

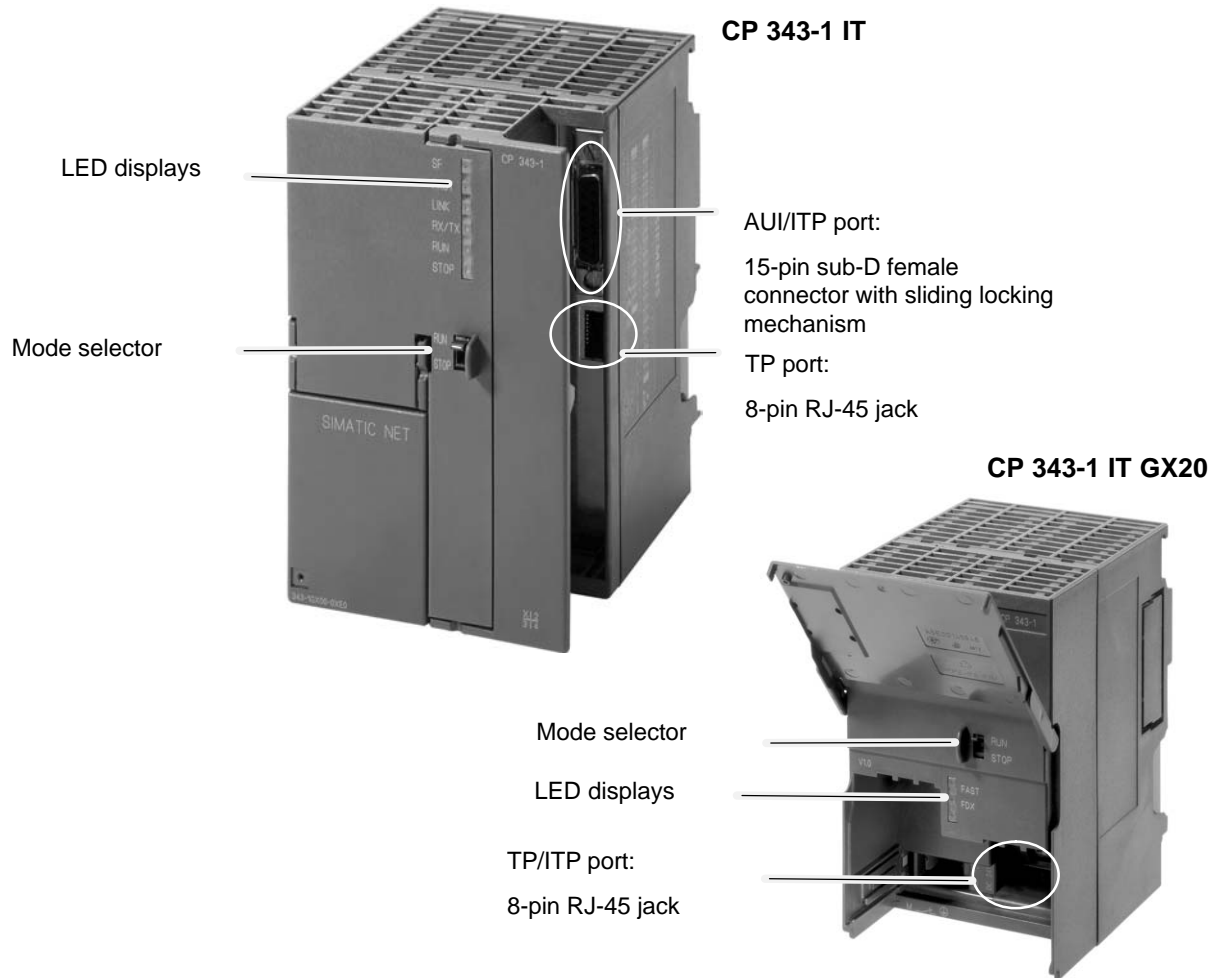
## SIMATIC NET

### S7-CPs for Industrial Ethernet

Manual Part B3

#### CP 343-1 IT / CP 343-1 IT GX20

6GK7 343-1GX11-0XE0      Version 1 and higher (Firmware Version V2.0)  
6GK7 343-1GX20-0XE0      Version 1 and higher (Firmware Version V1.0)  
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.

