

Connection Guide

S7-1200 Firmware V4.0 Connection Guide

Compatible with EB Pro V5.00.02 or later versions

Table of Contents

1. Preparation	1
Connecting HMI with PLC	1
Exporting PLC Tags	2
Exporting Data Block (DB)	3
Function Block (FB)	4
Technology Object	5
PLC Data Types	5
2. Software Configuration	5
EasyBuilder Configuration	5
Import Error	10
Accessing Bits of I, Q, M Word Register	10
3. Converting S7-1200/S7-1500 (absolute addressing) Driver	11
4. Notes on Upgrading Project	12
5. Communication Data Types	13
Supported Data Types	13
Not Supported Data Types	14



1. Preparation

S7-1200 FW4.0 driver supports importing the tags in external files. The following steps show the way to build the needed Tag file. (To communicate with Siemens S7-1200 FW4.0 device by using EasyBuilder8000, please see Chapter 4 in this manual.)

Please note that all changes made in TIA Portal software, including option change and Tag modification, will only take effect after re-download PLC program to PLC.

Connecting HMI with PLC

 Point to the PLC project and click the right mouse button, and then click [Properties].



2. Select [Protection] and select [Permit access with PUT/GET communication from remote partner (PLC, HMI, OPC,...)] check box.



	Select the access level for the PLC.					
Project information						
Catalog information	Assars lavel		A		Assess permission	
Identification & Maintenance		-	Dead	Maine	Parquard	
 PROFINET interface 	Sull serves (as servestics)	rivi	heau	write	Password	
General	Pullaccess (no protection)	v	~	~		
Ethernet addresses	O Read access		•			
Time synchronization	O HMI access	•				
Operating mode	O No access (complete protection)					
Advanced options						
Hardware identifier						
DI8/DO6	Full access (no protection):					
AI2	 TIA Portal users and HMI applications will h 	ave access to al	I functions.			
High speed counters (HSC)	No password is required.					
Pulse generators (PTO/PWM)						
Startup						
Startup Cycle						
Startup Cycle Communication load						
Startup Cycle Communication load System and clock memory						
Startup Cycle Communication load System and clock memory Web server						
Startup Cycle Communication load System and clock memory Web server Time of day						
Startup Cycle Communication load System and clock memory V Web server Time of day User interface languages						
Startup Cycle Communication load System and clock memory • Web server Time of day User interface languages Protection	Connection mechanisms					
Startup Cycle Communication load System and clock memory • Web server Time of day User interface languages Frotection Connection resources	Connection mechanisms					
Startup Cycle Communication load System and clock memory V Web server Time of day User interface languages Frontection Connection resources Overview of addresses	Connection mechanisms	it access with PI	TIGET comm	unication from	nemote partner (PIC H& OPC)	

Exporting PLC Tags

This section explains how to export PLC Tags (I, Q, M Tags).

