Modbus RTU introduction of instruction

Modbus device through receive from external control terminal (like Host computer/MCU) Modbus RTU instruction to perform related operations, one frame instruction generally consists of device address, function code, register address, register data, and check code, frame length is related to function code. Each frame date's first byte is the device address. Can set range on 1-255 default 255(scilicet 0xFF), the last 2byte is CRC check code.

Suppose the device address is 255, the commonly used Modbus RTU instructions are as follows:

 Open no.1 relay (manual mode)

 send:
 FF 05 00 00 FF 00 99 E4

 return:
 FF 05 00 00 FF 00 99 E4

 remarks:
 FF 05 00 00 FF 00 99 E4

(1)the 3--4th byte of the transmitted frame represents the relay address, the relay 1-relay 8 address are respectively 0x0000, 0x0001, 0x0002, 0x0003, 0x0004, 0x0005, 0x0006, 0x0007

(2)the 5--6th byte of the transmitted frame represents Data, 0xFF00 represent turn on relay, 0x0000 represents turn off relay

 Z.
 Turn off the relay No. 1 (manual mode)

 send:
 FF 05 00 00 00 00 D8 14

 return:
 FF 05 00 00 00 00 D8 14

 3.
 Turn on the relay No. 2 (manual mode)

 send:
 FF 05 00 01 FF 00 C8 24

 return:
 FF 05 00 01 FF 00 C8 24

4. Turn off the relay no.2 (manual mode) send: FF 05 00 01 00 00 89 D4 return: FF 05 00 01 00 00 89 D4

5. Turn on all relay send: FF 0F 00 00 00 08 01 FF 30 1D return: FF 0F 00 00 00 08 41 D3

6. Turn off all relay send: FF 0F 00 00 00 08 01 00 70 5D return: FF 0F 00 00 00 08 41 D3

 7.
 Set the device address to 1

 send:
 00 10 00 00 01 02 00 01 6A 00

 return:
 00 10 00 00 00 01 02 00 01 6A 00

 remark:
 The 9th byte of the transmitted frame, 0x01 is the written device address.

8. Set the device address to 255

 send:
 00 10 00 00 01 02 00 FF EB 80

 return:
 00 10 00 00 01 02 00 FF EB 80

 remark:
 The 9th byte of the transmitted frame, 0xFF is the written device address.

9. Read device address

send: 00 03 00 00 00 01 85 DB

return: 00 03 02 00 FF C5 C4

remarks: The 5th byte of the Return frame, 0xFF is the read device address

10. Read relay state

send:FF 01 00 00 00 08 28 12return:FF 01 01 01 A1 A0remarks:The 4th byte of the Return frame, Bit0--Bit7 of 0x01 representing relay 1-relay 8,0 is turn off, 1 is turn on.

11.Read optocoupler input statussend:FF 02 00 00 00 8 6C 12return:FF 02 01 01 51 A0remarks:The 4th byte of the Return frame, Bit0--Bit7 of 0x01 representoptocoupler 1 - optocoupler 8 input signal, 0 represent low level, 1 represent high level

 12. Set the baud rate to 4800

 send:
 FF 10 03 E9 00 01 02 00 02 4A 0C

 return:
 FF 10 03 E9 00 01 C5 A7

 remarks:
 the 9th byte of the transmitted frame is the baud rate setting value ,0x02, 0x03, x04

 represents 4800, 9600, 19200

 13.
 Set the baud rate to 9600

 send:
 FF 10 03 E9 00 01 02 00 03 8B CC

 return:
 FF 10 03 E9 00 01 C5 A7

 14.
 Set the baud rate to 9600

 send:
 FF 10 03 E9 00 01 02 00 04 CA 0E

 return:
 FF 10 03 E9 00 01 C5 A7

15. Read the baud rate

 send:
 FF 03 03 E8 00 01 11 A4

 return:
 FF 03 02 00 04 90 53

 remarks:
 The 5th byte of the Return frame represent baud rate, 0x02, 0x03, x04 represents

 4800,9600,19200.

 16.
 Turn on no. 1 relay (flash ON mode)

 send:
 FF 10 00 03 00 02 04 00 04 00 14 C5 9F

 return:
 FF 10 00 03 00 02 A4 16

 remarks:
 FF 10 00 03 00 02 A4 16

(1)the 3-4th byte of the transmitted frame is represent relay address, relay1-relay8's address separately is 0x0003, 0x0008, 0x000D, 0x0012, 0x0017, 0x001C, 0x0021, 0x0026

(2)The 10th-11th byte of the transmitted frame represents the delay setting value, and the delay base is 0.1S, so the delay time is 0x0014*0.1=20*0.1S=2S, and the relay automatically turns off after turned on 2S

17. Turn off no. 1 relay (flash OFF mode)

send: FF 10 00 03 00 02 04 00 02 00 1E A5 99

return: FF 10 00 03 00 02 A4 16

remarks:

(1)the 3-4th byte of the transmitted frame is represent relay address, relay1-relay8's address separately is 0x0003, 0x0008, 0x000D, 0x0012, 0x0017, 0x001C, 0x0021, 0x0026

(2)The 10th-11th byte of the transmitted frame represents the delay setting value, and the delay base is 0.1S, so the delay time is 0x001E*0.1=30*0.1S=3S, and the relay automatically turns off after turned on 3S

