SIEMENS

Industrial Communication

Industrial Ethernet Switches SCALANCE X-200

Operating Instructions

11
A5E00349864

Safety Guidelines

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

⚠DANGER
indicates that death or severe personal injury **will** result if proper precautions are not taken.

⚠WARNING
indicates that death or severe personal injury **may** result if proper precautions are not taken.

⚠CAUTION
with a safety alert symbol, indicates that minor personal injury can result if proper precautions are not taken.

CAUTION
without a safety alert symbol, indicates that property damage can result if proper precautions are not taken.

NOTICE
indicates that an unintended result or situation can occur if the corresponding information is not taken into account.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

The device/system may only be set up and used in conjunction with this documentation. Commissioning and operation of a device/system may only be performed by **qualified personnel**. Within the context of the safety notes in this documentation qualified persons are defined as persons who are authorized to commission, ground and label devices, systems and circuits in accordance with established safety practices and standards.

Prescribed Usage

Note the following:

⚠WARNING
This device may only be used for the applications described in the catalog or the technical description and only in connection with devices or components from other manufacturers which have been approved or recommended by Siemens. Correct, reliable operation of the product requires proper transport, storage, positioning and assembly as well as careful operation and maintenance.

Trademarks

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Disclaimer of Liability

We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

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1.1 Introduction

Overview of the SCALANCE X product family

The SCALANCE X-200 product family is part of the SCALANCE X product family. Below, you will find a brief overview of this product family.

The SCALANCE X family comprises various product lines that complement each other and that are carefully tuned to specific automation tasks.

SCALANCE X005 Entry Level

Unmanaged switch with five twisted-pair ports and optical diagnostics on the device for use in machine and system islands.

SCALANCE X-100 unmanaged

Switches with redundant power supply and signaling contact for use in applications in the immediate vicinity of machinery.
A variety of device variants with different numbers and designs of electrical and optical ports.

SCALANCE X-200 managed

The devices of the SCALANCE X-200 product line can be used universally – in machine-level applications as well as in networked plant sections, in electrical or electrical/optical linear, ring or star structures and with single mode up to 26 km.
Devices with a high degree of protection (IP65/67) can be installed outside the control cabinet.

Configuration and remote diagnostics functions are integrated in the STEP 7 engineering tool. This increases plant availability and has advantages during the engineering, commissioning and operational phases. The devices of the SCALANCE X-200 line also have standard remote diagnostics functions (SNMP, Web server).

SCALANCE X-200IRT managed

In subsystem networks with hard real-time requirements (real time and isochronous real time (available soon)), the SCALANCE X-200IRT switches can be used. They include the enhanced real-time controller ERTEC. By using the "cut through" switching mechanism, the switches are ideal to meet the real-time requirements of PROFINET.

The standard data transmission (TCP/IP) can take place on the same network. Dual network structures are therefore not necessary.

Network installation, configuration and diagnostics involves the same procedures as for the other devices of the SCALANCE X-200 product line.

SCALANCE X-200 IRT PRO managed

In terms of functionality, the SCALANCE X200 IRT PRO switches are the same as the SCALANCE X-200 IRT managed switches listed above. The switch is designed for IP65/67 applications with PROFINET-compliant IP65 connector technology (RJ-45 in compliance with IEC 61076-3-117 for X204 IRT PRO or SC RJ in compliance with IEC 61754-24-2 for X202-2P IRT PRO) and for systems installed outside cabinets.

SCALANCE X-300

The main areas of application are high-speed plant networks with an interface to the Enterprise network. The SCALANCE X-300 managed plus product line combines the firmware functionality of the SCALANCE X-400 product line (without routing functions at the layer 3 level) with the compact design of the SCALANCE X-200 product line. The "managed plus" attribute means both enhanced management functions compared with the SCALANCE X-200 and enhanced firmware functionality.

SCALANCE X-400 modular

The switches of the SCALANCE X-400 product series are suitable for the construction of optical/electrical linear, ring and star topologies (10/100/1000 Mbps) for high-speed systems.

They have a modular structure, in which media modules and extender modules can be inserted in the switch as required. These expansions make as many as eight electrical and eight optical ports additionally available.

By supporting IT standards, for example, VLAN, RSTP, Layer 3, automation networks can be seamlessly connected to existing corporate networks.

The SCALANCE X-400 switches are ideally suited, for example, for process control systems such as PCS 7.

What is possible?

The devices of the SCALANCE X-200 product lines allow the cost-effective installation of Industrial Ethernet linear (bus), star and ring structures with switching functionality.

By using the “cut through” switching mechanism, the SCALANCE X-200IRT switches are ideal to meet the real-time requirements of PROFINET.

Cut through is not possible

- between a port set to 10 Mbps and a port set to 100 Mbps
- when two packets are to be sent at the same time on one port.

One particular advantage of the SCALANCE X-200IRT switches in PROFINET networks is the integrated ERTEC. This gives priority to PROFINET packets when forwarding.

⚠ WARNING

When used under hazardous conditions (zone 2), the devices of the SCALANCE X-100 and SCALANCE X-200 product lines must be installed in an enclosure.

To comply with ATEX95 (EN 60079-15), this enclosure must meet the requirements of at least IP54 in compliance with EN 60529.

WARNING – EXPLOSION HAZARD: DO NOT DISCONNECT EQUIPMENT WHEN A FLAMMABLE OR COMBUSTIBLE ATMOSPHERE IS PRESENT.

Note

The specified approvals apply only when the corresponding mark is printed on the product.

Purpose of the Operating Instructions

These operating instructions support you when commissioning networks with the devices of the product line SCALANCE X-200.

Validity of the Operating Instructions

These operating instructions are valid for the following devices:

SIMATIC NET SCALANCE X208	6GK5208-0BA10-2AA3
SIMATIC NET SCALANCE X208PRO	6GK5208-0HA00-2AA6
SIMATIC NET SCALANCE X216	6GK5216-0BA00-2AA3
SIMATIC NET SCALANCE X224	6GK5224-0BA00-2AA3
SIMATIC NET SCALANCE X204-2	6GK5204-2BB10-2AA3
SIMATIC NET SCALANCE X206-1	6GK5206-1BB10-2AA3
SIMATIC NET SCALANCE X212-2	6GK5212-2BB00-2AA3
SIMATIC NET SCALANCE X204-2LD	6GK5204-2BC10-2AA3
SIMATIC NET SCALANCE X206-1LD	6GK5206-1BC10-2AA3
SIMATIC NET SCALANCE X212-2LD	6GK5212-2BC00-2AA3
SIMATIC NET SCALANCE X202-2IRT	6GK5202-2BB00-2BA3
SIMATIC NET SCALANCE X204IRT	6GK5204-0BA00-2BA3
SIMATIC NET SCALANCE X204 IRT PRO	6GK5204-0JA00-2BA6
SIMATIC NET SCALANCE X202-2P IRT PRO	6GK5202-2RJ00-2BA6
SIMATIC NET SCALANCE X202-2P IRT	6GK5202-2BH00-2BA3
SIMATIC NET SCALANCE X201-3P IRT	6GK5201-3BH00-2BA3
SIMATIC NET SCALANCE X200-4P IRT	6GK5200-4AH00-2BA3

Names of the devices in these operating instructions

The descriptions in these operating instructions always apply to the devices of the SCALANCE X-200 product line listed under "Validity of the Operating Instructions" in this

document unless the description relates to a specific device of the product line. In the remainder of the description, the devices are called **IE Switches X-200**.

Further documentation

The "SIMATIC NET Industrial Ethernet Twisted Pair and Fiber Optic Networks“ manual contains additional information on other SIMATIC NET products that you can operate along with the devices of the SCALANCE X-200 product line in an Industrial Ethernet network.

Finding information

To help you to find the information you require more quickly, the manual includes not only the table of contents but also the following sections in the Appendix:

- Index
- Glossary

Audience

These operating instructions are intended for persons involved in commissioning networks in which IE switches are used.

Standards and approvals

The devices of the SCALANCE X-200 product line meet the requirements for the CE mark. You will find detailed information in the section "Approvals and markings" in these operating instructions.

Network topologies

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2.1 Network topologies

Switching technology allows extensive networks to be set up with numerous nodes and simplifies network expansion.

Which topologies can be implemented?

Bus, ring, or star topologies can be implemented with the IE Switches X-200.

Note

Make sure that the maximum permitted cable lengths for the relevant devices are not exceeded. You will find the permitted cable lengths in the technical specifications.

For example, with X202-2P IRT, X201-3P IRT, X200P IRT and X202-2P IRT PRO only 50 m POF or 100 m HCS cable may be used.

Bus topology

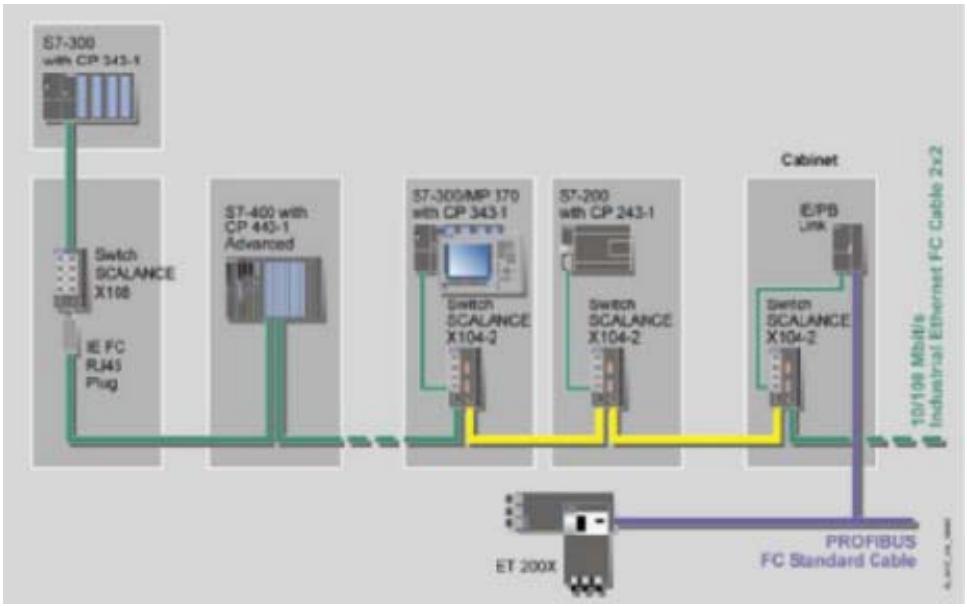

Figure 2-1 Electrical / optical linear topology with SCALANCE X-100

Star topology

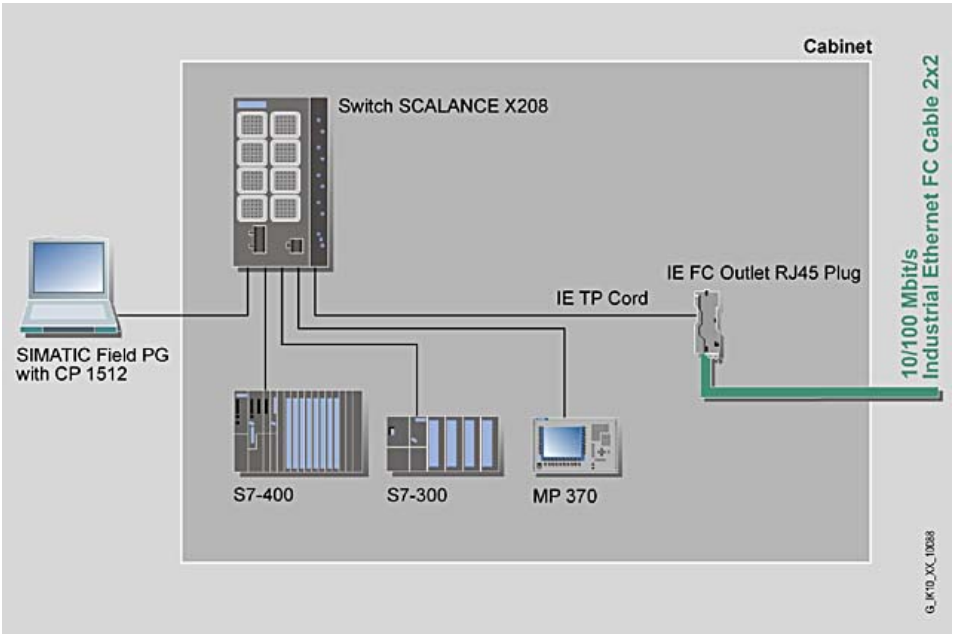

Figure 2-2 Electrical star topology. Example with SCALANCE X208

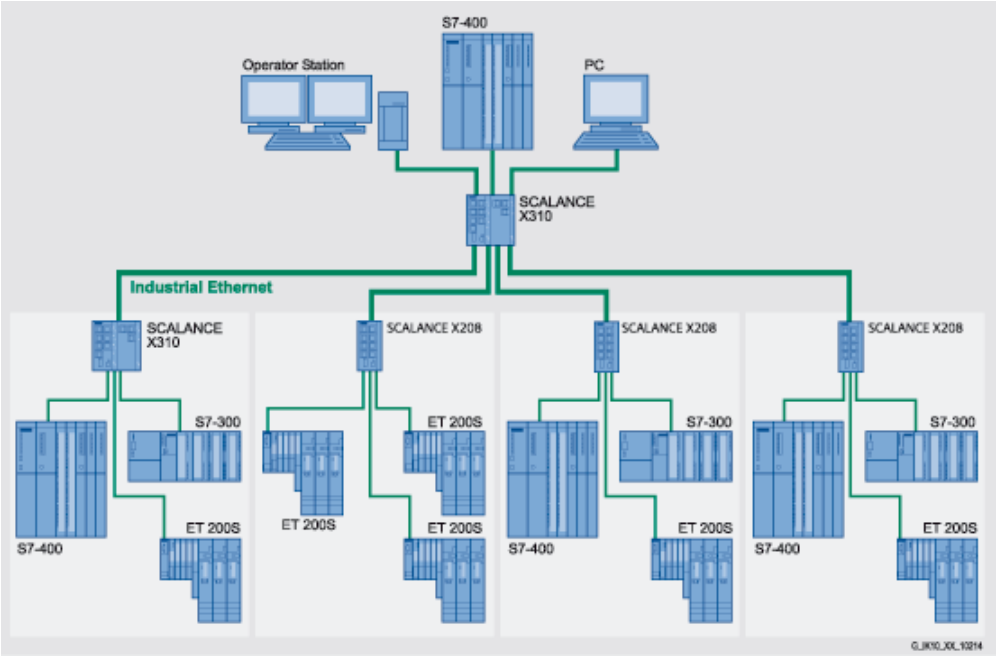

Figure 2-3 Optical star topology with SCALANCE X224 and SCALANCE X208

Ring topology

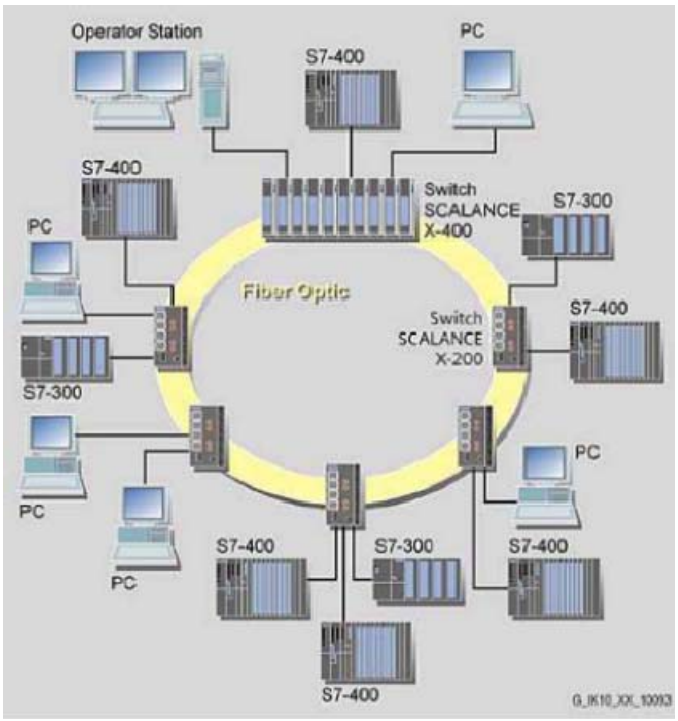

Figure 2-4 Optical ring topology, example with SCALANCE X-200 and SCALANCE X-400 as redundancy manager

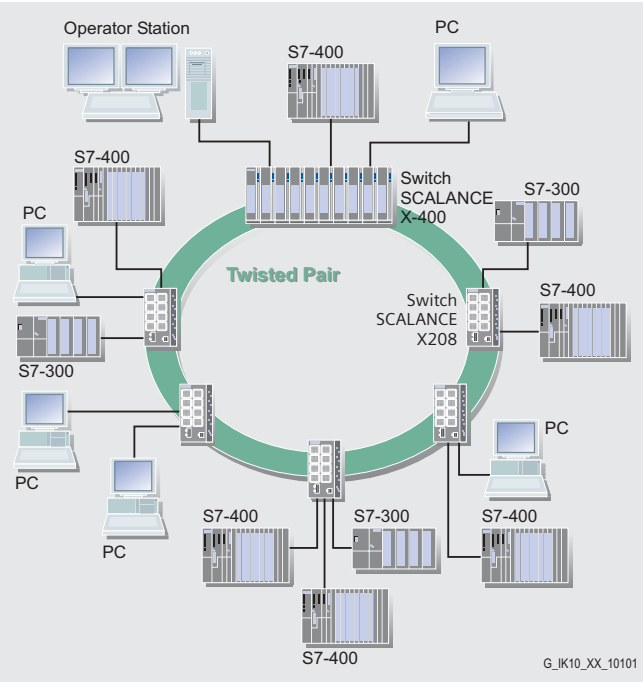

Figure 2-5 Electrical ring topology, example with SCALANCE X208 and SCALANCE X-400 as redundancy manager

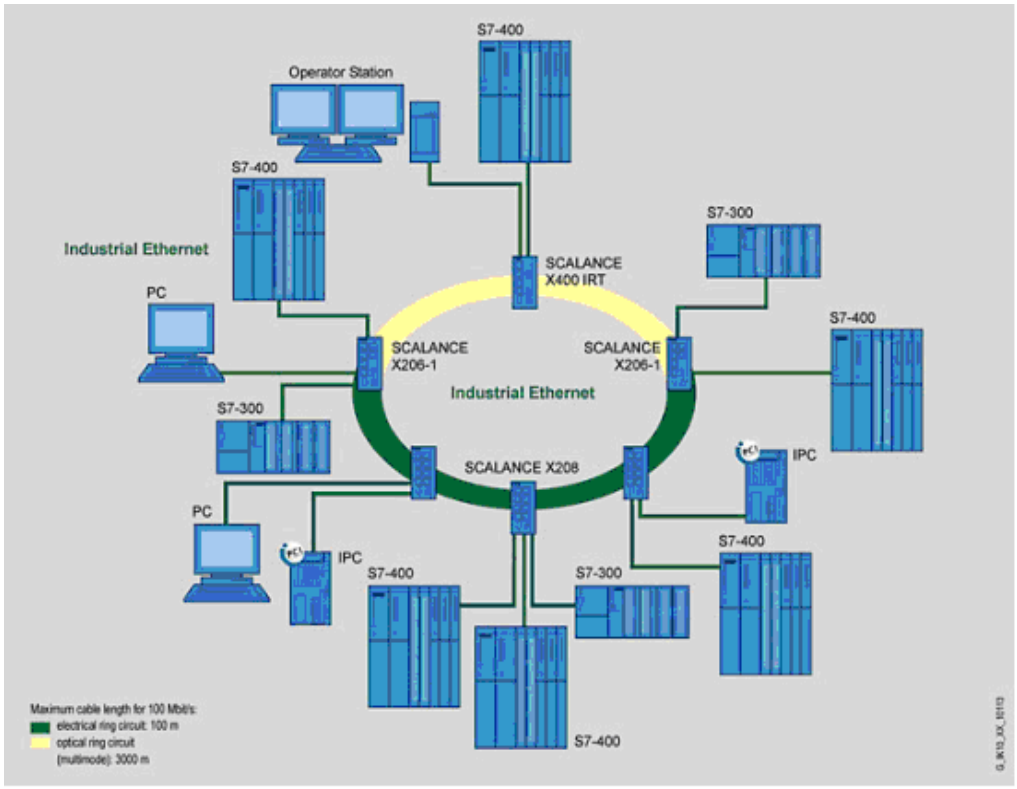

Figure 2-6 Ring topology with electrical and optical ring links, example with SCALANCE X206-1, SCALANCE X208, and SCALANCE X204-2 as redundancy manager

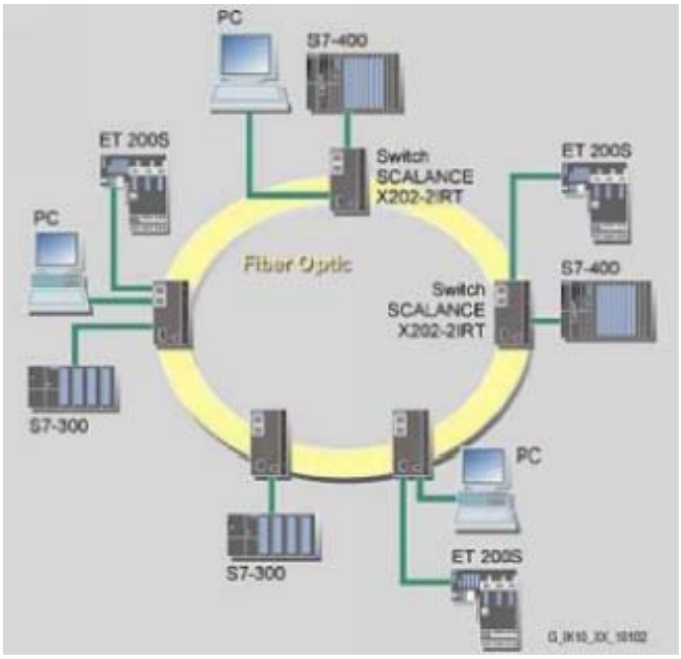

Figure 2-7 Ring topology with optical ring, example with SCALANCE X202-2IRT

To increase availability, optical or electrical bus topologies made up of IE Switches X-200 with an IE Switch X-200 (except SCALANCE X208 PRO), SCALANCE X414-3E, OSM Version 2, or ESM Version 2 configured as a redundancy manager can be closed to form a ring. The IE Switches X-200 are first connected over their ring ports to form a bus. The two ends of the bus are closed to form a ring by a switch operating in the redundancy manager mode. Devices of the IE Switches X-200 (except SCALANCE X208 PRO) product families, SCALANCE X400 or OSMs / ESMs can be used as redundancy managers. When a switch is used as the redundancy manager, the ring ports are isolated from each other if the network is operating problem-free.

The IE Switch X-200 (except SCALANCE X208 PRO), SCALANCE X414-3E, or OSM / ESM operating in the redundancy manager mode monitors the connected bus over its ring ports and switches the ring ports through if there is an interruption on the connected bus; in other words, it restores a functioning bus over this substitute path. Reconfiguration takes place within 0.3 seconds.

As soon as the problem has been eliminated, the original topology is restored; in other words, the ring ports in the redundancy manager are once again disconnected from each other.

2.2 Ring with redundancy manager

To increase network availability, optical, electrical, or mixed bus topologies comprising up to 50 switches (SCALANCE X-400, IE Switches X-200 or OSMs/ESMs) can be closed to form a ring.

Functional description

The two ends of the bus are closed to form a ring by an IE Switch X-200 (except SCALANCE X208 PRO) operating as a redundancy manager. The redundancy function is enabled and disabled by pressing a button on the front of the device or with the WEB interface (cannot be set by PNIO).

In contrast to the ring ports of the other switches, the ring ports of the redundancy manager are disconnected when the network is operating problem-free. The IE Switch X-200 (except SCALANCE X208 PRO) operating in the redundancy manager mode monitors the connected bus over its ring ports and switches the ring ports through if there is an interruption on the connected bus; in other words, it restores a functioning bus over this substitute path. Reconfiguration takes place within 0.3 seconds. As soon as the problem has been eliminated, the original topology is restored; in other words, the ring ports in the redundancy manager are once again disconnected from each other.

The default ring ports of the IE Switches X-200 are shown in the tables "Overview of the connection options" and "Overview of the connection options for IRT devices" in the section "Overview of the product characteristics".

After the RM function has been enabled or after the RM has been switched through, this is indicated by the RM LED on the housing.

Only one switch can be configured as a redundancy manager in a ring.

2.3 Redundant coupling of network segments

Coupling possibility

The redundant coupling of two network segments shown here as an example is only possible between SCALANCE X-200IRT devices, since this requires the standby function of the SCALANCE X-200IRT. This function can be configured with the WEB interface only.

The RM LED indicates whether the standby function is enabled.

The SCALANCE X-200IRT can be operated either as an RM or in standby mode.

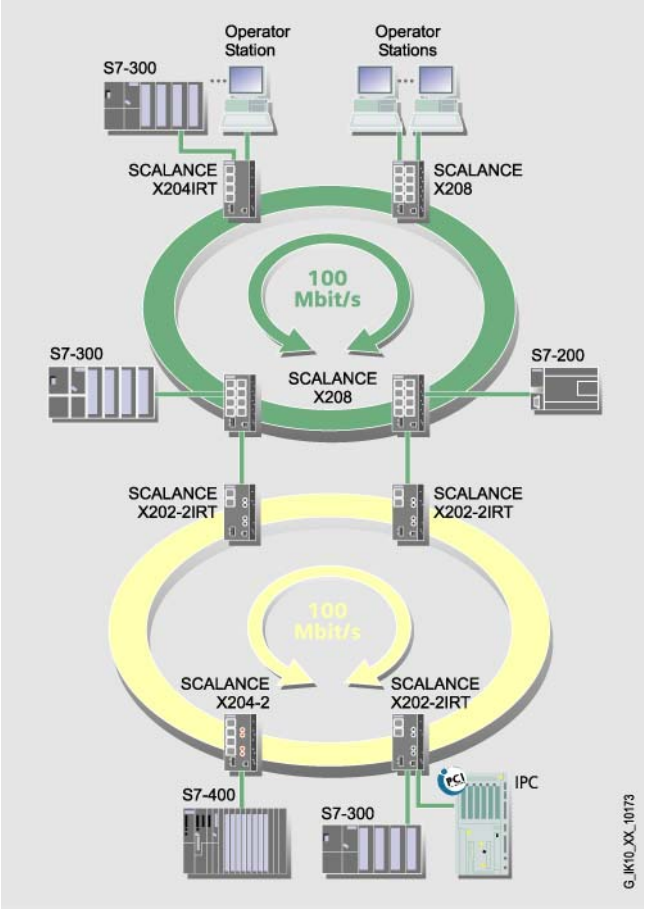

Figure 2-8 Redundant coupling of SCALANCE X-200 rings with 2 SCALANCE X-200 IRT devices

Product properties

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3.1 Overview of the product characteristics

Table 3-1 Overview of the product characteristics

Device type SCALANCE										
	X208	X208PRO	X216	X224	X204-2	X206-1	X212-2	X204-2 LD	X206-1 LD	X212-2LD
SIMATIC environment	+	+	+	+	+	+	+	+	+	+
Diagnostics LED	+	+	+	+	+	+	+	+	+	+
24 V DC	+	+	+	+	+	+	+	+	+	+
Compact housing (securing collar, etc.)	+	+	+	+	+	+	+	+	+	+
2x 24 V DC	+	+	+	+	+	+	+	+	+	+
Signaling contact + on-site operation	+	+	+	+	+	+	+	+	+	+
Diagnostics: Web, SNMP, PROFINET	+	+	+	+	+	+	+	+	+	+
C-PLUG	+	+	+	+	+	+	+	+	+	+
IRT capability	-	-	-	-	-	-	-	-	-	-
Fast learning	+	+	+	+	+	+	+	+	+	+
Passive listening	+	+	+	+	+	+	+	+	+	+
STP/RSTP listening	+	-	+	+	+	+	+	+	+	+
SNTP + SICLOCK	-	-	-	-	-	-	-	-	-	-
Cut through	-	-	-	-	-	-	-	-	-	-
Use in ring possible (not as RM)	+	+	+	+	+	+	+	+	+	+
Redundancy manager	+	-	+	+	+	+	+	+	+	+
Standby manager	-	-	-	-	-	-	-	-	-	-

Fast learning:
Fast recognition of MAC addresses on the device that change during operation (for example, when an end node is reconnected).

Table 3-2 Overview of the product characteristics

Device type SCALANCE							
	X202-2 IRT	X204 IRT	X204 IRT PRO	X202-2P IRT PRO	X202-2P IRT	X201-3P IRT	X200-4P IRT
SIMATIC environment	+	+	+	+	+	+	+
Diagnostics LED	+	+	+	+	+	+	+
24 V DC	+	+	+	+	+	+	+
Compact housing (securing collar, etc.)	+	+	+	+	+	+	+
2x 24 V DC	+	+	+	+	+	+	+
Signaling contact + on-site operation	+	+	+	+	+	+	+
Diagnostics: Web, SNMP, PROFINET	+	+	+	+	+	+	+
C-PLUG	+	+	+	+	+	+	+
IRT capability	+	+	+	+	+	+	+
Fast learning	+	+	+	+	+	+	+
Passive listening	+	+	+	+	+	+	+
STP/RSTP listening	+	+	+	+	+	+	+
SNTP + SICLOCK	+	+	+	+	+	+	+
Cut through	+	+	+	+	+	+	+
Use in ring possible (not as RM)	+	+	+	+	+	+	+
Redundancy manager	+	+	+	+	+	+	+
Standby manager	+	+	+	+	+	+	+

Note

IRT switches cannot be redundancy and standby manager at the same time.

Fast learning:
Fast recognition of MAC addresses on the device that change during operation (for example, when an end node is reconnected).

Table 3-3 Overview of the connection options

Fast Ethernet 10/100 Mbps	**Device type SCALANCE**									
	X208	**X208PRO**	**X216**	**X224**	**X204-2**	**X206-1**	**X212-2**	**X204-2 LD**	**X206-1 LD**	**X212-2 LD**
TP (RJ-45)	8	-	16	24	4	6	12	4	6	12
M12 208PRO only	-	8	-	-	-	-	-	-	-	-
Fiber multimode (BFOC)	-	-	-	-	2	1	2	-	-	-
Fiber single mode (BFOC)	-	-	-	-	-	-	-	2	1	2
Fiber POF / PCF (SC-RJ)	-	-	-	-	-	-	-	-	-	-
The following ports are set as ring ports when supplied	P1, P2	P1, P2	P1, P2	P1, P2	P5, P6	P1, P2	P13, P14	P5, P6	P1, P2	P13, P14

Table 3-4 Overview of the connection options for IRT devices

Fast Ethernet 10/100 Mbps	**Device type SCALANCE**						
	X202-2IRT	**X204IRT**	**X204IRT PRO**	**X202-2P IRT PRO**	**X202-2P IRT**	**X201-3P IRT**	**X200-4P IRT**
TP (RJ-45)	2	4	-	-	2	1	-
IE RJ-45 Plug PRO	-	-	4	2	-	-	-
IE SC RJ Plug PRO	-	-	-	2	-	-	-
Fiber multimode (BFOC)	2	-	-	-	-	-	-
Fiber single mode (BFOC)	-	-	-	-	-	-	-
Fiber POF / PCF (SC-RJ)	-	-	-	2	2	3	4
The following ports are set as ring ports when supplied	P3, P4	P1, P2	P1, P2	P3, P4	P3, P4	P3, P4	P3, P4

3.2 Components of the product

Table 3-5 Overview of the components supplied

Device type SCALANCE	Device	2-pin plug-in terminal block	4-pin plug-in terminal block	Compact instructions	CD			
					Operating instructions	PST tool	GSD file	SNMP OPC profile
X208	+	+	+	+	+	+	+	+
X216	+	+	+	+	+	+	+	+
X224	+	+	+	+	+	+	+	+
X204-2	+	+	+	+	+	+	+	+
X206-1	+	+	+	+	+	+	+	+
X212-2	+	+	+	+	+	+	+	+
X204-2LD	+	+	+	+	+	+	+	+
X206-1LD	+	+	+	+	+	+	+	+
X212-2LD	+	+	+	+	+	+	+	+
X202-2IRT	+	+	+	+	+	+	+	+
X204IRT	+	+	+	+	+	+	+	+
X202-2PIRT	+	+	+	+	+	+	+	+
X201-3PIRT	+	+	+	+	+	+	+	+
X200-4PIRT	+	+	+	+	+	+	+	+

Table 3-6 Overview of the components supplied

Device type SCALANCE	Device	Protective covers for M12 Ethernet sockets	Protective covers for M12 Ethernet connector interfaces	Compact instructions	CD			
					Operating instructions	PST tool	GSD file	SNMP OPC profile
X208PRO	+	8	3	+	+	+	+	+

Table 3-7 Overview of the components supplied

Device type SCALANCE	Device	Data connector protective cover	Power connector protective cover	M12 signaling contact protective cap	Compact instructions	CD			
						Operating instructions	PST tool	GSD file	SNMP OPC profile
X204IRT PRO	+	4	2	1	+	+	+	+	+
X202-2PIRT PRO	+	4	2	1	+	+	+	+	+

3.3 Unpacking and checking

Unpacking, checking

1. Make sure that the package is complete.
2. Check all the parts for transport damage.

⚠ WARNING
Do not use any parts that show evidence of damage!

3.4 SCALANCE X208

3.4.1 SCALANCE X208 product characteristics

Possible attachments

The SCALANCE X208 has eight RJ-45 jacks for the connection of end devices or other network segments.

Figure 3-1 SCALANCE X208

3.4.2 SCALANCE X208 TP ports

Connector pinout

On the SCALANCE X208, the TP ports are implemented as RJ--45 jacks with MDI-X assignment (Medium Dependent Interface–Autocrossover) of a network component.

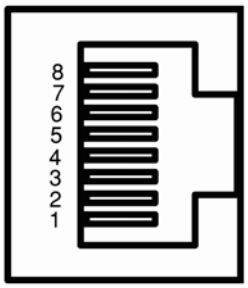


Figure 3-2 RJ-45 jack

Table 3-8 Pin assignment

Pin number	Assignment
Pin 8	n. c.
Pin 7	n. c.
Pin 6	TD-
Pin 5	n. c.
Pin 4	n. c.
Pin 3	TD+
Pin 2	RD-
Pin 1	RD+

NOTICE
TP cords or TP-XP cords with a maximum length of 10 m can be connected to the RJ-45 TP port. With the IE FC cables and IE FC RJ-45 plug 180, an overall cable length of up to 100 m is permitted between two devices depending on the cable type.

Autonegotiation

Autonegotiation means the automatic detection of the functionality of the port at the opposite end. Using autonegotiation, repeaters or end devices can detect the functionality available at the port of a partner device allowing automatic configuration of different types of device. With autonegotiation, two components connected to a link segment can exchange parameters and set themselves to match the supported communication functionality.

Note

Devices not supporting autonegotiation must be set to 100 Mbps/ half duplex or 10 Mbps half duplex.

Note

The SCALANCE X208 is a plug-and-play device that does not require settings to be made for commissioning.

MDI /MDIX autocrossover function

The advantage of the MDI /MDIX autocrossover function is that straight-through cables can be used throughout and crossover Ethernet cables are unnecessary. This prevents malfunctions resulting from mismatching send and receive wires. This makes installation much easier for the user.

IE Switches X-200 support the MDI / MDIX autocrossover function.

NOTICE
Please note that the direct connection of two ports on the switch or accidental connection over several switches causes an illegal loop. Such a loop can lead to network overload and network failures.

Auto polarity exchange

If the pair of receiving cables are incorrectly connected (RD+ and RD- swapped over), the polarity is reversed automatically.

3.5 SCALANCE X208PRO

3.5.1 SCALANCE X208PRO product characteristics

Possible attachments

The SCALANCE X208PRO has eight Industrial Ethernet M12 sockets with the high degree of protection IP65 for the connection of end devices or other network segments.

Figure 3-3 SCALANCE X208PRO

3.5.2 SCALANCE X208PRO M12 Industrial Ethernet ports

Connector pinout

On the SCALANCE X208PRO, the Industrial Ethernet ports are implemented according to the PROFINET standard as 4-pin M12 sockets, d-coded with the MDI-X assignment (Medium Dependent Interface-Autocrossover) of a network component.

Figure 3-4 SCALANCE 208PRO Ethernet socket M12

Table 3-9 Pin assignment

Pin number	Assignment as a network component
Pin 1	RX+
Pin 2	TX+
Pin 3	RX-
Pin 4	TX-

NOTICE
With IE FC cable and IE M12 Plug PRO, an overall cable length of up to 100 m is permitted between two devices depending on the cable type.

Autonegotiation

Autonegotiation means the automatic detection of the functionality of the port at the opposite end. Using autonegotiation, repeaters or end devices can detect the functionality available at the port of a partner device allowing automatic configuration of different types of device. With autonegotiation, two components connected to a link segment can exchange parameters and set themselves to match the supported communication functionality.

Note

Devices not supporting autonegotiation must be set to 100 Mbps/ half duplex or 10 Mbps half duplex.

Note

The SCALANCE X208PRO is a plug-and-play device that does not require settings to be made for commissioning.

MDI /MDIX autocrossover function

The advantage of the MDI /MDIX autocrossover function is that straight-through cables can be used throughout and crossover Ethernet cables are unnecessary. This prevents malfunctions resulting from mismatching send and receive wires. This makes installation much easier for the user.

IE Switches X-200 support the MDI / MDIX autocrossover function.

NOTICE
Please note that the direct connection of two ports on the switch or accidental connection over several switches causes an illegal loop. Such a loop can lead to network overload and network failures.

Auto polarity exchange

If the pair of receiving cables are incorrectly connected (RD+ and RD- swapped over), the polarity is reversed automatically.

3.6 SCALANCE X216

3.6.1 SCALANCE X216 product characteristics

Possible attachments

The SCALANCE X216 has 16 RJ-45 jacks for the connection of end devices or other network segments.

Figure 3-5 SCALANCE X216

3.6.2 SCALANCE X216 TP ports

Connector pinout

On the SCALANCE X216, the TP ports are implemented as RJ-45 jacks with MDI-X assignment (Medium Dependent Interface–Autocrossover) of a network component.

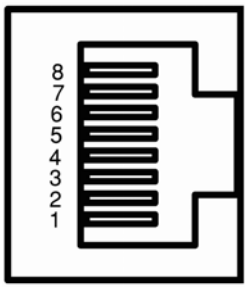


Figure 3-6 RJ-45 jack

Table 3-10 Pin assignment

Pin number	Assignment
Pin 8	n. c.
Pin 7	n. c.
Pin 6	TD-
Pin 5	n. c.
Pin 4	n. c.
Pin 3	TD+
Pin 2	RD-
Pin 1	RD+

NOTICE

TP cords or TP-XP cords with a maximum length of 10 m can be connected to the RJ-45 TP port.

With the IE FC cables and IE FC RJ-45 plug 180, an overall cable length of up to 100 m is permitted between two devices depending on the cable type.

Autonegotiation

Autonegotiation means the automatic detection of the functionality of the port at the opposite end. Using autonegotiation, repeaters or end devices can detect the functionality available at the port of a partner device allowing automatic configuration of different types of device. With autonegotiation, two components connected to a link segment can exchange parameters and set themselves to match the supported communication functionality.

Note

Devices not supporting autonegotiation must be set to 100 Mbps/ half duplex or 10 Mbps half duplex.

Note

The SCALANCE X216 is a plug-and-play device that does not require settings to be made for commissioning.

MDI /MDIX autocrossover function

The advantage of the MDI /MDIX autocrossover function is that straight-through cables can be used throughout and crossover Ethernet cables are unnecessary. This prevents malfunctions resulting from mismatching send and receive wires. This makes installation much easier for the user.

IE Switches X-200 support the MDI / MDIX autocrossover function.

NOTICE
Please note that the direct connection of two ports on the switch or accidental connection over several switches causes an illegal loop. Such a loop can lead to network overload and network failures.

Auto polarity exchange

If the pair of receiving cables are incorrectly connected (RD+ and RD- swapped over), the polarity is reversed automatically.

3.7 SCALANCE X224

3.7.1 SCALANCE X224 product characteristics

Possible attachments

The SCALANCE X224 has 24 RJ-45 jacks for the connection of end devices or other network segments.

Figure 3-7 SCALANCE X224

3.7.2 SCALANCE X224 TP ports

Connector pinout

On the SCALANCE X224, the TP ports are implemented as RJ-45 jacks with MDI-X assignment (Medium Dependent Interface–Autocrossover) of a network component.

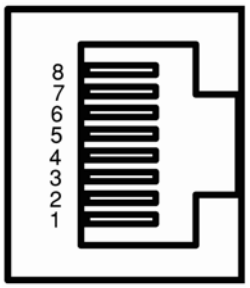


Figure 3-8 RJ-45 jack

Table 3-11 Pin assignment

Pin number	Assignment
Pin 8	n. c.
Pin 7	n. c.
Pin 6	TD-
Pin 5	n. c.
Pin 4	n. c.
Pin 3	TD+
Pin 2	RD-
Pin 1	RD+

NOTICE

TP cords or TP-XP cords with a maximum length of 10 m can be connected to the RJ-45 TP port.

With the IE FC cables and IE FC RJ-45 plug 180, an overall cable length of up to 100 m is permitted between two devices depending on the cable type.

Autonegotiation

Autonegotiation means the automatic detection of the functionality of the port at the opposite end. Using autonegotiation, repeaters or end devices can detect the functionality available at the port of a partner device allowing automatic configuration of different types of device. With autonegotiation, two components connected to a link segment can exchange parameters and set themselves to match the supported communication functionality.

Note

Devices not supporting autonegotiation must be set to 100 Mbps/ half duplex or 10 Mbps half duplex.

Note

The SCALANCE X224 is a plug-and-play device that does not require settings to be made for commissioning.

MDI /MDIX autocrossover function

The advantage of the MDI /MDIX autocrossover function is that straight-through cables can be used throughout and crossover Ethernet cables are unnecessary. This prevents malfunctions resulting from mismatching send and receive wires. This makes installation much easier for the user.

IE Switches X-200 support the MDI / MDIX autocrossover function.

NOTICE
Please note that the direct connection of two ports on the switch or accidental connection over several switches causes an illegal loop. Such a loop can lead to network overload and network failures.

Auto polarity exchange

If the pair of receiving cables are incorrectly connected (RD+ and RD- swapped over), the polarity is reversed automatically.

3.8 SCALANCE X204-2

3.8.1 SCALANCE X204-2 product characteristics

Possible attachments

The SCALANCE X204-2 has four RJ-45 jacks and two BFOC ports for the connection of end devices or other network segments.

Note

The BFOC socket (Bayonet Fiber Optic Connector) corresponds to the ST socket.

Figure 3-9 SCALANCE X204-2

3.8.2 SCALANCE X204-2 TP ports

Connector pinout

On the SCALANCE X204-2, the TP ports are implemented as RJ-45 jacks with MDI-X assignment (Medium Dependent Interface–Autocrossover) of a network component.

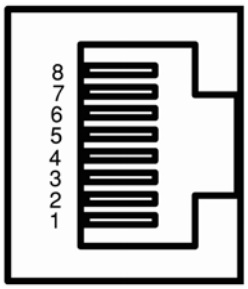


Figure 3-10 RJ-45 jack

Table 3-12 Pin assignment

Pin number	Assignment
Pin 8	n. c.
Pin 7	n. c.
Pin 6	TD-
Pin 5	n. c.
Pin 4	n. c.
Pin 3	TD+
Pin 2	RD-
Pin 1	RD+

NOTICE
TP cords or TP-XP cords with a maximum length of 10 m can be connected to the RJ-45 TP port. With the IE FC cables and IE FC RJ-45 plug 180, an overall cable length of a maximum of 100 m is permitted between two devices depending on the cable type.

Autonegotiation

Autonegotiation means the automatic detection of the functionality of the port at the opposite end. Using autonegotiation, repeaters or end devices can detect the functionality available at the port of a partner device allowing automatic configuration of different types of device. With autonegotiation, two components connected to a link segment can exchange parameters and set themselves to match the supported communication functionality.

Note

Devices not supporting autonegotiation must be set to 100 Mbps/ half duplex or 10 Mbps half duplex.

Note

The SCALANCE X204-2 is a plug-and-play device that does not require settings to be made for commissioning.

MDI /MDIX autocrossover function

The advantage of the MDI /MDIX autocrossover function is that straight-through cables can be used throughout and crossover Ethernet cables are unnecessary. This prevents malfunctions resulting from mismatching send and receive wires. This makes installation much easier for the user.

IE Switches X-200 support the MDI / MDIX autocrossover function.

NOTICE
Please note that the direct connection of two ports on the switch or accidental connection over several switches causes an illegal loop. Such a loop can lead to network overload and network failures.

Auto polarity exchange

If the pair of receiving cables are incorrectly connected (RD+ and RD- swapped over), the polarity is reversed automatically.

3.8.3 SCALANCE X204-2 FO ports

Transmission rate

The transmission rate of the optical Fast Ethernet ports is 100 Mbps.

Transmission mode

The transmission mode for 100Base-FX is specified in the IEEE 802.3 standard.

