

Bivocom

Industrial Cellular RTU TY511 Series User Guide



Copyright

Copyright © XIAMEN BIVOCOM TECHNOLOGIES CO., LTD. All rights reserved.

Trademark

BIVOCOM logo is a registered trademark of Xiamen Bivocom Technologies Co., Ltd. All other trademarks belong to their respective vendors or manufactures.

Disclaimer

Product specifications and information in this document are subject to change without any notice, and BIVOCOM reserves the right to improve and change this user guide at any time. Users should take full responsibility for their application of products, and Xiamen Bivocom Technologies Co., Ltd. disclaims all warranties and liability for the accurateness, completeness of the information published.

Global Technical & Sales Support



Xiamen Bivocom Technologies Co., Ltd.

Addr.: Unit 704, No. A3 Building, 3rd Software Park,
Xiamen, China 361022

Tel.: +86-592 - 6211713

Fax: +86-592 - 6211727

Email: support@bivocom.com

sales@bivocom.com

www.bivocom.com

About This Guide

Thank you for choosing Bivocom Industrial Cellular RTU TY511 Series.

Please thoroughly read this user guide before you configure and install the device.

This manual is compatible with below models

Model	Description
TY511-LF	Industrial LTE/WCDMA RTU
TY511-W	Industrial WCDMA RTU
TY511-G	Industrial GPRS RTU

Summary of Changes

Date	Version	Notes	Editor
03-02-2018	V1.0	Initial new version	Wei Liu

Table of Contents

Copyright	2
Trademark	2
Disclaimer	2
About This Guide	3
Summary of Changes	3
Table of Contents	4
1. Introduction	6
1.1 Overview	6
1.2 Applications	6
1.3 Dimensions	7
1.4 Physical Characteristics	7
1.5 Interfaces	8
1.6 Definition of PIN and cables	10
1.6.1 Definition of PIN	10
1.6.2 Definition of Cables	13
1.7 Power supply requirement	17
1.8 LED Indicators	17
1.9 Grounding screw	18
1.10 Mounting	18
1.11 Lightning protection instructions	19
2. Getting Started	19
2.1 Package Checklist	19
2.2 Installation	19
2.2.1 Install SIM/UIM Card	19
2.2.2 Install the terminal blocks	20
2.2.3 Fasten cellular antenna	21
2.2.4 Connect cable of power adapter to TY511	21
2.2.5 Connect TY511 to PC/Laptop via RS232	22
2.2.6 Open Config tool and power on TY511	22
2.2.7 Start to configure TY511	23
3. Parameter Setting	23
3.1 Config Tool	25
3.1.1 RTC Setting	27
3.1.2 Channel Setting	27
3.1.3 Hardware Interface	28
3.1.4 Device Setting	43
3.1.5 Data Center Setting	44
4.1.6 Other Center Setting	45

4.1.7 Camera Setting	46
4.1.7 Camera Time Report.....	47
4.1.8 SMS Setting	47
4.1.9 Serial Transmission	48
3.2 Keyboard Setting(Under development)	49
3.3 RTU Service Center Software	49
3.4 SMS Remote Setting (Under development)	50
4. Firmware Upgrade	50
4.1 Local Upgrade	50

1. Introduction

1.1 Overview

TY511 Series RTU is a type of industrial cellular remote telemetry unit, which adopts high-powered industrial 32-bits CPU, with multi-layer software detection and hardware protection mechanism to ensure reliability and stability of the device. It supports worldwide carrier 4G/3G/2G cellular network FDD-LTE, TDD-LTE, and HSPA/UMTS/WCDMA, EVDO, TD-SCDMA, EDGE, CDMA 1X and GPRS, to realize real time data acquisition, storage, control, alarm and transmission, as well as security of data transmission.

TY511 has rich interfaces, including tipping bucket rain gauge input, gray code, RS232, RS485, SDI-12, I/O(analog input, digital input and output), etc., and it has been widely used for remote monitoring and control applications, such as, hydrology, water resources, water pollution, water treatment, reservoir dam, mountain flood disaster, geological disaster, meteorology, environmental protection, new energy resources, etc.

1.2 Applications

TY511 Series RTU utilizes cellular network to connect your network devices and serial port devices to your center for remote monitoring and control.

Typical application as below.

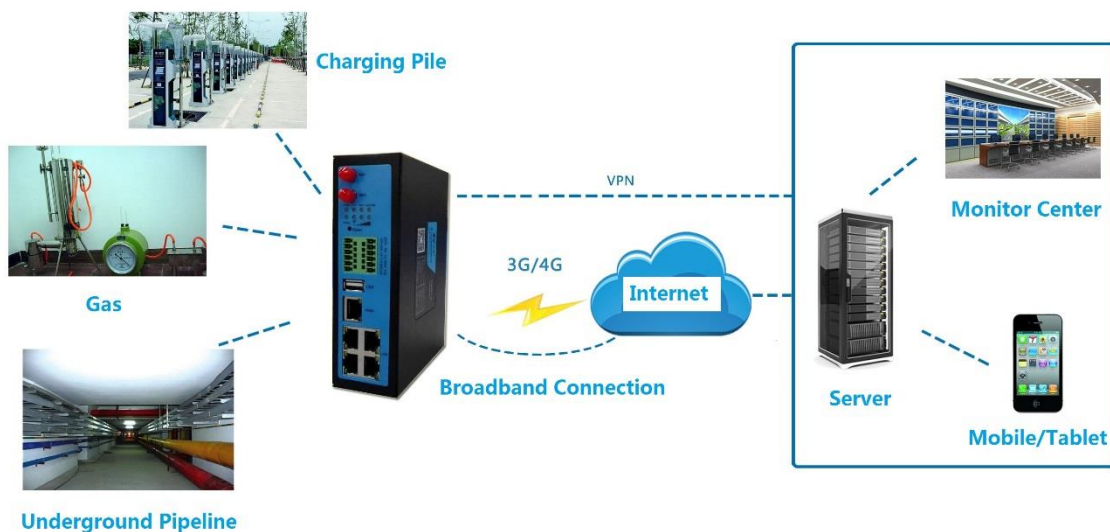


Figure 1: Diagram of RTU application

1.3 Dimensions

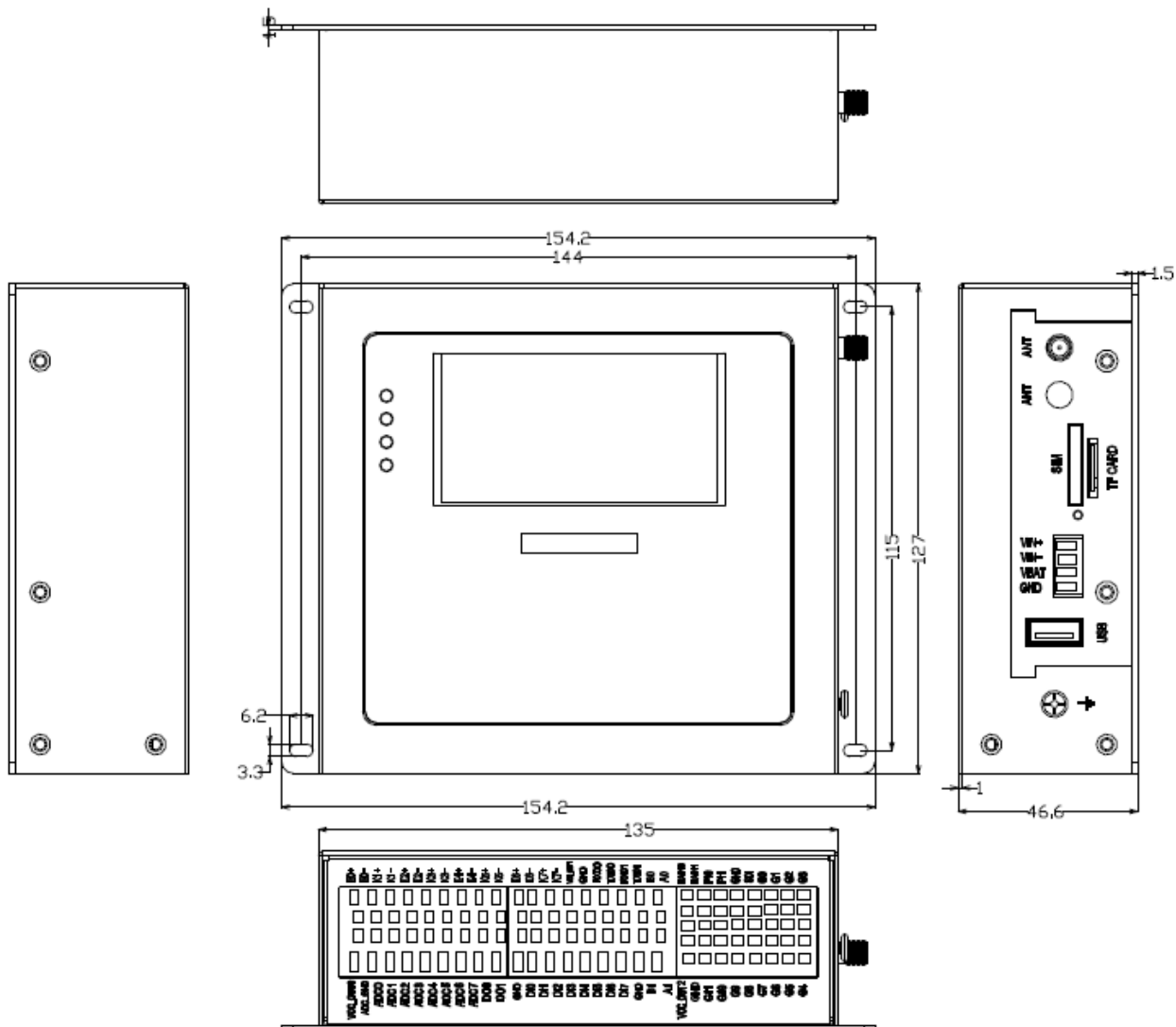


Figure 2: Dimensions of TY511

1.4 Physical Characteristics

Item	Content
Housing	Metal, IP30
Dimensions	154.2x127x46.6mm (6.07x5x1.83 inches), Antenna and other accessories not included.
Weight	790g (1.74lbs)

1.5 Interfaces

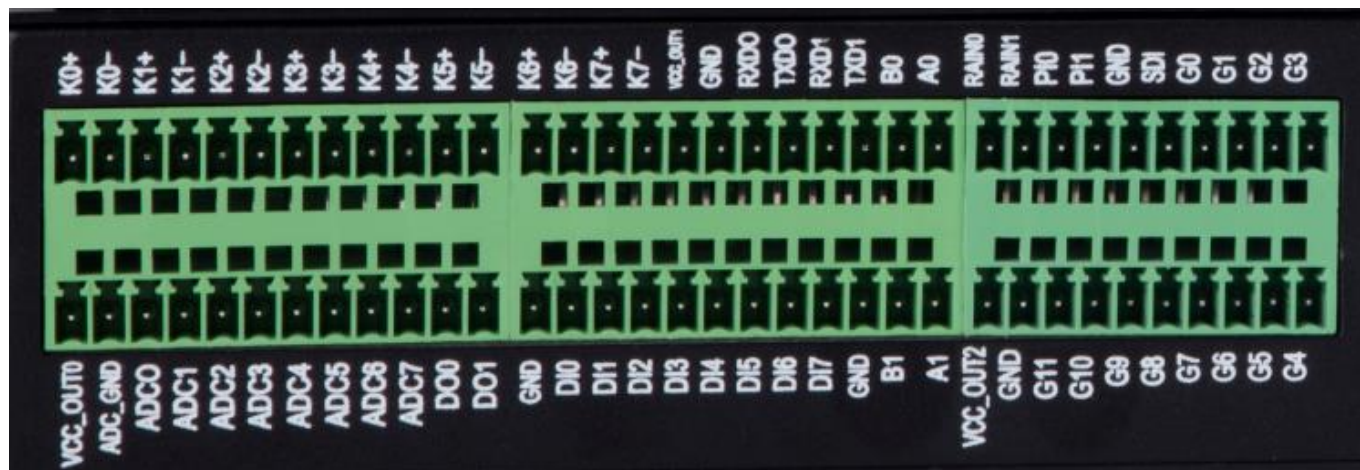


Figure 3: Interfaces of terminal block



Figure 4: Other interfaces

Interface	Description
Serial Port	<p>Number of ports: 4, (2x RS232, 2x RS485)</p> <p>Note: Built-in 8KV ESD protection for RS232, and 15KV ESD protection for RS485</p> <p>Baudrate: 300~230400bits/s</p> <p>Data Bit: 5, 6, 7, 8 bits</p> <p>Stop Bit: 1, 1.5, 2 bits</p> <p>Check: No, Even-parity, Odd Parity, SPACE and MARK</p>

LED Indicators	Power, System, Online, Error
Cellular Antenna	Number of ports: 1 Note: Standard SMA female antenna interface, characteristic impedance 50Ω
SIM Card Slot	Number of Ports: 1 Note: Standard drawer type card holder, support 1.8V/3V SIM/UIM card, built-in 15KV ESD protection
Power Supply	Standard Power: DC 12V/1.5A Power Range: DC 5~35V Note: Industrial terminal block, built-in power inverting protection and over voltage protection
Earth terminal	Number of ports: 1x M3 screw earth terminal
LCD Screen	128*64 dot matrix, backlight
Keyboard	16 Keys (2*8 keys)
Pulse quantity	2x tipping bucket rain gauge input(low level) 2x pulse input(high level)
Gray code	Number of ports: 1 Note: 12-bit gray code interface
SDI12	Number of ports: 1 Start Bit: 1 bit Data Bit: 7 bit Parity Bit: 1 bit Stop Bit: 1 bit Baud Rate: 1200bps
Analog quantity	Number of ports: 8 Note: 16-bit AD, support 4-20mA current signal input, and 0-5V voltage signal input is optional
DI(Digital Input)	Number of ports: 8(optical isolation) Logic 0: Wet contact 0-3VDC, or dry contact close Logic 1: Wet contact DC 5-30V, or dry contact open
DO(Digital output)	Number of ports: 2(optical isolation, Open Collector) Rated drive current: 50mA Rated drive voltage: 35V
Relay	Number of ports: 8 Max switching voltage: 30VDC/220VAC Max switching current: 4A Max switching power: 120W
Power output	Number of ports: 3 Note: power output is the same as power input of RTU, default is 12V. Rated output current of 1 power output is 1A, and total rated output current of 3 power outputs is 2A, built in overcurrent protection

1.6 Definition of PIN and cables

1.6.1 Definition of PIN

There are 68 PINs in total as below

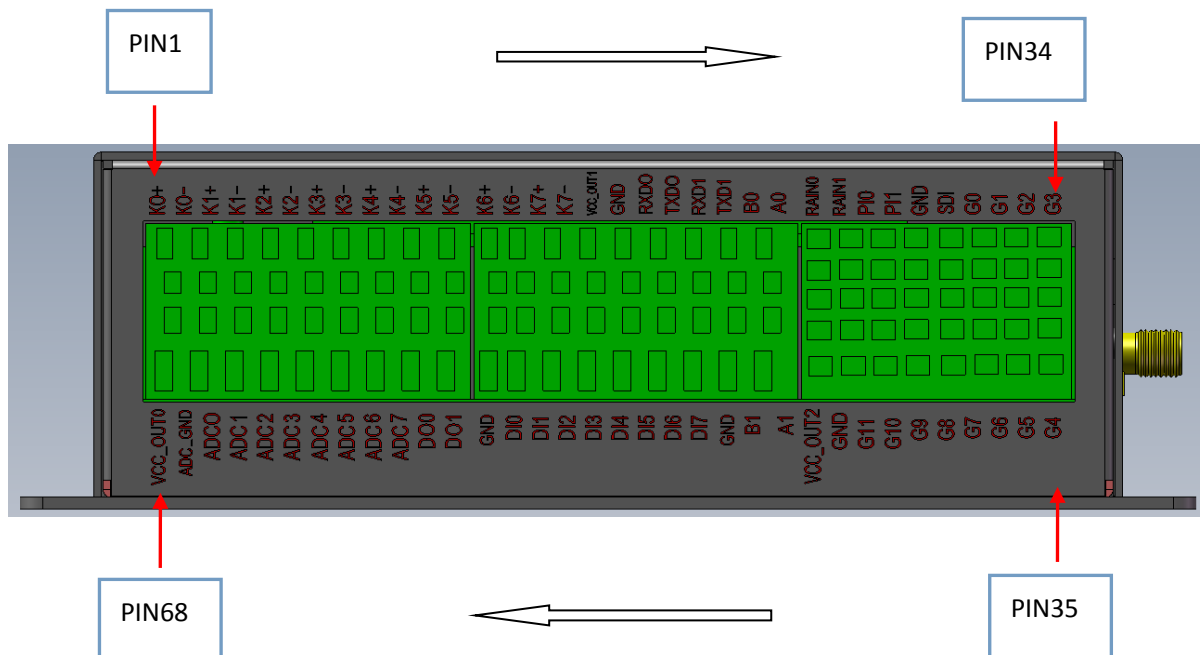


Figure 5: Number and order of Pin

Number	Function	Name	Default Function	Description
1	Relay	K0+	CH 0 NO relay output	Relay output
2	Output	K0-	CH 0 NO relay output	NO: normal open

3		K1+	CH 1 NO relay output	CH: Channel
4		K1-	CH 1 NO relay output	
5		K2+	CH 2 NO relay output	
6		K2-	CH 2 NO relay output	
7		K3+	CH 3 NO relay output	
8		K3-	CH 3 NO relay output	
9		K4+	CH 4 NO relay output	
10		K4-	CH 4 NO relay output	
11		K5+	CH 5 NO relay output	
12		K5-	CH 5 NO relay output	
13		K6+	CH 6 NO relay output	
14		K6-	CH 6 NO relay output	
15		K7+	CH 7 NO relay output	
16		K7-	CH 7 NO relay output	
17	RS232	VCC_OUT 1	VCC Output 1	Default baud rate:115200
18		GND	GND	
19		RXD0	CH 0 RS232 RXD	
20		TXD0	CH 0 RS232 TXD	
21		RXD1	CH 1 RS232 RXD	
22		TXD1	CH 1 RS232 TXD	
23	RS485-1	B0	RS485-0 B	Default baud rate:115200
24		A0	RS485-0 A	
25	Rain/Pulse	RAIN0	CH 0 rainfall input	Rainfall input, Low level input counting, Pulse input, High level(>2V) input counting
26		RAIN1	CH 1 rainfall input	
27		PI0	CH 0 pulse input	
28		PI1	CH 1 pulse input	
29		GND	Ground	
30	SDI12	SDI	SDI signal	SDI input/output
31		G0	Gray code 0 bit	
32		G1	Gray code 1 bit	
33		G2	Gray code 2 bit	
34		G3	Gray code 3 bit	

35	Gray Code	G4	Gray code 4 bit	12 bit gray code port
36		G5	Gray code 5 bit	
37		G6	Gray code 6 bit	
38		G7	Gray code 7 bit	
39		G8	Gray code 8 bit	
40		G9	Gray code 9 bit	
41		G10	Gray code 10 bit	
42		G11	Gray code 11 bit	
43		GND	Ground	
44		VCC_OUT 2	VCC Output 2	
45	RS485-2	B1	RS485-2 B	
46		A1	RS485-2 A	
47	Digital Input	GND	Ground	8 channels digital input
48		DI7	CH 7 digital input	
49		DI6	CH 6 digital input	
50		DI5	CH 5 digital input	
51		DI4	CH 4 digital input	
52		DI3	CH 3 digital input	
53		DI2	CH 2 digital input	
54		DI1	CH 1 digital input	
55		DI0	CH 0 digital input	
56	Digital output (OC)	GND	Ground	2 channels digital output OC: Open Collector
57		DO1	CH 1 digital output	
58		DO0	CH 0 digital output	
59	Analog input	ADC7	CH 7 analog input	8 channels analog input (4~20mA or 0~ 5V)
60		ADC6	CH 6 analog input	
61		ADC5	CH 5 analog input	
62		ADC4	CH 4 analog input	
63		ADC3	CH 3 analog input	
64		ADC2	CH 2 analog input	
65		ADC1	CH 1 analog input	
66		ADC0	CH 0 analog input	
67		ADC_GND	ADC Ground	
68		VCC_OUT	VCC output	

		0		
--	--	---	--	--

1.6.2 Definition of Cables

TY511 utilizes industrial terminal block, so we suggest you use materials of cable 28-16AWG. Definition of cable for power and RS232 are as below.

