Modbus RTU Relay

From Waveshare Wiki
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Overview

Modbus RTU Relay

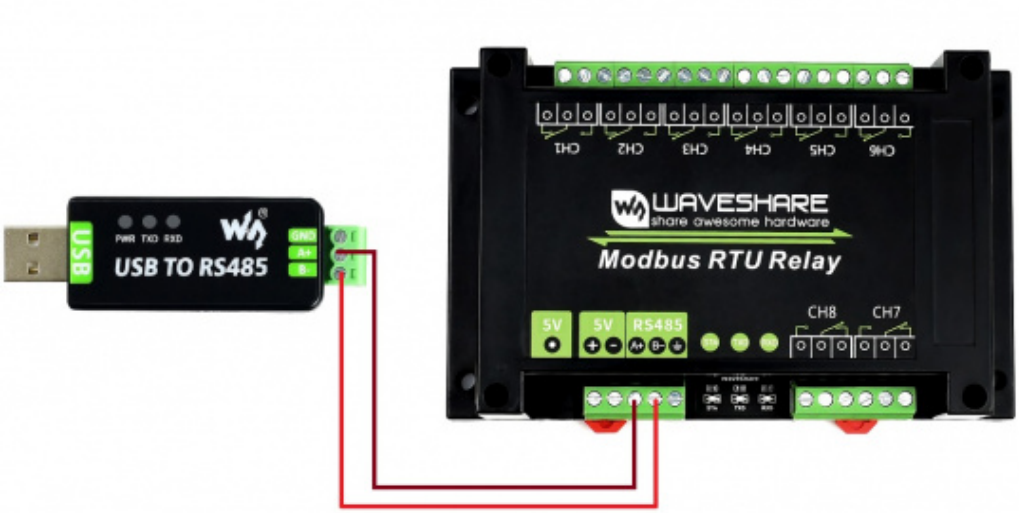
(https://www.waveshare.com/modbus-rtu-relay.htm)

Industrial Modbus RTU 8-ch Relay Module, RS485 Bus, Multi Protection

Hardware Test

RS485 Test

- Connect the USB TO 485 and the target board to A --> A and B --> B via cables as shown below:



(/wiki/File:Modbus_RTU_Relay-2.jpg)

- Download the SSCOM (https://files.waveshare.com/upload/9/9f/Sscom5.13.1_for_Modbus_RTU_Relay_V2.zip) and open it on the computer. Open the corresponding port number, set the baud rate as 9600, and click Multi-String to open the Multi-String Sending window, click the corresponding function to send the corresponding command.

(/wiki/File:Modbus_RTU_Relay_32CH03.png)

- If you need to send other commands then select HEX to send, plus check select ModbusCRC16 checksum, enter the first six bytes of the command, and click send then the CRC checksum will be added automatically.

(/wiki/File:Modbus_RTU_Relay_16CH03.png)

- For more detailed control commands, you can see them in the "Development Protocol".

From September 2021, the V2 version development protocol will be adopted. V2 version modifies the previous incompatible Modbus instruction and is fully compatible with Modbus protocol.
There is no difference between the hardware of V1 and V2 versions. Customers who have purchased the V2 development protocol before can contact customer service to upgrade the firmware.

