GW-7553 (Modbus RTU Slave) example for SIMATIC STEP 7

System Architecture: GW-7553 is a PROFIBUS slave and Modbus slave device.



Directory

Example 1:Receives AO data from Modbus master.

Example 2: Rceives DO data from Modbus master.

Example 3: Rereshes DI data to Modbus master.

Example 4: Rereshes AI data to Modbus master.

Example 1: PLC receives AO data from Modbus master.

SIMATIC STEP 7 Edit

1. HW Config. – configure GW-7553 (ex: System setting module x1, Input Register—2 word module x1)



2. HW Config – Parameter assignment (ex: Com port settings, Modbus type: Slave, Modbus format: RTU, Byte Order: Big Endian). Confirm the GW-7553's Com Port setting is the same with MBRTU tool (ex: baud rate-115200, data bits-8, stop bits-1, parity-none). About the MBRTU tool, please refer to the "Communication test" in the below.



3. Save and Compile

	<u>k</u> 1	HW Cor	ufig ·	- ISIMA	ATIC .	300 St	ation (Co	onfig	urati	on) (S7_Pro1]					
	100	<u>S</u> tation	<u>E</u> dit	Insert	PLC	<u>V</u> iew	<u>O</u> ptions	<u>W</u> in	udow	<u>H</u> elp						
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Γ	•	Page :	Setup P14	 SIM 0 TI	C 200	"tation										
		1 87_ 2 87_ 2 87	Pro3\ Pro3\	SIMATI SIMATI SIMATI	C 300 C 300	10 Station 10 Station 10 Station			on		I Address) Address	Comment		
		<u>4</u> S7_	Pro4	SIMATI	C 300	Station					256259	0.				
	1	Exit					Alt+F4									
	5															

4. Download setting into STEP 7

🔩 H.W. Config - [SIMAT	IC 300 Station (Configuration) -	- \$7_Pro1]				
👊 Station <u>E</u> dit Insert P	<u>LC View Options W</u> indow <u>H</u> elj					
🗅 🚅 🔓 🖩 🖷 🦷	Download	Ctrl+L				
	<u>Upload</u>			~	l	
= (0) UR	Download Module Identification			=	Find:	755:
1	Upload Module Ide <u>n</u> tification to PG				- D (*)	
X2 DP	Faulty Modules				Profile:	Stan
2.2 <u>DI16/D</u>	Module Information	Ctrl+D				Ē[
<u>2.4</u> 3	Operating Mode	Ctrl+I				
4	Clear/ <u>R</u> eset					
	Set Time of D <u>ay</u> Monitor/Medify					
_	Montoliny					
_	Updat <u>e</u> Firmware					
	Save De <u>v</u> ice Name to Memory Card			~		
<	Ethernet	•		>	-	
(2) G₩-7553	PROFIBUS	•				
Slot 🚺 DP ID	<u>S</u> ave Service Data		Q Address	Comment		
1 24D0	System setting		02	^		
2 2AI	Input Register2 word	256259				

5.Insert a new Organization Block (0	OB1,OB82,OB86)
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SIMATIC Manager - [S	57_G₩-7552 C:\Program Files\Siemens\Step7\s7proj\\$7_G₩-~1]	
File Edit Insert PLC	<u>Y</u> iew <u>Options Window H</u> elp	- 8 ×
□ □	Image: System data ion P(0) n(1) iss Cut Cut	
	Insert New Object Organization Block PLC Function Block Rewire Function Block Compare Blocks Reference Data Check Block Consistency Data Type Print Variable Table	
Inserts Organization Block at the	e cursor position.	1

Properties - Organizatio	n Block	×
General - Part 1 General	- Part 2 Calls Attributes	
<u>N</u> ame:	OB1	
Symbolic Name:		
Symbol <u>C</u> omment:		
Created in <u>L</u> anguage:	LAD	
Project path:		
Storage location of project:	C:\Program Files\Siemens\Step7\s7proj\S7_Pro1	
Data created :	Code Interface	
Last modified:	05/15/2013 09:44:33 AM 05/15/2013 09:44:33 AM	
C <u>o</u> mment:	Ā	
OK	Cancel Help	

SIMATIC Manager - [S7_Pro	1 C:\Program Files\Siemens\Step7\s7proj\S7_Pro1]	
🎒 File Edit Insert PLC View	<u>Options W</u> indow <u>H</u> elp	
D 🛩 🎛 🛲 X 🖻 🛍	🚵 😨 💁 º o 👬 👬 👬 👬 🚺 < No Filter >	J M 📽 🎯 🖷 🗖 🕅
ST_Pro1 SIMATIC 300 Station SCPU 313C-2 DP(1) Sources Sources	System data	■ OB86

6.S7 program edit

Variables used in the example LD Program:

Ci	Contents Of: 'Environment\Interface\TEMP'							
— 🗉 OB1_SCAN_1 🔥	Name	Data Type	Address	Comment	~			
- 🖻 OB1_PRIORITY	🕲 OB1_OB_NUMBR	Byte	3.0	1 (Organization block 1, OB1)	_			
—™ OB1_OB_NUMBR	1 OB1_RESERVED_1	Byte	4.0	Reserved for system				
-B OB1_RESERVED_1	OB1_RESERVED_2	Byte	5.0	Reserved for system				
- B OB1_RESERVED_2	1 OB1_PREV_CYCLE	Int	6.0	Cycle time of previous OB1 scan (milliseconds)				
-B OB1_MIN_CYCLE	🕲 OB1_MIN_CYCLE	Int	8.0	Minimum cycle time of OB1 (milliseconds)				
-B OB1_MAX_CYCLE	1 OB1_MAX_CYCLE	Int	10.0	Maximum cycle time of OB1 (milliseconds)	≡			
- 🖻 OB1_DATE_TIME	🕲 OB1_DATE_TIME	Date_And_Time	12.0	Date and time OB1 started				
	1 END	Bool	20.0					
	TEMPO	Word	22.0					
	TEMP 1	Word	24.0		~			