1) Power Adapter (Output 12VDC/1.5A)

Color of cable	Power Output Polarity
Red	VIN+(Anode)
Black	VIN-(Cathode)



Figure 6: power adapter

2) RS232 Cable (with DB9 female interface)

Color of Cable	Corresponding DB9-M Pin Number
Brown	2
Blue	3
Black	5

3) Power Supply Cable

Input range: 5-35VDC, power>4W, we suggest you use our standard power supply.

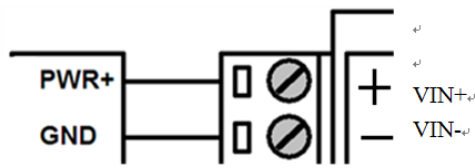


Figure 7: Power cable connection

4) RS232 Cable

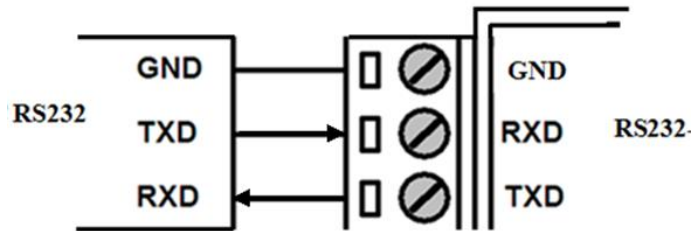


Figure 8: RS232 cable connection

5) RS485 Cable

For example, RS485 water level sensor.

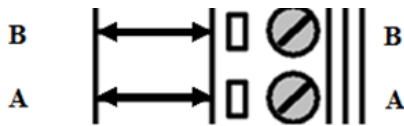


Figure 9: RS485 cable connection

6) Digital Input: (Wet contact)

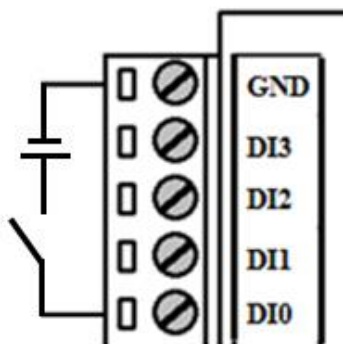


Figure 10: Digital input

7) Digital Output

Open Collector output, rated drive current 50mA, rated drive voltage 35VDC, that is to say, $R+R_{load}>20U\Omega$,

$U \leq 35\text{VDC}$.

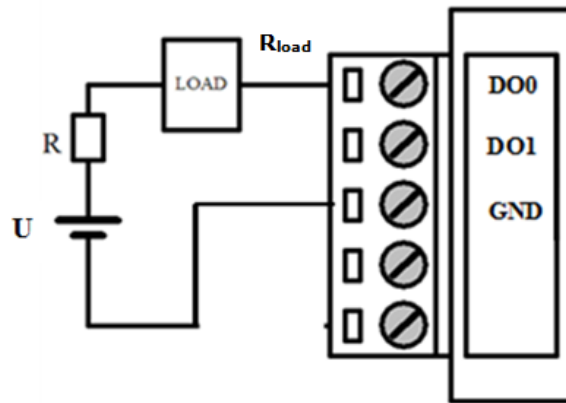


Figure 11: Digital output

8) Relay Output

Max switch voltage 30VDC, max switch current 1A, max switch power 30W)

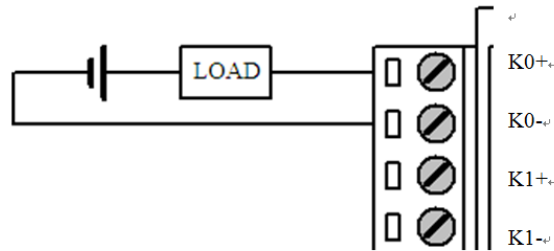


Figure 12: Relay Output

9) Analog Input(4-20mA)

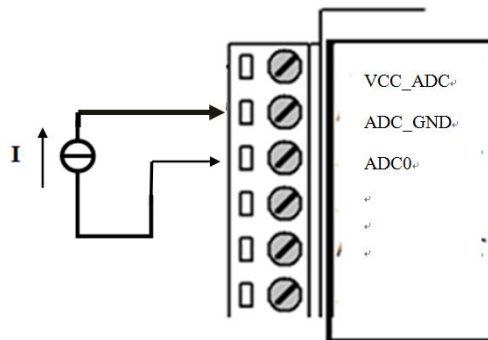


Figure 13: Analog input

10) Two-wire current loop sensor: (Current 4-20mA)

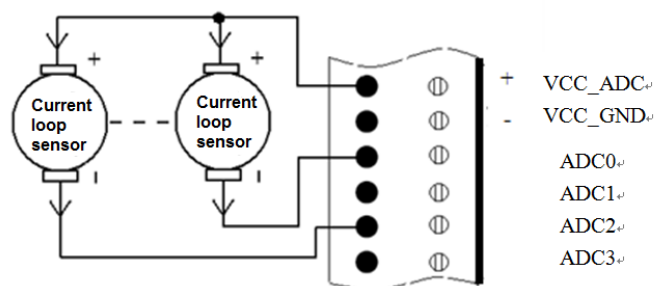


Figure 14: 2-wire current loop sensor

11) SDI Sensor

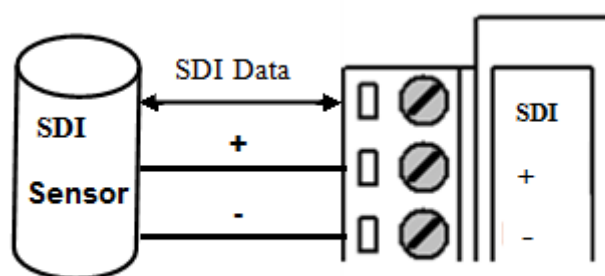


Figure 15: SDI sensor

12) Tipping-bucket rain gauge

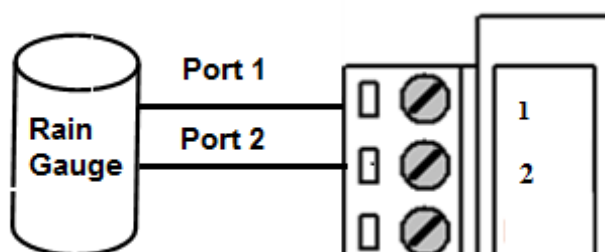


Figure 16: rain gauge

12 bit gray code water level sensor

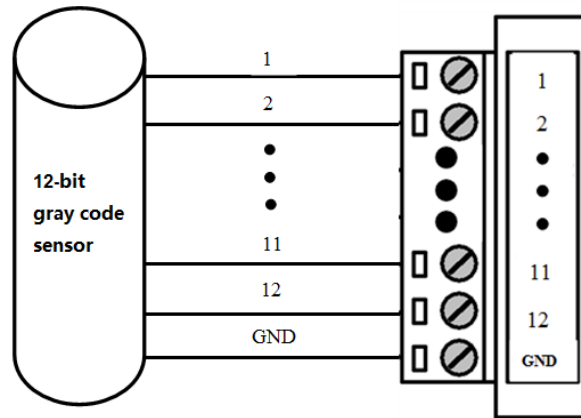


Figure 17: 12-bit gray code sensor

1.7 Power supply requirement

Devices are often used in complex environments, in order to adapt to the complex application environment and improve the stability of the system, the equipment uses advanced power technology. Users can use BIVOCOM 12VDC/1.5A power adapter to supply power to the device, or directly supply power to the device with DC 5-35V power supply. When the user supplies power to the device with an external power supply, the stability of the power supply must be ensured (the ripple is less than 300mV, and the instantaneous voltage does not exceed 36V), and the power supply is guaranteed to be more than 4W (excluding the power consumption of the external sensor).

Using Bivocom standard 12VDC/1.5A power adapter is highly recommended.

1.8 LED Indicators

TY511 has 4 LED indicators, 'Power', 'System', 'Online', 'Error', as follows.

LED Indicator	Status	Description
Power	On	Power on
System	Blink	Device is operating
Online	On	Device is online
Error	On	Error alarm



Figure 18: LED indicators

1.9 Grounding screw


There is a grounding terminal , using M3 screw, which allows users to connect the device to the ground. After grounding, the device is required to be reliably connected to the ground, and the grounding impedance is less than 4 ohms.



Figure 19: grounding screw

1.10 Mounting

This device supports wall mount with 4 screw holes, support M4 screw. For details, please refer to item [1.3](#) above mentioned.

1.11 Lightning protection instructions

When this device is connected to outdoor sensors (rain gauge, water level gauge, etc.), we suggest you take lightning protection measures (such as installing lightning arresters, etc.) to improve the safety level of the device.

2. Getting Started

2.1 Package Checklist

The following components are included in your TY511 package.

Check the list before installation. If you find anything missing, Please feel free to contact Bivocom.

- TY511 RTU Host
- Power Adapter(DC 12V/1.5A)
- 1* Cellular Antenna (Male SMA)
- 1* RS232 Cable
- 4* 12-Pin Terminal Blocks
- 2* 10-Pin Terminal Blocks
- 1* 4-Pin Terminal Blocks

2.2 Installation

WARNING: PLEASE DO NOT POWER ON THE RTU BEFORE INSTALLING ANY ACCESSORIES, SUCH AS, SIM CARD, TERMINAL BLOCK, POWER CABLE, SD CARD, ETC.

2.2.1 Install SIM/UIM Card

TY511 supports normal SIM/UIM only, so if you're using a Micro SIM or Nano SIM card, you may need to use a Micro SIM or Nano SIM to Normal SIM adapter.

Make sure your RTU is powered off, then use a needle object(such as a pen) to push the button near the SIM/UIM card tray, it will flick out immediately. Put the SIM/UIM card to card tray with right direction, insert it to RTU and make sure it's tightly matched.



Figure 20: SIM card tray

Warning: Never install SIM/UIM card when RTU is powered on.

2.2.2 Install the terminal blocks

There are 7 terminal blocks in the package, please install all of them to allow you to connect your sensors/PLC/microcontrollers to TY511, and power supply.



Figure 21: terminal block

2.2.3 Fasten cellular antenna

TY511 supports 1 SMA male cellular antenna(dual antenna is optional), fasten the antenna to TY511(SMA female port), and make sure it is screwed tightly to ensure the strength of signal.



Figure 22: antenna connector

2.2.4 Connect cable of power adapter to TY511

TY511 use 4-pin terminal block for connecting power cable, please make sure you connect the red cable to VIN+, and black cable for VIN-, then use screwdriver to fasten the cable.

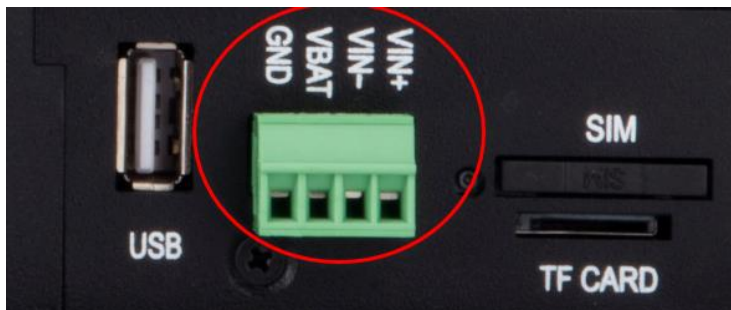


Figure 23: 4-pin terminal block



Figure 24: power adapter

Warning: Incorrect connection of the power cable may cause damage of device.

2.2.5 Connect TY511 to PC/Laptop via RS232

Use the RS232 cable to connect to the RS232 interface of TY511.

For definition of RS232 cable and RS232 serial port, please refer to item [1.6.2](#) and [1.6.1](#) respectively

If the PC or laptop doesn't have RS232 serial port, you may need a USB to RS232 adapter.

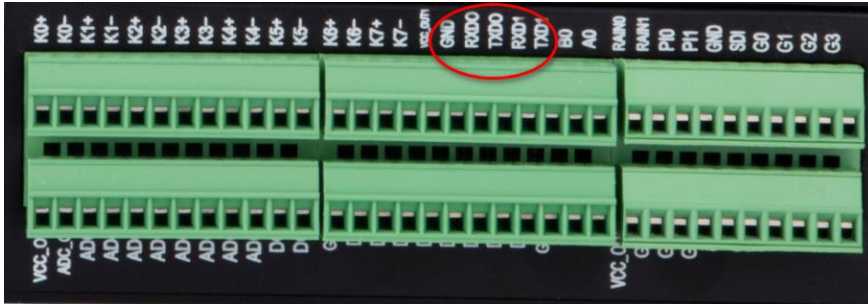


Figure 25: RS232 Serial port



Figure 26: RS232 Cable

2.2.6 Open Config tool and power on TY511

You can go to www.bivocom.com to download the TY511 Config Tool, or contact us to get this software, this config tool only support Windows OS, IOS is not ready yet.

Open the config tool below,

- 1) Click 'Setting', then click 'Reload', in the log info bar, it'll tell you to power on the RTY to enter into configuration.
- 2) Power on RTU, it'll tell you load successfully, then you enter into configuration, start to configure the parameters.
- 3) Configure the parameters you want, then save the configuration
- 4) Click 'Restart' to reboot the TY511.

NOTE: Please refer to item [3.1](#) for more details.

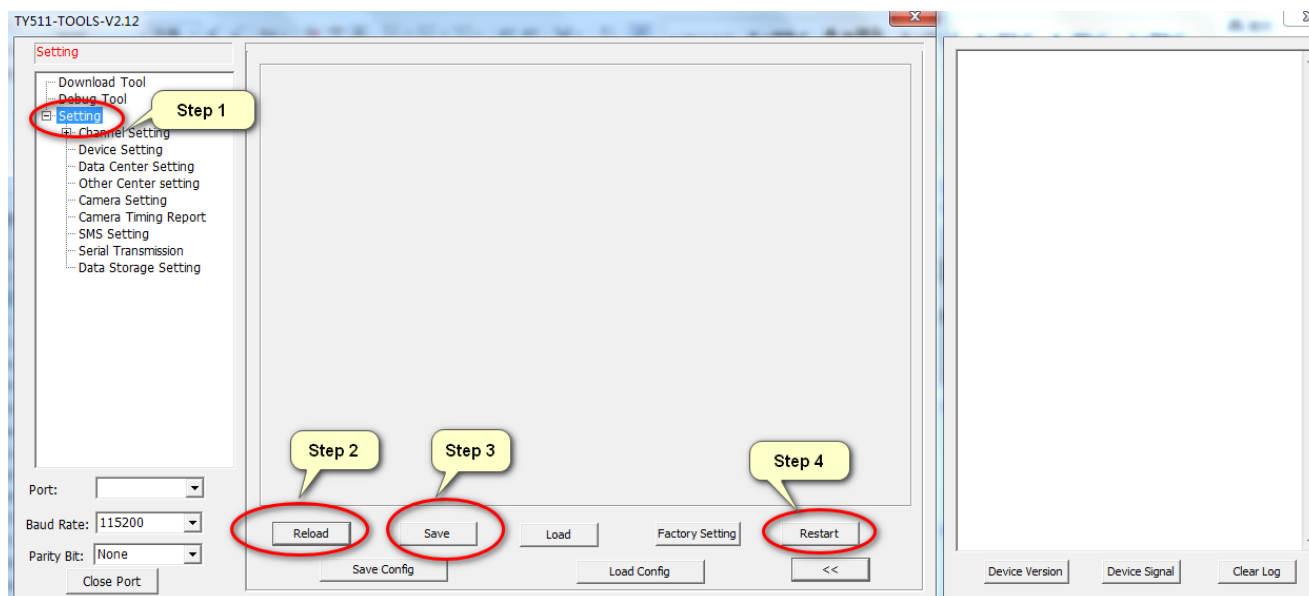


Figure 27: Config tool

2.2.7 Start to configure TY511

Then you can start to configure the parameter of TY511, please refer to item [3](#) for more details.

