SIEMENS

SIMATIC NET

PG/PC - PROFINET CP 1604 / CP 1616

Operating Instructions

Preface

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Approvals A

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Properties

The RJ-45 connection board for the CP 1604 has 4 RJ-45 jacks for connecting end devices or other network components. With the supplied 40-pin ribbon cable, the RJ-45 connection board for CP 1604 is connected to the CP 1604.

The signals of the 4 RJ-45 jacks are connected to the integrated real-time switch on the CP 1604.

Apart from the RJ-45 connectors, there are also 2 LEDs (green and yellow) for each port.

LED description	Meaning
Green LED	Is lit if a connection is established (Link LED).
Yellow LED	Is lit when sending and receiving (Activity LED).

1.2 CP 1616 communications processor

Appearance

The following figure shows the CP 1616 communications processor.



Properties

The CP 1616 is a PCI module for connecting PGs/PCs to Industrial Ethernet. The essential properties are as follows:

- Optimized for PROFINET IO
- With Ethernet realtime ASIC ERTEC 400
- Four RJ-45 jacks for connection of end devices or other network components
- Integrated 4-port real-time switch
- Automatic hardware detection is supported

Hardware requirements

To be able to operate, the CP 1616 requires a 32-bit wide, short PCI slot with master capability.

LED display

On the front of the CP 1616, there are 10 LEDs.

Above the four RJ-45 jacks, there are 2 red LEDs labeled "BF" (bus fault) and "SF" (group fault).

LEDs in the frame of each RJ-45 jack

Within the frame of each RJ-45 jack, there are 2 LEDs.

The upper green LED is lit when a connection is established (Link LED).

The lower yellow LED is lit when sending and receiving (Activity LED).

BF and SF LED

The BF and SF LEDs have the following significance:

BF LED	SF LED	Description
off	-	Communications connection is established.
on	-	Link status error has occurred.
flashing slowly	-	There are two possible causes: • An IO device cannot be addressed. • An IP address was assigned twice.
–	off	There are two possible causes: • No fault/error. • A download is in progress.
	on	Diagnostics information is available.
	flashing at 2 second intervals	The firmware of the module is in an inconsistent status. This status is possible, for example if the power supply was interrupted during a firmware update. Eliminate the error as described in the section "Eliminating problems (Page 90)".
alternating slow flashing		Flash test for module detection.

BF LED	SF LED	Description
alternating fast flashing		A disruption has occurred. In this case, diagnostics via the Web or using SNMP is no longer possible.
		Note If this error occurs, please contact Technical Support. The problem can be eliminated if you contact our specialists directly. You will find the contact data in the section "Preface (Page 3)". Resetting the firmware or restarting the PC will not eliminate the problem.

Virtual LEDs

Remember that apart from the LEDs visible on the front panel, there are also two "virtual" LEDs in the firmware. These are the operating mode LEDs RUN and STOP. They do not exist physically but can nevertheless be queried using SNMP. They are on in the RUN or STOP mode and never flash normally or quickly.

External power supply

The CP 1616 has a socket for connecting an external power supply.

With this power supply, the integrated real-time switch can operate even if the PC is turned off.

Ethernet

The CP 1616 is intended for operation in Ethernet networks.

It also has the following features:

- The connectors are designed for 10BaseT and 100BaseTX.
- Data transmission speeds of 10 and 100 Mbps in full/half duplex are supported.
- Autonegotiation
- The module includes a 4-port real-time switch.
- Autocrossover

Four RJ-45 jacks

The connection of the CP 1616 to the LAN (**L**ocal **A**rea **N**etwork) is via one of the four RJ-45 jacks on the front panel of the CP.