7. S7 program download

= <u>File E</u> dit Inse <mark>rt PLC D</mark> e	ebug <u>V</u> iew <u>O</u> ptions <u>W</u> indow	<u>H</u> elp					- 8 ×
	load	Ctrl+L	!« »! 🗖 📼	E = 1F - 1F - 0		▶?	
Select 1	Online CPU ish Connection to Configured CPU)f. 'Environme	nt\Interface\TE)@'		
				Data T		ddroce	Common
HE New network CPU M	dessages		EV_CLASS	Byte	, pe 12	1.0	Bits 0
Bit logic Display	y Force Values	Ctrl+Alt+F	SCAN_1	Byte	1	.0	1 (Col
Comparator Monte	50/Modify Variables		PRIORITY	Byte	2	.0	Priori
+ + Counter Modul	le Information	Ctrl+D	OB_NUMBR	Byte	3	.0	1 (Org
DB call Operat	ting Mode	Ctrl+I	RESERVED_1	Byte	4	.0	Reserv
Jumps Clear/F	Reset		RESERVED_2	Byte	5	.0	Reserv
+ I Integer functic Set In	DB1 MAX CYC		PREV_CYCLE	Int	6		Cycle
- Move	OB1_DATE_TI		_MIN_CYCLE	Int	8		Minimu
E MOVE		· ·		1111	· · · · · · · · · · · · · · · · · · ·		>
Program control	[~
+ an Status bits	OB1 : "Main Program	Sweep (Cyc	le)"				
🕀 👩 Timers	Conment:						
😟 🔛 Word logic							
FB blocks							
E SFB blocks	Network I: PLC read	AU Value					
SFC blocks	Modbus start address	:0				~	
Multiple instances	word count : 2					~	
E Dibiolies							
		VE		#END			
	EN	ENO		-()			
				, , , ,			
	PIW256 - IN	OUT #TEM	1P0				
	EN MO						
Assign a value	⁻ .						
	PIW258 - IN	OUT -#TEA	4P1				
Program 🖁 🗄 Call st.							~
1							
	A 2: Info 🔨 3: Cross-refere	ences A	4: Address info.	λ 5: Modify λ	6: Diagnostics 👌	7: Compa	rison /
Loads the current block to the PLC.			offline	Abs < 5.2	Inser	t Chg	

8. Make sure the RUN LED of the GW-7553 is on and the switch of the GW-7553 is at Normal mode.





Communication test

1. Confirm the GW-7553's Com Port setting is the same with Modbus Master tool (ex: MBRTU, you can download MBRTU from http://ftp.icpdas.com.tw/pub/cd/8000cd/napdos/modbus_utility/)

🚰 MBRTU V. 1.0.7 COM1						
COM status	Protocol Description					
C0M1 -	FC1 Read multiple coils status (0xxxx) for D0					
115200 💌	1. Set com port settings					
Line control : N,8,1	Byte 1: FC=01					
Open Close	Byte 2-3: Reference number Byte 4-5: Bit count					
Polling mode (no wait)	Statistics Clear Statistics					
Start Stop 200	Commands Packet Responses					
	Total Packet bytes 0 Difference Total Packet bytes 0					
Timer mode (fixed period)	Packet Quantity sent 0 Packet Quantity received 0					
Interval 50 ms	Polling or Timer mode (Date/Time) Polling Mode Timing (ms)					
Start Stop	Start time Time Start Max 000 Average					
	Stop time Time Stop Min 100 000					
Command						
140001	Send Command					
Commands 🔽	With CRC Responses					
	Clear Lists Exit Program					

Com Port Settings: baud rate-115200, data bits-8, stop bits-1, parity-none

2. Click "Send Command" button to wirte AO value (0x1122, 0x3344)

MBRTU V. 1.0.7 COM		
COM status	Protocol Description FC16 Write multiple registers (4xxxx) for AD Byte 1: FC=10 (hex) Byte 2-3: Reference number Byte 4-5: Word count Byte 6: Byte count (B=2 x word count) Byte 7-(B+6): Register values	
Poling mode (no wait) Timeout Start Stop 200 Timer mode (fixed period) Interval 50 ms Start Stop Command 1. Se	Statistics Commands Responses Current Packet Size (bytes) 8 Packet Current Packet 5/2 Total Packet bytes 13 Difference Total Packet bytes Packet Quantity 1 0 Packet Quantity Polling or Timer mode (Date/Time) Polling Mod Max 000 Start time Time Start Max 000 Add Command to write AO value (0x1122, 0x334)	Clear Statistics Size (bytes) 7 tes 8 received 1 e Timing (ms) Average 000
1 10 0 0 0 2 4 11 22 33 44		Send Command
Commands 🔽	With CRC Responses 44 42 5A 2. Receive Response	 N
	Clear Lists	Exit Program

3. PLC will receives the "AI Value (0x1122, 0x3344)" at PLC address PIW256&PIW258



Example 2: PLC receives DO data from Modbus master.

SIMATIC STEP 7 Edit

1. HW Config. – configure GW-7553 (ex: System setting module x1, Input Relay/Coil – 2 byte module x1)



2. HW Config – Parameter assignment (ex: Com port settings, Modbus type: Slave, Modbus format: RTU, Byte Order: Big Endian). Confirm the GW-7553's Com Port setting is the same with MBRTU tool (ex: baud rate-115200, data bits-8, stop bits-1, parity-none). About the MBRTU tool, please refer to the "Communication test" in the below.