Since the full duplex mode and the transmission rate cannot be modified for optical transmission, autonegotiation cannot be selected.

Transmission medium

Data transmission is over multimode fiber-optic cable (FOC). The wavelength is 1310 nm.

Multimode fiber-optic cables are used with a core of 50 or 62.5 µm; the light source is an LED.

The outer diameter of the FOC is 125 µm.

Transmission range

The maximum transmission range (segment length) is 3 km.

Connectors

The cables are connected over BFOC sockets.

3.9 SCALANCE X206-1

3.9.1 SCALANCE X206-1 product characteristics

Possible attachments

The SCALANCE X206-1 has six RJ-45 jacks and a BFOC port for the connection of end devices or other network segments.

Note

The BFOC socket (Bayonet Fiber Optic Connector) corresponds to the ST socket.

Figure 3-11 SCALANCE X206-1

3.9.2 SCALANCE X206-1 TP ports

Connector pinout

On the SCALANCE X206-1, the TP ports are implemented as RJ-45 jacks with MDI-X assignment (Medium Dependent Interface–Autocrossover) of a network component.

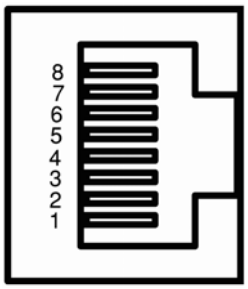


Figure 3-12 RJ-45 jack

Table 3-13 Pin assignment

Pin number	Assignment
Pin 8	n. c.
Pin 7	n. c.
Pin 6	TD-
Pin 5	n. c.
Pin 4	n. c.
Pin 3	TD+
Pin 2	RD-
Pin 1	RD+

NOTICE
TP cords or TP-XP cords with a maximum length of 10 m can be connected to the RJ-45 TP port. With the IE FC cables and IE FC RJ-45 plug 180, an overall cable length of a maximum of 100 m is permitted between two devices depending on the cable type.

Autonegotiation

Autonegotiation means the automatic detection of the functionality of the port at the opposite end. Using autonegotiation, repeaters or end devices can detect the functionality available at the port of a partner device allowing automatic configuration of different types of device. With autonegotiation, two components connected to a link segment can exchange parameters and set themselves to match the supported communication functionality.

Note

Devices not supporting autonegotiation must be set to 100 Mbps/ half duplex or 10 Mbps half duplex.

Note

The SCALANCE X206-1 is a plug-and-play device that does not require settings to be made for commissioning.

MDI /MDIX autocrossover function

The advantage of the MDI /MDIX autocrossover function is that straight-through cables can be used throughout and crossover Ethernet cables are unnecessary. This prevents malfunctions resulting from mismatching send and receive wires. This makes installation much easier for the user.

IE Switches X-200 support the MDI / MDIX autocrossover function.

NOTICE
Please note that the direct connection of two ports on the switch or accidental connection over several switches causes an illegal loop. Such a loop can lead to network overload and network failures.

Auto polarity exchange

If the pair of receiving cables are incorrectly connected (RD+ and RD- swapped over), the polarity is reversed automatically.

3.9.3 SCALANCE X206-1 FO ports

Transmission rate

The transmission rate of the optical Fast Ethernet ports is 100 Mbps.

Transmission mode

The transmission mode for 100Base-FX is specified in the IEEE 802.3 standard.

Since the full duplex mode and the transmission rate cannot be modified for optical transmission, autonegotiation cannot be selected.

Transmission medium

Data transmission is over multimode fiber-optic cable (FOC). The wavelength is 1310 nm.

Multimode fiber-optic cables are used with a core of 50 or 62.5 µm; the light source is an LED.

The outer diameter of the FOC is 125 µm.

Transmission range

The maximum transmission range (segment length) is 3 km.

Connectors

The cables are connected over BFOC sockets.

3.10 SCALANCE X212-2

3.10.1 SCALANCE X212-2 product characteristics

Possible attachments

The SCALANCE X212-2 has 12 RJ-45 jacks and two BFOC interfaces for connecting end devices or other network segments.

Note

The BFOC socket (Bayonet Fiber Optic Connector) corresponds to the ST socket

Figure 3-13 SCALANCE X 212-2

3.10.2 SCALANCE X212-2 TP ports

Connector pinout

On the SCALANCE X212-2, the TP ports are implemented as RJ-45 jacks with MDI-X assignment (Medium Dependent Interface–Autocrossover) of a network component.

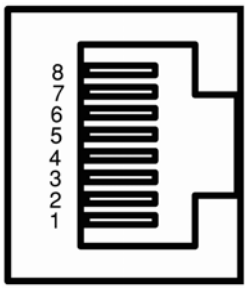


Figure 3-14 RJ-45 jack

Table 3-14 Pin assignment

Pin number	Assignment
Pin 8	n. c.
Pin 7	n. c.
Pin 6	TD-
Pin 5	n. c.
Pin 4	n. c.
Pin 3	TD+
Pin 2	RD-
Pin 1	RD+

NOTICE
TP cords or TP-XP cords with a maximum length of 10 m can be connected to the RJ-45 TP port. With the IE FC cables and IE FC RJ-45 plug 180, an overall cable length of up to 100 m is permitted between two devices depending on the cable type.

Autonegotiation

Autonegotiation means the automatic detection of the functionality of the port at the opposite end. Using autonegotiation, repeaters or end devices can detect the functionality available at the port of a partner device allowing automatic configuration of different types of device. With autonegotiation, two components connected to a link segment can exchange parameters and set themselves to match the supported communication functionality.

Note

Devices not supporting autonegotiation must be set to 100 Mbps/ half duplex or 10 Mbps half duplex.

Note

The SCALANCE X212-2 is a plug-and-play device that does not require settings to be made for commissioning.

MDI /MDIX autocrossover function

The advantage of the MDI /MDIX autocrossover function is that straight-through cables can be used throughout and crossover Ethernet cables are unnecessary. This prevents malfunctions resulting from mismatching send and receive wires. This makes installation much easier for the user.

IE Switches X-200 support the MDI / MDIX autocrossover function.

NOTICE
Please note that the direct connection of two ports on the switch or accidental connection over several switches causes an illegal loop. Such a loop can lead to network overload and network failures.

Auto polarity exchange

If the pair of receiving cables are incorrectly connected (RD+ and RD- swapped over), the polarity is reversed automatically.

3.10.3 SCALANCE X212-2 FO ports

Transmission rate

The transmission rate of the optical Fast Ethernet ports is 100 Mbps.

Transmission mode

The transmission mode for 100Base-FX is specified in the IEEE 802.3 standard.

Since the full duplex mode and the transmission rate cannot be modified for optical transmission, autonegotiation cannot be selected.

Transmission medium

Data transmission is over multimode fiber-optic cable (FOC). The wavelength is 1310 nm.

Multimode fiber-optic cables are used with a core of 50 or 62.5 µm; the light source is an LED.

The outer diameter of the FOC is 125 µm.

Transmission range

The maximum transmission range (segment length) is 3 km.

Connectors

The cables are connected over BFOC sockets.

3.11 SCALANCE X204-2LD

3.11.1 SCALANCE X204-2LD product characteristics

Possible attachments

The SCALANCE X204-2LD has four RJ-45 jacks and two BFOC ports for the connection of end devices or other network segments.

Note

The BFOC socket (Bayonet Fiber Optic Connector) corresponds to the ST socket.

Figure 3-15 SCALANCE X204-2LD

3.11.2 SCALANCE X204-2LD TP ports

Connector pinout

On the SCALANCE X204-2LD, the TP ports are implemented as RJ-45 jacks with MDI-X assignment (Medium Dependent Interface–Autocrossover) of a network component.

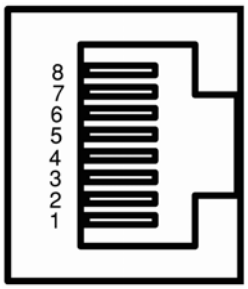


Figure 3-16 RJ-45 jack

Table 3-15 Pin assignment

Pin number	Assignment
Pin 8	n. c.
Pin 7	n. c.
Pin 6	TD-
Pin 5	n. c.
Pin 4	n. c.
Pin 3	TD+
Pin 2	RD-
Pin 1	RD+

NOTICE
TP cords or TP-XP cords with a maximum length of 10 m can be connected to the RJ-45 TP port. With the IE FC cables and IE FC RJ-45 plug 180, an overall cable length of a maximum of 100 m is permitted between two devices depending on the cable type.

Autonegotiation

Autonegotiation means the automatic detection of the functionality of the port at the opposite end. Using autonegotiation, repeaters or end devices can detect the functionality available at the port of a partner device allowing automatic configuration of different types of device. With autonegotiation, two components connected to a link segment can exchange parameters and set themselves to match the supported communication functionality.

Note

Devices not supporting autonegotiation must be set to 100 Mbps/ half duplex or 10 Mbps half duplex.

Note

The SCALANCE X204-2LD is a plug-and-play device that does not require settings to be made for commissioning.

MDI /MDIX autocrossover function

The advantage of the MDI /MDIX autocrossover function is that straight-through cables can be used throughout and crossover Ethernet cables are unnecessary. This prevents malfunctions resulting from mismatching send and receive wires. This makes installation much easier for the user.

IE Switches X-200 support the MDI / MDIX autocrossover function.

NOTICE
Please note that the direct connection of two ports on the switch or accidental connection over several switches causes an illegal loop. Such a loop can lead to network overload and network failures.

Auto polarity exchange

If the pair of receiving cables are incorrectly connected (RD+ and RD- swapped over), the polarity is reversed automatically.

3.11.3 SCALANCE X204-2LD TP ports

Transmission rate

The transmission rate of the optical Fast Ethernet ports is 100 Mbps.

Transmission mode

The transmission mode for 100Base-FX is specified in the IEEE 802.3 standard.

Since the full duplex mode and the transmission rate cannot be modified for optical transmission, autonegotiation cannot be selected.

Transmission medium

Data transmission is over single mode fiber-optic cable (FOC). The wavelength is 1310 nm.

Single mode fiber-optic cables are used with a core of 10 µm; the light source is an LED.

The outer diameter of the FOC is 125 µm.

Transmission range

The maximum transmission range (segment length) is 26 km.

Connectors

The cables are connected over BFOC sockets.

Note

The SCALANCE X204-2LD may only be coupled over its optical ports with

- SCALANCE X204-2LD
- SCALANCE X206-1LD
- SCALANCE X212-2LD
- SCALANCE X-400 with module type MM491-2LD
- SCALANCE X101-LD
- OMC TP11-LD
- OSM ITP62-LD

Coupling optical ports with

- SCALANCE X106-1
- SCALANCE X104-2
- SCALANCE X206-1
- SCALANCE X204-2
- SCALANCE X202-2IRT
- SCALANCE X212-2
- SCALANCE X-400 with module type MM491-2
- OMC TP11
- OSM ITP62
- OSM ITP53
- OSM TP62

is not permitted.

3.12 SCALANCE X206-1LD

3.12.1 SCALANCE X206-1LD product characteristics

Possible attachments

The SCALANCE X206-1LD has six RJ-45 jacks and a BFOC port for the connection of end devices or other network segments.

Note

The BFOC socket (Bayonet Fiber Optic Connector) corresponds to the ST socket.

Figure 3-17 SCALANCE X206-1LD

3.12.2 SCALANCE X206-1LD TP ports

Connector pinout

On the SCALANCE X206-1LD, the TP ports are implemented as RJ-45 jacks with MDI-X assignment (Medium Dependent Interface–Autocrossover) of a network component.

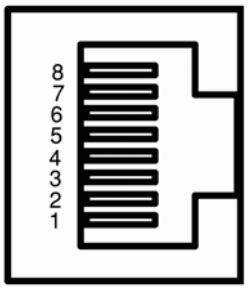


Figure 3-18 RJ-45 jack

Table 3-16 Pin assignment

Pin number	Assignment
Pin 8	n. c.
Pin 7	n. c.
Pin 6	TD-
Pin 5	n. c.
Pin 4	n. c.
Pin 3	TD+
Pin 2	RD-
Pin 1	RD+

NOTICE
TP cords or TP-XP cords with a maximum length of 10 m can be connected to the RJ-45 TP port. With the IE FC cables and IE FC RJ-45 plug 180, an overall cable length of a maximum of 100 m is permitted between two devices depending on the cable type.

Autonegotiation

Autonegotiation means the automatic detection of the functionality of the port at the opposite end. Using autonegotiation, repeaters or end devices can detect the functionality available at the port of a partner device allowing automatic configuration of different types of device. With autonegotiation, two components connected to a link segment can exchange parameters and set themselves to match the supported communication functionality.

Note

Devices not supporting autonegotiation must be set to 100 Mbps/ half duplex or 10 Mbps half duplex.

Note

The SCALANCE X206-1LD is a plug-and-play device that does not require settings to be made for commissioning.

MDI /MDIX autocrossover function

The advantage of the MDI /MDIX autocrossover function is that straight-through cables can be used throughout and crossover Ethernet cables are unnecessary. This prevents malfunctions resulting from mismatching send and receive wires. This makes installation much easier for the user.

IE Switches X-200 support the MDI / MDIX autocrossover function.

NOTICE
Please note that the direct connection of two ports on the switch or accidental connection over several switches causes an illegal loop. Such a loop can lead to network overload and network failures.

Auto polarity exchange

If the pair of receiving cables are incorrectly connected (RD+ and RD- swapped over), the polarity is reversed automatically.

3.12.3 SCALANCE X206-1LD FO ports

Transmission rate

The transmission rate of the optical Fast Ethernet ports is 100 Mbps.

Transmission mode

The transmission mode for 100Base-FX is specified in the IEEE 802.3 standard.

Since the full duplex mode and the transmission rate cannot be modified for optical transmission, autonegotiation cannot be selected.

Transmission medium

Data transmission is over single mode fiber-optic cable (FOC). The wavelength is 1310 nm.

Single mode fiber-optic cables are used with a core of 10 µm; the light source is an LED.

The outer diameter of the FOC is 125 µm.

Transmission range

The maximum transmission range (segment length) is 26 km.

Connectors

The cables are connected over BFOC sockets.

Note

The SCALANCE X206-1LD may only be coupled over its optical ports with

- SCALANCE X212-2LD
- SCALANCE X204-2LD
- SCALANCE X206-1LD
- SCALANCE X-400 with module type MM491-2LD
- SCALANCE X101-LD
- OMC TP11-LD
- OSM ITP62-LD

Coupling optical ports with

- SCALANCE X106-1
- SCALANCE X104-2
- SCALANCE X206-1
- SCALANCE X204-2
- SCALANCE X202-2IRT
- SCALANCE X212-2
- SCALANCE X-400 with module type MM491-2
- OMC TP11
- OSM ITP62
- OSM ITP53
- OSM TP62

is not permitted.

3.13 SCALANCE X212-2LD

3.13.1 SCALANCE X212-2LD product characteristics

Possible attachments

The SCALANCE X212-2LD has twelve RJ-45 jacks and two BFOC ports for the connection of end devices or other network segments.

Note

The BFOC socket (Bayonet Fiber Optic Connector) corresponds to the ST socket.

Figure 3-19 SCALANCE X 212-2LD

3.13.2 SCALANCE X212-2LD TP ports

Connector pinout

On the SCALANCE X212-2LD, the TP ports are implemented as RJ-45 jacks with MDI-X assignment (Medium Dependent Interface–Autocrossover) of a network component.

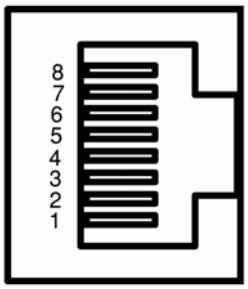


Figure 3-20 RJ-45 jack

Table 3-17 Pin assignment

Pin number	Assignment
Pin 8	n. c.
Pin 7	n. c.
Pin 6	TD-
Pin 5	n. c.
Pin 4	n. c.
Pin 3	TD+
Pin 2	RD-
Pin 1	RD+

NOTICE
TP cords or TP-XP cords with a maximum length of 10 m can be connected to the RJ-45 TP port. With the IE FC cables and IE FC RJ-45 plug 180, an overall cable length of up to 100 m is permitted between two devices depending on the cable type.

Autonegotiation

Autonegotiation means the automatic detection of the functionality of the port at the opposite end. Using autonegotiation, repeaters or end devices can detect the functionality available at the port of a partner device allowing automatic configuration of different types of device. With autonegotiation, two components connected to a link segment can exchange parameters and set themselves to match the supported communication functionality.

Note

Devices not supporting autonegotiation must be set to 100 Mbps/ half duplex or 10 Mbps half duplex.

Note

The SCALANCE X212-2LD is a plug-and-play device that does not require settings to be made for commissioning.

MDI /MDIX autocrossover function

The advantage of the MDI /MDIX autocrossover function is that straight-through cables can be used throughout and crossover Ethernet cables are unnecessary. This prevents malfunctions resulting from mismatching send and receive wires. This makes installation much easier for the user.

IE Switches X-200 support the MDI / MDIX autocrossover function.

NOTICE
Please note that the direct connection of two ports on the switch or accidental connection over several switches causes an illegal loop. Such a loop can lead to network overload and network failures.

Auto polarity exchange

If the pair of receiving cables are incorrectly connected (RD+ and RD- swapped over), the polarity is reversed automatically.

3.14 SCALANCE X202-2IRT

3.14.1 SCALANCE X202-2IRT product characteristics

Possible attachments

The SCALANCE X202-2IRT has two RJ-45 jacks and two BFOC ports for the connection of end devices or other network segments.

Note

The BFOC socket (Bayonet Fiber Optic Connector) corresponds to the ST socket.

Figure 3-21 SCALANCE X202-2IRT

3.14.2 SCALANCE X202-2IRT TP ports

Connector pinout

On the SCALANCE X202-2IRT, the TP ports are implemented as RJ-45 jacks with MDI-X assignment (Medium Dependent Interface–Autocrossover) of a network component.

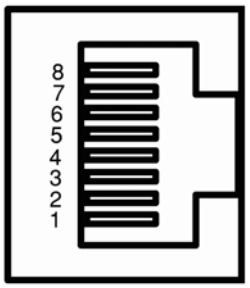


Figure 3-22 RJ-45 jack

Table 3-18 Pin assignment

Pin number	Assignment
Pin 8	n. c.
Pin 7	n. c.
Pin 6	TD-
Pin 5	n. c.
Pin 4	n. c.
Pin 3	TD+
Pin 2	RD-
Pin 1	RD+

NOTICE

TP cords or TP-XP cords with a maximum length of 10 m can be connected to the RJ-45 TP port.

With the IE FC cables and IE FC RJ-45 plug 180, an overall cable length of a maximum of 100 m is permitted between two devices depending on the cable type.

Autonegotiation

Autonegotiation means the automatic detection of the functionality of the port at the opposite end. Using autonegotiation, repeaters or end devices can detect the functionality available at the port of a partner device allowing automatic configuration of different types of device. With autonegotiation, two components connected to a link segment can exchange parameters and set themselves to match the supported communication functionality.

Note

Devices not supporting autonegotiation must be set to 100 Mbps/ half duplex or 10 Mbps half duplex.

Note

The SCALANCE X202-2IRT is a plug-and-play device that does not require settings to be made for commissioning.

MDI /MDIX autocrossover function

The advantage of the MDI /MDIX autocrossover function is that straight-through cables can be used throughout and crossover Ethernet cables are unnecessary. This prevents malfunctions resulting from mismatching send and receive wires. This makes installation much easier for the user.

IE Switches X-200 support the MDI / MDIX autocrossover function.

NOTICE
Please note that the direct connection of two ports on the switch or accidental connection over several switches causes an illegal loop. Such a loop can lead to network overload and network failures.

Auto polarity exchange

If the pair of receiving cables are incorrectly connected (RD+ and RD- swapped over), the polarity is reversed automatically.

3.14.3 SCALANCE X202-2IRT FO ports

Transmission rate

The transmission rate of the optical Fast Ethernet ports is 100 Mbps.

Transmission mode

The transmission mode for 100Base-FX is specified in the IEEE 802.3 standard.

Since the full duplex mode and the transmission rate cannot be modified for optical transmission, autonegotiation cannot be selected.

Transmission medium

Data transmission is over multimode fiber-optic cable (FOC). The wavelength is 1310 nm.

Multimode fiber-optic cables are used with a core of 50 or 62.5 µm; the light source is an LED.

The outer diameter of the FOC is 125 µm.

Transmission range

The maximum transmission range (segment length) is 3 km.

Connectors

The cables are connected over BFOC sockets.

3.15 SCALANCE X204IRT

3.15.1 SCALANCE X204IRT product characteristics

Possible attachments

The SCALANCE X204IRT has four RJ-45 jacks for connecting end devices or other network segments.

Figure 3-23 SCALANCE X204IRT

3.15.2 SCALANCE X204IRT TP ports

Connector pinout

On the SCALANCE X204IRT, the TP ports are implemented as RJ-45 jacks with MDI-X assignment (Medium Dependent Interface–Autocrossover) of a network component.

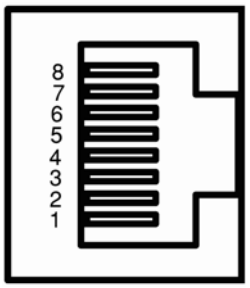


Figure 3-24 RJ-45 jack

Table 3-19 Pin assignment

Pin number	Assignment
Pin 8	n. c.
Pin 7	n. c.
Pin 6	TD-
Pin 5	n. c.
Pin 4	n. c.
Pin 3	TD+
Pin 2	RD-
Pin 1	RD+

NOTICE

TP cords or TP-XP cords with a maximum length of 10 m can be connected to the RJ-45 TP port.

With the IE FC cables and IE FC RJ-45 plug 180, an overall cable length of up to 100 m is permitted between two devices depending on the cable type.

Autonegotiation

Autonegotiation means the automatic detection of the functionality of the port at the opposite end. Using autonegotiation, repeaters or end devices can detect the functionality available at the port of a partner device allowing automatic configuration of different types of device. With autonegotiation, two components connected to a link segment can exchange parameters and set themselves to match the supported communication functionality.

Note

Devices not supporting autonegotiation must be set to 100 Mbps/ half duplex or 10 Mbps half duplex.

Note

The SCALANCE X204IRT is a plug-and-play device that does not require settings to be made for commissioning.

MDI /MDIX autocrossover function

The advantage of the MDI /MDIX autocrossover function is that straight-through cables can be used throughout and crossover Ethernet cables are unnecessary. This prevents malfunctions resulting from mismatching send and receive wires. This makes installation much easier for the user.

IE Switches X-200 support the MDI / MDIX autocrossover function.

NOTICE
Please note that the direct connection of two ports on the switch or accidental connection over several switches causes an illegal loop. Such a loop can lead to network overload and network failures.

Auto polarity exchange

If the pair of receiving cables are incorrectly connected (RD+ and RD- swapped over), the polarity is reversed automatically.

3.16 SCALANCE X204 IRT PRO

3.16.1 SCALANCE X204 IRT PRO product characteristics

Possible attachments

The SCALANCE X204 IRT PRO has four RJ-45 push-pull interfaces (PROFINET-compliant in accordance with IEC 61076-3-117) with the high degree of protection IP65/67 for connection of end devices or further network segments.

Figure 3-25 SCALANCE X204 IRT PRO

3.16.2 SCALANCE X204 IRT PRO TP ports

Connector pinout

On the SCALANCE X204 IRT PRO, the TP ports are implemented as RJ-45 jacks with MDI-X assignment (Medium Dependent Interface–Autocrossover) of a network component.

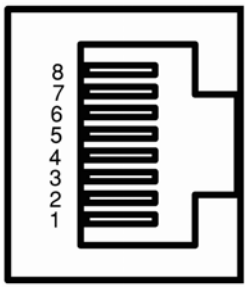


Figure 3-26 RJ-45 jack

Table 3-20 Pin assignment

Pin number	Assignment
Pin 8	n. c.
Pin 7	n. c.
Pin 6	TD-
Pin 5	n. c.
Pin 4	n. c.
Pin 3	TD+
Pin 2	RD-
Pin 1	RD+

NOTICE
TP cords or TP-XP cords with a maximum length of 10 m can be connected to the RJ-45 TP port. With the IE FC cables and IE RJ-45 Plug PRO 180, an overall cable length of up to 100 m is permitted between two devices depending on the cable type.

Autonegotiation

Autonegotiation means the automatic detection of the functionality of the port at the opposite end. Using autonegotiation, repeaters or end devices can detect the functionality available at the port of a partner device allowing automatic configuration of different types of device. With autonegotiation, two components connected to a link segment can exchange parameters and set themselves to match the supported communication functionality.

Note

Devices not supporting autonegotiation must be set to 100 Mbps/ half duplex or 10 Mbps half duplex.

Note

The SCALANCE X204 IRT PRO is a plug-and-play device that does not require settings to be made for commissioning.

MDI /MDIX autocrossover function

The advantage of the MDI /MDIX autocrossover function is that straight-through cables can be used throughout and crossover Ethernet cables are unnecessary. This prevents malfunctions resulting from mismatching send and receive wires. This makes installation much easier for the user.

IE Switches X-200 support the MDI / MDIX autocrossover function.

NOTICE
Please note that the direct connection of two ports on the switch or accidental connection over several switches causes an illegal loop. Such a loop can lead to network overload and network failures.

Auto polarity exchange

If the pair of receiving cables are incorrectly connected (RD+ and RD- swapped over), the polarity is reversed automatically.

3.17 SCALANCE X202-2P IRT PRO

3.17.1 SCALANCE X202-2P IRT PRO product characteristics

Possible attachments

The SCALANCE X202-2P IRT PRO has two RJ-45 push-pull interfaces (PROFINET-compliant in accordance with IEC 61076-3-117) with the high degree of protection IP65/67 and two
SC RJ push-pull interfaces (PROFINET-compliant in accordance with IEC 61754-24-2) with the high degree of protection IP65/67 for the connection of the end devices or further network segments.

Figure 3-27 SCALANCE X202-2P IRT PRO

3.17.2 SCALANCE X202-2P IRT PRO TP ports

Connector pinout

On the SCALANCE X202-2P IRT PRO, the TP ports are implemented as RJ-45 ports with MDI-X assignment (Medium Dependent Interface–Autocrossover) of a network component.

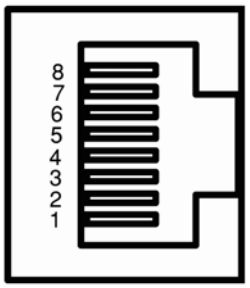


Figure 3-28 RJ-45 jack

Table 3-21 Pin assignment

Pin number	Assignment
Pin 8	n. c.
Pin 7	n. c.
Pin 6	TD-
Pin 5	n. c.
Pin 4	n. c.
Pin 3	TD+
Pin 2	RD-
Pin 1	RD+

NOTICE

TP cords or TP-XP cords with a maximum length of 10 m can be connected to the RJ-45 TP port.

With the IE FC cables and IE RJ-45 Plug PRO 180, an overall cable length of a maximum of 100 m is permitted between two devices depending on the cable type.

Autonegotiation

Autonegotiation means the automatic detection of the functionality of the port at the opposite end. Using autonegotiation, repeaters or end devices can detect the functionality available at the port of a partner device allowing automatic configuration of different types of device. With autonegotiation, two components connected to a link segment can exchange parameters and set themselves to match the supported communication functionality.

Note

Devices not supporting autonegotiation must be set to 100 Mbps/ half duplex or 10 Mbps half duplex.

Note

The SCALANCE X202-2P IRT PRO is a plug-and-play device that does not require settings to be made for commissioning.

MDI /MDIX autocrossover function

The advantage of the MDI /MDIX autocrossover function is that straight-through cables can be used throughout and crossover Ethernet cables are unnecessary. This prevents malfunctions resulting from mismatching send and receive wires. This makes installation much easier for the user.

IE Switches X-200 all support the MDI / MDIX autocrossover function.

NOTICE
Please note that the direct connection of two ports on the switch or accidental connection over several switches causes an illegal loop. Such a loop can lead to network overload and network failures.

Auto polarity exchange

If the pair of receiving cables are incorrectly connected (RD+ and RD- swapped over), the polarity is reversed automatically.

3.17.3 SCALANCE X202-2P IRT PRO FO ports

Transmission rate

The transmission rate of the optical Fast Ethernet ports is 100 Mbps.

Transmission mode

Since the full duplex mode and the transmission rate cannot be modified for optical transmission, autonegotiation cannot be selected.

Transmission medium

Data is transferred using plastic optical fiber (POF) or polymer cladded fiber (PCF). The wavelength is 650 nm.

POF cables with a core diameter of 980 µm as well as PCF cables with a core diameter of 200 µm are used. The light source is an LED.

Transmission range

The minimum cable length is 1 m. The maximum transmission distance (segment length) is 50 m for POF and 100 m for PCF cables.

Connectors

The cables are connected over SC-RJ sockets.

3.18 SCALANCE X202-2P IRT

3.18.1 SCALANCE X202-2P IRT product characteristics

Possible attachments

The SCALANCE X202-2P IRT has two RJ-45 jacks and two
SC RJ interfaces for connecting end devices or other network segments.

Figure 3-29 SCALANCE X202-2P IRT

3.18.2 SCALANCE X202-2P IRT TP ports

Connector pinout

On the SCALANCE X202-2P IRT, the TP ports are implemented as RJ-45 jacks with MDI-X assignment (Medium Dependent Interface–Autocrossover) of a network component.

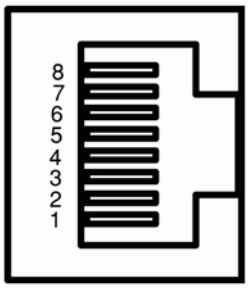


Figure 3-30 RJ-45 jack

Table 3-22 Pin assignment

Pin number	Assignment
Pin 8	n. c.
Pin 7	n. c.
Pin 6	TD-
Pin 5	n. c.
Pin 4	n. c.
Pin 3	TD+
Pin 2	RD-
Pin 1	RD+

NOTICE

TP cords or TP-XP cords with a maximum length of 10 m can be connected to the RJ-45 TP port.

With the IE FC cables and IE FC RJ-45 plug 180, an overall cable length of a maximum of 100 m is permitted between two devices depending on the cable type.

Autonegotiation

Autonegotiation means the automatic detection of the functionality of the port at the opposite end. Using autonegotiation, repeaters or end devices can detect the functionality available at the port of a partner device allowing automatic configuration of different types of device. With autonegotiation, two components connected to a link segment can exchange parameters and set themselves to match the supported communication functionality.

Note

Devices not supporting autonegotiation must be set to 100 Mbps/ half duplex or 10 Mbps half duplex.

Note

The SCALANCE X202-2P IRT is a plug-and-play device that does not require settings to be made for commissioning.

MDI /MDIX autocrossover function

The advantage of the MDI /MDIX autocrossover function is that straight-through cables can be used throughout and crossover Ethernet cables are unnecessary. This prevents malfunctions resulting from mismatching send and receive wires. This makes installation much easier for the user.

IE Switches X-200 all support the MDI / MDIX autocrossover function.

NOTICE
Please note that the direct connection of two ports on the switch or accidental connection over several switches causes an illegal loop. Such a loop can lead to network overload and network failures.

Auto polarity exchange

If the pair of receiving cables are incorrectly connected (RD+ and RD- swapped over), the polarity is reversed automatically.

3.18.3 SCALANCE X202-2P IRT FO ports

Transmission rate

The transmission rate of the optical Fast Ethernet ports is 100 Mbps.

Transmission mode

Since the full duplex mode and the transmission rate cannot be modified for optical transmission, autonegotiation cannot be selected.

Transmission medium

Data is transferred using plastic optical fiber (POF) or polymer cladded fiber (PCF). The wavelength is 650 nm.

POF cables with a core diameter of 980 µm as well as PCF cables with a core diameter of 200 µm are used. The light source is an LED.

Transmission range

The minimum cable length is 1 m. The maximum transmission distance (segment length) is 50 m for POF and 100 m for PCF cables.

Connectors

The cables are connected over SC-RJ sockets.

3.19 SCALANCE X201-3P IRT

3.19.1 SCALANCE X201-3P IRT product characteristics

Possible attachments

The SCALANCE X201-3P IRT has an RJ-45 jack and three SC RJ interfaces for connecting end devices or other network segments.

Figure 3-31 SCALANCE X201-3P IRT

3.19.2 SCALANCE X201-3P IRT TP ports

Connector pinout

On the SCALANCE X201-3P IRT, the TP port is implemented as an RJ-45 jack with MDI-X assignment (Medium Dependent Interface–Autocrossover) of a network component.

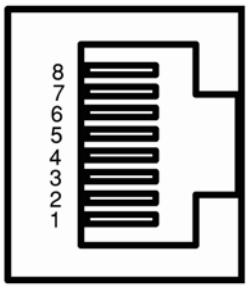


Figure 3-32 RJ-45 jack

Table 3-23 Pin assignment

Pin number	Assignment
Pin 8	n. c.
Pin 7	n. c.
Pin 6	TD-
Pin 5	n. c.
Pin 4	n. c.
Pin 3	TD+
Pin 2	RD-
Pin 1	RD+

NOTICE

TP cords or TP-XP cords with a maximum length of 10 m can be connected to the RJ-45 TP port.

With the IE FC cables and IE FC RJ-45 plug 180, an overall cable length of a maximum of 100 m is permitted between two devices depending on the cable type.

Autonegotiation

Autonegotiation means the automatic detection of the functionality of the port at the opposite end. Using autonegotiation, repeaters or end devices can detect the functionality available at the port of a partner device allowing automatic configuration of different types of device. With autonegotiation, two components connected to a link segment can exchange parameters and set themselves to match the supported communication functionality.

Note

Devices not supporting autonegotiation must be set to 100 Mbps/ half duplex or 10 Mbps half duplex.

Note

The SCALANCE X201-3P IRT is a plug-and-play device that does not require settings to be made for commissioning.

MDI /MDIX autocrossover function

The advantage of the MDI /MDIX autocrossover function is that straight-through cables can be used throughout and crossover Ethernet cables are unnecessary. This prevents malfunctions resulting from mismatching send and receive wires. This makes installation much easier for the user.

IE Switches X-200 support the MDI / MDIX autocrossover function.

NOTICE
Please note that the direct connection of two ports on the switch or accidental connection over several switches causes an illegal loop. Such a loop can lead to network overload and network failures.

Auto polarity exchange

If the pair of receiving cables are incorrectly connected (RD+ and RD- swapped over), the polarity is reversed automatically.

3.19.3 SCALANCE X201-3P IRT FO ports

Transmission rate

The transmission rate of the optical Fast Ethernet ports is 100 Mbps.

Transmission mode

Since the full duplex mode and the transmission rate cannot be modified for optical transmission, autonegotiation cannot be selected.

Transmission medium

Data is transferred using plastic optical fiber (POF) or polymer cladded fiber (PCF). The wavelength is 650 nm.

POF cables with a core diameter of 980 µm as well as PCF cables with a core diameter of 200 µm are used. The light source is an LED.

Transmission range

The minimum cable length is 1 m. The maximum transmission distance (segment length) is 50 m for POF and 100 m for PCF cables.

Connectors

The cables are connected over SC-RJ sockets.

3.20 SCALANCE X200-4P IRT

3.20.1 SCALANCE X200-4P IRT product characteristics

Possible attachments

The SCALANCE X200-4P IRT has four SC RJ interfaces for connecting end devices or other network segments.

Figure 3-33 SCALANCEX200?4PIRT

3.20.2 SCALANCE X200-4P IRT FO ports

Transmission rate

The transmission rate of the optical Fast Ethernet ports is 100 Mbps.

Transmission mode

The transmission mode for 100Base-FX is specified in the IEEE 802.3 standard.

Since the full duplex mode and the transmission rate cannot be modified for optical transmission, autonegotiation cannot be selected.

Transmission medium

Data is transferred using plastic optical fiber (POF) or polymer cladded fiber (PCF). The wavelength is 650 nm.

POF cables with a core diameter of 980 µm as well as PCF cables with a core diameter of 200 µm are used. The light source is an LED.

Transmission range

The minimum cable length is 1 m. The maximum transmission distance (segment length) is 50 m for POF and 100 m for PCF cables.

Connectors

The cables are connected over SC-RJ sockets.

3.21 C-PLUG (configuration plug)

Area of application

The C-PLUG is an exchangeable medium for storage of the configuration and project engineering data of the basic device. This means that the configuration data remains available if the basic device is replaced.

How it works

Power is supplied by the basic device. The C-PLUG retains all data permanently when the power is turned off.

If an empty C-PLUG (factory settings) is inserted, all configuration data of an IE Switch X-200 is saved to it when the device starts up. Changes to the configuration during operation are also saved on the C-PLUG without any operator intervention being necessary.

A basic device with an inserted C-PLUG automatically uses the configuration data of the C-PLUG when it starts up. This is, however, only possible when the data was written by a compatible device type.

This allows fast and simple replacement of the basic device. If a device is replaced, the C-PLUG is taken from the failed component and inserted in the replacement device. The first time it is started up, the replacement device has the same configuration as the failed device except for the MAC address set by the vendor.

Compatible devices

As a general rule, the data on the C-PLUG is only compatible with devices having an identical order number and the same device name.

The device combinations shown in the following table are exceptions. With these devices, the exchange of the C-PLUG is possible in one direction.

Table 3-24 Device combinations between which the C-PLUG can be exchanged:

Device type SCALANCE	C-PLUG created by device with order number		Compatible with device with order number
X208	6GK5208-0BA00-2AA3		6GK5208-0BA10-2AA3
X204-2	6GK5204-2BB00-2AA3		6GK5204-2BB10-2AA3
X206-1	6GK5206-1BB00-2AA3	➡	6GK5206-1BB10-2AA3
X204-1LD	6GK5204-2BC00-2AA3		6GK5204-2BC10-2AA3
X206-1LD	6GK5206-1BC00-2AA3		6GK5206-1BC10-2AA3

Note

Combinations other than those shown in the table are not compatible with each other.

Note

If a C-PLUG is inserted in a compatible device, no PNIO device name is entered in the compatible device.

When the compatible device starts to operate in PROFINET IO mode, the PNIO device name must be entered manually. This can be done, for example with the PST tool or Web Based Management.

If the compatible device is not in PROFINET IO mode, no further configuration is necessary.

Using a previously written C-PLUG

If you want to insert a C-PLUG that has already been used and has been written to an IE Switch X-200 with a different configuration, the existing C-PLUG data must first be deleted.

Note

The IE Switch X-200 normally starts up with the configuration of the C-PLUG, assuming this was written to by a compatible device type.

The C-PLUG must now be deleted in the "C-PLUG Information" menu of Web Based Management or the configuration of the device must be copied to the C-PLUG. The device starts up with the new configuration of the device only after the device has restarted.

If the C-PLUG was written by an incompatible device type, the basic device will not start up fully and signals an error. The delete function can nevertheless be used. When the device next starts up, the current configuration data of the basic device is written to the C-PLUG.

Diagnostics

Inserting a C-PLUG that does not contain the configuration of a compatible device type, inadvertently removing the C-PLUG, or general malfunctions of the C-PLUG are indicated by the diagnostic mechanisms of an IE Switch X-200 (LEDs, PROFINET, SNMP, WBM, etc.).

Inserting in the C-PLUG slot

The C-PLUG is not supplied with the IE Switches X-200. It is available as an optional accessory.

The slot for the C-PLUG is located on the back of the device.

To insert the C-PLUG, remove the screw cover. The C-PLUG is inserted in the receptacle. The screw cover must then be closed correctly.

NOTICE
The C-PLUG may only be inserted or removed when the power is off!

Removing the C-PLUG

It is only necessary to remove the C-PLUG if the IE Switch X-200 develops a fault.

The C-PLUG can be removed from the slot using flat pliers, tweezers, or a small screwdriver.

Figure 3-34 Removing the C-PLUG from the receptacle

3.22 Button

Button function

Using the button, you can display and modify the set fault mask. The fault mask setting is retained after device power off/on.

After pressing and holding down the button, the currently valid fault mask is displayed for approximately 3 seconds. The LEDs of the monitored ports flash at a frequency of 5 Hz.

To change the fault mask, keep the button pressed. After a further 3 seconds, the current link status of the ports is displayed and the the power supply LEDs flash at a frequency of 2.5 Hz. Keep the button pressed. After a further 3 seconds, this status is adopted and saved as the new fault mask. The monitored ports now are indicated by permanently lit LEDs until the button is released. As long as the LEDs are still flashing, however, the saving of the mask can be stopped by releasing the button.

If an empty fault mask is set (no port is monitored) or you want to set an empty mask, the 2 port LEDs flash on and off alternately.

At the same time, the monitoring of the connected power supply is set with the fault mask. The existence of the two power sources is monitored only if they are connected when the fault mask is saved.

The failure of the link of one of the monitored ports or one of the monitored power supplies is indicated by the red fault LED lighting up. At the same time, the signaling contact opens.

Port monitoring and power supply monitoring are not activated when the device is delivered (factory default), the redundancy manager is disabled.

The following applies to IE Switches X-200 (except SCALANCE X208 PRO): If the button is pressed for 2-3 seconds longer, the RM LED starts to flash for approx. 2 seconds. If the button is released during this time, the RM is disabled. If you hold down the button, the RM LED lights up permanently and the RM is enabled. If the button is pressed longer (15 seconds), the device is reset to "factory defaults". This is indicated by all the Port LEDs (green) flashing. During this activity, the device must not be turned off.

Note

On the SCALANCE X204 IRT PRO, SCALANCE X202-2P IRT PRO and SCALANCE X208 PRO, the button is beneath the C-PLUG cover on the rear of the device.

3.23 Displays

3.23.1 Fault indicator (red LED)

Fault indicator (red LED)

If the red LED is lit, the IE Switch X-200 has detected a problem.
The signaling contact opens at the same time.

The LED signals that the IE Switch X-200 can adopt the following statuses:

Device type SCALANCE	LED lit red	LED flashing red	LED not lit
X208	1, 2, 3, 4	9	10
X208PRO	1, 2, 3, 4	9	10
X216	1, 2, 3, 4	9	10
X224	1, 2, 3, 4	9	10
X204-2	1, 2, 3, 4	9	10
X206-1	1, 2, 3, 4	9	10
X212-2	1, 2, 3, 4	9	10
X204-2 LD	1, 2, 3, 4	9	10
X206-1 LD	1, 2, 3, 4	9	10
X212-2LD	1, 2, 3, 4	9	10
X202-2IRT	1, 2, 3, 4, 5, 6, 7	9	10
X204IRT	1, 2, 3, 4, 5, 6, 7	9	10
X204 IRT PRO	1, 2, 3, 4, 5, 6, 7	9	10
X202-2P IRT PRO	1, 2, 3, 4, 5, 6, 7, 8	9	10
X202-2P IRT	1, 2, 3, 4, 5, 6, 7, 8	9	10
X201-3P IRT	1, 2, 3, 4, 5, 6, 7, 8	9	10
X200-4P IRT	1, 2, 3, 4, 5, 6, 7, 8	9	10

1. Link down event on a monitored port.
2. Failure of one of the two redundant power supplies.

   Note

   SCALANCE X204 IRT PRO and SCALANCE X202-2P IRT PRO have no redundant power supply.

3. C-PLUG
4. Device startup, the LED is lit for approx. 20 seconds.
5. There is a BUS fault BF in PROFINET. Date exchange with the controller could not be established.
6. Redundancy manager connected through.
7. Switchover of standby connection.
8. Maintenance request or maintenance requirement.
9. An internal fault was detected. Inform the maintenance personnel and, if necessary, send the device in for repair.
10. No fault detected by the IE Switch X-200.

3.23.2 Power display

Power display

The LEDs signal that the IE Switch X-200 can adopt the following statuses:

The status of the power supply is indicated by two green LEDs or one green/yellow LED:

Device type SCALANCE	Green LED lit	Yellow-green LED		LED not lit
		LED lit green	LED lit yellow	
X208	-	2	3	4
X208PRO	1	-	-	4
X216	-	2	3	4
X224	-	2	3	4
X204-2	-	2	3	4
X206-1	-	2	3	4
X212-2	-	2	3	4
X204-2 LD	-	2	3	4
X206-1 LD	-	2	3	4
X212-2LD	-	2	3	4
X202-2IRT	-	2	3	4
X204IRT	-	2	3	4
X204 IRT PRO	-	2	3	4
X202-2P IRT PRO	-	2	3	4
X202-2P IRT	-	2	3	4
X201-3P IRT	-	2	3	4
X200-4P IRT	-	2	3	4

1. Power supply L1 or L2 is connected.
2. Both L power supplies are connected (redundant supply).
3. One L power supply is connected (non-redundant supply).
4. Power supply L1 and/or L2 not connected or <14 V.

Note

SCALANCE X204 IRT PRO and SCALANCE X202-2P IRT PRO have no redundant power supply.

