

# SIEMENS

## Active Mini-Starcoupler 7XV5550-0xA00

### Manual

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## General Instructions

This manual includes the information required for the normal use of the products described therein. It is intended for technically qualified personnel which has been specially trained or has special knowledge in the fields of protection-, instrumentation-, control-, and automatic control engineering (called automation in the following).

The knowledge and the technically correct translation of the safety instructions and warnings included in this manual are a prerequisite for the safe installation and commissioning, as well as for safety during operation and maintenance, of the product described. Only qualified personnel, as defined in the following explanation, possess the technical knowledge required to interpret correctly and to put into action for each individual case the safety instructions and warnings given in this document in a general manner.

This manual is an integral part of the scope of delivery. However, it cannot take into account every detail on all types of the described product and also every possible case regarding installation, operation or maintenance.

If further information is desired or in case special problems should arise, which are not treated adequately in this document, it is possible to obtain additional details from the local Siemens office or from the addresses stated in the back of this manual.

Additionally, we point out that the content of this product documentation is not part of or modifies any previous or existing agreement, promise, or legal relationship.

All obligations by Siemens result from the respective purchase order which also includes the complete and exclusively valid warranty provision.

The contractual warranty regulations are neither extended nor limited by the statements in this document.

## Safety Notes

These operating instructions contain notes that are to be complied with for your personal safety as well as to avoid property damages. These notes are marked by a triangular warning symbol and the different degrees of danger are categorized as follows:



### **Danger**

Disregard of the corresponding precautionary measures will cause death, severe bodily injury or considerable property damage.



### **Warning**

Disregard of the corresponding precautionary measures may cause death, severe bodily injury or considerable property damage.



### **Attention**

Disregard of the corresponding precautionary measures may lead to slight bodily injury or minor property damage



### **Note**

Shall draw your attention to special information on the product, product handling or the corresponding section of the documentation.



### **Qualified personnel**

Commissioning and operation of the equipment is to be performed by qualified personnel only. In the context of safety notes in this manual, the term qualified personnel refers to persons authorized to perform commissioning, grounding and labelling of devices, systems and electrical circuits.

## Intended Use

Please observe the following



### **Warning**

The device must be operated only within the scope of its intended use according to these operating instructions and in connection with third-party equipment or compounds recommended or accepted by Siemens.

Faultless and safe operation of the product require proper transport, storage, mounting and installation as well as careful operation and maintenance.

## Explanation of the symbols at the device:



### **Danger**

Warning of a danger.

Please read the documentation.

To be operated only by qualified personnel.



Double insulation

## Exclusion of liability

The contents of this document have been reviewed on their compliance with the hardware and software described therein. Yet, deviations cannot be excluded, so that we cannot guarantee full compliance. The specifications in this document are, however, reviewed at regular intervals. Necessary corrections will be included in the next edition. You are invited to send us your suggestions for improvement.

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Subject to technical changes without notice.

## Version changes:

First issued on 08.02.2001

Changes introduced on 14.01.2002:

- 6.3.3 Timeout-time 00:00:00 (infinite) cancelled.
- Page 37 Timeout-times must be graded.
- 8.1.1 Functional limitations of protection devices V1/2
- 8.2.1 Operation with DIGSI 4.3x



## **1 Application and short functional description**

The Active Mini-Starcoupler is designed for universal use in applications with serial interfaces, where one or several devices with different serial baudrate and data frame shall be linked together. It's an active, serial port-switcher, where you can switch from one or more selectable input interfaces (Master interfaces) with an ASCII sequence to one output interface (Slave interface). With a terminal program or a customer specific software on a PC, 128 Slave-interfaces can be selected from a central unit (normally a PC) and the communication between the central unit and the device runs over the port-switcher. At each Slave-interface one not addressable device or several by protocol addressable devices can be connected. Even the remote control via a modem connected to a Master-interface is possible. For each Slave-interface a channel number is parametrized in the Active Mini-Starcoupler. Furthermore the serial data format, the baudrate and the data frame can be set individually for each Slave-interface.

No hardware handshake for the serial interfaces is supported. The data-traffic between the master unit at the Master-interface to the devices at the Slave-interfaces must be controlled by a user defined protocol (e.c. protocol with device addresses or ASCII-protocol with XON/XOFF sequences).

Through the wide range power supply, which allows the connection to all common types of AC voltage supplies (AC: 110V / 230V) and DC batteries (DC: 24V –250V) and through the electromagnetic, disturbance free optical interfaces, the Active Mini-Starcoupler has favourite design features for the use in the industrial field and for serial applications together with protection and substation control.

It allows the central and remote interrogation :

- Of non-addressable devices. Each at one Slave-interface (e.c. devices with ASCII – protocol like relays of version 1 or 2 from SIEMENS).
- Of several addressable devices with common interface parameters on one Slave-interface (Over protocol identified devices like relays of version 3 and 4 from SIEMENS)
- Common operation with non–addressable and addressable devices in a communication topology from a master unit.
- Of devices with different baudrate and data frame.

## 1.1 Technical features

- One local RS232 interface with 9 pole Sub-D socket for the setting procedure or for normal data exchange. The interface don't support hardware handshake during normal operation. Only in a special setting mode the hardware handshake is provided.
- 5 optical duplex interfaces (transmit and receive connector) for the connection to multimode fibre optic cables (FO) with FSMA- or ST plugs. The data-exchange must be realized in a half-duplex mode with a continuous data stream of less than 254 Byte (max. byte-length for one continuous data stream in one direction).
- Settable idle state 'Light ON' or 'Light OFF' for each of the optical interfaces. Factory setting is 'Light OFF'. This state is equal with those of the optical interfaces from relays from SIEMENS.
- Wave length of the optical interfaces is 820 nm.
- The maximum distance between devices connected optically with multimode-FO (62,5/125  $\mu\text{m}$ ) is 1,5 km (approx. 1 mile).
- Individually settable async. baud rates of 1200, 2400, 4800, 9600, 19200, 38400, 57600 und 115200 Baud for each interface.
- Individually settable data frames 8N1, 8N2 und 8E1 for each interface.
- Wide range power supply with 24 V – 250 V DC and 110 / 230 V AC.
- LED indication for operation and date transfer from the Master to the Slave-interface..
- One RS485-interface for cascading in a half-duplex-mode between several Active-Mini-Starcouplers. Transmitting and receiving datas at the same time is not possible via this interface.
- Through cascading the whole configuration can be extended up to 128 Slave-interfaces.
- Plastic housing for 35 mm top-hat rail mounting.

### 1.1.1 Interfaces

The Active Mini-Starcoupler has at it's bottom side a 9 pole RS232 interface. This interface is used for parametrization and for central local access from a PC.

At it's front side five optical interfaces with a transmit (Tx) and receive (Rx) connector as FSMA- or ST-type are located. This interfaces allow an interference free connection to the optical interfaces of further Active Mini-Starcouplers or optical interfaces of devices / relays. The light idle state ON or OFF for each optical interface can be set by a terminal program in the Active Mini-Starcoupler by software.

For the cascading of Active Mini-Starcouplers it has at the bottom side a serial RS485 bus-interface, where several devices can communicate via an electrical half duplex two wire RS485 bus. The bus termination resistance is set with a DIP-switch to ON or OFF. For the first and last device at the RS485 bus it must be set to ON, OFF for the other devices between.

### **1.1.2 Setting parameters**

The setting of parameters work by a simple terminal program (e.g. Hyperterm from WINDOWS®) via the DIGSI – cable 7XV5100-4, which connects the RS232 interface from the Active Mini-Starcoupler with one serial PC-interface. The programming dialogue runs in the terminal program and the paramerters stored in the device. English and German is available for this setting dialogue. No special operational software is required.

If the switch S2.1 is set to ON, the setting dialogue runs with 9600 Baud (baudrate) and 8N1 (data format) after switching OFF and ON the power supply of the device, even the interface has been set to Master-mode and therefore may have other interface parameters. 8N1 and 9600 Baud have to be set in the terminal program for the PC interface connected with the device. After switching ON the power supply, with S1.1 in ON state, the device is in the setting mode. If the datas of the serial interface remain unchanged during this setting procedure, they are valid again with there existing values, when the setting mode is left by the user.

Parameters are stored unerasable against loss of power supply in an E<sup>2</sup>PROM in the device.

### **1.1.3 Master and Slave-interfaces**

All interfaces can be set as Master or Slave interface. All Master-interfaces must have the channel number zero. The Slave-interfaces are set to a channel number between 1 and 254. Via an ASCII – sequence the channel is selected and afterwards the data traffic is switched from the Master to the selected Slave-interface.

## 1.1.4 Master-interfaces

In one device more than one interface can work as Master-interface, set all with channel number zero. If several interfaces are set as Master-interfaces, they must have the same interface properties like data frame and baudrate. All received datas at one Master-interface are transmitted with the same data frame and baudrate to the other Master-interfaces of the device and Master-interfaces of cascaded devices.

## 1.1.5 Slave-interfaces

All interfaces, which have been as Slave-interfaces, must be programmed with a unique channel number between 1 and 128. It's not allowed to have equal channel numbers for Slave-interfaces in a topology of serveral devices, which is e.g. cascaded via the RS485 interface or a Master-interface. Each Slave-interface can have it's individual baudrate and data format.

## 1.1.6 Baudrates

All interfaces can set to 1200, 2400, 4800, 9600, 19200, 38400, 57600 und 115000 Baud.

## 1.1.7 Data format

All interfaces can set to:

8N1 (1 Start bit, 8 data bits, No parity bit, 1 Stop bit),  
8N2 (1 Start bit, 8 data bits, No parity bit, 2 Stop-bits) and  
8E1 (1 Start bit, 8 data bits, Even parity bit, 1 Stop-bits).

## 1.1.8 Channel selection during the operation

Slave-interfaces must be selected via the Master-interface with a channel selection command during normal operation. This switches an active data connection between Master- and Slave-interface for the serial data traffic. The entry for the selected channel number (one out of 1-128) is done in the terminal program during the operation mode beside the Prompt **REMOTE>** and terminated with a RETURN.

**REMOTE>2** <CR – Carrige RETURN> selects channel number 2

If the selected channel number has been identified by the Active Mini-Starcoupler and the channel is routed from the Master- to the Slave-port successfully, the device is in an Active Transmission Mode and answers to the terminal program or the application software with:

```
REMOTE>Connected to port # 3  
To deselect type BYE
```

All Master-interfaces are routed to the selected Slave-interface, e.g. the Active Mini-Starcoupler transforms baudrate and data frame according the settings for those interfaces. Only one active connection can be opened at the same time. All other Slave-interfaces are not connected and in an passive mode. Received datas at the Master-interface are send only to all other connected Master-interfaces and the selected Slave-interface.

After the Ative Transmission Mode is activated the operational software e.g. DIGSI is started on the PC. This software exchange serial datas between the PC and the serial interface of a device, which has been connected to the Slave-interface of the Active Mini-Starcoupler. This data transfer runs via the Master- and Slave-interface of the Active Mini-Starcoupler, where it transforms the serial datas.

