

SIMATIC NET

EGPRS/GPRS-Router SINAUT MD741-1

System manual

Preface, Contents

Applications and functions	1
Setup	2
Configuration	3
Local interface	4
External interface	5
Security functions	6
VPN connection	7
Remote access	8
Status, log and diagnosis	9
Additional functions	10
Technical Data	11
Applied Standards and Approvals	12

Glossary

C79000-G8976-C236-05

Release 01/2013

Legal information

Warning notice system

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



Danger

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



Warning

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



Caution

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

Caution

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

Notice

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

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

Qualified Personnel

The product/system described in this documentation may be operated only by **personnel qualified** for the specific task in accordance with the relevant documentation for the specific task, in particular its warning notices and safety instructions. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with these products/systems.

Prescribed Usage

Note the following:



Warning

Siemens products may only be used for the applications described in the catalog and in the relevant technical documentation. If products and components from other manufacturers are used, these must be recommended or approved by Siemens. Proper transport, storage, installation, assembly, commissioning, operation and maintenance are required to ensure that the products operate safely and without any problems. The permissible ambient conditions must be adhered to. The information in the relevant documentation must be observed.

Trademarks

All names identified by ® are registered trademarks of the Siemens AG. The remaining trademarks in this publication may be trademarks whose use by third parties for their own purposes could violate the rights of the owner.

Disclaimer of Liability

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

External power supply

Use only an external power supply which also complies with EN60950. The output voltage of the external power supply must not exceed 30V DC. The output of the external power supply must be short-circuit proof.



Warning

The power supply unit to supply the SINAUT MD741-1 must comply with the requirements for a Limited Power Source according to IEC/EN 60950-1

The power supply unit to supply the SINAUT MD741-1 must comply with NEC Class 2 circuits as outlined in the National Electrical Code ® (ANSI/NFPA 70) only.

Please pay regard to section 2.7 of the system manual, as well as the installation and utilisation regulations of the respective manufacturers of the power supply, the battery or the accumulator.

SIM card

To install the SIM card the device must be opened. Before opening the device, disconnect it from the supply voltage. Static charges can damage the device when it is open. Discharge the electric static of your body before opening the device. To do so, touch an earthed surface, e.g. the metal casing of the switch cabinet. Please pay regard to section 2.7 of this system manual.

Handling cables

Never pull a cable connector out of a socket by its cable, but pull on the connector itself. Cable connectors with screw fasteners (D-Sub) must always be screwed on tightly. Do not lay the cable over sharp corners and edges without edge protection. If necessary, provide sufficient strain relief for the cables.

For safety reasons, make sure that the bending radius of the cables is observed.

Failure to observe the bending radius of the antenna cable results in the deterioration of the system's transmission and reception properties. The minimum bending radius static must not fall below 5 times the cable diameter and dynamic below 15 times the cable diameter.

Radio device



Warning

Never use the device in places where the operation of radio devices is prohibited. The device contains a radio transmitter which could in certain circumstances impair the functionality of electronic medical devices such as hearing aids or pacemakers. You can obtain advice from your physician or the manufacturer of such devices. To prevent data carriers from being demagnetised, do not keep disks, credit cards or other magnetic data carriers near the device.

Installing antennas



Warning

The emission limits as recommended by the German Commission on Radiological Protection (13/14 September 2001; www.ssk.de) must be observed.

Installing an external antenna

Caution

When installing an antenna outdoors it is essential that the antenna is fitted correctly by a qualified person.

When the antenna is installed outdoors it must be earthed for lightning protection. The outdoor antennas shield must be reliable connective to protective earth.

The installation shall be done according the national installation codes

For US this is the National Electric Code NFPA 70, article 810.

For Germany, observe the current version of the Lightning Protection Standard VDE 0185 (DIN EN 62305) Sections 1 to 4 for buildings with lightning protection, or the standard VDE 0855 (DIN EN 60728-11) in case there is no lightning protection.

This work must be carried out by qualified personnel only.

Requirements for compliance to Safety, Telecom, EMC and other standards

Caution

Observe the regulations listed in chapter 12 before putting the SINAUT MD741-1 into operation.

Operating costs

Notice

Note that data packets exchanged for sign up connections, reconnecting, connect attempts (e.g. Server switched off, wrong destination address, etc.) as well as keeping the connection alive are also subject to charge.

Firmware with Open Source GPL/LGPL

The firmware of the SINAUT MD741-1 includes open Source Software under terms of GPL/LGPL. According to section 3b of GPL and of section 6b of LGPL we provide you the source code. Please write to

s_opsource@gmx.net
s_opsource@gmx.de

Please enter 'Open Source MD741' as subject of your e-mail, that we can filter your e-mail easier.

Firmware with OpenBSD

The firmware of SINAUT MD741-1 contains sections from the OpenBSD software.
The use of OpenBSD software is subject to the following copyright notice

```
* Copyright (c) 1982, 1986, 1990, 1991, 1993
* The Regents of the University of California. All rights reserved.
*
* Redistribution and use in source and binary forms, with or without
* modification, are permitted provided that the following conditions
* are met:
* 1. Redistributions of source code must retain the above copyright
*   notice, this list of conditions and the following disclaimer.
* 2. Redistributions in binary form must reproduce the above copyright
*   notice, this list of conditions and the following disclaimer in the
*   documentation and/or other materials provided with the distribution.
* 3. All advertising materials mentioning features or use of this software
*   must display the following acknowledgement:
*   This product includes software developed by the University of
*   California, Berkeley and its contributors.
* 4. Neither the name of the University nor the names of its contributors
*   may be used to endorse or promote products derived from this software
*   without specific prior written permission.
*
* THIS SOFTWARE IS PROVIDED BY THE REGENTS AND CONTRIBUTORS ``AS IS'' AND
* ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE
* IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR
* PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE REGENTS OR CONTRIBUTORS BE
* LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR
* CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF
* SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS
* INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, * WHETHER IN
* CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE)
* ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE
* POSSIBILITY OF SUCH DAMAGE.
```

Preface

Purpose of this documentation

This documentation will support you on your way to successful application of GSM/GPRS modem SINAUT MD741-1. It will introduce you to the topic in clear and straightforward steps and provide you with an overview of the hardware of the SINAUT MD741-1 GSM/GPRS modem. This documentation will help you during installation and commissioning of SINAUT GSM/GPRS modem and explains the diagnostics and service options available.

Validity of the documentation

This manual is valid for the following product:

GPRS/GSM-Modem SINAUT MD741-1

Firmware version 1.316

Hardware product version 2.x

Order number 6NH9741-1AA00

Intended purpose: (E-)GPRS-VPN-Router for industrial application

Online Support

In addition to our product documentation, the comprehensive online information platform supports you in all aspects of our Service & Support at any time and from any location in the world. You will find this on the Internet at the following address: www.siemens.com/automation/service&support

Here, you will find the following information:

- Support news, newsletter
- Product information, Product Support, Applications & Tools
- Technical Forum
- Access to other features of our Service & Support offer:
 - Technical Consulting
 - Engineering Support
 - Field Service

Phone: +49 911 895 7444

- Spare parts and repairs
Phone: +49 911 895 7448
- Optimization and modernization
- Technical Support
Expert advice on technical questions with a wide range of demand-optimized services for all our products and systems.
Phone: +49 911 895 7222
www.siemens.de/automation/support-request

You will find contact addresses on the Internet at the following address:

www.automation.siemens.com/partner

SITRAIN

With over 300 different courses, SITRAIN covers the entire Siemens product and system spectrum in the field of automation and drive technology. Advanced training tailored to your needs is also available. In addition to our classic range of courses, we also offer a combination of various training media and sequences. You can, for example, use self-study programs on CD-ROM or on the Internet as preparation or to consolidate training.

You will find detailed information on our training curriculum and how to contact our customer consultants at the following Internet address:

www.siemens.com/sitrain

Siemens documentation

- You will find the order numbers for the relevant Siemens documentation in the following catalogs:
 - SIMATIC NET Industrial Communication, catalog IK PI
 - SIMATIC Products for Totally Integrated Automation and Micro Automation, catalog ST 70

You can request these catalogs and additional information from your Siemens representative.

- You will find many SIMATIC NET manuals on the Internet pages of Siemens Customer Support for automation:

Link to Customer Support: <http://support.automation.siemens.com/WW/view/en>

Enter the ID of the relevant manual as the search item. The ID is listed below some of the reference entries in brackets.

→ You will find the latest version of this documentation under the entry ID 22550242.

- Alternatively you will find the SIMATIC NET manuals on the Internet pages of Siemens Customer Support for automation:

<http://support.automation.siemens.com/WW/view/en/10805878>

Browse to the designated product group and set the following filter settings:

"Entry list" → Entry type "Manuals"

Contents

1	Applications and functions	12
2	Setup.....	16
2.1	Important notes on using the device.....	16
2.2	Step by step.....	17
2.3	Preconditions for operation.....	18
2.4	Device front.....	19
2.5	Service button (SET)	19
2.6	Operating state indicators.....	20
2.7	Connections.....	21
2.8	Inserting the SIM card.....	23
2.9	Top rail mounting	24
3	Configuration	25
3.1	TCP/IP configuration of the network adapter in Windows XP	26
3.2	Allowed characters for user name, passwords and other inputs.....	27
3.3	Establishing a configuration connection	28
3.4	Start page of the Web user interface.....	31
3.5	Language selection.....	35
3.6	Configuration procedure	36
3.7	Configuration Profiles	37
3.8	Changing the password.....	38
3.9	Reboot	40
3.10	Load factory settings.....	41
4	Local interface	43
4.1	IP addresses of the local interface	43
4.2	DHCP server to local network	45
4.3	DNS to local network	47
4.4	Local hostname	49
4.5	System Time/NTP.....	50
4.6	Additional Internal Routes	52
5	External interface	53
5.1	Access parameters to EGPRS/GPRS	53
5.2	Installation mode - aligning antennas	58
5.3	Traffic volume supervision.....	60
5.4	EGPRS/GPRS Connection Monitoring.....	62
5.5	Hostname via DynDNS.....	65
5.6	SRS – Siemens Remote Service.....	66
5.1	NAT - Network Address Translation	68

6	Security functions	70
6.1	Firewall rules.....	70
6.2	Port Forwarding	75
6.3	Advanced security functions.....	77
6.4	Firewall Log	79
7	VPN connection	80
7.1	VPN Roadwarrior Mode.....	84
7.2	IPsec VPN Standard Mode.....	89
7.3	Loading VPN certificates	98
7.4	Firewall rules for VPN tunnel	99
7.5	Supervision of VPN connections	101
7.6	Advanced settings for VPN connections	103
7.7	Status of the VPN connections.....	106
8	Remote access	107
8.1	HTTPS remote access.....	107
8.2	SSH remote access	109
8.3	Remote access via dial-in connection	111
9	Status, log and diagnosis	114
9.1	Log.....	114
9.2	Remote logging.....	117
9.3	Snapshot.....	118
9.4	Hardware information	120
9.5	Software information.....	120
10	Additional functions.....	121
10.1	Service Center	121
10.2	Alarm SMS.....	121
10.3	SMS - Messaging from the local network.....	123
10.4	Software Update	126
11	Technical Data	128
12	Applied Standards and Approvals.....	131
12.1	EU Declaration of Conformance.....	131
12.2	Compliance to FM, UL and CSA	134
12.3	Compliance to FCC	135
	Glossary	137

Applications and functions

1

The SINAUT MD741-1 provides a wireless connection to the Internet or to a private network. The SINAUT MD741-1 can provide this connection in any location where a GSM network (Global System for Mobile Communication = mobile phone network) is available which provides the services EGPRS (Enhanced General Packet Radio Service = EDGE) or GPRS (General Packet Radio Service). A precondition for this is a SIM card of a GSM network operator with the appropriate services activated.

The SINAUT MD741-1 thus links a locally connected application or entire networks to the Internet via wireless IP connections. It is also possible to connect directly to an intranet, to which in turn the external remote stations are connected.

The SINAUT MD741-1 can establish a VPN (Virtual Private Network) between a locally connected application / a network and an external network, and can protect this connection against access by third parties through the use of IPsec (Internet Protocol Security).

In order to perform these tasks in the scenarios described, the device combines the following functions:

- EDGE modem for flexible data communication via EGPRS or GPRS
- Firewall for protection against unauthorized access. The dynamic packet filter examines data packets based on their source and destination addresses (stateful inspection firewall) and blocks undesirable data traffic (anti-spoofing)
- The SINAUT MD741-1 can establish via the wireless IP connections a VPN (Virtual Private Network) between the locally connected application or network and an external network and can protect this connection by IPsec (Internet Protocol Security) against unwanted access by third parties.

