

SIEMENS

SIMATIC

S7-1200

Update to the S7-1200 System Manual, edition 03/2014

Product Information

In spite of efforts to ensure the accuracy and clarity in the product documentation, some of the pages in the *S7-1200 Programmable Controller System Manual* contain information that has been identified as being incomplete, incorrect or misleading.

Security information

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AS-i V1.0 to V1.1 firmware upgrade power cycle requirement

For V4.0 S7-1200 CPUs, if using the web server or a SIMATIC Memory card to upgrade from V1.0 to V1.1 AS-i firmware, you must update the AS-i firmware in the AS-i Master CM 1243-2 according to the following procedure:

1. Download the firmware upgrade to the AS-i Master CM 1243-2.
2. When the download is complete, power cycle the S7-1200 CPU to complete the firmware upgrade process in the AS-i Master CM 1243-2.
3. Repeat steps 1 and 2 for each additional AS-i Master CM 1243-2. The S7-1200 PLC allows a maximum of three AS-i Master CM 1243-2.

DTL (Date and Time Long) data value restriction

The maximum value for the DTL data type is reduced to correct a compatibility issue.

Table 1 From: Maximum DTL value, as stated in the system manual

Year	Month	Day	Hour	Minute	Second	Nanosecond
2554	12	31	23	59	59	999 999 999

DTL#2554-12-31-23:59:59.999 999 999

Table 2 To: New maximum DTL value

Year	Month	Day	Hour	Minute	Second	Nanosecond
2262	04	11	23	47	16	854 775 807

DTL#2262-04-11:23:47:16.854 775 807

SIMATIC MC 32 GB

Consult with your Siemens contact or distributor for availability of the 32 GB SIMATIC Memory Card, order number 6ES7 954-8LT02-0AA00.

RF120C Communications module

The RF120C allows Siemens RFID and code reading systems to be connected directly and easily to an S7-1200. The reader is connected to the RF120C via a point-to-point connection. Up to three communications modules can be connected to an S7-1200 to the left of the CPU. The RF120C communications module is configured via the TIA Portal. The order number for the RF120C communications module is 6GT2002-0LA00.

For more information about this product and for the product documentation, refer to the product catalog web site for the RF120C. (<http://support.automation.siemens.com/WW/view/en/78961671>)

Monitoring execution status

When monitoring program execution status, you can see value updates for a maximum of 50 data elements. Scrolling the program block window allows you to view status for data elements of other instructions.

Correction of relay performance data

The Typical performance data table (Table A-8) has been corrected as shown below. The number of operating cycles (typical) is 2.0 million (not 12.0 million).

Table 3 Typical performance data

Switching capacity and life of the contacts			
For ohmic load	Voltage	Current	Number of operating cycles (typical)
	230 VAC	0.5A	2.0 million

SM 1221 DI 16 x 24 VDC connector pin locations

The connector pin locations table (Table A-108) has been corrected and is shown below.

Table 4 Connector pin locations for SM 1221 DI 16 x 24 VDC (6ES7 221-1BH32-0XB0)

Pin	X10	X11	X12	X13
1	No connection	GND	No connection	No connection
2	No connection	No connection	No connection	No connection
3	1M	2M	3 M	4 M
4	DI a.0	DI a.4	DI b.0	DI b.4
5	DI a.1	DI a.5	DI b.1	DI b.5
6	DI a.2	DI a.6	DI b.2	DI b.6
7	DI a.3	DI a.7	DI b.3	DI b.7

Effect of data logs on memory cards

Note

To ensure the overall performance and robustness of your system, limit the data log rate to no faster than every 200 ms.

Calculating the size of a data log file

The data log data bytes calculation in section 8.7.2.4 is incorrect. The correct calculation is shown below.

Data log data bytes = ((data bytes in one record + time stamp bytes + 12 bytes) * number of records)

Maximum size rule for data log files

The maximum size of one data log file cannot exceed the free load memory size or 500 megabytes, whichever is smaller. The size of 500 megabytes in this case refers to the decimal definition of megabyte, such that the maximum data log file size is 500,000,000 bytes or 500×1000^2 bytes.

Measurement ranges of the analog inputs for voltage (SB and SM)

The following table (Table A-159) has been updated to describe other uses of the value 7FFF.

Table 5 Analog input representation for voltage (SB and SM)

System		Voltage Measuring Range				
Decimal	Hexadecimal	±10 V	±5 V	±2.5 V	±1.25 V	
32767	7FFF ¹	11.851 V	5.926 V	2.963 V	1.481 V	Overflow
32512	7F00					
32511	7EFF	11.759 V	5.879 V	2.940 V	1.470 V	Overshoot range
27649	6C01					
27648	6C00	10 V	5 V	2.5 V	1.250 V	Rated range
20736	5100	7.5 V	3.75 V	1.875 V	0.938 V	
1	1	361.7 µV	180.8 µV	90.4 µV	45.2 µV	
0	0	0 V	0 V	0 V	0 V	
-1	FFFF					
-20736	AF00	-7.5 V	-3.75 V	-1.875 V	-0.938 V	
-27648	9400	-10 V	-5 V	-2.5 V	-1.250 V	
-27649	93FF					Undershoot range
-32512	8100	-11.759 V	-5.879 V	-2.940 V	-1.470 V	
-32513	80FF					Underflow
-32768	8000	-11.851 V	-5.926 V	-2.963 V	-1.481 V	

¹ 7FFF can be returned for one of the following reasons: overflow (as noted in this table), before valid values are available (for example immediately upon a power up), or if a wire break is detected.

