

## SIMATIC NET

### Industrial Ethernet Electrical Lean Switch

#### Installation Instructions

#### Preface, Contents

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Release 12/2002

A5E00152007

## Classification of Safety-Related Notices

This document contains notices which you should observe to ensure your own personal safety, as well as to protect the product and connected equipment. These notices are highlighted in the manual by a warning triangle and are marked as follows according to the level of danger:



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### **Danger**

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

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### **Warning**

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

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### **Caution**

with warning triangle indicates that minor personal injury can result if proper precautions are not taken.

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### **Caution**

without warning triangle indicates that damage to property can result if proper precautions are not taken.

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### **Notice**

indicates that an undesirable result or status can occur if the relevant notice is ignored.

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### **Note**

highlights important information on the product, using the product, or part of the documentation that is of particular importance and that will be of benefit to the user.

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## Trademarks

SIMATIC®, SIMATIC NET® and SINEC® are registered trademarks of Siemens AG.

Third parties using for their own purposes any other names in this document which refer to trademarks might infringe upon the rights of the trademark owners.

## Safety Instructions Regarding your Product

Before you use the product described here, read the safety instructions below thoroughly.

## Qualified Personnel

Only qualified personnel should be allowed to install and work on this equipment . Qualified persons are defined as persons who are authorized to commission, to ground, and to tag circuits, equipment, and systems in accordance with established safety practices and standards.

## Correct Usage of Hardware Products

Please note the following regarding the correct usage of hardware products:

---

### Caution

This device and its components 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.

This product can only function correctly and safely if it is transported, stored, set up, and installed correctly, and operated and maintained as recommended.

Before you use the supplied sample programs or programs you have written yourself, make certain that no injury to persons nor damage to equipment can result in your plant or process.

EU Directive: Do not start up until you have established that the machine on which you intend to run this component complies with the directive 89/392/EEC.

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# Preface

## Purpose of the Installation Instructions

These installation instructions support you when commissioning in networks with the Electrical Lean Switch (ELS) .

## Consignment

The ELS includes the following components:

- ELS device
- 3-pin plug-in terminal block
- Fittings (brackets, screws) for wall-mounted installation or installation in a 19" cubicle and for the S7-300 standard rail
- "Information on the Product"
- Manual Collection CD

## Mounting the ELS

Follow the instructions in Chapter 5 of these installation instructions.

## Validity of the Installation Instructions

These installation instructions are valid for the following devices:

- |             |               |
|-------------|---------------|
| • ELS TP40  | 6GK1102-6AA00 |
| • ELS TP40M | 6GK1102-6AB00 |
| • ELS TP80  | 6GK1102-7AA00 |

## Further Documentation

The "SIMATIC NET Industrial Ethernet Twisted Pair and Fiber-Optic Networks" manual contains information on other SIMATIC NET products that you can operate in conjunction with ELS devices in an Industrial Ethernet network.

You can download the electronic version of this network manual from Customer Support on the Internet under entry number 1172207:

<http://www4.ad.siemens.de/view/cs/de/1172207>

## Finding Information

To help you to find information quickly, the appendix includes the following sections in addition to the table of contents:

- Glossary
- Index

## Guide to the Manual

To help you to find specific information quickly, these installation instructions include the following parts:

- At the front of the installation instructions you will find a complete table of contents.
- The chapters have headings in the left margin with an overview of the contents of the paragraphs in the section.
- Following the appendix, you will find a Glossary in which the most important specialist terms used in the instructions are defined.
- At the back of the installation instructions, you will find an index with which you can find topics quickly.

## Audience

These installation instructions are intended for persons involved in commissioning networks with the ELS.

## **Personnel Qualification Requirements**

Only qualified personnel should be allowed to install and work on this equipment. Qualified personnel as referred to in the installation instructions or in the warning notes are defined as persons who are familiar with the installation, assembly, startup and operation of this product and who possess the relevant qualifications for their work, e.g.:

- Training in or authorization for connecting up, grounding or labeling circuits and devices or systems in accordance with current standards in safety technology;
- Training in or authorization for the maintenance and use of suitable safety equipment in accordance with current standards in safety technology;
- First Aid qualification.

## **Standards and Approvals**

The ELS TP40, ELS TP40M, and ELS TP80 meet the requirements for the CE mark. For more detailed information about approvals and standards, refer to the appendix.

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# 1 Introduction

# 1

With the Electrical Lean Switch ELS product generation, you can set up powerful Fast Ethernet networks with a small number of ports in an industrial environment. Nodes can only be attached to the network over twisted-pair ports; in other words, electrical ports.

## 1.1 ELS TP40

### Possible Attachments

- Two RJ-45 jacks for connecting DTEs
- Two ports with insulation-piercing contacts for the direct attachment of IE FastConnect (FC) cables



Figure 1: ELS TP40

| Properties of the ELS TP40                             |   |
|--|---|
| Two electrical ports (RJ-45 jacks)                     | <p>10/100 Mbps (half/full duplex)</p> <p>TP connector technology (RJ-45 jack with MDI-X pinning)</p> <p>Max. cable length 10 m (TP Cord or TP XP Cord)</p> <p>In conjunction with IE FC Outlet RJ-45, a total cable length of a maximum of 100 m is permitted.</p>  |
| Two electrical ports with insulation-piercing contacts | <p>10/100 Mbps (half/full duplex) (with MDI-X pinning)</p> <p>Permitted cable types:</p> <ul style="list-style-type: none"> <li>- IE FC TP standard cable 6XV1840-2AH10<br/>cable length max. 100 m *</li> <li>- IE FC TP marine cable 6XV1840-4AH10<br/>cable length max. 85 m *</li> <li>- IE FC TP trailing cable 6XV1840-3AH10<br/>cable length max. 85 m*</li> </ul> |

\*The specified IE FC cable lengths are reduced by 10 m if an IE FC outlet is used.

## 1.2 ELS TP40M

### Possible Attachments

- Two RJ-45 jacks for connecting DTEs
- Two ports with insulation-piercing contacts for the direct attachment of IE FastConnect (FC) cables

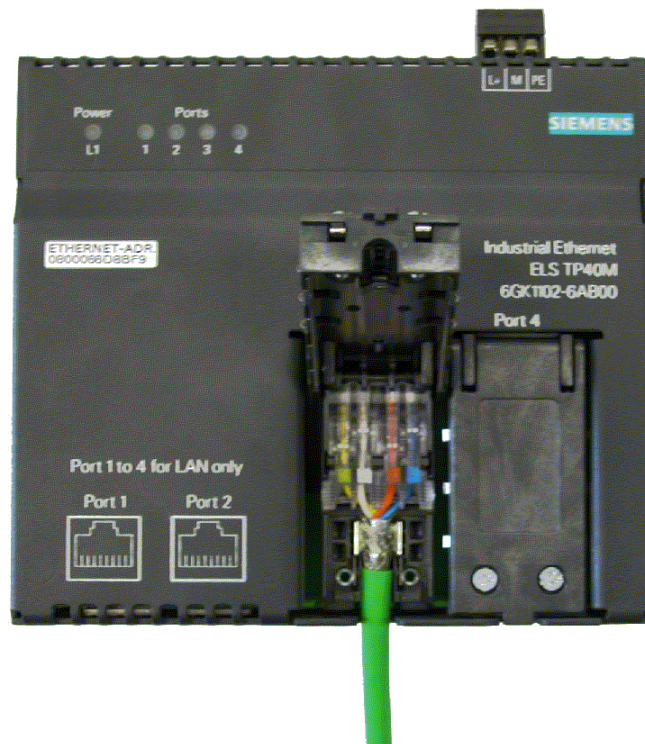


Figure 2: ELS TP40M

| Properties of the ELS TP40M                            |   |
|--|---|
| Two electrical ports (RJ-45 jacks)                     | <p>10/100 Mbps (half/full duplex)</p> <p>TP connector technology (RJ-45 jack with MDI-X pinning)</p> <p>Max. cable length 10 m (TP Cord or TP XP Cord)</p> <p>In conjunction with IE FC Outlet RJ-45, a total cable length of a maximum of 100 m is permitted.</p>  |
| Two electrical ports with insulation-piercing contacts | <p>10/100 Mbps (half/full duplex) (with MDI-X pinning)</p> <p>Permitted cable types:</p> <ul style="list-style-type: none"> <li>- IE FC TP standard cable 6XV1840-2AH10<br/>cable length max. 100 m *</li> <li>- IE FC TP marine cable 6XV1840-4AH10<br/>cable length max. 85 m *</li> <li>- IE FC TP trailing cable 6XV1840-3AH10<br/>cable length max. 85 m*</li> </ul> |

\*The specified IE FC cable lengths are reduced by 10 m if an IE FC outlet is used.

### 1.3 ELS TP80

Possible Attachments

- Eight RJ-45 jacks for connecting DTEs



Figure 3: ELS TP80

| Properties of the ELS TP80           |   |
|--------------------------------------|---|
| Eight electrical ports (RJ-45 jacks) | 10/100 Mbps (half/full duplex)<br>TP connector technology (RJ-45 jack with MDI-X pinning)<br>Max. cable length 10 m (TP Cord or TP XP Cord)<br>In conjunction with IE FC Outlet RJ-45, a total cable length of a maximum of 100 m is permitted. |

## 2 Functions

# 2

This section provides you with an overview of the functions of the Electrical Lean Switch (ELS) product generation.

The Electrical Lean Switches (ELS) allow the cost-effective setup of Ethernet bus or star structures with switching functionality. The ELS switches are intended for use in a switching cubicle.

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**Note**

If you use an ELS in a redundant OSM/ESM ring, the redundancy function is not supported.

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**Note**

The requirements of EN61000-4-5, surge test on power supply lines are only met if a

Blitzductor VT AD 24V type no. 918 402 is used.

Manufacturer:

DEHN+SÖHNE GmbH+Co.KG  
Hans Dehn Str.1  
Postfach 1640

D-92306 Neumarkt  
Germany

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## **3 Network Topologies**

# **3**

The following network topologies can be implemented with Electrical Lean Switches.

### 3.1 Network Topologies with ELS TP40

Attachment of individual remotely located DTEs over ELS TP40 to a TP network

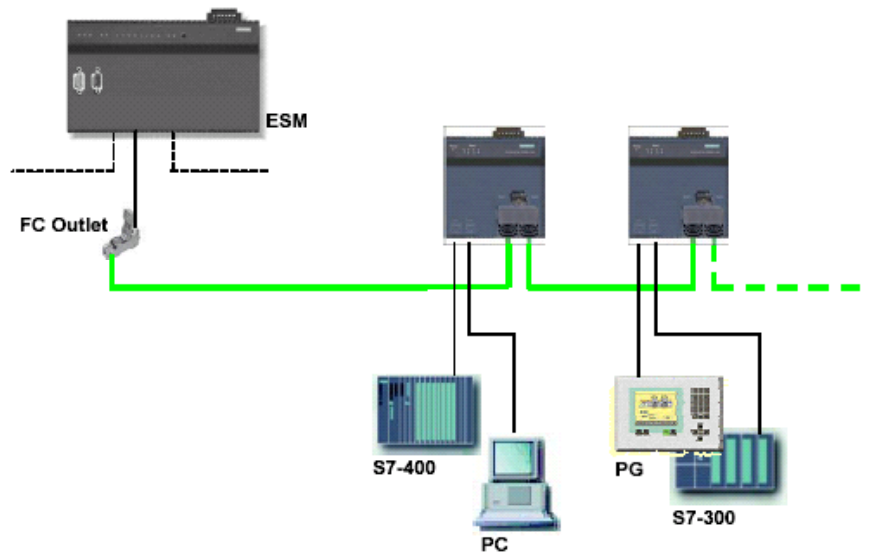


Figure 4: ELS TP40 Bus Topology

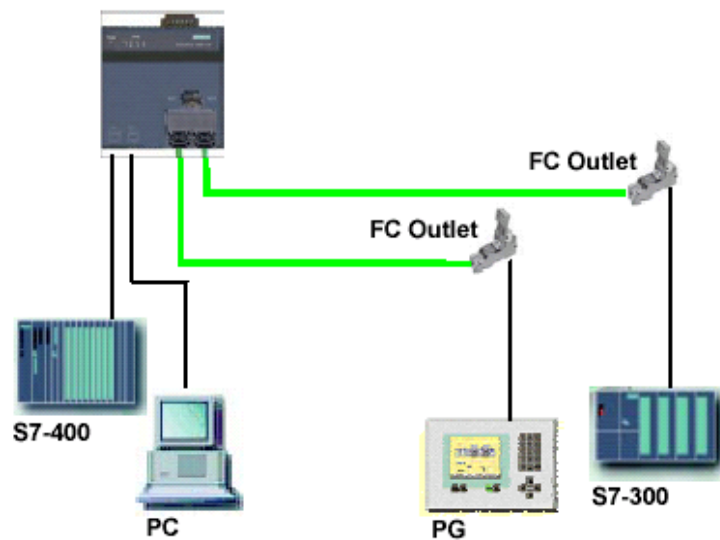


Figure 5: ELS TP40 Star Topology

### 3.2 Network Topologies with ELS TP40M

Attachment of individual remotely located DTEs over ELS TP40M to a twisted-pair network

