

SIMATIC NET

S7-CPs for PROFIBUS

Manual Part B4

CP 443-5 Extended for PROFIBUS

6GK7 443-5DX04-0XE0 Version 1 or higher (Firmware Version V6.1 or higher)
for SIMATIC S7-400 / S7-400H

Status and fault LEDs

Mode selector

PROFIBUS interface
(9-pin D-sub female connector)



Notes on the Product

Note

All notes in the **product information bulletin** that is supplied with this product are valid and must be observed.

Compatibility with the Previous Version

Note

Make sure that you read the information regarding **extended functionality and restrictions** in Chapter 6 of this manual!

Contents

Contents - Part A

PROFIBUS CPs - General Information	See General Part
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Note

Please remember that Part A of the manual also belongs to the description of the CP. Among other things, it contains explanations of the safety notices, the references to literature, and general information that applies to all S7 CPs for PROFIBUS.

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

<http://www4.ad.siemens.de/view/cs/de/1158693>

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1 Properties / Services

Application

The CP 443-5 Extended communications processor is designed for use in a SIMATIC S7-400 (standard) and S7-400H (fault-tolerant system) programmable controller. It allows the S7-400 / S7-400H to be connected to a PROFIBUS fieldbus system.

You can use the CP as a router for data records intended for field devices (for example PA slaves).

Services

The current version of the CP 443-5 Extended supports the following communication services in the standard and H systems:

- **PROFIBUS-DP with the following characteristics:**

- DP master (class 1) (redundant operation in fault-tolerant system also possible)
- Direct data exchange (DP slave to DP slave)

As a DP master, the CP 443-5 Extended is capable of enabling direct data exchange for "its" DP slaves.

- SYNC /FREEZE (please refer to Tables 2-1 and 2-2)

The outputs or inputs can be synchronized from the within the user program using system function SFC11.

- Constant bus cycle time (only in the standard system)

The ability to set a constant bus cycle time means that the DP master always starts the DP bus cycle after the same interval.

- Selectable DP modes:

DPV1 functionality (default in STEP 7)	S7-compatible
DP master mode for: <ul style="list-style-type: none"> • DP slaves complying with the PROFIBUS DP-V0 and DPV1 standard • Siemens DP slaves (Refer to the information in Tables 2-1 and 2-2 on the required CPU)	DP master mode for: <ul style="list-style-type: none"> • DP Slaves complying with the PROFIBUS DP-V0 standard (DP slaves complying with the DPV1 standard can only be used with restricted functionality) • Siemens DP slaves

(For more information on the topic of DPV1, refer to the STEP 7 / Hardware Configuration online help)

- CiR (Configuration in RUN) - in the standard system

By making a change to the configuration with CiR (Configuration in RUN), it is possible to put a DP slave / DP slot extension into operation or take it out of operation when necessary while the system is running.

In other words, you can configure and activate additional DP slaves or DP slots while the S7 station is in RUN.

- Activate/deactivate DP slaves in the standard system

DP slaves can be activated and deactivated from the within the user program using system function SFC12.

- Diagnostic Requests

As a DP master class 1, the CP 443-5 supports diagnostic requests of a DP master class 2.

- Identifying the bus topology in a DP master system

As a DP master, the CP 443-5 Extended supports the measurement of the PROFIBUS bus topology in a DP master system using a diagnostic repeater (DP slave).

System function SFC103 in the user program can instruct diagnostic repeaters to measure the PROFIBUS BUS topology in a DP master system. When completed, the results of the measurements made by the diagnostic data can then be read in and processed by the user program.

- **S5-compatible communication (SEND/RECEIVE interface) on FDL connections of the following types:**

- specified FDL connections
- free layer 2 connections
- broadcast
- multicast

- **S7 communication and PG/OP communication**

- PG functions with upload / download of FM modules, configuration / diagnostics and routing

Note on routing: Dynamic switchover to alternative paths (for example if there is a problem on one of the possible transmission paths) is not supported.