After the PC software application is finished, the connection between Master- and Slave-interface should be terminated. This can be done by the software, if the disconnection string is implemented in the software (e.g. DIGSI 3). If not, it can be done again with the terminal program. A timeout set for the interfaces also leads to an automatic release of the Active Transmission Mode. If within the timeout duration no datas are exchanged Master- and Slave-interface get disconnected.

### **1.1.9 Disconnection between Master- and Slave-interface**

After the entry of 'BYE' (without RETURN) after approx. 2 s the actual selected Slave-port is disconnected from the Master-interface. The Active Mini-Starcoupler switches from the Active Transmission Mode into the normal operation mode, where it waits for new commands. Because all Master-interfaces hear the 'BYE' command, if several Mini-Starcouplers are cascaded together e.g. via their RS485 interface, they know that they must be ready now for new channel selection commands.

### **1.1.10 Internal memory for the data-transfer**

The data-transfer between the interfaces of an Active Mini-Starcoupler runs in full-duplex mode. If serveral devices are cascaded via the RS485 interface it works only half-duplex. Because different baud rates and data formats can be set for the interfaces, it takes different time to transmit and receive datas from there. So an uninterrupted data transfer

is not possible all the time. The maximum telegram length is 255 byte. The device is able to store this amount of bytes. If more than 255 bytes are in the internal buffer, because much more datas are received at one interface before they can be transmitted over the other interface, datas get lost.

If a telegram is received gapless, there is no garanty that it is transmitted gapless over the other interface. The transmission of the first byte over one interface begins as soon as it is received over the other interface. This avoids delay times caused by the device.

### 1.1.11 Cascading several Mini-Starcouplers

Several Mini-Starcouplers can be linked together with the RS485-interface included in each device. It's an electrical 2-wire bus. In this bus configuration the first RS485-interface must set as a Master-interface and further RS485-interfaces must be set also as Master-interfaces with the same baudrate and data frame.

### 1.1.12 Mini-Starcoupler as Master-device

The Active Mini-Starcoupler which is connected close by the PC or the modem is called the Master-device. It answers in the normal operation mode to every ↵ (Return) with the string

**REMOTE>**

in the terminal program. Important is, that the parameter **'ANSWER'** for the Master-interface with channel number zero must be set to **'YES'** (It's a must for the operation together with DIGSI).

If a modem with automatic baud rate recognition shall be synchronized to the baud rate set for the Master-interface the paramter **'PING'** must be set to **'YES'**. Over the serial Master-interface, which is connected to the serial modem interface, every 10 seconds the modem string **'ATE0Q1'** (PING) is transmitted to the modem. This string is necessary for automatic baud rate recognition. This works, if the Master-interface is not active connected to a Slave-interface in the Active Transmission Mode and avoids that the modem switches to an unwanted baud rate.

### 1.1.13 Further Mini-Starcouplers as Slave-devices

Further Mini-Starcouplers which are conneced behind the Master-device are called Slave-devices. In Slave-devices the parameters **'ANSWER'** and **'PING'** for the Master-interfaces must be set to **'NO'**.

**ATTENTION !**

Only this settings makes it sure that with several Mini-Starcouplers, which are linked together in a configuration, only the first one answers to a ↵ (Return) from the terminal program or the application software with **>REMOTE** and only this one sends it's PING – string to the modems serial interface.

**2 Technical datas**

**2.1 Hardware features**

<p><b>Mechanical design</b>          Housing          Dimensions          Weight          Degree of protection              Housing              Terminals</p>	<p>Plastic EG90          see dimensional drawings          approx. 280g          according EN60529, IEC60529              IP 20              IP 20</p>
<p><b>Auxiliary voltage U<sub>H</sub></b>          Rated input voltage          - DC voltage          - AC voltage            Class of protection (depends on input voltage)            Power consumption          - DC voltage          - AC voltage</p>	<p>24 V - 250 V DC ± 20 %          24 V - 230 V AC ± 20 % / 45-65 Hz            II / III            With U<sub>H</sub> = U<sub>HN</sub>; typical value          5 W          4 W; 6 VA</p>
<p><b>Alarm relay</b>          1 Relay          Connector          Test voltage          Switching voltage (nominal value)          Switching capability          Switching current          Indication</p>	<p>MSR-Relay, 1 NC (open) contact, potential free          2-pol. Phoenix terminal          3,7 kV<sub>eff</sub>          250 V DC          20 W/VA          1 A permanent          LED green: 5 V o.k, processor in operation</p>
<p><b>RS232-interface</b>          Connector          Test voltage</p>	<p>9-pol. SUB-D, socket          500 V AC towards RS485-interface          2 kV AC towards other connections</p>
<p><b>RS485-interface</b>          Screw terminals          Test voltage</p>	<p>COMBICON 2-pol.          500 V AC towards RS232-interface          2 kV AC towards other connections</p>

<p><b>Optical interfaces</b> Optical inputs / outputs</p> <p>Optical connectors</p> <p>Laser class 1 acc. EN60825-1/-2 Data flow indication</p> <p>Wave length Launched power</p> <p>Sensitivity Optical budget Maximum reach By software settable baud rates By software settable data formats</p>	<p>5 transmitters, 5 receivers Factory setting: Light OFF in idle state FSMA (protective caps made of plastic) alternativ on request ST connectors</p> <p>LED yellow 'Master-interface transmit datas' LED yellow 'Slave-interface transmit datas' 820 nm 50/125µm: -19dBm multimode fibre 62,5/125µm: -15dBm multimode fibre 200µm; -6,2dBm HCS fibre</p> <p>-30dBm 10dB (+3 dB system budget – safety margin) 1.5 km with 62,5/125µm multimode fibre 1200, 2400, 4800, 9600, 19200, 3840, 57600, 115200 Baud 8N1, 8N2, 8E1</p>
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## 2.2 Safety Tests

<p><b>Safety test standards</b> according DIN EN 61010 Teil1 Overvoltage category Degree of pollution Fire resistance classification according to UL 94</p>	<p>III 2 V0</p>
<p><b>Dielectric tests</b> EN61010 IEC 255-5: ANSI/IEEE C37.90.0</p> <p>Voltage test (routine test) Auxiliary power to relay Auxiliary power to RS232 interface Relay to RS232 interface</p> <p>Surge voltage test (type test) VDE0435, Teil 303 Auxiliary power to relay Auxiliary power to RS232 interface Relay to RS232 interface Relay to RS485 interface</p>	<p>5,25 kV DC / 1s (with bypass capacitors) 3,7 kV AC / 50Hz / 1s (without bypass capacitors) 3,7 kV AC / 50Hz / 1s (without bypass capacitors)</p> <p>5 kV (peak); 1,2/50 µs; 0,5 J; 3 pos. and 3 neg. surges in intervals of 5 s all circuits, class III (not on open contacts)</p>



2.3 EMC tests

<p><b>EMC tests, Interference immunity</b> IEC 255-22 (product standards) EN 61010-1 (Generic standard)</p> <p>High frequency test IEC 60255-22-1, class III VDE 0435 Teil 303, Klasse III</p> <p>Electrostatic discharge (ESD) IEC 61000-4-2, class III IEC 60255-22-2 class III EN 61000-4-2, of degree 4</p> <p>Irradiation with HF field, non modulated IEC 60255-22-3, Klasse III</p> <p>Irradiation with HF field, amplitude modulated IEC 61000-4-3 ENV 50140, class III EN 61000-4-3</p> <p>Irradiation with HF field, pulse modulated IEC 61000-4-3 ENV 50140 / ENV50204, Klasse III</p> <p>Fast transient disturbance / burst IEC 61000-4-4, class IV IEC 60255-22-4, class IV EN 61000-4-4, class IV</p> <p>Fast transient disturbance / burst IEC 61000-4-4, Klasse III IEC 60255-22-4, Klasse III EN 61000-4-4, Klasse III</p> <p>Surge voltage test EN 61000-4-5,</p> <p>Line conducted HF, amplitude modulated IEC 61000-4-6, class III EN 61000-4-6, class III</p>	<p>1 MHz; 400 surges per s; Test duration 2 s 2,5 kV longit.voltage; 1 kV transverse voltage</p> <p>15 kV air discharge, both polarities; 150 pF; Ri = 330 Ohm</p> <p>10 V/m; 27 MHz to 500 MHz</p> <p>10 V/m; 80 MHz to 1000 MHz; 80% AM; 1kHz</p> <p>10 V/m; 900 MHz; repetition frequency 200 Hz; duty cycle of 50% or duty cycle of 100%</p> <p>On auxiliary voltage inputs 4 kV; 5/50 ns; 5 kHz; burst duration 15 ms Repetition 300 ms; both polarities; Ri = 50 Ohm; Test duration 1 min</p> <p>On signal lines 2 kV; 5/50 ns; 5 kHz; burst duration 15 ms Repetition 300 ms; both polarities; Ri = 50 Ohm; Test duration 1 min</p> <p>2 kV Auxiliary power to GND 1 kV Auxiliary power</p> <p>10 V; 150 kHz to 80 MHz; 80% AM; 1 kHz</p>
<p><b>EMC-tests, Interference Emission</b> EN 50081-1 (Generic standard) Conducted interference, only power supply voltage IEC CISPR 22, EN55022 VDE 0878 Teil 22</p> <p>Radio interference field strength IEC CISPR 22, EN55022 VDE 0878 Teil 22</p>	<p>150 kHz to 30 MHz limit class B</p> <p>30 MHz to 1000 MHz limit class B</p>