---

## Compatibility with the Previous Version

---

### Note

Due to the **enhanced functionality and restrictions**, pay particular attention to the notes in Chapter 7 of this manual.

---

## Address label: Unique MAC address preset for the CP

- CP 343-1 IT

The CP 343-1 IT ships with a factory-set MAC address. During configuration, you can assign a different MAC address.

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

- CP 343-1 IT GX20

The CP 343-1 IT GX20 ships with a factory-set MAC address. The MAC address is not changed during configuration.

# Contents

## Contents - Part A

**Ethernet CPs - General Information** ..... **see General Part**

---

### Note

Please note that Part A shown here also belongs to the description of the CP. Among other things, it includes an explanation of the safety notices and information relating to all S7-CPs for Industrial Ethernet

You can also obtain this general part from the Internet at:

<http://www4.ad.siemens.de/view/cs/de/8777865>

---

<b>7</b>	<b>Properties / Services</b> .....	<b>B3-5</b>
<b>8</b>	<b>Requirements for Use</b> .....	<b>B3-9</b>
<b>9</b>	<b>Installation and Commissioning</b> .....	<b>B3-10</b>
<b>10</b>	<b>Displays and Mode Selector</b> .....	<b>B3-12</b>
<b>11</b>	<b>Performance Data</b> .....	<b>B3-15</b>
5.1	General Characteristics .....	B3-15
5.2	Characteristics of S7 Communication .....	B3-15
5.3	Characteristics of the SEND/RECEIVE Interface .....	B3-16
5.4	Characteristic Data for HTTP and FTP .....	B3-17
5.5	Characteristic Data of TCP Connections for HTTP .....	B3-18
5.6	Characteristic Data for Using Java Applets .....	B3-18
5.7	Characteristics of the File System .....	B3-19
<b>12</b>	<b>The CP as Web Server: HTML Process Control</b> .....	<b>B3-20</b>
<b>13</b>	<b>Compatibility with the Previous Product</b> .....	<b>B3-21</b>
7.1	Extended Functionality .....	B3-21
7.2	Replacing Older Modules / Replacing Faulty Modules .....	B3-22
<b>14</b>	<b>Further Information on Operation</b> .....	<b>B3-24</b>
8.1	Memory Reset .....	B3-24
8.2	Working with Fast Ethernet - Automatic Setting .....	B3-26
8.3	FC Call Interface .....	B3-28
8.4	SNMP Agent (CP 343-1 IT GX20 only) .....	B3-29
8.5	Possible Security Gaps on Standard IT Interfaces / Preventing Illegal Access .....	B3-30

8.6	Influence of MPI on Connections via Industrial Ethernet .....	B3-30
8.7	Recommendations for Use with a High Communication Load .....	B3-31
8.8	Other information available about the CP .....	B3-31
<b>15</b>	<b>Loading New Firmware .....</b>	<b>B3-32</b>
<b>16</b>	<b>Technical Specifications .....</b>	<b>B3-34</b>

# 1 Properties / Services

## Application

The CP 343-1 IT communications processor is designed for operation in an S7-300 programmable logic controller. It allows the S7-300 / C7-300 to be attached to Industrial Ethernet.

## Difference between the CP 343-1 IT and CP 343-1 IT GX20

The CP 343-1 IT and the CP 343-1 IT GX20 have identical basic functions.

The CP 343-1 IT has several additional features that were deliberately omitted in the CP 343-1 IT GX20.

The CP 343-1 IT GX20 has several newer features that the CP 343-1 IT does not support.

Sections of text that relate only to the properties of one of the CP types are highlighted by a shaded background as shown here.

### CP 343-1 IT

- Additional properties of the CP 343-1 IT

### CP 343-1 IT GX20

- Additional properties of the CP 343-1 IT GX20

## Services

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

- S7 communication and PG/OP communication
  - PG functions (including routing)  
Using the PG functions, modules such as the FM 354 can be accessed via the CP (extended PG functions).
  - Operator control and monitoring functions (HMI) multiplexing TD/OP connections
  - Client and server for data exchange using communication blocks <sup>1)</sup> S7 connections configured at both ends
  - 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 via 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) via ISO-on-TCP connections and TCP connections
  - LOCK/UNLOCK with FETCH/WRITE services

### CP 343-1 IT

- S5-compatible communication over ISO transport connections with
  - SEND/RECEIVE interface
  - FETCH/WRITE services (server; complying with S5-protocol)

