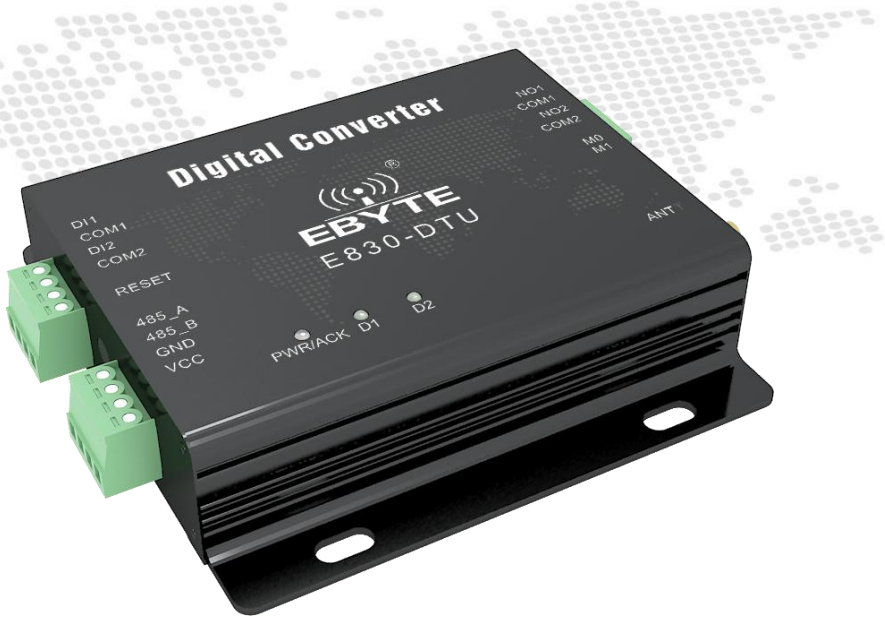
Chengdu Ebyte Electronic Technology Co.,Ltd

Wireless Modem

User Manual

Digital/Switching Wireless data radio

E830-DTU（2R2-433L）-V8



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Chapter 1 Product Introduction

1.1. Product Introduction

E830-DTU(2R2-433L)-V8 is a remote control product with switch tracking, control acquisition function, support 2 disconnector switch inputs and 2 relay outputs, communication interface using RS-485 interface (only for configuration mode); wireless acquisition function supports standard MODBUS RTU protocol, the product has a high degree of ease of use, can be widely used in industrial field equipment signal acquisition, monitoring and control.

1.2. Functional features

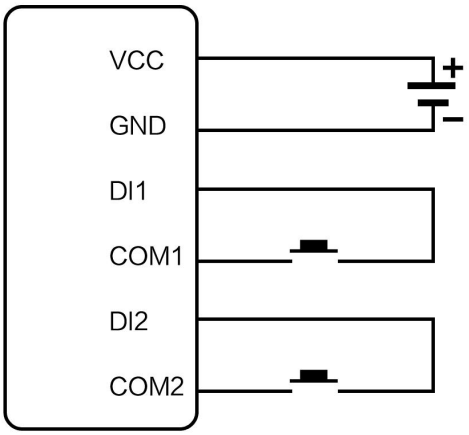
- Support 2-way dry contact switch input;
- Support 2 relay outputs;
- 433MHz frequency wireless data remote transmission;
- Digital tracking, control and acquisition functions;
- Support 4 working modes: wireless control acquisition, wireless following transmission mode, wireless following receiving mode, configuration mode, selected by DIP switch;
- Data processing using Modbus RTU protocol;
- Reset Tap the reset button, press and hold 5s in wireless control acquisition mode, and the Modbus address restores the default address 01;
- Built-in efficient watchdog with high reliability and stability;
- 3 two-color indicators show working status;
- The power supply has good overcurrent, overvoltage, anti-reverse connection and other functions.

Chapter 2 Quick Start

This chapter is a quick introduction to E830-DTU (2R2-433L)-V8 products, it is recommended that users read this chapter systematically and follow the instructions to operate again, you will have a systematic understanding of module products, users can also choose the chapter you are interested in reading according to their needs. For specific details and instructions, please refer to the subsequent sections.

2.1 Wiring method of each port

2.1.1 Input terminal wiring method



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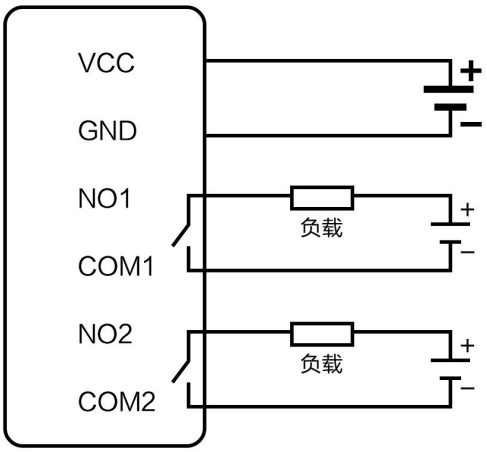
2.1.2 Output connection method