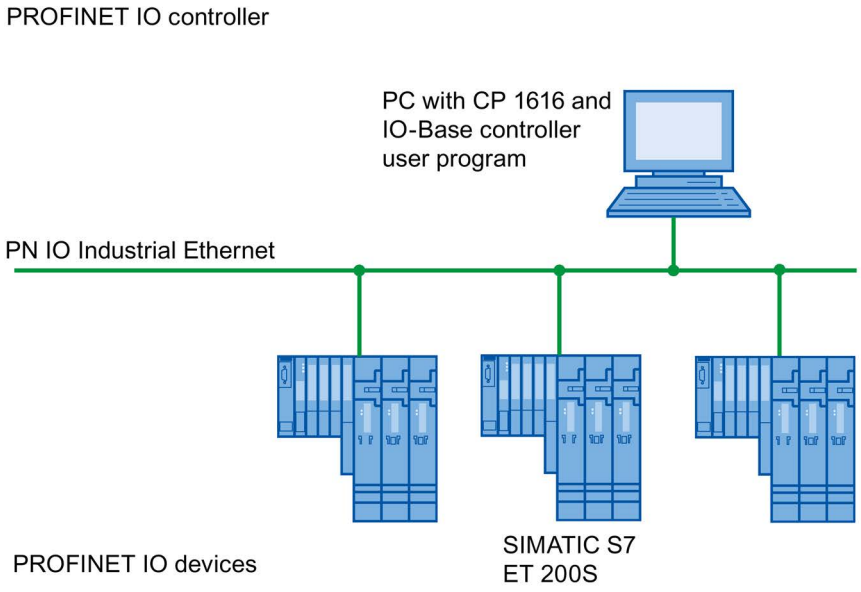
The four jacks are connected to the integrated real-time switch.

CP 1616 in a PC as IO controller

The following schematic illustrates a typical application:
PC with CP 1616 as PROFINET IO controller at the IO controller level.

The IO-Base controller user program runs on the PC and accesses the functions of the IO-Base user programming interface.

The data traffic is handled via a CP 1616 communications processor with several ET 200S SIMATIC S7 PROFINET IO devices via Industrial Ethernet.

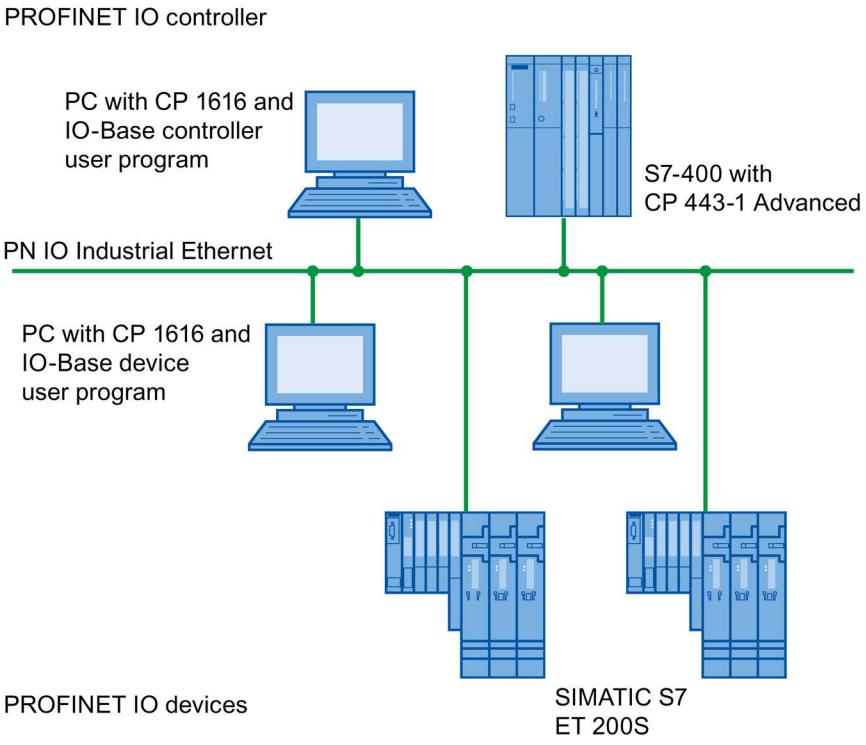


CP 1616 in a PC as IO device

The following schematic illustrates a typical application:
Two PCs each with a CP 1616 as PROFINET IO device at the IO device level.