1. As shown in the following figure, select [Show all tags] under PLC tags.

	Project tree		S7-1		_V4 PLC_1 [CPU 12	12C AC/DC/Rly] 🔸	PLC tag			
	Devices								🕣 Tags	E U:
	1 O O 1	B	3	Ě	D 🕂 🕅					
2			P	LC t	ags					
Ē	🥃 UInt_Array [DB9]	~			Name	Tag table		Data type	Address	
E E	🥃 USInt_Array [DB6]		1	-00	100	Bit	-	Bool	%IO.0	•
5	📒 Word_Array [DB7]		2	-	101	Bit		Bool	%I0.1	
르	🕨 🙀 Technology objects		з	-	102	Bit		Bool	%10.2	
H	🕨 🔚 External source files		4	-	103	Bit		Bool	%10.3	
	✓ PLC tags		5	-	104	Bit		Bool	%10.4	
	Show all tags		6	-	105	Bit		Bool	%10.5	
	📑 Add new tag table		7		106	Bit		Bool	%10.6	
	🎬 Default tag table [26]		8	-	107	Bit		Bool	%10.7	
	🖫 All_Type [11]		9	-	110	Bit		Bool	%11.0	
	堤 Bit [48]		10	-	111	Bit		Bool	%11.1	
	🖳 Byte [33]		11	-	112	Bit		Bool	%11.2	
	4 DWORD [18]		12	-	113	Bit		Bool	%11.3	
	lag table_1 [0]		13	-00	114	Bit		Bool	%11.4	
	🖳 Word [33]		14	-	115	Bit		Bool	%11.5	
	PLC data types		15	-00	116	Bit		Bool	%11.6	
	Watch and force tables	=	16	-00	117	Bit		Bool	%11.7	
	🔄 Traces		17	-	Q00	Bit		Bool	%Q0.0	
	Program info		18	-	Q01	Bit		Bool	%Q0.1	
	🕨 🔚 Device proxy data		19	-	Q02	Bit		Bool	%Q0.2	
	Text lists		20	-	Q03	Bit		Bool	%Q0.3	
	Local modules		21	-	Q04	Bit		Bool	%Q0.4	
	🕨 📑 Common data		22	-	Q05	Bit		Bool	%Q0.5	
	Documentation settings		23	-00	Q06	Bit		Bool	%Q0.6	
		~	24	-	Q07	Bit		Bool	%Q0.7	

2. Click [Export] icon to export the address tags.

	\$7-1200	_V4 → PLC_1 [CPU 1212C AC
a	₽ 1	🖻 🛃 🖬
	PLC t	ags
^		Na Export
	1 🗠	100
	2 📲	101

3. Designate the directory to save the tags and click [OK].



Exporting Data Block (DB)

This section explains how to export the tags in proper format from a Data Block to facilitate communication.

 Point to the DB and click the right mouse button, and then click [Generate source from blocks]. Enter the file name and then save the file. A *.scl or *.db file will be generated.



- **2.** If the DB contains data type Struct, it is important to follow the steps below to communicate correctly.
 - Step. 1 Copy the whole Struct data
 - Step. 2 Delete the data
 - Step. 3 Add a new row
 - Step. 4 Paste the copied data



Name	Data type	Start value	Retain	Accessible f	Visible		Na	ame	Data type	St	art value	Retain	Accessible f	I Visi
🔩 💌 Static					E	1		Static						
test_bool	Bool	false			6	2	- 🖬 🔹	test_bool	Bool	fa	lse			
	Struct	∎ ∰ Insert r ∰ Add rov	ow v		6	3		Static_1	Struct		P Insert P Add ro M € ro	row		6 .1.1
		X Cut		Ctrl- Ctrl-	×						Copy			Ctrl+C
	Step.	1 De Paste		Ctrl	-V				Step	.2	Paste			Ctrl+V
		X Delete Renam	e	C	el F2						Renar	ne		Del F2
		Update	interface		_						Updat	e interface		
		Cross-m Show o Go to k	eference infor werlapping ac ocal point of u	mation Shift+F ccesses se	11						Cross Show Go to	reference in overlapping local point o	formation Shif accesses fuse	ά+F11
Name	Data type	Start va	lue R	letain Ac	cessibl	1	Nar	me Static	Data type	Sta	rt value	Retain	Accessible f.	Visil
 ✓ Static 	A	() ()				2		test bool	Bool	fal	se	A		
test_bool	Bool	Add row				3	•	<add new=""></add>			P Insert r	ow v		
	Stop 2	X Cut Copy Paste		Ctrl+: Ctrl+: Ctrl+					Step	.4	Cut		0 0	trl+X trl+C trl+V
	Step.5	X Delete		De	1						× Delete			Del
		Update inte	rface								Update	interface		14
		Cross-refere	ence informa	tion Shift+F1							Cross-r	eference info	rmation Shift-	+F11

- **3.** When using data type Struct, please note that:
 - At least one member that is not Struct must exist in the DB; otherwise, the Struct data will not be able to be imported to EasyBuilder.
 - Multidimensional array of Struct and nested structure are not supported.