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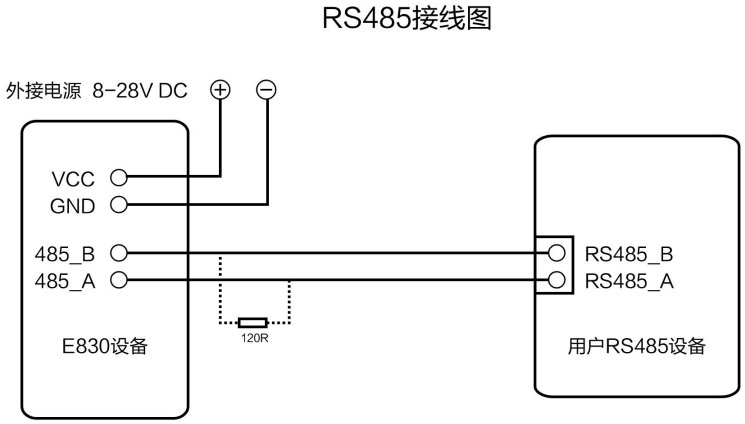
2.1.3 RS485 connection method

In RS485 communication, attention should be paid to A, B line matching, if the communication is found to be abnormal, add 120R matching resistor between A and B lines.

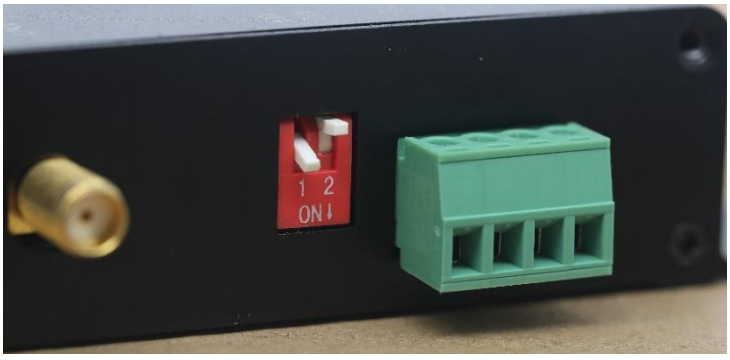


2.2 Follow the features to get started

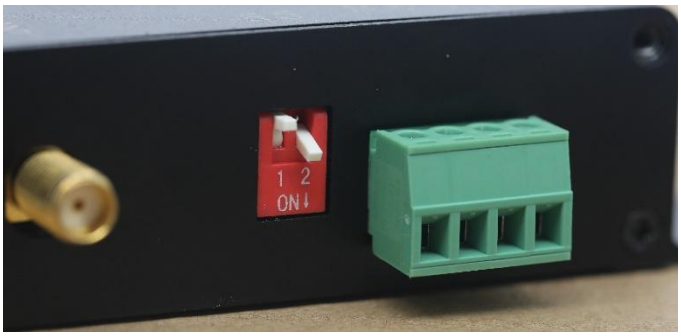
Prepare the two E830-DTUs (2R2-433L)-V8 labeled Device A and Device B respectively, ensure that their parameters are the same (factory default parameters are enough), configure Device A as the transmitter and Device B as the receiver, and need to power back on to take effect after changing the mode.

(Note: E830-DTU(2R2-433L) and E830-DTU(2R2-433L)-V8 cannot establish communication and follow function between the two.) The following function can only be implemented between E830-DTU(2R2-433L)-V8.)

Device A transmitter: M1M0=10



Device B receiver: M1M0=01



The input channel 1 of device A changes, while the blue light of D1 is on, the corresponding action of relay 1 of device B, and the green light of D1 is on;

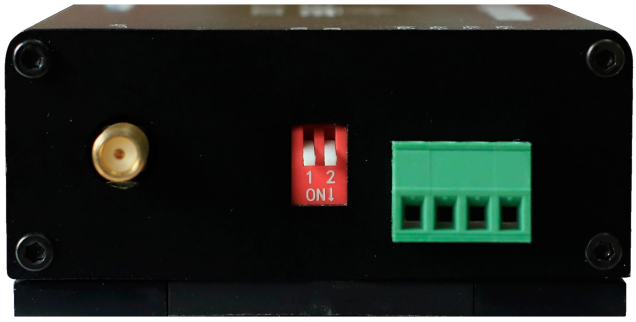
The input channel 2 of device A changes, while the blue light of D2 is on, the relay 2 of device B acts accordingly, and the green light of D2 is on;

In follow mode, only the relay at the receiving end has an input at the transmitter end, and the relay at the transmitter does not operate.

2.3 Get started with the control acquisition function

Prepare an E830-DTU (2R2-433L)-V8 device and an E90-DTU radio, the device wireless communication using the Modbus RTU protocol, see the register table below to set E90-DTU (433L30)-V8 / **E90-DTU (433L20)**-V8The wireless parameters of the radio are configured to be consistent with those of the E830-DTU(2R2-433L)-V8 device; the working mode of the E830-DTU(2R2-433L)-V8 device is configured through the DIP switch.

