Telecontrol

TIM 3V-IE

Overview

- SINAUT communications module TIM for SIMATIC S7-300 for use in a wide area network (WAN)
- IP communication via secure VPN (virtual private network) using the Internet NEW
- Wireless communication via GPRS router, GPRS modem, or radio devices
- Wired communication via Ethernet, DSL, dialup modems or dedicated line modem
- Complete migration of existing wireless, dedicated line and dial-up technology to IP-based network
- Message frame memory for complete recording of data
- Simple configuration and operation without specialist IT knowledge

Benefits

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- Flexible option for connection to any IP-based or conventional WAN
- Economical station design and low connection costs due to GPRS connection with the MD720-3 and utilizing the S7-CPUs 312 and 312C
- No additional mobile phone service for fixed IP addresses or contracts for private GPRS networks with bidirectional data traffic are necessary, as the VPN is integrated in the ST7 system. No more expensive and complex VPN configuration by IT specialists.
- Saving of traveling costs due to cost-effective remote programming, diagnostics, control and monitoring via the Internet
- Reduction in time and costs thanks to quick and user-friendly configuration of connections and data to be transferred with the SINAUT configuring software and block library
- Reliable storage of important data. Storage of data message frames (max. 16,000) including time stamp on TIM if the communication path is faulty or a partner has failed and to reduce connection costs for the dial-up network.
- Protection of investment for existing SINAUT ST1 systems through the integration of the SIMATIC S7-300 by means of ST1-compatible communication

Application

- Low-cost automation of water/wastewater networks with both complex and simple structures
- Control and monitoring of energy distribution systems and supply stations, such as oil, gas or district heating networks
- Preventive maintenance (condition monitoring) of globally distributed systems
- Monitoring of logistics and traffic control systems
- Connection of plants with basic or high-level security and availability requirements
- Use in hybrid networks with dialup, wireless, Ethernet or Internet communication

Design

The TIM 3V-IE offers all the advantages of the SIMATIC S7-300 design:

- Compact design
- 9-pin Sub-D connector with an RS232 interface for connection to a conventional WAN via an appropriate modem
- RJ45 socket for connection to Industrial Ethernet or an IP-based network;
  industry-standard design with additional sleeve for connecting the IE FC RJ45 Plug 180
- 2-pin plug-in terminal strip for connection of the 24 V DC external supply voltage
- Front LEDs for indicating the module status and the communication
- Simple installation;
  the TIM 3V-IE is mounted on the rail of the S7-300 and connected to the adjacent modules by means of the bus connectors supplied with the TIM. No slot rules apply.
- Can be operated in the expansion rack (ER) in conjunction with the IM 360/361
- Can be operated without a fan
- A battery backup or memory module are not required

Function

- The TIM 3V-IE enables a SIMATIC S7-300 to exchange data with other SINAUT ST7 or ST1 partners via any SINAUT network. The important SINAUT property – saving data complete with a time stamp on the TIM in the event of an interrupted link or failure of the partner – is then available not only for conventional WANs, but also for IP-based networks. Important events, alarms, etc. are not lost and the integrity of information in control center system archives is assured.
- The TIM 3V-IE module is particularly suitable for configuring low-cost stations, but also allows a simple S7-300 control center to be implemented. The module cannot be used in a SINAUT node station or combined with other TIMs in a control center.
- The SINAUT TD7 software for the CPU (TD7onCPU) is now integrated in the TIM 3V-IE (TD7onTIM). This enables the smallest S7 CPUs 312 and 312C to be used, because in the most favorable situation, no CPU RAM is required any more for SINAUT. (This does not apply to communication with SINAUT ST1 partners or the transmission of text messages; in these cases, the SINAUT TD7 software must be used for the CPU (TD7onCPU). One TIM 3V-IE can be used per S7-300 and one of the two interfaces (RS232 or RJ45) can be used for SINAUT communication (not both simultaneously). PG communication is possible at any time over the Ethernet interface.
- Message frame memory for up to 16000 data message frames
- Up to eight S7 connections via IP-based networks

Controllable communication modules:

- Control of the GSM/GPRS modems MD720-3 in GSM or GPRS mode. In GPRS mode, simple 128-bit encryption via the MD720-3 (MSC-VPN tunnel protocol). NEW
- Operation via SIMATIC NET Ethernet components with high IPsec security standard (e.g. GPRS router or SCALANCE S)
- Use of SCALANCE fiber-optic switches for spanning long distances
- Wireless transmission via IWLAN with SCALANCE W over medium distances
- Dedicated line modem MD2 for point-to-point, point-to-multipoint or line connections
- Wireless devices from various manufacturers, also for private mobile radio using the time slot method
- Analog dial-up modem MD3 for the analog telephone network or point-to-point dedicated lines
- ISDN modem MD4 for connecting to the ISDN network

Integration

Connection to IP-based networks

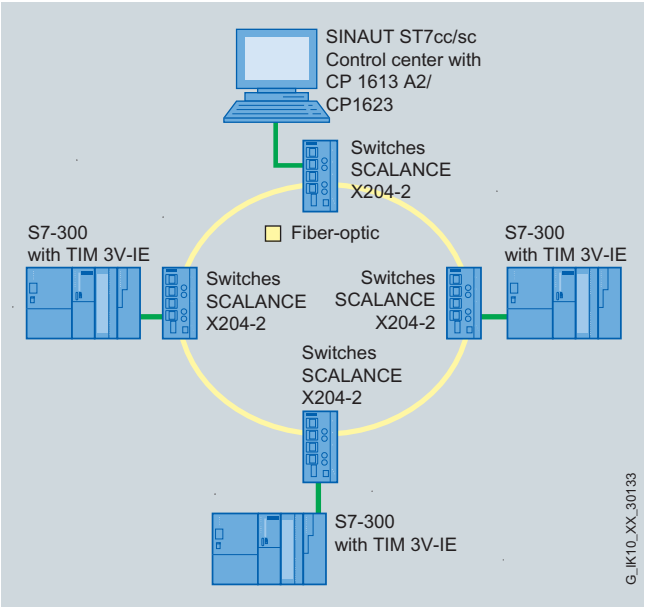
In addition to the RS232 interface, the TIM 3V-IE also has an RJ45 socket. This is suitable for the connection of IP-based networks (WAN or LAN). Depending on the application, various types of data communication equipment can be connected such as:

- SCALANCE X switches for Twisted Pair cable or fiber-optic cables
- SCALANCE W (IWLAN) and Ethernet radio devices from various manufacturers
- SINAUT MD741-1 for GPRS communication and EGPRS (EDGE) over mobile telephone networks
- SINAUT MD720-3 for GPRS communication over mobile telephone networks
- DSL router and SCALANCE S
- Broadband systems such as OTN and PCM30

Configuration examples in IP-based networks

Connection via switches, e.g. SCALANCE X

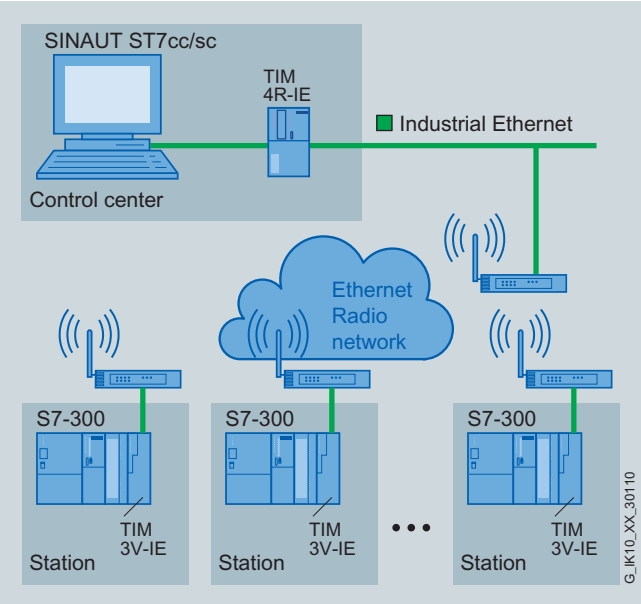
Simple network structures can be built up in this manner, or complex ones that comprise a combination of star, line and ring structures. At the control desk (ST7cc or ST7sc) the use of a TIM 4R-IE is not necessary, i.e. the connection is made directly to the Ethernet interface of the PC.



Integration (continued)

Wireless with Ethernet

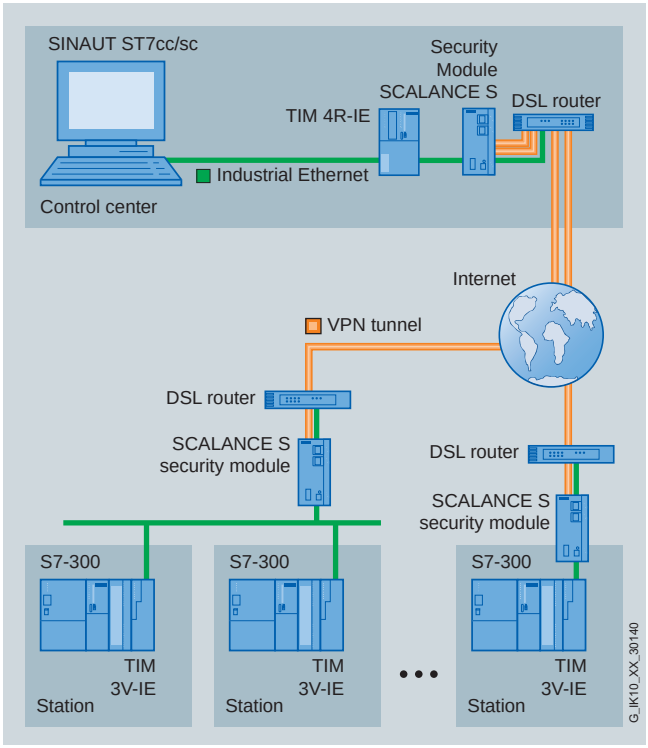
When wired Ethernet communication is not possible, a wireless network can be installed using commercially available Ethernet wireless modems or with IWLAN. In order to disconnect the networks, the connection in the control center can be made via a TIM 4R-IE or, as in the example, directly to the Ethernet interface of the PC.



Transmission over DSL

The continuously falling flat rates for DSL connections make this medium an interesting alternative to a leased line or also a telephone connection. DSL routers must be used in the station and control center, preferably routers in combination with SCALANCE S (VPN), in order to establish secure connections using VPN tunnels. A permanent IP address is recommended for DSL connection of the control center, the IP addresses of the stations can be dynamically assigned.

In order to decouple the networks, the connection in the control center can be made via a TIM 4R-IE or directly to the Ethernet interface of the PC.



Transmission over the GPRS mobile telephone service

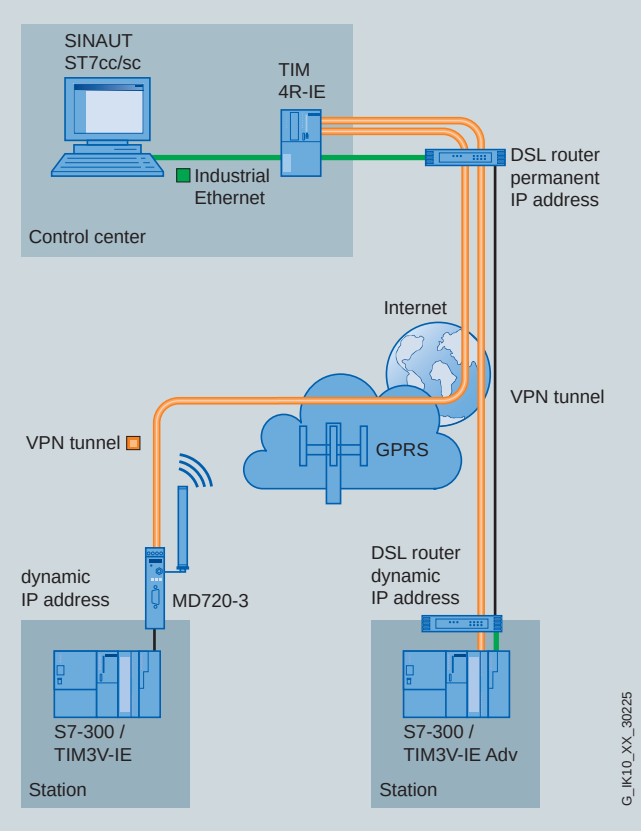
Continuous coverage of GPRS in many countries as well as inexpensive volume tariffs allow wireless connection of stations to the control desk without the need to create a separate radio network for this purpose. The stations can be either stationary or mobile.