Function Block (FB)

The Language field has three options: LAD, FBD, and SCL. To export a *.scl file, please select SCL. If LAD and FBD are used in the PLC project, please map the LAD and FBD tags to SCL tags.

Add new block		×
Name: FunctionBlock_1		
Organization block	Language: Number:	SCL LAD FBD SCL Automatic
Function block	Description: Function blocks so that they rem	are code blocks that store their values permanently in instance data blocks, nain available after the block has been executed.

Click the right mouse button in the created Function Block and select [Generate source from blocks]. Enter the file name and save the file. A *.scl file will be generated.



Technology Object

The *.scl file for configuring Technology Object is built in the installation file. You can find the file in the installation directory, Data Type folder.

PLC Data Types

 Point to [PLC data types] and click the right mouse button, and then click [Generate source from blocks]. Enter the file name and then save the file. A *.udt file will be generated.



- 2. If the DB contains PLC data types, it is important to follow the steps below to communicate correctly.
 - Step. 1 Copy the whole PLC data type
 - Step. 2 Delete PLC data type
 - Step. 3 Add a new row
 - Step. 4 Paste the copied data

2. Software Configuration

This chapter explains how to import Siemens S7-1200 Firmware V4.0 file and use PLC tags in EasyBuilder.

EasyBuilder Configuration

1. Launch EasyBuilder, and set the IP address.

S7-1200 Firmware V4.0 Connection Guide



Device Properties
Name : Siemens S7-1200 (Ethernet)
⊘ HMI
Location : Local
PLC type : Stemens S7-1200 (Ethernet)
V.2.50, SIEMENS_S7_1200.e30
PLC I/F : Ethernet
IP: 192.168.1.98, Port=102
Use UDP (User Datagram Protocol)
For proper communication, make sure that in TIA: [General] -> [Protection] -> [Permit access with PUT/GET communication from remote partner(PLC, HMI, OPC,)] is checked.
OK Cancel

2. Click [Import Tag...] button.

	xtended Memory Printer/Backup Server		Time Synchron	e-Ma	a 🛛	Recipes	
Device	Model	General	System Setting \$		Security	1	Font
Device list :							
No.	Name	Location	Device type	Interfa	се	I/F Prote	ocol
Local HMI	Local HMI	Local	MT8070iE/MT8			-	
Local PLC 4	Siemens S	7-1 Local	Siemens S7-1.	. Ethern	et (IP=1	TCP/IP	10
٠		m					*
New	Dalat	C Set	tin an Cita	+ Tag Info		mport Tea	
				1 102 1110		т. :с. т.	
Project description :					10	verny tags	
							*
							-
*						3	
CADA software can erver first and enab	a indirectly access le [MODBUS TC	PLC data via MOD P/IP Gateway])	BUS TCP/IP Server o	on HMI. (Ao	dd a MODE	BUS TCP/IP	
	PLC	1	Address Mapping To	able			



- 3. Select [Version 4.0 or later versions] for PLC firmware version.
- 4. Select the file to be imported. Please remember to change DB Number, and then click [Import] button. EasyBuilder will verify the tags one by one to check if the tags exist in PLC.

port Tags					
PLC firmware vers	ion				
0	Version 3.0 or earl	lier versions	Version 4	4.0 or later versior	IS
PLC tags					
File name	: D:\PLCTags.xlsx				Browse
Program blocks					
DB Number	[Program Blocks]	file name			
DB1	D:\1.db				
•					4
1 file(s) select	ted		Add Data Type	Delete	Browse
Technology object	ts				
DB Number		Tech	noloav Obiect		
1		PID_	3Step (V2.0)		
				Delete	
				Delete	Insert
Import status					
•		III			+
*			·····	- 1	
· Firmware version	on 4.0 or latter versio	ons only use [import ragj to get ar	nu veniy tagimon	nauon.
	program will alter ta	ag informatior	n and affect communicat	tion. If you modify	and download PLC
 Changes in PLC program, pleas on-line simulation 	e execute [Get Tag on.	Info] or [In	nport Tag] again befo	ore dowloading to I	-MI or executing

• PLC tags: The *.xlsx file that contains I, Q, M tag information.

