ARTISAN®
TECHNOLOGY GROUP

Your **definitive** source for quality pre-owned equipment.

Artisan Technology Group
(217) 352-9330 | sales@artisantg.com | artisantg.com

Full-service, independent repair center
with experienced engineers and technicians on staff.

We buy your excess, underutilized, and idle equipment
along with credit for buybacks and trade-ins.

Custom engineering
so your equipment works exactly as you specify.

- Critical and expedited services
- In stock / Ready-to-ship
- Leasing / Rentals / Demos
- ITAR-certified secure asset solutions

Expert team | Trust guarantee | 100% satisfaction

All trademarks, brand names, and brands appearing herein are the property of their respective owners.

Find the *Siemens 6GK7343-1EX10-0XE0* at our website: *Click HERE*

SIEMENS

SIMATIC NET

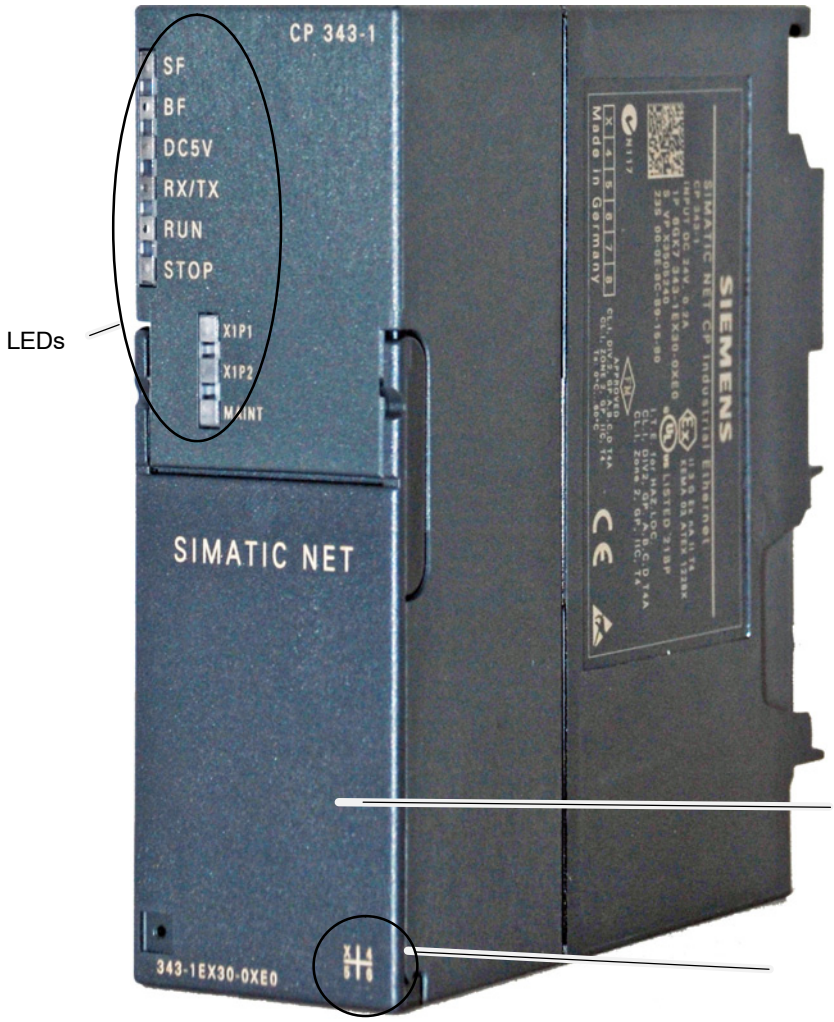
S7-CPs for Industrial Ethernet

Manual Part B

CP 343-1

6GK7 343–1EX30–0XE0 as of hardware version 2, as of firmware version V2.2

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



LEDs

TP port:

2 x 8-pin RJ-45 jack

(beneath the front panel)

X = Placeholder for hardware version

Release 09/2009
C79000-G8976-C201-06

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Notes on the product

Product names

This description contains information on the following product

- CP 343-1
  Order number 6GK7 343−1EX30−0XE0
  as of hardware version 2 and firmware version V2.2
  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 7 of this manual!

Address label: Unique MAC address preset for the CP

The CP ships with a factory-set MAC address. The MAC address is printed on the housing.

To avoid duplicate MAC addresses when moving the CP to a different part of the plant, we recommend that you change the MAC address during module configuration.

