

MANUFACTURER DOCUMENT PACKAGE

Manufacturer's Manual

Reference package for procurement and maintenance review

SIEMENS

6GK7443-1EX41-0XE0

INDUSTRIAL ETHERNET COMMUNICATION PROCESSOR

Used with the applicable SIMATIC S7-400 CP 443-1 Advanced configuration.

REFERENCE PACKAGE

OFFICIAL DOCUMENT

Selected official manufacturer pages follow this cover.

Source: Siemens SIMATIC S7-400 CP 443-1 Advanced manufacturer documentation; applicable pages 3, 4, 5, 13, 14, 15, 16, 24, 26, 27, 78

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Contents – Part A

S7-CPs for Ind. Ethernet – Configuring and Commissioning See General Part

Note

Please note Part A of the manual mentioned here. This also belongs to the description of the CP. Among other things, this includes the explanation of the safety notices used, Internet addresses and references as well as information that applies to all S7-CPs for Industrial Ethernet.

The general Part A version 1/2005 or higher also belongs to this Part B of the manual.

You can also obtain the current general Part A from the Internet at:

<http://support.automation.siemens.com/WW/view/en/30374198>

or

<http://support.automation.siemens.com/WW/view/en/27103175>

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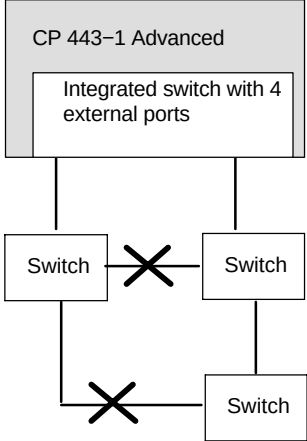
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3 Installation and Commissioning

3.1 Procedure / Steps in Installation

Installing the CP 443-1 Advanced involves the following steps:

Step	Explanation / Meaning
1. Turn off the power supply in the following situations: – You want to insert the CP in a central rack; – You want to insert the CP in a universal rack operating as the central unit. 2. Inserting the CP 443-1 Advanced: Fit in the CP onto the rack from the top and push in at the bottom. 3. Secure the CP with screws. Notice When using the universal rack UR1 or UR2 as an expansion rack, a communication bus transceiver is necessary!	The CP 443-1 Advanced can be plugged into all racks with slots for P and K bus attachment. The following racks are suitable: • Central rack CR2 (central unit) • Universal rack UR1 or UR2 – as central unit – as expansion rack with rack number 1–6 (only possible if PROFINET IO is not being used) When the CP is installed in an expansion rack, you only need to turn off the power supply for the expansion unit. Suitable slots in the rack: With the exception of the slots reserved for the power supply, the CP 443-1 Advanced can be operated in all slots with a P and K bus attachment.
4. Connect the CP to Industrial Ethernet over an RJ-45 jack.	You will find examples of network attachments in the general Part A of this manual.

Step	Explanation / Meaning
5. Where necessary, connect other components to the remaining free RJ-45 jacks.	To set up small local area networks or to connect several Ethernet devices, a 4-port switch has been integrated in the new CP 443-1 Advanced. With the autocrossing mechanism integrated in the switch, it is possible to use a standard cable to connect a laptop or PG directly. A crossover cable is not necessary. Please note the following points: • Manual configuration If a port is set to manual configuration, the autocrossing mechanism is also deactivated for this port. The port then behaves like the interface of a switch. Which cable you can use depends on the partner device. As default, the ports are set for automatic configuration. • Connecting switches If you connect further switches, make sure that no ring is formed in the network. You will find examples of network attachments in the general Part A of this manual. 

Step	Explanation / Meaning
6. The remaining steps in commissioning involve downloading the configuration data and user programs. Requirements: You have configured the CP in a STEP 7 project with HW Config and NetPro for the services you want to use.	You can connect the PG when configuring the CP as follows: • via MPI • via Industrial Ethernet For more detailed information is, please refer to /Part A/: – First addressing (node initialization) – Downloading the defined configuration The PG/PC requires a LAN attachment, for example via a CP 1613 or CP 1411 and must have the necessary software (for example the S7-1613 package or SOFTNET IE). The TCP/IP protocol or ISO protocol must be installed. The protocol used must then be applied to the S7ONLINE access point.
7. User diagnostics for commissioning and to analyze problems.	The following options are available: • Hardware Diagnostics and Troubleshooting with STEP 7; • Communication diagnostics with NCM S7 Diagnostics • Standard information using HW Config
8. Optional when using with PROFINET CBA: Download PROFINET CBA component	If the S7 station in which the CP is operated is used as a PROFINET CBA component, the interconnections are downloaded using SIMATIC iMap; with standard components, programs and configuration data are also downloaded with SIMATIC iMap. For more detailed information, refer to the topic "Using the CP with PROFINET CBA".

Caution

When installing the CP for use as a PROFINET IO controller, note the following points about the power supply:

When using the CP in the central rack or in a universal rack operating as central rack, you should not insert or remove the CP 443-1 Advanced when the power is on. If you remove the CP when the power supply is on, the CPU changes to STOP and indicates "I/O error" (in contrast to previous modules!).

After inserting the module with power applied, it is essential to turn the power supply off and on again.

Note:

If the CP is operated without PROFINET IO, it is possible to insert and remove the CP when the power is no without affecting the CPU.

3.2 C-PLUG (Configuration Plug)

Exchangeable C-PLUG

The CP has an exchangeable configuration plug (C-PLUG). This can store up to 32 MB of data in nonvolatile memory.

The retentive parameters include:

- IP address and IP parameters
- A newly set MAC address
- LAN settings
- Interconnection information for PROFINET CBA
- Data in the flash file system (see also Flash Area in Section 5.10 Memory Organization)
- SNMP Variables (modifiable)

This configuration plug simplifies replacement of modules. By simply exchanging the plug, all the data can be transferred to the replacement module.

