Application for Process Automation

applications & TOOLS

Connecting external periphery to PCS 7 via IE/PB Link PN IO

SIEMENS

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Preface

Objective of the application

The application shows how, in an existing system, field devices at a profibus from an external manufacturer can be parameterized via PCS 7 with the Process Device Manager (PDM).

The steps for the configuration of the IE/PB Link PN IO on a PCS 7 Engineering Station (ES) are described by in the example of the connection with a PROFIBUS PA device at a SIEMENS DP/PA Link.

Validity

… valid for PCS 7 V6.1 SP1, V7.0 SP1 and V7.1

Reference to the Automation and Drives Service & Support

This article is from the Internet application portal of the Industry Automation and Drive Technologies Service & Support. The link below takes you directly to the download page of this document:

http://support.automation.siemens.com/WW/view/en/31536572

Table of Contents

1 Introduction

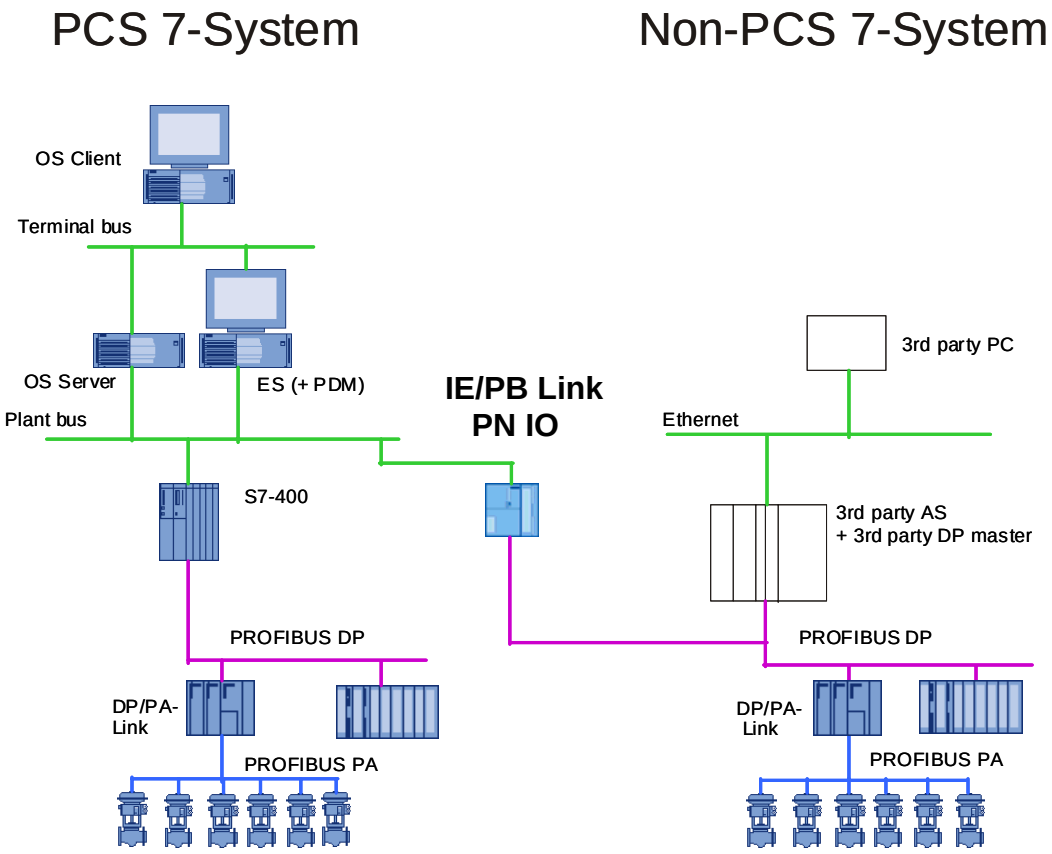
1.1 Description of the Automation Problem

If PCS 7 is used on a customer system with PROFIBUS (DP andPA) devices, which are connected to PROFIBUS DP Master (automation stations) from external manufacturers, the users often wish to configure and parameterize these field devices with the PDM too.