Application examples of the SINAUT MD741-1

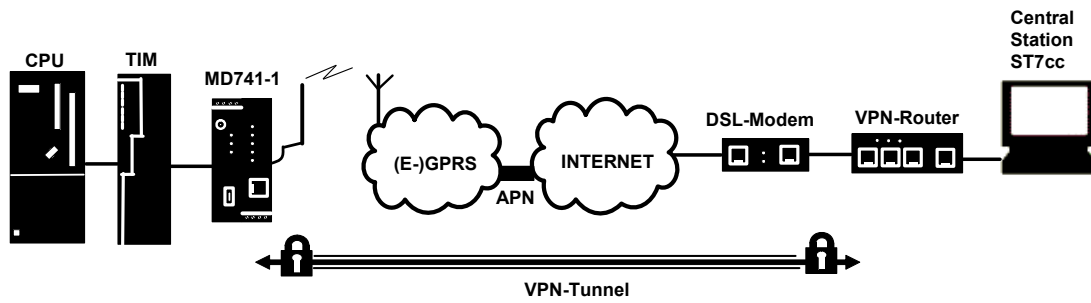


Figure 1-1 Connection between CPU and Central Station

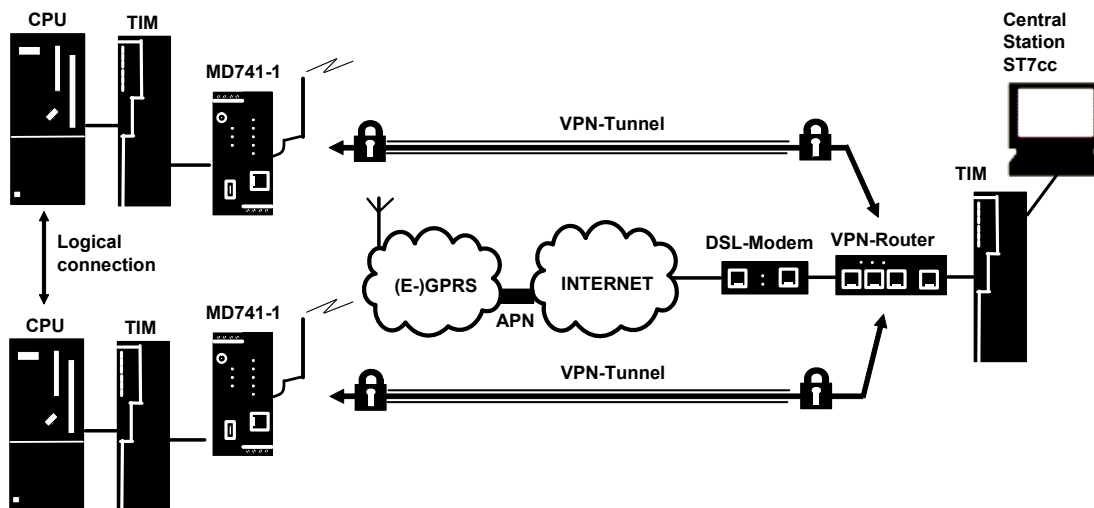


Figure 1-2 Connection between two CPUs

Configuration

The device can be configured via a Web user interface that can simply be displayed using a Web browser. It can be accessed by means of the following:

- the local interface
- EGPRS/GPRS
- CSD (Circuit Switched Data = dial-in data connection) of the GSM

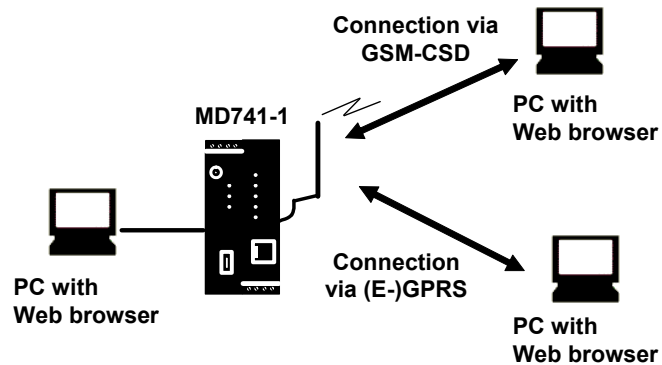


Figure 1-3 Configuration

VPN functions

The SINAUT MD741-1 provides the following VPN functions:

- Private and public VPN
- IPsec as VPN tunnel protocol
- IPsec-3DES encryption with 168 bits
- IPsec-AES encryption with 128, 192 and 256 bits
- Packet authentication MD5 and SHA-1
- Internet Key Exchange (IKE) with main mode and aggressive mode
- Authentication by pre-shared key (PSK), X.509v3 certificate and CA
- Dead peer detection (DPD)

Firewall functions

The SINAUT MD741-1 provides the following firewall functions in order to protect the local network and itself from external attacks:

- Stateful inspection firewall
- Anti-spoofing
- Port forwarding
- NAT

Additional functions

The SINAUT MD741-1 provides the following additional functions:

- DNS cache
- DHCP server
- NTP
- Remote logging
- In Port
- Web user interface for configuration
- Sending alarm SMS
- SSH console for configuration
- DynDNS client
- Dial-in data connection for maintenance and remote configuration

2.1 Important notes on using the device

Safety notices on the use of the device

The following safety notices must be adhered to when setting up and operating the device and during all work relating to it such as installation, connecting up, replacing devices or opening the device.

General notices on use in hazardous areas



Warning**Risk of explosion when connecting or disconnecting the device**

EXPLOSION HAZARD

DO NOT CONNECT OR DISCONNECT EQUIPMENT WHEN A FLAMMABLE OR COMBUSTIBLE ATMOSPHERE IS PRESENT.



Warning**Replacing components**

EXPLOSION HAZARD

SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIVISION 2 OR ZONE 2.

General notices on use in hazardous areas according to ATEX



Warning**Requirements for the cabinet/enclosure**

When used in hazardous environments corresponding to Class I, Division 2 or Class I, Zone 2, the device must be installed in a cabinet or a suitable enclosure.

To comply with EU Directive 94/9 (ATEX95), this enclosure must meet the requirements of at least IP54 in compliance with EN 60529.

**Warning****Suitable cables for temperatures in excess of 70 °C**

If the cable or conduit entry point exceeds 70 °C or the branching point of conductors exceeds 80 °C, special precautions must be taken. If the equipment is operated in an air ambient in excess of 50 °C, only use cables with admitted maximum operating temperature of at least 80 °C.

**Warning****Protection against transient voltage surges**

Provisions shall be made to prevent the rated voltage from being exceeded by transient voltage surges of more than 40 %. This criterion is fulfilled, if supplies are derived from SELV (Safety Extra-Low Voltage) only.

2.2 Step by step

Set up the SINAUT MD741-1 in the following steps:

Step	Chapter
1. First familiarise yourself with the preconditions for operation of the SINAUT MD741-1.	2.3
2. Read the safety instructions and other instructions at the beginning of this document very carefully, and be sure to follow them.	
3. Familiarise yourself with the control elements, connections and operating state indicators of the SINAUT MD741-1.	2.4 -2.7
4. Connect a PC with a Web browser (Admin PC) to the local interface (X2) of the SINAUT MD741-1.	3
5. Using the Web user interface of the SINAUT MD741-1, enter the PIN (Personal Identification Number) of the SIM card.	5.1
6. Disconnect the SINAUT MD741-1 from the power supply.	2.7
7. Insert the SIM card in the device.	2.8
8. Connect the antenna.	2.7
9. Connect the SINAUT MD741-1 to the power supply.	2.7
10. Set the SINAUT MD741-1 up in accordance with your requirements.	3 - 10
11. Connect your local application.	2.7

2.3 Preconditions for operation

In order to operate the SINAUT MD741-1, the following information must be on hand and the following preconditions must be fulfilled:

Antenna

An antenna, adapted to the frequency bands of the GSM network operator you have chosen: 850 MHz, 900 MHz, 1800 MHz or 1900 MHz. Use only antennas from the accessories for the SINAUT MD741-1.

See Chapter 2.7.

Power supply

A power supply with a voltage between 12 VDC and 30 VDC that can provide sufficient current.

See Chapter 2.7.

SIM card

A SIM card from the chosen GSM network operator.

PIN

The PIN for the SIM card.

EGPRS / GPRS activation

The SIM card must be activated by your GSM network operator for the services EGPRS or GPRS.

The EGPRS / GPRS access data must be known:

- Access Point Name (APN)
- User name
- Password

CSD 9600 bit/s activation

The SIM card must be activated by your GSM network operator for the CSD service if you wish to use remote configuration via a dial-in data connection, see Chapter 8.3.

2.4 Device front

Here are definitions of terms frequently used in this manual:



- 1) Connection terminals for the power supply
- 2) Set button
- 3) Antenna jack type SMA
- 4) Operating state indicators S, Q, C,
- 5) X1 (Service; USB) – without function
- 6) 10/100 Base-T - RJ45 jack for connecting the local network
- 7) Operating state indicators Power, LAN, VPN

Figure 2-1 Operating elements

2.5 Service button (SET)

On the front side of the SINAUT MD741-1 there is a small hole (see B) which is SET marked and has a button behind it. Use a pointed object, e.g. a straightened-out paperclip, to press this button.

- If you press the button for longer than 5 seconds, the SINAUT MD741-1 reboots and loads the factory settings.

2.6 Operating state indicators

The LEDs on the SINAUT MD741-1 provide information about the operating status of the device.

Meaning of the LEDs on the left-hand side of the device:

LED	State	Meaning
S (<i>Status</i>)	Flashing slowly	PIN transfer
	Flashing quickly	PIN error / SIM error
	ON	PIN transfer successful
Q (<i>Quality</i>)	OFF	Not logged into GSM network
	Flashing briefly	Poor signal strength (CSQ < 6)
	Flashing slowly	Medium signal strength (CSQ= 6..10)
	ON, with brief interruptions	Good signal strength (CSQ=11-18)
	ON	Very good signal strength (CSQ > 18)
C (<i>Connect</i>)	OFF	No connection
	Flashing quickly	Service call via CSD active
	ON with brief interruptions	GPRS connection active
	ON	EGPRS connection active
S, Q, C together	Light up in sequence quickly	Booting
	Light up in sequence slowly	Update
	Flashing quickly in unison	Error

Meaning of the LEDs on the right-hand side of the device:

LED	State	Meaning
DC5V	ON	Device switched on, operating voltage present
	OFF	Device switched off, operating voltage not present
LINK	ON	Ethernet connection established to the local application / the local network
	OFF	No Ethernet connection to the local application / the local network
	ON with brief interruptions	Data transfer via the Ethernet connection
VPN	ON	VPN connection active
	OFF	VPN connection active

2.7 Connections

X2 (10/100 Base-T)

The local network is connected to the local applications at the 10/100 Base-T connection, e.g. a programmable controller, a machine with an Ethernet interface for remote monitoring, or a notebook or desktop PC.

To set up the SINAUT MD741-1, connect the Admin PC with Web browser here.

The interface supports autonegotiation. It is thus detected automatically whether a transmission speed of 10 Mbit/s or 100 Mbit/s is used on the Ethernet.

A connecting cable with a RJ45 plug must be used. It can be a cross-over cable or a patch cable.

X1 (USB; Service)

In the SINAUT MD741-1 this interface has no function and is reserved for later applications. Do not connect any devices here. Doing so could interfere with the SINAUT MD741-1's operation.

SMA antenna jack

The SINAUT MD741-1 has an antenna jack of the type SMA for connecting the antenna.

The antenna that is used should have an impedance of about 50 ohms. It must be matched for GSM 900MHz and DCS 1800MHz or GSM 850 MHz and PCS 1900 MHz, depending on which frequency bands your GSM network operator uses. In Europe and China GSM 900MHz and DCS 1800MHz are used, in the USA GSM 850 MHz and PCS 1900 MHz are used. Obtain this information from your network operator.

The match (VSWR) of the antenna must be 1:2.5 or better.

Caution

Use only antennas from the accessories line for the SINAUT MD741-1. Other antennas could interfere with product characteristics or even lead to defects.

When installing the antenna, a sufficiently good signal quality must be ensured (CSQ > 11). Use the indicator lamps of the SINAUT MD741-1 which show the signal quality. Make sure that there are no large metal objects (e.g. reinforced concrete) close to the antenna.

Observe the installation and user instructions for the antenna being used.



WARNING

When the antenna is installed outdoors it must be earthed for lightning protection. The outdoor antennas shield must be reliably connective to protective earth. The installation shall be done according the national installation codes (For US this is the National Electric Code NFPA 70, article 810).

This work must be carried out by qualified personnel only.

Screw terminals for power supply

Power supply

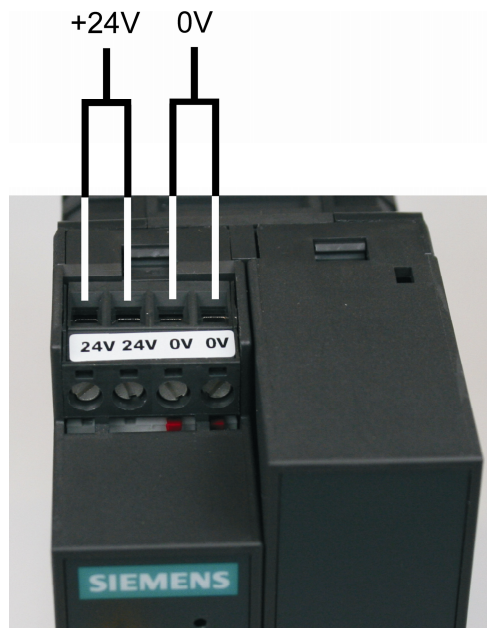


Figure 2-2 Screw terminals

The SINAUT MD741-1 operates with direct current of from DC 12-30 V, nominally DC 24 V. This power supply is connected at the screw terminals on the left-hand side of the device.

Connect the positive supply voltage to one or both screw terminals marked 24V and the negative supply voltage to one or both screw terminals marked 0V.

The rated current consumption is about 510 mA at 12 V and 230 mA at 30 V.

Warning:

The power supply unit of the SINAUT MD741-1 is not electrically isolated. Observe the safety instructions at the beginning of this manual.

Field wiring instructions

Use copper wires only.

Solid wire: 0,5...3 mm² (AWG 20...18)

Strained wire: 0,5...2,5 mm²

Torque of screw clamps: 0,6...0,8 Nm

2.8 Inserting the SIM card

Notice

Before inserting the SIM card, enter the PIN of the SIM card in the SINAUT MD741-1 via the Web user interface. See Chapter 5.1.



Figure 2-3 Inserting the SIM card

1. After you have entered the PIN of the SIM card, disconnect the SINAUT MD741-1 completely from the power supply.
2. The drawer for the SIM card is located on the back of the device. Right next to the drawer for the SIM card in the housing aperture there is a small yellow button. Press on this button with a pointed object, for example a pencil.

When the button is pressed the SIM card drawer comes out of the housing.