3. Parameter Setting

In this chapter, you'll learn more details about how to configure the RTU via config tool, keyboard, remote platform and SMS.

Note: only config tool is available now, others are under development.

1) Config tool

Open this config tool on your PC or laptop, connect TY511 to your PC via RS232 serial port and cable where Config Tool is running.

By using this config tool, you're able to configure all types setting of RTU as below.

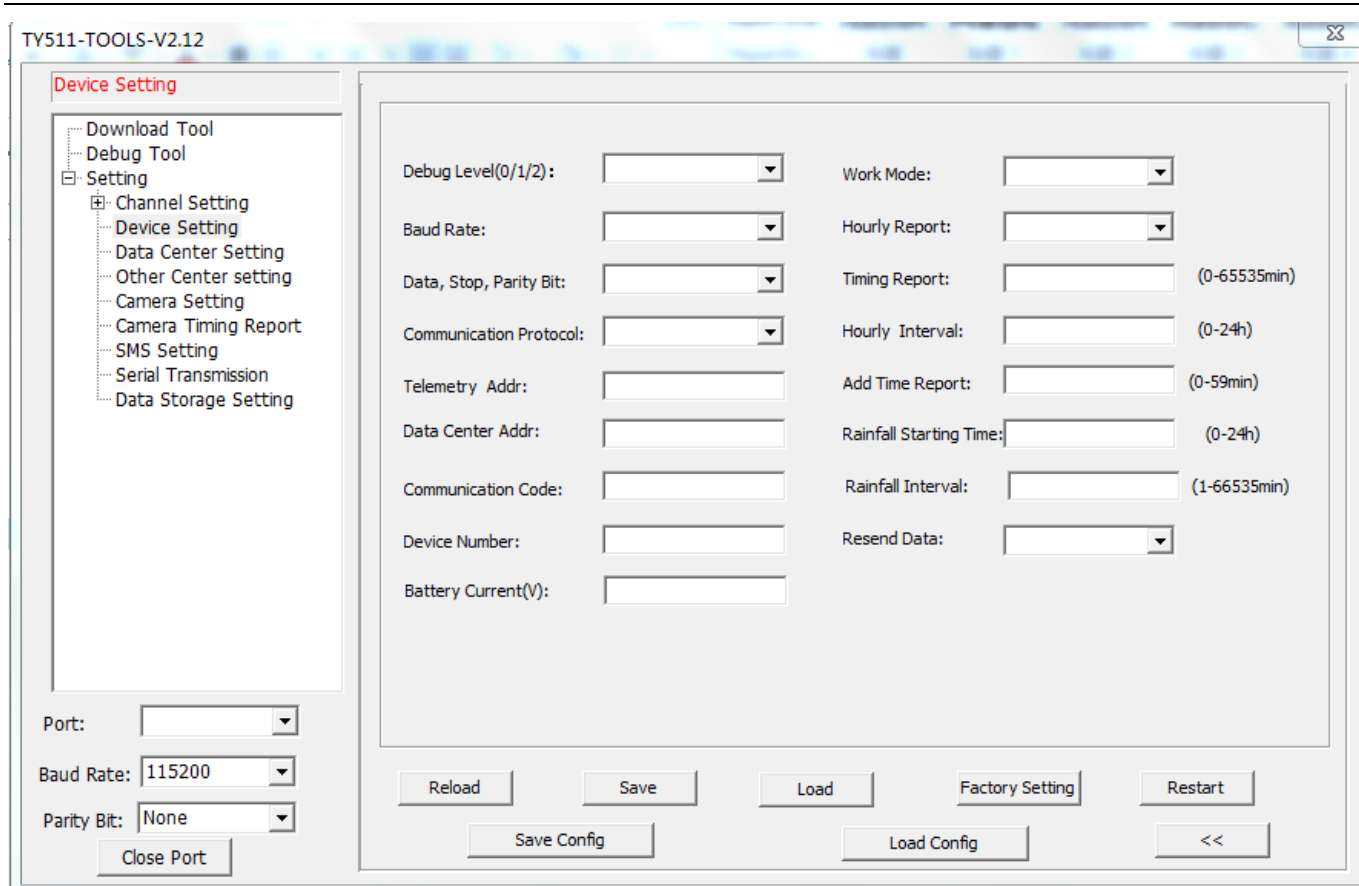


Figure 28: Config tool

2) Keyboard(Under development)

RTU supports configuration through the keyboard, and it is a way of configuring system parameters without external devices and tools.



Figure 29: Keyboard

3) Remote Platform(Under development)

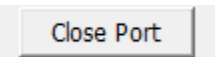
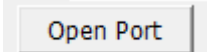
User can also configure the RTU via “Parameters Settings” of platform.

4) SMS(under development)

Users can send SMS to the phone number of RTU to configure the parameters of RTU.

3.1 Config Tool

When you open the RTU config tool, you'll find the parameters of serial port that has been open as below image, the default port is COM1 open with baud rate 115200, if you find the parameter of serial port between device(connected to RTU) and RTU are different, you can choose the right value in drop-down menu, then open the serial port.

When it shows , that means serial port is open, otherwise, click  to open it.

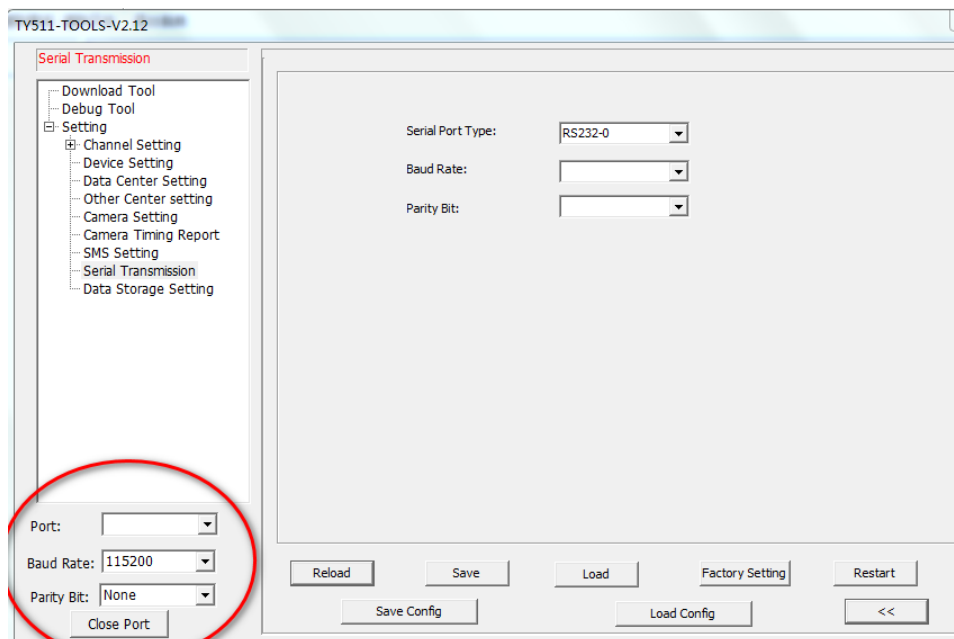
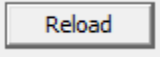


Figure 30: Serial Port Setting

After serial port open, click , a message will showed the output information bar: Waiting for the device to power on and enter the configuration.

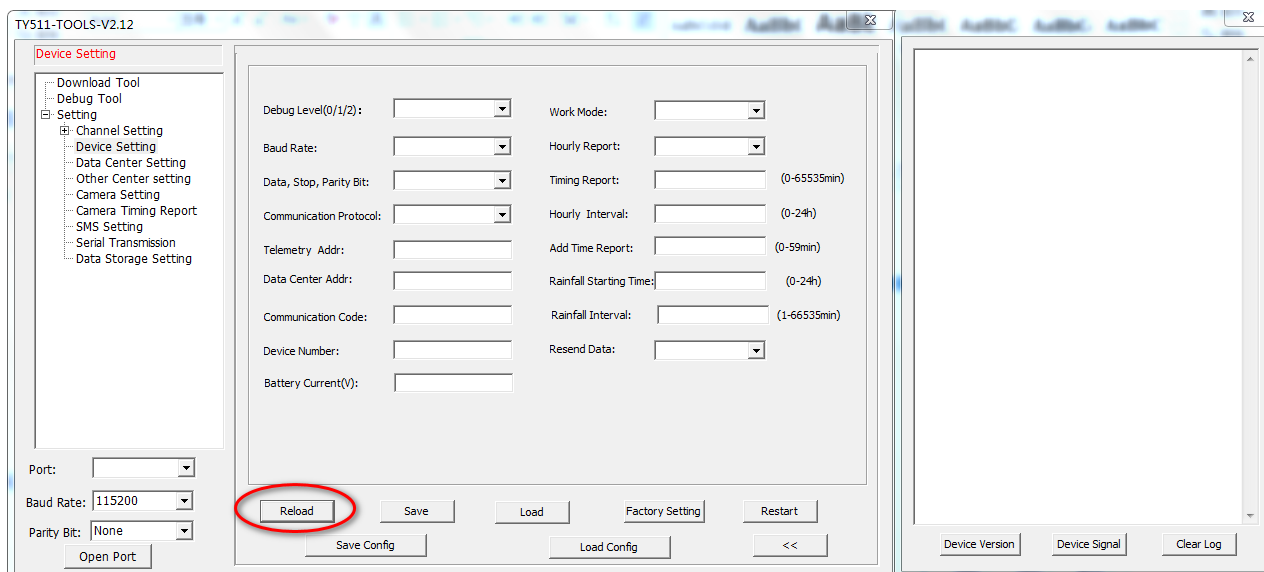


Figure 31: Reload

Then power on the TY511.

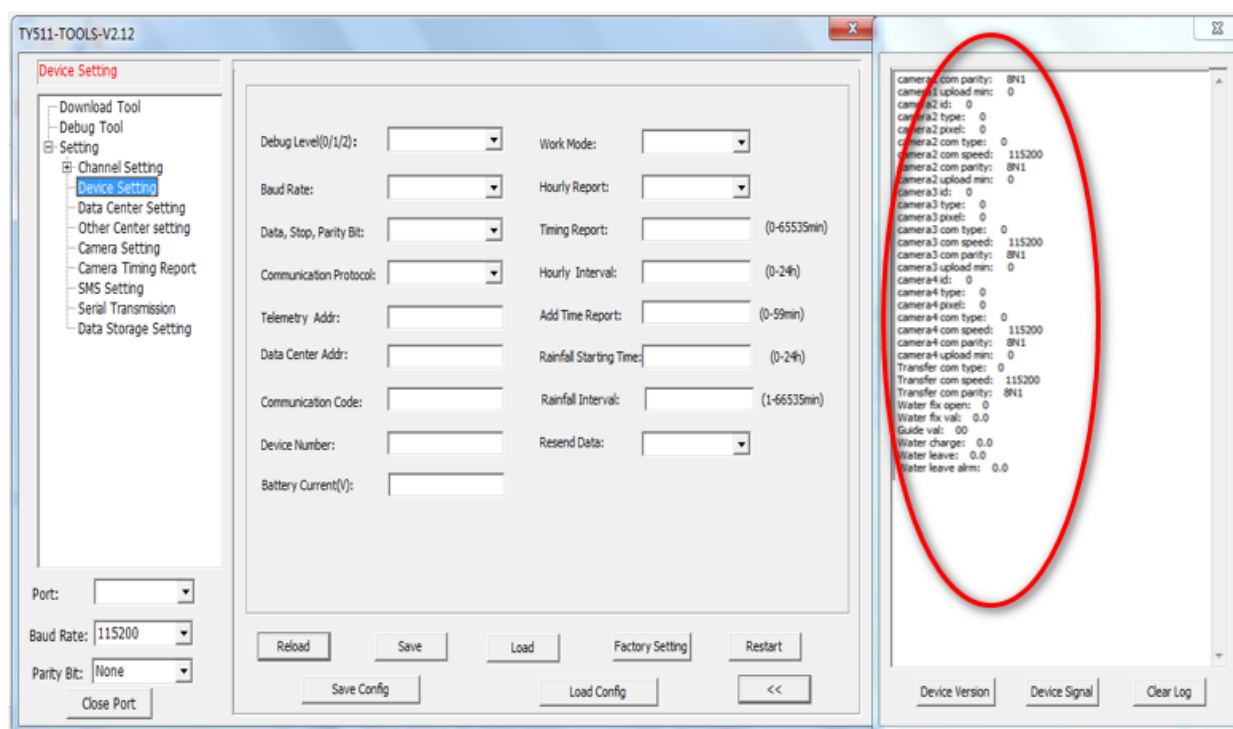


Figure 32: Enter into configuration

The config tool will automatically load the current configuration parameters of the TY511 into the configuration status and display it in the "Log Information" bar on the right, then you can start to configure all configuration parameters of the device.

3.1.1 RTC Setting

You can set the RTC time according to the current system time, or you can enter the time manually.

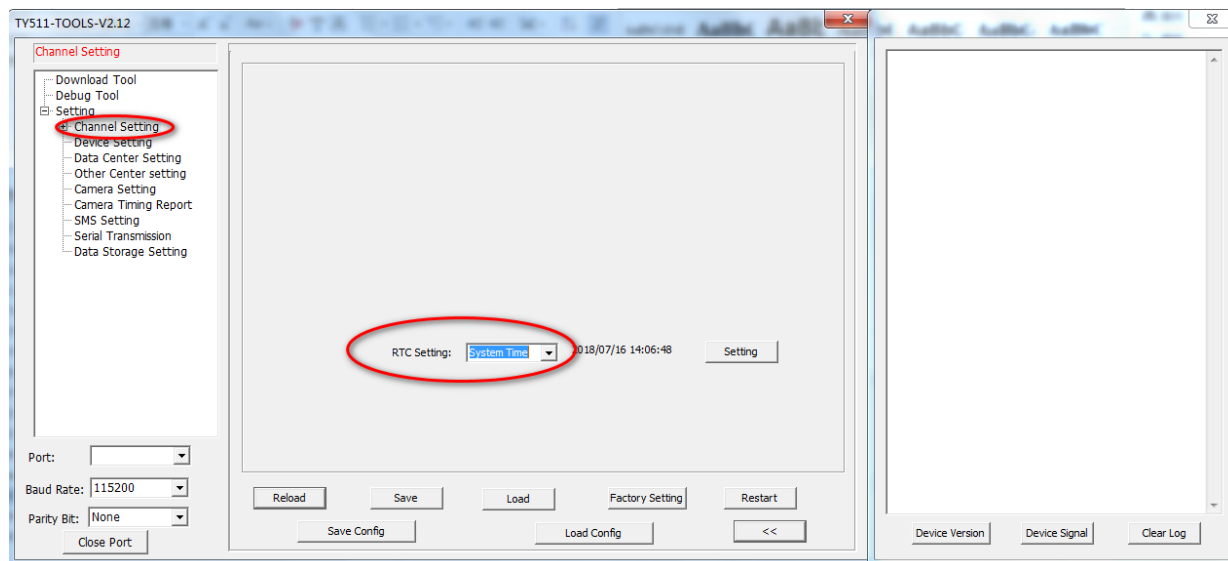


Figure 33: RTC Setting

3.1.2 Channel Setting

You can configure the channel storage length and hardware interface when you configure the channels.