Reg HW Config - [SIMATIC 300 Station (Configuration) S7_Pro1]								
🛄 Station Edit Insert PLC View Options Window H	lp							
Double Click	Properties - DP slave General Parameter Assignment							
X2 DP 2.2 D1160X 2.4 Count	Parameters Gamma Station parameters DP Interrupt Mode	Value Z						
	Ceneral DP parameters Device-specific parameters	115200 baud none 8 data bit 1 stop bit Slave						
(2) GW-7553(DPV1)	- ☐ Modbus Format - ☐ I/O Safe Mode - ☐ Byte Order	Modbus RTU Retain Last Value Big Endian(Motorola format)						
Slot DP ID Order Number / Designation 1 24DO System setting 2 16DI Input Relay/Coil2 byte 3		Малиа. 1 500 500 1						
4	OK	Cancel Help						

3. Save and Compile

oła e	IW Config - [SIMATIC 300 S	tation (Config	guration) \$7_Pro1]			
0 ⁰ 0	Station <u>E</u> dit Insert <u>P</u> LC <u>V</u> iew	∕ <u>O</u> ptions <u>W</u> i	ndow <u>H</u> elp			
] [<u>N</u> ew Open	Ctrl+N Ctrl+O	🗈 🗖 🚟 💦		1	
E	Open ON <u>L</u> INE <u>C</u> lose		IS(1): DP master system (1)		<u>F</u> ind:	
	Save				<u>P</u> rofile:	Standard
	Save and Co <u>m</u> pile	Ctrl+S			⊡ · ₩ F	PROFIBUS DP
	Proper <u>t</u> ies					PROFIBUS-PA
	Import		(2) GW-75			SIMATIC 300
4	<u>E</u> xport		. 🕷 🎏			SIMATIC 400
	Consistency C <u>h</u> eck	Ctrl+Alt+K	Hannit		± - <u>₩</u> ≥	SIMATIC PC Based Contra SIMATIC PC Station
-	Check CiR Compatibility	Ctrl+Alt+F	_			
	<u>P</u> rint	Ctrl+P		~		
<	Print Previe <u>w</u> Pom Setur		>			
	rage setup					
	1 S7_Pro1\SIMATIC 300 Station	L				
Ē	3 S7 Pro3/SIMATIC 300 Station	L	02			
1	4 S7_Pro4\SIMATIC 300 Station	L	1			
•	E <u>x</u> it	Alt+F4				
5						

4. Download setting into STEP 7

🔩 H W Config - [SIMA I	IC 300 Station (Configuratio	n) \$7_Pro1]				
🛄 Station Edit Insert 1	<u>LC View Options Mindow</u>	<u>Holp</u>				
🗅 🚅 🔓 🖫 🙀	Download	Ctrl+L				
-	<u>Up</u> load			~		
(0) UR	Download Module Identification Upload Module Ide <u>n</u> tification to	 PG	(1)		<u>F</u> ind:	
2 CPU 31	Faulty Modules				Profile:	Standard
2.2 D116DX 2.4 Count 3 4 c	Module Information Operating Mode Clear/ <u>R</u> eset Set Time of D <u>a</u> y <u>M</u> onitor/Modify	Ctrl+D Ctrl+I	75.			ROFIBUS DP ROFIBUS-PA ROFINET IO MATIC 300 MATIC 400 MATIC PC Based Control MATIC PC Station
	Updat <u>e</u> Firmware					
	Save De <u>v</u> ice Name to Memory C	ard		~		
<	Ethernet	•	>			
(2) GW-7552	PROFIBUS	•				
Slot 🚺 DP ID	Save Service Data					
1 24D0 2 16DI 3	System setting 0 Input Relay/Coil2 byte 01)2		^		

5.Insert a new Organization Block (OB1,OB82,OB86)

SIMATIC Manager - [S	7_GW-7552 C.\Program Files\Siemens\Step7\s7proj\\$7_GW-~1]	
File Edit Insert PLC	<u>V</u> iew <u>Options</u> <u>W</u> indow <u>H</u> elp	- 8 ×
□ □	a a a a a a a a a a a a a a a a a a a	
123 1310048	Cut Ctrl+X Copy Ctrl+C Paste Ctrl+V Delete Del Insert New Object Organization Block	
	PLC Function Block Rewire Function Compare Blocks Data Block Reference Data Data Type Check Block Consistency Variable Table	
	Print Rename F2 Object Properties Alt+Return Special Object Properties	
Insurte Occupitation Director of the		

Properties - Organization Block								
General - Part 1 General	Part 2 Calls Attributes							
<u>N</u> ame:	0B1							
Symbolic Name:								
Symbol <u>C</u> omment:								
Created in <u>L</u> anguage:	LAD							
Project path:								
Storage location of project:	C:\Program Files\Siemens\Step7\s7proj\S7_Pro1							
Determental.	Code Interface							
Last modified :	05/15/2013 09:44:33 AM 05/15/2013 09:44:33 AM							
Comment:								
OK	Cancel Help	1						

SIMATIC Manager - [S7_Pro	1 C:\Program Files\Siemens\Step7\s7proj\\$7_Pro1]	
🎒 File Edit Insert PLC View	<u>Options Window H</u> elp	
🗅 🛩 🔡 🛲 👗 🛍 🛍	💼 😨 💁 💁 📴 📰 🔃 🚺 < No Filter >	- V 12 00 12 01 12
 ⇒ \$7_Pro1 ⇒ \$100 Station ⇒ \$100 CPU 313C-2 DP(1) ⇒ \$100 Station (1) ⇒ \$100 Sources ⇒ \$100 Sources ⇒ \$100 Sources 	System data.	. OB86

6. S7 program edit

Variables used in the example LD Program:

	Name	Data T y pe	Address	Comment
1	OB1_DAT	Date	12.0	Date and time OB1 started
1	END	Bool	20.0	
1	temp1	Byte	21.0	
	temp2	Byte	22.0	
Ξ				

Network 1: Title:

Comment:



7. S7 program download



8. Make sure the RUN LED of the GW-7553 is on and the switch of the GW-7553 is at Normal mode.





Communication test

1. Confirm the GW-7553's Com Port setting is the same with Modbus Master tool (ex: MBRTU, you can download MBRTU from http://ftp.icpdas.com.tw/pub/cd/8000cd/napdos/modbus_utility/) Com Port Settings: baud rate-115200, data bits-8, stop bits-1, parity-none