Upload device as new station

You can now upload a device as a new station from the Online menu.

In Online menu, the "Upload device as new station (hardware and software)" menu command uploads the hardware configuration and software from a device connected online and creates a new station in the project .

This is an alternative to detecting the configuration of an unspecified CPU and then uploading the software from the CPU as described in sections 5.2 and 6.8 of the system manual.

Use of the DPRD_DAT and DPWR_DAT instructions to access consistent data

The DPRD_DAT and DPWR_DAT instructions in Table 8- 78 and following paragraph are corrected and shown below:

Table 6 DPRD_DAT and DPWR_DAT instructions

LAD / FBD	SCL	Description
	<pre>ret_val := DPRD_DAT(laddr:=_word_in_, record=>_variant_out_);</pre>	<p>Use the DPRD_DAT instruction to read one or more bytes of data from one of the following locations:</p> <ul style="list-style-type: none"> • Module in the local base • DP standard slave • PROFINET I/O device <p>The CPU transfers the data read consistently. If no errors occur during the data transfer, the CPU enters the read data into the target area set up by the RECORD parameter. The target area must have the same length as you configured with STEP 7 for the selected module. When you execute the DPRD_DAT instruction, you can only access the data of one module. The transfer starts at the configured start address.</p>
	<pre>ret_val := DPWR_DAT(laddr:=_word_in_, record:=_variant_in_);</pre>	<p>Use the DPWR_DAT instruction to transfer the data in RECORD consistently to the following locations:</p> <ul style="list-style-type: none"> • Addressed module in the local base • DP standard slave • PROFINET I/O device <p>The source area must have the same length as you configured with STEP 7 for the selected module.</p>

- The S7-1200 CPU supports up to 64 bytes of consistent data on the local bus. Use the DPRD_DAT and DPWR_DAT instructions to access more than 64 bytes of data consistently.
- PROFIBUS supports up to 4 bytes of consistent data. Use the DPRD_DAT and DPWR_DAT instructions to access more than 4 bytes of data consistently.
- PROFINET supports up to 1472 bytes of consistent data. You do not need to use these instructions for consistent transfers between the S7-1200 and PROFINET devices.
- You can use these instructions for data areas of 1 or more bytes. If the access is rejected, error code W#16#8090 results.

Parameter description update for TSEND_C and TRCV_C instructions

The following table shows an update to Table 10-3 for the REQ, EN_R, and CONT parameter descriptions for the TSEND_C and TRCV_C instructions:

Table 7 TSEND_C and TRCV_C data types for the parameters

Parameter and type		Data type	Description
REQ (TSEND_C)	IN	Bool	REQ = 1 starts the TSEND_C send job on a rising edge with the connection described in the CONNECT parameter. (CONT = 1 is also required to establish and maintain the communication connection.)
EN_R (TRCV_C)	IN	Bool	When EN_R = 1, TRCV_C is ready to receive. The receive job is processed. (CONT = 1 is also required to establish and maintain the communication connection.)
CONT	IN	Bool	Controls the communication connection: <ul style="list-style-type: none">• 0: Disconnect the communication connection• 1: Establish and maintain the communication connection When sending data (TSEND_C) (rising edge at the REQ parameter), the CONT parameter must have the value TRUE in order to establish or maintain a connection. When receiving data (TRCV_C) (rising edge at the EN_R parameter), the CONT parameter must have the value TRUE in order to establish or maintain a connection.

Read access security level for the CPU

Section 6.6.1 Access protection for the CPU incorrectly states that a password is required to change the CPU operating mode (RUN/STOP) for the Read access security level.

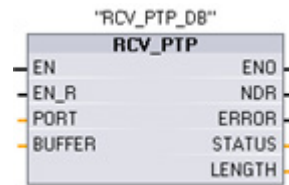
You do not have to enter a password to change the CPU operating mode.

Spare parts compatibility for communication modules

The new communication modules (6ES7 2xx-xxx32-0XB0) replace existing communication modules (6ES7 2xx-xxx30-0XB0). The new modules provide spare parts compatibility. You can employ the revised communication module in place of existing modules without any changes.

Behavior of RCV_PTP instruction

Note the following correlation between the EN_R input and the message buffer of the RCV_PTP instruction:



Input EN_R controls the copy of a received message to the BUFFER.

When the EN_R input is TRUE and a message is available, the CPU transfers the message from the CM or CB to the BUFFER and updates the NDR, ERROR, STATUS and LENGTH outputs.