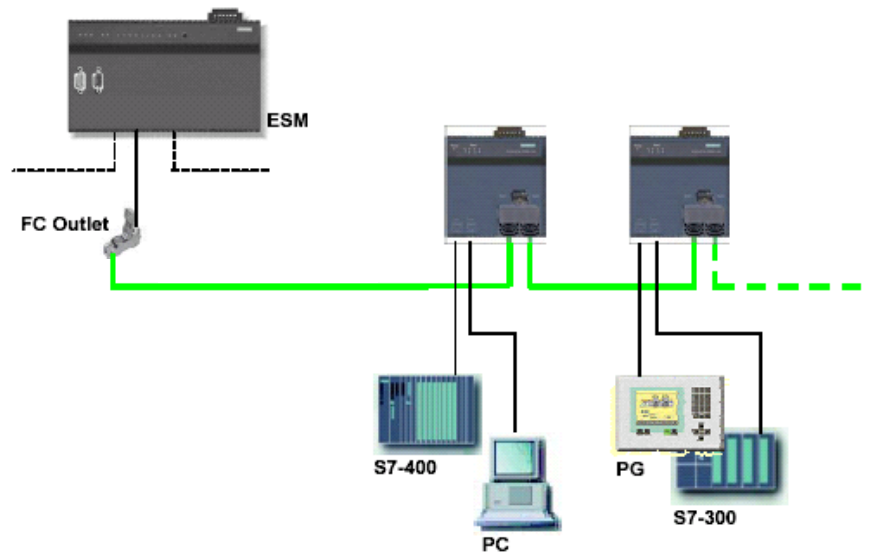


Figure 6: ELS TP40M Bus Topology

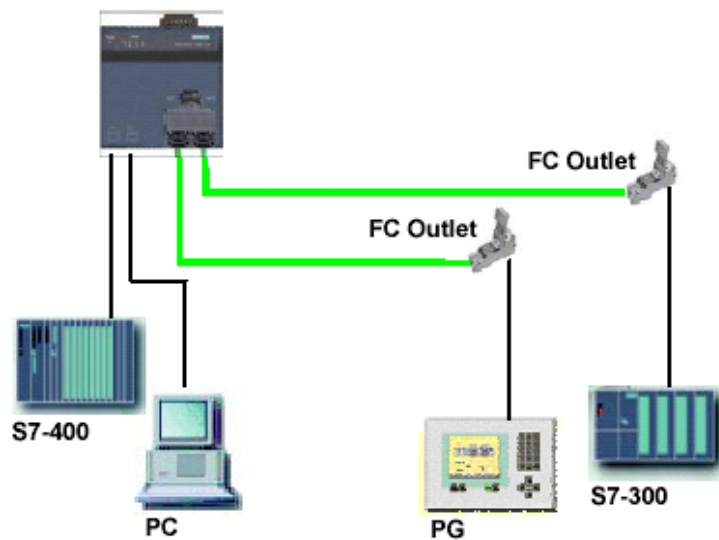


Figure 7: ELS TP40M Star Topology

### 3.3 Network Topologies with ELS TP80

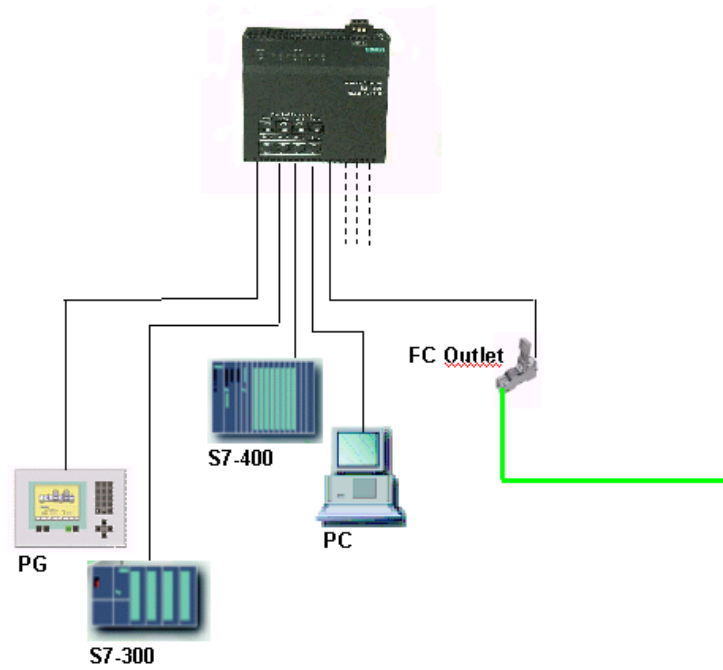


Figure 8: ELS TP80 Star Topology

## **4 Ports and Displays**

# **4**

This chapter provides you with an overview of the ports and displays of the ELS.

## 4.1 Ports and Displays of the ELS TP40

### 4.1.1 TP Ports

#### Pinning

On the ELS TP40, the TP ports are implemented as RJ-45 jacks and as insulation-piercing contacts with the MDI-X pinning (Medium-Dependent Interface Autocrossover) of a network component.

---

#### Notice

TP Cords or TP-XP Cords with a maximum length of 10 m can be connected to the RJ-45 TP port. In conjunction with IE FC Outlet RJ-45, a total cable length of 100 m is permitted.

IE FC TP cable with a maximum length 100 m can be connected to the TP ports with insulation-piercing contacts.

---

#### Autonegotiation

Autonegotiation means the automatic detection of the functionality of the port at the opposite end. Using autonegotiation, repeaters or DTEs 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

The ELS TP40 is a Plug and Play device that does not require settings to be made when it is installed.

---

#### MDI /MDIX Autocrossover Function

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

The Ethernet Switch chips used in the ELS all support the MDI / MDI-X autocrossover function.

---

**Note**

Ports of partner stations not supporting autonegotiation must be set to 100 Mbps/ half duplex or 10 Mbps half duplex.

---

### 4.1.2 Power Supply

The power supply is connected using a 3-pin plug-in terminal block with a screw locking mechanism.



Figure 9: ELS TP40





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**Warning**

Industrial Ethernet ELS TP40 switches are designed for operation with 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.

The power supply unit to supply the ELS TP40 must comply with NEC Class 2 (voltage range 18 - 32 V, current requirement 150 mA).

Never connect the ELS to a.c. power supplies or d.c. power supplies greater than 32 V d.c.

---

**Power Supply**

The power supply is connected over a high resistance with the enclosure to allow an ungrounded setup. The ELS TP40 device can also be grounded using the PE screw terminal on the terminal block.

### 4.1.3 Displays

#### Power display (green LED)

The status of the power supply is signaled by a green LED:

| Status    | Meaning                                   |
|-----------|---|
| lit green | Power supply L+ is connected              |
| Not lit   | Power supply L+ is not connected or <14 V |

#### Port status display (green/yellow LEDs)

The status of the ports is signaled by four LEDs:

| Status                     | Meaning                                   |
|----------------------------|---|
| Port 1 to 4 LED lit green  | TP link exists, no data reception         |
| Port 1 to 4 LED lit yellow | TP link exists, receiving data at TP port |

## 4.2 Ports and Displays of the ELS TP40M

### 4.2.1 TP Ports

#### Pinning

On the ELS TP40M, the TP ports are implemented as RJ-45 jacks and as insulation-piercing contacts with the MDI-X pinning (Medium-Dependent Interface Autocrossover) of a network component.

---

**Notice**

TP Cords or TP-XP Cords with a maximum length of 10 m can be connected to the RJ-45 TP port. In conjunction with IE FC Outlet RJ-45, a total cable length of 100 m is permitted.

IE FC TP cable with a maximum length 100 m can be connected to the TP ports with insulation-piercing contacts.

---

#### Autonegotiation

Autonegotiation means the automatic detection of the functionality of the port at the opposite end. Using autonegotiation, repeaters or DTEs 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**

The ELS TP40M is a Plug and Play device that does not require settings to be made when it is installed.

---

#### MDI /MDIX Autocrossover Function

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

The Ethernet Switch chips used in the ELS all support the MDI / MDI-X autocrossover function.

---

**Note**

Ports of partner stations not supporting autonegotiation must be set to 100 Mbps/  
half duplex or 10 Mbps half duplex.

---

### 4.2.2 Power Supply

The power supply is connected using a 3-pin plug-in terminal block with a screw locking mechanism.

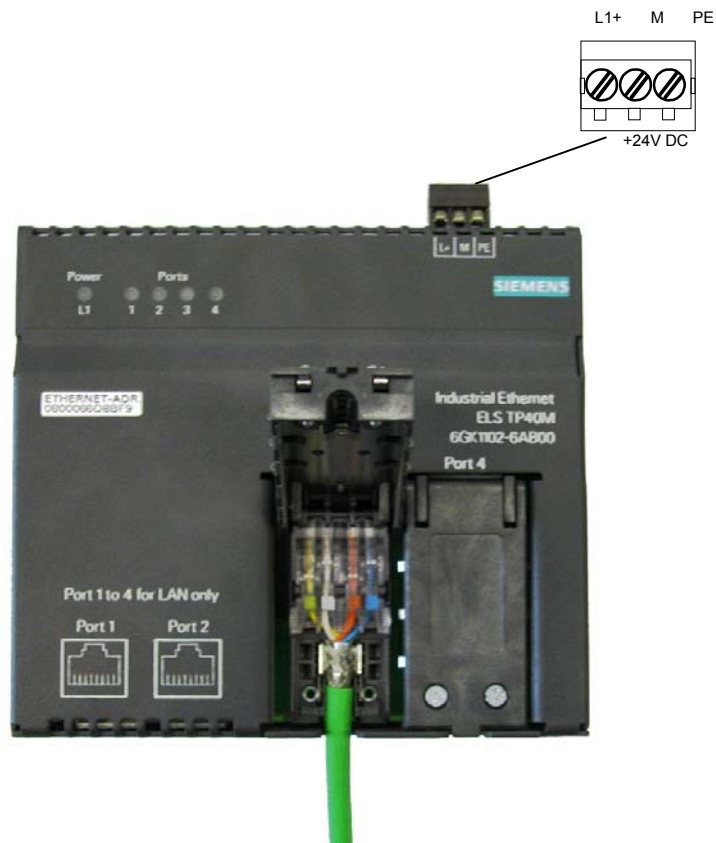


Figure 10: ELS TP40M



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**Warning**

Industrial Ethernet ELS TP40M switches are designed for operation with 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.

The power supply unit to supply the ELS TP40M must comply with NEC Class 2 (voltage range 18 - 32 V, current requirement 150 mA).

Never connect the ELS to a.c. power supplies or d.c. power supplies greater than 32 V d.c.

---

**Power Supply**

The power supply is connected over a high resistance with the enclosure to allow an ungrounded setup. The ELS TP40M device can also be grounded using the PE screw terminal on the terminal block.

### 4.2.3 Displays

#### Power Display (green and red LEDs)

The status of the ELS TP40M is indicated by a green and a red LED:

| Status              | Meaning  |
|---------------------|--|
| lit green           | Power supply L+ is connected   |
| not lit             | Power supply L+ is not connected or <14 V  |
| lit or flashing red | The red LED should go off after "Power on" after approximately one minute otherwise the ELS TP40M device is defective. |

#### Port Status Display (green/yellow LEDs)

The status of the ports is signaled by four LEDs:

| Status                     | Meaning                                   |
|----------------------------|---|
| Port 1 to 4 LED lit green  | TP link exists, no data reception         |
| Port 1 to 4 LED lit yellow | TP link exists, receiving data at TP port |

#### Port Status Display During Startup

Following startup, the LEDs are lit in the order shown:

- Red LED (approx. 0.5 s)
- Green power LED (green) and all yellow LEDs for approx. 13 s
- Red/green LEDs flash quickly for approx. 1.5 s

The device is operational after a further 3 seconds.

## 4.3 Ports and Displays of the ELS TP80

### 4.3.1 TP Ports

#### Pinning

On the ELS TP80, the TP ports are implemented as RJ-45 jacks with the MDI-X pinning (Medium-Dependent Interface Autocrossover) of a network component.

---

**Notice**

TP Cords or TP-XP Cords with a maximum length of 10 m can be connected to the RJ-45 TP port. In conjunction with IE FC Outlet RJ-45, a total cable length of 100 m is permitted.

---

#### Autonegotiation

Autonegotiation means the automatic detection of the functionality of the port at the opposite end. Using autonegotiation, repeaters or DTEs 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**

The ELS TP80 is a Plug and Play device that does not require settings to be made when it is installed.

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#### MDI /MDIX Autocrossover Function

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

The Ethernet Switch chips used in the ELS all support the MDI / MDI-X autocrossover function.

---

**Note**

Ports of partner stations not supporting autonegotiation must be set to 100 Mbps/ half duplex or 10 Mbps half duplex.

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### 4.3.2 Power Supply

The power supply is connected using a 3-pin plug-in terminal block with a screw locking mechanism.



Figure 11: ELS TP80



#### Warning

Industrial Ethernet ELS TP80 switches are designed for operation with 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.

The power supply unit to supply the ELS TP80 must comply with NEC Class 2 (voltage range 18 - 32 V, current requirement 150 mA).

Never connect the ELS to a.c. power supplies or d.c. power supplies greater than 32 V d.c.

### Power Supply

The power supply is connected over a high resistance with the enclosure to allow an ungrounded setup. The ELS TP80 device can also be grounded using the PE screw terminal on the terminal block.

### 4.3.3 Displays

#### Power display (green LED)

The status of the power supply is signaled by a green LED:

| Status    | Meaning                                   |
|-----------|---|
| lit green | Power supply L+ is connected              |
| Not lit   | Power supply L+ is not connected or <14 V |

#### Port status display (green/yellow LEDs)

The status of the ports is signaled by eight LEDs:

| Status                        | Meaning                                   |
|-------------------------------|---|
| Port 1 to 8 LED lit green     | TP link exists, no data reception         |
| Port 1 to 8 LED lit yellow    | TP link exists, receiving data at TP port |
| Port 1 to 8 LED flashes green | TP link exists, sending data              |

## **5 Installation and Maintenance**

# **5**

## 5.1 Consignment

### Unpacking, Checking the Consignment

1. Check that the consignment includes the following components:
  - ELS device
  - Mounting brackets, screws and terminal block
  - Information on the Product
  - Manual Collection CD
2. Check each component for any damage.



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**Warning**

Do not install damaged components!

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## 5.2 Installation|

There are several ways of installing the ELS:

- Installation on a 35 mm standard rail
- Installation on a SIMATIC S7-300 rail
- Installation in a 19" cabinet (along with other ELS modules in the 19" mounting system)
- Wall mounted

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### Note

- Remember that the ELS must only be installed horizontally (ventilation slits top/bottom see Figure 4). To ensure adequate convection, there must be a clearance of at least 5 cm above and below the ventilation slits. You should also make sure that the permitted ambient temperature range is not exceeded.
  - During installation and operation, make sure that you adhere to the installation instructions and safety-related notices in this description and in the SIMATIC NET Industrial Ethernet Twisted Pair and Fiber-Optic Networks manual /2/.
  - Unless specifically stated, the following installation options apply to all ELS switches.
- 

### Preparations

Remove the terminal block from the ELS and wire up the power supply lines as described in Section 4.1.2.

## DIN Rail Mounting

1. Install the ELS on a 35 mm standard rail complying with DIN EN 50022.
2. Fit the ELS on to the rail from above and press in the bottom of the device until the catch engages.
3. Connect the electrical cables and the terminal block for the power supply.



Figure 12: Installing the ELS on a DIN Standard Rail

### Removing from a Standard Rail

To remove the ELS from the rail, first disconnect the TP cables and pull off the terminal block.

Then pull down the device and release it from the rail.



Figure 13. Removing from the Standard Rail

### Installation on a SIMATIC S7-300 Standard Rail

1. First secure the supplied brackets to the left and right of the ELS.
2. Fit the guide on the top of the ELS casing into the S7 rail.
3. Screw the ELS to the bottom of the standard rail.



Figure 14. Installing an ELS TP40 on a SIMATIC S7-300 Standard Rail



## **Installation in a 19" Cubicle**

To install in the 19" cubicle, you require the two securing brackets supplied. You can achieve the 19" width

- with 3 ELS devices

Follow the steps outlined below:

1. First screw the ELS switches to the supplied mounting plates at the rear.
2. Fit two of the supplied brackets to the sides
3. Secure the devices using the brackets in the 19" cubicle.

## **Wall Mounting**

To install an ELS on a wall, follow the steps below:

1. Fit the supplied mounting brackets on the sides of the ELS.
2. Secure the device to the wall using the brackets and fittings suitable for the wall in question.
3. Using one of the brackets or the PE screw terminal, connect the device with protective earth with as low a resistance as possible.

---

### **Note**

The module must be secured to the wall so that the mounting can carry at least four times the weight of the module.

---

## **Grounding**

### **19" Cubicle**

Please note that the ELS must be grounded with low resistance via the two holding brackets. It is also possible to ground the device using the PE screw terminal on the terminal block.

### **Mounting on a DIN Rail**

The device is grounded either via the DIN rail or the PE screw terminal on the terminal block.

### Wall Mounting

Please note that the ELS must be grounded with low resistance via the two holding brackets. It is also possible to ground the device using the PE screw terminal on the terminal block.

### S7 Standard Rail

The device is grounded either via the two mounting brackets or the PE screw terminal on the terminal block.

