1 DNP3 简介

DNP 3.0(Distributed Network Protocol Version 3.0) 最初由美国 HARRIS 公司推出,已被 IEEE 推荐为 RTU/FTU 与主站间的通信规约。DNP3.0 在北美地区应用比较多,我国的香港及大陆一些开 展配电自动化工作的供电部门也有选择 DNP 3.0 的。现在世界上有专门的 DNP 用户组织,负责规约的 管理。

DNP 3.0 是遵循 I SO/OSI 七层参考模型的开放式远动通信规约。与 I EC 870.5-101 比较, DNP 3.0 也规定了类似的物理层、链路层及应用层的内容。由于 I EC 870.5-101 链路层每一帧中所传送的应用数据不超过 255 个字节,为了方便应用层传输大容量数据块,DNP 3.0 增加了一个传输层,将超过 255 个字节的应用数据分成若干个不超过 255 字节的数据子模块,送到链路层传输。DNP 3.0 与 I EC 870.5-101 的另一个重要区别是,在多种通信网络拓扑结构下支持自发响应 (unsolicited response)。

2 DNP3 远程站的组态

2.1 硬件需求和软件需求

硬件:

- (1) PS307 5A 电源 (6ES7 307-1EA01-0AA0)
- (2) CPU315-2PN/DP (6ES7 315-2EH14-0AB0)
- (3) TIM3V DNP3 (6NH7803-3BA00-0AA0)
- (4) MMC 64KB (6ES7953-8LF20-0AA0)
- (5) 以太网连接电缆
- (6) 一台装有以太网卡 PC

软件:

- (1) Windows XP SP3 操作系统
- (2) STEP7 V5.5 (或者 STEP7 Professional 2010)
- (3) SINAUT ST7 V5.1 (6NH7997-0CA51-0AA0)
- (4) Triangle MicroWorks 公司的 Protocol Test Harness V2.0.43 软件(作与 RTU 的连接测试,可以 从网上下载测试版)
- (5) Software toolbox 公司的 TOP Server V5.7 软件(作 DNP3 Master)测试。

2.2 DNP3 RTU 组态步骤

双击桌面上的 SIMATIC Manager 图标,打开 STEP7 组态软件。在编辑器环境下点击"File"菜单下的"New",打开新建项目窗口。如下图 1 所示:

New Project	
User projects Libraries Multiprojects	
Name Storage path	
DNP C:\Program Files\Siemens\Step7\s7pr	oj\Dnp
Add to current multiproject	Turner
	Type:
Storage location (path):	F Library
C:\Program Files\Siemens\Step7\s7proj	Browse
Ск Са	ncel Help

图1、新建项目

输入项目名为"DNP",项目的存储路径如上图1所示。点击"OK"按钮创建项目。 项目创建后,鼠标右键点击"DNP",在弹出的菜单中选择"Insert New Object"下的 "SIMATIC 300 Station"插入一个站名为SIMATIC 300(1)的 S7-300站。如下图2所示:

SIMATIC Manager - [DNP C:\Prog	ram Files\Siemens\Step7\s7proj\Dnp]	
File Edit Insert PLC View Options	Window Help	×
Cut Ctrl+X Copy Ctrl+V Paste Ctrl+V Delete Del Insert New Object ► PLC ► Rename F2 Object Properties Alt+Return	SIMATIC 400 Station SIMATIC 400 Station SIMATIC 500 Station SIMATIC PS Station Other Station SIMATIC SS PG/PC	<u>></u> <u>></u> <u></u> <u></u> <u></u> <u></u>
	MPI PROFIBUS Industrial Ethernet PTP DNP3 Dedicated Line SINAUT Dial-up Network SINAUT Dial-up Network	
	S7 Program M7 Program	
	OS OS (Client)	

图 2、插入 SIMATIC 300 站

插入后如下图 3 所示:

SIMATIC Manager - [DNP	C:\Program Files\Siemens\Step7\s7	
		Filter >
⊡-≝) DNP ⊕-∭ SIMATIC 300(1)	աղի Hardware	
i Press F1 to get Help.	ТСР	/IP -> B

图 3、插 SIMATIC 300 站后

在上图 3 中选中" SIMATIC 300(1)"站,然后鼠标双击"Hardware"打开此站的硬件配置界面。 从硬件列表中选择 SIMATIC S7-300 目录下的 RACK-300 下 Rail 插入到配置界面中,如下图 4 所示。

🖳 HW Config - [SIMATIC 300(1) (Configuration) DNP]	
🛄 Station Edit Insert PLC View Options Window Help	_ @ ×
D 🚅 🐂 🗣 🕼 🎒 🗈 💼 🕍 🎰 🕼 🗊 🗔 器	₩?
	Eind: Mt Mi
	Profile: Standard 💌
	PROFIBUS-PA
2	
4	SIMATIC 300
5	
6	
7	→ → EM-300
	Gateway
	🛉 🧰 ІМ-300
	🛉 🧰 M7-EXTENSION
	₽ 🔲 PS-300 📃
< >	E RALK-300
🖕 🛋 🔟 UB	🖶 🧰 SM-300 🛛 💌
	< · · · · · · · · · · · · · · · · · · ·
Slot Module O Fi M I Q C	6ES7 390-1???0-0AA0 ₹
	Available in various lengths
Press F1 to get Help.	

图 4、插入 S7-300 机架

在机架的第二槽中插入订货号为 6ES7 315-2EH14-0AB0 的 CPU 打开后。CPU 在右面硬件列中的位置如 下图 5 所示:

🖳 HW Config - [SIMATIC 300(1) (Configuration) DNP]	
🕅 Station Edit Insert PLC View Options Window Help	_ @ ×
D 😅 💱 📓 🐘 🎒 🗈 💼 🏜 🏦 🖪 🖼 🛠	
	Eind: Mt Mi
≡ 100 UB	Profile: Standard
(0) UR	6ES7 315-2EH13-0AB0
Slot Module 0 Fi M I Q Comment	E CPU 315F-2 DP
	6ES7 315-2EH14-0AB0 384 KB work memory; 0.05ms/1000 instructions; PROFINET connection; S7
	Communication (loadable FBs/FCs);
Press F1 to get Help.	Chg

图 5、在机架中插入 CPU

插入时弹出对话框,设置集成 PN 口的以太网地址为 192.168.0.2。其它参数如下图 6 所示:

Properties - Ethernet interface PN-IO (R0/S2.2)
General Parameters IP address: [192.168.0.2] Subnet mask: [255.255.0]	If a subnet is selected, the next available addresses are suggested. Gateway © Do not use router © Use router Address:
Subnet: not networked	<u>N</u> ew P <u>r</u> operties Dejete
OK	Cancel Help

图 6、设置 CPU 集成口的以太网接口参数

设置后点击"OK"后,如下图7所示:

💵 Station Edit Insert PLC Yiew Options Window Ho	® _ ⊐
D 🗃 🗣 🗣 💱 🎒 🗎 🖻 🔂 🏙 🏜 🗊 🗖	<mark>ﷺ</mark> № ?
I Image: CPU 315-2PN/DP X1 MPI/DP X2 PN-IO X2 P1 Poil 1 X2 P2 Poil 2 3 Image: CPU 315-2PN/DP	Eind: Profile: Standard PROFIBUS DP PROFIBUS-PA PROFINET IO SIMATIC 300 SIMATIC 300 SIMAT