1.2 Overview of the Overall Solution

The Engineering Station (ES) is connected to the PROFIBUS of the external system via an IE/PB Link PN IO.

Figure 1-1: System configuration with an IE/PB Link PN IO



The ES represents a PROFIBUS master class 2 (at the PROFIBUS DP), which only communicates anti-cyclically with the PA field devices.

The IE/PB Link PN IO works as a gateway, which converts the TCP/IP messages into PROFIBUS messages and vice versa.

Note A cyclic communication (e.g. for a visualization on an OS) is not possible via the IE/PB Link PN IO.

1.3 Preconditions

For the communication with the PROFIBUS PA devices it must be made sure, that a DP/PA Link from an external manufacturer supports the data record routing for PDM.

An IE/PB Link PN IO (6GK1 411-5AB00) is required.

Figure 1-2: IE/PB Link PN IO

Note For more information on the IE/PB Link PN IO, please refer to the "SIMATIC NET network transition IE/PB Link PN IO".

http://support.automation.siemens.com/WW/view/en/7851748

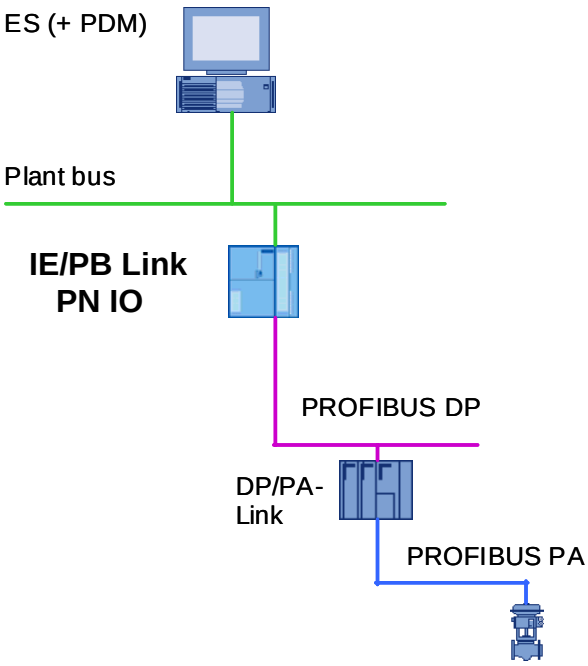
- Chapter 1 "Properties and Services"
- Chapter 4 "Configuring with STEP 7"

2 Configuration

2.1 Test Setup

For the present document the following test setup was used:

Figure 2-1: Test setup with Siemens DP/PA Link and a PA device

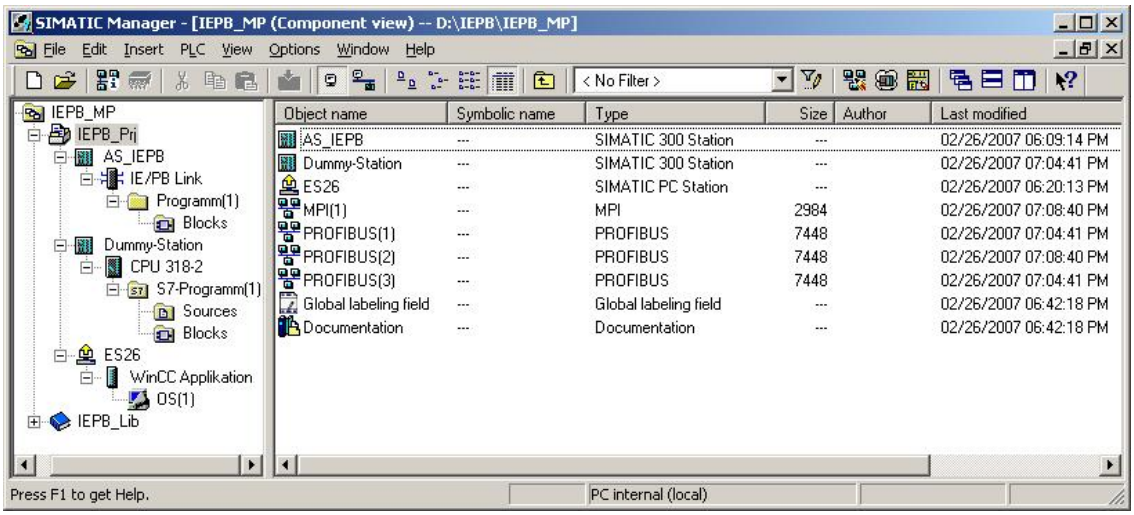


2.2 Implementation

In the PCS 7 multiproject, at least 3 stations are required:

- A PC station for the local Engineering Station
  > see chapter 3.1
- An S7-300 station with the IE/PB Link PN IO (under S7-300 in the HW Config)
  > see chapter 3.2
- A dummy station (S7-400 or S7-300) as the master of the DP and PA bus of the external manufacturer
  > see chapter 3.3

Figure 2-2: Configuration of the ES



3 Settings

3.1 Network Settings of the ES

For the application described here, the TCP/IP protocol is required on the system bus.

Background

In the PCS 7 standard case, only the ISO protocol is activated at the system bus, therefore the TCP/IP protocol must be additionally activated.

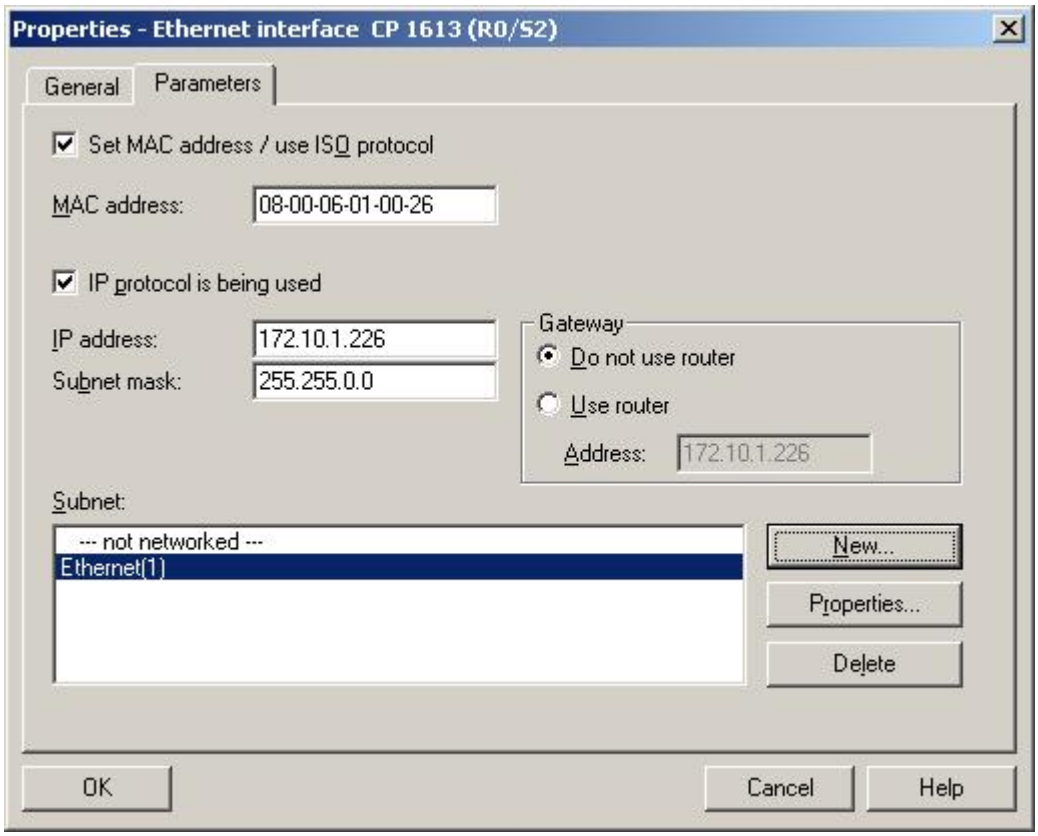
Basically, there are two possible uses:

- The ES is only operated as a stand-alone station only as a parameterization station at the external system (no terminal bus). Then only a CP1613 (or any other Ethernet card) is required for the system bus and only the TCP/IP protocol is activated in the object properties of this card.
- In addition to the connection to the external system, the ES is connected with a PCS 7 system in this example. Then, the TCP/IP protocol is activated in addition to the activated IOS protocol (PCS 7 standard) in the HW Config of the Ethernet card at the system bus (usually CP1613).

Procedure

1. Activate the TCP/IP protocol in the HW Config of the ES PC station in the object properties of the CP1613.

Figure 3-1: Configuration of the CP1613 with ISO and TCP/IP protocol



2. After saving and compiling in the HW Config, you can configure the local station from the SIMATIC Manager when the PG/PC interface “PC Internal (local)” is set.

Note

See:

“Process Control System 7 V7.1 PC Configuration and Authorization” manual > chapter 4.5.1.5 “How to Prepare an Engineering Station with CP 1613 for Use in PCS 7 V7.1”.

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Note for Using Asset Management

In a PCS 7 ES there are usually two Ethernet cards for the terminal bus (TCP/IP prot.) and the system bus (ISO prot.).

If the ES is also used as Maintenance Station Client, an NDIS adapter (for SNMP protocols) can be additionally activated - or can be installed as an alternative for a third Ethernet card.

It is important that the communication is via the IE/PB Link and not via the IP address of the NDIS adapter (or the third Ethernet card for the SNMP protocol).

If the IP addresses of the system bus and the NDIS adapter are the same, the NDIS adapter must be deactivated (in the Windows network properties, not in the HW Config).

3.2 SIMATIC 300 Station with an IE/PB Link PN IO

This S7-300 station only contains the IE/PB Link PN IO.

3.2.1 Creating the Station

For creating the station, please proceed as follows:

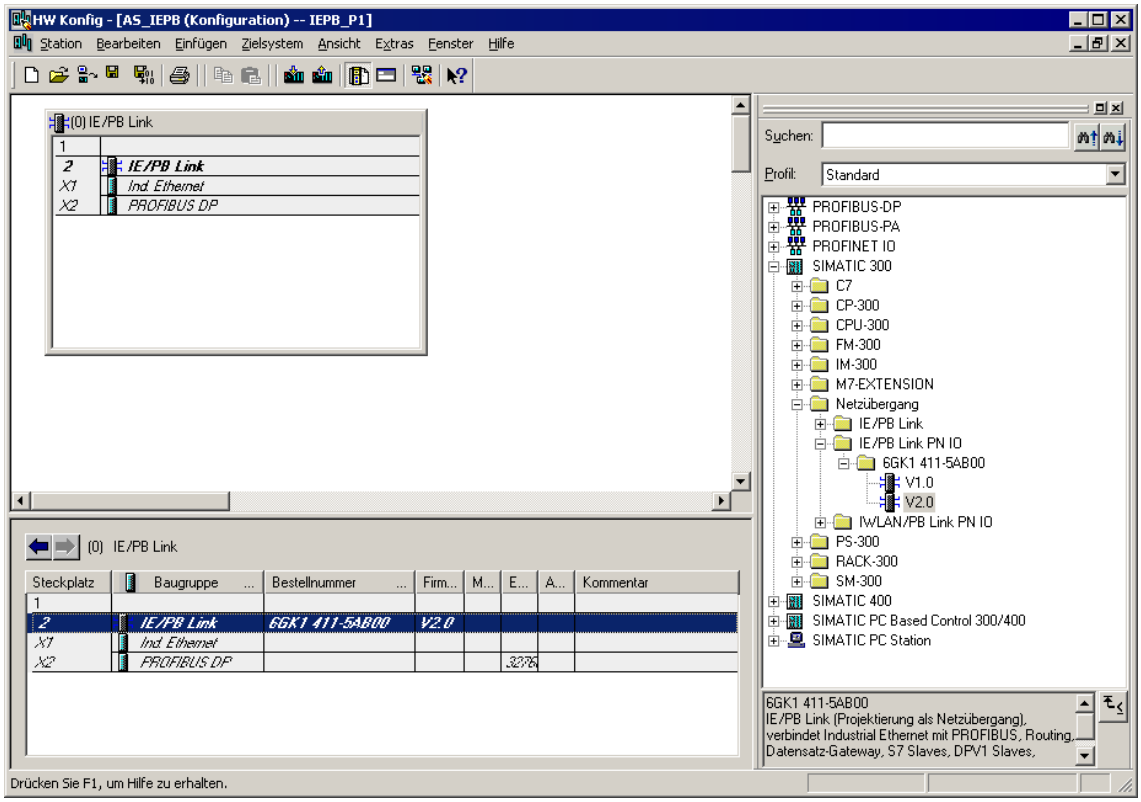
In the SIMATIC Manager...

