EBYTE

成都亿佰特电子科技有限公司

Chengdu Ebyte Electronic Technology Co.,Ltd.

Wireless Modem

用户使用手册

Wireless Remote Transmission Switch

E860-DTU(x0x0-400SLxx)-V2

本说明书可能会随着产品的改进而更新，请以最新版的说明书为准

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第一章 Product Overview

1.1 Product Introduction

Wireless Transmission switch is a LoRa modulation technology,Terminal equipment that realizes wireless remote transmission of switch quantity, supports acquisition of switch quantity input (DI) and control relay output (DO). Its core function is to realize remote synchronous control, without wiring, with high ease of use, convenient for users to quickly integrate into their own systems. DC voltage input 8 ~ 28V.

1.2 Features

- Adopt the latest LoRa technology (device has built-in wireless module) to support wireless signal transmission control;
- Support relay output 1/2/4/8-channel models (optional);
- Support 1/2/4/8 input channels (optional), default dry contact;
- 5km/10km for users to choose freely;
- Supports up to 10km Ultra Far Transmission distance;
- Support 1 to 1 and 1 to many modes, many-to-1 multiple working modes;
- Support 3 working modes, automatic matching, convenient and fast to use;
- Support network disconnection recovery. After the network disconnection time exceeds, the receiving end outputs(DO) Status Resettable;
- Support encrypted transmission to prevent mutual interference between networking devices;
- Multiple indicator lights show working status;
- Use the button to pair, simple and fast;
- It has restart and factory reset buttons to deal with various emergencies;
- Support firmware upgrades, convenient for customization and function upgrade maintenance
- Adopt flame-retardant plastic shell, safe and reliable;
- Power supply: DC 8~28V;
- Multiple protection functions including power reverse connection protection, over current protection, over voltage protection, etc.
- Supports standard 35mm rail installation, which is convenient and efficient to install;
- Supports software and hardware dual watchdogs, making the device run more stable and reliable;
- Working temperature: industrial temperature, -40 to 85 degrees Celsius
- Ambient humidity: 5%-95% without condensation

第二章 Technical indicators

2.1 Specifications

category	name	parameter
power supply	Operating voltage	DC 8～28V
	Power indicator	Blue LED indication
Wireless parameters	Working frequency band	410.125-493.125MHz (support ISM band)
	Transmit power	22dbm/30dBm optional
	Receiving sensitivity	-148 dBm@2.4Kbps
	Transmission distance	22dbm for 5km, 30dBm for 10km (clear and open environment, maximum power, antenna gain 5dBi, height 2m)
	airspeed	2.4K
	Antenna Options	SMA antenna base (external screw and internal hole)
Response speed	Response speed	Within 300ms
DI Input	DI channels	1/2/4/8 channels (optional)
	Input Type	Dry contact/NPN type
	Input instructions	Green LED indicator
DO Output	DO number	1/2/4/8 channels (optional)
	DO output type	1/2/4 are C-type relays, 8 is A-type relay
	DO output mode	Jog mode
	Relay contact capacity	1/2/4-way: 7A 30VDC, 7A 250VAC 8-way: 10A 30VDC, 10A 250VAC
	Output indication	Red LED indicator
Power consumption	Transmitting current consumption	290mA @ DC 12V
	Average current consumption	70mA @ DC 12V
	One relay current consumption	15mA @ DC 12V

other	Product size	E860-DTU(1010-400SL22)-V2: (length*width*height) 113*37*65mm E860-DTU(2020-400SL22)-V2: (length*width*height) 113*52*65mm E860-DTU(4040-400SL22)-V2: (length*width*height) 113*72*65mm E860-DTU(8080-400SL22)-V2: (length*width*height) 113*107*65mm E860-DTU(2020-400SL30)-V2: (length*width*height) 113*52*65mm E860-DTU(4040-400SL30)-V2: (length*width*height) 113*72*65mm E860-DTU(8080-400SL30)-V2: (length*width*height) 113*107*65mm
	Product Weight	E860-DTU(1010-400SL22)-V2:77±5g E860-DTU(2020-400SL22)-V2:110±5g E860-DTU(4040-400SL22)-V2:150±5g E860-DTU(8080-400SL22)-V2:192±5g E860-DTU(2020-400SL30)-V2:110±5g E860-DTU(4040-400SL30)-V2:150±5g E860-DTU(8080-400SL30)-V2:192±5g
	Working temperature and humidity	-40～+85℃、5%～95%RH（no condensation）
	Storage temperature and humidity	-60～+125℃、5%～95%RH（no condensation）