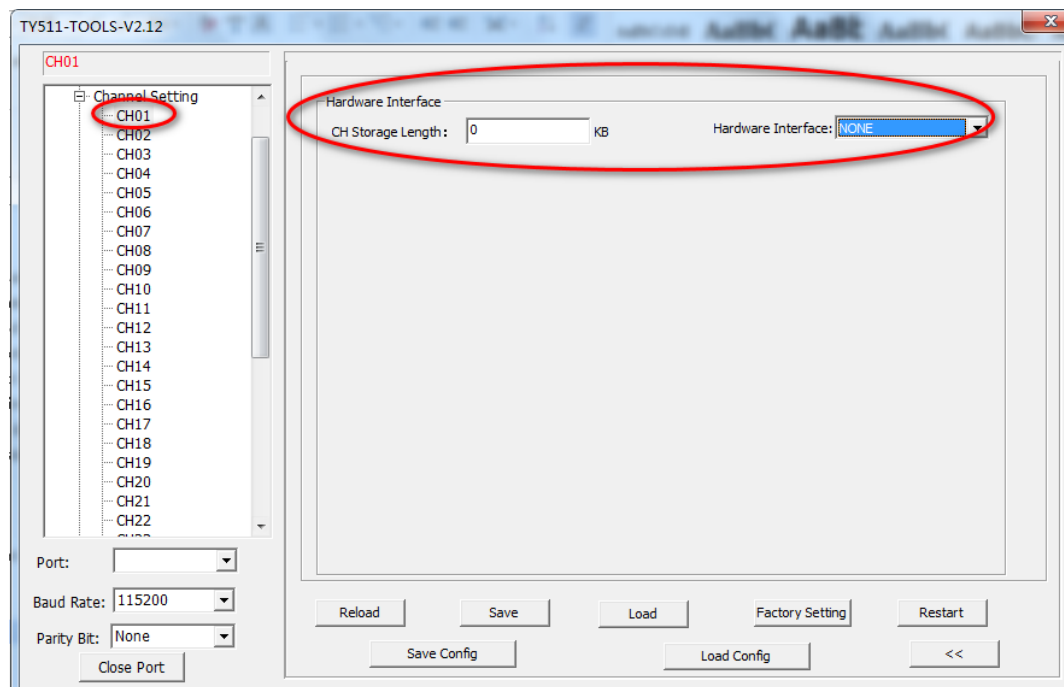


Figure 34: Channel Setting

Parameter Name	Description
CH storage length	The size of the stored data, Unit: KB
Hardware Interface	Serial port(COM00-COM14, 15 ports in total)
	ADC(Analog input, ADC00-ADC07, 8 ports in total)
	DI(Digital input, DI0-DI7, 8 ports in total)
	Rain(Rain0-Rain1, 2 ports in total)
	Pulse input(PI0-PI1, 2 ports in total)
	SDI
	GRAY

3.1.3 Hardware Interface

1) Serial Port

For serial port setting, there are 3 main partners to configure, 'Basic', 'Communication' and 'Alarm'.

a) Basic

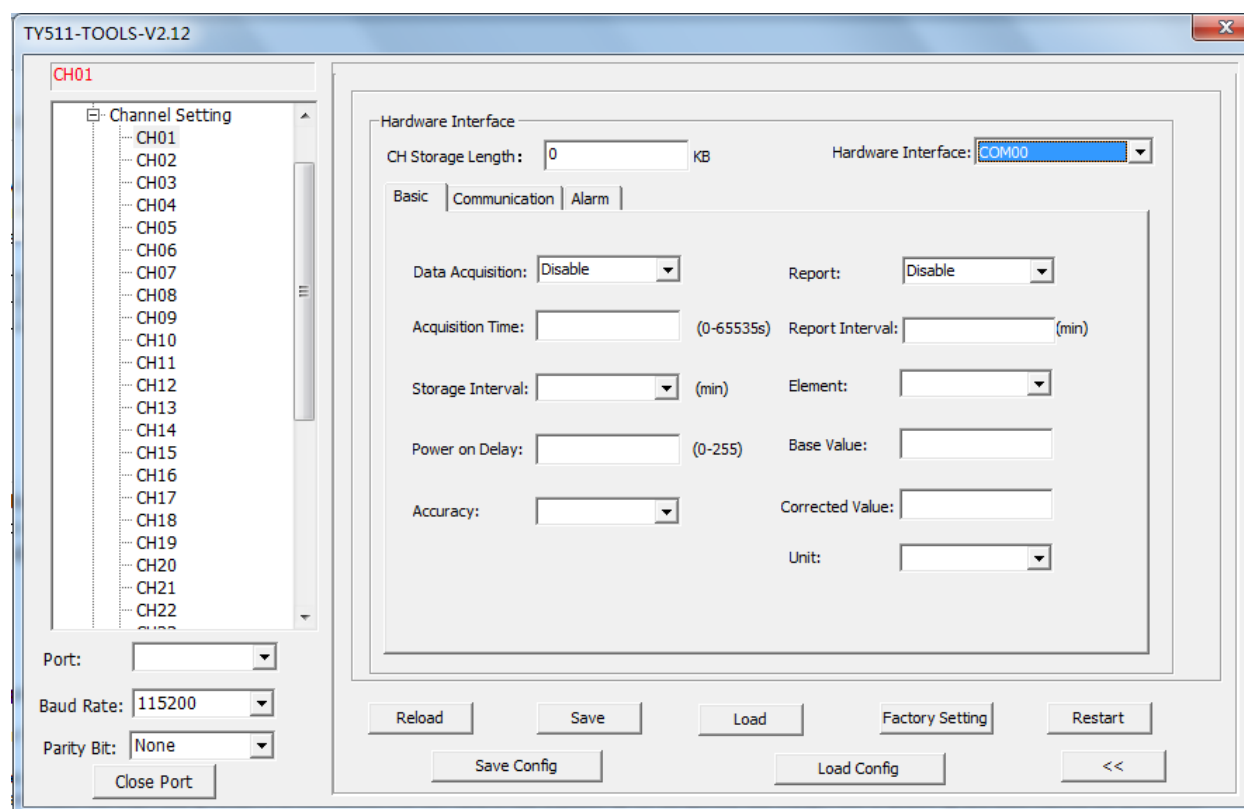


Figure 35: Basic setting

Parameter Name	Description
Data Acquisition	Enable or disable data acquisition
Acquisition Time	Setting acquisition time interval, from 0-65535s
Storage Interval	The time interval to store the data(min)
Power on delay	You can configure a time that TY511 will wait for the time you've set before it sends data acquisition request to your field sensor.
Accuracy	The accuracy of data, 0.01, 0.1, 1, 1000 to choose, and you can also set up the number you want. For example, you're collecting data at 0.001m, and you want to store the data in mm format, choosing 1000, that means your server will receive data at 1mm format.
Report	Choose enable or disable to decide whether to report the data to server or not.
Report Interval	The time interval to report the data
Element	The type of data you want to acquire, such as ADC, DI, etc.
Base Value	Assumed base value of sampling. By configuring this value, the data received at server is an accurate data. For example, the base value of water level gauge is 10m, and final water level is 20m, that means the data change is 10m.
Corrected Value	Correct the sampling value. If the data has fixed error, you can set a corrected value to correct it.
Unit	Choose the unit for the type of data.(cm, m, m3/s)

b) Communication

This is to configure the communication parameter of this channel on RTU TY511, as well as Modbus parameter.

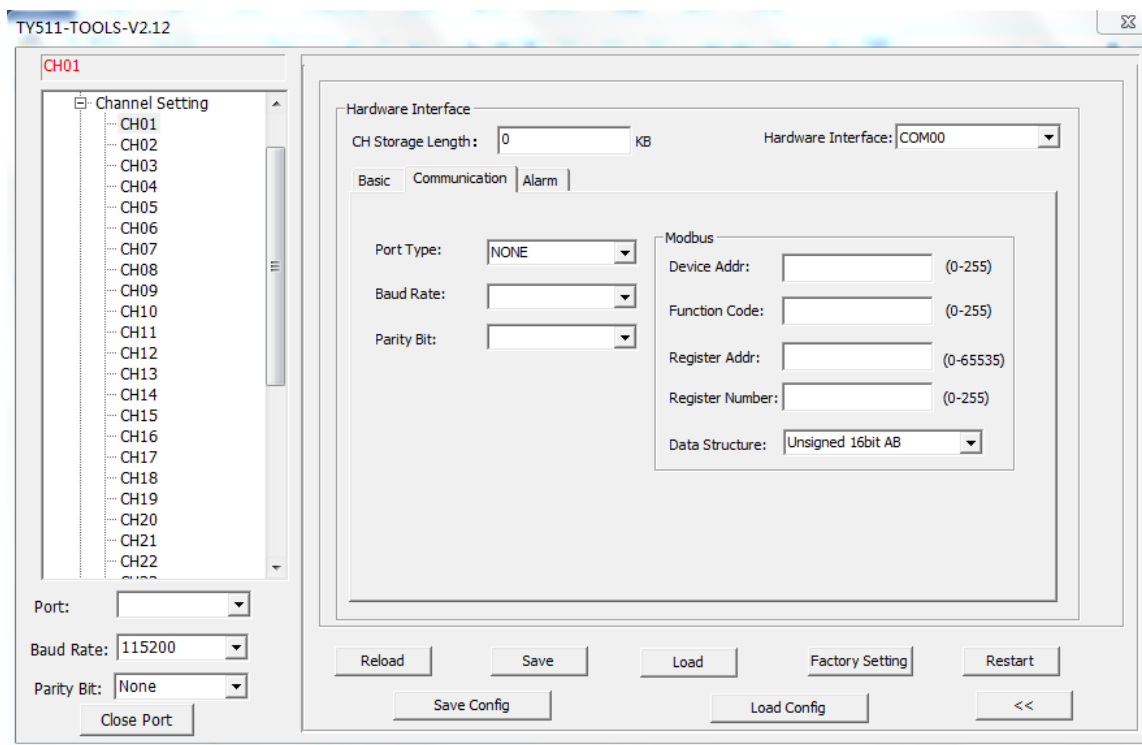


Figure 36: Communication Setting

c) Alarm

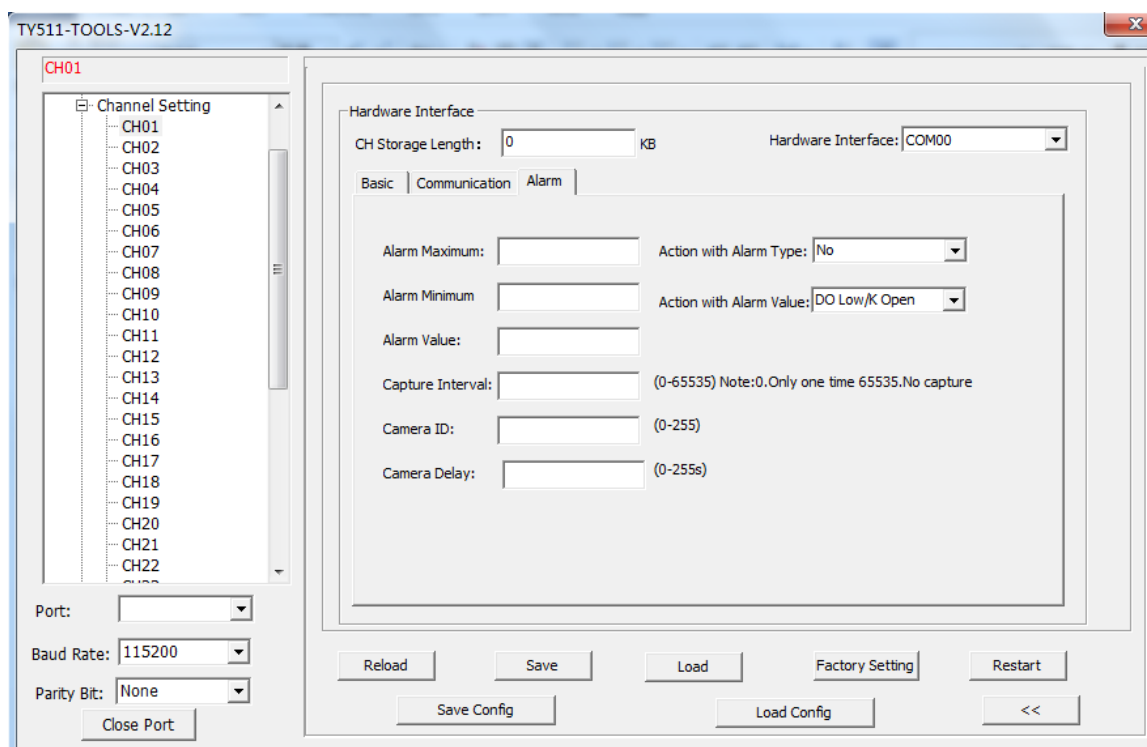


Figure 37: Alarm Setting

Parameters	Description
Alarm Maximum	You can set a maximum value for alarm, once it exceeds this value, RTU will send alarm message
Alarm Minimum	You can set a minimum value for alarm, once it exceeds this value, RTU will send alarm message
Alarm Value	You can set a value that if the data surpass this value RTU will send alarm message
Capture Interval	(0-65535) 0 only capture one time, 65535, no capture
Camera ID	The Camera ID(0-255)
Camera Delay	(0-255) 0, only capture one time, 65535, no capture
Action with Alarm Type	No, DO0, DO1 and K0~K7
Action with Alarm Value	DO Low/K Open, or DO High/K Close, No

2) ADC

For ADC setting, there are 3 main parameters to configure, 'Basic', 'Range' and 'Alarm'.

a) Basic

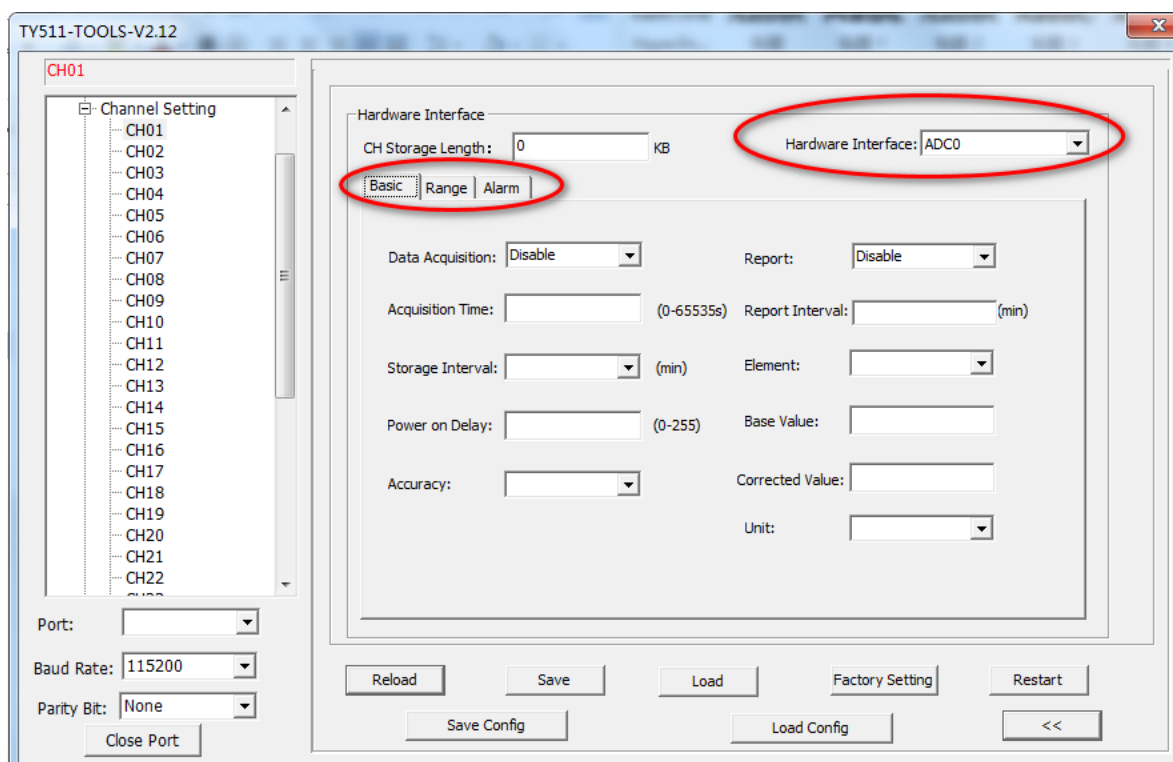


Figure 38: Basic Setting

Parameter Name	Description
Data Acquisition	Enable or disable data acquisition
Acquisition Time	Setting acquisition time interval, from 0-65535s
Storage Interval	The time interval to store the data(min)
Power on delay	You can configure a time that TY511 will wait for the time you've set before it sends data acquisition request to your field sensor.
Accuracy	The accuracy of data, 0.01, 0.1, 1, 1000 to choose, and you can also set up the number you want. For example, you're collecting data at 0.001m, and you want to store the data in mm format, choosing 1000, that means your server will receive data at 1mm format.
Report	Choose enable or disable to decide whether to report the data to server or not.
Report Interval	The time interval to report the data
Element	The type of data you want to acquire, such as ADC, DI, etc.
Base Value	Assumed base value of sampling. By configuring this value, the data received at server is an accurate data. For example, the base value of water level gauge is 10m, and final water level is 20m, that means the data change is 10m.
Corrected Value	Correct the sampling value. If the data has fixed error, you can set a corrected value to correct it.
Unit	Choose the unit for the type of data.(cm, m, m3/s)

b) Range

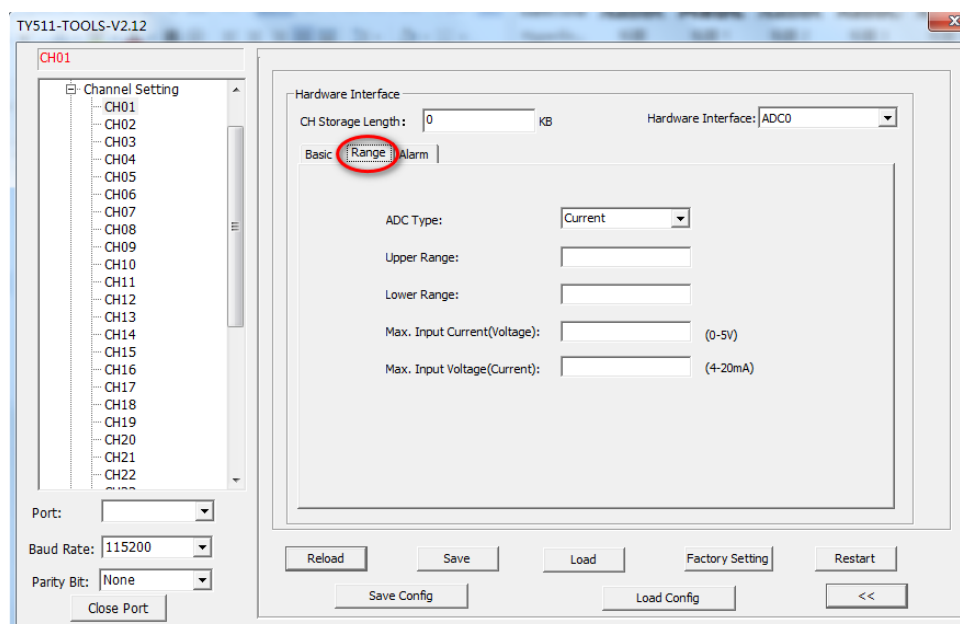


Figure 39: Range Setting

Parameters	Description
ADC Type	Current or Voltage to choose
Upper Range	The upper range of data For example, you're using analog input from 4-20mA, the 20mA is upper range, and 4 is lower range.
Lower Range	The lower range of data
Max. Input Current(Voltage)	Voltage: 0-5V
Min. Input Current(Voltage)	Current: 4-20mA

c) Alarm

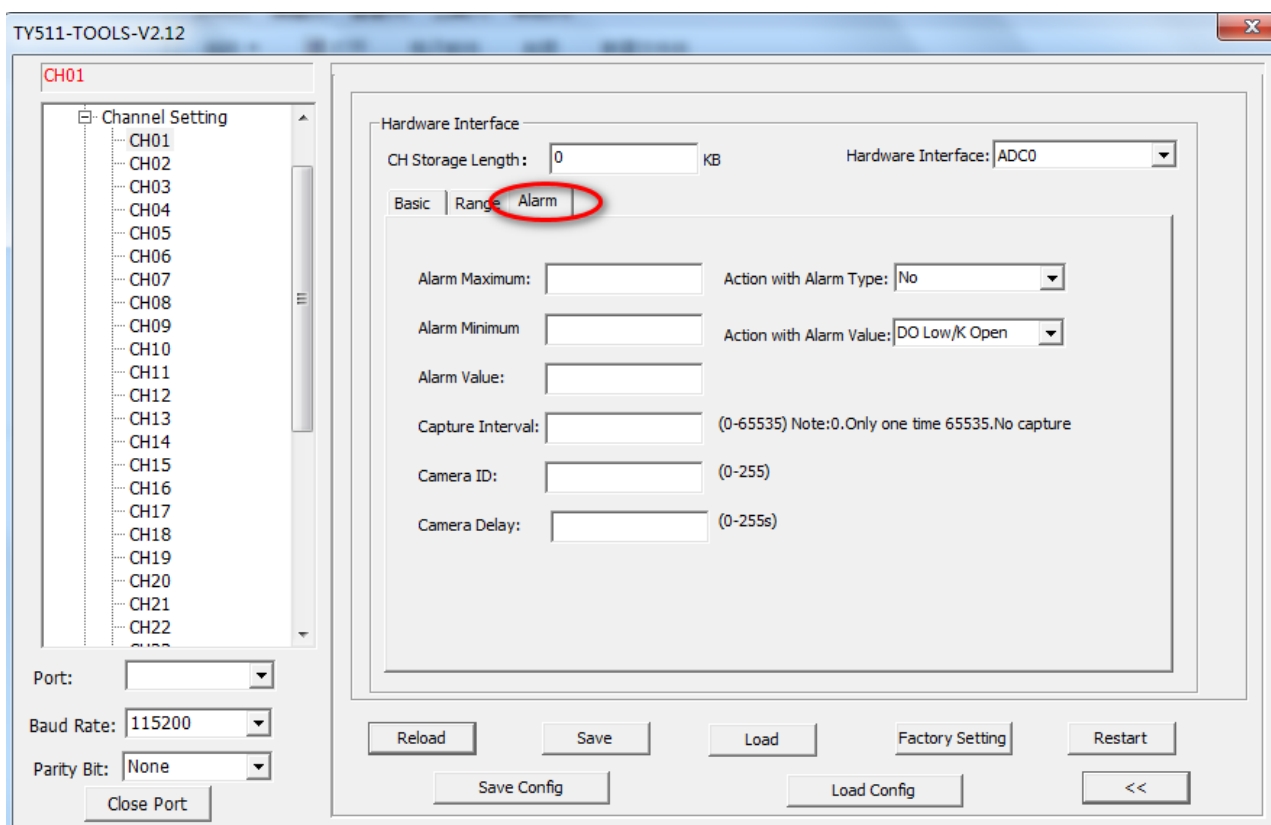


Figure 40: Alarm Setting

Parameters	Description
Alarm Maximum	You can set a maximum value for alarm, once it exceeds this value, RTU will send alarm message
Alarm Minimum	You can set a minimum value for alarm, once it exceeds this value, RTU will send alarm message