3. Place the SIM card in the drawer so that its gold-plated contacts remain visible.
4. Then push the drawer with the SIM card completely into the housing.

Notice

Do not under any circumstances insert or remove the SIM card during operation. Doing so could damage the SIM card and the SINAUT MD741-1.

2.9 Top rail mounting

The SINAUT MD741-1 is suitable for top-hat rail mounting on DIN EN 50022 rails. A corresponding bracket can be found at the rear of the device.

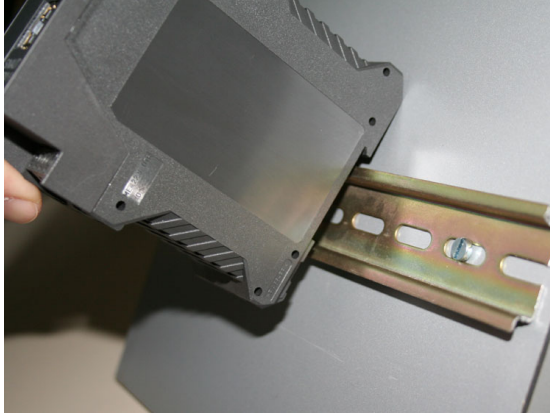


Figure 2-4 Top rail mounting

Installation

1. Fit the upper part of the locking mechanism of the device on to the DIN rail.
2. Press the device down against the DIN rail until the spring catch locks in place.

Uninstalling

1. Using a screwdriver, pull down the spring catch on the rear of the device.
2. Remove the device from the DIN rail

Configuration of the router and firewall functions is carried out locally or remotely via the Web-based administration interface of the SINAUT MD741-1.

Remote configuration

Remote configuration via HTTPS or CSD access is only possible if the SINAUT MD741-1 is configured for remote access. In this case proceed exactly as described in Chapter 8.

Configuration via the local interface

The preconditions for configuration via the local interface are:

- The computer (Admin PC) that you use to carry out configuration must be either connected directly to the Ethernet jack of the SINAUT MD741-1 via a network cable or it must have direct access to the SINAUT MD741-1 via the local network.
- The network adapter of the computer (Admin PC) that you use to carry out configuration must have the following TCP/IP configuration:

IP address: **192.168.1.2**

Subnet mask: **255.255.255.0**

Instead of the IP address **192.168.1.2** you can also use other IP addresses from the **range 192.169.1.x**.

- If you also wish to use the Admin PC to access the external network via the SINAUT MD741-1, the following additional settings are necessary:

Standard gateway: **192.168.1.1**

Preferred DNS server: **Address of the domain name server**

3.1 TCP/IP configuration of the network adapter in Windows XP

Configure the LAN connection

Click on *Start, Connect To ..., Show All Connections...*

Then click on *LAN Connection*. In the dialog box *Properties of LAN Connection*, click on the *General* tab and select there the entry *Internet Protocol (TCP/IP)*. Open *Properties* by clicking on the corresponding button.

The window *Properties of Internet Protocol (TCP/IP)* appears (see illustration below).

Note:

The path leading to the dialog box *Properties of LAN Connection* depends on your Windows settings. If you are not able to find this dialog box, search in the Windows Help function for *LAN Connection* or *Properties of Internet Protocol (TCP/IP)*.

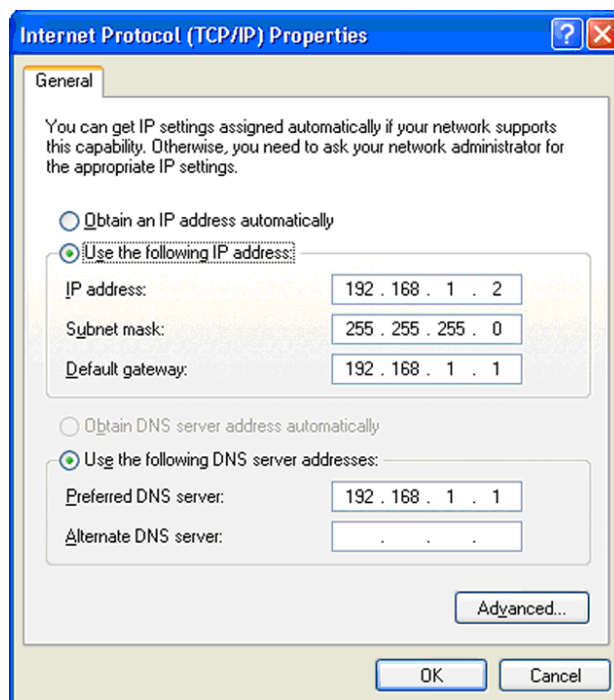


Figure 3-1 Properties of Windows Internet Protocol

Enter the following values in order to get to the Web user interface of the SINAUT MD741-1:

IP address: **192.168.1.2**

Subnet mask: **255.255.255.0**

In addition, enter the following values if you want to use the Admin PC to access the external network via the SINAUT MD741-1:

Standard gateway: **192.168.1.1**

Preferred DNS server: **192.168.1.1**

Preferred DNS server

If you call up addresses via a domain name (e.g. www.neuhaus.de), then you must refer to a domain name server (DNS) to find out what IP address is behind the name. You can define the following as the domain name server:

- The DNS address of the network operator,

or

- The local IP address of the SINAUT MD741-1, as long as it is configured for breaking out host names into IP addresses (see Chapter 4.3; **Factory settings**).

To define the domain name server in the TCP/IP configuration of your network adapter, proceed as described above.

3.2 Allowed characters for user name, passwords and other inputs

For user names, passwords, host names, APN and PIN the following ASCII characters may be used:

User names, passwords and PIN

abcdefghijklmnopqrstuvwxyz ABCDEFGHIJKLMNOPQR
STUVWXYZ0123456789!\$%&'()*+,-./:;<=>?@[\\]^_`{|}

Host names and APN

abcdefghijklmnopqrstuvwxyz ABCDEFGHIJKLMNOPQR
STUVWXYZ0123456789.-

3.3 Establishing a configuration connection

Setting up a Web browser

Proceed as follows:

1. Launch a Web browser.

(e.g. MS Internet Explorer Version 7 or later or Mozilla Firefox Version 2 or later; the Web browser must support SSL (i.e. HTTPS).)
2. Make sure that the browser does not automatically dial a connection when it is launched.

In MS Internet Explorer, make this setting as follows: Menu *Tools, Internet Options...*, tab *Connections*: Under *Dial-up and VPN Settings*, make sure that *Never dial a connection* is activated.

Calling up the start page of the SINAUT MD741-1

1. In the address line of the browser, enter the address of the SINAUT MD741-1 in full. In the factory settings this is:

https://192.168.1.1

Result: A security message appears. In Internet Explorer 7, for example, this one:



Figure 3-2 Confirming the security message

2. Acknowledge the corresponding safety message with "Continue loading this page ..."

Note

Because the device can only be administered via encrypted access, it is delivered with a self-signed certificate. In the case of certificates with signatures that the operating system does not know, a security message is generated. You can display the certificate.

It must be clear from the certificate that it was issued for SIEMENS AG. The Web user interface is addressed via an IP address and not using a name, which is why the name specified in the security certificate, is not the same as the one in the certificate.

Entering the user name and password

3. You will be asked to enter the user name and the password:

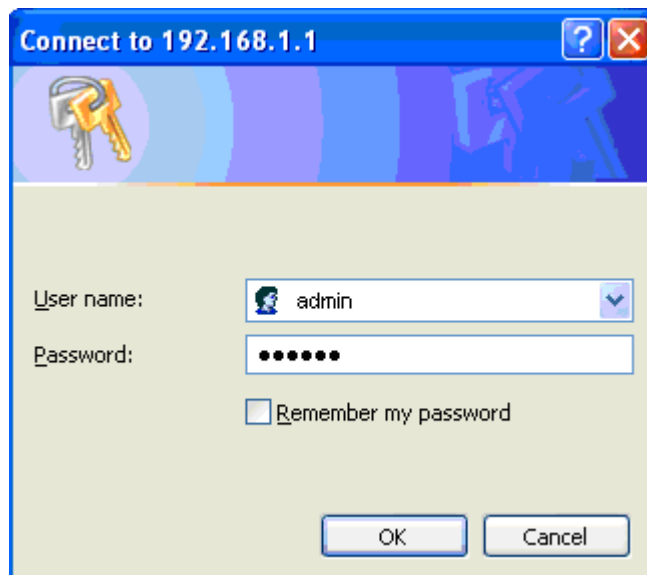


Figure 3-3 Enter user name and password

The factory settings are:

User name: **admin**

Password: **sinaut**

Note

You should change the password in any event. The factory settings are general knowledge and does not provide sufficient protection. Chapter 3.8 contains a description of how to change the password.

The start page is displayed

After the user name and password are entered, the start page of the SINAUT MD741-1 appears in the Web browser with an overview of the operating state, see Chapter 3.4.

The start page is not displayed

If after several tries the browser still reports that the page cannot be displayed, try the following:

- Check the hardware connection. On a Windows computer, go to the DOS prompt (Menu *Start, Programs, Accessories, Command Prompt*) and enter the following command:

```
ping 192.168.1.1
```

If a return receipt message for the 4 packets that were sent out does not appear within the specified time period, check the cable, the connections and the network card.

- Make sure that the browser does not use a proxy server. In MS Internet Explorer (Version 7.0), make these settings as follows: Menu *Tools, Internet Options...*, tab *Connections*: Under *LAN Settings*, click on the *Settings...* button, then in the dialog box *Settings for local network (LAN)*, make sure that under *Proxy Server* the entry *Use proxy server for LAN* is not activated.
- If other LAN connections are active on the computer, deactivate them for the duration of the configuration process. Under the Windows menu *Start, Connect To ..., Show All Connections...*, under LAN or High-Speed Internet right-click on the connection concerned and select *Deactivate* in the pop-up menu.
- Enter the address of the SINAUT MD741-1 with a slash:

```
https://192.168.1.1/
```

3.4 Start page of the Web user interface

After the Web user interface of the SINAUT MD741-1 is called up and the user name and password are entered, an overview of the current operating state of the SINAUT MD741-1 appears.

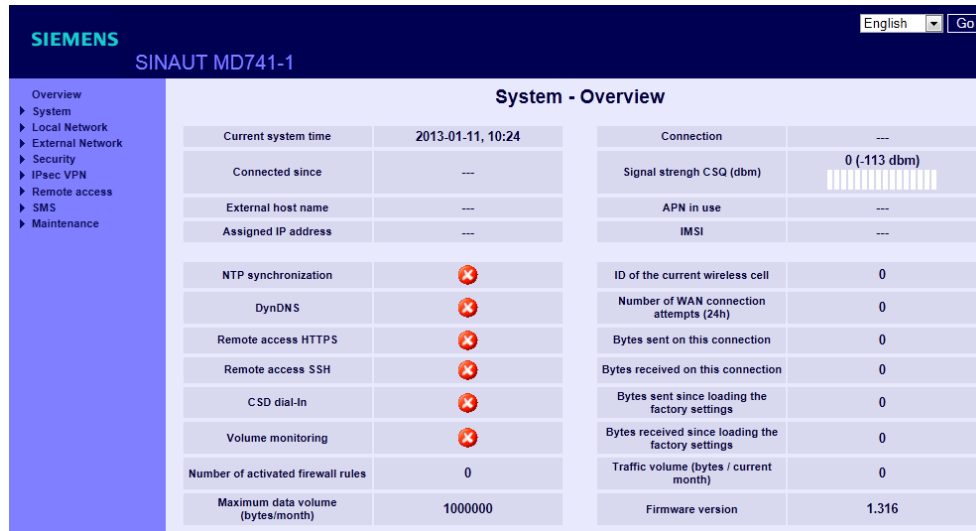


Figure 3-4 Overview

Note

Use the *Refresh* function of the Web browser to update the displayed values.

Current system time

Shows the current system time of the SINAUT MD741-1 in the format:

Year – Month – Day, Hours – Minutes

Connected since

With the date and time of day, this shows the time since the current wireless connection was established.

External hostname

Shows the hostname (e.g. md741.mydns.org) of the SINAUT MD741-1, if a DynDNS service is being used.

Assigned IP address

Shows the IP address at which the SINAUT MD741-1 can be reached in EGPRS or GPRS. This IP address is assigned to the SINAUT MD741-1 by EGPRS or GPRS.

Connection

Shows if a wireless connection exists, and which one:

- EDGE connection (IP connection via EGPRS)
- GPRS connection (IP connection via GPRS)
- CSD connection (service connection via CSD)

Note

Using connection monitoring

It is possible that you will see both an IP data connection and an assigned IP address although the connection quality is not adequate to transfer data. For this reason, we recommend that you use the connection monitoring. For more detailed information, refer to the section Checking the connection - Connection monitoring (see Chapter 5.4).

Signal strength CSQ (dbm)

The bar display and the number above it indicate the strength of the GSM signal as a CSQ value.

CSQ = 0	No connection to the GSM network
CSQ < 6	Bad signal strength
CSQ 6 ... 10	Medium signal strength
CSQ 11 ... 18	Good signal strength
CSQ > 18	Very good signal strength

The dBm value is shown in brackets after the CSQ value.

If the "Installation mode" function is enabled, the display is not active..

APN in use



Shows the APN (= Access Point Name) of the wireless link that is being used.

IMSI

This entry shows the subscriber ID that is stored on the SIM card being used. This ID (IMSI = International Mobile Subscriber Identity) is used by the mobile wireless provider to detect the authorizations and agreed services for the SIM card.



NTP synchronization

Shows whether or not the system time is obtained from an NTP server using NTP.

- : The service is activated.
- : The service is not activated.

DynDNS



Shows whether or not a DynDNS service is activated.

- : The service is activated.
- : The service is not activated.

You will find information indicating whether or not the logon with a DNS service was successful in the log.



