Chengdu Ebyte Electronic Technology Co.,Ltd

Wireless Modem

User Manual



Wireless Remote Synchronization Switch

E860-DTU(x0x0-x00SLxx)-S

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Content

DISCLAIMER 3
1. OVERVIEW 4
1.1 INTRODUCTION 4
1.2 FEATURES 4
2. TECHNICAL SPECIFICATIONS 5
2.1 SPECIFICATIONS AND PARAMETERS 5
2.2 MECHANICAL DIMENSION DRAWINGS 7
2.3 PORT DESCRIPTION 8
2.4 LED INDICATORS AND BUTTON DESCRIPTIONS 9
3. DETAILED EXPLANATION OF FEATURES 10
3.1 OPERATING MODES 10
3.1.1.ONE-ON-ONE, BIDIRECTIONAL WORK MODEL 11
3.1.2 ONE-TO-MANY BIDIRECTIONAL CONTROL 12
3.1.3 ONE-TO-MANY BIDIRECTIONAL CONTROL (DIFFERENT CHANNEL COUNTS) 15
REVISION HISTORY 15

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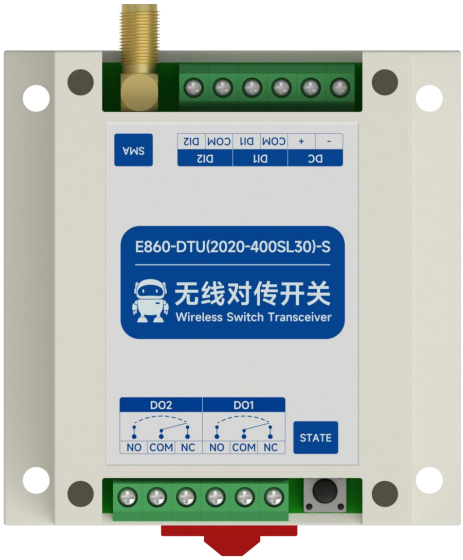
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1. Overview

1.1 Introduction





The Wireless Remote Synchronous Switch is an end-user device that uses LoRa modulation technology to enable wireless transmission of digital signals over long distances. It supports the acquisition of digital inputs (DI) and the control of relay outputs (DO). Its core functionality is to enable remote synchronous control without the need for wiring, offering high ease of use and allowing users to quickly integrate it into their own systems. The power supply voltage is 8–28 V DC.

1.2 Features

- Utilizes the latest LoRa technology (with a built-in wireless module), supporting wireless signal transmission and control;
- Supports models with 1- or 2-channel relay outputs (optional);

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- Supports 1 or 2 input channels (optional), with dry contacts as the default;
- Supports a maximum transmission range of 10 km (optional);
- Supports one-to-one and one-to-many modes;
- Supports network outage recovery; if the outage duration exceeds a set threshold, the receiver’s output can be reset;
- Supports encrypted transmission to prevent interference between devices in the network;
- Multiple indicator lights display operating status;
- Pairing and real-time control via buttons—simple and fast;
- Features restart and factory reset buttons to handle various emergencies;
- Constructed with a flame-retardant plastic housing for safety and reliability;
- Power supply: DC 8–28 V;
- Multiple protection features, including reverse polarity protection, overcurrent protection, and overvoltage protection;
- Supports standard 35mm DIN rail mounting and mounting via positioning holes for convenient and efficient installation;
- Supports software watchdog for more stable and reliable device operation;
- Operating temperature: Industrial-grade range, -40 to 85 degrees Celsius;
- Ambient humidity: 5%–95% non-condensing

2. Technical Specifications

2.1 Specifications and Parameters

Category	Name	Parameters
Power Supply	Operating Voltage	DC 8–28 V
	Power Indicator	Blue LED indicator
Wireless Parameters	Operating Frequency Band	410.125–493.125 MHz / 850.125–930.125 MHz
	Transmit Power	22 dBm / 30 dBm (selectable)
	Receive Sensitivity	-148 dBm@2.4Kbps
	Transmission Range	22 dBm: 5 km; 30 dBm: 10 km (clear, open environment; maximum power; antenna gain 5 dBi; height 2 m)
	Airspeed	2.4K
	Antenna Options	SMA antenna connector (external thread, internal bore)

