



# ZHC495C Application Guidance

## **LTE Cat 1 Modbus RTU**

Version: ZHC495C\_Application Guide\_V1.1

Date: 2021-5-20

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# 1 Overview

## 1.1 Product Introduction

ZHC495C is a support 8 Road dry (wet) node detection, 8 Circuit relay (COM, NO) output, 1 The serial port transparent transmission network IO product, compatible with Modbus RTU/TCP protocol. With "remote control" as the core function, it is highly easy to use, and users can easily and quickly integrate it into their own systems to achieve LTE, RS485 remote and local control.

## 1.2 Appearance description



**Reset:** reset button

**Terminal power supply:** 5.08mm terminal block plug, 9~36V

**Serial port:** RS485, 5.08mm terminal block plug

**SIM:** SIM card interface

**MAIN:** main antenna

**DO:** NO1, COM~NO8, COM are 8 relay outputs

**DI:** DI1~DI8 is 8-way dry/wet node input detection

## 2. Quick Start

This chapter is an introduction to the quick start of the ZHC495C product. It is recommended that users systematically read this chapter and follow the instructions to have a systematic understanding of the product. Refer to subsequent chapters for specific details and instructions.

**Wiring:** The computer is connected to the ZHC495C via USB to RS485.

**Networking:** Insert the SIM card in the power-off state.

**Power supply:** The working voltage of ZHC495C is DC9~36V.

### 2.1.RS485 bus control

Select the corresponding port and click Search to search for devices.



IO control



For detailed functions of the host computer, please refer to "CAT1 Series\_Host Computer\_Application Guide".



## 2.2. Vertical and horizontal cloud control

Refer to "CAT1 Series\_Zongheng Cloud Platform\_Application Guide"

### 3. Product Features

#### 3.1. Serial RS485

##### 3.1.1. Basic parameters

project	Attributes	parameter
baud rate	Serial port rate	1200~921600bit/s
stop bit	stop bit	1/1.5/2
data bits	data bits	8/7
Check Digit	Check Digit	None/even parity/odd parity

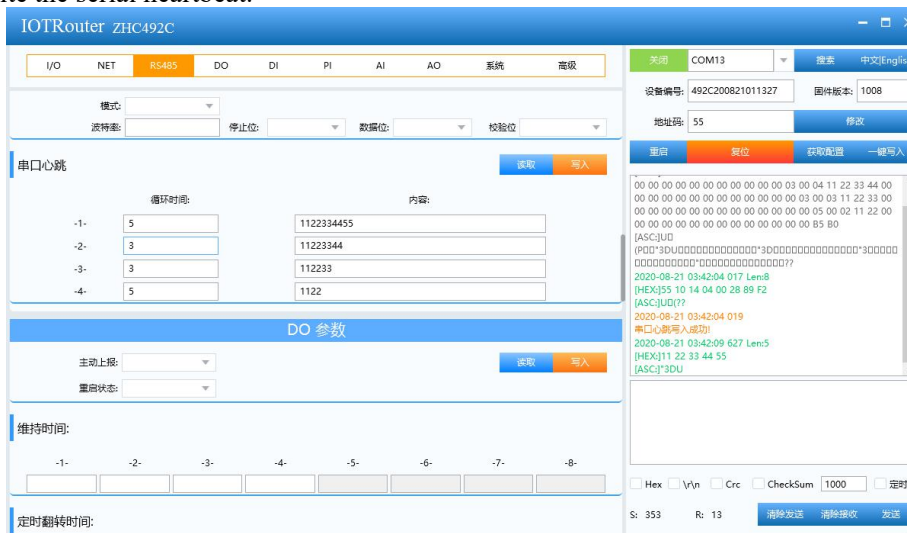
##### 3.1.2. Features

ZHC495C supports the serial port to send heartbeat regularly.

project	Attributes	parameter
cycle	The time interval from the last serial port heartbeat	0~65535s
length	Serial Heartbeat Packet Length	0~16
content	Hex format data	Example: The read address code is 0x55of 4 analog inputs 55 04 00 00 00 04 FC 1D

#### Serial heartbeat application example:

Write the serial heartbeat.