Remote access HTTPS

Shows whether remote access to the Web user interface of the SINAUT MD741-1 via the wireless network is permitted. For more detailed information, refer to the section 8.1.

- : Access is permitted.
- : Access is not permitted.



Remote access SSH

Shows whether remote access to the SSH console of the SINAUT MD741-1 via the wireless network is permitted.

- : Access is allowed.
- : Access is not allowed.



CSD Dial-In

Shows whether remote CSD service calls are allowed.

- : Access is allowed.
- : Access is not allowed.

Traffic volume supervision

Shows whether the volume monitoring is on or off.

- : The function is enabled.
- : The function is disabled.

ID of the current wireless cell

With the identification number, this entry shows the wireless cell in which the device is logged in (Cell ID).

Number of WAN connection attempts (24 h)

This counter shows how often the SINAUT MD741-1 attempted to establish a connection to the mobile wireless network in the last 24 hours.

Bytes sent and bytes received on this connection

These entries show the number of bytes that have been sent or received during the current connection to the mobile wireless network.

The counters are reset when a new connection is established.

Note

These figures serve only as a general indication of the data volume, and can differ significantly from the mobile wireless provider's accounting

Bytes sent since loading the factory settings

These entries show the number of bytes that have been sent or received via the mobile wireless network since the last restart of since the last time the factory settings were loaded.

The counters are reset when the factory settings are loaded.

Traffic volume (bytes / current month)

Dieser Zähler gibt das Datenvolumen in Byte an, das seit Anfang des Monats über das SINAUT MD741-1 übertragen wurde.

Number of activated firewall rules

This entry shows how many firewall rules are currently active.

Maximum data volume (bytes/month)

This entry shows the limit value to which the volume supervision was set.

Firmware version

- This shows the version number of the currently installed firmware of the SINAUT MD741-1.

3.5 Language selection

The Web user interface of the SINAUT MD741-1 supports English and German language.

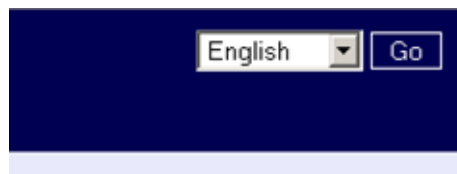


Figure 3-5 Language selection

Automatic

The SINAUT MD741-1 selects the language of the Web user interface in accordance to the selected language of the used Web browser:

- German, if the Web browser uses the German language,
- English, in all other cases.

German

The SINAUT MD741-1 uses the German language, irrespective of the Web browser settings.

English

The SINAUT MD741-1 uses the English language, irrespective of the Web browser settings.

Click the GO and refresh your Web browser to change the language.

3.6 Configuration procedure

The procedure for configuration is as follows:

Carrying out configuration

1. Use the menu to call up the desired settings area
2. Make the desired entries on the page concerned or use Reset to delete the current entry which has not been saved.
3. Use Save to confirm the entries so that they are accepted by the device.

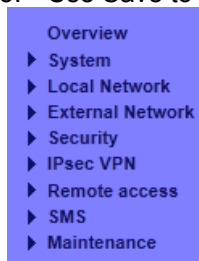


Figure 3-6 Configuration

Note

Depending on how you configure the SINAUT MD741-1, you may then have to adapt the network interface of the locally connected computer or network accordingly. When entering IP addresses, always enter the IP address component numbers without leading zeros, e.g.: 192.168.0.8.

Invalid entries

The SINAUT MD741-1 checks your entries. Obvious errors are detected during saving and the input box in question is marked.

IP	Netmask	
192.168.1.1	255.255.255.0	New
192.168.0.20	255.255.255.0	Delete
192.168.1.1	255.255.255.0	Delete

Figure 3-7 Indication of invalid entries

3.7 Configuration Profiles

The settings of the SINAUT MD741-1 can be saved in configuration profiles (files) and re-loaded at any time.

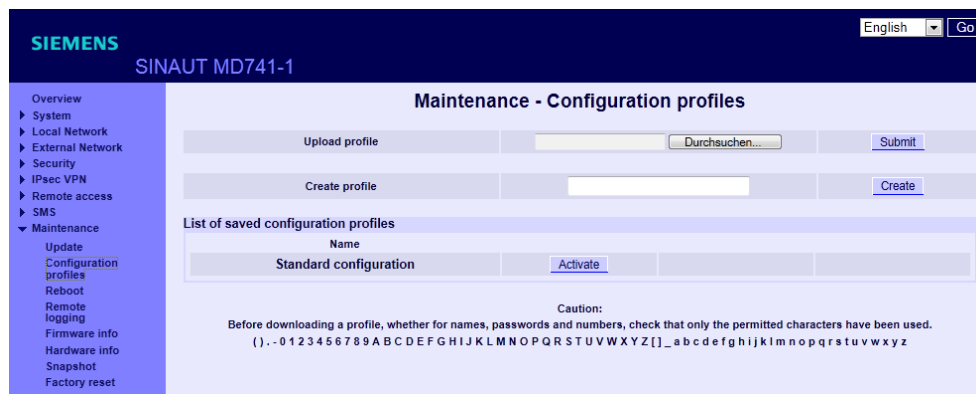


Figure 3-8 Maintenance > Configurations Profiles

Upload Profile

Loads to the SINAUT MD741-1 a configuration profile that was created before and saved on the Admin PC. Files with configuration profiles have the file extension *.epr.

Browse can be used to search the Admin PC for configuration profiles,

Submit loads the configuration profile to the SINAUT MD741-1.

It will then be shown in the table of saved configuration profiles.

Create profile

Saves the current settings of the SINAUT MD741-1 in a configuration profile.

First enter a name for the profile in the input box. *Create* saves the settings in a profile with this name and then displays them in the table of saved configuration profiles.

List of saved configuration profiles

This list displays all the configuration profiles stored on the SINAUT MD741-1. The three buttons next to the profiles have the following functions:

- **"Activate" button**
The SINAUT MD741-1 adopts the settings from the selected configuration profile and continues to work with it.
- **"Download" button**
Dialog for saving the configuration profile of the SINAUT MD741-1 on the Admin PC.
- **"Delete" button**
The configuration profile is deleted.
- **Default configuration**
The "Standard configuration" profile contains the factory settings. The profile cannot be saved or deleted.

3.8 Changing the password

Access to the SINAUT MD741-1 is protected by an access password. This access password protects access both via the

- local interface to the Web user interface, and
- via the local interface to the SSH console,

and also access via

- EGPRS or GPRS by https to the Web user interface, and
- EGPRS or GPRS to the SSH console

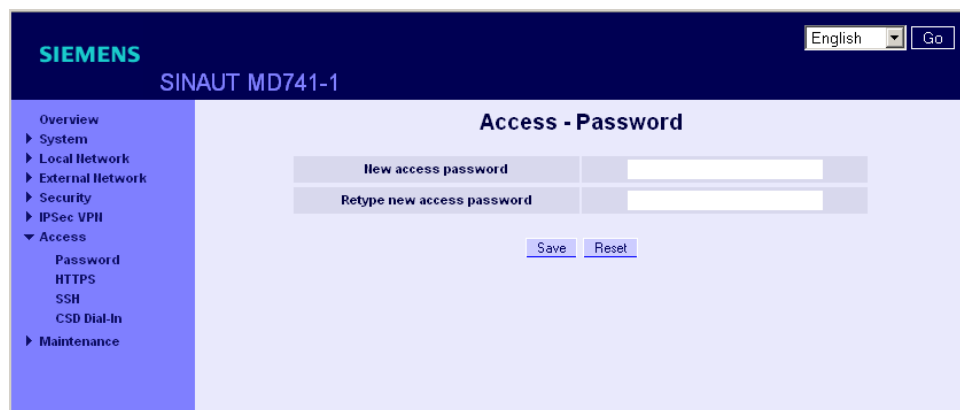


Figure 3-9 Access > Password

Access password (factory settings)

The factory settings for the SINAUT MD741-1 are:

- User name: **admin** (cannot be changed)
- Password: **sinaut**

Notice

Change the factory set password immediately

Change the password immediately after initial start-up. The factory settings are general knowledge and does not provide sufficient protection.

Note

The user name for the SSH access is different from the user name for the Web-Interface.

User name: **root** (cannot be changed)

The password for the SSH access is the same as for the Web-Interface.

New access password (with confirmation)

To change the password, enter the new password you have selected in *New access password* and confirm the entry in *Retype new access password*.

Reset can be used to discard any entries that have not yet been saved. *Save* accepts the new password.

3.9 Reboot

Although the SINAUT MD741-1 is designed for continuous operation, in such a complex system faults may occur, often triggered by external influences. A reboot can rectify these faults.

The reboot resets the functions of the SINAUT MD741-1. Current settings according to the configuration profile do not change. The SINAUT MD741-1 continues to work using these settings after the reboot.

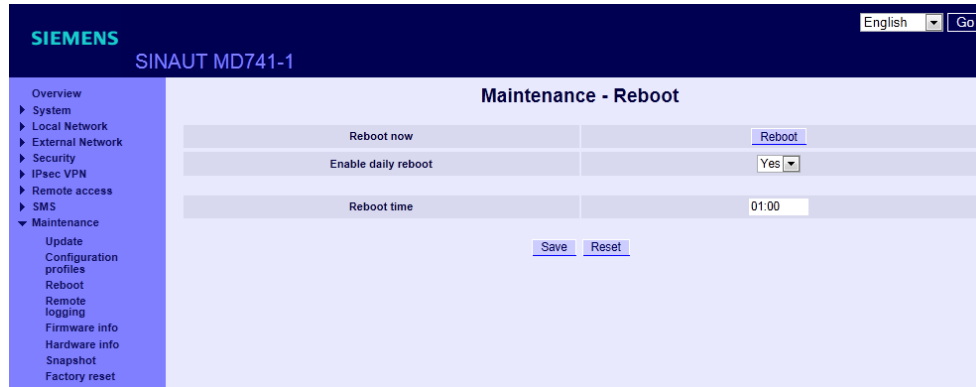


Figure 3-10 Maintenance > Reboot

Reboot now

A reboot will be executed immediately, if you press the *Reboot* button

Enable daily reboot

The reboot is carried out automatically once a day if you switch the function on with *Yes*.

Specify the *Time of the daily reboot*. The reboot will be carried out at the specified system time. Existing connections will be interrupted.

Reboot time

In the input box, enter a time in 24 hour format for the daily reboot.

Factory settings

Enable daily reboot:	No
Time of the daily reboot:	01:00

3.10 Load factory settings

The factory settings of the SINAUT MD741-1 can be restored by the following means:

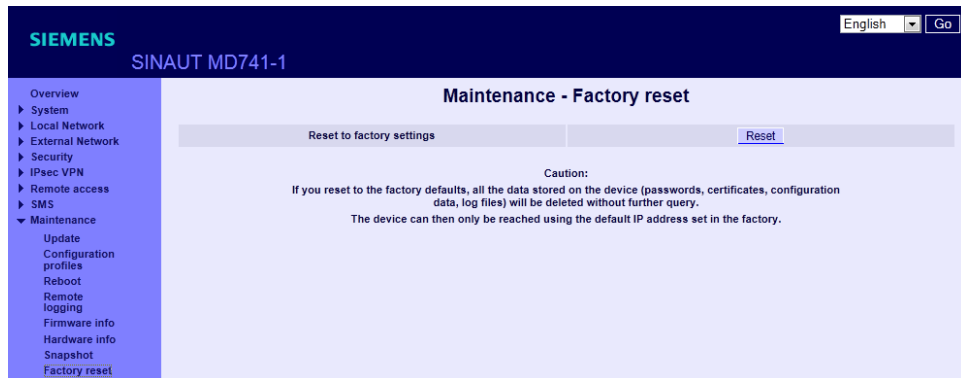


Figure 3-11 Maintenance > Factory Reset

Reset to factory settings

A click on the push button *Reset* loads the factory settings, resets the passwords and deletes the stored certificates, the configuration profiles and the archived log files.

Service button (SET)

The load of the factory settings can also be activated by pushing the service button (see chapter 2.5).

Effects of resetting to factory settings

Notice

Deleting data

Note the following effects before you reset the device to the factory settings:

- The device is reset to the factory settings and runs a restart. This may take several minutes.
- All the configuration data that was entered is deleted. This also includes user names and access passwords.
- The PIN of the SIM card is deleted in the configuration data.
- Created configuration profiles are deleted.

- Loaded certificates are deleted.
- Log files are deleted.

Reachability of the device

The device can once again be reached at the IP address 192.168.1.1 that was set in the factory.

Note

Save configuration profiles externally first

If you do not want to discard the entire data you have entered, you can save this in a configuration profile, store it externally and load it again after resetting to factory settings. For information on this, refer to section 3.7.

As an alternative: Resetting to the default configuration

If you do not want to delete created configuration profiles, certificates and log files, instead of resetting to factory settings, you also have the alternative of resetting the device to the standard configuration. For information on this, refer to section 3.7.

Local interface

4

The local interface is the interface of the SINAUT MD741-1 for connecting the local network. The interface is labeled X2 on the device. This is an Ethernet interface with a data rate of 10Mbit/s or 100Mbit/s.

The Local network is the Network connected to the local interface of the SINAUT MD741-1. The local network contains at least one local application.

Local applications are network components in the local network, for example a programmable controller, a machine with an Ethernet interface for remote monitoring, or a notebook or desktop PC or the Admin PC.

Configure the local interface and the related functions according to the your requirements and the advices in this chapter.

4.1 IP addresses of the local interface

This is where the IP addresses and the netmasks at which the SINAUT MD741-1 can be reached by local applications are set.



Figure 4-1 Local Network > Basic Settings > Local IP addresses

The factory settings for the SINAUT MD741-1 are as follows:

IP **192.168.1.1**

Netmask **255.255.255.0**

These factory-set IP addresses and netmasks can be changed freely, but should follow the applicable recommendations (RFC 1918).

