SET UP DATA SOURCE USING SIEMENS S7 PROTOCOL

In this Appendix...

Set up data source for a device using Siemens S7 protocol......G-3

APPENDIX

This manual covers the StrideLinx platform available from 2017 through 2021.

For details covering the StrideLinx Cloud 2.0 platform available after April 2021, please <u>click here</u> to link to that manual.

The StrideLinx Cloud 2.0 manual includes details describing the <u>Activation Code</u> model of Data Logging, Cloud Notify and other add-on features.

For information on the migration wizard from the original platform to StrideLinx Cloud 2.0, <u>click here</u>.

Set up data source for a device using Siemens S7 protocol

In order to use the cloud data logging or cloud notification functionality with a Siemens S7 PLC, the communication between the StrideLinx router and the PLC must be configured first. We will use Siemens TIA Portal software to collect information on the PLC and set required configuration options, then use the StrideLinx platform to set up data logging.

Prepare the Siemens PLC for remote data logging or notifications

Find the rack and slot numbers

In TIA Portal, click on the CPU and select "Project Information" in the center panel. Make note of the rack number and slot number to enter into the StrideLinx platform later.



Find the static IP address

The PLC must have a static IP address in order to be accessed throught the VPN. To find or set the IP address, select "Ethernet addresses" in the center panel. Make note of the IP address

PLC_1 (CPU	1515-2 PN				S. Pri	operties	Ulnio	2	Diagnost	tica	10	-3	Ö
General	10 tags	Syste	em constants	Texts	100								
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Catalog in Identifica	nformation tion & Meinten		Interface ne	tworked	with								
· PROFINETING	enface (X1)				Subnet:	Phile_1					-		
General	addresses					- Ad	t new Labor	6.					
Time synd Operating	throniation a mode	I.	IP protocol										
Advanced Interfa	d options					• Set IP a	ddress in th	e proje	ct.				
Media	redundancy						Paddress:	10	. 11 . 0	. 222			
 Real ti 	me settings					Sul	bnet mask:	255	255 . 25	5.0			
▼ Port [X	(3 P1 R)					Use ros	uter						
Ger	seral					Root	contrest.						
Port	t interconnec t options					🔿 IP addr	ess is set de	ectly at	the device	0			
· Fort [X	(1 P2 R)	~	PROFINET										
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A PLC_1	0	na_blo	ik 1 🏅 Defaul	t teg t	1							Con	nei

and subnet mask. Be sure the subnet mask shown matches the subnet mask of the VPN router.

Enable external access

In the PLC, make sure you enable the "Permit access with PUT/GET communication from remote partner (PLC, HMI, OPC, ...)" option.



The Siemens S7 PLC is now ready to set up data logging or notifications on the StrideLinx platform.

Configure the address and protocol for the PLC from which data will be read

On the StrideLinx platform, click on the SERVICES tab (10). Click the +(Add) button (11).

FD 4G \	/PN Router	1 0		
INFO	CONFIG	SERVICES	SUBSCRIPTIONS	ACCESS
	Ser	vices let you co	nnect with your device	s.

Add a Name and the IP Address of the PLC where the data resides. Click NEXT.

× Add service	
E FD 4G VPN Router	
Please specify a target for this service.	
IP address	
e.g. 192.168.140.100	
	NEXT

Select DATA SOURCE.



Select the Siemens S7 protocol. Fill in the rack and slot that were previously recorded for the PLC. Then click ADD to continue.

× Add service			
D ADC Wired Router			
Protocol* Siemens S7-300/400/1200/1500		Port ▼ 102	* 2
Rack	Slot		
BACK			ADD

Configure the data tags

To add a data tag, go to the SERVICES tab for the router and click the Edit services (pencil) icon next to the device for which you want to add the data tag.

ADC Wi	red Router				
INFO	CONFIG	SERVICES	APPS	ACCESS	
Seimen 10.11.0.45	s S7 1200				5
Data log	ger Siem	ens S7-300/400/12	200/1500	10.11.0.	Edit services 45:102

This opens the Edit services dialog. Click the name of the existing device for which you would like to add a data tag.

× Edit services	
LTB ADC Wired Router	
Name Seimens S7 1200	
IP address 10.11.0.45	
Data logger 10.11.0.45:102	Stemens \$7-300/400/1200/1500
+ Add service	
	CANCEL DONE

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	_	
L		

NOTE: It is advisable to enter data tags in small batches, and test the variables periodically to verify the entries. The entries can be tested by clicking "RUN TEST" in the Configurator, or from the Cloud Logging Web App as described in the <u>Data Logger Test Utility</u> section. Please refresh your browser if the information on screen appears to not be updated properly at any time.

The resulting "Edit service" screen displays the parameters for the data source, plus a count of existing data tags. Click OPEN CONFIGURATOR to add or edit tags.