- Operator control and monitoring functions (HMI)
- Client and server for data exchange on S7 connections via communications function blocks (fault-tolerant S7 connections also possible)¹⁾
- Download S7 connections and gateways in RUN.

- **Time-of-day synchronization via PROFIBUS**

- The CP forwards time-of-day synchronization frames from the LAN to the station (CPU = time slave) or from the station to the LAN (CPU= time master) or this station is synchronized via a different LAN and the time-of-day synchronization frame must be forwarded over PROFIBUS for the synchronization of further stations.
- The CP supports time stamping of distributed process signals in conjunction with the IM 153.
- Time-of-day status value (standard/daylight saving time switchover, synchronization status)

- **Data record routing**

You can use the CP as a router for data records intended for field devices (for example PA slaves). One tool that creates such data records for assigning parameters to field devices is SIMATIC PDM (Process Device Manager; see also SIMATIC PDM documentation...).

The services of the CP 443-5 Extended module listed above can be used at the same time.

1)

Blocks for S7 communication (see also STEP 7 online help or "System Software for S7-300/400 System and Standard Functions" manual):

BSEND	SFB 12
BRCV	SFB 13
PUT	SFB 14
GET	SFB 15
USEND	SFB 8
URCV	SFB 9
START	SFB 19
STOP	SFB 20
RESUME	SFB 21
STATUS	SFB 22
USTATUS	SFB 23
CONTROL	SFC 62

Project engineering

To configure and use any functions, you require **STEP 7 as of V5.3**.

It is possible to configure over the MPI or LAN/PROFIBUS.

Programming - Using Blocks

For some communication services, there are “off-the-peg” blocks (FCs/FBs) available that implement the interface in your STEP 7 user program. You will find a detailed description of these blocks in the NCM S7 for PROFIBUS manuals.

Notice

We recommend that you always use the latest block versions for all module types.

You will find information on the latest block version and links to download the current blocks in our Customer Support on the Internet:

<http://www4.ad.siemens.de/view/cs/en/8797900>

If you are using older block types, this recommendation only applies if you also have the latest firmware version.

You will find further information and Internet addresses in the Preface of the General Part of this manual.

Replacing Modules without a Programming Device

When installing the CP 443-5 Extended, the configuration data of the CP are always stored in the CPU. Therefore replacing modules is possible without having to download the configuration data from the PG.

The stored configuration data is protected from power outage by battery backup or by plugging a flash memory card into the CPU.

2 Requirements for Use

The CP 443-5 Extended V 6.1 described here is supported by all CPU operating systems in the versions listed in Tables 2-1 and 2-2.

2.1 Use with the Current CPU Types

Limits and Conditions

To use the CP type described here, the following limits and constraints apply within a rack:

- Number of operable CPs: 14
- Max. number of external DP chains (CP as DP master) : 10

Notice

The number CPs that can be operated as DP masters depends on the number of CP 443-1 Advanced modules operated as PROFINET IO controllers in the S7-400 station. In total, 10 CPs can be operated as

- PROFINET IO controllers (CP 443-1 Advanced) - maximum 4
 - DP masters (CP 443-5 Extended) - maximum 10
-

- Multicomputing is supported (except with CiR and H systems)

System Environment

The CP 443-5 Extended is supported by the S7-400 CPUs and CPU operating systems with the order numbers and versions listed in the table below.

From the table, you can see which functionality is supported when you use the CP 443-5 Extended V 6.1 with the various CPU types: The following characteristics are listed:

- CPU type, order number and version
- Option of multicomputing
- The number of CPs that can be operated with one CPU
- The maximum number of external DP chains of an S7 station;
- The number of AG-SEND or AG-RECV calls on the SEND/RECEIVE interface that can be active at the same time (data exchange on FDL connections over PROFIBUS and corresponding connections over Industrial Ethernet).
- Whether the CPU supports SYNC/FREEZE functionality (SFC11) via the CP.
- Whether the CPU supports the activate / deactivate (SFC12) DP functionality via the CP.

