SIEMENS

SIMATIC NET

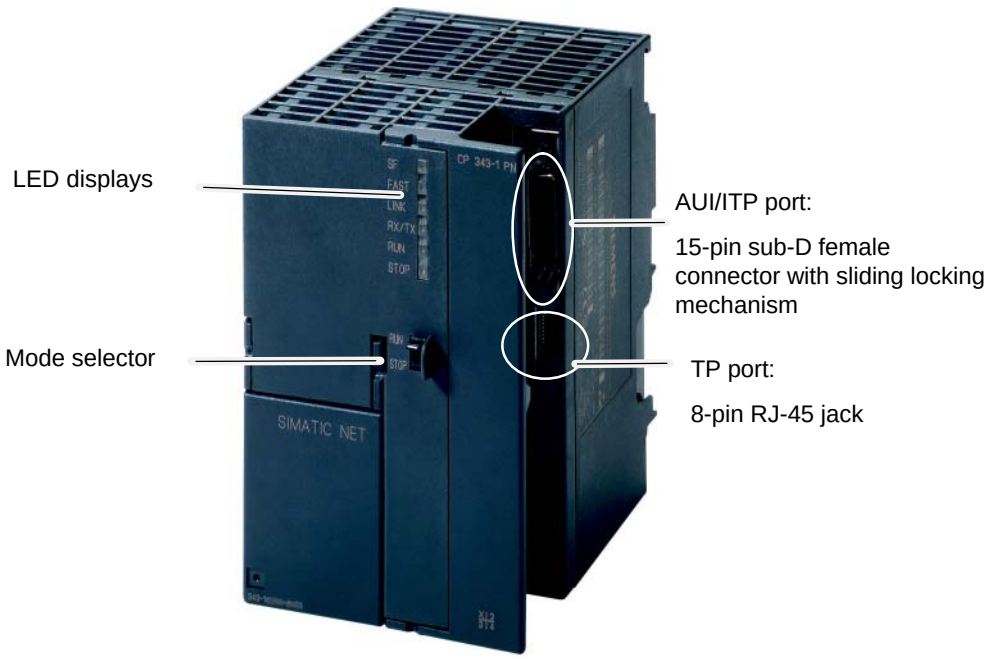
S7–CPs for Industrial Ethernet

Manual Part B2

CP 343-1 PN

6GK7343-1 HX00-0XE0 Version 3 and higher (Firmware version V1.1)

for SIMATIC S7–300 / C7–300



Notes on the Product

Note

All the notices in the **Product Information Bulletin** shipped with this device are valid and must be adhered to.

Address label: Unique MAC address preset for the CP

The CP 343-1 PN ships with a factory-set MAC address.

To ensure a unique address assignment, we recommend that you use this MAC address when configuring the module!

❑

Contents

Contents – Part A

Note

Please remember that Part A of the manual also belongs to the description of the CPs. Among other things, this includes an explanation of the safety–related notices and other information that applies to all S7 CPs for Industrial Ethernet.

You can also obtain this general section from the Internet:

http://www4.ad.siemens.de/view/cs/en/8774037

Contents – Part B2

1 Properties / Services

Application

The CP 343-1 PN communications processor is the communications module of the SIMATIC S7-300 for Industrial Ethernet with additional PROFInet functionality.

As shown in the graphic, the PROFInet functionality allows access over networks to devices on PROFIBUS.

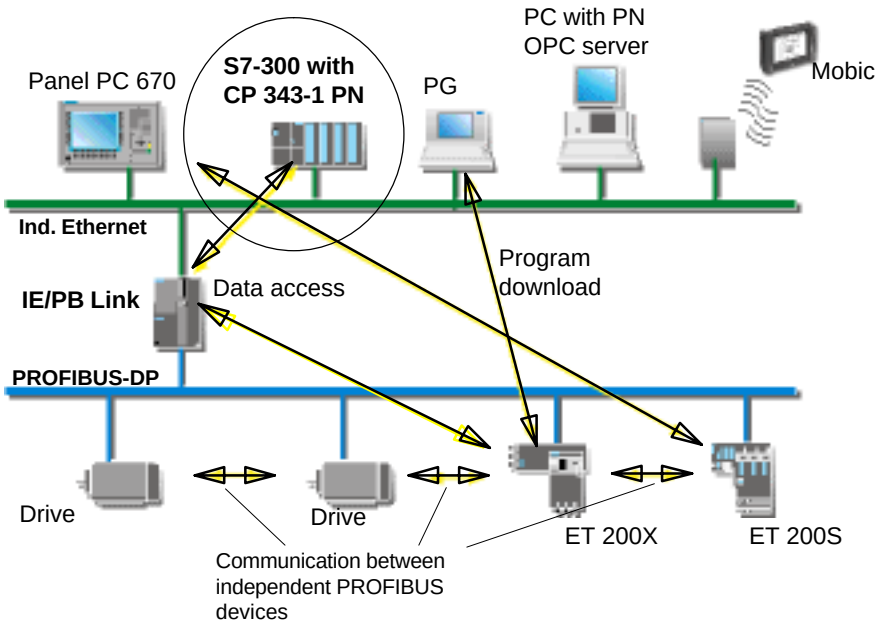


Figure 1-1

Configuring

You can configure the CP 343-1 PN over MPI or LAN/Industrial Ethernet. You require STEP 7 V5.1 SP3 or higher with NCM S7 for Industrial Ethernet (abbreviated to “NCM IE” below).