MBRTU V. 1.0.8 COM1								
COM status	Protocol Description							
СОМ1 🗨	FC15 Force multiple coils (0xxxx) for D0							
115200 💌	Byte 0: Net ID (Station number) Byte 1: FC=0F (hex)	<u>^</u>						
Line control : N,8,1	Byte 2-3: Reference number							
	Byte 4-5: Bit count Byte 6: Byte count (B=(bit count + 7)/8)							
OpenClose	Byte 7-(B+6): Data to be written (least significant is first coil!)	~						
Polling mode (no wait)	_ Statistics	Clear Statistics						
Timeout	Commands Packet Responses							
Start Stop 200	Current Packet Size (bytes) 8 Quantity Current Packet	Size (bytes) 8						
T 1 (2) 1 1 1	Packet Quantity sent 7 Packet Quantit	u received						
limer mode (fixed period)								
interval pu ms	Polling or Timer mode (Date/Time) Polling Mod	de Timing (ms)						
Start Stop	Stop time Time Stop Min 10							
Command								
		Send Command						
Commands 💌	With CRC Responses							
		~						
	Clear Lists	Exit Program						

2. Click "Send Command" button to wirte DO value (0x0102,)

MBRTU V. 1.0.8 COM	l	
COM status	Protocol Description FC15 Force multiple coils (0xxxx) for DD Byte 0: Net ID (Station number) Byte 1: FC=0F (hex) Byte 2-3: Reference number Byte 4-5: Bit count Byte 6: Byte count (B=(bit count + 7)/8) Byte 7-(B+6): Data to be written (least significant is	s first coil!)
Polling mode (no wait) Timeout 200 Timer mode (fixed period) Interval 50 ms Start Stop	Statistics Commands Current Packet Size (bytes) 8 Total Packet bytes 110 Packet Quantity Difference Packet Quantity sent 10 Polling or Timer mode (Date/Time) Start time Time Start Stop time Time Stop	Clear Statistics ssponses 8 rent Packet Size (bytes) 8 al Packet bytes 24 sket Quantity received 3 Polling Mode Timing (ms) Max Max 000 Min 100
Command D1 0f 00 00 00 10 2 01 02 Commands O1 0F 00 00 00 10 02 01 02 62	Send command to write DO value 71 01 OF 00 00 10 54 07 Recieve response	Send Command
	Clear Lists	Exit Program

3. PLC will receives the "DO Value (0x01, 0x02)" at PLC address IB0&IB1 Network 1: Title:



Example 3: PLC refreshes DI data to Modbus master.

SIMATIC STEP 7 Edit

1.HW Config. – configure GW-7553 (ex: System setting module x1, Output Relay/Coil—2 byte module x1)



2. HW Config – Parameter assignment (ex: Com port settings, Modbus type: Slave, Modbus format: RTU, Byte Order: Big Endian). Confirm the GW-7553's Com Port setting is the same with MBRTU tool (ex: baud rate-115200, data bits-8, stop bits-1, parity-none). About the MBRTU tool, please refer to the "Communication test" in the below.

🔩 H 🤀 Config - [SIMATIC 300 Station (Configuration	\$7_Pro1]	
👊 Station Edit Insert PLC View Options Window H	lp	
D 🚅 🐎 🖩 🖫 🎒 🐴 🐴 🖪 E 🖬 🏟 🖪 E	<u>₩</u> №2	
	Properties - DP slave	
	General Parameter Assignment	
2 CPU 31 DOUDIE CIICK PROFIBUS(1): DP master s	Parameters	Value
XZ DP 2.2 D1160X 2.4 Count	☐ General DP parameters ☐ DP Interrupt Mode ⊕ ☐ General DP parameters	DPWO
2 2 2	Device-specific parameters Device-specific parameters De	115200 baud none 8 data bit 1 stop bit Slave Modbus R TU
(2) GW-7553(DPV1)	- II IO Safe Mode - II Byte Order - II Output Data Mode - II Modbus Device ID (S)	Retain Last Value Big Endian(Motorola format) Manual 1
Slot DP ID Order Number / Designation	Modbus Polling Interval(ms) (M) Ouerst imcout Value(ms) (M)	500
2 16DO Output Relay/Coil2 byte	E Query mileout Value(ms)(M)	1
3	ОК	Cancel Help

3. Save and Compile

	t	HW Co	nfig -	[SIM/	TIC	300 St	ation (Co	nfigu	ratio	on)	S7_Pro1]				
	100	Station	<u>E</u> dit	Insert	PLC	<u>V</u> iew	Options	<u>W</u> ind	low	<u>H</u> elp					
1	С	<u>N</u> ew.					Ctrl+N	i i	B D (3 8	₩?				
Ē		Oper Oper	L ONU	ME			Ctrl+O	1						~	
	2	Clos	; ON <u>E</u> :	INE											Find:
								_							Profile
	Γ	Save	and C	ompile			Ctrl+S	-	aster	system	. (1)				
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	-	<u>1</u> S7	Pro1V	SIMA TI	C 300	Station						1	1 -		
	Ē	<u>2</u> 87. 3 87.	Pro3V Pm2V	SIMA II SIMA TI	C 300	Station Station			on		I Address	Q Address	Commen	t	
		<u>4</u> S7.	Pro4V	SIMATI	C 300	Station		t				34			
		Exit					Alt+F4	-							
	5	5	_			_		_	-						