## Connecting the IE FC TP Cable to the ELS TP40 or ELS TP40M

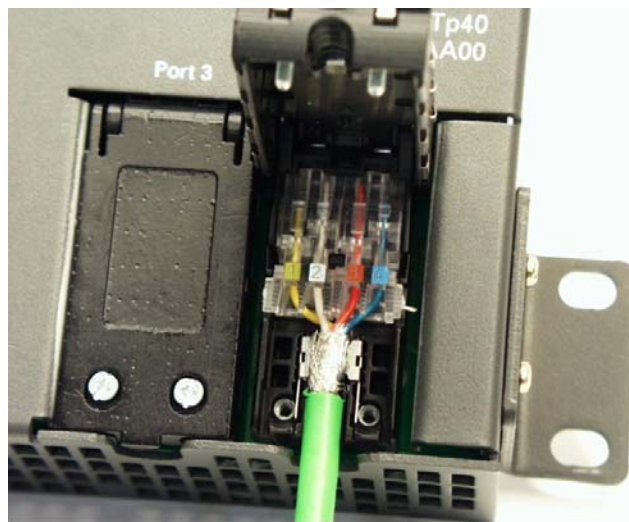


Figure 15. Connecting the IE FC TP Cable to the ELS TP40 or ELS TP40M

### When connecting the IE FC cables, follow the steps outlined below:

1. Strip the insulation from the FC TP cable with the IE FastConnect stripping tool. (Refer to the instructions for the IE FC stripping tool, Order no. 6GK1901-1GA00)
2. Remove the protective foil from the cores and remove the support element between the cores.
3. Open the cover of the TP ports with insulation piercing contacts.
4. Open the two contact covers.
5. Arrange the wires according to the color code of the contact cover of the TP ports with insulation piercing contacts.

6. Insert the wires of the IE FC TP cable into the contact cover according to the color code.
7. Press down both contact covers to establish contact with the cores.
8. Close and screw down the cover of the TP ports with insulation piercing contacts.

If you do not have an IE FastConnect stripping tool to strip the insulation from the IE FastConnect cable, you can prepare the cable to the lengths shown in Figure 8.

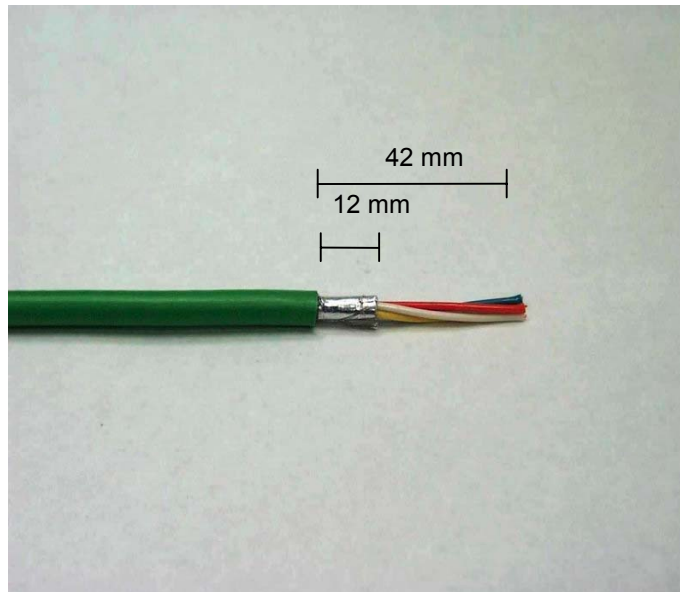


Figure 16. Length of Insulation Stripped from the IE FC TP Cable

## **5.3 Maintenance**

If a fault develops, please send the module to your SIEMENS service department for repair. The devices cannot be repaired on site.

## **6   Diagnostics over Industrial Ethernet**

# **6**

## 6.1 Introduction

The ELS has a configuration and diagnostic interface.

The device can be configured and its current status displayed using a graphic interface. All configuration or status data is available as MIB objects and can be modified and displayed within the graphic user interface.

The ELS has the following **configuration functions**:

- Configuration of the IP address, the subnet mask and the gateway using the Primary Setup Tool (PST).
- Reset of all values to the factory settings using the PST.
- Configuration of E-mail and trap recipients.
- Configuration of individual events that will trigger the sending of E-mails and/or traps.

The ELS has the following **diagnostic functions**:

- Display of the current status of the ports (link up/down, transmission rate, and duplicity).
- Display of the MAC address, the IP address, the subnet mask, the gateway, and the type of configuration (manual or using DHCP).
- Trap and E-mail monitoring unit: Cold start events and status changes at the port can be sent to E-mail and/or trap recipients.
- Display of statistical values of errors that have occurred on the network and that were detected by the ELS (CRC, defective frames, collisions etc.).
- Display of the system up time and the hardware and firmware version.

## 6.2 Configuration

The ELS can be configured in the following ways:

- Automatic IP address assignment using DHCP (factory setting)
- Manual IP address assignment

### 6.2.1 Automatic IP Address Assignment using DHCP (Factory Setting)

If a DHCP server is available in the network environment in which the ELS is to be used, the ELS will be automatically assigned the IP address, subnet mask, and default gateway after it is included in the network. It is then immediately operational. This is only possible when the DHCP server is suitably configured.

### 6.2.2 Manual IP Address Assignment

#### Primary Setup Tool (PST)

If you want to select an IP address, subnet mask, or default gateway for the ELS, you must use the PST. The PST then determines all the accessible Industrial Net Components (INC) in the network and makes them configurable. Using the PST, you can set the IP address, subnet mask, and router (default gateway) of the ELS.

If the DHCP mode is activated, the device is reset to the settings it had when it was supplied. In this case, remember that all user-defined settings will be deleted.

The following pages describe the use of the PST.

#### Installation of the Primary Setup Tool

The PST can be installed on a PC with the following operating systems:

- Windows XP Professional (without service pack)
- Windows 2000 Professional (service pack 2)
- Windows NT 4.0 (service pack 6a)

To install the PST, you must have approximately 300 KB free on your hard disk. To communicate over Ethernet, you require a network card.

How to install the PST:

1. Start the installation program "pst\_install.exe" on the supplied CD. All the necessary files are then copied to the selected folder (the default is the folder: "c:\siemens\pst").
2. You can now start the application in the installation folder (as default this is the folder: "c:\siemens\pst"). Double-click on the "s7wnpstx.exe" file.
3. When you first start the PST, the dialog shown in Figure 6-1 opens. Here, you can see all the available languages. Select the language you require and confirm the dialog with OK. If the language is displayed in gray, the language package is not available in this PST version.



Figure 6-1 Selecting the Language



4. Once you have selected the language, the menu shown in Figure 6-2 opens. Select a network adapter with **Settings -> Network Adapter**. All the network interfaces (maximum of four) found in your system will be listed. Select the network adapter you require by clicking on it. Make sure that you read the information in the "readme" file on the supplied CD.

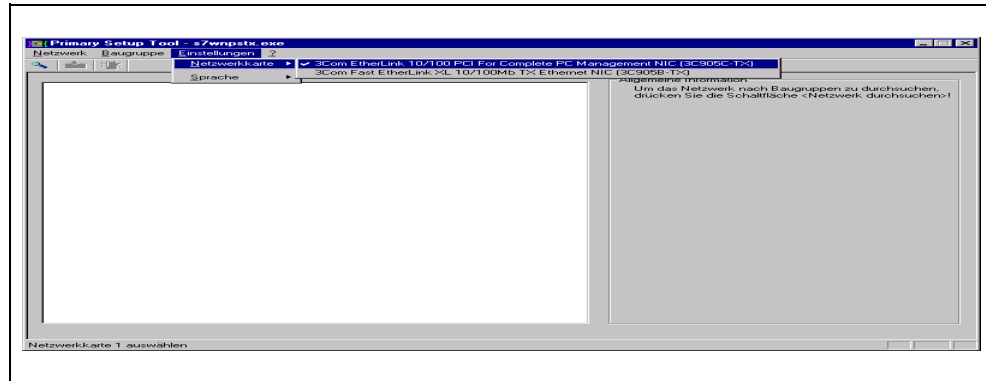


Figure 6-2 Configuring the Network Adapter

#### Note

If the network adapter installed in your system is not displayed, the DLC protocol required for the network adapter is not installed. In this case, follow the steps outlined below to install the DLC protocol:

### Windows NT – DLC Protocol Installation

- Select **Start -> Settings -> Control Panel**.
- Click on the "Network" icon.
- Go to the "Protocols" tab and click the "Add" button.
- From the network protocols displayed, select the DLC Protocol.
- Confirm your selection with "OK".

#### Note

Make sure you have your Windows CD at hand. You may need to reinstall Windows service packs.

## **Windows 2000 – DLC Protocol Installation**

- Select **Start -> Settings -> Control Panel**.
- Click on the "Network and Dial-up Connections" icon.
- From the list of network adapters, select the adapter for which you are going to install the DLC protocol by right clicking on the required network adapter and going to "Properties".
- Click on the "Install" button and select "Protocol".
- Click on the "Add" button and select the DLC Protocol from the protocols.
- Confirm your selection with "OK".

---

### **Note**

Make sure you have your Windows CD at hand. You may need to reinstall Windows service packs.

---

## **Windows XP – DLC Protocol Installation**

For Windows XP, the DLC Protocol must be installed extra since it is not included with the operating system. The supplied CD, however, contains a self-extracting ZIP archive with the name "PST\_XP\_install.exe" with which you can install the protocol. Start the "PST\_XP\_install.exe" file by double-clicking on it.

---

### **Note**

You will find information on the installation procedure in the "win\_xp\_readme.rtf" file.

---

## User Interface of the PST

After starting the PST, the menu shown in Figure 6-3 opens with the various areas.

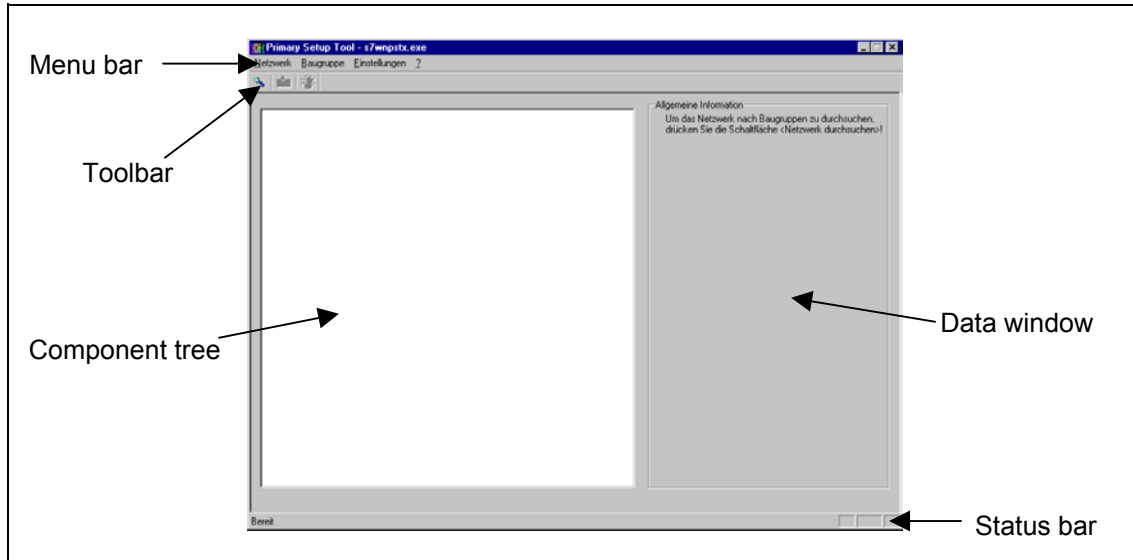


Figure 6-3 SIMATIC NET PST - User Interface

- **Menu bar**  
Here you can execute individual actions or specify the configuration of PST. The actions available in the menu bar are also possible in the toolbar.
- **Toolbar**  
The toolbar is a convenient way of executing actions by simply clicking on the icons. All the actions available in the toolbar are also available in the menu bar.
- **Component tree**  
The component tree lists all the ELS devices available in the network. You can make settings on the individual ELS devices by double-clicking on the corresponding icon in the component tree.
- **Data window**  
The data window displays the current values and allows you to enter new settings. Settings that cannot be modified are displayed in gray.
- **Status bar**  
The status bar provides you with information about the current status of the PST.

## Changing the Language Package

When you first started the PST, you were asked to select a specific language. You can also change the selected language after this first startup.

To change the language, select **Settings -> Language**.

Here you will find a list with all available languages.

If the language is displayed in gray, the language package is not available in this PST version.

## Changing the Network Adapter Configuration

If there is more than one network adapter installed in your computer, you can select a specific network adapter.

You can do this in the PST menu **Settings -> Network Adapter** (see Figure 6-4).

Here you will find all the network interfaces found on your system (restricted, however, to four). Make sure that you read the information in the "readme" file on the supplied CD.

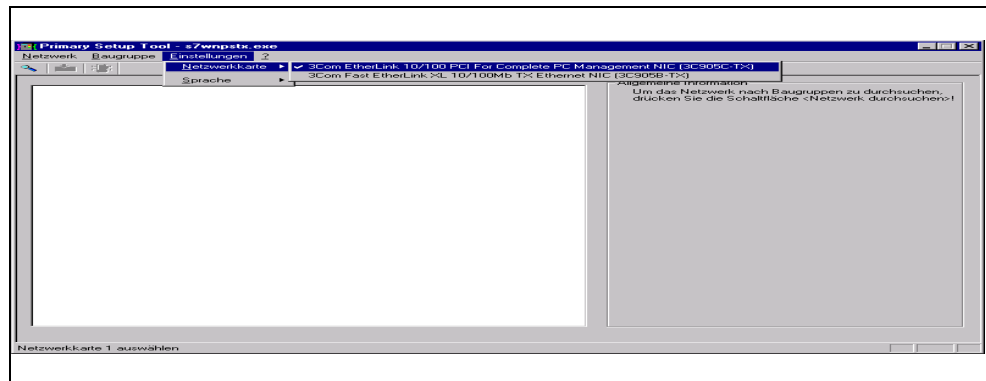


Figure 6-4 Configuring the Network Adapter

## Configuring the ELS

To configure an ELS, follow the steps outlined below:

1. Select **Network -> Browse** in the PST menu.  
The progress bar found in Figure 6-5 is displayed.

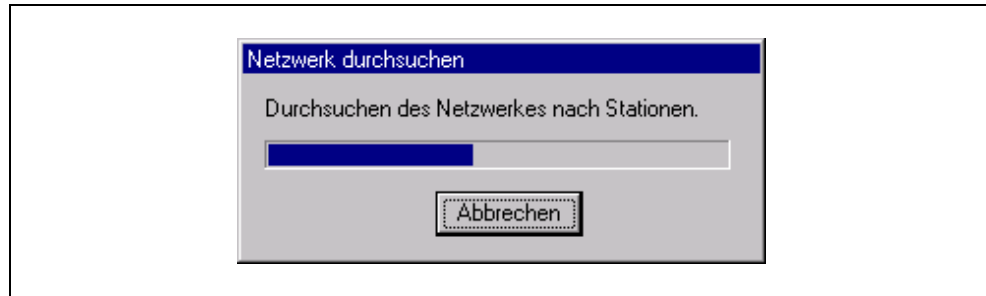


Figure 6-5 Progress Bar "Browsing Network".