To use the CP 343–1 PN under PROFInet, you require the engineering tool SIMATIC iMap version 1.1 or higher to configure the interconnections.

Services

The CP 343-1 PN supports the following communication services:

- Use of a SIMATIC S7-300 for Component based Automation based on the new PROFInet Standard of the PNO. This standard makes the following possible:
  - Component technology in automation

  - Graphical configuration of communication between intelligent devices instead of time–consuming programming
  - Heterogeneous engineering throughout the entire plant

  Component based Automation allows access to the variables of the PROFInet components by all standard PC applications with an OPC client interface, for example visualization systems. Using OPC Servers, objects can be selected directly from a variable list of the required PROFInet component.

- S7 communication and PG/OP communication
  - PG functions (including routing)
  - Operator control and monitoring functions (HMI)
  - Server for data exchange over S7 connections
  - Server for data exchange on connections configured at one end only without communication blocks on the S7-300 / C7-300 station
- S5 compatible communication with
  - SEND/RECEIVE interface over ISO-on-TCP, TCP and UDP connections
  - 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) over ISO-on-TCP connections and TCP connections;
  - LOCK/UNLOCK with FETCH/WRITE services;
- Internal time of day

  If a time master exists, the internal diagnostic buffer of the CP is time-synchronized over the LAN.
- Addressability using default MAC address

  The CP can be reached using the factory-set MAC address to allow IP address assignment; the CP supports the PST function (Primary Setup Tool).

Programming – Using Blocks

The interface in your STEP 7 user program to some of the communication services available with the Ethernet CP is formed by ready–made blocks (FCs/FBs). You will find a detailed description of these blocks in the NCM S7 for Ethernet manuals.

Notice

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

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

http://www4.ad.siemens.de/view/cs/de/8797900

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

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

2 Requirements for Use

General Operation

The following table shows the S7-300 CPUs with which the CP 343-1 PN can be operated with the range of functions described here:

Table 2-1

CPU	Order Number
CPU 312 IFM	6ES7 312-5AC02-0AB0
CPU 312 (T)	6ES7 312-5AC82-0AB0
CPU 313	6ES7 313-1AD03-0AB0
CPU 314	6ES7 314-1AE04-0AB0
CPU 314 (T)	6ES7 314-1AE84-0AB0
CPU 314 IFM	6ES7 314-5AE03-0AB0
CPU 314 IFM (T)	6ES7 314-5AE83-0AB0
CPU 315	6ES7 315-1AF03-0AB0
CPU 315-2 DP	6ES7 315-2AF03-0AB0
CPU 315-2 DP (T)	6ES7 315-2AF83-0AB0
CPU 316-2 DP	6ES7 316-2AG00-0AB0
CPU 318-2	6ES7 318-2AJ00-0AB0
CPU 614	6ES7 614-1AH03-0AB3
CPU 614-Z	6ES7 614-1AH03-0AB3-Z
CPU 312C	6ES7 312-5BD00-0AB0
CPU 313C	6ES7 313-5BE00-0AB0
CPU 313C-2 DP	6ES7 313-6CE00-0AB0
CPU 313C-2 PtP	6ES7 313-6BE00-0AB0
CPU 314C-2 DP	6ES7 314-6CF00-0AB0
CPU 314C-2 PtP	6ES7 314-6BF00-0AB0

The table lists the CPUs approved at the time of printing this product information bulletin. S7-300 CPUs approved later and not listed in the table also support the range of functions described here.

3 Installation and Commissioning

Procedure / Steps

Table 3-1

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! • The CP is delivered with a jumper inserted between the M terminals and the function ground. If you want to earth the reference potential, you must not remove the jumper between the M terminals and the function ground (see also /1/ under the topic “Setting Up an S7-300 with Earthed Reference Potential” and “Setting Up an S7-300 with Unearthed Reference Potential”).	
4. Attach the CP to Industrial Ethernet.	
5. The remaining steps in commissioning involve downloading the configuration data.	For further information, in particular on addressing the module for the first time (node initialization), refer to the manual NCM S7 for Ind. Ethernet /3/ : 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 the ISO protocol must be installed. The protocol used must then be applied to the S7ONLINE access point.

Note

The two front panels 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.

Configuration

To initialize the CP for communication services, use the configuration tool NCM S7 for Industrial Ethernet. Refer to Chapter 1 of this manual.