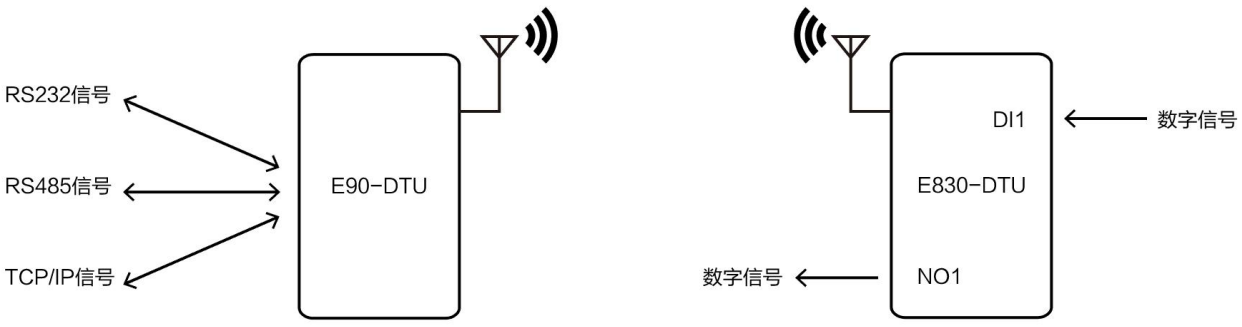
E90-DTU mode: M1M0=00



E830-DTU acquisition control mode: M1M0=11, after changing the mode, it needs to be powered back on to take effect.

In the acquisition mode, for example, the E90-DTU radio can read the input of the E830-DTU (2R2-433L)-V8 device through the command 01 02 00 00 00 00 02 F9 CB, when the 2 channels have input and 1 channel has no input, the data value 01 02 01 02 20 49 will be returned, and the blue light of D2 will be on.

In control mode, for example, the E90-DTU radio can control the output of relay 2 of the E830-DTU (2R2-433L)-V8 device by command 01 05 00 00 00 FF 00 8C 3A, and the output of relay 1 is disconnected, and the data value will be returned as 01 05 00 00 FF 00 8C 3A, and the green light of D2 will be on.