3.23.3 Port status indicator (green/yellow LEDs)

Port status indicator (green/yellow LEDs)

The LEDs signal that the IE Switch X-200 can adopt the following statuses.
The status of the interfaces is indicated by two-color LEDs:

Device type SCALANCE		LED lit green	LED lit yellow	LED flashes yellow	LED flashes green
	Number of port LEDs				
X208	8 port LEDs	1	2, 3	4	5, 6
X208PRO	8 port LEDs	1	2, 3	4	5
X204-2	6 port LEDs	1	2, 3	4	5, 6
X206-1	7 port LEDs	1	2, 3	4	5, 6
X204-2 LD	6 port LEDs	1	2, 3	4	5, 6
X206-1 LD	7 port LEDs	1	2, 3	4	5, 6
X202-2IRT	4 port LEDs	1	2, 3	4	5, 6
X204IRT	4 port LEDs	1	2, 3	4	5, 6
X204 IRT PRO	4 port LEDs	1	2, 3	4	5, 6
X202-2P IRT PRO	4 port LEDs	1	2, 3	4	5, 6
X202-2P IRT	4 port LEDs	1	2, 3	4	5, 6
X201-3P IRT	4 port LEDs	1	2, 3	4	5, 6
X200-4P IRT	4 port LEDs	1	2, 3	4	5, 6
X216	16 port LEDs	1	2, 3	4	5, 6
X212-2	14 port LEDs	1	2, 3	4	5, 6
X212-2LD	14 port LEDs	1	2, 3	4	5, 6
X224	24 port LEDs	1	2, 3	4	5, 6

1. TP link exists, no data reception.
2. TP link, data received at TP port.
3. Device startup, the LED is lit for approx. 6 seconds.
4. Setting or display of the fault mask.
5. The "Show Location" function was enabled over Ethernet (for example, PST tool).
   The button was pressed for longer than 15 seconds to reset the configuration.
6. PROFINET IO operation was started with the PN IO controller, the attempt to change the fault mask with the button was rejected by all the port LEDs flashing once.

3.23.4 Redundancy manager indicator (green LED)

Redundancy manager indicator (green LED)

The LED signals that the IE Switch X-200 can adopt the following statuses:

Device type SCALANCE	LED lit green	LED flashes green	LED not lit
X208	1	2	3
X208PRO	-	-	-
X216	1	2	3
X224	1	2	3
X204-2	1	2	3
X206-1	1	2	3
X212-2	1	2	3
X204-2LD	1	2	3
X206-1LD	1	2	3
X212-2LD	1	2	3
X202-2IRT	1	2	3
X204IRT	1	2	3
X204 IRT PRO	1	2	3
X202-2P IRT PRO	1	2	3
X202-2P IRT	1	2	3
X201-3P IRT	1	2	3
X200-4P IRT	1	2	3

1. Redundancy manager RM is enabled.
2. Redundancy manager is switched over.
3. Redundancy manager is disabled.

Note

The redundancy manager indicator and the standby indicator are implemented as a dual LED, the indicator color changes depending on the function (Redundancy function -> green, standby function -> yellow).

3.23.5 Standby functions (yellow LED)

Standby functions (yellow LED)

The LED signals that the IE Switch X-200 can adopt the following statuses:

Device type SCALANCE	LED lit yellow	LED flashes yellow (slowly)	LED flashes yellow (fast)	LED not lit
X208	-	-	-	-
X208PRO	-	-	-	-
X216	-	-	-	-
X224	-	-	-	-
X204-2	-	-	-	-
X206-1	-	-	-	-
X212-2	-	-	-	-
X204-2 LD	-	-	-	-
X206-1 LD	-	-	-	-
X212-2LD	-	-	-	-
X202-2IRT	1	2	3	4
X204IRT	1	2	3	4
X204 IRT PRO	1	2	3	4
X202-2P IRT PRO	1	2	3	4
X202-2P IRT	1	2	3	4
X201-3P IRT	1	2	3	4
X200-4P IRT	1	2	3	4

1. Standby function is enabled (IE Switch X-200 is in standby active mode).
2. Standby function is enabled (IE Switch X-200 is in standby passive mode).
3. Standby partner lost.
4. Standby function is disabled.

Note

When the device switches from active to passive mode because of a fault, the red fault LED is also activated. This is possible only when standby monitoring is enabled in the fault mask.

3.23.6 FOC diagnostic display (yellow LED)

Note

Only the SCALANCE X202-2P IRT, X202-2P IRT PRO, X201-3P IRT and X200-4P IRT devices have the FO cable diagnostic display.

FOC diagnostic display (yellow LED)

The diagnostic status of the SC RJ interfaces is signaled by an additional LED per port. The LED signals that the device can adopt the following statuses:

Device type SCALANCE	LED lit yellow	LED not lit
X202-2P IRT PRO	1	2
X202-2P IRT	1	2
X201-3P IRT	1	2
X200-4P IRT	1	2

1. Signaling maintenance is necessary. Maintenance should be performed to ensure problem-free operation.
2. Relevant only when the link exists:
   The available link power margin is adequate for problem-free operation.

3.23.7 LED display during startup

LED display during startup

Device type SCALANCE	When the device starts up, the following LEDs light up in the following order:
	1. Power LEDs (green) light up immediately after turning on the power. 2. Port LEDs (yellow) light up for approx. 6 seconds, the red LED is off. 3. Port LEDs go off, the red error LED is lit for approx. 20 seconds. 4. After the port LEDs go off, the correct link status is displayed after approx. 2 seconds. 5. The IE Switch X-200 is now ready for operation.
X208	+
X208PRO	+
X216	+
X224	+
X204-2	+
X206-1	+
X212-2	+
X204-2 LD	+
X206-1 LD	+
X212-2LD	+
X202-2IRT	+
X204IRT	+
X204 IRT PRO	+
X202-2P IRT PRO	+
X202-2P IRT	+
X201-3P IRT	+
X200-4P IRT	+

3.24 Technical specifications

Table 3-25 Construction

Device type SCALANCE	Dimensions (W x H x D) in mm	Weight in g	Installation options - DIN rail - S7-300 standard rail - Wall mounting
X208	60 x 125 x 124	780	+
X208PRO	90 x 125 x 124	1000	+
X216	120 x 125 x 124	1200	+
X224	180 x 125 x 124	1600	+
X204-2	60 x 125 x 124	780	+
X206-1	60 x 125 x 124	780	+
X212-2	120 x 125 x 124	1200	+
X204-2 LD	60 x 125 x 124	780	+
X206-1 LD	60 x 125 x 124	780	+
X212-2LD	120 x 125 x 124	1200	+
X202-2IRT	60 x 125 x 124	780	+
X204IRT	60 x 125 x 124	780	+
X204 IRT PRO	90 x 125 x 124	1000	+
X202-2P IRT PRO	90 x 125 x 124	1000	+
X202-2P IRT	60 x 125 x 124	780	+
X201-3P IRT	60 x 125 x 124	780	+
X200-4P IRT	60 x 125 x 124	780	+

Table 3-26 Ports

Device type SCALANCE	Attachment of end devices or network components over twisted pair	Connecting end devices or network components over fiber-optic	Connector for power supply	Connector for signaling contact
X208	8 x RJ-45 jacks with MDI-X pinning 10/100 Mbps (half/ full duplex)	-	1x4-pin plug-in terminal block	1 x 2-pin plug-in terminal block
X208PRO	8x4-pin M12 sockets, d-coded with MDI-X pinning 10/100 Mbps (half/full duplex)	-	2x4-pin a-coded M12 plugs	1x5-pin b-coded M12 plugs
X216	16 x RJ-45 jacks with MDI-X pinning 10/100 Mbps (half/full duplex)	-	1 x 4-pin plug-in terminal block	1 x 2-pin plug-in terminal block
X224	24 x RJ-45 sockets with MDI-X pinning 10/100 Mbps (half/ full duplex)	-	1 x 4-pin plug-in terminal block	1 x 2-pin plug-in terminal block

Device type SCALANCE	Attachment of end devices or network components over twisted pair	Connecting end devices or network components over fiber-optic	Connector for power supply	Connector for signaling contact
X204-2	4 x RJ-45 sockets with MDI-X pinning 10/100 Mbps (half/ full duplex)	2 x 2 BFOC sockets (100 Mbps, full duplex to 100BaseFX)	1x4-pin plug-in terminal block	1 x 2-pin plug-in terminal block
X206-1	6 x RJ-45 sockets with MDI-X pinning 10/100 Mbps (half/full duplex)	1x2 BFOC sockets (100 Mbps, full duplex to 100BaseFX)	1 x 4-pin plug-in terminal block	1 x 2-pin plug-in terminal block
X212-2	12 x RJ-45 jacks with MDI-X pinning 10/100 Mbps (half/full duplex)	2 x 2 BFOC sockets (100 Mbps, full duplex to 100BaseFX)	1 x 4-pin plug-in terminal block	1 x 2-pin plug-in terminal block
X204-2 LD	4 x RJ-45 sockets with MDI-X pinning 10/100 Mbps (half/ full duplex)	2 x 2 BFOC sockets (100 Mbps, full duplex to 100BaseFX)	1 x 4-pin plug-in terminal block	1 x 2-pin plug-in terminal block
X206-1 LD	6 x RJ-45 sockets with MDI-X pinning 10/100 Mbps (half/full duplex)	1x2 BFOC sockets (100 Mbps, full duplex to 100BaseFX)	1 x 4-pin plug-in terminal block	1 x 2-pin plug-in terminal block
X212-2LD	12 x RJ-45 jacks with MDI-X pinning 10/100 Mbps (half/full duplex)	2 x 2 BFOC sockets (100 Mbps, full duplex to 100BaseFX)	1 x 4-pin plug-in terminal block	1 x 2-pin plug-in terminal block
X202-2IRT	2 x RJ-45 jacks with MDI-X pinning 10/100 Mbps (half/full duplex)	2 x 2 BFOC sockets (100 Mbps, full duplex to 100BaseFX)	1 x 4-pin plug-in terminal block	1 x 2-pin plug-in terminal block
X204IRT	4 x RJ-45 sockets with MDI-X pinning 10/100 Mbps (half/ full duplex)	-	1x4-pin plug-in terminal block	1 x 2-pin plug-in terminal block
X204 IRT PRO	4 x RJ-45 sockets with MDI-X pinning 10/100 Mbps (half/ full duplex)	-	2 x 5-pin Power Plug Pro connectors (male)	1 x 5-pin b-coded M12 connector (male)
X202-2P IRT PRO	2 x RJ-45 jacks with MDI-X pinning 10/100 Mbps (half/full duplex)	2 SC RJ jacks (push-pull) (100 Mbps, full duplex to 100BaseFX)	2 x 5-pin Power Plug Pro connectors (male)	1 x 5-pin b-coded M12 connector (male)
X202-2P IRT	2 x RJ-45 jacks with MDI-X pinning 10/100 Mbps (half/full duplex)	2 SC RJ jacks (push-pull) (100 Mbps, full duplex to 100BaseFX)	1x4-pin plug-in terminal block	1 x 2-pin plug-in terminal block
X201-3P IRT	1 x RJ-45 socket with MDI-X pinning 10/100 Mbps (half/ full duplex)	3 SC RJ jacks (push-pull) (100 Mbps, full duplex to 100BaseFX)	1x4-pin plug-in terminal block	1 x 2-pin plug-in terminal block
X200-4P IRT	-	4 SC RJ sockets (100 Mbps, full duplex to 100BaseFX)	1x4-pin plug-in terminal block	1 x 2-pin plug-in terminal block

Table 3-27 Electrical data

Device type SCALANCE	Power supply 2 x 24 V DC (18-32 V DC) SELV (Safety Extra Low Voltage)	Power loss at 24 V DC	Current consumption at rated voltage	Overcurrent protection at input PTC resettable fuse
X208	+	3.84 W	160 mA	0.6 A / 60 V
X208PRO	+	4.4 W	185 mA	0.6 A / 60 V
X216	+	5.76 W	240 mA	1.1 A / 33 V
X224	+	8.40 W	350 mA	1.1 A / 33 V
X204-2	+	6.36 W	265 mA	0.6 A / 60 V
X206-1	+	5.28 W	220 mA	0.6 A / 60 V
X212-2	+	7.92 W	330 mA	1.1 A / 33 V
X204-2 LD	+	6.36 W	265 mA	0.6 A / 60 V
X206-1 LD	+	5.28 W	220 mA	0.6 A / 60 V
X212-2LD	+	7.92 W	330 mA	1.1 A / 33 V
X202-2IRT	+	6.0 W	300 mA	0.6 A / 60 V
X204IRT	+	4.8 W	200 mA	0.6 A / 60 V
X204 IRT PRO	+	4.8 W	200 mA	0.6 A / 60 V
X202-2P IRT PRO	+	7.2 W	300 mA	1.1 A / 33 V
X202-2P IRT	+	7.2 W	300 mA	1.1 A / 33 V
X201-3P IRT	+	8.4 W	350 mA	1.1 A / 33 V
X200-4P IRT	+	9.6 W	400 mA	1.1 A / 33 V

Table 3-28 Signaling contact

Device type SCALANCE	Voltage at signaling contact	Current through signaling contact
X208	24 V DC	max. 100 mA
X208PRO	24 V DC	max. 100 mA
X216	24 V DC	max. 100 mA
X224	24 V DC	max. 100 mA
X204-2	24 V DC	max. 100 mA
X206-1	24 V DC	max. 100 mA
X212-2	24 V DC	max. 100 mA
X204-2 LD	24 V DC	max. 100 mA
X206-1 LD	24 V DC	max. 100 mA
X212-2LD	24 V DC	max. 100 mA
X202-2IRT	24 V DC	max. 100 mA
X204IRT	24 V DC	max. 100 mA
X204 IRT PRO	24 V DC	max. 100 mA
X202-2P IRT PRO	24 V DC	max. 100 mA
X202-2P IRT	24 V DC	max. 100 mA
X201-3P IRT	24 V DC	max. 100 mA
X200-4P IRT	24 V DC	max. 100 mA

Table 3-29 Permitted cable lengths (copper)

Device type SCALANCE	**0 - 55 m IE TP torsion cable with IE FC RJ-45 Plug 180 or 0 - 45 m IE TP torsion cable with IE outlet RJ-45 + 10 m TP cord**	**0 - 85 m IE FC TP marine/trailing/ flexible/FRNC cable with IE FC RJ-45 Plug 180 or 0 -75 m IE FC TP marine/ trailing/flexible/FRNC cable + 10 m TP cord over IE FC outlet RJ-45**	**0 - 100 m IE FC TP standard cable with IE FC RJ-45 plug 180 or over IE FC outlet RJ-45 with 0 90 m IE FC TP standard cable + 10 m TP cord**
X208	+	+	+
X208PRO	0 - 55 m IE TP torsion cable with IE FC M12 Plug Pro	0 - 85 m IE FC TP marine/trailing/flexible/FRNC cable with IE M12 Plug PRO	0 - 100 m IE FC TP standard cable with IE M12 Plug PRO
X216	+	+	+
X224	+	+	+
X204-2	+	+	+
X206-1	+	+	+
X212-2	+	+	+
X204-2 LD	+	+	+
X206-1 LD	+	+	+
X212-2LD	+	+	+
X202-2IRT	+	+	+
X204IRT	+	+	+
X204 IRT PRO	0 - 55 m IE TP torsion cable with IE RJ-45 Plug Pro	0-85 m IE FC TP marine/trailing/flexible/FRNC cable with IE RJ-45 Plug Pro	0-100 m IE FC TP standard cable with IE RJ-45 Plug Pro
X202-2P IRT PRO	0 - 55 m IE TP torsion cable with IE RJ-45 Plug Pro	0-85 m IE FC TP marine/trailing/flexible/FRNC cable with IE RJ-45 Plug Pro	0-100 m IE FC TP standard cable with IE RJ-45 Plug Pro
X202-2P IRT	+	+	+
X201-3P IRT	+	+	+
X200-4P IRT	-	-	-

Table 3-30 Permitted cable lengths (fiber-optic)

Device type SCALANCE	1 - 50 m 980/1000 plastic optical fiber (POF)	1 - 100 m 200/230 polymer cladded fiber (PCF) 6 dB max. permitted FO cable attenuation with 3 dB link power margin	0 - 3000 m glass FOC 62.5/125 µm or 50/125 µm glass fiber; ≤ 1 dB/km at 1300 nm; 600 MHz x km; 6 dB max. permitted FO cable attenuation with 3 dB link power margin	0 - 26000 m glass FOC 10/125 µm single mode fiber; 0.5 dB/km at 1300 nm; 13 dB max. permitted FO cable attenuation with 2 dB link power margin
X208	-	-	-	-
X208PRO	-	-	-	-
X216	-	-	-	-
X224	-	-	-	-
X204-2	-	-	+	-
X206-1	-	-	+	-
X212-2	-	-	+	-
X204-2 LD	-	-	-	+
X206-1 LD	-	-	-	+
X212-2LD	-	-	-	+
X202-2IRT	-	-	+	-
X204IRT	-	-	-	-
X204 IRT PRO	-	-	-	-
X202-2P IRT PRO	+	+	-	-
X202-2P IRT	+	+	-	-
X201-3P IRT	+	+	-	-
X200-4P IRT	+	+	-	-

Table 3-31 MTFB / aging time

Device type SCALANCE	MTBF	Aging time
X208	83.71 years	30 seconds [1)]
X208PRO	115.48 years	30 seconds [1)]
X216	52.07 years	30 seconds [1)]
X224	45.87 years	30 seconds [1)]
X204-2	74.64 years	30 seconds [1)]
X206-1	78.71 years	30 seconds [1)]
X212-2	51.18 years	30 seconds [1)]
X204-2 LD	74.64 years	30 seconds [1)]
X206-1 LD	78.71 years	30 seconds [1)]
X212-2LD	51.18 years	30 seconds [1)]
X202-2IRT	70.90 years	30 seconds [1)]
X204IRT	80.58 years	30 seconds [1)]
X204 IRT PRO	80.58 years	30 seconds [1)]
X202-2P IRT PRO	83.72 years	30 seconds [1)]
X202-2P IRT	83.72 years	30 seconds [1)]
X201-3P IRT	78.03 years	30 seconds [1)]
X200-4P IRT	73.06 years	30 seconds [1)]

[1]supports fast learning: Quick recognition of MAC addresses on the device that change during operation (for example, when an end node is reconnected).

Table 3-32 Permitted ambient conditions

Device type SCALANCE	Operating temperature	Storage/transport temperature	Relative humidity in operation	Operating altitude at max. xx°C ambient temperature
X208	-20 °C through +60 °C	-40 °C through +70 °C	‹ 95 % (no condensation)	2000 m at max. 56 °C 3000 m at max. 50 °C
X208PRO	-20 °C through +70 °C	-40 °C through +70 °C	‹ 95 % (no condensation)	2000 m at max. 56 °C 3000 m at max. 50 °C
X216	0 °C through +60 °C	-40 °C through +70 °C	‹ 95 % (no condensation)	2000 m at max. 56 °C 3000 m at max. 50 °C
X224	0 °C through +60 °C	-40 °C through +70 °C	‹ 95 % (no condensation)	2000 m at max. 56 °C 3000 m at max. 50 °C
X204-2	-10 °C through +60 °C	-40 °C through +70 °C	‹ 95 % (no condensation)	2000 m at max. 56 °C 3000 m at max. 50 °C
X206-1	-10 °C through +60 °C	-40 °C through +70 °C	‹ 95 % (no condensation)	2000 m at max. 56 °C 3000 m at max. 50 °C
X212-2	0 °C through +60 °C	-40 °C through +70 °C	‹ 95 % (no condensation)	2000 m at max. 56 °C 3000 m at max. 50 °C
X204-2 LD	0 °C through +60 °C	-40 °C through +70 °C	‹ 95 % (no condensation)	2000 m at max. 56 °C 3000 m at max. 50 °C
X206-1 LD	0 °C through +60 °C	-40 °C through +70 °C	‹ 95 % (no condensation)	2000 m at max. 56 °C 3000 m at max. 50 °C
X212-2LD	0 °C through +60 °C	-40 °C through +70 °C	‹ 95 % (no condensation)	2000 m at max. 56 °C 3000 m at max. 50 °C
X202-2IRT	-10 °C through +60 °C	-40 °C through +70 °C	‹ 95 % (no condensation)	2000 m at max. 56 °C 3000 m at max. 50 °C

Device type SCALANCE	Operating temperature	Storage/transport temperature	Relative humidity in operation	Operating altitude at max. xx°C ambient temperature
X204IRT	-20 °C through +70 °C	-40 °C through +70 °C	‹ 95 % (no condensation)	2000 m at max. 56 °C 3000 m at max. 50 °C
X204 IRT PRO	-20 °C through +70 °C	-40 °C through +70 °C	‹ 95 % (no condensation)	2000 m at max. 56 °C 3000 m at max. 50 °C
X202-2P IRT PRO	0 °C through +60 °C	-40 °C through +70 °C	‹ 95 % (no condensation)	2000 m at max. 56 °C 3000 m at max. 50 °C
X202-2P IRT	0 °C through +60 °C	-40 °C through +70 °C	‹ 95 % (no condensation)	2000 m at max. 56 °C 3000 m at max. 50 °C
X201-3P IRT	0 °C through +50 °C	-40 °C through +70 °C	‹ 95 % (no condensation)	2000 m at max. 56 °C 3000 m at max. 50 °C
X200-4P IRT	0 °C through +40 °C	-40 °C through +70 °C	‹ 95 % (no condensation)	2000 m at max. 56 °C 3000 m at max. 50 °C

Note

The following applies to IE Switches X-200 that do not have IRT functionality:

The number of IE Switches X-200 connected in a line influences the frame propagation time.

When a frame passes through an IE Switch X-200, it is delayed by the Store&Forward function of the IE Switch X-200

- with a 64 byte frame length by approx. 10 microseconds (at 100 Mbps)
- with a 1500 byte frame length by approx. 130 microseconds (at 100 Mbps)

This means that the more IE Switch X-200 devices the frame passes through, the longer the frame delay.

Note

The following applies to IE Switches X-200 that have IRT functionality:

The number of IE Switches X-200 connected in a line influences the frame propagation time. The more IE Switches X-200IRT a frame runs through, the higher the frame delay.

By using the “cut through” switching mechanism, the IE Switches X-200IRT are ideal to meet the real-time requirements of PROFINET.

Cut through is not possible

- between a port set to 10 Mbps and a port set to 100 Mbps
- when two packets are to be sent at the same time on one port.

In this case, the IE Switch X-200 changes to Store&Forward and the delay increases.

Installation and maintenance

4

4.1 Installation

Types of installation

IE Switches X--200 can be installed in various ways:

- Installation on a 35 mm DIN rail
- Installation on a SIMATIC S7-300 standard rail
- Wall mounting

⚠WARNING

When used in shipbuilding, installation of SCALANCE X224, X216, X212-2, X212-2LD, X204IRT PRO and X202-2PIRT PRO on a 35 mm DIN rail is not permitted.

In ships, the 35 mm DIN rail does not provide adequate support.

Note

When installing and operating the device, keep to the installation instructions and safety-related notices as described here and in the manual SIMATIC NET Industrial Ethernet Twisted Pair and Fiber Optic Networks /1/.

Unless stated otherwise, the mounting options listed below apply to all IE Switches X-200.

Note

Provide suitable shade to protect the IE Switch X-200 against direct sunlight. This avoids unwanted warming of the device and prevents premature aging of the IE Switch X-200 and cabling.

⚠WARNING

If the IE switches

- SCALANCE X208
- SCALANCE X208PRO
- SCALANCE X204 IRT PRO
- SCALANCE X202-2P IRT PRO

are operated in ambient temperatures between 65°C and 70°C, the temperature of the IE switch housing may be higher than 70°C.

The subject unit must be located in a Restricted Access Location where access can only be gained by SERVICE PERSONNEL or by USERS who have been instructed about the reasons for the restrictions applied to the location and about any precautions that shall be taken when operated in an air ambient of 65-70°C.

⚠WARNING

If temperatures in excess of 70 °C occur on cables or at cable feed-in points, or the temperature at the branching point of the cables exceeds 80 °C, special measures need to be taken. If the equipment is operated at an ambient temperature of 50 °C - 60 °C, use cables with a permitted ambient temperature of at least 80 °C.

4.1.1 Installation on a DIN rail

Installation

Install the IE Switch X-200 on a 35 mm DIN rail complying with DIN EN 60715.

1. Place the upper catch of the device over the top of the DIN rail and then push in the lower part of the device against the rail until it clips into place.
2. Fit the connectors for the power supply.
3. Fit the connectors for the signaling contact.
4. Insert the terminal blocks or M12 cable connectors into the sockets on the device.

Figure 4-1 IE Switch X-200 removing from a DIN rail (35 mm)

Uninstalling

Removing an IE Switch X-200 from a DIN rail:

1. First disconnect all connected cables.
2. Use a screwdriver to release the lower DIN rail catch of the device and pull the lower part of the device away from the rail.

Figure 4-2 IE Switch X-200 removing from a DIN rail (35 mm)

4.1.2 Installation on a standard rail

Installing an IE Switch X-200 on a SIMATIC S7-300 standard rail

1. Place the upper guide at the top of the IE Switch X-200 housing in the S7 standard rail.
2. Screw the IE Switch X--200 to the underside of the standard rail.
3. Fit the connectors for the power supply.
4. Fit the connectors for the signaling contact.
5. Insert the terminal blocks or M12 cable connectors into the sockets on the IE Switch X-200.

Figure 4-3 IE Switch X-200 installation on a SIMATIC S7-300 standard rail

Uninstalling

Removing an IE Switch X-200 from a SIMATIC S7-300 standard rail

1. First disconnect all connected cables.
2. Loosen the screws on the underside of the S7 standard rail and lift the IE Switch X-200 away from the rail.

4.1.3 Wall mounting

Wall mounting

1. For wall mounting, use suitable mounting fittings for the wall
   (for example, for a concrete wall, four plugs 6 mm diameter and 30 mm long, 4 screws 3.5 mm diameter and 40 mm long).
2. Connect the electrical cable connecting cables.
3. Fit the connectors for the signaling contact.
4. Insert the terminal blocks or M12 cable connectors into the sockets on the IE Switch X-200.

For more exact dimensions, please refer to the section "Dimension drawings".

Note

The wall mounting must be capable of supporting at least four times the weight of the IE Switch X-200 (see "Technical specifications").

4.2 Connection

4.2.1 Power supply

Power supply

The power supply is connected using a 4-pin plug-in terminal block.

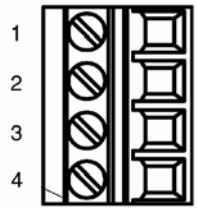
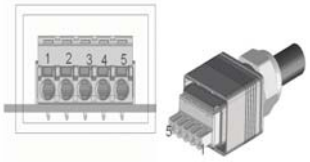
Exceptions:

1. SCALANCE X208 PRO
   The power supply of the SCALANCE X208 PRO is connected using 4-pin a-coded M12 sockets.

2. SCALANCE X204 IRT PRO and X202-2P IRT PRO
   The power supply of the SCALANCE X204 IRT PRO and the SCALANCE X202-2P IRT PRO is connected using a Power Plug PRO (PROFINET-compliant connector technology)
   These two devices also have two 24 V power connectors, one for the switched mode and one for the unswitched 24 V power supply (two plug-in power connectors). Using these power interfaces, it is possible to loop through the power for ET200 PRO with PROFINET-compliant connector technology. It is also possible to supply power to the module via an external T-piece (device supply over only one power interface).

The power supply is connected over a high resistance with the enclosure to allow an ungrounded set up. The power supply is non-floating.

Table 4-1 Pin assignment

Pin number	**Assignment (exceptions: SCALANCE X208PRO X204IRT PRO X202-2P IRT PRO)**	**SCALANCE X208PRO**	**X204IRT PRO X202-2P IRT PRO**
			
Pin 1	L1+ 24 V DC	L1+ 24 V DC	L1
Pin 2	M1	n. c.	N1
Pin 3	M2	M	L2
Pin 4	L2+ 24 V DC	n. c.	N2
Pin 5	-	-	PE

Note

Because the SCALANCE X204 IRT PRO and SCALANCE X202-2P IRT do not have a redundant power supply, the power supply must be connected to L1 and N1.

⚠ WARNING

IE Switches X-200 are designed for operation with SELV (Safety Extra Low Voltage). This means that only safety extra-low voltages (SELV) complying with IEC950/EN60950/ VDE0805 can be connected to the power supply terminals.

Measures must be taken to prevent transient overvoltages of more than 40% of the rated voltage. This is the case if the devices are operated exclusively with SELV (Safety Extra Low Voltage).

The power supply unit for the IE Switch X-200 power supply must meet NEC Class 2, as described by the National Electrical Code(r) (ANSI/NFPA 70).

The power of all connected power supply units must total the equivalent of a power source with limited power (LPS limited power source).

If the device is connected to a redundant power supply (two separate power supplies), both must meet these requirements.

The signaling contact can be subjected to a maximum load of 100 mA (safety extra-low voltage (SELV), 24 V DC).

Never operate an IE Switch X-200 with AC voltage or DC voltage higher than 32 V DC.

CAUTION

If IE Switches X-200 are supplied over long 24 V power supply lines or networks, measures are necessary to prevent interference by strong electromagnetic pulses on the supply lines. These can result, for example, due to lightning or switching of large inductive loads.

One of the tests used to attest the immunity of devices of the IE Switches X-200 to electromagnetic interference was the "surge immunity test" according to EN61000-4-5. This test requires overvoltage protection for the power supply lines. A suitable device is, for example, the Dehn Blitzductor VT AD 24 V type no. 918 402 or comparable protective element.

Manufacturer: DEHN+SÖHNE GmbH+Co.KG, Hans-Dehn-Str.1, Postfach 1640, D-92306 Neumarkt, Germany.

4.2.2 Signaling contact

Signaling contact

The signaling contact (relay contact) is a floating switch with which error/fault states can be signaled by breaking the contact.

The signaling contact is connected to a 2-pin plug-in terminal block.

Exception:
The signaling contact on the SCALANCE X208PRO, SCALANCE X204 IRT PRO and SCALANCE X202-2P IRT PRO is connected using a 5-pin b-coded M12 socket.

Table 4-2 Pin assignment

IE Switches X-200 (except for X208PRO)		**SCALANCE X208PRO, SCALANCE X204 IRT PRO , SCALANCE X202-2P IRT PRO**	
Pin number	**Assignment**	**Pin number**	**Assignment**
			
Pin 1	F1	Pin 1	F1
Pin 2	F2	Pin 2	n. c.
-	-	Pin 3	n. c.
-	-	Pin 4	F2
-	-	Pin 5	n. c.

The following errors/faults can be signaled by the signaling contact:

- The failure of a link at a monitored port.
- The failure of one of the two redundant power supplies.

  Note

  SCALANCE X204 IRT PRO and SCALANCE X202-2P IRT PRO have no redundant power supply

- Incompatible C-PLUG was inserted.

The connection or disconnection of a communication node on an unmonitored port does not lead to an error message.

The signaling contact remains activated until the error/fault is eliminated or until the current status is applied as the new desired status using the button.

Exception:
On the SCALANCE X208PRO, the signaling contact remains activated until the error/fault is eliminated or until the current status is applied as the new desired status by Web Based Management.

When the IE Switch X-200 is turned off, the signaling contact is always activated (open).

4.2.3 Grounding

Installation on a DIN rail

The device is grounded over the DIN rail.

S7 standard rail

The device is grounded over its rear panel and the neck of the screw.

Wall mounting

The device is grounded by the securing screw in the unpainted hole.

Please note that IE Switches X-200 must be grounded over one securing screw with minimum resistance.

If an IE Switch X-200 is mounted on a non-conducting base, a grounding cable must be installed. The grounding cable is not supplied with the device. Connect the paint-free surface of the device to the nearest grounding point using the grounding cable.

4.2.4 Fitting the IE FC RJ-45 Plug 180

Assembly of the IE FC RJ-45 Plug 180 on an IE FC Standard Cable

For information on assembling an IE FC RJ-45 Plug 180 on a SIMATIC NET Industrial Ethernet FastConnect cable, please refer to the instructions supplied with the IE FC RJ-45 Plug.

Figure 4-4 IE FC RJ-45 Plug 180

Inserting the IE FC RJ-45 Plug 180

1. Insert the IE FC RJ-45 Plug 180 into the twisted pair port of the IE Switch X-200 until it locks in place.

Figure 4-5 Inserting the IE FC RJ-45 Plug 180

The flush fit and locking mechanism of the PROFINET-compliant IE FC RJ-45 Plug 180 along with the securing collar on the TP port of the IE Switch X-200 guarantee a robust node connection suitable for industrial conditions providing tensile and bending strain relief for the twisted pair socket.

Removing the IE FC RJ-45 Plug 180

1. Press on the locking mechanism of the IE FC RJ-45 Plug 180 gently to remove the plug.

Figure 4-6 Releasing the RJ-45 Plug

If there is not enough space to release the lock with your hand, you can also use a 2.5 mm screwdriver. You can then remove the IE FC RJ-45 Plug 180 from the twisted pair socket.

Figure 4-7 Releasing the RJ-45 Plug with a screwdriver

4.2.5 Fitting the IE RJ 45 Plug Pro and IE SC RJ Plug Pro

IE RJ 45 Plug Pro and IE SC RJ Plug Pro

You will find the instructions for assembling a SIMATIC NET Industrial Ethernet cable with the industrial IE RJ-45 Plug Pro or IE SC RJ Plug Pro in the documentation supplied with the connectors.

Figure 4-8 IE RJ 45 Plug Pro or IE SC RJ Plug Pro

Inserting the IE RJ 45 Plug Pro or IE SC RJ Plug Pro

1. Insert the IE RJ 45 Plug Pro or IE SC RJ Plug Pro until they click in place in the IE Switches X-200.

Figure 4-9 IE RJ 45 Plug Pro or IE SC RJ Plug Pro inserted

Removing the IE RJ 45 Plug Pro or IE SC RJ Plug Pro

1. Remove IE RJ 45 Plug Pro or IE SC RJ Plug Pro from the socket of the IE Switches X-200.

Figure 4-10 Removing IE RJ 45 Plug Pro or IE SC RJ Plug Pro

4.3 Maintenance

Maintenance

If a fault develops, please send the device to your SIEMENS service center for repair. Repairs on-site are not possible.

Configuration / diagnostics using remote mechanisms

5

5.1 Assignment of an IP address

5.1.1 Introduction

Initial assignment of an IP address

Note

The initial assignment of an IP address for an IE Switch X-200 is not possible with Web Based Management because this configuration tool requires that an IP address is already available.

There are three ways of assigning an IP address to an unconfigured device, using:

- DHCP
- STEP 7 V 5.3 plus SVP 1 or higher
- Primary Setup Tool V3 or higher
  Before the IP address can be assigned with the setup tool, the IE Switch X-200 must be accessible over Ethernet.

Supported operating systems

The Primary Setup Tool can be installed and run under the following operating systems:

- Windows XP Professional
- Windows 2000 Professional SP2

5.1.2 Configuration with the Primary Setup Tool

5.1.2.1 Configuration with the Primary Setup Tool

Primary Setup Tool (PST)

The Primary Setup Tool is on the CD supplied with the device.

Downloading the Primary Setup Tool

The Primary Setup Tool is available on the Internet at:

SIEMENS Automation and Drives Service & Support

Entry ID 19440762

http://www4.ad.siemens.de/view/cs/xx/19440762

(xx = German de, English en, French fr, Italian it, Spanish es)

Supported operating systems

The Primary Setup Tool can be installed and run under the following operating systems:

Windows XP Professional

Windows 2000 Professional SP2

5.1.2.2 Installing the Primary Setup Tool

Procedure

Follow the steps outlined below to install the Primary Setup Tool on your computer:

1. Double-click on the setup.exe file name in the Windows Explorer or start the program with the Windows menu Start > Run.
2. In the Choose Setup Language dialog box, select the language in which you want to make the installation.
3. The first dialog box of the Installation Wizard appears. Click on the Next button.
4. The dialog box for selecting the installation folder appears. Click on the Next button if you want to accept the default C:\Program Files\Siemens\Primary Setup Tool\ . If you want to specify a different folder, you can open a dialog box for selecting a folder by clicking the Browse button.

   Start installation by clicking the Next button.
5. A final dialog box confirms successful installation. Click the Finish button to close this dialog box.
6. The Primary Setup Tool is now available in the installation folder under the name s7wnpstx.exe. Before you can use this program, the DLC protocol must be installed on the computer.

5.1.2.3 The DLC protocol

Checking

The Primary Setup Tool uses the DLC protocol for communication with the modules. This protocol is not supplied with Windows XP and is not installed automatically by the installation program of the Primary Setup Tool. This means that it must be installed separately with this operating system.

Procedure

Follow the steps below to check whether or not the DLC protocol is installed on a computer:

1. Select the menu Start > Settings > Control Panel > Network and Dial-up Connections.
2. Select the connection to your Ethernet communications module.
3. Open the Properties dialog using the context-sensitive menu (right mouse button). The General tab lists all the protocols and services. The DLC protocol should be listed and selected:

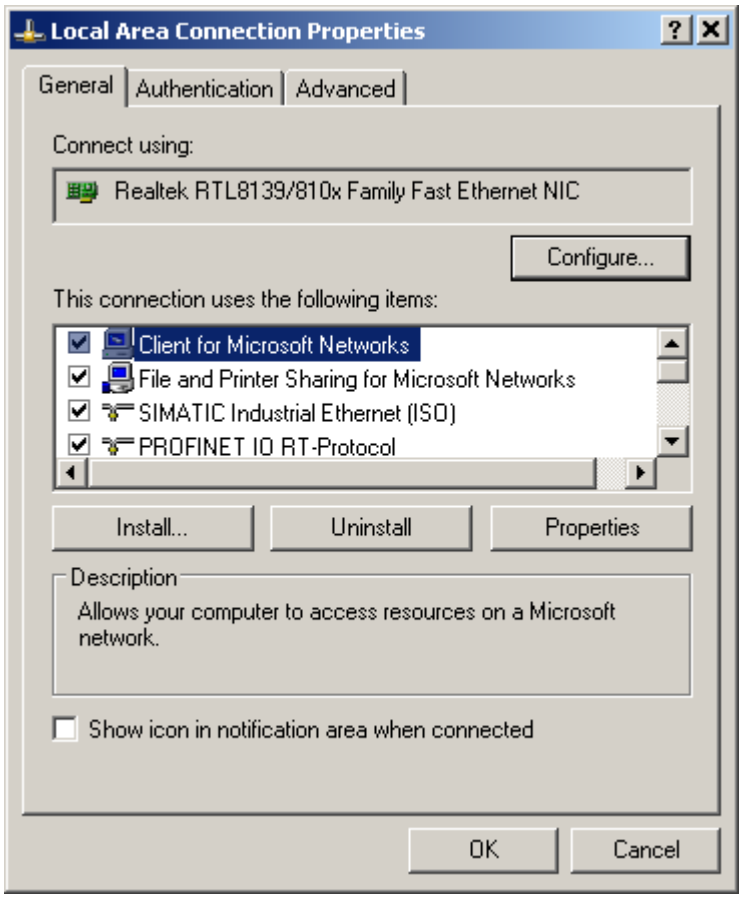


Figure 5-1 Properties of Local Area Connection-1

5.1.2.4 Installing the DLC protocol

Procedure

Follow the steps below to install the DLC protocol on a computer:

1. Select the menu Start > Settings > Control Panel > Network and Dial-up Connections.
2. Select the connection to your Ethernet communications module.
3. Open the Properties dialog using the context-sensitive menu (right mouse button).
4. Click the Install... button in the General tab
5. In the Network Component Type dialog, select Protocol and click the Add... button.
6. In the Network Protocol dialog box, Have Disk... button.
7. In the Install from Disk dialog box, click the Browse... button.
8. In the file selection dialog, change to the installation folder of the Primary Setup Tool (default C:\Program Files\Siemens\Primary Setup Tool\) and open the DLC Protocol subfolder.
9. Select the NETDLC.INF file and click the Open button.
10. In the Install from Disk dialog box, click the OK button. The protocol is installed, the DLC Protocol entry is added to the list box in the Properties dialog box of the communications module (Windows 2000/XP) for Siemens Primary Setup Tool.
11. Close the Properties dialog box by clicking on the OK button

5.1.2.5 Working with the Primary Setup Tool

Language selection

After starting the Primary Setup Tool for the first time, a dialog box opens in which you set the language for the program. You can also set the language separately in the Settings > Language menu.

Selecting the network adapter

If there is more than one network adapter in your computer, you can open the Settings > Network Adapter menu and specify which adapter is used by the Primary Setup Tool for network access. This menu displays a maximum of four network adapters, however only those for which the DLC protocol is activated are shown.

Browsing the Network

Before you assign IP addresses with the PST, you must first locate the configurable devices in the network. Start this search with the steps outlined below:

- Select the Network > Browse menu command.
- Press the F5 function key.
- Click on the magnifier icon in the toolbar below the menu bar.

While the Primary Setup Tool browses the network, the Browse Network dialog is displayed with a progress bar. On completion of the search, the Primary Setup Tool displays a list with all the devices it has found in the left-hand pane.

5.1.2.6 Configuring a module

If you click an entry in the list, the Primary Setup Tool displays information on the selected device in the right-hand pane.

Procedure

Follow the steps below to configure a device:

1. Click on the plus symbol in front of the device symbol or double-click on the device symbol to display all interfaces of the device.
2. Click on the interface you want to configure. The Primary Setup Tool displays the input dialog for the configuration data in the right-hand pane of the program window. Depending on the selected settings, some text boxes or check boxes may be disabled. The MAC address box is always disabled because this address is a property of the device that cannot be modified. The Client ID parameter and DNS is also not supported by the SCALANCE X-200.
3. Decide how the device will obtain its IP address:
   - Dynamically from a DHCP server:
     Select the Obtain IP address from DHCP server option button.
   - Manual assignment by the user:
     Select the Assign IP parameters option button.
4. Make the following entries if you have decided to assign the IP address manually:
   - Enter the IP address for the device in the IP Address box. In each subarea separated by periods, you can enter a number between 0 and 255, other entries are rejected by the program.
   - Enter the subnet mask in the subnet mask box.
   - When necessary, select the Router check box and enter the IP address of the router in the relevant text box. The information on the router is necessary if the computer with which you are creating the configuration is not in the same subnet as the device you are configuring.

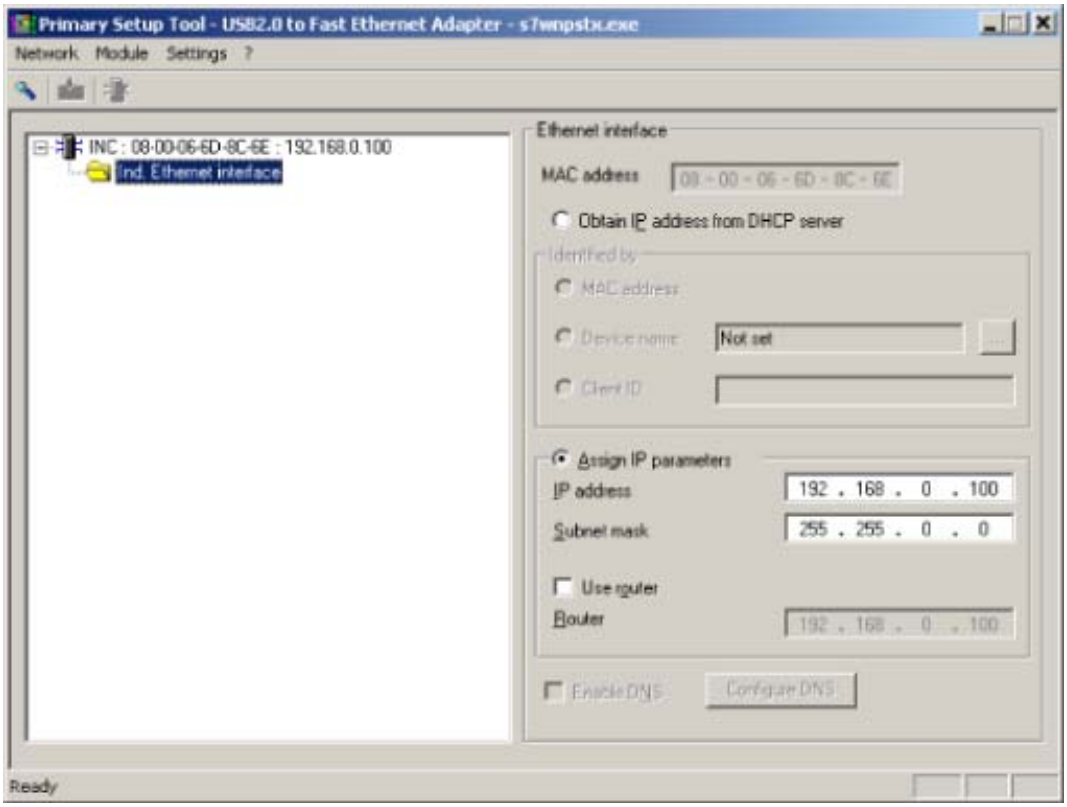


Figure 5-2 Dialog for configuring a module

Downloading configuration data to the module

Transfer the configuration data to the device by following the steps outlined below:

1. Select the module you want to configure in the left half of the program window. If an interface is selected and the input screen for the configuration data is displayed, it is not possible to download the configuration data.
2. Start the download with one of the steps outlined below:
   - Select the Module > Download menu command.
   - Click on the second button from the left in the toolbar (S7 modules with yellow arrow).