1)

Blocks for S7 communication (see also STEP 7 online help or manual

"System Software for S7-300/400 System and Standard Functions"):

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

- IT functions
  - Sending E-mails
  - Monitoring devices and process data (HTML process control)
  - FTP functions (File Transfer Protocol) for file management and for access to data blocks on the CPU (client and server roles).
- Time-of-day synchronization over Industrial Ethernet according to the following defined procedure:
  - SIMATIC mode
 

The CP receives MMS time-of-day messages and synchronizes its local time.
  - or
  - NTP mode (NTP: Network Time Protocol)
 

The CP sends time-of-day queries to an NTP server at regular intervals and synchronizes its local time.
- 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).

### CP 343-1 IT GX20

- SNMP agent
 

The CP supports data queries over SNMP in version V1 (**S**imple **N**etwork **M**anagement **P**rotocol) according to the MIB II standard.
- IP access protection (IP-ACL)
 

Using IP access protection gives you the opportunity of restricting communication over the CP of the local S7 station to partners with specific IP addresses.
- IP Configuration
 

You can configure the way in which the CP is assigned the IP address, the subnet mask and the address of a gateway.

It is also possible to assign the connection configuration to the CP either using STEP 7 or via a block interface in the user program (FB55: CP\_CONFIG) (see /3/).
- Querying a diagnostic buffer excerpt
 

The CP supports the option of querying a diagnostic buffer excerpt of the last ten diagnostic messages of the CPUs and CPs located in the same rack as the CP 343-1 IT GX20 using a Web browser.
- S5/S7 addressing mode
 

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

## Configuration

You can configure the CP 343-1 IT via MPI or LAN/Industrial Ethernet. You require STEP 7 with NCM S7 for Industrial Ethernet (abbreviated to “NCM IE” below) with the following version:

Table 1-1

Version STEP7/NCM IE	Functions of the CP 343-1 IT
V5.0 + SP3 or higher	The same functionality is available as with the previous versions of the CP 343-1 IT. Configuration data created with these STEP 7 or NCM versions can be downloaded to the CP 343-1 IT.
V5.1 + SP3 or higher	The full functionality including the extended functions as listed in Section 7 can be used.
V5.2 + SP1 or higher	Required to configure the CP 343-1 IT GX20

## Programming - Using Blocks

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

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

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 following table shows the S7-300 CPUs with which the CP 343-1 IT can be operated with this range of functions:

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

The SINUMERIK CPUs 840D and 810D are supported.

## 3 Installation and Commissioning

### Procedure / Steps

Table 3-1

Step	Explanation / Meaning
<p>1. Install the CP on the S7 standard rail. 2. Establish the connection via the enclosed bus connector to the backplane bus.</p> <p><b>Note</b> 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.</p>	<p>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/.</p>
<p>3. Connect the CP to the power supply.</p> <p><b>Notes</b></p> <ul style="list-style-type: none"> <li>• The CPU, CP and IM (if one exists) must be connected to the same power supply.</li> <li>• Only wire up the S7-300 / C7-300 with the power switched off!</li> <li>• 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").</li> </ul>	<p>Follow the steps as described in detail in /1/ when wiring between the power supply and the CPU.</p>
<p>4. Attach the CP to Industrial Ethernet.</p>	
<p>5. The remaining steps in commissioning involve downloading the configuration data.</p>	<p>You can connect the PG when configuring the CP as follows:</p> <ul style="list-style-type: none"> <li>• via MPI</li> <li>• via Industrial Ethernet</li> </ul> <p>For more detailed information, refer to the manual NCM S7 for Ind. Ethernet /3/ :</p> <ul style="list-style-type: none"> <li>- first addressing (node initialization)</li> <li>- downloading the defined configuration</li> </ul> <p>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 (CP 343-1 IT only) must be installed. The protocol used must then be applied to the S7ONLINE access point.</p>

---

**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.

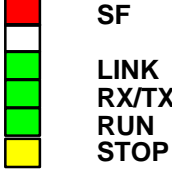

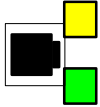

---

**Configuration**

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

## 4 Displays and Mode Selector






















Along with the five LEDs on the front panel that are used to indicate the mode, there is an additional display with two LEDs (on the CP 343-1 IT located beside the RJ-45 jack hidden by the front panel) to indicate the communication status.

