SIEMENS

SIMATIC NET

S7-CPs for Industrial Ethernet

Manual Part BL1

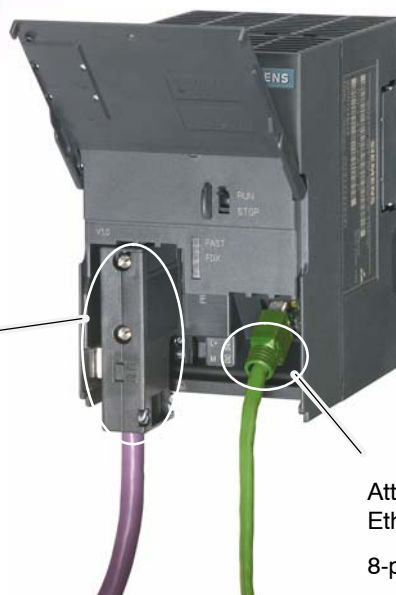## Network Gateway IE/PB Link PN IO

6GK1 411-5AB00   Version 1 or higher (Firmware Version V 1.0)

LED displays

Mode selector

IE/PB Link

C-PLUG

Attachment to PROFIBUS:

9-pin D-sub female
connector

Attachment to Industrial
Ethernet

8-pin RJ-45 jack

Notes on the Product

Product Names:

This description contains information on the product

* IE/PB Link PN IO order no.: 6GK1 411‑5AB00

Product Information Accompanying the Product

Note

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

Contents

Contents - Part A

S7-CPs - General Information .... **See General Part**

Note

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

The version of the General Part of the manual belonging to this Part B is version 12/2003.

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

http://www4.ad.siemens.de/view/cs/en/8777865

Contents - Part BL1

Contents

1   Properties and Services

Application

The IE/PB Link PN IO is a gateway that links Industrial Ethernet (management level) and PROFIBUS (cell level / field level).

The IE/PB Link PN IO allows access to all PROFIBUS DP slaves on the subordinate PROFIBUS; DP slaves complying with PROFIBUS DP-V0 are supported and, as of firmware version V2.0, also DP slaves complying with the DP-V1 standard and Siemens DP slaves.

The design of the IE/PB Link PN IO matches the components of the SIMATIC S7-300 range of devices.

You can use the IE/PB Link PN IO in the following modes:

• Gateway as PROFINET IO proxy

• Gateway in standard operation

Services

In these modes, the following communication services are supported:

• Gateway as PROFINET IO proxy

The IE/PB Link PN IO is an important component for the operation of PROFINET IO. It connects the PROFINET IO controllers to Industrial Ethernet and the PROFINET IO devices (DP slaves to PROFIBUS).

From the perspective of the PROFINET IO controller on Industrial Ethernet, there is no difference between accessing PROFINET IO devices connected to Industrial Ethernet and PROFIBUS DP slaves connected to PROFIBUS DP.

The IE/PB Link PN IO takes on the role of a proxy for the DP slaves connected to PROFIBUS DP.
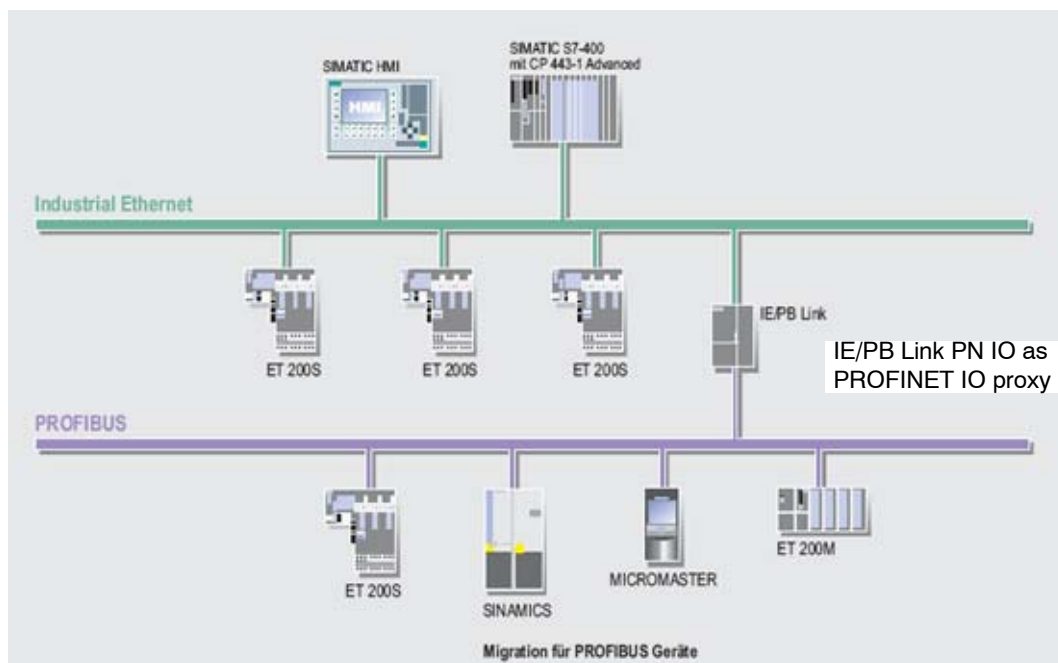
Figure 1-1   Example of Using the IE/PB Link PN IO PROFINET IO Proxy

- Gateway in standard operation

    - PG/OP communication

    PG/OP communication is used to download programs and configuration data, run test and diagnostic functions, and monitor the plant (HMI systems).

    - Assigning parameters to field devices (data record routing)

    You can use the IE/PB Link PN IO as a router for data records intended for field devices (DP slaves). This means that devices that are not directly linked to PROFIBUS and therefore do not have direct access to the field devices (DP slaves), can transfer data to the field devices via the IE/PB Link PN IO.

    The SIMATIC PDM (Process Device Manager) is an example of a tool that creates data records for assigning parameters to field devices.

    - Gateway to a DP master system with constant scan time mode

    The IE/PB Link PN IO serves as a gateway between Ethernet and the field devices of a DP master system. The IE/PB Link PN IO is then operated as an active node along with a DP master on PROFIBUS operating in the constant scan time mode.