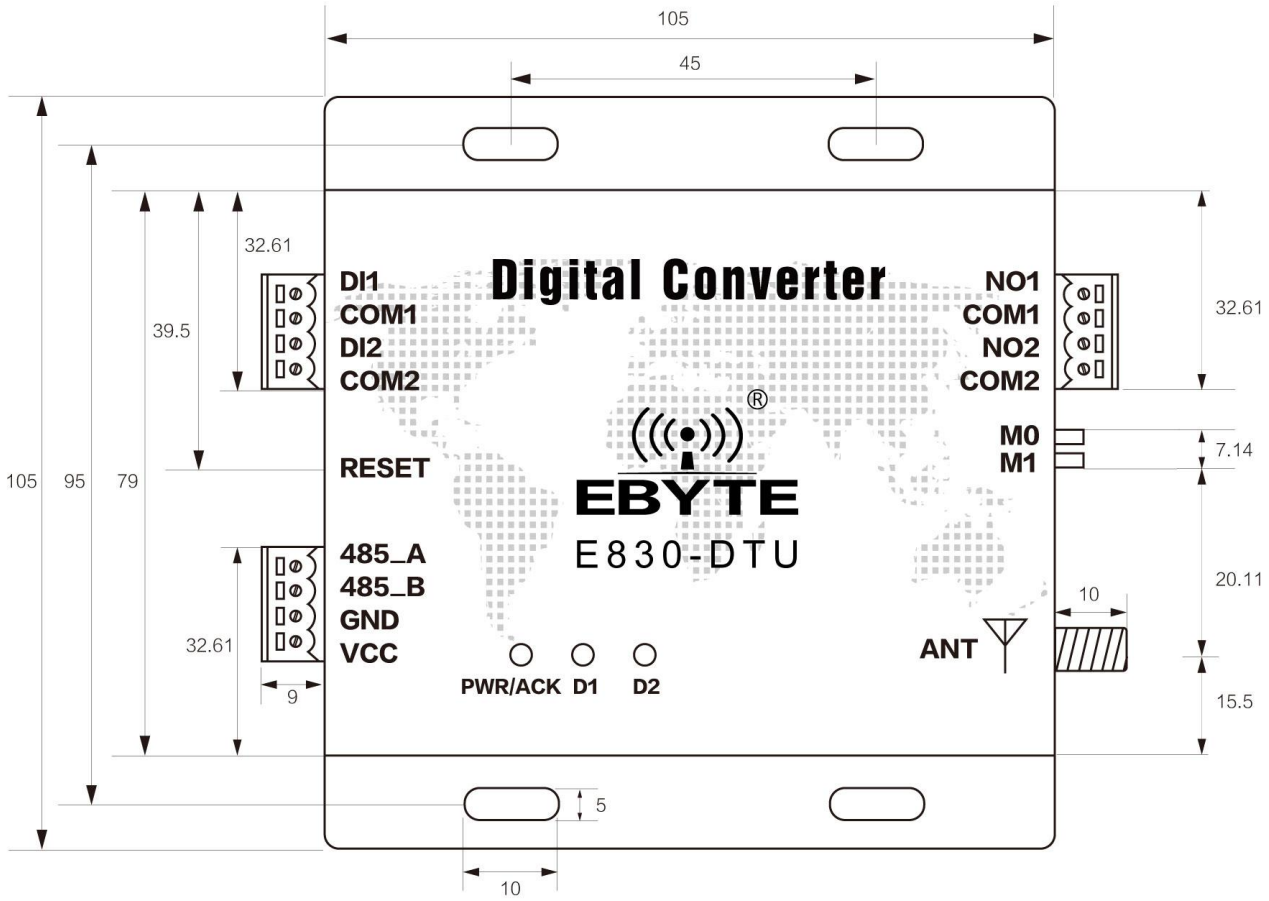


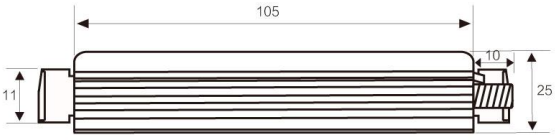
Chapter II Performance Parameters

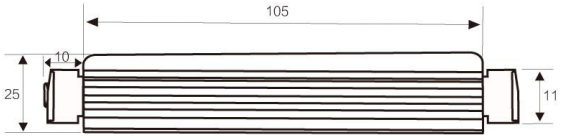
type	project	index

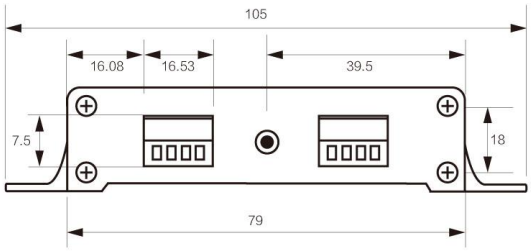
Wireless parameters	Factory default frequency	426MHz
	Transmit power	1W
Hardware parameters	Product size(H*W*D)	124*105*25
	Product weight	130g±5g
	Operating temperature	-40℃～+70℃
	Storage temperature	-40℃～+85℃
	Operating humidity	5%～95%
	Storage humidity	1%～95%
	Operating voltage	8~28V
	The relay outputs electrical parameters	Supports 5A 30VDC or 5A 250VAC
	Data interface (3.81 terminal block)	RS485:9600bps
Software parameters	Working mode	Follow the launch pattern Follow the receive pattern Control acquisition Configuration mode
	Configure the command	Modbus RTU