To use the CP 343–1 PN under PROFInet, you require the engineering tool SIMATIC iMap to configure the interconnections.

Operation with Fast Ethernet – Automatic Switchover

The CP 343-1 PN has a 10/100 Mbps full duplex port with “autonegotiation” for automatic switchover.

You will find more information about the current mode in NCM diagnostics in the diagnostic object “Industrial Ethernet” in the Section “Network Attachment”.

Notice

If you use 10 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.

PG/PC Connection

You can connect the PG when configuring the CP as follows:

- via Industrial Ethernet
- via MPI

Note

When using PROFInet, you must use the interface over Industrial Ethernet to load the interconnections over iMap.

4 Using the CP 343-1 PN with PROFInet

4.1 Preparing to Configure with STEP 7

Before you can use the CP 343–1 PN under PROFInet, you must first configure the S7–300 station with STEP 7.

Remember to make the following preparations for the later use of the module with PROFInet:

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

  You must create one CP 343–1 PN (and one only) in one central rack of the S7–300 station.

- Configure the Ethernet interface

  When you subsequently configure the Ethernet interface, make the following settings:

  – Activate the “IP protocol is being used” option.

  – Deactivate the “Set MAC address / use ISO protocol” option.

For more detailed information on transferring the configuration data to the engineering tool SIMATIC iMap, please refer to the manual /11/.

4.2 PROFInet Configuration with SIMATIC iMap

Functionality in PROFInet

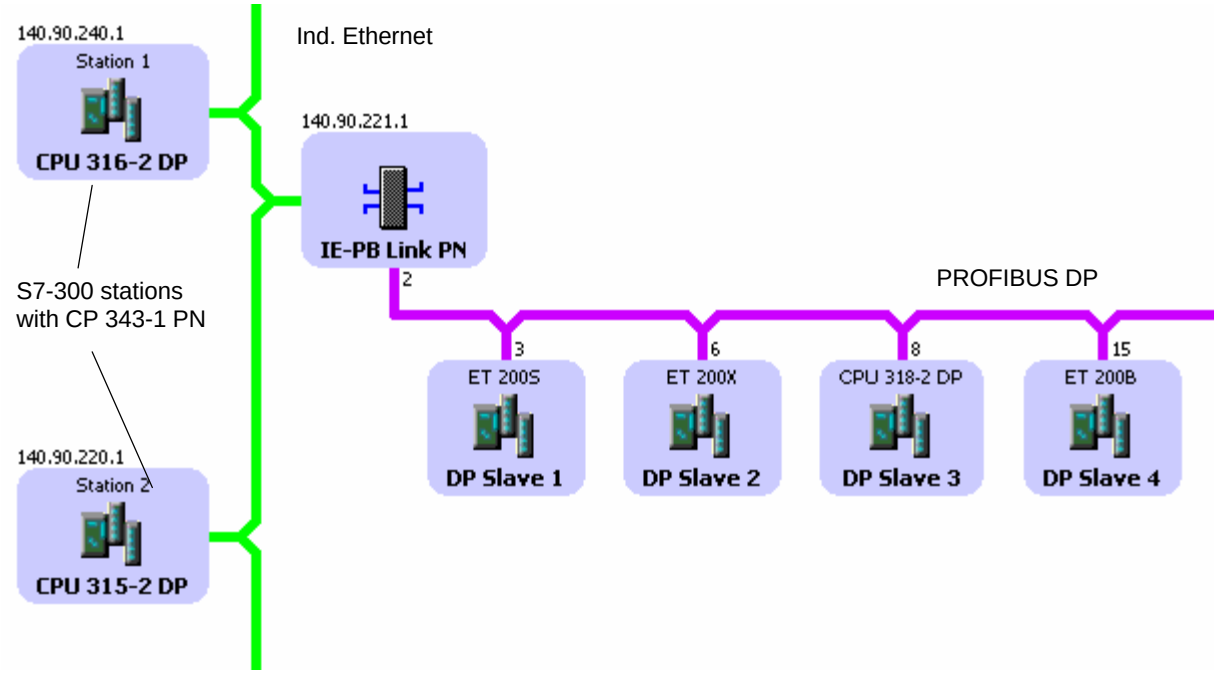
The CP 343-1 PN is a PROFInet-compliant device. An S7-300 station equipped with this CP can be interconnected in SIMATIC iMap as a PROFInet component.

You configure the interconnections between the PROFInet components in the plant view of SIMATIC iMap.