Effect

```
[HEX:]11 22  
[ASC:]"  
2020-08-21 03:42:26 713 Len:5  
[HEX:]11 22 33 44 55  
[ASC:]"3DU  
2020-08-21 03:42:29 775 Len:4  
[HEX:]11 22 33 44  
[ASC:]"3D  
2020-08-21 03:42:32 579 Len:3  
[HEX:]11 22 33  
[ASC:]"3  
2020-08-21 03:42:37 680 Len:2  
[HEX:]11 22  
[ASC:]"  
2020-08-21 03:42:43 546 Len:5  
[HEX:]11 22 33 44 55  
[ASC:]"3DU  
2020-08-21 03:42:46 606 Len:4  
[HEX:]11 22 33 44  
[ASC:]"3D  
2020-08-21 03:42:49 667 Len:3  
[HEX:]11 22 33  
[ASC:]"3  
2020-08-21 03:42:54 767 Len:2  
[HEX:]11 22  
[ASC:]"  
2020-08-21 03:43:00 633 Len:5  
[HEX:]11 22 33 44 55  
[ASC:]"3DU
```



## 3.2.DO

### 3.2.1. Read and write status

Send Modbus commands to ZHC495C through network and serial port, you can read and write DO status.

project	parameter
register address range	00001~00008(0x0000~0x0007)
Support function code	01, 05, 0F

to read! Take the relay output status as an example:

**check Inquiry:**55 01 00 00 00 01 F0 1E

**Query response:**55 01 01 01 80 78

The first relay control 05 function code:

**Control closure:**55 05 0000 FF 00 8D EB

**ring answer:**55 05 0000FF 00 8D EB

**Control Disconnect:**55 05 0000 00 00 CC 1B

**response:**55 05 0000 00 00 CC 1B

### 3.2.2. Features

ZHC495C DO supports active reporting, restart to maintain relay state, output hold time, timing rollover, etc.

project	Attributes	parameter
Take the initiative to report	Report all DO status values immediately after DO status changes	enable/disable
restart state	Whether to maintain the last DO output state after the device is powered on	enable/disable
Output hold time	The new state of DO is maintained for a specified time and then flipped	0~65535s
timing rollover	Every "set time", the DO state is flipped	0~65535s

### 3.3.DI

#### 3.3.1. Read Status

Send Modbus commands to ZHC495C through the network and serial port, you can read the DI status.

project	parameter
register address range	10001~10008(0x0000~0x0007)
function code	02

**Detection level:**The default state is0, after the input signal is given, the state is1, the detection method is, Modbus Protocol 02 function code.

Take the first channel detection as an example:

**Inquire:**55 02 000000 01B4 1E

**Query Response: (Detected0):**55 02 01 00B1B8

**Query Response: (Detected1):**55 02 01 01 70 78

#### 3.3.2. Features

ZHC495C DI supports active reporting, periodic reporting, etc.

project	Attributes	parameter
Take the initiative to report	Whether to enable DI status reporting	enable/disable
Cycle Time	When the DI status does not change, the period for reporting the status	0~65535s

#### **DI Proactive reporting instructions:**

If there is no DI status change after power-on, it will be reported according to the "cycle time" cycle. If there is a DI status change, all the status will be reported immediately and the cycle time will be reset.

### 3.4. Logic

ZHC495C supports setting 8 logics.

project	Attributes	parameter
Triggering conditions	Logic Trigger Condition	<b>Follow forward:</b> When DI is closed, DO is closed <b>Follow in reverse:</b> When DI is closed, DO is open, and when DI is open, DO is closed. <b>greater or equal to:</b> Trigger DO output when AI input is greater than or equal to the set value <b>Less than or equal to:</b> Trigger DO output when AI input is less than or equal to the set value <b>AO follows AI:</b> AO output value = AI input value Disabled: Turn off local logic
remote address	This logic will be triggered when a packet with the specified address code is received	01~FE;00 <b>set to local logic</b>
enter	Input conditions that trigger logic	can be specified by DI X. AI X trigger
AI threshold	Trigger logic when AI reaches a certain value <b>(greater than or equal to, less than or equal to mode takes effect)</b>	0~20000
output type	Output type after logic trigger	optional DO
output	Output channel after logic trigger	DO can be specified X , AO X output
DO value	Specifies the value of the DO channel output	Normally open, normally closed, flip