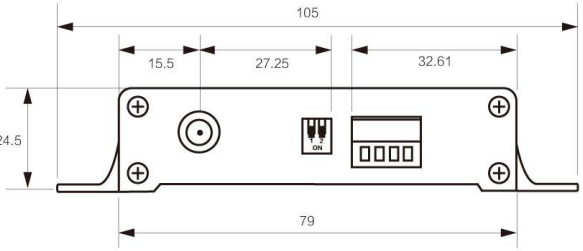
Chapter III Installation Dimensions



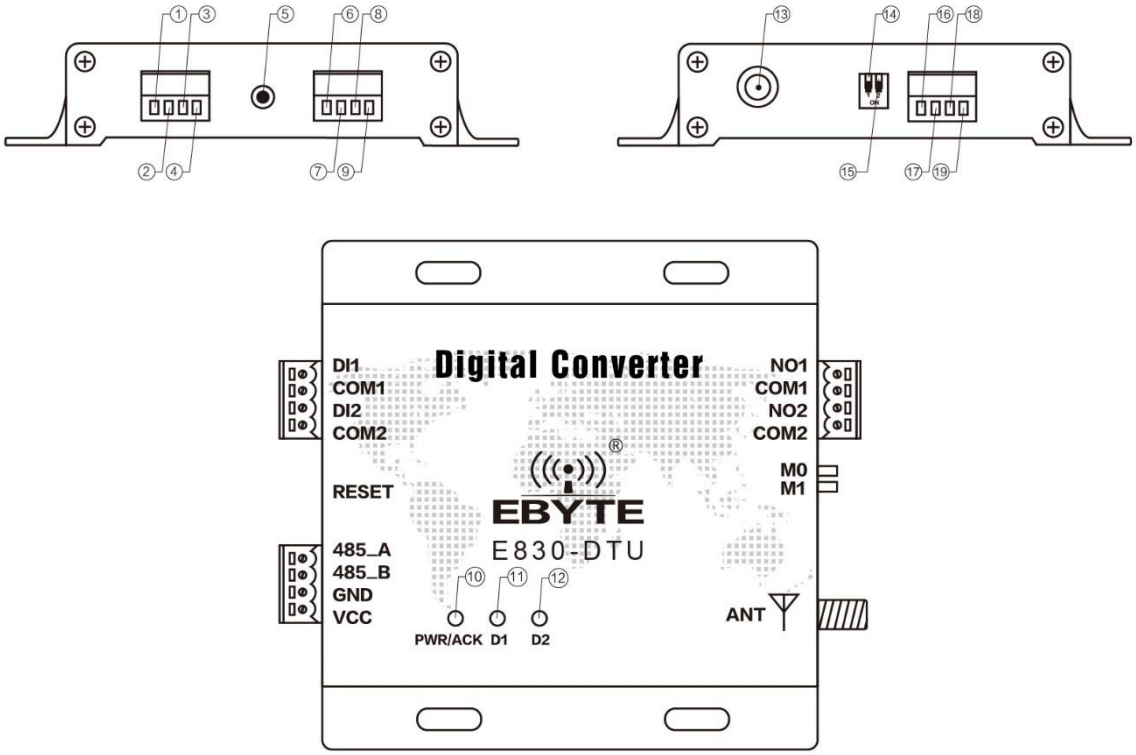








Chapter IV Explanations of Ministries



serial number	Standard definitions	function	illustrate
1	DI1	Switching input channel 1	Switching acquisition 1 channel, optocoupler isolation
2	COM1	Switching input channel 1	The common end of input channel 1 is internally connected to the module ground
3	DI2	Switching input channel 2	Switching acquisition 2 channels, optocoupler isolation
4	COM2	Switching input channel 2	The common side of input channel 2 is internally connected to the module ground
5	RESET	Reset button	In acquisition mode, you can press and hold the button 5s to reset the Modbus address to the default address 01
6	485_A	RS-485 interface A	RS-485 interface A is connected to device A interface and is used only for configuration parameters
7	485_B	RS-485 interface B	RS-485 interface B is connected to device B interface and is used only for configuration parameters
8	GND	Crimp power supply input negative terminal	Power supply reference ground
9	VCC	Crimp power input positive	Power input, range: DC8~28V, recommended 12V, 24V

10	PWR/ACK	Power/ACK LED	Two-color light, blue light for power indicator, power on solid on, green light for ACK indicator
11	D1	Input/output indicators	Two-color light, blue light when DI1 has input signal, green light when relay 1 has action
12	D2	Input/output indicators	Two-color light, blue light when DI2 has input signal, green light when relay 2 has action
13	ON	Wireless module antenna interface	433M antenna interface
14	M1	DIP switch 1	M0/M1 dialing codes determine the operating mode
15	M0	DIP switch 0	M0/M1 dialing codes determine the operating mode
16	COM2	Relay output channel 2	Relay 2 outputs the common terminal
17	NO2	Relay output channel 2	Relay 2 output normally open
18	COM1	Relay output channel 1	Relay 1 outputs the common terminal
19	NO1	Relay output channel 1	Relay 1 output normally open

4.1 Reset button description

Long press 5S is effective, and after successful reset, three green indicators will flash at the same time.

Note: Only in the acquisition control mode can take effect, and only reset the address of Modbus is 0x01H, other parameters will not reset, to restore the default factory settings, please use the host computer to configure.

4.2 Description of the LEDs

PWR/ACK: Power/ACK indicator

When the DTU is powered on, the power light is always on, which is blue; only when the transmitter receives the ACK returned by the receiver, this two-color indicator light will change from blue to purple and then back to blue, and when the color of the indicator changes, it means that the transmitter receives the ACK of the receiver

D1: Input/output indicator

Two-color light, blue light when DI1 has input signal, green light when relay 1 has action

D2: Input/output indicator

Two-color light, blue light when DI2 has input signal, green light when relay 2 has action

4.3 DIP switch description

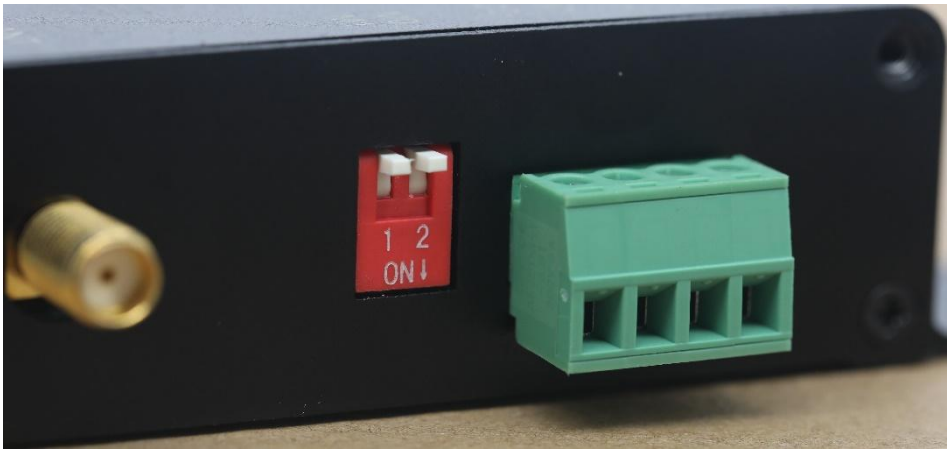
The working mode is established by means of a DIP switch (the state of M1M0, down to "ON");

Note: The mode switch must be powered back on to take effect.