❑

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Contents

Contents – Part A

Ethernet CPs – general information . . . . . see general Part A

Note

Please remember that Part A of the device manual also belongs to the description of the CP. Among other things, it contains explanations of the safety notices and general 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 from the Internet:

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

Contents – Part B

1 Properties / Services B–5

1.1 Application B–5

1.2 Communication services B–5

1.3 Other services B–6

2 Requirements for Use B–8

2.1 Operation in controller device families B–8

2.2 Configuration B–11

2.3 Programming B–11

3 Installation and Commissioning B–13

3.1 Procedure / steps B–13

3.2 Module replacement without PG B–16

3.3 Controlling the operating mode B–17

4 LED Displays B–18

5 Performance Data / Operation B–22

5.1 Number of possible connections over Ethernet B–22

5.2 Characteristic data for S7 communication B–23

5.3 Characteristics of the SEND/RECEIVE interface B–24

5.4 PROFINET IO B–25

5.4.1 Characteristic data B–25

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

5.4.2 How PROFINET IO devices start up with a large operational configuration B–27
5.4.3 Operating PROFINET IO alongside other services B–27
5.4.4 Effects of multicast communication on RT communication B–27
5.5 Characteristic data of the integrated switch B–28
6 The CP as Web server B–29
7 Compatibility with Predecessor Products B–30
7.1 Enhanced functions B–30
7.2 Changes B–31
7.3 Replacing older modules: spares / upgrading B–31
8 Further Notes on Operation B–35
8.1 Clear/reset and Reset to factory settings B–35
8.2 Network settings with Fast Ethernet B–36
8.3 Influence of MPI on connections via Industrial Ethernet B–38
8.4 IP configuration B–39
8.4.1 Configured S7 connections cannot be operated if the IP address is assigned over DHCP B–39
8.4.2 Detection of double IP addressing in the network B–39
8.4.3 Obtaining the IP address over DHCP: CP STOP on expiry of the lease B–40
8.5 IP access protection via the IP access control list with a PROFINET IO device B–40
8.6 Media redundancy B–40
8.7 Time-of-day synchronization B–41
8.8 SNMP agent B–43
8.9 Possible security gaps on standard IT interfaces: preventing illegal access B–44
8.10 Interface in the user program B–45
8.10.1 Programmed communication connections with FB55 IP_CONFIG (PROFINET interface) B–45
8.10.2 IP access protection with programmed communication connections . B–45
8.10.3 Programmed communications connections – Assigning parameters to the ports B–46
9 How to Load New Firmware B–47
10 Technical Specifications B–48
11 Other Information available about the CP B–49
12 References and Literature B–50

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

1 Properties / Services

1.1 Application

The CP 343-1 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 IO.

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

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 either as a PROFINET IO controller or as a PROFINET IO device but not for both functions 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.

- 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

    Blocks for S7 communication: BSEND FB12, BRCV FB13, PUT FB14, GET FB15, USEND FB8, URCV FB9, C_CNTRL FC62
    (see also STEP 7 online help or manual “System Software for S7-300/400 System and Standard Functions”)
  - Server for data exchange on S7 connections configured at one end only without communication blocks on the S7-300 / C7-300 station

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

- Open communications services 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;

    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

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 client to the CP. There must be another node in the ring other than the MRP redundancy manager.
- 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).

  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).
- 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.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

- 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)

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

- 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 and ISO 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.

  If you do not require this function, you can disable it in the STEP 7 configuration and disable the port 80.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

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 313-5BE00-0AB0 6ES7 313−5BE01−0AB0 6ES7 313−5BF03−0AB0
CPU 313C-2 DP	6ES7 313-6CE00-0AB0 6ES7 313−6CE01−0AB0 6ES7 313−6CF03−0AB0
CPU 313C-2 PtP	6ES7 313-6BE00-0AB0 6ES7 313−6BE01−0AB0 6ES7 313−6BF03−0AB0