- Whether the CPU supports the functionality for identifying the bus topology in a DP master system (SFC103) via the CP.
- DPV1 functionality
- CiR functionality (DP slave / DP slot, configurable extension)

Notice

ET 200M devices that were assigned to SYNC/FREEZE groups with STEP 7, **must not** have modules of the type FM or CP inserted.

Table 2-1 Use with the Current CPU Types

CPU	Order Number of the CPU: 6ES7...	Firmware version						
		As of V4.	24 / 24	Number of AG-SEND or AG-RCV calls at same time				
				SYNC/FREEZE functionality				
				DP-V1 functionality				
				CiR / HciR functionality ¹⁾				
Activate / deactivate DP slave					Identify bus topology			
CPU 412	..412-1XF04-0AB0	As of V4.	24 / 24	+		+	+	+
		As of V4.1	24 / 24	+	+	+	+	+
CPU 412-2	..412-2XG04-0AB0	As of V4.	24 / 24	+	+	+	+	-
		As of V4.1	24 / 24	+	+	+	+	+
CPU 414-2	..414-2XG04-0AB0	As of V4.	24 / 24	+	+	+	+	-
		As of V4.1	24 / 24	+	+	+	+	+
CPU 414-3	..414-3XJ04-0AB0	As of V4.	24 / 24	+	+	+	+	-
		As of V4.1	24 / 24	+	+	+	+	+
CPU414-4H	..414-4HJ04-0AB0	As of V4.	24 / 24	-	+	+	-	-
		As of V4.0.5	24 / 24	-	+	+	-	+
CPU 416-2	..416-2XK04-0AB0	As of V4.	64 / 64	+	+	+	+	-
		As of V4.1	64 / 64	+	+	+	+	+
CPU 416-3	..416-3XL04-0AB0	As of V4.	64 / 64	+	+	+	+	-
		As of V4.1	64 / 64	+	+	+	+	+
CPU 416F-2	..416-2FK04-0AB0	As of V4.	64 / 64	+	+	+	+	-
		As of V4.1	64 / 64	+	+	+	+	+

Table 2-1 Use with the Current CPU Types, continued

CPU	Order Number of the CPU: 6ES7...	Firmware version						
		Number of AG-SEND or AG-RECV calls at same time						
		SYNC/FREEZE functionality						
		DP-V1 functionality						
		CiR / H-CiR functionality ¹⁾						
Activate / deactivate DP slave						Identify bus topology		
CPU417-4	..417-4XL04-0AB0	As of V4.	64 / 64	+	+	+	+	-
		As of V4.1	64 / 64	+	+	+	+	+
CPU417-4H	..417-4HL04-0AB0	As of V4.	64 / 64	-	+	+	-	-
		As of V4.0.5	64 / 64	-	+	+	-	+

Legend:

- + => The characteristic is supported / the listed mode is possible
- => The characteristic is **not** supported / the listed mode is **not** possible

1) All CPUs are CiR capable (the H-CPU's H-CiR).

2.2 Converting older Systems

The discontinued CPUs listed in Table 2-2 support the following functionality in conjunction with the CP 443-5 Extended V 6.1:

- **No** DPV1 functionality
- **No** CiR functionality (DP slave, configurable expansion)
- **No** identification of the bus topology by the user program
- Maximum number of external DP chains per station: 4
- Number of operable CPs: 8
- Multicomputing

