

XB6S-C01SP

Serial Communications Module

User Manual



Nanjing Solidot Electronic Technology Co., Ltd. 2024

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1 Product Introduction

1.1 Product Overview

XB6S-C01SP is a plug-in 1-channel serial communication module, using X-bus backplane, adapted to our XB6S series coupler module, can realize Modbus master-slave, Freeport serial communication function, the module occupies a small space, the data interaction is simple to handle, and it can satisfy the needs of different application scenarios of serial communication.

1.2Product Features

- Supports multiple communication modes
 Eight modes MRM/MRS/MAM/MAS/FP_Request/FP_Input_Output/FP_Input/FP_Output can be set (see <u>6.1 Configuration Parameters</u> for details).
- Supports three communication interfaces RS485/RS422/RS232 interfaces.
- Supports three communication protocols Modbus RTU/ Modbus ASCII/Freeport.
- Small volume

Compact structure and small space occupation.

- Easy to diagnose Innovative channel indicator design, close to the channel, channel status obvious, easy to detect and maintain.
- Easy to configure Simple configuration and support for mainstream masters.
- Easy to install

DIN 35 mm standard rail installation

Adopts spring-type terminals for easy and quick wiring.

2 Product Parameters

2.1 General Parameter

Interface Parameter	
Product Model	XB6S-C01SP
Bus Protocol	X-bus
Bus Input Power	5VDC (4.5V~5.5V)
Supply Rated Voltage	
Rated Current	230mA
Consumption	
Power Consumption	1.15W
Technical Parameters	
Channel Number	1 channel
Communication	RS232, RS485, RS422
Interface Type ^[1]	
Communication	Modbus RTU, Modbus ASCII, Freeport
Protocols	
Baud	1200bps~115200bps
Weight	90g
Size	106.4 x 25.7 x 72.3mm
Wiring Method	Screwless Quick Plugs
Installation	DIN 35mm rail installation
Operating	-20°C~+60°C
Temperature	
Storage Temperature	-40°C~+80°C
Relative Humidity	95%, non-condensing
Protection class	IP20

Note [1]: Only one of the RS232, RS485 and RS422 interfaces can be used at the same time.

3 Panel

3.1 Panel Structure

Name of each part of the product



3.2 Indicator light function

Name	Markings	Color	Status	Status Description
			ON	Power supply is normal
Power indicator	PWR	GREEN		The product is not powered up or the power
			UFF	supply is abnormal
			ON	The system is functioning normally
			Flashing	No business data interaction, waiting for
Communication	CVC		1Hz	business data interaction to be established
Indicator	515	GREEN	Flashing	Firmuara Unarada
			10Hz	
			OFF	System not working
Input Channel	0 (right		FLASHING	Channel has data reception
Indicator	side)	GREEN	OFF	No data reception on channel
Output Channel	0 (left	CDEEN	FLASHING	Channel has data to send
Indicator	side)	GREEN	OFF	No data sent by channel

4 Installation and uninstall

4.1 External dimensions



4.2 Installation Guide

Precautions for installation\uninstall

- The module protection class is IP20 and the module needs to be installed in the cabinet for indoor use.
- Ensure that the cabinet is well ventilated (e.g., the cabinet is fitted with an exhaust fan).
- Do not install this equipment next to or above equipment that may cause overheating.
- Be sure to mount the module vertically on the fixed rails and maintain air circulation around it (at least 50 mm air circulation space above and below the module).
- Once the module is installed, be sure to secure the module by installing rail mounts on both ends.
- Be sure to disconnect the power supply when installing/uninstalling.
- Once the module is installed, it is recommended that wiring and cabling be done in accordance with the top and bottom alignments.

A warnings

• The protection provided by the device may be jeopardized if it is not used in accordance with the product user manual.





Ensure that the module is installed vertically on the fixed rail

Be sure to install the rail fixings



Schematic diagram of upper and lower wiring of the module



4.3 Installation and uninstall steps

Module Install	lation and uninstall
	1. Install the coupler module first on the rail that has been fixed.
	2. Install the required I/O modules or function modules in order to the right of the
Module	coupler module.
Installation	3、After installing all the required modules, install the end cap to complete the
Steps	assembly of the module.
	4. Install the rail fixings at both ends of the coupler module and end cap to fix the
	module.
Module	1. Loosen the guide rail fixings at both ends of the module.
Uninstall	2. Use a slotted screwdriver to pry off the module snap.
Steps	3. Pull out the uninstalled module.

4.4 Installation and uninstall diagram

Coupler Module Installation

■ Align the coupler module vertically in the rail slot as shown in Figure ① below.



Press the coupler module in the direction of the guide rail, and when you hear a "click" sound, the module is installed in place, as shown in Figure 2 below.



I/O Module Installation

Install the required I/O modules or function modules one by one according to the above steps of installing coupler modules as shown in Figures ③, ④ and ⑤ below, and push them in, and the modules will be installed in place when you hear the "click" sound.



3





(5)

End cap installation

Install the end cap on the right side of the last module, with the grooved side of the end cap aligned with the guide rail. Refer to the installation method of the I/O module for the installation method, and push the end cap inward into place, as shown in Figure (6) below.



■ After the end cap is installed, check whether the entire front of the module is flat to ensure that all modules and end cap are installed in place and the front is flush, as shown in Figure ⑦ below.



installation of guide rail fixings

Install and tighten the rail retainer firmly against the left side face of the coupler as shown in Figure (8) below.



Install the rail fixing on the right side of the end cap, first push the rail fixing firmly in the direction of the coupler to ensure that the module is installed tightly, and lock the rail fixing with a screwdriver, as shown in Figure (9) below.



Uninstall

Loosen the rail retainer at one end of the module with a screwdriver and move it to one side, making sure there is clearance between the module and the rail retainer, as shown in Figure (1) below.



10

Insert a flat-head screwdriver into the snap of the module to be removed, and apply pressure (hear the rattle) in the direction of the module sideways, as shown in the following figures (1) and (12). Note:
 There is one snap on the top and bottom of each module, and they are all operated in this way.



(11)



Uninstall the module as shown in figure ^(B) below, following the same procedure as for installing the module.



A	3
Ų	J

5 Wiring

5.1 Wiring Diagram



*GND is RS232 signal ground, internal conduction *Cables should be shielded twisted pair and reliably grounded *CF+/CF- is reserved for debugging interface of the module, not enabled yet.

	А			В	
Terminal	Terminal	Description	Terminal	Terminal	Description
Markings	Definition		Markings	Definition	
0	ТХ	RS232 transmitter	0	RX	RS232 receiver
1	GND	RS232 signal	1	GND	RS232 signal
		ground			ground
2	A+	RS485 transmit+	2	В-	RS485 transmit-
3	TX+	RS422 transmit +	3	TX-	RS422 transmit -
4	RX+	RS422 receive+	4	RX-	RS422 receive-
5	CF+	Reserve	5	CF-	Reserve
6	NC	Empty terminal	6	NC	Empty terminal
7	NC	Empty terminal	7	NC	Empty terminal
8	NC	Empty terminal	8	NC	Empty terminal
9	NC	Empty terminal	9	NC	Empty terminal

6 Operation

6.1 Configuration Parameter Definitions

Parameter name	Range of values	Clarification
	0	NoSelect
	1	Modbus RTU Master
	2	Modbus RTU Slave
	3	Modbus ASCII Master
Communication Mode	4	Modbus ASCII Slave
	5	FP_Request
	6	FP_Input_Output
	7	FP_Input
	8	FP_Output
	0	1200 bps
	1	2400 bps
	2	4800 bps
David	3	9600 bps
Baud	4	19200 bps
	5	38400 bps
	6	57600 bps
	7	115200 bps
	0	1 Bit
Stop Bit	1	2 Bits
Manual Farmanat	0	8 Bits
word Format	1	7 Bits
	0	Parity None
Parity	1	Parity Odd
	2	Parity Even
Control Mode	0	Disable
	1	Level

	2	Rising Edge
Nodo Output Modo	0	Poll
Node Output Mode	1	Change Trigger
Communication Error	0	Clear
Behavior	1	Hold
Respond Timeout	5~3000	Unit ms, default 50
Poll Delay	5~3000	Unit ms, default 10
Slave ID	1~247	Valid in slave mode, default 1
Slave Respond Delay	0~3000	Unit ms, default 50
Node_1_Param_1	0 to FFFFFFFFF	Default 0, see <u>Node Code Parameters</u> for details
Node_1_Param_2	0 to FFFFFFFFF	Default 0, see <u>Node Code Parameters</u> for details
Node_16_Param_1	0 to FFFFFFFFF	Default 0, see <u>Node Code Parameters</u> for details
Node_16_Param_2	0 to FFFFFFFF	Default 0, see <u>Node Code Parameters</u> for details

6.2Node Code Parameters

6.2.1 Modbus Master Function

In Modbus master mode, parameter 1 (Param_1) is composed of a 2-byte start address parameter and a 2-byte node code parameter, and parameter 2 (Param_2) consists of a 2-bit byte exchange parameter and a 1-byte slave station number parameter.

Param_1			
BIT31~BIT16	BIT15~BIT0		
Start Address	Node Code Se	e Modbus Maste	er Function Node
	Code for deta	ils.	
Param_2			
BIT31~BIT16	BIT15~BIT10	BIT9~BIT8	BIT7~BIT0
Reserve		See <u>ExByte</u>	Slave Station
		<u>Flag</u>	Number

Note: The start address parameter range is 0000~FFFFH and the slave station number parameter range is 1~247.

|--|

SubModule Grouping	SubModule	SubModule ID
	Read 8 bits	0x0101
	Read 16 bits	0x0102
	Read 24 bits	0x0103
	Read 32 bits	0x0104
	Read 40 bits	0x0105
	Read 48 bits	0x0106
	Read 56 bits	0x0107
Madhus Master Dood Coils	Read 64 bits	0x0108
Modbus Master Read Colls	Read 72 bits	0x0109
	Read 80 bits	0x010A
	Read 88 bits	0x010B
	Read 96 bits	0x010C
	Read 104 bits	0x010D
	Read 112 bits	0x010E
	Read 120 bits	0x010F
	Read 128 bits	0x0110
	Read 8 bits	0x0201
Modbus Master Read Discrete	Read 16 bits	0x0202
	Read 24 bits	0x0203
	Read 32 bits	0x0204
	Read 40 bits	0x0205
	Read 48 bits	0x0206

	Read 56 bits	0x0207
	Read 64 bits	0x0208
	Read 72 bits	0x0209
	Read 80 bits	0x020A
	Read 88 bits	0x020B
	Read 96 bits	0x020C
	Read 104 bits	0x020D
	Read 112 bits	0x020E
	Read 120 bits	0x020F
	Read 128 bits	0x0210
	Read 1 Reg	0x0301
	Read 2 Regs	0x0302
	Read 3 Regs	0x0303
	Read 4 Regs	0x0304
	Read 5 Regs	0x0305
	Read 6 Regs	0x0306
	Read 7 Regs	0x0307
Madhur Master Daad Hald	Read 8 Regs	0x0308
Modbus Master Read Hold	Read 9 Regs	0x0309
	Read 10 Regs	0x030A
	Read 11 Regs	0x030B
	Read 12 Regs	0x030C
	Read 13 Regs	0x030D
	Read 14 Regs	0x030E
	Read 15 Regs	0x030F
	Read 16 Regs	0x0310
	Read 1 Reg	0x0401
	Read 2 Regs	0x0402
	Read 3 Regs	0x0403
	Read 4 Regs	0x0404
	Read 5 Regs	0x0405
	Read 6 Regs	0x0406
	Read 7 Regs	0x0407
Madleys Master Daad Jacout	Read 8 Regs	0x0408
Modbus Master Read Input	Read 9 Regs	0x0409
	Read 10 Regs	0x040A
	Read 11 Regs	0x040B
	Read 12 Regs	0x040C
	Read 13 Regs	0x040D
	Read 14 Regs	0x040E
	Read 15 Regs	0x040F
	Read 16 Regs	0x0410
Modbus Master Write Coils	Write 8 bits	0x0501

	Write 16 bits	0x0502
	Write 24 bits	0x0503
	Write 32 bits	0x0504
	Write 40 bits	0x0505
	Write 48 bits	0x0506
	Write 56 bits	0x0507
	Write 64 bits	0x0508
	Write 72 bits	0x0509
	Write 80 bits	0x050A
	Write 88 bits	0x050B
	Write 96 bits	0x050C
	Write 104 bits	0x050D
	Write 112 bits	0x050E
	Write 120 bits	0x050F
	Write 128 bits	0x0510
	Write Single bit	0x05FF
	Write 1 Reg	0x0601
	Write 2 Regs	0x0602
	Write 3 Regs	0x0603
	Write 4 Regs	0x0604
	Write 5 Regs	0x0605
	Write 6 Regs	0x0606
	Write 7 Regs	0x0607
	Write 8 Regs	0x0608
Modbus Master Write Hold	Write 9 Regs	0x0609
	Write 10 Regs	0x060A
	Write 11 Regs	0x060B
	Write 12 Regs	0x060C
	Write 13 Regs	0x060D
	Write 14 Regs	0x060E
	Write 15 Regs	0x060F
	Write 16 Regs	0x0610
	Write Single Reg	0x06FF

6.2.3 Modbus Slave Function

In Modbus slave mode, parameter 1 (Param_1) is composed of a 2-byte start address parameter and a 2-byte node code parameter, and parameter 2 (Param_2) consists of a 2-bit byte swap parameter.

Param_1		
BIT31~BIT16	BIT15~BIT0	
Start Address	Node Code See Modbus Slave Function Node Code	
	for details.	
Param_2		
BIT31~BIT16	BIT15~BIT2	BIT1~BIT0
Reserve		See ExByte Flag

Note: Starting address parameter range is 0000~FFFFH

6.2.4 Modbus Slave Function Node Code

SubModule Grouping	SubModule	SubModule ID
	Read 8 bits	0x0701
	Read 16 bits	0x0702
	Read 24 bits	0x0703
	Read 32 bits	0x0704
	Read 40 bits	0x0705
	Read 48 bits	0x0706
	Read 56 bits	0x0707
Madhus Clave Deed Cails	Read 64 bits	0x0708
	Read 72 bits	0x0709
	Read 80 bits	0x070A
	Read 88 bits	0x070B
	Read 96 bits	0x070C
	Read 104 bits	0x070D
	Read 112 bits	0x070E
	Read 120 bits	0x070F
	Read 128 bits	0x0710
	Read 1 Reg	0x0801
	Read 2 Regs	0x0802
	Read 3 Regs	0x0803
	Read 4 Regs	0x0804
Modbus Slave Read Hold	Read 5 Regs	0x0805
	Read 6 Regs	0x0806
	Read 7 Regs	0x0807
	Read 8 Regs	0x0808
	Read 9 Regs	0x0809
	Read 10 Regs	0x080A
	Read 11 Regs	0x080B

	Read 12 Regs	0x080C
	Read 13 Regs	0x080D
	Read 14 Regs	0x080E
	Read 15 Regs	0x080F
	Read 16 Regs	0x0810
	Write 8 bits	0x0901
	Write 16 bits	0x0902
	Write 24 bits	0x0903
	Write 32 bits	0x0904
	Write 40 bits	0x0905
	Write 48 bits	0x0906
	Write 56 bits	0x0907
	Write 64 bits	0x0908
Modbus Slave Write Coils	Write 72 bits	0x0909
	Write 80 bits	0x090A
	Write 88 bits	0x090B
	Write 96 bits	0x090C
	Write 104 bits	0x090D
	Write 112 bits	0x090E
	Write 120 bits	0x090F
	Write 128 bits	0x0910
	Write 8 bits	0x0A01
	Write 16 bits	0x0A02
	Write 24 bits	0x0A03
	Write 32 bits	0x0A04
	Write 40 bits	0x0A05
	Write 48 bits	0x0A06
	Write 56 bits	0x0A07
	Write 64 bits	0x0A08
Modbus Slave Write Discrete	Write 72 bits	0x0A09
	Write 80 bits	0x0A0A
	Write 88 bits	0x0A0B
	Write 96 bits	0x0A0C
	Write 104 bits	0x0A0D
	Write 112 bits	0x0A0E
	Write 120 bits	0x0A0F
	Write 128 bits	0x0A10
	Write 1 Reg	0x0B01
	Write 2 Regs	0x0B02
	Write 3 Regs	0x0B03
Modbus Slave Write Hold	Write 4 Regs	0x0B04
	Write 5 Regs	0x0B05
	Write 6 Regs	0x0B06

	Write 7 Regs	0x0B07
	Write 8 Regs	0x0B08
	Write 9 Regs	0x0B09
	Write 10 Regs	0x0B0A
	Write 11 Regs	0x0B0B
	Write 12 Regs	0x0B0C
	Write 13 Regs	0x0B0D
	Write 14 Regs	0x0B0E
	Write 15 Regs	0x0B0F
	Write 16 Regs	0x0B10
	Write 1 Reg	0x0C01
	Write 2 Regs	0x0C02
	Write 3 Regs	0x0C03
	Write 4 Regs	0x0C04
	Write 5 Regs	0x0C05
	Write 6 Regs	0x0C06
	Write 7 Regs	0x0C07
Modbus Slave Write Input	Write 8 Regs	0x0C08
Modbus Slave Write Input	Write 9 Regs	0x0C09
	Write 10 Regs	0x0C0A
	Write 11 Regs	0x0C0B
	Write 12 Regs	0x0C0C
	Write 13 Regs	0x0C0D
	Write 14 Regs	0x0C0E
	Write 15 Regs	0x0C0F
	Write 16 Regs	0x0C10

6.2.5 ExByte Flag

Byte Number	function	Lengths
0	non-exchange	2 Bits
1	2Bytes Exchange	2 Bits
2	4Bytes Register Exchange	2 Bits
3	4Bytes Big-Little-Endian Exchange	2 Bits

6.2.6 Freeport function

In Freeport mode, parameter 1 (Param_1) is a 2-byte node code parameter composition.

BIT15~BIT0
Node Code See Freeport Function Node Code for
details.

6.2.7 Freeport Function Node Code

SubModule Grouping	SubModule	SubModule ID
	Input 1 byte	0x0D01
	Input 2 bytes	0x0D02
	Input 4 bytes	0x0D03
	Input 8 bytes	0x0D04
	Input 16 bytes	0x0D05
Freeport Input	Input 32 bytes	0x0D06
	Input 64 bytes	0x0D07
	Input 128 bytes	0x0D08
	Input 160 bytes	0x0D09
	Input 192 bytes	0x0D0A
	Input 224 bytes	0x0D0B
	Input 255 bytes	0x0D0C
	Output 1 byte	0x0E01
	Output 2 bytes	0x0E02
	Output 4 bytes	0x0E03
Freeport Output	Output 8 bytes	0x0E04
	Output 16 bytes	0x0E05
	Output 32 bytes	0x0E06
	Output 64 bytes	0x0E07
	Output 128 bytes	0x0E08
	Output 160 bytes	0x0E09

		F
	Output 192 bytes	0x0E0A
	Output 224 bytes	0x0E0B
	Output 255 bytes	0x0E0C
Freeport Parity	CRC8	0x0F01
	CRC16	0x0F02
	XOR	0x0F03
	SUM8	0x0F04
	LRC	0x0F05

6.2.8 Control and Status Node Codes

When the configuration parameter Control Mode is set to disable, there is no need to configure the control and status node code; when the configuration parameter Control Mode is set to Level or Rising Edge, it is necessary to configure the node code in Node 1 Parameter 1 (Node_1_Param_1) first. The node code is shown in the following table:

SubModule Grouping	SubModule	SubModule ID	Note
	1 Node	0x0001	
	2 Node	0x0002	
	3 Node	0x0003	
	4 Node	0x0004	
	5 Node	0x0005	
	6 Node	0x0006	
	7 Node	0x0007	Configuration in
	8 Node	0x0008	Master Mode
	9 Node	0x0009	waster would
Control&Status	10 Node	0x000A	
	11 Node	0x000B	
	12 Node	0x000C	
	13 Node	0x000D	
	14 Node	0x000E	
	15 Node	0x000F	
	Freeport Req	0x0020	
	Freeport Input_Output	0x0021	Configuration in
	Freeport Input	0x0022	Freeport Mode
	Freeport Output	0x0023	
	Modbus Slave	0x0030	Configuration in
			Slave Mode

6.3 Process data

The module factory defaults to XB6S-C01SP-32Bytes, the length of upstream and downstream data is 32Bytes each, when the amount of PDO data generated by the communication node parameter configuration of the module reaches a certain range (the amount of upstream data or the amount of downstream data either reaches the range limit), the coupler module will alarm 0x5002, then re-power up and scan the module, the module will switch to the corresponding PDO data length automatically.