CP 343-1		CP 343-1 IT GX20	
Front panel:		Front panel:	
RJ-45 jack		behind front panel:	

### LEDs Displaying the Status

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

Table 4-1

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.

Key:  on  off  flashing (0.5 Hz)

## 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 4-2

LED	Meaning (LED on)
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
- From a PG/PC. You can also control the modes using the configuration software in STEP 7, as follows .
  - NCM S7, Diagnostics for Industrial Ethernet (see /2/);
  - SIMATIC Manager\CP343-1 IT\PLC\Operating Mode

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, the following CP functions are still possible:
  - Configuration and diagnostics
  - FTP access to file system
  - HTTP access

---

**Note**

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

---

## 5 Performance Data

### 5.1 General Characteristics

Table 5-1

Characteristic	Explanation / Values
Total number of connections on Industrial Ethernet	In total (S7 connections + SEND/RECEIVE connections + FTP + HTTP) the number of connections is restricted to: <ul style="list-style-type: none"> <li>• 32 maximum (CP 343-1 IT)</li> <li>• 48 maximum (CP 343-1 IT GX20)</li> </ul>

#### Example

You can, for example, operate (CP 343-1 IT GX20):

- 6 ISO-on-TCP connections  
6 TCP connections  
4 UDP connections
- as well as:  
Depending on the CPU type, up to 32 S7 connections

If you use the functions for FTP server and HTTP server at the same time, you use additional resources and this must be taken into account (see Section 5.4 and 5.5).

### 5.2 Characteristics of S7 Communication

Table 5-2

Characteristic	Explanation / Values
Number of connections for S7 communication on Industrial Ethernet	in each case, up to <ul style="list-style-type: none"> <li>• 16 Operator control and monitoring functions (HMI)</li> <li>• 16 S7 connections configured at one end</li> <li>• 16 S7 connections configured at both ends</li> </ul> The number depends on the CPU type being used. Please refer to /1/ for the values for your CPU.
LAN interface - data record length per PDU	
<ul style="list-style-type: none"> <li>• Sending</li> <li>• Receiving</li> </ul>	240 bytes / PDU 240 bytes / PDU

### 5.3 Characteristics of the SEND/RECEIVE Interface

SEND/RECEIVE can be operated via TCP, ISO-on-TCP, ISO transport and via UDP connections. The SEND/RECEIVE interface is also used to send E-mails via a configured E-mail connection.

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	16 maximum Notes: <ul style="list-style-type: none"> <li>Jobs with long data fields (&gt;240 bytes) can be processed on up to 10 UDP connections at the same time.</li> <li>All UDP connections are also possible in the multicast mode.</li> <li>ISO transport connections are possible only with the CP 343-1 .</li> </ul>
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. <ul style="list-style-type: none"> <li>1 to 8192 bytes for ISO transport, ISO-on-TCP, TCP;</li> <li>1 to 2048 bytes for UDP</li> </ul>
Restrictions for UDP <ul style="list-style-type: none"> <li>Transfer is not confirmed</li> <li>Data field length</li> <li>No reception of UDP broadcast</li> </ul>	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). The maximum length of the data fields is 2048 bytes. To avoid overload resulting from a high broadcast load, the CP does not permit reception of UDP broadcast.

#### Reaction times on ISO transport, ISO-on-TCP or TCP connections

The calculation of the reaction times with ISO transport connections, 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 5-4

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



## 5.4 Characteristic Data for HTTP and FTP

### TCP connections for FTP

- FTP in client mode:

Per configured FTP connection, up to two TCP connections are occupied; the maximum configurable number is:

- On the CP 343-1 IT: 2 FTP connections
- On the CP 343-1 IT GX20: 10 FTP connections

To be able to use the FTP client blocks, you must configure the TCP connections intended for this purpose with the “Use FTP protocol” option.

- FTP in server mode:

Up to 2 TCP connections are used per FTP session (1 control connection and 1 data connection); a maximum of 2 FTP sessions are possible at the same time.

### Characteristics of the FCs for FTP Client Mode

The following table shows the memory requirements of the FCs available for FTP services.

When using FTP, the block execution times depend on the reaction times of the partner device and the length of the user data so that it is impossible to make general statements about the execution times.