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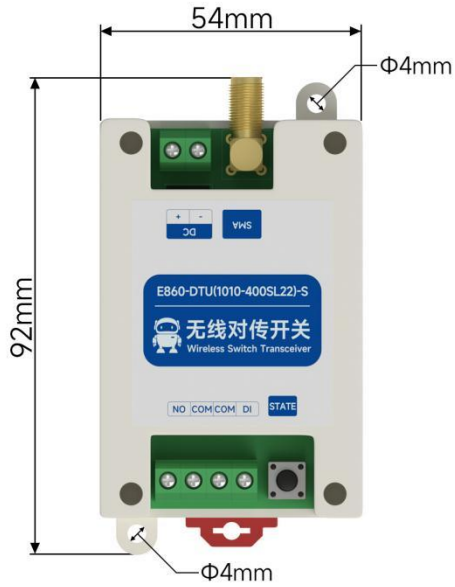
Response Time	Response Time	Within 300 ms
DI Input	DI Channels	1/2-channel (optional)
	Input Type	Dry contact/NPN type
	Input Indicator	Green LED indicator
DO Output	Number of DO Channels	1/2 channels (optional)
	DO Output Type	1 DO output: Type A relay / 2 DO outputs: Type C relays
	DO Output Mode	Momentary mode
	Relay Contact Rating	10 A at 30 VDC, 10 A at 250 VAC
	Output Indication	Green LED indicator
Power Consumption	Transmit Current Draw	290mA @ DC 12V
	Average Current Draw	70mA @ DC 12V
	Current Draw of the Relay Along the Line	15mA @ DC 12V
Other	Product Dimensions	E860-DTU(1010-400SL22)-S：92*54*32mm（Length × Width × Height） E860-DTU(2020-400SL22)-S：100*90*40mm（Length × Width × Height） E860-DTU(1010-400SL30)-S：92*54*32mm（Length × Width × Height） E860-DTU(2020-400SL30)-S：100*90*40mm（Length × Width × Height） E860-DTU(1010-900SL22)-S：92*54*32mm（Length × Width × Height） E860-DTU(2020-900SL22)-S：100*90*40mm（Length × Width × Height） E860-DTU(1010-900SL30)-S：92*54*32mm（Length × Width × Height） E860-DTU(2020-900SL30)-S：100*90*40mm（Length × Width × Height）
	Product Weight	E860-DTU(1010-400SL22)-S：72g E860-DTU(2020-400SL22)-S：120g E860-DTU(1010-400SL30)-S：75g E860-DTU(2020-400SL30)-S：123g E860-DTU(1010-900SL22)-S：72g E860-DTU(2020-900SL22)-S：120g E860-DTU(1010-900SL30)-S：75g E860-DTU(2020-900SL30)-S：123g
	Operating	-40～+85℃、5%～95%RH（No condensation）