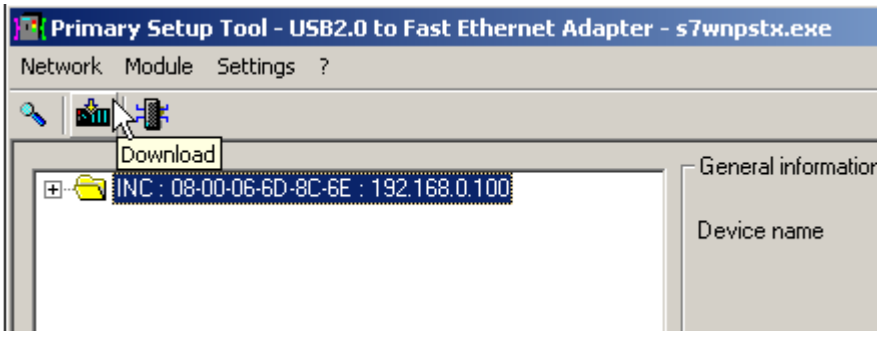


Figure 5-3 Dialog for downloading a module

Starting Web Based Management

INC devices (Industrial Network Component) such as the SCALANCE X-200 have a Web Based Management. Select the device you want to configure with Web Based Management and perform one of the following steps to start Web Based Management:

- Select the Module > INC Browser menu command.
- Click on the third button from the left in the toolbar (module with four blue cords).

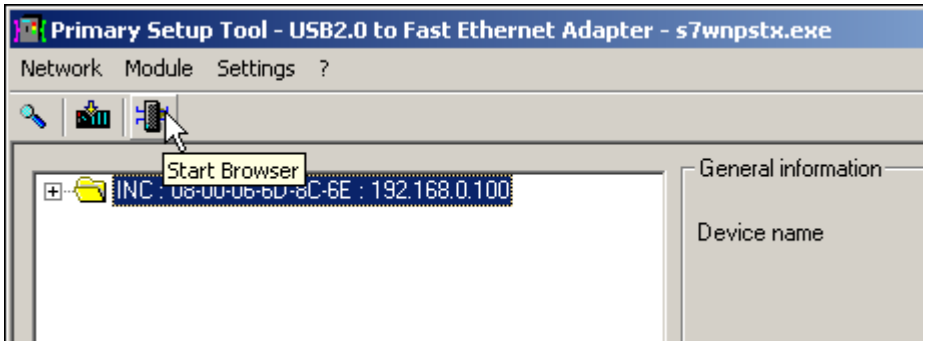


Figure 5-4 Dialog for starting Web Based Management

If the Module > Start INC Browser and the module icon are deactivated, there is no Web Based Management for the selected module.

Removing a module

You can remove a module from the list in the left part of the program window by selecting the Module > Remove Module menu command. Using this menu has no effect on the existence of a module in the network, after browsing the network again, all modules would be displayed again.

Assigning a PN IO device name

You can assign a PN IO device name to PROFINET IO-compliant devices. After selecting the Module > Assign Name menu, a dialog box opens in which you can enter the required name. The name can be a maximum of 255 characters long and over and above letters and numbers can contain only the special characters slash, hyphen, and underscore.

Finding the location of a device

With the Module > Ring command, you can make the LEDs of the relevant device flash. After selecting this menu, a dialog appears with which you can start and finish signaling.

The activity of the LEDs indicates which device is assigned to a particular list entry in the program window.

5.1.3 Configuration with DHCP

The Dynamic Host Configuration Protocol (DHCP) is a protocol that allows the dynamic configuration of IP addresses and provides additional information.

This allows the use of a limited number of existing IP addresses by managing the address assignment centrally. When a PC is first turned on in a LAN, the PC logs on at a server with this service. The server assigns a free IP address so that at the next startup, a connection is not absolutely necessary.

Properties of DHCP

- The use of DHCP is not restricted to the startup phase. DHCP can also be used during operation.
- The IP address remains valid for a period set by the DHCP server known as the "lease time". When this expires, the DHCP server must be requested to assign an IP address again.
- Generally, there is no fixed address assignment; in other words, when a client requests an IP address again, it is normally assigned a different address. It is, however, possible to configure the DHCP server so that it makes a fixed address assignment.

RFC - Request for Comments

The following RFC can be downloaded from the Internet:

RFC 2131 - Dynamic Host Configuration Protocol

5.2 Configuration with Web Based Management (WBM)

5.2.1 Principle

With Web Based Management, the IE Switch X-200 provides various diagnostic functions that can be operated using an Internet browser (for example the Microsoft Internet Explorer or Netscape).

The functions are controlled using a Java script stored on the IE Switch X-200 that can be loaded by the browser.

To access IE Switches X-200, the IP address of the device must be entered in the address box of the browser.

The functions provided by Web based Management differ depending on the device variant.

5.2.2 Requirements for Web Based Management

To be able to access the IE Switch X-200 using WBM, the following requirements must be met:

Internet Browser

You require a PC with an Internet browser. We recommend that you use a Microsoft Internet Explorer, version 5.5 or higher or a Netscape Browser, version 7.2 or higher. To execute the script, Java script must be activated in the browser.

Note

Firewall

When using a firewall, access to the following ports must be possible:

- Telnet port 23/TCP
- TFTP port 69
- HTTP port 80/TCP
- SNMP port 161/UDP
- SNMP trap port 162/UDP

5.2.3 Starting WBM

LOGIN

WBM starts with a login screen:

This screen only appears if you are using Microsoft Internet Explorer. If you are using a different browser (for example, Netscape, Mozilla, etc.), this screen may be different.

Figure 5-5 LOGIN screen

Enter the following in this screen:

- User name
- Password

The factory defaults are:

Administrator	User
User: admin	User: user
Password: admin	Password: user

NOTICE
Change the password for security reasons. If you reset the device, the passwords are also reset to the factory defaults.

5.2.4 LED simulation

Display of the operating state

IE Switches X-200 have several LEDs that provide information on the operating state of the devices. Depending on its location, direct access to the IE Switch X-200 is not always possible. WBM therefore provides a simulated display of the LEDs.

In the dialog (see below), you can see a schematic representation of an IE Switch X-200 with the existing modules and the corresponding LEDs. The send display is not displayed realistically; in other words, the LEDs do not flash.

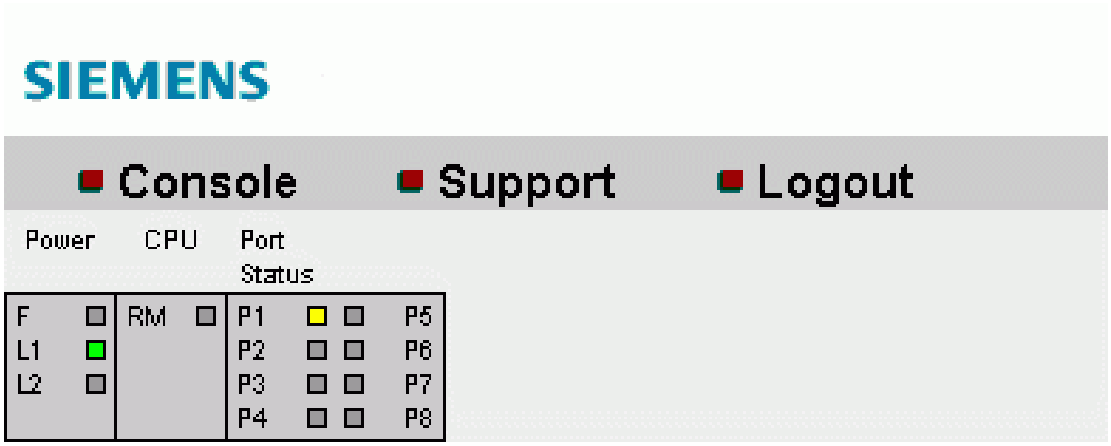


Figure 5-6 "LED Simulation" display

5.2.5 Working with WBM

Note

The Command Line Interface (CLI) is used only for service purposes and is not available to the user.

Navigation bar

The upper menu bar of WBM provides 3 links:

- Console
  This link opens a console window. In this window, you can enter CLI commands. You are then connected to the switch over a TELNET connection.
- Support
  This link initiates an Internet connection that takes you directly to the support pages of SIEMENS AG. This is only possible when the PC supports an Internet connection.
- Log out
  Closes the browser window.

Buttons

- Refresh
  If you click on this button, current data of the switch is requested and displayed.
- Set Values
  If you click on this button, configuration data you have set is stored on the device.

Note

It is only possible to change the configuration if you log on as "admin".

5.2.6 WBM menus

5.2.6.1 Management menus - the Start menu

The Start dialog

The following start the dialog appears after you start the WBM.

Select the required function from the menu on the left-hand side.

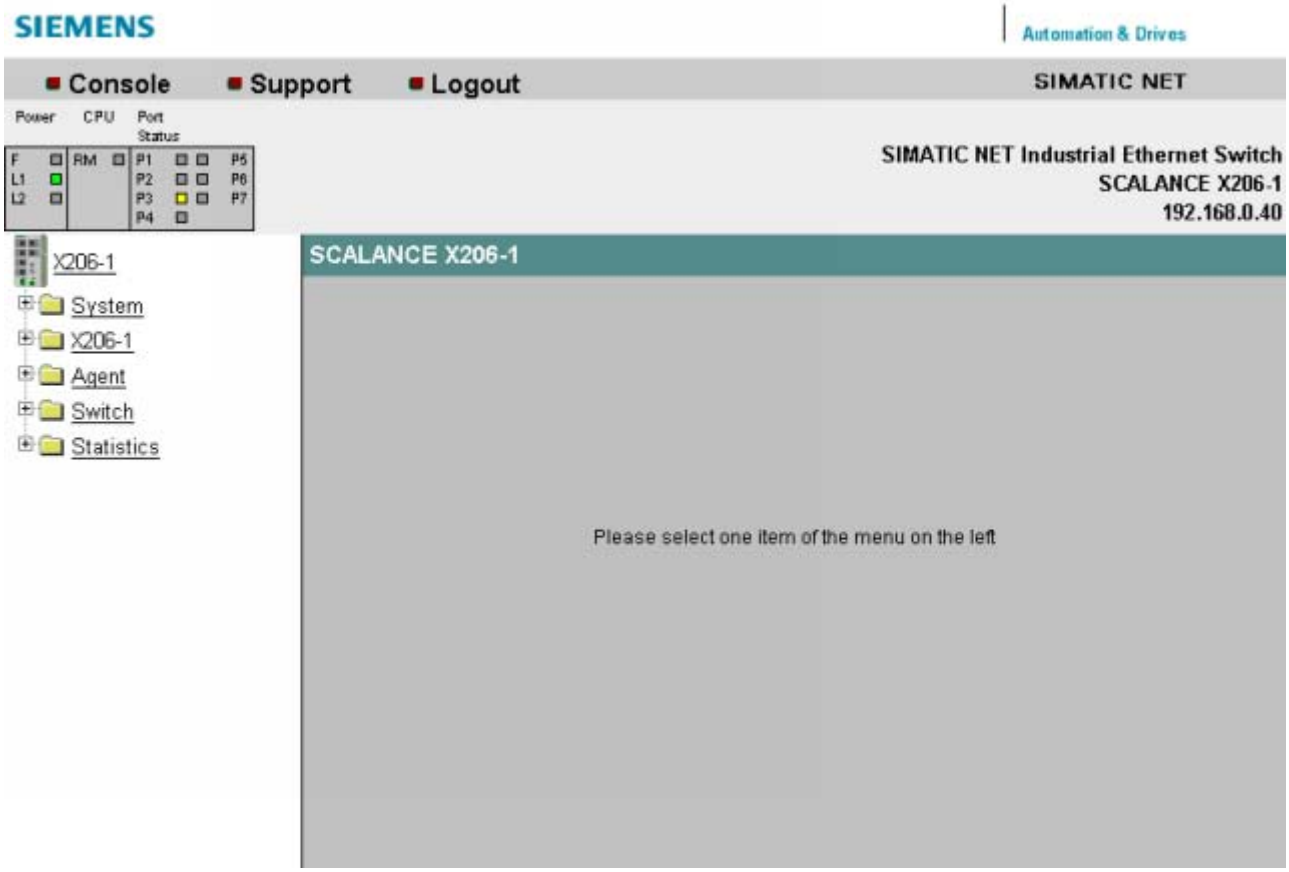


Figure 5-7 "Start Menu" dialog

5.2.6.2 The "System Configuration" WBM menu

System Configuration

The following dialog appears when you click on the System folder icon:

The first three text boxes are read-only and display general information on the device.

You can specify parameters in the lower three fields.

You can change the System Contact, System Location, and System Name.

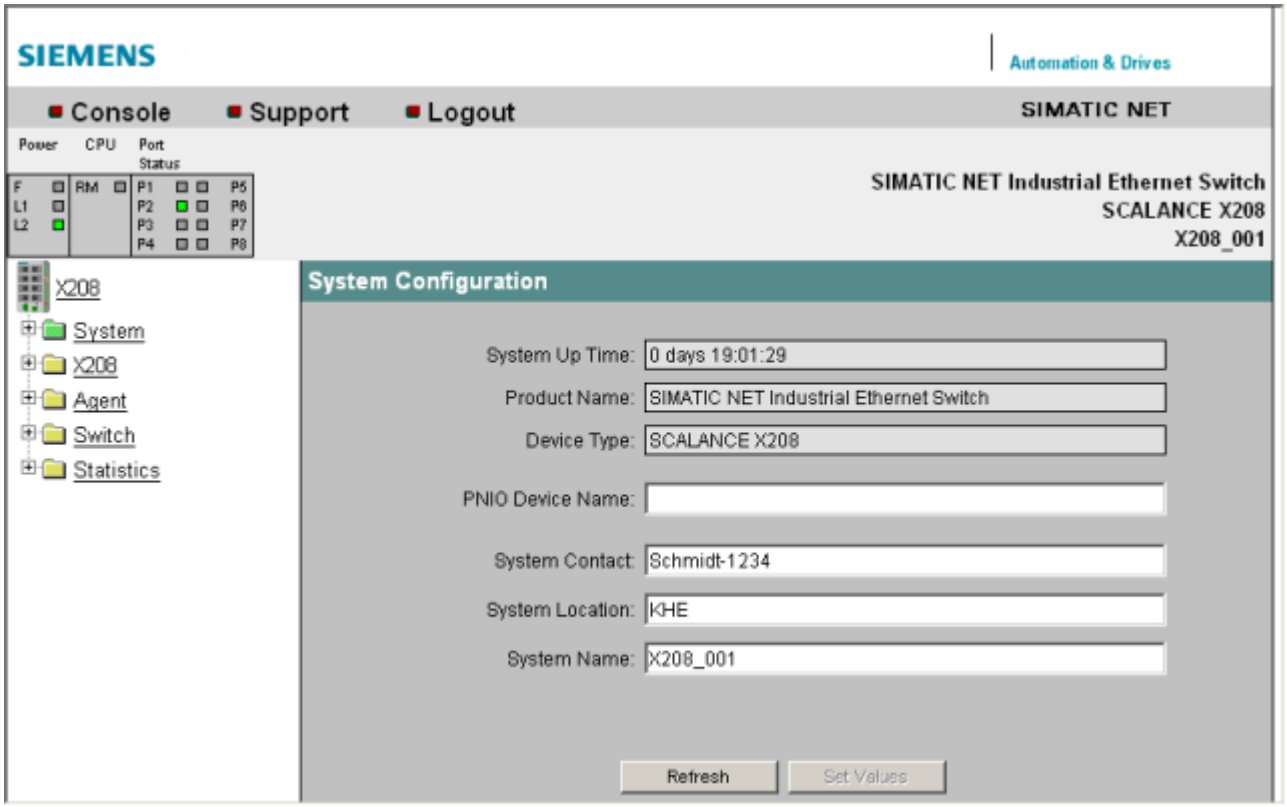


Figure 5-8 "System Configuration" dialog

System up time
The system up time displays the operating time of the device since the last restart.

Product Name
Displays the product name.

Device Type
Displays the device type.

PNIO Device Name
In this box, you enter the name under which the device will be accessible in PROFINET IO mode.

NOTICE
If IE Switches X-200 are operated without PROFINET functionality, the devices must not be assigned a PNIO device name. If a PNIO device name is assigned for IE Switches X-200, it is assumed that the devices are part of a PROFINET system. The PNIO device name can be set and deleted with Web Based Management, using the PST tool or with STEP 7. If an IE Switch X-200 is reset to the factory defaults, the PNIO device name is deleted.

System Contact
Enter the name of a contact person responsible for managing the device in this box.

System Location
In this box, you enter a location for the device, for example a room number.

System Name text box
Enter a description of the device in this box.

You apply your settings with Set Values.

5.2.6.3 The "System Identification & Maintenance" WBM menu

System Identification & Maintenance

The following dialog shows information on the parameters for Identification & Maintenance.

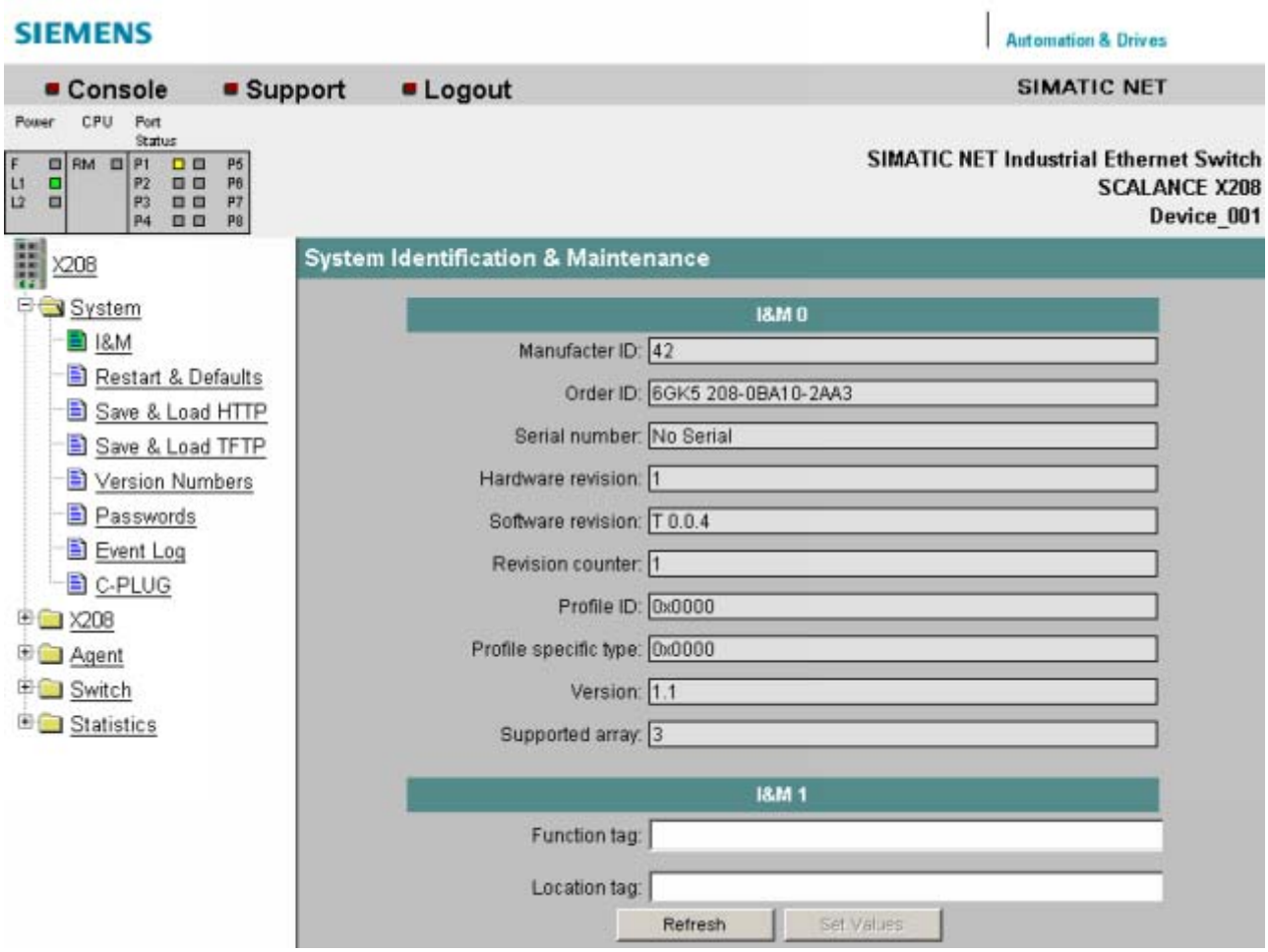


Figure 5-9 System Identification & Maintenance

I&M0
Here, you can see the individual parameters for Identification & Maintenance.

I&M 1
Function tag
Here, you can enter the function tag (plant designation).

Location tag
Here, you can enter the location tag (location identifier).

5.2.6.4 The "System Restart & Defaults" WBM menu

System Restart & Defaults

In this screen, there is a button with which you can restart the device and various options for resetting to the device defaults.

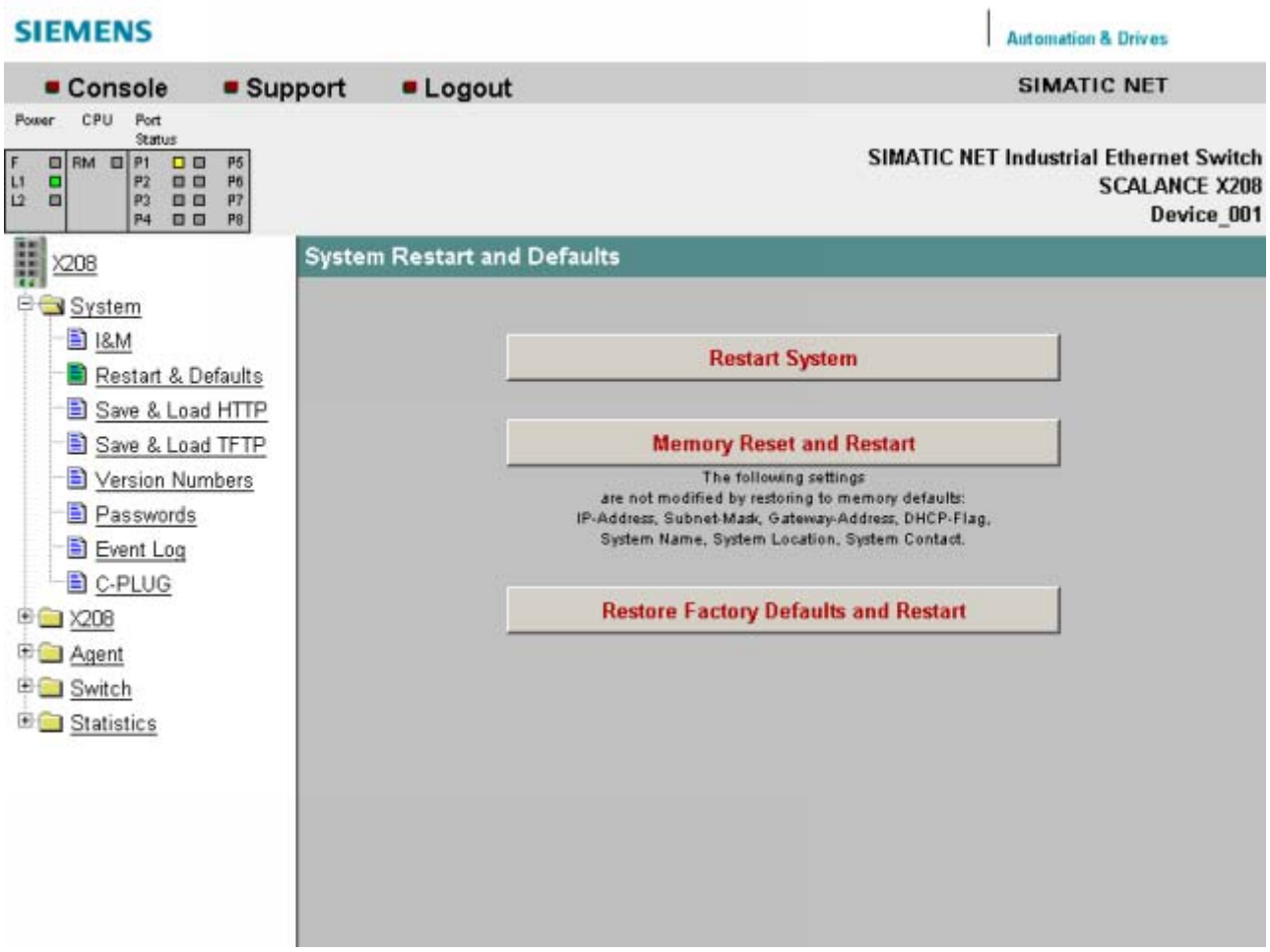


Figure 5-10 "Restart and Defaults" dialog

Restart System
Click this button to restart the IE Switch X-200. You must confirm the restart in a dialog box. During a restart, the IE Switch X-200 is reinitialized, the internal firmware is reloaded. The learned entries in the address table are deleted. You can leave the browser window open while the IE Switch X-200 restarts.

Memory Reset and Restart
Click on this button to restore the factory configuration settings with the exception of the following parameters:

- IP address
- Subnet mask
- Gateway address

- IP address of the default router
- DHCP flag
- System name
- System location
- System contact
- PNIO Device Name

There is no automatic restart, the parameters take effect immediately. In the user mode, this button is invisible.

Restore Factory Defaults and Restart
Click this button to restore the factory defaults for the configuration. The protected defaults are also reset. In the user mode, this button is invisible.

Note

The IE Switch X-200 must be given a new IP address before it can be accessed again.

5.2.6.5 The "System Save & Load HTTP" WBM menu

System Save & Load HTTP

The WBM allows you to store configuration information in an external file on your client PC or to load such data from an external file from the PC to the IE Switch X-200.

You can also load new firmware from a file located on your client PC. You can make the entries required for this on the page of the System Save & Load HTTP menu.

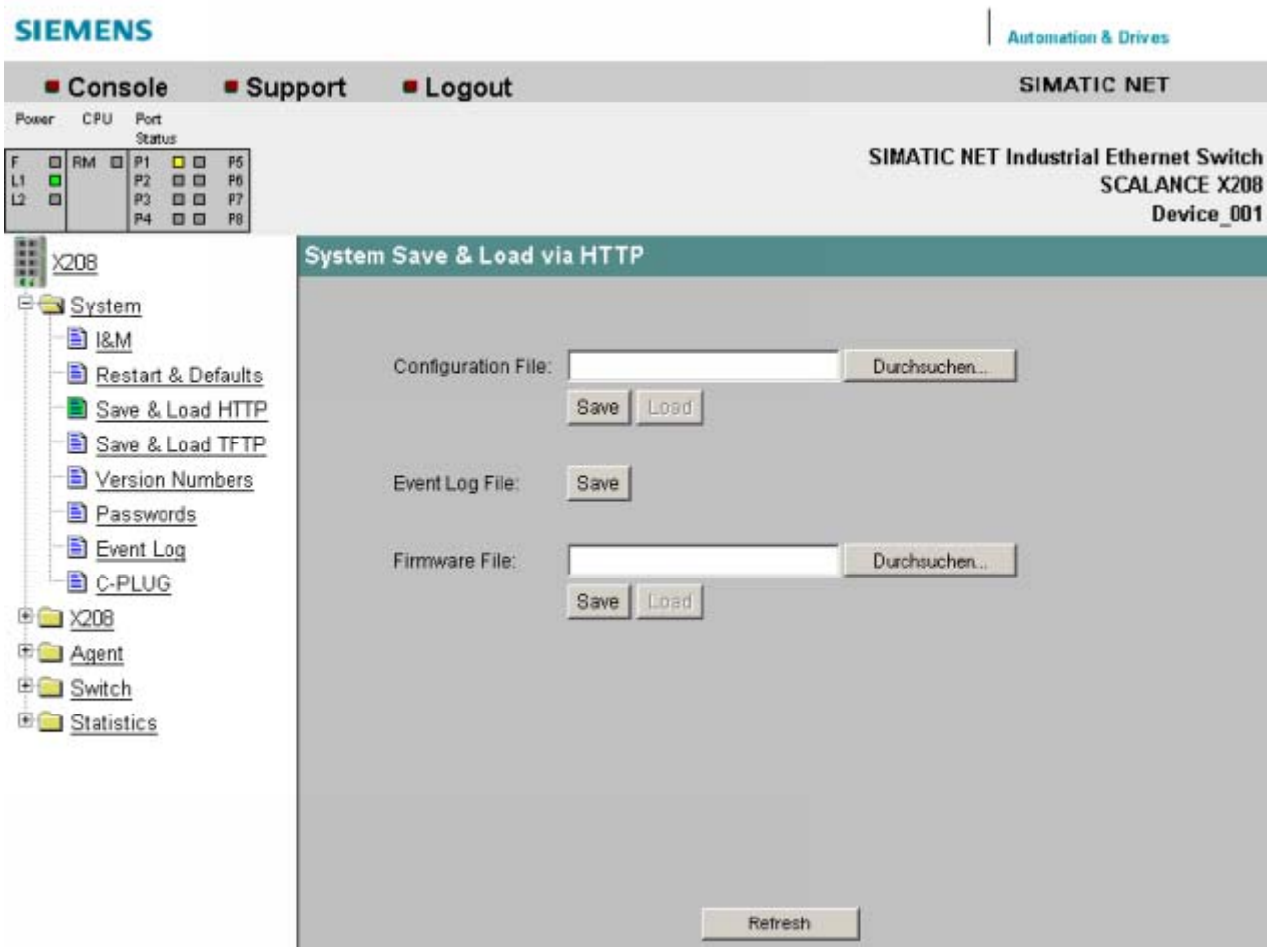


Figure 5-11 "System Save and Load via HTTP" dialog

Configuration File
Name and possibly also folder path of the configuration file (maximum 32 characters) that you want to load on the IE Switch X-200 or where you want to store the current configuration information

Event Log File (relevant only for IRT switches)
By clicking "Save", you can save the event table (event log file) to your PC.

Firmware File
Name and possibly also folder path of the file (maximum 32 characters) from which you want to load the new firmware.

5.2.6.6 The "System Save & Load TFTP" WBM menu

System Save & Load TFTP

The WBM allows you to store configuration information in an external file on a TFTP server or to load such data from an external file from the TFTP server to the IE Switch X-200.

You can also load new firmware from a file located on the TFTP server. You can make the entries required for this on the page of the System Save & Load TFTP menu.

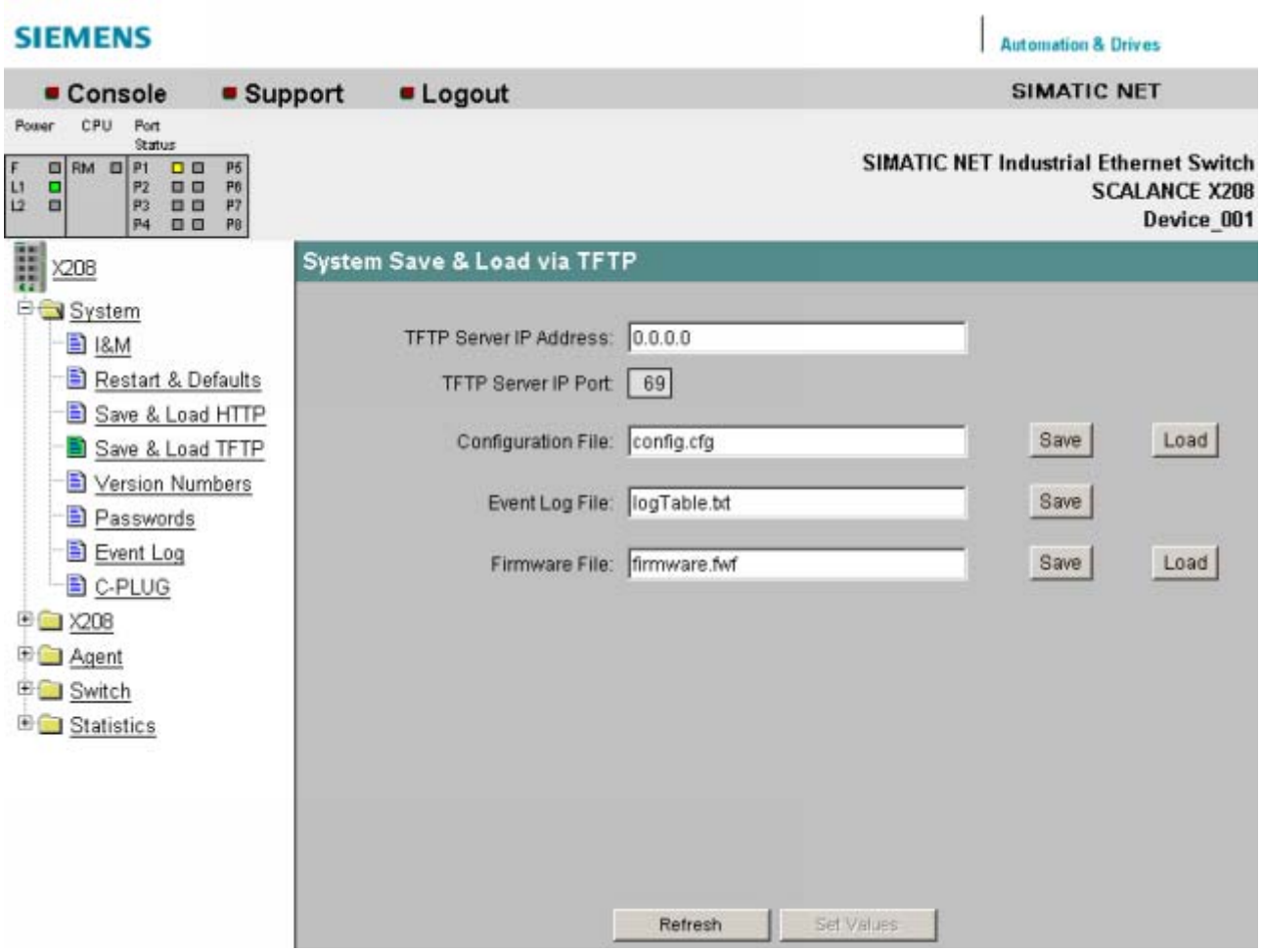


Figure 5-12 "System Save and Load via TFTP" dialog

TFTP Server IP Address
The IP address of the TFTP server with which you want to exchange data.

TFTP Server IP Port
The port of the TFTP server over which data exchange will be handled. If necessary, you can change the default value 69 to your own requirements.

Configuration File
Name and possibly also folder path of the configuration file (maximum 32 characters) that you want to load on the IE Switch X-200 or where you want to store the current configuration information

Event Log File (relevant only for IRT switches)
By clicking "Save", you can save the event table (event log file) to your PC.

Firmware File
Name and possibly also folder path of the file (maximum 32 characters) from which you want to load the new firmware.

5.2.6.7 The "System Version Numbers" WBM menu

System Version Numbers

This dialog informs you about the current versions of the boot software, firmware, and hardware.

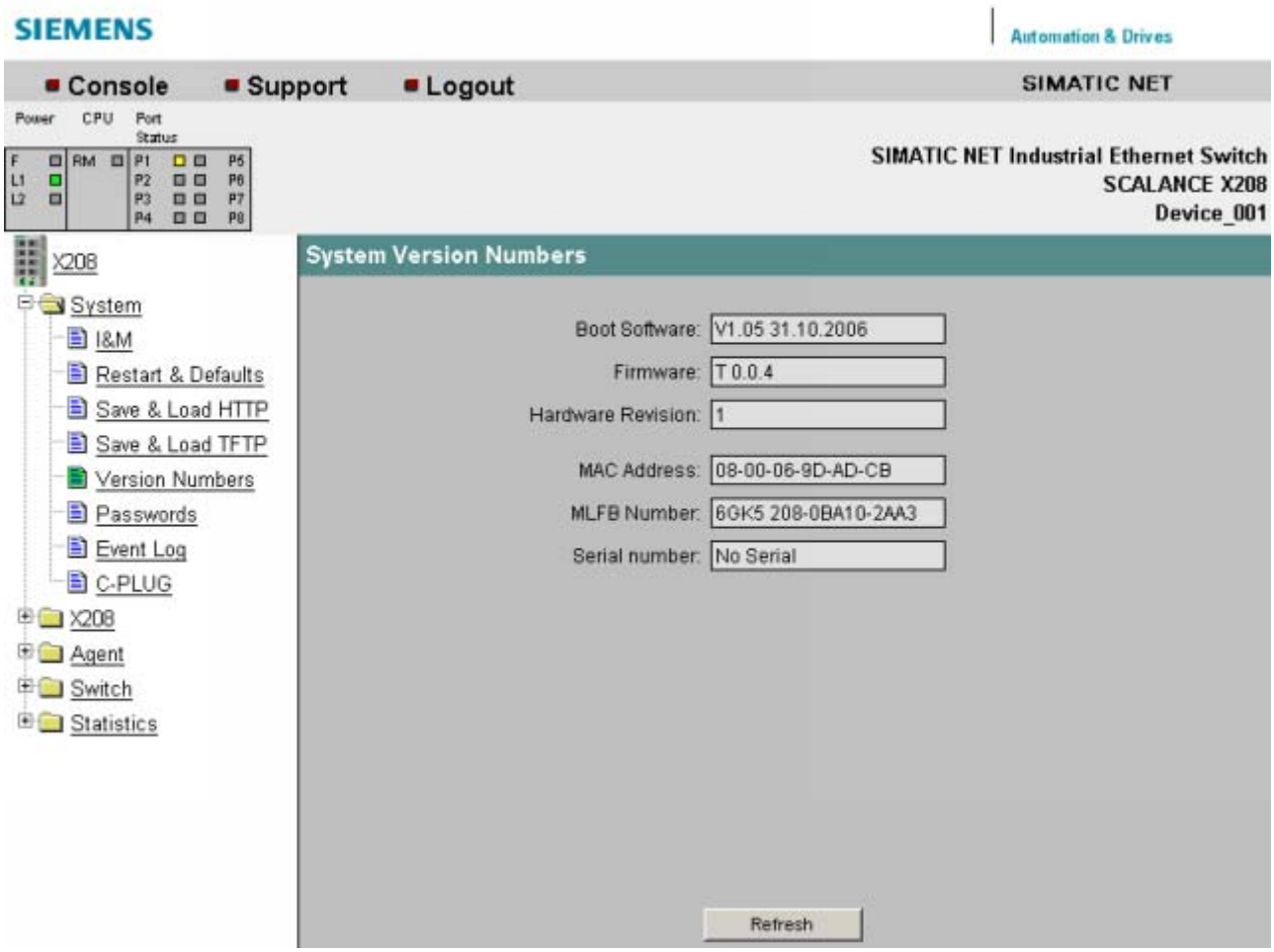


Figure 5-13 "System Version Numbers" dialog

Boot Software
The version of the boot software is displayed here. The boot software is stored permanently on the IE Switch X-200 and is used to load new firmware.

Firmware
The version of the firmware running on the IE Switch X-200.

Hardware Revision
Displays the version of the device.

MAC Address
Displays the MAC address of the device.

MLFB Number
Displays the order number of the device.

Serial number
Displays the serial number of the device.

5.2.6.8 The "System Passwords" WBM menu

System Passwords

In this dialog, if you are the administrator, you can change the passwords for Admin and User

You apply your settings with Set Value.

Note

Default password when supplied: admin

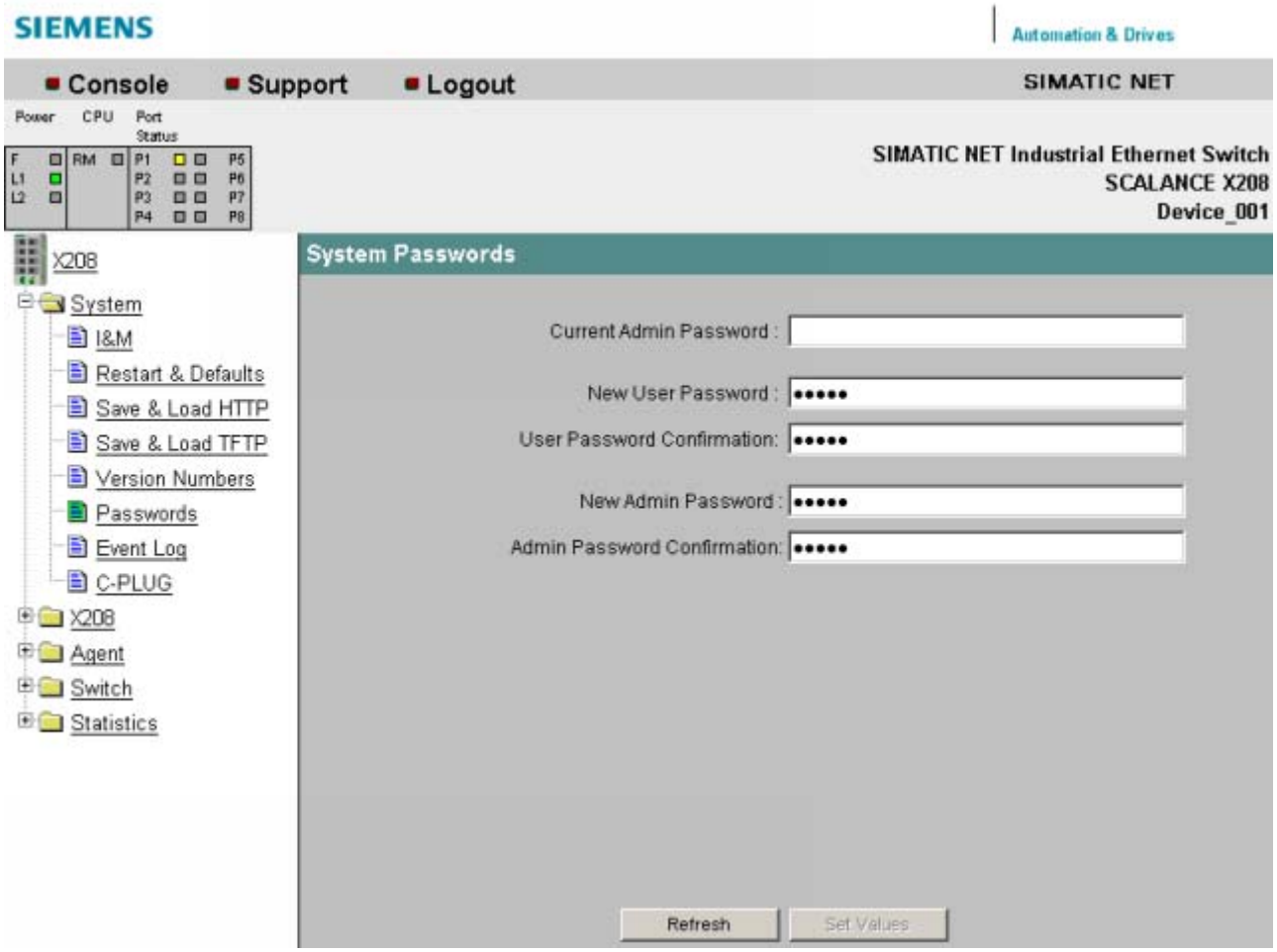


Figure 5-14 "System Passwords" dialog

5.2.6.9 The "System Event Log Table" WBM menu

System Event Log Table (relevant for IRT switches only)

This dialog shows which events occurred and when. You specify the events that are to be logged in the "Agent/Event Config" dialog.

You can save the event table using HTTP or TFTP in the System menu.

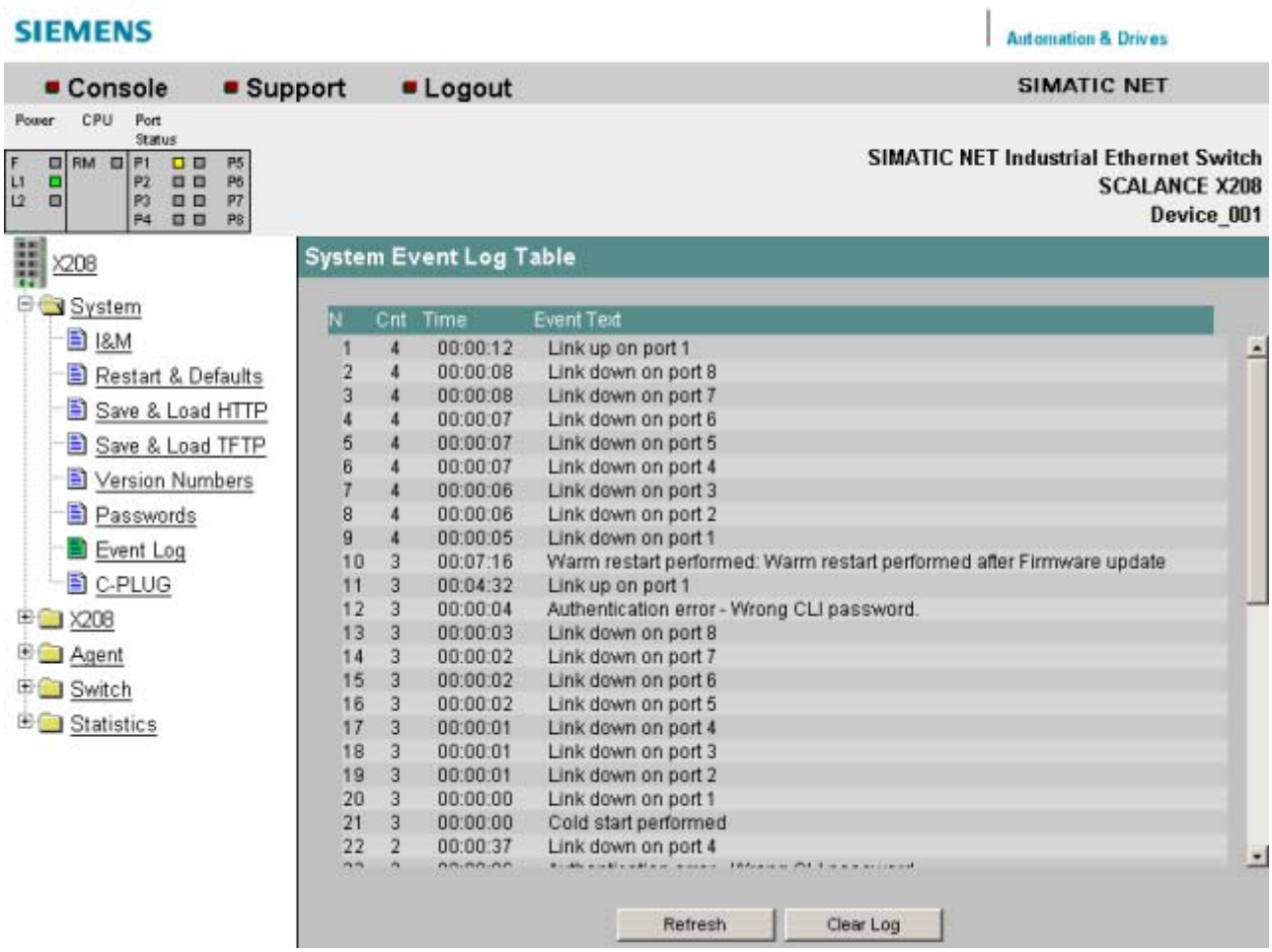


Figure 5-15 "System Event Log Table" dialog

5.2.6.10 The "Status" WBM menu

Status

This page provides information on operating states such as power supply and fault status.