图 7、插入 CPU 后的硬件配置界面

插入完 CPU 后, 然后插入 TIM 3V-IE DNP3 到 300 机架的第4槽。 TIM 3V-IE DNP3 在右面硬件列 表的位置如下图 8 所示。安装 SINAUT ST7 V5.1 后, 在硬件列表中出现此模块:

HW Config - [SIMATIC 30	D(1) (Con	figura	ution)	DN	P.]				
IN Station Edit Insert PLC	/iew Optic	ons <u>W</u>	jndow	Help					- 🗗 🗙
🗋 🗅 😅 🔓 🖉 🗳 🔤 🛱	a 🖪 🛛 🕯	in in		= ^s	🔡 💦				
			100		Second Second	~			
📼 (0) UR							Final	<u> </u>	السامير
			~				Tung.	1	aa i sat
2 CPU 315	-2PN/DP	<i>.</i>					Profile:	Standard	-
X1 MPI/DP							W PB	OFIBUS-PA	~
X2 PN-10			-				E R PR	OFINET IO	
X2P1 Poll 1 X2P2 Poll 2			-				SIN	MATIC 300	
3			-				1 🕀 🥮	C7	
4								CP-300	
5								CPU-300	
6								Gateway	
								IM-300	
							1 4 6	M7-EXTENSION	
							1 1 🖬	PS-300	
						~	📃 🗄 🧰	RACK-300	
2						>		SINAUT ST7	
						-	9	🚞 TIM 3 MPI	
							<u>A</u>	TIM 4 MPI	
Slot 🚺 Module	0 Fi.	. M	1	Q	Comment			HE TIM SVIE A	dyanced
1			1	3 3		~		STE TIM SVIE D	NPA
2 CPU 315-2PN/DP	6ES7V3	12	18	3 - 2				H TIM 4R-IE	
X7 MFI/DF	0	2	2047					H TIM 4R-IE D	INP3
A2 FN-ID			2046			-	📃 🗄 🧰	SM-300	~
V2 Brd 2	3	-	2045	3			<		>
3		-	2044			20	6NH7 803-	3BA00	٦
4							TIM 3 (1 x)	WAN, 1 x Industrial El	thernet,
5						~	without PG	nections, module repla }	acement
l Press F1 to get Help.									Chg //

图 8、TIM 3V-IE DNP3 在硬件列表的位置

插入 TIM 3V-IE DNP3 后。 如下图 9 所示

HW Config - [SIMATIC 300(1) (Configuration) I	DNP] 📃 🗖 🔀
III Station Edit Insert PLC View Options Window He	ip _ 2 ×
C 😅 🔓 🦉 🖏 🎒 👘 🖻 🛯 🏜 🏜 🚯 🗖	₩ №?
= (0) UR	Eind: Mt Mi
2 CPU 315-2PN/DP	Profile: Standard 💌
X1 MPI/DP	ROFIBUS-PA
X2 P1 Post 1	E ROFINET IO
X2 P2 Port 2	
4 HM 3V-IE DNP3	
5	6NH7 803-38A00
6	TIM 3 (1 x WAN, 1 x Industrial
	module replacement without
Press F1 to get Help.	

图 9、插入 TIM 3V-IE DNP3 后的硬件配置界面

TIM 3V-IE DNP3 后,双击该模块打开 TIM 3V-IE DNP3 的硬件属性窗口。所下图 10 所示:

Properties - TIM 3V-I	E DNP3 - (R0/S4)	D
General Addresses Ti	me Service Interfaces Options	
Short Designation:	TIM 3V4E DNP3	
	TIM 3 (1 x WAN, 1 x Industrial Ethernet, no S7 connections, module replacement without PG)	< >
Order No.:	6NH7 803-38A00	
<u>N</u> ame:	TIM 3V-IE DNP3	
<u>C</u> omment:		
		(¢) (>)
OK Canc	el Hel	p

图 10、TIM 3V-IE DNP3 硬件属性

在上图 10 的窗口中点击" Interfaces" 选项卡,进入到接口配置界面。如下图 11 所示

eneral Ad	dresses Time S	ervice Interfaces Options	
Interface	State not connected	Info	
WAN 1		No network node configured	
2			

图 11、" Interface" 配置界面

选择" Interface" 配置界面中的" Ethernet 1" ,选择后参数设置界面就出现,如下图 12 所示:

Pre	operties -	TIM 3V-IE	DNP3 - (R0/S4)		×
G	ieneral Ad	dresses Tim	e Service Interfaces	Options	
	Interface	State	Info		
	Ethernet 1 WAN 1	not connec	ted address = 192.168 No network node	3.0.1 configured	
		Ext.		DND2	1
	1	Ethernet I	Proper	DINP3 paramete	ers
	Send kee	palives for co	nnections - Interval [s] (0-65535, 0 = off):	10
	Keepalive	monitoring ti	me [s] (0-255, 0 = use de	efaults):	0
	Connectio	on mode:		DNP3 station	-
	Transport	protocol UDI	- .	Г	
	DNP3 ma	ster monitorin	g time [s]:		0
_	<u></u>				
	ОК	Cance			Help

图 12、配置接口参数

点击上图 12 中的"Properties..."按钮,在弹出的窗口里点击"New"按钮,新建一个以太网络。 并将此接口连接在此网络上。且设置此接口的 IP 地址为: 192.168.0.1;子网掩码为: 255.255.255.0。 如下图 13 所示:

Properties - Ethernet interface TIM	3V-IE DNP3 (R0/S4)
Set MAC address / use ISO protocol MAC address:	If a subnet is selected, the next available addresses are suggested.
IP address: Subnet mask: 255,255,255,0	Gateway
Subnet: <u> not networked</u> <u> Ethernet(1)</u>	P <u>r</u> operties Delete
ок	Cancel Help

图 13、配置后以太网接口参数

配置后,点击"OK"按钮返回到"Interface"配置的界面中。然后就可以点击"DNP3 Parameters…"按钮,进入到DNP3 的参数配置界面中。如图 14 所示:

fessages	
Unsolicited reporting:	No 💌
Retries of unsolicited reporting:	0 -
Select before operate time span [s]:	10 💌
Type of transmission:	Chronological
)ata Link	
Retries data link layer:	0 💌
Confirmation request data link layer:	Never
Timeout data link layer [ms] (0-65535):	2000
TCP/IP listen port (0-65535):	20000

图 14、配置 DNP3 参数界面

在 DNP3 的参数配置界面中,设置"Unsolicited"的值为"No";设置"TCP/IP listen Port(0-65535)"的值为"20000"。设置后点击"OK"再返回到上一级界面中。在"Interface"配置的界面中点击"OK"按钮完成参数的配置,配置后的界面如下图 15 所示:

Properties - TIM 3V-IE DNP3 - (R0/S4)	
General Addresses Time Service Interfaces Options	
Interface State Info	
Ethernet 1 connected to 'Ethernet(1)' address = 192.168.0.1 WAN 1 No network node configured	
Ethernet 1 Properties DNP3 parameters	
Send keepalives for connections - Interval [s] (0-65535, 0 = off): 10	-
Keepalive monitoring time [s] (0-255, 0 = use defaults):	-
Connection mode:	<u>ล </u>
Transport protocol UDP:	"
DNP3 master monitoring time [s]:	
OK Cancel	Help

图 15、配置参数后的" Interface" 界面

在图 15 中点击"OK"按钮完成配置,并返回到硬件配置的界面中。之后点击保存并编译按钮对整个硬件项目进行编译保存。

编译并保存后,关闭硬件配置界面,返回到项目界面中。在项目界面中鼠标右键点击"DNP"项目, 在弹出的菜单中选择"Insert New Object"下的"Other Station",并命名"Other Station"为 "DNP3 Master"。如下图 16 所示:



图 16、插入" Other Station"

在上面的窗口中选择"Options"菜单下的"Configure Network",如下图 17 所示:

File Eule Insert PLC View	COMONS WINDOW Help		
D 😂 🖁 🐖 🕹 🖻 💼 B 🗃 DNP F 🗐 SIMATIC 300(1)	Customize Access Protection Change Log	Ctrl+Alt+E	Filter >
	Text Libraries Language for Display Devices Manage Multilingual Texts		•
	Rewire Run-Time Properties		
	Compare Blocks Reference Data Define Global Data		•
	Configure Network		
	Simulate Modules Configure Process Diagnostics		
	OS OS Import		•
	CAx Data		•
	Set PG/PC Interface		-

图 17、打开网络配置界面

选择后,打开网络配置界面,如下图 18 所示:

🎇 NetPro - [DNP (Network) C:\Program Files\\Step7\s7p 📃	
Network Edit Insert PLC View Options Window Help	-
😂 🖩 🖏 🎒 📾 📾 🕍 🏜 🖓 🖉 🕼 🖻 ! 💦	
Ethernet(1)	<u>∧</u> ∃×I
Industrial Ethernet	M ile
MPI(1)	Sele
MPI	Ē
	+
SIMATIC 300(1)	÷
316-2P 3V-IE 3V-IE N/DP DNP3	
	4.5
2	V Ex
<	
Ready TCP/IP -> Broado	:01 //

图 18、网络配置界面

在上图中右键单击" DNP3 Master",在弹出的菜单中选择" Object Properties...。如下图 19 所示:



图 19、打开 DNP3 Master 的属性窗口

选择后,打开 DNP3 Master 的属性窗口,在属性窗口中选择"Interface"选项卡进入到接口配 置界面中,在接口配置界面中选择"New"按钮,在弹出的窗口中选择"Industry Ethernet"如下图 20 所示:

General Interface	s Type	Address	Subnet	
New	New In Type:	terface - Type Select DNP3 Dedicated Ling Industrial Ethernet MPI PROFIBUS PTP SINAUT Dedicated L SINAUT Dedicated L SINAUT Spontaneou	tion	
		DK Cancel	Help	
ок			Cancel	Help

图 20、选择 DNP3 Master 的通讯接口

选择后,把它挂在之前创建的 Ethernet(1)中。如图 21 所示:

Properties - Ethernet interface	
General Parameters	
✓ Set MAC address / use ISO protocol MAC address: 08-00-06-01-00-01	selected,
IP protocol is being used	able addresses are suggested.
IP address: 192.168.0.3 Subnet mask: 255.255.255.0 Image: State way Image: Do not up Address: Address:	ise router
Subnet:	<u>N</u> ew
Lthemet[1]	P <u>r</u> operties
	Dejete
ОК	Cancel Help

图 21、DNP3 Master 的接口参数设置

设置后,如下图 22 所示



图 22、设置后的网络配置

在上图 22 中,点击保存并编译按钮,对网络配置进行编译并保存。 以上的步骤完成了 DNP3 通讯的硬件配置,接下来步骤完成 DNP3 通讯程序部分。 双击桌面上的" SINAUT ST7 - Configuration" 图标,如下图 23 所示。



图 23、打开 SI NAUT ST7 配置工具

双击后打开的界面如下图 24 所示。

3 SINAUT ST7 : Configuration	
<u>Project SINAUT View Extras H</u> elp	
📽 ∿, 🧐 ୬₁ 🖬 🚳 ୬ 🖻 🦻 � � ● ● 🚦	
Press F1 for help.	

图 24、SINAUT ST7 配置界面

选择" Project" 下的" Open Project...", 会在弹出项目打开的对话框如下图 25 所示:

Open	Project			
Use	er projects	Sample projects		
N	ame S	torage path		
		Selected		
User	projects:	1		
Libra	ries: No proiocto	. —		
Multi	projects:		[Browse
		n		1.22
	OK		Cancel	Help
11				

25、打开项目对话框

在打开项目对话框中,点击"Browser..."按钮,在弹出的窗口中选择前面项目所存放的路径,并选择打开该项目。打开时会弹出如下图 26 所示的窗口:



图 26、SI NAUT ST7 配置工具选择窗口

在上图中,选择第1项连接配置项,然后点击"OK"按钮,打开连接配置界面如下图 27 所示:



图 27、SINAUT ST7 连接配置窗口

在上面得 DNP3 连接配置的窗口里,右键点击第1条连接。在弹出的菜单中选择"Add"。如下图 28 所示:

📅 SINAUT ST7 : Configuration - Project 'DN	NP', Path 'C:\Program Files\Siemens\Step7\s7 🔳	
Project Edit SINAUT View Extras Help		
😂 🔌 😏 🐂 🖬 🚭 🗼 🛍 💡 🍉	● ! ⊨· ·→ ↘ ·•· * - 8= ¥ Þ,	
A Connection configuration *		×
configured connections: total number: 0, shown: 0, selected: 0	possible connections: total number: 2, shown: 2, selected: 1	
	Delete	
	Recover lost connections	
	- <u>-</u>	
Press F1 for help.		- /

图 28、添加可用的连接到配置的连接中

选择后,选择的该连接被添加到左面的列表框中。如下图 29 所示.



图 29、添加连接后的视图

添加后选择菜单" SINAUT" 下的" Subscriber administration..." 。如下图 30 所示:

📅 SINAUT S	T7 : Configuration - Project 'DNP'	, Path 'C	\Program Files\Siemens\Step7\s7 🔳 🗖 🔀
Project Edit (SINAUT View Extras Help		
🖉 🔧 🏂	Subscriber administration	F4	• • > >, •• * - = = ×, >,
6	SINAUT ST1 - Configuration overview	, F5	
Connec	Close		
configured	Save	Ctrl+S	mections
total numb	Show invalid connections	Ctrl+U	r: 2, shown: 2, selected: 1
	Recover lost connections	Ctrl+R	DNP3 Master / DNP3 master / Ethernet(1)
	2 / SIMATIC 300(1) / CPU 315-2PN/E via subscriber-1001		2 / SIMATIC 300(1) / CPU 315-2PN/DP / P-Bus
	•• 1001 / SIMATIC 300(1) / TIM		
	••• 1001 / SIMATIC 300(1) / TIM		
<	>		
		1	
Starts the Subsc	riber Administration		

