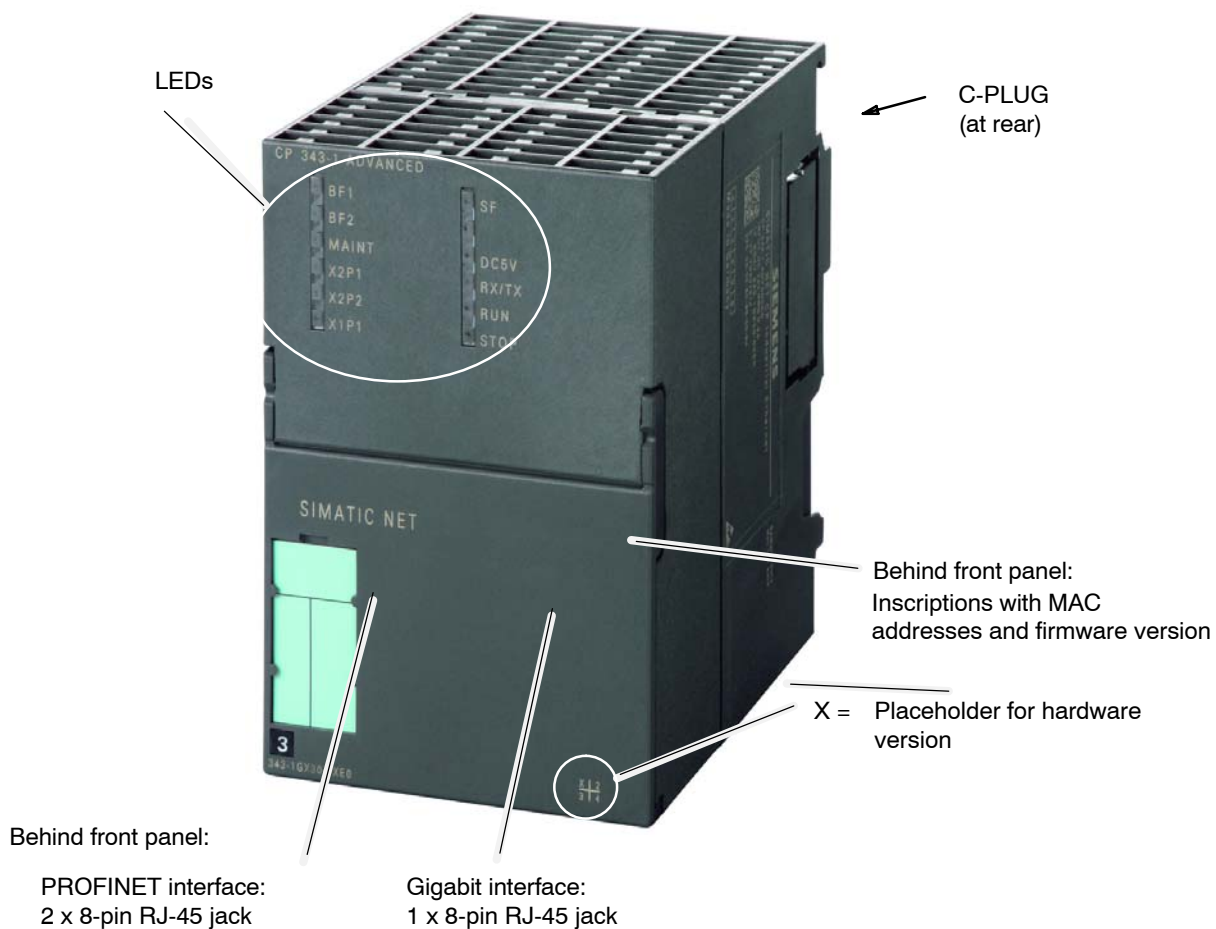# SIEMENS

SIMATIC NET

S7-CPs for Industrial Ethernet

Manual Part B

CP 343-1 Advanced

6GK7 343–1GX30–0XE0   as of hardware version 1, as of firmware version V1.0

for SIMATIC S7–300 / C7–300 and
SINUMERIK 840D power line

LEDs

C-PLUG
(at rear)

Behind front panel:
Inscriptions with MAC
addresses and firmware version

X = Placeholder for hardware
version

Behind front panel:

PROFINET interface:
2 x 8-pin RJ-45 jack

Gigabit interface:
1 x 8-pin RJ-45 jack

Notes on the product

Product names

This description contains information on the following product

- **CP 343−1 Advanced**
  Order number 6GK7 343−1GX30−0XE0
  as of hardware version 1 and firmware version V1.0
  for SIMATIC S7−300 / C7−300 and SINUMERIK 840D power line

Note

In this document, the term CP is used instead of the full product name.

Compatibility with the previous version

Note

Make sure that you read the information regarding **extended functions and restrictions** in Chapter 8 of this manual!

Address label: Unique MAC address preset for the CP

The CP is supplied with a MAC address preset in the factory for the PROFINET interface.

The gigabit interface has its own default MAC address.

The MAC addresses are printed on the housing.

If you configure a MAC address (ISO transport connections), we recommend that you use the MAC addresses printed on the module for module configuration!

- This ensures that you assign a unique MAC address in the subnet!

- If you replace a module, the MAC address of the predecessor is adopted when you load the configuration data; configured ISO transport connections remain operable.

❏

Contents

Contents − Part A

Note

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

Part A of the manual release 05/2008 and this Part B belong together

You can download the general Part A from the Internet:

http://support.automation.siemens.com/WW/view/en/8777865

Contents − Part B

1   Properties / Services

1.1   Application

The CP 343-1 Advanced communications processor is intended for operation in a SIMATIC S7-300, C7-300 or SINUMERIK 840D power line automation system. It allows attachment of the S7-300 to Industrial Ethernet and supports PROFINET.

The CP has the following interfaces:

- PROFINET interface (Ethernet interface ERTEC)

  To integrate the CP in a linear bus or ring, to connect a further Ethernet device or to use PROFINET media redundancy, an IRT-compliant 2-port ERTEC switch with autocrossing, autonegotiation and autosensing was integrated in the CP.

- Gigabit interface

  The CP also has an Ethernet interface complying with the gigabit standard IEEE 802.3ab. This is independent of the PROFINET interface and supports autocrossing, autonegotiation and autosensing. The gigabit interface can, for example, be used to connect to a PG/PC or to a higher-level company network.

  The gigabit interface does not support the following services:

  – PROFINET

  – Programmed communications connections (FB55 IP_CONFIG).

1.2   Communication services

The CP supports the following communication services:

- PROFINET IO

  PROFINET IO allows direct access to IO devices over Industrial Ethernet.

  The CP can be used as a PROFINET IO controller and as a PROFINET IO device at the same time.

  – PROFINET IO controller

    IO controller mode with alarm block and acyclic data exchange using read/write data record

  – PROFINET IO device

    Integration of the SIMATIC S7-300 programmable controller over the CP as intelligent PROFINET IO device.

  PROFINET IO can only be used via the ports of the PROFINET interface.

- PROFINET IO – IRT communication (Isochronous Real Time)

  IRT communication is possible in PROFINET IO. IRT communication is possible only when the CP is used as a PROFINET IO controller or as a PROFINET IO device but not for both modes at the same time.

- PROFINET CBA

  Use of a SIMATIC S7-300 for Component based Automation on the basis of the PROFINET standard of the PNO. This standard allows:

  – Component technology in automation;

  – Communication between intelligent devices is configured graphically instead of requiring laborious programming

  – Vendor-independent, plant-wide engineering.

  Component based Automation allows access to the variables of PROFINET components from all standard PC applications with the OPC client interface, for example, visualization systems. Over the OPC server, objects can be selected directly from a variable selection list of the selected PROFINET component.

- S7 communication and PG/OP communication with the following functions:

  – PG functions (including routing)

  – Operator control and monitoring functions (HMI)

    Multiplexing TD/OP connections

  – Client and server for data exchange using communication blocks [1] S7 connections configured at both ends

  – Server for data exchange on S7 connections configured at one end only without communication blocks on the S7-300 / C7-300 station

- S5-compatible communication with the following functions:

  – SEND/RECEIVE interface over ISO transport connections, ISO-on-TCP, TCP and UDP connections

    UDP frame buffering on the CP can be disabled during configuration. When necessary, this allows you to achieve a shorter reaction time between the arrival of a UDP frame and its evaluation on the CPU.

  – Multicast over UDP connection

    The multicast mode is made possible by selecting a suitable IP address when configuring connections.

  – FETCH/WRITE services (server; corresponding to S5 protocol) via ISO transport connections, ISO-on-TCP connections and TCP connections;

[1]
Blocks for S7 communication (see also STEP 7 online help or manual
                    "System Software for S7-300/400 System and Standard Functions"):

BSEND	FB12
BRCV	FB13
PUT	FB14
GET	FB15
USEND	FB8
URCV	FB9
C_CNTRL	FC62

The addressing mode can be configured for FETCH/WRITE access as the S7 or S5 addressing mode.

– LOCK/UNLOCK with FETCH/WRITE services;

– Connection diagnostics using the user program

- IT functions

    – Monitoring devices and process data (HTML process control)

    – FTP functions (File Transfer Protocol) for file management and access to data blocks in the CPU (client and server functions)

    If you do not require these functions, you can disable them in the STEP 7 configuration and disable the port (properties dialog of the CP > "IP Access Protection" tab).

    – Sending E-mail via ESMTP with "SMTP-Auth" for authentication on an E-mail server

1.3   Other services

- Media redundancy (MRP)

    Within an Ethernet network with a ring topology, the CP supports the media redundancy protocol MRP. You can assign the role of redundancy manager to the CP.

    If you are using IRT communication, no media redundancy is supported.

- Time-of-day synchronization over Industrial Ethernet using the following configurable modes:

    – SIMATIC mode

    The CP receives MMS time messages and synchronizes its local time and the time of the CPU.

    (accuracy approx. +/− 1 second)

    You can choose whether or not the time of day is forwarded. The forwarding direction can also be selected (station > LAN or LAN > station).

    Synchronization using the SIMATIC mode is only possible on the PROFINET interface.

    or

    – NTP mode (NTP: Network Time Protocol)

    The CP sends time-of-day queries at regular intervals to an NTP server and synchronizes its local time of day and the time of the CPU (accuracy approx. +/− 1 second).

    Via the gigabit interface, synchronization is possible only with the NTP mode.

- Addressing using a factory-set MAC address

  The CP can be reached over the default or configured MAC address to allow an IP address to be assigned.

- SNMP Agent

  The CP supports data queries over SNMP version V1 (**S**imple **N**etwork **M**anagement **P**rotocol). It delivers the content of certain MIB objects according to the MIB II standard and LLDP MIB.

- Time of day for the diagnostic buffer

  If a time master exists (using the NTP or SIMATIC mode), the time for CP-internal diagnostic buffer is synchronized over the LAN.

- Module access protection

  To protect the module form accidental or unauthorized access, protection can be configured at various levels.

- IP access protection (IP-ACL)

  IP access protection provides the following options:

  - Communication via the CP of the local S7 station can be restricted to partners with specific IP addresses

  - Access from a subnet, for example connected to the PROFINET interface to another subnet can be restricted; the other subnet can, for example, be connected to the gigabit interface.

- IP configuration

  For the PROFINET interface, you can configure how and with which method the CP is assigned the IP address, the subnet mask and the address of a gateway.

  As an alternative to STEP 7, you have the option of assigning the connection configuration via a block interface in the user program (FB55: IP_CONFIG).

  Note: Does not apply to S7 connections.

- Web diagnostics

  With the aid of Web diagnostics, you can read out the diagnostic data from a station connected via the CP to a PG/PC with an Internet browser.

  This makes it possible, for example, to read the diagnostic buffers of the intelligent modules in the rack.

  If you do not require this function, you can disable it in the STEP 7 configuration and disable the port (properties dialog of the CP > "IP Access Protection" tab).

2   Requirements for Use

2.1   Operation in controller device families

The CP can be operated in the following device families:

- S7-300 stations with the CPU types

  - Standard

  - Compact

  - Modular

- C7 control systems in C7 packaging system

- SINUMERIK

The following tables show the devices with which the CP can be operated with this range of functions:

Notice

The tables list the CPUs and devices approved at the time of printing this manual. S7-300 CPUs or C7 or C7 control systems approved later and not listed in the table also support the range of functions described here.