4. Download setting into STEP 7

	🧏 Н 🕅	Config -	[SIMA	TIC 300 Station (Configura	tion) S7_Prol]				
6	00 <u>S</u> tat	ion <u>E</u> dit	<u>I</u> nsert	<u>PLC View Options W</u> indov	/ <u>H</u> elp	_				
1		≩ 8 ∼ 🖬		<u>D</u> ownload	Ctrl+L					
Ē	_			<u>U</u> pload		T			^	
) UR	^	Download Module Identifi <u>c</u> ati Upload Module Ide <u>n</u> tification	on to PG			ĺ		<u>F</u> ind:
	2 X2		ν υ 3 1	Faulty Modules					Profile	
	2.2 2.4 3 4 c		16/DX unt	Module Information Operating Mode Clear/ <u>R</u> eset Set Time of D <u>ay</u> <u>M</u> onitor/Modify	Ctrl+D Ctrl+I					
				Updat <u>e</u> Firmware						
				Save De <u>v</u> ice Name to Memory	/ Card			(~	
	<	1111		Ethernet				>	_	
	-) (2) G	W-7553	PROFIBUS						
	Slot	DP	ID	<u>S</u> ave Service Data			Q Address	Comment		
	1	24DO		System setting		_	02	~		
	2	16DO		Output Relay/Coil2 byte			34			
T	3									

5.Insert a new Organization	Block (OB1,OB82,OB86)
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SIMATIC Manager -	[S7_Pro1 C:\Program F	iles\Siemens\St	ep7\s7proj\\$7_Pro1]		
🎒 File Edit Insert PL(C <u>V</u> iew <u>O</u> ptions <u>W</u> indow	<u>H</u> elp			
🗅 🗃 📲 🛲 🕹	🖻 🔁 📥 🔽 🗣		No Filter >	- 🏹 器 🖲	0 🗟 🗖 🔟 📢
S7_Pro1 STATIC 300 S SIMATIC 300 S G. CPU 313C-2 G. S7 Prog Source So	(tation 2 DP(1) ram(1) res	🔁 OB1	⊕ OB82	🔁 OB86	
	Cut	Ctrl+X	1		
	Сору	Ctrl+C			
	Paste	Ctrl+Y			
	Delete	Del			
	Insert New Object	•	Organization Block		
	PLC	•	Function Block		
	Rewire Compare Blocks Reference Data Check Block Consistency	Þ	Function Data Block Data Type Variable Table		
	Print	•			
	Rename Object Properties Special Object Properties	F2 Alt+Return ►			

Properties - Organizatio	n Block	×
General - Part 1 General	- Part 2 Calls Attributes	
<u>N</u> ame:	OB1	
Symbolic Name:		
Symbol <u>C</u> omment:		
Created in <u>L</u> anguage:	LAD	
Project path:	<u></u>	
Storage location of project:	C.\Program Files\Siemens\Step7\s7proj\\$7_Pro1	
Data amatada	Code Interface	
Last modified:	05/15/2013 09:44:33 AM 05/15/2013 09:44:33 AM	
C <u>o</u> mment:		
OK	Cancel Help	

SIMATIC Manager - [S7_Pro	1 C:\Program Files\Siemens\Step7\s7proj\S7_Pro1]	
🞒 File Edit Insert PLC View	<u>Options Window H</u> elp	
🗅 🛩 🔡 🛲 👗 🛍 🖻	💼 😨 📲 🖭 🔃 🗰 Ko Filter >	- y 20 - 1 - 1 - 1
S7_Pro1 SIMATIC 300 Station CPU 313C-2 DP(1) Sources Sources Blocks	System data	OB86

6.S7 program edit

Variables used in the example LD Program:

	Name	Data T y pe	Address	Comment
1	OB1_MAX	Int	10.0	Maximum cycle time of OB1 (milliseconds)
	OB1_DAT	Date	12.0	Date and time OB1 started
1	END	Bool	20.0	
1	Init	Bool	20.1	
	tri	Int	22.0	
٦.				

Network 2: Initial Cl

Initial Cl



OB1 : "Main Program Sweep (Cycle)"

PROFIBUS slave Modbus slave

Network 1: QBD add "1" refresh DO value

2 byte l6 DO



Using T2 trigger T1 .C1 and Tri will add 1 every 1s.

Network 2 : Timer T1 & T2



Network 3: Tl triggle Counter(Cl)

Counter(Cl) add "l" and Tri add "l" , too.



If Tri is equal to 256, reset counter (C1)

Network 4 : Compare Tri with 256

If Tri is equal to 256 that will reset Cl.



7. S7 program download

	LAD	STL/FBD -	[0B1 "C	ycle F	ixecution"	S7_Pro	INSIMATIC 3	00 Station\CPU	313C-2 DP(1)	\\0B1]	
	- <u>F</u> ile	<u>E</u> dit <u>I</u> nsert	P <u>L</u> C <u>D</u> ebug	<u>y V</u> ie	w <u>O</u> ptions	<u>W</u> indow	<u>H</u> elp				
[ጋ 😅	¦a~ 🔒 ∉	Do <u>w</u> nload				Ctrl+L	(»! 🗖 🖪	₽₽	-0 🕾 🖕 -	1 H N?
=			Select <u>O</u> nl	ine CP	U			intents Of-	Envi ronment	\Interface\	TF)(P '
F			E <u>s</u> tablish (Connec	tion to Confi	igured CPU		Name	Data Tron	+dd-occ	Corrort
		New network Bit logic	CPU M <u>e</u> s Display Fo	ages me Vs	lues		Ctrl+Alt+F	OB1_MAX	Int Data Iype	10.0	Maximum cycle time (
		Comparator Converter	<u>M</u> onitor/N	lodify	Variables			1 END	Bool	20.0	Date and time OBI S'
ľ	÷ 🔤	Counter	Mod <u>u</u> le Ir	forma	tion		Ctrl+D) Init	Bool	20.1	
Ŀ	+ DB	DB call	Operating	Mode.			Ctrl+I	1 tri	Int	22.0	
Ľ	÷	Jumps	<u>C</u> lear/Res	et				1			
Ľ	±	Integer functio	Set Time o	of Da <u>y</u>							
	+ · · · · · · · · · · · · · · · · · · ·	Move Program contro	ol		OB1 : '	'Main Pr	ogram Sweep	(Cycle)"			
	÷	Shift/Rotate Status bits Timom			Comment	:					
		Word logic FB blocks			Network	1 :Tit	:le:				
	+ • 🔁	FC blocks SFB blocks			Comment	:					
ľ	+	SFC blocks Multiple instan	ces								
	+… <mark>.</mark>]	L1braries			#In	it L			#Init (S)		
					"				(5)	I	