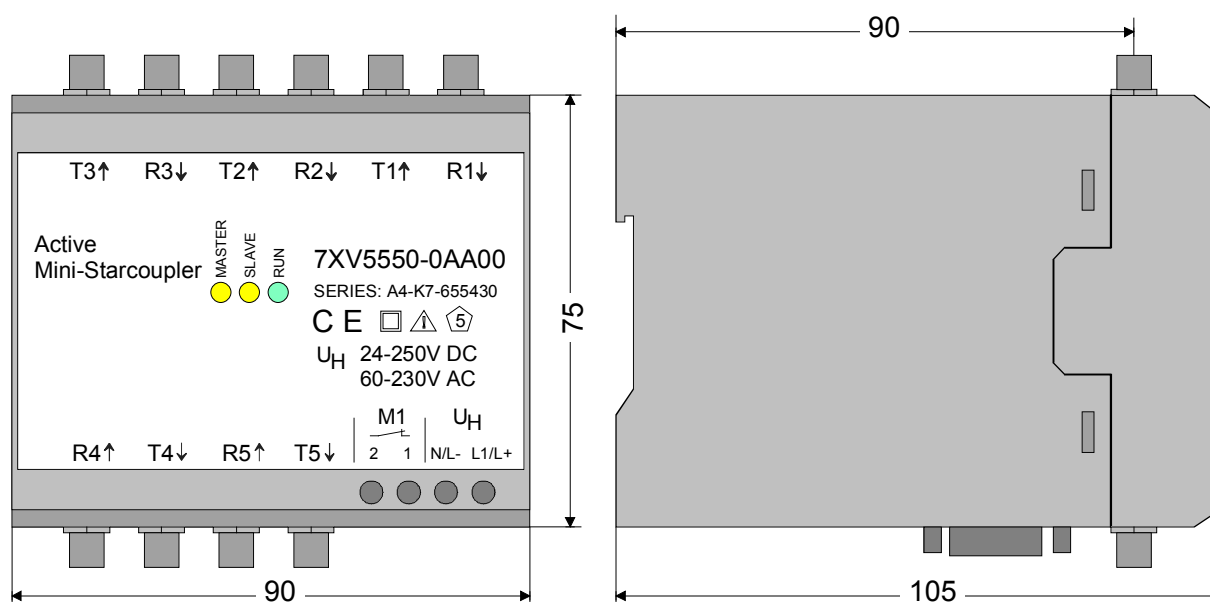
## 2.4 Mechanical Stress Tests

<p><b>Mechanical tests</b></p> <p><b>Vibration and shock during operation</b></p> <p>Vibration IEC 60255-21-1, class 1 IEC 60068-2-6</p> <p>Shock IEC 60255-21-2, class 1</p> <p>Seismic vibration IEC 60255-21-2, class 1 IEC 60068-3-3</p> <p><b>Vibration and shock during transport</b></p> <p>Vibration IEC 60255-21-1, class 1 IEC 60068-2-6</p> <p>Shock IEC 60255-21-2, Klasse 1 IEC 60068-2-27</p>	<p>sinusoidal 10 Hz to 60 Hz: <math>\pm 0,035</math>mm amplitude.; 60Hz - 150 Hz: 0,5g acceleration Frequency sweep rate 10 oktave/min 20 cycles in 3 orthogonal axes, half-sinusoidal</p> <p>Acceleration 5 g, duration 11 ms, 3 shocks in each direction of 3 orthogonal axes</p> <p>sinusoidal 1 Hz to 8 Hz: +3,5mm amplitude (horizontal axis) 1 Hz to 8 Hz: +1,5mm amplitude (vertical axis) 8 Hz to 35 Hz: 1g acceleration (horizontal axis) 8 Hz to 35 Hz: 0,5g acceleration (vertical axis) Frequency sweep rate 1 octave / min 1 cycle in 3 orthogonal axes</p> <p>sinusoidal 5 Hz to 8 Hz: <math>\pm 7,5</math> mm amplitude; 8 Hz to 150 Hz: 2 g acceleration Frequency sweep rate 1 octave / min 20 cycles in 3 orthogonal axes</p> <p>half-sine shaped Acceleration 15 g, Duration 11 ms, 3 shocks in each direction of 3 orthogonal axes</p>
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## 2.5 Climatic Stress tests

<p><b>Ambient Temperatures</b> EN 60068-2-1 and -2-2</p> <p>Recommended operating temperature with all fibre optic interfaces in idle state 'OFF' with all fibre optic interfaces in idle state 'ON'</p> <p>Limiting temporary (transient) operating temperature (all interfaces in idle state 'OFF')</p> <p>Limiting temperature during storage (with packing from the factory)</p> <p>Limiting temperature during transport (with packing from factory)</p> <p>Humidity</p>	<p>-5°C to +55°C (+23° F to +131°F) -5°C to +45°C (+23° F to +112°F)</p> <p>-20°C to +70°C (-4° F to +158°F)</p> <p>-25°C to +55°C (-13° F to +131°F)</p> <p>-25°C to +70°C (-13° F to +158°F)</p> <p>15% to 95%, condensation not permissible</p>
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## 2.6 Dimensions



## 3 Ordering Code

Name	SIEMENS ordering code
<b>Active Mini-Starcoupler</b>	<b>7 X V 5 5 5 0 - 0</b> <input type="checkbox"/> <b>A 0 0</b>
<b>Optical interfaces</b>	
FSMA-connectors	<b>A</b>
ST-connectors	<b>B</b>

## 4 Description of the device and it's interfaces

### 4.1 General description

The Active Mini-Starcoupler in the plastic housing is a hard-wired and tested functional unit, which can only be extended by it's external interfaces. They are provided with a clip-on mounting for DIN EN 50022 top-hat rail 35 mm. With screw type terminals the auxiliary power supply can be safely connected and an alarm contact also. The fibre optic cables are connected via the FSMA screw-type terminals or the ST bayonet catch terminals. The RS232 interface is connected via a 9 pole sub-D socket and the RS485 interface comes out via a 2 pole COMBICON plug connector. The device is free of silicone and halogen as well as flame-retardant.

### 4.2 Position and assignment of the terminals

#### 4.2.1 Auxilliary voltage X2

The auxilliary DC voltage (at L- and L+) or AC voltage (at N and L1) is connected to the terminals X2 (see figure 1). Because the device has no ON/OFF switch this switch must be installed external if it's necessary.

#### 4.2.2 Alarm contact X7

The link to the alarm contact takes place at the clamps X7 1/2. The potential free normally-closed contact opens, if the device is in operation, and closes if supply voltage is missing or an internal error occurs.

#### 4.2.3 Optical interfaces Tx/Rx

The 5 optical interfaces are marked with Tx (Transmit) and Rx (Receive) and numbered from 1 to 5 (see fig. 1). The optical connections are equipped according to the order code with FSMA or ST plugs. The fibre connections to other devices must to be crossed, that means the transmitting output Tx is connected with the Rx input and vice versa.

ATTENTION! Please tight the mechanical screw connections of the FO - cables with FSMA plug carefully and only by hand (do not use tools). The ST plugs are to be shifted with the lateral nose into the groove of the device connection and locked afterwards. During the installation of the FO - cables the bending radius specified for the cable is to be kept.

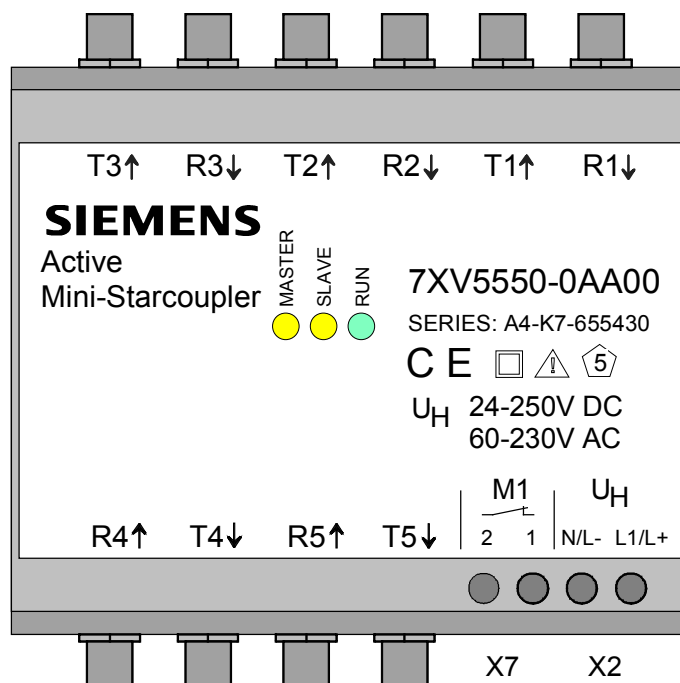


Fig. 1: Frontview of the Active Mini-Starcoupler

#### 4.2.4 RS232 Operating Interface X1

The serial RS232-operating interface X1 (see fig. 2) is constructed as 9-pole SUB-D socket. The operation is made by the serial PC interface, e.g. COM1 or COM2 with a serial zero-modem cable or the DIGSI-cable 7XV5100-4 (recommended cable for the connection to a central PC).

## 4.2.5 RS485- Cascading Interface X5

The 500 V isolated RS485-cascading interface X5 (see fig. 2) is led out on the bottom side of the Active Mini-Starcoupler over a COMBICON plug connector. Each of the interface ports " A " and " B " of the devices are connected in parallel with a 2-wire, shielded cable. The cable screen is grounded on one side left in each case beside the Active Mini-Starcoupler with a ground terminal on the hat rail.

At the first and last Active Mini-Starcoupler on a 2-wire RS485 bus the bus termination resistances must be switched ON.

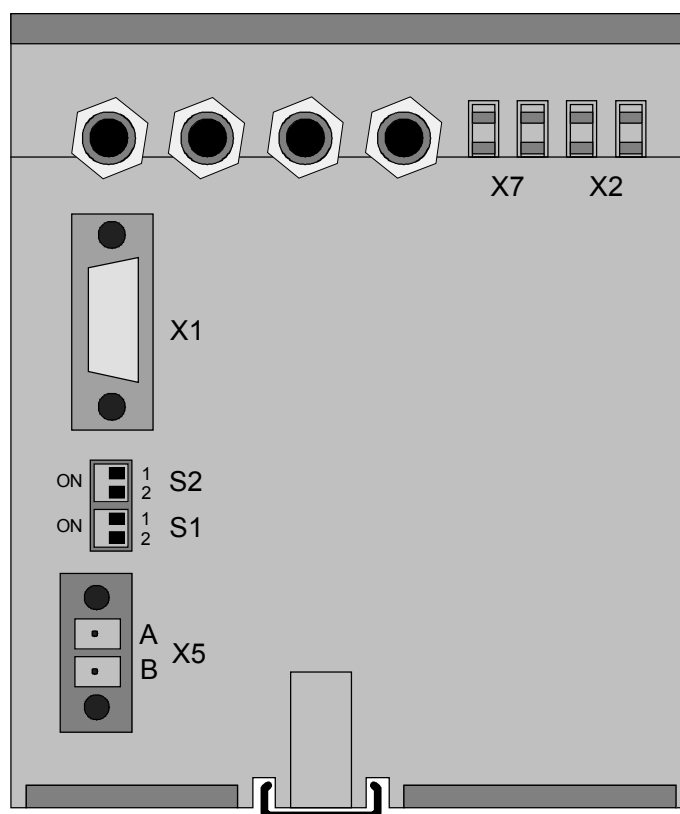


Fig.2: Bottom side of the Active Mini-Starcoupler

## 4.2.6 DIP-Switches S1 and S2

With the DIP-switches S1 and S2 on the bottom side of the Active Mini-Starcoupler the termination resistance for the RS485 bus is switched ON/OFF and the operation mode is activated.

### 4.3 Terminal Assignment

#### 4.3.1 Auxilliary voltage terminals X2

Terminal	Meaning	Symbol
X2 L1/L+	Power supply pin	DC: L+ AC: L1
X2 N/L-	Power supply pin	DC: L- AC: N

Tab. 1: Assignment of auxilliary voltage terminals

#### 4.3.2 Alarm relay terminals (Live contact) X7

Terminal	Meaning
1	Alarm relay contact 1
2	Alarm relay contact 2

Tab. 2: Assignment of alarm relay terminals

#### 4.3.3 RS232-Interface X1

The connection assignment for the 9-pole SUB-D socket

Pin. Nr.	Meaning	Symbol
1	Not connected	n.c.
2	Receive (receive datas)	RxD
3	Transmit (transmit datas)	TxD
4	Data Transmit Ready *	DTR
5	Ground	GND
6	Not connected	n.c.
7	+5 Volt	Vcc
8	Setting mode	Set mode
9	Not connected	n.c.