---

#### Note

Please note the following requirements for using the FTP blocks:

- FC5 (AG\_SEND) is also required for FTP blocks since this is called internally (the name “FC5” must be retained).
  - The CPU used must support SFC24 (TEST\_DB).
-

Table 5-5

FC		Memory Requirements / Bytes
FC40	FTP_CONNECT	774
FC41	FTP_STORE	1046
FC42	FTP_RETRIEVE	1118
FC43	FTP_DELETE	770
FC44	FTP_QUIT	370

## 5.5 Characteristic Data of TCP Connections for HTTP

For an HTTP session, up to 4 TCP connections are used as soon as you use one or more Web browsers to display data or files of the IT-CP.

## 5.6 Characteristic Data for Using Java Applets

To transfer large amounts of data from the S7BeansAPI using Java applets and the JavaBean "S7Variable", you can also use arrays.

### Maximum Array Size

The maximum array size for the CP 343-1 IT is as follows:

- 210 bytes when writing data to the CPU and
- 164 bytes when reading from the CPU.

---

#### Note

Please note that the maximum field size is specified here in bytes and that the maximum number of array elements is based on the number of bytes of the array basic data type.

---

### Example

The CP 343-1 IT can transfer a maximum of 41 array elements of the type DWORD or REAL in one read job since each element of the DWORD type or REAL requires four bytes.

## 5.7 Characteristics of the File System

Please remember the following restrictions:

Table 5-6

Characteristic	Explanation / Values
File names	The length of file names is limited to 64 characters for the file name itself and up to 256 characters for the path. File names are case-sensitive.
File size	The file size is limited to a maximum of 8 Mbytes.
Memory area for the file system	<ul style="list-style-type: none"> <li>• On the CP 343-1 IT:               <ul style="list-style-type: none"> <li>- Flash area (non-volatile memory) 10 Mbytes</li> <li>- RAM area (volatile memory) 300 Kbytes usable <sup>1)</sup></li> </ul> </li> <li>• On the CP 343-1 IT GX20:               <ul style="list-style-type: none"> <li>- Flash area (non-volatile memory) 30 Mbytes</li> <li>- RAM area (volatile memory) 30 Mbytes</li> </ul> </li> </ul>

1) The usable RAM is given; depending on the FTP services used for access to the S7-CPU, a larger area may be available (up to a maximum of 1 Mbyte, if no FTP services are used).

---

### Notice

The flash area of the file system allows a limited number of write cycles (approx. 10 000). You should therefore avoid writing data cyclically.

If you write temporary data often, you should switch to the RAM file system located in the ram subfolder. The files of the RAM file system are lost if the power is turned off or fails.

---

## 6 The CP as Web Server: HTML Process Control

The CP 343-1 IT / CP 343-1 IT GX20 provides you with the function of a Web server for access using a Web browser.

The CP provides an additional memory area for storage of files. This area is used to store HTML pages and S7 applets.

HTML pages can be used to transfer and display information in a Web browser. The S7 applets are Java applets specially tailored to SIMATIC S7 that are responsible for write or read access to the S7 CPU.

When the CP 343-1 IT is supplied, there are HTML system pages, S7 applets, S7 beans and further information in the file system.

### Please note the following special features when operating IT functions:

---

#### Note

The data exchange for productive communication (S7 connections, ISO-on-TCP connections, UDP connections) always has a higher priority than data exchange with the Web browser. This can lead to delays in the HTML process control in the Web browser.

---

### Web Browser

To access the HTML pages on the CP 343-1 IT, you require a Web browser.

The following Web browsers are suitable for communication with the CP 343-1 IT / CP 343-1 IT GX20 (other browsers also possible):

- Netscape Communicator (recommended version: 4.7 or higher)
- Internet Explorer (recommended version: 5.0 or higher)

These Web browsers support all the requirements necessary for the implementation of the IT functions (Java reference implementation - Java Development Kit 1.1.x is supported) in conjunction with the CP 343-1 IT / CP 343-1 IT GX20.

You will find these Web browsers, information and addons on the Internet.

# 7 Compatibility with the Previous Product

## 7.1 Extended Functionality

### What's New? Enhanced functionality compared with 6GK7 343-1GX00-0XE0

The following services and functions are new:

- Multicast over UDP connection

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

- S7 communication: Additional client function for data exchange using communication blocks on S7 connections configured at both ends.
- Internal clock that can be synchronized over the LAN if a time master is present.
- 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) or PSU (Primary Setup Unit).