The wireless connection is constantly online and therefore has the same properties as a dedicated line: Data changes can be transferred immediately and station or connection failures are detected at an early stage.

Integration (continued)

GPRS with simple stations: NEW

The GSM/GPRS modem MD720-3 or a TIM3V-IE Advanced with DSL router is used in the stations. The simple VPN protocol MSC of the MD720-3 permits communication via GPRS access and Internet and via routers with NAT or NAPT conversion. The MSC tunnel connections correspond to dedicated lines that are permanently maintained with extremely low volumes of data. When using the MSC tunnel, a TIM4R-IE must be used as a header station at which the tunnels end. The parameter setting of the MSC connection is performed in the SINAUT ST7 configuration software.

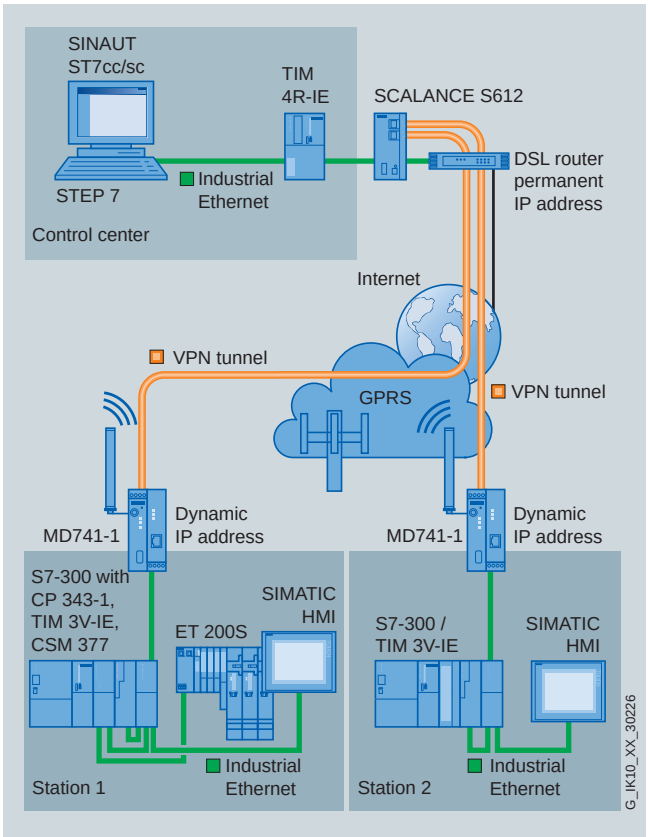


GPRS with complex stations and enhanced security:

The EGPRS router MD741-1, which is a combination of high-speed GPRS VPN router with enhanced data security (IPsec protocol) and firewall, is used in networked stations. In the stations, other devices connected via Industrial Ethernet to the MD741-1 for diagnosis and parameterization can be accessed from the control center.

The control desk PC must be constantly accessible from the GPRS network. It must therefore be directly connected to the GPRS provider using a dedicated line or permanently to the Internet, e.g. by means of DSL. A SCALANCE S612 or S613 Security Module performs the firewall function at the control desk and represents the remote stations for the VPN connections of the GPRS stations. The VPN is configured with the SIMATIC NET "Security Configuration Tool" and requires no special IT knowledge.

The IP address of the control center should preferably be permanent; those of the stations can be dynamically assigned.



Integration (continued)

Connection to a conventional WAN

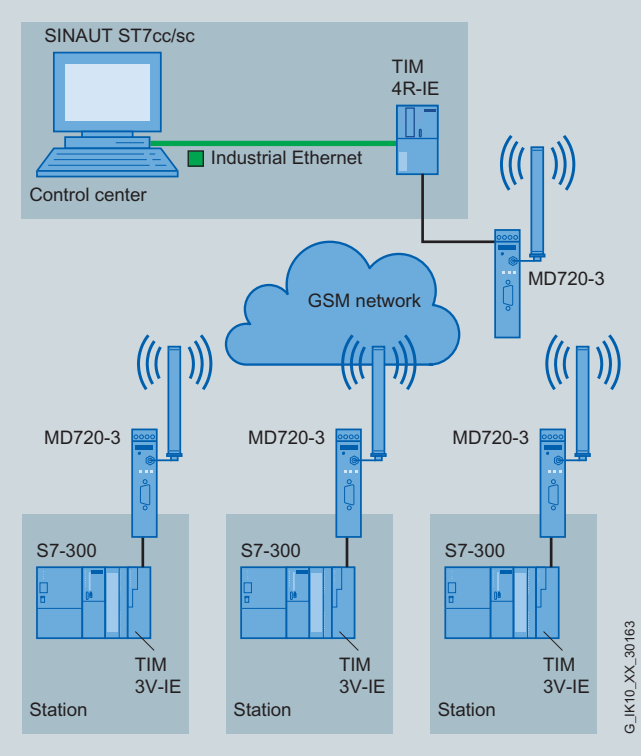
Connection to a conventional WAN is via the floating RS232 interface of the TIM 3V-IE module, via which various modems or data communication equipment can be connected, depending on the application, such as:

- Dedicated line modem MD2 for point-to-point, point-to-multi-point or line connections
- Wireless devices from various manufacturers, also for private mobile radio using the time slot method
- Analog dial-up modem MD3 for the analog telephone network or point-to-point dedicated lines
- ISDN modem MD4 for connecting to the ISDN network
- GSM modem MD720-3 for access to the mobile radio network via dial-up lines

Configuration examples in the conventional WAN

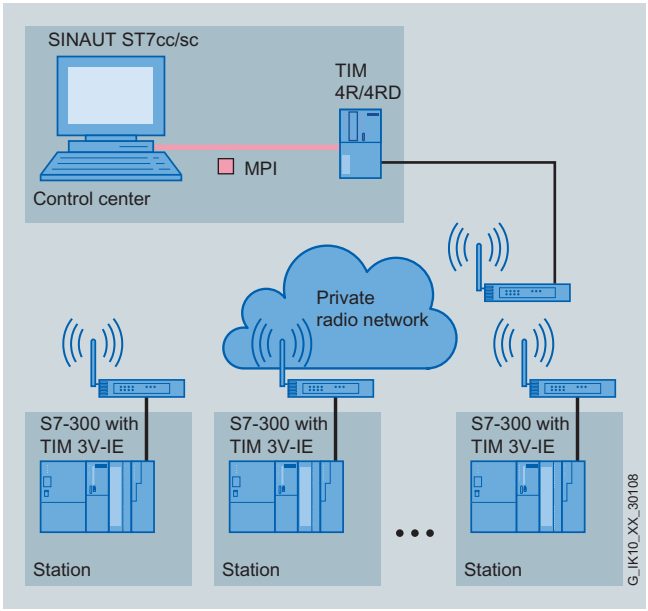
Use of the TIM 3V-IE in the mobile radio network (GSM)

The GSM modem MD720-3 is used for this purpose. At the control desk (ST7cc or ST7sc), it is connected through a TIM 4 module (e.g. TIM 4R-IE) that is connected to the PC via the Industrial Ethernet. The connections between the GSM modems are set up via GSM dial-up lines.



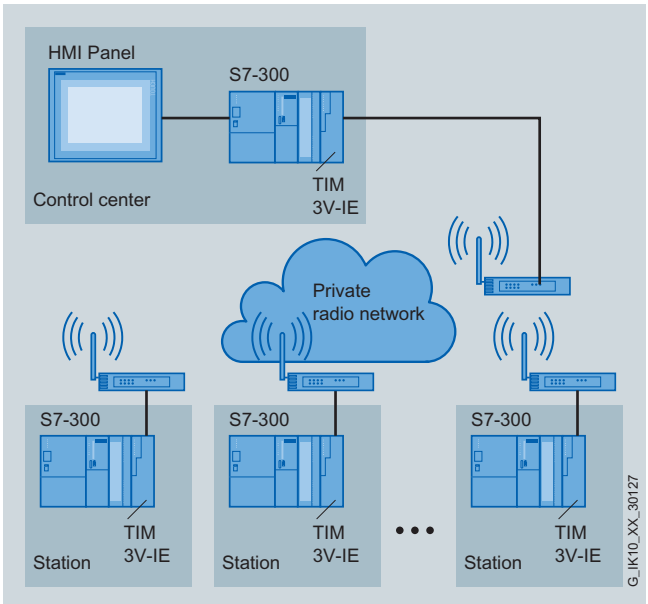
Use of the TIM 3V-IE in a private radio network

The radio network must be installed in accordance with the radio equipment that is approved in the relevant country (radio equipment is not included in the SINAUT product range). At the control desk (ST7cc or ST7sc), it is connected through a TIM 4 module (e.g. TIM 4R) that is connected to the PC via MPI. If a radio network is set up with time slot procedure, the TIM 4RD with DCF77 radio clock receiver must be used at the control desk.



Use of the TIM 3V-IE in a control center

In this case an S7-300 with a TIM 3V-IE forms the control desk. If a radio network with time slot procedure is set up, the TIM 3V-IE at the control desk must be replaced by a TIM 4RD with DCF77 radio clock receiver.



Technical specifications

Order No.	6NH7 800-3BA00
Product type designation	**TIM 3V-IE**
Data transmission rate	
• With Industrial Ethernet	10 … 100 Mbit/s
• In accordance with RS 232	50 … 38 400 bit/s
Interfaces	
Number of interfaces in accordance with Industrial Ethernet	1
Number of electrical connections	
• For external data transmission in accordance with RS 232	1
• For power supply	1
Design of electrical connection	
• of the Industrial Ethernet interface	RJ45 port
• at interface 1 for external data transmission	9-pin D-sub male connector (RS232)
• at interface 2 for external data transmission	–
• For power supply	2-pin, pluggable terminal strip
Design of the swap medium C-Plug	No
Supply voltage, current consumption, power loss	
Type of power supply	DC
Power supply	24 V
• Minimum	20.4 V
• Maximum	28.8 V
Current consumed	
• Maximum from backplane bus for 24 V DC	0.2 A
• Maximum from external power supply for 24 V DC	0.2 A
Effective power loss	5.8 W
Product expansion: optional backup battery	No
Permissible ambient conditions	
Ambient temperature	
• During operating phase	0 … 60 °C
• During storage	-40 … +70 °C
• During transport	-40 … +70 °C
Relative humidity at 25 °C without condensation during operating phase, maximum	95 %
IP degree of protection	IP20
Design, dimensions and weights	
Module format	Compact module S7-300, single-width
Width	40 mm
Height	125 mm
Depth	120 mm
Net weight	0.2 kg