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

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 314-6CF00-0AB0 6ES7 314−6CF02−0AB0 6ES7 314−6CG03−0AB0
CPU 314C-2 PtP	6ES7 314-6BF00-0AB0 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 6ES7 315−2AH14−0AB0
CPU 315−2 PN/DP	6ES7 315−2EG10−0AB0 6ES7 315−2EH13−0AB0 6ES7 315−2EH14−0AB0
CPU 315F−2 DP	6ES7 315−6FF01−0AB0
CPU 315F−2 PN/DP	6ES7 315−2FH10−0AB0 6ES7 315−2FH13−0AB0 6ES7 315−2FJ14−0AB0
CPU 315T−2 DP	6ES7 315−6TG10−0AB0
CPU 316	6ES7 316−1AG00−0AB0
CPU 316-2 DP	6ES7 316-2AG00-0AB0
CPU 317−2 DP	6ES7 317−2AJ10−0AB0
CPU 317−2 PN/DP	6ES7 317−2EJ10−0AB0 6ES7 317−2EK13−0AB0 / 6ES7 317-2EK14-0AB0
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 / 6ES7 317-2FK14-0AB0
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

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

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

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

2.2 Configuration

The following version of STEP 7 is required:

Table 2-4

STEP 7 version	Functions of the CP
V5.x	The range of functions of the CP 343-1 (EX11) can be configured.
V5.3 Service Pack 2 with hardware update	The range of functions of the CP 343-1 (EX21) can be configured.
V5.4 Service Pack 2	Requirement for configuring all functions of the CP 343-1 (EX30) to Firmware–Version V2.1
V5.4, Service Pack 5 + HSP 1039	Requirement for configuring the new functions of the CP.
V5.4, Service Pack 5, Hotfix 2 + HSP 1039	Requirement for configuring the new functions of the CP.

Installation of the Hardware Support Package (HSP)

You will find the HSP on the Internet at the following address:

www.siemens.com/automation/step7-hwconfig2

Install the HSP in STEP 7 / HW Config in the “Options” menu with the “Install Hardware Updates” menu command. You will find further information in the STEP 7 online help (under “HSP” or “Hardware update”).

After installing the HSP, close STEP 7. After restarting STEP 7, the CP is in the catalog of HW Config.

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 /9/.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

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).

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

3 Installation and Commissioning

3.1 Procedure / steps

Step	Explanation / meaning
1. Install the CP on the S7 standard rail. 2. Establish the connection via the enclosed bus connector to the backplane bus.	Slots 4 to 11 are permitted for the CP in racks 0 to 3 (connected by IM 360/361). 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) – 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.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

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

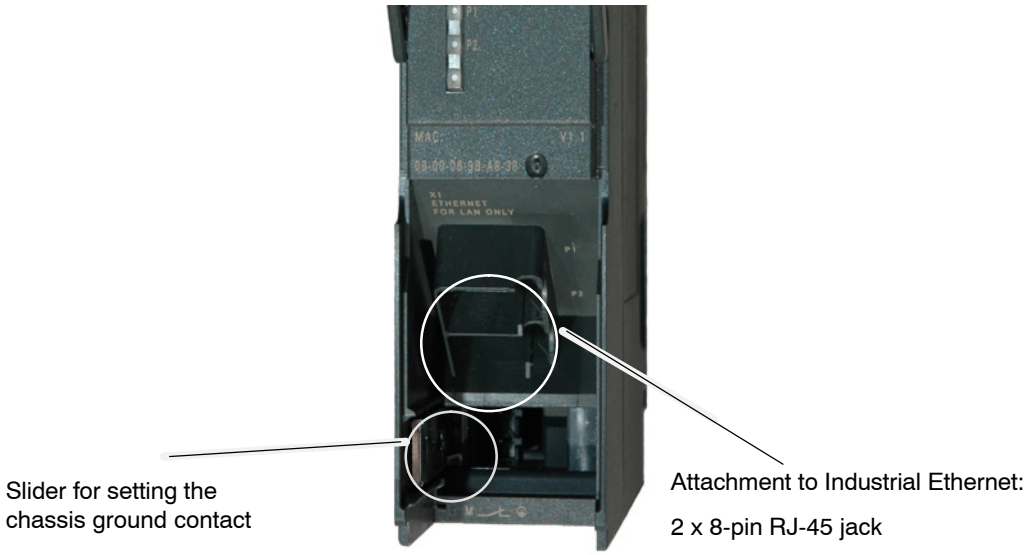


Figure 3-1 Connectors of the CP with the front panel open

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).

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

- 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.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

3.2 Module replacement without PG

General procedure

The configuration data for the CP is stored either on the CPU or on the CP. If the data is stored on the CPU, the module can be replaced with a module of the same type (identical order number) without a PG.

This option can be selected in the properties dialog of the CP (in the “Options” tab – “Replace Module without PG”). We recommend that you store the configuration data on the CPU if the configuration memory of the CPU allows.