图 30、切换到广域网站管理配置界面

切换后 如下图 31 所示:

📅 SINAUT ST7 : Configuration - Pro	ject 'DNP', Path '	C:\Program Files\	Siemens\Step7\s	7projWnp				
Project Edit SINAUT View Extras	Help				- 1-1 ×			
😂 🛰 🏂 🐂 🖬 🎯 🕺 🕸 👷 😨 😫								
Subscriber types:	Last change of conr	nection configuration:	03/11/11 1:	2.24.33 Sele	cted CPUs:			
E All SINAUT subscribers	Subscriber no.	Subscriber type	Module	Station	SINAUT (
- 💩 Redundant H-CPUs	01	Other Station	-	DNP3 Master	yes			
Redundant ST7cc/ST7sc	2	CPU 315-2PN/DP	CPU 315-2PN/DP	SIMATIC 300(1)	yes			
 ■ TIMs with TD7onTIM ■ Subscribers ■ 201 / SIMATIC 300(1) 	1001	SINAUT TIM	TIM 3V-IE DNP3	SIMATIC 300(1)	yes			
	«							

图 31、广域网站号管理界面

在上面的界面中,选择"1001/SIMATIC 300(1)"后点击 **还**按钮,在弹出的 TD7 on TIM 的库程 序中分别选择"WatchDog"、"PartnerStatus"、"OpinputMonitor"、"BinO4B_S",点击 "Paste into project"按钮,添加这四个对象到"1001/SIMATIC 300(1)"站下。如下图 32 所示



图 32、配置通讯的用户数据区

在上图中分别选择右面对象列表框中的各个对象,分别设置各对象的参数如下图 33、图 34、图 35、图 36 所示。

📅 SINAUT ST7 : Configuration - Pr	oject 'DNP' , Path 'C: \Program Files\Siemens\Step7\s7proj\Dnp' - [S 📃 🗖	\mathbf{X}
Project Edit SINAUT View Extras	Help _ 5	Ξ×
📙 😂 🔌 🏂 🍕 🖬 🚭 🕹 🛍	8 • • • • • •	
Subscriber types:	Last change of connection configuration: 03/11/11 12.24.33 Selected CPUs: 0	D
🕀 🏂 All SINAUT subscribers	Object no. Object name Partner no.(s) DNP3 start index:	
Redundant H-CPUs	🕲 WatchDog	
Redundant ST7cc/ST7sc	PartnerStatus 1	
TIMs with TD7onTIM	DpInputMonitor	
G All Destination Subschoers ■ W 1001 / SIMATIC 300(1) - ⊖ 1 / Bin04B_S	S 1 0 Bin04B_S 1 0	
	System Object: WatchDog	^
	OverABA	
		=
	Memory area: C DB (• Memory C Output	
	DB-No.: 0	-
	Address (Byte.Bit):	
		~
	×	
Press F1 for help.		- //

图 33、 看门狗的参数配置

SINAUT ST7 : Configuration - Pro	oject 'DNP', Path 'C:\Program Files\Siemens\Step7\s7proj\Dnp' - [Subscribe 🔳 🗖 🛛
Project Edit SINAUT View Extras	Help _ B ×
🖉 🔨 🧐 🐂 🖬 🎒 🐰 🖻	8 • 0 ! ! !
Subscriber types:	Last change of connection configuration: 03/11/11 12.24.33 Selected CPUs: 0
All SINAUT subscribers	Object no. Object name Partner no.(s) DNP3 start index:
Redundant ST7cc/ST7sc	PartnerStatus 1
TIMs with TD7onTIM	OpInputMonitor
All Describers → 1001 / SIMATIC 300(1) → 1 / Bin04B_S	[™]1 Bin04B_S 1 0
	System Object: PartnerStatus
	Status Output Byte
	Memory area: CDB (Memory) COutput Bit 0: (1/DNP3 Master 🗨
	DB-No.: D Bit 1:
	Address (Byte):
	Bit 3:
	Bit 4:
	Bit 5: 🔐 👻
	Bit 6:
	Bit 7: 🖳
1	< · · · · · · · · · · · · · · · · · · ·
Press F1 for help.	

图 34RTU 站状态参数设置

SINAUT ST7 : Configuration - Pro	oject 'DNP', Path 'C: \Program Files\Siemens\Step7\s7proj\Dnp' - [S 🔳 🗖 🔀
Project Edit SINAUT View Extras	Help
🖉 🔌 🧊 भ। 🖬 🚭 👗 🖻	<mark>8 • • • • • • • • • • • • • • • </mark>
Subscriber types:	Last change of connection configuration: 03/11/11 12.24.33 Selected CPUs: 0 Object no. Object name Partner no.(s) DNP3 start index: WatchDog PartnerStatus 1 OpInputMonitor 0 System object: OpInputMonitor Status byte for operator input Memory Output DB-No.: 0 Address [Byte]: [2] Tolerance time for hardware input Max. input time: 0 x 1.0 s Min. input time: 0 x 0.1 s
Press F1 for help.	

图 35、操作员输入监控参数设置

📅 SINAUT ST7 : Configuratio	on - Project 'DNP', Path 'C:\Program Files\Siemens\Step7\s7proj\Dnp' - [Subscriber ad 🔳	
Project Edit SINAUT View	Extras Help -	Ξ×
🖻 🥆 😏 🐂 🖬 🎒 🐰		
Subscriber types:	Last change of connection configuration: 03/11/11 12.24.33 Selected CPUs: 0 Object no. Object name Partner no.(s) DNP3 start index. Selected CPUs: 0 0 Object no. Object name Partner no.(s) DNP3 start index. Object no. Object name Partner Name Optimum Partner Status 1 Optimum Partner Status 1 Optimum Partner Status 1 Optimum Partner Status 1 Selected CPUs: 0 Difference 1 Column Partner Status 1 <	
	Object name: Bin04B_S Object parameters: Partner Object parameters: Object no.: S. Station S. Station Object no.: 1 DNP3 Master Selected partners: Selected partners: Selected partners: Object no.: S. Station Selected partners: Selected parameters: Selected parameters Event class 1: Velatile storage mode:	<
Press F1 for help.		- //

图 36、位数据通讯块的配置

配置完上面得参数后,选择左面的数据传输块"1/BinO4_S"。选择后并在右面的参数设置区设置参数如下图 37 所示:

📅 SINAUT ST7 : Configuration - Proje	ct 'DNP', Path 'C:\Program Files\Siemens\Ste	ep7\s7proj\Dnp'	
Project Edit SINAUT View Extras Help			
😂 🍾 🍃 🐂 🖬 🎒 🐰 🛍 💡			
😭 Subscriber administration *			
Subscriber types:	Last change of connection configuration: 03.	//11/11 18.06.09 Selected CPUs: 0	
	Channel name Channel two Inout addr. CalinputByte_1 Binary send P#M 10.0 BYTE 1 PinputByte_2 Binary send PinputByte_3 Binary send	Dutout addr.	
■ 1001 / SIMATIC 300(1)	Channel name: InputByte_1	Channel tupe: Binary send	
	Channel active: 🔽	r Input address	8
	Send at change of: 1	Memory area: C DE Memory C Data type: BYTE	Input
	Active: Hour: Minute: Time of day:	Number: I DB-No.: I Address [Byte]: 10	
	Hour: Minute: Second: Time scheme: 10	Masks Alarm mask:	ю́нех
	Trigger signal Active:	Send buffer principle mask: 0 Disable mask: 0	ю нех ю нех
	DB-No.: 0 Address (Byte,Bit): 0 . 0		