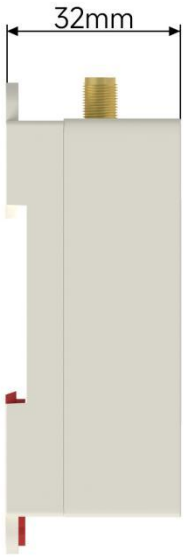
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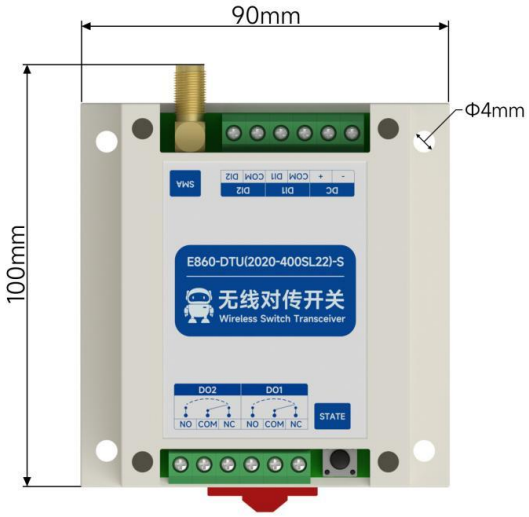
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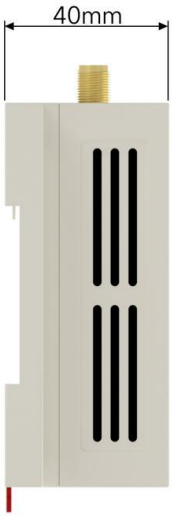
	Temperature and Humidity	
	Storage Temperature and Humidity	-60～+125℃、5%～95%RH（No condensation）
	Installation Method	Standard 35mm rail mounting, mounting with positioning holes

2.2 Mechanical Dimension Drawings









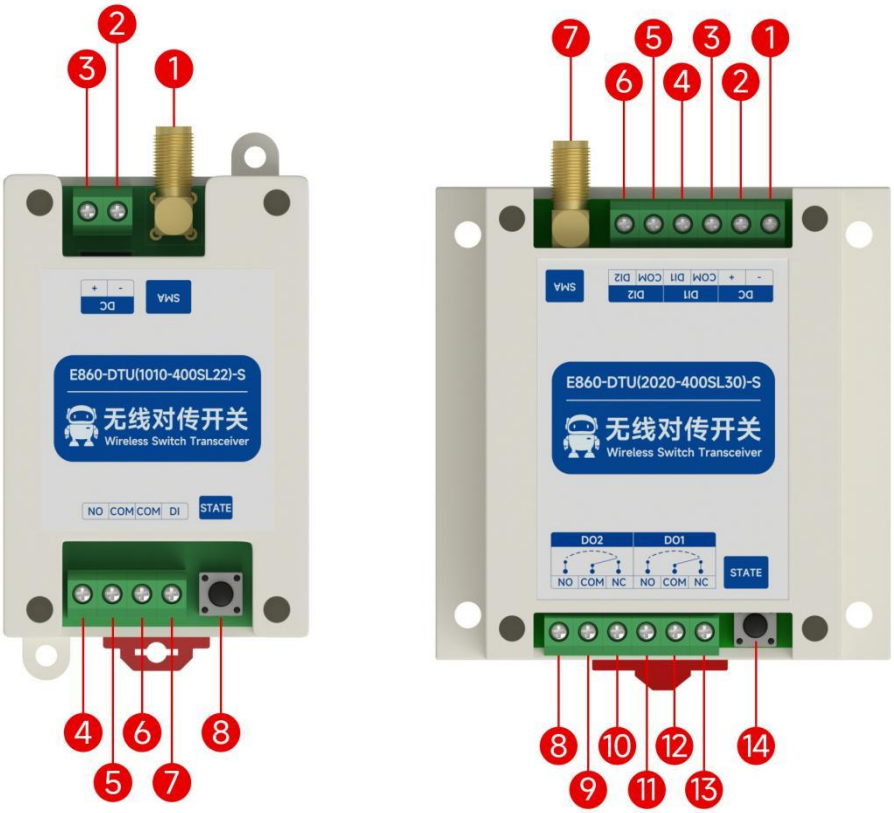
As shown in Figures 1 and 2 above, the dimensions of the 2-channel products differ only in their model designations.

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Here, we will use the E860-DTU (2020-400SL22)-S and the E860-DTU (1010-400SL22)-S as examples.