Table 2-1   Use of the CP with S7-300

CPU	Order number
CPU 312	6ES7 312–1AD10–0AB0 6ES7 312–1AE13–0AB0
CPU 312C	6ES7 312–5BD01–0AB0 6ES7 312–5BE03–0AB0
CPU 312 IFM	6ES7 312-5AC02-0AB0
CPU 313	6ES7 313-1AD03-0AB0
CPU 313C	6ES7 313–5BE01–0AB0 6ES7 313–5BF03–0AB0
CPU 313C-2 DP	6ES7 313–6CE01–0AB0 6ES7 313–6CF03–0AB0
CPU 313C-2 PtP	6ES7 313–6BE01–0AB0 6ES7 313–6BF03–0AB0

Table 2-1   Use of the CP with S7-300

CPU	Order number
CPU 314	6ES7 314–6AE01–0AB0 6ES7 314–6AE02–0AB0 6ES7 314–6AE03–0AB0 6ES7 314–6AE04–0AB0 6ES7 314–1AF10–0AB0 6ES7 314–1AF11–0AB0 6ES7 314–1AG13–0AB0
CPU 314 IFM	6ES7 314–5AE03–0AB0 6ES7 314–5AE10–0AB0
CPU 314C-2 DP	6ES7 314–6CF02–0AB0 6ES7 314–6CG03–0AB0
CPU 314C-2 PtP	6ES7 314–6BF01–0AB0 6ES7 314–6BF02–0AB0 6ES7 314–6BG03–0AB0
CPU 315	6ES7 315-1AF03-0AB0
CPU 315-2 DP	6ES7 315–2AF03–0AB0 6ES7 315–2AG10–0AB0
CPU 315–2 PN/DP [1]	6ES7 315–2EG10–0AB0 6ES7 315–2EH13–0AB0
CPU 315F–2 DP	6ES7 315–6FF01–0AB0
CPU 315F–2 PN/DP	6ES7 315–2FH10–0AB0 6ES7 315–2FH13–0AB0
CPU 315T–2 DP	6ES7 315–6TG10–0AB0
CPU 316-2 DP	6ES7 316-2AG00-0AB0
CPU 317–2 DP	6ES7 317–2AJ10–0AB0
CPU 317–2 PN/DP [1]	6ES7 317–2EJ10–0AB0 6ES7 317–2EK13–0AB0
CPU 317F–2 DP	6ES7 317–6FF00–0AB0 6ES7 317–6FF03–0AB0
CPU 317F–2 PN/DP	6ES7 317–2FJ10–0AB0 6ES7 317–2FK13–0AB0
CPU 317T–2 DP	6ES7 317–6TJ10–0AB0
CPU 318-2	6ES7 318-2AJ00-0AB0
CPU 319–3 PN/DP	6ES7 318–3EL00–0AB0
CPU 319–3 F PN/DP	6ES7 318–3FL00–0AB0
CPU 614	6ES7 614-1AH03-0AB3

Table 2-2   Use of the CP in C7 control systems

C7	Order number
C7−613	6ES7 613−1CA01−0AE03 6ES7 613−1CA02−0AE3
C7−633 DP	6ES7 633−2BF02−0AE03
C7−635 Keys	6ES7 635−2EC01−0AE3 6ES7 635−2EC02−0AE3
C7−635 Touch	6ES7 635−2EB01−0AE03 6ES7 635−2EB02−0AE3
C7−636 Keys	6ES7 636−2EC00−0AE03 6ES7 636−2EC00−0AE3
C7−636 Touch	6ES7 636−2EB00−0AE3

Table 2-3   Use of the CP with SINUMERIK 840D power line

Device group with CPU type
NCU561.3 with PLC 315-2 DP
NCU561.4 with PLC 314C-2 DP
NCU561.5 with PLC 317-2 DP
NCU57x.3 with PLC 315-2 DP M/S
NCU57x.4 with PLC 314C-2 DP
NCU57x.5 with PLC 317-2 DP

2.2   Configuration

Downloading configuration data

It is possible to download the configuration data to the CP via MPI or LAN/Industrial Ethernet. Addressing for the first time is possible only over the PROFINET interface of the CP. The following version of STEP 7 is required:

Table 2-4

STEP 7 version	Functions of the CP
V5.4 Service Pack 4	Requirement for configuring all functions of the CP.

Project engineering for PROFINET CBA

To be able to work in the PROFINET CBA environment, you require the SIMATIC iMap engineering tool.

SIMATIC iMap requires a connection over Industrial Ethernet (TCP/IP protocol).

The following SIMATIC iMap project engineering software is required:

Table 2-5

SIMATIC iMap version	Functions of the CP
as of V3.0 + Service Pack 1	The full PROFINET CBA functionality of the device can be used as of hardware version 1 and firmware version V1.0.

Table 2-6

Version STEP 7 add-on	Functions of the CP
as of V3.0 + Service Pack 4	The full functionality as described in this document can be used.

To operate PROFINET CBA, you require the current service packs of SIMATIC iMap containing the current FB88 V1.5 function block:

SIMATIC iMap V3.0 – Download Service Pack 1

SIMATIC iMap STEP 7 add-on V3.0 – Download Service Pack 4

http://support.automation.siemens.com/WW/view/de/10805413

2.3   Programming

Programming − FCs / FBs

For some communications services, there are pre-programmed blocks (FCs/FBs) available as the interface in your STEP 7 user program.

Please refer to the documentation of the FCs / FBs in the online help of STEP 7 or in the manual /63/.

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 area on the Internet:

http://support.automation.siemens.com/WW/news/en/8797900

With the older module types, this recommendation assumes that you are using the latest firmware for the particular block type.

Caution

The communication blocks for S7-300 (SIMATIC NET block libraries for S7-300 in STEP 7) must not be called in more than one priority class! If, for example, you call a communication block in OB1 and in OB35, block execution could be interrupted by the higher-priority OB.

If you call blocks in more than one OB, you must write your program so that a communication block that is currently executing cannot be interrupted by another communication block (for example by disabling/enabling SFC interrupts).

---

3   Installation and Commissioning

3.1   Procedure / steps

Step	Explanation / meaning
1. Install the CP on the S7 standard rail.	Slots 4 to 11 are permitted for the CP in racks 0 to 3 (connected by IM 360/361).
2. Establish the connection via the enclosed bus connector to the backplane bus.	Proceed as in the sections dealing with setup and wiring, described in detail in /1/.
Note The CP cannot be used in an extension rack that is connected via the IM 365! Reason: The required communication bus is not connected to the extension rack via the IM 365.	
3. Connect the CP to the power supply.	Follow the steps as described in detail in /1/ when wiring between the power supply and the CPU.
Notes • The CPU, CP and IM (if one exists) must be connected to the same power supply. • Only wire up the S7-300 / C7-300 with the power switched off!	
4. Connect the CP to Industrial Ethernet.	

5. The remaining steps in commissioning involve downloading the configuration data.	To download the configuration, you can connect the PG as follows:
	• via MPI
	• via Industrial Ethernet
	   For further details, refer to the general Part A of this manual:
	   – Addressing the first time (IP address assignment / node initialization)
	      Note: Addressing for the first time is possible only over the PROFINET interface.
	   – 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.

Step	Explanation / meaning
6. Use the diagnostic functions during commissioning and to analyze problems.	The following options are available: • The LED displays on the CP • Hardware diagnostics and troubleshooting with STEP 7 • Communication diagnostics with STEP 7 / NCM Diagnostics • Standard information using HW Config • Web diagnostics • If applicable, evaluation of the alarm block FB54 in the user program • Queries via SNMP
7. 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; for more detailed information, refer to the topic "Using the CP with PROFINET CBA".

Notice

Note the startup behavior:

Starting IT services, particularly when initializing the flash file system, may result in delays during startup. It may be necessary to set the CPU parameter "Monitoring time for transfer of parameters to modules" to a higher value – for example 30 s instead of the default 10 s.

This avoids the CP changing to STOP "Stopped by error".

You will find the parameter in the Properties dialog of the CPU in the "Startup" tab.

PROFINET interface:
2 x 8−pin RJ−45 jack (ring ports)

Slider for setting the
chassis ground contact

Gigabit interface:
1 x 8-pin RJ--45 jack

Connector for the
power supply
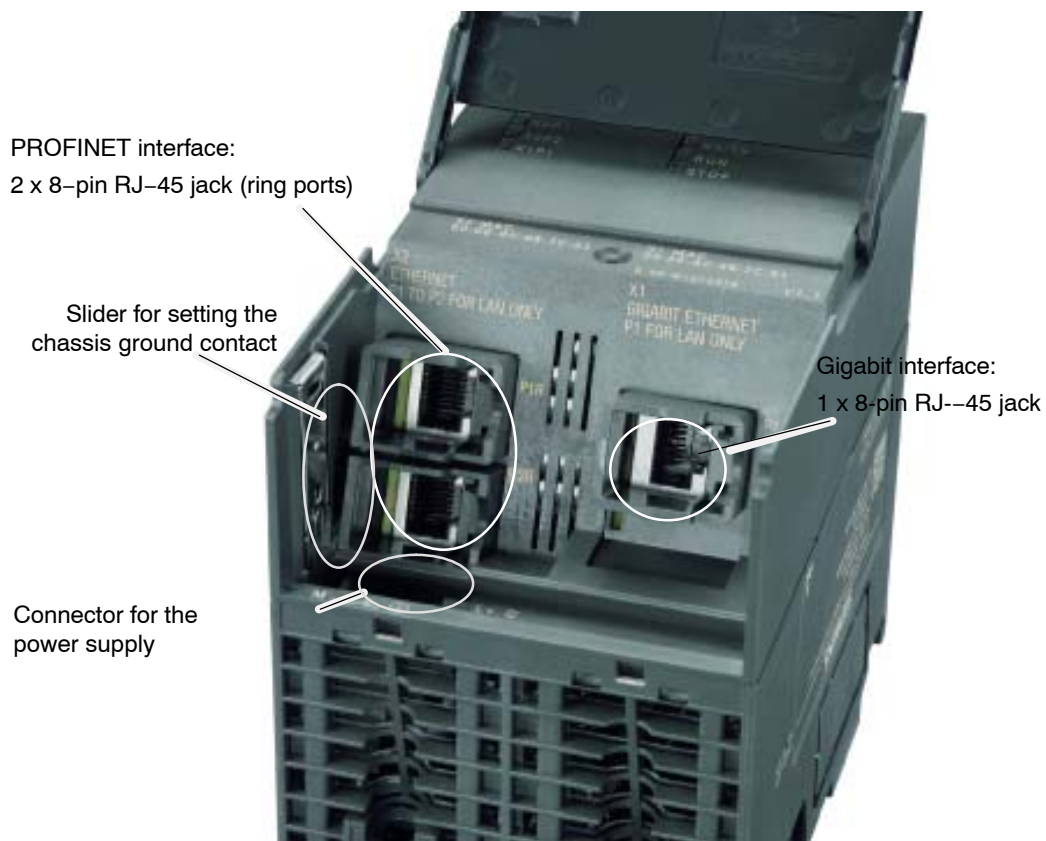
Figure 3-1   Connectors with the front panel open

Ground/chassis ground concept

Notice

Please note the instructions regarding the grounding and chassis ground concept
in the SIMATIC S7 installation guides; see "SIMATIC S7 Programmable Controller
S7−300 − Installation and Hardware: Installation Manual" /1/.

Behind the hinged panel on the left of the device, you will see a slider with which
you can connect or disconnect the chassis ground of the 24 V power supply with
reference ground.

- Slider pushed in: chassis and reference ground connected (note: the slider
  must be felt to lock in place).

- Slider pulled out: No connection between chassis and reference ground.

When shipped: Slider pushed in

Use a screwdriver to set the slider.

Note

An Ethernet cable can also be inserted and removed with the power supply on.

Note

The hinged front panel must be kept closed during operation.

The module must be installed so that its upper and lower ventilation slits are not covered, allowing adequate ventilation.

⚠ **Warning**

When used under hazardous conditions (zone 2), the devices must be installed in an enclosure.

Where ATEX 95 (EN 60079−15:2005, EN 60079−0:2006) applies, this enclosure must meet at least IP54 in compliance with EN 60529.

WARNING − EXPLOSION HAZARD: DO NOT DISCONNECT EQUIPMENT WHEN A FLAMMABLE OR COMBUSTIBLE ATMOSPHERE IS PRESENT.

⚠ **Warning**

The device is designed for operation with safety extra-low voltage (SELV). This means that only safety extra-low voltages (SELV) complying with IEC950/EN60950/ VDE0805 may be connected to the power supply terminals.

The power unit for supplying the device must comply with NEC Class 2 as described by the National Electrical Code(r) (ANSI/NFPA 70).

The power of all connected power units in total must correspond to a limited power source (LPS).

Configuration

To set up the CP for the communications services, note the information on the topic of configuration in Section 2.2 of this device manual.

3.2   C-PLUG (configuration plug)

Exchangeable C−PLUG

The CP has a receptacle for configuration plug (known as a C−PLUG) that is supplied as standard with the device. This can store up to 32 MB of data in nonvolatile memory.

Area of application

The C−PLUG is an exchangeable medium for storing configuration and project engineering data of the basic device (CP 343−1). This means that configuration data remains available if the basic device is replaced. It is possible to replace the module without a PG.

The retentively stored parameters include the complete configuration data:

• IP address and IP parameters

• A newly set MAC address

• LAN settings

• SNMP Variables (modifiable)

• Interconnection information for PROFINET CBA

Notice

The CP functions are available only when a C−PLUG is inserted.

If the C−PLUG is missing, the CP starts up but only diagnostic functions are available.

Recommendations for data storage

We always recommend that you store the project engineering data on the CPU.

If the configuration data is extensive, for example due to maximum PROFINET IO configurations, it is advisable to store the configuration data on the CP (on the C−PLUG) in the following situations:

• The configuration memory on the CPU is inadequate;

• The delays due to the extent of the configuration data when starting up the module are unacceptable.

Principle

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

Flash components are used in the C−PLUG in which the number of write operations is limited.

This must be taken into account when using blocks in the user program that write data to the C−PLUG (for example FB55 with changing IP parameters). Refer to the information in Section 5.9.