1. Create an S7-300 station in the component view of the SIMATIC Manager.

In the HW Config…

2. Add an IE/PB Link PN IO (Standard Library under S7-300 > Network transition (Gateway).
   Now the station is complete. No further components need to be added.

Figure 3-2: Configuration of the station with an IE/PB Link PN IO



3. Make sure that - in the tab “Options” of the object properties of the IE/PB LinkPN IO - the setting “Data record gateway” is activated (activated by default).
4. In the “Ind. Ethernet” properties dialog in the tab “Parameters”, enter an IP address (same network as the PC station).
5. In the “PROFIBUS DP” properties dialog in the tab “General”, enter a PROFIBUS address (this bus is later connected with the dummy station and the DP/PA Links).
6. In the tab “Operation mode”, in the properties dialog “PROFIBUS DP”, leave the setting “No DP” (the setting “DP Master” is only supported by ProfiNet).

3.2.2 Address Assignment for the IE/PB Link PN IO

Background

A first an IP address must be assigned to the IE/PB Link PN IO once, to enable the communication to the ES.

Since usually the wrong IP address is set at the IE/PB Link PN IO (or in the delivery status none at all), the IE/PB Link PN IO cannot be downloaded directly from the HW Config.

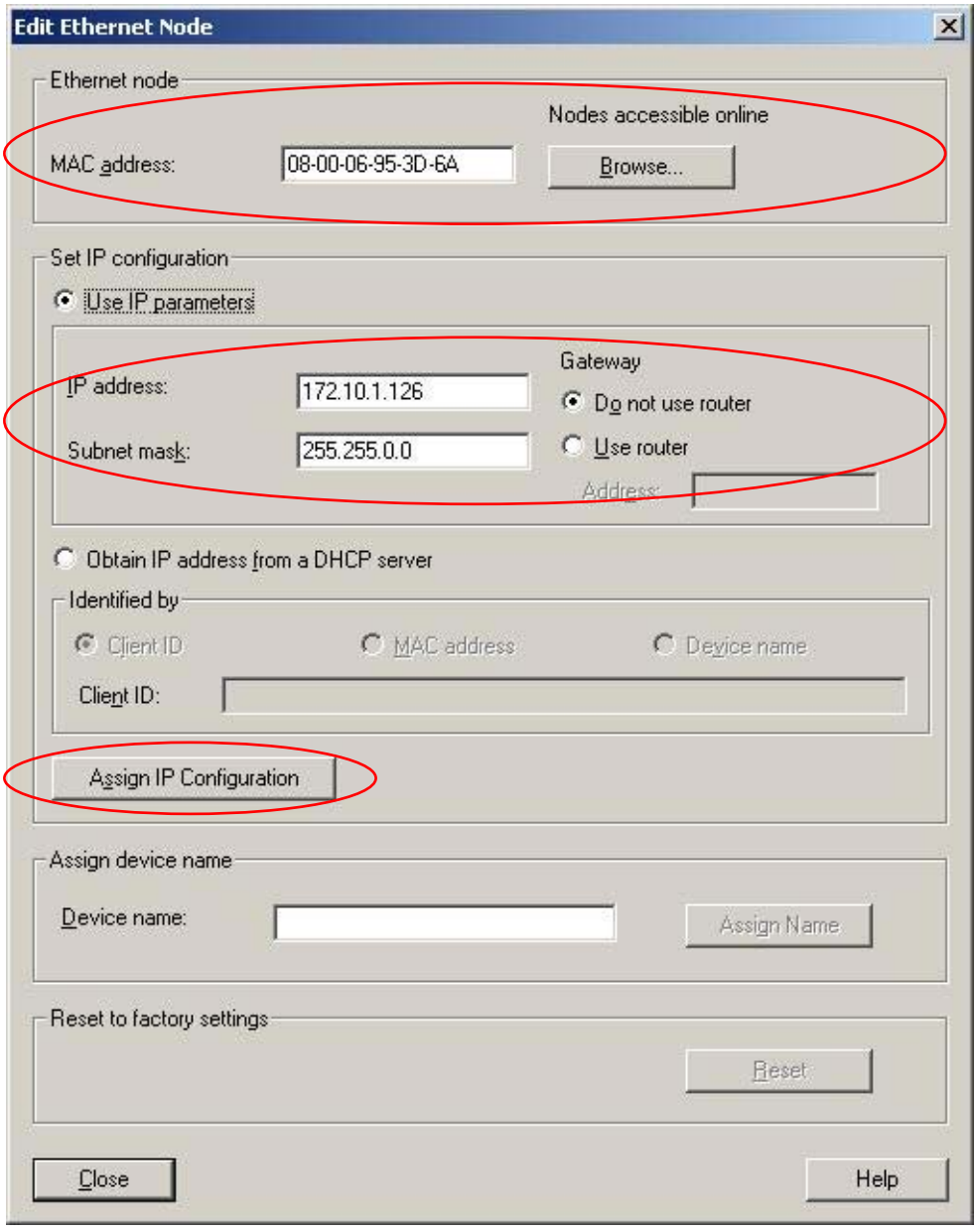