You can also start this action directly by clicking the relevant button (magnifying glass) in the toolbar (see Figure 6-6).

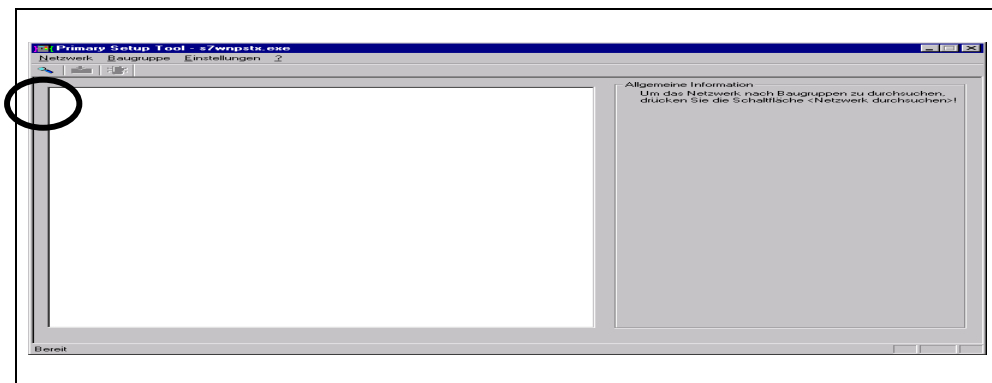


Figure 6-6 "Browsing Network" Starting Directly

2. The component tree now contains a list of all ELS devices that have been found.  
 Select one of the ELS devices in the component tree by double-clicking on it. The folder of this ELS is opened and a further icon appears. Click on this icon. The data of the interface is displayed in the data window (Figure 6-7). Data not displayed in gray can be modified.

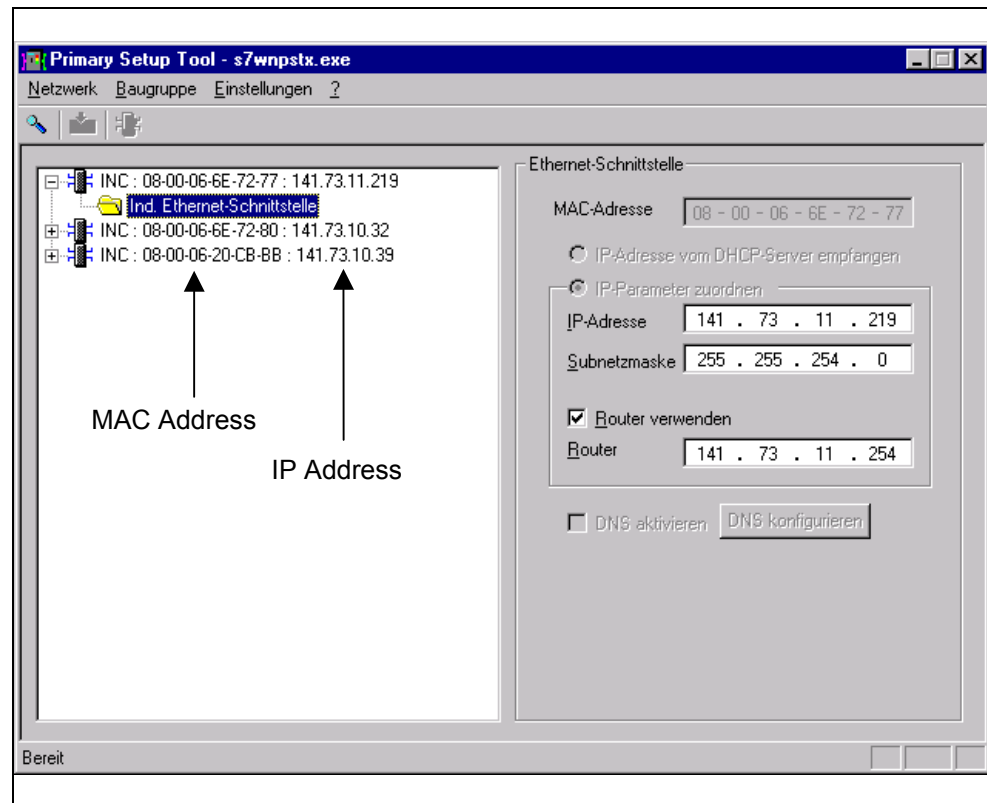


Figure 6-7 Component View

- **MAC Address**  
 Displays the MAC address of the ELS in hexadecimal form. The MAC address cannot be changed.
- **Obtain IP address from DHCP server**  
 Changes manual configuration of the ELS to automatic configuration using DHCP.  
 Caution: This resets the device to its original settings. All user-defined settings are deleted.
- **Assign IP parameters**  
 Changes automatic configuration using DHCP to manual configuration of the ELS.

- **IP address**  
IP address of the ELS (maximum range per field: 0 to 255). If you enter an invalid IP address, a warning is displayed and the input is rejected.
- **Subnet mask**  
Subnet mask of the ELS (maximum range of numbers per field: 0 to 255).
- **Router (default gateway)**  
Enter the IP address of the default gateway if the PC/Internet Browser is not in the same subnet as the ELS.

---

**Note**

Changing the parameters resets and restarts the ELS. This can take up to 15 seconds.

---

3. Close the folder by clicking on the icon in the menu tree again and download your configuration to the ELS by selecting **Module -> Download**.  
A progress bar indicates the status of the download.

You can also start this action directly using the appropriate icons in the toolbar (see Figure 6-8).

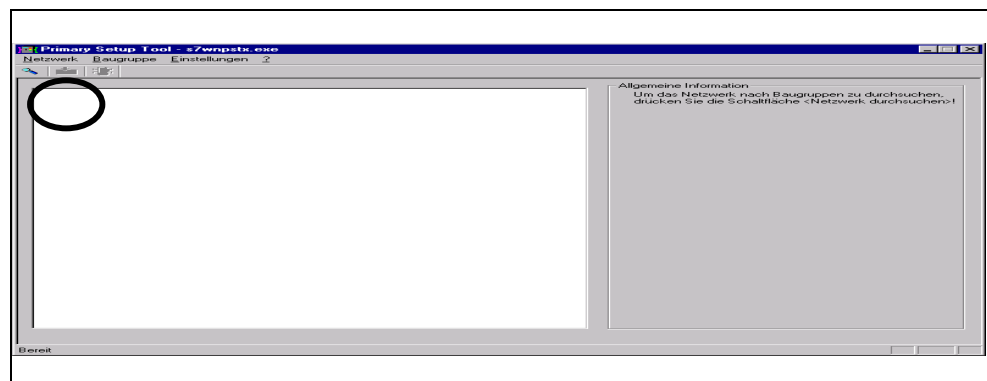


Figure 6-8 Direct Start: "Download Module"

4. Start the Web Based Management (WBM) if you require the full range of functions (including settings).  
Select **Module -> Start INC Browser**.

You can also start this action directly using the appropriate icons in the toolbar (see Figure 6-9).

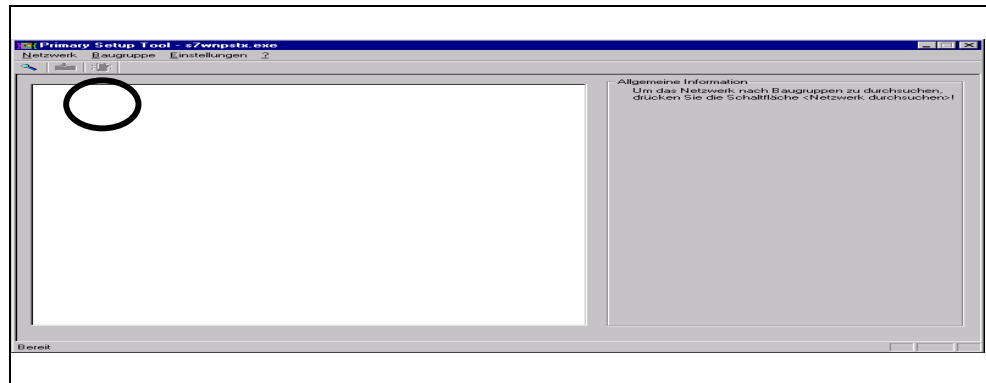


Figure 6-9 Direct Start: "Starting Web Based Management"

---

#### Note

To load settings on the ELS, you must close the settings window by double-clicking on the relevant folder in the menu tree.

Web Based Management can only be started correctly if your browser includes a Java Virtual Machine (JVM) Version 1.2.2 or higher. For more detailed information, refer to the next section and Section 6.5 of this manual.

---



## 6.3 Web Based Management (WBM)

### 6.3.1 General

The ELS includes integrated Web-Based Management; in other words, it can be operated using an Internet browser (such as Microsoft Internet Explorer or Netscape). The modules are operated using a Java applet stored on the ELS that is loaded by the browser. The browser can load the applet only when a Java Virtual Machine (JVM) is present. As of Version 6.x, Netscape provides a JVM integrated in the browser that can be used for Web Based Management. For the Microsoft Internet Explorer, the JVM Plugin must be installed separately. On the CD supplied, you will find a suitable JVM from Sun Microsystems. The latest JVM versions can also be downloaded from the Web pages of Sun Microsystems. For more detailed information, refer to the appendix of this documentation in the Section "Internet Browser Settings".

To access the ELS, the IP address must be entered in the address field of the browser. If there is a DNS server in your network that can interpret the address of the ELS, you can also access the module using the logical name.

All the information provided by the Java Applet is exchanged with the ELS using SNMP variables. The Management Information Base (MIB) of the ELS is on the supplied CD.

### 6.3.2 Requirements

To access an ELS 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 6.1 or higher.  
Before your Internet browser will work with the ELS, you must make the correct settings in the browser.  
For more information, refer to Section 6.5 of this manual.
- **Firewall**  
If there is a Firewall installed in your network, please make sure that this is configured so that the Java Applet can access the SNMP Port 161.

### 6.3.3 Access using WBM

#### How to Access WBM on the ELS

1. Open the Internet browser.
2. Enter the IP address or the URL of the ELS in the address field of the Internet Browser as follows:  
**http://<IP address of ELS> for example http://141.73.10.89**  
 and confirm with [RETURN].
3. A new window opens and the applet is loaded in it (see Figure 6-10).

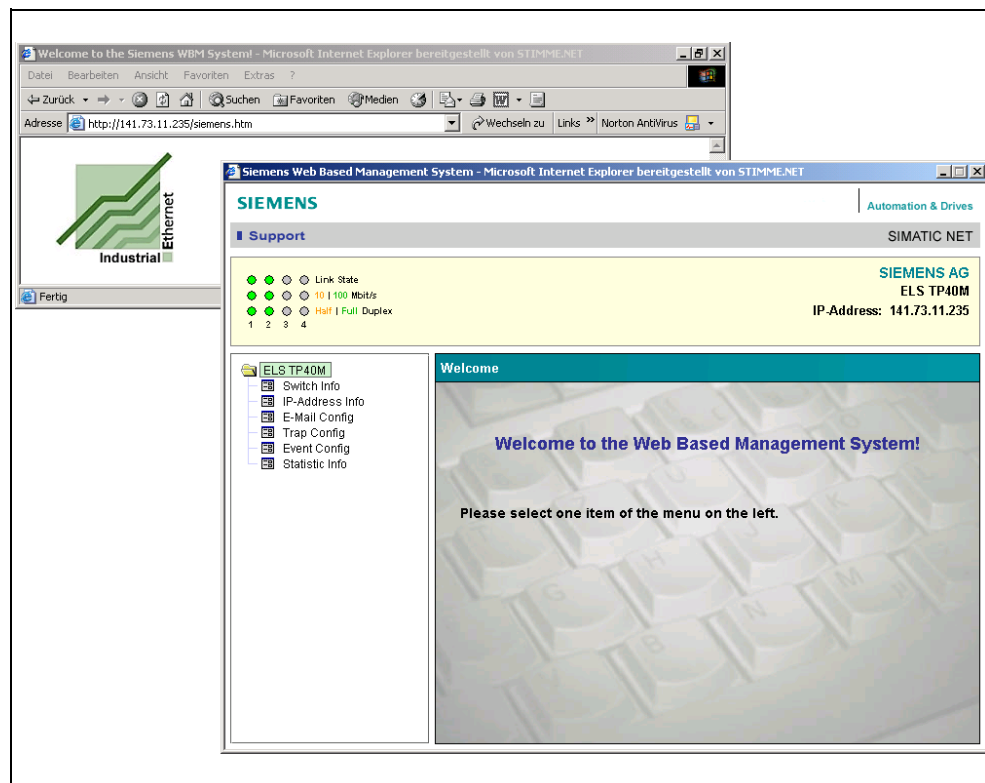


Figure 6-10 "Start" Window

If you click the support or SIEMENS icon, you automatically open the relevant A&D home page.

### 6.3.4 User Interface of the WBM

The dialogs of the ELS are made up of a device status field, a menu tree, and a data window.

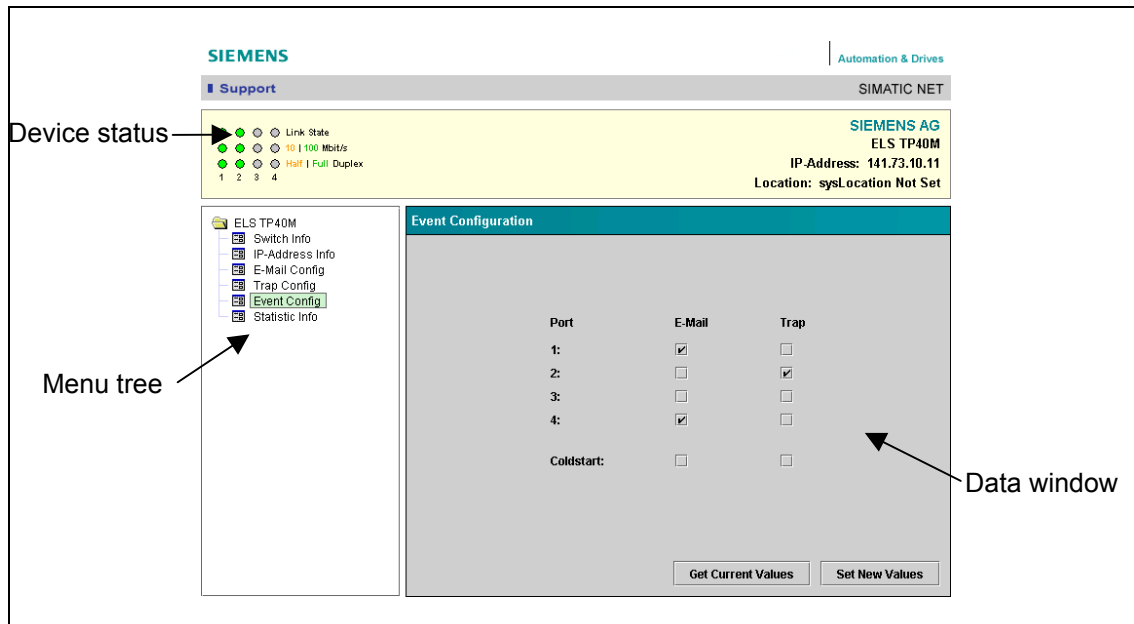


Figure 6-11 SIMATIC NET Network Management User Interface of the ELS

- **Device status field**

The display in the device status field represents the LED display of the ELS. In addition, the transmission rate and duplicity are represented by a separate row of LED symbols.