    - Cross-subnet S7 connections for HMI operation

    The IE/PB Link PN IO forwards communication over S7 connections. This service is, for example, used with HMI applications (PC stations).
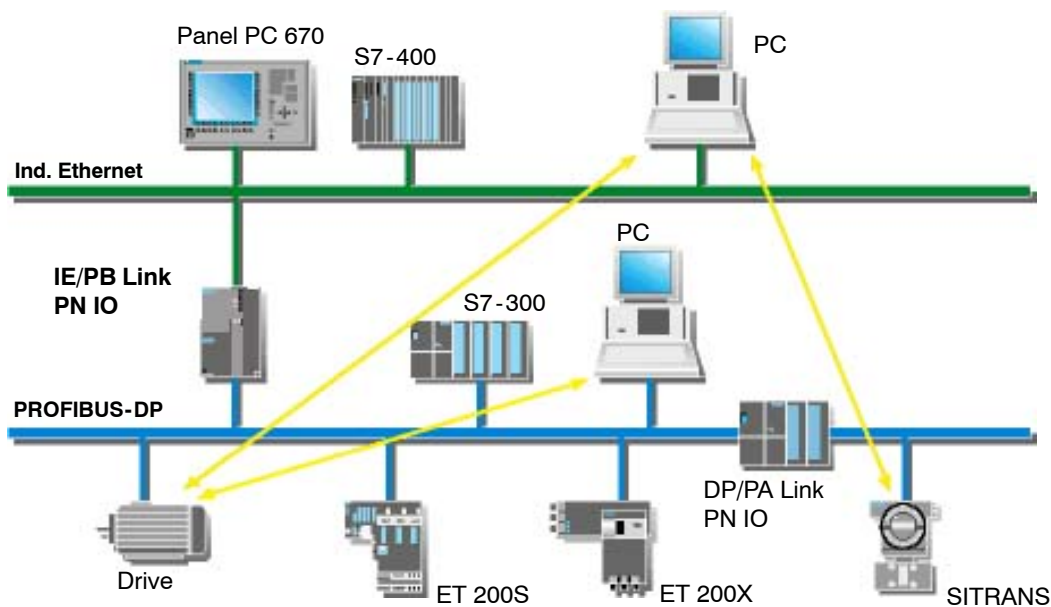
Figure 1-2   Example of Using the IE/PB Link PN IO in the Standard Mode

Further Properties

- Fast Ethernet

  The IE/PB Link PN IO has a 10/100 Mbps half/full duplex port with "Autonegotiation" for automatic switchover.

- Time-of-day synchronization

  If a time master exists on Industrial Ethernet, the IE/PB Link PN IO uses the time frames for time stamping the diagnostic buffer entries and process signals.

  Forwarding time-of-day frames

  The IE/PB Link PN IO can forward the time-of-day frames received from a time transmitter as follows:

  - from Ethernet to PROFIBUS
  - From PROFIBUS to Ethernet

- Downloading firmware

  The IE/PB Link PN IO supports the updating of firmware (FW) with the Firmware Loader.

  A firmware update can be downloaded at any time from the PC/PG via the Ethernet port.

- Option: C-PLUG as exchangeable medium for the project engineering data

  The IE/PB Link PN IO supports storage of the project engineering data on a C-PLUG. This allows simple replacement of a defect module by inserting the C-PLUG in the new module.

- Direct Data Exchange

  The IE/PB LINK PN IO supports direct data exchange between DP slaves in assigned DP master systems. This means that applications with PROFISAFE are also possible.

Configuration

You can configure the IE/PB Link PN IO over Industrial Ethernet or PROFIBUS.

You can perform the project engineering for the IE/PB Link PN IO for all modes over Industrial Ethernet. If you use the device as a standard gateway, it is also possible to change / download the project engineering data over PROFIBUS.

You require the STEP 7 configuration software with a version as shown below:

Table 1-1

Version STEP 7/NCM S7 *)	Functionality of the IE/PB Link PN IO (see also Chapter 8)
V5.3 SP1	The full functionality of the V1.0 firmware can be used.
V5.3 SP2 Hotfix 1 with HSP 1007	The full functionality of a module with firmware version V2.0 can be used.

*) As of V5.3, NCM is automatically part of the basic installation, as of this version no distinction between Ethernet and PROFIBUS is made.

2   Construction

LED displays

Mode selector

Hinged front panel
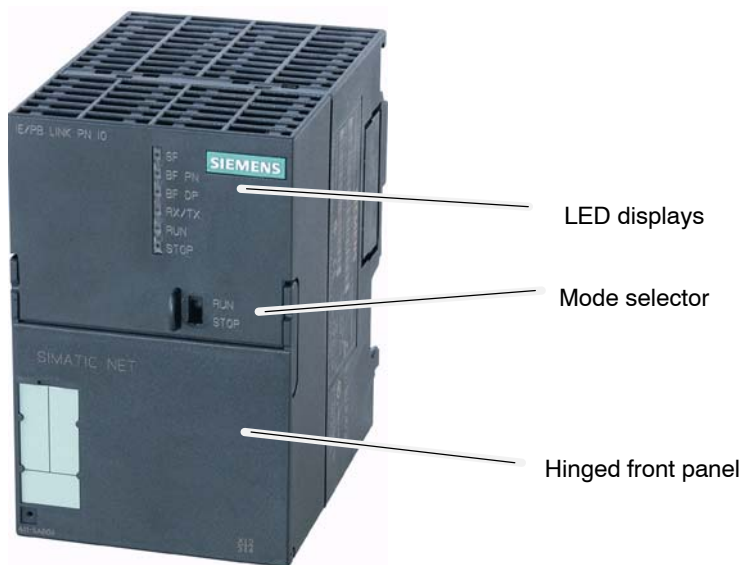
Figure 2-1

The module has been designed to match the components of the S7-300 programmable logic controller and has the following features:

- Double-width module for simple installation in the S7-300 rack

- The control and display elements are all on the front panel; some of the LEDs are behind the hinged front panel.

- No fan necessary

Behind the front panel, you will find:

- 8-pin RJ-45 jack to connect the IE/PB Link to Ind. Ethernet;

- 9-pin D-sub female connector for attaching the IE/PB Link to PROFIBUS

- Further LED displays;

- Slider for setting the chassis ground connection

On the back of the device, there is a slot for an external memory module (C-PLUG); the slot is accessible only after removing the device from the rack.

Notice

If you replace the C-PLUG, make sure that the power supply is off!

3   Installation and Commissioning

3.1   How to...

Follow the steps as shown in the graphic below; please make sure that you read the supplementary notes in this section. Installation and configuration can initially be considered as independent procedures.