Table 2-2 Use with no longer available CPU Types - Part 1

CPU	Order number	Version	Number of AG-SEND or AG-RECV calls at same time	
				SYNC/FREEZE
CPU 412	6ES7 412-1XF01-0AB0	2 or higher	12 / 12	-
	6ES7 412-1XF02-0AB0	2 or higher	12 / 12	+
CPU 413	6ES7 413-1XG01-0AB0	2 or higher	12 / 12	-
	6ES7 413-1XG02-0AB0	1 or higher	12 / 12	+
CPU 413-2	6ES7 413-2XG01-0AB0	2 or higher	12 / 12	-
	6ES7 413-2XG02-0AB0	1 or higher	12 / 12	+
CPU 414-1	6ES7 414-1XG01-0AB0	2 or higher	12 / 12	-
	6ES7 414-1XG02-0AB0	2 or higher	12 / 12	+
CPU 414-2 128 KB	6ES7 414-2XG01-0AB0	2 or higher	12 / 12	-
	6ES7 414-2XG02-0AB0	2 or higher	12 / 12	+
CPU 414-2 384 KB	6ES7 414-2XJ00-0AB0	4 or higher	12 / 12	-
	6ES7 414-2XJ01-0AB0	2 or higher	12 / 12	+
CPU 416-1	6ES7 416-1XJ01-0AB0	2 or higher	32 / 32	-
	6ES7 416-1XJ02-0AB0	1 or higher	32 / 32	+
CPU 416-2 0.8 MB	6ES7 416-2XK00-0AB0	4 or higher	32 / 32	-
	6ES7 416-2XK01-0AB0	1 or higher	32 / 32	+
CPU 416-2 1.6 MB	6ES7 416-2XL00-0AB0	4 or higher	32 / 32	-
	6ES7 416-2XL01-0AB0	1 or higher	32 / 32	+

Legend:

- + => The characteristic is supported / the listed mode is possible
- => The characteristic is **not** supported / the listed mode is **not** possible

Table 2-3 Use with no longer available CPU Types - Part 2

CPU	Order Number of the CPU: 6ES7...	Firmware version	Number of AG-SEND or AG-RECV calls at same time					
			SYNC/FREEZE functionality					
			DP-V1 functionality					
			CiR / H-CiR functionality ¹⁾					
			Activate / deactivate DP slave					Identify bus topology
CPU 412	..412-1XF03-0AB0	As of V3.1	24 / 24	+	+	+	+	-
CPU 412-2	..412-2XG00-0AB0	As of V3.1	24 / 24	+	+	+	+	-
CPU 414-2	..414-2XG03-0AB0	As of V3.1	24 / 24	+	+	+	+	-
CPU 414-3	..414-3XJ00-0AB0	As of V3.1	24 / 24	+	+	+	+	-
CPU414-4H	..414-4HJ00-0AB0	As of V3.1	24 / 24	-	+	+	-	-
CPU 416-2	..416-2XK02-0AB0	As of V3.1	64 / 64	+	+	+	+	-
CPU 416-3	..416-3XL00-0AB0	As of V3.1	64 / 64	+	+	+	+	-
CPU 416F-2	..416-2FK02-0AB0	As of V4.	64 / 64	+	+	+	+	-
CPU417-4	..417-4XL00-0AB0	As of V3.1	64 / 64	+	+	+	+	-
CPU417-4H	..417-4HL00-0AB0	As of V2.1	64 / 64	-	-	+	-	-
	..417-4HL01-0AB0	As of V3.1	64 / 64	-	+	+	-	-

Legend:

- + => The characteristic is supported / the listed mode is possible
- => The characteristic is **not** supported / the listed mode is **not** possible
- 1) All CPUs are CiR capable (the H-CPU H-CiR).

3 Installation and Commissioning



Caution

The CP 443-5 Extended must not be plugged in or removed when the power is connected.

If you do remove or insert the CP while it is powered on, the CPU changes to STOP; this does not cause damage to the CP. Afterwards, you must turn the power for the central rack off and on again.