The device status field is displayed and updated in every menu so that you have an overview of the current status of the ELS at all times.

The device status field also shows the ELS type (for example ELS-TP40M), the IP address (for example 141.73.10.89) and the location (if "System Location" has been assigned).

- **Menu tree**

By navigating through the menu tree, you can open the individual windows of the ELS WBM in much the same way as when working in the Windows Explorer by clicking the relevant icons.

- **Data window**

The data window displays the current values and allows you to enter new settings. Settings that cannot be modified are displayed in gray.

### 6.3.5 Management Menus

The WBM of the ELS has the following menu structure:

| Function        | Explanation  |
|-----------------|--|
| Switch Info     | Hardware Version<br>Software Version<br>System Contact<br>System Location<br>System Name<br>System Up Time |
| IP Address Info | MAC Address<br>IP Address<br>Subnet Mask<br>Default Gateway<br>DHCP  |
| E-Mail Config   | E-Mail Address (recipient)<br>"From" (E-mail sender)<br>Subject<br>SMTP Server IP Address                  |
| Trap Config     | Trap Address   |
| Event Config    | E-Mail<br>Trap<br>Cold Start   |
| Statistics Info | Receive Errors<br>Collision Errors   |

Table 6-1 Menu Structure of the ELS Web Based Management

The menu commands are described in the following sections.

### 6.3.6 Switch Information

Clicking the **Switch Info** menu opens the window shown in Figure 6-12.

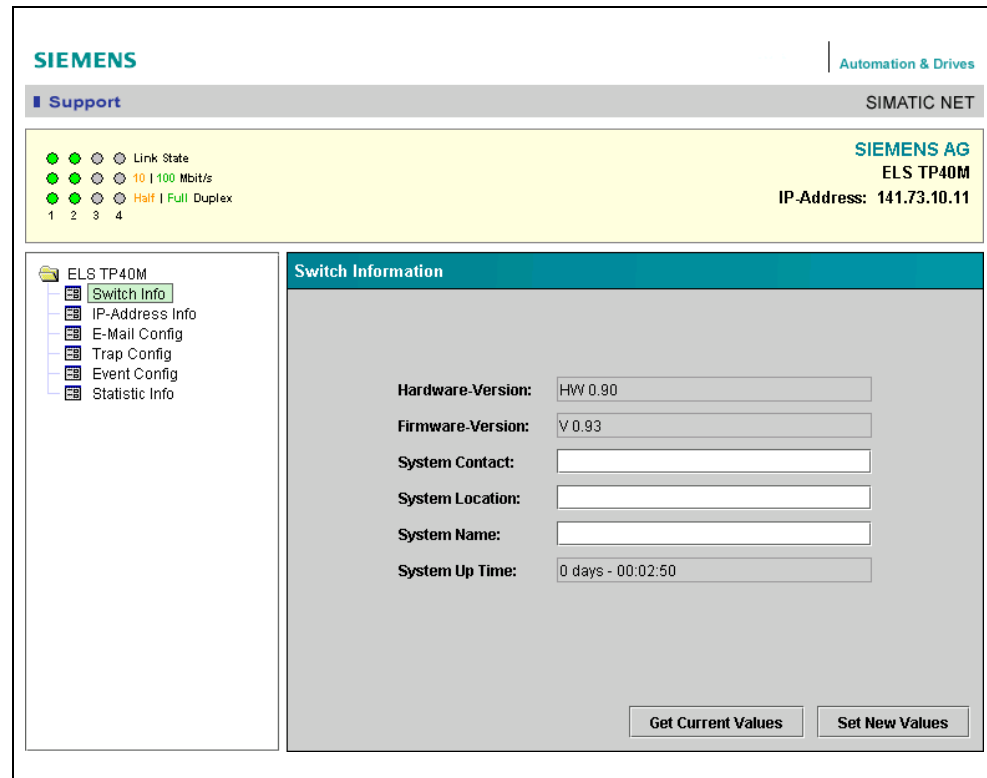


Figure 6-12 Switch Information Window

- **Hardware Version**  
Hardware version of the ELS
- **Firmware Version**  
Version of the ELS firmware
- **System Contact**  
In this box, you can enter a contact person/address (for example the maintenance engineer) for this device (a maximum of 63 characters).
- **System Location**  
In this field, you can enter information about the location of the ELS (a maximum of 63 characters).
- **System Name**  
The name of the ELS can be entered in this field (a maximum of 63 characters).

- **Get Current Values/Set New Values**

If you click the "Get Current Values" button, you obtain the values currently stored on the ELS. To transfer the entries in this window to the ELS and to save them there, click on "Set New Values".

### 6.3.7 IP Address Information

Clicking the **IP Address Info** menu opens the window shown in Figure 6-13.

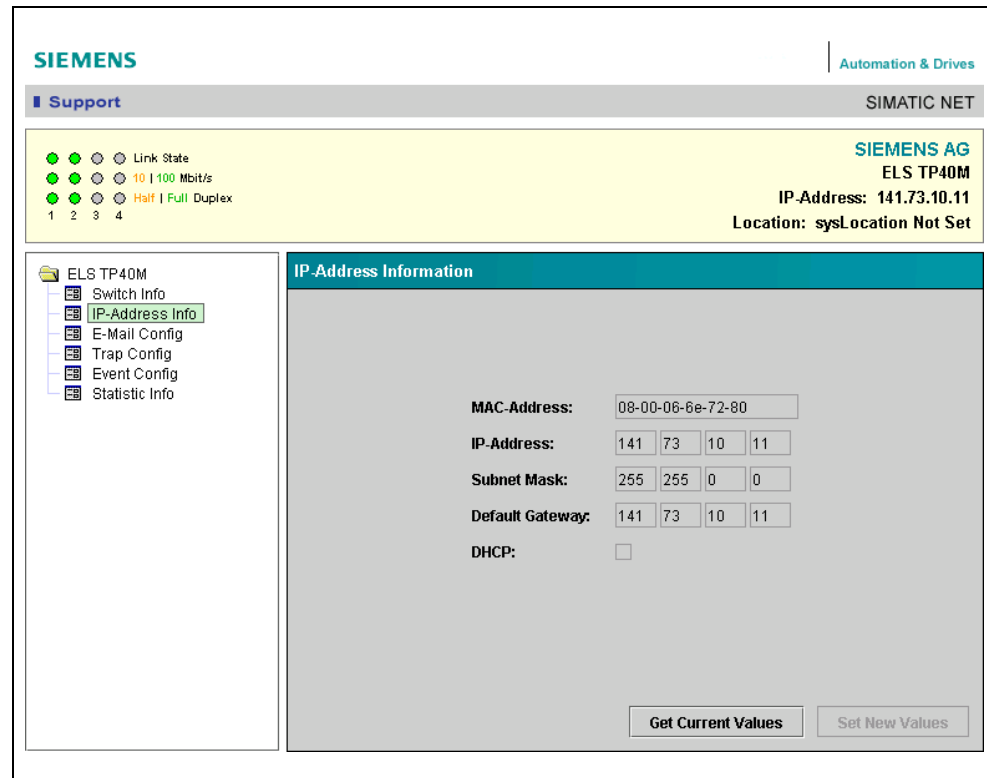


Figure 6-13 IP Address Information Window

- **IP Address**  
IP address of the ELS
- **Subnet Mask**  
Subnet mask of the ELS
- **Default Gateway**  
Displays the IP address of the default gateway.
- **DHCP**  
A check mark in this box indicates whether the address was assigned using DHCP.
- **Get Current Values**  
If you click the "Get Current Values" button, you obtain the values currently stored on the ELS.

---

**Note**

The IP address, the subnet mask, and the default gateway of the ELS can be modified using the PST tool. Automatic IP configuration is possible using DHCP.

If the IP address of the ELS is changed, the browser link to the ELS is lost. Close the ELS window in the Internet browser and reconnect to the ELS with the new IP address.

---



### 6.3.8 E-Mail Configuration

Clicking the **E-Mail Config** menu opens the window shown in Figure 6-14.

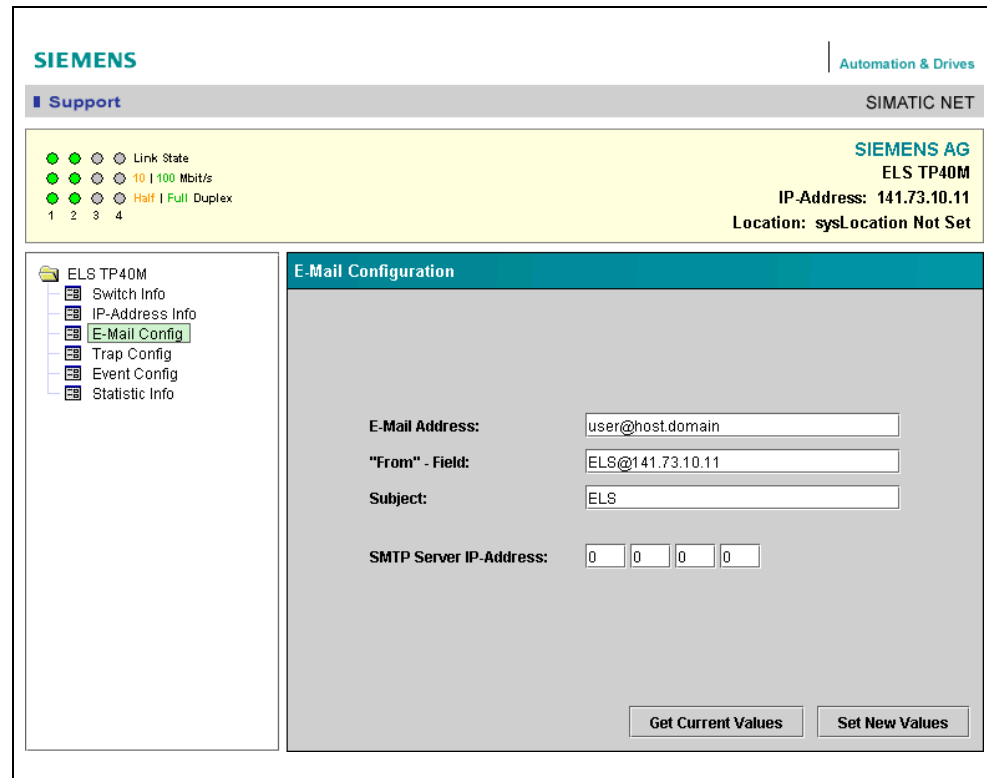


Figure 6-14 E-Mail Configuration Window

When certain faults occur and are detected by the ELS, it can automatically send an E-mail to a selected E-mail address containing an error message in plain language. Before an E-mail can be sent, it must be configured in this window and be activated in the "Event Configuration Menu".

- E-Mail Address**  
 Here, you enter the E-mail address to which an E-mail will be sent if an error occurs (a maximum of 63 characters).
- "From" - Field**  
 Address of the sender of the E-mail. Depending on the type and configuration of the SMTP server it may be necessary to configure the sender address (maximum of 63 characters).

- **Subject**  
In this field, you can enter a subject for the E-mail (a maximum of 63 characters).
- **SMTP Server IP-Address**  
Here, you enter the IP address of the SMTP server via which the E-mail will be sent. Make sure that the ELS can access the SMTP server (maximum range of values per field: 0 to 255).
- **Get Current Values/Set New Values**  
If you click the "Get Current Values" button, you obtain the values currently stored on the ELS. To save the entries made in this window, click the Set New Values button.

### 6.3.9 Trap Configuration

Clicking the **Trap Config** menu opens the window shown in Figure 6-15.

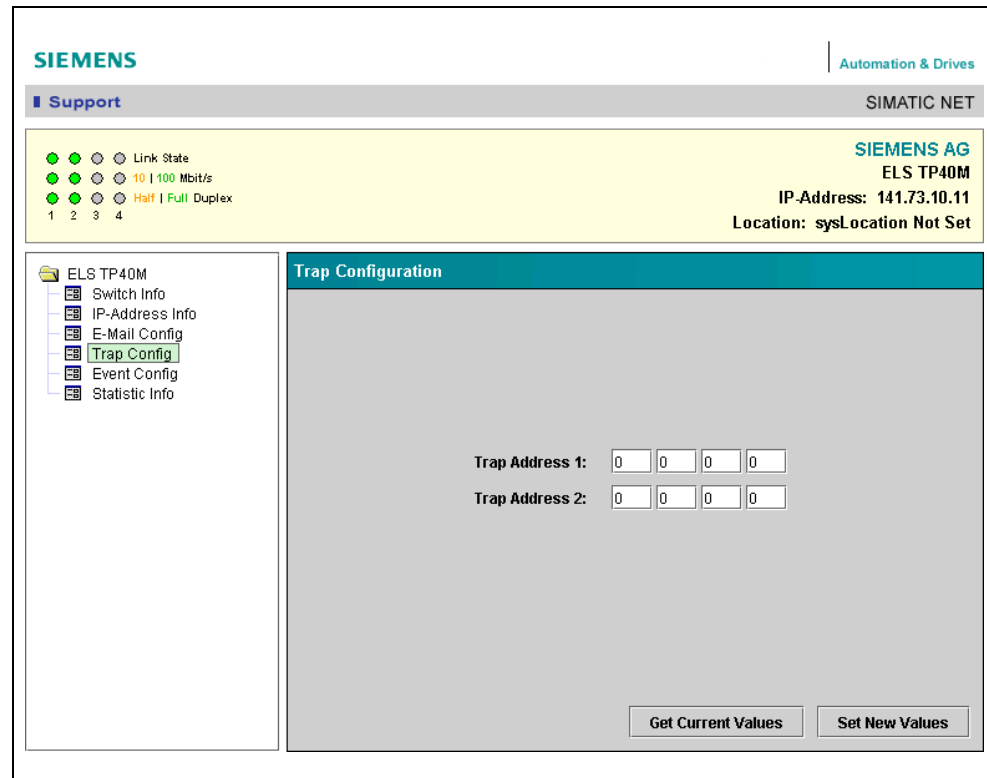


Figure 6-15 Trap Configuration Window

If an alarm occurs, the ELS can send traps (alarm messages) to up to two different (network management) stations at the same time. In this menu, you enter the addresses of the stations to which the traps will be sent. The corresponding events must also be activated in the "Event Configuration Menu".

- **Trap Address x**  
Enter the IP addresses of the stations to which traps will be sent (range per field: 0 to 255).
- **Get Current Values/Set New Values**  
If you click the "Get Current Values" button, you obtain the values currently stored on the ELS. To save the entries made in this window, click the "Set New Values" button.

## Construction of the Trap report

The ELS knows 2 kinds of traps:

- Coldstart
- Change of port status

In case of Power On a *Coldstart-trap* will be sent.

If the link-status of a port changes the current contents of the LED-STATUS Register will be sent.