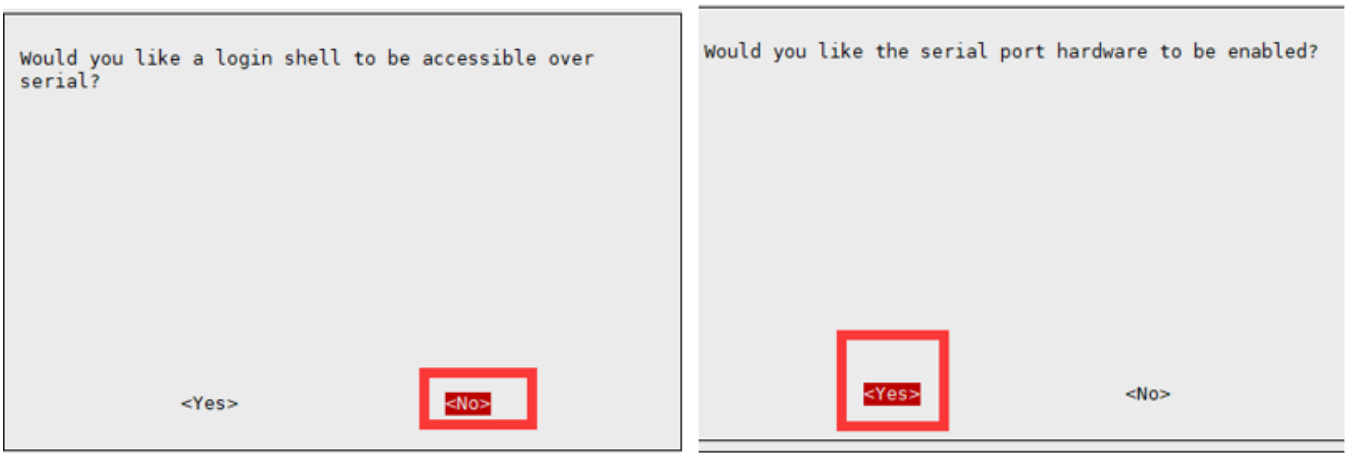
Demo Test

Note: RS485 can not be directly connected to the serial port of the Raspberry Pi, otherwise it may burn the device, you need to add 485 level conversion, the Raspberry Pi is recommended to use with the RS485 CAN HAT module, NUCLEO-F103RB, and Arduino is recommended to use with the RS485 CAN Shield module!

Raspberry Pi

Open the Raspberry Pi terminal and input the following commands to enter the configure interface:

```
sudo raspi-config
Select Interfacing Options -> Serial, disable shell visit, and open the serial port hardw
are
```



(/wiki/File:L76X_GPS_Module_rpi_serial.png)
And then reboot the Raspberry Pi:

```
sudo reboot
```

Open /boot/config.txt file, and find the following configure sentence to enable the serial ports. If there is none, you can add it at the end of the file.

```
enable_uart=1
```

For Raspberry Pi 3B users, the serial port is for Bluetooth and needs to be removed.

```
#dtoverlay=pi3-miniuart-bt
```

And then reboot the Raspberry Pi:

```
sudo reboot
```

If you want to insert the RS485 CAN HAT into the Raspberry Pi, connect the A and B ports of the Modbus RTU Relay module and the RS485 CAN HAT module.
If you use other 485 devices, you need to make sure A-A and B-B.
Run the following commands:

```
sudo apt-get install unzip
wget https://files.waveshare.com/upload/f/f9/Modbus_RTU_Relay_Code.zip
unzip Modbus_RTU_Relay_Code.zip
cd Modbus_RTU_Relay_Code/Python3
sudo python3 main.py
```

SRM32

The STM32 demos are based on the NUCLEO-F103RB and the RS485 CAN Shield module. Find the STM32 program file directory and open the STM32 project. Note that before using the computer to ensure that the keil5 software has been installed, download the demo to

the development board can be downloaded.
Normal operation of the relay module will turn on and then turn off in turn. The serial port will output the command sent.

Arduino

The Arduino demos are based on the NUO PLUS and RS485 CAN Shield modules.
Use Arduino IDE to open the demo, select the corresponding development board, and then download the demo.
The relay module will turn on and then turn off in order to run normally. The serial port will output the commands sent.

Development Protocol V2

From September 2021, the V2 of the development protocol will be adopted. The V1 is not compatible with Modbus commands and now the V2 is fully compatible with the Modbus protocol.
There is no difference in hardware between V1 and V2. Customers who have purchased the V1 version but need to use the V2 development agreement, can contact customer service to upgrade the firmware.

Function code

Function code	Description
01	Read the state of Relay
03	Read the address and version
05	Write a single Relay
06	Set baud rate and address
0F	Write all Relays

Control Single Relay

Command: 01 05 00 00 FF 00 8C 3A

Byte	Meaning	Description
01	Device address	0x00: the broadcast address; 0x01-0xFF: device addresses
05	05 Command	Command for controlling Relay
00 00	Address	The register address of controlled Relay, 0x0000 - 0x0008
FF 00	Command	0xFF00: open Relay; 0x0000： close Relay; 0x5500: flip Relay
8C 3A	CRC16	The CRC16 checksum of the first six bytes

Answer: 01 05 00 00 FF 00 8C 3A

Byte	Meaning	Description
01	Device address	0x00: the broadcast address; 0x01-0xFF: dives addresses
05	05 Command	Command for controlling relay
00 00	Address	The register address of controlled Relay,0 x 0000-0 x 0008
FF 00	Command	0xFF00: open Relay; 0x0000: close Relay 0x5500: flip Relay
8C 3A	CRC16	The CRC16 checksum of the first six bytes.