Inserting in the C-PLUG slot

The slot for the C-PLUG is on the rear panel of the device.

The C-PLUG is inserted in the receptacle.

Notice

The C−PLUG must be inserted or removed only when the power is off!

Figure 3-2   Fitting the C-PLUG and removing it from the CP with a screwdriver

Function

If the C-PLUG has not yet been written to (as shipped), when the device starts up, all the configuration data of the CP is saved automatically on it. Modifications to the configuration during operation are also saved on the C−PLUG without any action by the user being necessary.

If the C-PLUG is inserted, the basic device automatically uses the configuration data of the C-PLUG. This assumes that the data was written by a compatible device type.

If a fault occurs, the basic device can then be replaced much faster and more simply. If a device needs to be replaced, the C-PLUG is simply taken from the failed component and inserted in the replacement. As soon as it starts up, the replacement automatically has the same device configuration as the failed device.

C−PLUG formatting

Use only C−PLUGs that are formatted for the CP 343−1. C−PLUGs that have already been used and formatted in other device types must first be formatted for the CP 343−1 device type.

You do this with STEP 7 / NCM Diagnostics. For more detailed information, refer to the online help in the topic "General Diagnostics Functions − C-PLUG Diagnostics Object".

After formatting, all data areas are deleted on the C-PLUG. Project engineering is adopted only after reloading or after turning on the power supply again.

Removing the C-PLUG

It is only necessary to remove the C−PLUG if a fault occurs on the basic device (see Figure 3-2).

Notice

The C−PLUG must be removed only when the power is off!

Diagnostics

Inserting a C−PLUG containing the configuration of an incompatible device type, accidentally removing the C−PLUG or general malfunctions of a C−PLUG are signaled by the diagnostic mechanisms of the host device (SF−LED red).

3.3   Module replacement without PG

General procedure

The project engineering data for the CP is stored optionally on the CPU or on the CP or in the C−PLUG of the CP; this means that the module can be replaced with the module of the same type (identical order number) without a PG.

If you replace the module with the predecessor module 6GK7 343−1GX21−0XE0, the gigabit interface is deactivated.

For information on replacing previous modules, refer to the section "Compatibility" in Chapter 8.

Module replacement: Special feature with PROFINET CBA and with IT functions

For PROFINET CBA, the interconnection information is stored on the C−PLUG. The file system for the IT functions is also stored on the C-PLUG. The following must therefore be distinguished when replacing a module:

- C−PLUG of the previous module is used

  In this case, the CBA interconnection information and the data in the file system on the C−PLUG are available directly.

  Although a diagnostic buffer entry is generated indicating that the C-PLUG comes from a different device type, you can nevertheless continue to use the C-PLUG from the GX21 device type in the new device (GX30).

- A new C−PLUG is used

  In this case, you will need to reload the configuration with STEP 7 and the CBA interconnection information with SIMATIC iMap.

Module replacement: Special feature of IP address assignment from a DHCP server

During configuration of the CP you can specify the IP configuration in the properties dialog; one option is to obtain the IP address from a DHCP server.

Notice

When replacing modules, remember that the factory-set MAC address of the new module is different from the previous module. When the factory-set MAC address of the new module is sent to the DHCP server, this will return either a different or possibly even no IP address.

Ideally, you should therefore configure IP as follows:

Always configure a client ID if you want to obtain the same IP address from the DHCP server after replacing the module.

If you have configured a new MAC address instead of the factory-set MAC address (generally the exception), the DHCP server always receives the configured MAC address and the CP obtains the same IP address as the replaced module.

Obtaining the IP address from DHCP is only possible on the PROFINET interface ports and not on the gigabit interface.

3.4   Controlling the operating mode

You have the option of changing the mode of the CP between RUN and STOP using the STEP 7 / NCM S7 configuration software (PLC > Accessible Nodes).

Procedure

- Switch from STOP to RUN:

  The CP reads the configured and/or downloaded data into the work memory and then changes to the RUN mode.

- Switch from RUN to STOP:

  The CP changes to STOP. Established connections (ISO transport, ISO-on-TCP, TCP, UDP connections) are terminated (transitional phase with LED display "STOPPING");

  The reaction is as follows in STOP:

  – The communications connections mentioned above are terminated;

  – The configuration and diagnostics of the CP is possible (system connections for configuration, diagnostics, and PG channel routing are retained);

  – HTTP access is possible

  – The routing function is active

  – The time of day is not forwarded

  – PROFINET IO is disabled.

  – PROFINET CBA is disabled.

Module access protection

The configurable module access protection has the following effects on the functions described here:

- Module access protection is locked

  The functions can be executed.

- Module access protection: Status dependent

  With this setting, it is only possible to access the CP when the CPU is in STOP mode.

4   LED Displays

The display on the front panel consists of 11 LEDs that indicate the operating mode and the communication status.

Front
panel:

BF1		**SF**
BF2		
MAINT		**DC5V**
X2P1		**RX/TX**
X2P2		**RUN**
X1P1		**STOP**

The LEDs have the following meaning:

- SF: Group error

- BF1:   Bus fault gigabit interface

- BF2:   Bus fault PROFINET IO (PROFINET interface)

- MAINT   Maintenance necessary (diagnostic buffer)

- DC5V: DC 5 V power supply via the backplane bus (green = OK)

- RX/TX: Acyclic data exchange, for example SEND/RECEIVE
          (not relevant for PROFINET IO data)

- RUN: RUN mode

- STOP: STOP mode

- X2P1:   Link status of Ethernet port 1 (PROFINET interface)

- X2P2:   Link status of Ethernet port 2 (PROFINET interface)

- X1P1:   Link status of the gigabit interface

LEDs for displaying the mode

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

SF(red)	BF1 / BF2 (red) *)	RUN(green)	STOP(yellow)	CP Operating Mode
red on	–	off	yellow on	• Starting up after power "ON" or • Stopped (STOP) with errors – For example no valid C-PLUG detected In this state, the CPU or intelligent modules in the rack remain accessible using PG functions.
off	off	green flashing	yellow on	Starting up (STOP->RUN)
off	off	green on	off	Running (RUN)
off	off	green on	yellow flashing	Stopping (RUN->STOP)
off	off	off	yellow on	Stopped (STOP) In the STOP mode configuring and performing diagnostics on the CP remain possible.
–	red on	–	–	• Interface networked but no LAN cable inserted or • Duplicate IP address detected
–	red flashing	green on	–	The CP is configured as a PROFINET IO device; there is no data exchange with the PROFINET IO controller. (BF2 only)
red on	red flashing	green on	–	The CP (configured as a PROFINET IO controller) has detected at least one IO device as disrupted. (BF2 only)
red on	off	green on	off	• RUN with external error; Diagnostic message from one or more IO devices is pending. IO device diagnostics will provide detailed information. or • Event indication in conjunction with the MRP function; The CP diagnostic buffer contains detailed information.
red flashing	red flashing	green flashing	yellow flashing	Module fault / system error

Legend: ● (colored) on   ○ off   ☀ (colored) flashing   "–" any

*) The behavior applies to BF1 and BF2 if there is no restriction listed in the "CP mode" column.

The "MAINT" LED

Notice

When the "MAINT" LED lights up, important error messages and/or diagnostic interrupts have occurred. The CP continues in RUN mode.

Check the entries in the diagnostic buffer of the device.

Firmware download – LED display patterns

The LED display patterns when downloading the firmware are described in Chapter 10.

LEDs for displaying the CP communication status

In addition to the LEDs that signal the CP state, the following LEDs provide information about the status of the CP interface to Industrial Ethernet.

Table 4-1

LED	Display		Meaning
RX/TX (green)	☀ (green flashing)		The CP is sending/receiving over Industrial Ethernet Note: PROFINET IO services are not signaled here.
X2P1 / X2P2 X1P1 (green / yellow)	○		Port has no connection to Industrial Ethernet.
	● (green)	green	Existing connection over port to Industrial Ethernet (LINK status).
	☀ (yellow flashing)	green / yellow	LED flashes yellow (constant light green): Port sending/receiving over Industrial Ethernet or PROFINET IO. Note: All received / sent frames are signaled for each specific port including those simply forwarded by the switch.
	● (yellow)	yellow	Continuous data transfer at the port over Industrial Ethernet (for example PROFINET IO on the PROFINET interface).

Legend: ● (colored) on   ○ off   ☀ (colored) flashing   "–" any

CP 343-1 Advancedfor Industrial Ethernet / Manual Part B
Release 06/2008
C79000-G8976-C202-04

Module identification (PROFINET interface)

Using the SIMATIC Manager, you can search for and identify the module initially by browsing the connected network with the menu "PLC" > "Edit Ethernet Node". If you select the found node in the "Browse Network" dialog, and then click "flash", all the port LEDs of the PROFINET interface flash.

5 Performance Data / Operation

Note

Measurements of transmission and reaction times in Ethernet, PROFIBUS and PROFINET networks for a series of configurations can be found on the Internet at the following address:

http://www.siemens.com/automation/pd

5.1 Number of possible connections over Ethernet

Table 5-1

Characteristic	Explanation / values
Permitted number of simultaneous connections in total over Industrial Ethernet	48 maximum

Example of maximum load

You can, for example, operate:

> 32 S7 connections
> 2 ISO-on-TCP connections
> 8 TCP connections
> 6 UDP connections

Also:

- Other TCP connections for Web diagnostics and FTP server mode

- As PROFINET IO device:
  1 PROFINET connection to a PROFINET IO controller

  and/or

- As PROFINET IO controller:
  PROFINET connections to PROFINET IO devices

5.2   Characteristic data for S7 communication

Table 5-2

Characteristic	Explanation / values
Number of connections for S7 communication on Industrial Ethernet	in each case, up to • 16 Operator control and monitoring functions (HMI) • 16 S7 connections configured at one end • 16 S7 connections configured at both ends The number depends on the CPU type being used. Please refer to /1/ for the values for your CPU.
LAN interface – data field length generated by CP per protocol data unit • sending • receiving	 240 bytes / PDU 240 bytes / PDU

Execution times of the FBs for S7 connections

To calculate the CPU cycle times (OB1) with S7 connections, the execution time for the function blocks (FBs PUT, GET, USEND, URCV, BSEND, BRCV) required for processing on the S7-300 / C7-300 CPU is the decisive factor.

Table 5-3

Block type	Execution time on the CPU per block call					
	PUT	GET	USEND	URCV	BSEND	BRCV
Data length	<=160 bytes				<=16 KB	
CPU 314C-2 DP (6ES7 314-6CF00-0AB0)	<4.9 ms	<4.6 ms	<4.4 ms	<4.8 ms	<4.7 ms	<4.9 ms
CPU 317-2 PN/DP (6ES7 317-2EJ10-0AB0)	<1.1 ms	<1.4 ms	<1.3 ms	<1.5 ms	<1.4 ms	<1.9 ms

5.3   Characteristics of the SEND/RECEIVE interface

The SEND/RECEIVE interface provides access to communication over TCP, ISO-on-TCP, ISO transport, E-mail, and UDP connections.

The following characteristics are important:

Table 5-4

Characteristic	Explanation / values
Number of ISO transport connections + ISO-on-TCP connections + TCP connections + UDP connections + E-Mail connections **in total**	Maximum 16 Notes: • All UDP connections are also possible in the multicast mode • Free UDP connections are supported by the CP. • E-mail connection: 1
Max. data length for blocks AG_SEND (V4.0 and higher) and AG_RECV (V4.0 and higher)	AG_SEND and AG_RECV allow the transfer of data fields of between 1 and 240 bytes. • 1 to 8192 bytes for ISO transport, ISO-on-TCP, TCP, E-mail; • 1 to 2048 bytes for UDP
Restrictions for UDP • Transfer is not confirmed	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).
• No reception of UDP broadcast	To avoid communication overload resulting from a high broadcast load, the CP does not permit reception of UDP broadcast.
• UDP frame buffering	Size of the frame buffer with buffering enabled: 2 Kbytes Note: Following a buffer overflow, newly arriving frames are discarded.

Execution times of the FCs AG_SEND / AG_RECV

To calculate the CPU cycle times (OB1) with SEND/RECEIVE connections, the execution time for the FCs (FC AG_SEND, FC AG_RECV) required for processing on the S7-300 / C7-300 CPU is the decisive factor.

Table 5-5

Component	Explanation / values	
Execution time on the CPU 315-2 DP (6ES7 315-2EG10-0AB0)	per AG_SEND block call: • <1 ms at <= 240 bytes	per AG_RECV block call: • <1 ms at <= 240 bytes
Execution time on the CPU 317-2 PN/DP (6ES7 317-2EJ10-0AB0)	per AG_SEND block call: • <0.8 ms at <= 240 bytes	per AG_RECV block call: • <0.8 ms at <= 240 bytes

5.4 PROFINET IO

5.4.1 Characteristic data

Possible modes with PROFINET IO

With PROFINET IO, the CP can handle real-time communication (RT) and/or isochronous real-time communication (IRT).

In this case, it can function as a PROFINET IO device and/or as a PROFINET IO controller.

The following combinations of modes are possible:

- RT device + RT controller
- RT device + IRT controller
- IRT device + RT controller

The following combination is not possible:

- IRT device + IRT controller

Note

Note the information on IRT communication in Section 9.5.