Installation:

Configuration: (see also Chapter 4):
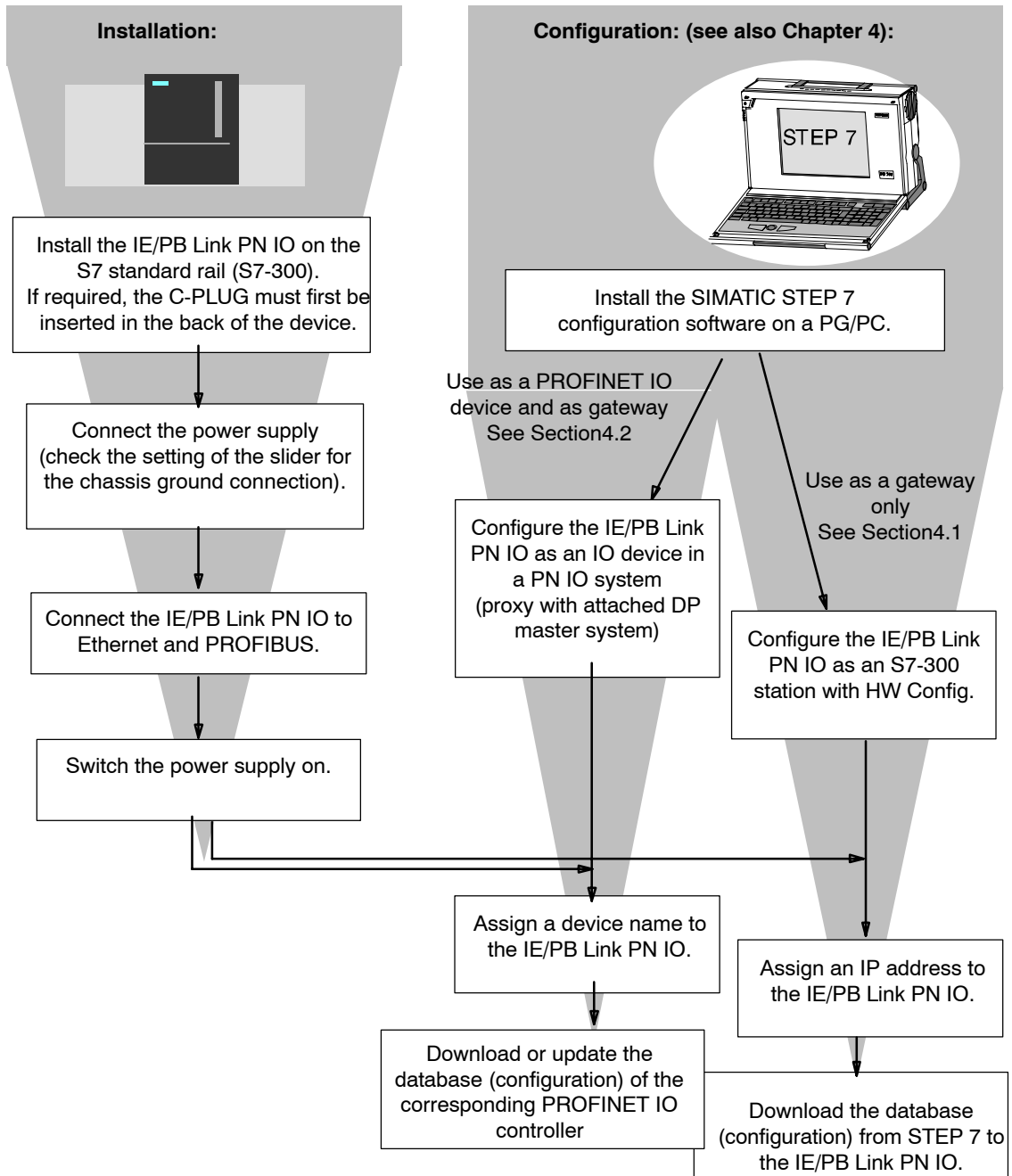
STEP 7

Install the IE/PB Link PN IO on the S7 standard rail (S7-300).
If required, the C-PLUG must first be inserted in the back of the device.

Connect the power supply (check the setting of the slider for the chassis ground connection).

Connect the IE/PB Link PN IO to Ethernet and PROFIBUS.

Switch the power supply on.

Install the SIMATIC STEP 7 configuration software on a PG/PC.

Use as a PROFINET IO device and as gateway
See Section4.2

Use as a gateway only
See Section4.1

Configure the IE/PB Link PN IO as an IO device in a PN IO system (proxy with attached DP master system)

Configure the IE/PB Link PN IO as an S7-300 station with HW Config.

Assign a device name to the IE/PB Link PN IO.

Assign an IP address to the IE/PB Link PN IO.

Download or update the database (configuration) of the corresponding PROFINET IO controller

Download the database (configuration) from STEP 7 to the IE/PB Link PN IO.

IE/PB Link PN IO

C-PLUG

Attachment to PROFIBUS:

9-pin D-sub female connector

Slider for setting the chassis ground connection

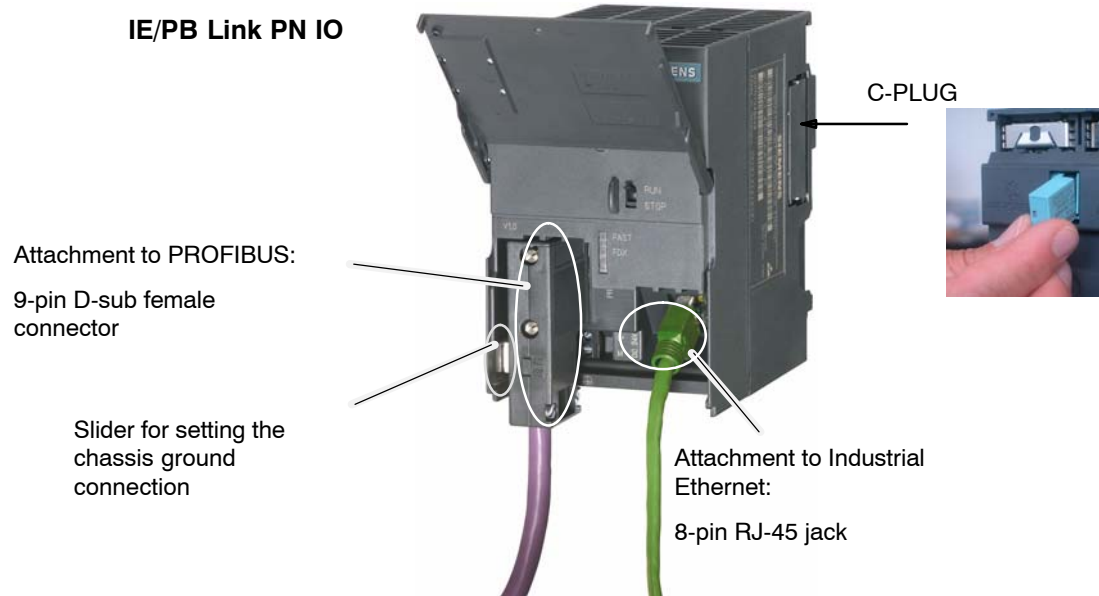Attachment to Industrial Ethernet:

8-pin RJ-45 jack

Figure 3-1

Notice

Important notes on installation and operation:

- The module must be installed so that its upper and lower ventilation slits are not covered, allowing adequate ventilation.
- When you fit the device onto the standard S7 rail, make sure it is not inserted in an S7-300 bus connection element.
- The hinged front panel must be kept closed during operation.