Examples: [Device with address 01]:

Relay 0 OFF: 01 05 00 00 00 00 CD CA

Relay 1 ON: 01 05 00 01 FF 00 DD FA

Relay 1 OFF: 01 05 00 01 00 00 9C 0A

Relay 2 ON: 01 05 00 02 FF 00 2D FA

Relay 2 OFF: 01 05 00 02 00 00 6C 0A

Relay 3 ON: 01 05 00 03 FF 00 7C 3A

Relay 3 OFF: 01 05 00 03 00 00 3D CA

Relay 0 Flip: 01 05 00 00 55 00 F2 9A

Relay 1 Flip: 01 05 00 01 55 00 A3 5A

Relay 2 Flip: 01 05 00 02 55 00 53 5A

Relay 3 Flip: 01 05 00 03 55 00 02 9A

Controll All Relays

Command: 01 05 00 FF FF 00 BC 0A

BC 0A||CRC16|| CRC16 checksum of the first 6 bytes of data

Byte	Meaning	Description
01	Device address	0x00: the broadcast address; 0x01-0xFF: devices address
05	05 command	Command for controlling Relay
00 FF	Address	Fixed 0x00FF
FF 00	CRC16	0xFF00: Relay open; 0x0000: Relay close; 0x5500: Relay flip

Answer: 01 05 00 FF FF 00 BC 0A

Byte	Meaning	Description
01	Device address	0x00: the broadcast address; 0x01-0xFF: devices address
05	05 command	Command for controlling Relay
00 FF	Address	Fixed 0x00FF
FF 00	CRC16	0xFF00: Relay open; 0x0000: Relay close; 0x5500: Relay flip
BC 0A	CRC16	The CRC16 checksum of the first six bytes

Example:

[Device with Address 01]:

All relays open: 01 05 00 FF FF 00 BC 0A

All relays closed: 01 05 00 FF 00 00 FD FA

All relays flip: 01 05 00 FF 55 00 C2 AA

Read States of Relays

Command：01 01 00 00 00 08 3D CC

Bytes	Meaning	Description
01	Device address	0x00: the broadcast address; 0x01-0xFF: device addresses
01	01 Command	Command for checking states of Relay
00 00	Initial Address	Fixed 0 x 0000
00 08	Command	Fixed 0 x 0008
3D CC	CRC16	The CRC16 checksum of the first six bytes

Answer：01 01 01 00 51 88

Byte	Meaning	Description
01	Device address	0x00: the broadcast address; 0x01-0xFF: device addresses
01	01 Command	Command for checking states of Relay
01	Number	The number of bytes returned
00	Stae	The state of Relay Bit0: The state of the first Relay; Bit1: The state of the second Relay; Bit2: The state of the third Relay; …… Bit7: The state of the eighth Relay
8C 35	CRC16	The CRC16 checksum of the first six bytes

Examples:

[Device with Address 01]

Command: 01 01 00 00 00 08 3D CC

Answer: 01 01 01 00 51 88 //Close all Relays

Command: 01 01 00 00 00 08 3D CC

Answer: 01 01 01 01 90 48 //Open Relay 0 and close other Relays

Command: 01 01 00 00 00 08 3D CC

Answer: 01 01 01 41 91 B8 //Open Relay 0 and Relay 6, close other Relays

Write States of Relays

Command: 01 0F 00 00 00 08 01 FF BE D5

Bytes	Meaning	Description
01	Device address	0x00: the broadcast address; 0x01-0xFF: the device address
0F	0F Command	Write Relay Status Command
00 00	Relay start address	Fixed 0x0000
00 08	Number of relays	Fixed 0x0008
01	Number of bytes	Fixed 0x01
FF	Relay Status	Bit0: control the first relay; Bit1: control the second relay; Bit2: control the third relay; …… Bit7: Control the eighth relay
BE D5	CRC16	CRC16 checksum of the first 6 bytes of data

Answer: 01 0F 00 00 00 01 94 0B

Bytes	Meaning	Description
01	Device address	0x00: the broadcast address; 0x01-0xFF: the device address
0F	0F Instruction	All Register Control Instructions
00 00	Address	Fixed 0x0000
00 08	Number of relays	Fixed 0x0008
54 0D	CRC16	CRC16 checksum of the first 6 bytes of data

Example:

[Device with Address 01]

All relays on: 01 0F 00 00 00 08 01 FF BE D5

All relays off: 01 0F 00 00 00 08 01 00 FE 95

0-1 ON; 3-7 OFF: 01 0F 00 00 00 08 01 03 BE 94

Relay Flash ON/OFF Command

Command: 01 05 02 00 00 07 8D B0

Bytes	Meaning	Description
01	Device address	0x00: the broadcast address; 0x01-0xFF: the device address
05	05 Command	Single Control Command
02	Command	02 for flashing on, 04 for flashing off
00	Relay Address	The address of the relay to be controlled, 0x00~0x08
00 07	Interval time	Delay time is data*100ms Value: 0x0007, delay: 7*100MS = 700MS
8D B0	CRC16	CRC16 checksum of the first 6 bytes of data