CP as PROFINET IO controller

The CP supports the following maximum configuration as a PROFINET IO controller:

Table 5-6

Characteristic	Explanation / values
Number of possible PROFINET IO devices	128, including a maximum of 32 IRT devices
	If data is stored on the CPU, the number of operable PROFINET IO devices may be < 128. This depends on the free configuration memory available on the CPU type you are using.
Size the input area over all PROFINET IO devices *)	4096 bytes max.
Size the output area over all PROFINET IO devices	4096 bytes max.

Table 5-6   , Fortsetzung

Characteristic	Explanation / values
Size of the IO data area per submodule of a module in an IO device	
• Inputs	240 bytes
• Outputs	240 bytes
Size of the consistency area for a submodule	240 bytes
Permitted number of CP 343-1 Advanced modules that can be operated as a PROFINET IO controller in an S7-300 station	1

*) The diagnostic addresses of the PROFINET IO devices cannot be used in the IO controller as inputs. The data area of the inputs is reduced by the diagnostic addresses used.

CP as PROFINET IO device

Use the following components in the hardware catalog of STEP 7 / HW Config to configure the CP as PROFINET IO device :

PROFINET IO > I/O > SIMATIC S7-CP > CP... > **6GK.. > V1.0**

In contrast, use the component of the hardware catalog of STEP 7 / HW Config listed below in the following situations:

• The CP is also being used as an IRT controller in addition to device mode.

• The CP is assigned as an IO device to an IO controller that does not support "expanded diagnostics".

   PROFINET IO > I/O > SIMATIC S7-CP > CP... > **6GK..(migration) > V1.0**

The CP supports the following maximum configuration as a PROFINET IO device:

Table 5-7

Characteristic	Explanation / values
Size of the input area of the PROFINET IO device	1024 bytes max.
Size of the output area of the PROFINET IO device	1024 bytes max.
Size of the IO data area per submodule in a PROFINET IO device	
• Inputs	240 bytes
• Outputs	240 bytes
Size of the consistency area for a submodule	240 bytes
Maximum number of submodules	32

Execution times of the FCs PNIO_SEND / PNIO_RECV

The calculation of the reaction times with PROFINET IO is determined by the execution time of the function blocks required on the S7-300 CPU (PNIO_SEND, PNIO_RECV).

Table 5-8

Component	Explanation / values	
Execution time on the CPU 315-2DP (6ES7 315-2EG10-0AB0)	per PNIO_SEND block call: • < 1 ms at 240 bytes	per PNIO_RECV block call: • < 1 ms at 240 bytes
Execution time on the CPU 317-2PN/DP (6ES7 317-2EJ10-0AB0)	per PNIO_SEND block call: • < 0.8 ms at 240 bytes	per PNIO_RECV block call: • < 0.8 ms at 240 bytes

5.4.2 How PROFINET IO devices start up with a large operational configuration

When operating the module with a large configuration (up to 48 communication connections and up to 128 PROFINET IO devices), it may take several minutes when the station starts up before all PROFINET IO devices have received configuration data from the PROFINET IO controller. The IE/PB Link PN IO operating as a PROFINET IO device is particularly affected by this.

To avoid the CPU stopping the distribution of configuration data in this situation, it may be necessary to increase the monitoring times on the CPU (Properties dialog, "Startup" tab).

5.4.3 Operating PROFINET IO alongside other services

Sporadically used services

Please remember the following when you use functions that affect the configuration of the mode alongside PROFINET IO (FB55; Primary Setup Tool, STEP 7, NCM Diagnostics):

Notice

These functions can influence operation with PROFINET IO to such an extent that an interruption of the cyclic I/O data exchange of the PROFINET IO devices lasting several seconds may result.

5.4.4   Effects of multicast communication on RT communication

---

Notice

If PROFINET IO RT communication is operated at the same time as broadcast (BC) or multicast (MC) in an Industrial Ethernet subnet, RT frames may be delayed by long BC frames or MC frames.

These frames can, for example, be generated by the communications FCs AG_SEND or AG_RECV.

With certain constellations, this can lead to a PROFINET RT communication abort. The factors that influence this are the switch configurations ("switch depth"), the update time and the MC/BC frame lengths.

For more detailed information on the influencing factors and possible solutions, refer to:

http://support.automation.siemens.com/WW/view/en/9104898

5.5   Characteristic data for PROFINET CBA

The CP supports PROFINET CBA interconnections between PROFINET CBA components.

The "typical" values specified below are values that cause the SIMATIC iMap configuration tool to generate a warning if they are exceeded; it is nevertheless possible that the configuration can be operated.

If one of the limit values specified for the interconnections is exceeded, they cannot be downloaded to the module. When the interconnections are downloaded, the SIMATIC iMap configuration tool generates an error message to this effect. If a limit value relating to the number or size of components is exceeded, the CPU will not change to RUN!

Table 5-9   Characteristic data for PROFINET CBA communication

Characteristic	Typical value	Limit value
PROFINET CBA		
Number of remote interconnection partners	32	64
Total of all I/Os	600	1000
Data length of all incoming I/Os	2048 bytes	8192 bytes
Data length of all outgoing I/Os	2048 bytes	8192 bytes
Data length for arrays and structures (acyclic interconnections), maximum	2048 bytes	8192 bytes
Data length for arrays and structures (cyclic interconnections), maximum	250 bytes	250 bytes
Data length for arrays and structures (local interconnections), maximum	–	2400 bytes

Table 5-9   Characteristic data for PROFINET CBA communication, Fortsetzung

Characteristic	Typical value	Limit value
Remote interconnections with acyclic transmission		
Sampling frequency: sampling interval, min. Possible values: 100, 200, 500, and 1000 ms	Fast value: 20% Medium value: 40% Slow value: 40%	100 ms minimum
Number of incoming interconnections	50	128 maximum
Number of outgoing interconnections	50	128 maximum
Data length of all incoming interconnections	2048 bytes	8192 bytes
Data length of all outgoing interconnections	2048 bytes	8192 bytes
Remote interconnections with cyclic transmission		
Transmission frequency: transmission interval, min. Possible values: 8, 16, 32, 64, 128, 256 and 512 ms	Fast value: 20% Medium value: 40% Slow value: 40%	8 ms minimum
Number of incoming interconnections	125	200
Number of outgoing interconnections	125	200
Data length of all incoming interconnections Note: The data length of all incoming interconnections limited to 484 bytes gross per transmission frequency and per partner station. Due to the differences in header information, the net data length depends on the data types being used. In the best case, a maximum of 2 byte arrays with a length of 238 bytes can be interconnected; in the worst case, a maximum of 120 properties of the type "Char" can be interconnected.	1000 bytes	2000 bytes
Data length of all outgoing interconnections	1000 bytes	2000 bytes
HMI variables over PROFINET (acyclic)		
Number of stations that can register for HMI variables (PN OPC/iMap) Stations are 2 * PN OPC and 1 * SIMATIC iMap	–	3
HMI variable update	–	500 ms minimum
Number of HMI variables	–	200 maximum
Data length of all HMI variables	1600 *)	8192 bytes
Device-internal interconnections		
Number of device-internal interconnections	50	256
Data length of all device-internal interconnections	400 bytes	2400 bytes
Interconnections with constants		
Number of interconnections with constants	100	200 maximum
Data length of all interconnections with constants	1024 bytes	4096 bytes
PROFIBUS proxy functionality		
Supported	No	No

Table 5-9   Characteristic data for PROFINET CBA communication, Fortsetzung

Characteristic	Typical value	Limit value
Access to S7extended variables		
Maximum number of S7 connections for access to variables with the PROFINET attribute "s7extended". Note: The PROFINET attribute "s7extended" is used only by OPC applications over the OPC server; variables with this attribute can only be used with OPC applications.	16 (not checked by iMap)	32 maximum Note: You should also keep in mind the maximum number of connections according to Section 7.3

*) The value is not checked by iMap.

Note

For information on the data length and data type in PROFINET CBA communication, refer to the online help on SIMATIC iMap, the "Creating PROFINET Components" manual and the "Configuring Plants with SIMATIC iMap" manual.

Reaction times for PROFINET CBA

The achievable reaction times for PROFINET CBA communication depend on the following factors:

- Type of interconnection (cyclic or acyclic) and the transmission frequency or scanning frequency

- Configuration limits on the component interface (interface DB of the PROFINET CBA function block (FB88))

• CPU cycle time

As a result, the reaction times for cyclic PROFINET CBA interconnections may exceed the configured value for the update time. You should therefore check the achievable reaction time during commissioning.

Since reaction times < 50 ms cannot be guaranteed, you should not set a transmission frequency $\leqq 32$ ms for cyclic interconnections.

Reaction times of 50 ms can be achieved at CPU cycle times of < 5 ms and with the following configuration limits:

• < 200 bytes inputs and at the same time

• < 200 bytes outputs

• maximum of 200 interconnection distributed on 32 partners

With higher CPU cycle times, the PROFINET CBA function block (FB88) should be called more often in the user program.

Note

The values of the utilization parameters of the selected components displayed in the network view by SIMATIC iMap with the "Edit / Check utilization" function relate to the data exchange as far as the CP. They do not apply to data access from the user program.

Execution times of the PN_InOut (FB88) function block

To calculate the CPU cycle times (OB1) in CBA operation, the execution time for the FB PN_InOut (FB88) required for processing on the S7-300 / C7-300 CPU is the decisive factor.

Table 5-10

Duration	length of the interface DB / bytes			
	512	**1024**	**2048**	**4096**
at least / µs	122	123	123	123
maximum / µs	2330	2330	2400	2400
typical / µs	1100	1270	1400	1435

From the table, you can see that the OB1 cycle is extended by at least 122 µs and by a maximum of 2400 µs.

5.6   Characteristic data for E-mail mode

Characteristics

The Advanced CP operates as an E-mail client. It supports the SMTP service (Simple Mail Transfer Protocol).

To send E-mails, one E-mail connection must always be set up per CP. The E-mail connection specifies the mail server via which all the mails sent by the Advanced CP are delivered.

To send E-mail in the user program of the S7 CPU, use the send call of the SEND/RECEIVE interface (FC AG_SEND / AG_LSEND).

The maximum data length is 8192 bytes.

Authentication

The CP supports the following authentication methods:

- PLAIN
- LOGIN
- CRAM−MD5
- DIGEST−MD5

5.7   Characteristic data for FTP mode

TCP connections for FTP

FTP actions are transferred from the CP over TCP connections. Depending on the mode, the following characteristic data apply:

- FTP in client mode:

  You can configure a maximum of 10 FTP connections. Up to 2 TCP connections are occupied per configured FTP connection.

- FTP in server mode:

  You can operate a maximum of 2 FTP sessions at the same time. Up to 2 TCP connections are occupied per FTP session (1 control connection and 1 data connection).

FB40 for FTP client mode

For communication via a TCP connection configured with the "Use FTP protocol" option, use the FTP block FB40.

The block execution time in FTP depends on the reaction times of the partner and the length of the user data; a general statement about the times is therefore not possible.

The functions used in the predecessor modules for FTP transfer (FC40...FC44) can continue to be used.

Additional features of FB40:

- Simplification in the user program due to working with command variable instead of differing function calls

- Additional function "APPEND"

  "APPEND" allows data to be appended to an existing file.

- Additional function "RETR_PART"

  "RETR_PART" allows data areas to be selected and read from a file.

5.8   Characteristic data for the use of Java applets

To transfer larger amounts of data efficiently from the S7BeansAPI using Java applets and the Java bean "S7Variable", you can make use of arrays.

Maximum array size

Depending on the transfer direction, the maximum size of arrays is as follows:

- When writing data to the CPU

  164 bytes

- When reading data from the CPU

  210 bytes

Note

Please note that the maximum block size in bytes is specified here and that the maximum number of array elements is decided by the byte size of the array basic data type.

Example

The CP 343-1 Advanced can transfer a maximum of 41 array elements of the type DWORD or REAL with a read job since each element of the type DWORD or REAL occupies four bytes.

5.9   Characteristics of the C-PLUG

The flash area allows a limited number of write cycles.

• Number of write cycles: approx. 100 000

Recommendation: You should therefore avoid writing data cyclically.

5.10   Characteristic data of the integrated switch

Learning addresses / deleting addresses (aging time)

The switch integrated in the CP (PROFINET interface) reads the source addresses in the data packets. The switch therefore learns the addresses of the end devices connected via a port.

If the switch receives a data packet, it directs this packet only to the port via which the appropriate DTE can be obtained.

The switch monitors the age of the learned addresses. Addresses that exceed the "aging time" are deleted. The aging time is 5 minutes.