- Accessibility after Memory Reset Using the IP Address

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.

- Resetting to factory settings

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

- The behavior of the firmware loader during startup has changed.
- FTP functions (File Transfer Protocol) for file management and for access to data blocks on the CPU (client and server roles).
- Time-of-day synchronization over Industrial Ethernet according to the following defined procedure:
  - SIMATIC mode

or

- NTP mode (NTP: Network Time Protocol)

## Enhanced Functions with 6GK7 343-1GX20-0XE0

### CP 343-1 IT GX20

The CP 343-1 IT GX20 supports the following additional functions:

- SNMP agent
- IP access protection (IP-ACL)
- IP Configuration
- Querying a diagnostic buffer excerpt
- S5/S7 addressing mode

## 7.2 Replacing Older Modules / Replacing Faulty Modules

### Replacing faulty modules: Difference between the CP 343-1 IT and CP 343-1 IT GX20

The CP 343-1 IT (6GK7 343-1GX11-0XE0) and CP 343-1 IT GX20 (6GK7 343-1GX20-0XE0) provide identical basic functionality.

Compared with the CP 343-1 IT GX20, the CP 343-1 IT has the following additional features:

- AUI port:
- Supports the ISO transport protocol

The CP 343-1 IT GX20 is therefore **not** intended as a replacement for a faulty CP 343-1 IT. If you need to replace such module, you can still order the CP 343-1 IT.

### Replacing a CP 343-1 IT

The CP 343-1 IT (6GK7 343-1GX11-0XE0) described here can be used as a replacement for the previous product CP 343-1 IT (6GK7 343-1GX00-0XE0).

## Interface in the User Program



---

### 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 in STEP 7 as module type 6GK7 343-1GX11-0XE0, you must use the block versions intended 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 343-1GX00-0XE0 in STEP 7 (as a replacement module).

---

---

### 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://www4.ad.siemens.de/view/cs/de/8797900>

---

## 8 Further Information on Operation

### 8.1 Memory Reset

#### Available Functions

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

- Clear / reset

Following this memory reset, the CP retains the 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
- LAN settings

#### CP 343-1 IT

- Configured MAC address

- Resetting to factory settings

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 the menu command **PLC ▶ Clear/Reset**

or

In STEP 7 / NCM Diagnostics with the menu command **Operating Mode ▶ Clear/Reset Module**

- Resetting to factory settings

In STEP 7 / NCM Diagnostics with the menu command **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 Working with Fast Ethernet - Automatic Setting

### How Automatic Setting 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:

#### CP 343-1 IT

- 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

### Displayed by 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:

- 10/100 Mbit 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 mode instead of “Autonegotiation”  
If your application requires a fixed mode instead of “Autonegotiation”, you will need to match up the partner devices.
- 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 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 displays the operating 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”.

## 8.3 FC Call Interface

### Status of 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<sub>H</sub>  
or  
DONE=0; ERROR=1; Status=8183<sub>H</sub>
- AG\_RECV:  
DONE=0; ERROR=0; Status=8180<sub>H</sub>  
or  
DONE=0; ERROR=1; Status=8183<sub>H</sub>

\*) valid for FCs with version 4.0 and higher

### Calling Communication 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 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).

---

### Changing Call Parameters only after Job Confirmation

---

#### Notice

After a job has been triggered, you may only change the call parameters on the FC call interface of the FCs AG\_SEND or AG\_RECV again after the FC has confirmed job execution with DONE=1 or ERROR=1.

If you do not keep to this rule, job execution may be aborted with an error.

---

## 8.4 SNMP Agent (CP 343-1 IT GX20 only)

### CP 343-1 IT GX20

#### SNMP (Simple Network Management Protocol)

The CP 343-1 IT GX20 supports data queries over SNMP in version 1.

SNMP is protocol language for managing networks and is easy to handle. To transmit data, SNMP uses the connectionless UDP protocol.

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

#### Supported MIB Objects

The CP supports all MIB objects of the standard MIB according to MIB II (RFC 1213).

Exceptions / restrictions:

- Write access is permitted only for the following MIB objects:  
sysContact, sysLocation and sysName;  
For security reasons, only read access is permitted for all other MIB objects.
- Traps are not supported by the CP.

