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今天这篇文章,我们想给大家介绍下如何通过启用CPU的I_Device功能来实现两台S7-300 CPU之间的数据交换。



如何使用I_Device功能实现两台S7-300之间的数据交换

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什么是I_Device呢?

"I_Device"中文翻译为"智能设备",它的概念来自于PROFINET网络。 我们知道,PROFINET网络中的设备可以分为IO控制器(IO_Controller)及IO设备(IO_Device)。当我们把IO控制器当做IO设备来使用的时候,该IO控制器就称为"I_Device".

本例程使用的硬件及通信要求如下:

硬件:

站点1:CPU315-2PN

输入/输出过程映像区的大小1024个字节,范围:0~1023 站点2:CPU317-2PN

输入/输出过程映像区的大小2048个字节,范围:0~2047 通信要求:

启用站点1的I_Device功能,实现如下功能:

1) 站点1的10个字节数据发送给站点2;

2) 站点1接收站点2的20个字节数据;

站点1的配置:

更改站点1CPU的过程映像区的大小:

| perties - CPU 315-2 PN | V/DP - (R0/S2) | | | | ι. |
|--|---|---|-----------------------|------------------|---------------|
| Cyclic Interrupts | Diagnostics/Clock | Protect | ion (| Communication | Web |
| General | Startup | | Synchro | onous Cycle Inte | rrupts |
| Cycle/Clock Memory | Retentive Mer | mory Ir | nterrupts | Time-of-Da | ay Interrupts |
| Cycle ✓ Update OB1 prof Scan cycle monitorin Minimum scan cycle Scan cycle load from Prioritized OCM Size of the process- Size of the process- Size of the process- QB85 - call up at I/C | cess image cyclically Ig time [ms]: time [ms]: n communication [%]: communication image input area: image output area: D access error: | 150 0 20 1024 1024 No OB85 c | 过程映 围:0- all up | 像区,取值范 ~1023 | 5 |
| Clock Memory | | | | | |
| | | | | | |
| Memory <u>b</u> yte: | | 0 | | | |
| | | | | | |
| | | | | | |

双击CPU315-2PN的PN-IO属性,更改设备名为:PN-IOXSUB

| Properties - PN-IOX | SUB (R0/S2.2) | | | | × |
|----------------------|--------------------|--------------------|---------------|--------|------------|
| Media redu | indancy | Time-of-Day Syr | nchronization | 0 | Options |
| General | Addresses | PROFINET | I-Device | Synch | ronization |
| Short description | : PN-IO | | | | |
| <u>D</u> evice name: | PN-IOXSUE | 3 | | | |
| 🗌 Use different | method to obtain d | levice name | | | |
| ☑ Support device | e replacement with | out exchangeable m | edium | | |
| | | | | | |
| Interface | | | | | |
| Туре: | Ethernet | | | | |
| Device | 0 | | | | |
| Address: | 192.168.0.1 | | | | |
| Networked: | yes | Properties | | | |
| <u>C</u> omment: | | | | | |
| | | | | | ^ |
| | | | | | |
| | | | | | × |
| | | | | Cancal | Halp |
| | | | | Cancel | пер |

找到I_Device选项卡并点击进入,如下图:

| Properties - PN-IO (R0/S2.2) | × |
|--|---------------------------|
| Media redundancy Time-of-Day Synchronization | Options |
| General Addresses PROFINET I-Device | Synchronization |
| ☐ I-device mode | |
| Parameter assignment for the PN interface and its ports on the | higher-level IO-controlle |
| Operate as higher-level shared device | |
| | |
| Station number: Diagnostic address: | |
| | |
| Transfer area: | |
| Subm Type I Address Q Address Isochr Comment | |
| | î |
| | _ |
| | |
| | <u> </u> |
| | |
| | |
| <u>N</u> ew E <u>d</u> it De <u>l</u> ete | |
| | |
| ОК | Cancel Help |

启用"I_Device"模式:

| Properties - PN-IO (R0/S2.2) | × |
|--|------------------------------|
| Media redundancy Time-of-Day Synchronization | Options |
| General Addresses PROFINET Provide I - device mode □ Parameter assignment for the PN interface and its ports on the PN interface and | he higher-level IO-controlle |
| Station number: 1500 Diagnostic address: | |
| Transfer area: | |
| Subm Type I Address Q Address Isochr Comme | ent |
| | Î |
| 创建数据交换区 | Ţ |
| New Edit Delete | |
| ОК | Cancel Help |