 Program blocks: The *.scl, *.db of Data Blocks (DB) or Function Block (FB) files and PLC data types file.

Click [Add Data Type...] to import the *.udt file of PLC data types. If the *.scl file contains Function Block (FB), please enter the correct [DB Number] to map to Data Block.

For example, if there is a FunctionBlock_1 and the Number is 1.

Add new block		
Name:		
FunctionBlock_1		
	Language:	SCL 🔻
OB	Number:	1
Organization		🔿 Manual
block		 Automatic

And, if Function Block_1 is selected as Type for Data Block Number 2.



Add new block		
Name:		
Datablock_2		
	Type:	😑 FunctionBlock_1 [🔻
OB	Language:	DB
Organization block	Number:	2
		 Manual
		 Automatic

When importing the file to EasyBuilder, please set the DB Number to 2.

DB Number	[Program Blocks] file name	
DB2	D:\FunctionBlock_1.scl	
4	III	

- Technology object: The file exists in EasyBuilder. Click the right mouse button, click [Insert], and then select the correct Object.
- 5. Clicking [Import] opens a "Verify Tags" dialog box. When the number of tags is large, it may take a longer time to import the tags. If you skip the verification step, before downloading the project to HMI, or do simulation, please go to [System Parameter Settings] » [Device list] and click [Verify Tags].

Verify Tags	×
Run [Verify Tags] now?	
 May take a long time if number of tags is large. Skip this for off-line simulation (no PLC connection needed) 	
* Before download and on-line simulation, PLC Tags must be checked by running [Verify T Go to [System Parameter Settings] > [Device] and click [Verify Tags] to check.	'ags].
Yes	No



Extended Menn	ary	Printer/Ba	ckup Server	Time Synchroniz	ation	e-Mail		Recipe
Device	M	odel	General	System Setting		Security		Font
evice list :								
No.	N	ame	Location	Device type	Interfa	се	I/F Pr	otocol
Local HMI	Lo	ocal HMI	Local	MT8070iE/MT8	-		-	
Local PLC 4	4 Si	emens S7-1	Local	Siemens S7-1	Ethern	et (IP=1	TCP/II	P
<								4

6. The result will be displayed in Import Status field. Click [OK] to leave.

npor catataa		
Success : [Dat	a_block_2-Tag_440] verified with PLC.	<u>^</u>
Verifying tags	with PLC . (Done)	
440 success(s)) 0 error(s)	
HHU SUCCESS(S)), o error(s)	*

7. The successfully imported tags can be found in Tag Manager. You can select the needed tags from this list.

Tag Manager		×
Find :		
Verogram blocks Config[DB2] Orfig[DB2] Orfig[DB2] Orfig[DB2] OrdeTime[DB2] Ordet_block_1[DB1] OPID_Compact[DB2] OPID_Ctrl[DB2] OPIDCtrl[DB2] OPIDCtrl[DB2] OPIC tags O		
Select all Discard all	ОК	Cancel
Binary access of byte, word and dword	s allowed for I, Q and	M area address.
Multi-dimensional array and index offset Right-chick on the tags to edit the array	are supported for arr limits.	ay address.