#### Access Permissions using Community Name

The CP uses the following community names for assigning permissions:

- For read access: "public"
- for read and write access: "private"

(note the use of lower-case letters!)

## 8.5 Possible Security Gaps on Standard IT Interfaces / Preventing Illegal Access

With various SIMATIC NET components, such as OSMs/ESMs, 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, Telnet), you should take suitable security measures to prevent unauthorized access to the components and the network particularly from within the WAN/Internet.

---

### Notice

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

---

If you have questions on the use of firewall systems and IT security, please contact your local Siemens office or representative. You will find the address in the SIMATIC NET Catalog IK PI or on the Internet at <http://www.siemens.de/simatic-net>

## 8.6 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 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.

## 8.7 Recommendations for Use with a High Communication Load

### Background

When using the CP described here, the points below will help you to avoid overload situations on your CPU.

In particular when you replace an older CP with the CP described here and are then confronted with overload problems, you should check your application for the pitfalls outlined below.

### Known Problems

- The functions for sending and receiving (FC 5/FC6 or FC 50/60) are often called cyclically in OB1. This leads to constant communication between the CPU and CP. As a result, other types of communication such as PG functions cannot be executed or only very slowly.
- HMI systems access data of the CPU too often using S7 functions. This slows down communication generally and there may be a lack of resources when SEND/RECEIVE FCs are called cyclically in OB1.

### Remedy

The recommendations below will help to avoid these situations:

- Do not call communication blocks cyclically in OB1!  
Communication should be called time-controlled in a suitable cyclic-interrupt OB. The call interval of this OB should be significantly higher than the average cycle time of your program.
- You should set a minimum cycle time that is higher than the average runtime of OB1. This frees resources for communication on the CPU. This is, for example, a remedy for existing applications when communication already takes place cyclically in OB1.
- If necessary, reduce the time taken for communication processing on the CPU by changing the parameters set for “cyclic load due to communication” in the properties dialog of the CPU.

## 8.8 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>

## 9 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.

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. Downloading over TCP/IP (and therefore over different networks) is not possible.

### How to Download the New Firmware

You must always start the download using the **current** MAC address of the CP 343-1 IT or the fixed MAC address of the CP 343-1 IT GX20!

#### CP 343-1 IT

For the 343-1 IT, the following applies depending on how you configured the CP:

- 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.



## Reformatting the File System

After updating the firmware, it is advisable to reformat the file system of the IT-CP.

---

### Notice

Prior to formatting, you should backup the files with FTP and then transfer them back to the module.

---

Follow the steps outlined below:

After downloading the firmware, turn the voltage off and on again once.

After the module has started up again, you can format the file system using a Web browser with the following instruction:

`http://<IP - Adresse>/__FSys_Format`

(Note that this command is case-sensitive!)

## 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.

Repeat the download as explained below:

- **Response when using the default or fixed MAC address**

The download can **always** be started using this fixed MAC address.

### CP 343-1 IT

- **Using a New MAC Address**

If the configured and default MAC address are different, the download can always be restarted using the configured MAC address.

---

### 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. With the mode selector set to STOP you then have ten seconds to start the firmware download again. In this case, you must always use the default MAC address.

During this time, the CP indicates "Ready to start firmware download".

## 10 Technical Specifications

Table 10-1 Technical Specifications

	CP 343-1 IT	CP 343-1 IT GX20
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)	not applicable
Attachment to Twisted Pair	RJ-45 jack	
Power supply	+5 V DC (+/-5%) and +24 V DC (+/-5%)	
Current consumption	70 mA	200 mA
<ul style="list-style-type: none"> <li>from backplane bus</li> <li>from external 24 V DC</li> </ul>	AUI: approx. 0.73 A maximum TP/ITP: approx. 0.4 A maximum	TP/ITP: approx. 0,2 A maximum
Power dissipation approx.	10 W	5.8 W
Permitted ambient conditions	<ul style="list-style-type: none"> <li>Operating temperature</li> <li>Transportation/storage temperature</li> <li>Relative humidity max.</li> <li>Altitude</li> </ul>	
Design	<ul style="list-style-type: none"> <li>Module format</li> <li>Dimensions (W x H x D) in mm</li> <li>Weight approx.</li> </ul>	
	Compact module S7-300; double width 80 x 125 x 120 600 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