Ports can be deactivated individually

The ports of the switch integrated in the CP and the gigabit interface can be deactivated individually in STEP 7 / HW Config. This can, for example, be used for service purposes.
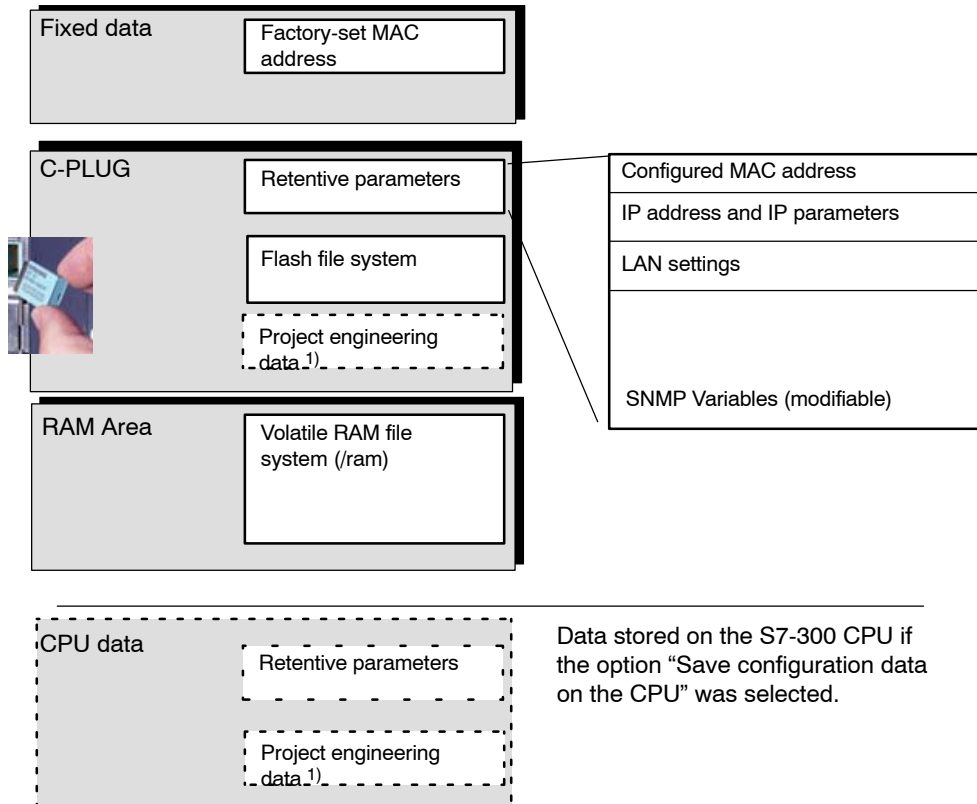
To do this, open the properties dialog of the relevant port and select the "disabled" setting under "Options > Transfer medium / duplex".

The port is turned off completely when it is deactivated. The corresponding LED on the device (for example P1) is then turned off.

5.11   Memory organization

5.11.1   Memory distribution

The data areas of the CP 343-1 Advanced are organized as follows:

Legend:

1) The configuration data is stored on the CPU or on the CP. This option can be selected in the properties dialog of the CP (in "Replace Module without PG" in the "Options" tab).

Note

Recommendation for data storage

If you use the CP in a complex plant configuration, for example as PROFINET IO controller with up to 128 IO devices, the configuration data will be correspondingly extensive. In such cases, the time for the transfer of the configuration data from the CPU to the CP may take several minutes.

In such case, you should weigh up the pros and cons of storing the data on the CP.

Meaning of the memory areas

On the CP 343-1 Advanced, the file system is divided into 2 areas:

- **Flash area in the C-PLUG** (non-volatile memory):

  The flash area allows data to be stored and retained if there is a power down.

  Since the number of times it is possible to write to this area is restricted, you should avoid repetitive write operations to this area, when such operations are necessary, write to RAM.

Notice

The flash area of the file system allows a limited number of write cycles (approximately 100 000). You should therefore avoid writing data cyclically.

If you write temporary data often, you should switch to the RAM file system located in the /ram subfolder. The files of the RAM file system (/ram) are lost if there is power down.

- **RAM area** (/ram volatile memory):

  In contrast to the flash area, the RAM can be written to and read from any number of times. The data in the RAM are retained as long as the CP is supplied with power.

  The RAM is intended to store data that change during operation and need to be recorded (data recording services). The RAM is also suitable for temporary storage.

  The RAM is located in the file system below the "/ram" folder. All files and folders below this folder are lost when there is a power down.

Please remember the following restrictions:

Table 5-11

Characteristic	Explanation / values
File names	The length of the file names is limited. Up to 64 characters are permitted for the file name, up to 256 characters for the path. It is possible to make the file name case-sensitive in the "Options" tab of the CP properties dialog.
File size	The file size is limited to a maximum of 8 MB.

Memory area for the file system	– Flash area (non-volatile memory)
	  28 MB
	– RAM area (volatile memory)
	  30 MB

6   Using the CP for PROFINET CBA

To be able to use the CP with PROFINET CBA, you create your user program with STEP 7 and configure the S7-300 station.

You then configure the interconnections between the PROFINET CBA components with SIMATIC iMap.

Notice

Operation under PROFINET CBA, is supported only via the PROFINET interface. The following information on configuration therefore relates only to the configuration of the PROFINET interface.

Notice

Simultaneous operation of PROFINET CBA and PROFINET IO device is not possible and is prevented in the configuration in STEP 7.

6.1   CBA interface in the user program with FB88

PN_InOut (FB88) and interface DB

The interface to the user program is the interface DB for PROFINET CBA. The task of function block PN_InOut (FB88) is to transfer data from the interface DB to the CP and from the CP to the interface DB.

Please note the documentation of the function blocks in the online help of STEP 7 or in the manual /63/.

6.2   Preparing for configuration with STEP 7

During configuration, remember the following requirements for subsequent use with PROFINET CBA:

* Configure the modules for the S7-300 station in HW Config

    You create one CP 343-1 (and one only) in an S7-300 station.

* Configuring the PROFINET interface

    If you use the S7-300 station as a standard component, you will need to make the following settings when you later configure the PROFINET interface:

    – Disable the "Set MAC address / use ISO protocol" option.

Notice

ISO transport connections and S7 connections using the ISO protocol cannot be operated when using the S7-300 station as a PROFINET CBA standard component!

For more detailed information on adopting the configuration data in the SIMATIC iMap engineering tool, refer to the documentation on SIMATIC iMap /60/.

6.3   PROFINET CBA configuration with SIMATIC iMap

Function in the PROFINET CBA environment

The CP is a PROFINET CBA-compliant device. An S7-300 station equipped with this CP can be interconnected in SIMATIC iMap as a PROFINET CBA component.

The project engineering of the interconnections between the PROFINET CBA components is done in the plant view of SIMATIC iMap.

### Representation in SIMATIC iMap

• Network view in SIMATIC iMap

The following graphic shows the network view of SIMATIC iMAP and illustrates how a CP*343-1 in an S7-300 station establishes a connection between DP slaves on PROFIBUS DP and an S7-300 station on Industrial Ethernet over an IE/PB Link.
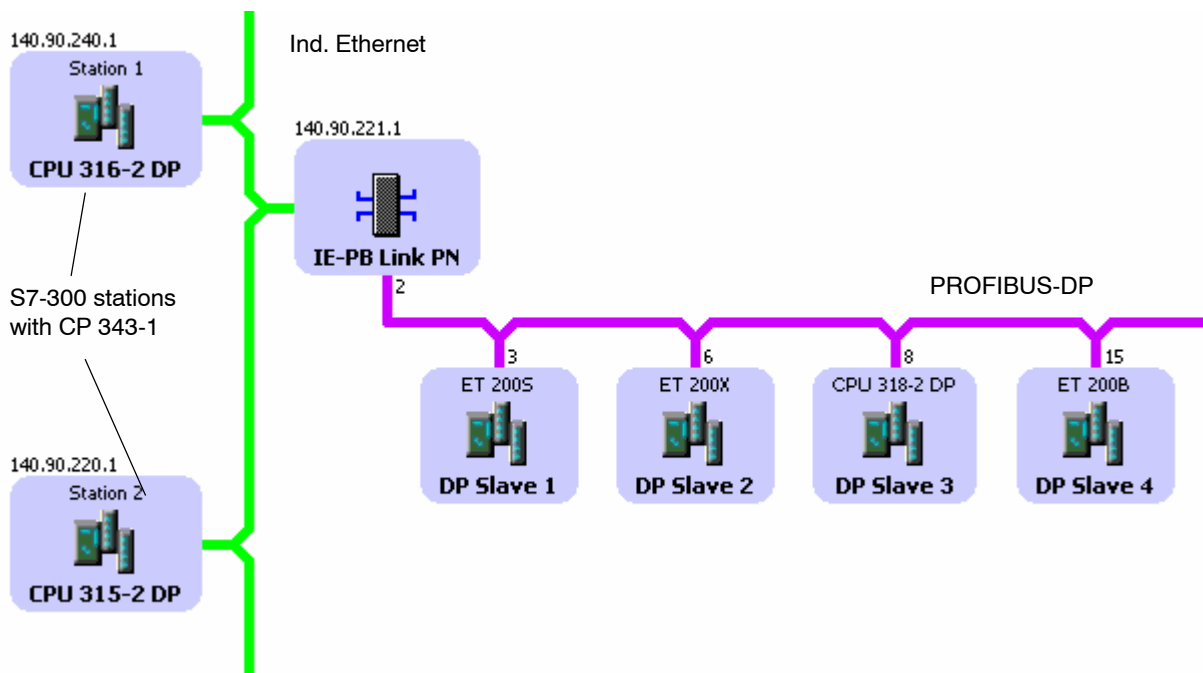
- Plant view in SIMATIC iMap

  In the plant view, the interconnection of input and outputs over the CP*343-1 becomes visible.

  Here, you can only see the PROFINET CBA components with their interconnections to the process inputs and process outputs.
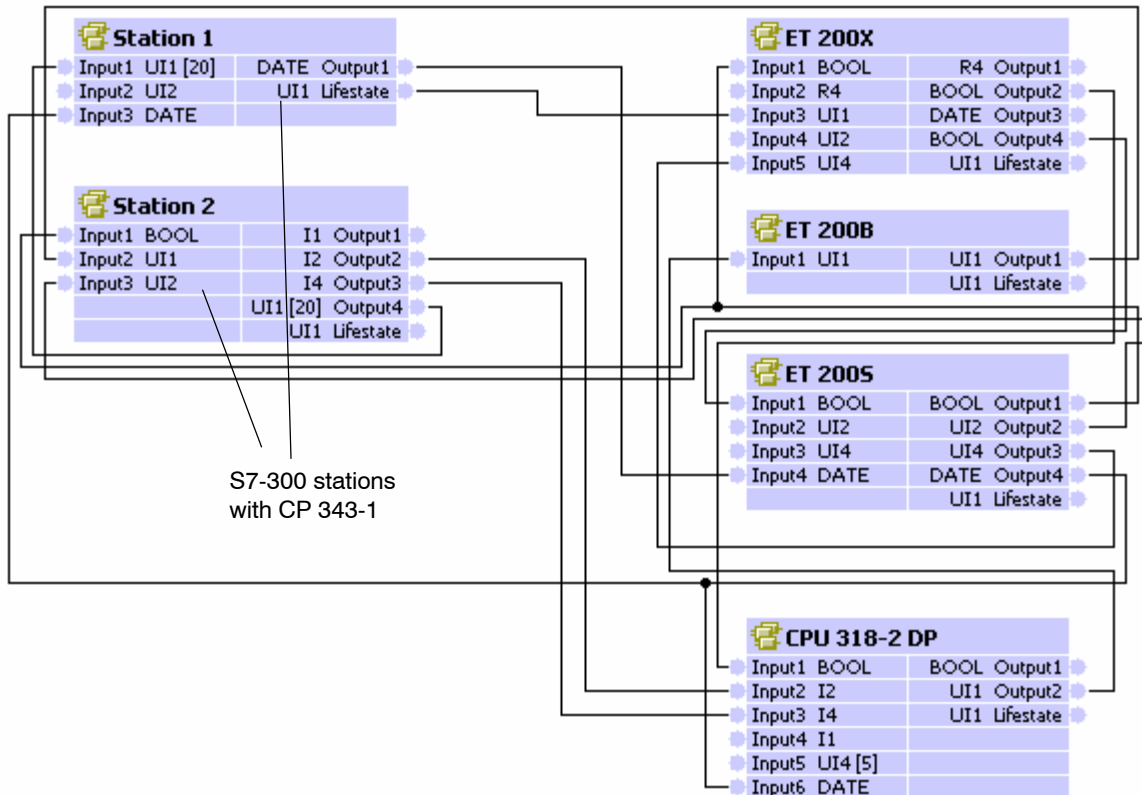
Assigning addresses and properties in SIMATIC iMap

You assign addresses and properties depending on the component type of the S7-300 station as follows:

- S7-300 station as singleton component

  Addresses and properties can only be changed in STEP 7.

- S7-300 station as standard component

  Addresses and properties can only be changed in SIMATIC iMap.

Notice

Please note that you have to perform an initial addressing of the CP 343-1 in STEP 7: this is described in the general Part A of this manual:

Downloading configuration data

When using PROFINET CBA, downloading configuration data depends on the component type of the S7-300 station, as follows:

- S7-300 station as singleton component

Step	Explanation / meaning
1.	• Downloading with STEP 7 Download the user program and configuration data to the S7-300 station with STEP 7.
2.	Downloading the interconnection information of the process inputs and process outputs to the PROFINET CBA components over the Ethernet port with SIMATIC iMap.

- S7-300 station as standard component

Step	Explanation / meaning
1.	• Downloading with SIMATIC iMap Download the user program and configuration data to the S7-300 station with SIMATIC iMap.
2.	Downloading the interconnection information of the process inputs and process outputs to the PROFINET CBA components over the Ethernet port with SIMATIC iMap.