\* (only supported if the setting mode is activated)

Tab. 3: Assignment of the 9 pole Sub-D plug

## 4.3.4 RS485-Interface X5

Connection X5 is a dual pole COMBICON screw type connector

Pin. Nr.	Meaning	Symbol
1	RS485 A	A
2	RS485 B	B

Tab. 4: Assignment of the 9 pole Sub-D plug

## 4.4 LED's

The LED's are at the front side of the device and visible. They indicate the operation of the device.

### 4.4.1 Green LED "RUN"

The green LED is ON as soon as the device is ready for operation. That means, the internal +5V supply voltage and the micro-processor work correct.

### 4.4.2 Yellow LED "MASTER"

The yellow LED "MASTER" flashes, if datas from a switched port are transmitted to the Master-interfaces.

If the micro-processor doesn't operate, the LED "MASTER" is ON as long as the LED "RUN" is in OFF-state, but +5V supply voltage is available.

### 4.4.3 Yellow LED "SLAVE"

The yellow LED "SLAVE" flashes, if datas from a Master-interface are transmitted to one of the selected Slave-interfaces.

The LED "SLAVE" is ON, as long as the micro-processor doesn't operate and the DIP-switch S2.1 is in "ON" position.

**Note:** If datas are exchanged between the Master-interfaces of the device and no Slave-interface is active switched no yellow LED flash.



#### 4.5 Setting of the DIP-switches

Switch S1	Position	Meaning
S1.1 S1.2	OFF OFF	Termination resistor for the RS485 bus is OFF
S1.1 S1.2	ON ON	Termination resistor for the RS485 bus is ON

Tab. 5: Positions for DIP-switch S1

**Note!** Both DIP-switches must be in the same position.

Switch S2	Position	Meaning
S2.1 S2.2	OFF OFF	Normal operating mode
S2.1 S2.2	ON OFF	Setting mode is active
S2.1 S2.2	ON ON	Bootmode / flashmode is active

Tab. 6: Positions for DIP-switch S2

**NOTE:** Other DIP-switch positions are not permitted

## 5 Installation and Commissioning



### **Warning**

When operating electrical devices, certain parts are necessarily under dangerous voltage. Therefore, disregard of the operating notes may cause severe bodily injury or property damage. Installation and electrical connection of the device should be performed by adequately qualified personnel only. In particular, all warnings must be strictly observed.



### **WARNING**

Do not look directly in the FO-transmitter diodes T1 – T5 if you wear optical aid (glasses, contact lens)

### 5.1 Reference to Installation

- The devices are permitted only for operation within enclosed housings or cabinets and places of installation are to be accessible only for qualified personnel.
- The device is clipped on a 35 mm top-hat rail (according to EN50022).
- The installation location should be free of vibrations. The admissible temperature (operation or functional temperature) is to be observed (see technical data).
- Disregard of the temperature range required for proper function may cause malfunction, failure or destruction of the device.

### 5.2 Connection

The chapter 'Connection' describe how to connect data- and power supply cables for a save operation. For the electrical connection the regulations on the raise of heavy-current installations are to be observed.



---

### **Warning**

Any connections with litz wire are to be realized with the help of wire end ferrules.

---

### 5.2.1 Voltage for operation – Auxilliary voltage

The wires for the auxilliary voltage are screwed on terminal X2 at the bottom side of the device. The assignment of the terminals is printed at the front side or can be read in this manual.

Connection to screw terminals:

Terminal cross section:	max. 2,5 mm <sup>2</sup>
Stripping length:	3 bis 5 mm
Cable cross section: (Single core cable or litz wire)	0,14 bis 1,5 mm <sup>2</sup>

### 5.2.2 Alarm relay terminals X7

X7 offers a potential free contact, which is closed if the device fails. The loss of the power supply is a device failure.

The wires for the alarm contacts are screwed on terminal X7 at the bottom side of the device. The assignment of the terminals is printed at the front side or can be read in this manual.

Connection to screw terminals:

Terminal cross section:	max. 2,5 mm <sup>2</sup>
Stripping length:	3 bis 5 mm
Cable cross section: (Single core cable or litz wire)	0,14 bis 1,5 mm <sup>2</sup>

### 5.2.3 Fibre Optic (FO) connections

- Only optical fibres prepared according to the regulations are to be used. The admissible optical budget is to be observed
- FO-types (only multimode) and max. distance see technical data.
- Transmitter diodes are printed with Tx.
- Receiver diodes are printed with Rx.
- The FO-cables must be crossed, that means a FO-connection is done between Tx output and Rx input and vice versa.



---

**Note**

When installing optical fibres the prescribed bending radius is to be observed.

---

## 5.2.4 RS232 connection

- After the connection of a serial cable to the 9 pole Sub-D connector at the device (X1) it should be screwed. For temporarily use it's not necessary to screw it. But please check if it's connected.

## 5.2.5 Commissioning

- Clip the Active Mini-Starcoupler on the top-hat rail according EN 50022 with the help of clip-on mounting. Do not make any changes at the device.
- Check whether the operation data comply with the values on the rating plate. Not change any DIP-switch at the device, before reading this manual.
- Connect FO cable to FO receiver (Rx) and FO transmitter (Tx) with the help of FSMA or ST plugs. Be carefull when connecting the FO plugs and avoid any dust at the FO – connections.
- Connect to RS485 and RS232 terminals and screw them for permanent use.
- Connect the alarm relay terminals X7.
- Connect auxiliary power to the terminals X2 (DC: L+ / AC: L1 and DC: L- / AC: N).
- The device is ready for use after switching on the auxiliary power. The green LED 'RUN' lights up.
- Parametrize the device with a terminal program at a PC via it's RS232 interface.
- The LED's 'MASTER' and 'SLAVE' blink or light, if datas are exchanged between Master- and Slave-interfaces.

## 5.3 Maintenance

The Active Mini-Starcoupler requires no maintainance. For cleaning please use a dry and free of fuzz rag. Put the caps onto the FO-interfaces to avoid dust pollution and interference from sun light or any artificial light source.

**Do not use any liquid agents or substances for cleaning.**

## 6 Modes of operation

### 6.1 How to activate the operation mode

After switching on the auxiliary voltage the device is automatically in the operation mode. For the first time the device has its factory settings. In the operation mode Slave-interfaces can be selected by one of the Master-interface(s) (e.c. RS232, RS485 or optical) with the help of a terminal program or with DIGSI. To be compatible with the channel-switch (port switcher) 7XV5500, which is supported from DIGSI 3, the device answers to the sequence:

```
(1000)<return>(1000)<return>(1000)
```

with

```
REMOTE>
```

The 'REMOTE>' answer must be set before for the Master interfaces connected direct close with the modem or the central PC.

**Note:** (1000) is the minimum time between two <Return> - key entries in milliseconds.

#### 6.1.1 How to select the Active Transmission Mode

To switch from the Master-interface to a Slave-interface, which port-number has been programmed before in the device, the following ASCII-sequence must be entered in the terminal program. With DIGSI it's automatically done, if you have set before the port number of the relay in DIGSI.

```
<port-number> (100) <return> (2000)
```

The successful switching procedure is indicated by the device with an answer string. This works also, if several devices are cascaded. The device, where the port number has been set answers via the other devices back to the terminal program or back to DIGSI.

```
REMOTE>Connected to port # 3  
To deselect type BYE
```

The selected port is now ready for the data-traffic between the Master- and the Slave-interface. It's in the Active Transmission Mode. The data exchange occurs with the interface parameters, which have been set for the Master- and the Slave interface (Slave port).

If another channel has been selected before and the Active Transmission Mode with this port is not terminated, the port selection sequence is ignored and no answer string follows.

If a port is selected, which is not programmed in any device, the answer string is a:

```
REMOTE>
```

## 6.1.2 Passiv Transmission Mode

If in the Active Transmission Mode is selected for one Slave-port in an Active Mini-Starcoupler, all other cascaded devices change to the Passive Transmission Mode. Their Master-interfaces receive the data sent from the Master- to the Slaveport. If the switched connection is terminated by a command the Passive Transmission mode is terminated also and each Master-port is ready for a new port selection string from the PC.

## 6.1.3 Termination of the Active Transmission Mode

To deselect a switched port connection an ASCII sequence must be sent from the terminal program or DIGSI. This sequence is:

```
(2000)BYE(2000)
```

**ATTENTION!** Please enter no `<Return>` after the `‘BYE’` string.

The Active Mini-Starcoupler answers with:

```
(100)REMOTE>
```

This answer also appears if no port has been switched before.

## 6.1.4 Time out conditions

If there is no reply from a device connected to a Slave-interface after the duration set in the parameter `‘TIMEOUT’` the connection between Master- and Slaveport is terminated automatically.

If the Masterport doesn't send any data to the selected Slave-port after the duration set in its parameter `‘TIMEOUT’` the connection is also terminated automatically.

After that automatic termination of a connection the Master-interface at this device generates the message:

(2100) **BYE** (2100) <return> (2000)  
**REMOTE**>

This 'BYE' string is also sent to all other Master-interfaces, which until now are in the Passive Transmission Mode. They switch back to the normal operation mode and are ready for new port selection commands.

### 6.1.5 Test aid for the data connection

To test the serial connection between the PC (also via a modem link) and the Active Mini-Starcouplers the ASCII-sequence '**PING**' can be used in the terminal program. Type the following text:

(1000) **PING** (1000) <**PORT-NUMBER**> (1000) <return>

where each character is serially sent from the terminal program to the Master-interface of the Active Mini-Starcoupler. It answers with the string:

**PONG\_**<**PORT-NUMBER**>

if one of the Slave-ports is set with this PORT-NUMBER.

"**PING**" is sent to all Master-interfaces, so all Master-ports hear the test-"**PING**" string, when several devices are cascaded.

## 6.2 Activation of the Setting Mode

To make or change settings for each serial interface of an Active Mini-Starcoupler the device must be brought from its normal operation mode (default after switch on the power supply) to the setting mode. There are several options to realize this:

### 6.2.1 With DIGSI – cable 7XV5100-4 (Bridged between pin 7-8)

- Deselect a potential selected port with "**BYE**"
- Switch DIP-switch S2.1 to "ON" (activates setting mode)
- Send with the terminal program the character: (1000) **p** (1000) to the serial RS232-interface of the Active Mini-Starcoupler. The PC and the device are connected via the DIGSI-cable. In the terminal program the parameters for the serial PC interface, like baudrate and data frame, must have the same values as set for the serial interface of the Active Mini-Starcoupler.