Simple instructions

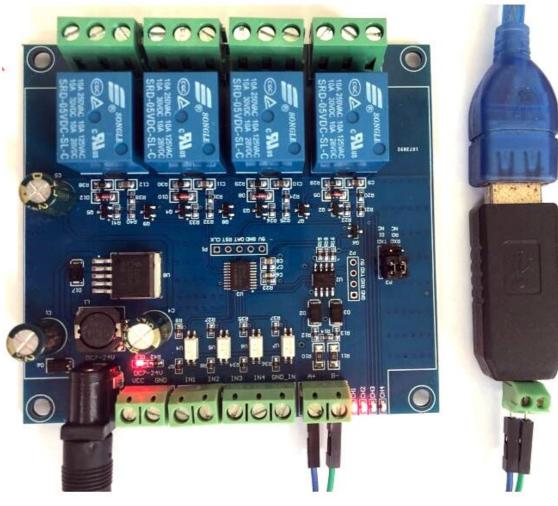
Modbus relay module can via RS485/TTL UART interface received from host computer /MCU's Modbus RTU command to perform related operations. The following is an example of using the host computer software via the RS485 interface to open relay 1 (manual mode), suppose device address for 255. baud rate is 9600. Then steps of usage as follows:

1, VCC, GND: Connect to the power

2, A+, B- : Connect to A+ and B- of external device

3, turn on host computer software ModbusRTU configuration Tool, choose correct port number, baud rate is 9600.default address is 255, click open serial ports4,

then click "JD1 ON" button can turn on relay 1 ,meanwhile indicator of relay 1 lights up as below:



50	COM3	٠	支持车	9600	•	0	打开串印	3	设置地	ŧĽ.	打开	ÈØ	月31-月38开	开始地址		至 10	JD1-JD8
유전력	DA#1012-A	-	地址	255			美闲里	3	读取地	ti i	关础	18	JD1-JD 8英	Billin	8 1 12		JD1-JD8
电器														1.4		调试值的	8
J119	€ 6		10	R¥1	0		TRAH			JD4	Ŧ						F成功14:25:12 05 00 00 77 00 99
1		,			0				0	1		U				14:26:1	3
3153	Ŧ 🧧	2	л	6开			开加几		8	JUS	Ŧ	2				12(LIFF) 14:26:13	05 00 00 FF 00 99 3
1					v											成功! 1	4:26:13 05 00 01 FF 00 C8
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How to generate check code

Modbus RTU command are send through upper PC software (like:ModbusRTU configuration Tool),CRC check code is auto generated, if want use serial debugging software (like SSCOM)to test Modbus relay module then need manually generated

CRC check code put on the end of transmitted frame, such as turn on the first relay (manual mode)

1. Turn on/off of relay (manual mode) transmitted frame composition :

device address (1Byte) +function code (1Byte) + register address (2Byte) + register data (2Byte) +CRC check code (2Byte)

2. Suppose the device address is 0xFF, Then the first 6 bytes of the transmitted frame are FF 05 00 00 FF 00

3. Use the CRC check tool to check the 6 bytes <u>http://www.ip33.com/crc.html</u>

	CRC (循环)	冗余校验)在线计算							
	Hex OAscii								
需要校验的数据:	FF 05 00 00 FF 00								
	输入的数据为16进制,例如:	31 32 33 34							
參数模型 NAME:	CRC-16/MODBUS x16+x15+x2+1								
宽度 WIDTH:	16 *								
多项式 POLY (Hex):	8005	例如:3D65							
初始值INIT(Hex):	FFFF	例如1:FFFF							
结果异成值 XOROUT(Hex):	0000	例如:0000							
	✓输入数据反转(REFIN)	※输出数据反转(REFOUT)							
	计算 清空								
校验计算结果 (Hex);	E499	短制							
	高位在左低位在右,使用时请	注意高低位顺序!!!							

4. Exchange checksum calculation result E499 high and low byte position then get CRC check code 99E4 and complete transmission frame: FF 05 00 00 FF 00 99 E4

5. Through serial port debugging software SSCOM V5.13.1 use the transmission frame send to modbus relay module can open first way relay (manual mode), as bellow:

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		5无注释 6无注释 7无注释 8无注释 9无注释	0	1 1000 3 1000 2 1000 0 1000 0 1000 0 1000 0 1000 0 1000	
		10元注释 11元注释 12元注释 13元注释 14元注释 15元注释 16元注释 16元注释		1000 1000 1000 1000 1000 1000 1000	
		18无注释 19无注释	-	1000	
		前「English <u>保存</u>	語教	隐藏 -	
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4 1	□ 接收款据到文作 超时相时间: 20 m 8: 提供SWT%站片服	「接收數据到文件 <mark>▼ 20次送</mark> 「 定时拨 細时时间: 20 ms 第1 字节 至 末尾 •	9元注释 10元注释 11元注释 11元注释 12元注释 13元注释 14元注释 15元注释 16元注释 16元注释 17元注释 18元注释 18元注释 19元注释 19元注释 19元注释 117元注释 117.111 117.111 1197.111 1197.111 </td <td>9元注释 9元注释 9元注释 0 10元注释 0 11元注释 0 12元注释 0 13元注释 0 13元注释 0 13元注释 0 15元注释 0 16元注释 0 17元注释 0 18元注释 0 19元注释 0 19元注释 0 19元注释 0 19元注释 0 19元注释 0 支送文件 停止 考发送区 量时发送 1000 ms/次 厂加 加校验None 第 1 字节 至 末尾 → 加校验None</td>	9元注释 9元注释 9元注释 0 10元注释 0 11元注释 0 12元注释 0 13元注释 0 13元注释 0 13元注释 0 15元注释 0 16元注释 0 17元注释 0 18元注释 0 19元注释 0 19元注释 0 19元注释 0 19元注释 0 19元注释 0 支送文件 停止 考发送区 量时发送 1000 ms/次 厂加 加校验None 第 1 字节 至 末尾 → 加校验None	