Alarm Value	You can set a value that if the data surpass this value RTU will sent alarm message
Capture Interval	(0-65535) 0, only capture on time, 65535, no capture
Camera ID	The Camera ID(0-255)
Camera Delay	(0-255) 0, only capture one time, 65535, no capture
Action with Alarm Type	No, DO0, DO1 and K0~K7
Action with Alarm Value	DO Low/K Open, or DO High/K Close, No

3) DI

For DI setting, you can configure the alarm as below.

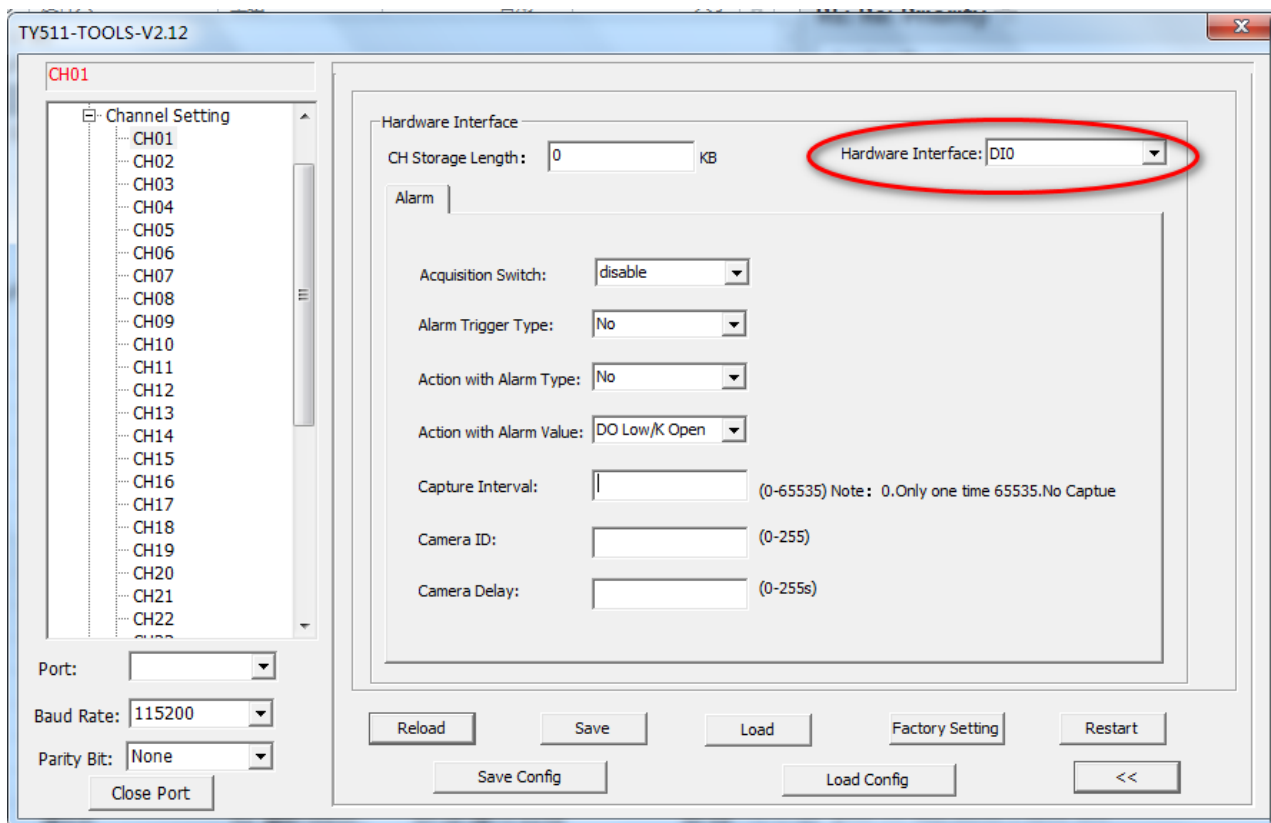


Figure 41: Alarm Setting

Parameters	Description
Acquisition Switch	Enable or disable
Alarm Trigger Type	No, High Level, Low Level
Action with Alarm Type	No, DO0, DO1 and K0~K7
Action with Alarm Value	DO Low/K Open, or DO High/K Close, No

Capture Interval	(0-65535) 0, only capture one time, 65535, no capture
Camera ID	Camera ID(0-255)
Camera Delay	(0-255) 0, no delay

4) Rain

For ADC setting, there are 2 main parameters to configure, 'Basic' and 'Alarm'.

a) Basic

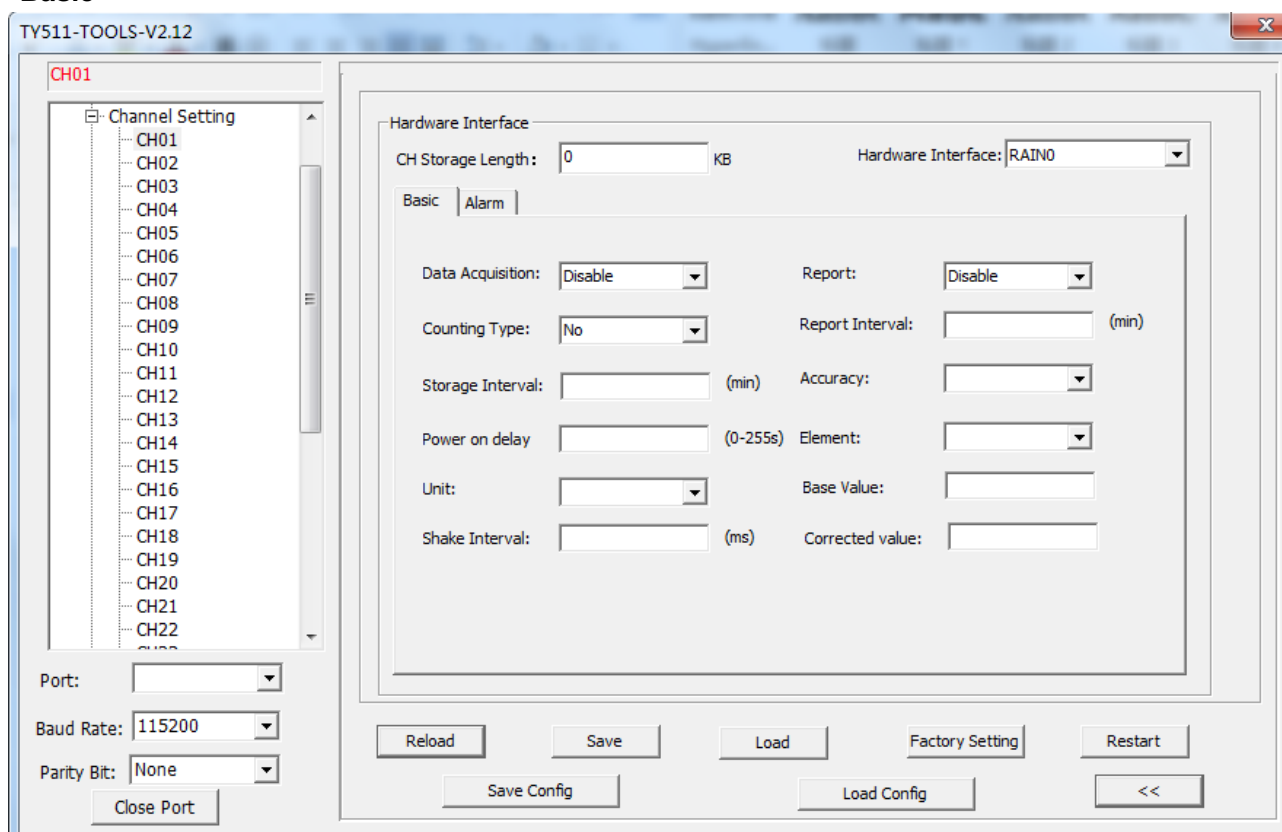


Figure 42: Basic Setting

Parameter Name	Description
Data Acquisition	Enable or disable data acquisition
Counting Type	No, rising edge, falling edge, double edge
Storage Interval	The time interval to store the data(min)
Power on delay	You can configure a time that TY511 will wait for the time you've set before it sends data acquisition request to your field sensor.
Unit	mm, cm, m, m3/s

Shake Interval	ms, anti-pulse value shift, just keep it a default value.
Report	Choose enable or disable to decide whether to report the data to server or not.
Report Interval	The time interval to report the data
Accuracy	The accuracy of data, 0.01, 0.1, 1, 1000 to choose, and you can also set up the number you want. For example, you're collecting data at 0.001m, and you want to store the data in mm format, choosing 1000, that means your server will receive data at 1mm format.
Element	The type of data you want to acquire, such as ADC, DI, etc.
Base Value	Assumed base value of sampling. By configuring this value, the data received at server is an accurate data. For example, the base value of water level gauge is 10m, and final water level is 20m, that means the data change is 10m.
Corrected Value	Correct the sampling value. If the data has fixed error, you can set a corrected value to correct it.

2) Alarm

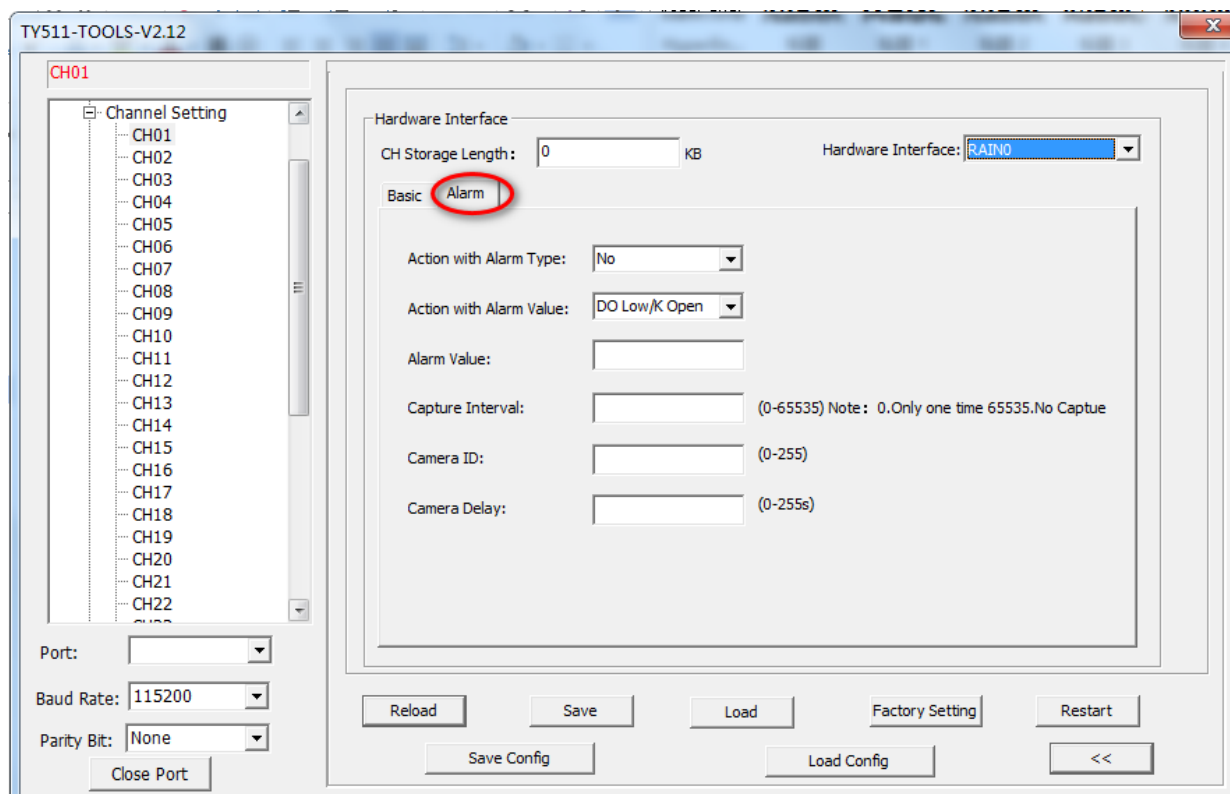


Figure 43: Alarm Setting

Parameters	Description
Action with Alarm Type	No, DO0, DO1 and K0~K7
Action with Alarm Value	DO Low/K Open, or DO High/K Close, No
Alarm Value	Set a value to trigger alarm, once the value reached, it'll send alarm message.
Capture Interval	(0-65535) 0, only capture one time, 65535, no capture
Camera ID	Camera ID(0-255)
Camera Delay	(0-255) 0, no delay

5) Pulse Input

For Pulse Input, there are 2 main parameters to configure, Basic and Alarm.

a) Basic

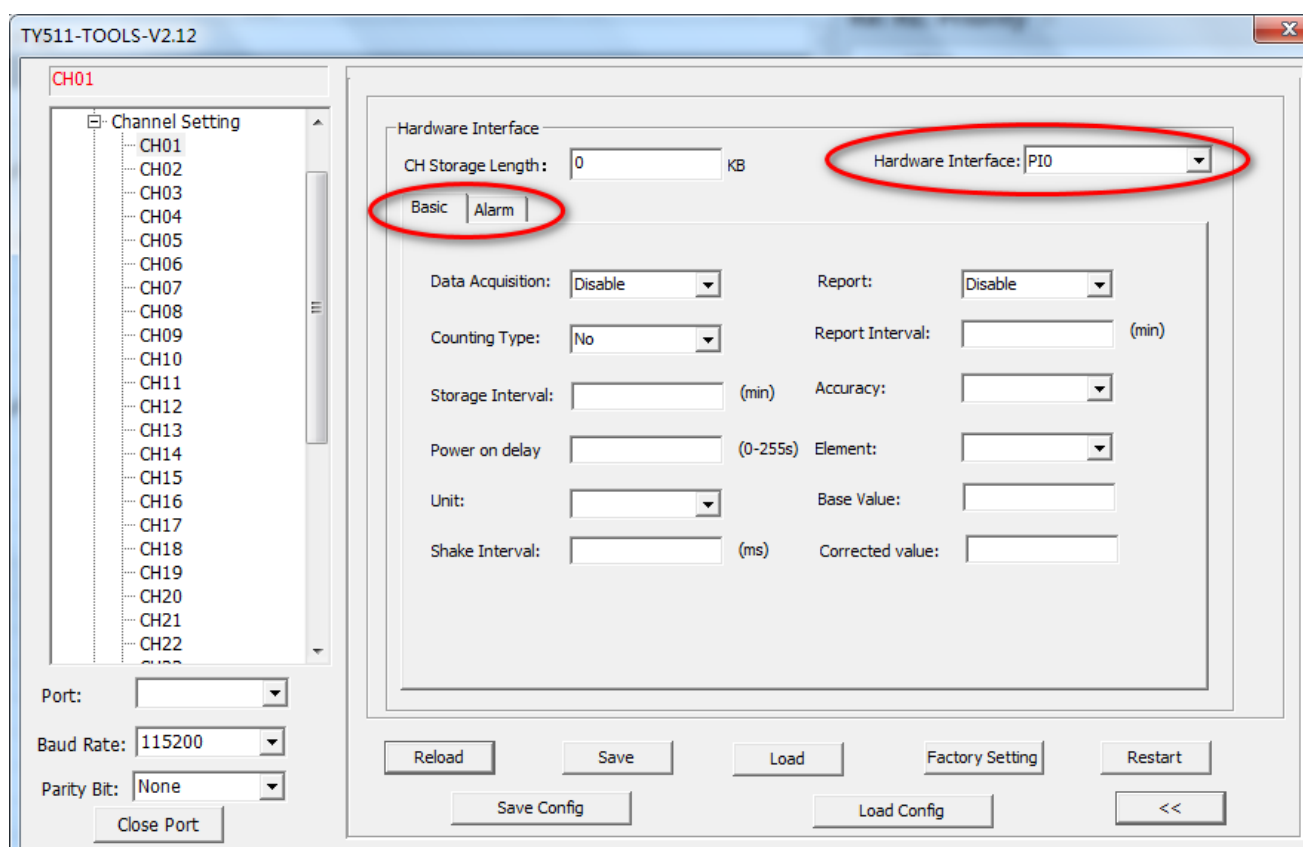


Figure 44: Basic Setting

Parameter Name	Description
Data Acquisition	Enable or disable data acquisition
Counting Type	No, rising edge, falling edge, double edge
Storage Interval	The time interval to store the data(min)
Power on delay	You can configure a time that TY511 will wait for the time you've set before it sends data acquisition request to your field sensor.
Unit	mm, cm, m, m3/s
Shake Interval	ms, anti-pulse value shift, just keep it a default value.
Report	Choose enable or disable to decide whether to report the data to server or not.
Report Interval	The time interval to report the data
Accuracy	The accuracy of data, 0.01, 0.1, 1, 1000 to choose, and you can also set up the number you want. For example, you're collecting data at 0.001m, and you want to store the data in mm format, choosing 1000, that means your server will receive data at 1mm format.
Element	The type of data you want to acquire, such as ADC, DI, etc.
Base Value	Assumed base value of sampling. By configuring this value, the data received at server is an accurate data. For example, the base value of water level gauge is 10m, and final water level is 20m, that means the data change is 10m.
Corrected Value	Correct the sampling value. If the data has fixed error, you can set a corrected value to correct it.