8. Make sure the RUN LED of the GW-7553 is on and the switch of the GW-7553 is at Normal mode.





Communication test

1. Confirm the Com Port setting of Modbus Master tool is the same with GW-7553's (ex: MBRTU, you can download MBRTU from http://ftp.icpdas.com.tw/pub/cd/8000cd/napdos/modbus/modbus_utility/) Com Port Settings: baud rate-115200, data bits-8, stop bits-1, parity-none

COM status COM1 115200 Line control : N,8,1 Open Close	Protocol Description FC1 Read multiple coils status (0xxxx) for DO [Request] Byte 0: Net ID (Station number) Byte 1: FC=01 Byte 2-3: Reference number Byte 4-5: Bit count	
Polling mode (no wait) Timeout 200 Timer mode (fixed period) Interval 50 ms Start Stop	Statistics Commands Responses Current Packet Size (bytes) 8 Quantity Total Packet bytes 91054 Difference Packet Quantity sent 10823 746 Polling or Timer mode (Date/Time) Polling Mode Max Start time 2009/12/21 上午 11:00:36 Max 16 Min 15 16 16	Clear Statistics Size (bytes) 7 tes 70539 received 10077 de Timing (ms) Average 5 0.446514611
01 02 00 00 00 10		Send Command
Commands 🔽 \	With CRC Responses	
	Clear Lists	Exit Program

2. Input command (" 01 02 00 00 00 10") in MBRTU and click <Send Command> button to send Modbus command: "01 02 00 00 00 10 79 C6". We can get the DI value (0x6F, 0xDE) from the response message.

SI MBRTU V. 1.0.8 COM1		
COM status	Protocol Description	
COM1 🔽	FC2 Read multiple input discretes (1xxxx) for DI	<u> </u>
115200 Line control : N,8,1 Open Close	[Request] Byte 0: Net ID (Station number) Byte 1: FC=02 Byte 2-3: Reference number Byte 4-5: Bit count	<
Polling mode (no wait) Timeout Start Stop 200	Statistics Commands Current Packet Size (bytes) 8 Packet Quantity Current P	Clear Statistics
Timer mode (fixed period)	Total Packet bytes 123 Difference Total Packet Quantity sent 15 O Packet Quantity	wet bytes 106
Interval 50 ms Start Stop	Polling or Timer mode (Date/Time) Polling Start time Time Start Stop time Time Stop	DOD Average
Command		
1200010		Send Command
Commands, 🔽	With CRC Responses	
01 02 00 00 00 10 79 C6 01 02 00 00 00 10 79 C6	O1 02 02 6F DE 14 10 O1 02 02 6F DE 14 10	X
	Clear Lists	Exit Program

3. We change QB3 to 0xFF and QB4 to 0xFF, and then we can click <Send Command> button to read DI again at MBRTU and we will get the new DI value (0xFF, 0xFF) from the



response message.

MBRTU V. 1.0.8 COM		
COM status	Protocol Description FC2 Read multiple input discretes (1xxxx) for DI [Request] Byte 0: Net ID (Station number) Byte 1: FC=02 Byte 2-3: Reference number Byte 4-5: Bit count	
Polling mode (no wait) Timeout Start Stop Timer mode (fixed period) Interval 50 Start Stop	Statistics Commands Current Packet Size (bytes) 8 Total Packet bytes 179 Packet Quantity sent 22 Polling or Timer mode (Date/Time) Start time Time Start Stop time Time Stop	Clear Statistics Responses Current Packet Size (bytes) 7 Total Packet bytes 155 Packet Quantity received 22 Polling Mode Timing (ms) Max 000 Average Min 100 000
Command		
Commands ▼ 01 02 00 00 00 10 79 C6 01 02 00 00 00 00 10 79 C6 01 02 00 00 00 00 10 79 C6 01 02 00 00 00 00 00 00 10 79 C6 01 02 00 00 00 00 00 00 00 00 79 C6 01 02 00 00 00 00 00 00 00 79 C6 01 02 00 00 00 00 00 00 79 C6 01 02 00 00 00 00 00 00 79 C6 01 02 00 00 00 00 00 00 79 C6 01 02 00 00 00 00 00 79 C6 0 00 00 00 00 00 00 79 C6 0 00 00 00 00 00 00 00 00 00 00 00 00 0	With CRC Response 01 02 02 FF FF B8 08 01 02 02 FF FF B8 08	nses
	Clear Lists	Exit Program

Example 4: PLC refreshes AI data to Modbus master.

SIMATIC STEP 7 Edit

1.HW Config. – configure GW-7553 (ex: System setting module x1, Output Register—2 word module x1)

)				
🔩 HW Config - [SIMATI	C 300 Station (Configuration)	S7_Pro1]		
💵 Station <u>E</u> dit Insert PL	.C <u>V</u> iew <u>O</u> ptions <u>W</u> indow <u>H</u> elp			
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(0) UR				<u>F</u> ind: Profile:
x2 DP 2.2 DI16Dx 2.4 Count 3 4 ►	PROFIBUS(1): DP master system	<u>(I)</u>	2	
<)		>	
(2) GW-7553(DF	VT1)			
Slot 🚺 DP ID	Order Number / Designation	I Address Q Address	Comment	
1 24DO	System setting	02	~	
2 2AO	Output Register2 word	256259		
3				

2. HW Config – Parameter assignment (ex: Com port settings, Modbus type: Slave, Modbus format: RTU, Byte Order: Big Endian). Confirm the GW-7553's Com Port setting is the same with MBRTU tool (ex: baud rate-115200, data bits-8, stop bits-1, parity-none). About the MBRTU tool, please refer to the

"Communication test" in the below.