2.2 Port Description

serial number	E860-DTU(1010-400SL22)-V2 Device Port Description	E860-DTU(2020-400SL22)-V2 E860-DTU(2020-400SL30)-V2 Device Port Description	E860-DTU(4040-400SL22)-V2 E860-DTU(4040-400SL30)-V2 Device Port Description	E860-DTU(8080-400SL22)-V2 E860-DTU(8080-400SL30)-V2 Device Port Description
1	RS485-A	Switch input port 1	Switch input port 1	Switch input port 1
2	RS485-B	Switch input port 2	Switch input port 2	Switch input port 2
3	PE (protective earth)	Switching common terminal	Switching common terminal	Switch input port 3
4	DC 8～28V(V-)	RS485-A	Switch input port 3	Switch input port 4
5	DC 8～28V(V+)	RS485-B	Switch input port 4	Switching common terminal
6	Switch input port 1	PE (protective earth)	Switching common terminal	Switch input port 5
7	Switching common terminal	DC 8～28V(V-)	GND	Switch input port 6
8	Relay output normally open port 1	DC 8～28V(V+)	RS485-A	Switch input port 7
9	Relay output COM port 1	Relay output normally open port 1	RS485-B	Switch input port 8
10	Relay output normally closed port 1	Relay output COM port 1	PE (protective earth)	Switching common terminal
11	STATE configuration reset button	Relay output normally closed port 1	DC 8～28V(V-)	GND
12		Relay output normally open port 2	DC 8～28V(V+)	RS485-A
13		Relay output COM port 2	Relay output normally open port 1	RS485-B
14		Relay output normally closed port 2	Relay output COM port 1	PE (protective earth)
15		STATE configuration reset button	Relay output normally closed port 1	DC 8～28V(V-)
16			Relay output normally open port 2	DC 8～28V(V+)
17			Relay output COM port 2	Relay output normally open port 1
18			Relay output normally closed port 2	Relay output COM port 1
19			Relay output normally open port 3	Relay output normally open port 2
20			Relay output COM port 3	Relay output COM port 2
twenty one			Relay output normally closed port 3	Relay output normally open port 3
twenty two			Relay output normally open port 4	Relay output COM port 3
twenty			Relay output COM port 4	Relay output normally

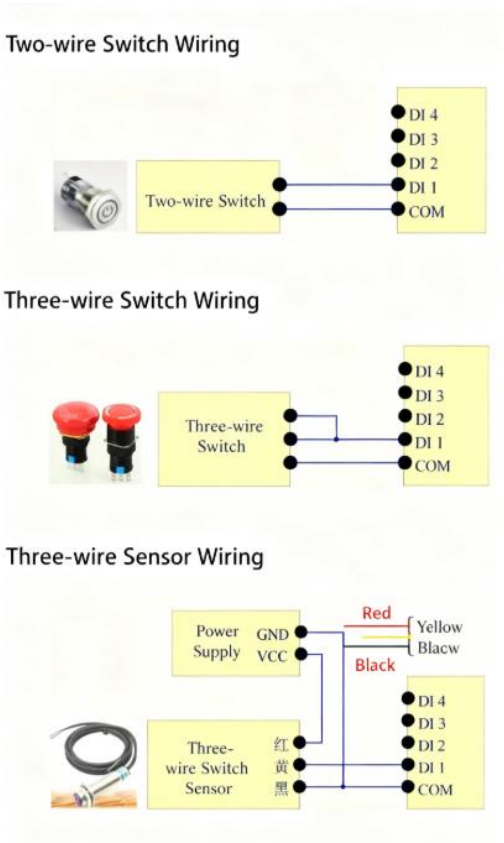
three				open port 4
twenty four			Relay output normally closed port 4	Relay output COM port 4
25			STATE configuration reset button	Relay output normally open port 5
26				Relay output COM port 5
27				Relay output normally open port 6
28				Relay output COM port 6
29				Relay output normally open port 7
30				Relay output COM port 7
31				Relay output normally open port 8
32				Relay output COM port 8
33				STATE configuration reset button