Notice

The CP will not start up without a C-plug!

Area of Application

The C-PLUG is an exchangeable medium for storing configuration and project engineering data of the basic device (CP 443-1 Advanced). This means that configuration data remains available if the basic device is replaced.

Principle

The power is supplied by the basic device. When powered down, the C-PLUG retains all data permanently.

5.2 Characteristic Data for S7 Communication

Table 5-2

Characteristic	Explanation / Values
Total number of S7 connections on Industrial Ethernet	128 max.
LAN interface – data field length generated by CP per protocol data unit • sending • receiving	480 bytes / PDU 480 bytes / PDU
• Number of PG connections • Number of OP connections	2 max. 30 max.

Table 5-3 , continued

Characteristic	Explanation / Values
Performance AG_LSEND and AG_LRECV	Note: In this test constellation, a head station sends data to 8 partner stations as fast as possible over a separate connection to each station. - Blocks of data ≤ 212 bytes: ISO-on-TCP, TCP, UDP, ISO transport: 315 messages/s - Blocks of data 213–240 bytes: ISO-on-TCP, TCP, UDP, ISO transport: 190 messages/s - Blocks of data < 800 bytes ¹⁾: ISO-on-TCP, TCP, UDP, ISO transport: 75 messages/s ¹⁾ Note: A further increase in the user data length reduces the specified performance.
Restrictions for UDP - Transfer is not confirmed - Data field length - No reception of UDP broadcast	The transmission of UDP frames is unconfirmed, in other words the loss of messages is not detected or displayed by the send blocks (AG_SEND or AG_LSEND). The maximum length of the data fields is 2048 bytes. To avoid overload resulting from a high broadcast load, the CP does not permit reception of UDP broadcast. As an alternative, use multicast mode over a UDP connection; this gives you the opportunity of registering the CP specifically as a member of a multicast group.
LAN interface – data field length generated by CP per protocol data unit	- sending ISO-Transport, ISO-on-TCP, TCP: 400 bytes / TPDU - receiving - ISO transport: 512 bytes / TPDU - ISO-on-TCP: 1024 bytes / TPDU - TCP: 1460 bytes / TPDU

Notice

If you use the SEND/RECEIVE interface on the CP, one(!) system connection resource is used by S7 functions. Remember this in conjunction with the maximum number of CPU connection resources. Remember also that it is not normally possible to use all the system connection resources available for S7 functions for CPs.

5.3.2 Number of simultaneous SEND/RECEIVE calls

The number of SEND/RECEIVE calls that can be used at the same time is limited both by the CPU and by the CP.

If the maximum number of simultaneous SEND/RECEIVE calls is exceeded, the value 8302_H (no receive resources) is indicated in the STATUS of the surplus SEND functions. This can, for example, happen when too many SEND/RECEIVE calls are sent at the same time in OB1.

Limitation by the CPU

In productive operation, the number of simultaneous SEND/RECEIVE calls depends on the CPU resources being used. Note the information on the available CPU resources in Section 2.

The following CPU resources are required:

- Per SEND job short (FC5) or long (FC50): 1 resource
- Per RECEIVE job short (FC6): 1 resource
- Per RECEIVE job long (FC60): 2 resources

Limitation by the CP

A maximum of 64 SEND/RECEIVE connections can be operated by the CP.

At an assignment of 1 CP per CPU, the maximum number of SEND/RECEIVE calls that can be used at one time is limited as follows:

- SEND calls short (FC5) or long (FC50): max. 32^{*)} / 12^{**)} per CPU
- RECEIVE calls short (FC6): max. 64^{*)} / 24^{**)} per CPU
- RECEIVE calls long (FC60): variable ^{***)}

^{*)} The values apply to the CPUs 416 and CPU 417.

^{**)} The values apply to the CPUs 412 and CPU 414.

^{***)} The number of FC60s that can be used at the same time depends on the number of SEND calls active at the same time (see Tables 5-4 and 5-5).

Table 5-4 Dependency of the maximum number of RECEIVE calls long (FC60) used at the same time on the number of SEND calls (CPU 412/414)

Number of simultaneous SEND calls	0	1	2	3. 4	5	6	7	8 9	10	11	12
Max. number of simultaneous FC60s per CPU 412/414	19	18	17	16	15	14	13	12	11	10	9

12 Technical Specifications

Table 6-1 Technical Specifications

Transmission rate	10 Mbps and 100 Mbps Note: To operate with PROFINET IO and PROFINET CBA, the transmission rate of 100 Mbps full duplex is an absolute necessity.
Interfaces	
Attachment to Industrial Ethernet	4 RJ-45 jacks
Aging time (4-port switch)	5 minutes
C-PLUG (memory submodule)	Number of write cycles: approx. 100 000
Current consumption via the S7 backplane bus from 5 V:	1.8 A maximum
Current consumption for battery backed RAM file system (/sram) from battery of power supply module	0.018 mA typical 0.063 mA maximum
Power loss	7.25 W
Permitted ambient conditions - Operating temperature - Transportation/storage temperature - Relative humidity max. - Altitude	0 °C to +60 °C –40 °C to +70 °C 95% at +25 °C up to 2000 m above sea level
Design	
Dimensions, module in casing H x W x D (mm)	290 x 25 x 210
Weight	approx. 700 g

In addition to the specifications listed here, the "General Technical Specifications" listed in the reference manual S7-400/M7-400 "Module Data" /13/ apply to the CP 443-1 Advanced.

- Electromagnetic compatibility
- Transportation and storage conditions
- Mechanical and climatic ambient conditions
- Insulation tests, class of protection and degree of protection