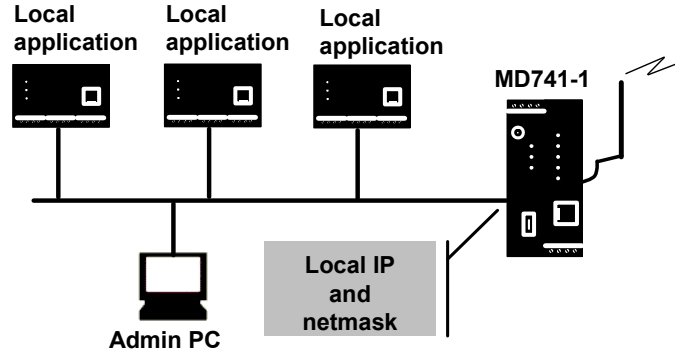


Figure 4-2 Local interface

You can define additional addresses at which the SINAUT MD741-1 can be reached by local applications. This is useful, for example, when the local network is subdivided into subnetworks. Then multiple local applications from different subnetworks can reach the SINAUT MD741-1 under various addresses.

New

Adds additional IP addresses and netmasks, which you can then modify in turn.

Delete

Removes the respective IP address and netmask. The first entry cannot be deleted.

4.2 DHCP server to local network

The SINAUT MD741-1 contains a DHCP server (DHCP = Dynamic Host Configuration Protocol). If the DHCP server is switched on, it automatically assigns to the applications that are connected to the local interface of the SINAUT MD741-1 the IP addresses, netmasks, the gateway and the DNS server. This is only possible if the setting for obtaining the IP address and the configuration parameter automatically via DHCP is activated for the local applications.

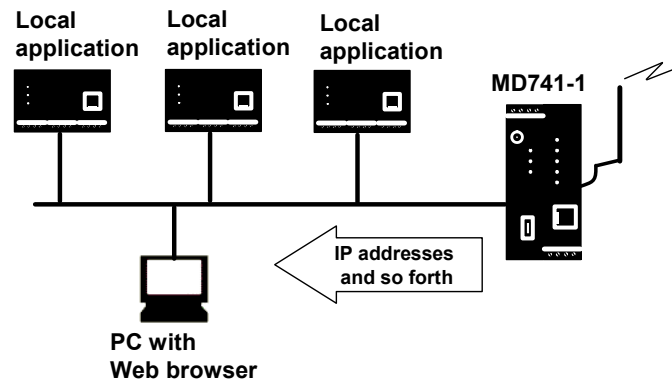


Figure 4-3 DHCP function on local interface

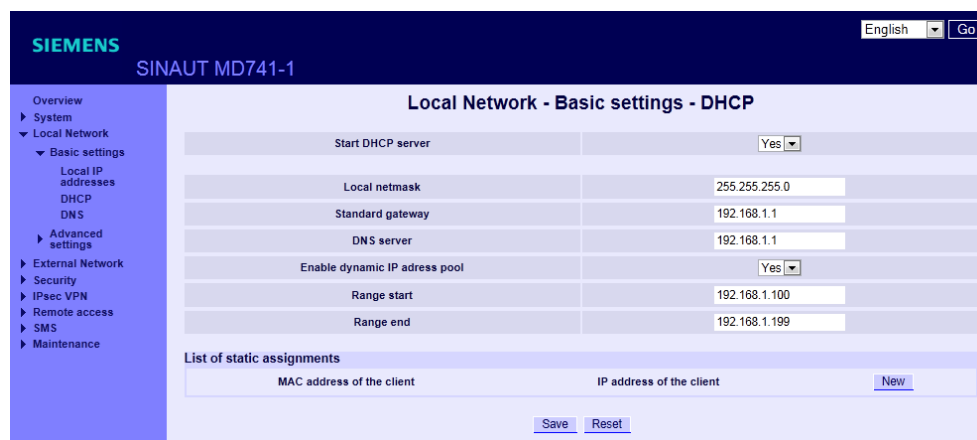


Figure 4-4 Local Network > Basic Settings > DHCP

Start DHCP server

Start DHCP server – Yes switches on the DHCP server of the SINAUT MD741-1;
No switches it off.

Local netmask

Here enter the local netmask that should be assigned to the local applications.

Standard gateway

Here enter the default gateway that should be assigned to the local applications.

DNS server

Here enter the DNS server that should be assigned to the local applications.

Enable dynamic IP address pool

With *Yes* the IO addresses that the DHCP server of the SINAUT MD741-1 assigns are drawn from a dynamic address pool.

With *No* the IP addresses must be assigned to the MAC addresses of the local application under *Static Leases*.

Range start

Specifies the first address of the dynamic address pool.

Range end

Specifies the last address of the dynamic address pool.

List of static assignments

In *Static Leases* of the IP addresses you can assign corresponding IP addresses to the MAC addresses of local applications.

If a local application requests assignment of an IP address via DHCP, the application communicates its MAC address with the DHCP query. If an IP address is statically assigned to this MAC address the SINAUT MD741-1 assigns the corresponding IP address to the application.

MAC address of the client – MAC address of the querying local application

IP address of the client – assigned IP address

Factory settings

The factory settings for the SINAUT MD741-1 are as follows:

Start DHCP server	No
Local netmask	255.255.255.0
Default gateway	192.168.1.1
DNS server	192.168.1.1
Enable dynamic IP address pool	No
Range start	192.168.1.100
Range end	192.168.1.199

4.3 DNS to local network

The SINAUT MD741-1 provides a domain name server (DNS) to the local network.

If you enter the IP address of the SINAUT MD741-1 in your local application as the domain name server (DNS), then the SINAUT MD741-1 answers the DNS queries from its cache. If it does not know the corresponding IP address for a domain address, then the SINAUT MD741-1 forwards the query to an external domain name server (DNS).

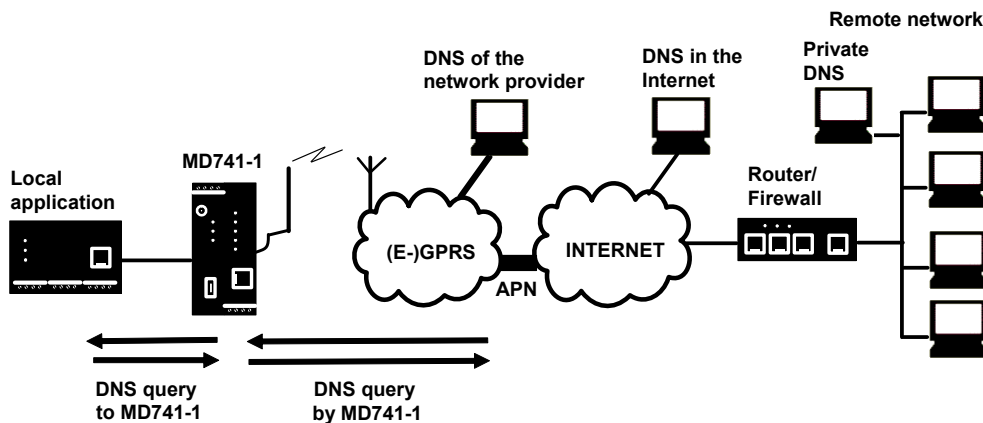


Figure 4-5 DNS function on local interface

The time period for which the SINAUT MD741-1 holds a domain address in the cache depends on the host being addressed. In addition to the IP address, a DNS query to an external domain name server also supplies the life span of this information.

The external domain name server (DNS) used can be a server of the network operator, a server on the Internet, or a server in a private external network.

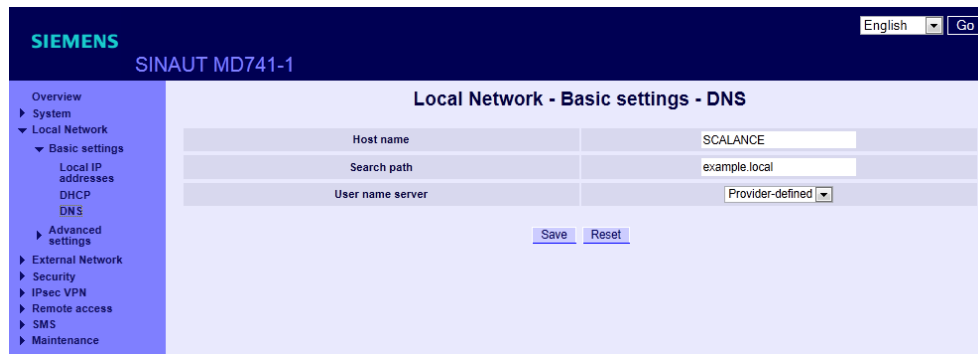


Figure 4-6 Local Network > Basic Settings > DNS

Selected nameserver

Select which domain name server (DNS) the SINAUT MD741-1 should query.

Provider-defined

When a connection is established to EGPRS or GPRS the network operator automatically communicates one or more DNS addresses. These are then used.

User-defined

As the user you select your preferred DNS. The DNSes can be connected to the Internet, or it can be a private DNS in your network.

User name server

If you have selected the option *User-defined* then enter the IP address of the selected DNS as the *Server IP Address*.

New can be used to add additional DNSes.

Factory settings

The factory settings for the SINAUT MD741-1 are as follows:

Use name server	Provider Defined
User defined nameserver	-
for new entry	0.0.0.0

4.4 Local hostname

The SINAUT MD741-1 can also be addressed from the local network using a host name. To do this, define a host name, e.g. *MD741*.

The SINAUT MD741-1 can then be called up, for example from a Web browser as *MD741*.



Figure 4-7 Local Network > Basic Settings > DNS

Note

The security concept of the SINAUT MD741-1 requires the creation of an outgoing firewall rule for each local application that is to use this hostname function. See Chapter 6.1.

If you do not use DHCP (see Chapter 4.2), then identical search paths have to be entered manually in the SINAUT MD741-1 and in the local applications. If you do use DHCP, the local applications received the search path entered in the SINAUT MD741-1 via DHCP.

Factory settings

The factory settings for the SINAUT MD741-1 are as follows:

Hostname	SINAUT
Search path	example.local

4.5 System Time/NTP

You can set the system time of the SINAUT MD741-1 yourself manually or have it synchronized automatically with a time server.

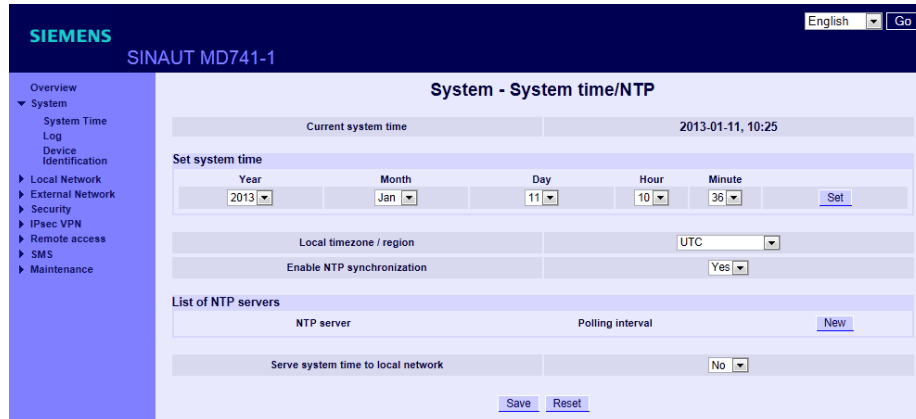


Figure 4-8 System > System Time/NTP

Current system time

This entry shows the currently set date and time.

Set system time

This is where you set the system time for the SINAUT MD741-1. This system time is:

- used as a time stamp for all log entries, and
- serves as a time basis for all time-controlled functions.

Select the year, month, day, hour and minute.

Local timezone / region

The NTP time servers communicate the UTC (= *Universal Time Coordinated*). To specify the time zone, select a city near the location near where the SINAUT MD741-1 will be operating. The time in this time zone will then be used as the system time.

Activate NTP synchronization

The SINAUT MD741-1 can also obtain the system time from a time server via NTP (= *Network Time Protocol*). There are a number of time servers on the Internet that can be used to obtain the current time very precisely via NTP.

NTP server

Click on *New* to add an NTP server, and enter the IP address of such an NTP server, or use the NTP server preset at the factory. You can specify multiple NTP servers at the same time.

It is not possible to enter the NTP address as a hostname (e.g. timeserver.org).

Polling interval

The time synchronization is carried out cyclically. The interval at which synchronization is performed is determined by the SINAUT MD741-1 automatically. A new synchronization will be carried out at least once every 36 hours. The poll interval defines the minimum period that the SINAUT MD741-1 waits until the next synchronization.

Notice

Synchronization of the system time via NTP creates additional data traffic on the EGPRS or GPRS interfaces. This may result in additional costs, depending on your user agreement with the GSM network operator.

Serve system time to local network

The SINAUT MD741-1 can serve itself as an NTP time server for the applications that are connected to its local network interface. To activate this function select **Yes**.

The NTP time server in the SINAUT MD741-1 can be reached via the local IP address set for the SINAUT MD741-1, see Chapter 4.1.

Factory settings

The factory settings for the SINAUT MD741-1 are as follows:

Local timezone	UTC
Activate NTP synchronization	No
NTP server	192.53.103.108
Polling interval	1.1 hours
Serve system time to local network	No

4.6 Additional Internal Routes

If the local network is subdivided into subnetworks, you can define additional routes. See also the Glossary.

