA	APN Access Point	cmnet
		Dial-up Center	*98*1#
		User Name	None
		Passowrd	None
China Unicom	GPRS	APN Access Point	uninet
		Dial-up Center	*99#
		User Name	None
		Passowrd	None
	WCDMA	APN Access Point	3gnet
		Dial-up Center	*99#
		User Name	None
		Passowrd	None
China Telecom	CDMA	APN Access Point	None
		Dial-up Center	#777
		User Name	Card
		Passowrd	Card
	EVDO	APN Access Point	None
		Dial-up Center	#777
		User Name	Card
		Passowrd	Card

Appendix 2: Indicator instructions

Indicator	State	Description
Power	OFF	Power off
	ON	Power is Normal
ACT	OFF	No data communication
	ON	Data communication
Online	OFF	Haven't dialed
	Flash once a second, then off for a second	Can't find a card
	Flash twice a second, then off for a second	Dial-up failure
	Flash triple a second, then off for a second	Dial-up success
	On for a second, off for a second	Connecting to the center
	ON	Connection successful to the center

Appendix 3: Device power consumption

Product	Data transmission current is produced in the state of connection	Average Standby Current (9V)	FLA (9V)
CM550-5XX	200(mA)	150(Ma)	500(mA)

Appendix 4: How to configure the mode of AD 1:1

The analog input configuration

Edit	NO	Enable	Analog type	Unit	The relative voltage/current of the top range	The real voltage/current of the top range	The relative voltage/current of the below range	The real voltage/current of the below range	Acquisition updated time
Edit 1	NO	NO	Voltage	V	0	0	0	0	0
Edit 2	NO	NO	Voltage	V	0	0	0	0	0
Edit 3	NO	NO	Voltage	V	0	0	0	0	0
Edit 4	NO	NO	Voltage	V	0	0	0	0	0
Edit 5	NO	NO	Voltage	V	0	0	0	0	0
Edit 6	NO	NO	Voltage	V	0	0	0	0	0
Edit 7	NO	NO	Voltage	V	0	0	0	0	0
Edit 8	NO	NO	Voltage	V	0	0	0	0	0