Answer: 01 05 02 00 00 07 8D B0

Bytes	Meaning	Description
01	Device address	0x00: the broadcast address; 0x01-0xFF: the device address
05	05 Command	Single Control Command
02	Command	02 for flashing on, 04 for flashing off
00	Relay address	To control the relay address, 0x00~0x08
00 07	Interval time	Delay time is data*100ms Value: 0x0007, delay: 7*100MS = 700MS
8D B0	CRC16	CRC16 checksum of the first 6 bytes of data

Example:

[Device with Address 01]

Relay 0 is open: 01 05 02 00 00 07 8D B0 //700MS = 7*100MS = 700MS

No.1 relay out of the way: 01 05 02 01 00 08 9C 74 //800MS

No.0 relay flashes off: 01 05 04 00 00 05 0C F9 //500MS

No.1 relay flashes off: 01 05 04 01 00 06 1D 38 //600MS

Set Baud Rate Command

Command: 00 06 20 00 00 05 43 D8

Bytes	Meaning	Description
00	device address	0x00: the broadcast address; 0x01-0xFF: the device address
06	06 command	set baud rate and address
20 00	command register	0x2000 sets the baud rate, 0x4000 sets the device address
00	parity	0x00: no parity check, 0x01: even parity check, 0x02: odd parity check
05	baud rate value	the corresponding baud rate value: 0x00: 4800 0x01: 9600 0x02: 19200 0x03: 38400 0x04: 57600 0x05: 115200 0x06: 128000 0x07: 256000
43 D8	crc16	CRC16 checksum of the first 6 bytes of data

Answer: 00 06 20 00 00 05 43 D8

Bytes	Meaning	Description
00	Device address	0x00: the broadcast address; 0x01-0xFF: the device address
06	06 command	set baud rate and address
20 00	command register	0x2000 sets the baud rate, 0x4000 sets the device address
00	parity	0x00: no parity check, 0x01: even parity check, 0x02: odd parity check
05	baud rate value	the corresponding baud rate value: 0x00: 4800 0x01: 9600 0x02: 19200 0x03: 38400 0x04: 57600 0x05: 115200 0x06: 128000 0x07: 256000
43 D8	CRC16	CRC16 checksum of the first 6 bytes of data

Examples:

[Device with Address 01]

Set baud rate 4800: 00 06 20 00 00 00 83 DB

Set baud rate 9600: 00 06 20 00 00 01 42 1B

Set baud rate 115 200: 00 06 20 00 00 05 43 D8

Set Device Address Command

Command: 00 06 40 00 00 01 5C 1B

Bytes	Meaning	Description
00	device address	0x00: the broadcast address; 0x01-0xFF: the device address
06	06 command	set the baud rate and device address
40 00	command register	0x2000 sets the baud rate, 0x4000 sets the device address
00 01	device address	set the device address as 0x0001-0x00FF
5C 1B	CRC16	CRC16 checksum of the first 6 bytes of data

Answer: 00 06 40 00 00 01 5C 1B

Bytes	Meaning	Description
00	device address	0x00: broadcast address; 0x01-0xFF: device addresses
06	06 command	set baud rate and device address
40 00	command register	0x2000 sets baud rate, 0x4000 sets device address
00 01	device address	the device address set; 0x0001-0x00FF
5C 1B	CRC16	CRC16 checksum of the first 6 bytes of data

Examples:

[Device with Address 01]

Set device address as 0x01: 00 06 40 00 00 01 5C 1b

Set device address as 0x02: 00 06 40 00 00 02 1C 1A

Set device address as 0x03: 00 06 40 00 00 03 DD DA

Read Device Address Command

Command: 00 03 40 00 00 01 90 1B

Bytes	Meaning	Description
00	Device address	0x00: the broadcast address; 0x01-0xFF: the device address
03	03 command	read the device address command
40 00	command register	0x0200: read the software version, 0x0040: read the device address
00 01	bytes	fixed 0x0001
90 1B	CRC16	CRC16 checksum of the first 6 bytes of data

Answer: 01 03 02 00 01 79 84

Bytes	Meaning	Description
00	device address	0x00: the broadcast address; 0x01-0xFF: the device address
03	03 command	Read the software version and the device address command
02	bytes	return bytes
00 01	device address	set the device address as 0x0001-0x00FF
79 84	CRC16	CRC16 checksum of the first 6 bytes of data

Examples:
[Device with Address 01]
Command: 00 03 40 00 00 01 90 1B
Answer: 01 03 02 00 01 79 84 //address 0x01
[Device with Address 02]
Command: 00 03 40 00 00 01 90 1B
Answer: 02 03 02 00 02 7D 85 //address 0x02
[Device with Address 03]
Command: 00 03 40 00 00 01 90 1B
Answer: 03 03 02 00 03 81 85 //address 0x03