2.3 LED Indicator and Button Description

port	LED indicator color	illustrate
PWR	Blue LED	Power indicator light, always on when powered on, off when no power
LINK	Yellow LED	1、1 to many (including 1 to 1) - bidirectional (when the devices have the same number of paths): ● As long as one slave is successfully connected to the host, the LINK indicator of the host will be on; ● After the slave is successfully connected to the host, the

		slave's LINK indicator is always on; 2、1 to many - bidirectional (different number of channels, each channel of the host aisle Independent control with slaves): The LINK indicator of the host flashes several times according to the number of connected devices (cycle 300ms, after flashing, it turns off for 1S, and then flashes again). For example: if 3 devices are connected, the LINK indicator flashes 3 times according to the cycle, then turns off for 1S and flashes again;
STATE (indicator light)	Blue LED	1、Host: The indicator light is always on; 2、Slave: indicator light flashes slowly; 3、Pairing: indicator light flashes quickly; 4、Not paired: the indicator light is off;
STATE (button)	White button	1、Long press for 2s to enter pairing mode; 2、Long press for more than 6 seconds to restore to factory settings; 3、Long press to cycle through the pairing state and reset state; 5. In Pairing Mode Short press to exit Pairing Mode
DI1-DI8	Green LED	Device switch input data indication, normally on means input, normally closed means no input
DO1-DO8	Red LED	Corresponding to 8 relay output switch indications respectively; normally on means output is in progress, normally closed means no output

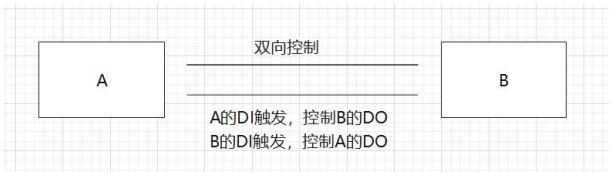
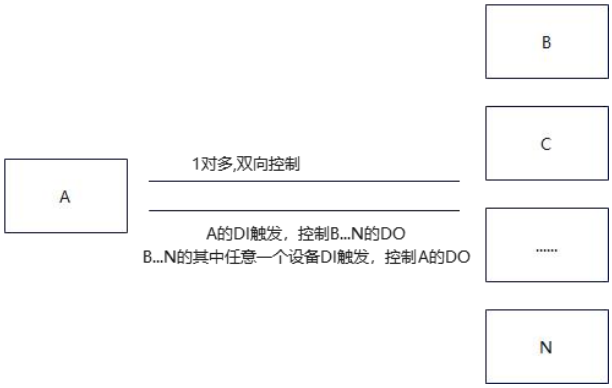
2.4 Wiring Instructions



第三章 Functional Details

3.1 Working Mode

This series has three working modes, as shown in the following table. When using this series of products, the working mode will be automatically selected for matching according to the user's usage.

1 to 1 two-way	
1 to many - bidirectional: Maximum 1 to 200; Any slave is input, the host is controlled	
1 to many - two-way (different number of paths)	Combination mode: 8-channel host can match 4 2-channel/2 4-channel/2 2-channel + 1 4-channel slaves. The DI and DO channel indicator lights correspond to different slaves. For example, if slave 1 is 2-channel, DI1, DI2, DO1, DO2 of the host correspond to slave 1. If slave 2 is 2-channel, it corresponds to DI3, DI4, DO3, DO4 of the host, and so on. Slave Accumulation aisle The number of routes is not allowed to exceed the host aisle Number of routes

Each time a different pairing mode is used, the last operation needs to be restored to factory settings before the operation is performed again.

Table 3-1 Working mode

3.1.1 1 to 1 bidirectional working mode

1. Prepare two E860-DTU(1010-400SL22)-V2, two power supplies with DC 12V output, two antennas, and then connect the power supplies as shown in the figure below.

Figure 3-2-1 Power supply wiring diagram

2. Now use one of them as the host, press and hold the STATE button for 2 seconds to enter the configuration right mode, the buzzer beeps once and the STATE indicator flashes; then the other device also presses the STATE button for 2s, hears the buzzer beep once, and the STATE indicator flashes, indicating that it has entered the mode.Pairing Mode; At this time, the two devices will automatically pair. When you hear two beeps from both devices, pairing is complete. At this time, short press the STATE button again to exit Pairing Mode That's it. At this time, the device that first enters the pairing mode is the host, and the LINK light and STATE light will be on. After the slave is successfully paired, the LINK light will be on and the STATE light will flash. As shown in the figure below, 1-22-3 is the host and 1-22-2 is the slave.