**Note:** (1000) is the minimum duration between two characters

## 6.2.2 With Zero-Modem Cable (Not bridged between pin 7-8)

- Deselect a potential selected port with **"BYE"**
- Switch DIP-switch S2.1 to "ON" (activates setting mode)
- The handshake signal '**DTR**' must be activated in the terminal programs for the serial PC interface (it's like a bridged pin 7-8).
- Send with the terminal program the character:  
(1000) p (1000)  
to the serial RS232-interface of the Active Mini-Starcoupler. The PC and the device are connected via the zero-modem cable. In the terminal program the parameters for the serial PC interface, like baudrate and data frame, must have the same values as set for the serial interface of the Active Mini-Starcoupler.

**Note:** (1000) is the minimum duration between two characters

## 6.2.3 With standard parameters 9600 Baud, 8N1 (recommended)

- Deselect a potential selected port with **"BYE"**
- Switch OFF the auxiliary voltage of the Active Mini-Starcoupler.
- Connect the serial RS232 interface of the device with the DIGSI-cable 7XV5100-4 (bridged at pin 7-8) or a Zero-Modem cable (with activated DTR-signal for the serial PC-interface) to a serial PC-interface. This interface must be selected also in the terminal program with the interface settings 8N1 and 9600 Baud.
- Set DIP-Schalter S2.1 to **"ON"**.
- Switch ON the auxiliary voltage. Green LED lights. The Active Mini-Starcoupler send the serial datas with:

### **9600 Baud, 8 Databits, no Parity, 1 Stopbit (8N1)**

to the terminal program, disregard of the actual settings for it's serial RS232-interface. This procedure is recommended if the settings for the RS232 interface of the Active-Ministarcoupler are unknown. It allows the setting procedure with well defined parameters.

**ATTENTION!:** Any change to the setting mode during an active data connection leads the to loss of all stored datas and interrupts the connection.



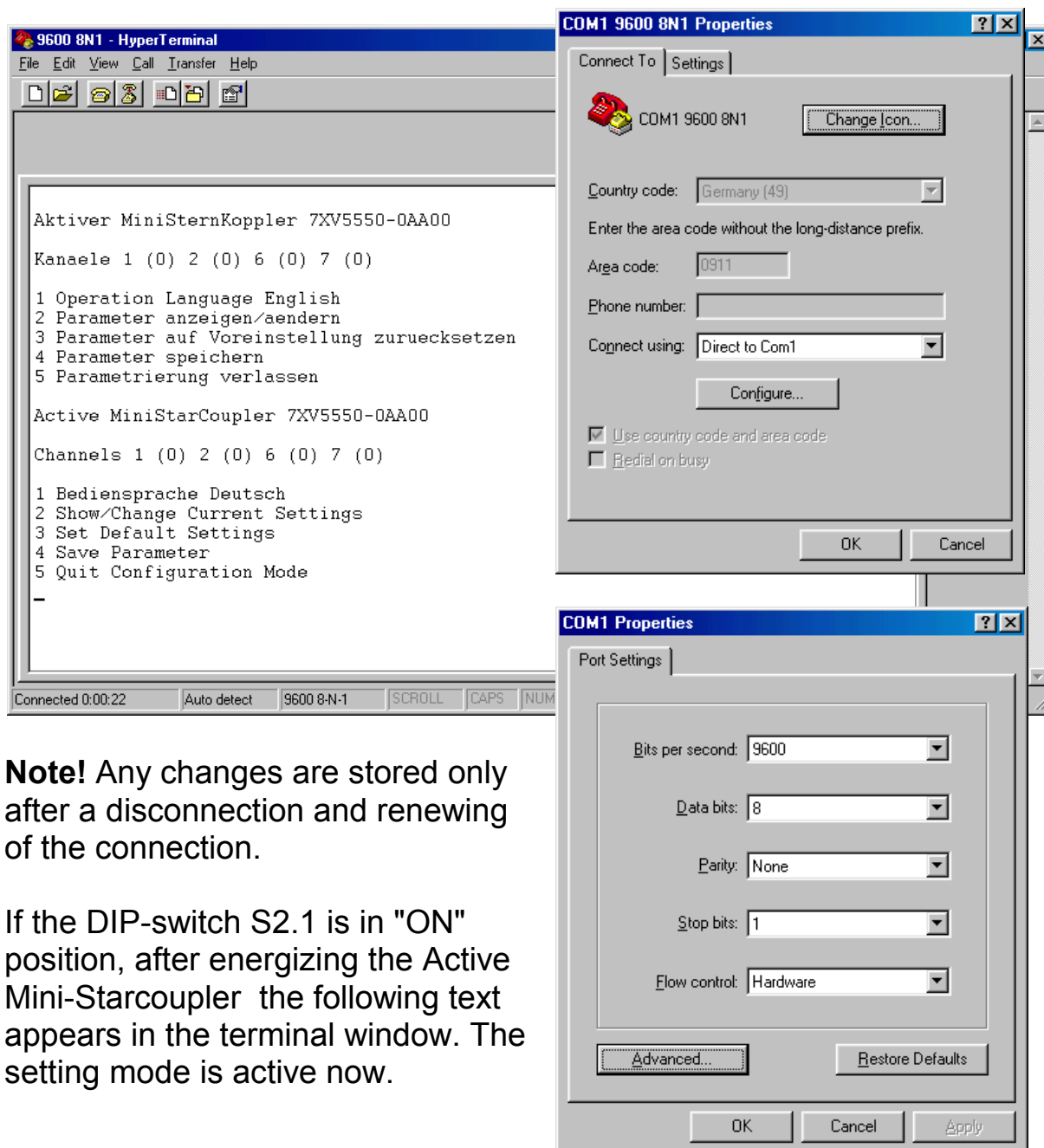
## 6.3 Setting of the interfaces

### 6.3.1 With the terminal program "Hyper-Terminal"

The terminal program 'Hyper-Terminal' is delivered for all WINDOWS® 9x and WINDOWS® NT4 operational system software.

#### Start / Programs / Accessories / Communications / Hyper Terminal

After starting the program choose the serial PC-interface e.g. COM1 or COM2 and select under it's Properties the baudrate with 9600 Baud/s and the data format with 8N1. Also the hardware handshake is supported by the RS232 interface in this setting mode. Store this values.



**Note!** Any changes are stored only after a disconnection and renewing of the connection.

If the DIP-switch S2.1 is in "ON" position, after energizing the Active Mini-Starcoupler the following text appears in the terminal window. The setting mode is active now.

## 6.3.2 The main setting dialogue / Change language

After the activation of the setting mode the Active Mini-Starcoupler sends it's setting options to the terminal window. The following setting dialogue appears:

```
Active MiniStarCoupler 7XV5550-0AA00
```

```
Channels 1 (0) 6 (0) 7 (0)
```

- 1 Bediensprache Deutsch
- 2 Show/Change Current Settings
- 3 Set Default Settings
- 4 Save Parameter
- 5 Quit Configuration Mode

If you select a '1' the operational language changes from German to English. All other entries from 2 - 5 now appear in English language. Another '1' changes back to German.

The selection of '2' shows the settings of all interfaces in a table overview (see here the default settings from the factory).

Interface	Chan.	Baud	Data	TimeOut	Light	Ping	Answ.
1	0	9600	8E1	05:00:00	NO	NO	YES
2	-	9600	8E1	05:00:00	NO	-	-
3	-	9600	8N2	05:00:00	NO	-	-
4	-	9600	8N2	05:00:00	NO	-	-
5	-	1200	8N2	05:00:00	NO	-	-
6 (RS485)	0	9600	8E1	05:00:00		NO	YES
7 (RS232)	0	9600	8E1	05:00:00		NO	YES
8	Back to Main Menu						

Tab. 4: Table of all interface settings

The selection of '3' loads the default settings (factory settings) and deletes all before parametrized values.

If '4' is selected the following question appears:

```
Really Save Settings? (Y/N)
```

A choice of 'Y' stores the parameters shown under '2' in the E<sup>2</sup>PROM of the device. Switching OFF and ON the auxiliary voltage doesn't change this settings. They are permanent stored in the device now.

If 'N' is selected the parameters are used until the next change but only up to this moment where the auxiliary voltage is switched OFF.

Selecting '5' closes the setting mode.

After the termination of the setting mode the string:

```
(2100)BYE(2100)<CR (Carrige Return)>(2100)
REMOTE>
```

is send from the Active Mini-Starcoupler to the terminal program.

**Note:** (2100) is the minimum duration time between the characters in milliseconds.

**Attention!** Potentially cascaded other Active Mini-Starcoupler, which are in an Inactive Transmission Mode, hear the "BYE" and change to the operation mode. It's recommended to set each Active Mini-Starcoupler stand alone.

After the termination of the setting procedure DIP switch 2.1 must be set to the OFF position.

### 6.3.3 Changing the parameters of a port (interface)

In this example a fibre optic interface (T2/R2) shall be changed from a Slave- into a Master-interface. Port 1,6 and port 7 are already set as Master-interfaces (port number 0) in reference to table 6.

We start the setting procedue from table 6. To change interface 2, which is a fibre optic interface (ref. to Table 6) select '2'. The following dialogue appears in the terminal window:

```
Channel For Interface 2 (-)
<ESC> Keep Current Setting
```

If the interface shall be set as a Slave-interface a port number from 1-128 must entered, which is not set already for another Slave-interface. Here in this example the port is set as Master-interface. The number selected for Master-interfaces is always the '0'. Entry of '0' leads to the following warning:

```
Attention: Changes Affect All Interfaces Configured
As Master.
Continue? (Y/N)
```

Confirming with 'Y' or setting an interface as a Slave-port with the entry of a number between 1 – 128, lead to the following setting dialogue:

## Baudrate for Interface 2 (0)

1. 1200
2. 2400
3. 4800
4. 9600
5. 19200
6. 38400
7. 57600
8. 115200

<ESC> Keep Current Setting

You can enter the setting for the other Master-ports (ports 1,6,7 are set already with 9600 Baud) either with <ESC> or confirm it with '4'. Entry of another number lead to a change of the baud rate for all other Master-interfaces. Enter here '4' to confirm 9600 Baud. The dialogue follows:

## Data Format For Interface 2 (0)

1. 8N1
2. 8E1
3. 8N2

<ESC> Keep Current Setting

You can enter the setting for the other Master-ports (ports 1,6,7 are set already with 8E1) either with <ESC> or confirm it with '2'. Changing the data format (entry of '1' or '3' here) change it for all other Master-ports. With entering '2' the dialogue follows:

## Level For Light In Quiescence For Interface 2 (0)

1. Light On
2. Light Off

<ESC> Keep Current Setting

This option is only shown for fibre optic interfaces. It determines the idle state ON or OFF for the optical interface (Note: Factory setting is OFF. This is also the factory setting for SIPROTEC relays from SIEMENS).