Order No.	6NH7 800-3BA00
Product type designation	**TIM 3V-IE**
Product properties, functions, components, general	
Number of modules - Note	Number of TIM per S7-300: 1
Cable length	
• Maximum with RS232 interface	6 m
• Maximum with RS485 interface	–
Performance data	
Performance data S7 communication	
Number of possible connections for S7 communication	
• Maximum	12
• For PG connections, maximum	4
• For OP connections, maximum	8
Service	
• SINAUT ST7 using S7 communication	Yes
• PG/OP communication	Yes
Performance data Multiprotocol operation	
Number of active connections for multiprotocol operation	12
Performance data Telecontrol	
Suitability for use	
• TIM node station	No
• TIM station	Yes
• TIM control center	No
Suitability for use - Note	RS232 and Industrial Ethernet cannot be used simultaneously
Protocol is supported	
• TCP/IP	Yes
• SINAUT ST1 protocol	Yes
• SINAUT ST7 protocol	Yes
Number of data frames which can be saved on the TIM	16 000
Storage capacity of S7 CPU's main memory	
• Required on CPU for TD7onCPU mode data blocks	20 Kibyte
• Required on TIM for TD7onTIM mode data blocks	0 Kibyte
Storage capacity - Note	TD7onCPU: at least 20 Kibyte, actual requirement depends on data quantity and functional scope TD7onTIM: 0 byte in most favorable case
Product property: buffered message frame memory	No
Transmission format	
• 11 bit for SINAUT ST1 protocol with polling	Yes
• 10 or 11 bit for SINAUT ST1 protocol with spontaneous sampling	Yes
• 10 bit for SINAUT ST7 protocol with multi-master polling	Yes
• 10 or 11 bit for SINAUT ST7 protocol with polling or spontaneous sampling	Yes

TIM 3V-IE

Technical specifications

Order No.	6NH7 800-3BA00
Product type designation	**TIM 3V-IE**
Operating mode with scanning of data transmission	
• With dedicated line/radio link	
- With SINAUT ST1 protocol	Polling, polling with time slot procedure
- With SINAUT ST7 protocol	Polling, polling with time slot procedure, multi-master polling with time slot procedure
• With dial-up network	
- With SINAUT ST1 protocol	Spontaneous
- With SINAUT ST7 protocol	Spontaneous
Hamming distance	
• For SINAUT ST1 protocol	4
• For SINAUT ST7 protocol	4
Product functions Management, configuration, programming	
configuration software required	SINAUT ST7 ES
Storage location of TIM configuration data	On the CPU

Order No.	6NH7 800-3BA00
Product type designation	**TIM 3V-IE**
Product functions Security Virtual Private Network	
Suitability for use of Virtual Private Network	Yes
Product function	
• Password protection for VPN	Yes
• MSC client via GPRS modem with MSC capability	Yes
MSC protocol is supported	No
Number of possible connections	
• As MSC client with VPN connection	1
• As MSC server with VPN connection	0
MSC protocol supported with Virtual Private Network	
Key length for MSC with Virtual Private Network	128 bit
Type of authentication with Virtual Private Network PSK	Yes
Virtual Private Network mode - Note	VPN mode as MSC client with MSC protocol and password protection only possible together with GPRS modem with MSC capability

Ordering data

	Order No.
TIM 3V-IE communications module With an RS232 interface for SINAUT communication via a conventional WAN or an IP-based network (WAN or LAN)	**6NH7 800-3BA00**
SINAUT ST7 Engineering Software Edition 09/2009 on CD-ROM, comprising: • SINAUT ST7 configuration and diagnostics software V5.0 for the programming device • SINAUT TD7 function block library V2.2 for the CPU • Electronic manual in German and English	**6NH7 997-0CA50-0AA0**
SINAUT ST7 Engineering Software Edition 09/2009 (Upgrade) for STEP 7 V5.4 SP4, for owners of previous versions of SINAUT ST7 Engineering Software	**6NH7 997-0CA50-0GA0**
IE FC RJ45 Plug 180 RJ45 plug-in connector for Industrial Ethernet with a rugged metal housing and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface	
• 1 pack = 1 unit	**6GK1 901-1BB10-2AA0**
• 1 pack = 10 units	**6GK1 901-1BB10-2AB0**
• 1 pack = 50 units	**6GK1 901-1BB10-2AE0**

	Order No.
Connecting cable For connecting a TIM (RS232) with a SINAUT ST7 MD2, MD3 or MD4 (RS232) modem; cable length 1.5 m	**6NH7 701-4AL**
Connecting cable For connecting a TIM (RS232) with the GSM modem MD720-3; also suitable for third-party modems or radio equipment with standard RS232 interface; cable length 2.5 m	**6NH7 701-5AN**
Connecting cable with one end open for connecting a TIM (RS232) to a third-party modem or radio unit (RS232); cable length 2.5 m	**6NH7 701-4BN**
Connecting cable For connecting two TIM modules via their RS232 interface without modems ("null modem"); cable length 6 m	**6NH7 701-0AR**

Overview

- SINAUT communications module TIM for SIMATIC S7-300 for use in wide area network (WAN) as station, node station, and control center
- IP communication via secure VPN (virtual private network) using the Internet NEW
- Wireless communication via GPRS router, GPRS modem or radio devices
- Wired communication via Ethernet, DSL, dialup modems or dedicated line modem
- Complete migration of existing wireless, dedicated line and dial-up technology to IP-based network
- Message frame memory for complete recording of data and support of redundant communication paths
- Simple configuration and operation without specialist IT knowledge

Benefits

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- Flexible option for connection to any conventional or IP-based WAN
- Low-cost station setup by means of direct connection to DSL router or GPRS via MD720-3 modem and use of the S7-CPUs 312 and 312C, because the SINAUT TD7 CPU software is integrated in the TIM 3V-IE Advanced. (This does not apply to communication with SINAUT ST1 partners and to the transmission of text messages; in this case the SINAUT TD7 software for the CPU (TD7onCPU) must be used, i.e. this software can still be used together with the TIM 3V-IE Advanced.)
- No additional mobile phone service for fixed IP addresses or contracts for private GPRS networks with bidirectional data traffic are necessary, as the VPN is integrated in the ST7 system. No more expensive and complex VPN configuration by IT specialists.
- Saving of traveling and maintenance costs due to cost-effective remote programming, diagnostics, control and monitoring via the Internet
- Reduction in time and costs thanks to quick and user-friendly configuration of connections and data to be transferred with the SINAUT configuring software and block library
- High availability of the connections due to possible redundant design of the communication paths
- Reliable storage of important data. Storage of data message frames (max. 32,000) including time stamp on TIM if the communication path is faulty or a partner has failed and to reduce connection costs for the dial-up network.

Application

- Low-cost automation of water/wastewater networks with both complex and simple structures
- Control and monitoring of energy distribution systems and supply stations, such as oil, gas or district heating networks
- Preventive maintenance (condition monitoring) of globally distributed systems
- Monitoring of logistics and traffic control systems
- Connection of plants with basic or high-level security and availability requirements
- Use in hybrid networks with dialup, wireless, Ethernet or Internet communication

Design

The TIM 3V-IE Advanced offers all the advantages of the SIMATIC S7-300 design:

- Compact construction;
  single standard width of the SIMATIC S7-300 SM modules
- 9-pin Sub-D connector with an RS232 interface for connection to a conventional WAN via an appropriate modem
- RJ-45 socket for connection to Industrial Ethernet; or an IP-based network;
  industrial design with additional sleeve for inserting the IE FC RJ45 Plug 180
- 2-pin plug-in terminal strip for connection of the 24 V DC external supply voltage
- Front LEDs for indicating the module status and the communication
- Easy to mount;
  the TIM 3V-IE Advanced is mounted on the S7-300 mounting rail and connected to adjacent modules by means of the bus connectors. No slot rules apply.
- Can be operated in the expansion rack (ER) in conjunction with the IM 360/361
- Can be operated without a fan
- A battery backup or memory module are not required

TIM 3V-IE Advanced

Function

- The TIM 3V-IE Advanced enables one or more SIMATIC S7-300 or control center PCs (SINAUT ST7cc or ST7sc) to exchange data with other SINAUT ST7 or ST1 partners via any one or two SINAUT networks. The two networks can also be operated in redundant combination. The important SINAUT property – saving data complete with a time stamp on the TIM in the event of an interrupted link or failure of the partner – is then available not only for conventional WANs, but also for IP-based networks. Important events, alarms, etc. are not lost and the integrity of information in control center system archives is assured.
- For setting up more complex control centers or node stations, several TIM 3V-IE Advanced modules can be used for each S7-300. A combination with additional TIM 3 and TIM 4 versions in the same rack is possible here.
- SINAUT ST7 and thus also the TIM 3V-IE Advanced are designed for data transmission via the widest range of WANs or combinations of WANs. Mixed networks comprising classical SINAUT WAN networks (dedicated line, wireless, dial-up network) and IP-based networks (fiber optic, DSL, GPRS, Internet etc.) can be configured uniformly using SINAUT, which saves both time and money.
- For communication via the Internet, the integrated MSC-VPN tunnel protocol for direct access to DSL routers can be used (MSC client). For communication via GPRS, either the router MD741-1 can be connected to the IE interface (VPN IPsec) or the GSM/GPRS modem MD720-3 (MSC-VPN) to the RS232 interface. NEW
- PG communication is possible at any time in parallel with the data communication
- Several TIM 3V-IE Advanced modules can be used for each S7-300
- Message frame memory for up to 32000 data message frames
- Up to twenty S7 connections via IP-based networks

Controllable communication modules:

- Control of the GSM/GPRS modems MD720-3 in GSM or GPRS mode. In the GPRS mode simple 128-bit encryption via the MD720-3 (MSC-VPN tunnel protocol)
- Operation via SIMATIC NET Ethernet components with high IPsec security standard (e.g. GPRS router or SCALANCE S)
- Direct operation on a DSL router by means of MSC tunnel protocol
- Use of SCALANCE fiber-optic switches for spanning long distances
- Wireless transmission via IWLAN with SCALANCE W over medium distances
- Dedicated line modem MD2 for point-to-point, point-to-multipoint or line connections
- Wireless devices from various manufacturers, also for private mobile radio using the time slot method
- Analog dial-up modem MD3 for the analog telephone network or point-to-point dedicated lines
- ISDN modem MD4 for connecting to the ISDN network

Integration

Connection to IP-based networks

In addition to the RS232 interface, the TIM 3V-IE Advanced also has an RJ45 socket. This is suitable for the connection of IP-based networks (WAN or LAN). Depending on the application, various types of data communication equipment can be connected such as:

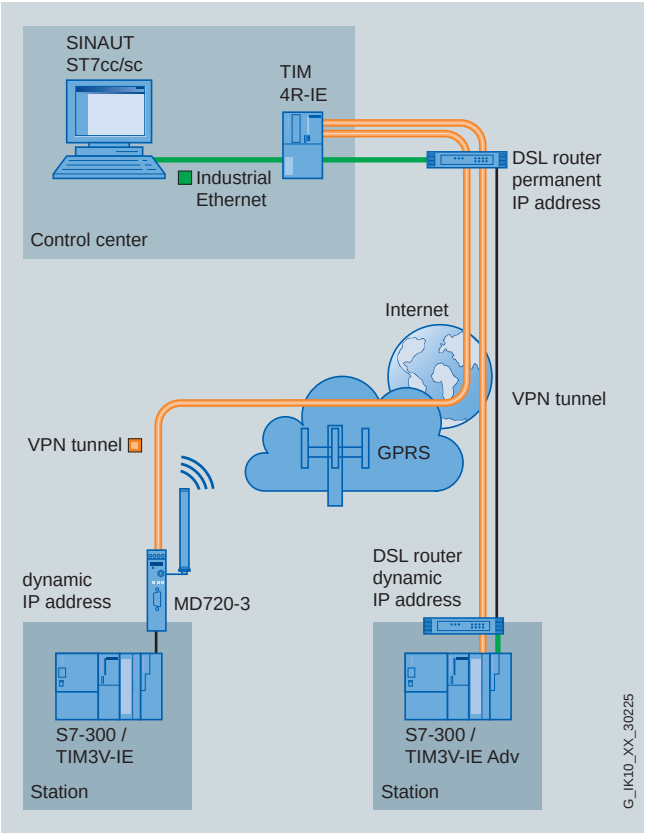
- SCALANCE X switches for Twisted Pair cable or fiber-optic cables
- SCALANCE W (IWLAN) and Ethernet radio devices from various manufacturers
- SINAUT MD741-1 for GPRS communication and EGPRS (Edge) over mobile telephone networks
- SINAUT MD720-3 for GPRS communication over mobile telephone networks
- DSL router and SCALANCE S for VPN (IPsec)
- Directly on a DSL router by means of MSC-VPN tunnel protocol integrated in the TIM NEW
- Broadband systems such as OTN and PCM30

Configuration examples with TIM 3V-IE Advanced

Use as a station

The TIM3V-IE Advanced can be used as a station like a TIM3V-IE. In addition, transmission is possible via the direct connection of the TIM to a DSL router (MSC tunnel).