点击"新建(New)"创建数据交换区。

注意:数据交换区的起始地址要在CPU的过程映像区之外。比如CPU315的过程 映像区范围为0~1023,则数据交换区的起始地址为:1024。

| Transfer Area Propertie | s | | | Х |
|--|--------------------------------------|---|-------------|--------|
| Higher-level PN partner: Slot: <u>S</u> ubslot: <u>A</u> ddress type: | IO controller 2 1000 Output | | | |
| Local: I-device <u>T</u> ransfer area type: A <u>d</u> dress type: Input Sta <u>r</u> t: <u>L</u> ength: <u>P</u> rocess image: I/O Madulas (submedulas) | Application Input I024 20 V | Output Start <u>:</u> Le <u>n</u> gth: Pro <u>c</u> ess image: | lect I/O | |
| O <u>u</u> tput address: | | Input address: | | - |
| Comment: | 接收20个字节 | | | \sim |
| ОК | | | Cancel Help | |

| Transfer Area Propertie | s | | | × |
|---|---------------|--|-------------------------------------|------|
| Higher-level PN partner: Slot: <u>S</u> ubslot: Address type: | IO controller | | | |
| Local: I-device <u>T</u> ransfer area type: A <u>d</u> dress type: Input Sta <u>r</u> t: Length: Process image: | Application | Output Start <u>:</u> Le <u>n</u> gth: | S <u>e</u> lect I/O 1024 10 | |
| | | Input address: | | |
| Comment: | 发送10个字节 | | Cancel | Help |