You can confirm the setting (Idle state OFF -> LIGHT=NO) in ref. to table 6 either with <ESC> with '2'. Changing this parameter does not effect the idle state of other optical interfaces. With '2' the following dialogue appear:

## Value For TimeOut For Interface 2 (0)

<ESC> Keep Current Setting

This parameter defines a supervision time (1-59 minutes) for the interface, which expiration leads to an automatic termination of an active connection between Master – and Slaveport (of the Active Transmission Mode), if no data is sent or received via the Master-port in this time period. Also the time set for the selected slave port is supervised. The timer is set in minutes, seconds and milliseconds (10 ms resolution), and expires if no data traffic is recognized during that time.

You can confirm the actual setting (5 min --> 05:00:00) either with <ESC> or set it with the entry of 05:00:00 (please note the format 05:00:00). If another timeout value is set it's valid for all other Master-ports.

**NOTE!** In individual or master devices, the timeout-time of the master interfaces must be set greater than the timeout time of the slave interfaces. The timeout time of the master interfaces in all the slave devices must be greater than the timeout time of the master interfaces in the master devices.

To shorten the setting procedure for a time period from 1-59 min only '5' must be entered here:

```
Answer On(1000)<return>(1000)<return>(1000)? (Y/N)
<ESC> Keep Current Setting
```

This dialogue appears only if the port number is selected with 0 (Master port). It defines, if a <Return> lead to the PROMPT **REMOTE**> in the terminal program during the normal operation mode or not.

**ATTENTION!** For Active Mini-Starcouplers in stand alone operation (only one unit) or for the unit which is connected nearest to the PC/modem in a cascading operation mode this setting for the Master-port must be 'Y'. It's a need for the operation together with DIGSI, because a **REMOTE**> indication is necessary, before an active port can be switched from the program.

Enter 'Y' here to come to the following dialogue:

```
Generate PING? (Y/N)
<ESC> Keep Current Setting
```

With the entry of 'Y' an automatic synchronisation of a modem connected to the Master interface is possible. Every 15 s the string

```
ATE0Q1
REMOTE>
```

is sent by the Master-port to the modem, when no active port is switched (normal operation mode). PING should be selected only for the Master-interface connected to the modem.

As a summary the settings are shown in a table overview:

Interface	Chan.	Baud	Data	TimeOut	Light	Ping	Answ.
1	0	9600	8E1	05:00:00	NO	NO	YES
2	0	9600	8E1	05:00:00	NO	NO	YES
3	-	9600	8N2	05:00:00	NO	-	-
4	-	9600	8N2	05:00:00	NO	-	-
5	-	1200	8N2	05:00:00	NO	-	-
6 (RS485)	0	9600	8E1	05:00:00		NO	YES
7 (RS232)	0	9600	8E1	05:00:00		NO	YES
8 Back to Main Menu							

With entry of '8' the main setting dialogue appears, where you can save the parameters (4) or terminate the setting dialogue (5).

Channels 1 (0) 2 (0) 6 (0) 7 (0)

- 1 Bediensprache Deutsch
- 2 Show/Change Current Settings
- 3 Set Default Settings
- 4 Save Parameter
- 5 Quit Configuration Mode

### 6.3.4 Saving parameters

The parameters which have been set are stored through the entry of '4' into the E2PROM of the device. They are available also after a loss of auxiliary power supply voltage. If the saving of the parameters fails the device indicates it in the terminal window with:

Parameter NOT Saved

### 6.3.5 Termination of the Setting mode

Selecting '5' terminates the setting mode.  
At the Master-ports the string

```
(2100)BYE(2100)<Return>(2100)  
REMOTE>
```

is transmitted with the parametrized interface parameters (here: 8E1, 9600 Baud)

**Note:** (2100) is the duration between the character 'E' and <Return>

The device is now in the operation mode and ready for port switching sequences.

## **7 Change the firmware in the device**

### **7.1 Warnings**



---

**Warning**

Please make only settings and changes according what is written here. Don't open the device or change it.



---

**Warning**

The firmware of the device is typ-tested. Only firmware released from SIEMENS can be used for a firmware update. Through wrong firmware dangerous conditions may be possible.



---

**Caution**

Only trained personnel may change the firmware. A unqualified attempt to change the firmware may lead to failures or the destruction of the device.

---

### **7.2 How to change the firmware**

The firmware can be changed without opening the device. To change it the following procedure is necessary:

- Switch OFF the device (remove auxiliary power supply voltage)
- Switch S2.1 and S2.2 to ON position (Bootmode)
- Connect an IBM-PC compatible device with DOS 6.22 or WINDOWS® with a zero-modem- or the DIGSI-cable 7XV5100-4 at the RS232 interface X1.
- Start the program 'BOOT16x.exe V2.2 or newer. This program is provided by the manufacturer for a firmware change.
- Switch OFF the device, when the boot-procedure is finished (shown by the boot program). Switch OFF the device. Set both S2.1 and S2.2 into there original state to OFF. Switch ON the device again.

**Never switch off the device during the boot procedure.**

## 8 Applications together with SIPROTEC relays

### 8.1 SIEMENS-Relays of version 1/2 together with DIGSI V3

An Active Mini-Starcoupler allows the central- or remote interrogation of maximal 5 non-addressable relays from version 1 or version 2 (V1 or V2) together with DIGSI V3. For each relay one optical interface is required. The number of non-addressable relays can be increased up to 128, if several Active Mini-Starcouplers are cascaded over the RS485-bus. The different interface parameters of each relay are set like the parameters of the connected Slave-interfaces. Each relays serial front interface requires a corresponding optical Slave-interface. The channel selection and the operation together with relays V1 and V2 is supported by settings in DIGSI V3.3 for each relay and explained in the manual of DIGSI V3.3.

This application shows how to operate with non-addressable relays V1 or V2. The relays are set with their optimal interface parameters, so each realy is interrogated with it's maximum baudrate. This allows quick central and remote access.

#### Settings for the first Active Mini-Starcoupler

left device nearest at the modem/PC for the configuration shown in fig. 4.

Interface	Chan.	Baud	Data	TimeOut	Light	Ping	Answ.
1	0	9600	8E1	06:00:00	NO	NO	YES
2	2	9600	8E1	05:00:00	NO	-	-
3	3	9600	8N2	05:00:00	NO	-	-
4	4	9600	8N2	05:00:00	NO	-	-
5	5	1200	8N2	05:00:00	NO	-	-
6 (RS485)	0	9600	8E1	06:00:00		NO	YES
7 (RS232)	0	9600	8E1	06:00:00		NO	YES

8 Back to Main Menu



The RS232-interface at port 7 (in fig. 4 named RS232/M0) is set as Master-interface (port number = 0) and is used for the local access from a central PC with DIGSI.

The optical interface at port 1 (in fig.4 FO/MO) is configured as Master-interface and connected with the modem. Through this interface runs the remote interrogation from a PC in the office with a modem to modem link via a telephone dial up connection. If the automatic baud rate adaption in the modem is set, the parameter 'PING' for this interface must be set to 'YES'.

The RS485-interface at port 6 (in fig. 4 named as RS485/M0) is set also as Master-interface and send datas received at the other Master-ports (here 1 or 7) to further Active Mini-Starcouplers. It's the interface for cascading several devices.

The optical interfaces at port 2 – 5 are parametrized as Slave-ports. The settings for the interfaces correspond with the interface settings in the relays. An active data connection between the Master-port 1 (modem) or 7 (RS232) to the relay is switched, if the Slave-interface is selected by it's interface selection string. This functionality is provided by WINDIMOD, the remote interrogation add-on for DIGSI 3.

### Settings for the next Active-Ministarcoupler

located right in fig. 4.

Interface	Chan.	Baud	Data	TimeOut	Light	Ping	Answ.
1	11	9600	8N2	05:00:00	NO	-	-
2	12	1200	8N2	05:00:00	NO	-	-
3	13	1200	8N2	05:00:00	NO	-	-
4	14	9600	8N2	05:00:00	NO	-	-
5	15	9600	8N2	05:00:00	NO	-	-
6 (RS485)	0	9600	8E1	07:00:00		NO	NO
7 (RS232)	0	9600	8E1	07:00:00		NO	NO
8 Back to Main Menu							

The RS232-interface at port 7 (in fig. 4 RS232/M0) is set as Master-interface and only used to set the interface parameters for this device.

The RS485-interface at port 6 (in fig. 4 RS485/M0) is set also as Master-interface. Through this interface runs the data exchange from the first device (left position) to the Slave-interfaces of the right device (in fig. 4 FO/S11 – FO/S15). The port numbers are set to 11 – 15 for this Slave-interfaces via the RS232 interface at the device. The parameter 'Answer' of the Master-interface is set to 'NO'. This avoids data collision on the RS485 bus. Only the Master-interface of the first device (Master – device) replies therefore to a command from the PC with **>REMOTE**.

The optical interfaces at port 1-5 of this device (Slave – device) are set as Slave-interfaces (in fig. 4 FO/S11 – FO/S15). A unique port number is set for each interface (here 11-15). A channel selection string from the PC with a terminal program or from DIGSI V3 is sent through the RS485 Master-interface of the first device (Master – device) to the RS485 Master-interface of the Slave - device. It selects a port there and switches an active serial connection between the Master port 1 or 7 from the Master - device with the selected Slave-port of the Slave - device.