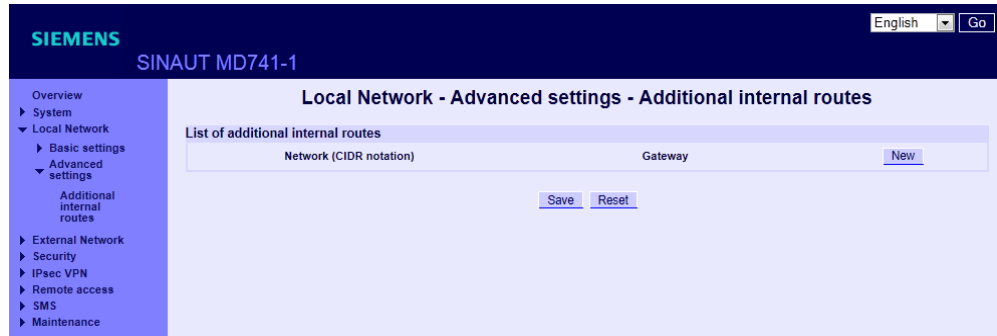


Figure 4-9 Local Network > Advanced Settings > Additional internal routes

To define an additional route to a subnetwork, click on *New*.

Specify the following:

- the IP address of the subnetwork (network), and also
- the IP address of the gateway via which the subnet is connected.

You can define any desired number of internal routes.

To delete an internal route, click on *Delete*.

Factory settings

The factory settings for the SINAUT MD741-1 are as follows:

Additional internal routes	-
Default for new routes:	No
Network:	192.168.2.0/24
Gateway:	192.168.0.254

External interface

5

The external interface of the SINAUT MD741-1 connects the SINAUT MD741-1 to the external network. EGPRS, GPRS or GSM are used for the communication at this interface.

External networks are the Internet or a private intranet.

External remote stations are network components in an external network, e.g. Web servers on the Internet, routers on an intranet, a central company server, an Admin PC, and much more.

Configure the external interface and the related functions according to the your requirements and the advices in this chapter.

5.1 Access parameters to EGPRS/GPRS

The SINAUT MD741-1 uses EGPRS or GPRS for communication with the external network. For access to the services EGPRS and GPRS and to the underlying GSM wireless network, access parameters are necessary, which you will receive from your GSM network operator.

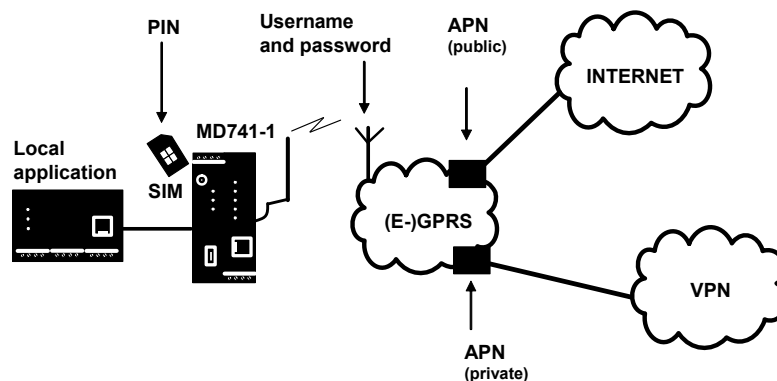


Figure 5-1 Access parameters to EGPRS/GPRS

The PIN protects the SIM card against unauthorised use.

The user name and password protect the access to EGPRS and GPRS.

The APN (Access Point Name) defines the transition from EGPRS or GPRS to additional connected IP networks, for example a public APN to the Internet or a private APN to a virtual private network (VPN).

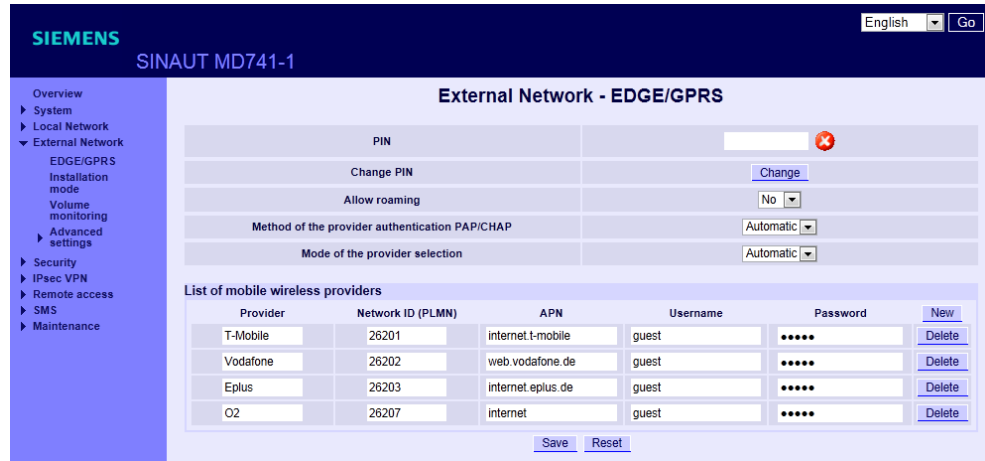


Figure 5-2 External Network > EDGE/GPRS - Provider selection mode Automatically

PIN

Enter the PIN for your SIM card here. You will receive the PIN from your network operator.

The SINAUT MD741-1 also works with SIM cards that have no PIN; in this case enter NONE. In this case the input box is left empty.

Note

If no entry is made, the input box for the PIN is shown with a red outline after saving.

- A green dot with a white check mark beside the input box indicates that the PIN was stored successfully on the device.
- A red dot with a white cross beside the input box indicates that the PIN was entered incorrectly and / or no PIN was stored on the device.

Changing the PIN

You have the option of replacing the PIN stored on the SIM card by your network provider with your own PIN. To do this, click the "Change" button.

Note

Check with your mobile wireless provider to find out whether this function is supported.

1. Enter the your own PIN in the "New PIN" input box.
The entry is displayed as hidden characters.
2. Repeat the entry in the next input box.
3. Save your entry by clicking the "Set" button.
A message appears with the information that the PIN was changed successfully or could not be changed.
4. Confirm this message by clicking the "OK" button.
This brings you automatically back to the "External Network - EDGE/GPRS" page.

Allow roaming

Specify whether or not the device automatically logs on with a different network if the specified GSM network is unreachable. Select one of the two options from the drop-down list.

To specify an additional NTP server, click the "New" button.

- Yes: The device automatically logs on with an available network.
- No: The device does not automatically log on with an available network.

Authentication method

From the drop-down list, select a method according to which the user name and password of the device will be transferred to the communications partner:

Automatic:	User name and password are transferred automatically with one of the following two methods. CHAP has the higher priority. If the communications partner does not support CHAP, the user name and password are transferred using PAP.
CHAP:	Encrypted transfer of user name and password using the Challenge Handshake Authentication Protocol (CHAP).
PAP	Challenge Handshake Authentication Protocol (CHAP) PAP Unencrypted transfer of user name and password using the Password Authentication Protocol (PAP)

Provider selection mode - manual

If you select *Manual* as the provider selection mode, enter the user name, password and APN for the GPRS service manually.

Mode of provider selection - Automatic

If you select *Automatic* as the provider selection mode, the access data for the GPRS service is selected automatically from the list of providers based on the Net ID of the SIM card. You can create several entries in the list.

Note

Only the standard APNs of the providers are entered automatically!

With *New*, you add a new entry. With *Delete*, you remove the entries.

Provider

Here, you can enter any text of your choice to name the GPRS service, such as the name of the provider (for example Vodafone, Eplus, my GPRS access).

Net-ID (PLMN) (only for the provider selection *Automatic*)

Here, enter the identification number (Net-ID) of the network provider. Each GSM/GPRS network provider has an assigned identification number that is unique worldwide known as the Public Land Mobile Network (PLMN). PLMN is made up of (MCC) and (MNC). You will find the Net-ID in the documentation provided by your GSM/GPRS network provider or on the provider's Internet pages.

The Net-ID is stored on the SIM card. The SINAUT MD741-1 reads the Net-ID from the SIM card and selects the corresponding GPRS access data from the list of providers.

APN

Enter the name of the transition from EGPRS and GPRS to other networks here.

You can find the APN in your GSM/GPRS network operator's documentation, on your operator's Website, or ask your operator's hotline.

User name

Enter the user name for EGPRS and GPRS here. Some GSM/GPRS network operators do not use access control with user names and/or passwords. In this case enter *guest* in the corresponding box.

Password

Enter the password for EGPRS and GPRS here. Some GSM/GPRS network operators do not use access control with user names and/or passwords. In this case enter *guest* in the corresponding box.

Factory settings

The factory settings of the SINAUT MD741-1 are as follows:

Provider selection mode **Manual**

Provider selection mode - manual

PIN **NONE**

APN **NONE**

User **guest**

Password **guest**

Provider selection mode - Automatic

1st provider **T-Mobile**

PLMN ID **26201**

APN **internet.t-mobile**

User name **guest**

Password **guest**

2nd provider **Vodafone**

PLMN ID **26202**

APN **web.vodafone.de**

User name **guest**

Password **guest**

3rd provider **Eplus**

PLMN ID **26203**

APN **internet.eplus.de**

User name **guest**

Password **guest**

4th provider	O2
PLMN ID	26207
APN	internet
User name	guest
Password	guest
nth provider	O2
PLMN ID	NONE
APN	NONE
User name	NONE
Password	NONE

5.2 Installation mode - aligning antennas

To find the ideal alignment of the antenna connected to the A1 socket, you can use the installation mode. This function makes it easier to test the signal strength in various antenna positions.

The information on the "Installation Mode" page is refreshed at intervals of a few seconds.

This provides you with fast information about the signal quality at the test positions so that you can identify the optimum position.

Note

Reboot when enabling and disabling

If you enable or disable the "Installation mode" function, when you click the "Save" button, the device automatically goes through a reboot.

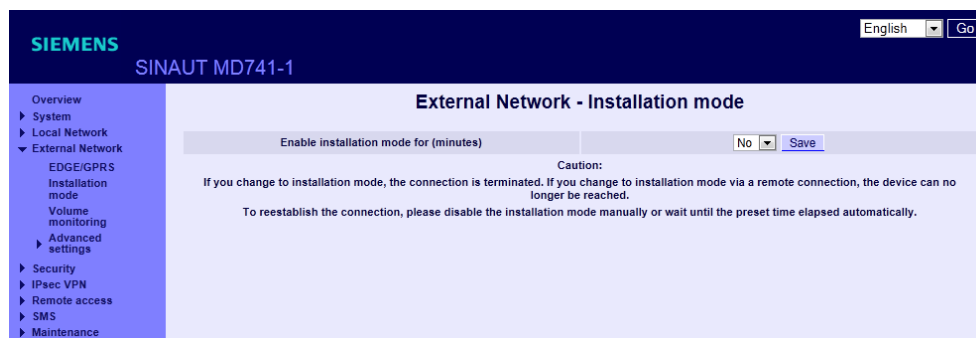


Figure 5-2 External Network > Installation mode

In the factory settings, the installation mode is disabled.

1. To enable the function, select a time from the drop-down list during which the installation mode is enabled (15/30/60/120 minutes).
2. Click the "Save" button. The SINAUT MD741-1 restarts and the entries described below appear.
3. You can stop the enabled function prematurely by selecting the "No" option.

Status of the current wireless cell

In this area of the page you will find information that relates to the mobile wireless cell in which the SINAUT MD741-1 is currently logged in.

Status of the neighboring wireless cells

In this area of the page, you will find information that relates to the neighboring, available mobile wireless cells.

Information about the wireless cell

Signal strength

- The bar display indicates the strength of the GSM signal.
- The numbers above the bar display indicate the CSQ value of the signal.
- The dBm value is shown in brackets after the CSQ value.

ID of the wireless cell

ID for the wireless cell in the mobile wireless network

LAC (Location Area Code)

ID for the current location of the SINAUT MD741-1 within the mobile wireless network

ARFCN (Absolute Radio Frequency Channel Number)

Based on the ARFCN, the uplink and downlink frequencies can be calculated.

BSIC (Base Station Identity Code)

This ID is used to be able to distinguish neighboring channels when the frequency bands overlap

5.3 Traffic volume supervision

This function monitors when a specified limit value for data transfer is reached. The upper limit that you specify defines the maximum data volume per month.

The current data volume of the particular month and the upper limit are displayed on the "System - Status" page opened under the "Overview" entry.

The SINAUT MD741-1 can send SMS messages automatically as soon as 80% and 100% of the specified data volume are reached.

In the factory settings the volume monitoring is deactivated.

Note

The data volume per month calculated here can significantly differ from the billing of themobile wireless provider due to block rounding and different billing periods.

The screenshot shows the Siemens SINAUT MD741-1 web interface. The main content area is titled "External Network - Volume monitoring". It contains the following configuration options:

- Enable volume monitoring:** A dropdown menu set to "Yes".
- Bytes transferred since start of month:** A text box showing "0" with a "Reset" button next to it.
- Maximum data volume in bytes per month:** A text box containing "1000000".
- Send SMS when 80% of the max. data volume is reached:**
 - Enable:** A dropdown menu set to "No".
 - Call number:** An empty text box.
 - Message text:** A text box containing "Warning:Max_Data_Volume_reach".
- Send SMS when 100% of the max. data volume is reached:**
 - Enable:** A dropdown menu set to "No".
 - Call number:** An empty text box.
 - Message text:** A text box containing "Alert:Max_Data_Volume_Reached".

At the bottom of the configuration area, there are "Save" and "Reset" buttons. Below the configuration area, a caution message states: "The displayed volume values may differ to the invoice from the service provider, because of data block rounding and/or different accounting periods." Below this, a "Caution:" section lists the allowed characters for the message text: "Please use for your message text only the following characters: () . - 0 1 2 3 4 5 6 7 8 9 A B C D E F G H I J K L M N O P Q R S T U V W X Y Z [] _ a b c d e f g h i j k l m n o p q r s t u v w x y z".

Figure 5-3 External Network > Volume monitoring

Enabling volume supervision

The following options are available:

- Yes: The volume supervision is enabled.
- No: The volume supervision is disabled.