8. After selecting the tags, click [OK], the following message will be shown.



Import tag information successfully.	Exit

9. The PLC tags can be selected when creating an object.

Comn	y Snape Label nent : Word Lamp Multi-	State Switch	
M Read address	ode : Value 🔹 Off	iset : 0	
PLC name :	Siemens S7-1200 (Ethernet)	✓ Settings	
Tag :	?	-	
	- Program blocks - Data_block_1[DB1] - PID_Compact[DB2] - Technological Objects - PLC tags - MArea - MArea - QArea	Name DB1_Dint DB1_Int	Data type Dint (32-bit) Int (16-bit)
Attribute			
🔲 Hide p:			

Import Error

If an error occurs during import, the possible reason can be: The PLC type is not supported, or EasyBuilder cannot verify if the PLC tag information is correct. You can still use the imported tags in the project, but the communication with PLC may fail. Please check the following points:

- Is the DB Number correct?
- Does the PLC tag exist in the PLC project? It is recommended to export the tag again in PLC software.
- Is the PLC IP address correct?

Accessing Bits of I, Q, M Word Register

Apart from using Bool tags, the Bit object can be used to read or write boolean array in I, Q, M registers in Byte, Word, or DWord formats. Select a word register and then select the Bool tag.



As shown in the following figure, PLCTags_Q is in Word format, the Bool tags in this register can be selected.

New Bit Lamp/1	Foggle Switch Object		23	
General Securi	ty Shape Label			
Comm	nent :			
	💿 Bit Lamp 💿 Togg	gle Switch		
Read address PLC name : Tag :	Siemens S7-1200 (Ethernet)	▼ Settings		
Tag :	?	f		
Blinking	- Program blocks - Data_block_1[DB1] - Dta_block_1[DB1] - PID_Compact[DB2] - Technological Objects - PLC tags - Area - Area - QAreaPLCT ags_Q	Name	Data type Bool Bool Bool Bool Bool Bool Bool Boo	
M		(7) [8] [9] [10] [11] [12]	Bool Bool Bool Bool Bool Bool	-
	Tag: QArea-PLCTags_Q[0]	, [ОК	Cancel

3. Converting S7-1200/S7-1500 (absolute addressing) Driver

EasyBuilder supports changing PLC Model from Siemens S7-1200 (symbolic addressing) (Ethernet) to Siemens S7-1200/S7-1500 (absolute addressing) in the project. Go to [Edit] » [System Parameter Settings] » [Device] to change the model and then import *.scl / *.db file again.

Please note that the following objects cannot be converted:

- PLC data types
- Technology Objects

Notes:

- To map the tags correctly between TIA Portal and EasyBuilder, please delete PLC data type tags in the DB of TIA Portal Project first, and then generate *.scl / *.db file.
- Symbolic Addressing and Absolute Addressing are two different naming systems in EasyBuilder. The system will use the naming system of Symbolic Addressing at the first import after changing PLC model, and then use Absolute Addressing for the later imports. This can cause compilation failure. To avoid compilation error,



from the second import of *.scl / *.db file, please select [Tag names use S7-1200 format].

Jont rags			
LC tags			
Filë ham	e: Please input a file name !		Browse
rogram blocks			
DB Number	[Program Blocks] file name		
DB1	D:\1.db		
4			
•			4
1 file(s) selecte		Delete	Browse
	a	Delete	
	a	Deete	
mport status	a	Delete	
mport status	a	Delete	
mport status	a	Delete	
mport status	a	Delete	
mport status	a 		
mport status	a 		,
mport status ∢ ✓ Tag names u	u III use S7-1200 format		,
Tag names u For proper co 1. [DB UTILT 2. [General]	use 57-1200 format munication, make sure that in TIA: TAIRES] -> [Attributes] -> [Optimized block access] -> [Protection] -> [Permit access with PUT/GET con	is unchecked.	e partner] is checked.

4. Notes on Upgrading Project

Weintek designs the driver as close as possible with S7-1200 Firmware V3.X, therefore most of the features work in a similar way. However, when using the driver to communicate with S7-1200 Firmware V4.0, the following situation can happen.