**Note:** please pay attention to the note on the graded timeout times of the master interfaces on page 37.

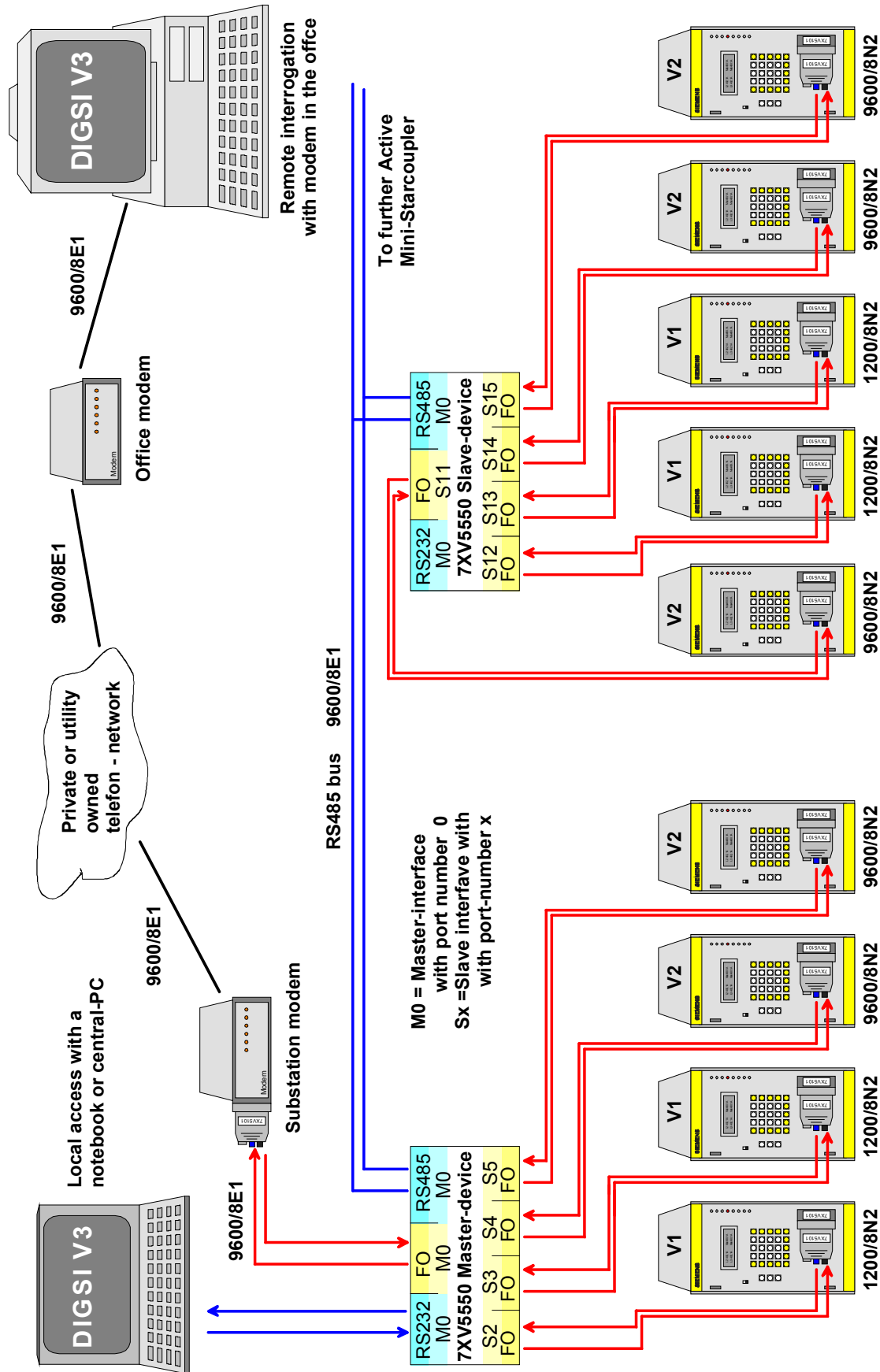


Fig. 4: Operation with relays V1 / V2 together with DIGSI V3

## 8.1.1 Functional limitations with V1 / V2 protection devices

Problems arise when cascading the Mini-Starcoupler via the RS485 interface in conjunction with devices that echo the received signal, or that respond immediately to any received signal. The cause for this is a bus conflict when the channel is released with a „BYE“. The „BYE“ from the pc collides with the data coming from the devices via the half duplex RS485 bus. The termination string „BYE“ is not recognised by all the cascading Mini-Starcouplers. The channel switched through the starcouplers is maintained until the time out.

This behaviour is known in the protection devices e.g.:  
7SJ511, 7SV511, 7VE511, 7VK511.

Before applying the Mini-Starcoupler, the compatibility of the devices must be checked.

### Is my device compatible?

The device may not respond immediately to the string „BYE“ (without ↵). If the device is connected with a pc, the device may not send any characters when the string „BYE“ is sent with the program „Hyper Terminal“.

### Solution!

All critical devices must be connected to the first active Mini-starcoupler. If this is not possible, the cascading of the active Mini-Starcouplers must be with full duplex fibre optic or RS232 interfaces.

#### Note:

The RS232-interfaces are only point to point connections, that must be kept as short as possible.

In the case of extended plants, an alternate cascading with fibre optic and RS232 interfaces is recommended. In this manner, valuable fibre optic interfaces can be saved. The fibre optic connections can cover greater distances, while the RS232 interfaces connect two adjacent active Mini-Starcouplers.

## 8.2 SIEMENS-Relays of version 1/2 and 3 together with DIGSI V3

One Active Mini-Starcoupler allows the central and remote interrogation of max. 4 non addressable relays of version 1 or 2 and with further starcouplers, which are connected to one Slave-interface, up to 250 addressable relays from version 3 can be in the topology. Each relay of version 1/2 needs an optical interface. The number of non addressable relays in a topology can be increased, if several Active Mini-Starcouplers are cascaded with the RS485 bus. The interface parameters of the Slave-interfaces must be set according the settings for the front – interface of the relays. The port selection procedure and the operation with the relays of version 1/2 or 3 is part of DIGSI 3 and comfortable supported by this program. How do set the parameters for DIGSI V3 is written in the DIGSI – manual, which is on the DIGSI – installation CD-ROM as a PDF-file.

In the following application non addressable relays ( V1/2) and addressable relays (V3) can be centrally interrogated with the max. baudrate, allowed for the relays serial interface.

Settings for the Master-device (close to the PC / modem) for the application shown in fig. 5

Interface	Chan.	Baud	Data	TimeOut	Light	Ping	Answ.
1	0	19200	8E1	06:00:00	NO	NO	YES
2	2	1200	8N2	05:00:00	NO	-	-
3	3	9600	8N2	05:00:00	NO	-	-
4	4	9600	8N2	05:00:00	NO	-	-
5	5	19200	8E1	05:00:00	NO	-	-
6 (RS485)	0	19200	8E1	06:00:00		NO	YES
7 (RS232)	0	19200	8E1	06:00:00		NO	YES

8 Back to Main Menu

The RS232-interface at connection point 7 (RS232/M0 in fig. 5) is set as Master-interface (port number 0) and realizes the local, central access to the relays with DIGSI 3. Also the settings of the device are made via this interface.

The optical interface at connection point 1 (FO/M0 in fig. 5) is connected with the modem and set as Master-interface. Through this interface runs the remote interrogation. If the automatic baud rate adaption in the

modem is activated and shall be initiated by this interface, the parameter 'PING' must be set to 'YES'.

The RS485-interface at connection 6 (RS485/M0 in fig. 5) is also set as Master-interface. Data received at the other two Master-interfaces (Connection 1 or 7) are sent to further Active Mini-Starcouplers via this interface.

The optical interfaces at connections 2 – 4 (FO/S2 – FO/S5 in fig. 5) are set as Slave-interfaces. A link between the Master-interface and one of these interfaces is switched by a port selection string from a terminal program or from DIGSI 3, which supports the port selection procedure. Before DIGSI starts the dialogue with a relay the port for the relay is selected.

The optical interface at connection 5 (FO/S5 in fig. 5) is set as Slave-interface. It is switched into the Active Transmission Mode, if one version 3 relay is selected in DIGSI. In DIGSI-remote for the application 'channel-switch' for all V3 relays port 5 must be set. All version 3 relays may have the same port-number, because they are addressable. Only one Slave-interface therefore is necessary for V3 relays.

The Mini Starcoupler shown in fig. 5 which distributes the optical signal from FO/S5 can be substituted by a "Modular Starcoupler" 7XV53. Also further Mini-Starcouplers can be cascaded in a star-topology.

If the front interface of a version 3 relay is used or relays with RS485 interface (e.g. 7SJ600), opto-electrical converters are available to interface from optical to electrical.

## 8.2.1 Operation with DIGSI 4.3x

The protection operation software DIGSI 4.3x now is capable of communicating directly or via active Mini-Starcoupler and via modem with all numerical protection relays provided by Siemens (V1/2/3, SIPROTEC 4). This allows for a substation management and common use of operating tools for selecting devices.

Existing substation management systems from DIGSI V3 may simply be converted to DIGSI 4.3x.

The settings for DIGSI 4 and the operating interface are described in detail in the DIGSI 4 manual.

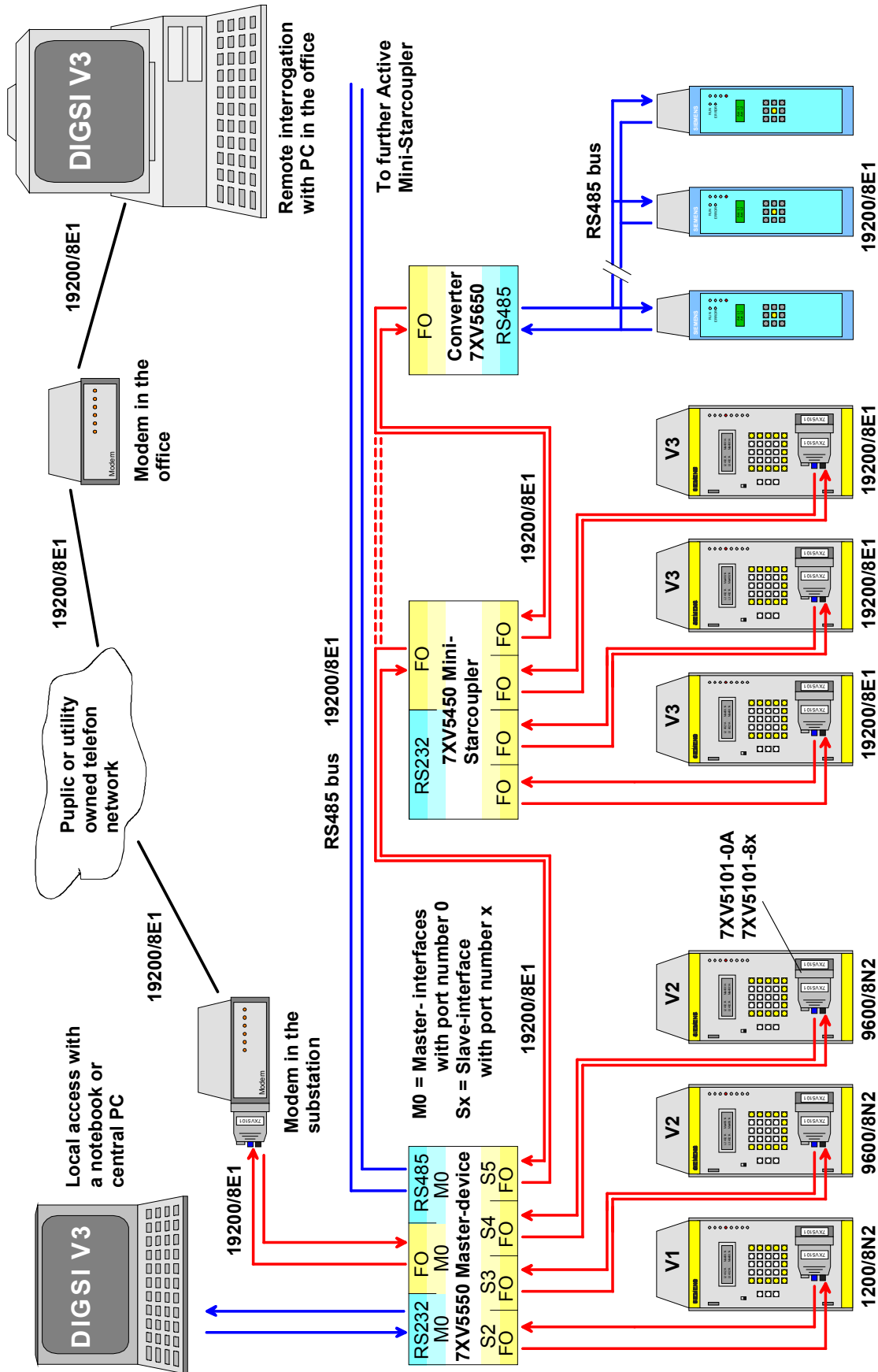


Fig. 5: Operation with relays of version 1/2 and version 3

## 8.3 SIEMENS-Relays of version 1/2/3 and SIPROTEC 4 relays together with DIGSI V3 or DIGSI 4

One Active Mini-Starcoupler allows the central and remote interrogation of max. 4 non addressable relays of version 1 or 2. With further starcouplers or FO/RS485 – converters addressable relays of version 3/4 can be connected to interfaces not used for V1/2 relays.