For information on replacing previous modules, refer to the section “Compatibility” in Chapter 7.

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.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

3.3 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.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

4 LED Displays

The display on the front panel consists of 8 LEDs that indicate the operating mode and the communication status.

Front panel:



The LEDs have the following meaning:

- SF: Group error
- BF: Bus fault PROFINET IO
- 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
- X1 / P1: Link status of Ethernet port 1
- X1 / P2: Link status of Ethernet port 2
- MAINT Maintenance necessary (Check/evaluate the diagnostic buffer)

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

LEDs for displaying the mode

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

SF (red)	BF (red)	RUN (green)	STOP (yellow)	CP Operating Mode
	–			• Starting up after power “ON” or • Stopped (STOP) with errors In this state, the CPU or intelligent modules in the rack remain accessible using PG functions.
				Starting up (STOP->RUN)
				Running (RUN)
				Stopping (RUN->STOP)
				Stopped (STOP) In the STOP mode configuring and performing diagnostics on the CP remain possible.
–		–	–	• Interface networked but no LAN cable inserted or • Duplicate IP address detected
–			–	The CP is configured as a PROFINET IO device; there is no data exchange with the PROFINET IO controller.
			–	The CP (configured as a PROFINET IO controller) has detected at least one IO device as disrupted.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

SF (red)	BF (red)	RUN (green)	STOP (yellow)	CP Operating Mode
	–		–	• Running (RUN), with fault Diagnostic message from one or more IO devices is pending. IO device diagnostics will provide detailed information. or • Event viewer in conjunction with the MRP function The CP diagnostic buffer provides detailed information. or • Advanced port diagnostics reports an error. Examples: – Current port setting (transmission medium, duplex) does not match the configuration. – Port interconnection does not match the configuration.
				Module fault / system error

Legend: (colored) on off (colored) flashing "–" any

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 9.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

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)			The CP is sending/receiving over Industrial Ethernet Note: PROFINET IO services are not signaled here.
P1 / P2 (green / yellow)			Port has no connection to Industrial Ethernet.
		green	Existing connection over port to Industrial Ethernet (LINK status).
		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	Continuous data transfer at the port over Industrial Ethernet (for example PROFINET IO).

Legend:  (colored) on  off  (colored) flashing "–" any

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.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

5 Performance Data / Operation

5.1 Number of possible connections over Ethernet

Table 5-1

Characteristic	Explanation / values
Permitted number of simultaneous connections in total over Industrial Ethernet	32 maximum

Example of maximum load

You can, for example, operate:

16 S7 connections, of which
- 8 PUT jobs
- 8 GET jobs

16 S7 connections, of which
- 2 ISO-on-TCP connections
- 8 TCP connections
- 6 UDP connections

Also:

- Other TCP connections for Web diagnostics
- As PROFINET IO device:
  1 PROFINET connection to a PROFINET IO controller

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

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

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. Remember the maximum number of Ethernet connections shown in section 5.1.
	16 resources maximum A resource is required for each S7 communication function executed. If the CP has 16 job resources, then 16 PUT **or** GET jobs can be executed on 16 S7 connection at the same time (the same with BSEND/BRECV and USEND/URECV jobs).
LAN interface – data field length generated by CP per protocol data unit	
• sending	240 bytes / PDU
• receiving	240 bytes / PDU

Failure time due to a connection abort

If an S7 connection aborts, for example due to the failure of the connection partner, it can take up to 40 seconds before the connection abort is detected in the block. Block processing is aborted and the block resources are released again. With PUT/GET, the block processing cannot be aborted.

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.

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://support.automation.siemens.com/WW/view/en/5209605

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

5.3 Characteristics of the SEND/RECEIVE interface

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

The following characteristics are important:

Table 5-3

Characteristic	Explanation / values
Total number of ISO transport connections + ISO-on-TCP connections + TCP connections + UDP connections	Maximum 16 Notes: • All UDP connections are also possible in the multicast mode • Free UDP connections are supported by the CP.
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; • 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.

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://support.automation.siemens.com/WW/view/en/5209605

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

5.4 PROFINET IO

5.4.1 Characteristic data

Possible modes with PROFINET IO

In PROFINET IO, the CP can function as PROFINET IO device or as PROFINET IO controller.