### LED-Status:

|        |        |        |        |
|--------|--------|--------|--------|
| Byte 3 | Byte 2 | Byte 1 | Byte 0 |
| Port 4 | Port 3 | Port 2 | Port 1 |

### Port Status:

|       |       |       |       |       |       |        |       |
|-------|-------|-------|-------|-------|-------|--------|-------|
| Bit 7 | Bit 6 | Bit 5 | Bit 4 | Bit 3 | Bit 2 | Bit 1  | Bit 0 |
| 0     | 0     | 0     | Link  | 0     | 0     | Duplex | Speed |

Link      1 = Link is up  
            0 = Link is down

Duplex    1 = Link is full duplex  
            0 = Link is half duplex

Speed     1 = Speed is 100Mbps  
            0 = Speed is 10Mbps

#### Example

Port 1:    Link Up , full duplex, 100 MB  
Port 2:    Link down  
Port 3:    Link down  
Port 4:    Link Up , half duplex, 10 MB

#### Inhalt in LED-Status

10000013<sub>hex</sub> // 268435475<sub>dez</sub>

---

#### Note

Leading Zeros might not be shown by your management system.

---

### 6.3.10 Event Configuration

Clicking the **Event Config** menu opens the window shown in Figure 6-16. Here, you can set link up/down and cold restart events for E-mail and/or trap recipients.

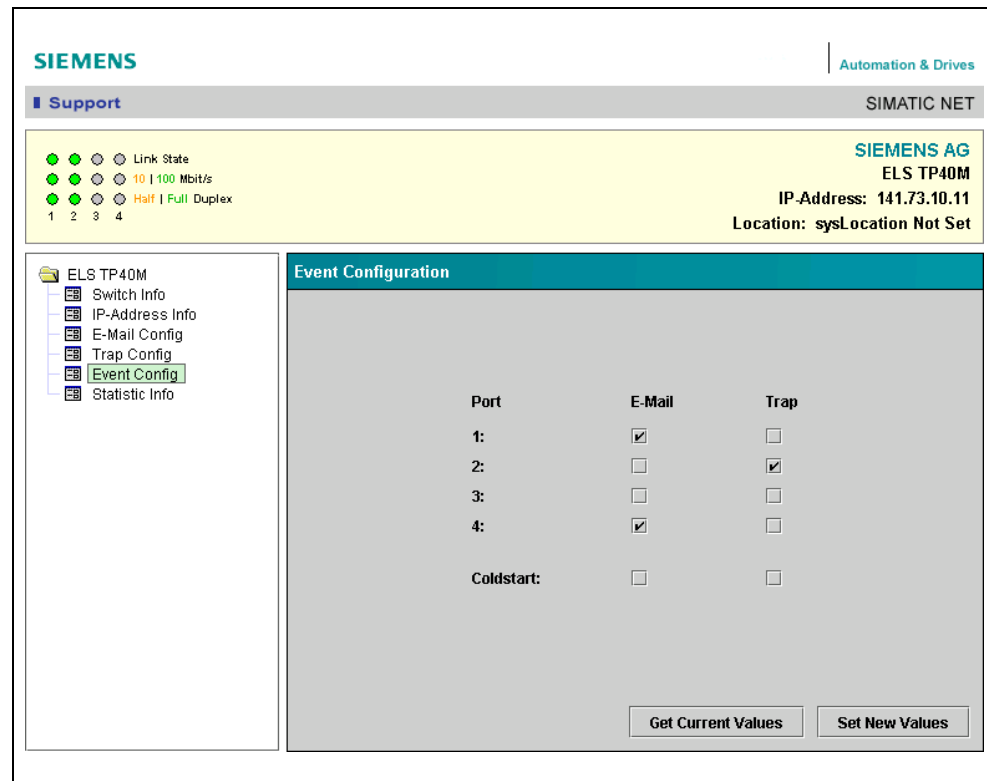


Figure 6-16 Event Configuration Window

Select, for example, the first box to monitor link up/down events at Port 1 using E-mail. If there is a change in the port status, an E-mail is sent to the recipient specified in the E-mail configuration menu.

- **Get Current Values/Set New Values**

If you click the "Get Current Values" button, you obtain the values currently stored on the ELS. To save the entries made in this window, click the "Set New Values" button.

### 6.3.11 Statistic Information

Clicking the **Statistic Information** menu opens the window shown in Figure 6-17. The ELS has internal statistical counters that count the number of bad received frames and collisions for each port. The statistical counters have a numeric range from "0 to 65535". An overflow results if this value is exceeded.

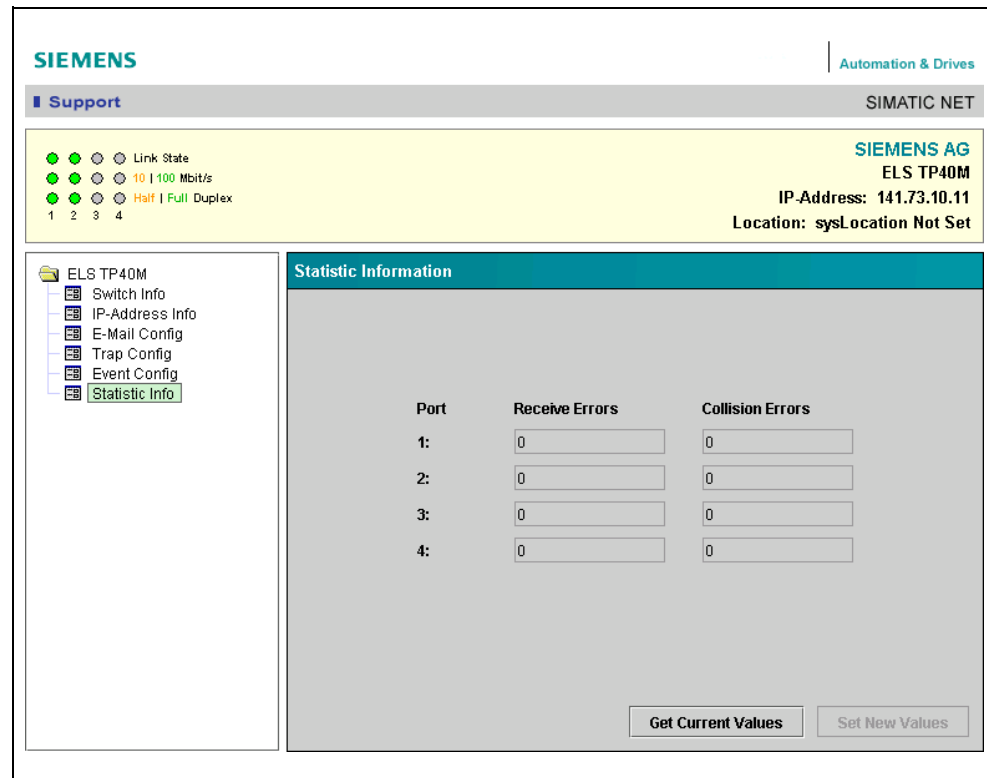


Figure 6-17 Statistic Information Window

For each port, the ELS can detect errors (CRC, defective frames, etc.) in received frames and count them (receive errors). Collisions occurring on a port are also detected and counted (collision errors).

- **Get Current Values**

If you click the "Get Current Values" button, you obtain the values currently stored on the ELS.

## 6.4 Diagnostics Using SNMP

With SNMP (Simple Network Management Protocol), a network management station can configure and monitor SNMP-compliant nodes such as the ELS. To make this possible, a management agent is installed in the DTE with which the management station exchanges data using SNMP Get and Set requests. The ELS supports SNMP V1.

The data that can be managed are in a database on the DTE (ELS) known as the MIB (Management Information Base) that can be accessed by the management station (or the applet of the ELS Web-Based Management) using the agent.

There are standardized MIBs defined in RFCs and private MIBs. Private MIBs are based on RFC 1213 and contain product-specific expansions not included in standard MIBs.

The ELS with network management supports MIB II (RFC 1213).

### ELS private MIB

The private MIB of the ELS is on the supplied CD.

The private MIB file can also be downloaded from an ELS directly with a Web browser at <http://<IP address of the ELS>/snELS.mib>.

Please note the capitalization of snELS.mib!

The description of the MIB objects of the private MIB is included in the MIB and can be read directly with a MIB compiler (for example the network management station) or with a text editor.

The **read-only community string** (SNMP password for read access) is set to **public**, the **read-write community string** (SNMP password for read and write access) is set to **private**.

## 6.5 Internet Browser Settings

To use the WBM of the ELS, you must make the correct settings in the Internet browser. This section contains information about setting the Internet browsers listed in the following table and the Java Virtual Machines used. You can use this procedure as the basis for setting other Internet browser versions. The WBM of the ELS has been tested with these Internet browsers and Java Virtual Machines.

| Browser   |   |
|---|---|
| Microsoft Internet Explorer 5.5 and 6.0                       | Netscape 6.1 and 6.2                                |
| Java Virtual Machine Plugin                                   |   |
| Sun Microsystems JRE with Plugin<br>1.3.0 and 1.3.1 and 1.4.0 | Sun Microsystems JRE with Plugin<br>1.3.0 and 1.3.1 |

---

### Note

The WBM of the ELS has been tested with certain combinations of browsers and Java Virtual Machines (JVM). Only the JVM supplied and installed with the product was tested with Netscape and the JVM from Sun Microsystems was tested with the Internet Explorer.

We recommend that you only use one of these combinations.

With newer versions, the interaction with the SIMATIC NET devices from the ESM/OSM family cannot be guaranteed. We therefore recommend that you use JVM V1.3.1.

JVM V1.3.1 is included on the CD accompanying the product.

---



### 6.5.1 Microsoft Internet Explorer 5.5 or 6.0

1. You can check whether or not you have the update version 5.5 or 6.0 of the Internet Explorer as follows:

Open the Internet Explorer and select **Help (?) -> About Internet Explorer** to open the window shown in Figure 6-18.



Figure 6-18 Microsoft Internet Explorer 6.0 – over Internet Explorer Window

2. Select **Tools -> Internet Options -> Advanced**, to open the window shown in Figure 6-19.

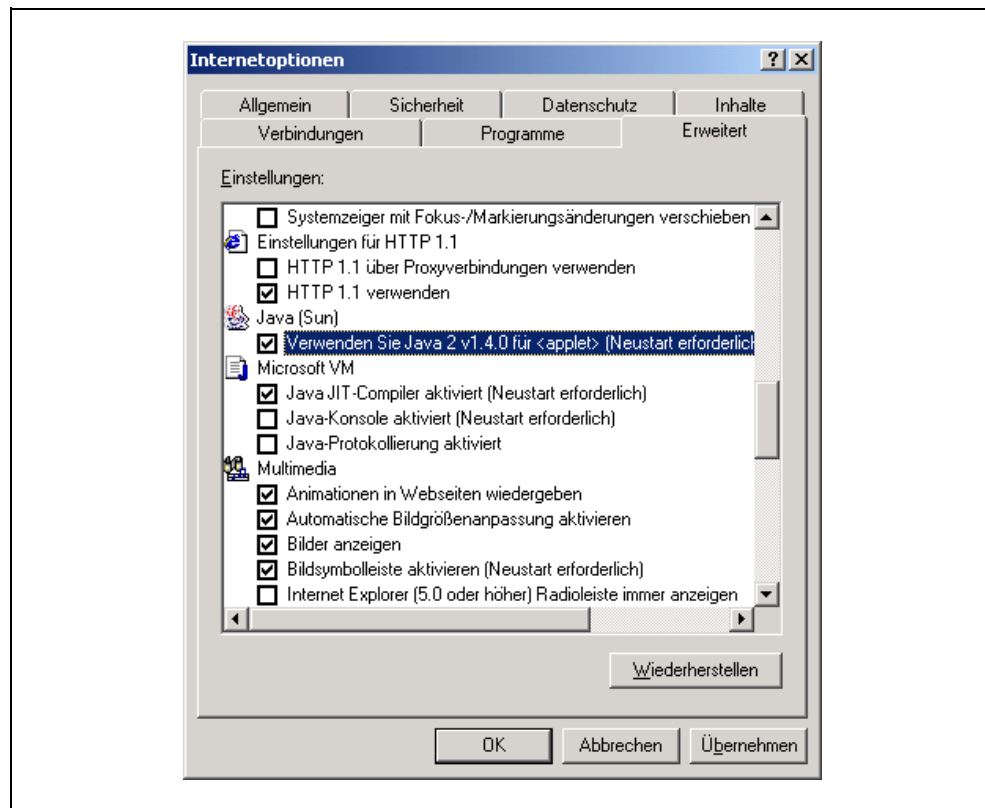


Figure 6-19 Microsoft Internet Explorer 6.0 – Advanced Internet Options

3. Make sure that the option "Use Java 2 v1.x.x for <applet>" is selected under the menu point Java (Sun). You may need to restart the Microsoft Internet Explorer.

---

**Note**

The "Use Java 2 v1.x.x for <applet>" can only be selected if you have already installed the JVM Plugin from Sun Microsystems (download from Sun Microsystems website).

---

4. If you use a proxy server that only accepts DNS registered IP addresses and your ELS is not DNS registered, you may need to connect directly to the ELS. To do this, select **Tools -> Internet Options -> Connections**. The dialog shown in Figure 6-20 opens.

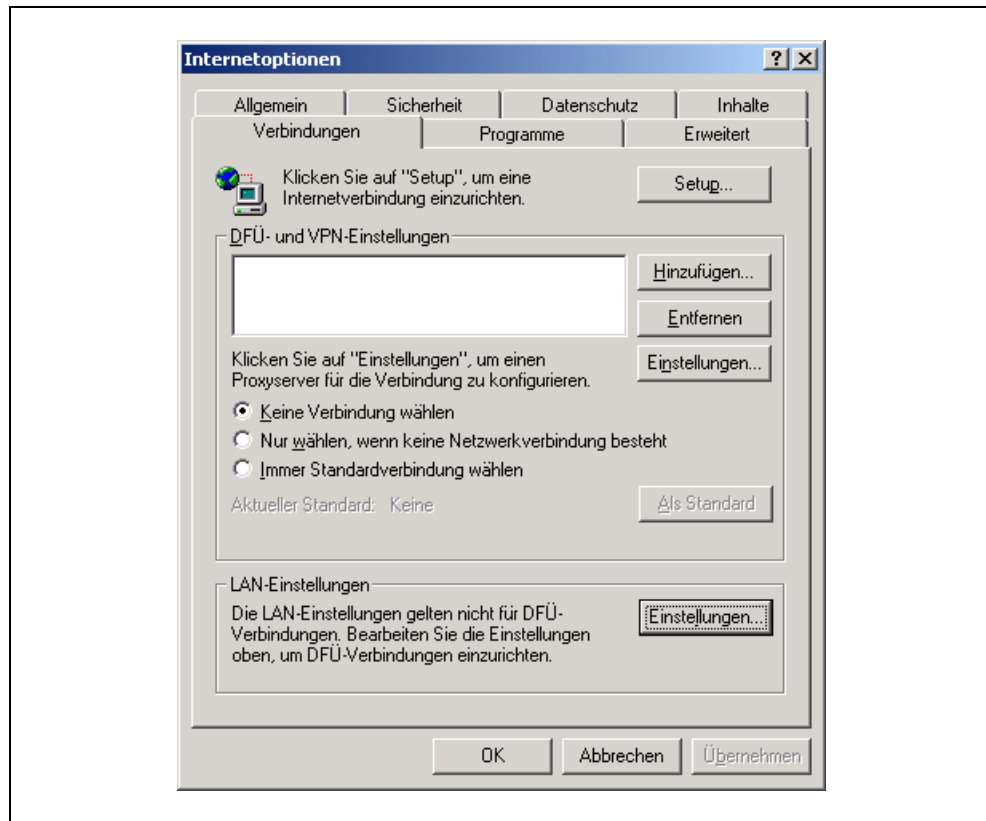


Figure 6-20 Microsoft Internet Explorer 6.0 – Connections Window

Select the "LAN Settings" button. The dialog shown in Figure 6-21 opens.