Each relay of version 1/2 needs an optical interface (see also section 8.2.1). The number of relays non addressable relays in a topology can be increased, if several Active Mini-Starcouplers are cascaded with the RS485 bus. The interface parameters of the Slave-interfaces must be set according the settings for the front – interface of the relays. The port selection procedure and the operation with the relays of version 1/2 or 3 is part of DIGSI 3 and comfortable supported by this program. How do set the parameters for DIGSI V3 is written in the DIGSI V3 – manual, which is on the DIGSI – installation CD-ROM as a PDF-file.

The Active Mini-Starcoupler is not supported by the DIGSI 4 software in the moment. SIPROTEC 4 relays are connected to an optical Master-interface, set as Master-interface. Datas from a modem or a central PC are sent with the max. baudrate of the Master-interfaces to the relays. For V4 relays higher baud rates are recommended (57,6 kBaud) to gain an acceptable performance for the remote interrogation. Further Mini-Starcouplers or other converters can be used to distribute the datas from the optical Master-interface to the relays serial interfaces (front port or rear service port). The max. baudrate recommended for the Master-interface and also set in the relays is 57,6 kBaud.

### Settings for the Master-device

close at the modem for the application in fig. 6:

Interface	Chan.	Baud	Data	TimeOut	Light	Ping	Answ.
1	0	57600	8N1	06:00:00	NO	NO	YES
2	2	1200	8N2	05:00:00	NO	-	-
3	3	9600	8N2	05:00:00	NO	-	-
4	4	19200	8E1	05:00:00	NO	-	-
5	0	57600	8N1	06:00:00	NO	NO	YES
6 (RS485)	0	57600	8N1	06:00:00		NO	YES
7 (RS232)	0	57600	8N1	06:00:00		NO	YES
8 Back to Main Menu							



The RS232-interface at connection point 7 (RS232/M0 in fig. 5) is set as Master-interface (port number 0) and realizes the local, central access to the relays with DIGSI. Also the settings of the device are made via this interface.

The optical interface at connection 1 (FO/M0 in fig. 6) is connected with the modem and set as Master-interface. Through this interface runs the remote interrogation. Because a lot of standard modems do not support 8E1 data frame the interface is set to 8N1, which is meanwhile a standard for modem connections. On the modem link features like data-compression and fault correction can be used in the modems to speed up the dial up connection. If the automatic baud rate adaption in the modem is activated and shall initiated by this interface, the parameter PING must set to YES.

The RS485-interface at connection 6 (RS485/M0 in fig. 6) is also set as Master-interface. Datas received at the other two Master-interfaces (Connections 1 or 7) are sent to further Active Mini-Starcouplers via this interface.

The optical interfaces at connections 2 – 4 (FO/S2 – FO/S5 in fig. 6) are set as Slave-interfaces. The connection between the Master-interface and one of this interfaces is switched by a port selection string from a terminal program or from DIGSI 3, which supports the port selection procedure for relays of version 1/2/3. Before DIGSI 3 start the dialogue with a relay the port for the relay is selected. Instead of connecting the optical interface of the relay V3 at FO/S4 – interface, a Mini-Starcoupler can be connected to this interface. Thus allow the operation to several V3 relays via this port, which must be selected with the same port number 4 in DIGSI 3.

The optical interface at connection point 5 (FO/M0 in fig. 6) is set as Master-interface. Because SIPROTEC 4 relays are addressable further devices can be connected with Mini Starcouplers or optical / RS485 converters. Instead of the Mini Starcoupler 7XV5450 a modular starcoupler can be used.

**Note!** Baudrates higher then 38,4 kBaud on the Master-interface are not supported from DIGSI V3.32 / V3.34. It's not allowed to start DIGSI 3 and DIGSI 4 in parallel on the PC if you are ONLINE with the relays. The serial PC interface belongs to one of the DIGSI-software applications.

### **8.3.1 Operation with DIGSI 4.3x**

Refer to section 8.2.1

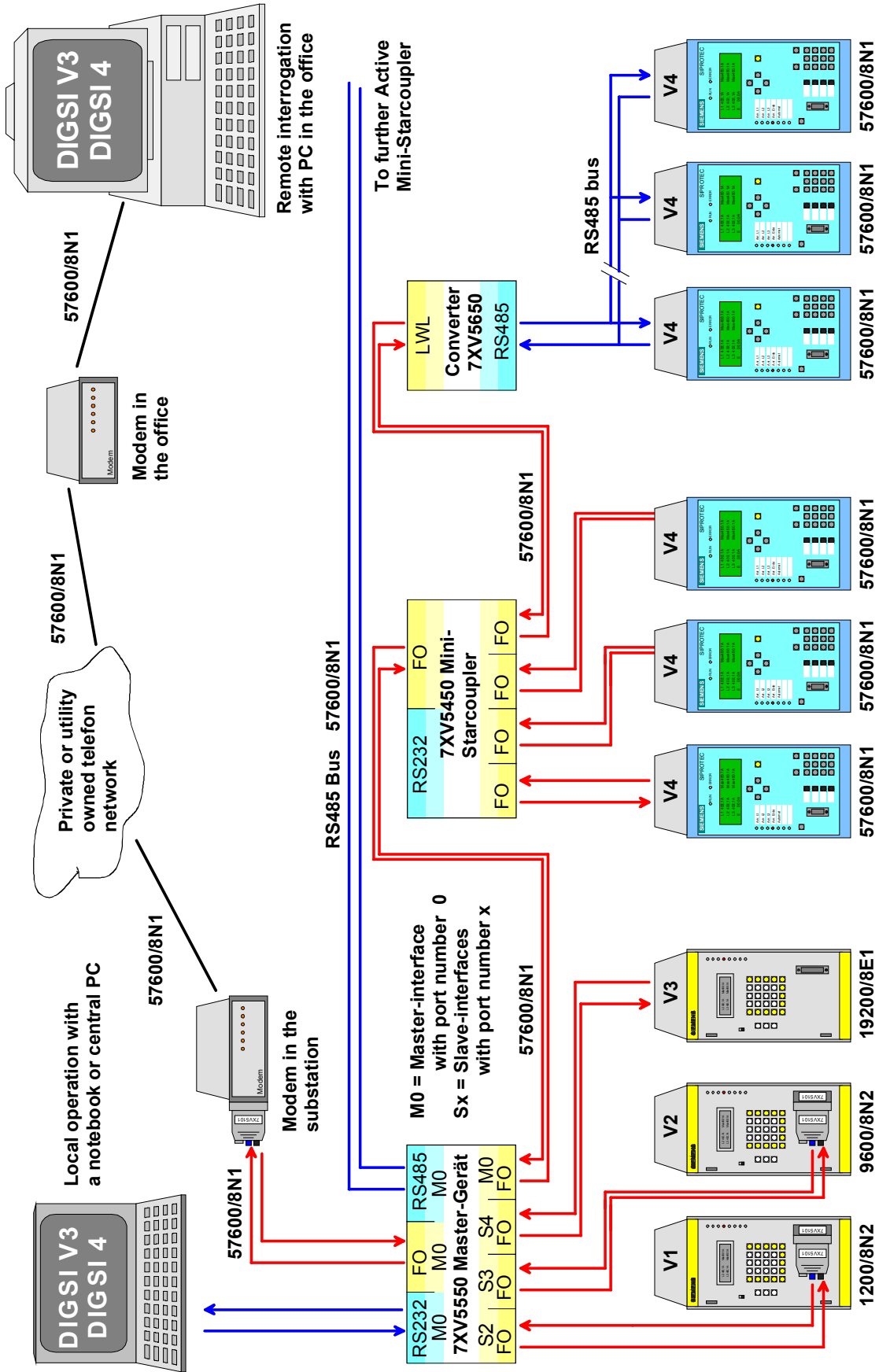


Bild 6: Operation with relays V1/2, V3 and SIPROTEC 4 relays

**EG-Konformitätserklärung**

EC Declaration of Conformity  
G34924-L2003-U100-B2/ 01.01

Hersteller: Siemens Aktiengesellschaft  
*Manufacturer:* Bereich Anlagenbau und Technische Dienstleistungen ATD  
 Technische Dienstleistungen TD

Anschrift: Siemensstraße 33  
*Address:* D - 71254 Ditzingen  
 Bundesrepublik Deutschland

Produkt-  
 bezeichnung: Aktiver MiniSternKoppler 7XV5550 - 0AA00 / -0BA00  
*Product*  
 description Active MiniStarCoupler 7XV5550 - 0AA00 / -0BA00

**Das bezeichnete Produkt stimmt in der von uns in Verkehr gebrachten Ausführung mit den Vorschriften folgender Europäischer Richtlinien überein:**

*The product described above in the form as delivered is in conformity with the provisions of the following European Directives:*

89/336/EWGRichtlinie des Rates zur Angleichung der Rechtsvorschriften der Mitgliedstaaten über die elektromagnetische Verträglichkeit  
 (geändert durch 91/263/EWG, 92/31/EWG, 93/68/EWG und 93/97/EWG).

*Council Directive on the approximation of the laws of the Member States relating to electromagnetic compatibility (amended by 91/263/EEC, 92/31/EEC, 93/68/EEC and 93/97/EEC)*

73/23/EWGRichtlinie des Rates zur Angleichung der Rechtsvorschriften der Mitgliedstaaten betreffend elektrische Betriebsmittel zur Verwendung innerhalb bestimmter Spannungsgrenzen (geändert durch 93/68/EWG)

*Council Directive on the approximation of the laws of the Member States related to electrical equipment designed for use within certain voltage limits (amended by 93/68/EEC)*

CE-Kennzeichnung / *CE marking* : 99

Die Konformität mit den Richtlinien wird nachgewiesen durch die Einhaltung folgender Normen:

*Conformity to the Directives is assured through the application of the following standards:*

Referenznummer <i>Reference number</i>	Ausgabedatum <i>Edition</i>	Referenznummer <i>Reference number</i>	Ausgabedatum <i>Edition</i>
EN 50081-1	1992	EN 50082-2	1995
EN 60950	1997	EN61010	1993

Ditzingen, den / *the* 14. Januar 2002  
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*This declaration certifies the conformity to the specified directives but contains no assurance of properties. The safety documentation accompanying the product shall be considered in detail*

If you have any notes or questions on this product please contact us under the following address:

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<http://www.SIPROTEC.com>.

or please register you for our Download Area which is part of our WEB-site, where also the latest version of this manual is available as a PDF-file.