Read Software Version Command

Command: 00 03 80 00 00 01 AC 1B

Bytes	Meaning	Description
01	Device address	0x00: the broadcast address; 0x01-0xFF: the device address
03	03 command	Read the software version and the device address command
80 00	command register	0x4000:read the device address, 0x8000: read the software version
00 01	Bytes	Fixed 0x0001
8F CA	CRC16	CRC16 checksum of the first 6 bytes of data

Answer: 01 03 02 00 C8 F0 B8

Bytes	Meaning	Description
01	Device Adress	0x00: the broadcast address, 0x01-0xFF: the device addresses
03	03 Command	Read the software version and the device address command
02	Bytes	Return bytes
00 C8	Software version	Convert to decimal and move the decimal point to the left by two places to indicate the software version 0x00C8 = 200 = V2.00
F0 B8	CRC16	CRC16 checksum of the first 6 bytes of data

Examples:

Command: 00 03 80 00 00 01 AC 1B

Answer: 03 03 02 00 C8 F1 00 //0x00C8=200=V2.00

Development Protocol V1

From September 2021, the V2 of the development protocol will be adopted. The V1 is not compatible with Modbus commands and now the V2 is fully compatible with the Modbus protocol.

There is no difference in hardware between V1 and V2. Customers who have purchased the V1 version but need to use the V2 development agreement can contact customer service to upgrade the firmware.

Command Format

The command contains 8 bytes:

Byte 1: Device Address

Byte 2: Function code

Byte 3 4: Address of register (big-endian)

Byte 5 6: data of register (big-endian)

Byte 7 8: CRC16 cheksum (little-endian)

Function code

Function code	Description
01	Read the state of Relay
03	Read address, revision
05	Write single Relay
06	Configure baudrate, address
0F	Write all Relays

Control single relay

Command: 01 05 00 00 FF 00 8C 3A

Byte	Meaning	Description
01	Device address	0 x 00 is broadcast address；0x01-0xFF are device addresses (Device address is 01 by default)
05	05 Command	Command for controlling Relay
00 00	Address	The register address of controlled Relay, 0 x 0000 - 0 x 0008
FF 00	Command	0 x FF00: Open Relay; 0 x 0000: Close Relay; 0 x 5500: Flip Relay
8C 3A	CRC16	The CRC16 checksum of the first six bytes.

Answer: 01 05 00 00 FF 00 8C 3A

Byte	Meaning	Description
01	Device address	0 x 00 is broadcast address; 0 x 01-0 x FF are dives addresses
05	05 Command	Command for controlling relay
00 00	Address	The register address of controlled Relay,0 x 0000-0 x 0008
FF 00	Command	0 x FF00: Open Relay; 0 x 0000: Close Relay 0 x 5500: Flip Relay
8C 3A	CRC16	The CRC16 checksum of the first six bytes.

Examples: [Device with address 01]: Open Relay 0: 01 05 00 00 FF 00 8C 3A

Close Relay 0: 01 05 00 00 00 00 CD CA

Open Relay 1: 01 05 00 01 FF 00 DD FA

Close Relay 1: 01 05 00 01 00 00 9C 0A

Open Relay 2: 01 05 00 02 FF 00 2D FA

Close Relay 2: 01 05 00 02 00 00 6C 0A

Open Relay 3: 01 05 00 03 FF 00 7C 3A

Close Relay 3: 01 05 00 03 00 00 3D CA

Flip Relay 0: 01 05 00 00 55 00 F2 9A

Flip Relay 1: 01 05 00 01 55 00 A3 5A

Flip Relay 2: 01 05 00 02 55 00 53 5A

Flip Relay 3: 01 05 00 03 55 00 02 9A

Controll all Relay

Command: 01 05 00 FF FF 00 BC 0A

Byte	Meaning	Description
01	Device address	0 x 00 is broadcast；0 x 01-0 x FF are devices address
05	05 command	Command for controlling Relay
00 FF	Address	Fixed 0 x 00FF
00 FF	Command	0 x 00FF: Open Relay;
F 00	CRC16	The CRC16 checksum of the first six bytes

Answer： 01 05 00 FF FF 00 BC 0A

Byte	Meaning	Description
01	Devices	0 x 00 is broadcast address；0 x 01-0 x FF is device address
05	05 Command	Command for controlling
00 FF	Address	Fixed 0 x 00FF
FF 00	Command	0 x FFFF: Open Relay; 0 x 0000: Close Relay; 0 x 5A00: Flip Relay;
BC 0A	CRC16	The CRC16 checksum of the first six bytes.