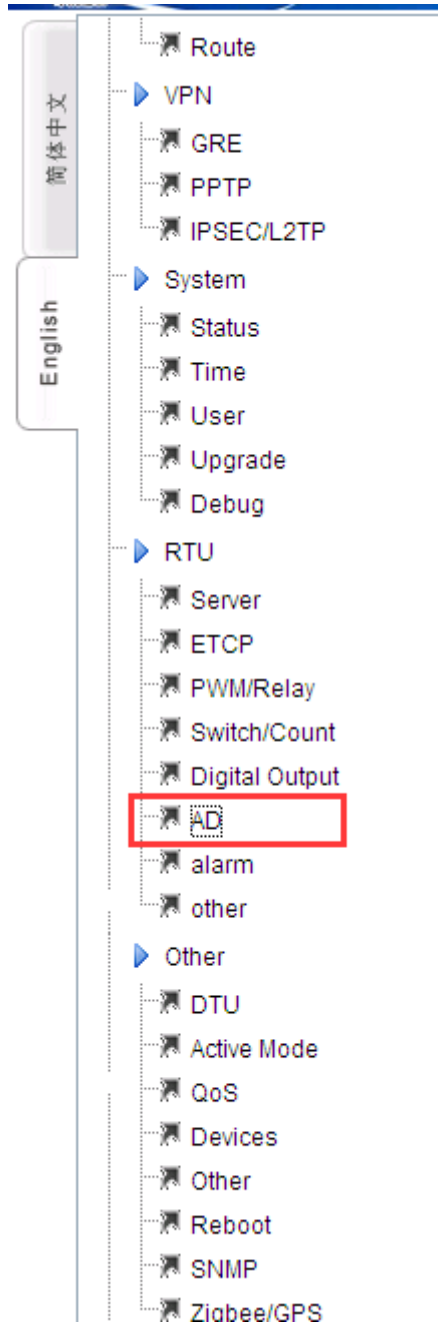


NO	<input type="text" value="1"/>
Enable	<input type="button" value="NO"/>
Type	<input type="button" value="Voltage"/>
Unit	<input type="button" value="V"/>
The relative voltage/current of the top range	<input type="text" value="0"/>
The real voltage/current of the top range	<input type="text" value="0"/>
The relative voltage/current of the below range	<input type="text" value="0"/>
The real voltage/current of the below range	<input type="text" value="0"/>
Acquisition updated time	<input type="text" value="0"/> (0~0ms)
Work type	<input type="button" value="Query"/>
Alarm trigger conditions	<input type="button" value="Less than or equal to alarm limit"/>
Alarm top limitation	<input type="text" value="0"/>
Alarm below limitation	<input type="text" value="0"/>

Appendix 5: AD calibration instructions

Please Log into the RTU Web configuration page by browser first, the original account and password is "admin", then access to the web page,

Step one, select the configuration of analog input.



Step two, Click to start.

AD check

AD check state



Step three, Access voltage 0V for the 8 ch analog input according to the tips.

AD check

AD check state

please into GND for ad check

Start

End

Step four, Then access the voltage 10V to the 8ch analog input according to the tips.

AD check

AD check state

please input 10v for ad check

Start

End

Step five: you will see the corresponding tooltips after completing the calibration.

AD check

AD check state

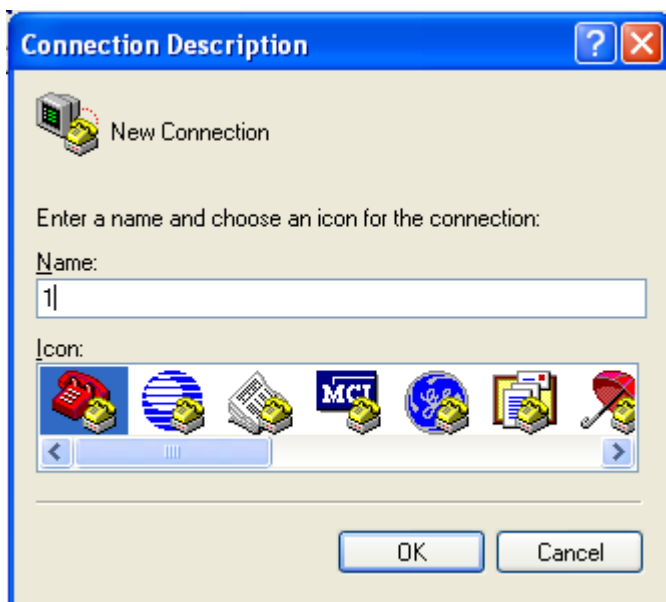
ad check success

Start

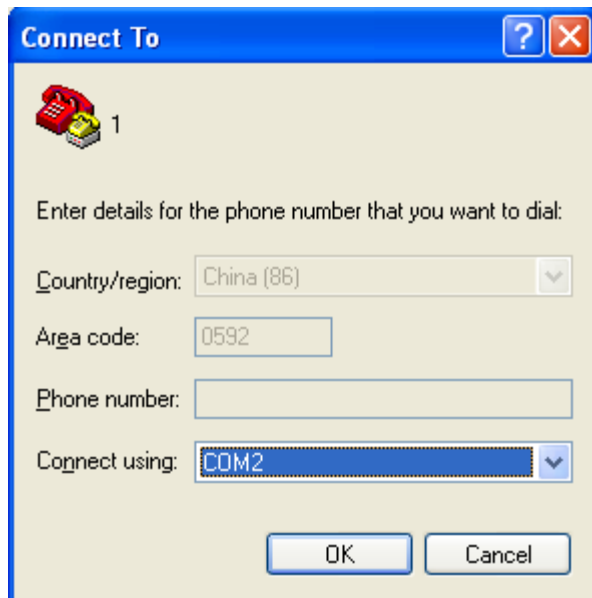
End

Appendix 6: Hyper terminal configuration

Select in turn on the bottom-left corner of WINDOWS desk: Start — Program — enclosure — Communication — Hyper terminal. You will see the bellow picture,