Figure 3-2-2 After the host and slave are paired successfully

3. At this time, DI1 of 1-22-3 can control DO1 of 1-22-2, and DI1 of 1-22-2 can control DO1 of 1-22-3, as shown in the figure below.

Figure 3-2-3 Slave DI controls host DO output

4. 2/4/8-wayTransmission switch This mode is used in the same way and will not be demonstrated here. DI and DO can be connected to the corresponding control system according to the user's choice for operation.

3.1.2 1 to many - bidirectional

1. This mode has a maximum of 1 to 200; any slave aisle Entered, host Output Channel The first one to enter pairing mode is the master. The DI of the master can control the DO of all slaves. In this mode, the number of channels of the first slave can be the same as that of the master. The number of I/O channels of the slaves to be paired later can be greater than the number of I/O channels of the master. For example, if the master has 4 channels, the slave can have 8 channels. The master takes the valid number of channels of the slave for pairing. That is, the 8-channel slave is paired as a 4-channel device, and only the first 4 I/O channels of the 8-channel slave are controlled. The same applies.

2. Prepare one E860-DTU(2020-400SL22)-V2, two E860-DTU(2020-400SL30)-V2, two power supplies with DC 12V output, two antennas, and then connect the power supply as shown in Figure 3-2-1.

3. Here we take E860-DTU(2020-400SL22)-V2 as the master, hereinafter referred to as 2-22-1, and two slaves E860-DTU(2020-400SL30)-V2, 2-30-1 and 2-30-2. Press and hold the STATE button of 2-22-1 for 2s to enter Pairing Mode, the buzzer beeps once and the STATE indicator flashes. Next 2-30-1, long press the STATE button for 2s. You will hear the buzzer beep once and the STATE indicator flashes, indicating that you have entered Pairing Mode; At this time, the two devices will automatically pair. When you hear two beeps from both devices, pairing is complete. At this time, short press the STATE button 2-30-1 to exit Pairing Mode That's it. At this point, the pairing mode of 2-22-1 and 2-30-1 is completed. Next, let 2-30-2 enter the pairing mode. At this time, 2-22-1 and 2-30-2 devices will complete the automatic pairing, and then short-press the STATE button to exit the pairing mode. At this time, the one-to-many pairing of devices with the same number of channels is completed, that is, 2-22-1 is the host, 2-30-1 and 2-30-2 are slaves, as shown in Figure 3-3-1 below. At this time, the STATE indicators of 2-30-1 and 2-30-2 will flash, indicating slaves, and the STATE indicator of 2-22-1 is always on, indicating the host.

Figure 3-3-1 Schematic diagram after successful one-to-many connection

Figure 3-3-2 The master switch input DI2 controls the two slave switch outputs DO2

Figure 3-3-3 Slave switch input DI2 controls host switch output DO2

3.1.3 1 to many - two-way (different number of paths)

1. Combination mode: If the host is 8-wayTransmission switch, can match 4 2-channel slaves/2 4-channel slaves/2 2-channel slaves + 1 4-channel slave. The DI and DO channel indicator lights correspond to different slaves. For example, if slave 1 is 2-channel, the host's DI1, DI2, DO1, and DO2 correspond to slave 1. If slave 2 is 2-channel, it corresponds to the host's DI3, DI4, DO3, and DO4, and so on.

2. Note: The total number of slave channels is not allowed to exceed the number of master channels.

3. Here we use one E860-DTU (4040-400SL22)-V2, referred to as 4-22-2 as the host, one E860-DTU (2020-400SL22)-V2, referred to as 2-22-1 as slave 1, and two E860-DTU (1010-400SL22)-V2, referred to as 1-22-2, 1-22-3 as slave 2 and slave 3. Here, 2+1+1=4, which meets the requirements of 1-to-many bidirectional with different numbers of channels. Then, follow the steps in 3.3・・・・・1-to-many-bidirectional (with the same number of channels) to connect them in sequence. After the connection is successful, the yellow LINK light of the host will flash in a three-on-one-off pattern. The yellow light flashes three times, which means that three slaves are connected. After the slaves are connected successfully in sequence, the matching of the switch input and output is completed. At this time, the corresponding relationship is as shown in the following table. The left part of the black frame represents the corresponding relationship between the host's DI and the slave's DO, and the right part represents the corresponding relationship between the host's DO and the slave's DI.

