通过 CP343-1 模块,如何实现 2 套 S7-300 之间的以太网通讯

Ethernet Communication By CP343-1 Between S7-300

Getting-started

(2004年6月)





摘 要:本文介绍通过 CP343-1 实现 S7-300 之间的以太网通讯.

关键词:CP343-1,以太网,S7-300

Key Words: CP343-1, ETHERNET, ISO_ON_TCP





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一、硬件组态

首先搭建一套测试设备,设备的结构图如下:

2 套 S7-300 系统由 PS307 电源、CPU314C-2DP、CPU314C-2PTP、CP343-1、CP343-1 IT、

PC、CP5611、STEP7 组成,PLC 系统概貌如下图:



如下将向您一步一步展示如何实现 2 套 S7-300 之间的以太网通讯: 第一步:打开 SIMATIC Manager,根据我们系统的硬件组成,进行系统的硬件组态,如图: 插入 2 个 S7300 的站,进行硬件组态:





分别组态2个系统的硬件模块:



🖳 HW Config - [ethernet1 (Configuration) ISO_sendreceive]							
💵 Station Edit Insert PLC View Options Window Help							
		🛯 🗾 📄					
— (U) UR							
1 PS 307 5A							
2 CPU 314C-2	PtP						
X2 PtP							
2.2 Di24/D016							
2.3 AI5/AO2							
2.4 Count							
2.3 Position							
5							
6	_						
J* 1							
4							
Slot 🖪 Module 🛛 🖸	Order number	Firmware	MPI address	address	0 address		
1 PS 307 5A 6E	ES7 307-1EA00-0AA0			1			
2 CPU 314C-2 PtP 6	ES7 214 CREAN AARA	V1.0	4				
X2 FP	6E57 307-1EA00-0AA0						
2.2 DI24/D016 124126 1241							
2.3 AI5/AO2				752761	752755		
2.4 🚺 Count				768783	768783		
2.5 🛛 Position				784799	784799		
3							
4 H CP 343-1 60	GK7 343-1EX11-0XE0	V2.0	5	256271	256271		
5							



🖳 HW Config - [ethernet2 (Config	juration) ISO_sendreceiv	/e]					
I Station Edit Insert PLC View	v Options Window Help						
		11					
(0) UR 2							
•							
(0) UR		1	1				
Slot Module	Order number	Firmware	MPI address	I address	Q address C		
1 PS 307 5A	6ES7 307-1EA00-0AA0		-				
2 CPU 314C-2 DP	6ES7 314-6CF00-0AB0	V1.0	2				
X2 DP				1023*			
2.2 DI24/DD16				124126	124125		
2.3 A/5/AU2				/32767	/52/55		
2.4 Lount			-	768783	768783		
2.5 753000				184199	784799		
4 1 K CP 343-1 IT	6GK7 343-1GX11-0XE0	V2.0	3	256271	256271		

设置 CP343-1、CP343-IT 模块的参数,建立一个以太网, MPI、IP 地址:



HW Config - [ethernet1 (Configur Image: Station Edit Insert PLC View	a <mark>tion) ISO_sendrece</mark> iv Options Window Help	ve]			
	1 1 1 1	₩ №			
	Properties - CP 343-1 - (General Addresses Op	R0/54) tions Diagnostics Addressing]		×
2.3 Als/AO2 2.4 Count 2.5 Position 3 4 CP 343-1	Short Description:	CP 343-1 S7 CP for Industrial Ethernet ISC FETCH/AVRITE interface, long communication, routing, module fixed MAC address, initialization) and TCP/IP data, UDP, T(replacement (over LAN, IP)	with SEND/RE(CP, ISO, S7 without PG, 10/1 multicast, firmwa	CEIVE and 🔺 100 Mbps, re V2.0 💌
	Order No./ firmware Name: Interface Type: Ethe Address: 140.0	6GK7 343-1EX11-0XE0 / V2.0	Backplar MPI add	ne Connection- dress: 5	<u> </u>
(0) UR Slot Module I 1 PS 307 5A 6 2 CPU 314C-2 PtP 6 X2 FtP 2 D D14C-2 PtP 2 2 D14C-2 PtP 2 2 D14C-2 PtP 2 3 D14C-2 PtP 3 D14C-2 PtP	Networked: Yes Comment:	Properties			
24 Count 25 Rovition 3 66	OK K7 343-1EX11-0XE0	V2.0 5	256271	Cancel 256271	Help

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	Excellence in 💊
Aut	omation & Drives:
	Siemens
Aut	Siemens

HW Config - [ethernet1 (Configuration) I50_sendreceive]		
Image: CPU 314C-2 PtP 2 CPU 314C-2 PtP 22 Di24/D016 2.3 Al5/A02 2.4 Count 2.5 Properties - CP 343-1 - (R0/54) 2.5 Properties - CP 343-1 (R0/54)	×	
30 1		-
Image: Solution of the second seco	New Properties Delete ncel Help	
4 J UP 343-1 6GK7 343-1EX11-0XE0 V2.0 3 256271 256271		