Note

You can connect to Ethernet and PROFIBUS even with the power switched on.

Ground/Chassis Ground Concept

> **Notice**
>
> Please keep to the instructions on the grounding and chassis concept in the installation instructions for SIMATIC S7-300/S7-400 LEERER MERKER.

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

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

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

When shipped: Slider pushed in

Use a screwdriver to set the slider.

PG/PC Connection

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

- via PROFIBUS

  You can only configure the IE/PB Link PN IO via PROFIBUS after it has been assigned its PROFIBUS address. Please follow the instructions for addressing in Chapter 4.

- via Industrial Ethernet

  You can only configure the IE/PB Link PN IO via Industrial Ethernet after it has been assigned its IP address. Please follow the instructions for addressing in Chapter 4.

Module Accessories

The accessories required to connect the IE/PB Link PN IO to an Industrial Ethernet and PROFIBUS LAN (S7 standard rail, power supply) must be ordered extra.

The optional C-PLUG can also be ordered separately.

For more detailed information and ordering data, refer to the Catalog IK PI.

3.2   C-PLUG (Configuration Plug)

C-Plug Removable Memory Medium As an Alternative to Flash Memory

The IE/PB Link PN IO has an internal flash memory for storage of the project engineering data. As an option, the device can be operated with a C-PLUG (configuration plug) removable memory medium.

The IE/PB Link PN IO can be operated with or without a C-PLUG. The existing flash memory is then only used when no C-PLUG is inserted.

If a C-PLUG is inserted, the project engineering data is always stored on it. This simplifies replacement of modules. By simply exchanging the C-PLUG, all the data can be transferred to the replacement module.

Notice

*   If a C-PLUG is inserted, that does not contain valid formatting or no valid data for the IE/PB Link PN IO, the IE/PB Link PN IO will not start up! Device status: "STOP with error".

    In this case, you must reformat the C-PLUG (with NCM diagnostics) or replace it with a C-PLUG containing valid data.

*   The C-PLUG may only be inserted for removed when the power is turned off!

Figure 3-2   Fitting a C-PLUG in the IE/PB Link PN IO and Removing a C-PLUG from the IE/PB Link PN IO using a Screwdriver

Working with and without a C-PLUG

The following table provides you an overview of how data is transferred to the C-PLUG. The following situations must be distinguished:

*   As shipped - operation without C-PLUG

*   A C-PLUG is inserted in a module in the status as shipped

*   A C-PLUG is inserted in an already installed module

Table 3-1   Working with and without a C-PLUG

Procedure / Status	Data Transfer	Result after Startup
As shipped - operation without C-PLUG		
• Flash memory empty • No C-PLUG inserted.	Project engineering data is received from the STEP 7 project. The following situations must be distinguished: • Use as Gateway only: Project engineering data transferred by the download function of STEP 7. • Use as PROFINET IO device: Project engineering data transferred from PROFINET IO controller.	The IE/PB Link PN IO starts up with the project engineering data that was transferred to the flash memory. [1]
A C-PLUG is inserted in a module in the status as shipped		
• Flash memory empty • Empty C-PLUG is inserted.	Project engineering data is received from the STEP 7 project. The following situations must be distinguished: • Use as PROFINET IO device: Project engineering data transferred from PROFINET IO controller. • Use as Gateway only: Project engineering data transferred by the download function of STEP 7.	The IE/PB Link PN IO starts up with the project engineering data that was transferred to the C-PLUG. [1]
• Flash memory empty • C-PLUG with project engineering data is inserted. Requirements: Project engineering data must be valid for the IE/PB Link PN IO [2]	Result after startup: The IE/PB Link PN IO starts up with the project engineering data stored on the C-PLUG.	The IE/PB Link PN IO starts up with the project engineering data on the C-PLUG. [1]

Table 3-1   Working with and without a C-PLUG, continued

Procedure / Status	Data Transfer	Result after Startup
C-PLUG is inserted in an already installed module		
• Flash memory with project engineering data • Empty C-PLUG is inserted.	When the IE/PB Link PN IO starts up, the project engineering data are loaded on the C-PLUG from flash memory The project engineering data in flash memory is deleted.	The IE/PB Link PN IO starts up with the project engineering data transferred to the C-PLUG from flash memory. [1]
• Flash memory with project engineering data • C-PLUG with project engineering data is inserted. Requirements: Project engineering data must be valid for the IE/PB Link PN IO [2]	As long as the C-PLUG contains value project engineering data for the IE/PB Link PN IO, this project engineering data is used; The data in flash memory is ignored. The next time the module starts up, internal flash memory is deleted.	Result: The IE/PB Link PN IO starts up with the project engineering data stored on the C-PLUG. [1]

1) Note on use as a PROFINET IO device: Only the device name is stored retentively on the C-PLUG; project engineering data is transferred by the PROFINET IO controller during each startup and stored in volatile memory.

2) Note: If the C-PLUG has no valid project engineering data for the IE/PB Link PN IO, the device will not start up! In this case, please use NCM diagnostics to clarify the situation and, if necessary, to format the C-PLUG.

4   Project Engineering with STEP 7

To connect (initial addressing) and configure the IE/PB Link PN IO, you require the STEP 7 configuration software (see Chapter 1).

NCM S7 is integrated in STEP 7; with NCM S7, you also have direct access to NCM diagnostics over the start menu and the firmware loader (see section 6.2).

Depending on the area of application of the IE/PB Link PN IO, project engineering involves the following steps:

- Use as a PROFINET IO device and as gateway

    - Assigning the device name for the first time

    - Configuring IE/PB Link PN IO a a PROFINet IO device with STEP 7/HW Config; here, a DP master system is assigned to the IE/PB Link PN IO. The configuration data is loaded automatically from the PROFINET IO controller.

- Use as a gateway only

    - Initial Address Assignment

    - Configuring the IE/PB Link PN IO as an S7-300 station with STEP 7/HW Config and downloading the configuration data to the IE/PB Link PN IO.

Notice

You must always "Reset to factory settings" if you want to change the mode of the IE/PB Link PN IO that is already set.

4.1   Use as a PROFINET IO Device and as Gateway

Configuring Properties and Addresses with STEP 7

To provide the IE/PB Link PN IO with address information and further parameters, you must create a loadable database (configuration) in STEP 7.

How to...

...**to configure the IE/PB Link PN IO as PROFINET IO device with STEP 7/HW Config:**

1. Start with an existing STEP 7 project in which you have already created a PROFINET IO controller, for example an S7-400 station with a CP 443-1 Advanced.

2. Double-click the station you have created to open the hardware configuration

tool HW Config.