By means of the MSC tunnel protocol (MSC client) integrated in the TIM3V-IE Adv, a connection can be operated via IE and a DSL router to a TIM4R-IE that terminates the MSC tunnel protocol.

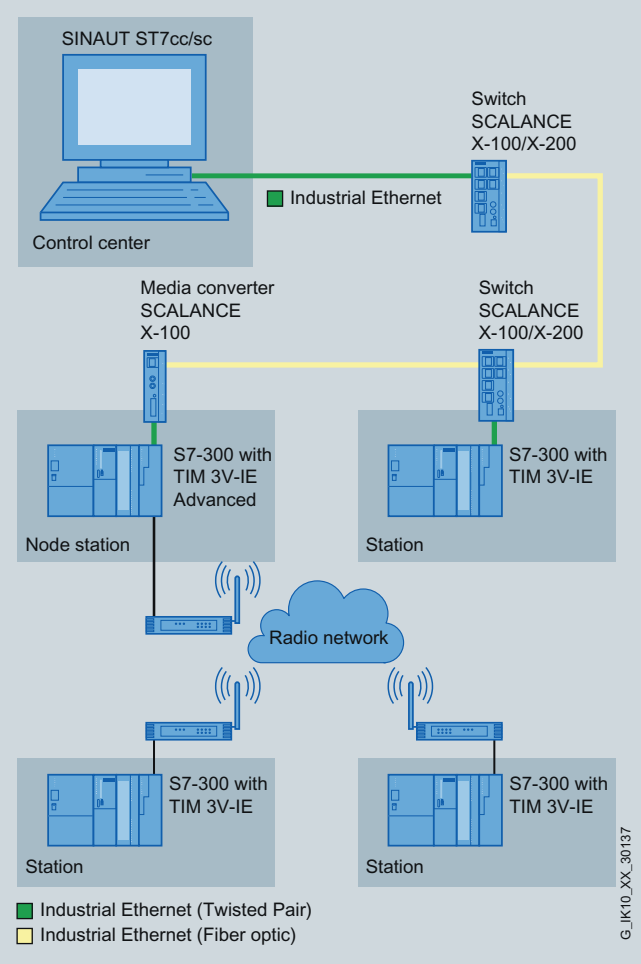


Integration (continued)

Use in a node station

When used in a node station, TIM 3V-IE Advanced can, for example, exchange data over its RS232 interface over a radio network with the lower-level stations. It is then connected to the control desk over the RJ45 interface, e.g. over a fiber-optic cable, that is connected through SCALANCE X switches. In this configuration, data can be exchanged between each of the SINAUT stations regardless of which network they are situated in.

In this case, in order to disconnect the networks, the connection in the control center can be made via a TIM 4R-IE or, as in the example, directly to the Ethernet interface of the PC.

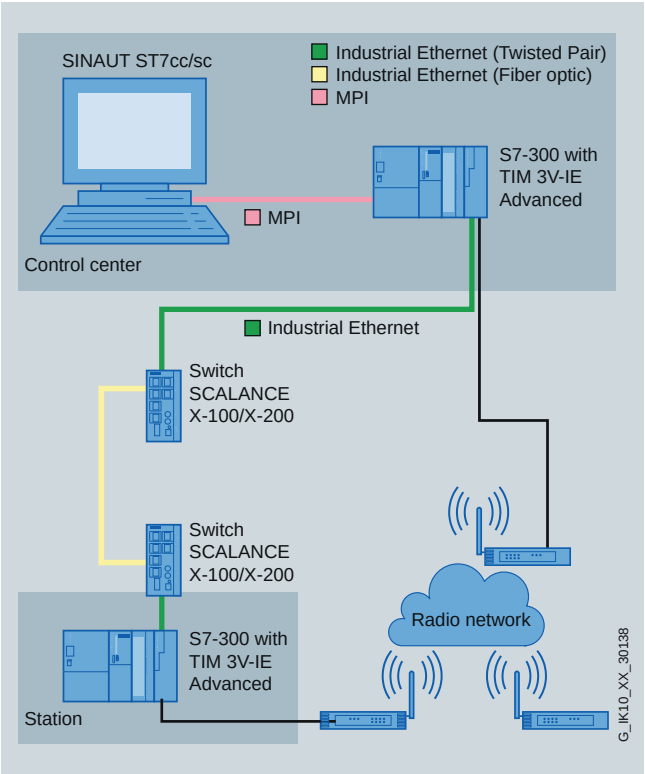


Redundant transmission paths

Using TIM 3V-IE Advanced, a station can be connected to the control desk over redundant paths. The TIM 3V-IE Advanced is used for this purpose both in the station and in the control center. The example includes a combination of fiber-optic cables and radio paths as redundant paths. The two TIMs coordinate data transmission: It takes place normally over the main path and only if it fails over the standby path. When the main path is restored, changeover back to this path is performed automatically.

The TIM 3V-IE Advanced in the control center has access to the MPI interface of the S7-300-CPU via the backplane bus, by which the TIM communicates with the control desk PC (e.g. ST7cc). Note that only certain types of CPU can be considered for this application.

A TIM 4R-IE can be used in the control center as a replacement for the TIM 3V-IE Advanced. Without a S7-300-CPU, this TIM is connected to the control desk PC via one of the two Ethernet ports.



Note:

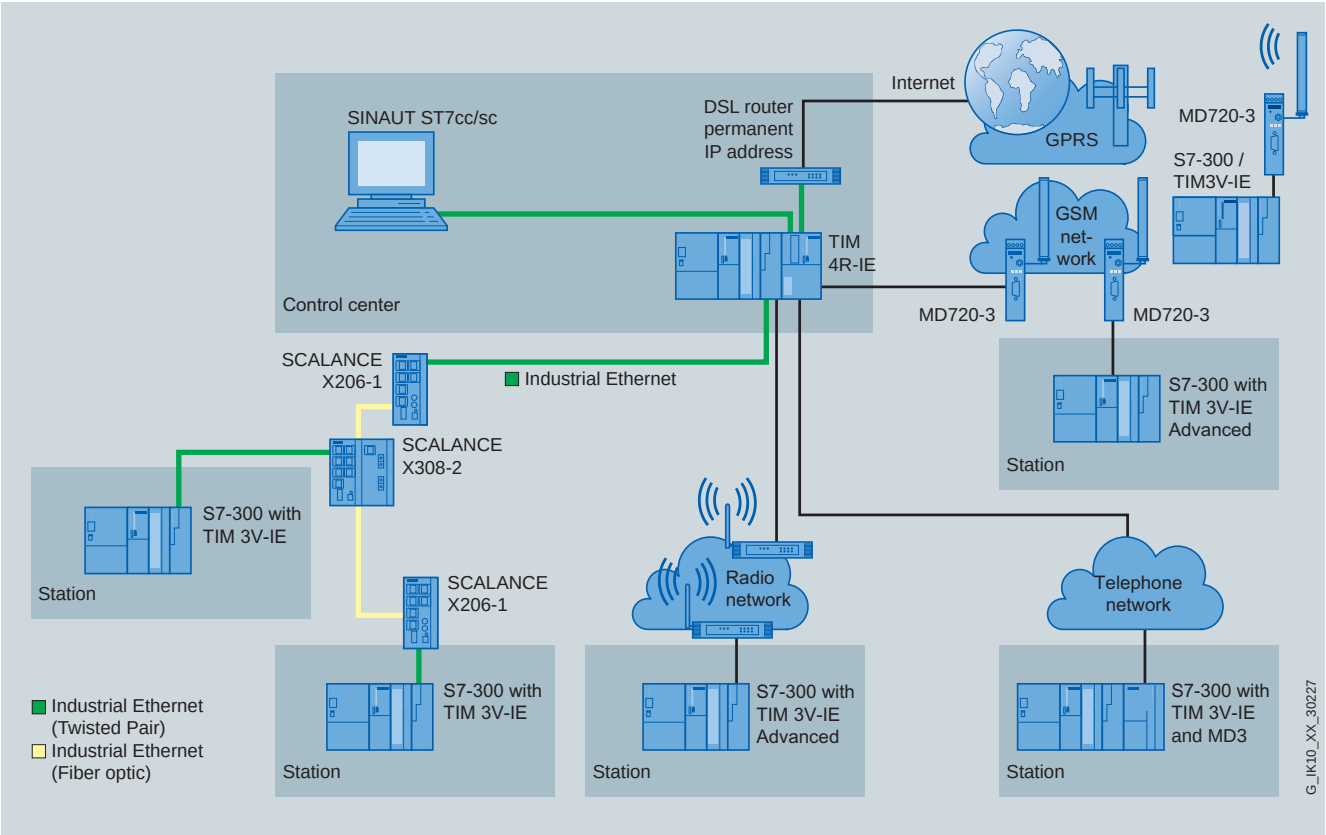
The MPI port of the local CPU can be used with the following CPU types: All variants of CPUs 312, 312C, 313C, 314 and 314C as well as CPU 315-2 DP and CPU 315F-2 DP.

TIM 3V-IE Advanced

Integration (continued)

Use in a control center

The TIM 3V-IE Advanced is also suitable for configuring a control center that comprises more than one TIM. In the following example, the TIM 3V-IE Advanced is combined with a TIM 4R-IE. Both TIMs are connected via the MPI with the CPU inserted in the rack. Both TIMs process data communication with the stations in their own networks and route the data via Industrial Ethernet to the PC.



Connection to a conventional WAN

Connection to a conventional WAN is via the floating RS232 interface of the TIM 3V-IE Advanced module, via which various modems or data communication equipment can be connected, depending on the application.

The RS232 interface can be operated here in parallel with the Industrial Ethernet interface.