Module PDO length range and model match table:

Module PDO Length Range and Model Matching Table			
Module Model	Upstream Data Length (Bytes)	Downstream Data Length (Bytes)	
XB6S-C01SP-32Bytes	0~32	0~32	
XB6S-C01SP-64Bytes	33~64	33~64	
XB6S-C01SP-128Bytes	65~128	65~128	
XB6S-C01SP-255Bytes	129~255	129~255	

The following is an example of the configuration parameters for model XB6S-C01SP-32Bytes.

> When the configuration parameter Control Mode is set to disable, the upstream and downstream process data is shown in the following table.

Upstream Data (32 Bytes)			
Byte Number	Function	Meaning	Address Range
1	Input data	- Serial communication module input data	32 bytes
2	Input data		
32	Input data		
Downstream data (32 bytes)			
Byte	Function	Meaning	Address
Number	Function		Range
1	Output data	Serial communication module output data	22 bytes
2	Output data		
			JZ Dytes
32	Output data		

> When the configuration parameter Control Mode is set to Level or Rising Edge, the upstream and downstream process data is shown in the table below.

6.3.1 Modbus Master Process Data

Upstream Data (32 Bytes)			
Byte Number	Function	Meaning	Address Range
1	Status word	Bit0: Idle state	
		Bit1: Busy state, i.e., in data transmission	1 byte
		Bit2: Completion status, i.e., data transmission completed	
2	Alarm code	See <u>Alarm Code</u>	1 byte
3	Input data		
4	Input data		Last 30
	•••	Serial communication module input data	bytes
32	Input data		
Downstream Data (32 Bytes)			
Byte Number	Function	Meaning	Address Range
	Control word	When the configuration parameter Control Mode is Level,	
1		set 1 to send data.	- 1 byte
		When the configuration parameter Control Mode is Rising	
		Edge, 0->1 send data	
2	Output data	- Serial communication module output data	
3	Output data		Last 31
			bytes
32	Output data		

Note: The process data in the above table is the configuration of one node in Level or Rising Edge mode. If two nodes are configured, byte numbers 1 and 2 of the upstream data are the status bits and alarm code of node 1, byte numbers 3 and 4 are the status bits and alarm code of node 2, and the remaining bytes are the data bits; byte number 1 of the downstream data is the control bit of node 1, byte number 2 is the control bit of node 2, and the remaining bytes are the data bits; the maximum number of nodes that can be configured is 15.

6.3.2 Modbus Slave Process Data

Upstream Data (32 Bytes)				
Byte Number	Function	Meaning	Address Range	
1	Status word	Bit0: Idle state		
		Bit1: Busy state, i.e., in data transmission	1 byte	
		Bit2: Completion status, i.e., data transmission		
		completed		
2	Alarm code	See <u>Alarm Code</u>	1 byte	
3	Input data			
4	Input data	Serial communication module input data	Last 30	
			bytes	
32	Input data			
Downstream Data (32 Bytes)				
Byte	Function	Meaning	Address	
Number	runction		Range	
1	Control word	Bit0: Alarm code clear	1 byte	
2	Output data	Serial communication module output data		
3	Output data		Last 31	
		Scharcommunication module output data	bytes	
32	Output data			

6.3.3 Freeport_Request Process Data

Upstream Data (32 Bytes)				
Byte Number	Function	Meaning	Address Range	
		Bit0: Idle state		
1	Status word	Bit1: Busy state, i.e., in data transmission	1 byto	
1		Bit2: Completion State, i.e., data transmission	Tbyte	
		completed		
		Bit0: Receive Data Length Error	1 byte	
2	Alarm code	Bit1: Checksum Error		
		Bit2: Timeout error		
3	Receive data length	0~255	1 byte	
4~5	Receive exception	0~65535	2 bytes	
6.7	count	0.05525	2 1. 4. 4	
6~/	Receive data count	0~65535	2 bytes	
8	Input data			
9	Input data	Serial communication module input data	Last 25 bytes	
32	Input data			
		Downstream Data (32 Bytes)		
Byte	yte		Address	
Number	Function	Meaning	Range	
	Control word	Bit0: Enable		
1		l word Bit1: Status word clear		
		Bit2: Receive data clear	-	
2	Send data length	0~255	1 byte	
		Bit0: receive exception count clear		
3	Clear count	Bit1: Receive data count clear1Bit2: Receive data length clear		
4	Error code clear	Bit0: Length exception clear		
		ror code clear Bit1: Checksum Error Clear 1 Bit2: Timeout Error Clear		
				5
6	Output data			
32	Output data			
6.3.4 Freeport_Input Process Data

		Upstream Data (32 Bytes)					
Byte Number	Function	Meaning	Address Range				
1	Alarm codo	Bit0: Receive data length error	1 byto				
I	Alarm code	Bit1: Checksum Error	TDyte				
2	Receive data length	0~255	1 byte				
3~4	Receive exception count	0~65535	2 bytes				
5~6	Receive data count	0~65535	2 bytes				
7	Input data						
8	Input data		Last 26				
		Serial communication module input data	bytes				
32	Input data						
Downstream Data (32 Bytes)							
Byte Number	Function	Meaning	Address Range				
Byte Number	Function	Meaning Bit0: Enable	Address Range				
Byte Number 1	Function Control word	Meaning Bit0: Enable Bit1: Status word clear	Address Range 1 byte				
Byte Number 1	Function Control word	Meaning Bit0: Enable Bit1: Status word clear Bit2: Receive data clear	Address Range 1 byte				
Byte Number 1	Function Control word	Meaning Bit0: Enable Bit1: Status word clear Bit2: Receive data clear Bit0: Receive exception count clear	Address Range				
Byte Number 1	Function Control word Clear count	Meaning Bit0: Enable Bit1: Status word clear Bit2: Receive data clear Bit0: Receive exception count clear Bit1: Receive data count clear	Address Range 1 byte 1 byte				
Byte Number 1	Function Control word Clear count	MeaningBit0: EnableBit1: Status word clearBit2: Receive data clearBit0: Receive exception count clearBit1: Receive data count clearBit1: Receive data count clearBit2: Receive data length clear	Address Range 1 byte 1 byte				
Byte Number 1 2	Function Control word Clear count	MeaningBit0: EnableBit1: Status word clearBit2: Receive data clearBit0: Receive exception count clearBit1: Receive data count clearBit2: Receive data length clearBit2: Receive length error clear	Address Range 1 byte 1 byte				
Byte Number 1 2 3	Function Control word Clear count Error code clear	MeaningBit0: EnableBit1: Status word clearBit2: Receive data clearBit2: Receive data clearBit0: Receive exception count clearBit1: Receive data count clearBit2: Receive data count clearBit2: Receive data length clearBit0: Receive length error clearBit1: Checksum Error Clear	Address Range 1 byte 1 byte 1 byte				
Byte Number 1 2 3 4	Function Control word Clear count Clear count Error code clear Output data Output data	MeaningBit0: EnableBit1: Status word clearBit2: Receive data clearBit0: Receive exception count clearBit1: Receive data count clearBit2: Receive data length clearBit2: Receive length error clearBit0: Receive length error clearBit1: Checksum Error Clear	Address Range 1 byte 1 byte 1 byte				
Byte Number 1 2 3 4 5	Function Control word Clear count Error code clear Output data Output data	Meaning Bit0: Enable Bit1: Status word clear Bit2: Receive data clear Bit0: Receive exception count clear Bit1: Receive data count clear Bit2: Receive data count clear Bit2: Receive data length clear Bit0: Receive length error clear Bit1: Checksum Error Clear	Address Range 1 byte 1 byte 1 byte Last 29				
Byte Number 1 2 3 4 5 	Function Control word Clear count Error code clear Output data Output data	MeaningBit0: EnableBit1: Status word clearBit2: Receive data clearBit0: Receive exception count clearBit1: Receive data count clearBit2: Receive data count clearBit2: Receive data length clearBit0: Receive length error clearBit1: Checksum Error ClearSerial communication module output data	Address Range 1 byte 1 byte 1 byte Last 29 bytes				

6.3.5 Freeport_Output Process Data

Downstream Data (32 Bytes)								
Byte Number	Function	Meaning	Address Range					
1	Control word	Bit0: Enable	1 byte					
2	Send data length	0~255	1 byte					
3	Output data							
4	Output data	Corial communication module output data	Last 30					
		Senal communication module output data	bytes					
32	Output data							

6.3.6 Freeport_Input_Output Process Data

		Upstream Data (32 Bytes)					
Byte Number	Function	Meaning	Address Range				
1	Alarm codo	Bit0: Receive data length error	1 byto				
1	Alarm code	Bit1: Checksum Error	Tbyte				
2	Receive data length	0~255	1 byte				
3~4	Receive exception count	0~65535	2 bytes				
5~6	Receive data count	0~65535	2 bytes				
7	Input data						
8	Input data		Last 26				
		Serial communication module input data	bytes				
32	Input data						
Downstream Data (32 Bytes)							
Byte Number	Function	Meaning	Address Range				
Byte Number	Function	Meaning Bit0: Enable	Address Range				
Byte Number 1	Function Control word	Meaning Bit0: Enable Bit1: Status word clear	Address Range				
Byte Number 1	Function Control word	Meaning Bit0: Enable Bit1: Status word clear Bit2: Receive data clear	Address Range				
Byte Number 1 2	Function Control word Send data length	MeaningBit0: EnableBit1: Status word clearBit2: Receive data clear0~255	Address Range 1 byte 1 byte				
Byte Number 1 2	Function Control word Send data length	MeaningBit0: EnableBit1: Status word clearBit2: Receive data clear0~255Bit0: Receive exception count clear	Address Range 1 byte 1 byte				
Byte Number 1 2 3	Function Control word Send data length Clear count	MeaningBit0: EnableBit1: Status word clearBit2: Receive data clear0~255Bit0: Receive exception count clearBit1: Receive data count clear	Address Range 1 byte 1 byte 1 byte				
Byte Number 1 2 3	Function Control word Send data length Clear count	MeaningBit0: EnableBit1: Status word clearBit2: Receive data clear0~255Bit0: Receive exception count clearBit1: Receive data count clearBit1: Receive data count clearBit2: Receive data length clear	Address Range 1 byte 1 byte 1 byte				
Byte Number 1 2 3	Function Control word Send data length Clear count	MeaningBit0: EnableBit1: Status word clearBit2: Receive data clear0~255Bit0: Receive exception count clearBit1: Receive data count clearBit2: Receive data count clearBit2: Receive data count clearBit2: Receive data length clearBit0: Receive length error clear	Address Range 1 byte 1 byte 1 byte				
Byte Number 1 2 3 4	Function Control word Send data length Clear count Error code clear	MeaningBit0: EnableBit1: Status word clearBit2: Receive data clear0~255Bit0: Receive exception count clearBit1: Receive data count clearBit2: Receive data length clearBit2: Receive length error clearBit0: Receive length error clearBit1: Checksum Error Clear	Address Range 1 byte 1 byte 1 byte 1 byte 1 byte				
Byte Number 1 2 3 4 5	Function Control word Send data length Clear count Error code clear Output data	MeaningBit0: EnableBit1: Status word clearBit2: Receive data clear0~255Bit0: Receive exception count clearBit1: Receive data count clearBit2: Receive data length clearBit2: Receive length error clearBit1: Checksum Error Clear	Address Range 1 byte 1 byte 1 byte 1 byte 1 byte				
Byte Number	Function Control word Send data length Clear count Error code clear Output data Output data	Meaning Bit0: Enable Bit1: Status word clear Bit2: Receive data clear 0~255 Bit0: Receive exception count clear Bit1: Receive data count clear Bit2: Receive data length clear Bit0: Receive length error clear Bit0: Receive length error clear Bit1: Checksum Error Clear	Address Range 1 byte 1 byte 1 byte 1 byte 1 byte Last 28				
Byte Number 1 2 3 4 5 6	Function Control word Send data length Clear count Error code clear Output data Output data	MeaningBit0: EnableBit1: Status word clearBit2: Receive data clear0~255Bit0: Receive exception count clearBit1: Receive data count clearBit2: Receive data length clearBit2: Receive length error clearBit1: Checksum Error ClearSerial communication module output data	Address Range 1 byte 1 byte 1 byte 1 byte 1 byte Last 28 bytes				

6.3.7 Modbus Alarm Code

Error Code	Comment
0x00	No error
0x01	Slave device address error
0x02	Function code error
0x03	CRC checksum error
0x04	Response bytes error
0x05	Coil register data error
0x06	Holding register data error
0x07	Illegal data address
0x08	Slave device failure
0x09	LRC checksum error
0x0C	Data length error
0x0D	Data conversion error
0x0E	ASCII frame error
0x0F	Response timeout

6.4 Module Configuration Description

6.4.1 Application in TwinCAT3 software environment

1. Preliminary

- Hardware Environment
 - > Module Model XB6S-C01SP
 - EtherCAT Bus Coupler Module, End Cap
 This description takes the XB6S-EC2002 coupler module as an example
 - > A computer with pre-installed TwinCAT3 software
 - > Shielded cables for EtherCAT
 - > One switching power supply
 - > Module installation rails and rail mounts
- Device Configuration Files
 Configuration file access: <u>https://www.solidotech.com/documents/configfile</u>

 Hardware configuration and wiring
 - Follow "<u>4 Installation and uninstall</u>" and "<u>5 Wiring</u>".

2、Preset Profiles

Place the ESI configuration file (EcatTerminal-XB6S_V1.19.13_ENUM.xml) in the TwinCAT installation directory under "C:\TwinCAT\3.1\Config\lo\EtherCAT" as shown below.

📕 › 此电脑 › 本地磁盘 (C:) › TwinCAT › 3.1 › Config › Io › EtherCAT						
名称	修改日期 ^	类型	大小			
Beckhoff El 32vy yml	2017/10/25 15:42	YMI 文档	5,007 KB			
Beckhoff EL66vy yml	2017/10/23 13:43	XIVIL 文档 VIAI 立档	1 920 12			
Beckhoff EKv9vv vml	2017/11/2 0:52	VMI 文档	1,020 KB			
Beckhoff ERZyng yml	2017/11/3 9:35		0.200 KP			
Beckhoff ATH2xxx xml	2017/11/0 3.40	>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>	420 KB			
	2017/11/23 13.22		435 KB			
Beckhoff EDD1vor vml	2017/12/0 0.40	XIVIL 文档 VMI 文批	2,099 KB			
Beckhoff El 24 www.	2017/12/14 11.54	XIVIL 文档	400 KD			
Beckholl EL34xx.xml	2017/12/15 15:55		3,034 KB			
	2017/12/19 14:30	XIVIL 文档	TO KB			
Becknoff EPP2xxx.xmi	2017/12/28 12:22	XIVIL 义怕	1,811 KB			
Beckhoff EJ1xxx.xml	2018/1/4 10:00	XML义档	67 KB			
Beckhoff EJ3xxx.xml	2018/1/4 10:07	XML 文档	1,169 KB			
Beckhoff EJ7xxx.xml	2018/1/4 10:11	XML文档	2,339 KB			
Beckhoff EJ9xxx.xml	2018/1/4 10:23	XML文档	160 KB			
Beckhoff EJ6xxx.xml	2018/1/4 10:31	XML文档	313 KB			
Beckhoff EL30xx.xml	2018/1/11 13:03	XML文档	11,508 KB			
Beckhoff EL37xx.xml	2018/1/23 13:59	XML 文档	11,837 KB			
Beckhoff EJ2xxx.xml	2018/1/23 14:21	XML 文档	239 KB			
Beckhoff EL5xxx.xml	2018/1/23 15:11	XML 文档	6,307 KB			
Beckhoff EJ5xxx.xml	2018/1/23 15:12	XML 文档	218 KB			
Beckhoff EL2xxx.xml	2018/1/24 9:40	XML 文档	2,868 KB			
Beckhoff EL33xx.xml	2018/1/26 9:34	XML 文档	6,727 KB			
Beckhoff ELM3xxx.xml	2018/2/1 10:19	XML文档	14,238 KB			
Beckhoff AX5xxx.xml	2018/2/8 16:15	XML 文档	930 KB			
Beckhoff EL1xxx.xml	2018/2/19 17:15	XML 文档	3,387 KB			
Beckhoff EL25xx.xml	2018/2/21 10:23	XML 文档	6,543 KB			
EcatTerminal-XB6S_V1.19.13_ENUM.xml	2024/6/25 10:15	XML 文档	1,821 KB			

3、Create Project

a. Click the TwinCAT icon in the lower right corner of the desktop and select "TwinCAT XAE (VS xxxx)" to open the TwinCAT software, as shown below.



b. Click "New TwinCAT Project", in the pop-up window, "Name" and "Solution name" correspond to the project name and solution name respectively, and "Location" corresponds to the project path, and these three items can be selected by default, then click "OK", the project is created successfully, as shown in the following figure.

New TwinCAT Project		Get Started	Beckhoff Ne	ws	
Mulin New Measuren	nent Project	A program and the program of the pro		What's New in 1	winCAT 3
New Project					? ×
▶ Recent		.NET Framework 4.5 • Sort b	y: Default	• II' 🗉	Search Installed
 Installed Templates Other Project TwinCAT Me TwinCAT PLC TwinCAT Pros Samples Online 	ct Types easurement C ojects	TwinCAT XAE Projec The Click here to go online and	winCAT Projects	Type: TwinCAT I TwinCAT XAE Sys Configuration	Projects tem Manager
Name:	TwinCAT Proje	ect1			
Location:	D:\workspace	\TwinCAT Project	•	Browse	() v
Solution name:	TwinCAT Proje	ect I		Create directory	OK Cancel

4、Scanning device

a. After creating the project, right-click on the "Scan" option under "I/O -> Devices" to perform a slave device scan, as shown in the following figure.



b. Check the "Local Connection" box, as shown in the following figure.



c. Click on the pop-up window "Scan for boxes" and select "Yes"; click on the pop-up window "Activate Free Run" and select "Yes", as shown in the figure below.



d. After scanning to the device, you can see Box1 (XB6S-EC2002) and Module1 (XB6S-C01SP-32Bytes) in the left navigation tree, and you can see TwinCAT in the "OP" status at "Online". At "Online", you can see that TwinCAT is in the "OP" state, and you can observe that the RUN indicator of the slave device is on, as shown in the figure below.

	TWINCAT Project				
) O 🟠 'O + 2 🗇 🕨 🗕	General Ether	rCAT DC	Process Data	Slots Startup CoE - On	line Diag History Online
「京解決方案资源管理器(Ctrl+;) ク	- State Mach	nine			
a」解决万案" I winCAT Project1"(1 个项目)	Init	-	Bootstrap	1	
SYSTEM	, mic		bootstap	Current State:	OP
MOTION	Pre-Op		Safe-Op	Requested State:	OP
I PLC	Ор		Clear Error	Requested state.	
964 C++					
🔺 🔄 I/O	DLL Status				
Devices	Port A:	Carrier	/ Open		
Device 2 (EtherCAT)	Port P:	No Car	rier / Closed	7	
Image-Info	TOTED.		ner, closed		
SyncUnits	Port C:	No Car	rier / Closed		
Inputs	Port D:	No Car	rier / Closed		
United Data					
Box 1 (XB6S-EC2002)	File Access	over Ether	CAT		
Inputs	Downloa	ad	Upload		
Outputs					
For Module 1 (XB6S-C01SP-32Bytes)					
WCState					
••• If 3					

5、Validating Basic Functions

a. Click "Box1 -> Startup -> New" in the left navigation tree to enter the configuration parameter editing page, as shown in the following figure.



b. In the Edit CANopen Startup Entry pop-up window, click the "+" in front of Index 2000:0 to expand the Configuration Parameters menu, you can see 44 configuration parameters, click on any one of the parameters, you can set the relevant configuration, as shown in the following figure.