In order to assign an IP address to the IE/PB Link PN IO (in the same IP network as the CP1613 of the ES), the PG/PC interface of the ES must temporarily be set to the respective Ethernet TCP/IP interface (PCS 7 standard: “PC internal (local)”).

Procedure

For assigning an IP address to the IE/PB Link PN IO (in the same IP network as the CP1613 of the ES), please perform the following steps:

1. Temporarily set the PG/PC interface of the ES to the respective Ethernet TCP/IP interface (PCS 7standard: “PC internal (local)”).
   This can be done via the menu “`Options / Set PG /PC Interface`” in the SIMATIC Manager for example.
   In a CP1613, the rule “CP1613(RFC1006)” can be set - as offered in the checklist of the PG/PC interface.
2. Assign the IP address to the IE/PB Link PN IO.
   Either use the “Primary Setup Tool” (PST) or “`PLC > Edit Ethernet node`” in the SIMATIC Manager and:
   - type in the MAC address manually and hit the “Assign IP Configuration” button, or
   - click on “Browse” to view the existing MAC addresses and select the address of the IE/PB Link PN IO (you should know the MAC address of the IE/PB Link, if other network nodes are also connected).

Figure 3-3: Dialog for assigning addresses to the IE/PB Link PN IO



3. Now set the PG/PC interface back to the PCS 7 standard “PC internal (local)”.

From now on, the station can be downloaded with the IE/PB Link PN IO, for example from HW Config.