| Media redundancy Time-of-Day Synchronization Options General Addresses PROFINET I-Device Synchronization I _device mode I -Device Synchronization I _ Operate as higher-level shared device I -Device I -Device Station number: 1500 Diagnostic address: 1024* Transfer area: Subm Type I Address Q Address Isochr Comment 1000 Applicati 10241043 no ##020/?\$Th I 1001 Applicati 10241033 no ##020/?\$Th I 1001 Applicati Delete I I I New Egit Delete I I I OK Cancel Help I I I Station Edit Innert PLC View Options Window Configure Network Specify Module Configure Network Specify Module | Med | | | | | | | | |
|--|---|--|--|---|-----------------------------|-------------------------|------------|---------------|-------------------------|
| General Addresses PROFINET I-Device Synchronization ✓ I-device mode □ Parameter assignment for the PN interface and its ports on the higher-level IO-controlle □ Operate as higher-level shared device 0 Diagnostic address: 1024* Station number: 1500 Diagnostic address: 1024* Transfer area: Subm Type I Address Q Address Isochr Comment 1000 Applicati 10241043 no 接收20个字节 1 1001 Applicati 10241033 no 接送10个字节 1 1001 Applicati Delete I I I Vew Edit Delete I I I Vew Edit Delete I I I I Vew Edit Delete I I I I Vew Edit Delete I I I I I I// Configuration) I Device Master/I I I I I I I <td></td> <td>lia redundanc</td> <td>y </td> <td>Time-of-D</td> <td>ay Synchro</td> <td>onization</td> <td></td> <td>0</td> <td>ptions</td> | | lia redundanc | y | Time-of-D | ay Synchro | onization | | 0 | ptions |
| ✓ E-device mode ● parameter assignment for the PN interface and its ports on the higher-level IO-controlle ○ Qperate as higher-level shared device Station number: 1500 Diagnostic address: 1024* Transfer area: Subm Type I Address Q Address Isochr Comment 1000 Applicati 10241043 no 接校20个字节 1001 Applicati 10241033 no 接拔20个字节 1001 Applicati 10241033 no 接拔10个字节 101 Applicati Delete I I OK Cancel Help Station CHI Insert PLC View Options Window Help Specify Module Configure Network Curl+Alt+E Specify Module Configure Network Specify Module Curl+Alt+T Phit:PROFINET D system 1 Imstall GSD File Install GSD File Install GSD File Install GSD File Install GSD File | Genera | I Ad | dresses | PROFINE | T | I-Device | | Synchr | onization |
| Transfer area: Subm Type I Address Q Address Isochr Comment 1000 Applicati 10241043 no 接收20个字市 1001 Applicati 10241033 no 接收20个字市 1001 Applicati 10241033 no 发送10个字市 Image: Submit State Sta | ✓ <u>I</u> -devic □ <u>P</u> a □ <u>O</u> Station nu | e mode arameter assig perate as hig mber: | gnment for the her-level share 1500 | PN interface | e and its po iagnostic a | orts on the address: | e higher-l | evel 10 4* | -controlle |
| Subm Type I Address Q Address Isochr Comment 1000 Applicati 10241043 no 接收20个字节 1001 Applicati 10241033 no 发送10个字节 1001 Applicati 10241033 no 发送10个字节 New Edit Delete Image: Cancel Help OK Cancel Help Cancel Help Station Edit Insert PLC View Options Window Help Customize Ctrl+Alt+E Specify Module Configure Network Symbol Table Ctrl+Alt+T PN1: PROFINET IO system 1 Image: PWOXSUB Image: PWOXSUB Image: PWOXSUB Image: PWOXSUB Image: PWOXSUB 3 Image: PWOXSUB Image: PWOXSUB Image: PWOXSUB Image: PWOXSUB 3 Image: PWOXSUB Image: PWOXSUB Image: PWOXSUB Image: PWOXSUB 3 Image: PWOXSUB Image: PWOXSUB Image: PWOXSUB Image: PWOXSUB 3 Image: PWOXSUB Image: PWOXSUB Image: PWOXSUB Image: PWOXSUB | Transfer a | irea: | | | | | | | |
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| 1001 Applicati 1024.1033 no 发送10个字节 ● ● ● ● | 1000 | Applicati | 10241043 | | no | 接收20个 | 字节 | | |
| New Edit Delete OK Cancel Help 支点1的CPU315-2PN生成I_Device GSD文件: Help Station Edit Insert PLC View Options Window Help Ctrl+Alt+E Station Edit Insert PLC View Options Window Help Ctrl+Alt+E Specify Module Configure Network Symbol Table Ctrl+Alt+T PN1: PROFINET IO system I MP/OP Edit Catalog Profile Update Catalog Not Prof 1 Prof 2 Install HW Updates Install GSD File | | | | | | | 2.1- | | |
| New Edit Delete OK Cancel Help Station Edit Insert PLC View Options Window Help Customize Ctrl+Alt+E Station Edit Insert PLC View Options Window Help Customize Ctrl+Alt+E Specify Module Configure Network Symbol Table Ctrl+Alt+T PN1: PROFINET IO system Edit Catalog Profile Update Catalog N2 P1R Pot 1 Linstall HW Updates Install HW Updates | | | | | | | | | Ţ |
| 広山的CPU315-2PN生成I_Device GSD文件: HW Config - [SIMATIC 300(1) (Configuration) I_Device_Master] Station Edit Insert PLC View Options Window Help Customize Ctrl+Alt+E Specify Module Configure Network Symbol Table Ctrl+Alt+T PN1: PROFINET IO system 1 2 Customize Report System Error Edit Catalog Profile Update Catalog Install HW Updates Install GSD File | <u>N</u> ew. | E | <u>d</u> it | De <u>l</u> ete | | | | | |
| HW Config - [SIMATIC 300(1) (Configuration) I_Device_Master] Station Edit Insert PLC View Options Window Help Image: Station Edit Insert PLC View Options Image: Station Edit Insert PLC View Customize Image: Station Edit Insert PLC View Specify Module Image: Station Edit Insert PLC View Specify Module Image: Station Edit Insert PLC View Symbol Table Image: Station Edit Insert PLC View Symbol Table Image: Station Edit Insert PLC View Edit Catalog Profile Image: Station Edit Insert PLC View Install GSD File | ОК | | | | | | Cance | el | Help |
| Image: Solution of the second of | ок 占点1的C | 2PU315-2 | PN生成I_I | Device G | SD文件 | : | Cance | el | Help |
| Image: Specify Module Image: S | OK 5点1的C HW Config - [Station_Edit | CPU315-2 SIMATIC 300(1) (| PN生成I_I Configuration) I | Device G | SD文件 | : | Cance | el | Help |
| X1 Impl/DP Edit Catalog Profile X2 Impl/DP Edit Catalog Profile X2 P1 R Port 1 Update Catalog X2 P2 R Impl/DP Install HW Updates 3 Imstall GSD File | OK 与点1的C HW Config - [Station Edit | CPU315-2 SIMATIC 300(1) (Insert PLC) | PN生成I_[Configuration) I View Options V | Device G _Device_Master] Vindow Help nize | SD文件 | trl+Alt+E | Cance | el | Help |
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| | OK 日本 HW Config - [Station Edit 全 哈 □ 1 2 X1 X2 X2 72717 | CPU315-2 (SIMATIC 300(1) (Insert PLC) (SIMATIC 300(1) (Inse | PN生成I_I Configuration) I View Options V 社 Custon Specify Config Symbo Report Edit Ca Update | Device Master] Vindow Help nize Module Module Module I Table System Error Italog Profile Catalog | SD文件 。 | trl+Alt+E trl+Alt+T | Cance | el | Help |

Find in Service & Support...

Create GSD file for I-Device...