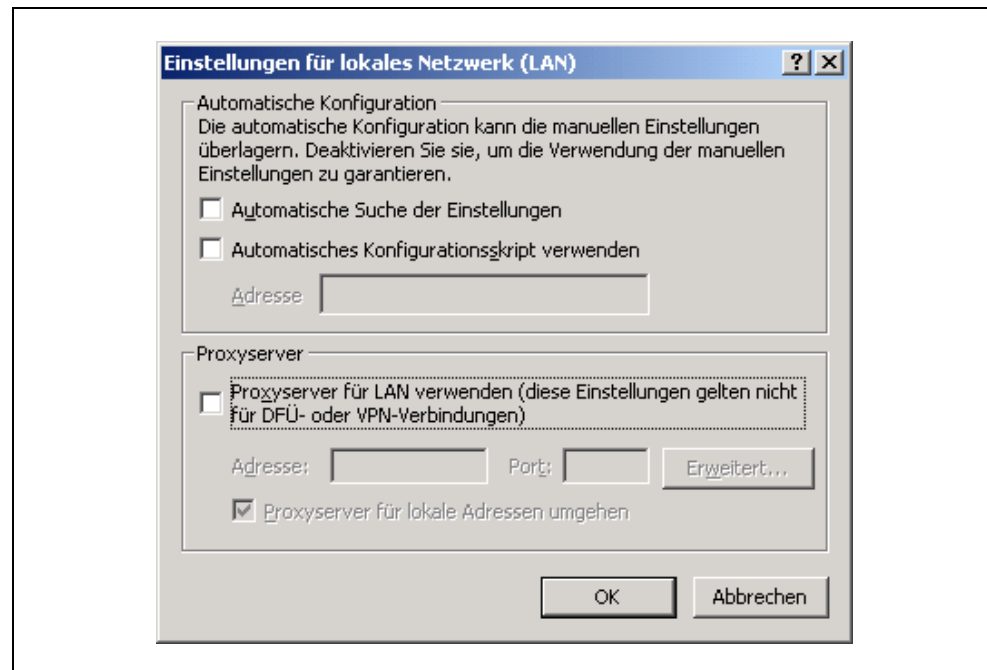


Figure 6-21 Microsoft Internet Explorer 6.0 – LAN Settings

5. In this window, disable the proxy server by clicking the "Use a proxy server for your LAN" check box or click the "Advance" button to open the dialog shown in Figure 6-22. Here you can enter the addresses for which the proxy server is not used.

Enter the address of the ELS in this window.

Using wildcards, you can also enter address ranges.

Example: If you enter "141.73.10.\*", no proxy server is used for addresses 141.73.10.0 to 141.73.10.255.

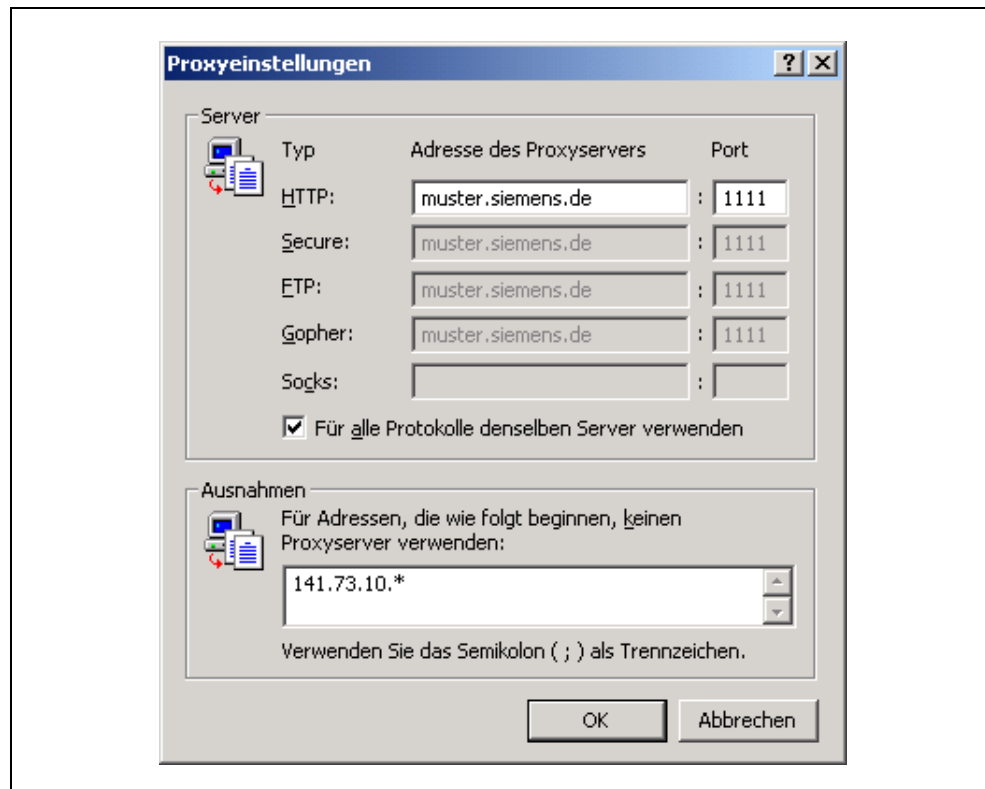


Figure 6-22 Microsoft Internet Explorer – Proxy Settings

### 6.5.2 Netscape 6.1 or 6.2

In Netscape Communicator, select **Edit -> Preferences -> Advanced**, to open the window shown in Figure 6-23.

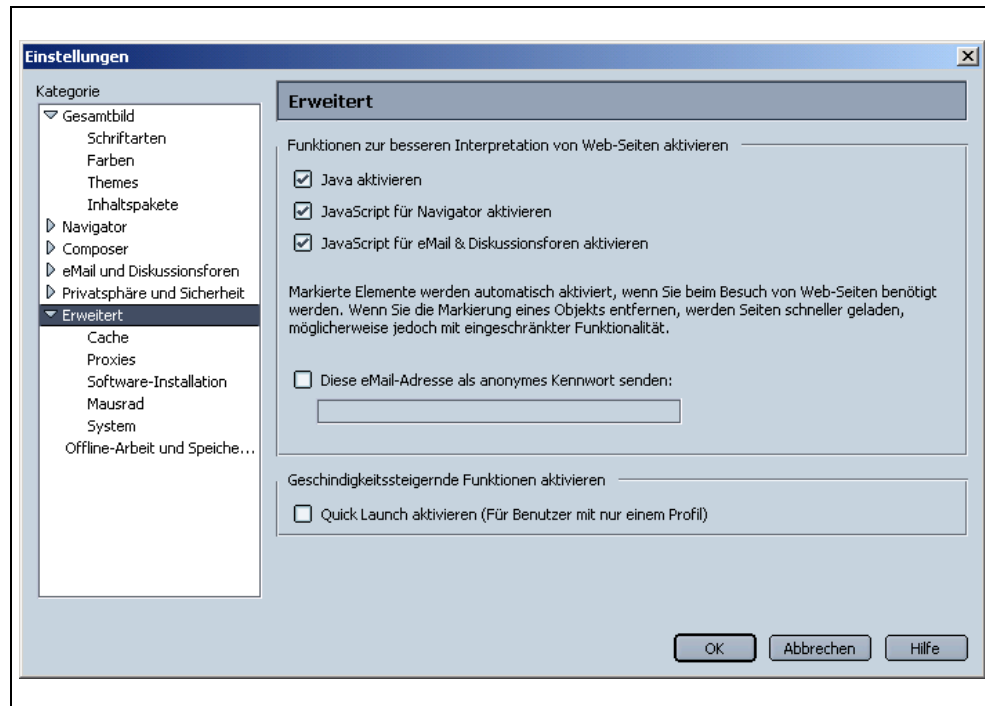


Figure 6-23 Netscape 6.2 – Advanced Preferences Window

1. Select "Enable Java" and "Enable JavaScript for Navigator".
2. If you use a proxy server that only accepts DNS registered IP addresses and your ELS is not DNS registered, you may need to connect directly to the ELS.

To do this select **Edit -> Preferences -> Advanced -> Proxies** to open the window shown in Figure 6-24 and set Direct connection to the Internet.

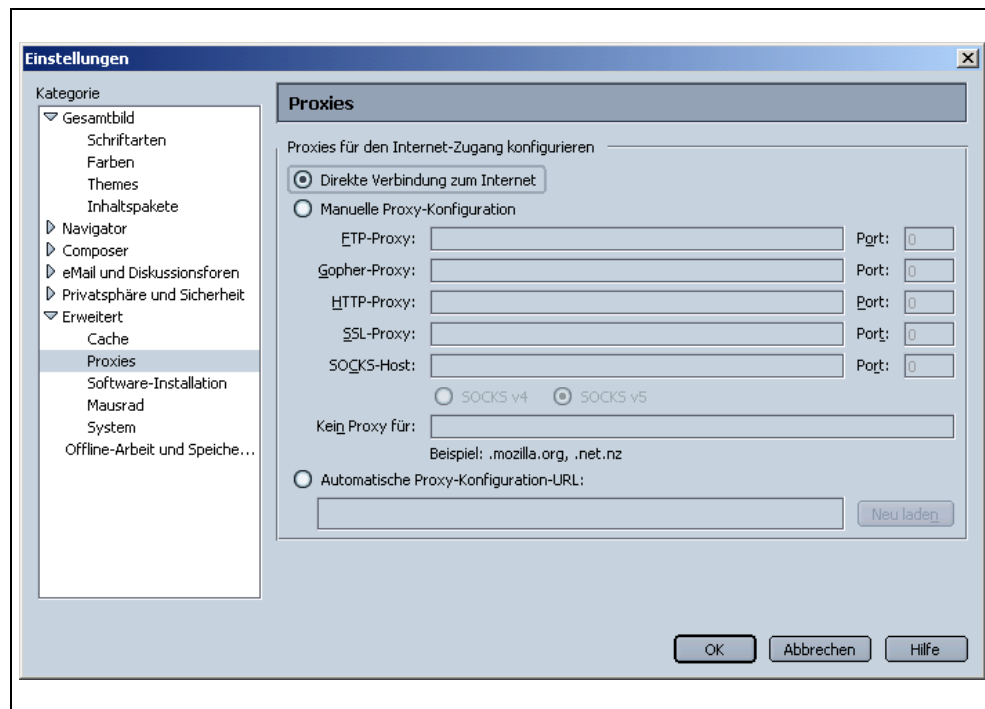


Figure 6-24 Netscape 6.2 – Proxy Preferences Window

## **7    Technical Specifications**

# **7**



## 7.1 Technical Specifications of the ELS TP40

| Attachments  |  |
|--|--|
| Attachment of DTEs or Network Components over Twisted Pair | 2 x RJ-45 jacks with MDI-X pinning 10/100 Mbps (half/full duplex)          |
| Attachment of Industrial Ethernet FC TP cables             | 2 x insulation piercing contacts with MDI-X 10/100 Mbps (half/full duplex) |
| Connector for power supply                                 | 1 x 3-pin plug-in terminal block   |

| Electrical Data                      |  |
|--------------------------------------|--|
| Power Supply                         | 24 V dc supply<br>(18 to 32 V dc)<br>safety extra-low voltage (SELV) |
| Power loss at DC 24 V                | 3.6 W  |
| Current consumption at rated voltage | 150 mA   |
| Overcurrent protection at input      | PTC resettable fuse (0.6 A / 60 V)                                   |

| Permitted Cable Lengths                          |  |
|--|--|
| Attachment over Industrial Ethernet FC TP cables | 100 m standard cable<br>85 m trailing cable<br>85 m marine cable   |
| TP Connection                                    | When using the FC Outlet RJ-45, the following cable lengths are permitted:<br>100 m for standard cable<br>85 m for trailing cable<br>85 m for marine cable |

### Note

The number of ELS switches connected influences the frame propagation time. When a frame passes through the ELS, it is delayed by the Store&Forward function of the switch.

- with a frame length of 64 bytes by approximately 10  $\mu$ s
- with a frame length of 1500 bytes by approximately 130  $\mu$ s

This means that the more ELS switches the frame passes through, the longer the propagation time.

|            |           |
|------------|-----------|
| Aging Time | 5 minutes |
|------------|-----------|

| Permitted Ambient Conditions/EMC |  |
|----------------------------------|--|
| Operating temperature            | 0°C to +60°C   |
| Storage/transport temperature    | -40°C to +80°C   |
| Relative humidity in operation   | < 95% (no condensation)  |
| Operating altitude               | 2000 m at max. 56 °C ambient temperature<br>3000 m at max. 50 °C ambient temperature |
| Noise emission                   | EN 50081-2 Class A   |
| Noise immunity                   | EN 50082-2   |
| Degree of protection             | IP 20  |

| Approvals             |                        |
|-----------------------|------------------------|
| UL                    | UL 1950                |
| CSA                   | CSA C22.2 No.950       |
| FM                    | FM 3611                |
| C-TICK                | AS/NZS 2064 (Class A). |
| CE                    | EN 50081-2, EN 50082-2 |
| Shipbuilding approval | -                      |

| MTBF                         |   |
|------------------------------|---|
| MTBF                         | 108.85 years  |
| Construction                 |   |
| Dimensions (W x H x D) in mm | 145 x 136.5 x 69  |
| Weight in g                  | 950   |
| Installation options         | Standard rail<br>S7-300 rail<br>Wall mounted<br>Installation in 19" cubicle<br><b>Only horizontal installation permitted</b><br><b>(ventilation slits top/bottom)</b> |

| Consignment |   |
|-------------|---|
| ELS TP40    | <ul style="list-style-type: none"> <li>• ELS TP40 device</li> <li>• Mounting brackets, screws and terminal block</li> <li>• Information on the Product</li> <li>• Manual Collection CD</li> </ul> |

| Order numbers:  |                    |
|---|--------------------|
| ELS TP40  | 6GK1102-6AA00      |
| "Industrial Twisted Pair and Fiber Optic Networks" Manual | 6GK1970-1BA10-0AA0 |
| IE FC Stripping Tool                                      | 6GK1901-1GA00      |
| IE FC blade cassettes                                     | 6GK1901-1GB00      |
| IE FC TP standard cable                                   | 6XV1840 2AH10      |
| IE FC TP trailing cable                                   | 6XV1840-3AH10      |
| IE FC TP marine cable                                     | 6XV1840-4AH10      |

## 7.2 Technical Specifications of the ELS TP40M

| Attachments  |  |
|--|--|
| Attachment of DTEs or Network Components over Twisted Pair | 2 x RJ-45 jacks with MDI-X pinning 10/100 Mbps (half/full duplex)          |
| Attachment of Industrial Ethernet FC TP cables             | 2 x insulation piercing contacts with MDI-X 10/100 Mbps (half/full duplex) |
| Connector for power supply                                 | 1 x 3-pin plug-in terminal block   |

| Electrical Data                      |  |
|--------------------------------------|--|
| Power Supply                         | 24 V dc supply<br>(18 to 32 V dc)<br>safety extra-low voltage (SELV) |
| Power loss at DC 24 V                | 4.8 W  |
| Current consumption at rated voltage | 200 mA   |
| Overcurrent protection at input      | PTC resettable fuse (0.6 A / 60 V)                                   |

| Permitted Cable Lengths                          |  |
|--|--|
| Attachment over Industrial Ethernet FC TP cables | 100 m standard cable<br>85 m trailing cable<br>85 m marine cable   |
| TP Connection                                    | When using the FC Outlet RJ-45, the following cable lengths are permitted:<br>100 m for standard cable<br>85 m for trailing cable<br>85 m for marine cable |

### Note

The number of ELS switches connected influences the frame propagation time. When a frame passes through the ELS, it is delayed by the Store&Forward function of the switch.