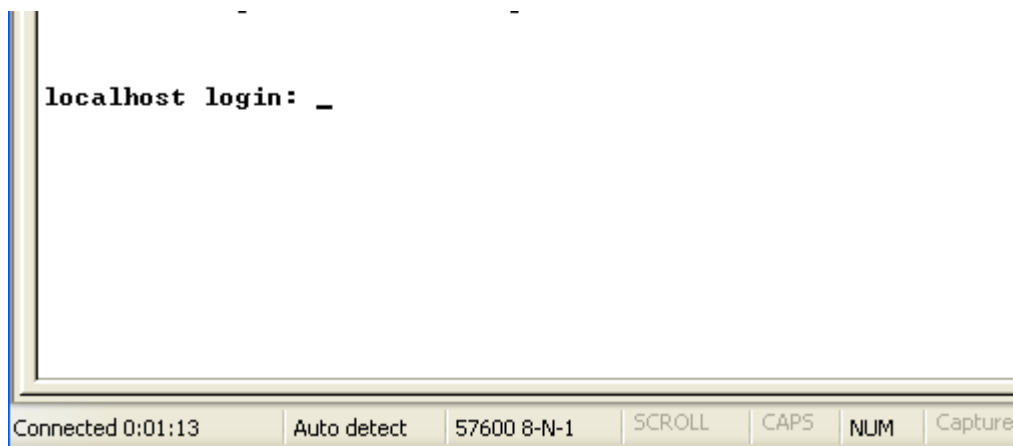


click "confirm" after establishing the new terminal name, and then the selection page will be present as below



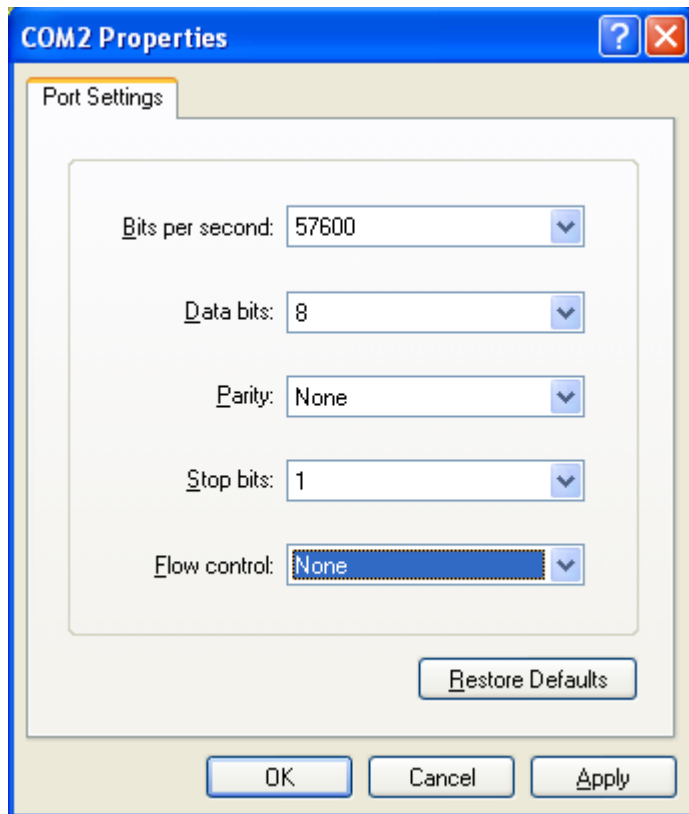
The image shows a Windows-style dialog box titled "Connect To". It contains a telephone icon and the text "Enter details for the phone number that you want to dial:". Below this are four input fields: "Country/region:" with a dropdown menu showing "China (86)", "Area code:" with a text box containing "0592", "Phone number:" with an empty text box, and "Connect using:" with a dropdown menu showing "COM2". At the bottom are "OK" and "Cancel" buttons.