- When importing the file, it takes a rather long time to verify. To avoid this, build a new DB, and copy the tag data into the new DB, by following the steps:
 - Step. 1 Copy the tags in the original Data Block.
 - Step. 2 Click [Add new block].
 - Step. 3 Paste the copied data.
- When importing the tag data in the Data Block to the project again, if choose only some of the Data Blocks to import, and the tags in the rest Data Blocks are reserved, then during import, EasyBuilder will ask whether to reserve the existing tags, please click [Yes].
- When compiling the file, a tag error occurs. Please see Chapter 5 in this manual to check if the data type is supported.
- PLC data types that contain initial values cannot be imported.



• Differences between V4 and V3/V2:

	V4	V3 & previous
	Import the tags from *.xlsx /	Get the tags directly from
Import Tag	*.scl/*.db files. The PLC can be in	PLC, so PLC must connect
	off-line status.	PC.
	Please see Chapter 4 in this	
Data Type	manual to find the supported	All supported.
	object.	
	Import from * col and chacify the	Define
Function Block	import from ".sci and specify the	"FunctionBlock.txt" file in
		the installation folder.

EasyBuilder8000 does not support Siemens S7-1200 Firmware V4.0 and later versions. To communicate with Siemens S7-1200 Firmware V4.0 in EasyBuilder8000, please use Siemens S7-1500 driver. See the FAQ about how to use I Series model to communicate with S7-1200 Firmware V4.0.

5. Communication Data Types

Supported Data Types

S7-1200 data type	EasyBuilder data format	memo
Bool	bit	
Byte	16-bit BCD, Hex, Binary, Unsigned	8-bit
Char	USInt	
CREF	Struct	
Date	UInt	
Dint	32-bit BCD, Hex, Binary, Signed	32-bit
DTL	Struct	
DWord	32-bit BCD, Hex, Binary, Unsigned	32-bit
ErrorStruct	Struct	
IEC_COUNTER	Struct	
IEC_DCOUNTER	Struct	
IEC_SCOUNTER	Struct	
IEC_TIMER	Struct	



IEC_UCOUNTER	Struct	
IEC_UDCOUNTER	Struct	
IEC_USCOUNTER	Struct	
Int	16-bit BCD, Hex, Binary, Signed	16-bit
NERF	Struct	
SInt	16-bit BCD, Hex, Binary, Signed	8-bit
Struct	Bool, Byte, SINT, USInt, Word, Int, UInt, DWord, Dint, Real, UDInt	
Time	DWord	
Time_Of_Day	DWord	
Real	32-bit Float	32-bit
UDInt	32-bit BCD, Hex, Binary, Unsigned	32-bit
UInt	16-bit BCD, Hex, Binary, Unsigned	16-bit
USInt	16-bit BCD, Hex, Binary, Unsigned	8-bit
Word	16-bit BCD, Hex, Binary, Unsigned	16-bit
Array	Bool, Byte, SINT, USInt, Word, Int, UInt, DWord, Dint, Real, UDInt	Length=word Support up to 3 dimensional array

Not Supported Data Types

EasyBuiller does not support communication with the following V4 data types.

AOM IDENT 1. CONN ANY 2. 3. CONN_OUC 4. CONN PRG 5. DB ANY DB WWW 6. 7. EVENT ANY EVENT ATT 8. EVENT_HWINT 9. 10. HW_ANY 11. HW_DEVICE 12. HW DPSLAVE 13. HW HSC 14. HW IEPORT 15. HW INTERFACE 16. HW_IO 17. HW_IOSYSTEM 18. HW_PTO

- 19. HW PWM
- 20. HW_SUBMODULE 21. LReal
- 22. OB_ANY
- 23. OB ATT
- 24. OB CYCLIC
- 25. OB DELAY
- 26. OB DIAG
- 27. OB_HWINT 28. OB_PCYCLE
- 29. OB_STARTUP
- 30. OB TIMEERROR
- 31. OB_TOD
- 32. PIP
- 33. PORT
- 34. RTM
- 35. String
- 36. Array of PLC data types