眠 HW Config - [ethernet2 (Configuration)	ISO_sendreceive]	
🛄 Station Edit Insert PLC View Options	Window Help	
CPU 31 X2 DP		E
2.2 Di24/Dt	Properties - LP 343-1 11 - (RU/54)	의
2.5 AlscALs 2.4 Dount 2.5 Position	Symbols DNS Parameters Diagnostics Addressing General Addresses Options Time-of-Day Synchronization Users	
	Short Description: CP 343-1 IT	
<u>.</u>	S7 CP for Industrial Ethernet ISO and TCP/IP with SEND/RECEIVE and FETCH/WRITE interface, long data, UDP, TCP, ISO, S7 communication, routing, module replacement without FG, with web server and E-mail, 10/100 Mbps, fixed MAC address, initialization over	
(0) UR	Order No./ firmware 6GK7 343-1GX11-0KE0 / V2.0	
Slot Module Order num	Name: CP 343-1 IT	
1 S 307 5A 6ES7 307-1	Interface Rackplane Connection	1111
2 CPU 314C-2 DP 6ES7 314	Tupe: Ethernet MPLaddress 3	
22 DP 22 DI24/D016	Address: 140.80.0.2	
2.3 A/5/A02	Networked: Yes Properties	
24 Lount 25 Rosition		
3	Comment:	IEI
4 GK7 343-1		
6		
7	,	
8	OK Cancel Help	7 H I!
10		

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HW Config - [ethernet2 (Configuration) Image: Station Edit Insert PLC View Options	ISO_sendreceive] Window Help
Image: Constraint of the system PS 307 5A Image: CPU 314C-2 DP Image: CPU 314C-2 DP X2 DP Image: DP 2.2 DI24/D016 Image: DP 2.3 AlSrA02 Image: DP 2.4 Count Image: DP	Properties - CP 343-1 IT - (R0/54)
2.5 Position 3 4 CP 343-1 IT 5	General Parameters ✓ Set MAC address / use ISO protocol MAC address: 08-00-06-01-00-01
(0) UR	IP address: 140.80.0.2 Subnet mask: 255.255.0.0 Use router Address: 140.80.0.2
1 PS 307 5A 6ES7 307 4 2 1 CPU 314C-2 DP 6ES7 314 X2 DP 22 0124/D016 2.3 AV5A02 24 24 2.5 Position 3 4	Subnet: Ethernet(1) Properties Delete
4 1 CP 343-1 IT 6GK7 343- 5 5 6 9	Cancel Help

二、网络组态

组态完 2 套系统的硬件模块后,分别进行下载,然后点击 Network Configration 按钮,打开系统的网络组态窗口 NetPro,选中 CPU314,如下图:



🔡 NetPro -	[ISO_s	endred	eive:	(Netw	ork) C):\simati	c net tes	t\ISO_	_send]
🍄 Network	Edit	Insert	PLC	View	Options	Window	Help			
🖻 🖬 🗣	5	B	2	din di	I 🔏	S 🔊		!!	\?	
industr	iai Eti	nerne	[
MPI(1) MPI										
WITT	ethe CPU	ernet1				eth	ernet2	P		
	314C-: PtP	2 343-1				314C DP	-2 34	43-1 Г		
	2					2	2			
•										
Local ID			Р	artner II	>	Partner		Тур	е	
								-		

在窗口的左下部分点击鼠标右键,插入一个新的网络链接,并设定链接类型为 ISO-on-TCP connection 或 TCP connection 或 UDP connection 或 ISO Transport connection,如下图:



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点击 OK 后,弹出链接属性窗口,使用该窗口的默认值,并根据该对话框右侧信息进行后面程序 的块参数设定:





RetPro - [ISO_sendreceive (Network) D:\simatic net test\ISO_ Retwork Edit Insert PLC View Options Window Help Image:	_send]	
ethernet1 MPI(1) MPI ethernet1 ethernet2 MPI ethernet2 CPU CPU CPU CPU CPU CPU CPU CPU CPU CPU	Properties - ISO-on-TCP connection General Addresses Options Overview Status Information Local Partner IP (dec): 140.80.0.2 140.80.0.1 TSAP (ASC): TCP-1 TCP-1 TSAP (hex): 54.43.50.2D.31 54.43.50.2D.31	
Local ID Partner ID Partner Type 0001 A020 0001 A020 ethernet1 / CPU 314C-2 PtP ISO-on-TCP	TSAP length: 5 5	elp

当2套系统之间的链接建立完成后,用鼠标选中图标中的CPU,分别进行下载,这里略去CPU314C-2DP的下载图示:

Excellence in Automation & Drives: Siemens		SIEMENS
Pro - [IS0_sendreceive (Network) D:\simatic Point Network Edit Insert PLC View Options Window Image: Image	net test\150_send] Help	
Industrial Éthernet MPI(1) MPI ethernet1 ethernet1 CPU CPU 314C-2 343-1 PP 4 6 S Local ID Partner ID Partner D Partner D Partner D Partner CPU 314C-2 D P S	Station: ethernet1 Module: [0/2/0] CPU 314C-2 PtP Cop Target Modules Image: Cop Target Modules The following modules will be stopped for loading of the data. Racks Slot CPU 314C-2 PtP 0 2	Cancel
	OK Cancel	Help