- with a frame length of 64 bytes by approximately 10  $\mu$ s
- with a frame length of 1500 bytes by approximately 130  $\mu$ s

This means that the more ELS switches the frame passes through, the longer the propagation time.

|            |           |
|------------|-----------|
| Aging Time | 5 minutes |
|------------|-----------|

| Permitted Ambient Conditions/EMC |  |
|----------------------------------|--|
| Operating temperature            | 0°C to +60°C   |
| Storage/transport temperature    | -40°C to +80°C   |
| Relative humidity in operation   | < 95% (no condensation)  |
| Operating altitude               | 2000 m at max. 56 °C ambient temperature<br>3000 m at max. 50 °C ambient temperature |
| Noise emission                   | EN 50081-2 Class A   |
| Noise immunity                   | EN 50082-2   |
| Degree of protection             | IP 20  |

| Approvals             |                        |
|-----------------------|------------------------|
| UL                    | UL 1950                |
| CSA                   | CSA C22.2 No.950       |
| FM                    | FM 3611                |
| C-TICK                | AS/NZS 2064 (Class A). |
| CE                    | EN 50081-2, EN 50082-2 |
| Shipbuilding approval | -                      |

| MTBF                         |   |
|------------------------------|---|
| MTBF                         | 51 years  |
| Construction                 |   |
| Dimensions (W x H x D) in mm | 145 x 136.5 x 69  |
| Weight in g                  | 950   |
| Installation options         | Standard rail<br>S7-300 rail<br>Wall mounted<br>Installation in 19" cubicle<br><b>Only horizontal installation permitted</b><br><b>(ventilation slits top/bottom)</b> |

| Consignment |   |
|-------------|---|
| ELS TP40M   | <ul style="list-style-type: none"> <li>• ELS TP40 device</li> <li>• Mounting brackets, screws and terminal block</li> <li>• Information on the Product</li> <li>• Manual Collection CD</li> </ul> |

| Order numbers:  |                    |
|---|--------------------|
| ELS TP40M   | 6GK1102-6AB00      |
| "Industrial Twisted Pair and Fiber Optic Networks" Manual | 6GK1970-1BA10-0AA0 |
| IE FC Stripping Tool                                      | 6GK1901-1GA00      |
| IE FC blade cassettes                                     | 6GK1901-1GB00      |
| IE FC TP standard cable                                   | 6XV1840 2AH10      |
| IE FC TP trailing cable                                   | 6XV1840-3AH10      |
| IE FC TP marine cable                                     | 6XV1840-4AH10      |

## 7.3 Technical Specifications of the ELS TP80

| Attachments  |   |
|--|---|
| Attachment of DTEs or Network Components over Twisted Pair | RJ-45 jacks with MDI-X pinning 10/100 Mbps (half/full duplex) |

| Electrical Data                      |  |
|--------------------------------------|--|
| Power Supply                         | 24 V dc supply<br>(18 to 32 V dc)<br>safety extra-low voltage (SELV) |
| Power loss at DC 24 V                | 3.6 W  |
|                                      |  |
| Current consumption at rated voltage | 150 mA   |
| Overcurrent protection at input      | PTC resettable fuse (0.6 A / 60 V)                                   |

| Permitted Cable Lengths |  |
|-------------------------|--|
| TP Connection           | 0-10 m with TP cord.<br>When using the FC Outlet RJ-45, the following cable lengths are permitted:<br>100 m for standard cable<br>85 m for trailing cable<br>85 m for marine cable |

### Note

The number of ELS switches connected influences the frame propagation time. When a frame passes through the ELS, it is delayed by the Store&Forward function of the switch.

- with a frame length of 64 bytes by approximately 10  $\mu$ s
- with a frame length of 1500 bytes by approximately 130  $\mu$ s

This means that the more ELS switches the frame passes through, the longer the propagation time.

|            |           |
|------------|-----------|
| Aging Time | 5 minutes |
|------------|-----------|

| Permitted Ambient Conditions/EMC |  |
|----------------------------------|--|
| Operating temperature            | 0°C to +60°C   |
| Storage/transport temperature    | -40°C to +80°C   |
| Relative humidity in operation   | < 95% (no condensation)  |
| Operating altitude               | 2000 m at max. 56°C ambient temperature<br>3000 m at max. 50°C ambient temperature |
| Noise emission                   | EN 50081-2 Class A   |
| Noise immunity                   | EN 50082-2   |
| Degree of protection             | IP 20  |

| Approvals             |                        |
|-----------------------|------------------------|
| UL                    | UL 1950                |
| CSA                   | CSA C22.2 No.950       |
| FM                    | FM 3611                |
| C-TICK                | AS/NZS 2064 (Class A). |
| CE                    | EN 50081-2, EN 50082-2 |
| Shipbuilding approval | -                      |

| MTBF                         |   |
|------------------------------|---|
| MTBF                         | 81.52 years   |
| Construction                 |   |
| Dimensions (W x H x D) in mm | 145 x 136.5 x 69  |
| Weight in g                  | 950   |
| Installation options         | Standard rail<br>S7-300 rail<br>Wall mounted<br>Installation in 19" cubicle<br><b>Only horizontal installation permitted</b><br><b>(ventilation slits top/bottom)</b> |

| Consignment |   |
|-------------|---|
| ELS TP80    | <ul style="list-style-type: none"> <li>• ELS TP80 device</li> <li>• Mounting brackets, screws and terminal block</li> <li>• Information on the Product</li> <li>• Manual Collection CD</li> </ul> |

| Order numbers:  |                    |
|---|--------------------|
| ELS TP80  | 6GK1102-7AA00      |
| "Industrial Twisted Pair and Fiber Optic Networks" Manual | 6GK1970-1BA10-0AA0 |



## 8 Further Support

# 8

### Who to Contact

If you have technical questions about using the described product and your problem is not dealt with in the documentation or in the integrated help system, please contact your Siemens representative or dealer.

You will find the addresses:

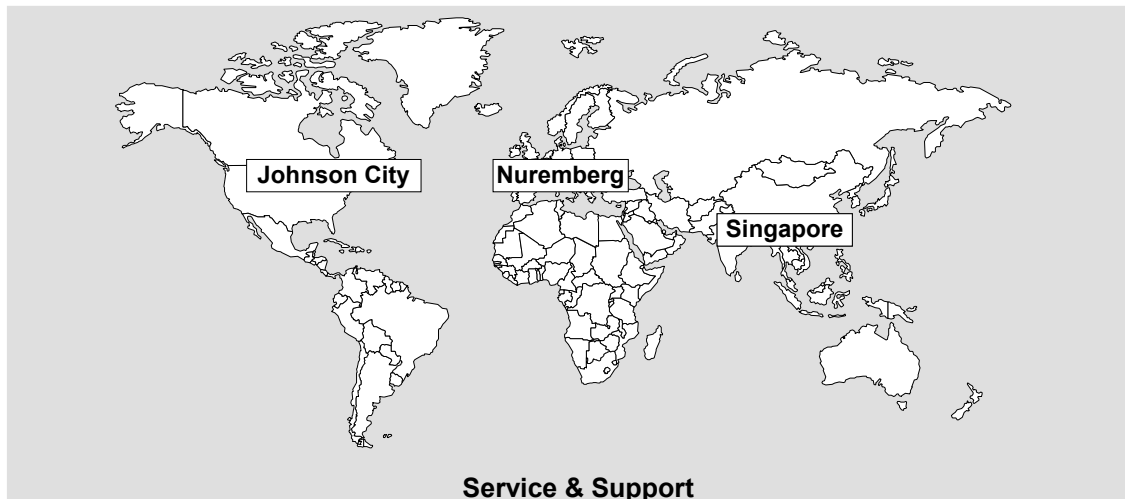
- in our catalog IK PI
- on the Web (<http://www.ad.siemens.de/net>)

## Automation and Drives, Service & Support

Service & Support from A&D is available round the clock worldwide.

The languages spoken are German and English.

French, Italian, and Spanish are also spoken on the authorization hotline.



| Technical Support  | Authorization Hotline   |
|--|---|
| <b>Europe and Africa (Nuremberg)</b><br>Mo. to Fr. 7:00 to 17:00 (local time, GMT +1)<br>Phone: +49 - (0) 180 - 5050 - 222<br>Fax: +49 - (0) 180 - 5050 - 223<br>E-mail: <a href="mailto:techsupport@ad.siemens.de">techsupport@ad.siemens.de</a>        | <b>Europe and Africa (Nuremberg)</b><br>Mo. to Fr. 7:00 to 17:00 (local time, GMT +1)<br>Phone: +49 - (0) 911 - 895 - 7200<br>Fax: +49 - (0) 911 - 895 - 7201<br>E-mail: <a href="mailto:authorization@nbgm.siemens.de">authorization@nbgm.siemens.de</a> |
| <b>America (Johnson City)</b><br>Mo. to Fr. 8:00 to 19:00 (local time, GMT -5)<br>Phone: +1 - (0) 423 - 262 - 2522<br>Fax: +1 - (0) 423 - 262 - 2231<br>E-mail: <a href="mailto:simatic.hotline@sea.siemens.com">simatic.hotline@sea.siemens.com</a>     |   |
| <b>Asia and Australia (Singapore)</b><br>Mo. to Fr. 8:30 to 17:30 (local time, GMT +8)<br>Phone: +65 - (0) 740 - 7000<br>Fax: +65 - (0) 740 - 7001<br>E-mail: <a href="mailto:simatic.hotline@sae.siemens.com.sg">simatic.hotline@sae.siemens.com.sg</a> |   |

| SIMATIC Premium Hotline  |   |
|--|---|
| <b>Worldwide (Nuremberg)</b><br>Workdays<br>0:00 to 24:00 (local time, GMT +1)<br>Phone: +49 - (0) 911 - 895 - 7777<br>Fax: +49 - (0) 911 - 895 - 7001<br>E-mail: <a href="mailto:techsupport@ad.siemens.de">techsupport@ad.siemens.de</a> | Fast callback,<br>(charged, only with SIMATIC Card) |

## Service & Support on the Internet

On the World Wide Web, you will find the very latest information on the entire SIMATIC product range, forexample, answers to frequently asked questions (FAQs), Tips and Tricks, software updates, manuals, and user information.

In addition to this free information, you can also order the following, for which a charge is made:

- Software products
- Sample application programs

These are charged to the SIMATIC CARD.

Internet address:

<http://www.siemens.de/automation/service&support>

You can also formulate a question for the SIMATIC Knowledge Manager that will find the solution in the knowledge database.

If you are working in an area without an online connection, part of the free information area is available on the "SIMATIC Customer Support Knowledge Base" CD.

## Training for SIMATIC NET

Who to Contact about Training Courses:

Siemens AG  
Trainings-Center für Automatisierungs- und Antriebstechnik  
A&D PT 49 Kursbüro  
Östliche Rheinbrückenstraße 50  
76181 Karlsruhe  
Germany

Phone: +49 - (0) 721 - 595 - 2917  
Fax: +49 - (0) 721 - 595 - 6087  
Internet: <http://www.sitrain.com>

## Certification

The products of SIMATIC NET are manufactured and marketed using a quality management system complying with DIN ISO 9001 and certified by DQS (certificate registration no. 2613). The DQS certificate is recognized in all IQNet countries (Reg. No. 2613).

## 9 Notes on the CE Mark

# 9

### Product name:

|             |           |               |
|-------------|-----------|---------------|
| SIMATIC NET | ELS TP40  | 6GK1102-6AA00 |
| SIMATIC NET | ELS TP40M | 6GK1102-6AB00 |
| SIMATIC NET | ELS TP80  | 6GK1102-7AA00 |

The SIMATIC NET product listed above meets the requirements of the following EU directives:

### EMC Directive

Directive 89/336/EEC "Electromagnetic Compatibility"

### Area of Application

The product is designed for use in an industrial environment:

| Area of Application | Requirements      |                   |
|---------------------|-------------------|-------------------|
|                     | Noise emission    | Noise immunity    |
| Industry            | EN 50081-2 : 1993 | EN 50082-2 : 1995 |

### Installation Guidelines

- The product meets the requirements if you adhere to the installation and safety instructions contained in this description and in the "SIMATIC NET Industrial Ethernet TP and Fiber-Optic Networks" manual /2/.

### Conformity Certificates

The EU declaration of conformity is available for the responsible authorities according to the above-mentioned EU directive at the following address:

Siemens Aktiengesellschaft  
Bereich Automatisierungs- und Antriebstechnik  
Industrielle Kommunikation (A&D PT2)  
Postfach 4848  
D-90327 Nürnberg

### Notes for the Manufacturers of Machines

This product is not a machine in the sense of the EU directive on machines. There is therefore no declaration of conformity for the EU directive on machines 89/392/EEC.

If the product is part of the equipment of a machine, it must be included in the procedure for obtaining the declaration of conformity by the manufacture of the machine.

## 10 Glossary

# 10

|                        |   |
|------------------------|---|
| <b>Autonegotiation</b> | 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. |
| <b>Autosensing</b>     | See Autonegotiation   |
| <b>ELS</b>             | Electrical Lean Switch  |
| <b>ESM</b>             | Electrical Switch Module  |
| <b>EMC</b>             | Electromagnetic compatibility   |
| <b>FC</b>              | FastConnect   |
| <b>MDI-X</b>           | Medium Dependent Interface Crossover<br>RJ-45 jack with network component pinning.  |
| <b>OSM</b>             | Optical Switch Module   |
| <b>TP Port</b>         | Twisted-pair port   |

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## 12 References

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- /1/ SIMATIC NET Industrial Ethernet OSM/ESM Network Management, Release 08/2001  
supplied with every device on CD and available at  
<http://www4.ad.siemens.de/view/cs/de/8677203>  
on the Web.
- /2/ SIMATIC NET Industrial Twisted Pair and Fiber-Optic Networks, Release 05/2001  
Order numbers:  
6GK1970-1BA10-0AA0 German  
6GK1970-1BA10-0AA1 English  
6GK1970-1BA10-0AA2 French  
6GK1970-1BA10-0AA4 Italian
- /3/ SINEC H1 Manual for Triaxial Networks, Release 04  
Order number  
6GK1970-1AA20-0AA0 (German/English)