Current monthly byte count

This counter shows the data volume in bytes that was transferred via the SINAUT MD741-1 since the beginning of the month.

On the first of the month, the counter is automatically reset. If you click the "Reset" button, the counter is set to 0 manually.

Maximum bytes per month

Enter the limit value for the monthly data volume in bytes in the input box.

In the factory settings, the value is set to 1,000,000 bytes.

Send SMS when 80% of the max. data volume is reached

If you want the SINAUT MD741-1 to send a warning SMS message as soon as 80 % of the data volume has been reached, make the following settings:

1. Enable the SMS function by selecting the "Yes" option from the drop-down list.
2. Enter the call number of a subscriber that can receive the SMS messages.
3. If necessary change the message text from the factory settings.
4. Then click the "Save" button.

Send SMS when 100% of the max. data volume is reached

If you want the SINAUT MD741-1 to send an alarm SMS message as soon as 100 % of the data volume has been reached, make the following settings:

1. Enable the SMS function by selecting the "Yes" option from the drop-down list.
2. Enter the call number of a subscriber that can receive the SMS messages.
3. If necessary change the message text from the factory settings.
4. Then click the "Save" button.

Factory settings

Enabling volume supervision:	No (turned off)
Maximum bytes per month:	1,000,000
Send SMS when 80% of the max. data volume is reached	
Enable:	Yes: Turned on No: Turned off
Call number:	Call number of the receiving telephone
Message text:	Warning:Max_Data_Volume_nearly_reached
Send SMS when 100% of the max. data volume is reached	
Enable:	Yes: Turned on No: Turned off
Call number:	Call number of the receiving telephone
Message text:	Alert:Max_Data_Volume_reached

5.4 EGPRS/GPRS Connection Monitoring

With the function *Connection Check* the SINAUT MD741-1 checks its connection to EGPRS or GPRS and to the connected external networks, such as the Internet or an intranet. To do this, the SINAUT MD741-1 sends ping packets (ICMPs) to up to four remote stations (target hosts) at regular intervals. This takes place independently of the user data connections. If after such a ping the SINAUT MD741-1 receives a response from at least one of the remote stations addressed, then the SINAUT MD741-1 is still connected with the EGPRS or GPRS and ready for operation.

Some *network operators* interrupt connections when they are inactive. This is likewise prevented by the *Connection Check* function.

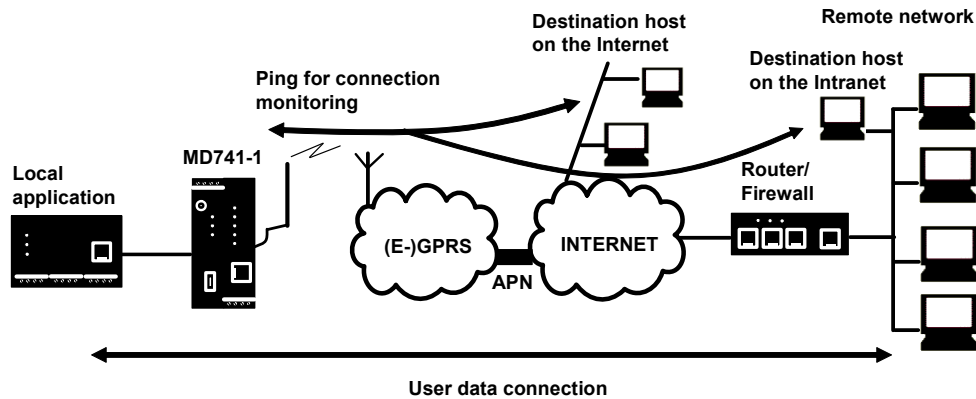


Figure 5-4 Connection Monitoring

Notice

Sending ping packets (ICMPs) increases the amount of data sent and received via EGPRS or GPRS. This can lead to increased costs.

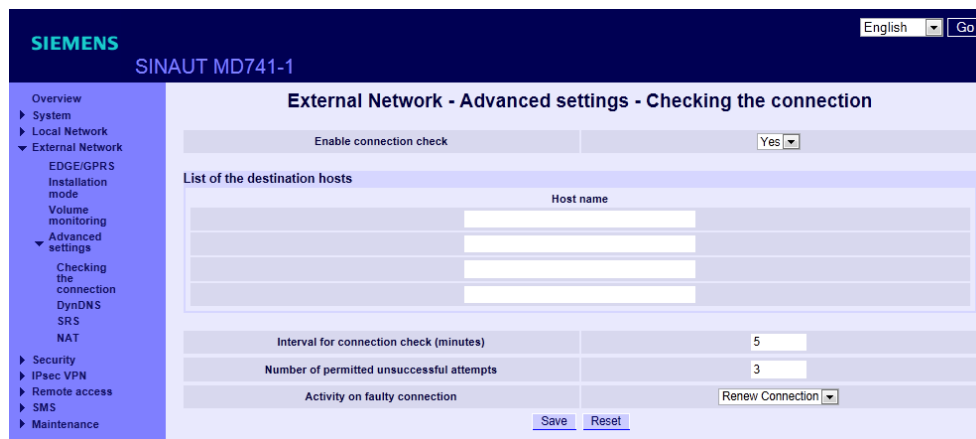


Figure 5-5 External Network >Advanced Settings > Checking the connection

Enable connection check

Yes activates the function.

Destination Hosts – Host name

Select up to four remote stations that the SINAUT MD741-1 can ping. The remote stations must be available continuously and must answer pings.

Note

Make sure that the selected remote stations will not be disturbed.

Interval for connection check (minutes)

Specifies the interval at which the connection check ping packets are sent by the SINAUT MD741-1. This is specified in minutes.

Number of permitted unsuccessful attempts

Specifies how many times it is allowed for all ping packets of an interval not to receive an answer, i.e. for none of four pinged remote stations to answer, before the specified action is carried out.

Activity on faulty connection

Renew Connection

The SINAUT MD741-1 re-establishes the connection to EGPRS or GPRS if the ping packets sent were not answered.

Reboot MD741-1

The SINAUT MD741-1 carries out a reboot if the ping packets sent were not answered.

Factory settings

The factory settings for the SINAUT MD741-1 are as follows:

Enable connection check	No (switched off)
Host name	-
Interval for connection check	5 (minutes)
Number of permitted unsuccessful attempts	3 (failed attempts)
Activity on faulty connection	Renew Connection

5.5 Hostname via DynDNS

Dynamic domain name servers (DynDNS) make it possible for applications to be accessible on the Internet under a hostname (e.g. myHost.org), even if these applications do not have a fixed IP address and the hostname is not registered. If you log the SINAUT MD741-1 on to a DynDNS service, you also can reach the SINAUT MD741-1 from external network under a hostname, e.g. mySINAUT.dyndns.org.

For more information on DynDNS see the Glossary.

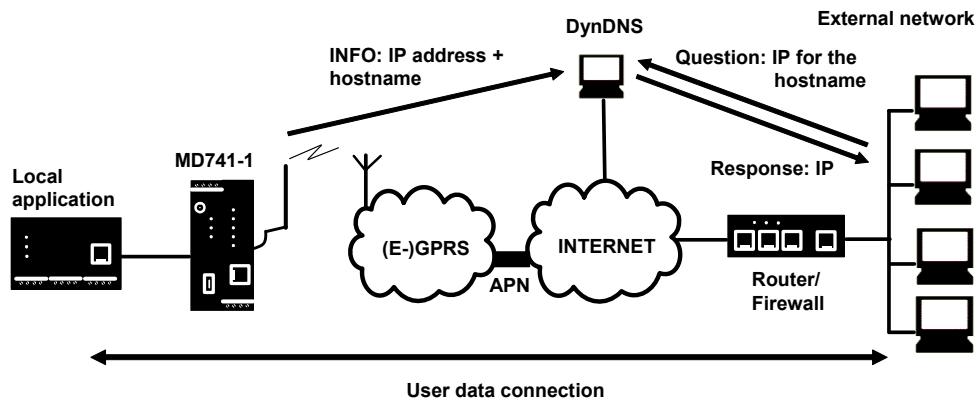


Figure 5-6 DynDNS Function

Figure 5-7 External Network > Advanced Settings > DynDNS

Log this device on at a DynDNS server

Select Yes if you want to use a DynDNS service.

User name / Password

Enter here the username and the password that authorise you to use the DynDNS service. Your DynDNS provider will give you this information.

Host name of the DynDNS server

Here enter the hostname that you have agreed with your DynDNS provider for the SINAUT MD741-1, e.g. myMD741.dyndns.org.

Factory settings

The factory settings for the SINAUT MD741-1 are as follows:

Log this device on at a DynDNS server	No (switched off)
Username	guest
Password	guest
Host name	myname.dyndns.org

5.6 SRS – Siemens Remote Service

Note

Using the services provided by the "SIMATIC Remote Support Services", remote access to machines and plants is available.

To use the services, additional service agreements are necessary and certain constraints must be kept to. If you are interested in the Siemens Remote Service, speak to your local Siemens contact.

If the Siemens Remote Service is activated, the SINAUT MD741-1 transfers its external IP address assigned by the EDGE/GPRS service to a selectable destination server. This transfer is made using the secure HTTPS protocol.

The procedure is comparable with the DynDNS service and requires suitable access to the server.

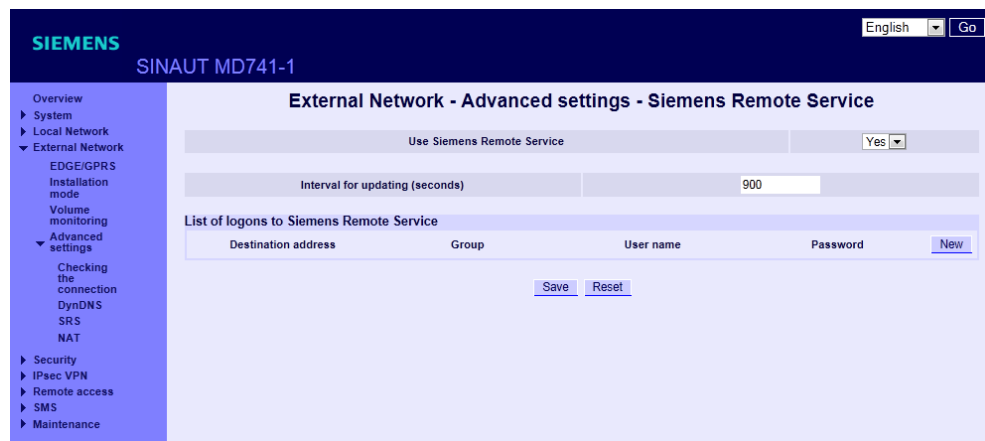


Figure 5-8 External Network > Advanced Settings > SRS

With *New*, you add a new destination server. With *Delete*, you remove existing entries.

Use Siemens Remote Service

Select *Yes* if you want to use Siemens Remote Service.

If you do not want to use the Siemens Remote Service, select *No*.

Interval for updating (seconds)

Enter the interval in seconds at which the assigned IP address of the SINAUT MD741-1 is transferred to the selected destination server.

Siemens Remote Service Accounts

Here, enter the destination address and access data of one or more destination servers:

Destination address

Enter the IP address of the destination server.

Group

Enter the group name.

User name

Enter the user name for access to the destination server.

Password

Enter the password for access to the destination server.

Factory settings

The factory settings of the SINAUT MD741-1 are as follows:

Use Siemens Remote Service	No (turned off)
Interval of updating	900 seconds
Destination address	0.0.0.0
Group	group
User name	user
Password	pass

5.1 NAT - Network Address Translation

With NAT, for outgoing frames, the device can change the specified sender IP addresses from its internal network to its own external address. This NAT technology is used if the internal addresses cannot or should not be forwarded externally, for example because a private address range such as 192.168.x.x is used or because the local network structure should remain hidden. This method is also known as IP masquerading.

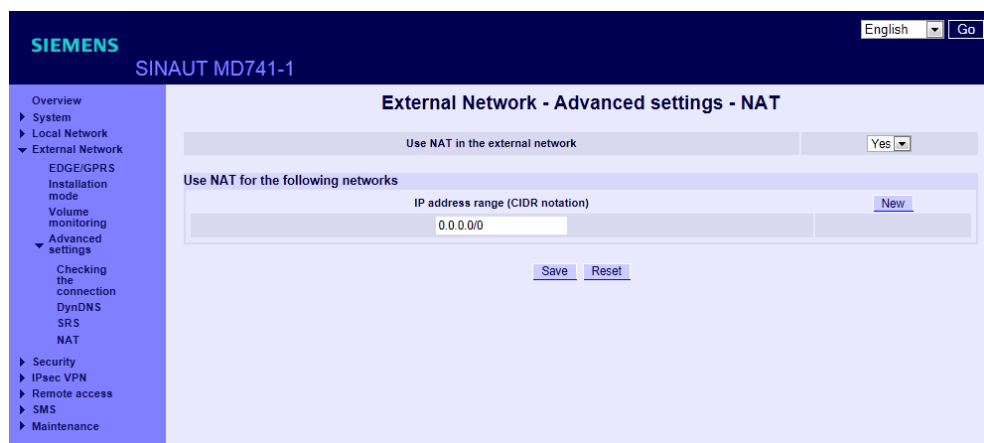


Figure 5-7

External Network > Advanced Settings > NAT

Use NAT in the external network

Select the "Yes" option from the drop-down list.

The following options are available:

- Yes: The NAT function is enabled.
- No: The NAT function is disabled.

Use NAT for the following networks

In the input box, enter the networks for which NAT will be used. Enter an address range in the CIDR notation.

Factory settings

Use NAT for the external network:	Yes (turned on)
IP address range (CIDR notation):	0.0.0.0/0

6.1 Firewall rules

The SINAUT MD741-1 contains a stateful inspection firewall.