3.3 Dummy Station for the Master DP

Background

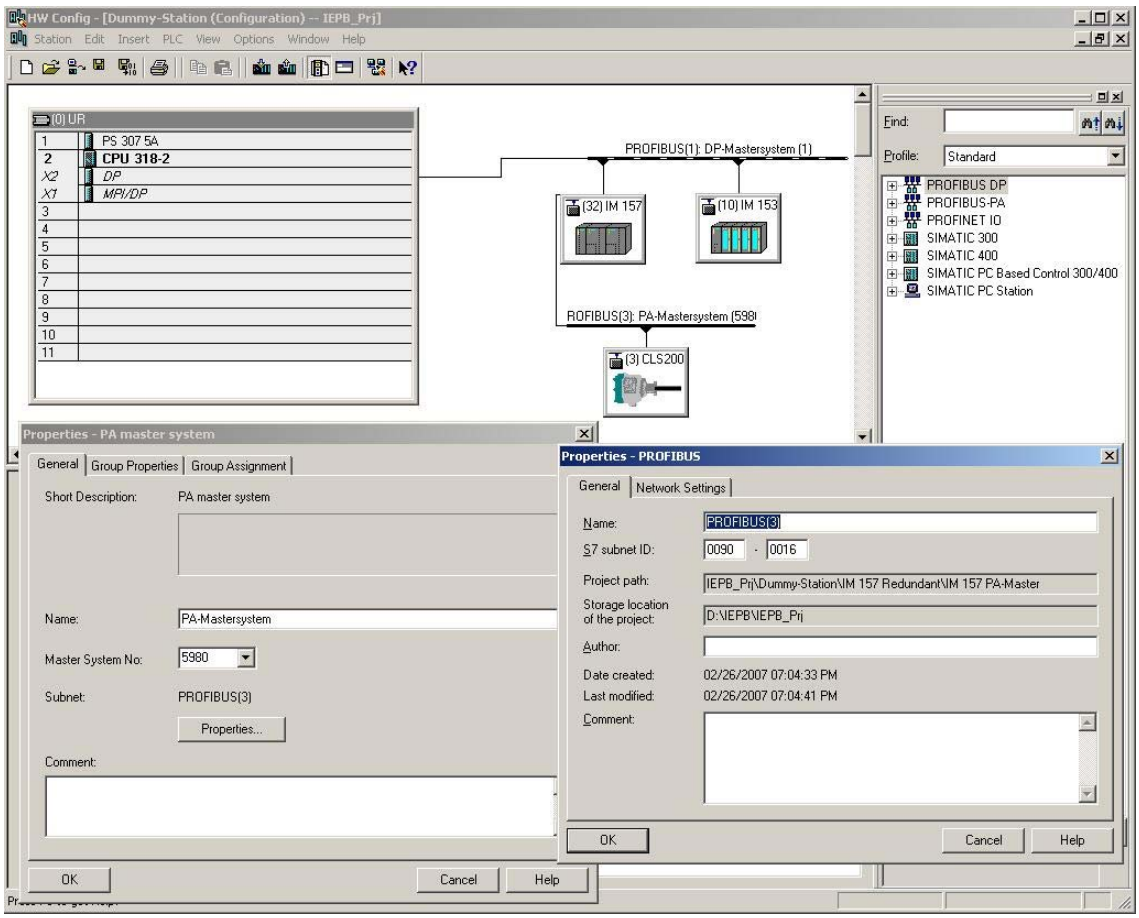
To create a PROFIBUS DP in the HW Config, there must be a Master DP.

Since it is a PROFIBUS from an external manufacturer, any S7-300 or S7-400 station must be installed as a dummy for the (external) master. Nothing has to be changed in the external master itself.

Procedure

1. Enter an S7-300 or S7-400 station (Rack, PS and CPU type as required).

Figure 3-4: Configuration of the PA bus



2. Assign a (Master) DP address, which has not yet been assigned in the existing bus.

3. Set the DP mode preferably to “DPV1” (if the slave devices support this); otherwise you can also use “S7-compatible” (=DPV0).
4. Add a DP/PA Link and at least one PA device with the existing addresses.