Edit CANopen	Startup Entry				×
Transition □I->P ☑P->S □S->0	Index (her □S -> P Sub-Index □O -> S ∨alidation	<): < (dec): ite	2000 0 Complete Access		OK Cancel
Data (hexbin):	2D				Hex Edit
Validate Mask:					
Comment	SubIndex 000				Edit Entry
Index	Name	Flags	Value	Unit	^
<mark>⊟-</mark> 2000:0	XB6S-C01SP Config	RO	> 45 <		
2000:01	Communication Mode	RW	NoSelect (0)		
2000:02	Baud Rate	RW	115200 (7)		
2000:03	Stop Bit	RW	StopBit 1 (0)		
2000:04					
20020000000000000000000000000000000000	Word Format	RW	8Bits (0)		
2000:05	Word Format Parity	RW RW	8Bits (0) Parity None (0)		
2000:05	Word Format Parity Control Mode	RW RW RW	8Bits (0) Parity None (0) Disable (0)		
2000:05 2000:06 2000:07	Word Format Parity Control Mode Node Output Mode	RW RW RW	8Bits (0) Parity None (0) Disable (0) Poll (0)		
2000:05 2000:06 2000:07 2000:08	Word Format Parity Control Mode Node Output Mode Communication Error Behavior	RW RW RW RW	8Bits (0) Parity None (0) Disable (0) Poll (0) Clear (0)		
2000:05 2000:06 2000:07 2000:08 2000:09	Word Format Parity Control Mode Node Output Mode Communication Error Behavior Respond Timeout	RW RW RW RW RW	8Bits (0) Parity None (0) Disable (0) Poll (0) Clear (0) 0x00000032 (50)		
2000:05 2000:06 2000:07 2000:08 2000:09 2000:04	Word Format Parity Control Mode Node Output Mode Communication Error Behavior Respond Timeout Poll Delay	RW RW RW RW RW RW	8Bits (0) Parity None (0) Disable (0) Poll (0) Clear (0) 0x00000032 (50) 0x0000000A (10)		
2000:05 2000:06 2000:07 2000:08 2000:09 2000:0A 2000:0A	Word Format Parity Control Mode Node Output Mode Communication Error Behavior Respond Timeout Poll Delay Slave ID	RW RW RW RW RW RW RW RW	8Bits (0) Parity None (0) Disable (0) Poll (0) Clear (0) 0x00000032 (50) 0x0000000A (10) 0x00000001 (1)		
2000:05 2000:06 2000:07 2000:08 2000:09 2000:0A 2000:0B 2000:0B	Word Format Parity Control Mode Node Output Mode Communication Error Behavior Respond Timeout Poll Delay Slave ID Slave Respond Delay	RW RW RW RW RW RW RW RW RW RW	8Bits (0) Parity None (0) Disable (0) Poll (0) Clear (0) 0x00000032 (50) 0x0000000A (10) 0x0000000A (10) 0x0000000A (10)		
2000:05 2000:06 2000:07 2000:08 2000:09 2000:0A 2000:0B 2000:0C 2000:0C	Word Format Parity Control Mode Node Output Mode Communication Error Behavior Respond Timeout Poll Delay Slave ID Slave Respond Delay Node_1_Param_1	RW RW RW RW RW RW RW RW RW RW RW	8Bits (0) Parity None (0) Disable (0) Poll (0) Clear (0) 0x00000032 (50) 0x0000000A (10) 0x0000000A (10) 0x0000000A (10) 0x0000000A (10) 0x0000000A (10)		

c. For example, to modify the communication mode parameters, you can double-click "Communication Mode" to modify the parameter values, as shown in the following figure.

Edit CANoper	n Startup Entry						×
Transition □I->P ☑P->S □S->0	_S→P _0->S	Index (h Sub-Ind	ex): ex (dec): date	2000		OK Canc	el
Data (hexbin):	00 00 00 00					HexEd	dit
Validate Mask: Comment:	Communicatio	on Mode				EditEr	ıtry
Index	Name		Flags	Value	Unit		^
⊡ 2000:0	XB6S-C01SP Co	onfiq	RO	> 45 <			
2000:01	Communication	Mode	RW	NoSelect (0)			
2000:02	Baud Rate	Set Value	Dialog			×	
2000:03	Stop Bit		bialog			~ ~	
2000:04	Word Format	Deel	0				
2000:05	Parity	Dec.	0				
2000:06	Control Mode	Hex	0x000	00000	Can	cel	
2000:07	Node Output Md	_					
2000:08	Communication	Enum:	NoSe	elect	~		
2000:09	Respond Timed		NoSe	elect weRTLIMeeter	_		
2000:0A	Poll Delay		Mode	nusBTUSlave			
2000:0B	Slave ID	Bool:	Modk	ousAsciiMaster	E	Edit	
2000:0C	Slave Respond	Binanc	Modk	ousAsciiSlave		4	
2000:0D	Node_1_Param	Dinary.	Requ	Output			
2000:0E	Node_1_Param	Bit Size:	Input	_Output			~
			Outpu	ut			

d. After the parameter modification is completed, you can see the modified parameter items and parameter values under Startup, as shown in the following figure. After the parameter setting is completed, it is necessary to carry out Reload operation and re-power up the module to realize that the master station automatically sends down the parameter setting.

			o energy core offinite	blag motory on the	
Transition	Protocol	Index	Data	Comment	
<ps></ps>	CoE	0xF030 C 0	01 00 01 E5 00 00	download slot cfg	
PS	CoE	0x2000:01	ModbusRTUMaster (1)	Communication Mode	
				0.00	1 1

e. The left navigation tree "Module 1 -> Inputs" displays the upstream data of the communication module, which is used to monitor the status of the module, as shown in the figure below.

解决方案资源管理器 ▼ ↓ ×	TwinCAT Proj	ect1 🕈 🗙						
00 🟠 To + 2 🗇 🖌 🗕	Name	Online	Туре	Size	>Address	In/Out	User ID	Linked to
捜索解決方案溶源管理器(Ctrl+:)	🕫 RX 1	0	USINT	1.0	41.0	Input	0	
	🕫 RX 2	0	USINT	1.0	42.0	Input	0	
igJ 群决力案"IwinCAI Project1"(1 个坝目)	🕫 RX 3	0	USINT	1.0	43.0	Input	0	
IwinCAT Project1	🕫 RX 4	0	USINT	1.0	44.0	Input	0	
	🕫 RX 5	0	USINT	1.0	45.0	Input	0	
	🕫 RX 6	0	USINT	1.0	46.0	Input	0	
	📌 RX 7	0	USINT	1.0	47.0	Input	0	
	📌 RX 8	0	USINT	1.0	48.0	Input	0	
	🕫 RX 9	0	USINT	1.0	49.0	Input	0	
A Devices	🕫 RX 10	0	USINT	1.0	50.0	Input	0	
Device 2 (EtherCAT)	🔁 RX 11	0	USINT	1.0	51.0	Input	0	
Image	🕫 RX 12	0	USINT	1.0	52.0	Input	0	
Image-Info	🔁 RX 13	0	USINT	1.0	53.0	Input	0	
SyncUnits	🕫 RX 14	0	USINT	1.0	54.0	Input	0	
Inputs	📌 RX 15	0	USINT	1.0	55.0	Input	0	
Outputs	🕫 RX 16	0	USINT	1.0	56.0	Input	0	
InfoData	🕫 RX 17	0	USINT	1.0	57.0	Input	0	
 Box 1 (XB6S-EC2002) 	🕫 RX 18	0	USINT	1.0	58.0	Input	0	
Inputs	🔁 RX 19	0	USINT	1.0	59.0	Input	0	
Outputs	📌 RX 20	0	USINT	1.0	60.0	Input	0	
 F Module 1 (XB6S-C01SP-32Bytes) 	📌 RX 21	0	USINT	1.0	61.0	Input	0	
👂 🛄 Inputs	📌 RX 22	0	USINT	1.0	62.0	Input	0	
Outputs	🕫 RX 23	0	USINT	1.0	63.0	Input	0	
WcState	🕫 RX 24	0	USINT	1.0	64.0	Input	0	
👂 🛄 InfoData	🕫 RX 25	0	USINT	1.0	65.0	Input	0	
🌇 Mappings	🕫 RX 26	0	USINT	1.0	66.0	Input	0	
	🔁 RX 27	0	USINT	1.0	67.0	Input	0	
	🕫 RX 28	0	USINT	1.0	68.0	Input	0	
	🕫 RX 29	0	USINT	1.0	69.0	Input	0	
	🕫 RX 30	0	USINT	1.0	70.0	Input	0	
	🕫 RX 31	0	USINT	1.0	71.0	Input	0	
	🕫 RX 32	0	USINT	1.0	72.0	Input	0	

f. The left navigation tree "Module 1 -> Outputs" displays the downstream data of the communication module. is used for to monitor the output status of the module, as shown in the figure below.

₩決方案资源管理器 ▼ 平 ×	TwinCAT Pro	ject1 🕈 ×						
0 0 A 0 - 2 A F -	Name	Online	Туре	Size	>Address	In/Out	User ID	Linked to
	TX 1	0	USINT	1.0	41.0	Output	0	
授系解决刀亲页//rē理簡(Ct11+;) / / / / / / / / / / / / / / / / / / /	TX 2	0	USINT	1.0	42.0	Output	0	
解决方案"TwinCAT Project1"(1 个项目)	🗳 TX 3	0	USINT	1.0	43.0	Output	0	
TwinCAT Project1	TX 4	0	USINT	1.0	44.0	Output	0	
▷ Generation System	🖻 TX 5	0	USINT	1.0	45.0	Output	0	
	🖙 TX 6	0	USINT	1.0	46.0	Output	0	
	🗳 TX 7	0	USINT	1.0	47.0	Output	0	
SAFELY	🗳 TX 8	0	USINT	1.0	48.0	Output	0	
	🗳 TX 9	0	USINT	1.0	49.0	Output	0	
	TX 10	0	USINT	1.0	50.0	Output	0	
▲ ➡ Device 2 (Ether(AT)	🗳 TX 11	0	USINT	1.0	51.0	Output	0	
	TX 12	0	USINT	1.0	52.0	Output	0	
Image-Info	🖙 TX 13	0	USINT	1.0	53.0	Output	0	
SvncUnits	TX 14	0	USINT	1.0	54.0	Output	0	
Inputs	🖙 TX 15	0	USINT	1.0	55.0	Output	0	
Outputs	🗳 TX 16	0	USINT	1.0	56.0	Output	0	
👂 🛄 InfoData	F TX 17	0	USINT	1.0	57.0	Output	0	
 Box 1 (XB6S-EC2002) 	🗳 TX 18	0	USINT	1.0	58.0	Output	0	
👂 🛄 Inputs	🖙 TX 19	0	USINT	1.0	59.0	Output	0	
Outputs	🖙 TX 20	0	USINT	1.0	60.0	Output	0	
 F Module 1 (XB6S-C01SP-32Bytes) 	🗳 TX 21	0	USINT	1.0	61.0	Output	0	
Inputs	🗳 TX 22	0	USINT	1.0	62.0	Output	0	
Outputs	🗳 TX 23	0	USINT	1.0	63.0	Output	0	
WcState	🖙 TX 24	0	USINT	1.0	64.0	Output	0	
🕨 🛄 InfoData	🖙 TX 25	0	USINT	1.0	65.0	Output	0	
Tappings Tappings	🗳 TX 26	0	USINT	1.0	66.0	Output	0	
	🗳 TX 27	0	USINT	1.0	67.0	Output	0	
	🗳 TX 28	0	USINT	1.0	68.0	Output	0	
	🕨 TX 29	0	USINT	1.0	69.0	Output	0	
	🗳 TX 30	0	USINT	1.0	70.0	Output	0	
	TX 31	0	USINT	1.0	71.0	Output	0	
	■ TX 32	0	USINT	1.0	72.0	Output	0	

6、 RTU Master Mode Function Example

Example 1: Verify that the module RTU master writes the values of the 2 holding registers in disable mode with a tool or device such as Modbus Slave debugging software.

a. Configure the configuration parameters and select 1 for communication mode i.e. RTU master mode as shown below.

Communication Mode: Select ModbusRTUMaster;

Control Mode: Select Disable;

Node_1_Param_1: Configure 0x00000602, see <u>6.2.1 Modbus Master Functionality</u> for configuration parameters;

Node_1_Param_2: Configure 0x00000001, see <u>6.2.1 Modbus Master Functionality</u> for configuration parameters.

E <mark>dit CAN</mark> open	n Startup Entry				×	
Transition □I->P ☑P->S □S->0	Index (□S->P Sub-In □O->S □Val	Index (hex): 0 Sub-Index (dec): 0 Validate Complete Access				
Data (hexbin) : Validate Mask:					Hex Edit	
Comment:					Edit Entry	
Index	Name	Flags	Value	Unit	^	
⊡ 20 <u>00:0</u>	XB6S-C01SP Config	RO	> 45 <			
2000:01	Communication Mode	RW	ModbusRTUMaster (1)			
2000:02	Baud Rate	RW	115200 (7)			
2000:03	Stop Bit	RW	StopBit 1 (0)			
2000:04	Word Format	RW	8Bits (0)			
2000:05	Parity	RW	Parity None (0)			
2000:06	Control Mode	RW	Disable (0)			
2000:07	Node Output Mode	RW	Poll (0)			
2000:08	Communication Error Behavio	r RW	Clear (0)			
2000:09	Respond Timeout	RW	0x00000032 (50)			
- 2000:0A	Poll Delay	RW	0x0000000A (10)			
2000:0B	Slave ID	RW	0x00000001 (1)			
			0.0000004 (10)			
- 2000:0C	Slave Respond Delay	RW	0X000000A (10)			
2000:0C <mark>2</mark> 000:0D	Slave Respond Delay Node_1_Param_1	RW RW	0x000000602 (1538)			

b. In the downstream data, the values of the 2 holding registers are written as shown below.

解决方案资源管理器 ▼ ↓ ×	TwinCAT Project1	÷×						
0 0 û 0 - 2 d / -	Name	Online	Туре	Size	>Address	In/Out	User ID	Linked to
	■• TX 1	1	USINT	1.0	41.0	Output	0	
	■ TX 2	1	USINT	1.0	42.0	Output	0	
M 解决方案"TwinCAT Project1"(1 个项目)	■> TX 3	1	USINT	1.0	43.0	Output	0	
TwinCAT Project1	■ TX 4	1	USINT	1.0	44.0	Output	0	
▷ SYSTEM	■• TX 5	0	USINT	1.0	45.0	Output	0	
MOTION	■ • TX 6	0	USINT	1.0	46.0	Output	0	
	■ TX 7	0	USINT	1.0	47.0	Output	0	
SAFETY	■ TX 8	0	USINT	1.0	48.0	Output	0	
	■ TX 9	0	USINT	1.0	49.0	Output	0	
A The Devices	■ TX 10	0	USINT	1.0	50.0	Output	0	
Devices	■ TX 11	0	USINT	1.0	51.0	Output	0	
	TX 12	0	USINT	1.0	52.0	Output	0	
	TX 13	0	USINT	1.0	53.0	Output	0	
SvncUnits	TX 14	0	USINT	1.0	54.0	Output	0	
Inputs	TX 15	0	USINT	1.0	55.0	Output	0	
Outputs	TX 16	0	USINT	1.0	56.0	Output	0	
InfoData	TX 17	0	USINT	1.0	57.0	Output	0	
Box 1 (XB6S-EC2002)	■ TX 18	0	USINT	1.0	58.0	Output	0	
Inputs	■ TX 19	0	USINT	1.0	59.0	Output	0	
Outputs	■ TX 20	0	USINT	1.0	60.0	Output	0	
 Fi Module 1 (XB6S-C01SP-32Bytes) 	TX 21	0	USINT	1.0	61.0	Output	0	
Inputs	TX 22	0	USINT	1.0	62.0	Output	0	
Outputs	TX 23	0	USINT	1.0	63.0	Output	0	
WcState	TX 24	0	USINT	1.0	64.0	Output	0	
👂 🔚 InfoData	TX 25	0	USINT	1.0	65.0	Output	0	
Mappings	TX 26	0	USINT	1.0	66.0	Output	0	
	TX 27	0	USINT	1.0	67.0	Output	0	
	TX 28	0	USINT	1.0	68.0	Output	0	
	■ TX 29	0	USINT	1.0	69.0	Output	0	
	TX 30	0	USINT	1.0	70.0	Output	0	
	TX 31	0	USINT	1.0	71.0	Output	0	
	■ TX 32	0	USINT	1.0	72.0	Output	0	

c. The debugging software allows to see the values of the 2 registers received as shown below.

Modbus Slave - Mbslav1



Example 2: Verify that the module RTU master reads the 10 holding registers in Level mode with a tool or device such as Modbus Slave debugging software.

a. Configure the configuration parameters and select 1 for communication mode i.e. RTU master mode as shown below.

Communication Mode: Select ModbusRTUMaster;

Control Mode: Select Level;

Node_1_Param_1: Configure 0x00000001, see <u>6.2.8 Control and Status Node Codes</u> for details on configuration parameters;

Node_2_Param_1: Configure 0x0000030A, see <u>6.2.1 Modbus Master Functionality</u> for configuration parameters;

Node_2_Param_2: Configure 0x00000001, see <u>6.2.1 Modbus Master Functionality</u> for configuration parameters.

Edit CANopen	Startup Entry				×
Transition □I->P ☑P->S □S->0	Index □S->P Sub-In □O->S Ve	(hex): ndex (dec): ılidate	2000 16 Complete Access		OK Cancel
Data (hexbin):	01 00 00 00				Hex Edit
Validate Mask: Comment:	Node_2_Param_2				Edit Entry
Index	Name	Flags	Value	Unit	^
2000:01	Communication Mode	RW	ModbusRTUMaster (1)		
- 2000:02	Baud Rate	RW	115200 (7)		
2000:03	Stop Bit	RW	StopBit 1 (0)		
2000:04	Word Format	RW	8Bits (0)		
2000:05	Parity	RW	Parity None (0)		
2000:06	Control Mode	RW	Level (1)	1	
2000:07	Node Output Mode	RW	Poll (0)		
2000:08	Communication Error Beha	vior RW	Clear (0)		
2000:09	Respond Timeout	RW	0x00000032 (50)		
2000:0A	Poll Delay	RW	0x0000000A (10)		
2000:0B	Slave ID	RW	0x00000001 (1)		
2000:0C	Slave Respond Delay	RW	0x0000000A (10)		
2000:0D	Node_1_Param_1	RW	0x00000001 (1)		
2000:0E	Node_1_Param_2	RW	0x00000000 (0)		
2000:0F	Node_2_Param_1	RW	0x0000030A (778)		V

dit CANopen	Startup Entry				×		
Transition □ I -> P ☑ P -> S □ S -> 0	on Index (hex): 2000 S S → P Sub-Index (dec): 16 0 O → S Validate Complete Access						
Data (hexbin):	01 00 00 00				Hex Edit		
/alidate Mask:							
Comment:	Node_2_Param_2				Edit Entry		
Index	Name	Flags	Value	Unit	^		
2000:08	Communication Error Behavior	RW	Clear (0)				
2000:09	Respond Timeout	RW	0x00000032 (50)				
2000:0A	Poll Delay	RW	0x0000000A (10)				
2000:0B	Slave ID	RW	0x00000001 (1)				
2000:0C	Slave Respond Delay	RW	0x0000000A (10)				
2000:0D	Node_1_Param_1	RW	0x00000001 (1)				
2000:0E	Node_1_Param_2	RW	0x00000000 (0)				
2000:0F	Node_2_Param_1	RW	0x0000030A (778)				
2000:10	Node_2_Param_2	RW	0x00000001 (1)				
2000:11	Node_3_Param_1	RW	0x00000000 (0)				
2000:12	Node_3_Param_2	RW	0x00000000 (0)				
2000:13	Node_4_Param_1	RW	0x00000000 (0)				
2000:14	Node_4_Param_2	RW	0x00000000 (0)				
2000:15	Node_5_Param_1	RW	0x00000000 (0)				
		ENGLY.	0.0000000.00				

b. Set the control word to 1 in the Downstream data and open the debugging software to send the data as shown below.