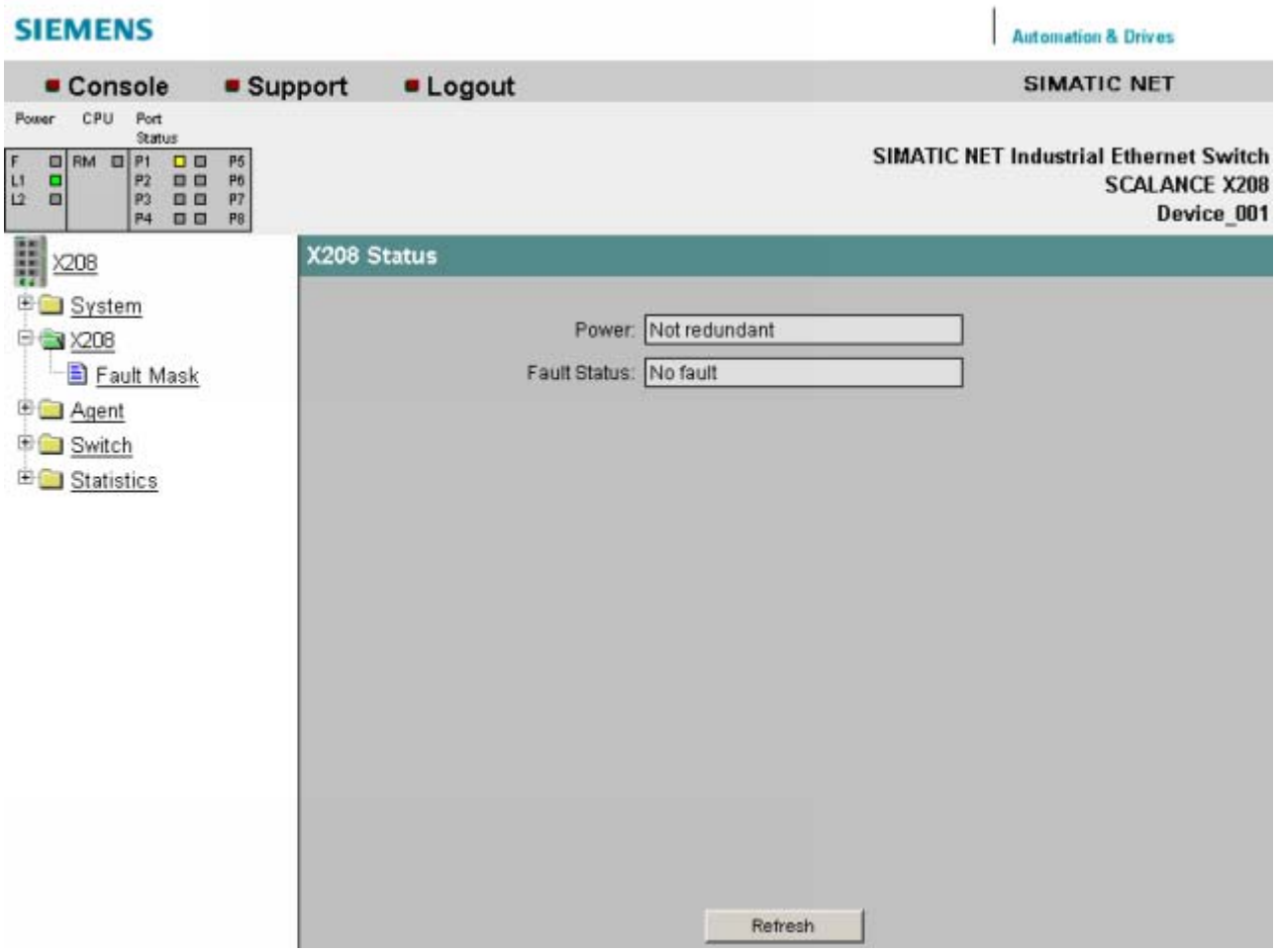


Figure 5-16 "Status" dialog

Power
This displays how the power is supplied.

Fault Status
Indicates whether faults have occurred.

5.2.6.11 The "Fault Mask" WBM menu

Fault Mask

The settings in this dialog allow you to monitor the link status and the redundant power supply.

The values of the settings that can be made with the button configuration are also displayed.

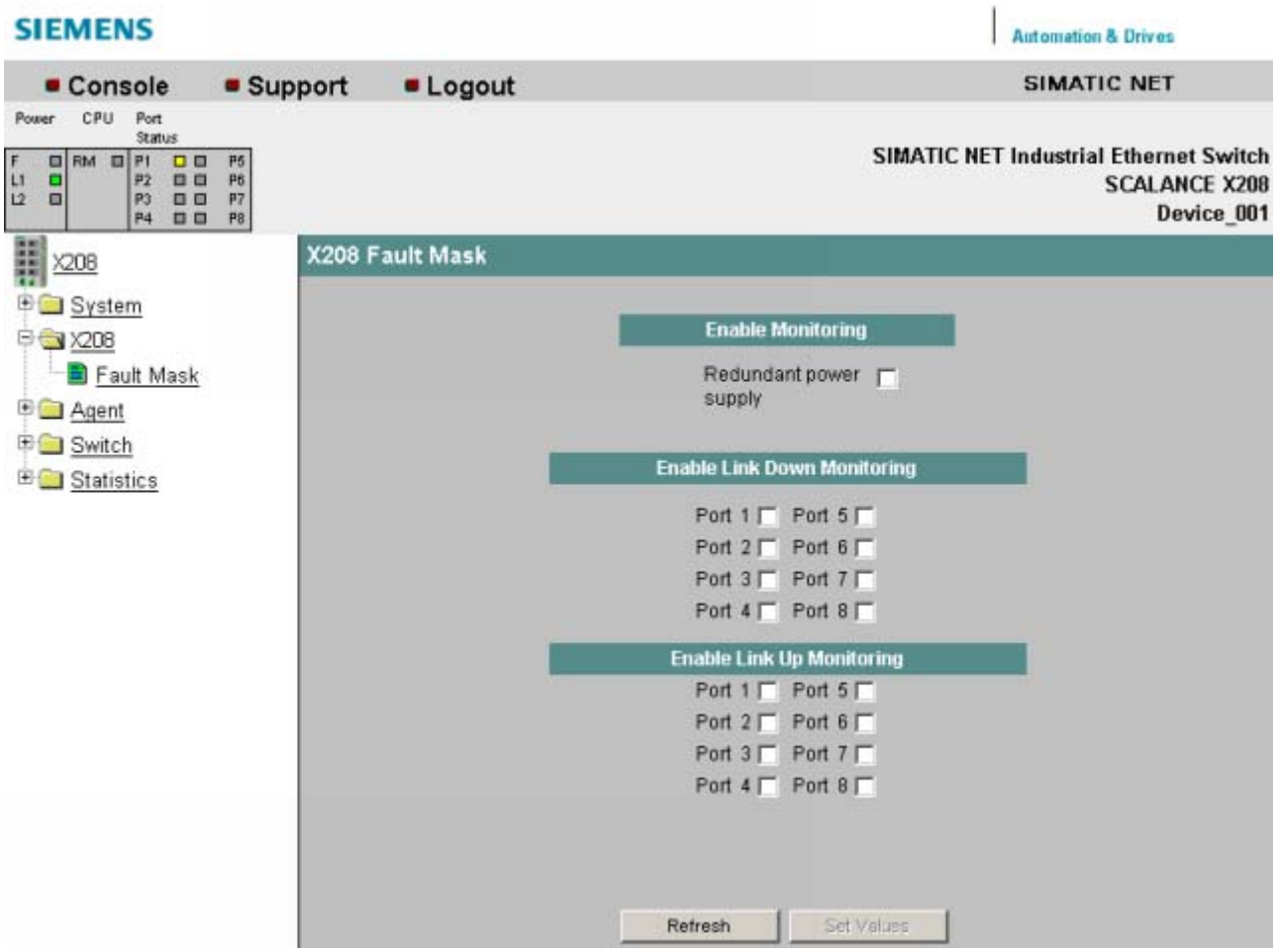


Figure 5-17 "X204IRT Fault Mask" dialog

Enable Monitoring

Redundant power supply
Here, you can enable/disable monitoring of the redundant power supply.

Note

SCALANCE X204 IRT PRO and SCALANCE X202-2P IRT PRO have no redundant power supply

---

Ring redundancy manager
(relevant for IRT switches only)

Standby manager
(relevant for IRT switches only)

Enable Link Down Monitoring
Here, you can enable/disable monitoring of the link status for the individual ports.

Enable Link Up enabled
Here, you can enable/disable monitoring of the link status for the individual ports.

Note

With the default setting as supplied, no port is monitored; in other words, the fault mask is empty.

5.2.6.12 The "Ring Redundancy" WBM menu

"Ring redundancy"

In this dialog, you can configure the ports for fast ring redundancy. You can also specify whether this device is operating as a ring manager or client.

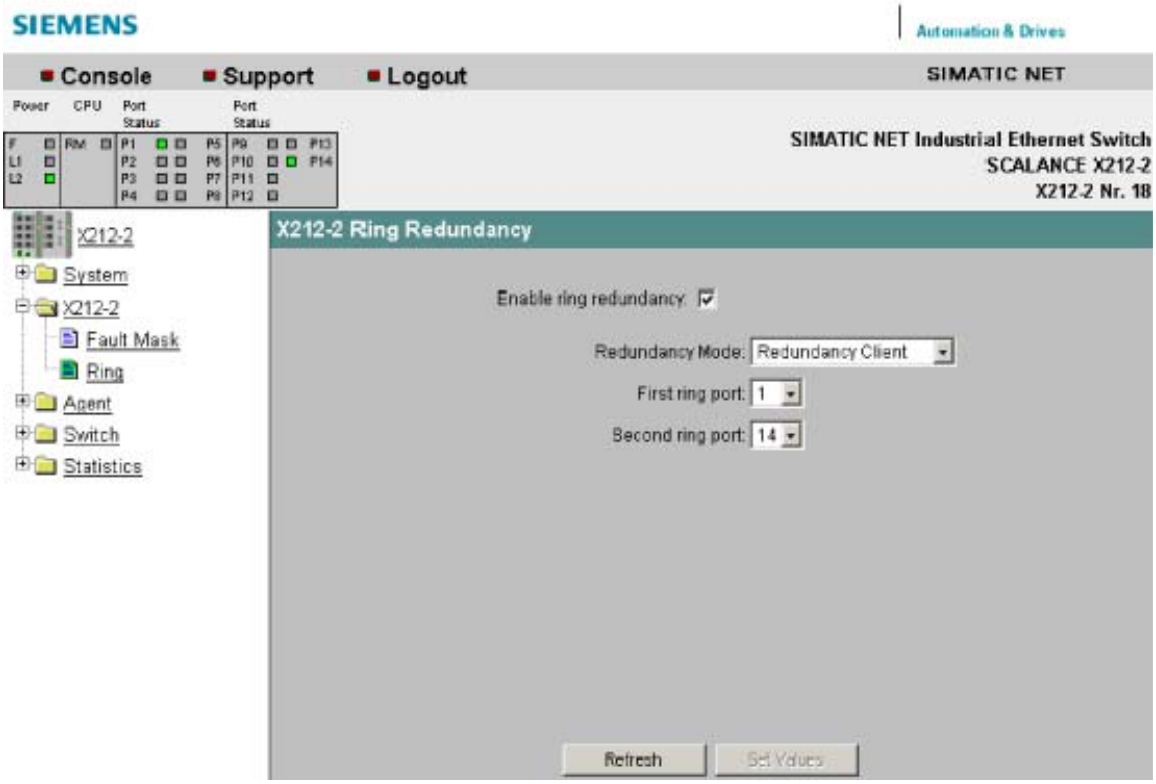


Figure 5-18 Ring Redundancy WBM menu (if the device is operating as a ring client)

Enable ring redundancy
This function is enabled and disabled here.

Redundancy mode
Here, you select the operating mode for the device:

- Redundancy Client
- Redundancy Manager

First ring port (relevant only when client redundancy is selected)
Here, you select which is the first ring port.

Second ring port (relevant only when client redundancy is selected)
Here, you select which is the second ring port.

Static ring port (relevant only when redundancy manager is selected)
The port that is active in the ring is specified here.

Isolated ring port (relevant only when redundancy manager is selected)
The port that closes the ring but via which no communication takes place is specified here.

Redundancy manager state (relevant only when redundancy manager is selected)
This indicates whether or not the ring manager is enabled or disabled.

Number of state changes (relevant only when redundancy manager is selected)
This shows how often the redundancy manager switched to a different path due to an interruption in the ring since the device was turned on.

Maximum delay (ms) (relevant only when redundancy manager is selected)
This shows how much a test frame was delayed. (Test frames are placed on the ring to detect interruptions in the ring.) For reliable functioning of the network, values > 20 ms are necessary.

Note

The standby function always requires an activated redundancy client. If the standby manager is "enabled", the following message appears if you attempt to disable ring redundancy or to switch to redundancy manager:
Cannot disable "Redundancy" if "Standby Manager" is enabled.

Note

When shipped, ring ports are set as default, refer to the section "Overview of the product characteristics", table "Overview of the connection options".

5.2.6.13 The "Standby Manager" WBM menu

Standby manager

The standby manager mechanism allows the redundant coupling of two rings. You enable the standby manager function here.

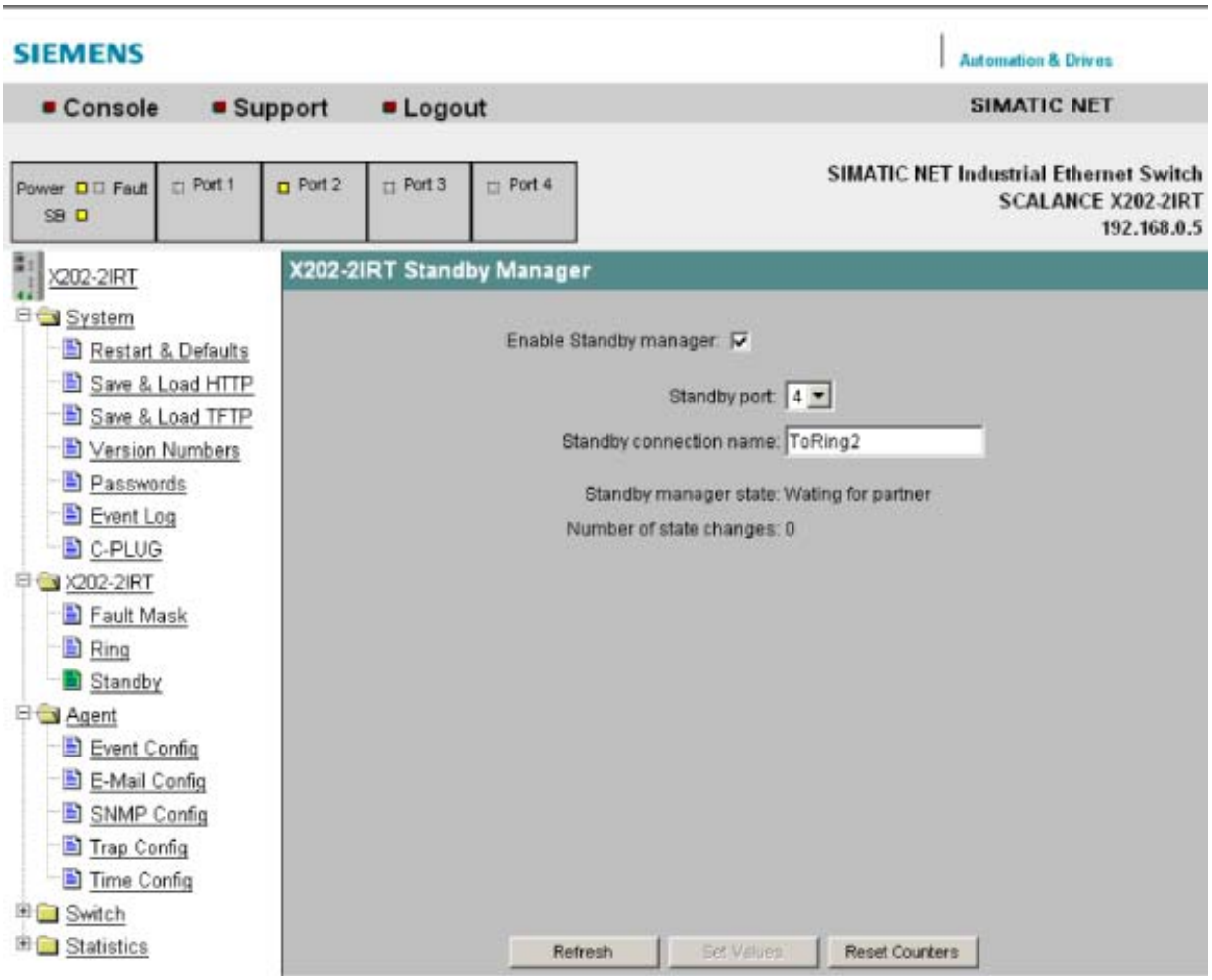


Figure 5-19 X204IRT Standby Manager dialog

Enable Standby manager
This function is enabled and disabled here.

Standby port
The coupling to the second ring is carried out over the port selected here.

Standby connection name
The name of the standby connection is entered here; this must be identical to the name entered for the standby partner.

Note

The standby manager always requires an activated redundancy client. If this is not activated, the following error message is displayed:

"Cannot enable Standby manager if Redundancy is disabled and not in "Redundancy Client" mode."

If the redundancy manager is enabled, standby mode is also not possible. In this case, the following error message is displayed:

"Cannot enable Standby manager if Redundancy Manager is enabled."

Note

If two devices are linked by the standby function, the "Standby" function must be enabled on both devices.

5.2.6.14 The "C-PLUG Information" WBM menu

C-PLUG Information

This dialog tells you whether a C-PLUG is inserted and whether it is valid for the IE Switch X-200.

If a C-PLUG is inserted, the dialog displays the configuration data it contains.

You cannot modify the contents of the boxes.

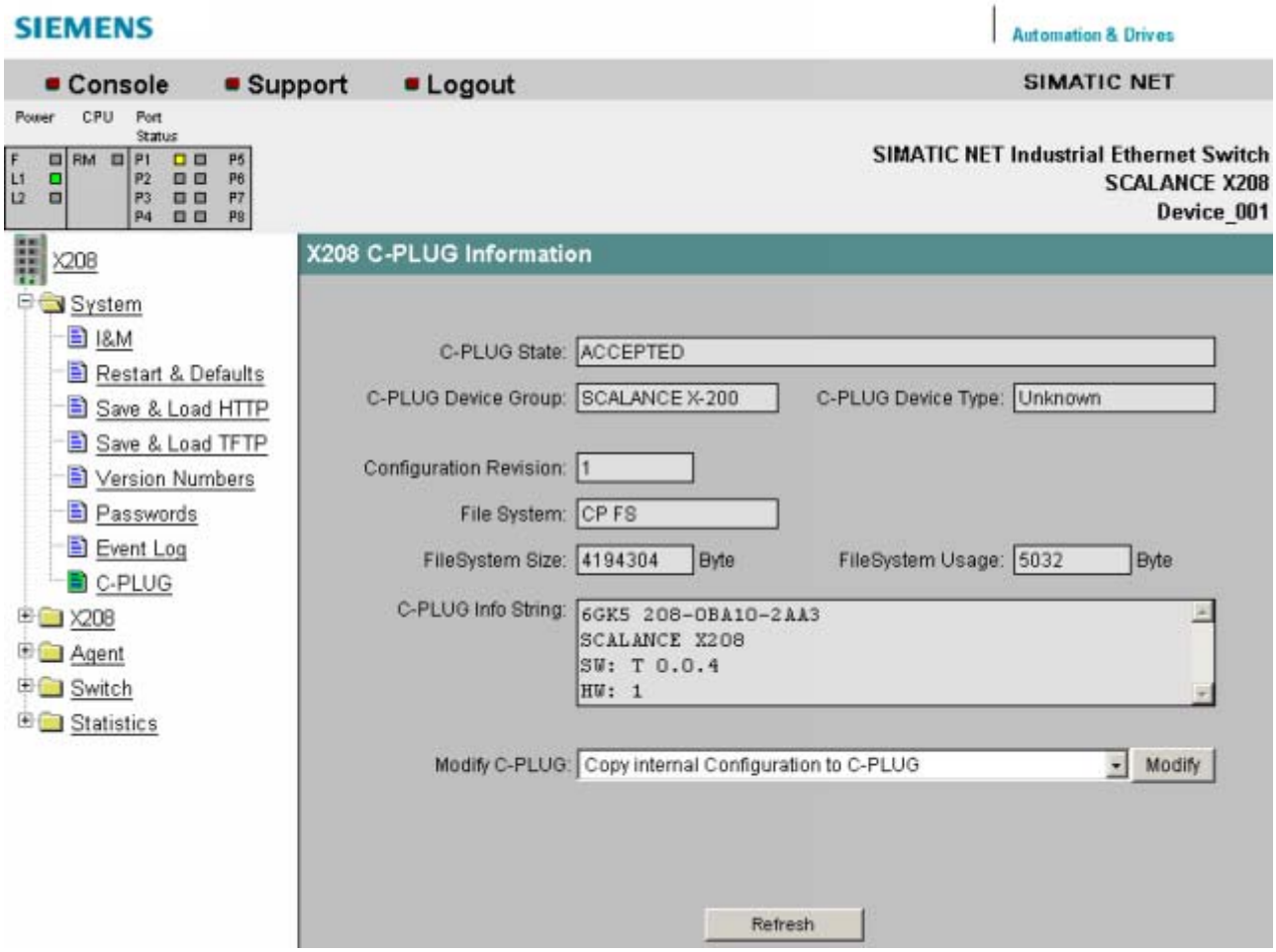


Figure 5-20 "C-PLUG Information" dialog

C-PLUG State
The status of the C-PLUG is displayed here.

- ACCEPTED
  There is a C-PLUG with a valid and matching content inserted in the device.

- NOT ACCEPTED
  No C-PLUG or C-PLUG inserted but invalid or incompatible content. This status is also displayed if the C-PLUG was formatted during operation.
- NOT ACCEPTED, HEADER CRC ERROR
  A C-PLUG with bad content is inserted.
- NOT PRESENT
  There is no C-PLUG inserted in the IE Switch X-200.

C-PLUG Device Group
Indicates the SIMATIC NET product line that previously operated with the C-PLUG.

C-PLUG Device Type
Indicates the device type within the product line that previously operated with the C-PLUG.

Configuration Revision
Indicates the version of the configuration structure. This information relates to the configuration options supported by the IE Switch X-200. This does not relate to the actual hardware configuration. This information does not change if you add or remove modules or extenders. The information can, however, change if you update the firmware.

File System
Shows the type of C-PLUG file system.

File System Size
Shows the maximum storage capacity of the C-PLUG file system.

File System Usage
Shows the storage space being utilized in the C-PLUG file system.

C-PLUG Info String
Displays information on the device that used the C-PLUG previously, for example order number, type designation, version of hardware and software.

Modify C-PLUG, Modify button
If you are logged on as administrator, you can make settings here.

- **Copy internal Configuration to C-PLUG and Restart**
  The configuration in the internal flash of the switch is copied to the C-PLUG and this is followed by a restart.
  Use case:
  The IE Switch X-200 starts up with a C-PLUG inserted. This contains a configuration that differs from the IE Switch X-200 or a configuration containing errors. If you have not made any changes to the configuration after starting up the device, you can use this function to overwrite the content of the C-PLUG with the original device configuration.
- **Copy default Configuration to C-PLUG and Restart**
  This stores the configuration with all factory default values on the C-PLUG. This is followed by a restart during which the IE Switch X-200 restarts with these default values.
- **Clean C-PLUG (Low Level Format, Configuration lost)**
  Deletes all data from the C-PLUG and triggers low-level formatting. This is not followed by an automatic restart and the device displays an error. You can clear this error status by restarting or removing the C-PLUG.

Your selection is then adopted when you click "Modify".

5.2.6.15 The "Agent Configuration" WBM menu

Agent Configuration

This menu item provides you with options for the IP address. You can specify whether or not the IE Switch X-200 obtains its IP address dynamically or has a fixed address. You can also enable options for accessing the IE Switch X-200 such as TELNET or SNMP.

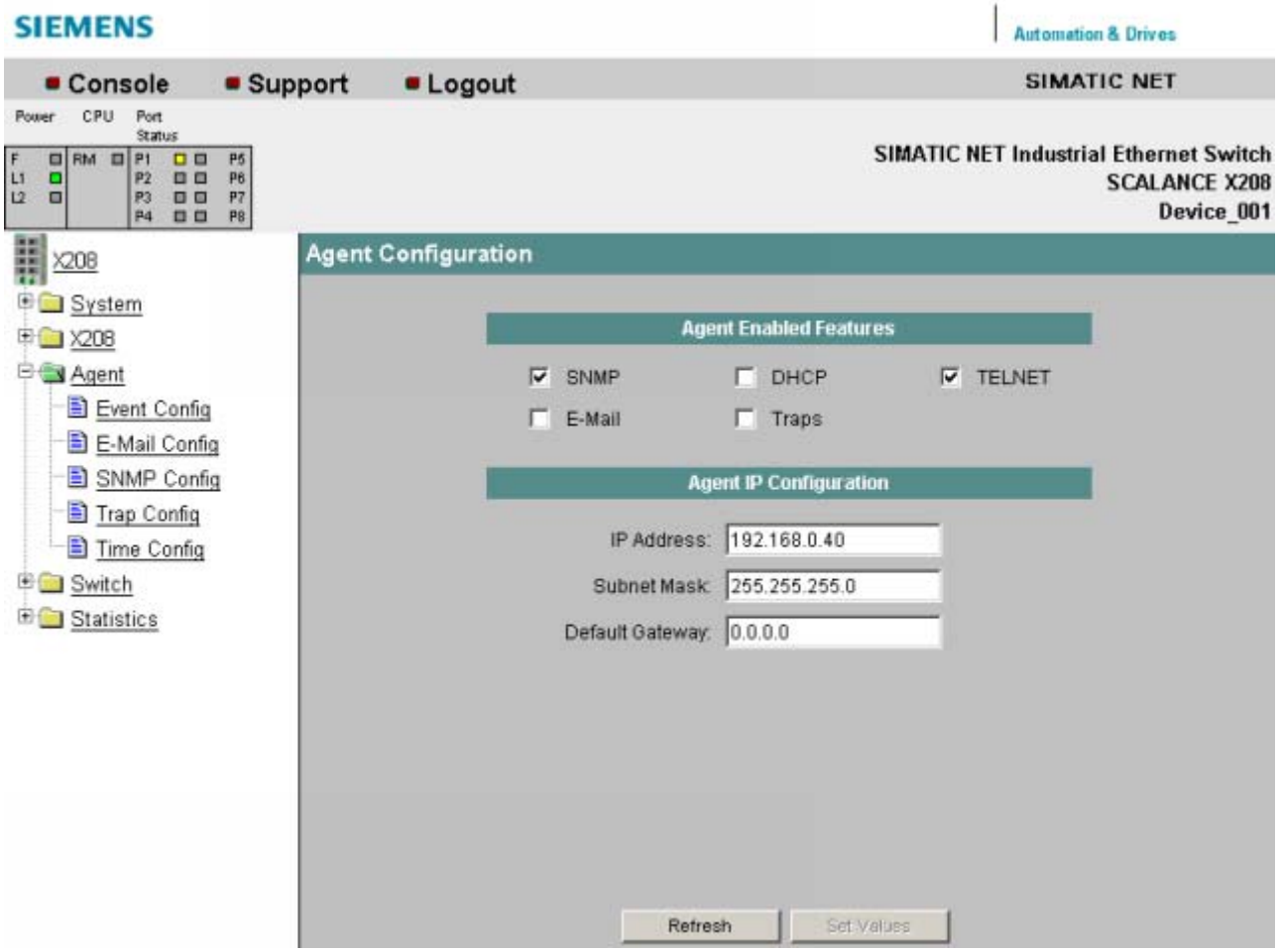


Figure 5-21 "Agent Configuration" dialog

Note

When supplied, SNMP and TELNET are activated. Access to the console over TELNET is reserved for service purposes.

When supplied, no IP configuration: IP address, subnet mask, and default gateway is set.

Settings for IE Switches X-200

Agent Enabled Features

SNMP
Enables/disables SNMP functionality.

E-Mail
Enables/disables E-mail functionality.

DHCP
Enables/disables the IE Switch X-200 searching for a DHCP server in the network when it starts up and configuring its IP parameters according to the data supplied by this server.

Traps
Enables/disables trap functionality.

TELNET
Enables/disables the availability of the IE Switch X-200 over TELNET.

Agent IP Configuration

IP Address

The IP address of the IE Switch X-200. If you make a change here, the WBM loses the connection to the IE Switch X-200. Enter the new address in the Internet browser to reestablish the connection.

Subnet Mask

Here, you enter the subnet mask of the IE Switch X-200.

Default gateway

If the PC with the Internet browser is not in the same subnet as the IE Switch X-200, you must enter the IP address of the default gateway here.

5.2.6.16 The "Agent Event Configuration" WBM menu

Agent Event Configuration

On this page, you specify how the IE Switch X-200 reacts to system events. By selecting the corresponding check boxes, you specify how the IE Switch X-200 reacts to the various events. The following options are available:

- The IE Switch X-200 sends an E-mail.
- The IE Switch X-200 triggers an SNMP trap.
- The IE Switch X-200IRT saves the relevant event in the event table (relevant for IRT switches only).

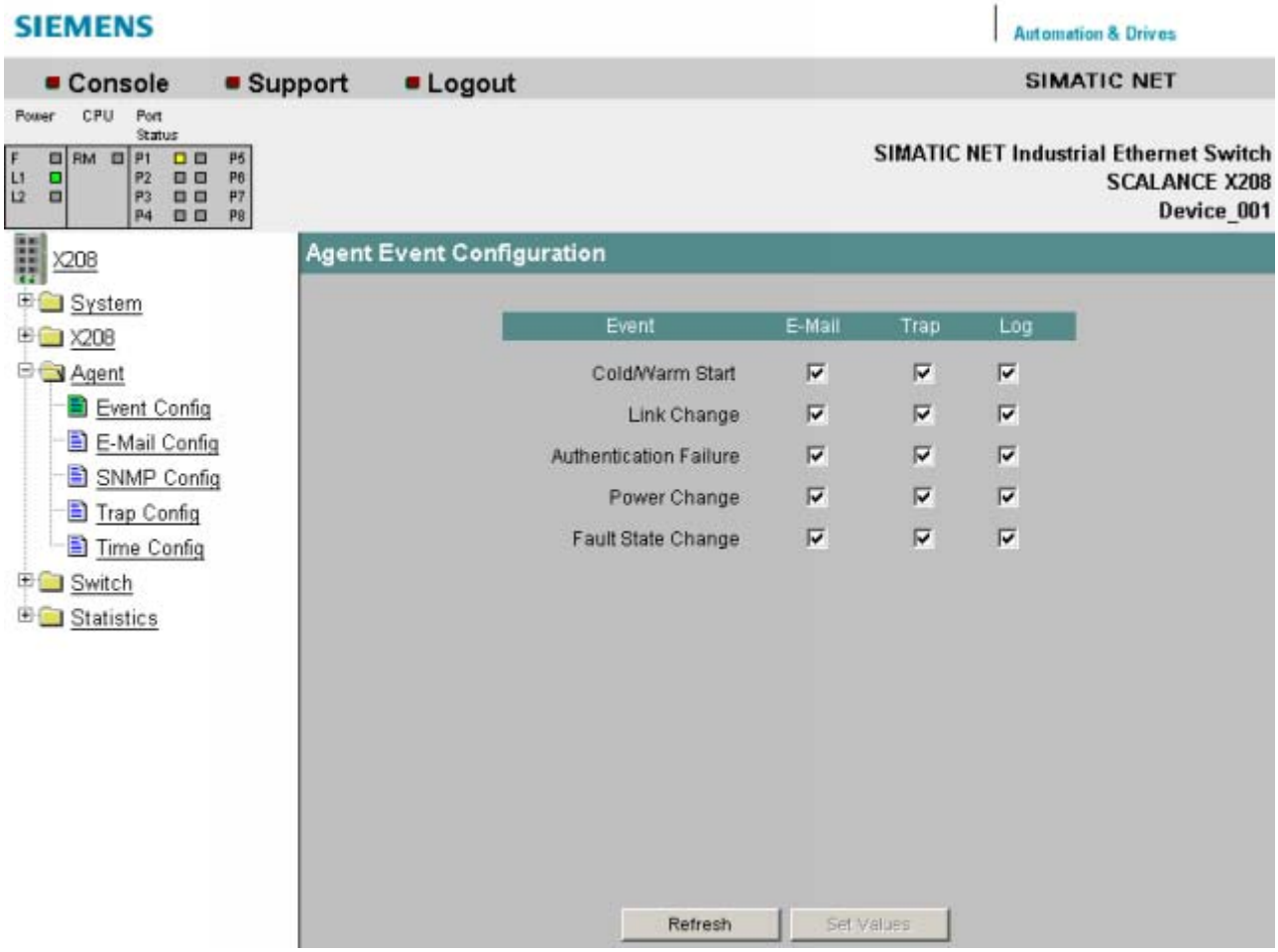


Figure 5-22 "Agent Event Configuration" dialog

You can configure the reaction of the IE Switch X-200 to the following events:

E-Mail
Displays and allows you to set the events that would cause an E-mail to be sent.

Trap
Displays and allows you to set the events that would cause an SNMP trap to be sent.

Cold/Warm Start
The IE Switch X-200 was turned on or reset by the user.

Link Change
A port has failed or data traffic is being handled again over a port that had previously failed.

Authentication Failure
There was an SNMP access with a bad password or inadequate access rights (refer also to the section "Agent SNMP Configuration").

Power Change
This event occurs only when the power supply line 1 and line 2 is monitored. It indicates that there was a change to line 1 or line 2.

Fault State Change
The fault status has changed. The fault status can relate to the activated port monitoring, the response of the signaling contact or the power supply monitoring.

Redundancy Event (relevant for IRT switches only)
A redundancy event is triggered:

- When the redundant connection is opened or closed
- When a second ring manager is identified.

Standby Event (relevant for IRT switches only)
A standby event is triggered:

- When the standby connection is opened or closed
- When the standby partner is lost or returns.

5.2.6.17 The "Agent E-Mail Configuration" WBM menu

Agent E-Mail Configuration - Network monitoring with E-mails

An IE Switch X-200 provides you with the option of automatically sending an E-mail (for example to a network administrator) if an alarm event occurs. The E-mail contains the identification of the sending device, a description of the cause of the alarm in plain language, and a time stamp with the time since the device started up. This allows centralized network monitoring to be set up for networks with few nodes based on an E-mail system. When an E-mail event message is received, the WBM can be started by the browser using the identification of the sender to read out further diagnostic information.

E-mails can only be sent when

- the E-mail function is activated on the IE Switch X-200 and the E-mail address of the recipient is configured.
- the E-mail function is enabled for the relevant event.
- there is an SMTP server in your network that can be reached by the IE Switch X-200.
- the IP address of the SMTP server is entered on the IE Switch X-200.

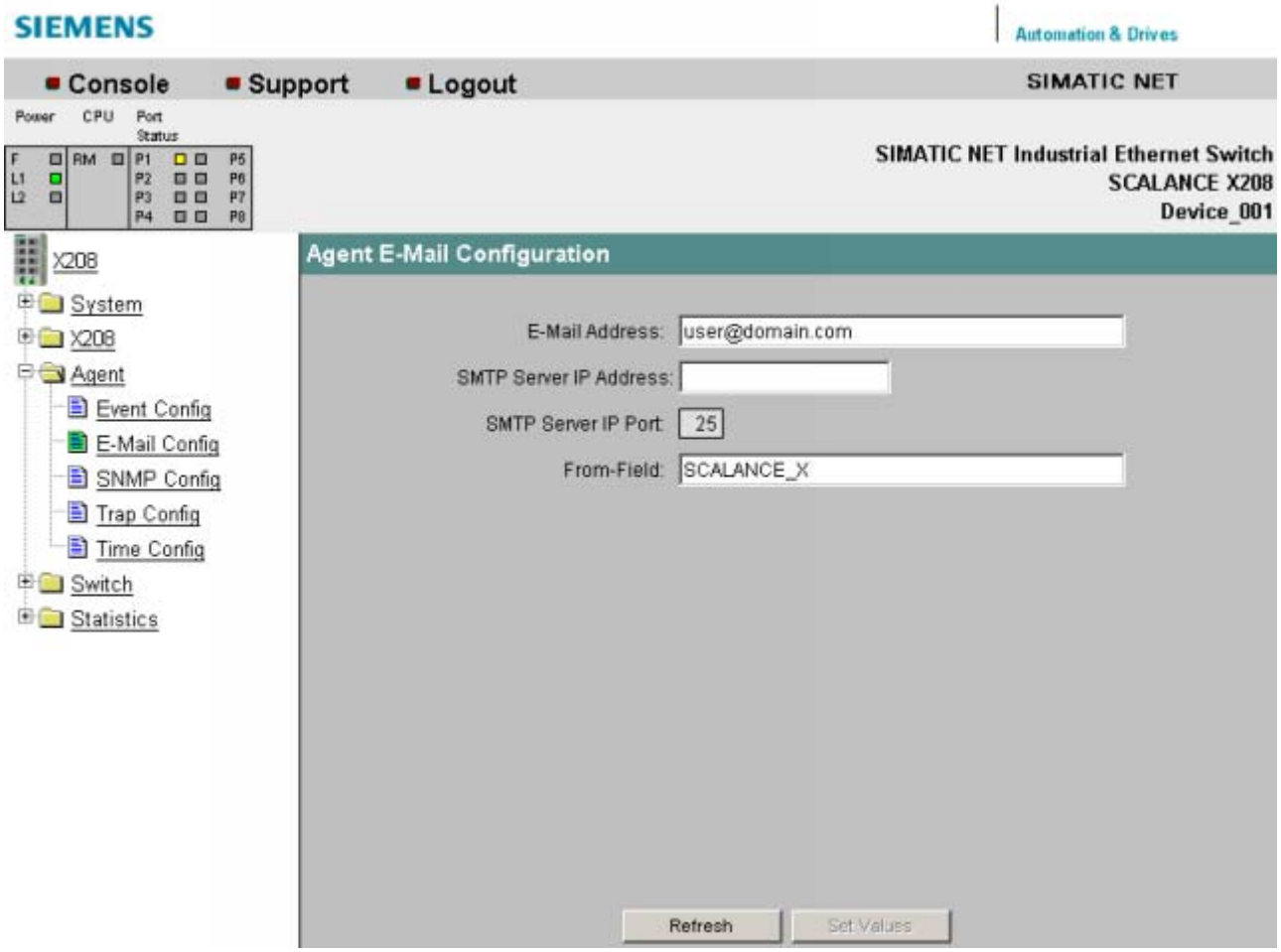


Figure 5-23 "E-Mail Configuration" dialog

E-Mail Address
Here, you enter the E-mail address to which the IE Switch X-200 sends an E-mail if a fault occurs.

SMTP Server IP Address
Here, you enter the IP address of the SMTP server over which the E-mail is sent.

SMTP Server IP Port
The IP port over which the mail is sent. If necessary, you can change the default value 25 to your own requirements.

"From" Field

Address of the sender of the E-mail.

5.2.6.18 The "Agent SNMP Configuration" WBM menu

Agent SNMP Configuration - Configuration of SNMP for an IE Switch X-200

On the SNMP Configuration page, you make basic settings for SNMP. For detailed settings (traps, groups, users), there are separate menu items in WBM.

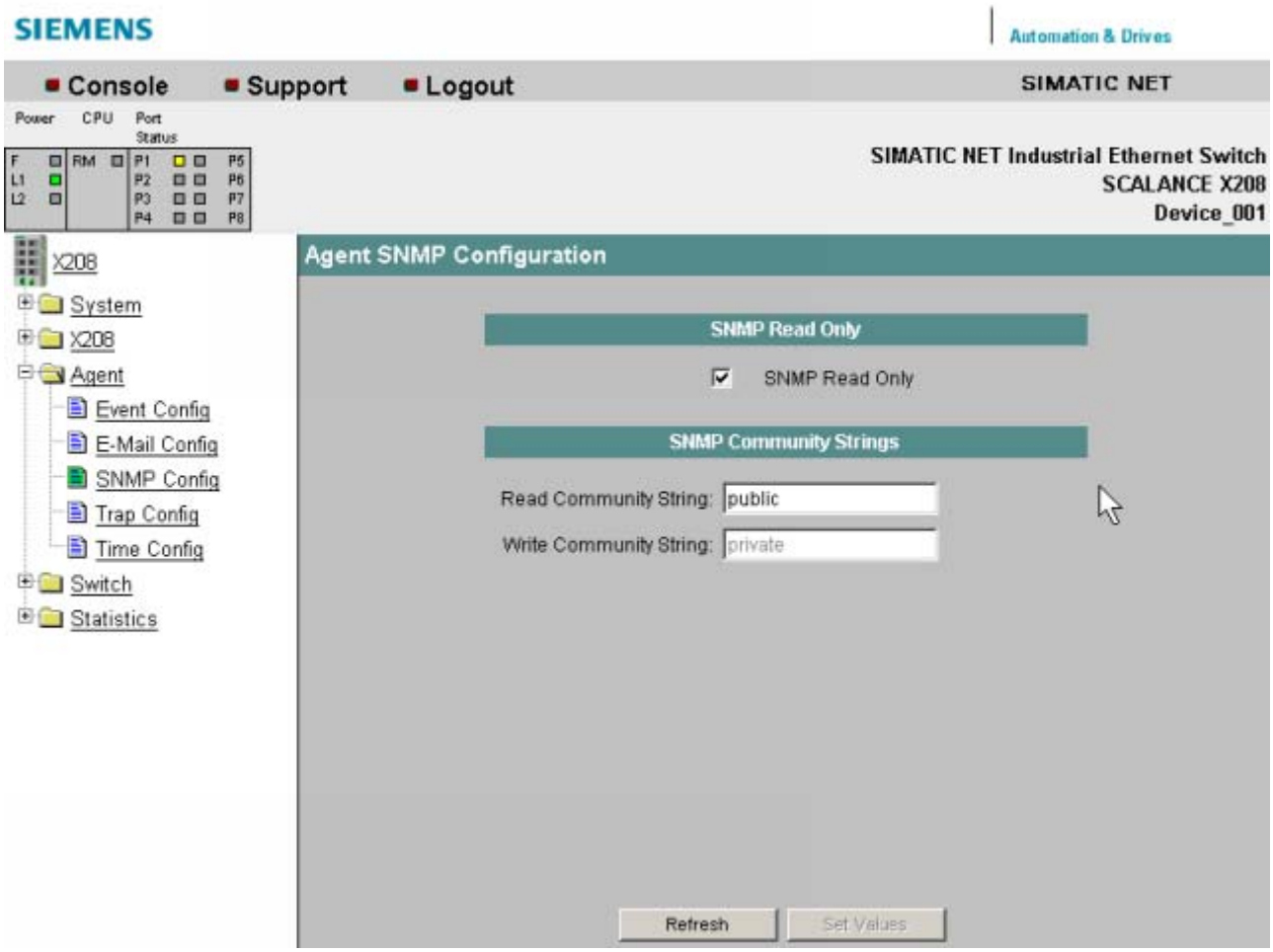


Figure 5-24 "Agent SNMP Configuration" dialog

SNMP Read Only
Enables/disables write protection for SNMP variables.

SNMO Community Strings

Read Community String
Displays the user name for read access to SNMP variables.