Display in SIMATIC iMap

- Network View in SIMATIC iMap

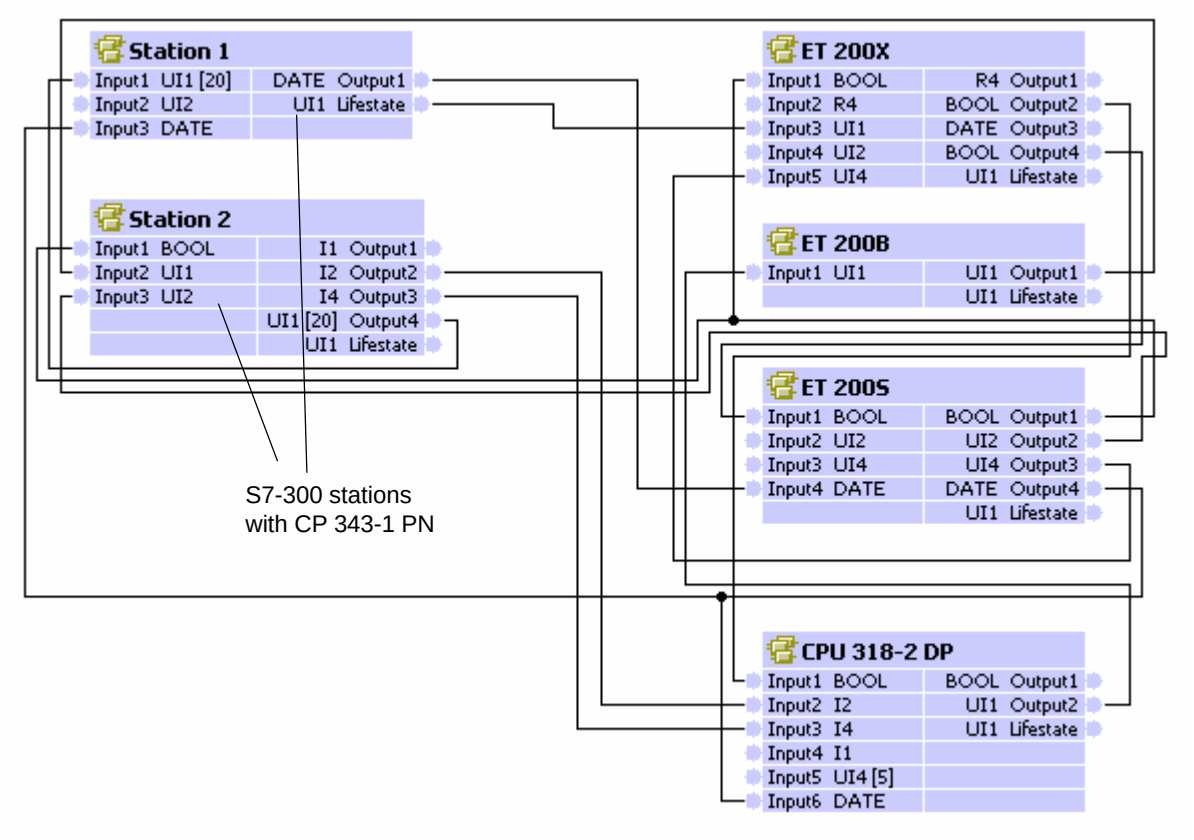
  In the network view of SIMATIC iMap, the following graphic shows how a CP 343-1 PN in an S7-300 station establishes the connection between DP slaves on PROFIBUS-DP and an S7-300 station on Industrial Ethernet over an IE/PB Link.



- Plant view in SIMATIC iMap

  In the plant view, the interconnection of inputs and outputs over the CP 343-1 PN is visible.

  Here, you can only see the PROFInet components with their interconnections to the process inputs and process outputs.



Assigning Addresses and Properties in SIMATIC iMap

Notice

Please remember that you must assign an address for the CP 343-1 PN once in STEP 7; this is described in Chapter LEERER MERKER.

If you select the CP 343-1 PN in the network view, you can set the IP addresses.

You can also enter management information (technological names).

Downloading Configuration Data

Using SIMATIC iMap, you download the configuration data with information about the interconnections of the process inputs and process outputs to the PROFInet components via the Ethernet port.

Notice

The ”Replace module without PG” functionality (configuration data stored on the CPU) can no longer be used fully after downloading interconnections since the interconnection information is stored only on the CP.

After replacing a module, you must download the interconnection information to the new CP using SIMATIC iMap.

Module Diagnostics in SIMATIC iMap

When the CP 343-1 PN is online, you can use the diagnostic functions in SIMATIC iMap and, for example, read out the diagnostic buffer of the device.

Note

For more detailed information about adopting the STEP 7 configuration and using it in PROFInet and in the SIMATIC iMap engineering tool, refer to the documentation on SIMATIC iMap.

4.3 Programming – the PN_InOut (FB88) Block

How it Works

FB88 transfers data from the interface DB to the CP 343-1 PN and from the CP 343-1 PN to the interface DB. The interface DB itself is the interface to the user program.

To allow this, FB88 must be called cyclically. It is also possible to call FB88 more than once in a cycle.

On the interface, FB88 requires only the module address of the CP 343-1 PN.

To ensure data consistency, you can only modify the data to be transferred or start to read the received data when the job is completed (DONE=1).