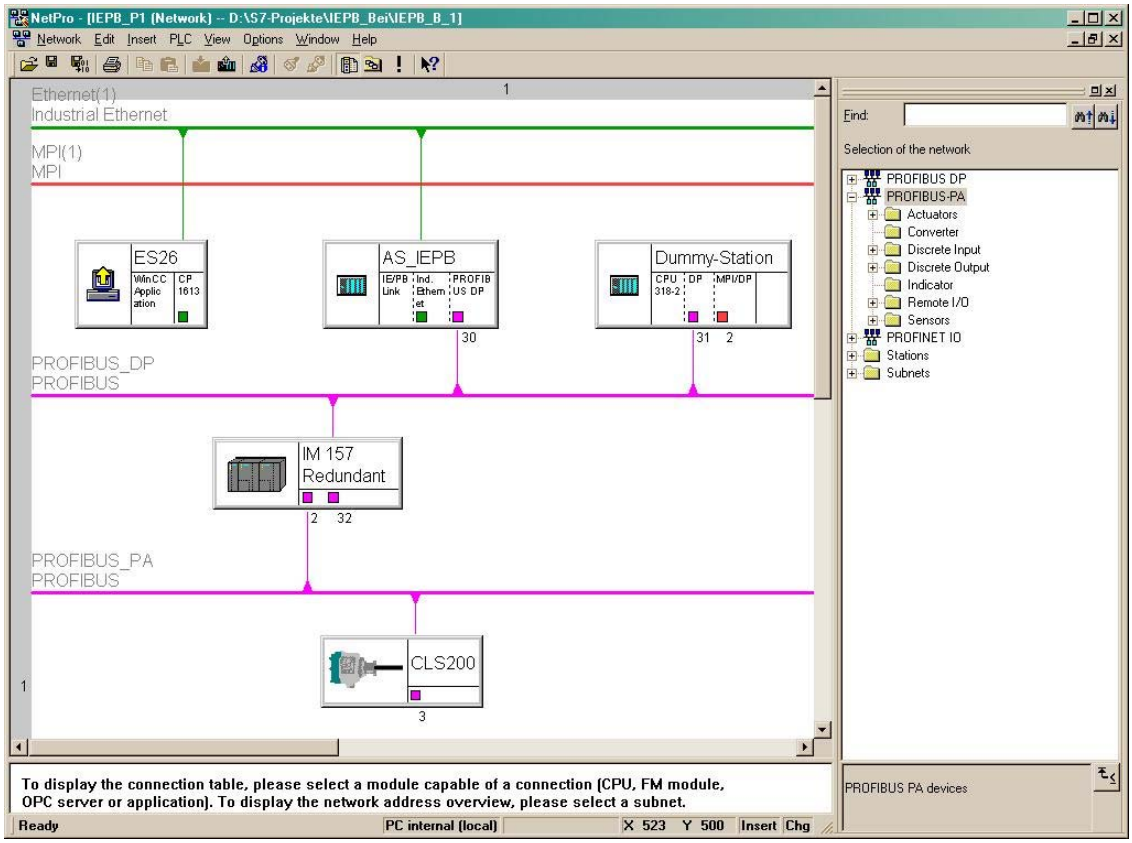
Note

If a DP/PA Link from an external manufacturer is used, the respective GSD file must be installed before.

See “The SIMATIC Process Device Manager” manual, chapter 13.2 “Device Integration in SIMATIC PDM with HW Config”

5. Enter the correct existing S7 subnet ID in “Properties” of the PA bus; it is assigned automatically when something is added (but usually incorrectly here).
6. Connect the IE/PB Link (see chapter 3.2) on the PROFIBUS side with this DP bus, either in the HW Config or in NetPro.

Figure 3-5: View in NetPro



Usual device parameterization with PDM

Double-click the PA device, select the type if necessary, and refresh the diagnostics status.

This refreshes the PDM network view.

Note Without PROFIBUS CP, the Lifelist function can only be used in the ES for devices at the PROFIBUS PA or for DP devices behind a Y Link (secondary bus system).

4 History

Table 4-1: History

Version	Date	Modification
V1.0	08/09/23	First edition
V2.0	09/05/12	Update to PCS 7 V7.1 incl. IE/PB Link PN IO