There is also a PC with a CP 1616 as PROFINET IO controller, a SIMATIC S7-400 with a CP 443-1 as PROFINET IO controller and two SIMATIC S7 ET 200S PROFINET IO devices in the network.

On the IO device PCs, there is an IO-Base device user program that accesses the functions of the IO-Base user programming interface. The data traffic is via a CP 1616 communications processor to a PC as PROFINET IO controller or an S7-400 automation system with a CP 443-1 via Industrial Ethernet.



2.2 CP 1616 communications processor

2.2.1 Important information

Electrostatic sensitive devices

Please remember the measures to prevent electrostatic charge when installing the module

(ESD - **E**lectro**s**tatic **D**ischarge)

Installing the CP 1616

Opening the PC and plugging or pulling the modules is permitted only when the power is off.

Read the manual

Before installing the module, please read the section "Procedure for installing the CP 1616 (Page 31)" or similar in the manual of your PC and keep to the instructions.

External power supply

The CP 1616 has a socket for connecting an external power supply.

With this power supply (6 to 9 VDC), the CP 1616 can operate as a switch even if the PC is turned off.

NOTICE
UL approval These modules are intended for installation in Siemens PCs which are approved in accordance with UL 508 and listed under UL file number E85972. These PCs must comply with the UL 508 guidelines on "limited voltage / current" or have an "LPS supply" in accordance with UL 60950 or a "Class 2 supply" in accordance with UL 1310/UL 1885.

2.2.2 Procedure for installing the CP 1616

⚠WARNING

Do not put any damaged parts into operation!

Do not use any parts that show evidence of damage!

Recommendation for installation when using Linux

Install the CP 1616 first and then install the CP 1616 driver.

Requirements and conditions

- If available, enable the plug-and-play mechanism in the BIOS of your computer.
- The CP 1616 communications processor requires a PCI slot with master capability.

Note

Note on the number of possible CP 1616s in one computer

A maximum of one CP 1616 module can be installed in one PG/PC.

Installation and connection of the CP 1616

To install and connect up the CP 1616 follow the steps outlined below:

1. Turn off your computer and pull out the power cable connector from the socket.
2. Open the computer housing as described in the manual accompanying your PG/PC.
3. Remove the cover of a free PCI slot in your computer.
4. Remove the CP 1616 from its packaging.

Note

When handling the module, make sure that you do not touch the connectors or the electronic components.

5. Insert the CP 1616 the PCI slot. Make sure that the CP 1616 sits firmly and uniformly in the socket of the slot.
6. Close the computer housing as described in the manual accompanying your PG/PC.

7. Plug the connecting cable (TP) into the appropriate socket on the front panel of the CP 1616.
8. Plug the power supply connector into the socket again and turn on your computer.

Note

If you insert the CP 1616 in a suitable PCI slot and then secure the metal plate to the housing, the module sometimes skews in the slot in computers of some manufacturers.

After securing the module, please make sure that it is still sitting correctly and firmly in the slot!

Configuration 3

Configuring

After the communications processor has been installed in the computer, the CP still needs to be configured.

The further procedure is described in the "Commissioning PC Stations" manual and in the "PROFINET with STEP7 V14" Function Manual. You will find the manuals on the SIMATIC NET Product DVD in the directory: V2.X.X\CP16xx\doc.

Special point to be taken into regard when configuring the I&M data:

Die data "Higher-level designation" and "Location designation" that can be set in "STEP 7 Professional (TIA Portal)" can be loaded together with the STEP 7-project into the communications processor.

If the communications processor is also configured as an IO device, the data "HID" and "LID" can also be read out from any partner stations via the PROFINET protocol. This is effected by reading the data record "I&M 1". Responding to this data record is the task of the user application. Ensure that the data received from the application agree with the data configured in "STEP 7 Professional (TIA Portal)".

Downloading firmware

The CP ships with a current firmware version.

If you want to use the CP 16xx driver of a current SIMATIC NET CD, new firmware for the CP is also supplied with it. The following activities are then necessary:

- Download the firmware to the CP.
- Update and activate the driver of the CP on the PC.