b) Alarm

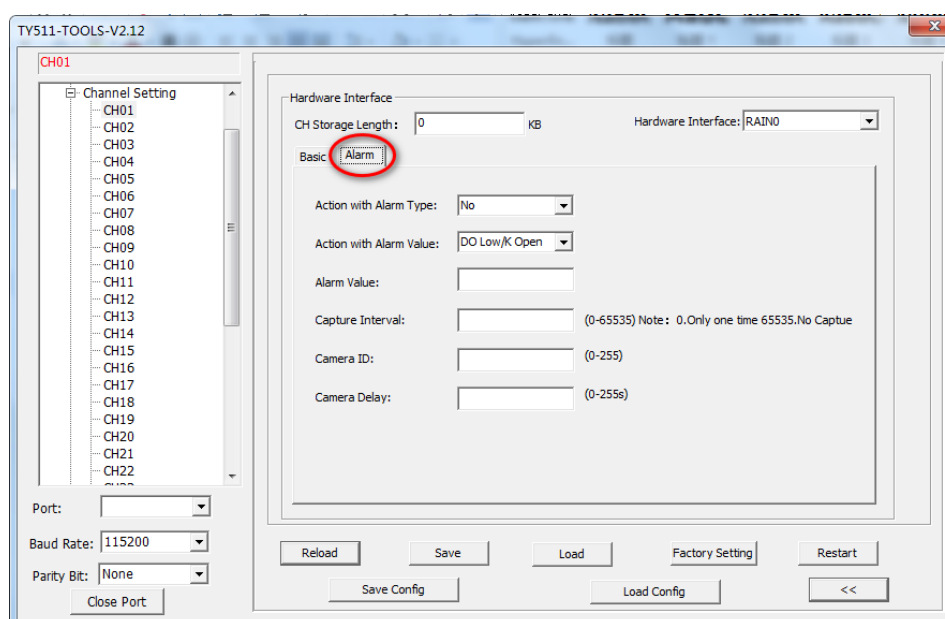


Figure 45: Alarm Setting

Parameters	Description
Action with Alarm Type	No, DO0, DO1 and K0~K7
Action with Alarm Value	DO Low/K Open, or DO High/K Close, No
Alarm Value	Set a value to trigger alarm, once the value reached, it'll send alarm message.
Capture Interval	(0-65535) 0, only capture one time, 65535, no capture
Camera ID	Camera ID(0-255)
Camera Delay	(0-255) 0, no delay

6) SDI(Optional)

For SDI, there are 2 main parameters to configure, Basic and Alarm.

a) Basic

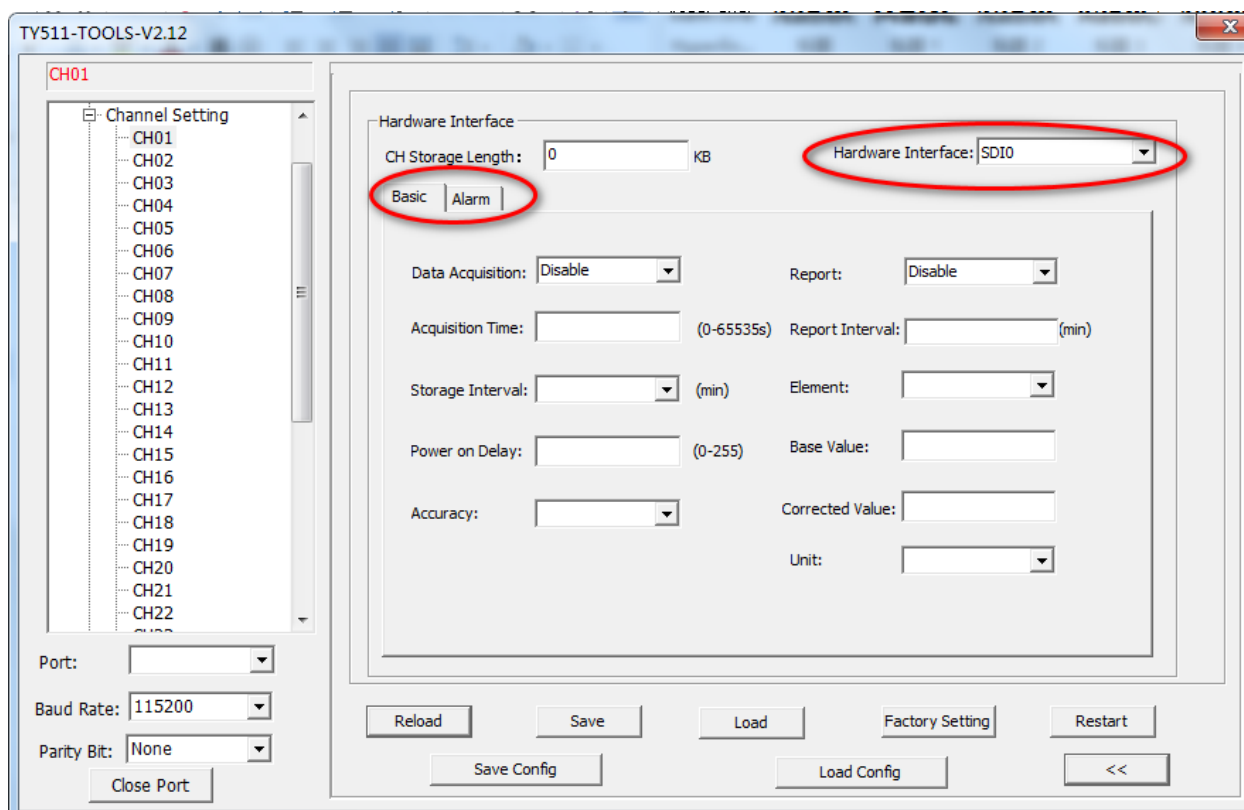


Figure 46: Basic Setting

Parameter Name	Description
Data Acquisition	Enable or disable data acquisition
Acquisition Time	Setting acquisition time interval, from 0-65535s
Storage Interval	The time interval to store the data(min)
Power on delay	You can configure a time that TY511 will wait for the time you've set before it sends data acquisition request to your field sensor.
Accuracy	The accuracy of data, 0.01, 0.1, 1, 1000 to choose, and you can also set up the number you want. For example, you're collecting data at 0.001m, and you want to store the data in mm format, choosing 1000, that means your server will receive data at 1mm format.
Report	Choose enable or disable to decide whether to report the data to server or not.
Report Interval	The time interval to report the data
Element	The type of data you want to acquire, such as ADC, DI, etc.
Base Value	Assumed base value of sampling. By configuring this value, the data received at server is an accurate data. For example, the base value of water level gauge is 10m, and final water level is 20m, that means the data change is 10m.
Corrected Value	Correct the sampling value. If the data has fixed error, you can set a corrected value to correct it.
Unit	Choose the unit for the type of data.(cm, m, m3/s)

b) Alarm

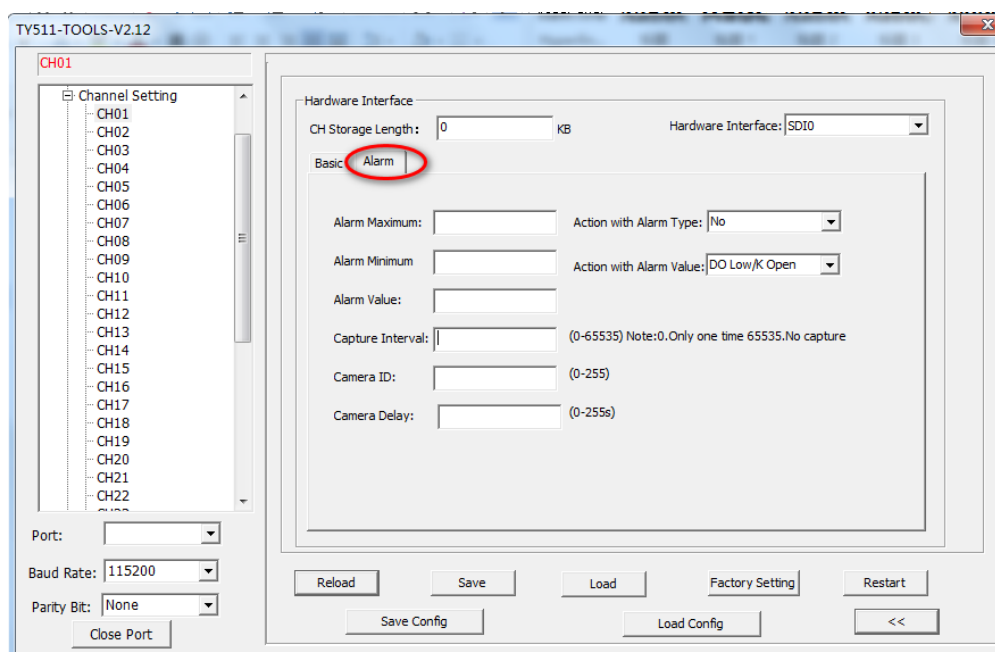


Figure 47: Alarm Setting

7) GRAY Code(Optional)

For Gray code, there are 2 main parameters to configure, basic and alarm.

a) Basic

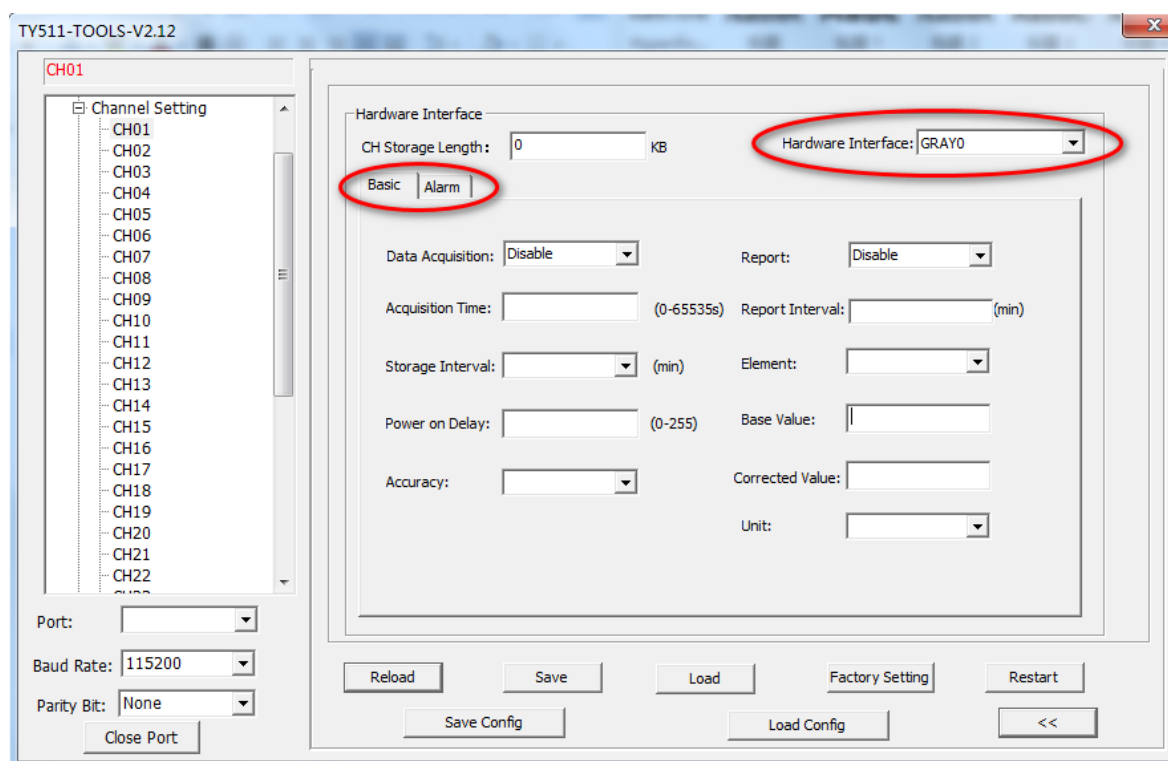


Figure 47: Basic Setting

Parameter Name	Description
Data Acquisition	Enable or disable data acquisition
Acquisition Time	Setting acquisition time interval, from 0-65535s
Storage Interval	The time interval to store the data(min)
Power on delay	You can configure a time that TY511 will wait for the time you've set before it sends data acquisition request to your field sensor.
Accuracy	The accuracy of data, 0.01, 0.1, 1, 1000 to choose, and you can also set up the number you want. For example, you're collecting data at 0.001m, and you want to store the data in mm format, choosing 1000, that means your server will receive data at 1mm format.
Report	Choose enable or disable to decide whether to report the data to server or not.
Report Interval	The time interval to report the data

Element	The type of data you want to acquire, such as ADC, DI, etc.
Base Value	Assumed base value of sampling. By configuring this value, the data received at server is an accurate data. For example, the base value of water level gauge is 10m, and final water level is 20m, that means the data change is 10m.
Corrected Value	Correct the sampling value. If the data has fixed error, you can set a corrected value to correct it.
Unit	Choose the unit for the type of data.(cm, m, m3/s)

b) Alarm

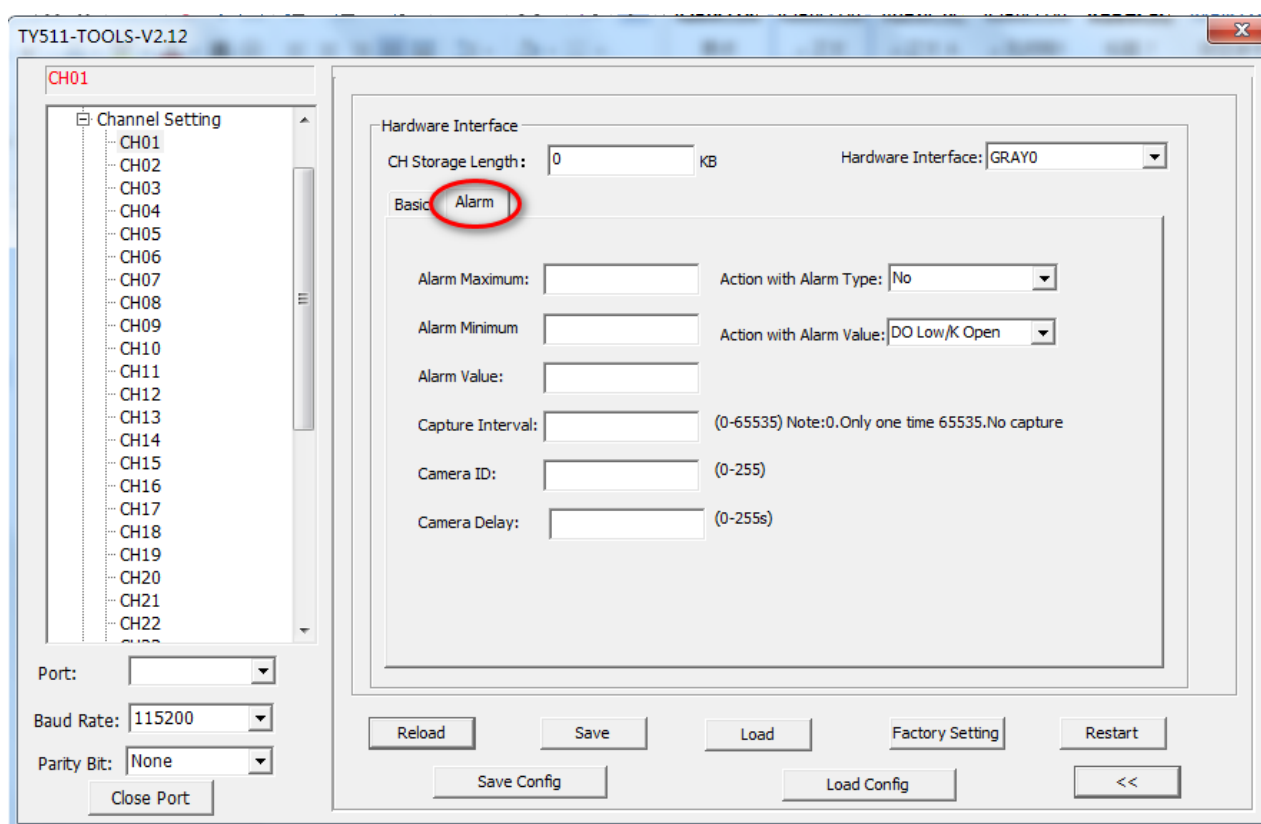


Figure 48: Alarm Setting

Parameters	Description
Alarm Maximum	You can set a maximum value for alarm, once it exceeds this value, RTU will send alarm message
Alarm Minimum	You can set a minimum value for alarm, once it exceeds this value, RTU will send alarm message