Procedure / Steps

Step	Explanation / Meaning
1. Insert the CP 443-5 Extended	<p>The CP 443-5 Extended can be operated in the following racks:</p> <ul style="list-style-type: none"> • Central rack CR2, CR3 • Universal rack UR1 UR2 or UR2H as the central or expansion rack with rack no. 1-6 (only possible if there is no DP operation). <p>The CP 443-5 Extended cannot be used in an ER1 or ER2 expansion rack.</p> <p>Suitable slots in the rack: With the exception of the slots reserved for the power supply and IM-R, the CP 443-5 Extended can be inserted in all slots with a P and K bus interface (in the central or in an expansion rack no. 1-6).</p>

Notice

When you are using PROFIBUS-DP, the module must only be operated in the central rack!

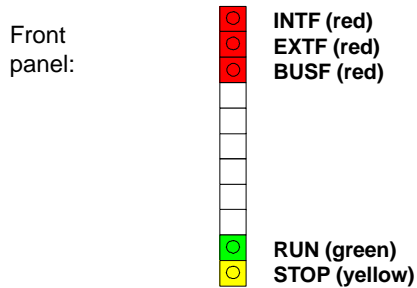
When using the universal rack as an extension rack, you require an IM with a communication bus link!

Step	Explanation / Meaning
2. Attachment to PROFIBUS	Note the information in the General part of this manual.

Step	Explanation / Meaning
3. Configuration	<p>Depending on the communication services being used, configuration involves the following steps:</p> <ul style="list-style-type: none"> • Node initialization This is necessary in all situations. This assigns a PROFIBUS address and bus parameters to the PROFIBUS CP. • Configuring connections: This is necessary when using the communication services, S7 functions and FDL connections (SEND/RECEIVE interface). • DP configuration This is necessary when the DP mode is used. <p>For details, see /2/, General Part.</p>
4. PG/PC Attachment for Configuration	<p>You can connect the PG when configuring the CP as follows:</p> <ul style="list-style-type: none"> • via MPI • via LAN / PROFIBUS The CP 443-5 Extended must already have a PROFIBUS address. <p>For details, see /2/, General Part.</p>

4 Displays and Mode Selector

LED Display of the Operating Status of the CP



The different combinations of the five LEDs on the front panel indicate the status of the CP:

Table 4-1

INTF LED	EXTF LED	BUSF LED	RUN LED	STOP LED	CP Operating Status
			☀	●	Starting up (STOP->RUN)
			●	○	Running (RUN)
			●	☀	Stopping (RUN->STOP)
			○	●	Stopped (STOP)
●			○	●	STOP with internal error or memory reset.
○	○	○	○	☀	Waiting for firmware update (duration 10 seconds after power on)
●	●	○	○	☀	Waiting for firmware update (CP currently has an incomplete firmware version).
●			●	○	<ul style="list-style-type: none"> Download in RUN active / CiR RUN with internal error (for example, bad configuration data)
		●			PROFIBUS bus errors
	●	☀	●	○	RUN; however problems on DP chain (DP slave not in data transfer or not accessible)
	●	○	●	○	RUN; however problems on DP chain (faulty module in DP slave).
☀	☀	☀	☀	☀	Module fault / system error

Legend: ● on ○ off ☀ flashing

Field gray: undefined / any

Controlling the Operating Status

There are different ways in which you can control the status of the CP 443-5 Extended, as follows:

- Mode selector
- Configuration software NCM S7 Diagnostics
- SIMATIC Manager in STEP 7

To control the status from STEP 7 / NCM S7, the mode selector must be set to RUN.

Mode Selector

With the mode selector, you can set the following operating statuses:

- Switch from STOP to RUN:
The CP reads the configured and/or modified data into the work memory and then changes to the RUN mode.
- Switch from RUN to STOP:
The CP changes to STOP with the following results:
 - Established connections (FDL connections, configured, and unconfigured S7 connections) are terminated
 - DP slaves are taken out of data transfer
 - Data record routing is deactivated

In the STOP mode

- Configuration and diagnostics are possible
- The time of day is distributed

5 Performance Data

5.1 Supported Transmission Rates

The transmission rate is set with the SIMATIC STEP 7 configuration software. For the permitted rates, refer to Table 7-1 in Section 7

5.2 Characteristics of the DP Interface

No special FBs or FCs are necessary for the DP mode. The interfacing to the distributed peripheral I/O is by direct I/O access or using SFCs/SFBs of the CPU (see /11/).