Description

This section shows you how to use the firmware loader.

The Firmware Loader allows you to download new firmware versions to the SIMATIC NET modules.

For more detailed information about the individual download variants, refer to the integrated help in the program.

Firmware

Here, firmware means the system programs in the SIMATIC NET modules.

Uses of the Firmware Loader

The Firmware Loader allows you to download new firmware versions to the SIMATIC NET modules. It is used for the following:

- PROFIBUS modules
- Industrial Ethernet modules
- Modules for gateways (for example, IE/PB Link)

Installation

The firmware loader is available in Windows when you have installed STEP 7/NCM PC on your PC.

Load files

The load file contains the firmware of the CP and other information that can be displayed by the firmware loader. Based on this information, it checks the compatibility with the device.

The load file ships with the name "fw16xx-v.v.v.b.b.fwl"; where "v.v.v." stands for the version number and "b.b" for the build number.

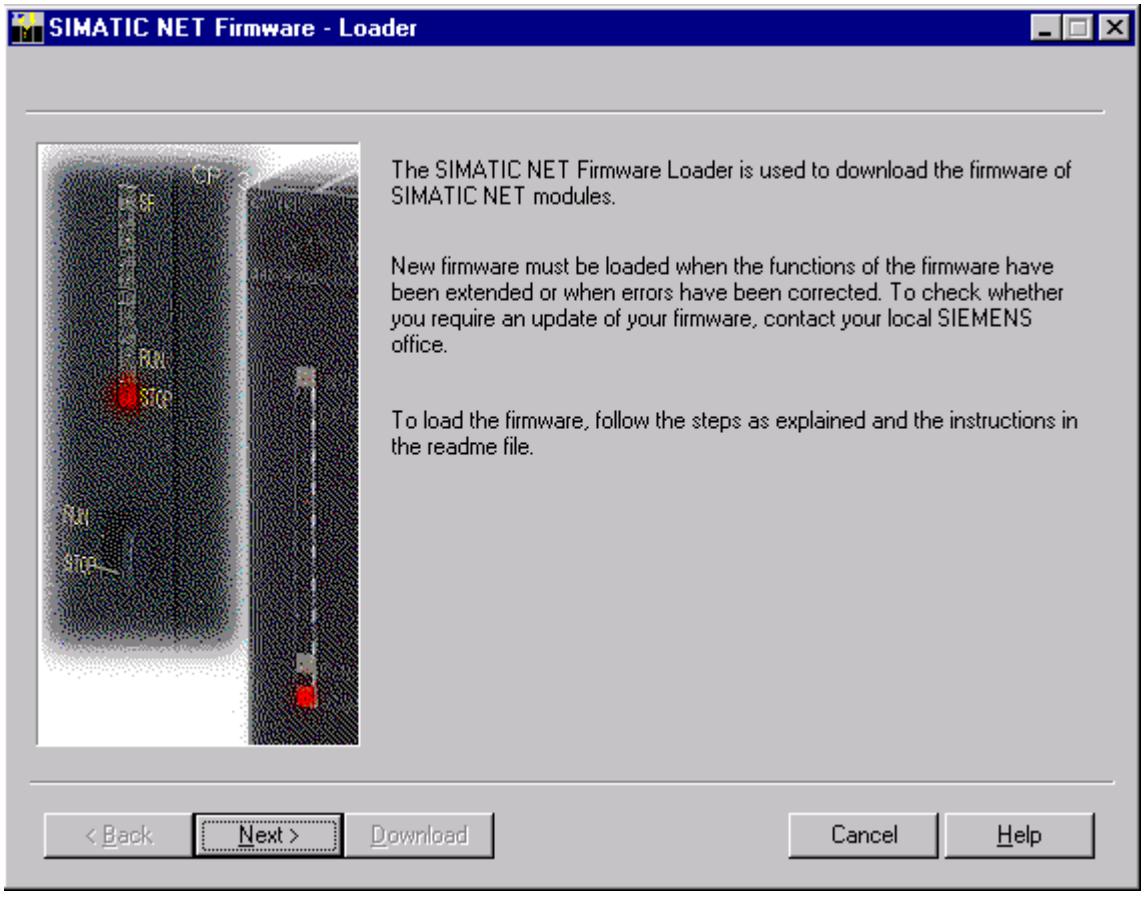
Working with the Firmware Loader

Depending on the module type, the download is prepared and executed in three or four dialog steps.