2.3 Port Description



No	E860-DTU(1010-X00SLXX)-S Device Port Descriptions	E860-DTU(2020-X00SLXX)-S Device Port Descriptions
1	SMA Antenna Connector	8–28 V DC (V-)
2	8–28 V DC (V-)	8–28 V DC (V+)
3	8–28 V DC (V+)	Digital Input Common Terminal
4	Relay Output: Normally Closed Contact 1	Digital Input Port 1
5	Relay Output Common Terminal	Digital Input Common Terminal
6	Digital Input Common Terminal	Digital Input Port 2
7	Digital Input Common Terminal	AWS Antenna Interface
8	STATE Button	Relay Output Normally Open Port 1
9		Relay Output Common Terminal
10		Relay Output Normally Closed Terminal 1
11		Relay Output Normally Open Terminal 2
12		Relay Output Common Terminal
13		Relay Output Normally Open Terminal 2

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14		STATE button

2.4 LED Indicators and Button Descriptions

Indicator Light	LED Indicator Light Colors	Note
DC	Red LED	Power indicator light: stays on when the power is on and turns off when the power is off.
STATE/LINK	Blue LED/Orange LED	1. Press and hold for 2 seconds to enter pairing mode; 2. Press and hold for 6 seconds or longer to restore factory settings; 3. Press and hold continuously to cycle through pairing mode and reset mode; 4. While in configuration mode, press briefly to exit configuration mode; 5. One-to-many (including one-to-one) - bidirectional (when devices share the same number of channels): As long as one slave device successfully connects to the master, the master's LINK indicator remains steady; after a slave device successfully connects to the master, the slave's LINK indicator remains steady; 6. One-to-many - bidirectional (with different numbers of channels, where each channel on the master is independently controlled by a slave): The number of connected devices determines how many times the host's LINK indicator flashes (cycle: 300 ms; after the flash cycle completes, the light turns off for 1 second, then begins flashing again). For example: If two devices are connected, the LINK indicator flashes twice per cycle, then turns off for 1 second before resuming the flash cycle;

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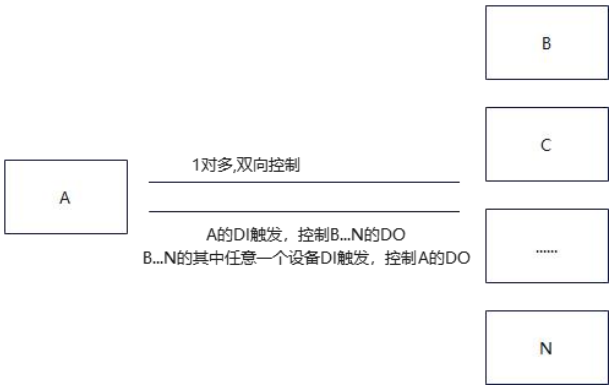
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DI	Pass through the corresponding sign when the light is green.	A green light turns on when a signal is received at the corresponding port of the device.
DO	Pass through the corresponding sign when the light is green.	A green light turns on when the corresponding port for the device is enabled.

3. Detailed Explanation of Features

3.1 Operating Modes

This series offers three operating modes, as shown in the table below. When using this series of products, the system automatically selects the appropriate operating mode based on the user's usage. Each time you switch to a different pairing mode, you must reset the device to factory settings before proceeding.

One-on-one, bidirectional control	
One-to-Many—bidirectional control: When any slave is activated, the master is controlled.	
One-to-Many—bidirectional control(Different Number of Channels)	Configuration: One master with 2 channels can be paired with two slave devices, each with 1 channel; the master's DI1 controls the slave device's DO1.

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3.1.1.One-on-One, Bidirectional Work Model

1. For example, prepare two E860-DTU (1010-400SL22)-S units, two power supplies with a 12V DC output, and two antennas, then connect the power supplies as shown in the figure below,



Figure 3-2-1 Power Supply Wiring Diagram

2. At this point, designate one of the devices as the host. Press and hold the STATE button for 2 seconds to enter configuration mode; the STATE indicator will flash. Next, press and hold the STATE button on the other device for 2 seconds; once the STATE indicator flashes, it indicates that the device has entered configuration mode. The two devices will then automatically pair to complete the pairing process. Now, briefly press the STATE button once to exit configuration mode. The device that entered pairing mode first is the master; its LINK and STATE lights will remain steady. After the slave is successfully paired, its LINK light will remain steady and its STATE light will flash. As shown in the figure below, 2-1 is the master and 2-2 is the slave.