解决方案资源管理器 ▼ ↓ ×	TwinCAT Pro	oject1 🕈 🗙						
004 0-20 ¥	Name	Online	Туре	Size	>Address	In/Out	User ID	Linked to
搜索解达方案资源等理器(Ctrl+1) 0 -	🖬 TX 1	1	USINT	1.0	41.0	Output	0	
	■ TX 2	0	USINT	1.0	42.0	Output	0	
Q] 解决方案"TwinCAT Project1"(1 个项目)	🗳 TX 3	0	USINT	1.0	43.0	Output	0	
TwinCAT Project1	TX 4	0	USINT	1.0	44.0	Output	0	
P SYSTEM	🗳 TX 5	0	USINT	1.0	45.0	Output	0	
MOTION	🗳 TX 6	0	USINT	1.0	46.0	Output	0	
	🗳 TX 7	0	USINT	1.0	47.0	Output	0	
SAFETY	🗳 TX 8	0	USINT	1.0	48.0	Output	0	
	🗳 TX 9	0	USINT	1.0	49.0	Output	0	
	🖙 TX 10	0	USINT	1.0	50.0	Output	0	
Devices	TX 11	0	USINT	1.0	51.0	Output	0	
	TX 12	0	USINT	1.0	52.0	Output	0	
	TX 13	0	USINT	1.0	53.0	Output	0	
SyncUnits	■ TX 14	0	USINT	1.0	54.0	Output	0	
Inputs	🗳 TX 15	0	USINT	1.0	55.0	Output	0	
Outputs	🗳 TX 16	0	USINT	1.0	56.0	Output	0	
👂 🛄 InfoData	🗳 TX 17	0	USINT	1.0	57.0	Output	0	
Box 1 (XB6S-EC2002)	🖙 TX 18	0	USINT	1.0	58.0	Output	0	
👂 🛄 Inputs	🗳 TX 19	0	USINT	1.0	59.0	Output	0	
Outputs	🗳 TX 20	0	USINT	1.0	60.0	Output	0	
 F Module 1 (XB6S-C01SP-32Bytes) 	🗳 TX 21	0	USINT	1.0	61.0	Output	0	
👂 🛁 Inputs	🗳 TX 22	0	USINT	1.0	62.0	Output	0	
Outputs	🗳 TX 23	0	USINT	1.0	63.0	Output	0	
WcState	■ TX 24	0	USINT	1.0	64.0	Output	0	
👂 唱 InfoData	🖻 TX 25	0	USINT	1.0	65.0	Output	0	
📸 Mappings	■ TX 26	0	USINT	1.0	66.0	Output	0	
	TX 27	0	USINT	1.0	67.0	Output	0	
	TX 28	0	USINT	1.0	68.0	Output	0	
	TX 29	0	USINT	1.0	69.0	Output	0	
	TX 30	0	USINT	1.0	70.0	Output	0	
	E TX 31	0	USINT	1.0	71.0	Output	0	
	F TX 32	0	USINT	1.0	72.0	Output	0	

c. You can see the received data in the Upstream data as shown below.

解决方案资源管理器 ▼ ↓ ×	TwinCAT P	roject1 👳 🗙						
© © ☆ ē ₽	Name	Online	Туре	Size	>Address	In/Out	User ID	Linked to
「現空解法方室溶源管理器(Ctrl+:)	🔁 RX 1	5	USINT	1.0	41.0	Input	0	
	🔊 🕫 RX 2	0	USINT	1.0	42.0	Input	0	
A」解决方案"TwinCAT Project1"(1 个项目)	🔁 RX 3	0	USINT	1.0	43.0	Input	0	
TwinCAT Project1	🔁 RX 4	255	USINT	1.0	44.0	Input	0	
	🔁 RX 5	0	USINT	1.0	45.0	Input	0	
	🔁 RX 6	255	USINT	1.0	46.0	Input	0	
	🔁 RX 7	0	USINT	1.0	47.0	Input	0	
SAFELY	🕶 RX 8	255	USINT	1.0	48.0	Input	0	
	🕶 RX 9	0	USINT	1.0	49.0	Input	0	
	🕶 RX 10	255	USINT	1.0	50.0	Input	0	
Device 2 (Ether(AT))	🔁 RX 11	0	USINT	1.0	51.0	Input	0	
= Device 2 (Effect AT)	🕶 RX 12	255	USINT	1.0	52.0	Input	0	
	🔁 RX 13	0	USINT	1.0	53.0	Input	0	
♦ SyncUnits	🕶 RX 14	255	USINT	1.0	54.0	Input	0	
Inputs	🕶 RX 15	0	USINT	1.0	55.0	Input	0	
Outputs	🔁 RX 16	255	USINT	1.0	56.0	Input	0	
👂 🛄 InfoData	🕶 RX 17	0	USINT	1.0	57.0	Input	0	
 Box 1 (XB6S-EC2002) 	🔁 RX 18	255	USINT	1.0	58.0	Input	0	
Inputs	🕶 RX 19	0	USINT	1.0	59.0	Input	0	
Outputs	🕶 RX 20	255	USINT	1.0	60.0	Input	0	
 FI Module 1 (XB6S-C01SP-32Bytes) 	🔁 RX 21	0	USINT	1.0	61.0	Input	0	
🕨 🛄 Inputs	🕶 RX 22	255	USINT	1.0	62.0	Input	0	
Outputs	🕶 RX 23	0	USINT	1.0	63.0	Input	0	
WcState	💌 RX 24	0	USINT	1.0	64.0	Input	0	
InfoData	🕶 RX 25	0	USINT	1.0	65.0	Input	0	
📸 Mappings	🕶 RX 26	0	USINT	1.0	66.0	Input	0	
	🕶 RX 27	0	USINT	1.0	67.0	Input	0	
	🕶 RX 28	0	USINT	1.0	68.0	Input	0	
	🕫 RX 29	0	USINT	1.0	69.0	Input	0	
	🕶 RX 30	0	USINT	1.0	70.0	Input	0	
	🔁 RX 31	0	USINT	1.0	71.0	Input	0	
	🕶 RX 32	0	USINT	1.0	72.0	Input	0	

7. Example of Freeport_Input function

Example: Receive an 8-byte data in Level mode using Freeport_Input through a tool or

device such as a serial port debugging assistant.

a. Configure the configuration parameters with communication mode selection 7 i.e. Input mode as shown below.

Communication Mode: Select Input;

Control Mode: Select Level;

Node_1_Param_1: Configure 0x00000022, see <u>6.2.8 Control and Status Node Codes</u> for details on configuration parameters;

Node_2_Param_1: Configure 0x0000D04, see <u>6.2.6 Freeport Freeport Functions</u> for details on configuration parameters.

Edit	CANopen	Startup Entry					×
Tra	nsition -> P P-> S S-> O	_S->P _0->S	Index (he) Sub-Inde)	(): (dec): te	2000 1 Complete Access		OK Cancel
Data	(hexbin):	07 00 00 00					Hex Edit
Valid Com	late Mask: ment:	Communication	Mode				Edit Entry
Inde	ex	Name		Flags	Value	Unit	^
	2000:01	Communication Mo	ode	RW	Input (7)		
	2000:02	Baud Rate		RW	115200 (7)		
	2000:03	Stop Bit		RW	StopBit 1 (0)		
	2000:04	Word Format		RW	8Bits (0)		
	2000:05	Parity		RW	Parity None (0)		
	2000:06	Control Mode		RW	Level (1)		
-	2000:07	Node Output Mode	i	RW	Poll (0)		
	2000:08	Communication En	or Behavior	RW	Clear (0)		
	2000:09	Respond Timeout		RW	0x00000032 (50)		
1	2000:0A	Poll Delay		RW	0x0000000A (10)		
	2000:0B	Slave ID		RW	0x00000001 (1)		
1	2000:0C	Slave Respond De	elay	RW	0x0000000A (10)		
1	2000:0D	Node_1_Param_1		RW	0x00000022 (34)		
1	2000:0E	Node_1_Param_2		RW	0x00000000 (0)		
- Aller	2000:0F	Node_2_Param_1		RW	0x00000D04 (3332)		~
i							

b. Set the control word to 1 in the downstream data and open the serial port debugging assistant to send data as shown below.

解决方案资源管理器 ▼ ↓ ×	TwinCAT Pr	oject1 🕆 ×						
001 0·20 1	Name	Online	Туре	Size	>Address	In/Out	User ID	Linked to
搜索解决方案资源管理器(Ctrl+:) 0 •	■ TX 1	1	USINT	1.0	41.0	Output	0	
	TX 2	0	USINT	1.0	42.0	Output	0	
ig」解决万案"TwinCAT Project1"(1 个项目)	■ TX 3	0	USINT	1.0	43.0	Output	0	
IwinCAT Project1	■ TX 4	0	USINT	1.0	44.0	Output	0	
	🖙 TX 5	0	USINT	1.0	45.0	Output	0	
MOTION	■ TX 6	0	USINT	1.0	46.0	Output	0	
	🗳 TX 7	0	USINT	1.0	47.0	Output	0	
SAFELY	■ TX 8	0	USINT	1.0	48.0	Output	0	
	🗳 TX 9	0	USINT	1.0	49.0	Output	0	
	🖙 TX 10	0	USINT	1.0	50.0	Output	0	
A Device 2 (Ether(AT)	TX 11	0	USINT	1.0	51.0	Output	0	
	TX 12	0	USINT	1.0	52.0	Output	0	
Image-Info	E TX 13	0	USINT	1.0	53.0	Output	0	
SvncUnits	TX 14	0	USINT	1.0	54.0	Output	0	
Inputs	🖙 TX 15	0	USINT	1.0	55.0	Output	0	
Outputs	TX 16	0	USINT	1.0	56.0	Output	0	
🕨 🛄 InfoData	TX 17	0	USINT	1.0	57.0	Output	0	
Box 1 (XB6S-EC2002)	TX 18	0	USINT	1.0	58.0	Output	0	
Inputs	TX 19	0	USINT	1.0	59.0	Output	0	
Outputs	TX 20	0	USINT	1.0	60.0	Output	0	
 F Module 1 (XB6S-C01SP-32Bytes) 	TX 21	0	USINT	1.0	61.0	Output	0	
Inputs	TX 22	0	USINT	1.0	62.0	Output	0	
Outputs	TX 23	0	USINT	1.0	63.0	Output	0	
WcState	TX 24	0	USINT	1.0	64.0	Output	0	
InfoData	TX 25	0	USINT	1.0	65.0	Output	0	
Mappings	TX 26	0	USINT	1.0	66.0	Output	0	
	TX 27	0	USINT	1.0	67.0	Output	0	
	TX 28	0	USINT	1.0	68.0	Output	0	
	TX 29	0	USINT	1.0	69.0	Output	0	
	TX 30	0	USINT	1.0	70.0	Output	0	
	• TX 31	0	USINT	1.0	71.0	Output	0	
	TX 32	0	USINT	1.0	72.0	Output	0	
	2010 State 2000 A 12					10.000 A 10.000		

c. The Upstream data can be seen in the received data length of 8, the received data count of 1, and the received 8 bytes of data (RX7~RX14) as shown below.

解决方案资源管理器 ▼ ♀ ×	TwinCAT Pro	oject1 🕈 🗙						
© ⊙ ☆ [™] = • • 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Name	Online	Type	Size	>Address	In/Out	User ID	Linked to
搜索解决方案资源管理器(Ctrl+·) 0-	🔁 RX 1	0	USINT	1.0	41.0	Input	0	
	🕶 RX 2	8	USINT	1.0	42.0	Input	0	
MJ 解决方案" I winCAT Project1"(1 个项目)	🛩 RX 3	0	USINT	1.0	43.0	Input	0	
I winCAT Project'	🐔 RX 4	0	USINT	1.0	44.0	Input	0	
P SYSTEM	📽 RX 5	1	USINT	1.0	45.0	Input	0	
	🔁 RX 6	0	USINT	1.0	46.0	Input	0	
	🕶 RX 7	1	USINT	1.0	47.0	Input	0	
SAFETT	🕶 RX 8	2	USINT	1.0	48.0	Input	0	
	🔁 RX 9	3	USINT	1.0	49.0	Input	0	
	🔁 RX 10	4	USINT	1.0	50.0	Input	0	
▲ ➡ Device 2 (EtherCAT)	🕶 RX 11	5	USINT	1.0	51.0	Input	0	
	🔁 RX 12	1	USINT	1.0	52.0	Input	0	
Image-Info	🕶 RX 13	2	USINT	1.0	53.0	Input	0	
SvncUnits	🕶 RX 14	3	USINT	1.0	54.0	Input	0	
Inputs	💌 RX 15	0	USINT	1.0	55.0	Input	0	
Outputs	🕶 RX 16	0	USINT	1.0	56.0	Input	0	
InfoData	🕶 RX 17	0	USINT	1.0	57.0	Input	0	
Box 1 (XB6S-EC2002)	💌 RX 18	0	USINT	1.0	58.0	Input	0	
👂 🛄 Inputs	🕶 RX 19	0	USINT	1.0	59.0	Input	0	
Outputs	🕶 RX 20	0	USINT	1.0	60.0	Input	0	
Fi Module 1 (XB6S-C01SP-32Bytes)	🕶 RX 21	0	USINT	1.0	61.0	Input	0	
👂 🛁 Inputs	🕶 RX 22	0	USINT	1.0	62.0	Input	0	
Outputs	🕶 RX 23	0	USINT	1.0	63.0	Input	0	
WcState	🕶 RX 24	0	USINT	1.0	64.0	Input	0	
👂 🔚 InfoData	🕶 RX 25	0	USINT	1.0	65.0	Input	0	
Mappings	🕶 RX 26	0	USINT	1.0	66.0	Input	0	
	💌 RX 27	0	USINT	1.0	67.0	Input	0	
	🕶 RX 28	0	USINT	1.0	68.0	Input	0	
	🕶 RX 29	0	USINT	1.0	69.0	Input	0	
	🕶 RX 30	0	USINT	1.0	70.0	Input	0	
	🕶 RX 31	0	USINT	1.0	71.0	Input	0	
	🛩 RX 32	0	USINT	1.0	72.0	Input	0	

6.4.2 Application in Sysmac Studio software environment

1. Preliminary

- Hardware Environment
 - > Module Model XB6S-C01SP
 - EtherCAT Coupler, End Cap
 This description uses the XB6S-EC2002 coupler as an example
 - > One computer with Sysmac Studio software pre-installed
 - > One Omron PLC, this description takes model NX1P2-9024DT as an example.
 - > Shielded cables for EtherCAT
 - > One switching power supply
 - > Device Configuration Files

Configuration file access: https://www.solidotech.com/documents/configfile

- Hardware configuration and wiring
 Follow "<u>4 Installation and uninstall</u>" and "<u>5 Wiring</u>".
- Computer IP requirements

Set the IP address of the computer and the IP address of the PLC to make sure they are on the same network segment.

2、New project

a. Open Sysmac Studio software, click "New Project".

Sysmac Studio (64bit)			1000		×
	_		_	-	_
	_				
Offline	💼 Project P	Properties			
New Project	Project name	XB6S			
<u>open Project</u>	Author	29719			
import					
- <u>m</u> <u>E</u> xport	Comment				
Online	Type	Standard Project			
9 <u>C</u> onnect to Device					
Version Control	In Colort	Device			
No Version Control Explorer	Catagon				
<u>L</u> icense	Category	Controller			
📼 <u>L</u> icense	Version	NX1P2 • 9024DT			
	Version	1.49			
Debet Contract					
Open in Emulation Mode			Create		

• Project name: Customizable .

- Select device: "Device" selects the corresponding PLC model and "Version" selects the corresponding PLC version number.
- b. When you have finished entering the project properties, click "Create".
- c. Click "Controller -> Communications Setup" in the menu bar, select the method to be used every time you connect to the controller when you are online, and enter "Remote IP Address Enter "Remote IP Address" as shown in the following figure.



d. Click "Ethernet communication test", the system shows that the test is successful.

3、Installation of XML files

- a. Expand "Configurations and Setup" in the left navigation tree and double click on "EtherCAT".
- b. Right-click "Master" and select "Display ESI Library" as shown in the following figure.

XB6S - new_Controller_0 - Sysmac Studio (64bit)		- 🗆 ×		
File Edit View Insert Project Controller Simulation Tools Wine	dow Help			
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Multiview Explorer	- Toolb	ох 🝝 ф		
new_Controller_0 ▼ Configurations and Setup Master ► EtherCAT Master ► 0 CPU/Expansion Racks VO Map ► 10 Controller Setup Master	Cut Copy Paste Delete Undo Redo	dors s coups rminal Coupler rvo Drives squency Inverter gital IO time		
 ■ A Contoure secup ■ Motion Control Setup e' Cam Data Settings ► Event Settings 	Expand All Collapse All Calculate Transmission Delay Time of the Master	Keyword Show all versions NX-ECC201 Rev:1.2		
Task Settings Bata Trace Settings Programming	Import Slave Settings and Insert New Slave Export Slave Settings	NX-ECC202 Rev:1.2 NX-ECC202 EtherCAT coup NX-ECC203 Rev:1.7		
4	Write Slave Node Address Compare and Merge with Actual Network Configuration Get Slave Serial Numbers	NX-ECC203 EtherCAT coup R88D-1SAN02H-ECT Rev: R88D-1SAN02H-ECT 200V/ R88D-1SAN04H-ECT Rev:		
Output	Clear All Settings Display Diagnosis/Statistics Information Display Production Information Display Packet Monitor Display ESI Library	R88D-1SAN08H-ECT 2007 R88D-1SAN08H-ECT 2007 R88D-1SAN08H-ECT 2007 R88D-1SAN10F-ECT Rev: R88D-1SAN10F-ECT 4007 R88D-1SAN10H-ECT Rev:		
Filter 🕑 Output Build	Export Configuration Information Output to ENS File Export All Couplers' //O Allocations Assign Drives to Axes Safety Related PDOs Batch Setting	Model name : NX-Ei Product name : NX- Revision : 1.2 Vendor : OMRON C Comment : EtherCA		

c. In the pop-up "ESI Library" window, click "Install (File)", select the module's XML file path, click "Yes" to complete the installation, as shown in the following figure.

📓 ESI Library	-		×
 Omron R88D-TSN04H-ECT -03 Omron R88D-TSN08H-ECT Omron R88D-TSN08H-ECT Omron R88D-TSN08H-ECT Omron R88D-TSN08H-ECT Omron R88D-TSN10F-ECT Omron R88D-TSN15F-ECT Omron R88D-TSN15F-ECT Omron R88D-TSN15F-ECT Omron R88D-TSN15F-ECT Omron R88D-TSN20F-ECT Omron R88D-TSN30F-ECT Omron R88D-TSN30F-ECT Omron R88D-TSN30F-ECT Omron R88D-TSN30F-ECT Omron R88D-TSN35F-ECT Omron R88D-TSN35F-			
Install (File) Install (Folder) Uninstall		(Close

4、 Add Device

There are two ways to add devices: online scanning and offline adding, and this note introduces offline adding as an example.

a. In the right side of the "Toolbox" column, click to expand all suppliers, select "Nanjing Solidot Electronic Technology Co., Ltd."



b. Click to select XB6S Series Fieldbus and double-click the XB6S-EC2002 Coupler Module to add a slave device, as shown below.