3. Take the device type gateway IE/PB Link PN IO from the hardware catalog under PROFINET IO and insert this as an IO device in the PN IO system of the IO controller. For the interface in the PROFINET IO system, an IP address is assigned automatically. STEP 7 also assigns the IE/PB Link PN IO a device number. The highest free device number in the current PROFINET IO system is selected.

...to connect the PROFIBUS subnet in your STEP 7 project:

4. After taking the IE/PB Link PN IO from the hardware catalog, you will be prompted to network the IE/PB Link PN IO over the PROFIBUS interface.

    If you have not yet created the required subnets, you can do this now by selecting the relevant entry. This creates a DP master system.

    Results:

    -   The IE/PB Link PN IO is created as a PROFINET IO device with a DP master system
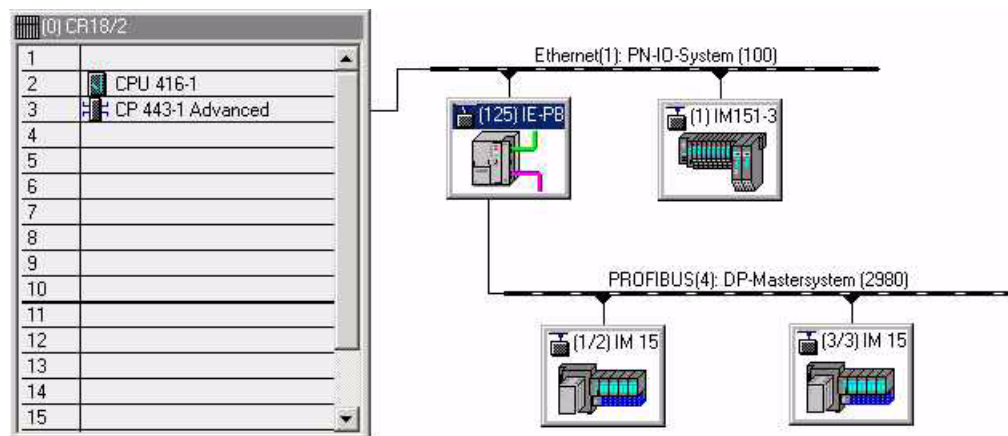
5. Set any other properties of the IE/PB Link PN IO. For more detailed information, please refer to the online help in STEP 7.

6. Configure the DP master system with its DP slaves (for further information, refer to the online help).

    Note:
    With the IE/PB Link PN IO, the DP master system is assigned to the PROFIBUS submodule. If you want to create a new DP master system, you must therefore first select the PROFIBUS submodule.

How to Commission the IE/PB Link PN IO as a PROFINET IO Device

7. Assign a device name to the IE/PB Link PN IO for the first time.

    The IE/PB Link PN IO ships with a factory-set MAC address. Without further configuration, the device can only be accessed over the Ethernet port using this MAC address.

    During configuration, an IP address is assigned automatically. This IP address is transferred to the IE/PB Link PN IO (IO device) later when the PROFINET IO controller starts up.

    To allow the IO controller to identify the IO device at this time, you must first assign a device name to the IE/PB Link PN IO just like any other IO device (refer to the flowchart on page BL1-10). To do this, use the menu command **PLC ▸ Ethernet ▸ Assign Device Name... in the SIMATIC Manager or in HW Config.**

    (You will find more detailed information on this procedure in the STEP 7 online help.)

8. Download the configuration of the appropriate PROFINET IO controller. The IO controller receives the configuration data of the IE/PB Link PN IO. When the IO controller starts up, the IE/PB Link PN IO is configured automatically just like other PROFINET IO devices.

Note

The configuration data loaded from the PROFINET IO controller is not stored retentively by the IE/PB Link PN IO. After turning the power for the device off and on again, all the configuration data except for the device name is deleted. During startup, the configuration data is loaded again by the PROFINET IO controller.


4.2   Use As a Gateway Only

4.2.1   Configuring and Commissioning

How to...

...**configure the IE/PB Link PN IO as an S7-300 station with STEP 7/HW Config:**

1. Open an existing STEP 7 project or create a new project.

2. Create a SIMATIC 300 station.

3. Double-click the station you have created to open the hardware configuration tool HW Config.

4. Take the gateway IE/PB Link PN IO device type from the SIMATIC 300 hardware catalog.
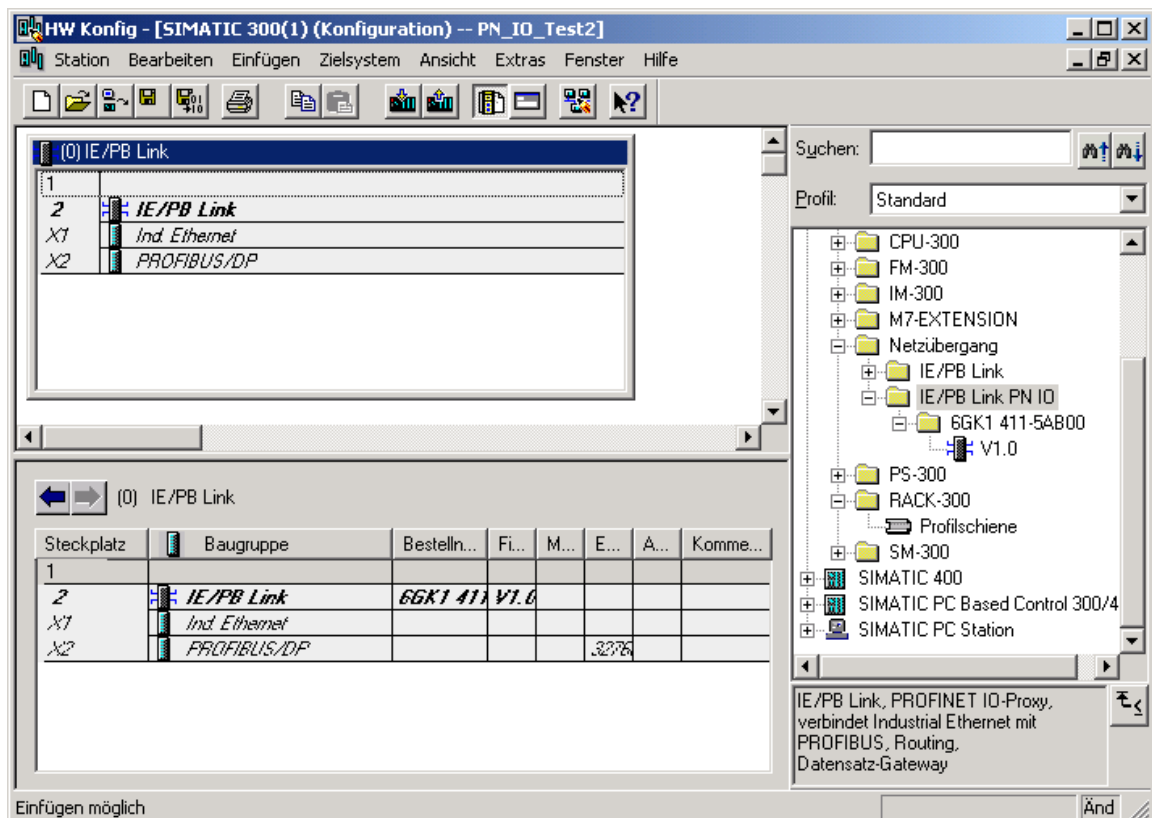
...connect the IE/PB Link PN IO to the Ethernet and PROFIBUS subnet in your STEP 7 project:

5. After taking the IE/PB Link PN IO from the hardware catalog, you will be prompted to network the IE/PB Link PN IO over the Ethernet interface and then over the PROFIBUS interface.