ADC Wired Router			
Protocol*	0	Port*	
Siemens 37-300/400/1200/1300	U	102	
Rack	Slot		
0	2		
	D		
	D		
	D		
	6 variables		
	6 variables		
	6 variables		

Data tags can be entered interactively, or a set of tags can be imported from a previouslyexported CSV file. Export of sets of data tags is discussed later in the "Export Data Tags" subsection. For this example, select "Add new variable" to manually enter tags.

+1	Add new variable	
	Import from CSV-file	
	CANCEL	ADD

A data entry screen opens, with one new data tag ready to be entered. Set the relevant parameters for the new data tag. The data tag input fields and supported data types are described in the next two tables, respectively. Subsequent figures illustrate the correct syntax for entering Siemens S7 addresses. Additional data tags can be entered in this round by clicking "+1" in the lower left corner of the screen. When all the desired tags have been entered click ADD.

Vame*						
Select a data type *	Region *	*	Data block *	Address*		
Factor			Unit			
					ſ	Ō 🕯

	Data Tag Input Fields
Field	Description
Name	Give the data tag a logical name.
Select a data type	See next table for the available data types.
Region	Select the type of value that needs to be logged. Values are Output Byte (AB), Input Byte (EB), Data Block (DB) and Markers (MB)
Data Block	Define in which data block the data tag is located.
Address	Define at which address in the data block the tag is located.
Unit (optional)	Here you can assign a value to a unit, for example, gallons or psi.
Factor (optional)	This allows you to multiply by a value. For example, factor 0.01 divides the data value by 100.

Data Types Supported							
StrideLinx	Siemens S7 Elementary Types	Siemens S7 Memory Types					
Bool	BOOL	I/Q/M/DBX					
Float32	REAL	ID/QD/MD/DBD					
Float64							
Int8	BYTE	IB/QB/WB/DBB					
Int16	INT	IW/QW/MW/DBW					
Int32	DINT	ID/QD/MD/DBD					
Int64							
String	CHAR	DBB String/DBB Char					
Uint8							
Uint16	WORD	IW/QW/MW/DBW					
Uint32	DWORD	ID/QD/MD/DBD					
Uint64							

The following subsection, "Siemens S7 address notation and lookup," presents the recommended method to determine the correct address and syntax for your data tag. After all data is entered, click ADD to continue.

Once you have added all the data tags you want to log, you will be prompted to push the configuration to the router.

FD 4G VPN Router							
	CONFIG						
This co configu	nfiguration is r ration on the d	the current	PUSH CHANGES				
WAN							

The data tag entries should now be verified using the procedure described in the "Test Utility" subsections of Chapter 4 and Chapter 5.



NOTE: Additional data tag parameters related specifically to data logging (i.e., sampling interval, data retention policy, and logging only when changed) can be set from the Cloud Logging web app discussed in Chapter 4.

The Cloud Logging web app can now be used to set up data dashboards and to adjust additional data tag parameters related specifically to data logging, and the Cloud Notify web app can be used to set up alarm notifications.

Export data tags

Data tag configurations can be exported in CSV format. The CSV file is downloaded to your local PC, and can later be imported to set up another StrideLinx router.

Select data tags to be exported by clicking the icon for each data tag, or select all data tags at once from the More Options (•••) menu in the upper right corner of the screen. The selected data tags can then be deleted, duplicated, or exported from the pop up menu at the bottom of the screen.

Siemens S7 address notation and lookup

The following data within Siemens S7 PLC is addressable for remote access.

Siemens S7 Memory Addressing									
Mem	ory Type	Range	Description	Read/Write	Data Type				
I * IB * IW * ID *	0.00-65535.7			Bit					
	IB *	065535		DAM	Byte				
	IW *	0-65535		H/W	Word				
	ID *	065535			Double Word				
Q -	Q *	0.00-65535.7			Bit				
	QB *	065535		DAM	Byte				
	QW *	065535		H/W	Word				
	QD *	065535			Double Word				
	M *	0.00-65535.7			Bit				
	MB *	0–65535		DAM	Byte				
IVI	MW *	065535		H/W	Word				
	MD *	0–65535			Double Word				
DB	DBX *				Bit				
	DBB *		Data Block	DAM	Byte				
	DBW *	1.0-000000000000000	Memory	T/ W	Word				
	DBD *				Double Word				

* Does not need to be entered. Only displayed.

NOTE: Timers and Counters are System Blocks that are not addressable.



NOTE: Data Blocks must have "Optimized Block Access" DISABLED in SIMATIC STEP 7 software in order to be accessed remotely.

Data_block_1 [DB42		×
General		
General Information Time stamps Compilation Protection Attributes Download with	Attributes Only store in load memory Data block write-protected in the device Optimized block access	
		OK Cancel

G-11

Use the Offset column of the Data Block as the byte address for StrideLinx. Even though the DB is defined as "Int" the offset is still byte not word.

To view the status of the variables in the PLC, connect to the PLC within SIMATIC STEP 7 and add or open an existing Watch Table from the Devices Tree as shown below.