Caution

If problems occur while downloading interconnections from SIMATIC iMap, for example power down on the target station, it is not always possible to download the interconnections again when the power returns.

If this error occurs, SIMATIC iMap reports the station as being unreachable.

Remedy:
Using the PG command, change the CP 343-1 from STOP to RUN to bring the target station back an operational status and to allow the interconnections to be downloaded again from SIMATIC iMap.

Device diagnostics in SIMATIC iMap

In online view of SIMATIC iMap, you can use diagnostic functions and, for example, read out device and functional information.

Note

For more detailed information on adopting the configuration from STEP 7 and use with PROFINET CBA and the SIMATIC iMap engineering tool, refer to the documentation on SIMATIC iMap /60/.

6.4   Using PROFINET CBA communication and standard communication at the same time

Notice

The information in this section applies only if a singleton component was created from the S7-300 station. With a standard component, the connection information configured in STEP 7 is lost.

Overview

Parallel operation of PROFINET CBA communication and standard communication using the services S7 communication and S5-compatible communication is possible with the CP.

This mode is important for your application when, for example, you want to implement communication between existing "conventional" SIMATIC devices and PROFINET CBA devices in an existing system.

The special feature is that the configuration of the communication for PROFINET CBA devices is only possible in SIMATIC iMap. Communication with conventional devices, on the other hand, requires that the connections are configured in STEP 7.

Recommended procedure

Here, we would like to give you a few tips and recommendations.

For communication between a PROFINET CBA device and a conventional device, use S7 or ISP transport, TCP or ISO-on-TCP connections.

Configure the S7 and TCP connections in STEP 7 as follows:

*   for S7 communication

    –   PROFINET CBA device:
        single-ended, passive (partner unspecified)
        (no configuration is necessary if the device involved in S7 communication is operated simply as a server).

    –   conventional device: single-ended, active

*   for S5-compatible communication (TCP / ISO-on-TCP connections)

    –   PROFINET CBA device and specified, passive

    –   conventional device: unspecified, active

This achieves the following:

*   You can specify the connection after for the conventional devices at any time with STEP 7;

*   You can use the PROFINET CBA devices in SIMATIC iMap (in other words

connect them) without having to change the connection configuration again in STEP 7; the devices are always ready to send and receive on the configured connections (connection is established by the active partner).

For the PROFINET CBA device, this means the following procedure:

Step	Procedure / meaning [1]
1.	First configure unspecified connections in STEP 7 (only with TCP – see above).
2.	Create suitable user programs in STEP 7 to handle communication with the conventional devices.
3.	Then generate the PROFINET CBA components in STEP 7 and enter these in the SIMATIC iMap library.
4.	Interconnect the PROFINET CBA component in SIMATIC iMap.
5.	Downloading the user program and configuration data to the S7-300 station with STEP 7.
6.	Downloading the interconnection information of the process inputs and process outputs to the PROFINET CBA components over the Ethernet port with SIMATIC iMap.

1) Note: The steps in the procedure depend on whether you are using a standard or a singleton component ! The table applies only to a singleton component !

7 The CP as Web server

7.1 HTML process control with IT functions

The CP provides you with the function of a Web server for access using a Web browser.

IT functions

When shipped, the file system of the CP contains S7 beans and further information in the file system. The CP also provides HTML pages for Web diagnostics.

HTML pages are used to indicate and display information in a Web browser. These, for example, contain diagnostic information.

S7 applets are Java applets specially written for SIMATIC S7 and that used to allow write or read access to the S7-CPU.

With the following address, you have access to Web diagnostics:

```
http:\\<IP address of the CP>\diag
```

When supplied, diagnostic buffer entries shown on diagnostic pages are always in English. How to load other languages on the CP is described in the following sections.

For detailed information on Web diagnostics, refer to the general Part A of this manual.

Please note the following special features when operating IT functions:

Note

The data exchange for productive communication (S7 connections + SEND/RECEIVE connections) always has a higher priority than data exchange with the Web browser. This can lead to delays in the HTML process control in the Web browser.

Enabling the Web server function

If you want to use the CP for IP communication with HTTP, you will need to activate port 80 of the CP in the configuration:

Select the option "Activate Web server" under "IP access protection" in the properties dialog of the CP.

The Web server function is enabled as default.

Web browser

To access the HTML pages on the CP, you require a Web browser. The following Web browsers are suitable for communication with the CP (other browsers also possible):

• Internet Explorer (recommended version: 6.0 or higher)

• Opera (recommended version: 9.2 or higher)

• Firefox (recommended version: 2.0 or higher)

These Web browsers support all the requirements necessary for the implementation of the IT functions (Java reference implementation – Java Development Kit) 1.1.x is supported) in conjunction with the CP.

You will find these Web browsers, information and add-ons on the Internet.

7.2   Web diagnostics – Language setting of the text file for diagnostic buffer events

Diagnostic buffer events can be output in Web diagnostics. The necessary text file is available in English on the CP when it ships.

You can change the language of the diagnostic messages by writing the text file from your STEP 7 installation to the file system of the CP by transferring it with FTP. As soon as a text file is transferred to the file system of the CP as described below, the CP uses this file instead of the default text file as shipped.

• If STEP*7 is installed, you will find the text files for specific languages on your PG/PC in:

..\Program files\Common files\Siemens\s7wmed\data

The files are stored there in the form "s7wmeldx.edb",

(where x = {a,b,c,d,e,j}
a = German; b = English; c = French; d = Spanish; e = Italian; j = Japanese)

To transfer the file with FTP, change the name of the required file to "s7wmeld.edb".

• The file must be transferred by FTP in binary mode and stored in the file system of the CP in:

/config/s7wmeld.edb (case-sensitive)

Note

You can also use the method described here to update the text file.

8   Compatibility with Predecessor Products

8.1   Enhanced functions

The abbreviations used below to identify the modules (for example "EX21" or "GX21") correspond to the last four characters of the mid section of the order number.

New: Enhanced functions compared with the CP 343-1 Advanced GX21

The CP 343-1 Advanced (6GK7 343-1GX30-0XE0) supports all functions of the previous module (6GK7 343-1GX21-0XE0) with the restrictions listed further below.

The following features are new and can be used when configuring with STEP 7 as of version 5.4 SP4:

- Web diagnostics

- Function as PROFINET IO device

- Integrated ERTEC 2-port IRT switch

- Gigabit interface

- IRT communication with PROFINET IO

- New function block for FTP client mode (optional)

- Expanded PROFINET IO configuration limits

- E-mail with authentication, in other words, configurable access control

- Media redundancy (MRP)

- Changed connection configuration limits (see Section 5.1)

- Reading and writing data records with FB52

- Diagnostics: Alarm evaluation in the user program with FB54

- PROFINET CBA:

  The following feature can be used when configuring as of service pack 3 for SIMATIC iMap STEP 7 Add-on V2.0: PROFINET CBA communication parallel to communication via the ISO protocol (only for singleton components).

8.2   Changes

Please note the following modified features compared with the predecessor modules:

Modifications in construction compared with the CP 343-1 Advanced GX21

*   The mode selector is no longer present

    (the mode can be changed in the SIMATIC Manager in STEP 7 or NCM Diagnostics).

Functional modifications

*   Configuration limits for CBA for cyclic interconnections reduced to a maximum of 250 bytes;

*   ACL-LOG file in the file system no longer exists, LOG data can be viewed via HTTP server.

8.3   Replacing older modules: spares / upgrading

Distinction

When replacing existing modules with the module described here, the following variants must be distinguished:

*   **Use as a replacement:**

    The situation described here is when an existing module can be replaced by a new module by removing and inserting it with no change to the configuration.

*   **Upgrading** (functionally compatible module replacement)

    The situation in this case is when the module described here can be used instead of an older module as long as adaptations are made in the configuration. The CP used previously is replaced by the new CP in the configuration.

Unless stated otherwise, the range of functions of the older module continues to be supported in both cases.

You can also upgrade modules listed under "use as a replacement". This becomes necessary when you want to use new features that were not available on the previously used module.

Use as a replacement:

The CP 343-1 Advanced (6GK7 343-1GX30-0XE0) described here can be used as a replacement for the following predecessor products:

- CP 343-1 (6GK7 343-1GX11-0XE0) [*)]
- CP 343-1 (6GK7 343-1GX20-0XE0)
- CP 343-1 (6GK7 343-1GX21-0XE0) [**)]
- CP 343-1 (6GK7 343-1EX21-0XE0) [**)]

*)   Please note that there is no longer an AUI interface as was available in these device types. To attach to an AUI network, use the media converter Scalance X101-1 AUI (6GK5 101-1BX00-2AA3).

**) Note the reduced configuration limits for PROFINET CBA for cyclic interconnections (new: 250 bytes maximum).

Upgrading

The following predecessor products can be upgraded to the CP 343-1 Advanced (6GK7 343-1GX30-0XE0) described here:

- CP 343-1 PN (6GK7 343-1HX00-0XE0) [*)]
- See modules in "use as a replacement"

*)   Please note that there is no longer an AUI interface as was available in these device types. To attach to an AUI network, use the media converter Scalance X101-1 AUI (6GK5 101-1BX00-2AA3).

Interface in the user program

Notice

For new user programs, please make sure that you always use the latest block versions. You will find information on the latest block version and links to download the current blocks on the Internet:

http://support.automation.siemens.com/WW/news/en/8797900

Module replacement

When replacing an older module with the module described here, keep to the steps outlined below:

Table 8-1

Originally configured module	Configuration steps
6GK7 343-1GX21-0XE0 6GK7 343-1GX20-0XE0 6GK7 343-1GX11-0XE0 6GK7 343-1EX21-0XE0	Case a: Configuration unchanged / replacement module If you do not have any new requirements compared with the previous CP (numbers of connections etc.), no modification of the project engineering is necessary. When putting the module into operation, note the following difference: • If the option of storing the configuration data on the CPU was selected for the CP you are replacing, when the CP starts up, the configuration data will be transferred automatically from the CPU to the CP. • Otherwise, download the configuration data to the CP from your PG/PC again. • Special case EX21 / GX21 – configuration data on the C−PLUG If a C−PLUG was used, the configuration data can be adopted by exchanging the C−PLUG. Case b: Adapted configuration / upgrade If you want to use the extended functionality of the new CP, follow the steps below: 7. In STEP 7 / HW Config, replace the previously configured CP with the new module from the hardware catalog. 8. Extend the configuration to meet your requirements, for example in the connection configuration. 9. Save, compile and download the configuration data to the CPU or CP again.

Notice

When replacing an older module with the CP 343−1 Advanced (GX30), the previous port properties are adopted by port 1 of the PROFINET interface of the new CP. Port 2 is set to "Automatic settings". The gigabit interface is deactivated.

---

9   Further Notes on Operation

9.1   Memory reset

Available functions

The CP has a two-level function available for resetting memory:

- Clear / reset

  Following this memory reset, the CP retains the default MAC addresses and the retentive parameters. The CP is therefore immediately ready for downloads using the IP address.

  The retentive parameters include:

  – IP address, subnet mask and, if applicable, router address

  – LAN settings

  – PROFINET CBA interconnections

- Resetting to factory settings

  After the memory reset, the CP retains only the two factory-set MAC addresses (as shipped).

How to use the function

You can start the memory reset functions in STEP 7.

- Clear / reset

  In STEP 7/HW Config with **PLC ▸ Clear/Reset**

  or

  In STEP 7 / NCM Diagnostics with **Operating Mode ▸ Clear/Reset Module**

- Factory defaults reset

  In STEP 7 / NCM Diagnostics with **Operating Mode ▸ Reset to Factory Defaults**

Behavior after memory reset

The CPU in the S7 station does not recognize that the CP memory was reset. The CP therefore changes to the "stopped with error" state (see Chapter 4).

The configuration data must then be reloaded.

if the configuration data are stored on the CPU, you can start a download with power down/up.