   If you have not yet created the required subnets, you can do this now by selecting the relevant entry.

Note

The IE/PB Link can also be used as a gateway between an MPI subnet and an Ethernet subnet. To do this, the PROFIBUS interface of the IE/PB Link must be networked with the MPI subnet (see 5.)

Result: You have created the IE/PB Link PN IO component with a basic module and the Ethernet and PROFIBUS submodules in the S7-300 station in HW Config.

6. When necessary, set other properties of the IE/PB Link PN IO; for more detailed information, refer to the following sections 4.2.2 through 4.2.4.

How to Commission the IE/PB Link PN IO

7. Assign an IP address to the IE/PB Link PN IO if you have not already done so in the SIMATIC Manager without the configuration steps described here. In HW Config, select the **menu command ▶ PLC ▶ Assign Ethernet Ethernet Address...**

Note

You will find more detailed information on this procedure in the STEP 7 online help. Note the requirements outlined there.

---

8. Download the database (configuration) from STEP 7 to the IE/PB Link PN IO.

   When you download for the first time, you must download over Industrial Ethernet using the TCP/IP interface. Depending on the PG network attachment, subsequent downloads are then possible over PROFIBUS or over Industrial Ethernet using the TCP/IP interface.


Notice

Please note that the IE/PB Link PN IO is a special configuration component containing all the necessary station components. This means that you cannot place any other components such as a DIN rail or modules alongside the IE/PB Link PN IO in the S7-300 station you have created!

4.2.2   Setting the Properties in the IE/PB Link PN IO Basic Module

Opening the Properties Dialog

You can set the remaining properties of the IE/PB Link PN IO in HW Config or in the component view in NetPro.

After selecting the basic module and opening the object properties, you can make the following settings:
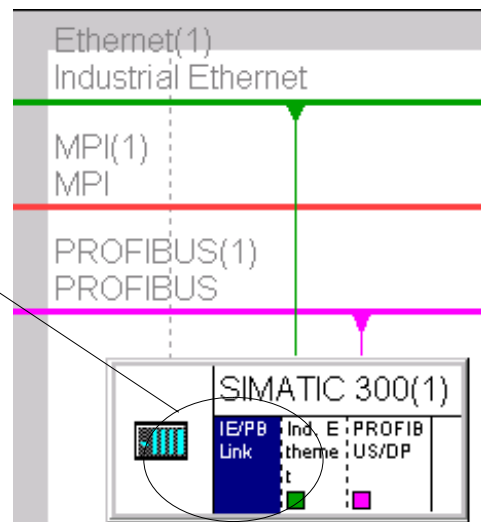
- • "General" Tab

  Here, you can enter general information such as a technological name to be used for component management in the STEP 7 project.

- • "Options" Tab

  - Time-of-day Synchronization

    Here, you can decide whether or not the IE/PB Link PN IO forwards time-of-day frames from a time transmitter. Selectable directions: from PROFIBUS to Ethernet or from Ethernet to PROFIBUS.

  - Assigning Parameters to Field Devices (data record routing)

    Here, you can decide whether or not the device will support data record routing for assigning parameters to field devices. As default, the option is activated.
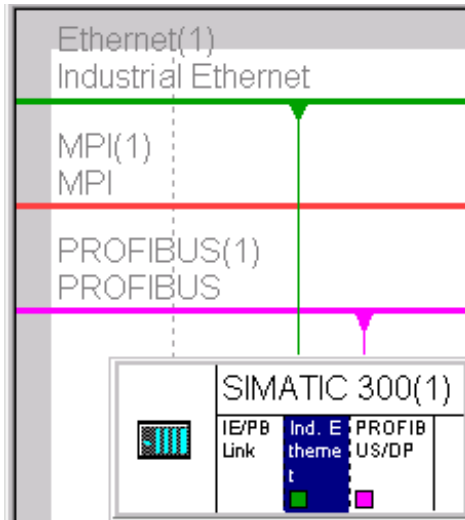
- • "Diagnostics" Tab

  Here, you can start NCM Diagnostics directly for the online IE/PB Link PN IO.

Note

You will find more detailed information in the STEP 7 online help.

4.2.3   Setting Properties in the Ethernet Submodule

In NetPro, the S7-300 station you have
configured is displayed as shown here:

After you have selected the Ethernet
submodule and opened the object
properties, you can make the
settings described here:

In HW Config, the S7-300 station you
have configured is displayed as shown
below:
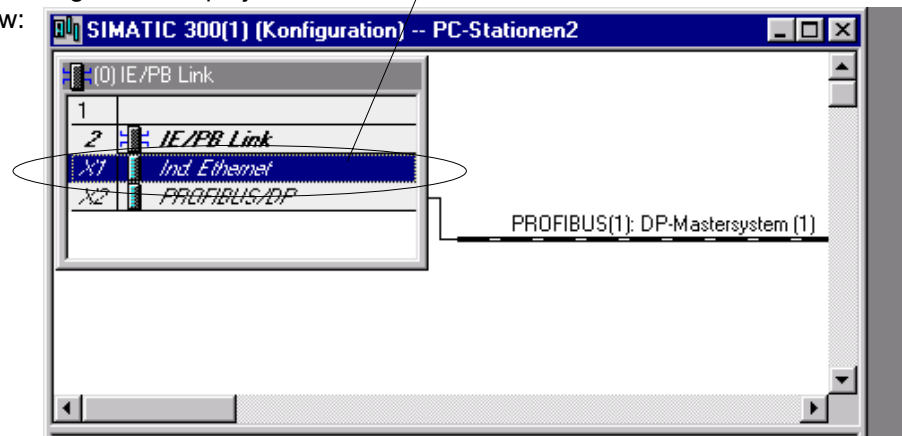
These properties can be configured:

- "General" Tab

  Here, you can enter general information to be used for component management
  in the STEP 7 project. You can also set parameters for the interface to Ind.
  Ethernet.