Technical specifications

Order No.	6NH7 800-3CA00
Product type designation	**TIM 3V-IE Advanced**
Data transmission rate	
Transmission rate with Industrial Ethernet	10 … 100 Mbit/s
Transmission rate in accordance with RS 232	50 … 38 400 bit/s
Interfaces	
Number of interfaces in accordance with Industrial Ethernet	1
Number of electrical connections	
• For external data transmission in accordance with RS 232	1
• For power supply	1
Design of electrical connection	
• of the Industrial Ethernet interface	RJ45 port
• at interface 1 for external data transmission	9-pin D-sub male connector (RS232)
• at interface 2 for external data transmission	–
• For power supply	2-pin, pluggable terminal strip
Design of the swap medium C-Plug	No
Supply voltage, current consumption, power loss	
Type of power supply	DC
Power supply	24 V
• Minimum	20.4 V
• Maximum	28.8 V
Current consumed	
• Maximum from backplane bus for 24 V DC	0.2 A
• Maximum from external power supply for 24 V DC	0.2 A
Effective power loss	5.8 W
Product expansion: optional backup battery	No
Permissible ambient conditions	
Ambient temperature	
• During operating phase	0 … 60 °C
• During storage	-40 … +70 °C
• During transport	-40 … +70 °C
Relative humidity at 25 °C without condensation during operating phase, maximum	95 %
IP degree of protection	IP20
Design, dimensions and weights	
Module format	Compact module S7-300, single-width
Width	40 mm
Height	125 mm
Depth	120 mm
Net weight	0.2 kg

Order No.	6NH7 800-3CA00
Product type designation	**TIM 3V-IE Advanced**
Product properties, functions, components, general	
Number of modules - Note	Number of TIM per S7-300: several, number depends on connection resources of S7-300 CPU
Cable length	
• Maximum with RS232 interface	6 m
• Maximum with RS485 interface	–
Performance data	
Performance data S7 communication	
Number of possible connections for S7 communication	
• Maximum	24
• For PG connections, maximum	4
• For OP connections, maximum	20
Service	
• SINAUT ST7 using S7 communication	Yes
• PG/OP communication	Yes
Performance data Multiprotocol operation	
Number of active connections for multiprotocol operation	24
Performance data Telecontrol	
Suitability for use	
• TIM node station	Yes
• TIM station	Yes
• TIM control center	Yes
Suitability for use - Note	RS232 and Industrial Ethernet can be used simultaneously
Protocol is supported	
• TCP/IP	Yes
• SINAUT ST1 protocol	Yes
• SINAUT ST7 protocol	Yes
Number of data frames which can be saved on the TIM	32 000
Storage capacity of S7 CPU's main memory	
• Required on CPU for TD7onCPU mode data blocks	20 Kibyte
• Required on TIM for TD7onTIM mode data blocks	0 Kibyte
Storage capacity - Note	TD7onCPU: at least 20 Kibyte, actual requirement depends on data quantity and functional scope TD7onTIM: 0 bytes in most favorable case
Product property: buffered message frame memory	No

TIM 3V-IE Advanced

Technical specifications (continued)

Order No.	6NH7 800-3CA00
Product type designation	**TIM 3V-IE Advanced**
Transmission format	
• 11 bit for SINAUT ST1 protocol with polling	Yes
• 10 or 11 bit for SINAUT ST1 protocol with spontaneous sampling	Yes
• 10 bit for SINAUT ST7 protocol with multi-master polling	Yes
• 10 or 11 bit for SINAUT ST7 protocol with polling or spontaneous sampling	Yes
Operating mode with scanning of data transmission	
• With dedicated line/radio link	
- With SINAUT ST1 protocol	Polling, polling with time slot procedure
- With SINAUT ST7 protocol	Polling, polling with time slot procedure, multi-master polling with time slot procedure
• With dial-up network	
- With SINAUT ST1 protocol	Spontaneous
- With SINAUT ST7 protocol	Spontaneous
Hamming distance	
• For SINAUT ST1 protocol	4
• For SINAUT ST7 protocol	4
Product functions Management, configuration, programming	
configuration software required	SINAUT ST7 ES
Storage location of TIM configuration data	On the CPU

Order No.	6NH7 800-3CA00
Product type designation	**TIM 3V-IE Advanced**
Product functions Security Virtual Private Network	
Suitability for use of Virtual Private Network	Yes
Product function	
• Password protection for VPN	Yes
• MSC client via GPRS modem with MSC capability	Yes
MSC protocol is supported	Yes
Number of possible connections	
• As MSC client with VPN connection	1
• As MSC server with VPN connection	0
MSC protocol supported with Virtual Private Network	TCP/IP
Key length for MSC with Virtual Private Network	128 bit
Type of authentication with Virtual Private Network PSK	Yes
Virtual Private Network mode - Note	–

Ordering data	Order No.
TIM 3V-IE Advanced communications module With an RS232 interface and an RJ45 interface for SINAUT communication via a conventional WAN and an IP-based network (WAN or LAN)	**6NH7 800-3CA00**
SINAUT ST7 Engineering Software Edition 09/2009 on CD-ROM, comprising: • SINAUT ST7 configuration and diagnostics software V5.0 for the programming device • SINAUT TD7 function block library V2.2 for the CPU • Electronic manual in German and English	**6NH7 997-0CA50-0AA0**
SINAUT ST7 Engineering Software Edition 09/2009 (Upgrade) for STEP 7 V5.4 SP4, for owners of previous versions of SINAUT ST7 Engineering Software	**6NH7 997-0CA50-0GA0**

	Order No.
Accessories	
IE FC RJ45 Plug 180 RJ45 plug-in connector for Industrial Ethernet with a rugged metal housing and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface	
• 1 pack = 1 unit	**6GK1 901-1BB10-2AA0**
• 1 pack = 10 units	**6GK1 901-1BB10-2AB0**
• 1 pack = 50 units	**6GK1 901-1BB10-2AE0**
Connecting cable For connecting a TIM (RS232) with a SINAUT ST7 MD2, MD3 or MD4 (RS232) modem; cable length 1.5 m	**6NH7 701-4AL**
Connecting cable For connecting a TIM (RS232) with the GSM modem MD720-3; also suitable for third-party modems or radio equipment with standard RS232 interface; cable length 2.5 m	**6NH7 701-5AN**
Connecting cable with one end open for connecting a TIM (RS232) to a third-party modem or radio unit (RS232); cable length 2.5 m	**6NH7 701-4BN**
Connecting cable For connecting two TIM modules via their RS232 interface without modems ("null modem"); cable length 6 m	**6NH7 701-0AR**

TIM 4R-IE

Overview

- SINAUT communications module TIM with four interfaces for SIMATIC S7-300 or as self-contained unit for the S7-400 for use in the wide area network (WAN)
- For universal use in a SINAUT station, node station and control center
- Internet communication via integrated MSC-VPN tunnel with direct connection to DSL router or operation via IPsec VPN with additional SIMATIC NET components NEW
- Wireless communication via GPRS router, GPRS modem, or radio devices
- Wired communication via Ethernet, DSL, dialup modems or dedicated line modem
- Complete migration of existing wireless, dedicated line and dial-up technology to IP-based network
- Message frame memory for complete recording of data and support of redundant communication paths
- Simple configuration and operation without specialist IT knowledge

Benefits

get Designed for Industry

- Protection of investment by combining existing conventional networks with IP-based networks by means of flexible options for connection of up to four SINAUT networks
- Low-cost construction of the control center by direct connection as independent device to a DSL router, made possible by the integrated MSC-VPN protocol NEW
- No additional mobile phone service for fixed IP addresses or contracts for private GPRS networks with bidirectional data traffic are necessary, as the VPN is integrated in the ST7 system. No more expensive and complex VPN configuration by IT specialists.
- High availability of the connections due to possible redundant design of the communication paths
- Reliable storage of important data. Storage of data message frames (approx. 56,000) including time stamp on TIM in the case of communication path malfunction or power failure
- Saving of time and money through fast and user-friendly configuration of the connections, as well as through remote programming and diagnostics (PG routing) parallel to the SINAUT data transmission via the WAN or Internet connection
- Easy maintenance through replacement of modules without PG

Application

- Use as self-contained central station for the low-cost automation of water/wastewater networks with both complex and simple structures
- Control and monitoring of energy distribution systems and supply stations, such as oil, gas or district heating networks
- Preventive maintenance (condition monitoring) of globally distributed systems
- Monitoring of logistics and traffic control systems
- Connection of plants with basic or high-level security and availability requirements
- Use in hybrid networks with dialup, wireless, Ethernet or Internet communication

Design

The TIM 4R-IE offers all the advantages of the SIMATIC S7-300 design:

- Compact construction;
  double standard width of SIMATIC S7-300 SM modules
- Two 9-pin Sub-D connector with a combined RS232/RS485 interface for connection to a conventional WAN via an appropriate modem
- Two RJ45 sockets for connection to Industrial Ethernet; or an IP-based network; industrial design with additional sleeve for inserting the IE FC RJ45 Plug 180
- 2-pin plug-in terminal strip for connection of the 24 V DC external supply voltage
- Front LEDs for indicating the module status and the communication
- Easy to mount;
  the TIM is mounted on an S7-300 mounting rail;
  if integrated into an S7-300 as a CP, it is connected to adjacent modules by means of the bus connector supplied with the TIM. No slot rules apply. As a standalone device, it is linked via one of its Ethernet ports with one or more S7-400 CPUs or with one or more control center PCs.
- Can be operated in the expansion rack (ER) in conjunction with the IM 360/361
- Can be operated without a fan
- A backup battery and a memory module (C-PLUG) can be installed as options

Function

The TIM 4R-IE can be used as a standalone device, i.e. it is fully functional even without S7-300-CPU. In this stand-alone mode, the TIM is especially suitable as a SINAUT communications processor for the control desk PC (SINAUT ST7cc or ST7sc) or for a SIMATIC S7-400. The TIM is connected to the PC or S7-400 via one of its two Ethernet interfaces. If the control desk is redundantly designed or if an S7-400 is additionally available there as a higher-level controller, then the TIM performs the SINAUT communication with the stations for all these devices connected to the local Ethernet.

The TIM 4R-IE can also be built into a SIMATIC S7-300 as a CP, e.g. if these devices require redundant transmission paths there or function as node stations at which more than two networks must be merged.

All the devices mentioned can exchange data with other SINAUT ST7 or ST1 partners with the aid of the TIM 4R-IE and specifically via as many as four SINAUT networks that can also be operated in any redundant combination.

The important SINAUT property - saving data complete with a time stamp on the TIM in the event of an interrupted link or failure of the partner - is then available not only for conventional WANs, but also for IP-based networks. Important events, alarms, etc. are not lost and the integrity of information in control center system archives is assured. Additional security is offered by the optional backup battery of the TIM 4R-IE which prevents the loss of saved data message frames if the 24 V supply fails.

For setting up more complex control centers or node stations, several TIM 4R-IE modules can be used. Combinations with TIM 3V-IE Advanced and TIM 3 and other TIM 4 versions are also possible.

As a communication module for the control desk PC, the TIM reduces the number of S7 connections that the PC would otherwise have to maintain when directly linked to the stations via an IP-based network, to just one (1) connection. In addition, the TIM then separates the local Ethernet from the IP-based network to the stations. Only SINAUT and PG communication with the stations is allowed through. This prevents unnecessary traffic in the WAN which is often not broadband.

A TIM 4R-IE that is used at a redundant control desk reduces the data volume in a WAN and thus it reduces the costs for networks with volume tariffs, e.g. GPRS. If stations were connected directly to the redundant control desk (without central TIM 4R-IE), they would send each message frame twice in order to send data to both control desk PCs. In the case of a control center TIM 4R-IE, the stations only send their message frames once. The doubling of the message frames for supplying both PCs is then performed by the control center TIM 4R-IE.

For data transmission via conventional WANs, the TIM 4R-IE has other, special properties that predetermine its use as a "control center" TIM.

SINAUT ST7 and thus also the TIM 4R-IE are designed for data transmission via the widest range of WANs or combinations of WANs. Mixed networks comprising classical SINAUT WAN networks (dedicated line, wireless, dial-up network) and IP-based networks (fiber optic, DSL, GPRS, Internet etc.) can be configured uniformly using SINAUT, which saves both time and money.