图 37、Bin04_S 功能块参数配置

设置后点击快捷按钮中的保存按钮。如下图 38 所示:



保存 SI NAUT ST7 中的配置

点击保存按钮后会弹出下图 39 的对话框。





在上图 39 中点击"OK"按钮,点击后会弹出数据编译生成的窗口。如图 40 所示:

Options 🛛
Subscriber administration
Print
C Dverview format
C Details
Generation / Compilation options
Generate System data blocks for TIMs and CPUs
Generate SINAUT ID7 source files for CPUs
Compile SINAUT TD7 source files for CPUs
Generation / Compilation of TD7 source files will be done
for all CPUs
C for selected <u>C</u> PUs
Subscriber number as comment for stations, CPUs and TIMs
SMS configuration
☑ Check character set of SMS message strings
OK Cancel Help

图 40、生成数据选择项

在上图中,采用缺省的设置,点击"OK"按钮,进行数据的生成。生成过程中没出现任何的错误 会弹出如下图 41 所示的窗口。

Info - Generation / Compilation	
All SINAUT configuration data have been saved successfully.	
State of optional generation / compilation functions:	
- Generation of System data blocks for TIMs and CPUs:	ОК
- Generation of SINAUT TD7 source files for CPUs:	ОК
- Compilation of SINAUT TD7 source files for CPUs:	ОК
- Generation of comment for stations, CPUs and TIMs:	ΟΚ
Attention ! Please note that the state of the compilation of SINAU include the result of the compiler run. For safety reason STEP7 block editor should always be checked.	T TD7 source files does not is the output messages of the
	Help

图 41、数据生成正常

点击"OK"按钮。到此就完成了整个 DNP3 的硬件及软件配置。

用以太网线连接编程器到 CPU315-2PN/DP 的集成口。

双击桌面上的 SIMATIC Manager 图标,打开 STEP7 组态软件。在编辑器环境下点击"File"菜 单下的"Open",在弹出的打开项目窗口中选择刚才新建的项目。如下图 42 所示:

Open Proj	ject				X
User proj	ects Libr	aries Sample	projects	Multiprojects	1
Name	Storage C:\Prog	path ram Files\Siem	ens\Step7\	s7proj\Dnp	
		2000 an 2010 a			
User projec Libraries: Sample pro	its: jects:	Selected			D
Multiprojec				Cancel	Browse

图 42、打开项目

打开项目后。选择 SIMATIC 300(1)站,选择后点击下载按钮下载项目到 PLC 中。如下图 43 所示:



图 43、下载组态到硬件

插入变量表,在变量表中输入从 M10.0 到 M10.7 的 8 个布尔变量。插入后在线监控并强制 M10.1、 M10.3、M10.5、M10.7 为" TRUE" 值。此地址区与前面的设置的传输的地址。如下图 44 所示:

88	Va	-	VAT_	1						
Iab	le	Edit	<u>I</u> nse	ert P <u>L</u> C	V <u>a</u> riable <u>V</u> iev	v <u>O</u> ptions	<u>W</u> indow <u>H</u> elp			
-[22]	▰▯◪▤▮▯▫▫××◾▯ਃ№ ᅇ◶~∽									
1	V	AT_	1	@DNP\S	IMATIC 300(1)\CPU 315	5-2PN/DP\\$7	/ Prog	ram(1)	ONLI
	1	Ad	dress	Symbol	Display format	Status value	Modify value			1
1		М	10.0		BOOL	false	false			
2		М	10.1		BOOL	true	true			
3	S. C. S.	М	10.2		BOOL	false	false			
4		М	10.3		BOOL	true	true			
5		М	10.4		BOOL	false	false			
6		М	10.5		BOOL	true	true			
7	2003	М	10.6		BOOL	false	false			
8		М	10.7		BOOL	true	true			
9										
DNID	CTRA	ATT	c 200/	111 107	Drogram(1)			0 5		1

图 44、PLC 变量在线监控表

到此完成了 DNP3 RTU 的配置。

2.3 Protocol Test Harness 作 DNP3 主站与 DNP3 RTU 通讯

首先,把与编程器连接的以太网线从 CPU315-PN/DP 的集成 PN 口换到 TIM 3V-IE DNP3 的以太网口上。

然后,双击桌面上的 Protocol Test Harness (模拟 DNP3 的主站),如下图 45 所示:



图 45、运行 DNP3 主站

打开后,出现图 46 的界面。



图 46、Protocol Test Harness 配置界面

在上图中点击"Cancel"按钮,点击后选择菜单"Open"下的"DNP3 Master Session"。如下 图 47 所示:

74 Tri	angle MicroWorks, Inc. Protoc	ol Test Harness 🔲 🗖 🗖 🔀
File C	pen Edit Window Help	
Cha Se:	DNP3 Master Session DNP3 Monitor Channel DNP3 Slave Session MODBUS Master Session	→ MMI
Co Tr Ra	MODBUS Monitor Channel MODBUS Slave Session IEC 60870-5-101 Master Sector IEC 60870-5-101 Monitor Channel IEC 60870-5-101 Slave Sector	Application Physical Data. IV Static IV Event IV Cyclic
su ww Typ use Loa	IEC 60870-5-103 Master Sector IEC 60870-5-103 Monitor Channel IEC 60870-5-103 Slave Sector IEC 60870-5-104 Master Sector IEC 60870-5-104 Monitor Channel IEC 60870-5-104 Slave Sector	on test harness commands or cess the Manual and Quick Start Guide

图 47、配置为 DNP3 Master

选择后弹出" Open DNP3 Master" 的窗口。在窗口中选择" Channel" 选项卡,设置参数如下图

10		
48	所不	:

74 Open DNP 3 Master	
Specify Channel and Session parameters, ther	n press "Open"
to establish a connection to your device	
Channel Session Next Step	
New Channel 🚔	
Channel Name: (DNP3)
Connection Type	<u> </u>
C Serial TCP/IP	
TCP Parameters	
Host: (192.168.0.1)
Port: 20000	5
	Advanced Settings
⊢Equivalent Tcl command line arguments	
mdnpopenchannel name "DNP3" host 19	2.168.0.1
	•
Copy to Clipboard	
Cancel	Open

图 48、DNP3 通道配置

配置完通道参数后,选择"Session"选项卡,设置参数如下图 49 所示:

74 Open DNP3 Master	
Specify Channel and Session parameters, then to establish a connection to your device	press ''Open''
Channel Session Next Step	
Session Name: mDNP Link Layer Addresses Source: 1 Destination: 2 Unsolicited Report by Exception	
 Disable when Restart IIN received Enable after Restart IIN processing fin 	shed
⊢ Equivalent Tcl command line arguments	Advanced Settings
mdnpopensession source 1 destination 2	
Copy to Clipboard	>
Cancel	Open