- "Options" Tab

  Here, you can make any individual network settings that may be necessary; as
  default, automatic setting is selected here.

- "Addressing" Tab

    In the "Addressing" tab, you can assign the previously configured IP address and the IP parameters to the IE/PB Link PN IO once; these are simply displayed here and cannot be modified.

    Only after these steps are completed, can you download the configuration data to the IE/PB Link PN IO from the PG/PC over Ethernet or PROFIBUS.

Note

You will find more detailed information on this procedure in the STEP 7 online help.

4.2.4 Setting the Properties in the PROFIBUS Submodule

After selecting the PROFIBUS/DP submodule and opening the object properties, you can make the following settings:
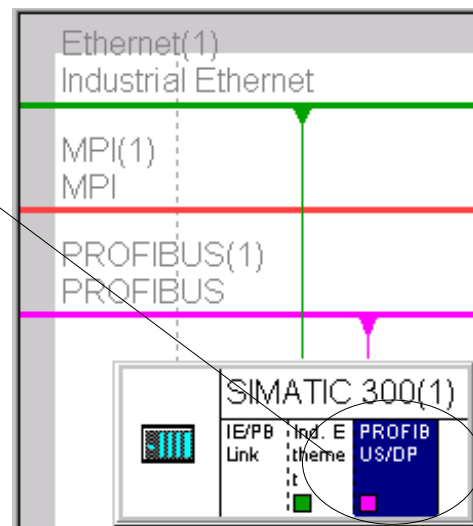
- "General" Tab

    Here, you can set the parameters for the interface to PROFIBUS; in other words, assign the network and the PROFIBUS address.

    You can also enter general information to be used in component management in the STEP 7 project.

- "Addresses" Tab

    The address parameter for diagnostics displayed here has no significance for the IE/PB Link PN IO.

5 Operation - Controls and Displays

5.1 Controlling the Operating Mode

There are different ways in which you can control the mode of the IE/PB Link, as follows:

- Mode selector
- SIMATIC Manager in STEP 7

To control the mode from STEP 7 / NCM S7 Diagnostics, 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 IE/PB Link 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 IE/PB Link changes to the STOP mode and behaves as follows:

  - PROFIBUS DP changes to the safe state;
  - PG/OP access to DP slaves and other PROFIBUS stations remain possible.

5.2 LED Displays

Along with the six LEDs on the front panel that are used to indicate the mode, an additional display with three 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:

🟥	**SF**	System error
🟥	**BF PN**	PROFINET bus error
🟥	**BF DP**	PROFIBUS DP bus error
🟩	**RX/TX**	Send / receive activity on Ind. Ethernet
🟩	**RUN**	Normal operation
🟨	**STOP**	Operation in STOP mode

Table 5-1

SF (red)	BF PN (red)	BF DP (red)	RX/TX (green) 1)	RUN (green)	STOP (yellow)	Operating Mode
●	●	●	◐	●	●	Turn on (lamp test)
●	○	○	☀	○	●	Configuration distribution phase
◐	◐	◐	◐	☀	●	Starting up (STOP->RUN)
◐	◐	◐	◐	●	○	Running (RUN)
◐	◐	◐	◐	●	☀	Stopping (RUN->STOP)
○	○	○	◐	○	●	Stopped (STOP)
○	○	○	◐	●	○	Running (RUN), no error
●	○	○	◐	●	○	Running (RUN), error of a DP slave
●	○	☀	◐	●	○	Running (RUN), error on PROFIBUS that does not affect PROFINET IO.
●	☀	☀	◐	●	○	Running (RUN), with error • Error on PROFIBUS that affects PROFINET IO (for example, IO device) or • Error on PROFINET IO that also affects PROFIBUS (for example proxy not started up)

Table 5-1   , continued

SF (red)	BF PN (red)	BF DP (red)	RX/TX (green) 1)	RUN (green)	STOP (yellow)	Operating Mode
●	☀	◑	◑	●	○	Running (RUN), error on PROFINET IO; missing logical or physical connection to PROFINET IO controller.
●	●	◑	◑	●	○	The Ethernet connection is interrupted.
●	◑	●	◑	●	○	Running (RUN) • with disturbances on PROFIBUS or • no PROFIBUS project engineering to suit system.
○	○	○	◑	○	☀	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 (the IE/PB Link PN IO currently has an incomplete firmware version).
○	○	○	◑	☀	☀	Firmware being deleted.
◑	◑	◑	◑	☀	○	Firmware being loaded (LEDs flash alternately).
●	○	○	◑	○	●	Stopped (STOP) with errors
☀	☀	☀	◑	☀	☀	Module fault / system error

Legend: ● on   ○ off   ☀ flashing   ◑ not defined (LED may be lit)

1) Note on RX/TX-LED:
The display of the RX/TX LEDs for an existing Ethernet attachment depends on the traffic on the Ethernet network; the display flickers more or less intensively. If the LED, on the other hand, is permanently unlit, an interruption on Ethernet can be assumed.

Communication Status of the Device on Industrial Ethernet

In addition to the LEDs that signal the mode, there are also LEDs behind the hinged front panel that provide information about the status of the interface to Industrial Ethernet.

🟩 FAST
🟩 FDX
🟩 LINK

Table 5-2

LED	Meaning (LED on)	Display	
FAST LED (green)	Signals current transmission rate	●	100 Mbps (Fast Ethernet)
		○	10 Mbps
FDX LED (green)	Signals current duplex mode	●	Full duplex
		○	Half duplex
LINK LED (green)	Signals an existing connection to partner	●	Connection established
		☀	"Flashing" activated from PG

Legend: ● on   ○ off   ☀ flashing   ◐ not defined (LED may be lit)

6   Further Notes on Operation

6.1   Memory Reset / Resetting to the Factory Settings

For the IE/PB Link PN IO, two memory reset variants are available:

*   Clear / reset

*   Resetting to factory settings

Notice

You must always "reset to factory settings" if you want to change the configured mode of operation of the IE/PB Link PN IO; you can operate the module as a PROFINET IO device or only as a gateway.

How to Use the Functions

You can start the memory reset functions in STEP 7. The device must be in STOP.

*   Clear / reset

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

    or

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

*   Resetting to factory settings

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

Memory Reset - Effects

After clear/reset, the IE/PB Link PN IO retains the retentive parameters.

Resetting to Factory Settings - Effects

After it has been reset to the factory settings, the IE/PB Link PN IO still has the MAC address that was set in the factory (as shipped).

The content of the C-PLUG is completely deleted. The next time the module starts up, the C-PLUG is initialized as a data record of the type IE/PB Link PN IO.

6.2   Loadable Firmware

The IE/PB Link PN IO supports the updating of firmware with the Firmware Loader.

An update of the firmware can be downloaded from the PC/programming device at any time.