Write Community String
Displays the user name for write access to SNMP variables. Here, changes can only be made, when write protection (SNMP read only) has been disabled.

5.2.6.19 The "Agent Trap Configuration" WBM menu

Agent Trap Configuration - SNMP Traps for Alarm Events

If an alarm event occurs, the IE Switch X-200 can send traps (alarm frames) to up to two different (network management) stations at the same time. Traps are sent only for events specified in the Agent Event Configuration menu.

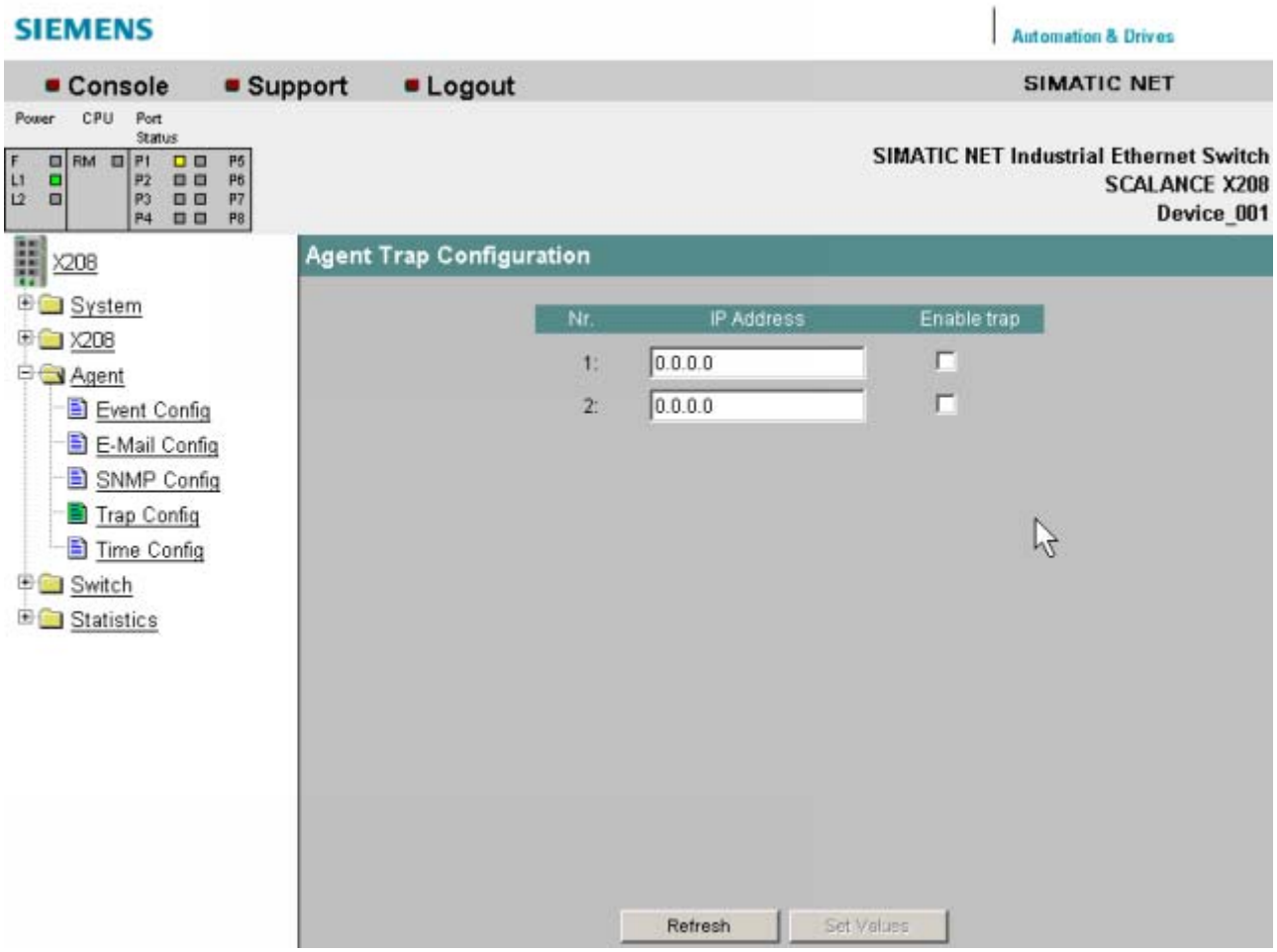


Figure 5-25 "Agent Trap Configuration" dialog

IP Address
Here, you enter the addresses of the stations to which the IE Switch X-200 will send traps.

Enable Trap
Click on the check box next to the IP addresses to enable the sending of traps to the corresponding stations.

5.2.6.20 The "Agent Time Client Configuration" WBM menu

Agent Time Client Configuration

This dialog is used to configure the time protocols.

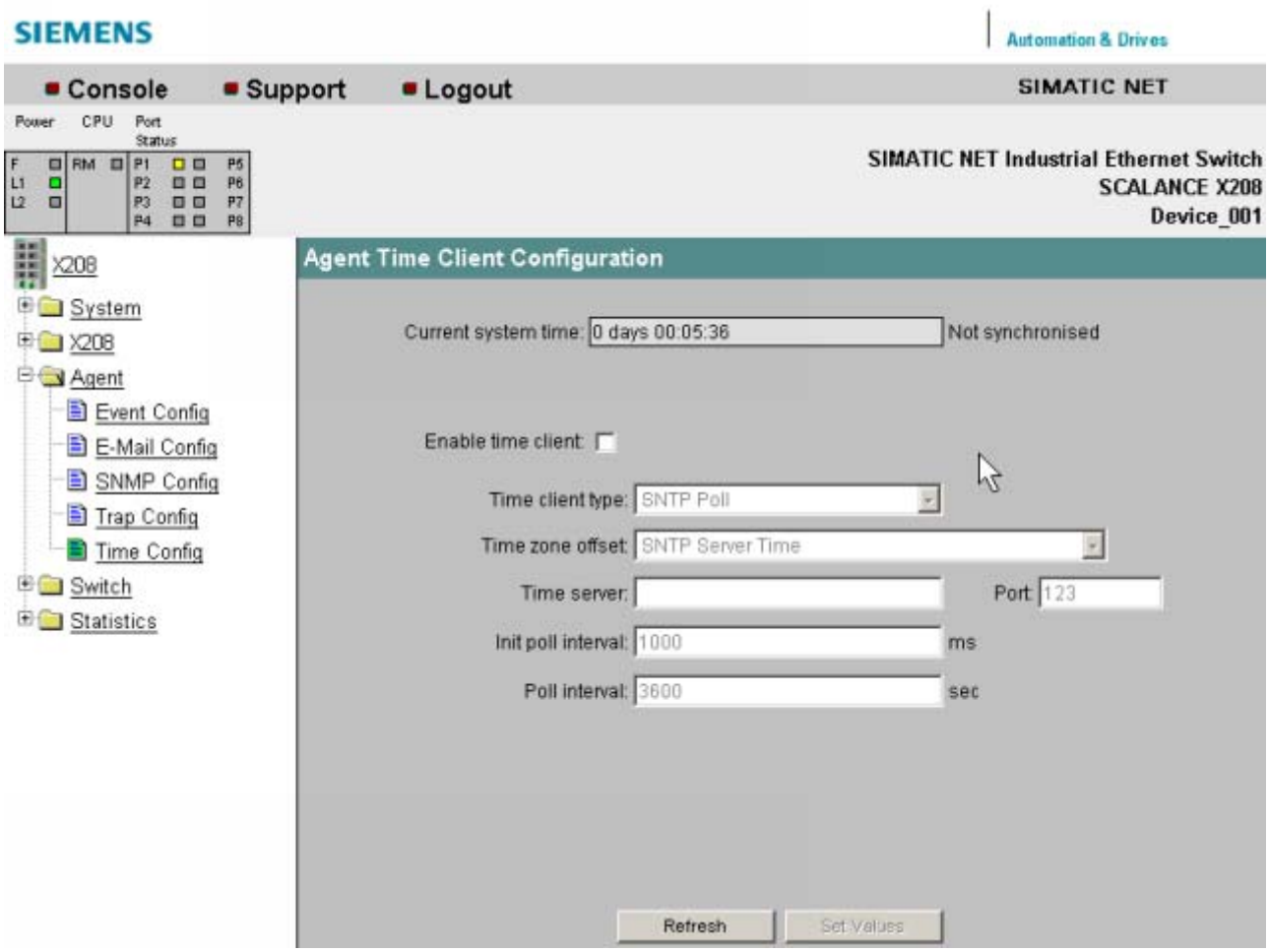


Figure 5-26 Agent Time Client Configuration dialog

Current system time
Either the time since the last restart or the current time is displayed here.

If the time is received from a "non-time server", the text "not synchronized" is displayed.

Enable time client
The time function can be enabled and disabled here.

Time client type
You can choose from four different protocol types here:

- SNTP Poll
  If you choose this protocol type, you have to define further settings:
  Time server: The IP address of the server is specified here.
  Port: The communication port to the SNTP server is entered here.
  Init poll interval: Indicates the wait time in milliseconds until the first poll is sent to the

server.
Poll interval: Indicates the interval in seconds in which the time is updated.

- SNTP Listen
- SIMATIC time
  If you use the SIMATIC time transmitter, you do not need to make any further settings.
- Manual
  Here, an input field opens for you to enter the current time. The time is quartz controlled and thus always exact. When you switch off or reset the device, this information is lost and must be entered again.

Time zone offset
You can enter a time zone correction for the SNTP protocols here.

Time server
Here, you can enter the Internet address of the server with which the system time will be synchronized. The number of the UDP port being used can also be entered. As default, the SNTP protocol uses UDP port 123.

Init poll interval
Here, you can enter the interval at which the IE Switch X200 repeats the initial poll for the system time if this was not successful the first time.

Poll interval
Once the system time has been adopted the first time from the time server, it is updated cyclically with renewed polls to the time server. Here, you specify how often the updates take place.

5.2.6.21 The "Switch Configuration (Port Mirroring)" WBM menu

Port Mirroring

With this dialog, you can enable or disable port mirroring; in other words, mirroring the data traffic from the mirror port to the monitor port.

Apart from the device be monitored, no other communication node should be connected to the monitor port.

Figure 5-27 "Switch Configuration (Port Mirroring)" dialog

Mirroring Enabled
Clicking this check box enables or disables the mirroring function.

Mirroring Port
Under mirrored port, enter the port to be monitored.

Monitor Port
Under monitor port, enter the port to be monitored.

You apply your settings with Set Value.

NOTICE
Note the following for all IE Switches X-200IRT: With cyclic PROFINET data traffic, the "Port Mirroring" function only returns the frames received at the monitored port. With non-cyclic frames, both sent and received packets are returned at the mirror port.

5.2.6.22 The "Switch Ports Status" WBM menu

Switch Ports Status

This screen (applies only to IE Switches X-200 V2.0 and not to IE Switches X-200 IRT V3.0) shows you the current status of the ports.

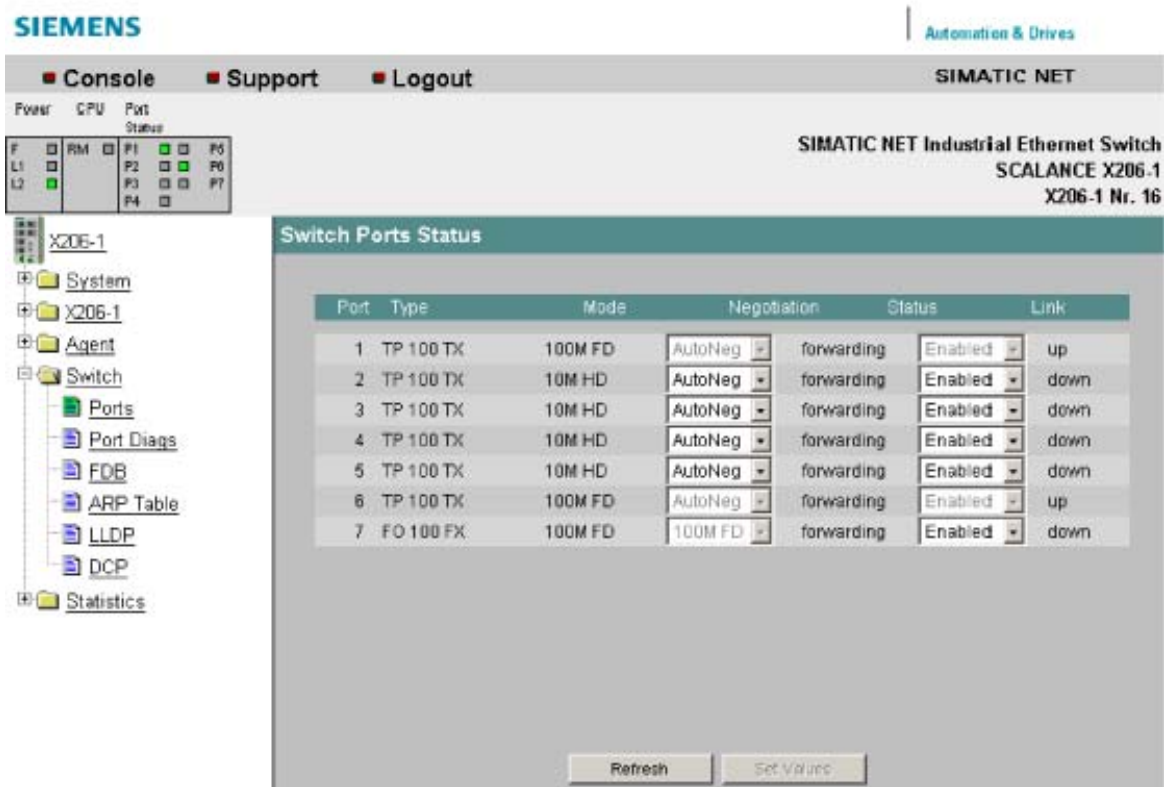


Figure 5-28 "Switch Ports Status" dialog

Type information box

Displays the type of port.
The following port types are available with the IE Switch X-200 modules:

TP 10 TX

TP 100 TX

FO 100 FX

Mode
The transmission rate (10 or 100 Mbps) and the transmission mode (full duplex (FD) or half duplex (HD)).

Negotiation
Indicates whether autonegotiation is enabled or disabled.

Status
Indicates that the port is enabled.

Link
Status of the link to the network. The following alternatives are possible:

- up
  The port has a valid link to the network, a link integrity signal is being received.
- down
  The link is down, for example because the connected device is turned off.

NOTICE
With IE Switches X-200, that are not IRT-compliant, it is not possible to disable ports in PROFINET mode! If a port of such a device is disabled by Web Based Management, the disabled setting is overwritten when a PROFINET configuration is downloaded. In PROFINET mode, all ports of a non IRT-compliant IE Switch X-200 are automatically enabled.

5.2.6.23 The "Switch Port Diagnostics" WBM menu

Switch Port Diagnostics

With this dialog, each individual Ethernet port can run independent fault diagnostics on the cable. This allows short-circuits and cable breaks to be localized.

NOTICE
Please note that this test is permitted only when no data connection is established on the port to be tested. This test is not possible for IRT devices.

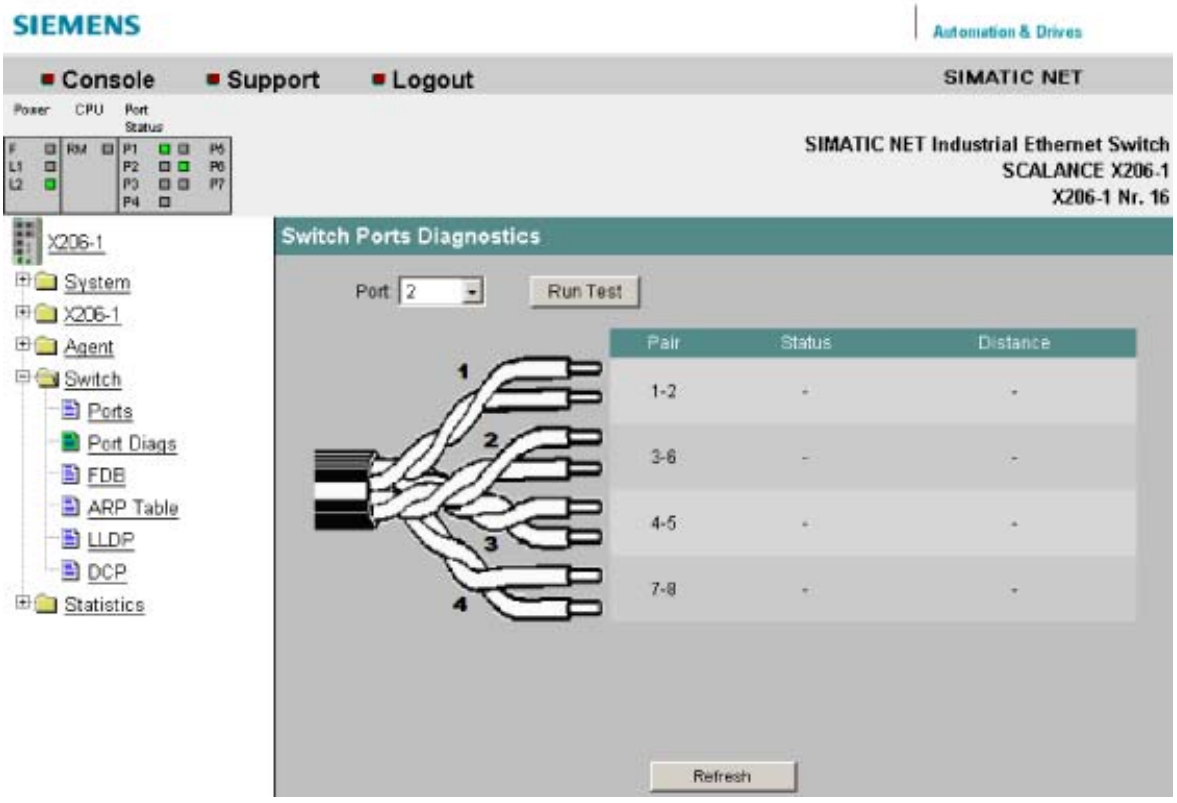


Figure 5-29 "Switch Ports Diagnostics" dialog

Port
The port to be tested is specified here.

Run Test
This button activates the test.

Pair
Displays the pair of wires in the cable.
Pairs 4-5 and 7-8 are not used.

Status
Displays the status of the cable.

Distance
Displays the distance to the cable end, cable break, or short-circuit.

5.2.6.24 The "Switch Forwarding Database" WBM menu

Switch Forwarding Database

This dialog shows which MAC addresses are connected to which switch port.

The information is taken from the internal address table of the IE Switch X-200.

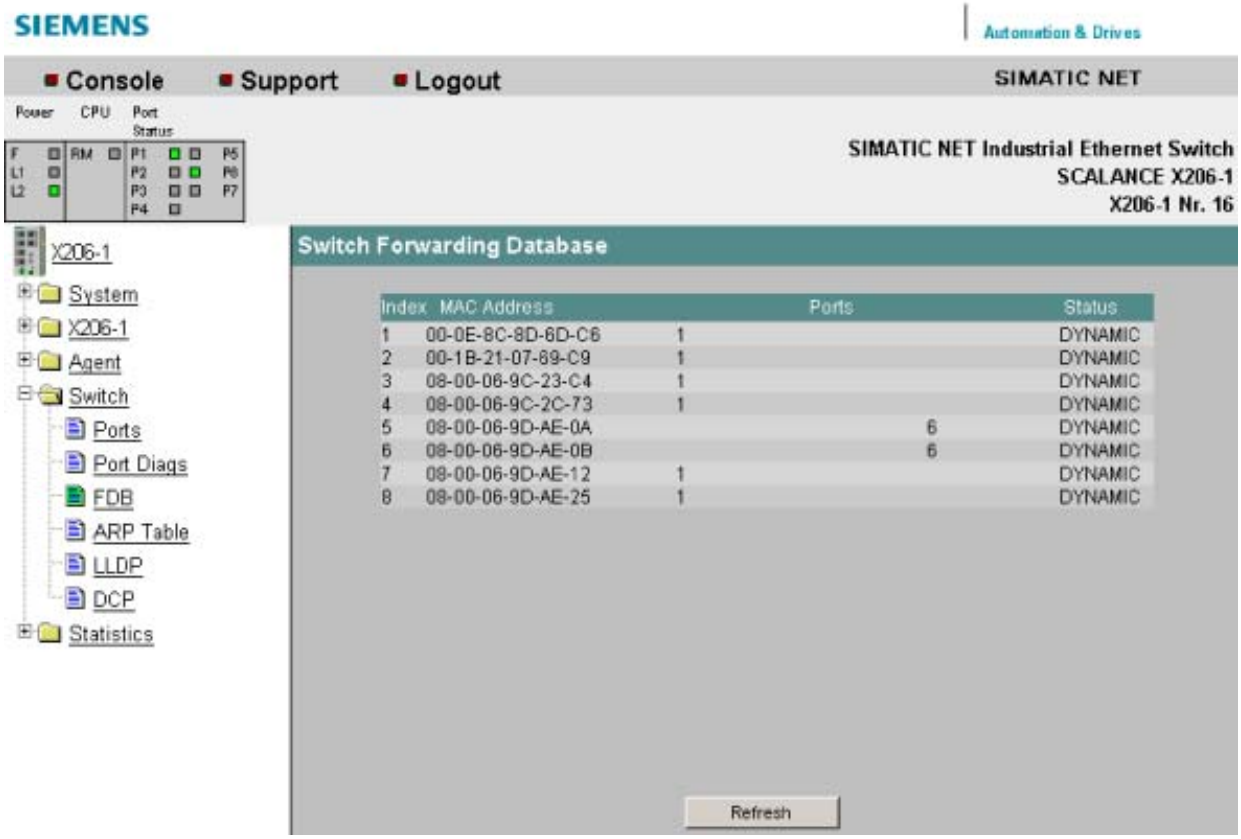


Figure 5-30 Switch Forwarding Database dialog

5.2.6.25 The "Switch ARP Table" WBM menu

Switch ARP (Address Resolution Protocol)Table

This dialog shows which MAC address is assigned to which IP address.

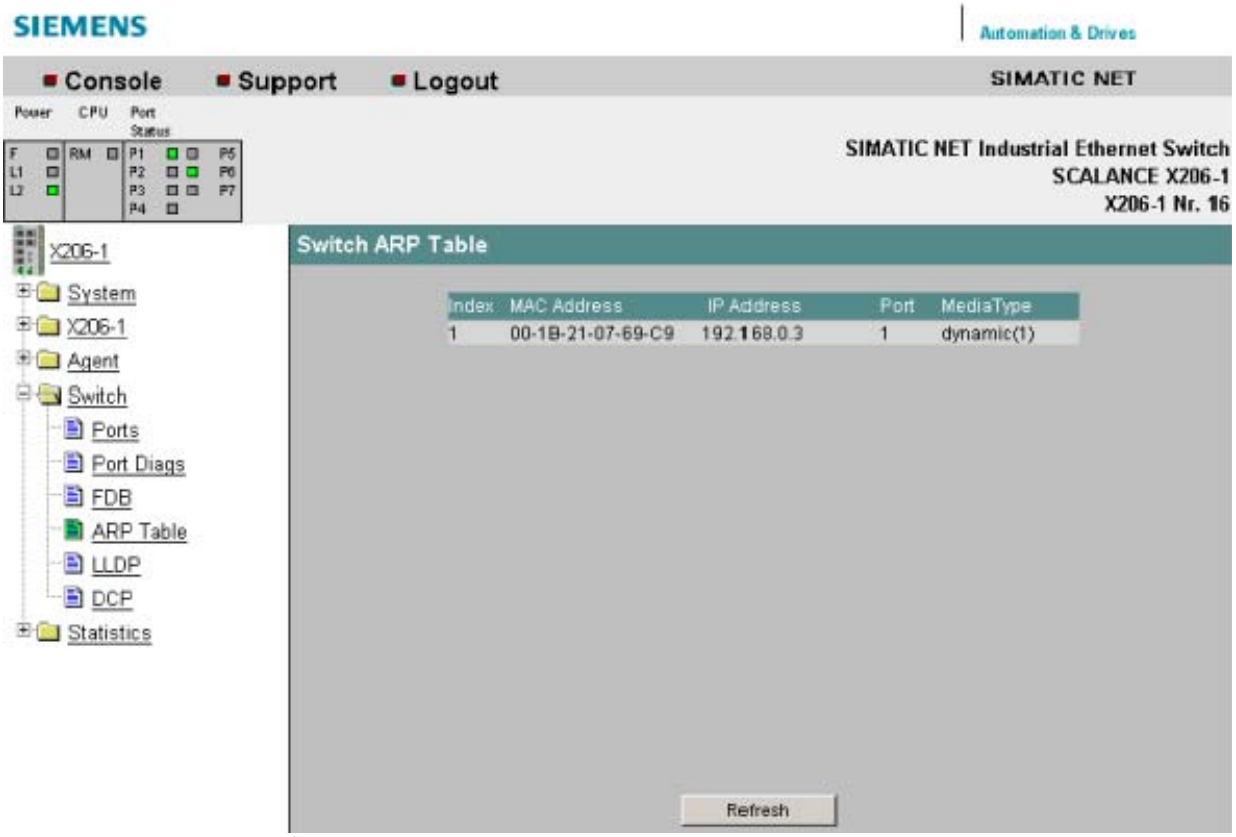


Figure 5-31 Switch ARP Table

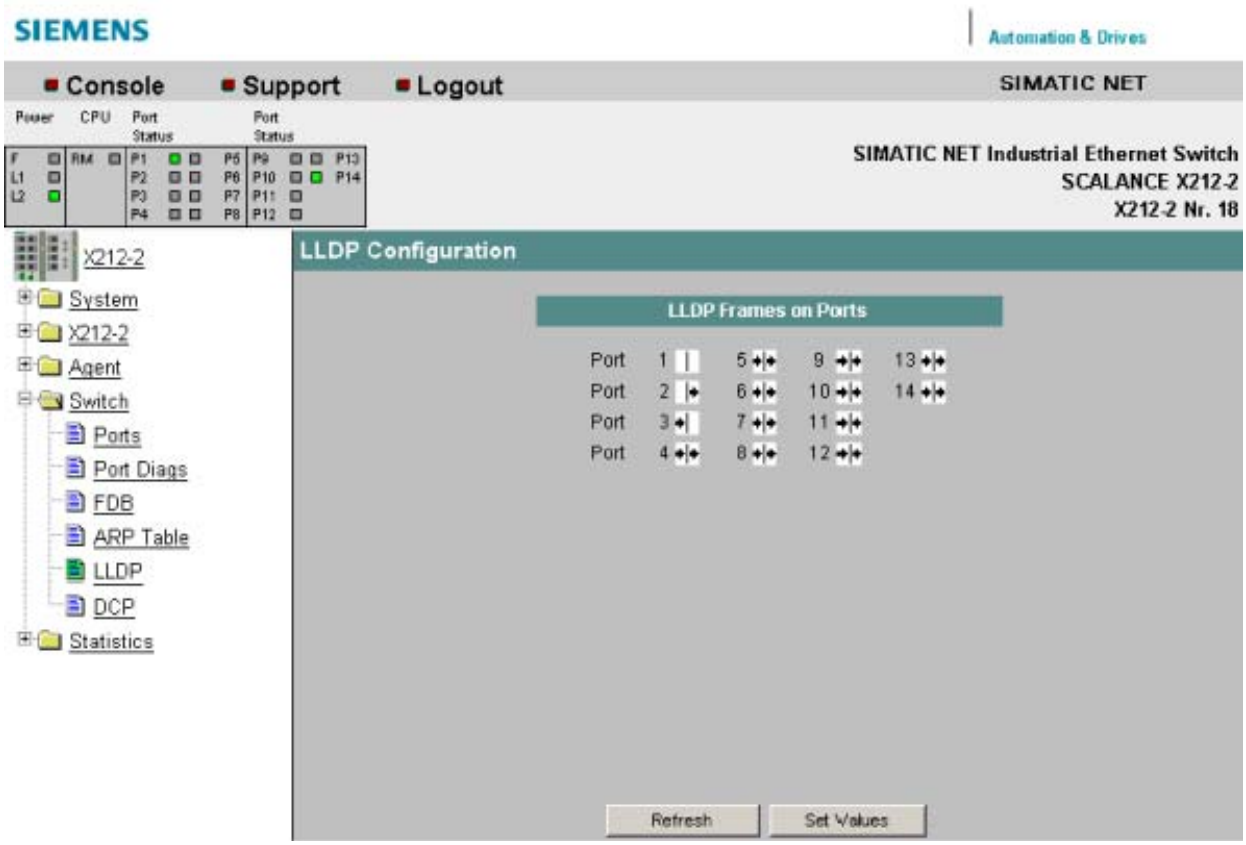
5.2.6.26 The "Switch LLDP" WBM menu

Configuring frames of the Link Layer Discovery Protocol

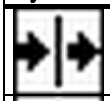
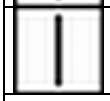
This dialog allows you to configure frames of the Link Layer Discovery Protocol (LLDP).

The LLDP protocol is used to exchange information between neighboring devices. An IE Switch X-200 sends LLDP frames to all ports at regular intervals. The LLDP frames received from neighboring devices are not forwarded; only the information they contain about neighboring devices is stored. This information can be read from a central location and used to identify the network topology.

To structure a network logically, the sending and receipt of LLDP frames can be configured per port.



The following settings can be made for the displayed ports:

Symbol	Meaning
	Port sends and receives LLDP frames
	LLDP frames are neither sent nor received
	LLDP frames are sent but not received
	LLDP frames are received but not sent

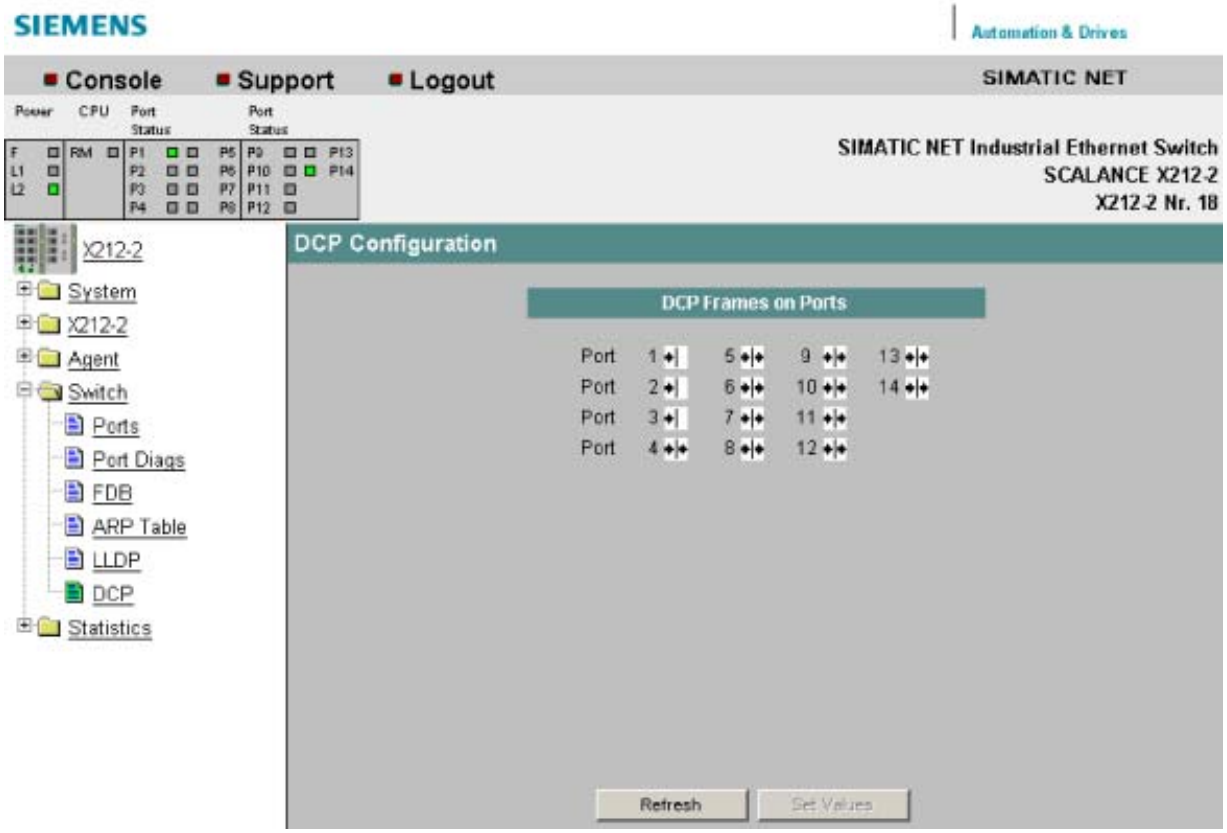
5.2.6.27 The "Switch DCP" WBM menu

Configuring Discovery and basic Configuration Protocol frames

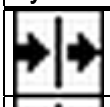
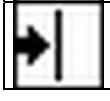
Using this dialog, you can configure frames sent by the Discovery and basic Configuration Protocol (DCP).

The DCP protocol is used to detect nodes in a network and to assign basic parameters such as the IP address, system name etc. to them.

To allow the logical structuring of networks, the sending of DCP frames can be enabled or disabled port-oriented on an IE Switch X-200.



The following settings can be made for the displayed ports:

Symbol	Meaning
	Port sends and receives DCP frames
	DCP frames are received but not sent

5.2.6.28 The "Statistics" WBM menu

Statistics - counting and evaluation of received and sent frames

An IE Switch X-200 has internal statistics counters (RMON (Remote Monitoring) counters) with which it counts the number of received frames according to the following criteria:

- Frame length
- Frame type
- Bad frames

This information provides you with an overview of the data traffic and any problems on the network.

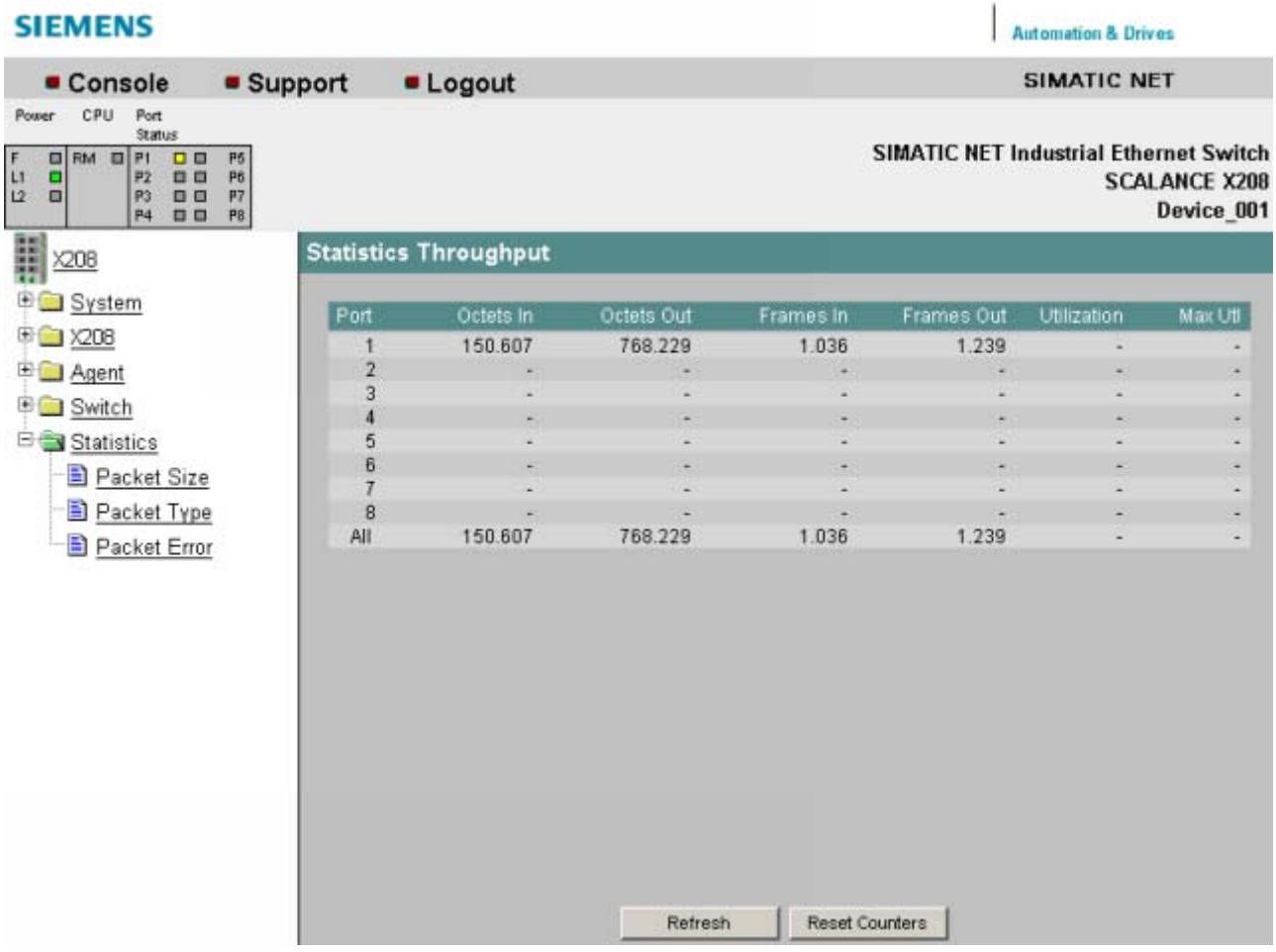


Figure 5-32 "Statistics Throughput" dialog

Octets In
Displays the number of received bytes.

Octets Out
Displays the number of sent bytes.

Frames In
Displays the number of received frames.

Frames Out
Displays the number of sent frames.

Utilization
Displays the port utilization as a percentage (%). If the bus utilization is less than 1%, nothing is displayed.

Max. Utilization
Displays the peak value of port utilization as a percentage (%).

5.2.6.29 The "Statistics Packet Size" WBM menu

Packet Size Statistics - received packets sorted according to length

The Packet Size Statistics page displays how many packets of which size were received at each port.

If you click the Reset Counters button, you reset the counters for all ports.

If you click on an entry in the Port column, the Packet Size Statistics graphic is displayed for the selected port. You then see a graphical representation of the counter value.

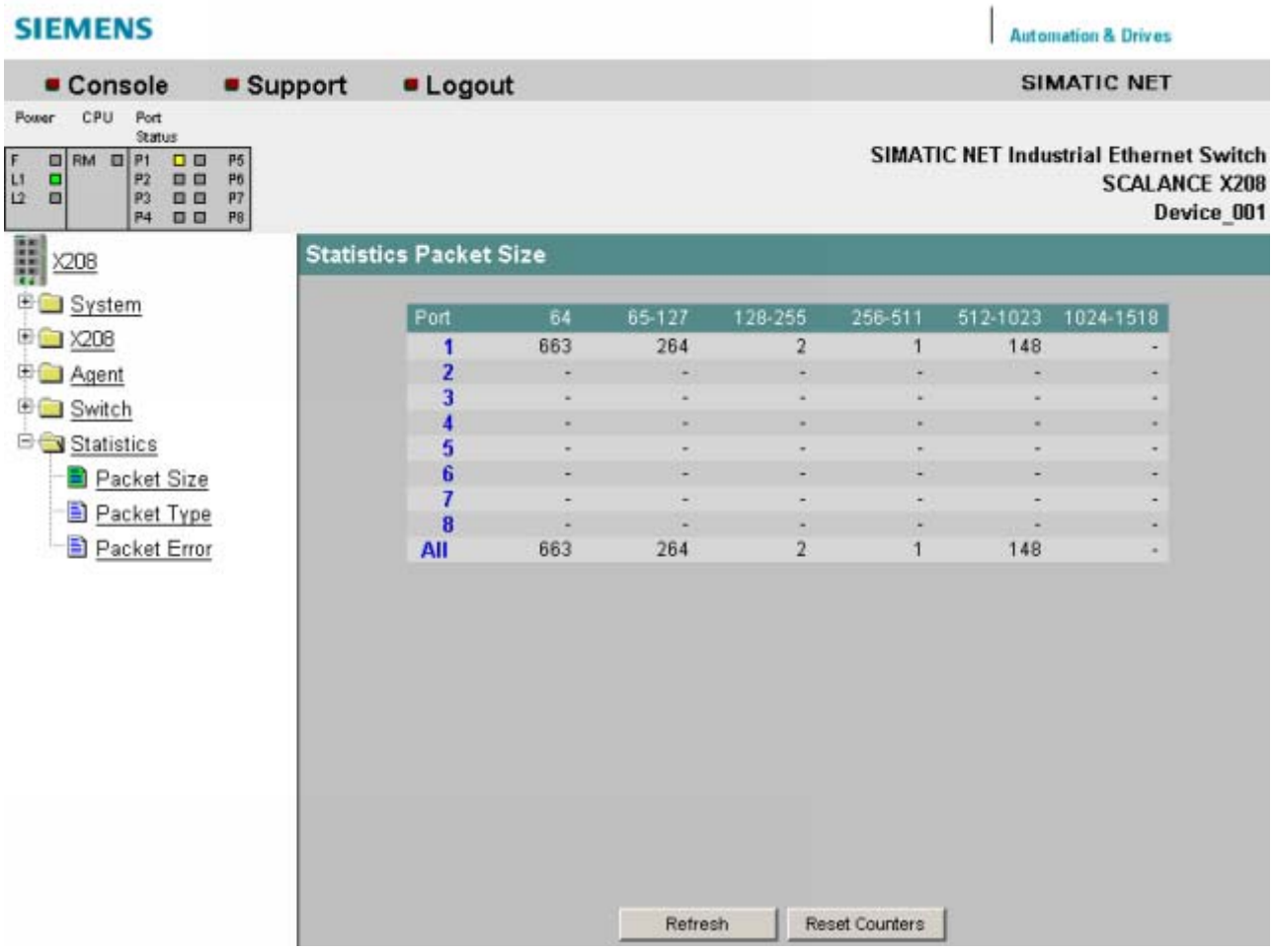


Figure 5-33 "Statistics Packet Size" dialog

64
Displays the number of packets with a length of 64 bytes.

65-127
Displays the number of packets with a length of 65-127 bytes.

128-255
Displays the number of packets with a length of 128-255 bytes.

256-511
Displays the number of packets with a length of 256-511 bytes.

512-1023
Displays the number of packets with a length of 512-1023 bytes.

1024-1518
Displays the number of packets with a length of 1024-1518 bytes.

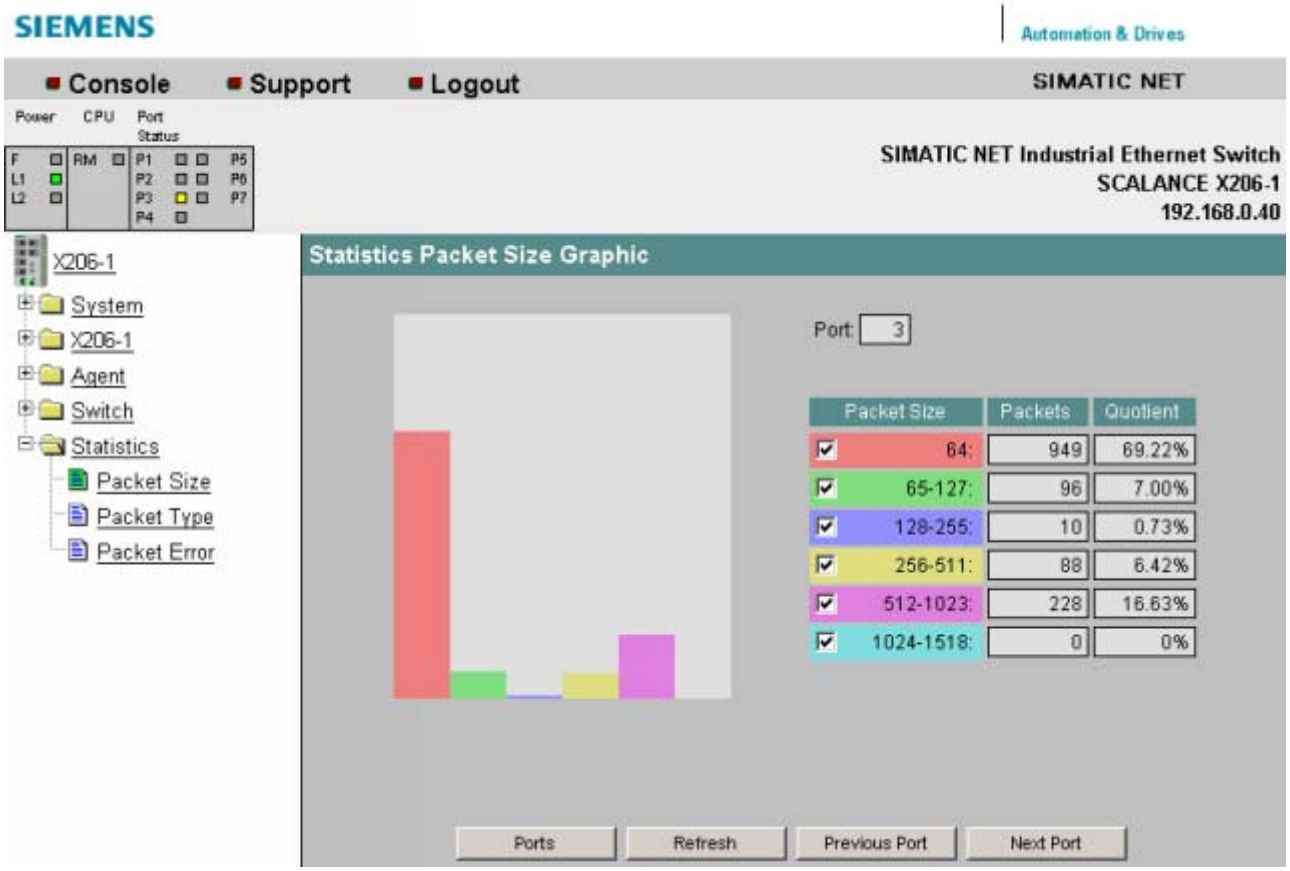


Figure 5-34 "Statistics Packet Size Graphic" dialog (graphic view)

5.2.6.30 The "Statistics Packet Type" WBM menu

Packet Type Statistics - received packets sorted according to type

The Statistics Packet Type page displays how many frames of the type unicast, multicast, and broadcast were received at each port.