图 49、DNP3 会话参数设置

设置完上述的参数后,点击" Open" 按钮,点击后打开了 DNP3 的数据窗口和命令窗口,如下图 50 所示:



图 50、DNP3 数据与命令窗口

在上图中点击命令窗口中的" Integrity Data poll-Class 0123", 如下图 51 所示



图 51、读取 Class 0123 的数据

执行命令后,选择数据窗口中的"Binary Inputs",选择后就可以看到读取到得数据。如下图 52 所示:

74 Data Window 0									
File Options View									
Tree View	Data View								
D-TH Test Harness	Channel	Session	Sector	Data Type	#	Description	Value	Flags	Protocol Specific
Ē⊤ Ž DNP3	DNP3	mDNP	0	Binary Input	0		0	Online	
DT 55 mDNP	DNP3	mDNP	0	Binary Input	1		1	Online	
(III Binary Inputs)	DNP3	mDNP	0	Binary Input	2		0	Online	
Double Bit Inputs	DNP3	mDNP	0	Binary Input	3		1	Online	
	DNP3	mDNP	0	Binary Input	4		0	Online	
Counters	DNP3	mDNP	0	Binary Input	5		1	Unline	
Frozen Counters	DNP3	mDNP	0	Binary Input	6		U	Unline	
- Analog Inputs	UNP3	MDNP	U	Binary Input	1		1	Unline	
- Analog Outputs									~
Virtual Terminals									
	•								•

图 52、DNP3 主站读取到得从站的数据

与 PLC 中的数据相匹配,如下图 53 所示:

7 Data Window 0								X
File Options View								
Tree View Data View	/							
D TH Test Harness Channel	Session Se	ctor Dal	а Туре	#	Description Value	Flags	Protocol Specific	
DNP3 DNP3	mDNP 0	Bin	ary Input	0	<u> </u>	Online		
DNP3	mDNP U	Bin Bin	ary Input	1		Unline		
Double Bit Inputs DNP3	mDNP 0	Bin	ary Input	3	1/8	Online		
Binary Outputs DNP3	mDNP 0	Bin	ary Input	4	// /0	Baline		
Counters DNP3	mDNP 0	Bin	ary Input	5		Online	15	
Frozen Counters	mDNP 0	Bin	ary input ary input	7	1/10	Online		
Analog Inputs			ary mpon	1	1110	1	N	dia a
String Data		Kar Var	- VAT	1	1//			
		Table E	dit The	art E	10 Variable View	Optops	Window Help	
		Tapic F				Spectra	7 A Licip	
		-F# [) 🛋 🛙		🗐 👗 🖻 🖻 י	$\circ \circ$	× 2	N? 01 66 47
			1_1	BUN	215 MA TIC 300(1	NCPU P	5-2PD/DPIS/	Program(1) ONLI
			Address	Sym	Display format S	tatus valu	e Modify value	
		1 N	1 10.0		BOOL	false	false	
		2 N	1 10.1		BOOL	true	true	
		3 N	1 10.2		BOOL	false	false	
		4 N	1 10.3		BOOL	rue	true	
		5 N	1 10.4		BOOL	false	false	
		6 N	1 10.5		BOOL 🔪 🚺	true	true	
		7 N	1 10.6		BOOL V	false	false	
		8 N	1 10.7		BOOL	true	true	
		9				2		
		DNP\SIM4	TTC 300	11	S7 Program(1)			
		Part Party	112 000	*7900	(ar i rograffi(1)		1	

图 53、数据的一致

整个 DNP3 数据通信过程可在 Protocol Test Harness 中查看到,如下图 54 所示:

🎏 Triangle MicroWorks, Inc. P	rotocol Test Harness	
File Open Edit Window Help		
Channels: All	S>>> MMI Clear Display	
Sessions: All	V +++ User	
🔽 Errors 🔽 Time Stamp	Image: Image: state in the	
12:04:57.140:	IIN1.4 Time Synchronization Required	1
12:04:57.140: <+++ mDNP	Insert request in queue: Time Synchronization Due to Need Time IIN	
12:04:57.140: **** mDNP	Duplicate request removed from message queue ****	
12:04:57.140: <=== mDNP	Application Header, Write Request	
12:04:57.140:	FIR(1) FIN(1) CON(0) UNS(0) SEQ# 4	
12:04:57.140:	c4 02 32 01 07 01 11 22 33 44 55 66	
12:04:57 249: ===> mDND	Application Header Desponse	
12:04:57.249:	FIR(1) FIN(1) CON(0) INS(0) SFO# 4	
12:04:57.249:		
12:04:57.249: +++> mDNP	Process response to request: Time Synchronization Due to Need Time IIN	
12:04:57.249: <=== mDNP	Application Header, Read Request	
12:04:57.249:	FIR(1) FIN(1) CON(0) UNS(0) SEQ# 5	
12:04:57.249:	c5 01 3c 02 06 3c 03 06 3c 04 06 3c 01 06	
12:04:57.358: ===> mDNP	Application Header, Response	
12:04:57.358:	FIR(1) FIN(1) CON(0) UNS(0) SEQ# 5	
12:04:57.358:	c5 81 00 00 01 02 00 00 07 01 81 01 81 01 81 01	
12:04:57.358:	81	
12:04:57.358: +++> mDNP	Process response to request: Integrity Poll Due to Restart IIN	
12:04:57.358:	Object 1(Binary Input), variation 2, qualifier 0x00(8 Bit Start Stop)	
12:04:57.358:	Binary Input 000000 = 0x01	
12:04:57.358:	Binary Input 000001 = 0x81	
12:04:57.358:	Binary Input 000002 = 0x01	
12:04:57.358:	Binary Input 000003 = 0x81	
12:04:57.358:	Binary Input 000004 = 0x01	
12:04:57.358:	Binary Input 000005 = 0x81	
12:04:57.358:	Binary Input 000006 = 0x01	
12:04:57.358:	Binary Input 000007 = 0x81	
1		-
		•
1 tmw>		*

到此完成了 DNP3 通信的测试。

2.4 TOP Server 作 DNP3 主站与 DNP3 RTU 通讯

首先安装 TOP Server, 安装时在选择驱动是选择 DNP3 Master On Ethernet。

安装后配置 TOP Server, 配置步骤如下:

点击添加通道按钮,如下图 55 所示:

🍘 TOP Server -	Runtime (Demo	Expires 01:19:54)	
<u>File E</u> dit <u>V</u> iew <u>T</u>	ools <u>R</u> untime <u>H</u> el	p	
🗋 🐸 🗟 🛃	i 🗐 🛅 🛍 🤅	🔄 🚰 🗳 👗 🛍 🗙 🛄	
🖃 🖣 Channel1	New Chappel	Device 🛆 Model ID Description	
Device1		Device1 DNP Master	
E Pata Type E:	xamples		
	campies		
			>
Date 🗸	Time	Source	Event 🔥
11/4/2011	6:17:43 PM	TOP Server\Runtime	Toolbo>
11/4/2011	6:17:43 PM	TOP Server\Runtime	Simulat
11/4/2011	6:17:49 PM	TOP Server\Runtime	Runtime
11/4/2011	6:17:49 PM	TOP Server\Runtime	Starting
11/4/2011	6:17:49 PM	Simulator	Simulati 🗸
<			>
Create a new commu	unications channel.	Default User Clients: 1 Active tags: 27	'0 of 270 📃 🙀