Once DONE=1 or ERROR=1 is set, the transfer is either completed or has been terminated due to an error. Data can now be evaluated or set again. Data are transferred again the next time the block is called.

In your user program, make sure that on completion of data transfer FB88 is called again only after all the input data have been read and all output data have been written to the interface DB.

Note

You will find detailed information on the structure and handling of the interface DB in the SIMATIC iMap documentation /11/:

You will find a model interface DB (DB100) in the block library described below under Supplied with the Block Library.

Notice

Calling communications blocks for S7–300 (SIMATIC NET block libraries for S7–300 in STEP 7) in several priority classes is not permitted! If, for example, you call a communications block in OB1 and in OB35, the block execution could be interrupted by the higher–priority OB.

If you call the blocks in several OBs, you must write your program so that an executing communication block cannot be interrupted by another communication block (for example, by disabling/enabling SFC alarms).

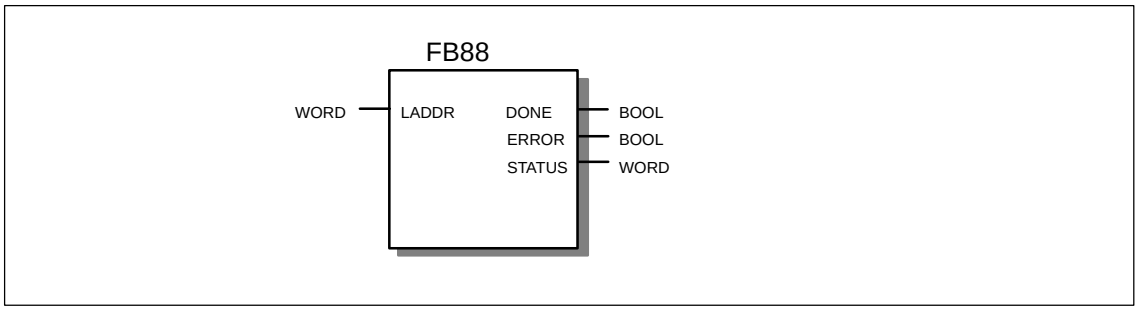
Do not modify the instance DB of FB88 (this is known as the call interface with DB88 below)!

Supplied with the Block Library

FB88 is supplied with SIMATIC iMap.

The block is available in the PROFInet Library in ”PROFInet_System_Library”.

Call Interface



Sample Call in STL Representation

```
STL                                          Explanation
Call FB 88 , DB88                            //Block call with instance DB88
LADDR   :=     W#16#0120
DONE    :=     M 99.1
ERROR   :=     M 99.0
STATUS  :=     MW 104
```

Explanation of the Formal Parameters

The following table explains the formal parameters for FB88:

Parameter	Declaration	Type	Remarks
LADDR	INPUT	WORD	Module base address When you configure the CP with STEP 7 HW Config, the module base address is displayed in the configuration table. Specify this address here. Do not change the parameter until the job is completed (DONE=1 or ERROR=1).
DONE	OUTPUT	BOOL	Reports the (successful) completion of a job.
ERROR	OUTPUT	BOOL	Report that the job could not be executed free of errors.
STATUS	OUTPUT	WORD	This parameter returns detailed information about the execution of the job. Status codes can be returned even during execution of the job (DONE=0 and ERROR=0).

Evaluating the Status Codes

Note that the status codes DONE, ERROR, and STATUS are updated at every block call.

The following table explains how the user program can evaluate the codes made up of DONE, ERROR and STATUS.

Table 4-1 Codes of PN_InOut (FB88)

DONE	ERROR	STATUS	Meaning
1	0	0000_H	Job completed without error.
0	0	0000_H	No job being executed.
0	0	8181_H	Job active.
0	0	8183_H	The service has not yet started, data cannot be read.
0	0	8184_H	Bad instance DB; generally resulting from the user program writing to the instance DB illegally.
0	1	$80B0_H$	Block error: the data record number is wrong. This status can also occur after a cold restart or a warm restart after power down/up.
0	1	$80B1_H$	Block error: data record length or offset is wrong.
0	1	$80B3_H$	Parameter error: bad CP address.
0	1	$80C1_H$	Temporary error: the specified data record is currently being processed.
0	1	$80C2_H$	Temporary error: there are too many jobs pending; the data record cannot be read yet.
0	1	$80C3_H$	Temporary error: resources (memory) occupied.

Table 4-1 Codes of PN_InOut (FB88), Fortsetzung

DONE	ERROR	STATUS	Meaning
0	1	$80C4_H$	Communication error: occurs temporarily; repeating the job in the user program is often useful. or Configuration error: the configured module does not match the module actually being used; the PROFInet service is not supported.
0	1	$80D1_H$	Configuration error: maximum number of input and output data buffers exceeded.
0	1	$80D2_H$	Configuration error: the configured module does not match the module actually being used; the PROFInet service is not supported.