Example：

[Device with address 01]:

Open all Relays: 01 05 00 FF FF 00 BC 0A

Close all Relays: 01 05 00 FF 00 00 FD FA

Flip all Relays: 01 05 00 FF 55 00 C2 AA

Read states of Relays

Command：01 01 00 00 00 08 3D CC

Bytes	Meaning	Description
01	Device address	0 x 00 is broadcast address；0 x 01-0 x FF are device addresses
01	01 Command	Command for checking states of Relay
00 00	Address	Fixed 0 x 00FF
00 08	Command	Fixed 0 x 0008
3D CC	CRC16	The CRC16 of the first six bytes

Answer: 01 01 01 00 8C 35

Byte	Meaning	Description
01	Device address	0 x 00 is broadcast address; 0 x 01-0 x FF are device addressese
01	01 Command	Command for checking states of Relay
01	Number	The number of bytes returned。
00	Sate	The state of Relay Bit0: The state of the first Relay; Bit1: The state of the second Relay; Bit2: The state of the third Relay; …… Bit7:The state of the eighth Relay;
8C 35	CRC16	The CRC16 checksum of the first six bytes.

Examples:

[Device with Address 01]

Command: 01 01 00 00 00 08 3D CC

Answer: 01 01 01 00 51 88 //Close all Relays

Command: 01 01 00 00 00 08 3D CC

Answer: 01 01 01 01 90 48 //Open Relay 0 and close other Relays

Command: 01 01 00 00 00 08 3D CC

Answer: 01 01 01 41 91 B8 //Open Relay 0 and Relay 6, close other Relays

Write Relay

Command: 01 0F 00 00 00 08 01 FF BE D5

Byte	Meaning	Description
01	Device address	0x00 is the boradcast address；0x01-0xFF are device addresses
0F	0F Command	Command for writing Relay
00 00	Begin Address	Fixed 0x0000
00 08	number of Channels	Fixed 0x0008
01	number of bytes	Fixed 0x01
FF	Status of Relays	Bit0: Control the first channel; Bit1: Control the second channel; Bit2: Control the third channel; ... Bit7: Control the seventh channel:
BE D5	CRC16	The CRC16 checksum of the first six bytes.

Answer: 01 0F 00 00 00 08 54 0D

Byte	Meaning	Description
01	Device address	0x00 is the boradcast address; 0x01-0xFF are device addresses
0F	0F Command	Command for controlling all Relay
00 00	Address	Fixed 0x0000
00 08	number of channels	Fixed 0x0008
54 0D	CRC16	The CRC16 checksum of the first six bytes

Example:

[Device with address 01]

Open all Relay: 01 0F 00 00 00 08 01 FF BE D5

Close all Relay: 01 0F 00 00 00 08 01 00 FE 95

0-1 Open；3-7 Close: 01 0F 00 00 00 08 01 03 BE 94

Open/Close Relay in certain time

Command: 01 05 02 00 00 07 8D B0

Byte	Meaning	Description
01	Device address	0 x 00 is the boradcast address; 0 x 01-0 x FF are device addresses
05	05 Command	Command for controlling signle Relay
02	Command	02 is the command for closing Relay in the current time，04 is the command for opening Relay in the current time
00	Address of Relay	The address of Relay controlled
00 07	Delay	The Delay time is Data*100ms Data:0 x 0007，Delay:7*100MS = 700MS
8D B0	CRC16	The CRC16 checksum of the first six bytes.

Answer：01 05 02 00 00 07 8D B0

Byte	Meaning	Description
01	Device address	0 x 00 is the boradcast address；0 x 01-0 x FF are device addresses
05	05 Command	Command for controlling single Relay
02	Command	02 is the command for closing Relay in the current time，04 is the command for opening Relay in the current time
00	Address of Relay	The address of Relay controlled
00 07	Delay	The delay time is the data*100ms data:0 x 0007，Delay:7*100MS = 700MS
8D B0	CRC16	The CRC16 checksum of the first six bytes.

Example：

[Device with address 01]

Open Relay 0: 01 05 02 00 00 07 8D B0 //700MS = 7*100MS = 700MS

Open Relay 1: 01 05 02 01 00 08 9C 74 //800MS

Close Relay 0: 01 05 04 00 00 05 0C F9 //500MS

Close Relay 1: 01 05 04 01 00 06 1D 38 //600MS

Set baud rate

Command: 00 06 20 00 00 05 43 D8

Byte	Meaning	Description
00	Device address	0 x 00 is the boradcast address; 0 x 01-0 x FF are device addresses
06	06 Command	Set baud rate or device address
20 00	Command register	0x2000: Set baud rate，0 x 4000:Set device address
00	Parity	0x00: None; 0 x 01: Even; 0 x 02: Odd
05	Baud rate	Baudrate: 0 x 00: 4800 0 x 01: 9600 0 x 02: 19200 0 x 03: 38400 0 x 04: 57600 0 x 05: 115200 0 x 06: 128000 0 x 07: 256000
43 D8	CRC16	The CRC16 checksum of the first six bytes.