Please select the serial port number such as COM2,COM3 to configure parameters according to the real situation, then click "confirm", then you will see the configuration page as bellow,

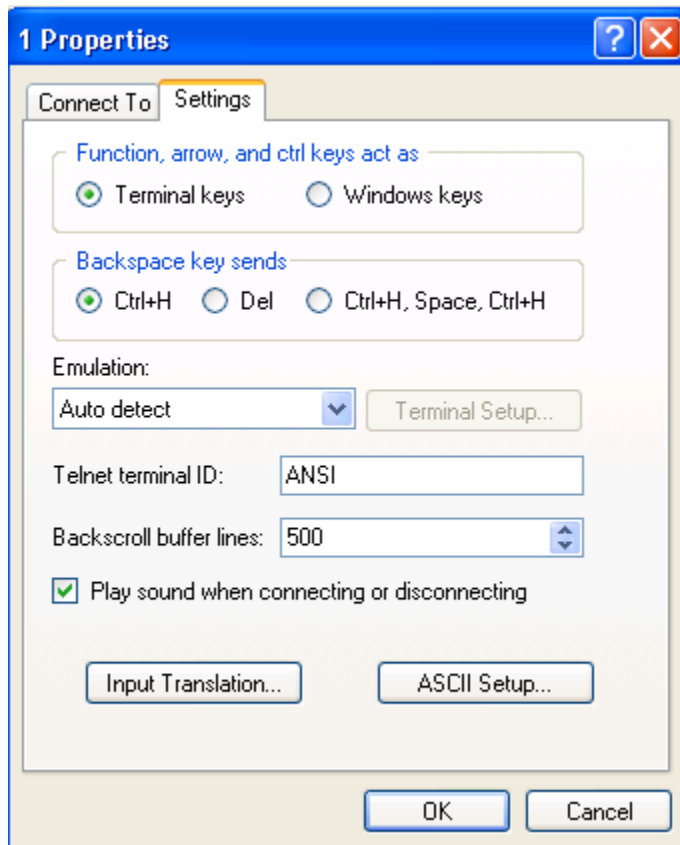


Mark: Please set your terminal according to the parameter configurations on above picture, or you will be failure to access the setting program of DTU parameters.

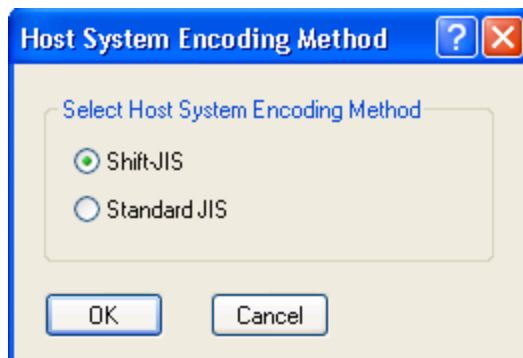
Please click the button of "confirm" after setting the corresponding parameters according to the above picture , then access the terminal operating page as bellow picture,



Please select Document-->Property in the page of hyper terminal, then access the Properties dialog, and click the "setting"tab, set the related parameters as bellow picture.



Click the button of "input conversion" in above picture, set the system encoding according to below picture,



The setup for the hyper terminal now is completed.

Appendix 7.Common Problems Analysis

1. Power Indicator is off.

Please check the cable is connected correctly, also check the power supply is the right one which can meet the standard, or it will demolish the device.

2. Online indicator is off.

The online Indicator will be turned on when the RTU accesses the internet successfully, if it is off, please check the network coverage and the signal strength in your area, meanwhile please check the SIM card which is setting up correctly and valid and the data center sever is normal, and also the normal TCP data communication is intercepted by the firewall.

3. Communication indicator is off.

Communication indicator of 3G device doesn't flash. For other device, it will flash when send and receive data.

(4) All the Indicators are normal, but no data communication.

Please contact with the local mobile operators to confirm that whether they provide GPRS or not in your area, because the GPRS may not fully cover all the areas of GSM, and confirm that the settingse of IP, domain name and port (communication port) are correct.