You can find out which SFCs are used that are relevant to the error evaluation in the Properties dialog of the FB described here in the “Calls” tab

Note

For entries coded $8Fxx_H$ in the STATUS column, refer also to the STEP 7 Standard and System Functions reference manual. You will find information in the chapter “Evaluating Errors with the Output Parameter RET_VAL”

Status Codes during CP Startup

When the PROFInet CP is restarted (warm or cold restart, for example due to changing a switch setting), the output parameters of the block are reset as follows:

- DONE = 0
- ERROR = 0
- STATUS = 8181_H

Numeric Data / Resources Required

Table 4-2 Numeric Data for FB 88

NAME	Version	FB No.	Local Data Bytes	MC7 Bytes	Load Memory Requirements Bytes	Work Memory Requirements Bytes
PN_InOut	1.4	88	54	2034	2464	2070

5 Using PROFInet Communication and Standard Communication at the Same Time

Overview

With the CP, it is possible to operate PROFInet communication and standard communication at the same time using the S7 communication services and S5-compatible communication.

This mode is relevant to your application, for example, when you want to implement communication between existing ”conventional” SIMATIC devices and PROFInet devices in an existing system.

The ”problem” in this case, is that communication with PROFInet devices must be configured with the SIMATIC iMap application. Communication with conventional devices, on the other hand, requires that connections are configured in STEP 7.

Recommended Procedure

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

Use S7, TCP, or ISO-on-TCP connections for communication between the PROFInet device and a conventional device.

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

- With S7 communication
  - PROFInet device:
    No configuration necessary, the device can only be operated as a server for S7 communication.
  - Conventional device: only one end of connection active
- In S5–compatible communication (TCP– / ISO–on–TCP connections)
  - PROFInet device: unspecified passive
  - Conventional device: unspecified active

This achieves the following:

- With STEP 7, you can specify the connection partner for the conventional devices at any time.
- You use the PROFInet devices in SIMATIC iMap and can therefore interconnect them without having to change the connection configuration again in STEP 7; the devices are ready to send and receive on the configured connections (the connection is established by the active partner).

For the PROFInet device, this means that you should follow the procedure below:

1. First configure unspecified connections in STEP 7 (only with TCP – see above).

2. Create suitable user programs in STEP 7 that will handle communication with the conventional devices.
3. Then generate the PROFInet components in STEP 7 and import them into the SIMATIC iMap library.
4. Interconnect the PROFInet components in SIMATIC iMap.
5. Download the components from SIMATIC iMap to the PROFInet device; the configuration data created with STEP 7 with the unspecified connections are also downloaded.

6 Displays and Mode Selector

Along with the six LEDs on the front panel that are used to indicate the mode, an additional display with two LEDs is located beside the RJ-45 jack (hidden by the front panel) and indicates the communication status.

LEDs Displaying the Status

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

Table 6-1

SF(red)	RUN(green)	STOP(yellow)	CP Operating Mode
○	☼	●	Starting up (STOP->RUN)
○	●	○	Running (RUN)
○	●	☼	Stopping (RUN->STOP)
○	○	☼	Ready for firmware loading (this mode is active for ten seconds following power up when the mode selector is set to STOP)
●	○	☼	Waiting for firmware update (CP currently has an incomplete or incorrect firmware version)
○	○	●	Stopped (STOP) In the STOP mode configuring and performing diagnostics on the CP remain possible.
●	○	●	Stopped (STOP) with errors In this state, the CPU or intelligent modules in the rack remain accessible using PG functions.
☼	☼	☼	Module error/system error [1)]

Key: ● on ○ off ☼ flashing (0.5 Hz)

1) Note:
If this status occurs, the module must be turned off and on again; simply activating the RUN selector will not bring about a restart.

CP Communication State

In addition to the LEDs that signal the CP state, the front panel also includes LEDs that provide information about the status of the CP interface to Industrial Ethernet.

Table 6-2

LED		Meaning (LED on)
Front panel	**RJ-45 jack**	
LINK LED (green)		Signals an existing connection to ITP/TP
RX/TX LED (green)		Flashing: CP sending/receiving via TP/ITP/AUI
	FAST LED (green)	Signals an existing connection to ITP/TP at 100 Mbps (Fast Ethernet)
	FD LED (green)	Signals an existing full duplex connection

Note

Read the explanations of the operating modes in the NCM S7 for Industrial Ethernet manual /2/.

Controlling the Operating Mode

There are different ways in which you can control the mode of the CP, as follows:

- Mode selector
- SIMATIC Manager in STEP 7

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

Mode Selector

With the mode selector, you can set the following modes:

- Switch from STOP to RUN:

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

Note

The modes can only be controlled using NCM S7 or the SIMATIC Manager when the selector is set to RUN.

- Switch from RUN to STOP:

  The CP changes to STOP with the following results:

  – Established connections are terminated:

  – In the STOP mode, it is still possible to configure and run diagnostics on the CP; It is,however, not possible to download interconnections (PROFInet operation).