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c. In the EtherCAT main page, select the XB6S-EC2002 coupler module you just added, and choose "Edit Module Configuration", as shown in the following figure.

📓 XB6S - new_Controller_0 - Sysmac Studio ((64bit)		- 🗆 X
Eile Edit View Insert Project Contro	oller <u>S</u> imulation <u>T</u> ools <u>W</u> indow <u>H</u> elp		
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Multiview Explorer	AT X ressINetwork configuration Master Master E001 XB6S-EC2002 Rev:0x00 XB6S-EC2002 Rev:0x00	Item name Value PDO Map Settings Fraction of the state	Toolbox
	Poild		Model name : XB65 Product name : XB6 Revision : 0x00000 Vendor : Nanjing S Comment :
output			

d. Position the cursor in the "Module Module", click on the module in the right toolbox module list, and add I/O modules one by one in the order of I/O module configuration. Note: The order and model number must be consistent with the physical topology!

XB6S - new_Controller_0 - Sysmac Studie	o (64bit)	- 🗆 ×
<u>File Edit View Insert Project Cont</u>	roller <u>S</u> imulation <u>T</u> ools <u>W</u> indow <u>H</u> elp	
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L: ﷺ Function Blocks ► 冊 Data ► Ħ Tasks I Filter	Output Build	Model : XB6S-C01SI Product name : 1 Cf Vendor : Nanjing Si

5. Setting the node address

a. Click "Controller -> Online" in the menu bar to turn the controller to online status. Right-click the master device, click and select "Write Slave Node Address", as shown in the following figure.



b. In the Set Node Address window, click the value under Set Value, enter the node address, and click "Write" to change the slave device node address, as shown in the following figure.



c. After writing, a re-power prompt will pop up, as shown in the following figure, click "Write", and then follow the prompts to reboot the power from the device.



6. Download configuration to PLC

a. Click the button "Controller -> Transfer...-> To Controller..." in the menu bar, as shown in the following figure.

XB6S - new_Controller_0 - Sysmac	Studio (64bit)		I X
File Edit View Insert Project	Controller Simulation Tools Window Help		
X 🗐 🔓 🗇 ở ở 🗐	Communications Setup Change Device	▲ ¾ & ♣ ♣ ¶ 0 및 ☆ ↓ ▲ ♦ ♦	
Multiview Explorer new_Controller_0 Configurations and Setup Configurations and Setup Configurations and Setup Controller Setup CPU/Explore Setup Controller Setup Controller Setup Control Set	Online Ctrl+W Offline Ctrl+Shift+W Synchronize Ctrl+M Transfer > Mode > Monitor > Stop Monitoring > Set/Reset > Forced Refreshing > MC Test Run > MC Tool Coordinate System Monitor Table > SD Memory Card Controller Clock Release Access Right Update CPU Unit Name	To Controller Ctrl+T From Controller Ctrl+Shift+T Number of Slaves PDO Communication Reference Clock Evist Total Cable Length Total Cable Length Tota	all versions T couple T couple T couple T Rev1 2007/2 T Rev1 2007/2 T Rev1 2007/2 T Rev1 2007/2 T Rev1
 ♥ BrogramU L & Section0 L & Functions L & Function Blocks ▶ m Data ▶ m Tasks If Tasks 	Security Clear All Memory Reset Controller Output Build Output Build	Program Location ONLINE 192 ERR/ALM RUI	RON C

b. The configuration will be downloaded to the PLC, the transmission confirmation pop-up window will appear, click "Execute", and then click "Yes/OK" in the subsequent pop-up window, as shown in the figure below, after the download is completed, you need to re-power up.



7、 Setting Parameters

a. Switch the configuration to offline state, edit module configuration page in node 1, select XB6S-C01SP-32Bytes module, click "Edit Setting Parameters", as shown in the following figure.



Note: If the PLC firmware version is too low, you need to use EC_CoESDOWrite, EC_CoESDORead instruction to write and read the SDO address.

b. In the XB6S-C01SP Parameter Setting page, you can see 44 configuration parameters, click on any parameter to set the related configuration, as shown in the following figure.

Edit Setting Parameters	- 🗆 X
Item name	Value
0x2000:01 XB6S-C01SP Config/Communication Mode	0: NoSelect 🖉 🗸
0x2000:02 XB6S-C01SP Config/Baud Rate	7: 115200
0x2000:03 XB6S-C01SP Config/Stop Bit	0: StopBit 1
0x2000:04 XB6S-C01SP Config/Word Format	0:8Bits
0x2000:05 XB6S-C01SP Config/Parity	0: Parity None
0x2000:06 XB6S-C01SP Config/Control Mode	0: Disable
0x2000:07 XB6S-C01SP Config/Node Output Mode	0: Poll
0x2000:08 XB6S-C01SP Config/Communication Error Behavior	0: Clear
0x2000:09 XB6S-C01SP Config/Respond Timeout	50
0x2000:0A XB6S-C01SP Config/Poll Delay	10
0x2000:0B XB6S-C01SP Config/Slave ID	1
0x2000:0C XB6S-C01SP Config/Slave Respond Delay	10
0x2000:0D XB6S-C01SP Config/Node_1_Param_1	0
0x2000:0E XB6S-C01SP Config/Node 1 Param 2	0
0x2000:0F XB6S-C01SP Config/Node_2_Param_1	0
0x2000:10 XB6S-C01SP Config/Node 2 Param 2	0
0x2000:11 XB6S-C01SP Config/Node 3 Param 1	0
0x2000:12 XB6S-C01SP Config/Node 3 Param 2	0
	Move In Move Down Add Remove
	inde op inde boint inde inde
	Return to Default
C Help	
Data type :	
Comment :	
L	
This Setting Parameters are saved in the CPU Unit as a part of EtherCAT setting.	
Select Synchronize on the Toolbar to transfer.	
	OK Cancel Apply

c. For example, to modify the communication mode parameters, you can click "Communication Mode" to modify the parameter values, as shown in the following figure. After all the parameters are configured, you need to re-download the program to the PLC, and the PLC and module need to be re-powered.

Edit Setting Parameters			\times
Item name	Value		
0x2000:01 XB6S-C01SP Config/Communication Mode	1: ModbusRTUMaster		
0x2000:02 XB6S-C01SP Config/Baud Rate	7: 115200		
0x2000:03 XB6S-C01SP Config/Stop Bit	0: StopBit 1		
0x2000:04 XB6S-C01SP Config/Word Format	0: 8Bits		
0x2000:05 XB6S-C01SP Config/Parity	0: Parity None		
0x2000:06 XB6S-C01SP Config/Control Mode	0: Disable		
0x2000:07 XB6S-C01SP Config/Node Output Mode	0: Poll		
0x2000:08 XB6S-C01SP Config/Communication Error Behavior	0: Clear		
0x2000:09 XB6S-C01SP Config/Respond Timeout	50		
0x2000:0A XB6S-C01SP Config/Poll Delay	10		
0x2000:0B XB6S-C01SP Config/Slave ID	1		
0x2000:0C XB6S-C01SP Config/Slave Respond Delay	10		
0x2000:0D XB6S-C01SP Config/Node_1_Param_1	0		
0x2000:0E XB6S-C01SP Config/Node_1_Param_2	0		
0x2000:0F XB6S-C01SP Config/Node_2_Param_1	0		
0x2000:10 XB6S-C01SP Config/Node_2_Param_2	0		
0x2000:11 XB6S-C01SP Config/Node_3_Param_1	0		
0x2000:12 XB6S-C01SP Config/Node_3_Param_2	0		\sim
	Move Up Move Down Add	Ren	nove
		Return to [Default
C Help			
Data type :			
Comment ·			
This Setting Parameters are saved in the CPULInit as a part of EtherCAT setting			=
Select Synchronize on the Toolbar to transfer.			
	ОК	Cancel	Apply

8、I/O Functions

a. Double-click "I/O Map" in the left navigation tree to see the mapping table of the modules in the topology, so that you can monitor the input and output values of the communication modules, as shown in the figure below.

XB6S - new_Controller_0 - Sysmac Studio (64bit)			- 🗆 X
<u>Eile E</u> dit <u>V</u> iew <u>Insert P</u> roject <u>C</u> ontroller <u>S</u> in	nulation <u>T</u> ools <u>W</u> indow <u>H</u> elp		
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new_Controller_0 -	Position Port Descr The Port Descr Position Port Descr Position Descr Position Port Descr Position Position Posi	ription R/W Data Type Value Variable	<search></search>
Configurations and Setup	Node1 VB6S-EC2002		
▼ @ EtherCAT	Outputs_CouplerCtrl_F200_01 Inputs_CouplerState_F100_01	R UINT 0	
L = 0 : XB6S-C01SP-32Bytes(M1)	Slot 0 XB6S-C01SP-32Bytes		
▼ S CPU/Expansion Racks	Outputs_TX 1_/001_01 Outputs_TX 2_7001_02	W USINI 0 W USINT 0	
L== CPU Rack	Outputs_TX 3_7001_03	W USINT 0	
▼ Controller Setup	Outputs_TX 5_7001_05	W USINT 0	
L Deration Settings	Outputs_TX 6_7001_06 Outputs_TX 7_7001_07	W USINT 0	
L # Built-in EtherNet/IP Port Settings	Outputs_TX 8_7001_08	W USINT 0	•
Le Option Board Settings	Outputs_TX 9_7001_09 Outputs_TX 10_7001_0A	W USINT 0 W USINT 0	
L 🗰 Memory Settings	Outputs_TX 11_7001_0B	W USINT 0	
Motion Control Setup	Outputs_TX 12_7001_0C Outputs TX 13 7001 0D	W USINT 0 W USINT 0	
L & Axes Group Settings	Outputs_TX 14_7001_0E	W USINT 0	
er Cam Data Settings	Outputs_TX 15_7001_0F Outputs_TX 16_7001_10	W USINT 0 W USINT 0	
► Event Settings	Outputs_TX 17_7001_11	W USINT 0	
Task Settings E Data Trace Settings	Outputs_TX 18_7001_12 Outputs_TX 19_7001_13	W USINT 0 W USINT 0	
Programming	Outputs_TX 20_7001_14		Controller Status 🚽 🖡
V 🛙 POUs	Outputs_TX 21_7001_15 Outputs TX 22_7001_16	W USINT 0 W USINT 0	
Reprograms	Outputs_TX 23_7001_17	W USINT 0	ERR/ALM PROGRAM mode
L 🕱 Function Blocks	Outputs_TX 24_7001_18 Outputs_TX 25_7001_19	W USINT 0	
▼ m Data	Outpute TV 26 7001 1A	W IIGINT	
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X865 - new_Controller_0 - Sysmac Studio (64bit) File Edit View Insert Project Controller Studio V Image: Studio (64bit) Image: Studio (64bit) Multiview Explorer Image: Studio (64bit) Image: Studio (64bit) Image: Studio (64bit)	Imulation Tools Window Help Position Port Imulation Do Imputs, RX 3, 6001.03 Imputs, RX 5, 6001.03 Do Imputs, RX 5, 6001.06 Imputs, RX 5, 6001.06 Imputs, RX 10, 6001.04 Imputs, RX 10, 6001.08 Imputs, RX 12, 6001.02 Imputs, RX 12, 6001.02 Imputs, RX 11, 6001.08 Imputs, RX 12, 6001.01 Imputs, RX 12, 6001.02 Imputs, RX 12, 6001.04 Imputs, RX 12, 6001.05 Imputs, RX 12, 6001.05 Imputs, RX 12, 6001.06 Imputs, RX 12, 6001.07 Imputs, RX 12, 6001.13 Imputs, RX 12, 6001.12 Imputs, RX 12, 6001.13 Imputs, RX 12, 6001.14 Imputs, RX 22, 6001.16 Imputs, RX 22, 6001.17 Imputs, RX 22, 6001.16 Imputs, RX 22, 6001.10 Imputs, RX 22, 6001.10 Imputs, RX 22, 6001.10 Imputs, RX 22, 6001.10 Imputs, RX 22, 6001.10 Imputs, RX 22, 6001.10 <td>R/W Data Ype Value Variant R USINT 0 R Variant 0 R USINT 0 R Variant 0 R R USINT 0 R Variant 0 R Variant R USINT 0 R Variant 0 R <</td> <td>- C ×</td>	R/W Data Ype Value Variant R USINT 0 R Variant 0 R USINT 0 R Variant 0 R R USINT 0 R Variant 0 R Variant R USINT 0 R Variant 0 R <	- C ×

9、 RTU Master Mode Function Example

Example 1: Verify that the module RTU master writes the values of the 2 holding registers in disable mode with a tool or device such as Modbus Slave debugging software.

a. Configure the configuration parameters and select 1 for communication mode i.e. RTU master mode as shown below.

Communication Mode: Select ModbusRTUMaster;

Control Mode: Select Disable;

Node_1_Param_1: Configure 1538 (0x0000602), see <u>6.2.1 Modbus Master Function</u> for configuration parameters;

Node_1_Param_2: Configuration 1 (0x00000001), see <u>6.2.1 Modbus Master Function</u> for configuration parameters.

📓 Edit Setting Parameters			- 🗆 X
Item name	T	Value	
0x2000:01 XB6S-C01SP Config/Communication Mode	1: ModbusRTUMaster		 ^
0x2000:02 XB6S-C01SP Config/Baud Rate	7: 115200		
0x2000:03 XB6S-C01SP Config/Stop Bit	0: StopBit 1		
0x2000:04 XB6S-C01SP Config/Word Format	O: 8Bits		
0x2000:05 XB6S-C01SP Config/Parity	0: Parity None		
0x2000:06 XB6S-C01SP Config/Control Mode	0: Disable		
0x2000:07 XB6S-C01SP Config/Node Output Mode	0: Poll		
0x2000:08 XB6S-C01SP Config/Communication Error Behavior	0: Clear		
0x2000:09 XB6S-C01SP Config/Respond Timeout	50		
0x2000:0A XB6S-C01SP Config/Poll Delay	10		
0x2000:0B XB6S-C01SP Config/Slave ID	1		
0x2000:0C XB6S-C01SP Config/Slave Respond Delay	10		
0x2000:0D XB6S-C01SP Config/Node_1_Param_1	1538		
0x2000:0E XB6S-C01SP Config/Node_1_Param_2	1		
0x2000:0F XB6S-C01SP Config/Node_2_Param_1	0		
0x2000:10 XB6S-C01SP Config/Node_2_Param_2	0		
0x2000:11 XB6S-C01SP Config/Node_3_Param_1	0		
0x2000:12 XB6S-C01SP Config/Node_3_Param_2	0		\sim
		Move Up Move Down	Add Remove
			Return to Default
_ Help			
Data type :			
Comment :			
This Setting Parameters are saved in the CPU Unit as a part of EtherCAT setting. Select Synchronize on the Toolbar to transfer.			
			OK Cancel Apply

After all parameters are configured, the program needs to be re-downloaded to the PLC, and the PLC and module need to be re-powered.

b. In the downstream data, the values of the 2 holding registers are written as shown below.

XB6S - new_Controller_0 - Sysmac Studio (64	bit)							- 🗆 ×
Eile Edit View Insert Project Controller	Simulation	Iools Window Help		_				
Х 🖲 🛍 首 つ さ 🗃 📼 🗗	く影り	競 🏦 🛱 📵 🔣 🛕 🔌 68	🖗 🦒 🛍 O 🦻	21 (P	∐ @, Q, ~q			
Multiview Explorer 🗸 🖡	EtherCAT	- Node1 : XB6S-EC2002 (E0 🧬 I/O Map 3	×			~	Toolbox	÷ 0
new Controller 0 🔻	Position	Port	Description F	R∕W∣ Dat	a Type Value Variable		<search></search>	V P X
	Noda1	EtherCAI Network Configuration		_	_	Â		
Configurations and Setup		Abos-cc2002 Outputs CouplerCtrl E200.01			2			
▼ @ EtherCA1		Inputs CouplerState F100.01			0			
Node1 : XB6S-EC2002(E001)	Slot 0	T # XB65_C015D-32Butes	~	. Only	ľ			
CPU/Expansion Racks		Outputs TX 1 7001 01	v	v USIN	T 1			
L == CPU Rack		Outputs TX 2 7001 02	v	V USIN	T 1			
📕 🛷 I/O Map	_	Outputs TX 3 7001 03	v	V USIN	т 1			
🖉 🔻 🕄 Controller Setup		Outputs TX 4_7001_04	v	V USIN	т 1			
L B Operation Settings		Outputs_TX 5_7001_05	v	V USIN	тр			
L # Built-in EtherNet/IP Port Settings		Outputs_TX 6_7001_06	v	V USIN	т 0			
📖 Built-in I/O Settings		Outputs_TX 7_7001_07	v	V USIN	т 0			
Dotion Board Settings		Outputs_TX 8_7001_08	v	V USIN	т О			
Manager Settings		Outputs_TX 9_7001_09	v	V USIN	т 0			
L Memory settings		Outputs_TX 10_7001_0A	v	V USIN	т			
▼		Outputs_TX 11_7001_0B	M	V USIN	T 0			
∟ ⊕ Axis Settings		Outputs_TX 12_7001_0C	V	V USIN	0			
L the Axes Group Settings		Outputs_IX 13_7001_0D	M M	V USIN				
er Cam Data Settings		Outputs_1X_14_7001_0E	v.		, U			
Event Settings	-	Outputs_TX_15_7001_0F	VI VI					
Task Settings	-	Outputs_TX 10_7001_10			T 0			
Re Data Trace Settings	-	Outputs TX 18 7001_11	v.		T D			
Programming		Outputs TX 19 7001_12	, W		T O			
		Outputs TX 20 7001 14	v	V USIN	T D		Controller Status	– p
• 10 December 2	-	Outputs TX 21 7001 15	v	V USIN	T D			X
▶ jr; Programs	-	Outputs TX 22 7001 16	Ŵ	V USIN	то			192 169 250 1
L (#) Functions	_	Outputs_TX 23_7001_17	W	V USIN	т 0		ERR/ALM	RUN mode
L 波 Function Blocks		Outputs TX 24 7001 18	v	V USIN	т			
🖉 🐨 Data		Outputs_TX 25_7001_19	v	V USIN	т О			
L 58 Data Types		Outpute TX 26 7001 1A	NA NA		r h			
L I Global Variables	- Monitor type					121		
▼ m Tasks	 Data type 	🔵 Binary 🌰 Hex 🌑 Signed decimal 🌰 Unsign	ed decimal		MSB-LSB	LSB-MSB		
▶ E PrimaryTask	Output					- 1 X		
🖬 Filter 📝	Output Build	1						

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c. The debugging software allows to see the values of the 2 registers received as shown below.

-31	Modbus Slave - Mb	oslav1	
<u>F</u> ile	Edit Connection	<u>Setup</u> isplay	/ <u>V</u> iew <u>W</u> indow <u>H</u> elp
D	🖻 🔒 🎒 📋	🗏 👜 🤋 📢	
	Mbslav1		
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L			
For H	lelp, press F1.		

Example 2: Verify that the module RTU master reads the 10 holding registers in Level mode with a tool or device such as Modbus Slave debugging software.

a. Configure the configuration parameters and select 1 for communication mode i.e. RTU master mode as shown below.

Communication Mode: Select ModbusRTUMaster;

Control Mode: Select Level;

Node_1_Param_1: Configuration 1 (0x00000001), see <u>6.2.8 Control and Status Node Codes</u> for details on configuration parameters;

Node_2_Param_1: Configuration 778 (0x0000030A), see <u>6.2.1 Modbus Master Function</u> for configuration parameters;

Node_2_Param_2: Configuration 1 (0x0000001), see <u>6.2.1 Modbus Master Function</u> for configuration parameters.