Table 5-1

Characteristic	Explanation / Values
Number of DP slaves that can be operated	125
Max. size of the input area of all DP slaves	4 Kbytes
Max. size of the output area of all DP slaves	4 Kbytes
Maximum number of inputs per DP slave	244 bytes
Maximum number of outputs per DP slave	244 bytes
Max. size of the consistent area for a module	128 bytes

Diagnostic Requests

As a DP master class 1, the CP 443-5 supports diagnostic requests of a DP master class 2.

Note

In some situations, it is necessary to increase the default value for the startup parameter "Monitoring time for transfer of parameters to modules" in the Properties dialog of the CPU:

- When there is a large number of modules (DP slaves) configured that can be assigned parameters;
 - When a high value is configured for the constant bus cycle time in the network properties of the PROFIBUS DP chain.
-

CiR Functionality (see also function manual “Modifying the System during Operation via CiR” Siemens AG /14/)

The numbers of connections etc. shown in Table 5-1 also apply in the case of a configured DP slave expansion (CiR functionality) to the entire DP master system.

If you specify the properties of a CiR object in the DP master system of the CP 443-5 Extended in STEP 7, these values are included in checks performed by STEP 7.

The configurable properties relate to:

- The number of DP slaves and modules you can insert in a DP slave
- The number of input and output bytes that can still be configured in RUN.

5.3 Characteristics of S5-compatible Communication (SEND/RECEIVE Interface) over FDL Connections

The following information is important for operating FDL connections (specified, free layer 2 (SDA and SDN), broadcast, multicast):

Table 5-2

Characteristic	Explanation / Values
Total number of FDL connections that can be operated.	32 maximum
Size of the transferable data area on FDL connections	1-240 bytes maximum per specified FDL connection (for sending and receiving) Free layer 2, broadcast and multicast: Per job up to 236 bytes of user data can be transferred. The job header requires an additional 4 bytes.

Cycle Load Time due to FDL Connections

The cycle load time for FDL connections is largely dependent on the time required to execute the function blocks (AG-SEND, AG-RECV) on the S7-400 CPU.

The following table lists the cycle load times of the available FCs in milliseconds. A distinction is made between the statuses "job completed" and "job active". The entries relate to the run time in the CPU 417 (6ES7 417-4XL04-0AB0 - see Table 2-1).

Table 5-3

Status	Job Completed		Job Active	
	min.	max.	min.	max.
Component / FC				
AG-SEND	0.10 ms	0.11 ms	0.14 ms	0.16 ms
AG-RECV	0.13 ms	0.14 ms	0.12 ms	0.13 ms

5.4 Characteristics of S7 Communication

The following data are important for operating S7 connections:

Table 5-4

Characteristic	Explanation / Values
Number of S7 connections that can be operated via PROFIBUS	Maximum 48 (The value depends on the S7-400 CPU being used.)

5.5 Parallel Use of Communications Services (Multiprotocol Operation)

If you use the available communication services at the same time, certain restrictions result in terms of the communications performance.

To illustrate the relationship between the connection types, the DP mode, and configured connections, the following values apply to the **typical** configurations.

Table 5-5

Connection Type	Number of Connections	With the DP Configuration
FDL connections	32	No DP
	32	with DP mode
S7 connections	48	No DP
	48	with DP mode
FDL and S7 connections ¹⁾	59	No DP
	54	with DP mode

1) one additional 1 S7 connection can be set up online (for example for routing)

Note

If PG or HMI functions or data record routing are used, a suitable number of S7 connections must be reserved during configuration!