CP as PROFINET IO controller

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

Table 5-4

Characteristic	Explanation / values
Number of possible PROFINET IO devices	32 If data is stored on the CPU, the number of operable PROFINET IO devices may be < 32. This depends on the free configuration memory available on the CPU type you are using.
Size the input area over all PROFINET IO devices *)	1024 bytes max.
Size the output area over all PROFINET IO devices	1024 bytes max.
Size of the IO data area per submodule of a module in an IO device • Inputs • Outputs	 240 bytes 240 bytes
Size of the consistency area for a submodule	240 bytes
Permitted number of CP 343-1 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.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

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.. > V2.2**

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

- 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) > V2.2**

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

Table 5-5

Characteristic	Explanation / values
Size of the input area of the PROFINET IO device	512 bytes max.
Size of the output area of the PROFINET IO device	512 bytes max.
Size of the IO data area per submodule in a PROFINET IO device • Inputs • Outputs	 240 bytes 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).

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://support.automation.siemens.com/WW/view/en/5209605

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

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

When operating the module with a large configuration (up to 32 communication connections and up to 32 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 if you use other functions at the same time as PROFINET IO that affect the configuration or the mode (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:

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

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

5.5 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 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.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

6 The CP as Web server

Web diagnostics

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

The CP provides HTML pages for Web diagnostics.

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

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

Diagnostic buffer entries are output in English on the diagnostic pages. This is not influenced by the language selected for display of the Web pages.

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

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

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)

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

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

7 Compatibility with Predecessor Products

7.1 Enhanced functions

The CP 343-1 (6GK7 343-1EX30-0XE0) supports all functions of the previous module (6GK7 343-1EX21-0XE0) with the restrictions listed further below.

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

New: Enhanced functions compared with the CP 343-1 EX21

- Web diagnostics
- Function as PROFINET IO device
- Integrated ERTEC 2-port real-time switch
- Changed connection configuration limits (see Section 5.1)
- Reading and writing data records with FB52
- Diagnostics: Alarm evaluation in the user program with FB54
- No support of PROFINET CBA

New: Enhanced functions compared with the CP 343-1 EX30 with firmware version V2.1

The following features can be used with the module as of firmware version 2.2:

- Advanced Web diagnostics (can be disabled)
- New GSDML file
- Configurable PROFINET interface with planning of port topology
- Advanced PROFINET diagnostics
- LLDP and DCP frames can be disabled for specific ports
- Media redundancy (MRP) in PROFINET IO
- I&M functions (configurable plant designation and location identifier)
- Configurable protection levels
- UDP buffering (can be disabled)
- New options for time−of−day synchronization
- Support of optimized PROFINET blocks FC11/FC12 version V3.0

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

7.2 Changes

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

Modifications in construction compared with the CP 343-1 EX21

- Single-width design
- The mode selector is no longer present

  (the mode can be changed in the SIMATIC Manager in STEP 7 or NCM Diagnostics).
- No exchangeable C-PLUG

7.3 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.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Use as a replacement:

The CP 343-1 (6GK7 343-1EX30-0XE0) described here can be used as a replacement for the following predecessor products:

- CP 343-1 (6GK7 343-1EX10-0XE0) *)
- CP 343-1 (6GK7 343-1EX11-0XE0) *)
- CP 343-1 (6GK7 343-1EX20-0XE0)
- 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).

**) Compared with the device types CP 343-1 (EX21), note the changed number of possible connections and the lower PROFINET IO configuration limits and lack of support for PROFINET CBA compared with device type CP 343-1 (EX21).

Upgrading

The following predecessor products can be upgraded to the CP 343-1 (6GK7 343-1EX30-0XE0) described here:

- See modules in “use as a replacement”

The CP 343-1 (EX30) can be inserted along with a dummy module SM370 (6ES7 370-0AA01-0AA0) in a double-width slot in an existing S7-300 rack. The SM370 placeholder module has a switch on the rear that, in this case, needs to be set to ”NA”.

Interface in the user program



Danger

Please remember that if you use this module as a replacement, you should only use the blocks on the SEND/RECEIVE interface that are permitted for the CP type used! We recommend that you always use the latest block versions.