Answer: 00 06 20 00 00 05 43 D8

Byte	Meaning	Description
00	Device address	0 x 00 is the boradcast address; 0 x 01-0xFF are device addresses
06	06 Command	Set baud rate or device address
20 00	Command register	0 x 2000: Set baud rate, 0 x 4000 Set device address
00	Parity	0 x 00: None; 0 x 01: Even; 0 x 02: Odd
05	Baud rate	The baud rate 0 x 0000: 4800 0 x 0001: 9600 0 x 0002: 19200 0 x 0003: 38400 0 x 0004: 57600 0 x 0005: 115200 0 x 0006: 128000 0 x 0007: 256000
43 D8	CRC16	The CRC16 checksum of the first six bytes.

Example:

[Device with address 0 x 01]

Set baud rate as 4800: 00 06 20 00 00 00 83 DB

Set baud rate as 9600: 00 06 20 00 00 01 42 1B

Set baud rate as 115200: 00 06 20 00 00 05 43 D8

Set device address

Command: 00 06 40 00 00 01 5C 1B

Byte	Meaning	Description
00	Device address	0 x 00 is the boradcast address; 0 x 01-0 x FF are device addresses
06	06 Command	Set baud rate or device address
40 00	Command register	0 x 2000: Set baud rate, 0 x 4000: Set device address
00 01	Device address	The device address,0 x 0001-0 x 00FF
5C 1B	CRC16	The CRC16 checksum of the first six bytes.

Answer: 00 06 40 00 00 01 5C 1B

Byte	Meaning	Description
00	Device address	0x00 is the boradcast address；0 x 01-0 x FF are device addresses
06	06 Command	Set baud rate or device address
40 00	Command register	0 x 2000: Set baud rate，0 x 4000:Set device address
00 01	Device address	Set device address,0 x 0001-0 x 00FF
5C 1B	CRC16	The CRC16 checksum of first six bytes.

Example:

[Device with address 0 x 01]

Set device address as 0 x 01: 00 06 40 00 00 01 5C 1b
Set device address as 0 x 02: 00 06 40 00 00 02 1C 1A
Set device address as 0 x 03: 00 06 40 00 00 03 DD DA

Read device address

Command: 00 03 40 00 00 01 90 1B

Byte	Meaning	Description
00	Device address	0 x 00 is the boradcast address; 0 x 01-0 x FF are device addresses
03	03 Command	Read Device address
40 00	Command register	0 x 0200: Read software revision, 0 x 0040: Read device address
00 01	Device address	Device address
90 1B	CRC16	The CRC16 checksum of the first six bytes.

Answer: 01 03 02 00 01 79 84

Byte	Meaning	Description
01	Device address	0 x 00 is the boradcast address; 0 x 01-0 x FF are device addresses
03	03 commands	Read software revision or device address
02	Number of bytes	Number of bytes returned
00 01	Device address	Devicess
79 84	CRC16	The CRC16 checksum of the first six bytes.

Example:

[Device with address 01]

Command: 00 03 40 00 00 01 90 1B
Answer: 01 03 02 00 01 79 84 //Device address 0x01
[Device with address 02]

Command: 00 03 40 00 00 01 90 1B
Answer: 02 03 02 00 02 7D 85 //Device address 0x02
[Device with address 03]

Command: 00 03 40 00 00 01 90 1B

Answer: 03 03 02 00 03 81 85 //Device address 0x03

Read software revision

Command: 00 03 80 00 00 01 AC 1B

Byte	Meaning	Description
01	device address	0 x 00 is the boradcast address; 0 x 01-0 x FF are device addresses
03	03 Command	Read software revision or device address
80 00	Command register	0 x 8000: Read software revision, 0 x 4000: Read device address.
00 01	number of bytes	Fixed 0 x 0001
AC 1B	CRC16	The CRC16 checksum of the first six bytes.

Answer：01 03 02 00 C8 F0 B8

Byte	Meaning	Description
01	Device address	0 x 00 is the boradcast address; 0 x 01-0 x FF are device addresses
03	03 Command	Read software revision, read device address
02	Number of bytes	number of bytes returned
00 C8	Software revision	It should be converted to DEC and divided with 100, for example 0 x 00C8 = 200 = V2.00
F0 B8	CRC16	The CRC16 checksum of the first six bytes.