三、程序编程

到此为止,系统的硬件组态和网络配置已经完成。下面进行系统的软件编制,在SIMATIC Manager 界面中,分别在 CPU314C-2PTP、CPU314C-2DP 中插入 OB35 定时中断程序块和数 据块 DB1,DB2,并在两个 OB35 中调用 FC5 (AG_Send)和 FC6 (AG_Recv)程序块,如下 图:



Network 2: Title:

Comment:



Network 3: Title:

Comment:



创建 DB1、DB2 数据块,如下图:

HH-≎ HIN	Kara Content of the second sec						
	File	Edit Inser	t PLC Debug View	Options Window H	elp		
<u>عا</u>	×	Address	Name	Туре	Initial value	Comment	
		0.0		STRUCT			
E		+0.0	aa	ARRAY[1400]		Temporary placeholder variable	
II.		*1.0		BYTE			
II.		=400.0		END_STRUCT			
H.	11						

2 套控制程序已经编制完成,分别下载到 CPU 当中,将 CPU 状态切换至运行状态,就可以实现 S7-300 之间的以太网通讯了。

如下界面说明了将 CPU314C-2DP 的 DB1 中的数据发送到 CPU314C-2PTP 的 DB2 中的监视界面:

a. 选择 Data View, 切换到数据监视状态:



1	式 LAD/STL,	/FBD	- [[)B1 -	- 150	_se	ndrece	eive∖eth	ernet2	\CPI	J 314C	-2	DP
1	📑 File Edit	t In:	sert	PLC	Deb	ug	View	Options	Windo	w F	Help		
	D 🗃 🔓	<u> </u>		<u>3</u>	光耳	a	Ov V Del	erviews tails	0	Ctrl+	к		Į <
	Address	Nam	e			т	PLO	C Register					ıe
	0.0					s	• LA	D	0	⊂trl+	1		
	+0.0	aa	1			A	STI		0	⊂trl+	2		
	*1.0					в	FBI	D	0	⊂trl+	3		
	=100.0					E	Dal	ta View	(Ctrl+	F4		
							• De	claration V	'iew (Ctrl+	5		
							Dis	play with				•	
							Zoo Min Zoo	om In himize om Factor.		Ctrl+ Ctrl+	Num+ Num-		
							 ✓ Too Bre ✓ State 	olbar eakpoint Ba atus Bar	ar				
							Col	lumn Width	h				
							Dis	play Colun	nns P	=11			
							Up	date View	F	-5			

b. CPU314C-2DP 的 DB1 中发送出去的数据:

🔣 LAD/STL/FBD - [@DB1 ISO_sendreceive\ethernet2\CPU 314C-2 DP_ONLINE]									
🕞 File Edit Insert PLC Debug View Options Window Help									
Address	Name	Туре	Initial value	Actual value	Comme				
0.0	aa[1]	BYTE	B#16#0	B#16#01	Tempo				
1.0	aa[2]	BYTE	B#16#0	B#16#02					
2.0	aa[3]	BYTE	B#16#0	B#16#03					
3.0	aa[4]	BYTE	B#16#0	B#16#04					
4.0	aa[5]	BYTE	B#16#0	B#16#05					
5.0	aa[6]	BYTE	B#16#0	B#16#06					
6.0	aa[7]	BYTE	B#16#0	B#16#07					
7.0	aa[8]	BYTE	B#16#0	B#16#08					
8.0	aa[9]	BYTE	B#16#0	B#16#09					
9.0	aa[10]	BYTE	B#16#0	B#16#10					
10.0	aa[11]	BYTE	B#16#0	B#16#11					
11.0	aa[12]	BYTE	B#16#0	B#16#00					

c. CPU314C-2PTP 的 DB2 中接收到的数据



ļ	K LAD/STL/FBD - [@DB2 ISO_sendreceive\ethernet1\CPU 314C-2 PtP_ONLINE]									
1	File Edit Insert PLC Debug View Options Window Help									
	D 🖻 🔓	· 🗉 🧧 🔏 🖬								
	Address	Name	Туре	Initial value	Actual value	Comment				
I	0.0	bb[1]	BYTE	B#16#0	B#16#01	Temporar				
I	1.0	bb[2]	BYTE	B#16#0	B#16#02					
I	2.0	bb[3]	BYTE	B#16#0	B#16#03					
I	3.0	bb[4]	BYTE	B#16#0	B#16#04					
I	4.0	bb[5]	BYTE	B#16#0	B#16#05					
I	5.0	bb[6]	BYTE	B#16#0	B#16#06					
I	6.0	bb[7]	BYTE	B#16#0	B#16#07					
I	7.0	bb[8]	BYTE	B#16#0	B#16#08					
I	8.0	bb[9]	BYTE	B#16#0	B#16#09					
I	9.0	bb[10]	BYTE	B#16#0	B#16#10					
	10.0	bb[11]	BYTE	B#16#0	B#16#11					
	11.0	bb[12]	BYTE	B#16#0	B#16#00					
	10.0	11 5103		D #1 C #0	D #1 C #00					





附录一推荐网址

AS

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