For communication via the Internet, the integrated MSC-VPN tunnel protocol for direct access to DSL routers can be used. The TIM 4R-IE can operate here as an MSC server or MSC client. For communication via GPRS, either the router MD741-1 can be connected to the Industrial Ethernet interface (VPN IPsec) or the GSM/GPRS modem MD720-3 (MSC-VPN) to the RS232 interface. NEW

- The TIM4R-IE has four interfaces for simple and redundant transmission paths:
  - Two combined RS232/RS485 interfaces for connection to standard WANs such as dedicated line, wireless or dial-up network
  - Two RJ45 interfaces for connection to IP-based networks (WAN or LAN) such as fiber-optics, DSL, GPRS, etc.
- Compact, double-width module that can be used in a wide variety of situations:
  - The TIM handles the SINAUT communication for one or more S7-400 controllers or control desk PCs (SINAUT ST7cc or ST7sc) as a stand-alone device (stand-alone without S7-300 CPU); the connection in this case is via Ethernet interfaces of the TIM
  - As a communications processor (CP) in an S7-300
- This way, the S7 CPU or the control desk PC can carry out SINAUT communication:
  - Over any two SINAUT WANs with SINAUT ST7 and SINAUT ST1 partners
  - Over two IP-based networks with SINAUT ST7 stations
- All four interfaces can be used at the same time for SINAUT communication.
- The two RJ45 interfaces can be configured either as an MSC-VPN server in the central office or as MSC-VPN client in a station. At the RS232 interface, an MD720-3 can be operated in GPRS mode as MSC-VPN client. NEW
- The four transmission paths can all be different and operated independently of one another, but also in any redundant combination.
- Flexible creation of redundant transmission paths via two conventional WANs, via two IP-based networks or a combination of WAN + IP-based network.
- When installed as a CP in an S7-300, the following communication is also possible via the backplane bus:
  - With the CPU
  - Via the MPI of this CPU with other CPUs and control desk PCs (ST7cc, ST7sc) connected over the MPI bus.
  - With other TIMs in this rack
- Message frame memory for up to 56,000 data message frames
- Optional backup battery for backup of the stored data message frames and the hardware clock if the power fails
- Up to 62 S7 connections or 128 MSC-VPN tunnel connections (as control center) via IP-based networks and MPI (for S7-300-CPU)
- The SINAUT TD7 software for the CPU (TD7onCPU) is integrated in the TIM (TD7onTIM); implemented with installation as CP in a S7-300
- Module replacement possible without PG
  - In stand-alone mode using the optional C-PLUG
  - When installed as a CP in an S7-300 over the memory card of the CPU
- PG communication is possible at any time in parallel with the data communication
- Several TIM 4R-IEs can be used per S7-300, also in connection with one or more TIM 3V-IE Advanced
- Up to 128 S7 connections via IP-based networks (in MSC tunnel mode)

TIM 4R-IE

Function (continued)

Controllable communication modules:

- Control of the GSM/GPRS modems MD720-3 in the GSM or GPRS mode. In GPRS mode, simple 128-bit encryption via the MD720-3 (MSC-VPN tunnel protocol).
- Operation via SIMATIC NET Ethernet components with high IPsec security standard (e.g. GPRS router or SCALANCE S)
- Direct operation on a DSL router by means of MSC tunnel protocol
- Use of SCALANCE fiber-optic switches for spanning long distances
- Wireless transmission via IWLAN with SCALANCE W over medium distances
- Dedicated line modem MD2 for point-to-point, point-to-multi-point or line connections
- Wireless devices from various manufacturers, also for private mobile radio using the time slot method
- Analog dial-up modem MD3 for the analog telephone network or point-to-point dedicated lines
- ISDN modem MD4 for connecting to the ISDN network

Special properties as "control center" TIM

For data transmission via conventional WANs, the TIM 4R-IE has other, special properties that predetermine its use as a "control center" TIM:

- In a dialup network the message "Failure of local node" can be switched off. If the control desk PC fails or is temporarily shut down, the control center TIM 4R-IE will not send any failure message to the stations in the dialup network and therefore saves transmission costs.
- One especially useful feature during commissioning is the possibility that SINAUT stations can be switched on and off on the control center TIM 4R-IE. This applies not only for stations that are connected via dedicated line/radio, but also for stations in the dial-up network. The last status set for each station is permanently stored on the TIM and is therefore not lost if the power fails or the TIM is restarted.
- For GPRS, dedicated lines and mobile networks, the message "Node faulty" can be suppressed on the TIM 4R-IE for a programmable period of time. A station failure is then no longer indicated after x unanswered calls (polls), but only when a recognized fault still exists after expiry of the programmed time. This enables the number of failure messages to be reduced in poor-quality networks and it also minimizes the additional message frame traffic that must be processed after each station is restored.

Optional C-PLUG

The most frequent application for the TIM 4R-IE will be its use as a communication module for the control desk PC or for an S7-400. The TIM then operates in standalone mode, i.e. without S7-300 CPU. The option of saving the TIM configuration data on the MMC card of the CPU, in order to exchange the TIM without a PG in the event of a fault, no longer applies. The saving of configuration data on the C-PLUG, which can be optionally equipped, solves this problem. This means that, even in standalone mode, a replacement of the TIM is possible without PG.

Integration

Connection to IP-based networks

In addition to the two combined RS232/RS485 interfaces, the TIM 4R-IE also has two RJ45 sockets. These are suitable for the connection of IP-based networks (WAN or LAN). Depending on the application, various types of data communication equipment can be connected such as:

- SCALANCE X switches for Twisted Pair cable or fiber-optic cables
- SCALANCE W (IWLAN) and Ethernet radio devices from various manufacturers
- SINAUT MD741-1 for GPRS communication and EGPRS (Edge) over mobile telephone networks
- DSL router in combination with SCALANCE S for VPN (IPsec)
- GPRS/GSM modem MD720-3 for GPRS communication via GSM mobile telephone networks using MSC-VPN tunnel protocol
- Directly on a DSL router by means of the MSC-VPN tunnel protocol integrated in the TIM
- Broadband systems such as OTN, PCM30

Connection to a conventional WAN

For the connection to a conventional WAN the TIM 4R-IE provides two floating RS232/RS485 interfaces, to which various data communication devices can be connected, depending on the application, such as:

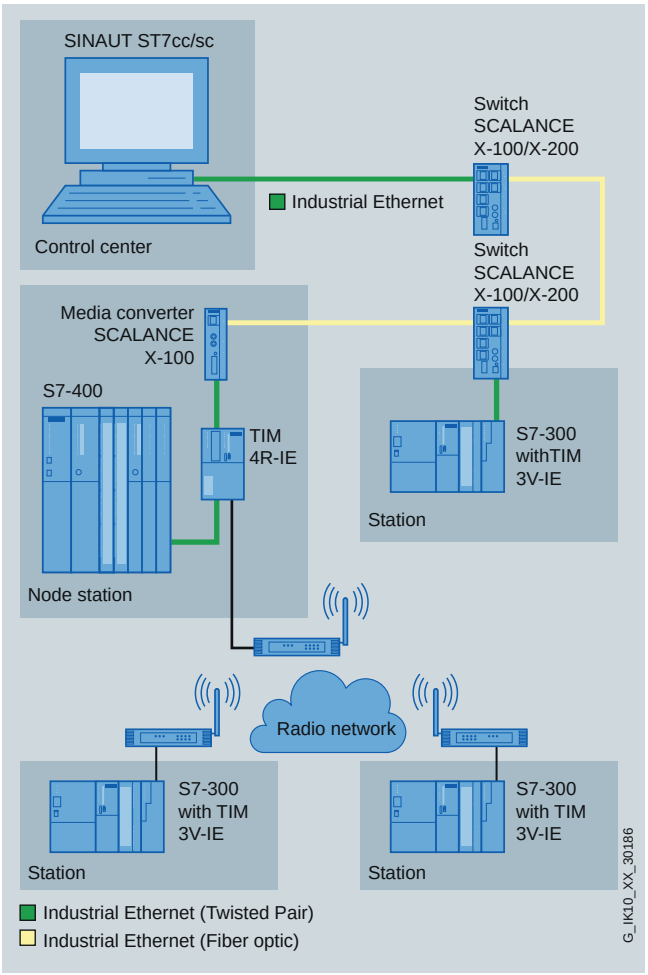
- Dedicated line modem MD2 for point-to-point, point-to-multi-point or line connections
- Wireless devices from various manufacturers, also for private mobile radio using the time slot method
- Analog dial-up modem MD3 for the analog telephone network or point-to-point dedicated lines
- ISDN modem MD4 for connecting to the ISDN network
- GPRS/GSM modem MD720-3 for access to the mobile telephone network

Integration (continued)

Configuration examples using TIM 4R-IE

Use in a node station

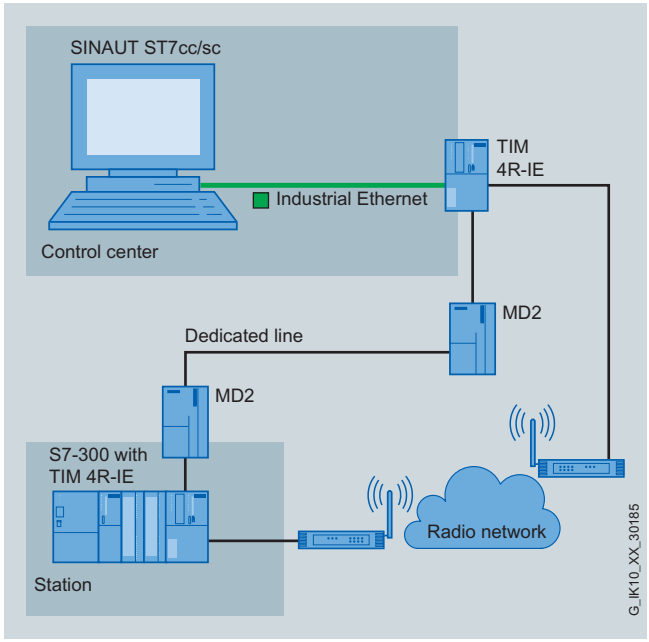
In a node station with a SIMATIC S7-400 the TIM 4R-IE is connected to the S7-400 via one of its two Ethernet interfaces and can, for example, exchange data by radio with the subordinate stations via an RS232/RS485 interface. It is then connected to the control center via the second Ethernet interface, e.g. via a fiber-optic cable that is connected through SCALANCE X switches and media converters.
In this configuration, data can be exchanged between all of the SINAUT stations regardless of which network they are situated in.



Use in a node station

Redundant transmission paths

Using TIM 4R-IE, a station can be connected to the control center over redundant paths. The TIM 4R-IE is used for this purpose both in the station and in the control center. The example shows as redundant paths a combination of leased line and radio, i.e. two conventional WANs, for which the TIM 4R-IE offers corresponding connections (2 x RS232/RS485). The two TIMs coordinate the data transmission. It takes place normally over the main path and only if it fails over the standby path. When the main path is restored, changeover back to this path is performed automatically.