M Edit Setting Parameters				- 🗆	×
Item name		Value			
0x2000:01 XB6S-C01SP Config/Communication Mode	1: ModbusRTUMaster				
0x2000:02 XB6S-C01SP Config/Baud Rate	7: 115200				
0x2000:03 XB6S-C01SP Config/Stop Bit	0: StopBit 1				
0x2000:04 XB6S-C01SP Config/Word Format	0: 8Bits				
0x2000:05 XB6S-C01SP Config/Parity	0: Parity None				
0x2000:06 XB6S-C01SP Config/Control Mode					
0x2000:07 XB6S-C01SP Config/Node Output Mode	0: Poll				
0x2000:08 XB6S-C01SP Config/Communication Error Behavior	0: Clear				
0x2000:09 XB6S-C01SP Config/Respond Timeout	50				
0x2000:0A XB6S-C01SP Config/Poll Delay	10				
0x2000:0B XB6S-C01SP Config/Slave ID	1				
0x2000:0C XB6S-C01SP Config/Slave Respond Delay	10				
0x2000:0D XB6S-C01SP Config/Node_1_Param_1	1				
0x2000:0E XB6S-C01SP Config/Node_1_Param_2	0				
0x2000:0F XB6S-C01SP Config/Node_2_Param_1	778	1			
0x2000:10 XB6S-C01SP Config/Node_2_Param_2	1				
0x2000:11 XB6S-C01SP Config/Node_3_Param_1	0				
0x2000:12 XB6S-C01SP Config/Node_3_Param_2	0				\sim
		Mayo Da	un Add	Der	2010
		Move op		Rei	nove
				Return to	Default
- Help					
Data type :					
Comment :					
This Setting Parameters are saved in the CPU Unit as a part of EtherCAT setting. Select Synchronize on the Toolbar to transfer.					
			OK	Cancel	Apply
	11.73P				

After all parameters are configured, the program needs to be re-downloaded to the PLC, and the PLC and module need to be re-powered.

b. Set the control word to 1 in the Downstream data and open the debugging software to send the data as shown below.

SKAGS - new_Controller_0 - Sysmac Studio (64b	pit)								- 🗆 ×
<u>File Edit View Insert Project Controller</u>	<u>Simulation</u>	<u>I</u> ools <u>W</u> indow <u>H</u> elp							
	২ ১৯ জ	R # # @ R 🔺 🔌	68 🍪 🖡 📬 O	ō ¹	1	କ୍ ବ୍ ଞ୍			
Multiview Explorer 🗸 📮	EtherCAT	-🗖 Node1 : XB6S-EC2002 (E0 💣 I/O I	Map 🗙				-	Toolbox	÷ 0
new_Controller_0 🔻	Position	Port	Description	R/W	Data Type	Value Vari	able	<search></search>	V A
Configurations and Setup	Node1	▼ TXB6S-EC2002			1			-	
The Sther CAT		Outputs CouplerCtrl F200 01		w	UINT	0			
V m Elifercal	-	Inputs CouplerState F100 01		R	UINT	0			
► □ Node1 : XB6S-EC2002(E001)	Slot 0	▼ XB6S-C01SP-32Bytes							
▼ S CPU/Expansion Racks		Outputs TX 1 7001 01		W	USINT	1			
L # CPU Rack		Outputs TX 2_7001_02		W	USINT	0			
📕 🛷 I/O Map		Outputs_TX 3_7001_03		w	USINT	0			
🖉 🗮 Controller Setup		Outputs_TX 4_7001_04		w	USINT	0			
L G L G Coperation Settings		Outputs_TX 5_7001_05		w	USINT	0			
L 部 Built-in EtherNet/IP Port Settings		Outputs_TX 6_7001_06		w	USINT	0			
L ■ Built-in I/O Settings		Outputs_TX 7_7001_07		w	USINT	0			
Option Board Settings		Outputs_TX 8_7001_08		w	USINT	0	·		
Mamon Cattings		Outputs_TX 9_7001_09		w	USINT	0			
L Memory Settings		Outputs_TX 10_7001_0A		w	USINT	0			
▼		Outputs_TX 11_7001_0B		w	USINT	0			
L 奇 Axis Settings		Outputs_TX 12_7001_0C		w	USINT	0			
L 🖏 Axes Group Settings		Outputs_TX 13_7001_0D		w	USINT	0			
e' Cam Data Settings		Outputs_IX 14_7001_0E		w	USINT	0			
Event Settings		Outputs_TX 15_7001_0F		w	USINT	0			
n Task Settings	-	Outputs_1X 16_7001_10		vv	USINT	0			
M Data Trace Settings		Outputs_TX 17_7001_11		WV.	LICINIT				
Programming		Outputs_TX 10_7001_12		w	LISINT				
		Outputs_TX 19_7001_15		w	USINT	0		Controller Status	- ų
	-	Outputs TX 21 7001 15		w	USINT	0			a la
► M Programs	-	Outputs TX 22 7001 16		w	USINT	0			102 169 250 1
L 🕄 Functions		Outputs TX 23 7001 17		w	USINT	0		FRR/ALM	RUN mode
∟ ﷺ Function Blocks		Outputs_TX 24_7001_18		w	USINT	0			
🔳 🔻 🕅 Data		Outputs_TX 25_7001_19		w	USINT	0			
டந்த Data Types		Outpute TY 26 7001 1A		w	LISINT	0			
🔲 um Global Variables	Monitor type					Rit order	2	-	
▼ I n Tasks	Data type	💿 Binary 🌰 Hex 🌰 Signed decimal 🌰 U	Insigned decimal			MSB-L	SB 🖱 LSB-MSB		
PrimaryTask									
	Build						• ª ×		

c. You can see the received data in the Upstream data as shown below.

XB6S - new_Controller_0 - Sysmac Studio (64	it)	- 🗆 X
<u>Eile Edit View Insert Project Controller</u>	Simulation Iools Window Help	
Х 単 隆 首 ち ぐ 図 国 岳	▲ 路 區 扇 盤 幕 ❷ 承 ▲ ▲ & ◎ ゅ ゅ 0 ほ ピ ロ Q ⊂ ペ	
Multiview Explorer 🚽 🤻	ໝ EtherCAT -□ Node1 : X86S-EC2002 (E0 💀 1/O Map 🗙	Toolbox 🚽 🕴
new_Controller_0 🔻	Position Port Description R/W Data Type Value Variable	<search> ▼ ₽ ×</search>
Configurations and Sotup	Inputs RX 2 6001 02 R USINT 0	
The Sther CAT	Inputs RX 3_6001_03 R USINT 0	
V @ EtherCAT	Inputs_RX 4_6001_04 R USINT 255	
► ► Node1 : XB6S-EC2002(E001)	Inputs_RX 5_6001_05 R USINT 0	
▼	Inputs_RX 6_6001_06 R USINT 255	
L == CPU Rack	Inputs_RX 7_6001_07 R USINT 0	
🔳 👒 I/O Map	Inputs_RX 8_6001_08 R USINT 255	
▼ Controller Setup	Inputs_RX 9_6001_09 R USINT 0	
L B. Operation Settings	Inputs_RX 10_6001_0A R USINT 255	
L # Built-in EtherNet/IP Port Settings	Inputs_RX 11_6001_0B R USINT 0	
E Built-in I/O Settings	Inputs_RX 12_6001_0C R USINT 255	
E Option Roard Settings	Inputs_RX 13_6001_0D R USINT 0	
	Inputs_RX 14_6001_DE R USINT 255	
L m Memory Settings	Inputs_RX 15_6001_0F R USINT 0	
▼	Inputs IX 10 6001 10 K USINI 2235	
∟ ⊕ Axis Settings	Inputs KX 17_6001_11 K USINI U	
上岛 Axes Group Settings		
e' Cam Data Settings	Input_N15_001_13 R GSINT 0	
Event Settings	Inputs DV 31 600115 P USINT 0	
Task Settings	Innuts RX 22 600116 R USINT 255	
P Data Trace Settings	Inputs RX 23 6001 17 R USINT 0	
Programming	Inputs RX 24 6001 18 R USINT 0	
	Inputs RX 25 6001 19 R USINT 0	Controller Status 🚽 🕂
V Prous	Inputs RX 26_6001_1A R USINT 0	Л×
▶ a Programs	Inputs_RX 27_6001_1B R USINT 0	ONUINE 102 169 250 1
L 🗑 Functions	Inputs_RX 28_6001_1C R USINT 0	FRR/ALM RUN mode
L ᇎ Function Blocks	Inputs_RX 29_6001_1D R USINT 0	
🔳 🔻 🕅 Data	Inputs_RX 30_6001_1E R USINT 0	
L 5 Data Types	Inputs RX 31 6001 1F R USINT 0	
∟ 🗠 Global Variables	Monitor type Bit order	
🖉 🖬 Tasks	O Data type ● Binary ● Hex ● Signed decimal ● Unsigned decimal ● Construction	
PrimaryTask	D.11	
	Build	

10. Example of Freeport_Input function

Example: Receive an 8-byte data in Level mode using Freeport_Input through a tool or

device such as a serial port debugging assistant.

a. Configure the configuration parameters and select 7 for communication mode i.e. Input mode as shown below.

Communication Mode: Select Input;

Control Mode: Select Level;

Node_1_Param_1: Configuration 34 (0x0000022), see <u>6.2.8 Control and Status Node Codes</u> for details on configuration parameters;

Node_2_Param_1: Configuration 3332 (0x0000D04), see <u>6.2.6 Freeport Freeport Functions</u> for details on configuration parameters.



After all parameters are configured, the program needs to be re-downloaded to the PLC, and the PLC and module need to be re-powered.

b. Set the control word to 1 in the downstream data and open the serial port debugging assistant to send data as shown below.

📓 XB6S - new_Controller_0 - Sysmac Studio (64bit) — 🗆 🛛				
Elle Edit View Insert Project Controller Simulation Tools Window Help				
	🔬 🗔 🖽 🤮 🐴 😫 🗮 👗 🔺 🍇 🖗 🦡	* 0 5: 5 [] @ @ %		
Multiview Explorer 🗸 🕂	EtherCAT - Node1 : XB65-EC2002 (E0 / 1/0 Map ×		- Toolbox - 🗸 🖡	
new Controller 0 🔻	Position Port Descripti	on R/W Data Type Value Variable	<search></search>	
	EtherCAT Network Configuration			
Configurations and Setup	Nodel V XB6S-EC2002			
■ ▼ 器 EtherCAT	Outputs_CouplerCtrl_F200_01			
Node1 : XB6S-EC2002(E001)	Slot 0 T VRCC CONCR 338.+			
V S CPU/Expansion Racks	Outputs TV 1 7001 01			
L == CPU Rack	Outputs IX 2 7001 02	W LISINT 0		
I/O Map	Outputs_IX 2_7001_02			
▼ ■ Controller Setup	Outputs_TX 4 7001_04	W USINT 0		
Operation Settings	Outputs TX 5 7001 05	W USINT 0		
Built-in EtherNet/ID Port Settings	Outputs TX 6 7001_06	W USINT 0		
Built in L/O Cettings	Outputs_TX 7_7001_07	W USINT 0		
E Built-In I/O Settings	Outputs_TX 8_7001_08	W USINT 0		
Doption Board Settings	Outputs_TX 9_7001_09	W USINT 0		
L Memory Settings	Outputs_TX 10_7001_0A	W USINT 0		
A Motion Control Setup	Outputs_TX 11_7001_08	W USINT ⁰		
	Outputs_TX 12_7001_0C	W USINT 0		
L the Axes Group Settings	Outputs_TX 13_7001_0D	W USINT 0		
e' Cam Data Settings	Outputs_TX 14_7001_0E	W USINT 0		
Event Settings	Outputs_1X 15_7001_0F	W USINI U		
Task Settings	Outputs_1X 16_/001_10			
R Data Trace Settings	Outputs_TX_17_7001_T1 Outputs_TX_19_7001_12			
Programming	Outputs_IX_10_7001_12	W LISINT D		
The POlk	Outputs_TX 20 7001_15	W USINT 0	Controller Status 🚽 🗜	
• Ef Dragrame	Outputs TX 21 7001 15	W USINT 0	XX	
▶ a, Programs	Outputs_TX 22_7001_16	W USINT 0	ONLINE 192 168 250 1	
La: Functions	Outputs_TX 23_7001_17	W USINT 0	ERR/ALM RUN mode	
L I Function Blocks	Outputs_TX 24_7001_18	W USINT 0		
🗸 🖬 Data	Outputs_TX 25_7001_19	W USINT 0		
■ L冠 Data Types	Outpute TV 26 7001 18			
L I Global Variables	nitor type	Bit order	4	
V th Tasks O Data type ● Binary ● Hex ● Signed decimal ● Unsigned decimal ● Unsigned decimal				
PrimaryTask	d	- # >		

c. The Upstream data can be seen in the received data length of 8, the received data count of 1, and the received 8 bytes of data (RX7~RX14) as shown below.

📓 XB65 - new_Controller_0 - Sysmac Studio (64bit) – 🗆 X								
File Edit View Insert Project Controller	Simulation Tools	Window Help						
				01 10	m e e s			
	A 660 660 BB							
Multiview Explorer 🗸 🦊	🛗 EtherCAT 🛛 🗖 Noc	ie1 : XB6S-EC2002 (E0 🏼 🏕 I/O N	lap 🗙			-	Toolbox	- ù
new_Controller_0	Position	Port	Description	R/W Data	Type Value Variable		<search></search>	▼ P ×
- Configurations and Satur		Inputs RX 2 6001 02		R USINT	8	\sim		
 Configurations and Setup The EtherCAT 		Inputs_RX 3_6001_03		R USINT	0			
▼ _W EulerCAT		Inputs_RX 4_6001_04		r usint	0			
► Thodel: XB6S-EC2002(E001)		Inputs_RX 5_6001_05		R USINT	1			
▼ Si CPU/Expansion Racks		Inputs_RX 6_6001_06		R USINT	0			
L== CPU Rack		Inputs RX 7 6001 07		R USINT	1			
📕 🥔 I/O Map		Inputs_RX 8_6001_08		R USINT	2			
🖉 🔻 Controller Setup		Inputs_RX 9_6001_09		R USINT	3			
L □ Operation Settings		Inputs_RX 10_6001_0A		R USINT	4			
L# Built-in EtherNet/IP Port Settings	_	Inputs_RX 11_6001_0B		R USINT	5			
∟ I Built-in I/O Settings	_	Inputs_RX 12_6001_0C		R USINT	1			
E Ontion Board Settings		Inputs_RX 13_6001_0D		R USINT	2			
Momon Sottings		Inputs_RX 14_6001_0E		R USINI	3			
L minenory settings		Inputs_KX 15_6001_0F			0			
		Inputs_RX 16_6001_10		R USINI	0			
L 奇 Axis Settings	_	Inputs_IX 17_0001_11			0			
L the Axes Group Settings	_	Inputs PX 19 6001 12			0			
er Cam Data Settings	_	Inputs RX 20 6001 14			ő			
Event Settings	_	Inputs RX 21 6001 15		R LISINT	0			
Task Settings	_	Inputs RX 22 6001 16		R USINT	0			
🖂 Data Trace Settings		Inputs RX 23 6001 17		R USINT	0			
Programming		Inputs_RX 24_6001_18		R USINT	0			
▼ # POLIs		Inputs_RX 25_6001_19		R USINT	0		Controller Status	🗕 🗘
 Deparament 		Inputs_RX 26_6001_1A		R USINT	0			XX
P 36 Flogranis		Inputs_RX 27_6001_1B		R USINT	0			192 168 250 1
La: Functions		Inputs_RX 28_6001_1C		R USINT	0		ERR/ALM	RUN mode
∟		Inputs_RX 29_6001_1D		R USINT	0			
🖉 🔻 🛅 Data		Inputs_RX 30_6001_1E		R USINT	0			
∟∺র Data Types		Inputs RX 31 6001 1F		R USINT	0			
L International Variables	Monitor type				Bit order			
🖉 🔻 🖿 Tasks	🔵 Data type 🔵 Bina	ry 🔵 Hex 🔵 Signed decimal 🔵 U	nsigned decimal		MSB-LSB (LSB-MSB		
▶ ■ PrimaryTask	p. ild							
El Siltor	Output Duild					• # X		
	Surbut Build							

6.4.3 Application in TIA Portal V17 software environment

1. Preliminary

- Hardware environment
 - > Module model XB6S-C01SP
 - PROFINET Bus Coupler Module, End Cap
 This description uses the XB6S-PN2002 coupler module as an example
 - > One computer with pre-installed TIA Portal V17 software
 - > Shielded cables for PROFINET
 - > One Siemens PLC, this description takes Siemens S7-1500 CPU 1511-1 PN as an example.
 - > One switching power supply
 - > Module installation rails and rail fixings
 - Device Configuration Files
 Configuration file access: <u>https://www.solidotech.com/documents/configfile</u>
- Hardware configuration and wiring
 Follow "4 Installation and uninstall" and "5 Wiring".

2、New project

a. Open TIA Portal V17 software, click "Create New Project", enter the information and click "Create" button, as shown below.

Why stemens					_ U X
					Totally Integrated Automation PORTAL
Start			Create new project		
Devices &		Open existing project	Project name:	XB6S	
		🥚 Create new project	Path: Version:	V17	
		Migrate project	Author: Comment:	29719	
	-				~
					Create
Online & Diagnostics	1	Welcome Tour			
		rırst steps			
		Installed software			
		Help			
		🚳 User interface language			
Project view					

- Item name: customizable, can be left as default.
- Path: the project keeps the path, which can be left as default.
- Version: can be left as default.

- AUTHOR: The default can be maintained.
- Note: Customizable, may not be filled in.

3、 Adding a PLC controller

a. Click "Configure A Device", as shown in the following figure.

Vi Si	emens - C:\Users\297	19 Document	ISIX B6SIX B6S	×
				Totally Integrated Automation PORTAL
s	tart			First steps
		*	Open existing project	Project: "XB65" was opened successfully. Please select the next step:
		٢	Migrate project	Start
	Motion & technology		Close project	Devices &
				networks b N Configure a device
	Online & Diagnostics	10	Welcome Tour First steps	PLC programming Write PLC program
				technology technology objects
			Installed software	Visualization Configure an HM screen
			Help	
			🚱 User interface language	
				Open the project view
•	Project view		Opened project: C:\Users\29719\D	Documents\XB6S\XB6S

b. Click "Add New Device", select the PLC model you are currently using, and click "Add", as shown in the following figure. After adding, you can see that the PLC has been added to the device navigation tree.



4、 Scanning connected devices

a. Click "Online Access -> Update Accessible Devices" in the left navigation tree, as shown in the following figure. After the update is completed, the connected slave devices are displayed as shown in the following figure.



The IP address of the computer must be in the same network segment as the PLC, if not, modify the IP address of the computer and repeat the above steps.

b. Double-click "Online and Diagnostic" under Slave Devices in the left navigation tree, and you can assign the IP address and configuration name of the current slave under the "Function" menu.
 Click "Assign IP Address", fill in "Subnet Mask", then "IP Address", and click "Assign IP Address" at the bottom. Click "Assign IP Address" at the bottom of the screen, as shown in the figure below.


c. Click "Assign PROFINET Device Name", fill in "PROFINET Device Name", and click "Assign Name", as shown in the following figure.

Project tree 🔲 🖣	Online access 🕨 Realtek PCIe G	bE Family Controller	Accessible dev	ice [8C-F3-E	7-21-E0-B4] + Accessi	ible device [8C-F3-E7-21-E0-B4]	_ # # ×
Devices							
1	▼ Diagnostics General	Assign PROFINET dev	ice name				- =
Add new device Add new device Bevices & networks Devices & networks De	✓ Functions Assign IP address Assign PROFINET device name Reset to factory settings		Configured PF PROFINET de C	ROFINET de vice name: Device type:	vice XB65-PN2002 PNIO		
Displaying memory and the interfaces	2 2 2		Only sho	ow devices of ow devices wi ow devices wi	the same type th bad parameter settings thout names		
Display more information		IP address	MAC address	Device	PROFINET device name	Ctatur	
Accessible device [192, 168.0.2] W. Online & diagnostics Intel(R) W-Fi & AV201160MHz Intel(R) W-Fi & AV201160MHz USB [S7USB] Differenal [Local] Differenal		17 BUUESS			rilashes Up	odate list Assign name	
< "	< III >						*

5. Adding a GSD Configuration File

a. In the menu bar, select "Options -> Manage General Station Description File (GSD)" as shown in the following figure.