Help Provided by STEP 7

The number of connections on PROFIBUS shown in Table 5-5 can vary due to other influencing factors. The STEP 7 configuration tool displays warnings and help messages as soon as limit values are exceeded.

Scaling Services in the “Mixed Mode”

The DP delay time is used to scale cyclic DP communication and the other services (FDL and S7 connections). A DP delay time of 0 seconds guarantees the fastest possible DP update. By increasing the DP delay time, you create extra time on the CP for handling other services.

Note

Recommendation: In the mixed mode - PROFIBUS DP along with communications functions - a delay should be selected (recommended: 1 ms at transmission rates > 1.5 Mbps).

Notice

For the SFCs 11, 12, 13, 51, 55, 56, 57, 58, 59 and 103 and for SFBs 52 and 53, several calls are necessary. The duration of job processing depends on the load, bus round trip time and the transmission rate. If these SFCs are called in a loop within one cycle, the cycle time could be exceeded.

Exceptions:

- SFC51 requires only one call if it is used for reading the diagnostic data in a diagnostic interrupt (SFC51 with parameter 'partial system status list' 0xB1 and 0xB2).
- Only one call is necessary for SFB54 (receive alarm with SFB54 "RALRM").

Blocks for DPV1 (according to the PNO standard ¹⁾):

- SFB52 RDREC "Read data record from a DP slave" corresponds to SFC59
 - SFB53 WRREC "Write data record to a DP slave" corresponds to SFC58
 - SFB54 ALARM "Read alarm information from a DP slave"
-

1) PNO: PROFIBUS Users Organization

5.6 Time-of-day Synchronization

The CP 443-5 forwards time-of-day synchronization frames in the following directions:

1. From the CPU via the CP to PROFIBUS if the local CPU is the time master or this station is synchronized via a different LAN and the time-of-day synchronization frame is forwarded via PROFIBUS for the synchronization of further stations.
2. From PROFIBUS over the CP to the CPU if a remote station is time master, for example:
 - a remote CPU 41x with PROFIBUS interface (for example, CP 443-5)
 - a remote PC with CP 5412 / 5613 / 5614

Note

With transmission rates of < 1.5 Mbps, we recommend that you configure a synchronization interval of at least 10 s.

5.7 Data Record Routing

A maximum of 11 connections can be established simultaneously to PA field devices at any one time.

PDM can, however, use several connections to one PA field device (for more information, refer to the manual "PDM - The Process Device Manager").

5.8 Use in Fault-tolerant Systems ¹⁾

With a CP 443-5 Extended, you have the following options in a fault-tolerant (H) system:

- Operating fault-tolerant S7 connections with communication services configured on one partner
- or**
- You can implement redundant and single peripheral structures (mixed mode is also possible).

You will find more detailed information about the possible operating and structural options in the "SIMATIC S7-400H Programmable Controller Manual, Fault-tolerant Systems".

If the CP 443-5 Extended is used in a fault-tolerant S7-400H system, the following communications services can also be used on single (non-redundant) connections:

- S7 connection (including PG functions and PG routing)
- S5-compatible communication (SEND/RECEIVE interface) on FDL connections
- Time-of-day distribution

Note

¹⁾ Please note the CPU types in Table 2-1/2-2/2-3

5.9 Other Characteristics

Note on DP:

The connected DP slaves can only be assigned to and serviced by one CPU.

Notice

If you use the CiR functionality, multicomputing is not possible.

Memory Reset on the CP



Warning

Please note that when you reset the CP memory using NCM Diagnostics or the SIMATIC Manager, the configuration data on the CPU must also be deleted otherwise the data will become inconsistent.

Special feature of the DP mode:

If the CPU is in the RUN mode, the memory reset is rejected by the CP.