Clear/reset module – Effects

Following this memory reset, the CP retains the newly configured MAC address and the retentive parameters. The CP is therefore immediately ready for downloads using the IP address.
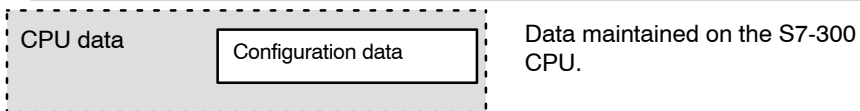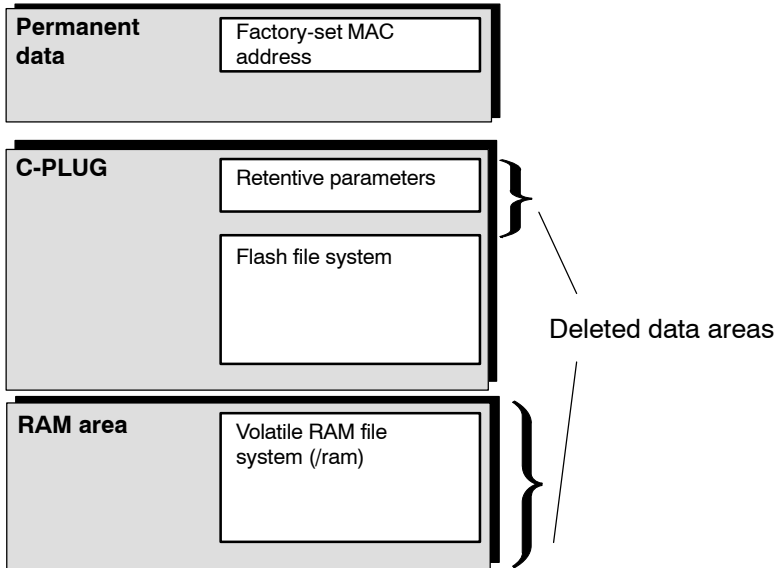
This has the following overall effect:

Permanent data	Factory-set MAC address

C-PLUG	Retentive parameters
	Flash file system

RAM area	Volatile RAM file system (/ram)

} Deleted data area

CPU data	Configuration data	Data maintained on the S7-300 CPU.
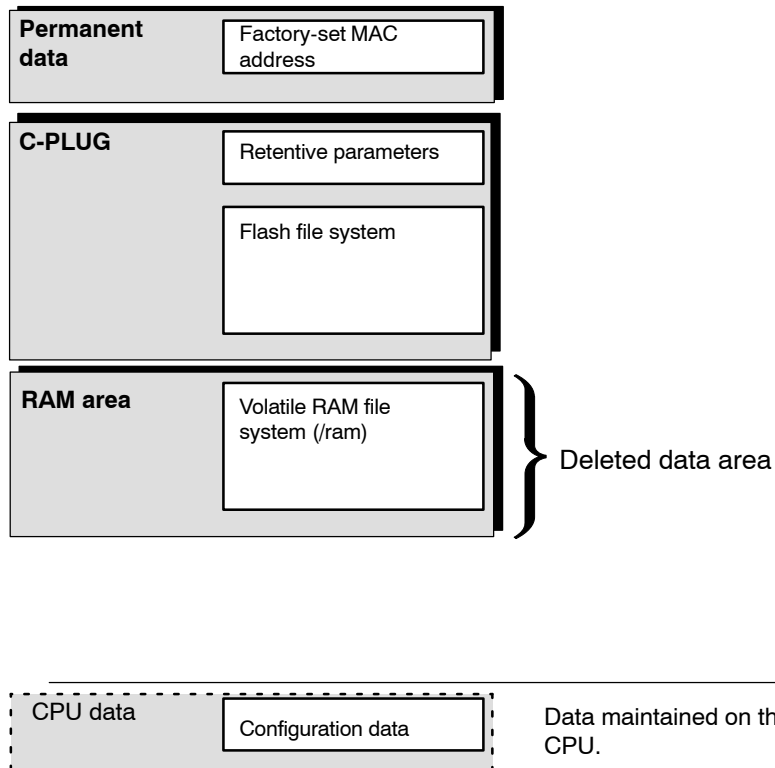
Rest to factory defaults – Effects

After resetting to factory defaults, the CP always retains the factory set MAC addresses (as shipped).

The data in the C-PLUG is handled as follows:

The data in the file system of the C-PLUG (flash area) is retained, the retentive parameters are deleted.

This has the following overall effect:

Permanent data	Factory-set MAC address

C-PLUG	Retentive parameters
	Flash file system

Deleted data areas

RAM area	Volatile RAM file system (/ram)

CPU data	Configuration data

Data maintained on the S7-300 CPU.

Note

Remember that the interconnection information for PROFINET CBA belongs to the retentively stored parameters on the C-PLUG and is therefore deleted by this action.

9.2 Network settings with Fast Ethernet / gigabit Ethernet

9.2.1 Fast Ethernet with the PROFINET and gigabit interface

The common transmission characteristics of the two interfaces are described below. For information on the transmission speed 1 Gbps of the gigabit interface, see Section 9.2.2.

The configuration of the network settings "Transmission medium / duplex" is made for both interfaces in the properties dialog of the port of the relevant interface in the "Options" tab.

Row "X1P1": Port properties of the gigabit interface

Row "X2P1": Properties of port 1 of the PROFINET interface
Row "X2P2": Properties of port 2 of the PROFINET interface

Automatic setting or individual network settings

As default, the CP is configured for automatic detection (Autosensing/Autonegotiation/Autocrossing).

Notice

In normal situations, the basic setting ensures trouble-free communication. You should only change these in exceptional situations.

If you create a manual configuration for the CP, the automatic negotiation of the network settings (autonegotiation) is no longer effective. If, on the other hand, the communication partner works with autonegotiation, no communication will be established.

Only use manual configuration when the communication partner works with the same manually set configuration.

Autocrossing mechanism

The automatic setting also includes an "autocrossing" mechanism. With autocrossing, you can connect network components and end devices using either crossover or straight-through cables.

STEP 7 / NCM Diagnostics and Web diagnostics display the network setting

Diagnostics of the port settings for the CP described here is possible using the entries in the diagnostic buffer over Web diagnostics, SNMP, NCM diagnostics, and the LED displays.

You will find information on the currently used network settings in STEP 7 as follows:

- In NCM Diagnostics under the diagnostic object "Industrial Ethernet" in the "Network Attachment" group box;

- In HW Config with the menu command "PLC > Module Information";

- In WEB diagnostics.

Diagnostic data of the gigabit interface are available only with Web diagnostics, SNMP and NCM Diagnostics.

Further notes:

- Autocrossing

  If you disable the "automatic setting" option, autocrossing is also disabled; which cable you can then use depends on the role of the CP (network component or end device).

- 10/100 Mbps network components without "autonegotiation"

  If you use 10/100 Mbps network components that do not support "autonegotiation", you may have to set the mode manually during CP configuration using STEP 7 / HW Config (in the properties dialog of the CP). As default, the CP is configured for automatic detection.

- Forcing a specific network setting instead of "Autonegotiation"

  If your application requires a fixed network setting instead of "Autonegotiation", both partner devices must have the same setting.

- No reaction to Autonegotiation query with manual configuration

  Remember that if you configure the CP manually, it will not react to an autonegotiation query! As a result, a connected partner will not be able to make the required network setting and communication will not be established.

  Example:
  If, for example, the CP is set to "100 Mbps – full duplex", a CP connected as partner will set "100 Mbps – half duplex". Reason: Due to the fixed setting, no autonegotiation response is possible; the connected partner recognizes the 100 Mbps with autosensing but nevertheless remains in half duplex.

- Recommendation: Change "individual network settings" only over MPI.

  If you modify the LAN settings in the properties dialog of the CP in the "Port Parameters" tab, these changes will be adopted by the CP and activated when the configuration data is downloaded to the CP. In some situations, the device may then no longer be obtainable over Ethernet.

  We therefore recommend that you download configuration data to the S7 station over an MPI connection if you change this setting.

  If you download the configuration data over the LAN interface, depending on the selected setting, it is possible that the current download will not be completed due to the changes to the configuration taking immediate effect and an inconsistent configuration is reported.

  Example:
  The download is started initially with the setting TP/ITP at 10 Mbps half duplex. If the "Individual network setting" is now changed to 100 Mbps full duplex, the download cannot be completed.

9.2.2   Transmission speed of the gigabit interface

If you want to use transmission speed 1 Gbps, leave the interface set to "Automatic settings".

The connection partner must also be configured with "Automatic settings". If the connection partner does not support gigabit Ethernet, the data will be transferred at the next lower speed (100 or 10 Mbps).

9.3   Influence of MPI on connections via Industrial Ethernet

If a station on **MPI** is added or removed, for example because a service PG has been connected or disconnected, it is possible that active communication connections on the communications bus are aborted. This has the following effects on the communication connections on Industrial Ethernet:

- All S7 connections are temporarily aborted.
  This does not apply when using CPUs with a separate communication bus, for example:

  CPU 318-2, CPU 317-2 PN/DP, CPU 319-3 PN/DP, CPU 315–2 PN/DP, CPU 315F–2 PN/DP, CPU 317–2 DP, CPU 317T–2 DP, CPU 317F–2 DP, CPU 317F–2 PN/DP, CPU 318–2 DP

- The connections on which a job on the communication bus with a data length > 240 bytes is being processed are aborted temporarily.

- FETCH/WRITE connections are temporarily aborted.

On the FC interface in the user program, the condition codes made up of the DONE, ERROR and STATUS parameters must be evaluated in FC11 / FC12.

9.4   IP configuration

9.4.1   Configured S7 connections cannot be operated if the IP address is assigned over DHCP

Notice

If you obtain the IP address over DHCP, any S7 connections you may have configured will not work. Reason: The configured IP address is replaced by the address obtained over DHCP during operation.

Obtaining the IP address from DHCP is only possible on the PROFINET interface and not on the gigabit interface.

9.4.2   Detection of double IP addressing in the network

To save you time-consuming troubleshooting in the network, the CP detects double addressing in the network.

The reaction of the CP when double addressing is detected varies as follows:

- CP during startup

  When the CP starts up (after power down or after the initial addressing), the CP queries its own IP address on the network. If there is a response, the CP does not start up! The error is indicated by an LED ("STOP with internal error" is displayed) and an entry is made in the internal diagnostic buffer.

  The CP remains in STOP mode.

When you eliminate the cause by removing the device with the same IP address or changing its address, you must then restart the CP.

- CP in RUN mode

  In RUN, the CP also sends this query at intervals of one minute to detect double IP addresses.

  If a double IP address is detected, the CP also reports this via the LEDs (BUSF LED) and generates an entry in the diagnostic buffer.

  The CP remains in RUN mode.

9.4.3 Obtaining the IP address over DHCP: CP STOP on expiry of the lease

If you have configured "Obtain IP address from a DHCP server", when the CP starts up, it is assigned a valid IP address by the DHCP server for a restricted time (period of the lease).

When the lease expires the reaction of the CP is as follows:

The CP changes to STOP and loses the previously assigned IP address if the DHCP server does not extend it before expiry of the lease. All communication connections are terminated.

9.5 PROFINET IO / IRT communication – synchronization types

Within an IRT domain (Isochronous Real Time), you can use the CP for IRT communication.

You specify the required synchronization parameters in the properties dialog of the PROFINET interface (HW Config: Row "X2 (<device name>)") in the "Synchronization" tab.

9.6 IP access protection via the IP access control list with a PROFINET IO device

Please note the following when IP access protection is activated:

When you configure the CP as a PROFINET IO device, make sure that you enter the IP address of the PROFINET IO controller in the IP access list.

9.7 Media redundancy

You can use the CP in a ring topology with media redundancy. The CP itself can be redundancy manager or redundancy client.

You create the configuration in STEP 7 in the properties dialog of the PROFINET interface in the "Media redundancy" tab (HW Config: Row "X2 (<device name>)").

For more detailed information on configuration, refer to the online help of the "Media redundancy" tab and in Part A of the manual.

Notice

If you are using IRT communication, no media redundancy is supported.

9.8   Time-of-day synchronization

General rules

The CP supports the two modes explained below for time-of-day synchronization:

*   SIMATIC mode

*   NTP mode (NTP: Network Time Protocol)

Note

No automatic changeover to daylight saving is defined in NTP. As a result, you may need to implement this changeover using a program application.

Notice

Note the following regarding time-of-day synchronization in NTP mode:

If the CP recognizes an NTP frame as being "not exact" (example: NTP server is not externally synchronized), it is not forwarded to the communication bus. If this problem occurs, none of the NTP servers is displayed as "NTP master" in the diagnostics; rather all NTP servers are displayed only as being accessible.

Forwarding the time-of-day message

You can configure the direction in which time-of-day messages are forwarded in STEP 7 / NCM S7 in the properties dialog of the CP as follows.

- Configuration "from station to LAN"

  The CP forwards time frames from the CPU to Industrial Ethernet when the local CPU is time master (SIMATIC mode only) or when the time of day is forwarded by a different CP on the K bus.

- Configuration "from LAN to station"

  The CP forwards time frames from Industrial Ethernet to the CPU when one of the following components is time master:

  - In the SIMATIC mode:
    - a remote CPU 41x
    - a SIMATIC NET time transmitter
    - a CP 1430 TF
  - an NTP server when using the NTP mode

As default, time-of-day synchronization is not activated for the CP and it does not therefore forward the time. However, the internal clock of the CP is synchronized even in this case if a time-of-day frame is received from the communication bus or from Industrial Ethernet.

Synchronization using one of the two modes described here must be configured in STEP 7 in the properties dialog of the CP – "Time-of-Day Synchronization" tab.

For more detailed information on the parameters and options, please refer to the online help in the properties dialog.

Coordinating forwarding of the time of day with several CPs

If there is more than one CP in a station connected to the same network, only one of these CPs is allowed to pass on time-of-day messages.

You can therefore made the following settings in the configuration:

- Automatic

  The CP receives the time-of-day message from the LAN or from the station and forwards it to the station or to the LAN.

  If several CPUs are being operated in the station, this automatic setting can lead to collisions. To avoid this, you can specify the direction of forwarding with the following options:

- From station to LAN

- From LAN to station

- Write access is permitted only for the following MIB objects of the system group:

  sysContact, sysLocation and sysName;

  For all other MIB objects / MIB object groups, only read access is possible for security reasons.

- Traps are not supported by the CP.