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Figure 3-2-2: After Successful Pairing of Host and Slave

3. At this point, DI1 on module 2-1 can control DO1 on module 2-2, and DI1 on module 2-2 can control DO1 on module 2-1, as shown in the figure below.

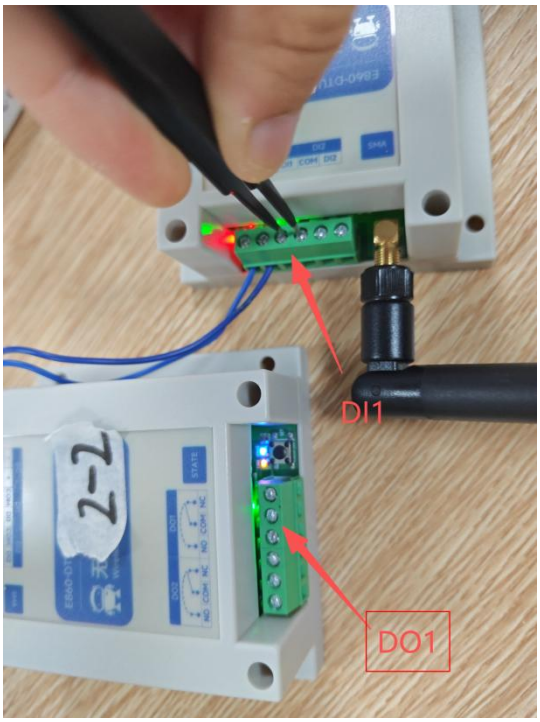


Figure 3-2-3: Diagram of Slave DI Controlling Master DO Output

4.1 Channel Synchronous Switch: This mode operates on the same principle and will not be demonstrated here. DI and DO can be connected to the appropriate control system according to the user's selection for operation.

3.1.2 One-to-Many Bidirectional Control

1. This mode supports up to 1 master and 200 slaves. When a DI signal is input to any slave, the master is controlled; the

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first device to enter pairing mode becomes the master. The master's DI can control the DO of all slaves.

2. Prepare two E860-DTU (2020-900SL22)-S units, two E860-DTU (2020-900SL30)-V2 units, three 12V DC power supplies, and three antennas, then connect them to power.

3. Here, we will use the E860-DTU (2020-900SL22)-S as the master unit, hereinafter referred to as 2-1. The two slave units are the E860-DTU (2020-900SL30)-S and the E860-DTU (2020-900SL22)-S, referred to as 2-2 and 2-3, respectively. Press and hold the STATE button on 2-1 for 2 seconds to enter configuration mode; the STATE indicator light will flash. Next, press and hold the STATE button on 2-2 for 2 seconds; once the STATE indicator light flashes, it indicates that configuration mode has been entered. At this point, the two devices will automatically pair, completing the pairing process. Next, briefly press the STATE button on unit 2-2 to exit configuration mode. This completes the pairing between units 2-1 and 2-2. Next, put unit 2-3 into pairing mode; units 2-1 and 2-3 will then automatically pair. Afterward, briefly press the STATE button on each unit to exit pairing mode. This completes the one-to-many pairing for devices with the same channel number, where 2-1 is the master and 2-2 and 2-3 are the slaves, as shown in Figure 3-3-1 below. At this point, the STATE indicator lights on 2-2 and 2-3 will flash, indicating they are slaves, while the STATE indicator light on 2-1 will remain steady, indicating it is the master.