For more information, refer to the following section and the dialog boxes themselves.

Starting the firmware download

1. In the Windows Start menu, select "Start" > "SIMATIC" > "STEP 7" > "NCM S7" > "Firmware Loader".
2. Click the "Next" button and follow the instructions displayed in the dialog.



NOTICE
Interrupting the download can lead to problems
Remember that interrupting the download can lead to an inconsistent module status!

NOTICE
Load file used
Make sure that the load file you are using is intended as an update for the version of the firmware contained on your module. If you are in any doubt, contact your local Siemens advisor.

Operating hardware

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4.1 Diagnostics with SNMP

4.1.1 SNMP and CP 1616/CP 1604

Diagnostics with SNMP

Using SNMP (Simple Network Management Protocol), a network management station can configure and monitor SNMP-compliant devices. To allow this, a management agent is installed on the device with which the management station exchanges data using Get and Set requests.

MIB

A MIB (Management Information Base) is a type of database containing the description of the objects and functions of a device. SNMP clients access this information.

A distinction is made between standardized and private MIBs:

- Standardized MIBs are described in RFC documents.
- Private MIBs contain product-specific expansions.

MIB II describes a set of SNMP variables that is normally supported by all SNMP-compliant devices.

SNMP V1 and SNMP V2 protocols

With the SNMP V1 and SNMP V2 protocols, all the objects of MIB-II relevant for the product and the objects of a private MIB can be queried.

SNMP-compliance of a CP 1616/CP 1604

A management agent is integrated in the CP 1616/CP 1604.

The CP 1616/CP 1604 supports the SNMP V1 and SNMP V2 protocols.

In the MIB-II, the CP 1616/CP 1604 contains all groups except "egp and transmission" and "at".

Security concept

Access with SNMP is controlled by the concept of communities.

Access	Community
Read-only access	public
Read and write access	private

Meaning of the abbreviations/acronyms and sources of further information

In the following table, you can see the meaning of the abbreviations/acronyms used above and can also see where you can obtain further information.

Abbreviation/acronym	Meaning	Further information
SNMP	Simple Network Management Protocol	RFC 1157
SNMP V2	Simple Network Management Protocol Version 2 (administration, protocol operations and security)	RFC 1901 and RFC 1905
SMIv1	Structure and Identification of Management Information – Describes the structure of MIB objects.	RFC 1155
MIB-II	Management Information Base, Version 2	RFC 1213
Private MIB	MIB with product-specific expansions	Section "Private MIB of a CP 1616/CP 1604 (Page 42)"

5.2 CP 1616 communications processor

CP 1616

The following technical specifications apply to the CP 1616 communications processor:

Data transfer	
Transmission rate	10/100 Mbps

Interfaces	
Connection to 10BaseT/100BaseTx	RJ-45 ports (four)
Connection to PG/PC	PCI slot (3.3 V/5 V, 32 bits)

Voltage	
PCI power supply	5 VDC, +/5%
Power supply external	6 to 9 VDC

Current consumption	
PCI voltage at +5 V	max. 800 mA
External supply at +6 V	max. 650 mA
External supply at +9 V	max. 450 mA

Permitted ambient conditions	
Operating temperature	+5 °C to +70 °C
Transportation/storage temperature	-20 ℃ to +60 °C

Construction	
Module format	PC card, short PCI format
Dimensions (H x W x D) in mm	167 x 18 x 107
Weight	110 g
Space required	PCI slot, short

Requirements of the external power supply source	
Electrical isolation	required
Rated voltage range	6 to 9 VDC
CP 1616 current consumption	approx. 0.8 A