When EN_R is FALSE, the CPU checks the CM or CB for messages and updates the NDR, ERROR and STATUS outputs, but does not transfer the message to the BUFFER. (Note that the default value of EN_R is FALSE.)

The recommended practice is to set EN-R to TRUE and control execution of the RCV_PTP instruction with the EN input.

Uploading program blocks from online CPU to offline project

In section 6.8.1 "Copying elements of the project", the description of uploading program blocks from the online CPU to the offline project is incorrect.

When you upload the program blocks, you do not upload the technology blocks or tags. To upload technology blocks, right-click "Technology objects" in the project tree node and select "Upload from device (software)". To upload tag names, you must upload the entire PLC.

Note also when uploading program blocks, you can upload all blocks or blocks individually.

Configuring the SM 1278 4 x IO-Link Master

The TIA Portal version in section 15.3.1 is incorrect.

For the module integration, you need the Siemens engineering tool TIA Portal V13 or higher (not TIA Portal V12).

Number of asynchronous communication connections supported

Overview of communication services

The CPU supports the following communication services:

Communication service	Functionality	Using PROFIBUS DP		Using Ethernet
		CM 1243-5 DP master module	CM 1242-5 DP slave module	
PG communication	Commissioning, testing, diagnostics	Yes	No	Yes
HMI communication	Operator control and monitoring	Yes	No	Yes
S7 communication	Data exchange using configured connections	Yes	No	Yes
Routing of PG functions	For example, testing and diagnostics beyond network boundaries	No	No	No
PROFIBUS DP	Data exchange between master and slave	Yes	Yes	No
PROFINET IO	Data exchange between I/O controllers and I/O devices	No	No	Yes
Web server	Diagnostics	No	No	Yes
SNMP (Simple Network Management Protocol)	Standard protocol for network diagnostics and parameterization	No	No	Yes
Open communication over TCP/IP	Data exchange over Industrial Ethernet with TCP/IP protocol (with loadable FBs)	No	No	Yes
Open communication over ISO on TCP	Data exchange over Industrial Ethernet with ISO on TCP protocol (with loadable FBs)	No	No	Yes
Open communication over UDP	Data exchange over Industrial Ethernet with UDP protocol (with loadable FBs)	No	No	Yes

Available connections

The CPU supports the following number of maximum simultaneous, asynchronous communication connections for PROFINET and PROFIBUS. The maximum number of connection resources allocated to each category are fixed; you cannot change the values:

Category	Value	Already configured
PG communication	4	
HMI communication	12	
S7 communication	8	0
Open user communication	8	
Free available connections	6	0
Maximum number available resources	38	

Based upon the allocated connection resources, the following number of connections per device are available:

	Programming terminal (PG)	Human Machine Interface (HMI)	GET/PUT server	GET/PUT client	Open User Communications	Web server
Maximum number of connection resources	4 (guaranteed to support 1 PG device)	12 (guaranteed to support 3 HMI devices)	3	8	8	30 (guaranteed to support 3 web browsers)

For an example, the CPU has 4 available PG connection resources. Depending on the current PG functions in use, the PG might actually use 1, 2, 3, or 4 of the available connection resources. If one PG uses 1 connection resource and another PG uses 3 connection resources for their current functions, it is possible to use 2 PGs at one time; however, you are always guaranteed at least 1 PG.

Another example is the number of HMIs, as shown in the figure below. HMIs have 12 available connection resources. Depending on what HMI type or model that you have and the HMI functions that you use, each HMI might actually use 1, 2, 3, or 4 of its available connection resources. Given the number of available connection resources being used, it may be possible to use more than 3 HMIs at one time. However, you are always guaranteed at least 3 HMIs.

Example	HMI 1	HMI 2	HMI 3	HMI 4	Total connection resources available
Connection resources used	2	3	3	4	12

Note

Web server (HTTP) connections: The CPU provides connections for multiple web browsers. The number of browsers that the CPU can simultaneously support depends upon how many connections a given web browser requests/utilizes.

Note

The Open User Communications, S7 connection, HMI, programming device, and Web server (HTTP) communication connections can utilize multiple connection resources based upon the features currently being used.

SB 1231 AI 1 x 12 bit

Table A-207, Analog inputs is incorrect. The common rejection value for SB 1231 AI x 12 bit is 40 dB, DC to 60 Hz (not 400 dB, DC to 60 Hz).

In Table A-209, Wiring diagrams for the analog input SB, the note, ① is further clarified as Connect "R" and "0+" for current applications.

TeleService modules

The Teleservice module, TS Adapter IE Advanced (order number 6ES7 972-0EA00-0XA0) is available for use with the S7-1200.

SM 1232, SM 1234, and SB 1232 analog output tables

In the following tables, the microsecond specification is incorrect. It should be shown as " μ s" (microseconds), not " μ S". The tables affected are:

- A-146 SM 1232 Analog outputs
- A-153 SM 1234 Analog outputs
- A-212 SB 1232 Analog outputs