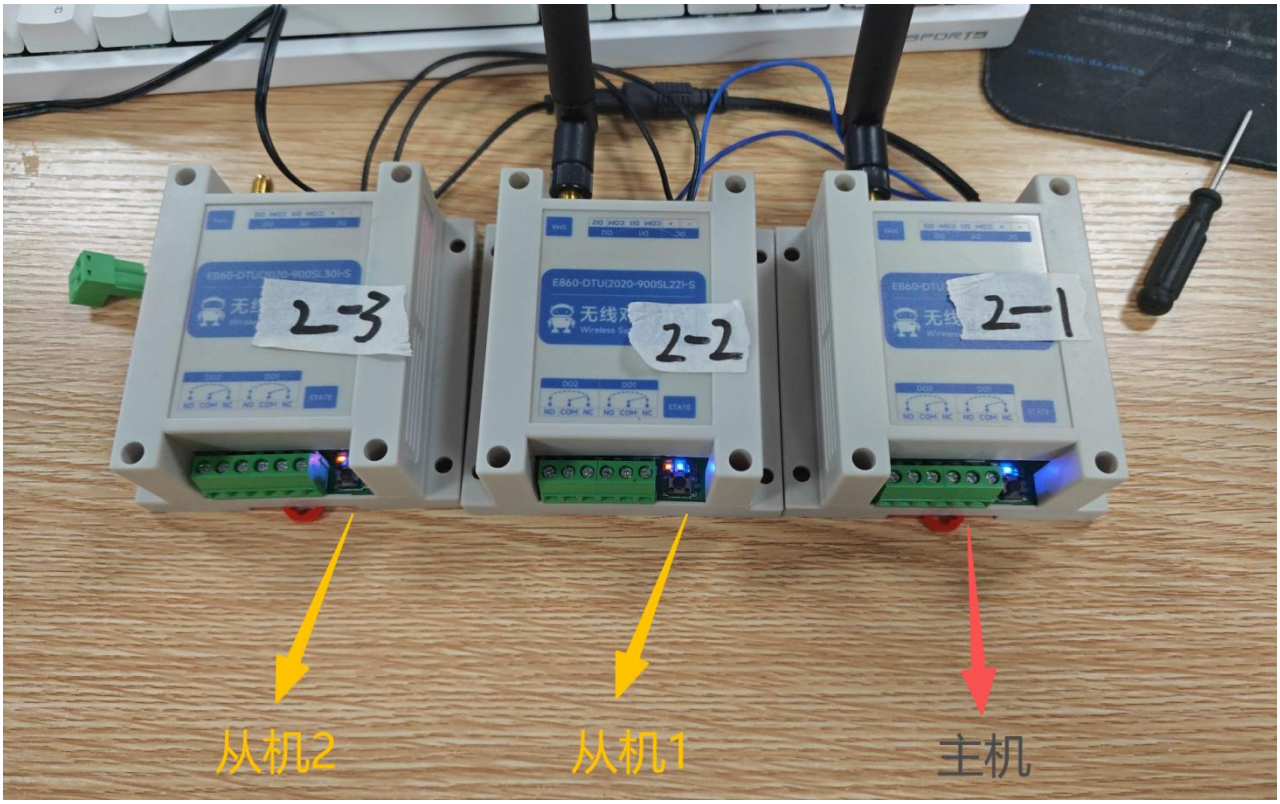


Figure 3-3-1 Schematic Diagram of a Successful One-to-Many Connection