¥

| | Create GSD File for I-Device | | × |
|-----|----------------------------------|---------------------------------------|------|
| | l-device: | CPU 315-2 PN/DP/PN-IOXSUB | • |
| | Identifier for generic I-device: | PN-IOXSUB | |
| | Catalog comment: | station 1 | ^ |
| | | | × |
| | GSD file: << Must be created >> | | |
| | Create | Export | |
| | Close | | Help |
| | | | |
| 点击' | "Export"导出GSD文件, | 如下图: | |
| | Create GSD File for I-Device | | × |
| | I-device: | CPU 315-2 PN/DP/PN-IOXSUB | • |
| | Identifier for generic I-device: | PN-IOXSUB | |
| | Catalog comment: | station 1 | ^ |
| | |] | × |
| | GSD file: GSDML-V2.25-#Siemens-F | PreConf_PN-IOXSUB-20180927-112126.xml | |
| | Create | Export | |
| | Close | | Help |

站点2的配置:

打开站点2(CPU317-2PN)的硬件组态,修改CPU的过程映像区的大小:

| perties - CPU 317-2 PN | V/DP - (R0/S2) | | | | | | |
|--|--|------------------|------------|---------|-------------|---------|--------|
| Cyclic Interrupts | Diagnostics/Clock | Pro | tection | Con | nmunication | n | Web |
| General | Startup | | Syr | nchrono | us Cycle In | terrup | ts |
| Cycle/Clock Memory | Retentive Mer | mory | Interrup | ots | Time-of-I | Day Int | errupt |
| - Cycle ✓ Update OB1 prod Scan cycle monitorin Minimum scan cycle Scan cycle load from | cess image cyclically g time [ms]: time [ms]: n communication [%] | 150 0 : 20 | | | | | |
| Prioritized OCM of Size of the process-i | communication mage i <u>n</u> put area: | 2048 | _ | | | | |
| Size of the process- | mage output area: | 2048 | | | | | |
| <u>O</u> B85 - call up at I/C |) access error: | No OB | B5 call up | | | | - |
| - Clock Memory Clock memory Memory <u>byte</u> : | | 0 | | | | | |
| ОК | | | | | Cancel | | Help |

安装站点1导出的GSD文件:

| Install GSD Files: from the directory C:\Temp\GSD File GSDML-V2.25-#Siemens-PreConf_PN-IOXSUB-20180927-112126 xml 09/27/2018 11:21:26 AM V2.25 Fr Install Show Log Select All Deselect All | nstall GSD Files | | | × |
|---|-----------------------------|---------------------------------|------------------------|----------------|
| Browse Browse File Release Version GSDML-V2.25-#Siemens-PreConf_PN-IOXSUB-20180927-112126.xml 09/27/2018 11:21:26 AM V2.25 End End End Install Show Log Select All | I <u>n</u> stall GSD Files: | from the directory | • | |
| File Release Version La GSDML-V2.25-#Siemens-PreConf_PN-IOXSUB-20180927-112126.xml 09/27/2018 11:21:26 AM V2.25 Er Install Show Log Select All Deselect All | C:\Temp\GSD | | | <u>B</u> rowse |
| GSDML-V2.25-#Siemens-PreConf_PN-IOXSUB-20180927-112126.xml 09/27/2018 11:21:26 AM V2.25 En | File | | Release | Version Lan |
| < <p>Install Show Log Select All</p> | GSDML-V2.25-#Siemens-PreCon | f_PN-IOXSUB-20180927-112126.xml | 09/27/2018 11:21:26 AM | V2.25 Eng |
| < <p>Install Show Log Select All Deselect All</p> | | | | |
| Install Show Log Select All | | | | |
| Install Show Log Select <u>All Deselect All Install </u> | | | | |
| Install Show Log Select All | | | | |
| Install Show Log Select All Deselect All | < | | | > |
| Install Show Log Select All Deselect All | | | | |
| Install Show Log Select All Deselect All | | | | |
| | Install Show | Log Select <u>A</u> ll | Deselect All | |
| | | | | |
| Close Help | Close | | | Help |

在硬件目录"PROFINET IO/Preconfigured Stations"中,找到站点1的硬件组态 文件,将其组态到站点2的PN网络中:



这样,在站点1的程序中为PIB1024赋值,站点2的PQB2048就能收到;

同样的道理,在站点2中,改变PQB2048的值,在站点1的PIB1024中能得到相应的变化;

是不是觉得似曾相识?其实这种操作,跟PN/PN耦合器非常类似哦。

好了,关于I_Device的组态及使用就介绍到这里。如果你喜欢这篇文章,可以去 官网(www.founderchip.com)下载本文PDF版本。

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