Note

Read the sections about downloading configuration data to the CP in the NCM S7 for Industrial Ethernet manual /2/.

7 Performance Data

7.1 General Characteristics

Table 7-1

Characteristic	Explanation / Values
Total number of connections on Industrial Ethernet	32 maximum

7.2 Characteristics of S7 Communication

Table 7-2

Characteristic	Explanation / Values
Number of connections for S7 communication on Industrial Ethernet	The number depends on the CPU type being used. Please refer to /1/ for the values for your CPU.

7.3 Characteristics of Connections (SEND/RECEIVE Interface)

Table 7-3

Characteristic	Explanation / Values
Total number of ISO-on-TCP connections **+** TCP connections **+** UDP connections	16 maximum (Note: All UDP connections are also possible in the multicast mode)
Max. data length for blocks AG_SEND (V4.1 and higher) and AG_RECV (V4.5 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-on-TCP, TCP; • 1 to 2048 bytes for UDP

Table 7-3 , continued

Characteristic	Explanation / Values
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).
• Data field length	The maximum length of the data fields is 2048 bytes.
• No reception of UDP broadcast	To avoid overload resulting from a high broadcast load, the CP does not permit reception of UDP broadcast.

Reaction times on ISO-on-TCP and TCP Connections

The calculation of the reaction times with ISO-on-TCP or TCP connections is determined by the run time of the function blocks required on the S7-300 CPU (AG_SEND, AG_RECV).

Table 7-4

Component	Explanation / Values
Run time in the CPU 314-1	per block AG_SEND, AG_RECV: 2.5 ms to 5 ms

7.4 Characteristics of the PROFInet Interface

The CP 343-1 PN supports PROFInet interconnections between PROFInet components.

Table 7-5

Characteristics:	Explanation / Values
Maximum number of interconnections	256
Transmission interval for interconnections The transmission interval specified here is the interval after which a variable value is retransmitted by the sender (output of one component) to the recipient (input of the other component).	Multiple of 100 ms
Maximum number of communications partners (PROFInet components on Industrial Ethernet)	64

Notice

If you have a large system or when using other services at the same time (for example online monitoring), it may not be possible to guarantee a configured transmission frequency of 100 ms in all cases. To remedy this, it is advisable to increase the interval to at least 200 ms.

8 Compatibility with the Previous Product

8.1 Extended functions

The CP 343-1 PN (6GK7 343-1HX00-0XE0) version 3 described here can be used as a replacement for the previous versions.

The CP 343–1 PN with firmware version V1.1 described here includes the following **enhancements or extended functions.**

- Unrestricted release (class A)
- Improved performance

8.2 Compatibility with Previous Products / Use as a Replacement

The CP 343-1 PN (6GK7 343-1HX00-0XE0) described here can be used as a replacement for the previous product CP 343-1 (6GK7 343-1EX10-0XE0).

The CP 343-1 PN described here has the **extended functionality** described in this manual (such as PROFInet functionality).

Danger

Please remember that if you use this module as a replacement, you should only use the blocks permitted for the configured CP type on SEND/RECEIVE interface!

If you configure the module described here as module type 6GK7 343-1HX00-0XE0 in STEP 7, you must use the blocks specified for this module type:

AG_SEND (V4.1 and higher)
AG_RECV (V4.5 and higher)
AG_LOCK (V4.0 and higher)
AG_UNLOCK (V4.0 and higher)

You can only continue to use blocks of the older types if you configure the module as module type 6GK7 343-1EX10-0XE0 in STEP 7 (as a replacement module).

9 Further Information on Operation

9.1 Clear / Reset

Available Functions

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

- 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 and IP parameters

  – A newly set MAC address

  – LAN settings

- Resetting to factory defaults

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

Note

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

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 obtain 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**

- 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 6).

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.

9.2 Working with Fast Ethernet – automatic switchover

How Automatic Switchover Works

The CP has a 10/100 Mbps full duplex interface with autosensing and autonegotiation of the network settings. After turning on the CP, these functions work as explained below:

- Step 1: Checking the AUI interface

  Here, the CP uses the settings “10 Mbps half duplex”.

  If frames are received on AUI during this time, the CP remains in this mode. Otherwise, the CP changes to step 2.

  Duration of step 1: 3 seconds

- Step 2: Autosensing and autonegotiation on TP / ITP

  The CP attempts to detect the transmission rate used by the partner.

  If detection is not possible, the CP changes to the AUI mode (back to step 1).

  If detection is possible, the CP attempts to negotiate an optimum duplex mode with the partner.

  If no negotiation is possible, the CP uses the previously detected transmission rate and half duplex.

  Duration of step 2: 2 seconds

Display of the FAST LED

The CP indicates the phase of the automatic switchover with a flashing FAST LED.