Siemens - C:\Users\29719\Docum	ents/Automation/XB65/XB65		
Project Edit View Insert Online	Options Tools Window Help	Tot	ally Integrated Automation
📑 🎦 🔒 Save project 🛛 🚇 🐰 🔟	Settings	ne 🖉 Go offline 🛔 🖪 🦉 🚽 🛄 < earch in project	POR
Project tree	Support packages		_ • •
Devices	Manage general station description	files (GSD)	rk view
	Start Automation License Manager	apartian a Delations 🕅 🎟 🗐 🕀 🛊	
2	🔄 🕙 Show reference text		
► D x865	[]] Global libraries	>	^
Add new device			=
Devices & networks	PLC_1	ackages	
PLC 1 [CPU 1511-1 PN]	CPU 1511-1 PN		
Device configuration			
Online & diagnostics			
Software units			
Program blocks			
Technology objects			
External source files			
PLC tags			
PLC data types			
Watch and force tables			
Online backups			
🕨 🔀 Traces			
OPC UA communication			
Web applications			
Device proxy data			
Program info			
PLC supervisions & alarm	IS		
PLC alarm text lists			
Local modules			
Ungrouped devices		N 100%	
Security settings	× • • •		······································
> Details view		9 Properties 71 Info	P. Diagnostics

 b. Click "Source Path" to select the folder, check whether the status of the GSD file you want to add is "Not yet installed", click "Install" button if it is not installed. If it is already installed, click "Cancel" to skip the installation step, as shown in the following figure.

Ma	nage general station description files				×
	nstalled GSDs GSDs in the project				
S	ource path: D:\				
0	Content of imported path				
6	File	Version	Language	Status 👻	Info
6	GSDML-V2.42-sDot-XB6S-PN2002-20240426.xml	V2.42	English, Chinese	Not yet installed	XB65-PN2002
					_
					>
			Delete	Install	Cancel

6. Hardware Detection Add Device

a. Double click on "Devices and Networks" in the left navigation tree and select PLC in the Network view as shown below.

∦Ą,s	siemens - C:\Users\29719\Documents\Automati	nIXB6SIXB6S		- 1
Proje	ect <u>E</u> dit <u>V</u> iew <u>I</u> nsert <u>O</u> nline Optio <u>n</u> s <u>T</u> o	ils <u>W</u> indow <u>H</u> elp	Totally Integ	rated Automation
*	🔁 🖬 Save project 📑 🐰 🏥 🛱 🗙 🏷 ±	(# ± 🖥 🔃 🕼 🖳 💋 Go online 🖉 Go offline h 🖪 🖪 🛠 🚽 📋 🗇earch in project> 🦓	rotany integ	PORTAL
-	Project tree 🛛 🖾 🖣	XB6S > Devices & networks		_∎≡×
ſ	Devices	🐙 Topology view	h Network view	Device view
1	1 I I I I I I I I I I I I I I I I I I I	Relations 🔢 Connections HM connection		
2				
	T X865			
Ē	Add new device			=
8	Devices & networks	PLC_1		
8	PLC 1 [CPU 1511-1 PN]	CPU 1511-1 PN		Integrated Automation PORTAL
	Device configuration			
2	V. Online & diagnostics			
	Re Software units			
	Program blocks			
	Technology objects			
	External source files			- letv
	PLC tags			
	PLC data types			- 6
	Watch and force tables			- 5
	Doline backups			
	🕨 🔄 Traces			
	OPC UA communication			
	Web applications			
	Device proxy data			
	Program info			
	PLC supervisions & alarms			
	PLC alarm text lists			
	Local modules			
	La Ungrouped devices			~
	🕨 📷 Security settings 🛛 🗸 🗸	< III > 100	%	<u></u>
>	Details view	C Properties	Linfo Diagr	iostics 🛛 🗖 🗕 🔶

b. In the menu bar, select "Online -> Hardware Detection -> PROFINET Devices from Network", as shown in the following figure.

st Edit View locat	Opline Options Tools Window Help				
Save project	Go online	Ctrl+K	line 🖉 Go offline 🛔 🌆 🖪 🗰 🗶 🖃 🛄 <search in="" project=""> 👫</search>	Totally Integ	grated Automatic POR
roject tree	Go offline	Ctrl+M			
Devices	Use only legacy PG/PC communication		🛃 Topology view	h Network view	Device vie
ÊŇ	I Simulation	•	onnection 💌 🔒 Relations 🕎 📆 🗐 🖽 🛄 🔍 ±		-
	Stop runtime/simulation				
XB6S Add new device Devices & networks LC_1 [CPU 1511-1]	Download to device Extended download to device Download and reset PLC program Download user program to Memory Card	Ctrl+L			1
Device configura	Snapshot of the actual values Load snapshots as actual values Load start values as actual values				
Technology obje Technology obje External source t A PLC tags	Upload from device (software) Upload device as new station (hardware a Backup from online device	and software)			
PLC data types	Hardware detection	•	CPU from network		
Watch and force	HMI Device maintenance	•	PROFINE I devices from hetwork		
Gonline backups	Accessible devices	Ctrl+U			
Government Government Government Government	Start CPU	Ctrl+Shift+E Ctrl+Shift+Q			
 Device proxy dat Program info 	Q Online & diagnostics Receive alarms	Ctrl+D			
PLC supervisions	& alarms				
PLC alarm text lis	ts				
Local modules					5
La Ungrouped devices			\$ 100	*	
Security settings	~ ~ …				

c. The hardware detection window pops up, select the correct PG/PC interface, click "Start Search", as shown in the following figure.

Hardware detection of	PROFINET devices				×
	Type of th	e PG/PC interface : PG/PC interface :	🕊 PN/IE 💹 Realtek PCIe Gl	bE Family Controller	- - -
	Accessible nodes of the selecte	d interface:			Start search
Information: There is no it is already in the projec	check if a device is already in the t.	project. Every time	a device is selected	d for detection, it is added	to project even if
				Add devices	Cancel

d. Detect the coupler device in the network, check the coupler, click "Add Device", as shown in the following figure.

	Туре	of the PG/PC interface: PG/PC interface:	PN/IE	GbE Family Controller	•
	Accessible nodes of the sel	ected interface:			Start search
	PROFINET device name	Device series	IP address	MAC address	
	xb6s-pn2002	PNIO	192.168.0.2	8C-F3-E7-21-E0-B4	
nformation: There is no t is already in the proje	check if a device is already in ct.	the project. Every time	a device is selec	ted for detection, it is adde	d to project even if

e. After the coupler is successfully added, you can see the coupler icon in the network view as shown below.

Siemens - C:\Users\29719\Documents\Automatic	on\XB6S\XB6S	— İ
Project Edit View Insert Online Options To Project Edit View Insert Online Options To Project Edit View Insert Online Options To	ols Window Help C# 12 🗓 🖳 🖳 🕼 🖉 Go online 🖉 Go offline 🏭 🖪 🗊 🛠 🖃 🛄 <earch in="" projects="" td="" 🕌<=""><td>ted Automation PORTAL</td></earch>	ted Automation PORTAL
Project tree 🔲 🖣	XB6S → Devices & networks	_ # # ×
Devices	🖉 Topology view 🛛 👗 Network view	Device view
1 III III III III III III III III III I	💦 Network 🔡 Connections HM connection 💌 🛺 Relations 🕎 🖏 📲 🛄 🍳 ±	
XB65 XB65 Add new device Devices & networks Device configuration Online & diagnostics Software units Program blocks Program blocks PLC 1 (Cat spes QL Cata types QL Vate and force tables Research OPC L4 communication We applications PLC supervisions & alarms 	PLC_1 CPU 1511-1 PN Hardware detection of devices unsuccessful (0230:001010) Hardware detection of IO devices was unsuccessful Not all devices could be added to the project. Please see "Info > General" to b for more information. Xb6s-pn2002 XB6s-PN2002 Not assigned	Network data

f. Select the coupler icon and switch to the device view, you can see that the IO devices in the topology are detected to be added, as shown in the following figure.

		🚽 Topology	view 🔥	Network	view	Device	view
xb6s-pn2002 [XB6S-PN2002] 💌 🔛	🕅 🖓 🖉	Device overview					
	^	Module	Rack	Slot	I address	Q address	Туре
2		 xb6s-pn2002 	0	0			XB6
57200	=	PN-IO	0	0 X1			PNIO
n65 P		XB6S-C01SP-32Bytes_1	0	1			XB6
+6			0	2			
			0	3			
			0	4			
-			0	5			
			0	6			
			0	7			
			0	8			
			0	9			
		-	0	10			
		•	0	11			
		-	0	12			
		-	0	13			
			0	14			
			0	15			
			0	16			
			0	17			
			0	18			
			0	19			
			0	20			
			0	21			
			0	22			
			0	23			
			0	24			
			0	25			
			0	26			

g. Switch to the network view, click "Unassigned (blue font)" on the coupler, i.e. slave device, and select "PLC_1.PROFINET interface_1" as shown in the following figure.

Abos > Devices & networks		_ - ^
	📲 Topology view 🛔 Netwo	rk view
💦 Network 🔡 Connections 🛛 HMI connection 💌 🗔 Relations 🕎 🖫	≝ 🔲 � . ±	E
		^
PLC_1		≡
CPU 1511-1 PN		
		- •
		- k dat
xb6s-pn2002 XB6S-PN2002		
Not assigned Select IO controller		
		~
< III	> 100%	💌 <u> </u>

h. When the connection is complete, it is shown in the following figure.

XB6S > Devices & networks	_∎≣×
🚽 Topology view 🛛 🏭 Network v	iew 📑 Device view
💦 Network 🔡 Connections 🛛 HMI connection 💌 💀 Relations 🔡 🐫 📲 🔛 🛄 🔍 ±	
4 IO system: PLC_1.PROF	INET IO-System (100) 🛕
	=
PLC_1 CPU 1511-1 PN PLC_1.PROFINET IO-Syste xb6s-pn2002 XB65-PN2002 PLC_1	
2 100%	
N	· · · · Ÿ · · · 🔁

7、 Assign device name

a. In the network view, right-click on the connection line between the PLC and the coupler, and select "Assign Device Name" as shown in the following figure.

KB6S Devices & networks						_ = = ;
		2	Topology view	h Network	k view 📑 Devi	ce view
Network Connections HMI connection	on 💌 🖪 Relations 🕎		l € ±			
			耳 IO sys	stem: PLC_1.PR	OFINET IO-System (1	100) ^
						=
PLC_1						
CPU 1511-1 PN						
_						
						- 11
PLC_1.PROFINI	X Cut	Ctrl+X				
	Copy	Ctrl+C				_
	🛅 Paste	Ctrl+V				
	X Delete	Del				-
	Rename	F2				
kb6s-pn2002	Assign to new DP master / I	O controller				
	Compile	•				
	Download to device	•				
	💋 Go online	Ctrl+K				
	Go offline	Ctrl+M				_
	Q Online & diagnostics	Ctrl+D				_
	Assign device name					_
	Assign PROFIsafe address					_
	Receive alarms					
	Update and display forced o	operands				~
III	Show catalog	Ctrl+Shift+C	> 1009	6	· · · · · · · · ·	-, 📵
	Q Properties	Alt+Enter	Q Properties	i Info	Diagnostics	

b. The "Assign PROFINET Device Name" window pops up as shown below.

gn PROFINET device	name.					
-		Configured PRO	FINET de	vice		
		comgarea mo		ale taufastistat		
		PROFINET devic	e name:	plc_1.profinet interface_1		-
		Dev	ice type:	CPU 1511-1 PN		
		Online access				
		Type of the PG/PC i	nterface:	PN/IE		•
		PG/PC i	nterface:	Realtek PCIe GbE Family	Controller	- 🖲 🖪
ي ا		Device filter				
1		Only show	devices of	the same type		
		Onlyshow	devices wit	th had parameter settings		
		Onlyshow	devices wi	in bau parameter settings		
		Only show	devices wit	thout names		
	Accessible de	vices in the network				
	IP address	MAC address	Device	PROFINET device name	Status	
Flash LED						
	<					
					date list	Assign name
line status information	:					
			1111			

c. Select PLC for the device name and click "Update List". After the update is completed, check whether the status of the node in "Accessible nodes in the network" is "OK". If it is not OK, select the device and click "Assign Name", as shown in the following figure.

Online access Type of the PG/PC interface: PG/PC interfac	•
Type of the PG/PC interface: PN/IE PG/PC interface: PG/PC interface: PG/P	•
PG/PC interface: Realtek PCIe GbE Family Controller	• •
Device filter Only show devices of the same type Only show devices with bad parameter settings Only show devices without names Accessible devices in the network:	
Only show devices of the same type Only show devices with bad parameter settings Only show devices without names Accessible devices in the network:	
Only show devices with bad parameter settings Only show devices without names Accessible devices in the network:	
Only show devices without names	
Accessible devices in the network:	
IP address MAC address Device PROFINET device name Status	
192.168.0.1 EC-1C-5D-54-FF-BE \$7-1500 plc_1	
Flash LED	

d. Select the coupler for the device name, click "Update List", and then assign the name in the same way after updating, as shown in the following figure.

		Configured PRO	FINET de	vice		
		PROFINET devic	e name:	xb6s-pn2002		-
		Dev	vice type:	XB6S-PN2002		
		Online access				
		Type of the PG/PC i	interface:	4 PN/IE		•
		PG/PC i	interface:	Realtek PCIe GbE Fi	amily Controller	• 🖲 🖸
		Device filter				
		🖌 Only show	devices of	the same type		
		Only show	devices wi	th bad parameter settir	nas	
		Onlyshow	devices wi	thout names		
		Comyshow	uevices wi	ulouthames		
	Accessible dev	ices in the network:				
	IP address	MAC address	Device	PROFINET device nam	ne Status	
	192.168.0.2	8C-F3-E7-21-E0-B4	PNIO	xb6s-pn2002	🛇 ок	
Flash LEO						
Hash LED	<					
urtach ittéb	<			III	Update list	Assign name

e. Check to see if the MAC address on the module silkscreen is the same as the MAC address of the assigned device name. Click "Close".

8. Download Configuration Structure

- a. In the network view, select the PLC. first click the Compile button in the menu bar, then click the Download button to download the current configuration to the PLC.
- b. In the pop-up interface of "Extended download to device", the configuration is shown in the following figure.

Extended download to	device		_				×
	Configured access no	des of "PLC_1"					
	Device	Device type	Slot	Interface type	Address	Subnet	
	PLC_1	CPU 1511-1 PN	1 X1	PN/IE	192.168.0.1	PN/IE_	1
		Type of the PG/PC into	erface:	PN/IE		-	
	Con		·] 🛡 🖳 7 🛞				
	con	1st ga	teway:				
	Select target device:			[Show all compatibl	e devices	•
	Device	Device type	Inter	ace type Add	dress	Target dev	ice
Flash LED	-	-	PN/IE	Acc	ess address	-	
						Start	search
Online status information	Ľ			(Display only error	r messages	
					Γοε	id <u>c</u>	ancel

c. Click the "Start Search" button as shown below.

-	consigured acce		1		1		
	Device	Device type	Slot	Interface type	Address	Subnet	
	PLC_1	CPU 1511-1 PN	1 X1	PN/IE	192.168.0.1	PN/IE_1	
		Type of the PG/PC inte	erface:	PN/IE			
		PG/PC inte	erface:	Realtek PCIe G	bE Family Controlle	r 🔻	•
		Connection to interface/s	ubneti	PN/IE 1	ber uning condone		
		connection to intenace/si	ubriet.	11012_1		-	
					el 11		
	Select target de	evice:			Show all compatib	le devices	
	Select target de Device	evice: Device type	Interfa	ace type Add	Show all compatib fress	le devices Target devic	e
-	Select target de Device PLC_1	Device : Device type CPU 1511-1 PN	Interfa PN/IE	ace type Add	Show all compatib Iress 2.168.0.1	Target devices	e
	Device PLC_1 	Device type CPU 1511-1 PN 	Interfa PN/IE PN/IE	ace type Add 192 Acc	Show all compatib Iress 2.168.0.1 ess address	Target devices Target devic PLC_1 	e
-	Select target de Device PLC_1 -	Device type CPU 1511-1 PN 	Interfa PN/IE PN/IE	ace type Add 192 Acc	Show all compatib Iress 2.168.0.1 ess address	Target devices Target devic PLC_1	e
a a	Select target de Device PLC_1 	Device type CPU 1511-1 PN -	Interfa PN/IE PN/IE	ace type Add 192 Acc	Show all compatib Iress 2.168.0.1 ess address	Ie devices Target devic PLC_1 —	e
Tash LED	Select target de Device PLC_1 	Price: Device type CPU 1511-1 PN -	Interfa PN/IE PN/IE	ace type Add 192 Acc	Iress 2.168.0.1 ess address	Ile devices Target devic PLC_1 —	e
Flash LED	Select target de Device PLC_1 	vrice: Device type CPU 1511-1 PN -	Interfa PN/IE PN/IE	ace type Add 192 Acc	Show all compatib Iress 2.168.0.1 ess address	Ile devices Target devic PLC_1 -	e
Elesh LED	Select target de Device PLC_1 -	vrice: Device type CPU 1511-1 PN -	Interfa PN/IE PN/IE	ace type Add 192 Acc	Show all compatib Iress 2.168.0.1 ess address	Target devices Target devic PLC_1	e
Elesh LED	Select target de Device PLC_1 -	vrice: Device type CPU 1511-1 PN -	Interfa PN/IE PN/IE	ice type Adt 19: Acc	Show all compatib Iress 2.168.0.1 ess address	Ie devices Target devic PLC_1 Start s	e
Flash LED	Select target de Device PLC_1 -	vrice: Device type CPU 1511-1 PN -	Interfa PN/IE PN/IE	ice type Add 192 Acc	Display only error	Target devices Target devic PLC_1	e
Elash LED	Select target de Device PLC_1 - - - - - - - - - - - - -	vice: Device type CPU 1511-1 PN - with address 192.168.0.1.	Interfa PN/IE PN/IE	ice type Add 192 Acc	Display only error	Target devices Target devic PLC_1	e
Elash LED	Select target de Device PLC_1 - tion: blished to the device 1 compatible device	vice: Device type CPU 1511-1 PN - with address 192.168.0.1. s of 3 accessible devices for	Interfa PN/IE PN/IE	ice type Add 192 Acc	Display only erro	It devices Target devic PLC_1 Start s Start s or messages	e
Flash LED	Select target de Device PLC_1 - - - - - - - - - - - - -	vice: Device type CPU 1511-1 PN - with address 192.168.0.1. s of 3 accessible devices for ted.	Interfa PN/IE PN/IE und.	ice type Add	Show all compatible Iress L168.0.1 Ess address Display only error	It devices Target devic PLC_1	e

d. Click "Load" to bring up the load preview window, as shown below.

tatus	1	Target	Message	Action	
+I	A	PLC_1	Ready for loading.	Load 'PLC_1'	-
	Δ	 Protection 	Protection from unauthorized access		
	4		Devices connected to an enterprise network or directly to the internet must be appropriately protected against unauthorized access, e.g. by use of firewalls and network segmentation. For more information about industrial security, please visit http://www.siemens.com/industrialsecurity		100
	0	Reset	Reset module	Delete all	0
	0	Stop modules	The modules are stopped for downloading to device.	Stop all	
	0	Device configurati	Delete and replace system data in target	Download to device	1
1	-	· ·			

- e. Click "Load".
- f. Click "Finish".
- g. Power the unit back up.