If you click the Reset Counters button, you reset the counters for all ports.

If you click on an entry in the Port column, the Statistics Packet Type Graphic is displayed for the selected port. You then see a graphical representation of the counter value.

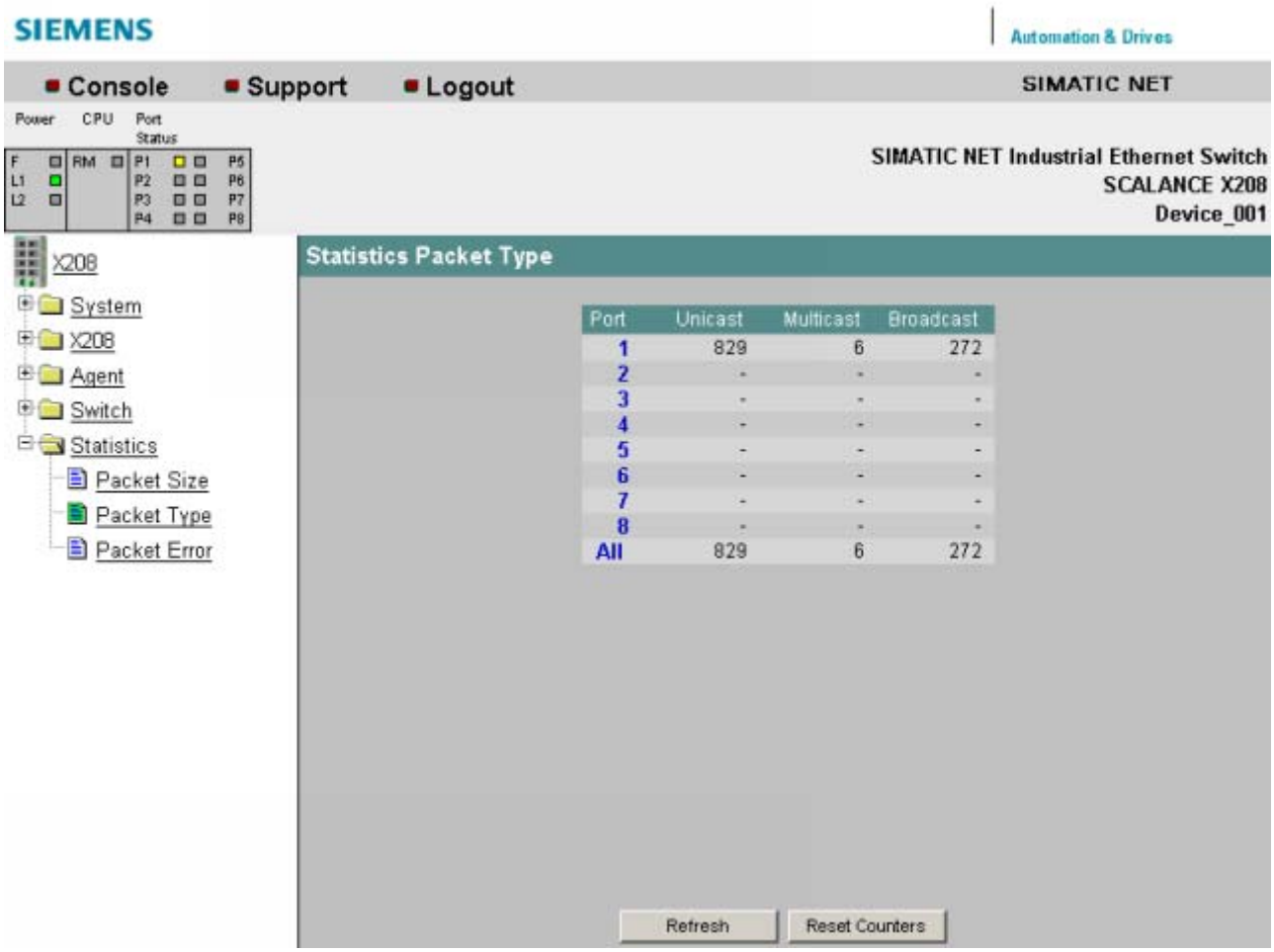


Figure 5-35 "Statistics Packet Type" dialog

Unicast
Displays the number of packets to the unicast recipient address.

Multicast
Displays the number of packets to the multicast recipient address.

Broadcast
Displays the number of packets to the broadcast recipient address.

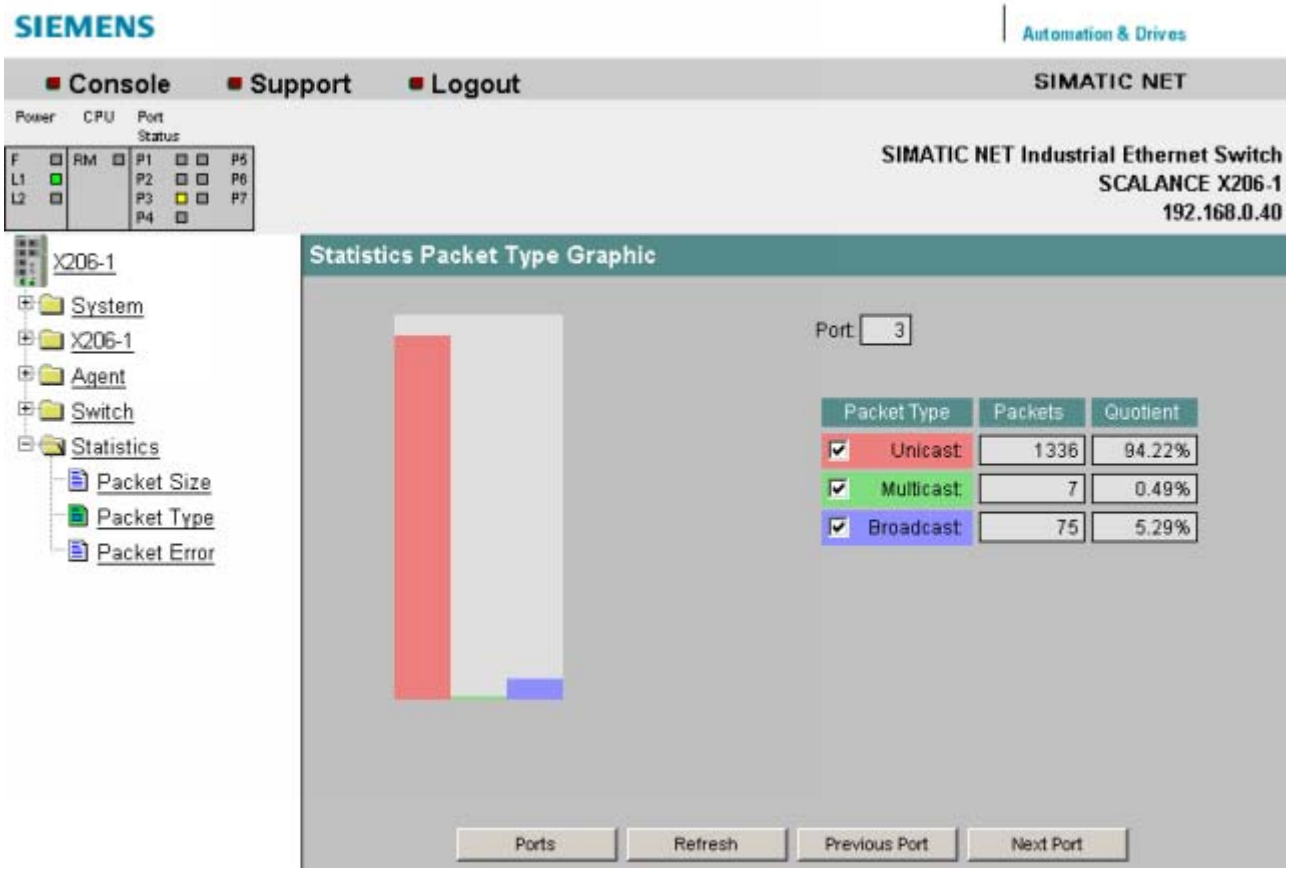


Figure 5-36 "Statistics Packet Type Graphic" dialog (graphic view)

5.2.6.31 The "Statistics Packet Error" WBM menu

Statistics Packet Error - Counting and Evaluation of Transmission Errors

This dialog displays information on any errors that may have occurred and allows diagnostics for the port on which the error occurred. You can reset the error counters with the "Reset Counters" button.

If you click on an entry in the Port column, the Statistics Packet Error Graphic is displayed for the selected port. You then see a graphical representation of the counter value.

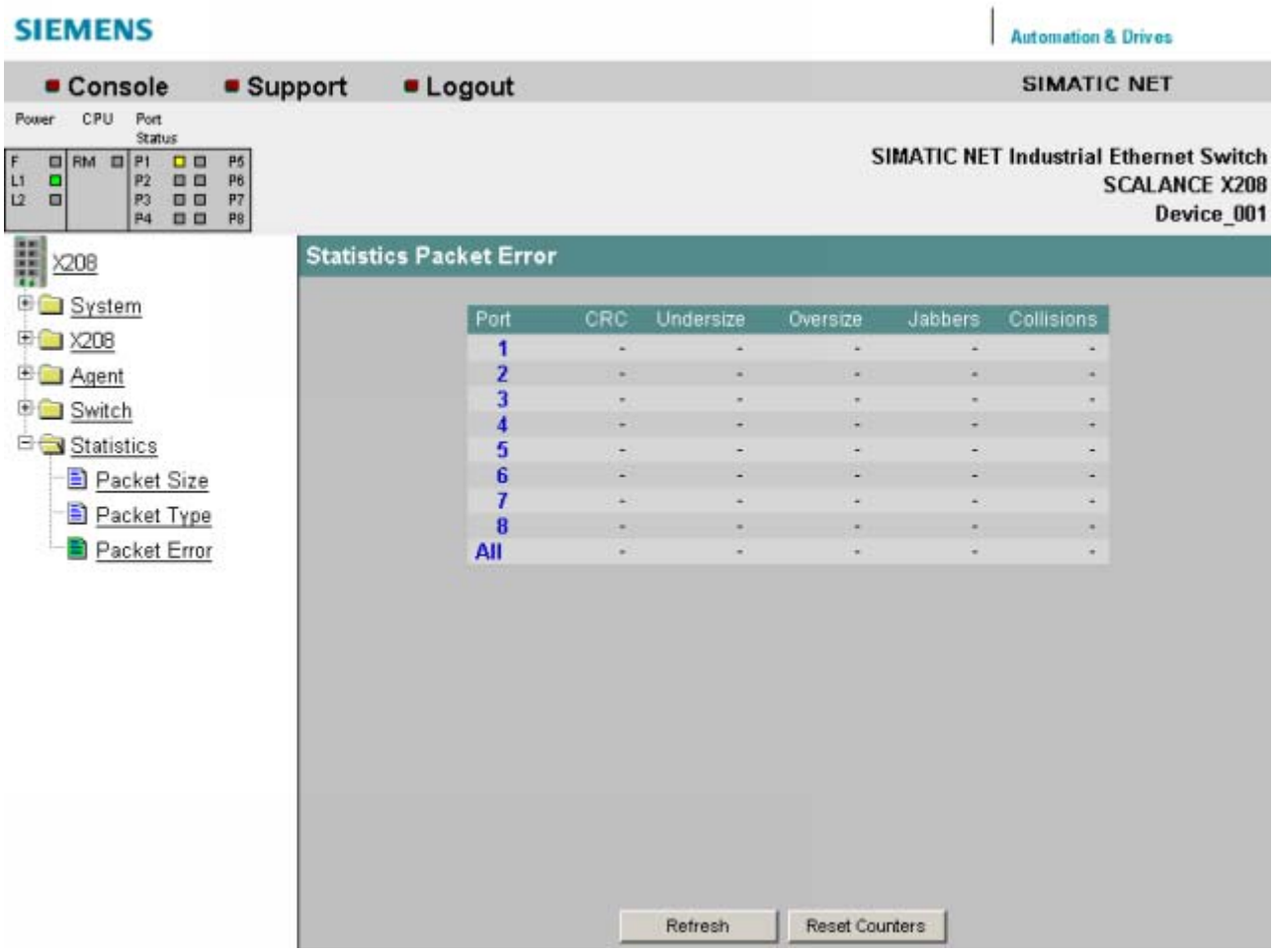


Figure 5-37 "Statistics Packet Error" dialog

The following errors can be detected:

CRC

Packets with a valid length but bad checksum.

Undersize

Packets too short with valid checksum.

Oversize

Packets too long with valid checksum.

Jabbers

Packets too long without valid checksum.

Collisions

Indicates the number of collisions that have occurred.

5.2.6.32 The "Plastic Optical Fiber" WBM menu

Fiber-optic cables and diagnostics

If you select the POF menu item in the left-hand panel, the following screen appears

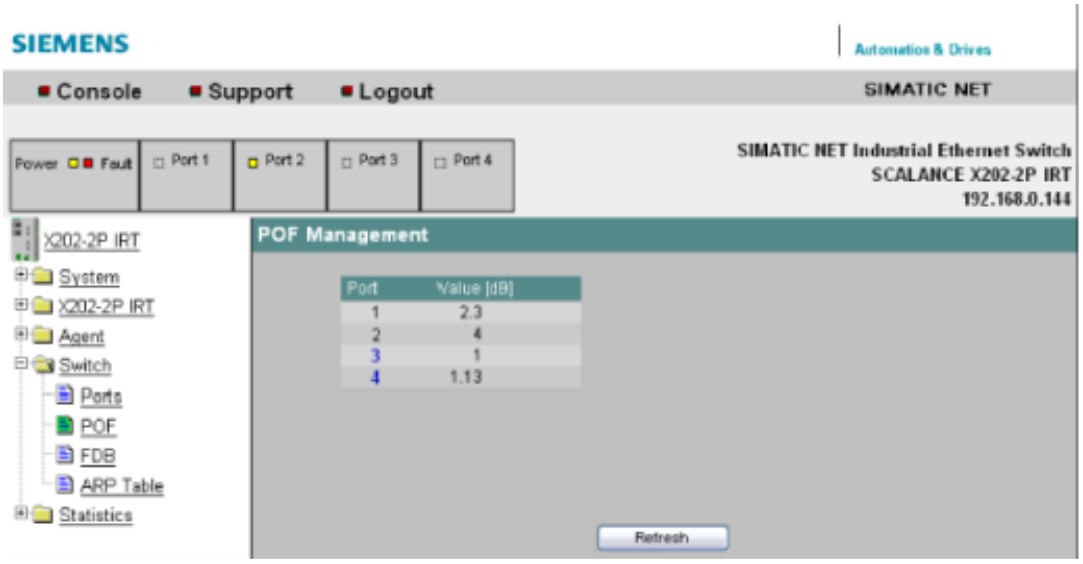


Figure 5-38 POF Management

Here, you can see the currently available link power margin as a numerical value for each POF port.

The link power margin indicates the attenuation on the connection between sender and receiver that can be overcome. The higher the link power margin, the higher the attenuation can be while maintaining a functioning link. If the link power margin sinks, the attenuation has increased, for example due to aging or a defect. The longer the cable being used, the lower the link power margin available.

The fiber-optic diagnostics screen appears if you click on one of the displayed ports. It displays information on the available link power margin over time.

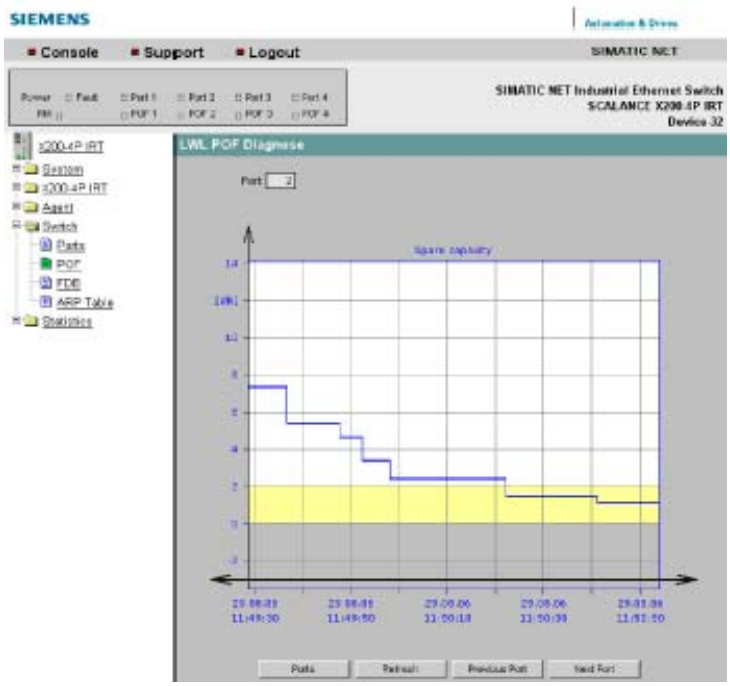


Figure 5-39 POF fiber-optic diagnostics

The vertical axis shows the available link power margin in dB.

The horizontal axis shows the time since the IE Switch X-200 started up.

If the IE Switch X-200 is synchronized with a time server, this is the time base. If there is no time synchronization, the display starts at 00:00:00.

The diagram itself is divided into two areas:

White:
There is an adequate link power margin for problem-free operation. When the IE Switch X-200 is installed, the link power margin should be in this range.

Yellow:
If the link power margin enters this range, maintenance is necessary. The boundary of the yellow area is at a link power margin of 2 dB. To ensure long-term functionality of the system, the maintenance should be performed. If the link power margin is in the yellow range, this is signaled by the FO LED lighting up.

NOTICE
The page for diagnostics of fiber-optic cable only shows correct link power margins when plastic optical fiber (POF) is used. If polymer cladded fiber (PCF) is used, diagnostics is not possible.

5.2.7 SNMP

5.2.7.1 Configuration and diagnostics over SNMP

Configuration of an IE Switch X-200 over SNMP

A network management station can configure and monitor a SCALANCE X-200 using SNMP (Simple Network Management Protocol). To allow this, a management agent is installed in the IE Switch X-200 with which the management station exchanges data using Get and Set requests. An IE Switch X-200 supports SNMP V1 and V2.

The configurable data is in a database on the IE Switch X-200 known as the MIB (Management Information Base). The management station or Web Based Management can access this MIB.

SIMATIC NET SNMP OPC Server

The use of the SNMP OPC Server Windows application allows access to device information over the OPC interface. This allows network visualization, system diagnostics, and plant status monitoring to be implemented on any OPC client systems. OPC client systems include, for example, OPC Scout, SIMATIC HMI/SCADA, Office applications. This allows, for example, not only simple device diagnostics but also detailed information such as redundant network structures or network load distribution to be visualized. This increases operational safety and improves plant availability. The SNMP OPC Server has the following properties:

- Full integration in the SIMATIC NET OPC server environment.
- Parallel use of SNMP with other communication protocols such as PROFINET or S7 communication.
- Integrated MIB compiler for creating device profiles. The SNMP OPC MIB compiler can only compile SNMP V1 objects.
- Configuration and project engineering in STEP 7/NCM as of version V5.2

Supported MIBs

A distinction is made between standardized MIBs defined in RFCs and private MIBs. Private MIBs contain product-specific expansions that are not included in standard MIBs.

An IE Switch X-200 supports the following MIBs

- RFC1213: MIB II (all groups except for egp, transmission, at)
- Bridge MIB
- Private MIB

Access to the private MIB of an IE Switch X-200

Follow the steps below to display the private MIB:

Start and Internet browser (for example Internet Explorer) and enter the following URL. When entering the URL, keep to the upper/lower case notation in the file name.

http://<IP address of the SCALANCE X200>/snScalanceX200.mib

If you have not yet logged on, a login window appears.

Once you are logged on, you have access to the private MIB file of the device.

In the Internet Explorer, select the *View -> Source* menu. With other browsers, select a comparable menu to display the source code.
If you use the Internet Explorer with the default settings, the private MIB file is opened in a Notepad editor and can be saved as a text file. The private MIB file also contains a description of the individual objects.

5.2.7.2 MIB variables

MIB variables of an IE Switch X-200

Key variables in the MIB-II standard
The following section lists certain SNMP variables from MIB II for monitoring the device status. MIB II describes all the SNMP variables that are usually supported by all SNMP-compliant devices.

Table 5-1 Variables in the System directory

Variable	Access rights	Description
sysDescr	Read only	A string with up to 255 characters is used. This value contains the manufacturer's device ID.
sysObjectID	Read only	The address (object identifier) used to access device-specific SNMP variables is output here: 1.3.6.1.4.1.4196.1.1.5.2.nnn.mmm
sysUpTime	Read only	Time since the last reset (for example, after power up). The value is shown in hundredths of a second.
sysContact	Read and write	A contact person can be entered here. (Default: empty string). Possible value: string with a maximum of 255 characters.
sysName	Read and write	A name for the device can be entered here. (Default: empty string). Possible value: string with a maximum of 255 characters.
sysLocation	Read and write	The device location can be entered here (default: empty string). Possible value: string with a maximum of 255 characters.
sysService	Read only	Shows the functions (services) provided by the component according to the ISO/OSI model. Layer functionality: 1. Physical (e.g. repeaters) 2. datalink/subnetwork (e.g. bridges , switches) 3. Internet (e.g. IP gateways, routers) 4. End to end (e.g. IP hosts) 7. Applications (e.g. E-Mail servers) Data type: 32-bit integer

Table 5-2 Variables in the Interface directory

Variable	Access rights	Description
ifNumber	Read only	The number of different interfaces available in the component. Possible values: 4 - 8
ifDescr	Read only	A description and possibly additional information for a port. Possible value: string with a maximum of 255 characters
ifType	Read only	The value ethernet-csmacd(6) or optical(65) is entered for SCALANCE X-200.
ifSpeed	Read only	Data transfer rate of the Ethernet port in bits per second. SCALANCE X-200 devices: either 10 Mbps or 100 Mbps
ifOperStatus	Read only	The current operating status of the Ethernet port. The following values are possible: • up(1) • down(2)
ifLastChange	Read only	Length of time for which the selected port has been operating in the current status. The value is shown in hundredths of a second.
ifInErrors	Read only	Number of received packages that were not forwarded to higher protocol layers because of an error.
ifOutErrors	Read only	Number of packages that were not sent because of an error.

Port Indexes

The interface index must be used for port designations. The following table shows how the interface indexes are assigned to the ports.

Interface Index	Port
1	Port 1
2	Port 2
3	Port 3
4	Port 4
5	Port 5
6	Port 6
7	Port 7
8	Port 8
. . .	. . :
24	Port 24

Important private MIB variables of an IE Switch X-200

OID The private MIB variables of the IE Switch X-200 have the following object identifier:

iso(1).org(3).dod(6).internet(1).private(4).enterprises(1).
ad(4196).adProductMibs(1).simaticNet(1).iScalanceX(5).iScalanceX200(2)

Variable	Access rights	Description
snX200FaultState	Read and write	Displays the status of the signaling contact. Possible values: • 1 No error • 2 Error
snX200FaultValue	Read only	Errors are assigned an ascending index according to the order in which they occur. This 4-byte variable specifies the index.
snX200RmState	Read only	Indicates whether the redundancy manager is active or passive. Possible values: • 1 The redundancy manager is passive. The IE Switch X-200 is operating as redundancy manager and has opened the ring. In other words, the bus with the IE Switches X-200 connected to it is operating correctly. The "Passive" status is also shown when the redundancy manager mode is disabled. • 2 The redundancy manager is active. The IE Switch X-200 is operating as redundancy manager and has closed the ring. In other words, the bus with the IE Switches X-200 connected to it is interrupted (fault). The redundancy manager switches through the connection between the ring ports and thus restores a functioning bus configuration.
snX200RmStateChanges	Read only	Indicates how often the redundancy manager was switched to "active".
snBootStrapVersion	Read only	The firmware version of the bootloader in the format major.minor.
snHwVersion	Read only	The hardware version of the system in the format major.minor.
snInfoSerialNr	Read only	The serial number of the product.
snMacAddressBase	Read only	The MAC address of the IE Switch X-200.
snSwVersion	Read only	The software version of the system.
snInfoMLFB	Read only	The MLFB number of the device.
snX200PowerSupplyState	Read only	State of the redundant power supply: 1 Redundant supply 2 No redundant supply Note: SCALANCE X204 IRT PRO and SCALANCE X202-2P IRT PRO have no redundant power supply
SnX200RmMode	Read only	The redundancy manager mode. 1 The IE Switch X-200 is redundancy manager: 2 The IE Switch X-200 is not redundancy manager:

5.2.8 Configuration over Command Line Interface (CLI)

5.2.8.1 Command Line Interface (CLI)

Note

The Command Line Interface (CLI) is used only for service purposes and is not available to the user.

IRT technology with SCALANCE X-200

6

With STEP 7 as of V5.4, you can configure PROFINET devices that support data exchange over isochronous real-time Ethernet (IRT). IRT frames are transferred deterministically over planned communication paths in a fixed order to achieve the best possible synchronicity and performance.

Supported devices

Topology-based IRT requires special network components that support planned data transmission. X202-2 IRT, X204 IRT, X204 IRT PRO, X202-2P IRT, X202-2P IRT PRO, X201-3P IRT and X200-4P IRT support topology-based IRT.

Constant bus cycle and isochronous real time now also available with PROFINET

The possibilities available for constant bus cycles and isochronous real time with PROFIBUS DP are now available for PROFINET IO.

When using the constant bus cycle functionality in PROFIBUS DP, all nodes are synchronized by a global control signal generated by the DP master.

In PROFINET IO with IRT, a sync master generates a signal with which the sync slaves synchronize themselves. The sync master and sync slaves belong to a sync domain that is assigned a name during project engineering. In principle, both an IO controller and an IO device can adopt the role of sync master. A sync domain has exactly one sync master.

Relationship: Sync domain and IO systems

The important point is that sync domains do not need to be restricted to a PROFINET IO system: The devices of several IO systems can be synchronized by a single sync master as long as they are connected to the same Ethernet subnet.

On the other hand: A IO system may only belong to one sync domain.

Signal delays must be taken into account

If you use extremely precise synchronization intervals, the cable lengths (the associated delays) must be taken into account. With the aid of a Topology Editor, you can enter the properties of the cables between the ports of the switches. Based on this information and the other configuration data, STEP 7 calculates the optimized sequence of the IRT communication and the resulting update time.

Keeping network load within limits

To allow you to limit the network load resulting from extremely short update times, update groups are configured for the IRT data. If only a few devices require the shortest update times, these are assigned to the first update group. Each other update group has an update

group with n times the update time compared with the previous group (n can be configured); in other words, the group is updated less often and network load is reduced.

In STEP 7 V5.4, only one update group is planned.

IRT runs alongside real-time and TCP/IP communication

Apart from IRT communication for which a fixed bandwidth is reserved within the update time, RT communication and TCP/IP communication are also permitted within the update time.

In RT communication (real-time communication), the cyclic data is transferred between the IO controller and IO device, however, without the "best possible synchronicity".

Unsynchronized IO device automatically exchange data using RT communication.

Since TCP/IP communication is also possible, other non real-time data or configuration/diagnostic data can be transported.

PROFINET IO functionality

7

7.1 Configuring with PROFINET IO

Using PROFINET IO

One option for diagnostics, parameter assignment, and generation of alarm messages of the connected IE Switch X-200 is to use PROFINET IO.

Here, we will show you how you can use the options of PROFINET IO for a connected IE Switch X-200.

In the following example, it is assumed that an S7 station is already configured with a PN IO chain (see also PN IO System Manual).

An example of a hardware configuration with a PN IO chain is shown in the following figure.

NOTICE
If you want to operate IE Switches X-200 that were previously configured over PROFINET without PROFINET functionality, the devices must be reset to the factory defaults. You can do this with the "Reset to Factory Defaults" function in Web Based Management or by pressing the button when you turn on the power supply.

NOTICE
If IE Switches X-200 are operated without PROFINET functionality, the devices must not be assigned a PNIO device name. If a PNIO device name is assigned for IE Switches X-200, it is assumed that the devices are part of a PROFINET system. The PNIO device name can be set and deleted with Web Based Management, using the PST tool or with STEP 7. If an IE Switch X-200 is reset to the factory defaults, the PNIO device name is deleted.

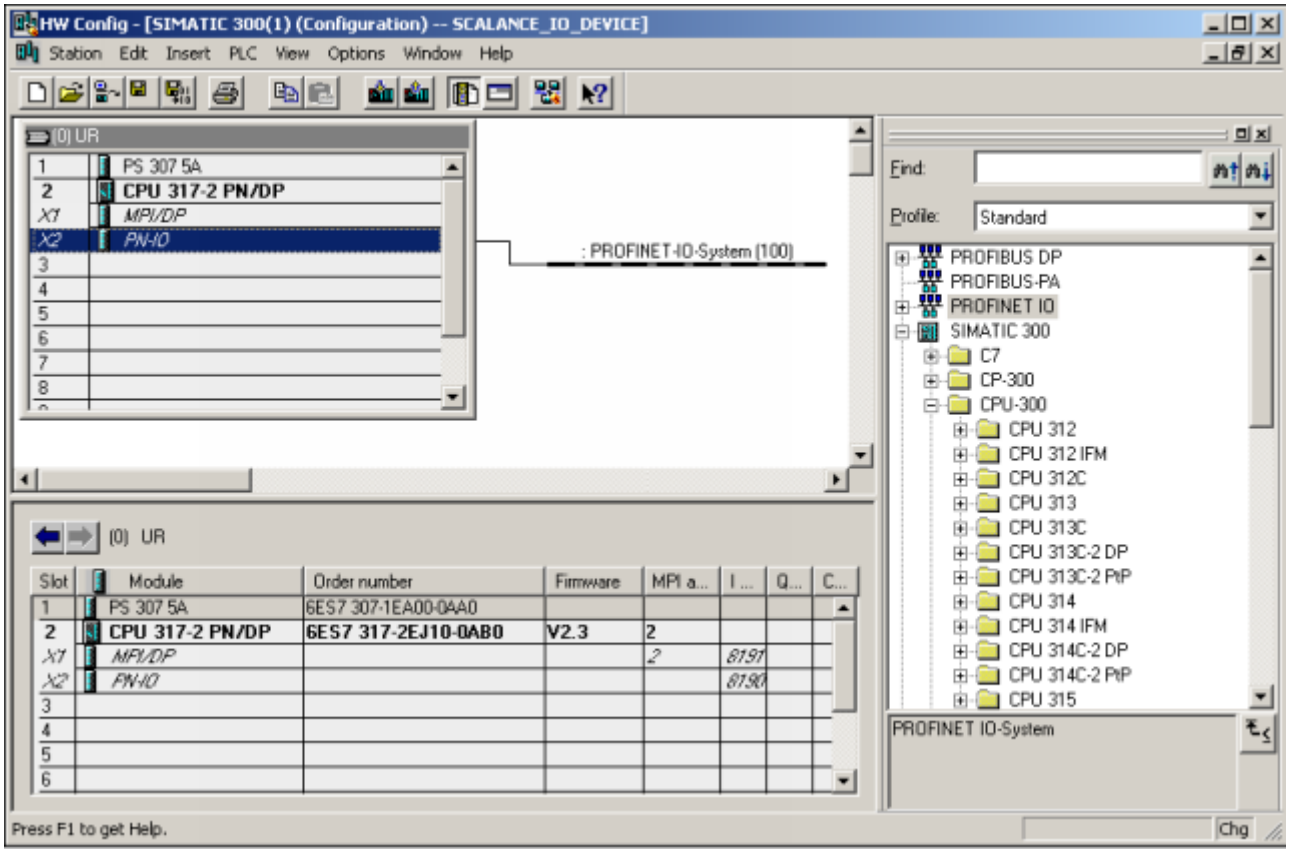


Figure 7-1 PNIO station setup

Including the IE Switch X-200

To include the individual IE Switches X-200 as PN IO devices, the IE Switch X-200 must exist in the module catalog under PROFINET IO.

Procedure

If the devices are not yet included in STEP 7, follow the steps below:

1. In the dialog, select HW Config -> Options "Install GSD files".
   The following dialog opens:

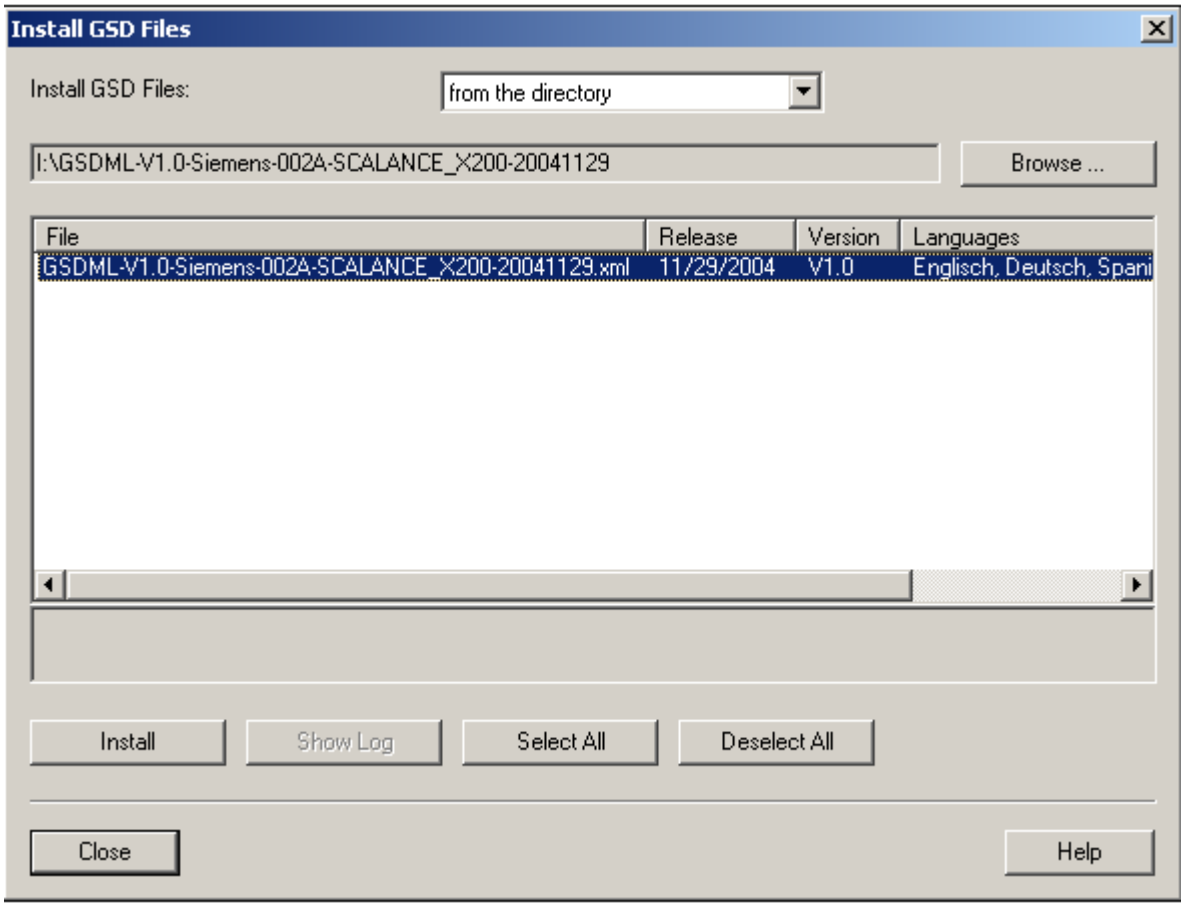


Figure 7-2 Installing PNIO GSD Files

2. Use the browse function to locate the supplied xml file (GSDML-V2.1-Siemens-002A-SCALANCE_X200-20070613.xml).
3. Then adopt the file using the "Install" function.
   The IE Switches X-200 are now included in the module catalog (refer to the module catalog in the following figure).
4. Drag the required IE Switches X-200 from the hardware catalog to the PROFINET IO system. The inserted IE Switch X-200 appears as an icon in HW Config.
5. Click on the "(1)SCALANCE" icon so that the slots of the SCALANCE are displayed in the lower part of the screen. By double-clicking on slot=0, you can set the global parameters of the SCALANCE (substitute module) as shown in the figure.
6. Click on the slots of the ports and set the specific parameters.

7. Right-click on the icon of the IE Switch X-200 to open the context menu. Select "Object Properties". Enter the device name and set the required IP configuration.
8. Save and compile the hardware configuration.
9. Select the Station > Save and Compile menu command.
10. Interconnect the devices over the network and turn on the power supply on the controller and the IE Switch X-200.

To transfer the name to the SCALANCE X-208, you require an online connection from the PG to the IO device.

1. You transfer the device name to the SCALANCE X-208 with PLC > Ethernet > Assign Device Name.

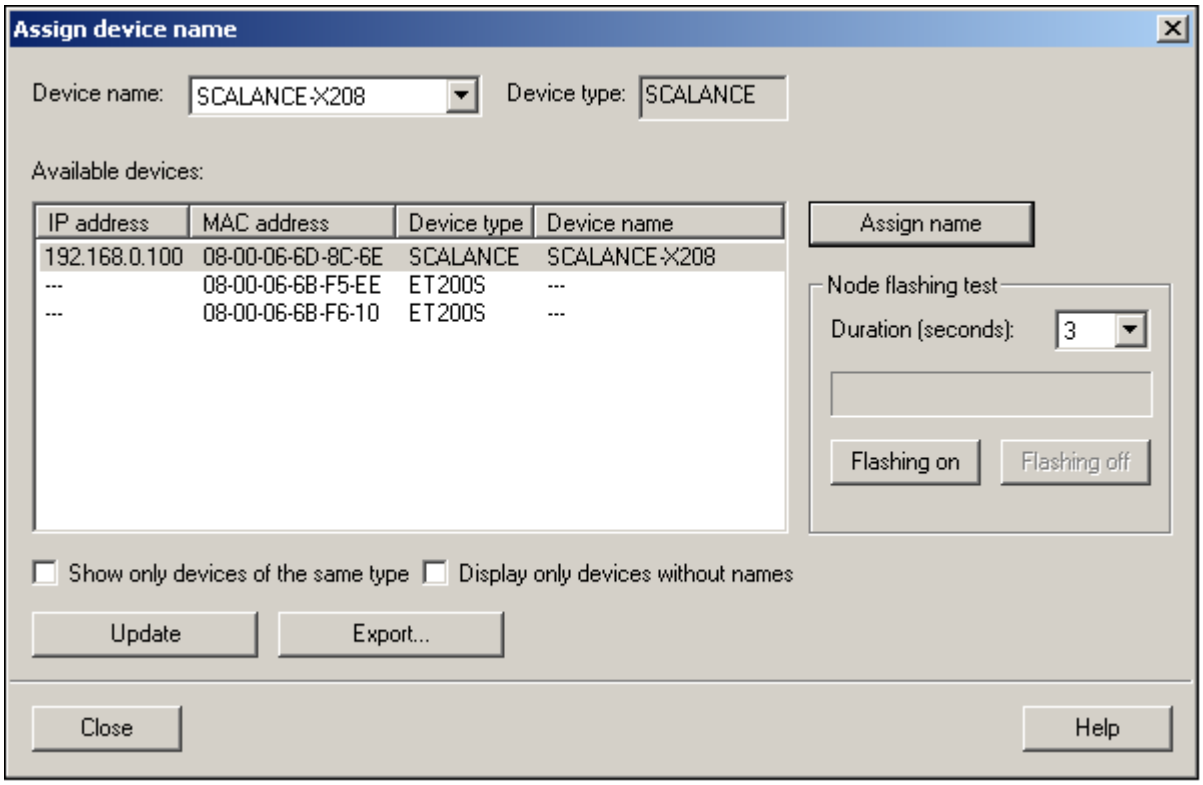


Figure 7-3 Assign Device Name PNIO dialog

If you use more than one IO device, the Assign Device Names dialog also displays more than one IO device. In this case, you should compare the MAC address of the device with the indicated MAC address and select the proper IO device. You can also check the assignment visually with the "Flashing On/Off" button (all the LEDs of the selected SCALANCE flash).

1. Click on the Assign Name button in the Device Names dialog box. The device name is stored permanently on the SCALANCE.

After assigning the name, the device name you assigned appears in the dialog box.

1. Select PLC > Download to Module to download the hardware configuration to the CPU module.

7.2 Settings in HW Config

General settings

Here, you can set the parameters of the IE Switch X-200 that are valid for all ports.

1. Select the picture of the IE Switch X200 in the network view. In the lower part of the picture, you can see the slots of the device.
2. Select slot "0". Right-click to open the context menu where you can select the object properties.
3. Select the "Parameters" tab in the object properties dialog of slot "0". Here, you can make the following selections:

   Redundant power supply
   Not monitored
   The failure of one of the two power supplies does not cause an alarm to be generated
   Monitored
   The failure of one of the two power supplies causes an alarm

   C-PLUG
   Not monitored
   The C-PLUG is not monitored
   Monitored
   A C-PLUG error causes an alarm

Port-specific settings

Here, you can make the settings for the individual ports.

1. Select the slot of the relevant port. Right-click to open the context menu where you then select the object properties.
2. Select the "Options" tab in the object properties dialog.
   Select the "Topology" tab in the properties dialog.
   Here, you can select a further device from this configuration in the "Partner port" box of the port connected to this port.
   If you do not want to monitor the topology, select "Any partner". (Default).

Approvals and markings

8

Product Name:

SIMATIC NET	SCALANCE X208	6GK5 208-0BA10-2AA3
SIMATIC NET	SCALANCE X208PRO	6GK5 208-0HA00-2AA6
SIMATIC NET	SCALANCE X216	6GK5216-0BA00-2AA3
SIMATIC NET	SCALANCE X224	6GK5224-0BA00-2AA3
SIMATIC NET	SCALANCE X204-2	6GK5 204-2BB10-2AA3
SIMATIC NET	SCALANCE X206-1	6GK5 206-1BB10-2AA3
SIMATIC NET	SCALANCE X212-2	6GK5212-2BB00-2AA3
SIMATIC NET	SCALANCE X204-2LD	6GK5 204-2BC10-2AA3
SIMATIC NET	SCALANCE X206-1LD	6GK5 206-1BC10-2AA3
SIMATIC NET	SCALANCE X212-2LD	6GK5212-2BC00-2AA3
SIMATIC NET	SCALANCE X202-2IRT	6GK5 202-2BB00-2BA3
SIMATIC NET	SCALANCE X204IRT	6GK5 204-0BA00-2BA3
SIMATIC NET	SCALANCE X204IRT PRO	6GK5204-0JA00-2BA6
SIMATIC NET	SCALANCE X202 2P IRT PRO	6GK5202-2JR00-2BA6
SIMATIC NET	SCALANCE X202-2P IRT	6GK5 202-2BH00-2BA3
SIMATIC NET	SCALANCE X201-3P IRT	6GK5 201-3BH00-2BA3
SIMATIC NET	SCALANCE X200-4P IRT	6GK5 200-4AH00-2BA3

EMC Guidelines

89/336/EEC "Electromagnetic Compatibility"

Area of application

The products are designed for use in an industrial environment:

Area of application	Requirements	
	RF interference level	Immunity to interference
Industrial area	EN 61000-6-4 Class A: 2001	EN 61000-6-2: 2001

Installation Guidelines

The products meet the requirements if you keep to the installation instructions and safety-related notices as described here and in the manual "SIMATIC NET Industrial Ethernet Twisted Pair and Fiber Optic Networks" /1/ when installing and operating the device.

Conformity Certificates

The EC Declaration of Conformity is available for the responsible authorities according to the above-mentioned EC Directive at the following address:

Siemens Aktiengesellschaft
Bereich Automatisierungs- und Antriebstechnik
Industrielle Kommunikation (A&D SC IC)
Postfach 4848
D-90327 Nürnberg

Notes for the Manufacturers of Machines

The products are not machines in the sense of the EC Machinery Directive. There is therefore no declaration of conformity relating to the EC Machinery Directive 98/37/EEC for these products.

If the products are part of the equipment of a machine, they must be included in the procedure for the declaration of conformity by the manufacturer of the machine.

FDA and IEC approvals

The devices

- SCALANCE X204-2LD
- SCALANCE X206-1LD
- SCALANCE X212-2LD

meet the FDA and IEC requirements listed below:

Figure 8-1 FDA and IEC approvals

Approvals

Note

The specified approvals apply only when the corresponding mark is printed on the product.