Automatic Setting or Individual Network Settings

As default, the CP is configured for automatic detection. As soon as you define a configuration manually when configuring the CP with STEP 7/HW Config (in the properties dialog of the CP – ”Options” tab), the automatic switchover is no longer effective.

Further Notes:

- 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.
- If your application requires a fixed mode instead of “Autonegotiation”, you will need to match up the partner devices.
- 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 set the required mode and communication will not be ideal.

  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 using the “Individual network settings” option of the CP, these changes will be adopted by the CP and activated when the configuration data is downloaded to the CP.

  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.

  Example:
  The download is started initially with the setting TP/ITP at 10 Mbps half duplex. If the “Individual network setting” changes this to AUI, the download cannot be completed.

NCM Diagnostics Indicates the Mode

You will find more information about the currently used network settings in NCM diagnostics in the diagnostic object “Industrial Ethernet” in the Section “Network Attachment”.

9.3 FC Call Interface

Status on the FC call interface; special situation with FC versions

With the FCs AG_SEND (FC5) and AG_RECV (FC6), the following situations

- The CP is in the STOP mode
- The connection is not configured
- The connection is not established
- The connection was aborted

are indicated by the following codes:

- AG_SEND:
  DONE=0; ERROR=0; Status=8181_H
  or
  DONE=0; ERROR=1; Status=8183_H
- AG_RECV:
  DONE=0; ERROR=0; Status=8180_H
  or
  DONE=0; ERROR=1; Status=8183_H

Calling Communications Blocks for an S7–300

Notice

Calling communications blocks for S7–300 (SIMATIC NET block libraries for S7–300 in STEP 7) in several priority classes is not permitted! If, for example, you call a communications block in OB1 and in OB35, the block execution could be interrupted by the higher–priority OB.

If you call the communications blocks in several OBs, you must write your program so that an executing block cannot be interrupted by another communications block (for example, by disabling/enabling SFC alarms).

Modify the call parameters of the FC after the FC has confirmed job execution

Notice

Once the job has been triggered, you can only modify the call parameters of the FC call interface of FC AG_SEND or AG_RECV again after the FC has confirmed job execution with DONE=1 or with ERROR=1.

If you ignore this, it is possible that execution of the job will be aborted with an error.

9.4 Influence of MPI Connections 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 all the 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.
- The connections on which a job on the communication bus with a data length > 240 bytes is being processed are aborted temporarily.

The return values must be handled accordingly on the FC interface in the user program.

9.5 Other Information Available about the CP

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

http://www4.ad.siemens.de/view/cs/de/10806025

10 Loading New Firmware

Requirements

You download new firmware to a SIMATIC NET CP using the firmware loader shipped with the STEP 7 option NCM S7 for Industrial Ethernet.

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.

How to Download New Firmware

You must always start the download using the **current** MAC address of the CP!

Depending on how you configured the CP, the following applies:

- If you use the **MAC address printed on the module** in your configuration unchanged, you must also use this MAC address when you download the firmware.
- If you use **a different MAC address** from the factory-set address in your configuration, you must also use this other MAC address when you download the firmware.

When the firmware is downloading, the RUN–LED is lit; depending on the status of the download, the LED may also flicker.

How to Deal with an Interrupted Download

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.

Repeat the download as explained below:

- **Using the Default MAC Address**

  If you use the default MAC address in your configuration, you can **always** start the download with this fixed MAC address.

- **Using a New MAC Address**

  If you use a **different MAC address** from the factory-set address in your configuration, you must also use this other MAC address when you download the firmware.

Notice

The emergency address 00.AF.FE.AF.FE.00 is no longer used with the module described here.

If you can no longer start the download either with the configured or the default MAC address, you should turn the entire rack off and on again. You can then trigger the firmware download again within 10 seconds with the mode selector set to STOP. In this case, you must always use the default MAC address.

During this time, the CP indicates “Ready for Firmware Download”.

11 Technical Specifications

Table 11-1 Technical Specifications

Transmission rate	10 Mbps and 100 Mbps
Interfaces	
Attachment to Industrial Ethernet (10/100 Mbps)	15-pin sub-D female connector (automatic switchover between AUI and Industrial Twisted Pair)
Attachment to Twisted Pair	RJ-45 jack
Power supply	+5 V DC (+/–5%) and +24 V DC (+/–5%)
Current consumption	
• from backplane bus	70 mA
• from external 24 V DC	AUI: approx. 0.6 A maximum TP/ITP: approx. 0.3 A maximum
Power loss	7.25 W
Permitted ambient conditions	
• Operating temperature	0 °C to +60 °C
• Transportation/storage temperature	–40 °C to +70 °C
• Relative humidity max.	95% at +25 °C
• Altitude	maximum 2000 m above sea level
Design	
• Module format	Compact module S7-300; double width
• Dimensions (W x H x D) in mm	80 x 125 x 120
• Weight approx.	600 g

All the information in /1/ in the Section “General Technical Specifications“ regarding the following topics also applies to the CP 343-1:

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