Alarm Value	You can set a value that if the data surpass this value RTU will sent alarm message
Capture Interval	(0-65535) 0, only capture on time, 65535, no capture
Camera ID	The Camera ID (0-255)
Camera Delay	(0-255) 0, only capture one time, 65535, no capture
Action with Alarm Type	No, DO0, DO1 and K0~K7
Action with Alarm Value	DO Low/K Open, or DO High/K Close, No

3.1.4 Device Setting

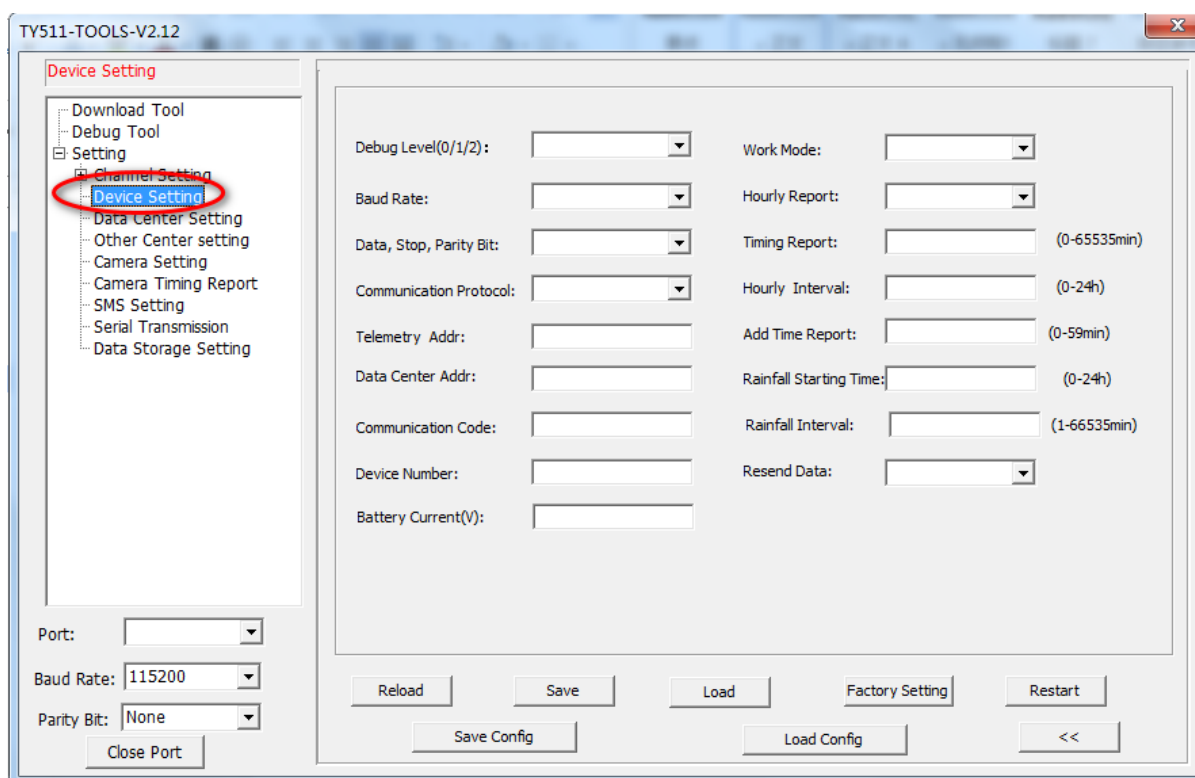


Figure 49: Device Setting

Parameters	Description
Debug Level	0(no log)
	1(Part of important logs export from RS232/RS485)
	2(Part of important logs export from RS232/RS485)
Baud Rate	300bps~115200bps
Data, Stop and Parity Bit	8N1, 8O1, 8E1
Communication Protocol	SL-HEX, SL-ASCII, SZY(Water resource)

Telemetry Addr	Address of telemetry station
Data Center Addr	Address of data center
Communication Code	Password of communication
Device Number	The number of RTU
Battery Current	Unit: V
Work Mode	Auto, Mixed, Query and Debug
Hourly Report	Enable, Disable
Timing Report	Default is 5(0-65535min)
Hourly Interval	Default is 1(0-24h)
Add Time Report	(0-59min)
Rainfall Starting Time	(0-24h)
Rainfall Interval	(1-66535min)
Resend Data	Open, Close

3.1.5 Data Center Setting

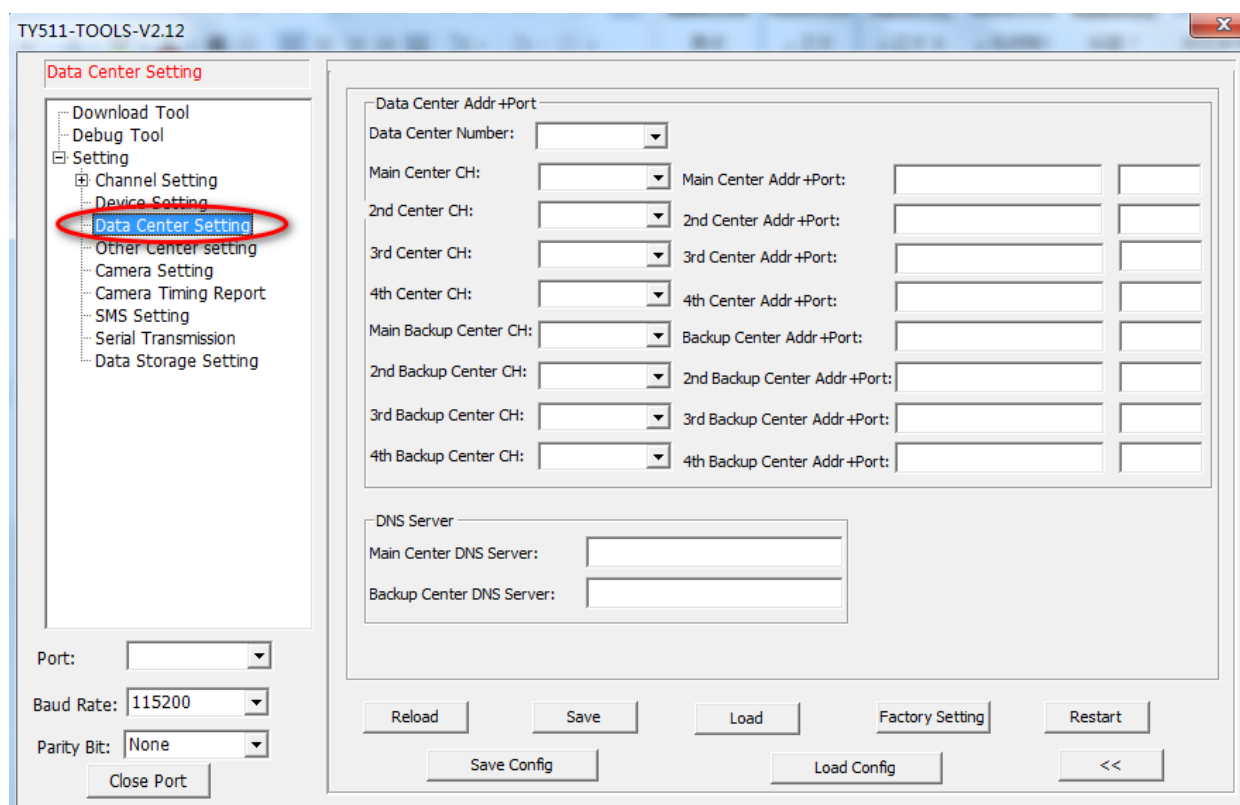


Figure 50: Data Center Setting

Parameter	Description
Data Center Number	Supports up to 5 data center, when choose number over 1, backup is invalid
Center CH	Center channel
Center Addr+Port	Domain name or IP address supported
Main or Backup Center DNS Server Addr	When you use DNS for data center, you need a DNS server to resolve the IP address corresponding to the domain name

4.1.6 Other Center Setting

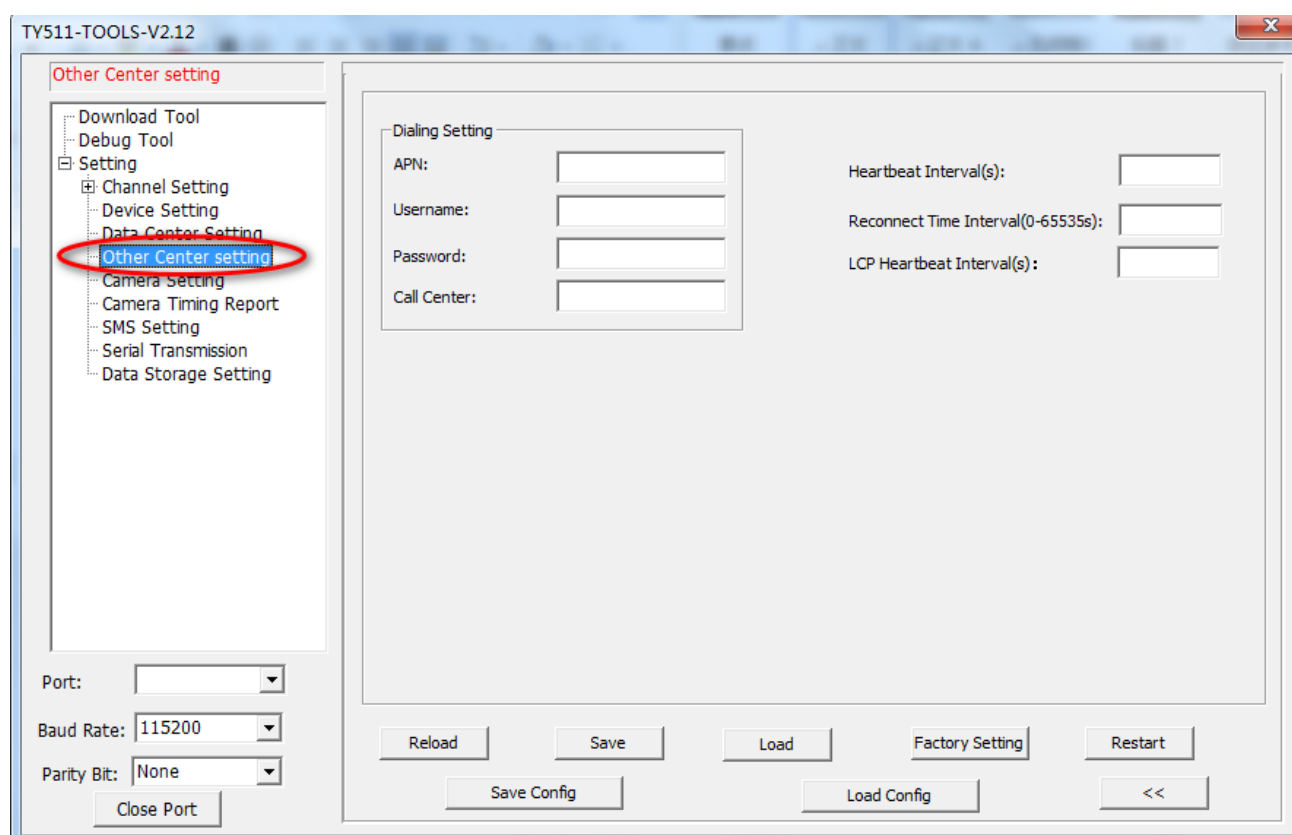


Figure 51: Other center setting

Parameter	Description
APN	APN of SIM card from your local carriers
Username	Username of APN
Password	Password of APN
Call Center	Call center number of APN

Heartbeat Interval	Heartbeat time, 60 seconds is suggested for TCP mode, and 31 seconds for UDP
Reconnect Time Interval	Waiting time for disconnection reconnection
LCP Heartbeat Interval	LCP level detection, keep it as default

4.1.7 Camera Setting

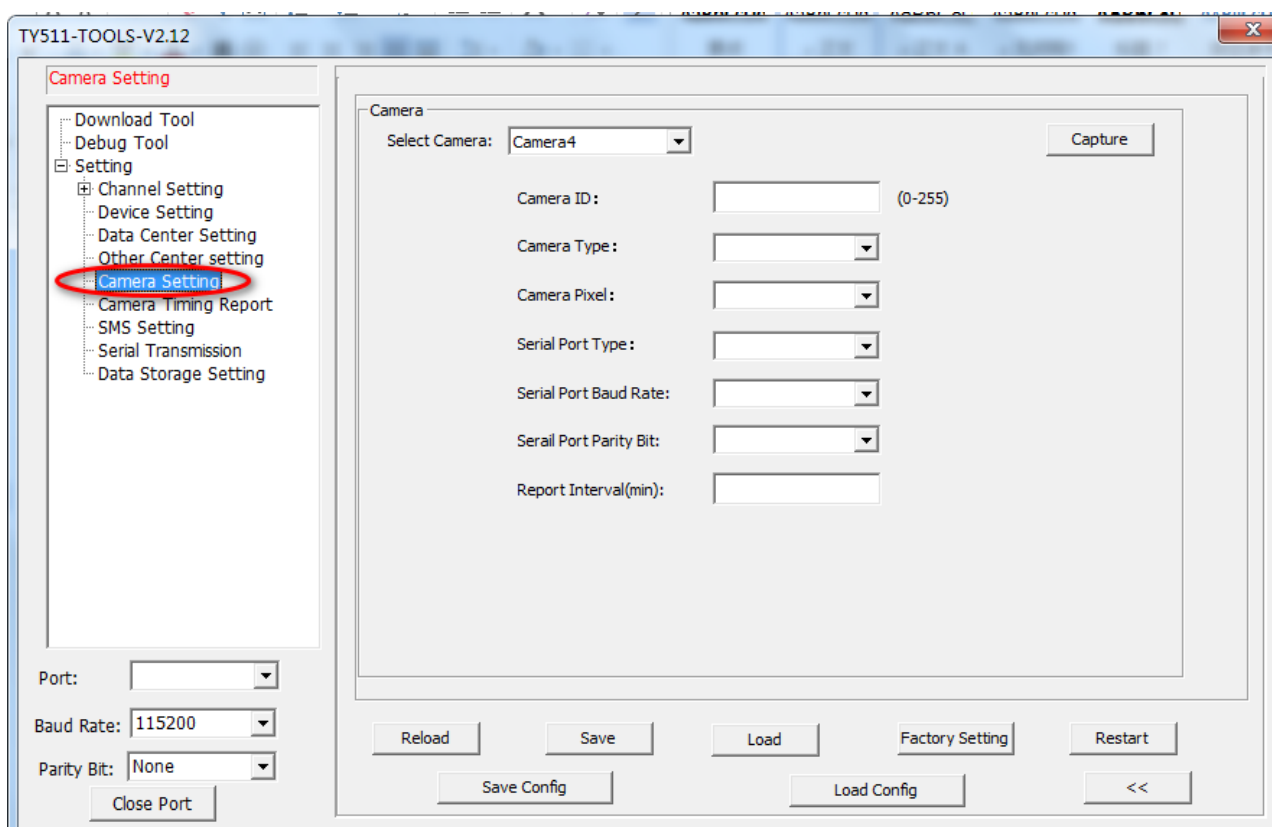


Figure 52: Camera setting

Parameter	Description
Camera ID	ID of camera you can set up(0-255)
Camera Type	SXH, None Note: only certain brands and models of camera are compatible with TY511.
Camera Resolution	640x480, 800x600, 1024X768, 1280X800, 1280X960
Serial Port	2*RS232, 2*RS485
Serial Port Baud Rate	The baud rate of serial port connected to Camera: 300bps~115200bps
Serial Port Parity Bit	8N1, 8O1, 8E1
Report Interval	Set the time you want report to center

4.1.7 Camera Time Report

You can timing up to 10 group camera report.