Host	Slave		Slave	Host
DI1 of 4-22-2	DO1 of slave 1 2-22-1		Slave 1 2-22-1 DI1	4-22-2 DO1
4-22-2 DI2	Slave 2 2-22-1 DO2		Slave 2 2-22-1 DI2	4-22-2 DO2
4-22-2 DI3	DO1 of slave 3 1-22-2		Slave 3 1-22-2 DI1	4-22-2 DO3
4-22-2 DI4	DO1 of slave 4 1-22-3		DI1 of slave 4 1-22-3	4-22-2 DO4

Table 3-4-1 Correspondence between the master and slave switch input and output in the case of 1-to-many bidirectional different number of paths

Figure 3-4-1 The switch input DI3 of the master controls the switch output of the corresponding DO1 channel of slave 2

Figure 3-4-2 The switch input DI1 of slave 3 controls the switch output of the corresponding host DO4 channel

第四章 Introduction to the host computer interface

4.1 Enter the host computer interface

Figure 4-1-1 Open the host computer and select the entry interface

As shown in Figure 4-1-1, open the host computer software, select the EB60-DTU model, click OK, and enter the host computer interface.

4.2 Host computer introduction

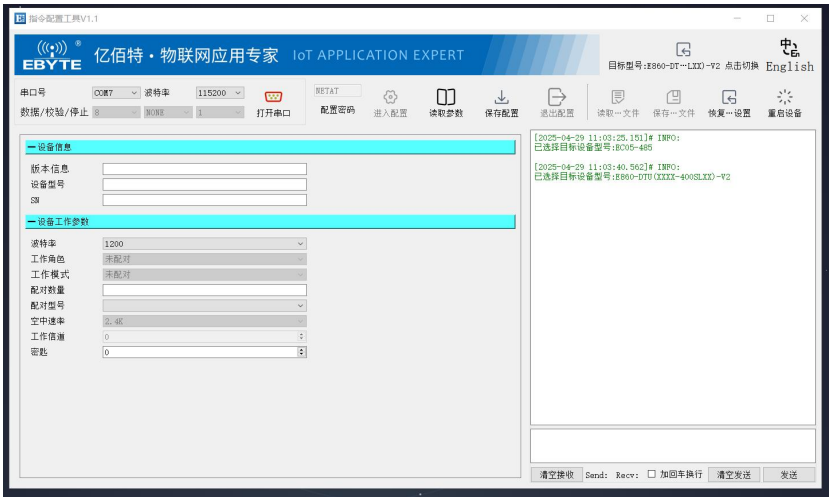


Figure 4-2-1 Entering the host computer interface

Software interface language: supports switching between Chinese and English;

Serial port number: Select the serial port number to which the device is connected;

Baud rate: The baud rate defaults to 115200;

Data/Check/Stop Bit: This setting is a fixed value and cannot be changed;

Open the serial port: Click it and the host computer can connect to the device;

Read parameters: After opening the serial port, click to enter the AT command operation interface, where you can view device information and change data related to device working parameters;

Save configuration: save the current configuration;

Factory Reset: Reset basic and advanced functions to factory defaults;

Restart device: device restarts;

Device information: After reading the parameters, the version information, device model, and SN code are displayed;

Equipment working parameters: After reading the parameters, the working parameter contents are displayed;

Baud rate: Display the current baud rate and support changes;

Working role: Displays the current status of the device. If it is a host, it will display the host; if it is a slave, it will display the slave; if there is no connection, it will not display;

Working mode: Display the current working mode of the device;

Pairing quantity: Displays the number of slaves that the device is paired with as a master. If it is a slave, it will not be displayed.

Pairing model: Displays the slave model that the device is paired with as the master. If it is a slave, it will not be displayed.

Air speed: Display the current speed;

Working channel: Displays the current working channel value., and can be configured through the host computer to specify the channel;

Key: You can set the corresponding password

4.3 Firmware Upgrade

You can use the Ebyte serial port upgrade tool to upgrade the device's product firmware, which is convenient for customization and function upgrades. The following describes how to use it.

First, download the "Ebyte Serial Port Upgrade Tool" from the relevant download page of the product's official website, then open the tool, and then select the RS485 serial port that has been connected, open it, then select the firmware package and import it; finally, refer to the steps to start the automatic upgrade to upgrade. As shown in Figure 4-4-1 below.

Figure 4-4-1 Firmware upgrade operation process

The final right of interpretation belongs to Chengdu Ebyte Electronic Technology Co., Ltd.

Revision History

Version	Revision Date	Revision Notes	Maintainer
1.0	2025-06-24	Initial release	LT

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