Device type SCALANCE	c-UL-us	c-UL-us for hazardous locations[1]	FM[1]	C-TICK	CE	ATEX95 Zone 2[1]	E1
X208	UL 60950-1 CSA C22.2 No. 60950-1	UL 1604, UL 2279Pt.15 CL.1, Div.2 GP. A.B.C.D T.. CL.1, Zone 2, GP, IIC, T.. CL.1, Zone2, AEx nC IIC T..	FM 3611 CL.1, Div.2 GP. A.B.C.D T.. CL.1, Zone 2, GP. IIC, T.. Ta:..	AS/NZS 2064 (Class A)	EN 61000-6-4 Class A, EN 61000-6-2	EN60079-15 II 3 G EEx nA II T.. KEMA 03 ATEX 1226 X	-
X208PRO	UL 60950-1 CSA C22.2 No. 60950-1	UL 1604, UL 2279Pt.15 CL.1, Div.2 GP. A.B.C.D T.. CL.1, Zone 2, GP, IIC, T.. CL.1, Zone2, AEx nC IIC T..	FM 3611 CL.1, Div.2 GP. A.B.C.D T.. CL.1, Zone 2, GP. IIC, T.. Ta:..	AS/NZS 2064 (Class A)	EN 61000-6-4 Class A, EN 61000-6-2	EN60079-15 II 3 G EEx nA II T.. KEMA 03 ATEX 1226 X	-
X216	UL 60950-1 CSA C22.2 No. 60950-1	UL 1604, UL 2279Pt.15 CL.1, Div.2 GP. A.B.C.D T.. CL.1, Zone 2, GP, IIC, T.. CL.1, Zone2, AEx nC IIC T..	FM 3611 CL.1, Div.2 GP. A.B.C.D T.. CL.1, Zone 2, GP. IIC, T.. Ta:..	AS/NZS 2064 (Class A)	EN 61000-6-4 Class A, EN 61000-6-2	EN60079-15 II 3 G EEx nA II T.. KEMA 03 ATEX 1226 X	-
X224	UL 60950-1 CSA C22.2 No. 60950-1	UL 1604, UL 2279Pt.15 CL.1, Div.2 GP. A.B.C.D T.. CL.1, Zone 2, GP, IIC, T.. CL.1, Zone2, AEx nC IIC T..	FM 3611 CL.1, Div.2 GP. A.B.C.D T.. CL.1, Zone 2, GP. IIC, T.. Ta:..	AS/NZS 2064 (Class A)	EN 61000-6-4 Class A, EN 61000-6-2	EN60079-15 II 3 G EEx nA II T.. KEMA 03 ATEX 1226 X	-
X204-2	UL 60950-1 CSA C22.2 No. 60950-1	UL 1604, UL 2279Pt.15 CL.1, Div.2 GP. A.B.C.D T.. CL.1, Zone 2, GP, IIC, T.. CL.1, Zone2, AEx nC IIC T..	FM 3611 CL.1, Div.2 GP. A.B.C.D T.. CL.1, Zone 2, GP. IIC, T.. Ta:..	AS/NZS 2064 (Class A)	EN 61000-6-4 Class A, EN 61000-6-2	EN60079-15 II 3 G EEx nA II T.. KEMA 03 ATEX 1226 X	-
X206-1	UL 60950-1 CSA C22.2 No. 60950-1	UL 1604, UL 2279Pt.15 CL.1, Div.2 GP. A.B.C.D T.. CL.1, Zone 2, GP, IIC, T.. CL.1, Zone2, AEx nC IIC T..	FM 3611 CL.1, Div.2 GP. A.B.C.D T.. CL.1, Zone 2, GP. IIC, T.. Ta:..	AS/NZS 2064 (Class A)	EN 61000-6-4 Class A, EN 61000-6-2	EN60079-15 II 3 G EEx nA II T.. KEMA 03 ATEX 1226 X	-
X212-2	UL 60950-1 CSA C22.2 No. 60950-1	UL 1604, UL 2279Pt.15 CL.1, Div.2 GP. A.B.C.D T.. CL.1, Zone 2, GP, IIC, T.. CL.1, Zone2, AEx nC IIC T..	FM 3611 CL.1, Div.2 GP. A.B.C.D T.. CL.1, Zone 2, GP. IIC, T.. Ta:..	AS/NZS 2064 (Class A)	EN 61000-6-4 Class A, EN 61000-6-2	EN60079-15 II 3 G EEx nA II T.. KEMA 03 ATEX 1226 X	-
X204-2 LD	UL 60950-1 CSA C22.2 No. 60950-1	UL 1604, UL 2279Pt.15 CL.1, Div.2 GP. A.B.C.D T.. CL.1, Zone 2, GP, IIC, T.. CL.1, Zone2, AEx nC IIC T..	FM 3611 CL.1, Div.2 GP. A.B.C.D T.. CL.1, Zone 2, GP. IIC, T.. Ta:..	AS/NZS 2064 (Class A)	EN 61000-6-4 Class A, EN 61000-6-2	EN60079-15 II 3 G EEx nA II T.. KEMA 03 ATEX 1226 X	-
X206-1 LD	UL 60950-1 CSA C22.2 No. 60950-1	UL 1604, UL 2279Pt.15 CL.1, Div.2 GP. A.B.C.D T.. CL.1, Zone 2, GP, IIC, T.. CL.1, Zone2, AEx nC IIC T..	FM 3611 CL.1, Div.2 GP. A.B.C.D T.. CL.1, Zone 2, GP. IIC, T.. Ta:..	AS/NZS 2064 (Class A)	EN 61000-6-4 Class A, EN 61000-6-2	EN60079-15 II 3 G EEx nA II T.. KEMA 03 ATEX 1226 X	-

Device type SCALANCE	c-UL-us	c-UL-us for hazardous locations[1]	FM[1]	C-TICK	CE	ATEX95 Zone 2[1]	E1
X212-2LD	UL 60950-1 CSA C22.2 No. 60950-1	UL 1604, UL 2279Pt.15 CL.1, Div.2 GP. A.B.C.D T.. CL.1, Zone 2, GP, IIC, T.. CL.1, Zone2, AEx nC IIC T..	FM 3611 CL.1, Div.2 GP. A.B.C.D T.. CL.1, Zone 2, GP. IIC, T.. Ta:..	AS/NZS 2064 (Class A)	EN 61000-6-4 Class A, EN 61000-6-2	EN60079-15 II 3 G EEx nA II T.. KEMA 03 ATEX 1226 X	-
X202-2IRT	UL 60950-1 CSA C22.2 No. 60950-1	UL 1604, UL 2279Pt.15 CL.1, Div.2 GP. A.B.C.D T.. CL.1, Zone 2, GP, IIC, T.. CL.1, Zone2, AEx nC IIC T..	FM 3611 CL.1, Div.2 GP. A.B.C.D T.. CL.1, Zone 2, GP. IIC, T.. Ta:..	AS/NZS 2064 (Class A)	EN 61000-6-4 Class A, EN 61000-6-2	EN60079-15 II 3 G EEx nA II T.. KEMA 03 ATEX 1226 X	-
X204IRT	UL 60950-1 CSA C22.2 No. 60950-1	UL 1604, UL 2279Pt.15 CL.1, Div.2 GP. A.B.C.D T.. CL.1, Zone 2, GP, IIC, T.. CL.1, Zone2, AEx nC IIC T..	FM 3611 CL.1, Div.2 GP. A.B.C.D T.. CL.1, Zone 2, GP. IIC, T.. Ta:..	AS/NZS 2064 (Class A)	EN 61000-6-4 Class A, EN 61000-6-2	EN60079-15 II 3 G EEx nA II T.. KEMA 03 ATEX 1226 X	-
X204IRT PRO	UL 60950-1 CSA C22.2 No. 60950-1	UL 1604, UL 2279Pt.15 CL.1, Div.2 GP. A.B.C.D T.. CL.1, Zone 2, GP, IIC, T.. CL.1, Zone2, AEx nC IIC T..	FM 3611 CL.1, Div.2 GP. A.B.C.D T.. CL.1, Zone 2, GP. IIC, T.. Ta:..	AS/NZS 2064 (Class A)	EN 61000-6-4 Class A, EN 61000-6-2	EN60079-15 II 3 G EEx nA II T.. KEMA 03 ATEX 1226 X	-
X202-2P IRT PRO	UL 60950-1 CSA C22.2 No. 60950-1	UL 1604, UL 2279Pt.15 CL.1, Div.2 GP. A.B.C.D T.. CL.1, Zone 2, GP, IIC, T.. CL.1, Zone2, AEx nC IIC T..	FM 3611 CL.1, Div.2 GP. A.B.C.D T.. CL.1, Zone 2, GP. IIC, T.. Ta:..	AS/NZS 2064 (Class A)	EN 61000-6-4 Class A, EN 61000-6-2	EN60079-15 II 3 G EEx nA II T.. KEMA 03 ATEX 1226 X	-
X202-2P IRT	UL 60950-1 CSA C22.2 No. 60950-1	UL 1604, UL 2279Pt.15 CL.1, Div.2 GP. A.B.C.D T.. CL.1, Zone 2, GP, IIC, T.. CL.1, Zone2, AEx nC IIC T..	FM 3611 CL.1, Div.2 GP. A.B.C.D T.. CL.1, Zone 2, GP. IIC, T.. Ta:..	AS/NZS 2064 (Class A)	EN 61000-6-4 Class A, EN 61000-6-2	EN60079-15 II 3 G EEx nA II T.. KEMA 03 ATEX 1226 X	-
X201-3P IRT	UL 60950-1 CSA C22.2 No. 60950-1	UL 1604, UL 2279Pt.15 CL.1, Div.2 GP. A.B.C.D T.. CL.1, Zone 2, GP, IIC, T.. CL.1, Zone2, AEx nC IIC T..	FM 3611 CL.1, Div.2 GP. A.B.C.D T.. CL.1, Zone 2, GP. IIC, T.. Ta:..	AS/NZS 2064 (Class A)	EN 61000-6-4 Class A, EN 61000-6-2	EN60079-15 II 3 G EEx nA II T.. KEMA 03 ATEX 1226 X	-
X200-4P IRT	UL 60950-1 CSA C22.2 No. 60950-1	UL 1604, UL 2279Pt.15 CL.1, Div.2 GP. A.B.C.D T.. CL.1, Zone 2, GP, IIC, T.. CL.1, Zone2, AEx nC IIC T..	FM 3611 CL.1, Div.2 GP. A.B.C.D T.. CL.1, Zone 2, GP. IIC, T.. Ta:..	AS/NZS 2064 (Class A)	EN 61000-6-4 Class A, EN 61000-6-2	EN60079-15 II 3 G EEx nA II T.. KEMA 03 ATEX 1226 X	-

[1]For temperature information "T.." or the maximum ambient temperature "Ta:..", refer to the type plate.

Mechanical stability

Device type SCALANCE	IEC 60068-2-6 vibration	IEC 60068-2-27 shock
X208	5 – 9 Hz: 3.5 mm 9 – 500 Hz: 1 g 1 octave/min, 20 sweeps	15 g, 6 ms duration 6 shocks per axis
X216	5 – 9 Hz: 3.5 mm 9 – 500 Hz: 1 g 1 octave/min, 20 sweeps	15 g, 11 ms duration 6 shocks per axis
X224	5 – 9 Hz: 3.5 mm 9 – 500 Hz: 1 g 1 octave/min, 20 sweeps	15 g, 11 ms duration 6 shocks per axis
X204-2	5 – 9 Hz: 3.5 mm 9 – 500 Hz: 1 g 1 octave/min, 20 sweeps	15 g, 6 ms duration 6 shocks per axis
X206-1	5 – 9 Hz: 3.5 mm 9 – 500 Hz: 1 g 1 octave/min, 20 sweeps	15 g, 6 ms duration 6 shocks per axis
X212-2	5 – 9 Hz: 3.5 mm 9 – 500 Hz: 1 g 1 octave/min, 20 sweeps	15 g, 11 ms duration 6 shocks per axis
X204-2 LD	5 – 9 Hz: 3.5 mm 9 – 500 Hz: 1 g 1 octave/min, 20 sweeps	15 g, 11 ms duration 6 shocks per axis
X206-1 LD	5 – 9 Hz: 3.5 mm 9 – 500 Hz: 1 g 1 octave/min, 20 sweeps	15 g, 6 ms duration 6 shocks per axis
X212-2LD	5 – 9 Hz: 3.5 mm 9 – 500 Hz: 1 g 1 octave/min, 20 sweeps	15 g, 6 ms duration 6 shocks per axis
X202-2IRT	10 - 58 Hz: 0.075 mm 58 - 500 Hz: 1 g 10 cycles per axis	10 g, 16 ms duration 6 shocks per axis
X204IRT	10 - 58 Hz: 0.075 mm 58 - 500 Hz: 1 g 10 cycles per axis	10 g, 16 ms duration 6 shocks per axis
X204 IRT PRO	5 – 9 Hz: 3.5 mm 9 – 150 Hz: 1 g 10 cycles per axis	15 g, 11 ms duration 6 shocks per axis
X202-2P IRT PRO	5 – 9 Hz: 3.5 mm 9 – 150 Hz: 1 g 10 cycles per axis	15 g, 11 ms duration 6 shocks per axis
X202-2P IRT	5 – 9 Hz: 3.5 mm 9 – 500 Hz: 1 g 1 octave/min, 20 sweeps	15 g, 11 ms duration 6 shocks per axis
X201-3P IRT	5 – 9 Hz: 3.5 mm 9 – 500 Hz: 1 g 1 octave/min, 20 sweeps	15 g, 11 ms duration 6 shocks per axis
X200-4P IRT	5 – 9 Hz: 3.5 mm 9 – 500 Hz: 1 g 1 octave/min, 20 sweeps	15 g, 11 ms duration 6 shocks per axis

Accessories

9

9.1 Accessories

Table 9-1 Order numbers

	Order number	Available for SCALANCE
"Industrial Ethernet TP and Fiber Optic Networks" manual	6GK1970-1BA10-0AA0	All
IE FC Stripping Tool	6GK1901-1GA00	All except X200-4P IRT
IE FC blade cassettes	6GK1901-1GB00	All except X200-4P IRT
IE FC TP standard cable GP	6XV1840-2AH10	All except X200-4P IRT
IE FC TP trailing cable	6XV1840-3AH10	All except X200-4P IRT
IE FC TP marine cable	6XV1840-4AH10	All except X200-4P IRT
IE FC TP trailing cable GP	6XV1870-2D	All except X200-4P IRT
IE FC TP flexible cable GP	6XV1870-2B	All except X200-4P IRT
IE FC FRNC cable GP	6XV1871-2F	All except X200-4P IRT
IE POF standard cable GP	6XV1874-2A	X202-2P IRT, X201-3P IRT, X200-4P IRT
IE POF trailing cable	6XV1874-2B	X202-2P IRT, X201-3P IRT, X200-4P IRT
IE TP torsion cable	6XV1870-2F	All except X200-4P IRT
Power M12 cable connector PRO	6GK1907-0DC10-6AA3	X208PRO
Signaling contact M12 cable connector PRO	6GK1908-0DC10-6AA3	X208PRO
IE FC RJ-45 Plug 180 pack of 1	6GK1901-1BB10-2AA0	All except X208PRO, X200-4P
IE FC RJ-45 Plug 180 pack of 10	6GK1901-1BB10-2AB0	All except X208PRO, X200-4P
IE FC RJ-45 Plug 180 pack of 50	6GK1901-1BB10-2AE0	All except X208PRO, X200-4P
IE M12 Plug PRO, pack of 1	6GK1901-0DB10-6AA0	X208PRO
IE M12 Plug PRO, pack of 8	6GK1901-0DB10-6AA8	X208PRO
IE M12 connecting cable 0.3 m	6XV1870-8AE30	X208PRO
IE M12 connecting cable 0.5 m	6XV1870-8AE50	X208PRO
IE M12 connecting cable 1.0 m	6XV1870-8AH10	X208PRO
IE M12 connecting cable 1.5 m	6XV1870-8AH15	X208PRO
IE M12 connecting cable 2.0 m	6XV1870-8AH20	X208PRO
IE M12 connecting cable 3.0 m	6XV1870-8AH30	X208PRO
IE M12 connecting cable 5.0 m	6XV1870-8AH50	X208PRO
IE M12 connecting cable 10.0 m	6XV1870-8AN10	X208PRO
IE M12 connecting cable 15.0 m	6XV1870-8AN15	X208PRO
IE M12 panel feed through, pack of 5	6GK1901-0DM20-2AA5	X208PRO
Signaling contact M12 cable connector PRO	6GK1908-0DC10-6AA3	X208PRO

	Order number	Available for SCALANCE
Power supply PS791-1PRO	6GK5791-1PS00-0AA6	X208PRO
C-PLUG	6GK1900-0AB00	X-200
IE SC RJ PCF Plug	6GK1900-0NB00-0AC0	X202-2P IRT, X201-3P IRT, X200-4P IRT
IE SC RJ POF Plug	6GK1900-0MB00-0AC0	X202-2P IRT, X201-3P IRT, X200-4P IRT
IE termination kit SC RJ PCF Plug	6GK1900-0NL00-0AA0	X202-2P IRT, X201-3P IRT, X200-4P IRT
IE termination kit SC RJ POF Plug	6GK1900-0ML00-0AA0	X202-2P IRT, X201-3P IRT, X200-4P IRT
IE SC RJ POF refill set	6GK1900-0MN00-0AA0	X202-2P IRT, X201-3P IRT, X200-4P IRT

References

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10.1 References

Sources of information and other documentation

1. SIMATIC NET Industrial Twisted Pair and Fiber-Optic Networks,
   Order numbers:
   6GK1970-1BA10-0AA0 German
   6GK1970-1BA10-0AA1 English
   6GK1970-1BA10-0AA2 French
   6GK1970-1BA10-0AA4 Italian
2. PROFINET Cabling and Interconnection Technology
   Can be ordered from the PROFIBUS User Organization (PNO)

11 Dimension drawings

11.1 Dimension drawing

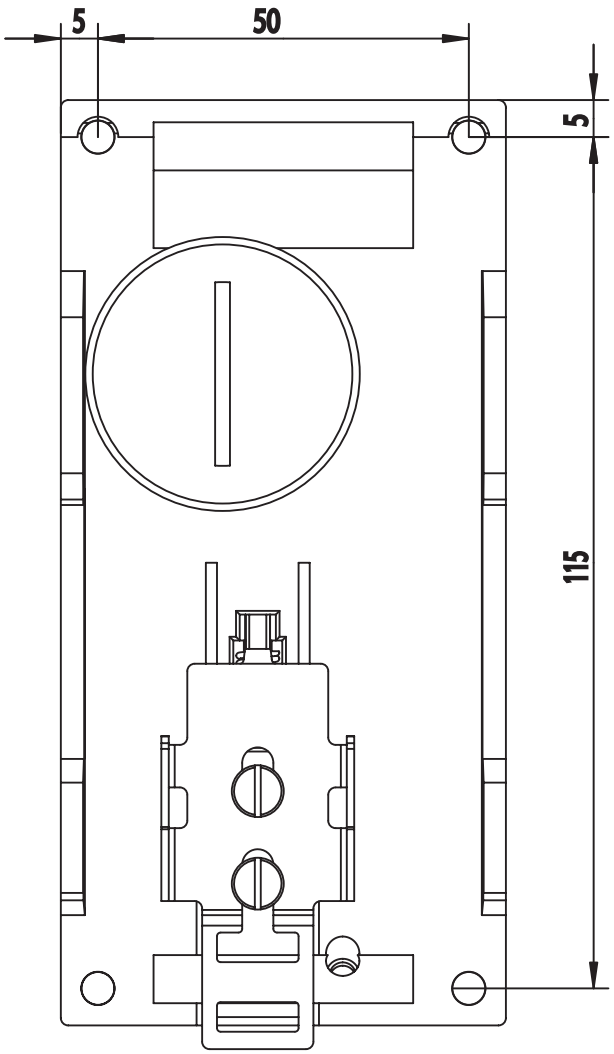

Figure 11-1 Dimension drawing SCALANCE X208, X206-1, X204-2, X202-2IRT, X204IRT, X204-2LD, X206-1LD, X202-2P IRT, X202-4P IRT, X201-3P IRT, X200-4P IRT

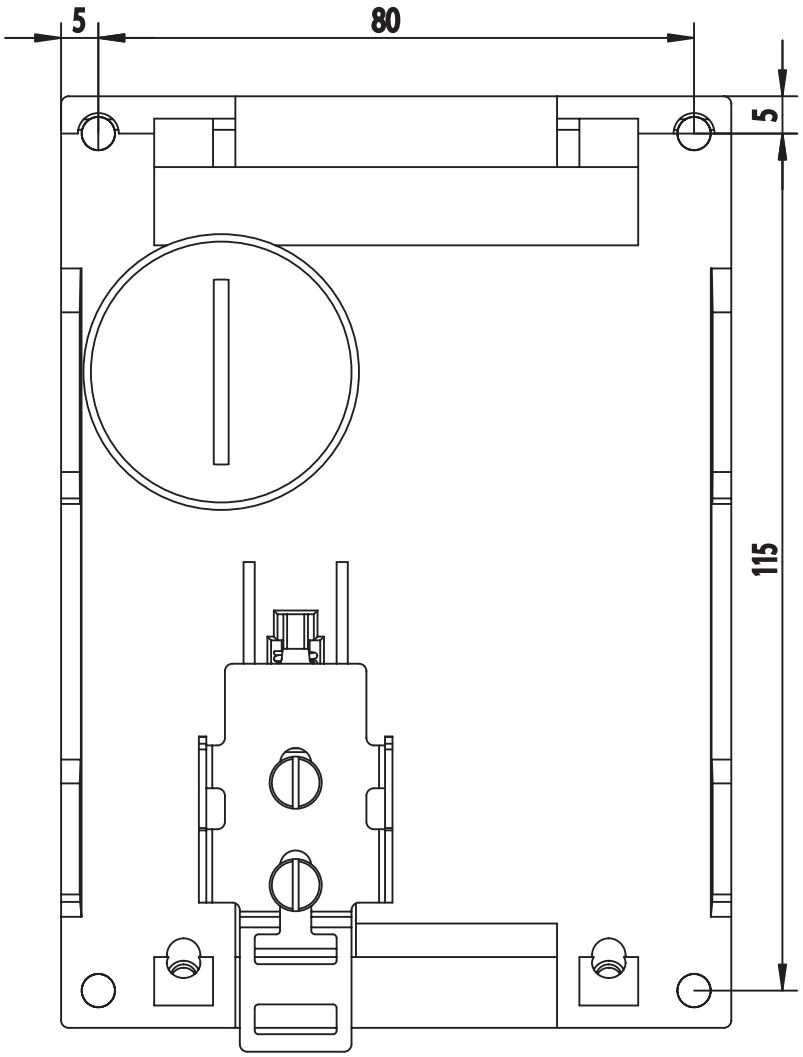

Figure 11-2 Dimension drawing SCALANCE X208PRO

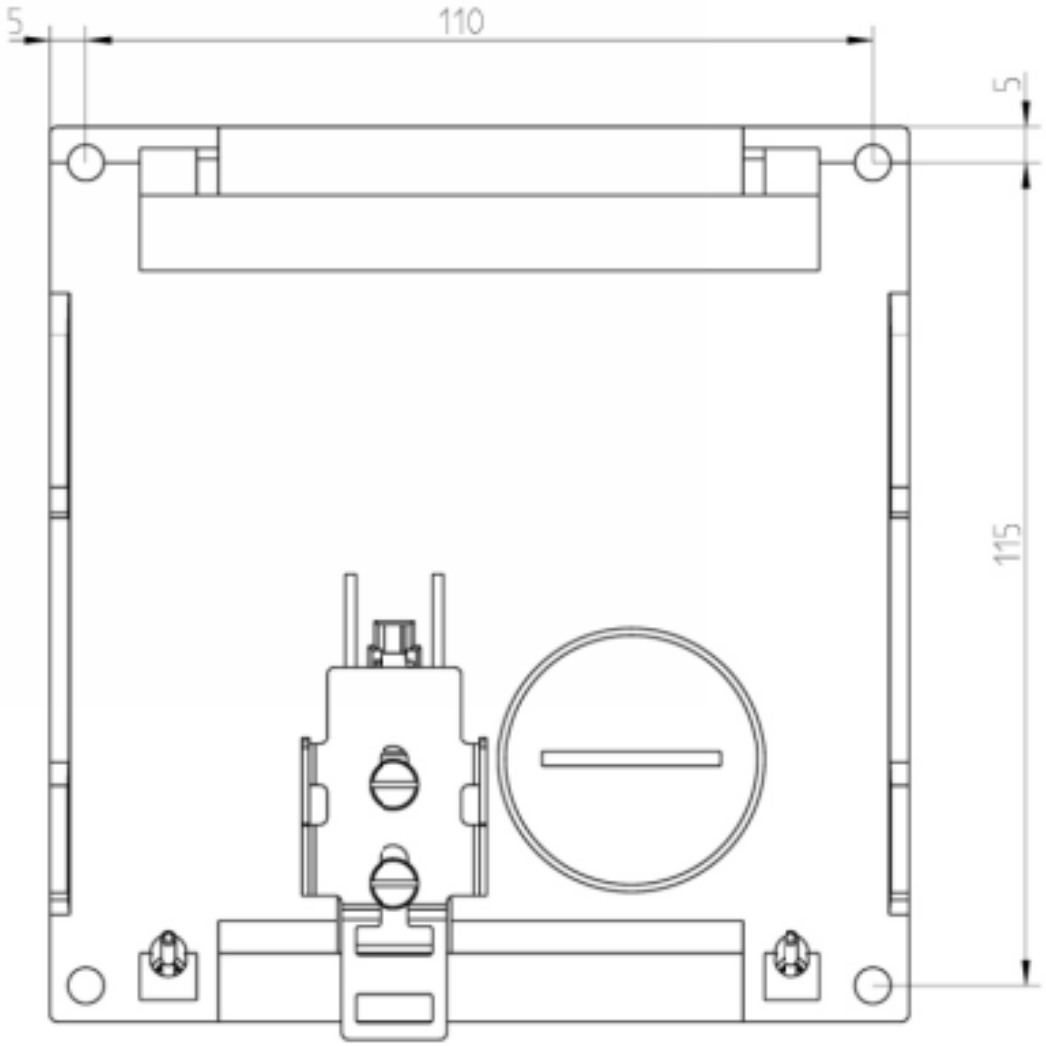

Figure 11-3 Dimension drawing SCALANCE X216, X212-2 and X212-2LD

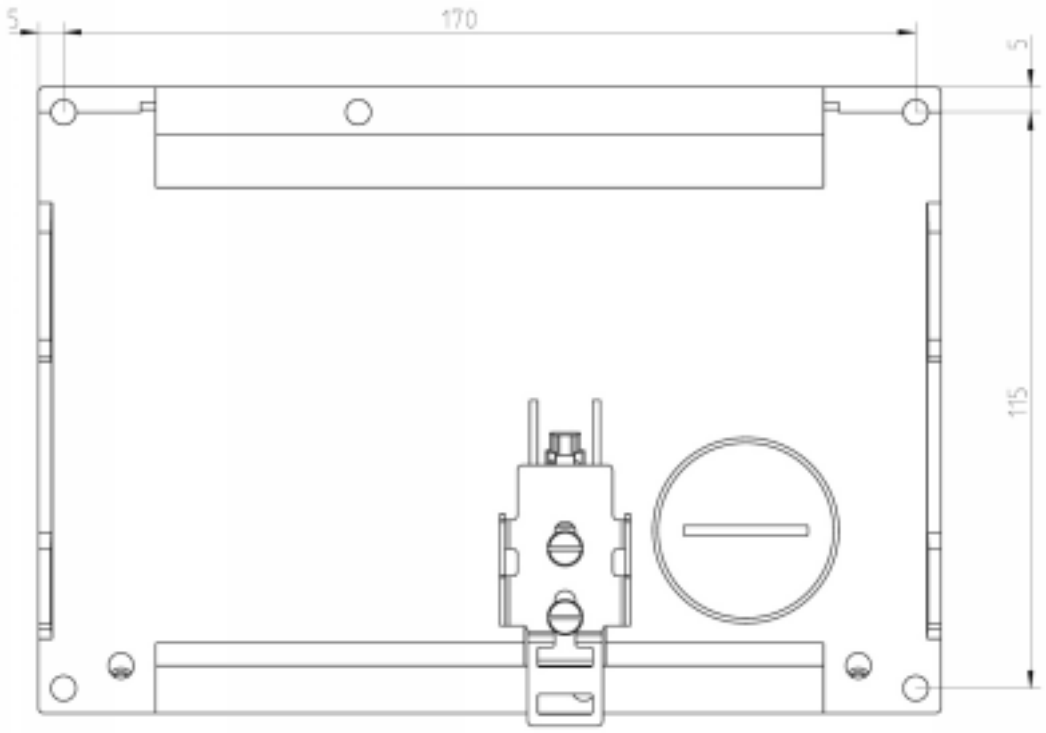

Figure 11-4 Dimension drawing SCALANCE X224

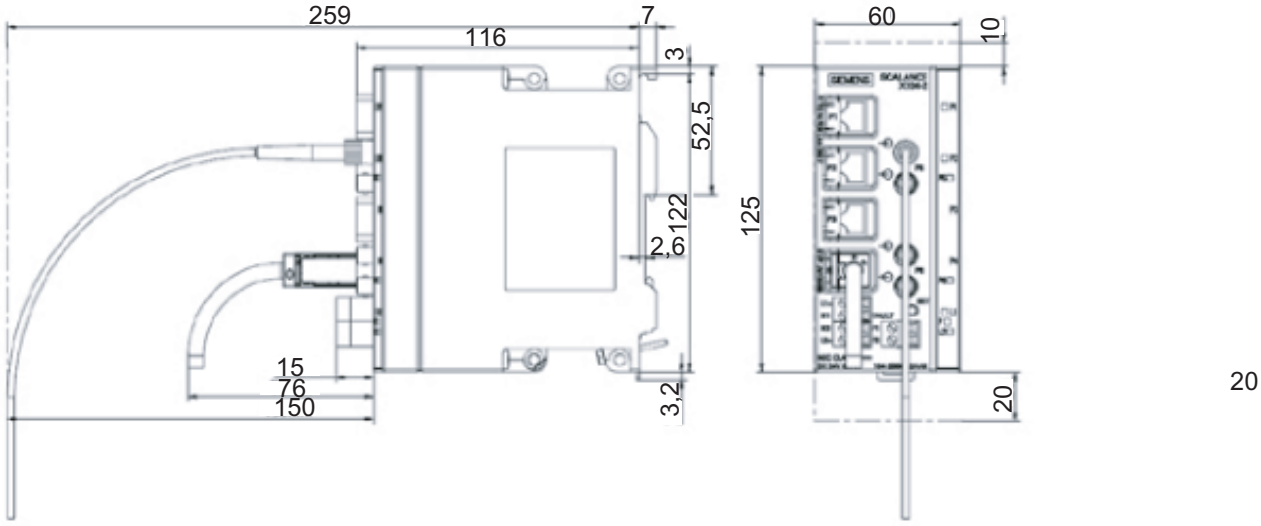

Figure 11-5 SCALANCE X200 side view

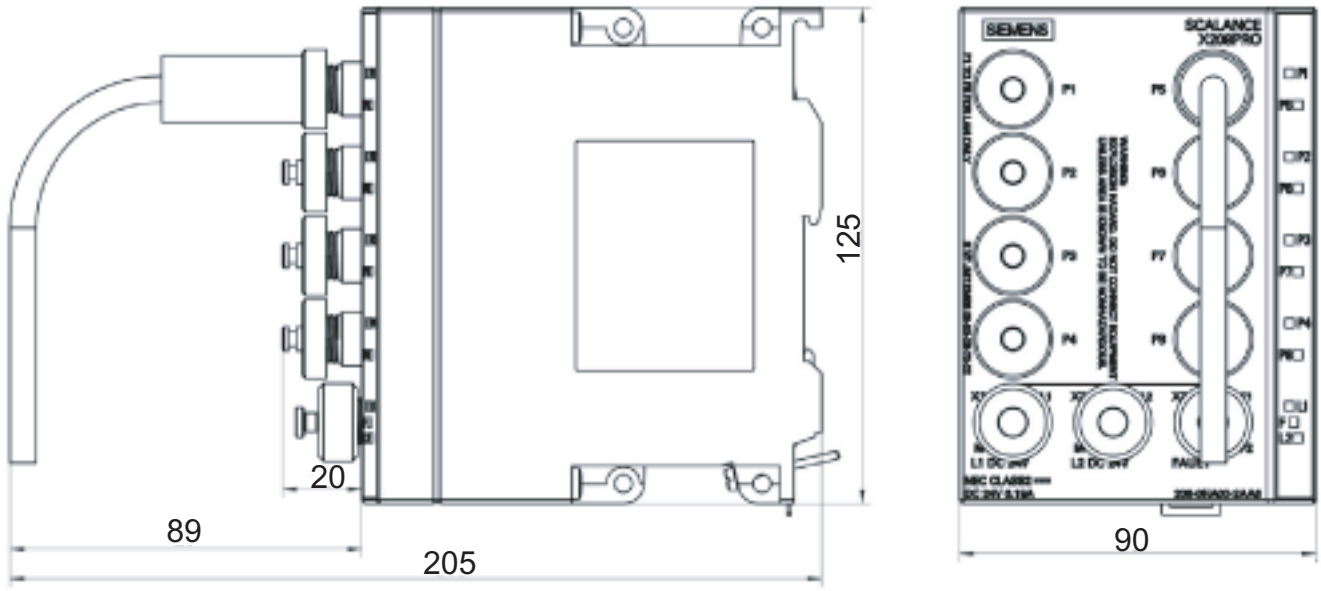

Figure 11-6 SCALANCE X208PRO side view

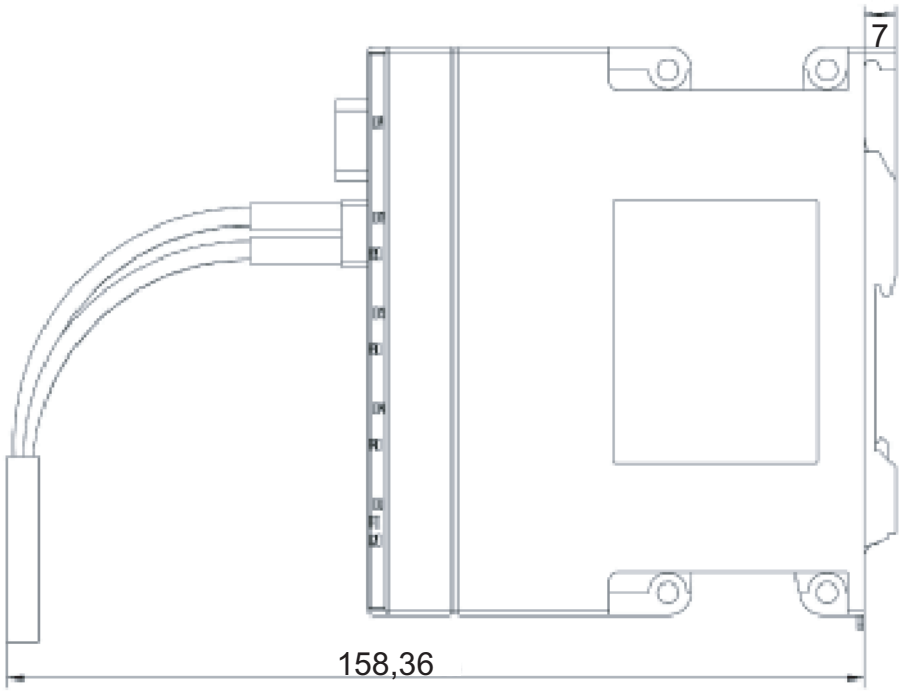

Figure 11-7 SCALANCE X-200 POF

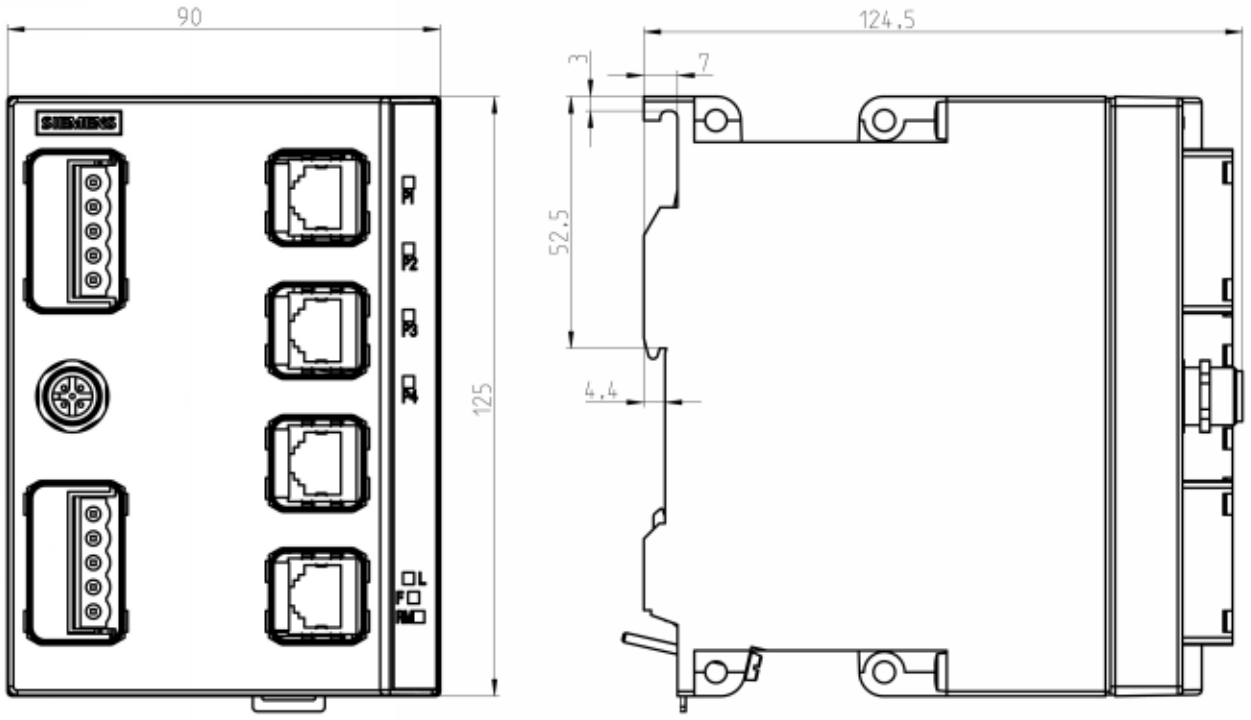

Figure 11-8 SCALANCE X204 IRT PRO, SCALANCE X202-2P IRT dimension drawings

Glossary

Aging time

The aging time is the time after which a learned MAC address is discarded if a SCALANCE X100 or X-200 has not received frames with this sender address during this time.

Autocrossover

Technique with which a TP port is automatically switched over between MDI and MDI-X assignment to make a connection independent of the port assignment of the device being attached. This means that crossover cables are not required. The autocrossover function can only be used when the port is set to autonegotiation mode.

Autonegotiation

Procedure standardized by IEEE 802.3 in which the transmission parameters (for example 10/100 Mbps, full/half duplex) are negotiated automatically between the devices.

BOOTP

A protocol for automatic assignment of IP addresses. The IP addresses are provided by a BOOTP server.

CLI

Command Line Interface. Terminal-based configuration option for SCALANCE. The CLI can be used both over the serial interface or with TELNET over the Fast Ethernet interface of the CPU.

C-PLUG

The C-PLUG (configuration plug) is an exchangeable medium for storage of the configuration and project engineering data. If the device is replaced, the configuration can be adopted by swapping the C-PLUG.

CRC

Cyclic Redundancy Check. A checksum used in transmission protocols to detect errors in frames.

Cut through

With this technique, a frame is forwarded as soon as the destination address is recognized. The delay is therefore not dependent on the frame length. If there are problems in a network, however, defective frames are also forwarded and can therefore add to the network load.

DCP

DCP (Discovery and basic Configuration Protocol) is used to detect nodes without an IP address and to assign a basic configuration to them, for example IP address.

Default gateway

A network node that forwards all frames not addressed to stations in the same LAN (subnet).

DHCP

DHCP (Dynamic Host Configuration Protocol), like BOOTP, a method for automatic assignment of IP addresses. With DHCP, however, addresses can be assigned while the device is operating.

Event

For Alarms & Events: An event is anything that happens that could be of interest to a client. Although events can also be generated when a condition is met, they are not necessarily dependent on conditions. Events that are not linked to conditions include, for example, error messages of the communication system.

Fault mask

Specifies the desired status (good status). Deviations from this occurring during operation are handled as faults.

HTTP

Hypertext Transfer Protocol.

Protocol for transfer from Web sites

IRT

Isochronous Real Time supports applications with extremely high real-time requirements (for example, motion control).

LLDP

LLDP (Link Layer Discovery Protocol) is used to exchange information between neighboring devices.

This can be read and, for example, used to identify the network topology.

MIB

Managed Information Base. A tree structure containing all the data relevant for network management in SNMP.

Mirroring

A port (mirror port) with its specific data traffic can be mirrored to another port (monitor port) for test purposes. Protocol analysis devices can be connected to the monitor port, in other words, the monitor port is not available for data exchange. Mirroring has no effect on the mirror port.

Multicast

A frame with a multicast address is received by all nodes prepared to receive this address.

Multimode

In multimode transmission, the pulse is transferred using many modes (waves) that travel along curved paths or are reflected within the core. Attenuation is mainly caused by physical absorption and dispersion as well as by mechanical bending. The amount of attenuation depends among other things on the wavelength of the input light. Multimode fiber-optic cables have an outer diameter of 125 µm and 50 or 62.5 µm core diameter. Due to the larger core diameter the pulse edges degrade more than in single mode transmission resulting in shorter transmission distances.

OSM

Optical Switching Module – SIMATIC NET Ethernet switch with optical ports.

PCF

Polymer Cladded Fiber
Optical fiber that can be assembled in the field and whose core is made of glass and jacket made of plastic.

POF

Plastic Optical Fiber
Optical fiber that can be assembled in the field and whose core and jacket are made of plastic.

Reconfiguration time

The time required to restore a functional configuration if a device fails or a network cable is interrupted.

Redundancy manager

Network node in a ring topology that does not forward any frames between its ring ports if there are functioning connections between all other nodes. As soon as a connection between two nodes is interrupted, the redundancy manager forwards frames so that there is an intact connection between all nodes.

Ring port

Two ports in a switch via which it is connected with other switches to form a ring. One switch must be configured as the redundancy manager in the ring. This sends test frames via the ring ports that are forwarded by all the ring ports of the other switches in the ring. This makes sure that the ring does not have any interruptions.

RMON

Remote Monitoring. RMON-compliant devices allow diagnostic data to be collected on the device and read out by a network management station. This means that network problems are detected early and can be eliminated. The particular advantage of RMON is that it is independent of location. The acquired data can be analyzed at any point in the network with suitable reporting software.

RSTP

Rapid Spanning Tree protocol. Variant of the Spanning Tree protocol optimized for speed.

This protocol prevents loops forming in multiple, redundant network connections. If there is an interruption on a connection, the network is automatically reconfigured so that there is exactly one connection between all nodes.

Segment

In the Ethernet bus system, transceivers connected together over the bus cable along with the nodes connected over patch cables form a segment. Several such segments can be connected via repeaters. When using twisted pair and fiber-optic cables, each subsection forms a segment.

Signaling contact

Floating relay contact over which detected fault/error states are signaled.

Single mode

In single mode transmission, (and monomode transmission) the pulse is transmitted by a straight mode (wave). Attenuation is mainly caused by physical absorption and dispersion as well as by mechanical bending. The amount of attenuation depends, among other things, on the wavelength of the input light. The single mode fiber typically has a core diameter of 5 to 9 µm. The outer diameter is, however, once again 125 µm (compare multimode). The smaller core diameter degrades the pulse edges less than multimode transmission and allows greater transmission distances.

SNMP

Simple Network Management Protocol. Standardized protocol for transporting network management information.

SNTP

Simple Network Time Protocol

Protocol for time synchronization over networks.

Store and forward

An entire frame is received, its validity checked (checksum, length etc.) and then buffered. Invalid frames are discarded, in other words, a frame is forwarded only when it is error-free.

STP

Spanning Tree protocol. This protocol prevents loops forming in multiple, redundant network connections. If there is an interruption on a connection, the network is automatically reconfigured so that there is exactly one connection between all nodes.

STP/RSTP listening

Support of Spanning Tree and Rapid Spanning Tree Topology Change frames.

When an STP/RSTP Topology Change frame is received, the MAC address table is deleted to allow the reconfiguration of the network.

TELNET

With this protocol, an interactive connection can be established to another device in the LAN or on the Internet. The user then has the same options as when directly connected to this device with a terminal.

TFTP

Trivial File Transfer Protocol. A simple, UDP-based protocol for data transfer. Due to its limited size, it can also be used by network nodes with little ROM.

TP port

Port with a TP connector (RJ-45 jack)

WBM

Web Based Management. With WBM, configuration and diagnostics are handled with an Internet browser. Entries made by the user are sent to the device using the HTTP protocol and the device transfers its replies by HTTP to the user.

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