If you use the module described here as a replacement for one of the modules listed below, make sure that you use the block versions listed after the modules:

- 6GK7 343-1EX10-0XE0
- 6GK7 343-1EX11-0XE0 configured as 6GK7 343-1EX10-0XE0

Block versions:

AG_SEND (V4.2 and higher)
AG_RECV (V4.7 and higher)
AG_LOCK (V4.0 and higher)
AG_UNLOCK (V4.0 and higher)

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

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 7-1

Originally configured module	Configuration steps
6GK7 343-1EX21-0XE0 *) 6GK7 343-1EX20-0XE0 6GK7 343-1EX11-0XE0 6GK7 343-1EX10-0XE0 **) ***)	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. 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.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Notice

Read the following notes on the module types listed in Table 7-1:

*) When replacing a module, remember the changed configuration limits for the possible connections, the reduced PROFINET IO configuration limits and that the PROFINET CBA functionality is no longer supported.

**) If you replace a module, you will need to download the adapted project engineering data to the new module types using STEP*7. The procedure is therefore possible only with “Case b / adapted configuration”.

***) If you replace a module, you will need to update the communication blocks to the latest version.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

8 Further Notes on Operation

8.1 Clear/reset and Reset to factory settings

If the CP was configured with the protection level “status dependent”, the following two functions are only available if the CPU is in STOP. You will find the setting in the properties dialog of STEP 7 > ”Options” > Module access protection.

Available functions

The following two functions are available for the CP:

- Clear / reset

  Following this memory reset, the CP retains the preset MAC address 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

- Resetting to factory settings

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

If you store the configuration data on the CPU, please read the note below.

Note

Using the functions described here to reset the memory, you do not modify the configuration data on the CPU!

If you subsequently upload the configuration data from the CPU to a PG you will always object the configuration data that were previously on the CP (with parameters, connections, IP address).

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**

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

- 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.

8.2 Network settings with Fast Ethernet

Row “X1P1”: Properties of port 1 of the PROFINET interface
Row “X1P2”: 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.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

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.

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.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

- 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.

8.3 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 FC5 / FC6.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

8.4 IP configuration

8.4.1 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.

8.4.2 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 return of power or after assignment of an Ethernet address), the CP sends out a query for 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 (display “stopped (STOP) with error” + LED “BF”) and by an entry in the internal diagnostic buffer.

  The CP remains in STOP

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.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

8.4.3 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.

8.5 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.

8.6 Media redundancy

You can use the CP in a ring topology with media redundancy. The CP can only be a 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.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

8.7 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.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

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

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

8.8 SNMP agent

SNMP (**S**imple **N**etwork **M**anagement **P**rotocol)

The CP supports data queries via SNMP in Version 1. It returns the contents of certain MIB objects according to the MIB II standard, LLDP MIB.

SNMP is a protocol for managing networks. To transmit data, SNMP uses the connectionless UDP protocol.

The information on the properties of SNMP-compliant devices is entered in MIB files (MIB = Management Information Base).

Where to find further information

For more detailed information on working with MIB files, refer to the documentation of the SNMP client you are using (example of an SNMP client: SNMP OPC Server from SIMATIC NET).

You will find more information on MIB on the following SIMATIC NET Internet page:

http://support.automation.siemens.com/WW/view/en/15177711

Supported MIB objects

The CP supports the following groups of MIB objects of the MIB II standard in compliance with RFC1213:

- System
- Interfaces
- Address Translation (AT)
- IP
- ICMP
- TCP
- UDP
- SNMP

The other groups of the MIB II standard are not supported:

- EGP
- Transmission

The CP also supports the LLDP-MIB according to IEEE 802.1AB and the PROFINET expansions of the LLDP-MIB (see also IEC 61158-10-6).

Exceptions / restrictions:

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

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

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	Type of interface
1–2	Port 1–2
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!

8.9 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.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

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/partner/guisearch.asp

8.10 Interface in the user program

8.10.1 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.

8.10.2 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:

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

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.

8.10.3 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.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

9 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 always start the download using the active MAC address of the CP!

LEDs to indicate the CP mode

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

Table 9-1

SF (red)	BF (red)	RUN (green)	STOP (yellow)	CP operating mode
●	●	☼	●	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.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

10 Technical Specifications

Transmission rate	10 Mbit/s und 100 Mbit/s
Connection to Ethernet	2 x RJ-45 jack
Power supply	DC +24 V (permitted range: +20.4 V through +28.8 V)
Current consumption • from backplane bus • from external 24 V DC	 0.2 A maximum TP: approx. 0.2 A maximum
Power loss approx.	5.8 W
Permitted ambient conditions • Operating temperature • Transportation/storage temperature • Relative humidity max. • Altitude • Pollutant concentration	 0 °C to +60 °C in vertical operation 0 °C to +40 °C in horizontal operation –40 °C to +70 °C 95% at +25 °C up to 2000 m above sea level According to ISA–S71.04 severity level G1, G2, G3
Design • Module format • Dimensions (W x H x D) in mm • Weight approx.	 Compact module S7-300; single width 40 x 125 x 120 220 g