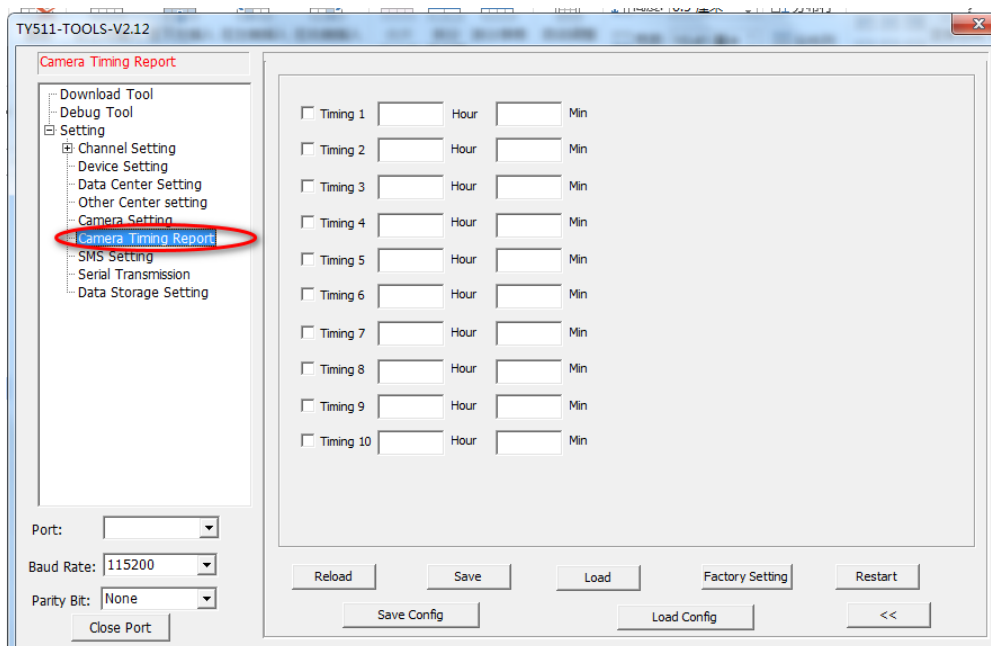


Figure 53: Camera Timing setting

4.1.8 SMS Setting

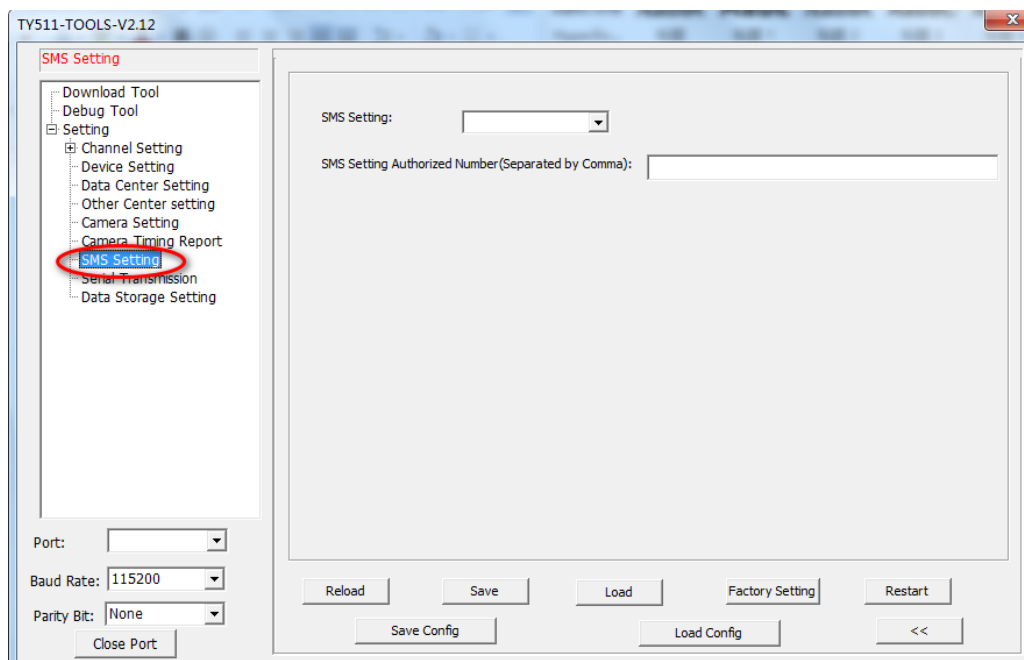


Figure 54: SMS setting

Parameter	Description
SMS Setting	Open, Close
SMS Setting Authorized Number	Authorized phone number to receive SMS, multi number will be separated by comma

4.1.9 Serial Transmission

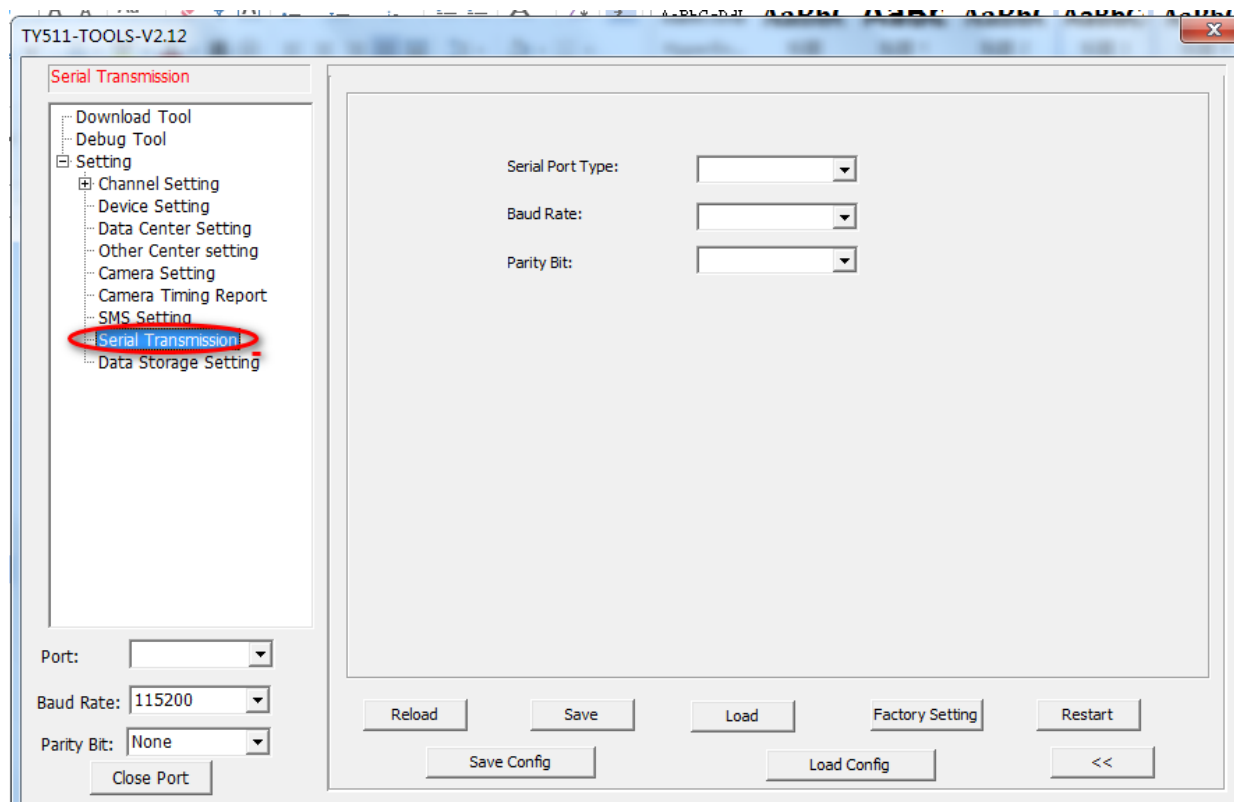


Figure 55: Serial Transmission

Parameter	Description
Serial Port Type	2*RS232 and 2*RS485
Baud Rate	300bps~115200bps
Parity Bit	8N1, 8O1, 8E1

4.1.10 Data Storage Setting

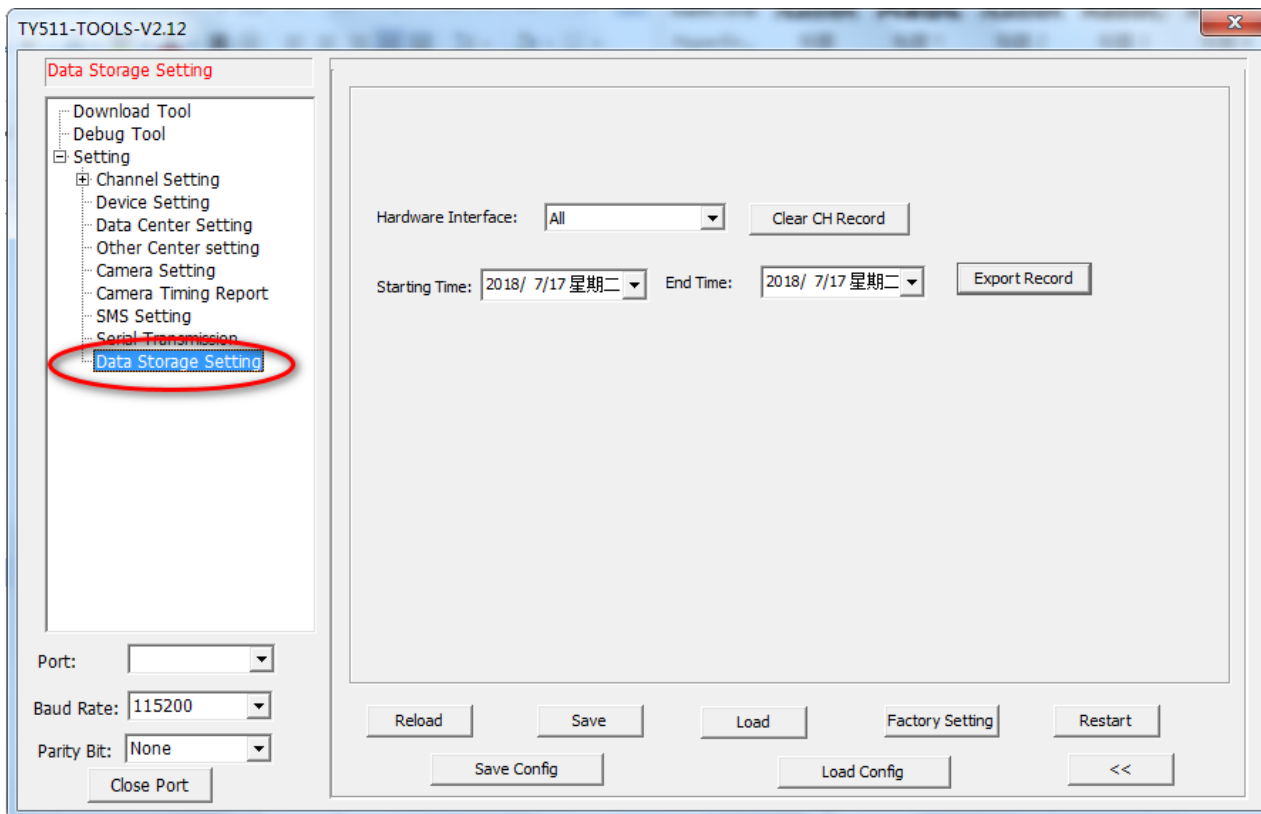


Figure 56: Data Storage Setting

Parameter	Description
Clear CH Record	Delete the storage record
Expert Record	Export the data record

3.2 Keyboard Setting(Under development)

3.3 RTU Service Center Software

When use RTU TY511, you need our service center software to convert the data(analog input, digital input, etc) to real value, and set up the connection with your database server.

- 1) Go to www.bivocom.com to download this software and open it.
- 2) Click System, configure the service port the same as the port of RTU TY511 of item [4.1.5](#) above
- 3) Enable the database setting, configure the IP address(or domain name) and name of your database, as

well as account and password.

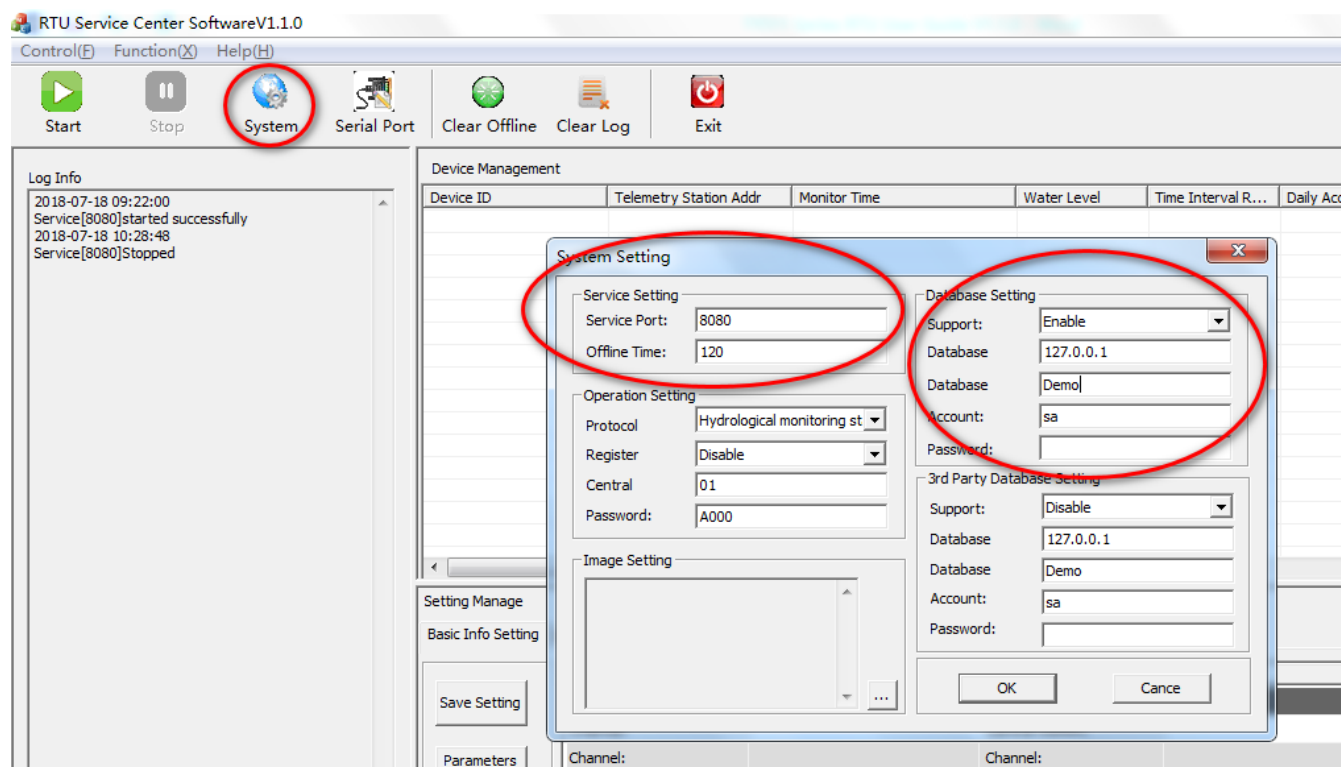


Figure 57: Service Center Software

3.4 SMS Remote Setting (Under development)

4. Firmware Upgrade

4.1 Local Upgrade

Connect the RTU TY511 with your PC via RS232 or RS485 cable, and don't power on RTU at this moment

- 1) Click download

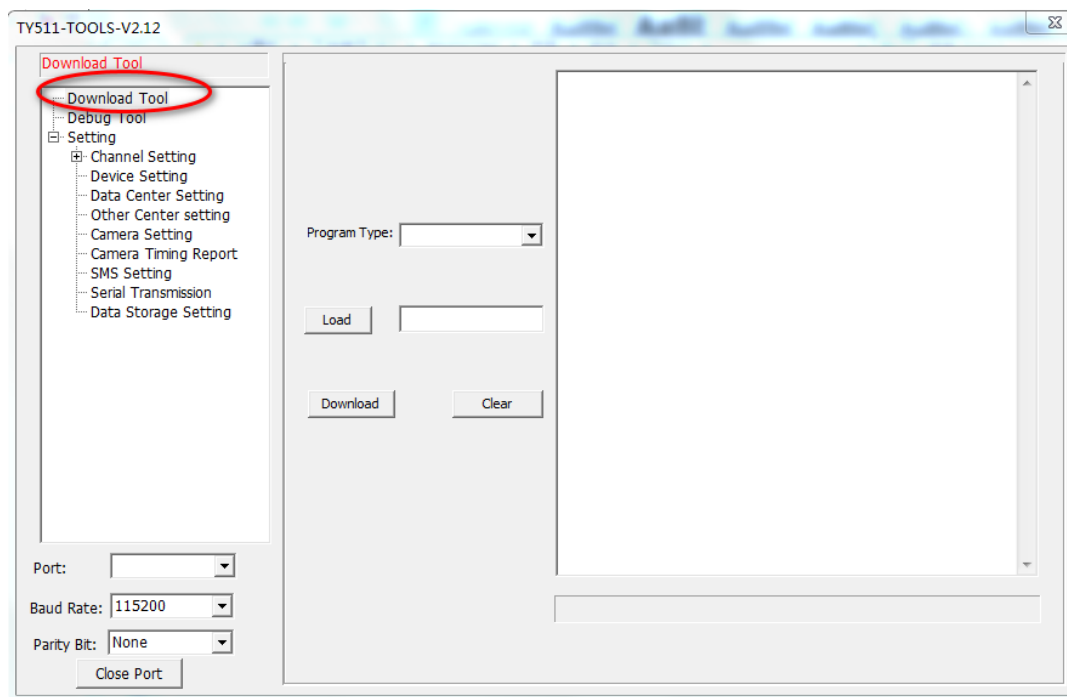


Figure 58: Download Tool

- 2) Click Load, and find the firmware you want to upgrade, then click download.
- 3) Power on the RTU, start to upgrade.
- 4) When it shows “download success ok”, that means firmware upgrade completed and successfully.

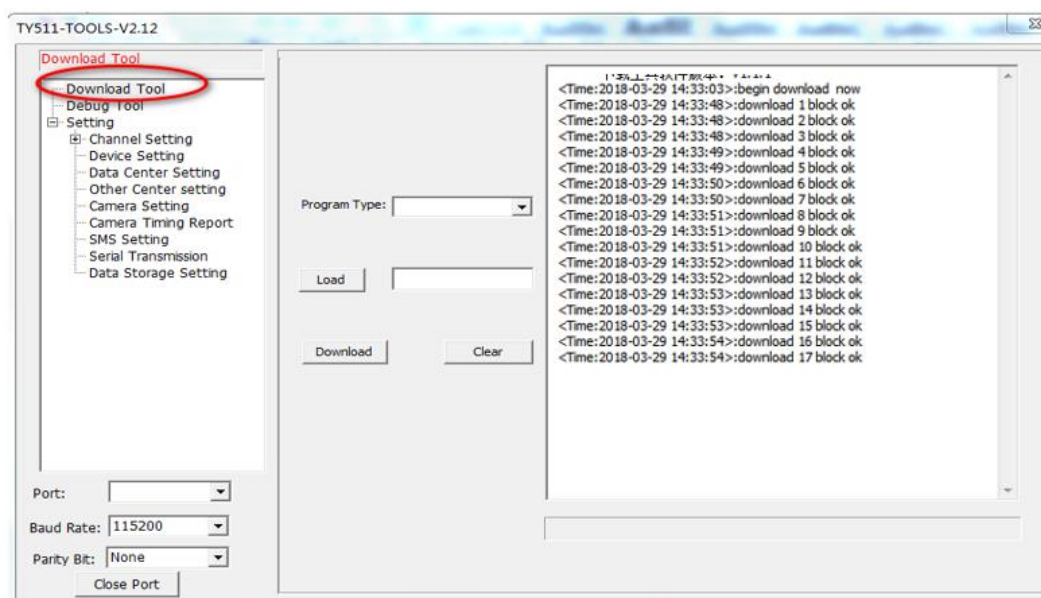


Figure 59: download tool

- 5) After that, you can start to configure the parameters of RTU.