"Interfaces" MIB group

This group returns status information about the CP interfaces. The MIB objects of the ifTable provide the status information of the interfaces. The "ifIndex" object identifier is assigned to the CP interfaces as follows:

ifIndex if gigabit interface		Type of interface
is networked	**is not networked**	
1	–	Gigabit interface
2–3	1–2	Port 1–2 (PROFINET interface)
4	3	Internal CP interface

Access permissions using community name

The CP uses the following community names to control the access rights in the SNMP agent:

Type of access	Community name [*)]
Read access	public
Read and write access	private

*) Note the use of lower-case letters!

9.10   Possible security gaps on standard IT interfaces: preventing illegal access

With various SIMATIC NET components, such as switches, a wide range of parameter assignment and diagnostic functions (for example, Web servers, network management) are available over open protocols and interfaces. The possibility of unauthorized misuse of these open protocols and interfaces by third parties, for example to manipulate data, cannot be entirely excluded.

When using the functions listed above and these open interfaces and protocols (for example, SNMP, HTTP), you should take suitable security measures to prevent unauthorized access to the components and the network particularly from within the WAN/Internet.

Notice

We expressly point out that automation networks must be isolated from the rest of the company network by suitable gateways (for example using tried and tested firewall systems). We do not accept any liability whatsoever, whatever the legal justification, for damage resulting from non-adherence to this notice.

If you have questions on the use of firewall systems and IT security, please contact your local Siemens office or representative. You will find the address in the SIMATIC catalog IK PI or on the Internet at
http://www.automation.siemens.com/net > Contact & Partners > Local Partners.

9.11   Interface in the user program

9.11.1   Programmed communication connections with FB55 IP_CONFIG (PROFINET interface)

Downloading the configuration using FB55

FB55 allows program-controlled transfer of the configuration data.

Note

If the CP is in PG STOP mode, the configuration is downloaded using FB55; the CP then changes automatically to RUN.

9.11.2   IP access protection with programmed communication connections

In principle, it is possible to set up communication connections using FB55 by programming and at the same time by configuring IP access protection. Please note the following point:

Notice

When configuring specified connections in STEP 7 / NCM S7, the IP addresses of the partners are entered automatically in the IP-ACL (IP Access Control List).

The IP addresses of partners with unspecified connections (passive end points) and of partners on programmed communication paths are not entered in the IP-ACL. This means that communication with unspecified nodes is not possible if IP access protection is activated.

9.11.3   Programmed communications connections – Assigning parameters to the ports

The CP now supports the following settings when assigning parameters to the ports in the parameter block for TCP connections and UDP connections:

*   SUB_LOC_PORT parameter

    The port can be specified as an option when the connection is established actively.

*   SUB_REM_PORT parameter

    The port can be specified as an option when the connection is established passively.

9.12   Gigabit interface – special features in STEP 7

Notice

The STEP 7 functions in the SIMATIC Manager "Display Accessible Nodes" and "Edit Ethernet Node..." are not supported in the device version of the gigabit interface described here.

9.13 Attachment to Industrial Ethernet networks

Since the CP forwards frames from and to private and public IP addresses via its two interfaces, you should not connect the CP to a public network.

9.14 Use of the CP as IP router

The CP can be used to forward IP messages from a local area network to a higher–level network and vice versa. The CP then controls access permission according to the configuration.

An extensive network with other IP subnets can then be connected to one of the Ethernet interfaces. To achieve this, an external router can be configured on this interface that handles forwarding to nodes that are not directly reachable. In this case, enter the IP address of this router in "Default Router" for the appropriate interface in HW Config.

Notice

The use of the CP as a universal router between two extended networks with further subnets is not supported.

10   How to Load New Firmware

Requirements

You download new firmware to a SIMATIC NET CP using the firmware loader shipped with STEP 7 / NCM S7.

Requirements for downloading

- To download firmware, you require an Industrial Ethernet CP module in the PG/PC (for example, CP 1613) or a normal Ethernet module with the "Softnet" software package.

- The S7-ONLINE interface must be set to the "ISO – Industrial Ethernet" protocol. It is not possible to download using TCP/IP (and therefore not to other networks).

How to download new firmware

You can download via the PROFINET interface or the gigabit interface of the CP. Always use the active MAC address on the CP interface you use to load the firmware!

LEDs to indicate the CP mode

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

Table 10-1

SF (red)	BF1 + BF2 (red)	RUN (green)	STOP (yellow)	CP operating mode
●	●	-☀-	◯ yellow	Downloading firmware.
-☀-	-☀-	-☀-	◯	Firmware was successfully downloaded.
-☀-	-☀-	◯	-☀-	Firmware could not be downloaded.

Legend: ● (colored) on   ◯ off   -☀- (colored) flashing   "–" any

What to do if a download is interrupted

Disturbances or collisions on the network can lead to packets being lost. In such cases, this can lead to an interruption of the firmware download. The firmware loader then signals a timeout or negative response from the module being loaded.

In this case, turn the station off and on again and repeat the download.

11   Technical Specifications

Transmission rate	
• PROFINET interface	10 Mbps and 100 Mbps
• Gigabit interface	10 Mbps, 100Mbps and 1Gbps
Connection to Ethernet	
• PROFINET interface	• 2 x RJ-45 jack
• Gigabit interface	• 1 x RJ-45 jack
Power supply	DC +24 V (permitted range: +20.4 V through +28.8 V)
Current consumption	
• from backplane bus	0.27 A maximum, 0.14 A typical
• from external 24 V DC	TP: approx. 0.62 A maximum, 0.48 A typical
Power loss approx.	14.7 W maximum
Permitted ambient conditions	
• Operating temperature	0 °C to +60 °C in vertical operation
	0 °C to +40 °C in horizontal operation
• Transportation/storage temperature	−40 °C to +70 °C
• Relative humidity max.	95% at +25 °C
• Altitude	up to 2000 m above sea level
• Pollutant concentration	According to ISA−S71.04 severity level G1, G2, G3
Design	
• Module format	Compact module S7-300; double width
• Dimensions (W x H x D) in mm	80 x 125 x 120
• Weight approx.	800 g

In addition to this, all the information in the S7-300 reference manual /67/ "Module Data" in the section "General Technical Specification" on the topics listed below applies to the CP:

- Electromagnetic compatibility

- Transportation and storage conditions

- Mechanical and climatic ambient conditions

- Insulation tests, class of protection and degree of protection

12   Other Information available about the CP

FAQs on the Internet

You will find detailed information (FAQs) on using the CP described here on the Internet under the following entry number (entry type "FAQ"):

http://support.automation.siemens.com/WW/view/en/10806025

GSDML file

You will find the GSDML file for the CP described here on the Internet under the following entry ID:

http://support.automation.siemens.com/WW/view/en/19698639

You will find the following information in the general Part A of the manual:

- A list of the documents require for configuration, commissioning and operation (Preface)

- Detailed descriptions of configuration and commissioning of the module

- Description of the IT functions

- Description of the Media Redundancy Protocol MRP

- Description of Web diagnostics and NCM S7 Diagnostics

- The approvals of the device (Appendix)

- A glossary (Appendix)

The general Part A of the manual is available in the Manual Collection that ships with the device or on the Internet at the following address:

http://support.automation.siemens.com/WW/view/en/8777865

13 References and Literature

Locating Siemens literature

The order numbers for Siemens documentation can be found in the catalogs "SIMATIC NET Industrial Communication, catalog IK PI" and "SIMATIC Products for Totally Integrated Automation and Micro Automation, catalog ST 70".

You can obtain these catalogs and any further information you require from your local SIEMENS office or national head office.

Some of the documents listed here are also in the SIMATIC NET Manual Collection supplied with every S7-CP.

Many SIMATIC NET manuals are available on the Internet pages of Siemens Customer Support for Automation:

http://support.automation.siemens.com/WW/view/de

Enter the ID of the relevant manual as a search key. The ID is shown below the literature name in brackets.

Manuals that are installed with the online documentation of the STEP 7 installation on your PG/PC, can be selected from the Start menu (Start > SIMATIC > Documentation).

You fill find a overview of the SIMATIC documentation at:

http://www.automation.siemens.com/simatic/portal/html_76/techdoku.htm

On configuration, commissioning and use of the CP

/**55**/   SIMATIC NET
S7 CPs for Industrial Ethernet
Manual
Siemens AG
(manual for each CP in the SIMATIC NET Manual Collection)

/**56**/   Version history / current downloads for SIMATIC NET S7 CPs
Siemens AG
(SIMATIC NET Manual Collection)

On configuration with STEP 7 / NCM S7

/**57**/   NCM S7 for Industrial Ethernet
Primer
Siemens AG
Part of the online documentation in STEP 7

/**58**/   SIMATIC NET, Instructions
Commissioning PC Stations
Siemens AG
(SIMATIC NET Manual Collection)

/**59**/   SIMATIC
Configuring Hardware and Connections with STEP 7
Part of the STEP 7 documentation package STEP 7 Basic Knowledge"
Part of the online documentation of STEP 7
Siemens AG

On project engineering of PROFINET CBA (components and systems):

/**60**/   Component based Automation – Configuring Plants with SIMATIC iMap
Manual
Siemens AG
(ID: 18404678)

/**61**/   Basic Help in the SIMATIC iMap Engineering Tool (online help)
Siemens AG

/**62**/   Component Based Automation – Configuring Plants in SIMATIC iMap
Siemens AG
(ID: 22762190)

    You will find further information on SIMATIC iMAP at:

    http://support.automation.siemens.com/WW/view/en/10805413

On programming

/**63**/   SIMATIC NET
Functions (FC) and Function Blocks (FBs) for SIMATIC NET S7 CPs
Programming Manual
Siemens AG
(SIMATIC NET Manual Collection)

/**64**/   Version history of the SIMATIC NET function blocks and functions for SIMATIC S7
Reference work
Siemens AG
(SIMATIC NET Manual Collection)

/**65**/   SIMATIC – Programming with STEP 7
Part of the STEP 7 documentation package STEP 7 Basic Knowledge
Part of the online documentation of STEP 7
Siemens AG

/**66**/   Automatisieren mit STEP 7 in AWL und SCL (ISBN: 978−3−89578−280−0) /
              Automating with STEP 7 in STL and SCL (ISBN: 978−3−89578−295−4)
              User manual, programming manual
              Berger, Hans
              Publicis KommunikationsAgentur GmbH, GWA, 2006

For installation and commissioning of the CP

/**67**/   SIMATIC S7
              S7−300 Automation System
              − CPU 31xC und 31x Installation: Operating Instructions (ID: 13008499)
              − Module Data: Reference Manual (ID: 8859629)
              Siemens AG

              and

              SIMATIC S7
              S7−400, M7−400 Automation system
              − Installation Manual (ID: 1117849)
              − Module Data: Reference Manual (ID: 1117740)
              Siemens AG

On using and configuring PROFINET IO

/**68**/   SIMATIC
              PROFINET System Description
              System Manual
              Siemens AG
              (Part of the Manual Collection)

/**69**/   SIMATIC
              From PROFIBUS DP to PROFINET IO
              Programming Manual
              Siemens AG
              (Part of the Manual Collection)

On the IT functions of the CPs

/**70**/   Information Security in Industrial Communication
              White Paper
              SIEMENS AG
              (http://www.automation.siemens.com/net/html_76/support/whitepaper.htm)

/**71**/   Creating Java Beans with IBM VisualAge
              SIEMENS AG
              (ID: 10499820)

/**72**/   S7Beans / Applets for IT–CPs
            Programming Aid
            SIEMENS AG
            (SIMATIC NET Manual Collection)
            (ID: 24843908)

On setting up and operating an Industrial Ethernet network

/**73**/   SIMATIC NET
            Manual Twisted Pair and Fiber–Optic Networks
            Siemens AG
            (SIMATIC NET Manual Collection)

/**74**/   SIMATIC NET
            Manual Triaxial Networks
            (SIMATIC NET Manual Collection)

SIMATIC and STEP 7 basics

/**75**/   Communication with SIMATIC
            System Manual
            Siemens AG
            (ID: 25074283)

/**76**/   Documentation package "STEP 7 Basic Knowledge"
            with
            – Working with STEP 7 V5.4 Getting Started (ID: 18652511)
            – Programming with STEP 7 (ID: 18652056)
            – Configuring Hardware and
              Communication Connections with STEP 7(ID: 18652631)
            – Form S5 to S7, Converter Manual (ID: 1118413)
            Siemens AG
            Order number 6ES7 810–4CA08–8AW0
            Part of the online documentation in STEP 7

/**77**/   Documentation package "STEP 7 Reference"
            with
            – Statement List (STL) for S7–300/400 (ID: 18653496)
            – Ladder Diagram (LAD) for S7–300/400 (ID: 18654395)
            – Function Block Diagram (FBD) for S7–300/400 (ID: 18652644)
            – System and Standard Functions for S7–300/400 Volumes 1 and 2 (ID: 1214574)
            – System software for S7-300/400 System and Standard Functions Part 2
            Siemens AG
            Order number 6ES7 810–4CA08–8AW1
            Part of the online documentation in STEP 7

Other topics

/**78**/   Ethernet, IEEE 802.3 (ISO 8802−3)
              (http://www.ieee.org)

/**79**/   RFC1006 (ISO Transport Service on top of the TCP Version: 3)
              Request For Comment
              (http://www.ietf.org)

/**80**/   RFC793 (TCP)
              (http://www.ietf.org)

/**81**/   RFC791 (IP)
              (http://www.ietf.org)