DP Diagnostic Frames when the CPU is in STOP

All diagnostic frames from DPV0 standard slaves and all DP alarm frames from DP-S7/DP-V1 standard slaves arriving when the CPU is in STOP mode are handled as follows:

- In "S7-compatible" mode

The problems that still exist at the transition from CPU STOP to CPU RUN are passed on the user program.

- In DP-V1 mode

The diagnostic/alarm frames are forwarded even when the CPU is in STOP mode, however, they must be evaluated by a suitable user program when the module starts up.

6 Compatibility with the Previous Product

6.1 Extended Functionality Compared with Previous Product:

Compared with previous products, the CP 443-5 Extended (6GK7 443-5DX04-0XE0) with firmware version V6.0 or higher has significantly improved performance in all services, in particular when they are operated parallel to each other.

The CP443-5 Extended described here (6GK7 443-5DX04-0XE0) with firmware version V6.1 or higher can be used as a replacement for the following predecessors of the CP 443-5 Extended:

- 6GK7 443-5DX00-0XE0
- 6GK7 443-5DX01-0XE0
- 6GK7 443-5DX02-0XE0
- 6GK7 443-5DX03-0XE0
- 6GK7 443-5DX04-0XE0, V6.0

Version History / Predecessor Products

The document "Version History/Current Downloads for the SIMATIC NET S7 CPs" contains information on all the previously supplied PROFIBUS CPs for SIMATIC S7. You will find the latest version of this document at:

<http://www4.ad.siemens.de/view/cs/de/9836605>

6.2 Replacing Older Modules / Replacing Defective Modules

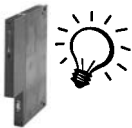
Replacing Modules

Please follow the following procedure when replacing an older module with one of those described here:

Table 6-1

Module used until now	Configuration Procedure
6GK7 443-5DX00-0XE0 6GK7 443-5DX01-0XE0 6GK7 443-5DX02-0XE0 6GK7 443-5DX03-0XE0 6GK7 443-5DX04-0XE0	<p>Configuration unchanged (replacing a defective module)</p> <p>If you have no extra requirements for the CP compared with the old one, no changes to the configuration are necessary.</p> <p>All you need to do is replace the hardware with the power supply turned off.</p> <p>Extending the Configuration (using new functions)</p> <p>If you want to use options that you had not used with the previous CP, follow the steps below (see also Chapter 3):</p> <ol style="list-style-type: none"> 1. In STEP 7 / HW Config replace the already configured CP 443-5 Extended with the new module; you will find this in the Hardware Catalog. 2. Modify your configuration according to your requirements, for example in the Properties dialog for the PROFIBUS subnet. 3. Save, compile, and download the configuration data to the CPU or the CP.

Information in the Online Help and Documentation on S7 CPs for PROFIBUS



The information “for new modules” contained in both the STEP 7 / NCM S7 online help and the S7 CPs for PROFIBUS manual is also relevant for the CP described here. Look out for this symbol.

7 Technical Specifications

General Technical Data

Table 7-1

Technical Data	Value
Supported Transmission Rates	9.6 Kbps, 19.2 Kbps, 45.45 Kbps 93.75 Kbps, 187.5 Kbps, 500 Kbps 1.5 Mbps, 3 Mbps, 6 Mbps, 12 Mbps
Interfaces	
Attachment to PROFIBUS	9-pin D-sub female connector
Maximum current consumption on the PROFIBUS interface with network components attached (for example, optical network components)	100 mA at 5V
Power supply	5 V DC
Current consumption - from S7-400 backplane bus	1.0 A typical at 5V
Power loss	5.5 W
Permitted ambient conditions	
• Operating temperature	0 °C to +60 °C
• Transportation/storage temperature	-40 °C to +70 °C
• Relative humidity	max. 95% at +25 °C
• Altitude	up to 2000 m above sea level
Design	
Dimensions W x H x D (mm)	25 x 292 x 200
Weight	approx. 800 g

All the information in /1/ in the Section “General Technical Data” regarding the following topics also applies to the CP 443-5 Extended

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