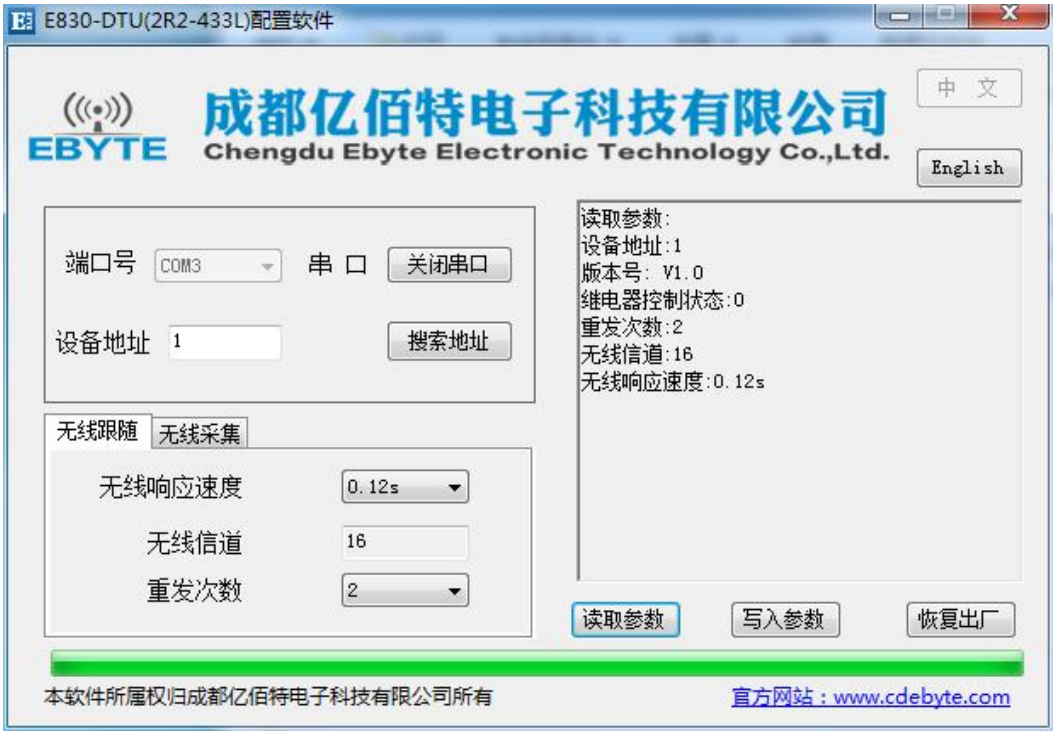
mode	Pattern category	M1	M0	exegesis
Mode 0	Control the acquisition mode	1	1	Wireless control of the acquisition function
Mode 1	Follow the launch pattern	1	0	When following the function, the transmitter
Mode 2	Follow the receive pattern	0	1	When following the function, the receiving end
Mode 3	Configuration mode	0	0	Used to configure wireless parameters and Modbus related parameters

Chapter 5 Parameter Configuration

Configuration mode (M1M0=00), parameters can be configured through the host computer:



Device address: is the current Modbus address of DTU, the range is 0-248, the smaller the value, the faster the computer search speed, the larger the value, the slower the search speed;When the address is changed by the host computer, the address must be searched again for other parameters to take effect.



Chapter 6: Following the Pattern

6.1 Wireless response speed

It is the time when the data is input from the input port and then transmitted through the wireless module to the relay action of the DTU output at the other end;

There are 5 levels in total, the smaller the time, the faster the speed, the smaller the delay, and the closer the distance.

E830-DTU wireless response time code value table		The E90-DTU corresponds to the air rate
1	320ms	1200bps
2	200ms	2400bps (factory default)
3	120ms (factory default).	4800bps
4	100ms	9600bps
5	80ms	19200bps

6.2 Wireless channel

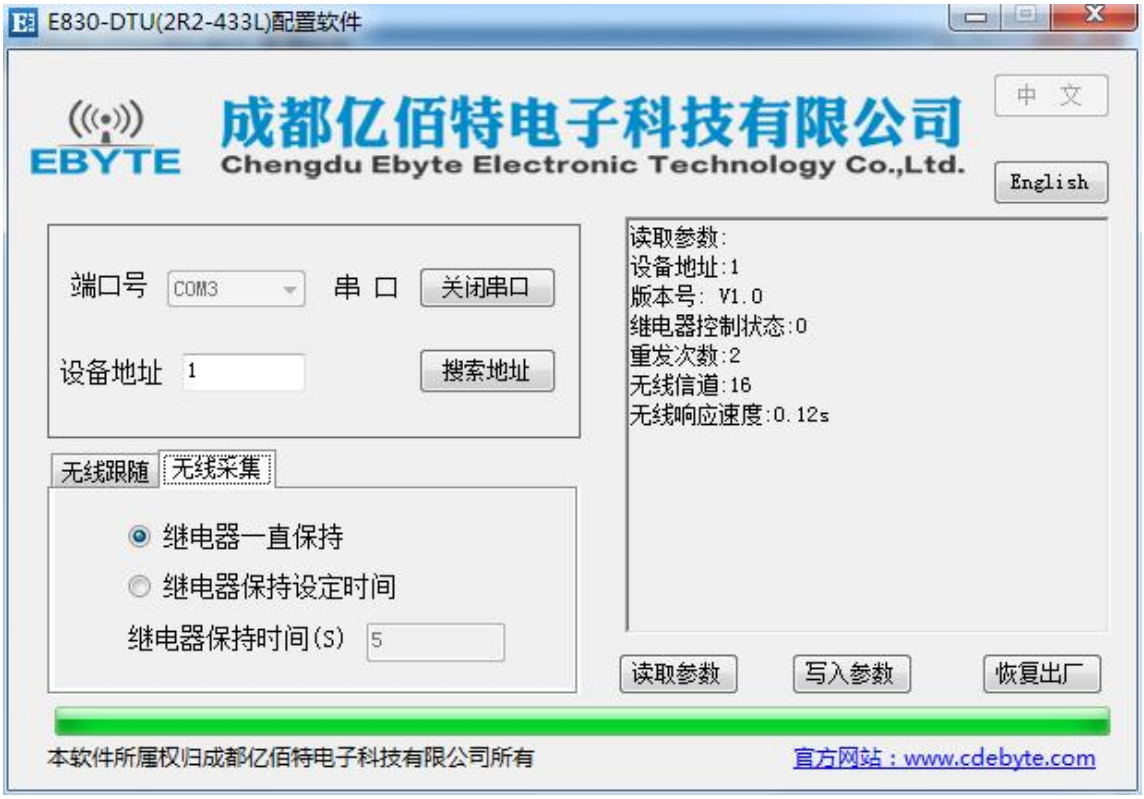
The frequency of DTU wireless communication, a total of 0~31 channels, the corresponding frequency point is as follows:

E830-DTU wireless channel code value table		E90-DTU corresponds to frequency channel and module address	
Corresponding frequency	Corresponds to the channel	Corresponds to the channel	Corresponding address
410MHz	0	0	0
411MHz	1	1	1
412MHz	2	2	2
439MHz	29	29	29
440MHz	30	30	30
441MHz	31	31	31

E90-DTU address translation method：Populate the channel in the E830 with the address and channel in the E90。For example: The E830 channel is 31, then the E90 parameter sets the channel to 31, and the address is set to 31, as shown below:

6.3 Number of retransmissions

When the DTU receiver does not receive data in the following mode, the transmitter will resend the number of times the data is sent, which avoids data packet loss, but the more times it is retransmitted, the longer the transmission time will be; the actual number of transmissions = the number of retransmissions + 1; the range is from 0~10 times, and the default is 2 times.



Chapter VII: Collection Modes

7.1 The relay is kept all the time

In the acquisition mode, the control state of the relay is always maintained, and the default is that the relay is always maintained.

7.2 The relay holds the set time

It is in the acquisition mode that the control state of the relay is maintained for a certain time, and the holding time can be defined by itself;

Note: Relay hold time (S) valid values are integers, decimals are invalid;

When the relay control state is 0, its relay is always held, and the relay hold time cannot be set;The relay hold time can only be set when the relay control state is 1.

Chapter VIII: ModBus

8.1 Default factory settings

Wireless channel	Modbus address	Response time	Number of retransmissions	Relay control status
16	01	0.12s	2	0

Note: When the wireless channel is 16, the DTU operating frequency is 426MHz.

8.2 Modbus address table

8.2.1 Coil read and write instructions

Coil address table (function codes: 0x01H, 0x05H, 0x0FH)					
address	parameter	Read/Write	minimum	maximum	illustrate
00001	NO1	Read/Write	0x0000	0xFF00	Status of read/write relay 1
00002	NO2	Read/Write	0x0000	0xFF00	Status of read/write relay 2

Note: When sending the modbus command, the address in the table needs to be subtracted by one.

Example 1: Use the 01 function code to read the output status of the coil, for example, read the output port NO1, NO2 command as follows:

01	01	00 00	00 02	bd cb
Device ModBus address	Function code	Start address	Number of coils	CRC checksum

Return data value:

01	01	01	02	D0 49
Device ModBus address	Function code	Data length	Coil value	CRC checksum

Send command: 01 01 00 00 00 02 bd cb

Return data: 01 01 01 02 D0 49

In the return value, the coil value is 02, corresponding to the binary bit 0000 0010, 1 represents the relay output closed, 0 represents the relay output disconnected. bit0 is 0, which means that the relay output NO1 is disconnected; bit1 is 1, which means that the relay output NO2 is closed.

Example 2: Use the 05 function code to write an output coil, for example, let the N01 relay output close, and send the following

command:

01	05	00 00	FF 00	8C 3A
Device ModBus address	Function code	address	Write the value	CRC checksum

Return data value:

01	05	00 00	FF 00	8C 3A
Device ModBus address	Function code	address	Write the value	CRC checksum

Send instructions: 01 05 00 00 FF 00 8C 3A

Return data: 01 05 00 00 FF 00 8C 3A

In the send instruction, the write value FF 00 represents ON, i.e. the relay is closed, and the write value of 00 00 represents OFF, i.e. the relay is off.

Example 3: Use the 0F function code to write two output coils, for example, let the N02 relay output close, N01 relay output disconnect, send the command as follows:

01	0F	00 00	00 02	01	02	5F 56
Device ModBus address	Function code	Start address	Number of coils	Data length	Write the value	CRC checksum

Return data value:

01	0F	00 00	00 02	D4 0A
Device ModBus address	Function code	Start address	Number of coils	CRC checksum

Send command: 01 0F 00 00 00 02 01 02 5F 56

Return data: 01 0F 00 00 00 02 D4 0A

In the sending instruction, write the value 02, corresponding to binary 0000 0010, bit0 is 0, representing OFF, that is, relay N01 is disconnected; bit1 is 1, representing ON, that is, relay N02 is closed.

8.2.2 Discrete address table

Discrete address table (function code: 0x02H)					
address	**parameter**	**Read/Write**	**minimum**	**maximum**	**illustrate**
10001	D AND 1	read only	0	1	Read the status of digital input channel 1
10002	D and 2	read only	0	1	Read the status of digital input channel 2

Note: When sending the modbus command, the address in the table needs to be subtracted by one;

Example 1: Use the 02 function code to read discrete inputs, such as reading DI2 and DI1 switching inputs, and send the following command:

01	02	00 00	00 02	F9 CB
Device ModBus address	Function code	Start address	Number of coils	CRC checksum

Return data value:

01	02	01	02	20 49
Device ModBus address	Function code	Data length	Enter the status	CRC checksum

Send instructions: 01 02 00 00 00 02 F9 CB

Return data: 01 02 01 02 20 49

In the returned data, the input state is 02, corresponding to binary 0000 0010, bit0 is 0, representing disconnected, that is, the switch input DI1 is the open state; bit1 is 1, representing closed, that is, the switching input DI2 is closed.