Mi Siemens - Project2							_ C	эx
<u>P</u> roject <u>E</u> dit ⊻iew Insert <u>O</u> nline O	otio <u>n</u> s <u>T</u> ools	<u>W</u> indow <u>H</u> elp			Totally In	tegrated Automa	tion	
📑 📴 🔒 Save project 🚢 🐰 💷 👔	X D ± C	±₩₩₽₩₽₩	Go online 📝 Go	offline 🔥 🖪 📑	* '	PC	ORTAL	С.
Project tree	🛙 🔺 Project	2 F PLC_1 [CPU 1212C DC/DC	/DC] 🕨 Watch a		Watch table_2		I I X	4
Devices	1							V.
	⇒ 1 43 B	9.9.99 000 000						Te
		Name	Address	Displayformat	Monitoriyalue	Modifyvalue	3	stin
Device configuration	A 1	"MotorControl" MOTOR RPM	%DB2 DBW0	DEC signed	600	mouny value		ē
Opline & diagnostics	2	"MotorControl" SETPOINT RPM	%DB2 DBW2	DEC signed	600		ň	-
Program blocks	a 3	"MotorControl".START	%DB2.DBX4.0	Bool	TRUE			4
Add new block	4	"MotorControl".STOP	%DB2.DB×4.1	Bool	FALSE			se
Amain [OB1]	5		Add new>				Ĩ.	ks
Data block 7 [DB7]								
Data_block_8 [DB8]								L
MotorControl [DB2]								libr
🕨 😹 System blocks	•							ari
Technology objects								es
External source files								_
PLC tags	•							
PLC data types								
➡ Image: watch and force tables								
🕍 Add new watch table								
Force table								
Watch table_1								
Program info	~ <	m					>	
Details view			[C Properties	linfo D Di	agnostics		
> Decails view	-		-	scroperties .		aynosues		
Portal view Overview	Online	👯 Watch t 📕 Data_bl	MotorC	Watch t 🗸	Connected to PLC_1	, Address IP=10.11.		μ,

Data Block Addressing syntax differs some between what is seen in SIMATIC STEP 7 and in StrideLinx. To view the Data Block, double click on the specific Data Block you wish to view. When a specific Data Block is selected, a window like the one shown below will open.

Siemens - Project2	_					_	_		_				
roject Edit View Insert Online 🔮 🎦 🎧 Save project 🎩 🐰 🤠	Options	5	ools <u>W</u> ± (Pil±	indow Help	🛱 🚿 Go on	ine 🗾 o	o offline	Å2 10 10	×	, ^{Totally}	Integrated	Automation PORTA	L
Project tree	П (ojectZ	+ PLC_1 (CPU 1212	C DO/DO/DC]	 Progra 	im bloc	ks 🕴 Mota	rConti	ol [DB2]	b	_ # # ×	1
Devices		L									~		
1900		L	0 0									124	l
			Motor	Control									
+ T Project2			Na	ime	Data type		Offset	Start value		Retain	Visible in	Comment	
Add new device	222	1	-0 -	Static									
Devices & networks	m	2	-0 -	MOTOR_RPM	Int	3 -	0.0	0		-		MOTOR SPEED	
- 1 [CPU 12120 DODODC]	~	3	-0-	SETPOINT_RPM	int		2.0	0	h			SETPOINT RPM	ŝ
T Device configuration		4	-0.*	START	Bool		4.0	false	Ψ			MOTOR START	
😼 Online & diagnostics		5	-0.+	STOP	Bool		4.1	false		8		MOTOR STOP	
 Program blocks 	•												
Add new block		L											
Hain [OB1]	•	E											
Data_block_7 [DB7]	•	E											
Data_block_8 [DBS]		L.											
MoterControl [DB2]		E											
System blocks		E											
Figure recentoring objects		E											
R Chan			٤	81			13		-			1	ł
> Details view		Г					Q Pro	perties	1 In	fo D	Diagnostics		
A Partal view		V	S anline	di U. Watch tabl	Data bing	-k 📄	MotorCo	int 🗸	Conr	acted to PL	C. 1. Address II	statt I	F

The previous image shows DB2. Inside DB2, there are four variables:

- MOTOR_RPM is addressed at byte0 and is a 16-bit Integer.
- SETPOINT_RPM is addressed at byte2 and is also a 16-bit Integer.
- START is addressed at byte 4, bit 0 and is a Boolean.
- STOP is addressed at byte 4, bit 1 and is a Boolean.

If the "Offset" column is not displayed, right-click any column header to Show / Hide Columns. These four variables would be addressed as follows in StrideLinx:

- MOTOR_RPM: Type = Int16, Region = DB, Data block = 2, Address = 0
- SETPOINT_RPM: Type = Int16, Region = DB, Data block = 2, Address = 2
- START: Type = Boolean, Region = DB, Data block = 2, Address = 4, Bit = 0
- STOP: Type = Boolean, Region = DB, Data block = 2, Address = 4, Bit = 1

G-13

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