### 3.5. System Information

project	Attributes	parameter
Modbus address code	Modbus address code	01~FE
DEVID	Equipment factory unique number	read only
password	The password used to access the Zongheng cloud platform	Support 16byte
Reporting mode	Format and channel of actively reported data	network modbus RTU report network modbus TCP report Network JSON report serial port modbus RTU report serial port modbus TCP report Serial JSON report Serial port + network modbus RTU report Serial port + network modbus TCP report Serial port + network JSON reporting
networking mode	Use the networking mode when accessing the Aspect Cloud transparent transmission	enable/disable
group id group password	group id Devices with the same group password can establish networking mode	Support 16byte
group type	Within the same group, different types of devices can exchange data	A/B



### 3.6. Timing trigger

ZHC495C supports "reach a set time point (Beijing time), trigger an action".

project	Attributes	parameter
model	Whether to enable this timing trigger	enable/disable
Timing	The time point when the action was triggered	Hour: 00~twenty three;min: 00~59;seconds: 00~60
Action type	Type of action to perform	reboot /DO
execution channel	When the action type is DO, the output channel of DO	DO1~4
execution status	When the action type is DO, the DO channel output value	switch

### 3.7. Network Affiliate Information

ZHC495C supports obtaining SIM card number, signal strength, and setting APN.

project	Attributes	parameter
CCID	SIM unique identification number	20 digits and letter combinations. read only
signal strength	The signal strength of the environment in which the device is located	See Appendix QCSQ for details
APN address	Access point settings, private network card needs to set this	provided by the operator
APN username	Username required to access the specified network	provided by the operator
APN password	Passwords required to access the specified network	provided by the operator



### 3.8. Status Indicator

name	Function	condition	Status Description
POW	Power Indicator	Always bright	system startup
		Always off	System does not start
WORK	System working status indicator	Always bright	network module not started
		1000ms off 1000ms on	Network module is starting
		1500ms off for 100ms on for 100ms off for 100ms on	SIM card error
		200ms off 200ms on	get IP
		500ms off 500ms on	The network is normal
SEND	Network data sending indicator	Always off	SOCKET not established
		Always bright	SOCKET has been established
		flicker	send network data
RECV	Network data reception indicator	Always off	default
		Always bright	The module is connected to the network
		flicker	receive network data



### 3.9. Factory reset

A) The device can be restored to factory settings by operating the RESET button.

Steps:

Step 1: Power on the device.

Step 2: Press and hold the RESET button until all the indicator lights of the device are off, release the reset button immediately, and the device is successfully restored to factory settings.

If it is found that the serial port of the device starts to actively send JSON data packets after reset, it indicates that the reset button is pressed for too long and the device enters the local firmware upgrade mode. At this time, power off the device and perform the reset operation again.

B) Restore factory settings by sending Modbus/JSON commands.

Modbus commands:55 06 20 14 00 02 4E 1B

JSON command:{"msgType":"setDeviceConfig","data": {" sysCmd ": "2"}}





### 3.10. Firmware upgrade

For the firmware upgrade process, please refer to "CAT1 series\_host computer\_application guide"