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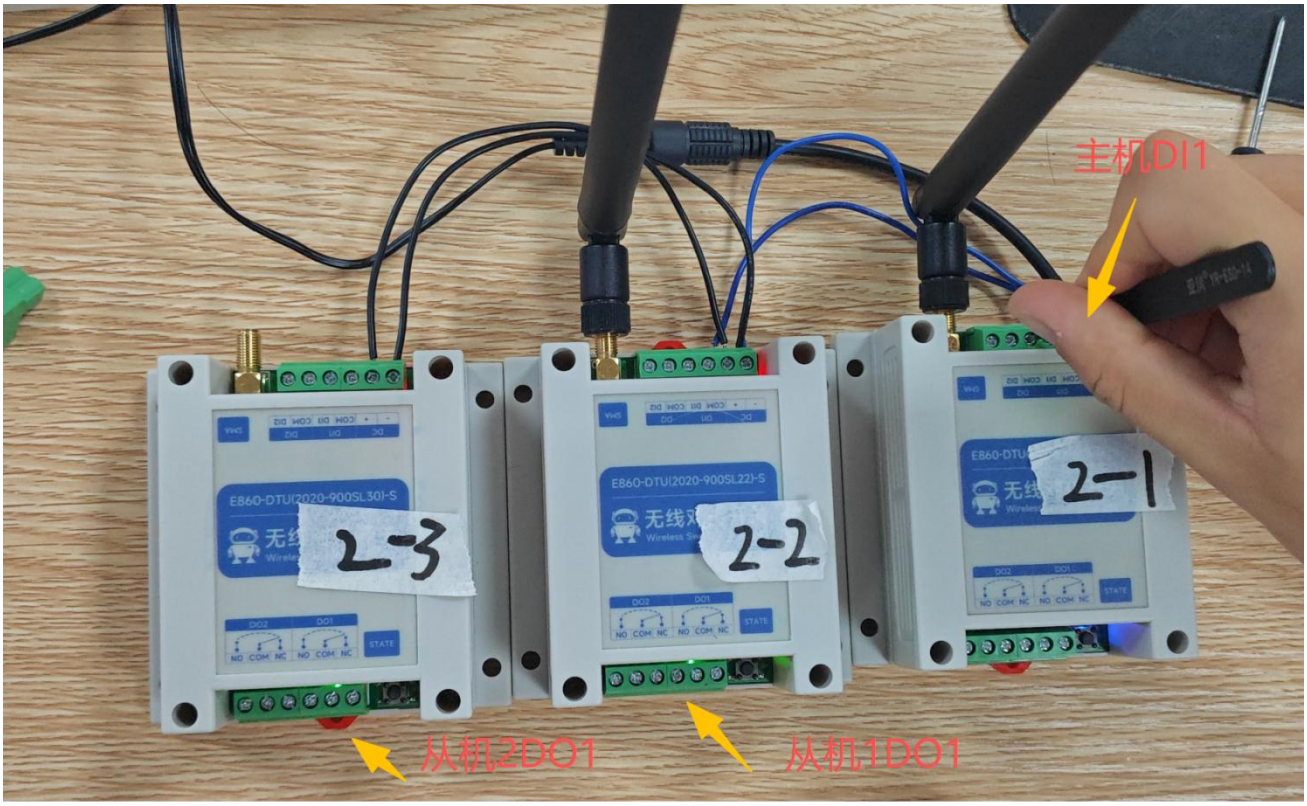
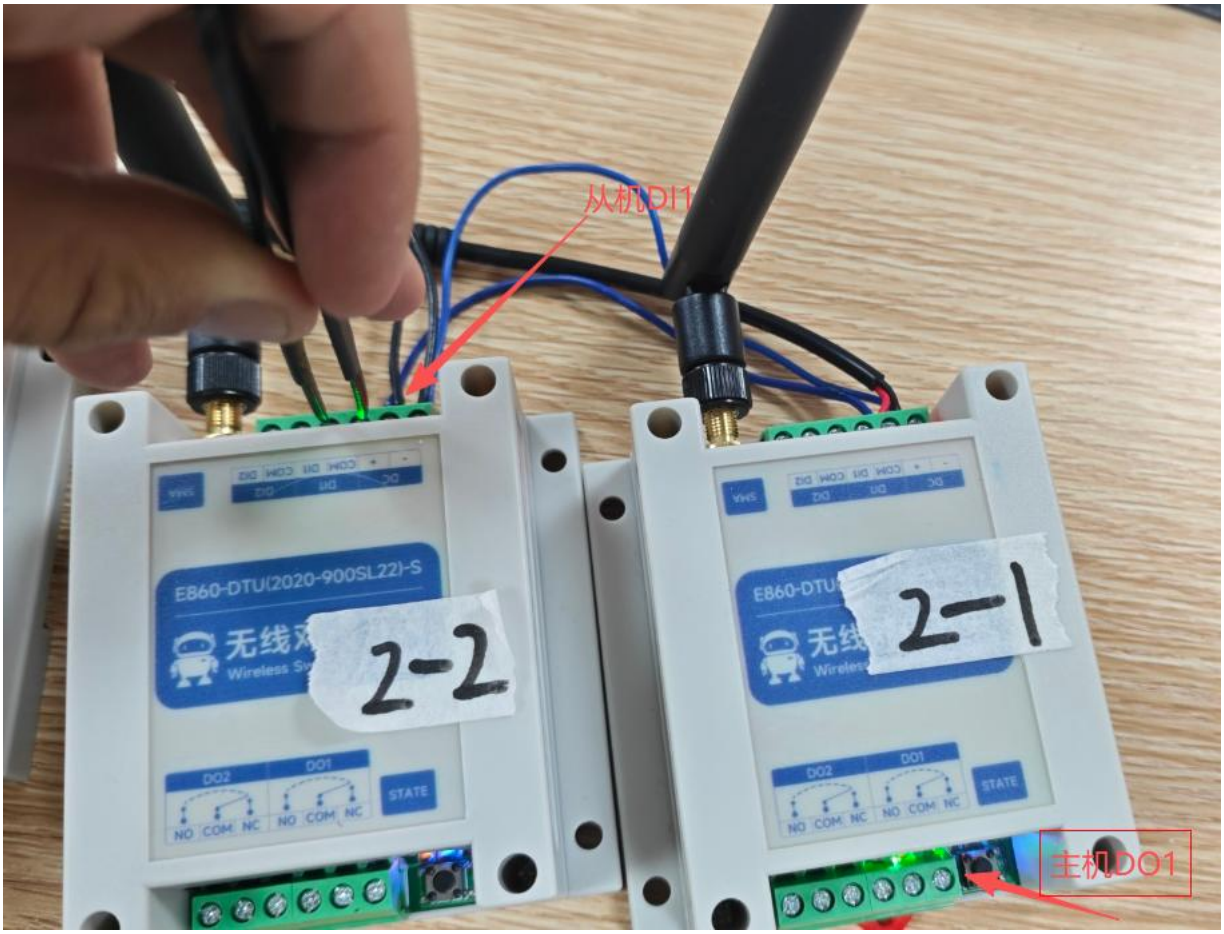