In addition to this, all the information in the S7-300 reference manual /13/ “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

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

11 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/10806067

GSDML file

You will find the GSDML file for the CP described here on the Internet under the following entry ID (Entry type “Download”):

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 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 (Entry type “Manuals”):

http://support.automation.siemens.com/WW/view/de/27103175

Manual Release 05/2008 has the ID 30374198.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

12 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

/**1**/ SIMATIC NET
S7 CPs for Industrial Ethernet
Manual
Siemens AG
(manual for each CP in the SIMATIC NET Manual Collection)

/**2**/ Version history / current downloads for SIMATIC NET S7 CPs
Siemens AG
(SIMATIC NET Manual Collection)

On configuration with STEP 7 / NCM S7

/**3**/ NCM S7 for Industrial Ethernet
Primer
Siemens AG
Part of the online documentation in STEP 7

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

/**4**/ SIMATIC NET, Instructions
Commissioning PC Stations
Siemens AG
(SIMATIC NET Manual Collection)

/**5**/ 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):

/**6**/ Component based Automation – Configuring Plants with SIMATIC iMap
Manual
Siemens AG
(ID: 18404678)

/**7**/ Basic Help in the SIMATIC iMap Engineering Tool (online help)
Siemens AG

/**8**/ 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

/**9**/ SIMATIC NET
Functions (FC) and Function Blocks (FBs) for SIMATIC NET S7 CPs
Programming Manual
Siemens AG
(SIMATIC NET Manual Collection)
(ID: 30564821)

/**10**/ Version history of the SIMATIC NET function blocks and functions for SIMATIC S7
Reference work
Siemens AG
(SIMATIC NET Manual Collection)

/**11**/ 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

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

/**12**/ 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

/**13**/ 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

/**14**/ SIMATIC
PROFINET System Description
System Manual
Siemens AG
(Part of the Manual Collection)

/**15**/ SIMATIC
From PROFIBUS DP to PROFINET IO
Programming Manual
Siemens AG
(Part of the Manual Collection)

On the IT functions of the CPs

/**16**/ Data Security in Industrial Communication
White Paper
SIEMENS AG
(http://www.automation.siemens.com/net/html_76/support/whitepaper.htm)

/**17**/ Creating Java Beans with IBM VisualAge
SIEMENS AG
(ID: 10499820)

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

/**18**/ S7Beans / Applets for IT−CPs
Programming Aid
SIEMENS AG
(SIMATIC NET Manual Collection)
(ID: 24843908)

On setting up and operating an Industrial Ethernet network

/**19**/ SIMATIC NET
Manual Twisted Pair and Fiber−Optic Networks
Siemens AG
(SIMATIC NET Manual Collection)

/**20**/ SIMATIC NET
Manual Triaxial Networks
(SIMATIC NET Manual Collection)

SIMATIC and STEP 7 basics

/**21**/ Communication with SIMATIC
System Manual
Siemens AG
(ID: 25074283)

/**22**/ 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

/**23**/ 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

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Other topics

/**24**/ Ethernet, IEEE 802.3 (ISO 8802−3)
(http://www.ieee.org)

/**25**/ RFC1006 (ISO Transport Service on top of the TCP Version: 3)
Request For Comment
(http://www.ietf.org)

/**26**/ RFC793 (TCP)
(http://www.ietf.org)

/**27**/ RFC791 (IP)
(http://www.ietf.org)

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Artisan Technology Group is an independent supplier of quality pre-owned equipment

Gold-standard solutions

Extend the life of your critical industrial, commercial, and military systems with our superior service and support.

We buy equipment

Planning to upgrade your current equipment? Have surplus equipment taking up shelf space? We'll give it a new home.

Learn more!

Visit us at **artisantg.com** for more info on price quotes, drivers, technical specifications, manuals, and documentation.

Artisan Scientific Corporation dba Artisan Technology Group is not an affiliate, representative, or authorized distributor for any manufacturer listed herein.

We're here to make your life easier. How can we help you today?

(217) 352-9330 | sales@artisantg.com | artisantg.com

ARTISAN® TECHNOLOGY GROUP