3. Save and Compile

	ų, e	W Config -	[SIMAT	IC 300 S	tation (Co	nfigu	ratior	n) 8	7_Pro1]					
6	00 8	tation <u>E</u> dit	<u>I</u> nsert <u>F</u>	LC <u>V</u> iew	<u>O</u> ptions	<u>W</u> ind	ow <u>I</u>	<u>H</u> elp						
	С	<u>N</u> ew			Ctrl+N	į	<u>b</u> =	- 1	N?					
Γ		Open ONLI	INF		Cm+O	1						~	<u> </u>	
	2	Close				- 1							Find:	7552
		- Sauce				-1						_	Durafila	Store Jam
	Ŀ	Save and C	ompile		Ctrl+S		JS(1):]	DP ma	ster system (1)			riome.	Standan
	I.	Duranting				-1	2			<u> </u>	•			
	-	Fiopermes				_			5 (2) G W-79	8				
		Import				- 1								
	Ц_	<u>E</u> xport						R		'				
		Consistency	y C <u>h</u> eck		Ctrl+Alt+F	<u>،</u>		.4	andi					
		Check CiR	Compatibi	lity	Ctrl+Alt+F	7								
		Print			Ctrl+P							~		
ŀ	<	Print Previe	<u>₩</u>			- 1						>		
Γ	_	Page Setup.				t								
L	4	<u>1</u> S7_Pro1V	SIMATIC	300 Station										
L		<u>2</u> S7_Pro2V	SIMATIC	300 Station			on	1	I Address	Q Address	Comment	1		
L	[<u>3</u> S7_Pro3V	SIMATIC	300 Station		1				02		~		
		<u>4</u> S7_Pro4V	SIMATIC	300 Station						256259		_		
	•	Exit			Alt+F4	H								
	5					_								

4. Download setting into STEP 7

📲 н 🕷 (Config -	[SIMA	TIC 300 Station (C	onfigurati	on) 87_	Pro1]				
💵 <u>S</u> tatio	on <u>E</u> dit	Insert	PLC View Options	<u>W</u> indow	<u>H</u> elp					
🗅 🖻	₽ ~ 🖬		<u>D</u> ownload		Ctrl	+L	1			
			<u>U</u> pload						~	
(0)	UR		Download Module	dentifi <u>c</u> atio	n					Find
1		~	Upload Module Ide	ntification to	o PG					<u>-</u>
2 X2		<u> </u>	<u>F</u> aulty Modules							Profile:
2.2		16/DX	Module Information	ı	Ctrl	+D				
$\frac{2.4}{3}$	<u> </u>	UDI	Operating Mode		Ctrl	+I				
4	+	_	Clear/ <u>R</u> eset							
Ē			Set Time of Day							
			Monitor/Modify							
			Updat <u>e</u> Firmware							
			Save De <u>v</u> ice Name	o Memory	Card				~	
<			Ethernet			•		>]	
	(2) G	W-7553	PROFIBUS			•				
Slot	DP	ID	<u>S</u> ave Service Data				Q Address	Comment		
1	24DO		System setting				02		^	
2	240		Output Register2	word			256259			
3										

5.Insert a new Organization Block	(OB1	,OB82	OB86)
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SIMATIC Manager - [S	S7_G ₩-7552 C.\Program Files\Stemens\Step7\s7proj\S7_G ₩-~1]	
🔁 File Edit Insert PLC	<u>V</u> iew Options <u>W</u> indow <u>H</u> elp	- 8 ×
□ 😂 👫 🐖 👗 🖬 □ 😂 S7_G ₩-7552 □ 🗑 SIMATIC 300 Stat	E 💼 🏜 🔍 🗣 ≗a 🖫 ﷺ 💼 < No Filter > 💽 🏏 🞇 🕮 🖷 🖃 📅 😵 tion and a tion	
CPU313C-2 D Grup S7 Program CPUST Source Blocks	2₽(0) m(1) es	
	Cut Ctrl+X	
	Copy Ctil+C	
	Delete Del	
	Insert New Object Organization Block	
	PLC Function Block	
	Rewire Put Disch	
	Compare Blocks Data Block Data Data	
	Reference Data Variable Table	
	Print	
	Rename F2	
	Object Properties Alt+Return	
	Special Object Properties	
Inserts Organization Block at the	e cursor position.	//

Properties - Organizatio	n Block	×
General - Part 1 General	Part 2 Calls Attributes	
<u>N</u> ame:	0B1	
Symbolic Name:		
Symbol <u>C</u> omment:		
Created in <u>L</u> anguage:	LAD	
Project path:		
Storage location of project:	C:\Program Files\Siemens\Step7\s7proj\S7_Pro1	
Date created :	Code Interface 05/15/2013 09:44:33 AM	
Last modified:	05/15/2013 09:44:33 AM 05/15/2013 09:44:33 AM	
C <u>o</u> mment:		
OK	Cancel Help	

SIMATIC Manager - [S7_Pro1 C:\Program Files\Siemens\Step7\s7proj\S7_Pro1]								
🞒 File Edit Insert PLC View	<u>Options Window H</u> elp							
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Image: Style styl	System data	€ OB86						

6.S7 program edit

Variables used in the example LD Program:

	Name	Data T y pe	Address	Comment
1	OB1_DAT	. Date	12.0	Date and time OB1 started
1	END	Bool	20.0	
1	Tri	Int	22.0	
1	Init	Bool	24.0	
1				

Network 1 : Initial Cl





Network 2: QBD add "1" refresh AO value

2 word 2AO



Network 3: Timer T1 & T2



Network 4 : Tl trigger Cl

```
Counter(Cl) add "l" and Tri add "l" ,too.
```



Network 5: Compare Tri with 256

If Tri is equal to 256 than will reset Cl.