Figure 3-3-2: Host digital input DI1 controls the digital output DO1 of two slave devices



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Figure 3-3-3: Slave digital input (DI1) controls master digital output (DO1)

3.1.3 One-to-Many Bidirectional Control (Different Channel Counts)

1. Configuration: For example, if the master is a 2-channel synchronous switch, it can be paired with two 1-channel slaves. The DI and DO channel indicator lights correspond to different slaves; for instance, if Slave 1 has 2 channels, then the master's DI1, DI2, DO1, and DO2 correspond to Slave 1.

Note: The total number of channels across all slaves must not exceed the number of channels on the master.

2. In this example, one E860-DTU (2020-400SL30)-S, referred to as 2-1, serves as the master, and two E860-DTU (1010-400SL22)-S units, referred to as 1-1, 1-2 as Slave 1 and Slave 2, respectively. After a successful connection, the master's yellow LINK indicator will flash in a pattern of two on, one off. Two flashes of the yellow light indicate that two slaves are connected. Once the slaves are successfully connected in the correct order, the digital I/O mapping is complete. At this point, the correspondence between the master's DI and the slave's DO is as shown in the table below:

3.

Host	Slave
DI1 on 2-1	Slave 1: DO1 at 1-1
DI2 on 2-1	Slave 2: DO2 at 1-2

Table 3-4-1 Pairs of digital I/O between the master and slave under various one-to-many bidirectional configurations with different numbers of channels



Revision history

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Versions	Revision Date	Revision Notes	Maintaining people
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