Example:

Command: 00 03 80 00 00 01 AC 1B

Answer: 03 03 02 00 C8 F1 00 //0 x 00C8 = 200 =V2.00

Resources

- Protocol Manual of Modbus RTU Relay (/wiki/Protocol_Manual_of_Modbus_RTU_Relay)

Demo codes

- Demo codes (https://files.waveshare.com/upload/f/f9/Modbus_RTU_Relay_Code.zip)

Softwares

- Sscom software for Modbus RTU Relay (https://files.waveshare.com/upload/e/e3/Sscom5.13.1_for_Modbus_RTU_Relay.zip)

- Sscom software for Modbus RTU Relay V2 (https://files.waveshare.com/upload/9/9f/Sscom5.13.1_for_Modbus_RTU_Relay_V2.zip)

FAQ

Question:It doesn't work on non-windows systems, how can I fix it?

Answer:

Click here (https://www.ftdichip.cn/Drivers/D2XX.htm) to install the corresponding drivers.

Question:Does it support Linux system?

Answer:

Yes, it also supports Win7/8/8.1/10/11, Mac, Linux, Android, and WinC...

Question:What about the RS485 proximity communication exception, the received data will be more than 0?

Answer:

Remove the 120-ohm termination matching resistor for RS485.

Question:Support USB to RS232,RS485 and TTL at the same time?

Answer:

Not supported, only USB to one of the three, USB to RS232, RS485, or TTL.
It is not possible to simultaneously convert RS232, RS485, and TTL to USB.

Question:Does it support RS232,RS485 and TTL interchange?

Answer:

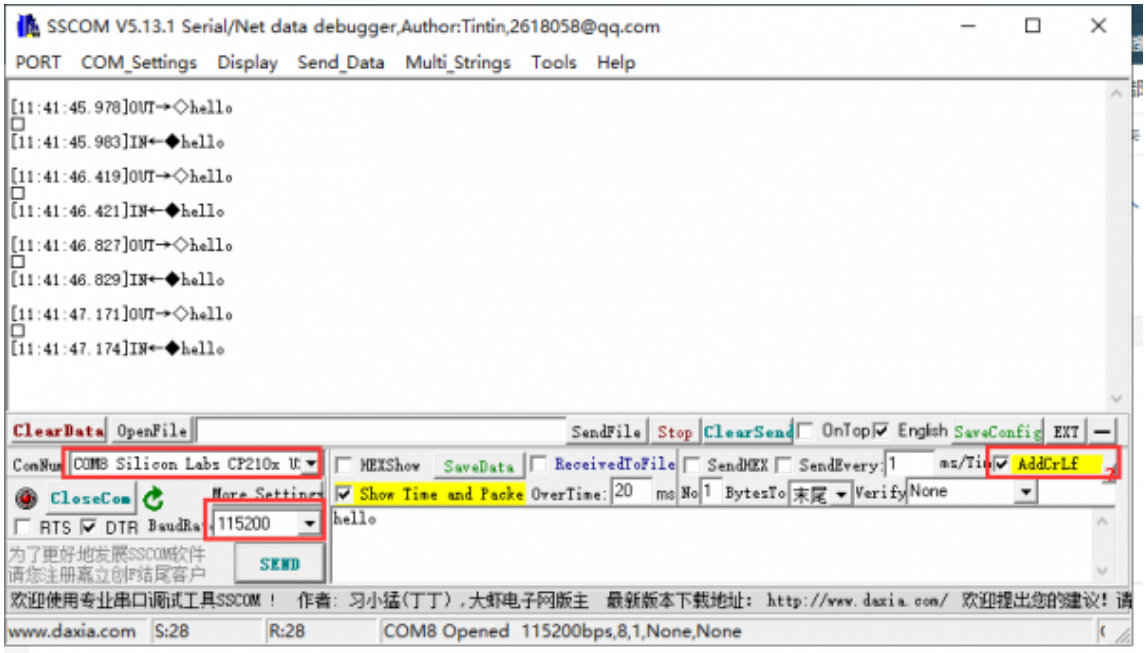
Not supported, RS232, RS485 and TTL can not be interchangeable, support USB to RS232, RS485, or TTL.

Question:How can I confirm that the TTL, RS232 or RS485 function is working?

Answer:

TTL and RS232 are full-duplex communication, you can short RXD and TXD to test, RS485 is half-duplex communication, you can test with an external USB to RS485 device, the following figure is the loopback test TTL:

(/wiki/File:Serial_Module_FAQ01.png)



(/wiki/File:Serial_Module_FAQ02.png)

Question:What is the VCC function?

Answer:

VCC is the power supply pin, which can be switched by 5V or 3.3V (50mA) to power the connected device, if the device already has another external power supply, it can be connected without VCC.

Support

Technical Support

If you need technical support or have any feedback/review, please click the **Submit Now** button to submit a ticket, Our support team will check and reply to you within 1 to 2 working days. Please be patient as we make every effort to help you to resolve the issue.
Working Time: 9 AM - 6 AM GMT+8 (Monday to Friday)

Submit Now (https://service.waveshare.com/)