9. Communication Link

a. Click the "Start CPU" button in the menu bar, and then click the "Go Online" button, the icons are green, that is, the connection is successful, as shown in the figure below.

Siemens - C:\Users\29719\Documents\Automation	XB65\XB65	- •
Project Edit View Insert Online Options Tools Project Edit View Insert Online Options Tools Project Edit View Insert Online Options Tools	Window Help 1	Totally Integrated Automation PORTAL
Project tree	XB6S → Devices & networks	_ = = ×
Devices	🛃 Topology view	h Network view
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	💦 Network 🔢 Connections 🔣 HMI connection 💌 🗛 Relations 🔛 🐫 📲 🖽 🛄 🍳 生	=
orks	‡ IO syst	tem: PLC_1.PROFINET IO-System (100)
💈 🔻 🗋 XB6S 🗹 🔍 🔨		=
Add new device		
📸 Devices & networks	PLC_1 X06S-PN2002	
🚊 🕨 🚰 PLC_1 [CPU 1511-1 PN] 🛛 🗹 🔵		
💈 🔻 🗮 Ungrouped devices		
▼ 🔄 xb6s-pn2002 [XB6S-PN2002] 🗹 🗉		
Device configuration	PLC 1 PROFINET IO-Syste	
🖳 Online & diagnostics		2
📩 xb6s-pn2002 [XB6S-PN2002] 🗹		• two
XB6S-C01SP-32Bytes_1		
Security settings		È ä
Cross-device functions		
Common data		
Documentation settings		
Languages & resources		
Version control interface		
 Online access 		
Y Display/hide interfaces		
▶ 🛄 COM <3> [RS232/PPI multi-master) 🔤		
COM <4> [RS232/PPI multi-master)		

10. Parameter configuration

a. In the offline state, open the "Network View", select the coupler module, switch to the device view, right-click the XB6S-C01SP-32Bytes module, and then click the "Properties" button to view and set the parameters of the module, as shown below. As shown in the figure below.

					📲 Topolo	gy view	Network view	v IY Device vie	ew
Dev	vice overview								
*	Module		Rac	k Slot	I address	Q address	Туре	Article number	
	 xb6s-pn2002 		0	0			XB65-PN2002	XB65-PN2002	^
	PN-IO		0	0 X1			PNIO		
	XB6S-C01SP-32Bytes_1	×	Change Start dev Cut Copy	device vice tool		Ctrl+X Ctrl+C	Go to device view		
		×	Paste Delete Rename Pack add	dresses		Ctrl+V Del F2			
		2	Unpack of Compile Downloa Go onlin	addresses ad to device e	e) Ctrl+K			
			Go offline Online & Assign d Update a	e diagnosti levice nam and display	e forced opera	Ctrl+M Ctrl+D nds			
		×	Cross-re Cross-re	ferences ference inf	ormation Shi	F11 ft+F11			
<			Show ca	talog	Ctrl+S	hift+C			>
	0.		Export m	nodule labe	ling strips			apostics	
		0	Propertie		Ale	Enter		ignostics	-

b. In the property page, click "Module Parameters", as shown in the following figure. Parameters can be configured according to the actual use of the need to configure, after the completion of the configuration, re-download the program to the PLC, the PLC and the module need to be re-powered.

XB6S-C01SF	P-32Bytes_1	XB6S-C01SP-32Bytes]		Properties	🔄 Info	Diagnostics		-
General	IO tags	System constants Texts	5					
✓ General Catalog	information	Module parameters						*
Module par I/O address	ameters es	XB6S-C01SP Parameter						
		Communication Mode	: No Select					
		Baud	: 115200					
		Stop Bit	: StopBit 1					
		Word Format	: 8 Bits				-	
		Parity	: Parity None					
		Control Mode	: Disable				-	
		Node Output Mode	: Poll				•	
		Error Behavior	: Clear				. 💌	
		Respond Timeout(ms)	: 50					
		Poll Delay(ms)	: 10					
	•	Slave ID	: 1					
		Slave Respond Delay(ms)	: 10					
		Node 1 Param 1	: 0					
		Node 1 Param 2	: 0					
		Node 2 Param 1	: 0					
		Node 2 Param 2	: 0					
		Node 3 Param 1	: 0					
		Node 3 Param 2	: 0					
		Node 4 Param 1	: 0					
		Node 4 Param 2	: 0					
		Node 5 Param 1	: 0					
		Node 5 Param 2	: 0					
		Node 6 Param 1	: 0					
		Node 6 Param 2	: 0					
		Node 7 Param 1	. 0					

11, Functional verification

a. Expand the left side of the project navigation, select "Watch and force Table", double-click "Add New Watch Table", the system adds a new watch table, as shown in the following figure.

Project tree	□ ◀	XB6S	PLC_1 [CPU	1511-1 PN] → Wa	itch and force tables	s 🔸 Watch table	1			_ # = ×
Devices										
		2	11 ²⁰ 11/2 11/2 11/2	9, 90 27 00 00	» 1					
		i	Name	Address	Display format	Monitor value	Modify value	9	Comment	
▼ 3 XB65	2 • •	1		Add new>						
Add new device										
Devices & networks										
PLC_1 [CPU 1511-1 PN]										
Device configuration										
Q. Online & diagnostics										
Software units										
Program blocks										
Technology objects										
External source files										
PLC tags										
PLC data types										
 Watch and force tables 										
Add new watch table										
Force table										
Watch table_1										
🕨 📴 Online backups										
🕨 🔀 Traces										
OPC UA communication										
Web applications										
Device proxy data										
Program info										
PLC supervisions & alarms										
PLC alarm text lists	~	<								>

b. Open the Device View to view the channel I address (channel address of the input signal) and Q address (channel address of the output signal) of each module in the device overview.
 For example, the "I address" of XB6S-C01SP-32Bytes module is 0 to 31, and the "Q address" is 0 to 31, as shown in the following figure.

,		5	5								
XB6S ►	Ungrouped devices + xb6	s-pn2	2002 [)	KB6S-PN	2002]					_ • •	iX
							🛃 Topology v	iew 🔥 Netv	vork view	Device view	
De	evice overview										
- Y	Module		Rack	Slot	I address	Q address	Туре	Article number	Firmware	Comment	T
	🖌 🔻 xb6s-pn2002		0	0			XB65-PN2002	XB65-PN2002	V18.00.05		^
	PN-IO		0	0 X1			PNIO				
	XB6S-C01SP-32Bytes_1		0	1	031	031	XB6S-C01SP-32Bytes		1.0		
			0	2							
			0	3		1					=
			0	4							
			0	3 4		:					

c. In the address cell of the monitoring table, fill in the input/output channel address, such as writing "IB0" to "IB31", "QB0" to "QB31", press "Enter", after all the information is filled in, click the

button to monitor the data. "QB0" to "QB31", press the "Enter" key, and click button to watch the data after all the information is filled in.

12、 RTU Master Mode Function Example

Example 1: Verify that the module RTU master writes the values of the 2 holding registers in disable mode with a tool or device such as Modbus Slave debugging software.

a. Configure the configuration parameters and select Modbus RTU master mode for the

communication mode as shown below.

Communication mode: Select Modbus RTU master;

Control Mode: Select Disable;

Node 1 Parameter 1: Configure 1538 (0x00000602), see <u>6.2.1 Modbus Master Functions</u> for configuration parameters;

Node 1 Parameter 2: Configuration 1 (0x0000001), see <u>6.2.1 Modbus Master Functions</u> for details on configuration parameters.

XB6S-C01SP-32Byte	s_1 [XB6S-C0)1SP-32Bytes]	🖸 Properties 🚺 Info 🗓	Diagnostics 🛛 🗖 🗖 🤝 🤜
General IO ta	gs Syste	em constants Texts		
 General Catalog information 	n Module	e parameters		<u>^</u> ≣
Module parameters	XB6S	-C01SP Parameter		
I/O addresses		Communication Mode:	Modbus RTU Master	
		Baud:	115200	
	-	Stop Bit:	StopBit 1	•
		Word Format:	8 Bits	•
		Parity:	Parity None	
	4	Control Mode:	Disable	
		Node Output Mode:	Poll	•
	-	Error Behavior:	Clear	-
		Respond Timeout(ms):	50	
	-	Poll Delay(ms):	10	
		Slave ID:	1	
		Slave Respond Delay(ms):	10	
		Node 1 Param 1:	1538	
		Node 1 Param 2:	1	
<		Node 2 Param 1	0	×

After all parameters are configured, the program needs to be re-downloaded to the PLC, and the PLC and module need to be re-powered.

		<u>,</u> 43 431 00-00	,					
*	i Name	Address	Display format	Monitor value	Modify value	9	Comment	
33		%QB0	DEC+/-	1	1			^
34		%QB1	DEC+/-	1	1			
35		%QB2	DEC+/-	1	1		N.	
36		%QB3	DEC+/-	1	1		V	
37		%QB4	DEC+/-	0				
38		%QB5	DEC+/-	0				
39		%QB6	DEC+/-	0				
40		%QB7	DEC+/-	0				
41		%QB8	DEC+/-	0				
42		%QB9	DEC+/-	0				
43		%QB10	DEC+/-	0				
44		%QB11	DEC+/-	0				
45		%QB12	DEC+/-	0				
46		%QB13	DEC+/-	0				=
47		%QB14	DEC+/-	0				-
48		%QB15	DEC+/-	0				
49		%QB16	DEC+/-	0				
50		%QB17	DEC+/-	0				
51		%QB18	DEC+/-	0				
52		%QB19	DEC+/-	0				
53		%QB20	DEC+/-	0				
54		%QB21	DEC+/-	0				
55		%QB22	DEC+/-	0				
56		%QB23	DEC+/-	0				
57		%QB24	DEC+/-	0				
58		%QB25	DEC+/-	0				
59		%QB26	DEC+/-	0				
60		%QB27	DEC+/-	0				~
	<						>	

b. In the downstream data, the values of the 2 holding registers are written as shown below.

c. The debugging software allows you to see the values of the 2 registers received as shown below.

-	Modbus Slave - M	bslav1						_		\times
<u>F</u> ile	<u>Edit</u> <u>Connection</u>	n <u>S</u> etup <u>D</u> isplay	y <u>V</u> iew <u>W</u> indow	<u>H</u> elp						
) 😅 日 🚭 🛅	🗏 👜 😵 📢								
	Mbslav1									
Ī) = 1: F = 03									
	Alias	00000								
	0	257								
	1	257								
	2	0								
	3	0								
	4	0								
	5	0								
	6	0								
	7	0								
	8	0								
	9	0								
Ш.										
Ш.										
Ш.										
For	Help, press F1							Port 4: 1	15200-8	-N-1
. 01	theip, press in						11	1 010 41		

Example 2: Verify that the module RTU master reads the 10 holding registers in Level mode with a tool or device such as Modbus Slave debugging software.

a. Configure the configuration parameters and select Modbus RTU master mode for the communication mode as shown below.

Communication mode: Select Modbus RTU master;

Control Mode: Selects level triggering;

Node 1 Parameter 1: Configuration 1 (0x00000001), see <u>6.2.8 Control and Status Node Codes</u> for details on configuration parameters;

Node 2 Parameter 1: Configure 778 (0x0000030A), see <u>6.2.1 Modbus Master Functions</u> for configuration parameters;

Node 2 Parameter 2: Configuration 1 (0x0000001), see <u>6.2.1 Modbus Master Functions</u> for configuration parameters.

B6S-C01SP	-32Bytes_1 [)	(B6S-C01SP-32	Bytes]				Properties	🛄 Info	B Diagnostics	
General	IO tags	System cons	stants	Texts						
General Catalog in	nformation	Modul	e param	eters						
Module para	ameters	XB6	S-CO1SP	Parameter						
I/O addresse	5		Com	munication M	Aode:	Modbus RTU Master				
				I	Baud:	115200		•		
				Sto	p Bit:	StopBit 1				-
				Word Fo	rmat:	8 Bits				-
				F	arity:	Parity None				-
		_		Control M	/lode:	Level				-
			N	ode Output M	Aode:	Poll				-
				Error Beh	avior:	Clear				-
		-	Resp	ond Timeout	(ms):	50				
		•		Poll Delay	(ms):	10				
				Slav	ve ID:	1				
			Slave Re	spond Delay	(ms):	10				
				Node 1 Para	am 1:	1				
				Node 1 Para	am 2:	0				
				Node 2 Para	am 1:	778				
				Node 2 Para	am 2:	1				
		_		Node 3 Para	am 1:	0				
				Node 3 Para	am 2:	0				
				Node 4 Para	am 1:	0				
				Node 4 Para	am 2:	0				
				Node 5 Para	am 1:	0				

After all parameters are configured, the program needs to be re-downloaded to the PLC, and the PLC and module need to be re-powered.

b. Set the control word to 1 in the Downstream data and open the debugging software to send the data as shown below.

i	Name /	Address	Display format	Monitor value	Modify value	9	Comment	
3		%QB0	DEC+/-	1	1		4	~
4	•	%QB1	DEC+/-	0				
5	9	%QB2	DEC+/-	0				
6	٩	6QB3	DEC+/-	0				
7	q	6QB4	DEC+/-	0				
В	٩	%QB5	DEC+/-	0				
9	e	6QB6	DEC+/-	0				
D	٩	%QB7	DEC+/-	0				
1	٩	6QB8	DEC+/-	0				
2	٩	6QB9	DEC+/-	0				
3	٩	6QB10	DEC+/-	0				
4	q	6QB11	DEC+/-	0				
5	9	6QB12	DEC+/-	0				
5	٩	6QB13	DEC+/-	0				=
7	٩	6QB14	DEC+/-	0				
8	9	6QB15	DEC+/-	0				
9	ę	%QB16	DEC+/-	0				
D	ę	6QB17	DEC+/-	0				
17	9	6QB18	DEC+/-	0				
2	٩	6QB19	DEC+/-	0				
3	9	6QB20	DEC+/-	0				
4	9	6QB21	DEC+/-	0				
5	9	6QB22	DEC+/-	0				
6	9	6QB23	DEC+/-	0				
7	9	%QB24	DEC+/-	0				
в	9	6QB25	DEC+/-	0				
9	ę	6QB26	DEC+/-	0				~

c. You can see the received data in the Upstream data as shown below.

Name	Address	Display format	Monitor value	Modify value	9	Comment	
	%IBO	DEC+/-	5				
	%IB1	DEC+/-	0				
	%IB2	DEC+/-	0				
	%IB3	DEC+/-	255				
	%IB4	DEC+/-	0				
	%IB5	DEC+/-	255				
	%IB6	DEC+/-	0				
	%IB7	DEC+/-	255				
	%IB8	DEC+/-	0				
	%IB9	DEC+/-	255				
	%IB10	DEC+/-	0				
	%IB11	DEC+/-	255				
	%IB12	DEC+1-	0				
	%IB13	DEC+/-	255				
	%IB14	DEC+/-	0				
	%IB15	DEC+/-	255				
	%IB16	DEC+/-	0				
	%IB17	DEC+/-	255				
	%IB18	DEC+/-	0				
	%IB19	DEC+/-	255				
	%IB20	DEC+/-	0				
	%IB21	DEC+/-	255				
	%IB22	DEC+/-	0				
	%IB23	DEC+/-	0				
	%IB24	DEC+/-	0				
	%IB25	DEC+/-	0				
	%IB26	DEC+/-	0				
	%IB27	DEC+/-	0				

13. Example of Freeport_Input function

Example: Receive an 8-byte data in Level mode using Freeport_Input through a tool or

device such as a serial port debugging assistant.

a. Configure the configuration parameters and select the free port pure input mode for the communication mode as shown below.
Communication Mode: Select Input mode;
Control Mode: Selects Level;
Node 1 Parameter 1: Configuration 34 (0x0000022), see <u>6.2.8 Control and Status Node Codes</u> for details on configuration parameters;
Node 2 Parameter 1: Configure 3332 (0x0000D04), see <u>6.2.6 Freeport Freeport Functions</u> for

details on configuration parameters.

					Q Properties	🗓 Info	U Diagnostics	
General	IO tags	System constants	Texts					
 General Catalog i 	information	Module parame	ters					^
Module para	ameters es	XB6S-C01SPF	Parameter					
		Comn	nunication Mo	de: Input				
			Ba	ud: 115200				-
			Stop	Bit: StopBit 1				-
			Word Form	at: 8 Bits				
			Par	rity: Parity None				
			Control Mo	de: Level				
		No	de Output Mo	de: Poll				
			Error Behav	ior: Clear				-
		Respo	and Timeout(m	ns): 50				
			Poll Delay(m	ns): 10				
		-	Slave	ID: 1				
		Slave Res	pond Delay(m	ns): 10				
			Node 1 Param	n 1: 34				
			Node 1 Param	12: 0				
			Node 2 Param	11: 3332				
			Node 2 Param	n 2: 0				
			Node 3 Param	n 1: 0				
			Node 3 Param	n 2: 0				
			Node 4 Param	n 1: 0				
			Node 4 Param	n 2: 0				
			Node 5 Param	n 1: 0				~

After all parameters are configured, the program needs to be re-downloaded to the PLC, and the PLC and module need to be re-powered.

b. Set the control word to 1 in the downstream data and open the serial port debugging assistant to send data as shown below.

i	Name	Address	Display format	Monitor value	Modify value	9	Comment	
3		B %QB0	DEC+/-	1	1	M 🔺		^
4		%QB1	DEC+/-	0				
5		%QB2	DEC+/-	0				
6		%QB3	DEC+/-	0				
7		%QB4	DEC+/-	0				
8		%QB5	DEC+/-	0				
9		%QB6	DEC+/-	0				
0		%QB7	DEC+/-	0				
1		%QB8	DEC+/-	0				
2		%QB9	DEC+/-	0				
3		%QB10	DEC+/-	0				
4		%QB11	DEC+/-	0				
5		%QB12	DEC+/-	0				
6		%QB13	DEC+/-	0				=
7		%QB14	DEC+/-	0				
8		%QB15	DEC+/-	0				
9		%QB16	DEC+/-	0				
0		%QB17	DEC+/-	0				
1		%QB18	DEC+/-	0				
2		%QB19	DEC+/-	0				
3		%QB20	DEC+/-	0				
4		%QB21	DEC+/-	0				
5		%QB22	DEC+/-	0				
6		%QB23	DEC+/-	0				
7		%QB24	DEC+/-	0				
8		%QB25	DEC+/-	0				
9		%QB26	DEC+/-	0				~

c. The Upstream data can be seen in the received data length of 8, the received data count of 1, and the received 8 bytes of data (IB6~IB13), as shown in the following figure.

i	Name	Address	Display format	Monitor value	Modify value	9	Comment		
		%IBO	DEC+/-	0					^
		%IB1	DEC+/-	8					ī
		%IB2	DEC+/-	0					
		%IB3	DEC+/-	0					
		%IB4	DEC+/-	1					-
		%IB5	DEC+/-	0					1
		%IB6	DEC+/-	1					
		%IB7	DEC+/-	2					
		%IB8	DEC+/-	3					
)		%IB9	DEC+/-	4					
		%IB10	DEC+/-	5					
2		%IB11	DEC+/-	1					
5		%IB12	DEC+/-	2					
L.		%IB13	DEC+/-	3					
5		%IB14	DEC+/-	0					
5		%IB15	DEC+/-	0					
7.1		%IB16	DEC+/-	0					
3		%IB17	DEC+/-	0					
>		%IB18	DEC+/-	0					
)		%IB19	DEC+/-	0					
		%IB20	DEC+/-	0					
2		%IB21	DEC+/-	0					
3		%IB22	DEC+/-	0					
12		%IB23	DEC+/-	0					
5		%IB24	DEC+/-	0					
5		%IB25	DEC+/-	0					
7.5		%IB26	DEC+/-	0		ā			
		P IP 37	DECI	0		0		 -	~