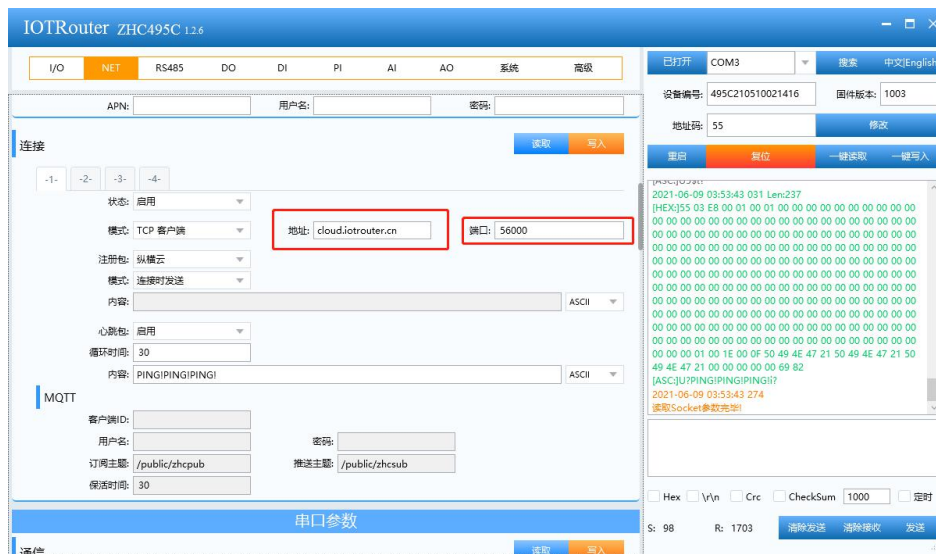
## 4. Product application

### 4.1. Transparent Cloud

Operation process (take socket1 as an example):

#### 1. Set socket1 parameters

Please confirm the IP address and port of the server you need to connect to; it is recommended to open the registration package and heartbeat package. If necessary, you can customize it and restart after setting.



#### 2. Server operation

After the device is connected to the user server, a custom registration package will be sent to facilitate the customer to identify the device. Modbus, JSON protocol (Please refer to ZHC495C\_JSON\_application guide) To operate the device, the device adapts to Modbus RTU/TCP, JSON protocol.

### 4.2.MQTT

ZHC495C supports one MQTT application (connection 1).

When the device actively pushes data, it will select the mode according to the "Data Actively Report" option.



The above figure is in the MQTT application, indicating that "application data is in JSON format" is encapsulated in the MQTT protocol and reported through the network. The server can parse the application data of MQTT according to "ZHC495C\_JSON\_Application Guide".



### 4.3. Vertical and horizontal cloud transmission

Refer to "CAT1 Series\_Transparent Cloud Transmission\_Application Guide"

### 4.4. Vertical and horizontal cloud platform

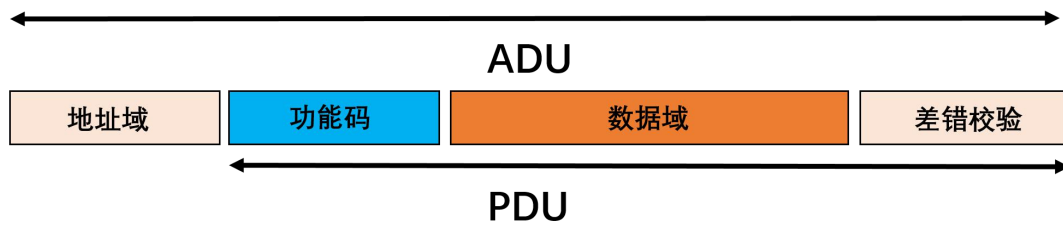
Refer to "CAT1 Series\_Zongheng Cloud Platform\_Application Guide"

## 5. Modbus command frame

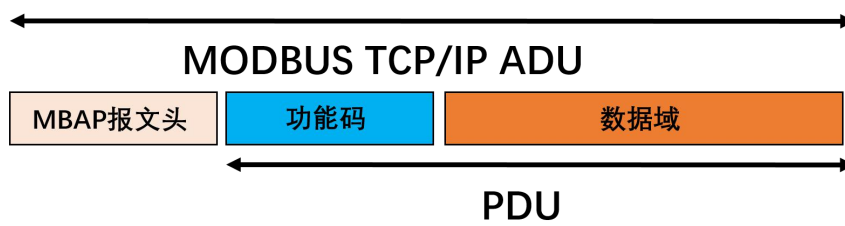
### 5.1 Modbus command frame

The ZHC495C data format follows the general Modbus frame format, and the device can parse the Modbus RTU/TCP protocol and perform related operations.

#### Modbus RTU:



#### Modbus TCP:



### 5.2 Register Allocation

For register address allocation, please refer to "ZHC495C\_register address table"



## 6. JSON Protocol

ZHC495C supports JSON protocol, please refer to "CAT1 Series\_JSON\_Application Guide"



## 7. Update History

2021.5.20 Created by: YYX



## 8. Contact information

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