The IE/PB Link PN IO remains in the firmware load mode for ten seconds after turning on the power with the mode selector set to STOP; the LEDs indicate this status (see Section 5.2).

Note

Please note that the port of the PG must be set to ISO and the PG must be in the same subnet!

After downloading the firmware, the device must be started again.

For more information on downloading the firmware, refer to the README file of the NCM S7 for Industrial Ethernet / PROFIBUS configuration software.

6.3   Working with Fast Ethernet - Automatic Switchover

The IE/PB Link PN IO has a 10/100 Mbps half/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".

6.4   Changing Interface Parameters when Downloading

If you change the interface parameters (for example the transmission rate) compared with current settings, the download may abort.

In this case, adapt the PG/PC interface to the network configuration according to the new interface parameters and then start the complete download again.

6.5   Forwarding the Time of Day

If time forwarding is disabled on the IE/PB Link PN IO, a device with firmware version V1.0 works with an internal time of day even if there is a time master on the Ethernet network.

As of firmware version V2.0, the time of day for the time stamp of the diagnostic buffer is taken from the time master even when time forwarding is disabled.

6.6   SNMP Agent

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

The IE/PB Link PN IO supports data queries over SNMP in version 1.

SNMP is a 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 IE/PB Link PN IO supports all MIB objects according to the MIB standard 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 IE/PB Link PN IO.

Access Permissions using Community Name

The IE/PB Link PN IO uses the following community names for assigning rights:

* For read access: "public"

* for read and write access: "private"

(note the use of lowercase letters!)

7   Performance Data

7.1   Features of S7 Communication

Table 7-1

Characteristic	Explanation / Values
Maximum number of connections	32

For S7 communication, both configured and unconfigured S7 connections are used.

7.2   Features of Data Record Routing

Assigning Parameters to Field Devices (data record routing)

You can use the IE/PB Link as a router for data records intended for field devices (DP slaves). This means that devices that are not directly linked to PROFIBUS and therefore do not have direct access to the field devices (DP slaves), can transfer data to the field devices via the IE/PB Link.

The SIMATIC PDM (Process Device Manager) is an example of a tool that creates data records for assigning parameters to field devices.

As default, the function is activated.

Table 7-2

Characteristic	Explanation / Values
Maximum number of connections to DP slaves	32
Maximum data record size for the parameters that can be transferred via a connection per DP slave	240 bytes

7.3   Total Number of Connections

You can use a total of maximum 48 connections (S7 connections and connections to the DP slaves).

Notice

Please note that one TCP/IP connection on Industrial Ethernet is occupied per S7 connection used.

7.4   Characteristic Data for PROFINET IO

Table 7-3

Characteristic	Explanation / Values
Maximum number of DP slaves on IE/PB LInk PN IO (PROFINET IO devices for PROFINET IO)	64
Maximum number of DP inputs	2048 bytes
Maximum number of DP outputs	2048 bytes

Note

All PROFINET IO devices (DP slaves) to be connected to the IE/PB Link must be created with STEP 7 as PROFIBUS-DPV0 (standard slaves).

7.5   Update Time when Operating PROFINET IO Alongside other Services

Depending on the number of PROFINET IO devices operating on the same Ethernet subnet, STEP 7 automatically sets the lowest possible value for the update time for the IO devices. If required, you can configure this update time for the IO devices using the properties dialog of the PROFINET IO system in HW Config (see Section 4.1).

It is advisable to configure a higher update time in the following situations:

*   When non‑cyclic communication services such as S7 connections, data record routing or HMI connections are used at the same time as cyclic communication over PROFINET IO;

*   When diagnostic or alarm frames occur often in the DP master system.

Recommendation: Do not set the lowest possible update time when operating multiple services. Select the next higher value proposed by STEP 7.

8   Compatibility with Previous Products

8.1   Range of Functions of the Firmware Versions:

Table 8-1

Firmware Version	Range of Functions
V 1.0	• Gateway as PROFINET IO proxy and in standard mode • Routing • Data record gateway • DP slaves complying with PROFIBUS DP‑V0 standard
V2.0	• Gateway as PROFINET IO proxy and in standard mode • Routing • Data record gateway • MPI networking • DP slaves complying with PROFIBUS DP‑V0 and DP‑V1 standard and Siemens DP slaves • Direct data exchange (slave‑to‑slave)

8.2   Upgrading Older Modules / Use as Replacement

Upgrading:

Modules with a firmware version V1.0 can be upgraded to firmware version V2.0 (loadable firmware). This allows the full range of functions of V2.0 to be used.

Use as a Replacement:

Table 8-2

Previously used Module	Steps in Configuration
6GK1 411-5AB00 with firmware version V1.0	**Case a: Configuration unchanged (replacement)** If you do not require any extended functionality compared with the previously used device, you do not need to make any changes to the configuration. To put the module into operation, you simply need to replace the old device with the power supply turned off. **Case b: Expanded configuration (using new functions)** If you want to use options that go beyond those that were possible with the IE/PB Link PN IO you have been using up to now, follow the steps below: • Replace the IE/PB Link PN IO V1.0 that you configured previously in STEP 7 / HW Config with V2.0; you will find this in the hardware catalog (refer to the section on configuration). • Expand your configuration according to your requirements, for example with DP-V1 slaves on the master chain. • Save, compile and download the configuration data again to the station with the PROFINET IO controller or to the IE/PB Link PN IO.

9   Technical Specifications

Supported Transmission Rates	
• Ind. Ethernet	10 Mbps and 100 Mbps
• PROFIBUS	9.6 Kbps 19.2 Kbps 45.45 Kbps 93.75 Kbps 187.5 Kbps 500 Kbps 1.5 Mbps 3 Mbps 6 Mbps 12 Mbps
Maximum current consumption on the PROFIBUS interface with network components connected (e.g. optical network components)	100 mA at 5V
Interfaces	
Attachment to Industrial Ethernet:	RJ-45 jack
Attachment to PROFIBUS	9-pin sub-D female connector
Power supply	DC +24 V (permitted range: 20.4 V to 28.8 V)
Current consumption	
• from external 24 V DC	Approx. 0.29 A (typical at 24 V)
Power loss	7.5 W
Permitted ambient conditions	
• Operating temperature	0 °C to +60 °C installed horizontally 0 °C to +40 °C installed vertically
• Transportation/storage temperature	-40 °C to +70 °C
• Relative humidity max.	95% at +25 °C
• Altitude	up to 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

In addition to this, all the information in /1/ S7-300 Module Data: Reference Manual in the section "General Technical Specification" on the topics listed below applies to the IE/PB Link

- Electromagnetic compatibility

- Transportation and storage conditions

- Mechanical and climatic ambient conditions

- Insulation tests, class of protection and degree of protection