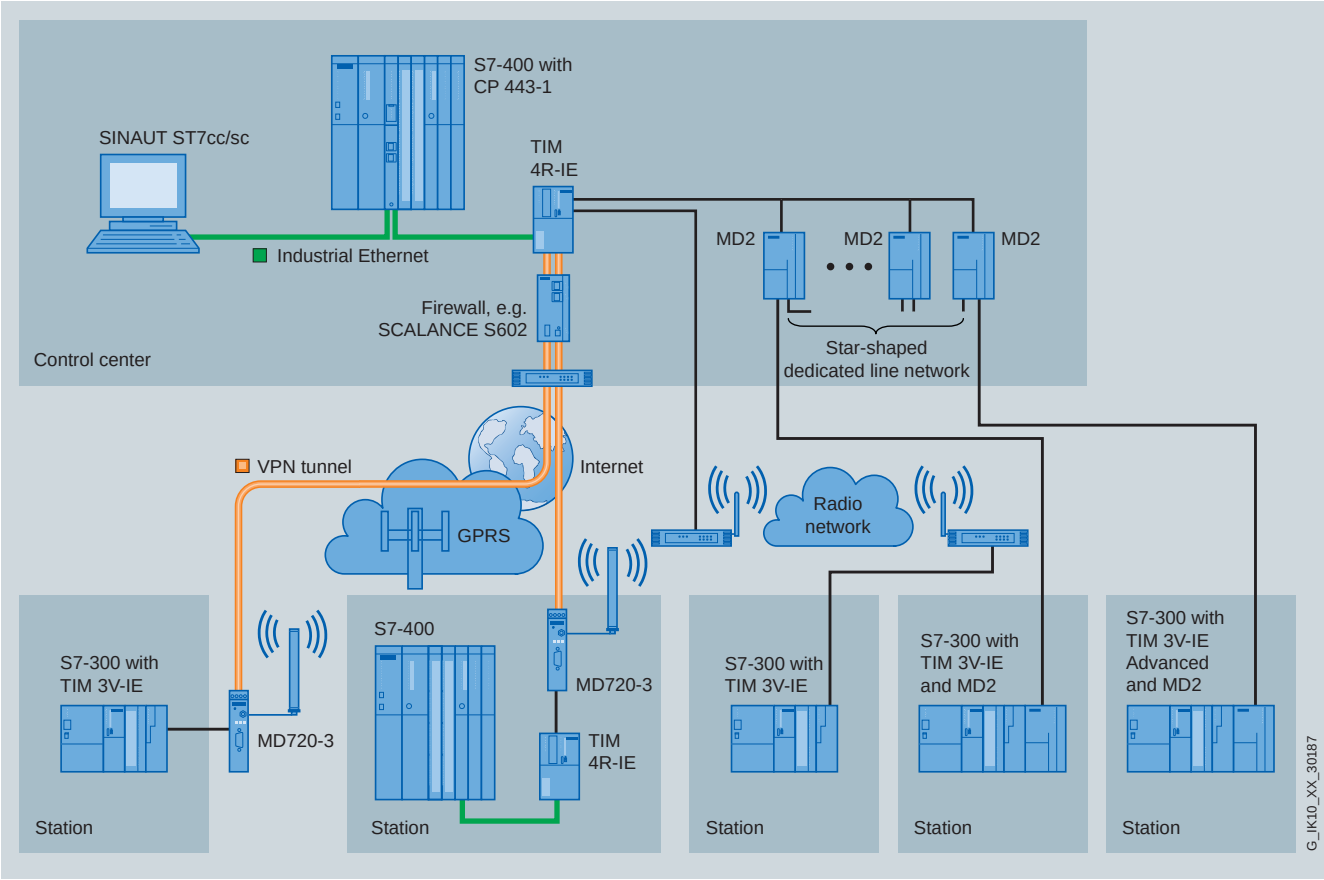
Redundant transmission paths

Integration (continued)

Use in a control center

The TIM 4R-IE is also suitable for use in a control center, either alone or in combination with other TIMs. The following example shows a TIM 4R-IE that is connected via one of its two Ethernet interfaces with the control center PC (e.g. ST7cc). An S7-400 is also connected to the Industrial Ethernet and this must also exchange data with the SINAUT stations. SINAUT stations are connected by means of GPRS using MSC-VPN via the second Ethernet port of the TIM, while a wireless network and point-to-point leased line network are connected via the two RS232/RS485 ports. For the point-to-point connection, the port of the TIM is set to RS485. It is then possible to operate up to 30 SINAUT leased line modems on this port; the example shows MD2 modems.

If the stations in this network have to be provided with the date and time, the control center PC assumes the function of the clock-time master. Via the Ethernet connection, the TIM 4R-IE is regularly synchronized by the PC and it then takes over the synchronization of the connected stations.



Use in a control center

Technical specifications

Order No.	6NH7 800-4BA00
Product type designation	**TIM 4R-IE**
Data transmission rate	
Data transmission rate	
• With Industrial Ethernet	10 … 100 Mbit/s
• In accordance with RS 232	50 … 38 400 bit/s
Interfaces	
Number of interfaces in accordance with Industrial Ethernet	2
Number of electrical connections	
• For external data transmission in accordance with RS 232	2
• For power supply	1
Design of electrical connection	
• of the Industrial Ethernet interface	RJ45 port
• at interface 1 for external data transmission	9-pin D-sub male connector (RS232), switchable to RS485
• at interface 2 for external data transmission	9-pin D-sub male connector (RS232), switchable to RS485
• For power supply	2-pin, pluggable terminal strip
Design of the swap medium C-Plug	Yes
Supply voltage, current consumption, power loss	
Type of power supply	DC
Power supply	24 V
• Minimum	20.4 V
• Maximum	28.8 V
Current consumed	
• Maximum from backplane bus for 24 V DC	0.2 A
• Maximum from external power supply for 24 V DC	0.17 A
Effective power loss	4.6 W
Product expansion: optional backup battery	Yes
Type of battery	Lithium AA / 3.6 V / 2.3 Ah
Backup current	
• Typical	100 µA
• Maximum	160 µA
Permissible ambient conditions	
Ambient temperature	
• During operating phase	0 … 60 °C
• During storage	-40 … +70 °C
• During transport	-40 … +70 °C
Relative humidity at 25 °C without condensation during operating phase, maximum	95 %
IP degree of protection	IP20

Order No.	6NH7 800-4BA00
Product type designation	**TIM 4R-IE**
Design, dimensions and weights	
Module format	Compact module S7-300 double width
Width	80 mm
Height	125 mm
Depth	120 mm
Net weight	0.4 kg
Product properties, functions, components, general	
Number of modules - Note	Number of TIM 4R-IE per S7-300/S7-400: several, number depends on connection resources of CPU
Cable length	
• Maximum with RS232 interface	6 m
• Maximum with RS485 interface	30 m
Performance data	
Performance data S7 communication	
Number of possible connections for S7 communication	
• Maximum	64
• For PG connections, maximum	2
• For OP connections, maximum	62
Service	
• SINAUT ST7 using S7 communication	Yes
• PG/OP communication	Yes
Performance data Multiprotocol operation	
Number of active connections for multiprotocol operation	128
Performance data Telecontrol	
Suitability for use	
• TIM node station	Yes
• TIM station	Yes
• TIM control center	Yes
Suitability for use - Note	–
Protocol is supported	
• TCP/IP	Yes
• SINAUT ST1 protocol	Yes
• SINAUT ST7 protocol	Yes
Number of data frames which can be saved on the TIM	56 000
Storage capacity of S7 CPU's main memory	
• Required on CPU for TD7onCPU mode data blocks	20 Kibyte
• Required on TIM for TD7onTIM mode data blocks	0 Kibyte
Storage capacity - Note	TD7onCPU: at least 20 Kibyte, actual requirement depends on data quantity and functional scope TD7onTIM: 0 bytes in most favorable case

Technical specifications (continued)

Order No.	6NH7 800-4BA00
Product type designation	**TIM 4R-IE**
Product property: buffered message frame memory	Yes
Transmission format	
• 11 bit for SINAUT ST1 protocol with polling	Yes
• 10 or 11 bit for SINAUT ST1 protocol with spontaneous sampling	Yes
• 10 bit for SINAUT ST7 protocol with multi-master polling	Yes
• 10 or 11 bit for SINAUT ST7 protocol with polling or spontaneous sampling	Yes
Operating mode with scanning of data transmission	
• With dedicated line/radio link	
- With SINAUT ST1 protocol	Polling, polling with time slot procedure
- With SINAUT ST7 protocol	Polling, polling with time slot procedure, multi-master polling with time slot procedure
• With dial-up network	
- With SINAUT ST1 protocol	Spontaneous
- With SINAUT ST7 protocol	Spontaneous
Hamming distance	
• For SINAUT ST1 protocol	4
• For SINAUT ST7 protocol	4
Product functions Management, configuration, programming	
configuration software required	SINAUT ST7 ES
Storage location of TIM configuration data	On TIM-internal flash memory or on TIM in optional C-PLUG or on MMC of S7-300 CPU if TIM fitted in S7-300 PLC

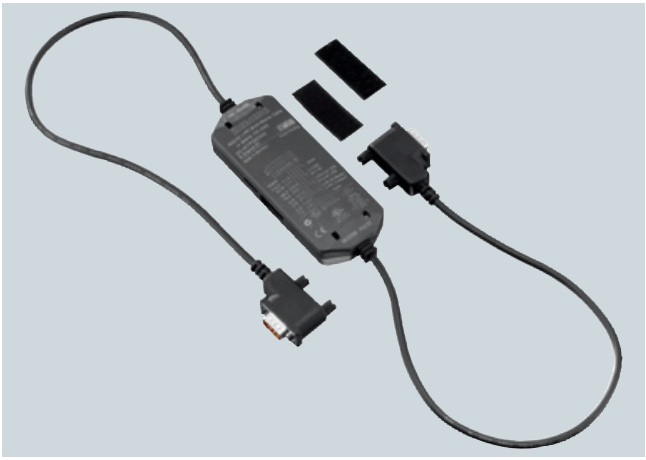
Order No.	6NH7 800-4BA00
Product type designation	**TIM 4R-IE**
Product functions Security Virtual Private Network	
Suitability for use of Virtual Private Network	Yes
Product function	
• Password protection for VPN	Yes
• MSC client via GPRS modem with MSC capability	Yes
MSC protocol is supported	Yes
Number of possible connections	
• As MSC client with VPN connection	1
• As MSC server with VPN connection	128
MSC protocol supported with Virtual Private Network	TCP/IP
Key length for MSC with Virtual Private Network	128 bit
Type of authentication with Virtual Private Network PSK	Yes
Virtual Private Network mode - Note	–
Product functions Time	
Product component: hardware real-time clock	Yes
Product property: buffered hardware real-time clock	Yes
Maximum accuracy of hardware real-time clock per day	4 s
Time resolution	1 ms
Time deviation referred to master clock	
• Typical	10 ms
• Maximum	1000 ms

Ordering data	Order No.
TIM 4R-IE communications module With two combined RS232/RS485 interfaces for SINAUT communication via conventional WANs and two RJ45 interfaces for SINAUT communication via IP-based networks (WAN or LAN)	**6NH7 800-4BA00**
SINAUT ST7 Engineering Software Edition 09/2009 on CD-ROM, comprising: • SINAUT ST7 configuration and diagnostics software V5.0 for the programming device • SINAUT TD7 function block library V2.2 for the CPU • Electronic manual in German and English	**6NH7 997-0CA50-0AA0**
SINAUT ST7 Engineering Software Edition 09/2009 (Upgrade) for STEP 7 V5.4 SP4, for owners of previous versions of SINAUT ST7 Engineering Software	**6NH7 997-0CA50-0GA0**

	Order No.
Accessories	
C-PLUG Swap medium for simple replacement of devices in the event of a fault; for storing configuration or application data; can be used for SIMATIC NET products with C-PLUG slot	**6GK1 900-0AB00**
Backup battery 3.6 V/2.3 Ah for TIM 4R-IE	**6ES7 971-0BA00**
IE FC RJ45 Plug 180 RJ45 plug-in connector for Industrial Ethernet with a rugged metal housing and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface	
• 1 pack = 1 unit	**6GK1 901-1BB10-2AA0**
• 1 pack = 10 units	**6GK1 901-1BB10-2AB0**
• 1 pack = 50 units	**6GK1 901-1BB10-2AE0**
Connecting cable For connecting a TIM (RS232) with a SINAUT ST7 MD2, MD3 or MD4 (RS232) modem; cable length 1.5 m	**6NH7 701-4AL**
Connecting cable For connecting a TIM (RS485) with a SINAUT ST7 MD2, MD3 or MD4 (RS485) modem; cable length 1.5 m	**6NH7 701-4DL**
Connecting cable For connecting a TIM (RS232) with the GSM modem MD720-3; also suitable for third-party modems or radio equipment with standard RS232 interface; cable length 2.5 m	**6NH7 701-5AN**
Connecting cable with one end open for connecting a TIM (RS232) to a third-party modem or radio unit (RS232); cable length 2.5 m	**6NH7 701-4BN**
Connecting cable For connecting two TIM modules via their RS232 interface without modems ("null modem"); cable length 6 m	**6NH7 701-0AR**

PPI modem cable

Overview



- Intelligent RS232/PPI multimaster cable for connecting modems with RS 232 interface to SIMATIC S7-200 (RS485)

Benefits

get Designed for Industry

- Matching cable length for control cabinet assembly
- No RS232 adapter (gender changer) required for modem connection
- Simple fixing of cable in control cabinet using Velcro fastener

Application

The intelligent RS 232/PPI multimaster cable can be used for the connection between modems and the S7-200. It is then possible to connect modems such as the GSM modem MD720-3 with RS232 interface to the PPI interface of the S7-200 without using a gender changer. As a result of the short cable lengths and the industrial Velcro fasteners, the PPI modem cable is suitable for use in control cabinets.