图 55、添加新通道

点击后再弹出的窗口里输入通道名 如下图 56 所示:



图 56、设置通道名

设置后点击上图的"Next"按钮,在出现的新的窗口中选择"DNP Master Ethernet"驱动。如下 图 57 所示:

Select the device driver you want to assign to the channel. The drop-down list below contains the names of all the drivers that are installed on your system.
Device driver: DNP Master Ethernet Enable diagnostics
Enable diagnostics

图 57、设置设备的驱动为 DNP Master

接着点击"Next"按钮,选择物理网卡,如下图 58 所示。注意这里不同的计算机物理网卡是不一样的,选择实际使用的物理网卡即可。

This channel is configured to communicate over a network. You can select the network adapter that the driver should use from the list below. Select 'Default' if you want the operating system to choose the network adapter for you.
<u>N</u> etwork Adapter: Broadcom Net⊠trem [192.168.0.3] Default Broadcom Net⊠trem [192.168.0.3]
Broadcom NetXtrem [192.168.0.3]

图 58、选择物理网卡

选择后继续点击"Next"按钮,在弹出的窗口里,采用缺省的设置如下图 59 所:

You can control how the server processes writes on this channel. Set the optimization method and write-to-read duty cycle below. Note: Writing only the latest value can affect batch processing or the equivalent.
Optimization Method C Write all values for all tags C Write only latest value for <u>n</u> on-boolean tags Mrite only latest value for all tags
Duty Cycle Perform 10 writes for every 1 read

图 59、写操作的优先权设置

This driver is capable of limiting data transmissions to one channel at a time. To enable, assign this channel to a Virtual Network. All channels in a network will be granted permission to communicate in a round-robin manner. Select None to disable.
Virtual Network: None
Control the amount of time in milliseconds the channel delays sending a new request to the next device after receiving a response from the last device.

接着点击"Next"按钮,在出现的窗口中仍然采用缺省设置,如下图 60 所示:

图 60、虚拟网卡设置

在上图中点击"Next"按钮,设置参数如下图 61 所示。

Inder may set one protocol UDP Only - set if you want the master to bind a specific port), and the destination host name IP address and port. Protocol: ITCP Source Port: 0 Destination Host: 192.168.0.1

图 61、设置通讯参数

继续点击" Next" 按钮, 出现图 62.



图 62、连接参数设置

继续点击"Next"按钮,在出现的窗口中点击"Finish"按钮,如下图 63 所示。

New Channel - Summary	If the following information is correct click 'Finish' to save the settings for the new channel.
	Name: Channel2 Device Driver: DNP Master Ethernet Diagnostics: Disabled
	Network Adapter: Broadcom NetXtrem [192.168.0.3] Write Optimization:
	Write only latest value for all tags 10 writes per read Communication Serialization:
<	Back Finish Cancel Help

图 63、完成通道配置

在通道下点击添加新设备。如下图 64 所示:

🌮 TOP Server	- Runtime (Dem	io Expires 00:54:23)				
<u>File E</u> dit <u>V</u> iew	<u>T</u> ools <u>R</u> untime !	<u>H</u> elp				
	🛃 🖣 🛅 🚳	8 😁 🔊 X 🖬 🛙	3 🗙 🔝			
🖃 🍄 Channel2	2	Device / Model	ID	Description		
	e Examples Examples	Click to add a device.	111			>
	6:17:40 DM	TOP Server\Puptime			Starting S	iroul
11/4/2011	6:17:49 PM	Simulator			Simulator	Dev
11/4/2011	6:17:51 PM	TOP Server\Runtime			Configura	tion
11/4/2011	6:19:18 PM	TOP Server\Runtime			Configura	tion
11/4/2011	6:20:58 PM	TOP Server\Runtime			Configura	tion 🧹
<						>
Ready			Default Us	er Clients: 0 Acti	ive tags: 0 of	0 .::

图 64、添加新设备

点击添加新设备后,弹出如下图 65 的窗口。

	A device name can be from 1 to 256 characters in length. Names can not contain periods, double quotations or start with an underscore.
	Device <u>n</u> ame: Device1
~	Back Next > Cancel Help

图 65、输入设备名

在设置名中采用缺省的设备名。点击"Next"按钮,在弹出的窗口如下图 66 中,采用缺省的参数 设置。



图 66、客户端的扫描模式配置

继续点击"Next"按钮,在出现的窗口如下图 67 里,采用缺省设置。

devices on th	will prevent stalling communications with other e channel.
Demote and Demote and Demote for	to device demotion on communication failures er 3 = successive failures 10000 = milliseconds I write requests during the demotion period

图 67、指定设备通讯失败的操作

在上图中继续点击"Next"按钮,在出现的窗口中设置参数如下图 68 所示:

Set the 16-bit Addresses for (this device) and Slave (rem Request Timeout in millised Keep-Alive Interval in secor	the DNP Mas lote device). S onds. Set the 1 lds.	ter iet the ICP
<u>M</u> aster Address: <u>S</u> lave Address:	[1 [2	
<u>R</u> equest Timeout (ms): <u>K</u> eep-Alive Interval (sec):	30000	
	1	

图 68、DNP 站地址的设置

设置后点击"Next"按钮,在出现的窗口中选择时钟的同步方式为"LAN",如下图 69 所示。

Use LAN time sync sty function code 24, oth Serial time sync style, sync option can be se	yle if the device supports erwise use Serial. If using the delay measurement elected.
_ime Sync Style: ☐ Use <u>D</u> elay Me	asure in Time Sync
< <u>B</u> ack <u>N</u> ext >	Cancel Help

图 69、时钟同步参数设置

设置后,在上图中继续点击"Next"按钮,在出现的窗口里采用缺省的设置值。如下图 70 所示:

The Event Poll intervals specify h Event Class will be polled for data	ow often each changes.
l Event Class <u>1</u> Poll Interval (sec) Event Class <u>2</u> Poll Interval (sec) Event Class <u>3</u> Poll Interval (sec)	5 ÷
: <u>B</u> ack <u>N</u> ext > Cance	el Help

图 70、各类型事件的轮询间隔

设置后,继续点击"Next"按钮。接下来的都可在出现的窗口里点击"Next"按钮,保持缺省值即可。

设置完所有的设备参数后。点击添加变量,如下图 71 所示:

🍘 TOP Server	- Runtime (Dem	o Expires 00:39:27)				
<u>File E</u> dit <u>V</u> iew	<u>T</u> ools <u>R</u> untime	<u>H</u> elp				
	a 🔊 🛅 🖾	🔁 🕾 🖻 🖌 🖓	8 × 1	2C		
📮 🌍 Channel2		Tag Name 🕢 🛛 Address	Data	Туре	Scan Rate	
Device	e1	Click to add a static ta	g. Tags are i	not required,	but are browsa	able by OP(
🛨 🜱 Data Type	Examples Examples					
	2.xdmp.ob	1410	-			-
						>
Date 🗸	Time	Source				Eve 🔨
11/4/2011	6:17:51 PM	TOP Server\Runtime				Cor
11/4/2011	6:19:18 PM	TOP Server\Runtime				Cor
11/4/2011	6:20:58 PM	TOP Server\Runtime				Cor
11/4/2011	6:21:37 PM	TOP Server\Runtime				DNF
11/4/2011	6:21:37 PM	TOP Server\Runtime				Una
11/4/2011	6:22:16 PM	TOP Server\Runtime				Star
11/4/2011	6:22:16 PM	DNP Master Ethernet				DNF
<						>
Ready			Default User	Clients: 0	Active tags: 0	of 0

图 71、添加新变量

点击后,在出现的变量属性窗口里,输入变量名和变量地址,如下图 72 所示。

cherdir scaling				
Identification				
<u>Name: M10_0</u>	2		0	
Addr <u>e</u> ss: (1.0.0. va	alue			2
Description:				×
Data properties				
Data type:	Default	T		
<u>C</u> lient access:	Read/Write	-		
<u>S</u> can rate:	100 🛨	milliseconds		
Note: The scan rate is or specify a rate when refer	nly used for client encing this tag (e.	applications th g., non-OPC c	nat do not clients)	

图 72、变量参数设置

设置后、点击"OK"按钮,完成第一个布尔变量的读取设置。按照此操作继续添加其他7个布尔 变量,设置后 如下图73所示。

🖻 TOP Server - Runtime (Demo Expires 00:31:14)								
<u>File Edit View Tools Runtime Help</u>								
🔁 🖣 Channel2		Tag Name 😕	Address	Data Type	Scan Rate	Scaling		
🔄 🛅 Device1	l,	<u>е</u> м10_0	1.0.0.Value	Boolean	100	None		
🕀 🅎 Data Type Ex	kamples	M10_1	1.0.1.Value	Boolean	100	None		
E ■ Simulation Ex	amples	M10_2	1.0.2.Value	Boolean	100	None		
		М10_3	1.0.3.Value	Boolean	100	None		
		6 M10_4	1.0.4.Value	Boolean	100	None		
		M10_5	1.0.5.Value	Boolean	100	None		
		<mark>е_</mark> М10_6	1.0.6.Value	Boolean	100	None		
		M10_7	1.0.7.Value	Boolean	100	None		
		<			1	>		
Date 💎	Time	Source				Event 🔨		
11/4/2011	6:17:43 PM	1 TOP Se	rver\Runtime			Simulator de		
11/4/2011	6:17:49 PM	1 TOP Se	rver\Runtime			Runtime ser		
11/4/2011	4/2011 6:17:49 PM TOP Se		rver\Runtime			Starting Sim		
11/4/2011 6:17:49 PM Simulato		or			Simulator De			
<						>		
Ready				Default	t User Clients: 0 Ac	tive tags: 0 of 0		

图 73、所有读取的布尔变量数据

设置后,点击"Quick Client"按钮,如下图 74 所示。

ኞ TOP Server - Runtime	(Demo Expire	s 00:28:37)				×
<u>File E</u> dit <u>V</u> iew <u>T</u> ools <u>R</u> unt	time <u>H</u> elp					
0 🐸 🗟 🛃 🐃 🗄	1 🖾 🙆 🕾	5 % 1	a 🗈 🗙 🙆	D		
📮 🖣 Channel2	Tag Name 🥖	Address	Data Type	Scan Rate	Scaling	^
Device1	M10_0	1.0.0.Value	Boolean	100	None	
🕀 🅎 Data Type Examples	M10_1	1.0.1.Value	Boolean	100	None	
	M10_2	1.0.2.Value	Boolean	100	None	
	M10_3	1.0.3.Value	Boolean	100	None	~
	<	- 1111			>	
Date 💎 Time	Source	,			Event	A
< C					>	
Ready			Defaul	t User Clients: 0 Ac	tive tags: 0 of 0	

图 74、打开 OPC 客户端监控变量

点击该按钮后,打开 OPC 的客户端,在打开 OPC 客户端中选择"Channel 2. Device"查看到的变量如下 图 75 所示。

🛯 OPC Quick Client - Untitled *										
<u>File E</u> dit <u>Y</u> iew <u>T</u> ools <u>H</u> elp	Eile Edit View Iools Help									
D 🛎 🖬 🛫 💣 📽 👗 🖻	B X									
E SWToolbox.TOPServer.V5	Item ID 🔬	Data Type	Value	Timestamp	Quality	Update Co 🔥				
System	Channel2.Device1ChannelResponseTimeout	DWord	10000	20:04:08.781	Good	1				
	Channel2.Device1DestinationHost	String	192.168.0.1	20:04:08.781	Good	1				
Channel2. System	Channel2.Device1DestinationPort	Word	20000	20:04:08.781	Good	1				
Channel2.Device1	Channel2.Device1DeviceRequestQueueDepth	DWord	0	20:04:08.781	Good	1				
Channel2.Device1System	Channel2.Device1DeviceRequestTimeout	DWord	30000	20:04:09.781	Good	1				
Data Type ExamplesSystem	Channel2.Device1EventClass1PollInterval	DWord	5	20:04:09.781	Good	1				
Data Type Examples 16 Bit Devi	Channel2.Device1EventClass2PollInterval	DWord	5	20:04:09.781	Good	1				
Data Type Examples 16 Bit Devi	Channel2.Device1EventClass3PollInterval	DWord	5	20:04:09.781	Good	1				
Data Type Examples 16 Bit Devi	Channel2.Device1IntegrityPolIInterval	DWord	3600	20:04:09.781	Good	1				
Data Type Examples.8 Bit Device	Channel2.Device1MasterAddress	DWord	1	20:04:09.781	Good	1 _				
Data Type Examples.8 Bit Device	Channel2.Device1Protocol	Byte	0	20:04:08.781	Good	1				
📄 Data Type Examples.8 Bit Device	Channel2.Device1SlaveAddress	DWord	2	20:04:09.781	Good	1				
- 📄 Data Type Examples.8 Bit Device	Channel2.Device1SourcePort	Word	0	20:04:08.781	Good	1				
- Simulation ExamplesSystem	Channel2.Device1.M10_0	Boolean	0	20:04:09.812	Good	1				
Simulation Examples.Functions	Channel2.Device1.M10_1	Boolean	1	20:04:09.812	Good	1				
	Channel2.Device1.M10_2	Boolean	0	20:04:09.812	Good	1				
	Channel2.Device1.M10_3	Boolean	1	20:04:09.812	Good	1				
	Channel2.Device1.M10_4	Boolean	0	20:04:09.812	Good	1				
	Channel2.Device1.M10_5	Boolean	1	20:04:09.812	Good	1				
	Channel2.Device1.M10_6	Boolean	0	20:04:09.812	Good	1				
	Channel2.Device1.M10_7	Boolean	1	20:04:09.812	Good	1 🖌 💌				
	X									
Ready						Item Count: 276				

图 75、监控到得变量状态

到此完成了 TOP Server 与 RTU 的连接测试。

本文網址: <u>http://support.automation.siemens.com/CN/view/zh/77323896</u>