8.2.3 Register address table

Register address table (function codes: 0x03H, 0x06H, 0x10H)						
40033	ModBus address	2	Read/Write	0	248	address
40034	Relay control status settings	2	Read/Write	0	1	0 (default), the relay is always maintained; 1. The relay keeps the set duration.
40035	Relay hold time setting	2	Read/Write	1	1000	Valid when the relay status is 1, default 5S
40036	Number of retransmissions	2	Read/Write	0	10	Default 2 times
40037	Wireless channel	2	Read/Write	0	31	Wireless communication channel
40038	Wireless response time	2	Read/Write	0	4	Default 2, see Wireless Response Time for details
40039	Device version information	2	read	0	65535	Device version information

Note:

1. When sending the modbus command, the address in the table needs to be subtracted by one;

2. The 40034, 40035 register setting values are only valid in the control acquisition mode, and the 40036 register setting values are only valid in the follow mode;

3.40039 register read-only, so only 03H function code is supported, 06H, 10H function code is not supported.

Example 1.Use the 03 function code to read the register value, such as reading the Modbus address register, the command is as follows:

01	03	00 20	00 01	85 C0
Device ModBus address	Function code	Read register start address	Read register length	CRC checksum

Return data value:

01	03	02	00 01	79 84
Device ModBus address	Function code	Read returns the number of bytes	Register value	CRC checksum

Send instructions: 01 03 00 20 00 01 85 c0

Return data: 01 03 02 00 01 79 84

The return register value is 00 01, which means that the device address is 1.

Example 2.Use the 06 function code to write a register, for example, the value of the write and resend times register is 5 times, the command is as follows:

01	06	00 23	00 05	B8 03
Device ModBus address	Function code	Write the register address	Write register values	CRC checksum

Return data value:

01	06	00 23	00 05	B8 03
Device ModBus address	Function code	Write the register address	Write register values	CRC checksum

Send instructions: 01 06 00 23 00 05 B8 03

Return data: 01 06 00 23 00 05 B8 03

In the send instruction, the write register value is 00 05, and the write value of the register representing the number of retransmissions is 5.

Example 3.Use the 10 function code to write multiple registers, for example, set the resend number register value to 8 and the wireless channel register set to 16:

01	10	00 23	00 02	04	00 08 00 10	31 AM
Device ModBus address	Write commands	Start address	Number of write registers	Number of bytes written	Write register values	CRC checksum

Return data value:

01	10	00 23	00 02	B0 02
Device ModBus address	Write commands	Start address	Number of registers	CRC checksum

Send instructions: 01 10 00 23 00 02 04 00 08 00 10 31 AC

Return data: 01 10 00 23 00 02 B0 02

In the transmit instruction, the write register value is 00 08 00 10, 00 08 is the retransmit register value, 00 10 wireless channel register value.

Chapter IX Precautions for Use

1. This station should not be operated in the vicinity of flammable places (such as coal mines) or explosive dangerous objects (such as detonators for detonation).
2. A suitable DC regulated power supply should be selected, which requires strong anti-high-frequency interference ability, small ripple, and sufficient load capacity; it is best to have over-current, over-voltage protection and lightning protection functions to ensure the normal operation of the data transmission station.
3. Do not use in a working environment that exceeds the environmental characteristics of the data transmission station, such as high temperature, humidity, low temperature, strong electromagnetic field or dusty environment.
4. Do not leave the data station continuously at full capacity, as this may burn out the transmitter.
5. The ground wire of the data transmission radio should be well connected with the ground wire of external equipment (such as PC, PLC, etc.) and the ground wire of the power supply, otherwise it is easy to burn the communication interface; do not plug in or unplug the serial port with electricity.
6. When testing the logarithmic radio station, a matching antenna or 50Ω dummy load must be connected, otherwise it is easy to damage the transmitter; if the antenna is connected, then the distance between the human body and the antenna is best more than 2 meters to avoid injury, and do not touch the antenna during transmission.
7. Wireless data transmission stations often have different communication distances in different environments, and the communication distance is often affected by temperature, humidity, obstacle density, obstacle volume, and electromagnetic environment; in order to ensure stable communication, it is recommended to reserve more than 50% of the communication distance margin.
8. If the measured communication distance is not ideal, it is recommended to analyze and improve the communication distance from the antenna quality and antenna installation method. You can also contact support@cdebyte.com for help.
9. When selecting a power supply, in addition to retaining 50% of the current margin according to the recommendation, it should be noted that its ripple should not exceed 100mV.

Chapter X Important Statements

1. EBIT reserves the right to final interpretation and modification of all contents in this manual.
2. Due to the continuous improvement of the hardware and software of the product, this manual may be changed without notice, and the latest version of the manual shall prevail.

Remediate records

version	Revision date	Revision Instructions	Maintainers
V1.0	2022-06-29	Initial version	GUO Hong

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