Design

- 24 V DC power supply via the RS485 interface of the SIMATIC S7-200
- 3 LEDs for status display:
  - Tx, green: RS232 send
  - Rx, green: RS232 receive
  - PPI, green: RS485 send

Function

PPI mode:

- Signal conversion from RS232 to RS485
- Control of token in a multimaster PPI network (PPI master)
- Supports 10-bit modem protocol via RS232, and DPT and PPI protocols via RS485

Freeport mode:

- Signal conversion from RS232 to RS485
- Switchover between local and remote modes
- Configuration in local mode using DIP switches
- Configuration in remote mode using terminal program (e.g. MS Hyper Terminal)
- Supports AT modem commands and PIN for Siemens modems

Technical specifications

Order No.	**6NH9 701-0AD**
Product type identification	**PPI modem cable**
Power supply	from CPU
Protocols	
PPI	Yes; 10/11-bit
ASCII	Yes; Freeport
MPI	
Transmission rate (PPI), max.	187.5 kbit/s; 9.6/19.3/187.5 kbit/s; setting: DIP switch; RS232 not required
Status information/alarms/ diagnostics	
Diagnostics LEDs	Tx (green): RS232 send display; Rx (green): RS232 receive display; PPI (green): RS485 send display
Electrical isolation	
Electrical isolation	1
Dimensions	
Approx. weight	300 g

Ordering data

Ordering data	**Order No.**
PPI modem cable For connecting modems with RS232 interface to SIMATIC S7-200	**6NH9 701-0AD**

Application

The SINAUT ST7 engineering software with the following components is required for the configuration, diagnostics and operation of the SINAUT system:

- SINAUT ST7 Configuring Software
- SINAUT TD7 Library

The software package is a work package which can be used for any number of SINAUT projects without a licensing process.

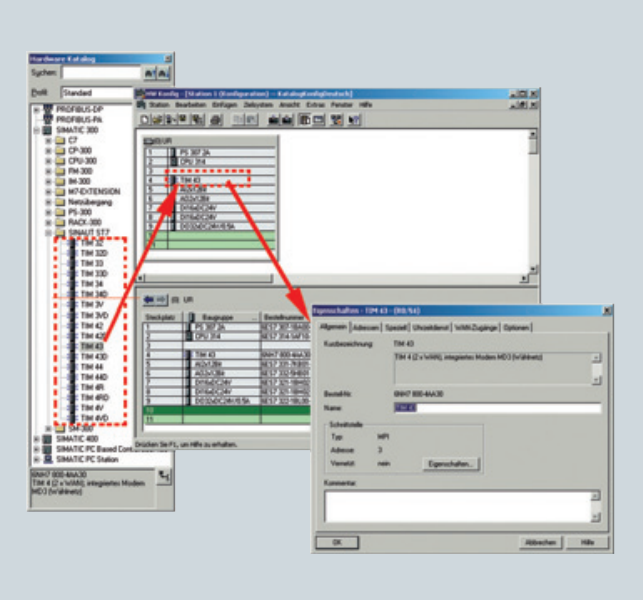
Function

SINAUT ST7 configuring software for STEP 7

- Executable under Windows XP, Vista or Server 2003; STEP 7 software V5.4 SP4 or higher must also be installed.
- Includes:
  - Module manager to supplement the HW Config STEP 7 tool; displays and sets the parameters of the TIM modules in HW-Config
  - WAN Manager to supplement the NetPro STEP 7 tool; displays and sets the parameters of the SINAUT WAN networks and network nodes in NetPro
  - The SINAUT ST7 configuring tool is used for project-wide functions such as SINAUT connection configuration and SINAUT station management
  - SINAUT ST7 diagnostics and service tool; in addition to the diagnostics functions familiar to users of STEP 7, it also provides access to SINAUT-specific diagnostic information. The service tool can be used, for example, to upload new software to the TIM.

Module manager for SINAUT ST7

A SINAUT ST7 folder is added to the SIMATIC 300 directory. This folder contains a list of all available TIM modules. The TIM module required in each case can be selected from this directory and installed in the S7 rack. A corresponding Properties dialog box can be called up to set the module parameters.



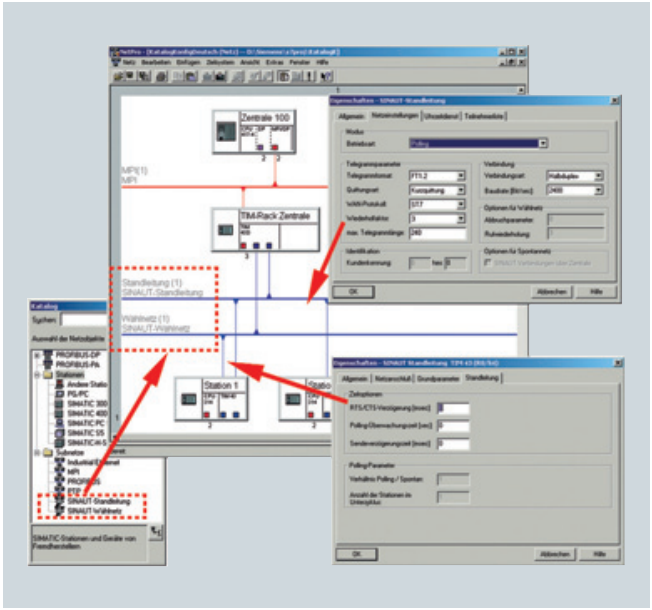
WAN Manager for SINAUT ST7

In the catalog for the STEP 7 network configuration tool NetPro, the SINAUT "dedicated line" and "dial-up" networks are added to the subnetworks directory. The SINAUT networks required in each case can be selected from this directory and installed in the NetPro window. With the SINAUT ST7 configuring tool V5.0 and higher, the MSC-VPN tunnel protocol can also be used under the "Industrial Ethernet" network type for configuring the SINAUT data transmission via the Internet and GPRS. NEW

The TIM modules can be assigned to these networks using the mouse or dialog boxes. Any erroneous connections are rejected immediately.

A corresponding Properties dialog box is called up to define the generally valid parameters for a network, e.g. ST1 or ST7 protocol, transmission rate, etc.

The individual properties for each of the network nodes can be defined in a further dialog box, e.g. the dedicated telephone number for the connection to a dialup network.



If necessary, the Properties dialog box for a TIM module can be opened in NetPro with the same property options as in HW Config.

SINAUT ST7 configuring tool

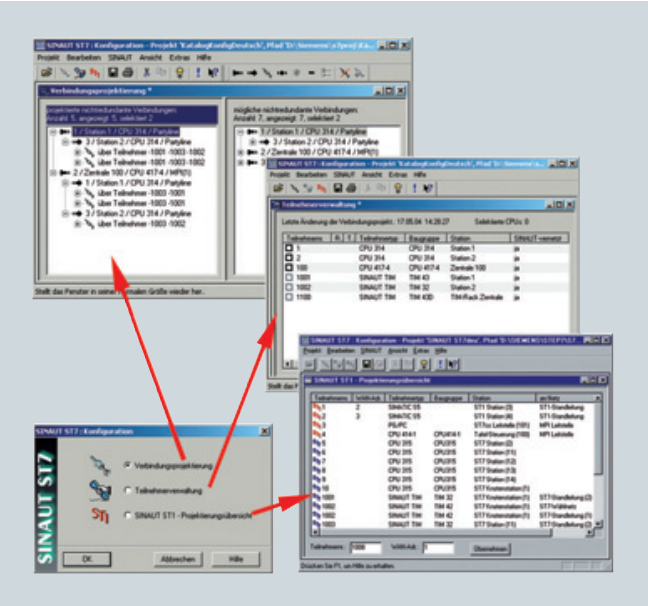
The SINAUT ST7 configuring tool is a separate configuration tool for SINAUT ST7 and includes:

- Connection configuration
- Station management
- SINAUT ST1 – Configuration overview

First, the "*Connection configuration*" tool is used to define the SINAUT devices (ST7 CPU, ST7cc, ST7sc or ST1 device) between which a connection is required. For this purpose, the tool displays a list of all connections possible in the right-hand side of a two-section window. The tool has generated the list automatically using the network configured with NetPro (see WAN Manager). The user moves the connections actually required from the right-hand to the left-hand window using the pop-up menu.

SINAUT ST7 Engineering Software

Function (continued)



One of the features provided by the "*Station management*" tool is a list of all SINAUT devices. If necessary, station-specific modifications can be made, e.g. the SINAUT station numbers can be changed for the individual devices, or message texts can be configured to be sent as text message. The station management tool also handles configuring of the data message frames to be sent and received if message frame generation and evaluation are to be carried out by the TIM (only possible for TIMs with TD7onTIM functionality). The tool generates the system data blocks (SDB) for the CPUs and TIMs from the configuration data. If the SINAUT TD7 software is used for the CPU, the tool also preprocesses the accounting and communication data blocks for the CPUs, which it stores in the CPU block library together with the blocks (FBs, FCs) which are essential to the CPUs for SINAUT communication.

The third tool, *"SINAUT ST1 – Configuration overview"* is only required for configuring systems which also feature SINAUT ST1 devices. This tool makes adjusting the addresses for SINAUT ST1 much easier.

SINAUT ST7 diagnostics and service tool

In addition to the diagnostics functions familiar to users of STEP 7, the SINAUT ST7 diagnostics and service tool also provides access to SINAUT-specific diagnostic information. The service tool can be used, for example, to upload new software to the TIM.

SINAUT TD7 library, blocks for the CPU

The SINAUT TD7 library is a software package with blocks for the CPU (TD7onCPU). The package has been designed so that it can run both on an S7-400 and on an S7-300 CPU. Only a small number of blocks have been designed specifically for the S7-300 or S7-400 CPU respectively.

In the terminals, the SINAUT TD7 software ensures that process data is transmitted between CPU and control desk, e.g. ST7cc, and from CPU to CPU in the event of changes. Connection, CPU or control desk failures are displayed. A data update for all participating communication partners is performed automatically following debugging or startup of a CPU or of the control desk. A time stamp can be assigned to data messge frames if required.

The package essentially comprises:

- **Basic and auxiliary blocks**
  Most of these blocks are always required in the CPU, a small number are optional. The basic blocks perform central tasks such as startup, connection and connection partner monitoring, general prompting, time management, communication processing, etc.. The auxiliary blocks, for example, insert message frames into the sending mailbox and retrieve them from the receive mailbox, perform connection-specific send and receive operations or provide access to information the user is searching for.
- **Data-point typicals**
  These blocks are integrated into the CPU program on the basis of the data types and data volumes to be transmitted. In the event of changes to data, they create message frames or output received process data.

In order to operate correctly, the TD7onCPU package needs a number of data blocks which are generated by the SINAUT ST7 configuring tool. These are:

- **Central accounting DB**
  This block contains all data required centrally, e.g. accounting data for all communication partners as well as for all connections to be managed.
- **Communication DBs**
  A separate communication DB is created for every connection with a sending and receive mailbox and all data required for controlling and monitoring this connection.

Technical specifications

SINAUT ST7 Engineering Software	
Operating systems	MS Windows XP Professional SP 2, 3 MS Windows Server 2003 SP2 MS Windows Vista 32 Bit Ultimate and Business with or without SP1
STEP 7 versions	STEP 7 V5.4 SP4 or higher

Ordering data

	Order No.
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