7. S7 program download

HH-0 HH	LAD	/STL/R	(BD -	[OB1	— "Су	cle Exe	ecution"	S7_Pro	1\SIMATIC	300 Station\CPU	313C-2 DP(1)	\\0B1]			
۲	File	<u>E</u> dit	Insert	P <u>L</u> C	<u>D</u> ebug	<u>V</u> iew	<u>O</u> ptions	<u>W</u> indow	<u>H</u> elp						
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				Sei Es	lect <u>O</u> nlin tablish Co	ie CPU onnectio	 in to Confi	gured CPU	r	ents Of: 'En	vironment\I	nterface\TEN	œ'		
	ню	Manager	. to consult		II Massa	~~~		•		Name	Data Type	Address	Comment	11.00	11
	+ -	Bitlog	ic	Di	splav Fon	ges ce Valu	25		Ctrl+Alt+F	END	Date	12.0	Date and	time OE	JI STAD
	ŧ. 🔽	Compa	arator	M	onitor/Mc	odify Va	riables			Tri	Int	22.0			
	÷ 🔤	Conver	rter	M	dule Info	ormatio	n		Ctrl+D] Init	Bool	24.0			
	±	DB cal	1	OI	erating N	4ode			Ctrl+I	1					
6	÷	Jumps		⊡b	ear/Reset.										
	±	Integer	r functic c-noint	Se	t Time of	Da <u>y</u>									
		Move Program Shift/R Status I Timers Word I FB blo FC blo SFB bl SFC bl SFC bl Librari	m contro otate bits clogic cks ocks ocks ocks le instan es	ol			le twork	256 – #Tri –	mpare Tri w l to 256 th CMP <=1 IN1 IN2	ith 256 an will reset	C1. C1 (R)-				

8. Make sure the RUN LED of the GW-7553 is on and the switch of the GW-7553 is at Normal mode.



Communication test

1. Confirm the Com Port setting of Modbus Master tool is the same with GW-7553's (ex: MBRTU, you can download MBRTU from http://ftp.icpdas.com.tw/pub/cd/8000cd/napdos/modbus/modbus_utility/) Com Port Settings: baud rate-115200, data bits-8, stop bits-1, parity-none

🚰 MBRTU ¥.1.0.8 COM1						
COM status	Protocol Description FC4 Bead multiple input registers (3xxxx) for Al					
LUMI 115200 V Line control : N,8,1 Open Close	[Response] Byte 0: Net ID (Station number) Byte 1: FC=04 Byte 2: Byte count of response (B=2 x word co Byte 3-(B+2): Register values	ount)				
Polling mode (no wait) Timeout 200 Timer mode (fixed period) Interval 50 ms Start Stop	Statistics Commands Current Packet Size (bytes) Total Packet bytes Packet Quantity Difference Packet Quantity sent Polling or Timer mode (Date/Time) Start time Time Start Stop time Time Stop	Clear Statistics esponses 9 tal Packet Size (bytes) 9 tal Packet bytes 9 cket Quantity received 1 Polling Mode Timing (ms) Max Max 000 Min 100				
Command 140002		Send Command				
Commands 🔽	With CRC Response	es				
	Clear Lists	Exit Program				

2. Input command (" 01 04 00 00 00 02") in MBRTU and click <Send Command> button to send Modbus command: "01 04 00 00 00 02 71 CB". We can get the AI value (0x006F, 0x00DE) from the



S MBRTU V. 1.0.8 COM1					
COM status	Protocol Description				
СОМ1	FC4 Read multiple input registers (3xxxx) for Al	-			
115200 Line control : N.8,1 Open Close	[Response] Byte 0: Net ID (Station number) Byte 1: FC=04 Byte 2: Byte count of response (B=2 x word count) Byte 3-(B+2): Register values				
Polling mode (no wait)	Statistics Clear St	tatistics			
Start Stop 200	Commands Current Packet Size (bytes) Total Packet bytes Total Packet bytes Total Packet bytes Current Packet bytes	i) 9			
Timer mode (fixed period)	Packet Quantity sent 2 0 Packet Quantity received	2			
Interval 50 ms	Polling or Timer mode (Date/Time) Polling Mode Timing (r	ms)			
Start Stop	Start time Time Start Max 000 2 Stop time Time Stop Min 100 <td>Average 000</td>	Average 000			
Command					
140002	Sen	d Command			
Commands 🔽	With CRC Responses				
01 04 00 00 02 71 CB 01 04 04 00 6F 00 DE 48 C1					
ſ	Clear Lists Exit Prog	gram			

3. We change PQW256 to 0x00FE and PQW258 to 0x00DC, and then we can click <Send Command> button to read AI again at MBRTU and we will get the new AI value (0x00FE, 0x00DC) from the response message.

Network 2: QBO add "1" refresh AO value

2 word 2AO					
	The second	MOVE]	#END	
16#00000009 #Tri –	EN IN	ENO OUT	16#00000009 QB0		
	ΕN	MOVE ENO			
16#000000fe 254 -	IN	OUT	16#000000fe −PQW256		
16#000000dc	ΕN	MOVE ENIO	16#000000dc		
220 –	IN	OUT	-PQW258]	

🕬 MBRTU V. 1.0.8 COM1		
COM status	Protocol Description FC4 Read multiple input registers (3xxxx) for Al	
Line control : N.8.1	[Response] Byte 0: Net ID (Station number) Byte 1: FC=04 Byte 2: Byte count of response (B=2 x wor Byte 3-(B+2): Register values	rd count)
Polling mode (no wait) Timeout Start Stop 200 Timer mode (fixed period)	Statistics Commands Current Packet Size (bytes) Total Packet bytes 80 Packet Quantity Difference Packet Quantity sent	Clear Statistics Responses Current Packet Size (bytes) 9 Total Packet bytes 90 Packet Quantity received 10
Interval 50 ms Start Stop	Polling or Timer mode (Date/Time) Start time Time Start Stop time Time Stop	Max O00 Average Min 100 000
Command		
Commands V	With CRC Respo	Send Command
01 04 00 00 00 02 71 CB 01 04 00 00 00 02 71 CB	D1 04 04 00 FE 00 DC 9B ED D1 04 04 00 FE 00 DC 9B ED	
	Clear Lists	Exit Program