A stateful inspection firewall is a packet filtering method. Packet filters only let IP packets through if this has been defined previously using firewall rules. The following is defined in the firewall rules:

- which protocol (TCP, UDP, ICMP) can go through,
- the permitted source of the IP packets (From IP / From port)
- the permitted destination of the IP packets (To IP / To port)

It is likewise defined here what will be done with IP packets that are not allowed through (discard, reject).

For a simple packet filter it is always necessary to create two firewall rules for a connection:

- One rule for the query direction from the source to the destination, and
- a second rule for the query direction from the destination to the source.

It is different for a SINAUT MD741-1 with a stateful inspection firewall. Here a firewall rule is only created for the query direction from the source to the destination. The firewall rule for the response direction from the destination to the source results from analysis of the data previously sent. The firewall rule for the responses is closed again after the responses are received or after a short time period has elapsed. Thus responses can only go through if there was a previous query. This means that the response rule cannot be used for unauthorised access. What is more, special procedures make it possible for UDP and ICMP data to also go through, even though these data were not requested before.



Figure 6-1 Security > Firewall rules

Firewall Rules, incoming

The Firewall Rules (Incoming) are used to define how to handle IP packets that are received from external networks (e.g. the Internet) via EGPRS or GPRS. The source is the sender of this IP packet. The destination is the local applications on the SINAUT MD741-1.

In the factory settings, no incoming firewall rule is set initially, i.e. no IP packets can go through.

New

Adds an additional firewall rule that you can then fill out.

Delete

Removes firewall rules that have been created.

Protocol

Select the protocol for which this rule will be valid. The following selections are available: *TCP*, *UDP*, *ICMP*. If you select *All*, the rule is valid for all three protocols.

From IP address

Enter the IP address of the external remote station that is allowed to send IP packets to the local network. Do this by specifying the IP address or an IP range for the remote station. **0.0.0.0/0** means all addresses.

To specify a range, use the CIDR notation - see the Glossary.

From port

Enter the port from which the external remote station is allowed to send IP packets. (is only evaluated for the protocols TCP and UDP)

To IP address

Enter the IP address in the local network to which IP packets may be sent. Do this by specifying the IP address or an IP range of the application in the local network. **0.0.0.0/0** means all addresses.

To specify a range, use the CIDR notation - see the Glossary.

To port

Enter the port to which the external remote station is allowed to send IP packets.

Action

Select how incoming IP packets are to be handled:

Accept – The data packets can go through,

Reject – The data packets are rejected, and the sender receives a corresponding message.

Drop – The data packets are discarded without any feedback to the sender.

Firewall Rules, outgoing

The Firewall Rules (Outgoing) are used to define how to handle IP packets that are received from the local network. The source is an application in the local network. The destination is an external remote station, e.g. on the Internet or in a private network.

In the factory settings, no outgoing firewall rule is set initially, i.e. no IP packets can go through.

New

Adds an additional firewall rule that you can then fill out.

Protocol

Select the protocol for which this rule will be valid. The following selections are available: *TCP*, *UDP*, *ICMP*. If you select *All*, the rule is valid for all three protocols.

From IP address

Enter the IP address of the local application that is allowed to send IP packets to the external network. Do this by specifying the IP address or an IP range for the local application. **0.0.0.0/0** means all addresses.

To specify a range, use the CIDR notation - see the Glossary.

From port

Enter the port from which the local network is allowed to send IP packets. Do this by specifying the port number.
(is only evaluated for the protocols TCP and UDP)

To IP adresse

Enter the IP address in the external network to which IP packets may be sent. Do this by specifying the IP address or an IP range of the application in the network.
0.0.0.0/0 means all addresses.

To specify a range, use the CIDR notation - see the Glossary.

To port

Enter the port to which the external remote station is allowed to send IP packets. Do this by specifying the port number.
(is only evaluated for the protocols TCP and UDP)

Action

Select how outgoing IP packets are to be handled:

Accept – The data packets can go through,

Reject – The data packets are rejected, and the sender receives a corresponding message.

Drop – The data packets are discarded without any feedback to the sender.

Firewall Rules incoming / outgoing**Log**

For each individual firewall rule you can define whether the event should be

- logged when the rule takes effect - set Log to Yes
- or not - set Log to No (factory settings)

The log is kept in the firewall log, see Chapter 6.4.

Log entries for unknown outgoing connection attempts

This logs all connection attempts that are not covered by the defined rules.

Factory settings

The factory settings for the SINAUT MD741-1 are as follows:

Incoming firewall

Firewall Rules, incoming	- (Everything blocked)
Protocol	All
From IP address	0.0.0.0/0
From port	Any
To IP address	0.0.0.0/0
To port	Any
Action	Accept
Log	No (switched off)
Log entries for unknown outgoing connection attempts	No (switched off)

Outgoing firewall

Firewall Rules, outgoing	- (Everything blocked)
Protocol	All
From IP address	0.0.0.0/0
From port	Any
To IP address	0.0.0.0/0
To port	Any
Action	Accept
Log	No (switched off)
Log entries for unknown outgoing connection attempts	No (switched off)

6.2 Port Forwarding

If a rule has been created for port forwarding, then data packets received at a defined IP port of the SINAUT MD741-1 from the external network will be forwarded. The incoming data packets are then forwarded to a specified IP address and port number in the local network. The port forwarding can be configured for TCP or UDP.

In port forwarding the following occurs: The header of incoming data packets from the external network that are addressed to the external IP address of the SINAUT MD741-1 and to a specific port are adapted so that they are forwarded to the internal network to a specific computer and to a specific port of that computer. This means that the IP address and port number in the header of incoming data packets are modified.

This process is also called Destination NAT or Port Forwarding.

Note

In order for incoming data packets to be forwarded to the defined IP address in the local network, a corresponding incoming firewall rule must be set up for this IP address in the packet filter. See Chapter 6.1.



Figure 6-2 Security > Port Forwarding

New

Adds a new forwarding rule that you can then fill out.

Delete

Removes forwarding rules that have been created.

Protocol

Specify here the protocol (TCP or UDP) to which the rule should refer.

Arrives at port

Specify here the port number (e.g. 80) at which the data packets which are to be forwarded arrive from the external network.

Is forwarded to IP address

Specify here the IP address in the local network to which the incoming data packets should be forwarded.

Is forwarded to port

Specify here the port number (e.g.) for the IP address in the local network to which the incoming data packets should be forwarded.

Log

For each port forwarding rule you can define whether the event should be

- logged when the rule takes effect - set Log to Yes
- or not - set Log to No (factory settings)

The log is kept in the firewall log, see Chapter 6.4.

Factory settings

The factory settings for the SINAUT MD741-1 are as follows:

Forwarding Rules	-
Protocol	All
Arrives at port	80
Is forwarded to IP address	127.0.0.1
Is forwarded to port	80
Log	No (switched off)

6.3 Advanced security functions

The advanced security functions serve to protect the SINAUT MD741-1 and the local applications against attacks. For protective purposes it is assumed that only a certain number of connections or received PING packets are permissible and desirable in normal operation, and that a sudden burst represents an attack.

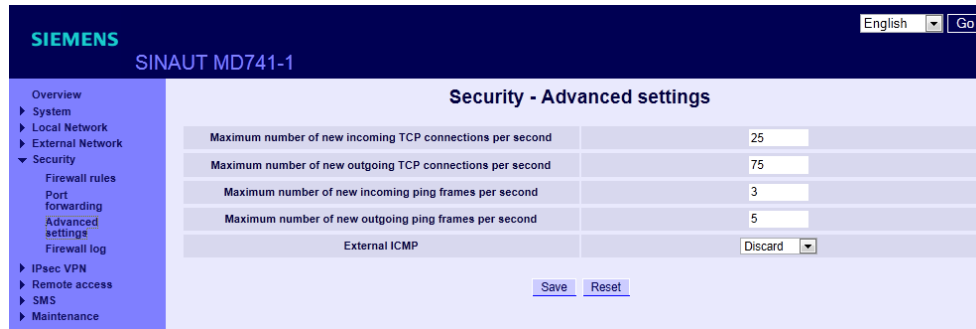


Figure 6-3 Security > Advanced Settings

Maximum number ...

The entries

- Maximum number of new incoming TCP connections per second
- Maximum number of new outgoing TCP connections per second
- Maximum number of new incoming ping packets per second
- Maximum number of new outgoing ping packets per second

set the upper limits. The settings (see illustration) have been selected so that they will in practice never be reached in normal use. In the event of an attack, however, they can be reached very easily, which means that the limitations constitute additional protection. If your operating environment contains special requirements, then you can change the values accordingly.

External ICMP to the SINAUT MD741-1

You can use this option to affect the response when ICMP packets are received that are sent from the external network in the direction of the SINAUT MD741-1. You have the following options:

- *Drop*: All ICMP packets to the SINAUT MD741-1 are discarded.
- *Allow Ping*: Only ping packets (ICMP type 8) to the SINAUT MD741-1 are accepted.
- *Accept*: All types of ICMP packets to the SINAUT MD741-1 are accepted.

Factory settings

The factory settings for the SINAUT MD741-1 are as follows:

Maximum number of new incoming TCP connections per second	25
Maximum number of new outgoing TCP connections per second	75
Maximum number of new incoming ping packets per second	3
Maximum number of new outgoing ping packets per second	5
External ICMP to the MD741-1	Drop

6.4 Firewall Log

The application of individual firewall rules is recorded in the firewall log. To do this, the LOG function must be activated for the various firewall functions.



Figure 6-4 Security > Firewall Log

Note

The firewall log is lost in the event of a reboot.

7.1 Explanation of VPN connections

The IPsec protocol suite

The SINAUT MD741-1 uses the IPsec method in the tunnel mode for the VPN tunnel. Here, the frames to be transferred are completely encrypted and provided with a new header before they are sent to the VPN gateway of the partner. The frames received by the partner are decrypted and forwarded to the recipient.

Roadwarrior mode and standard mode

There are two modes for VPN connections:

- **Roadwarrior mode**
In the Roadwarrior mode, the SINAUT MD741-1 can accept up to 10 VPN connections from partners with an unknown address. These partners can, for example, be mobile partners that obtain their IP address dynamically. In addition to this, VPN connections can also be operated in standard mode. The VPN connection must be established by the partner. In Roadwarrior mode, the SINAUT MD741-1 can only accept VPN connections but cannot establish them actively.
- **Standard mode**
In standard mode, the address of the VPN gateway of the partner must be known so that the VPN connection can be established. The VPN connection can either be established by the SINAUT MD741-1 or by the VPN gateway of the remote station.

Authentication method

The SINAUT MD741-1 supports three authentication methods:

- X.509 certificate

- CA certificate
- Pre-shared Key (PSK)

X.509 certificate and CA certificate

With the authentication methods X.509 certificate and CA certificate, keys are used for authentication that were previously signed by a certification authority (CA). This method is considered particularly secure. A CA can be a provider but also, for example the system administrator of your project as long as the required software tools are available. The CA creates a certificate file (PKCS12) for both ends of a VPN connection with the file extension ".p12". This certificate file contains the public and private key of the local station, the signed certificate of the CA and the public key of the CA. With the authentication method X.509, there is also a key file (*.pem, *.cer or *.crt) for both of the partner stations with the public key of the local station.

The two methods differ in the exchange of the public key. With X.509 certificate, the key and the key file are exchanged between the SINAUT MD741-1 and the VPN gateway manually, for example using a CD-ROM or e-mail. You will find more information on loading the certificate in section 7.4.

With CA certificate, the key is exchanged between the SINAUT MD741-1 and VPN gateway of the remote station via the data connection when the VPN connection is established. Here, there is no manual exchange of key files.

Pre-shared Key (PSK)

This method is supported in the main by older IPsec implementations. Here, the authentication is made with a previously agreed character string. To achieve a high degree of security, use character strings made up of approximately 30 uppercase and lowercase characters as well as numbers selected at random.

Local ID and ID of the partner

The local ID and the ID of the partner are used by IPsec to uniquely identify the partners during establishment of the VPN connection. The device's own local ID forms the remote ID of the remote station and vice versa.

- **When authenticating with X.509 certificate and CA certificate:**
 - If you leave the default setting "NONE", the distinguished names from the device's own certificate and from the certificate transferred by the partner are automatically adopted and used as the local ID and ID of the partner.
 - If you change the entries for the local ID or the ID of the partner manually, adapt the entries of the partner accordingly. The manual entry for the IDs must be made in the ASN.1 format, for example "C=XY/O=XY Org/CN=xy.org.org".
- **With authentication using Pre-shared Key:**

- In Roadwarrior mode, you need to enter the ID of the partner manually. It must have the format of a host name or the format of an e-mail address and must match the local ID of the partner.
- If you leave the local ID set to "NONE", the IP address is used as the local ID.
- If you enter the local ID manually, this must have the format of a host name or the format of an e-mail address and must match the ID of the partner.

1:1 NAT

When a VPN tunnel is being established, a special variant of the NAT is used with the SINAUT MD741-1, the 1:1 NAT, also known as bidirectional NAT. This variant allows connection establishment both from the local network to the external network and from the external network to the local network. With the SINAUT MD741-1, the network addresses of the frames are changed.

For each VPN connection and for both connection directions, you can specify individually whether or not the 1:1 NAT function is enabled. You can make the relevant settings on the "IPsec VPN - Edit connection" page.

IKE

Abbreviations/acronyms

- IKE: Internet Key Exchange
- SA: Security Association
- ISAKMP: Internet Security Association and Key Management Protocol
- IPsec: Internet Protocol security

Connection establishment

The VPN connection is established in two phases.

1. Initially, in phase 1, the security association (SA) is established using the ISAKMP protocol. Phase 1 is used for the exchange of keys between the SINAUT MD741-1 and the VPN gateway of the remote station.
2. Following this, in phase 2, the SA is established via the IPsec protocol. Phase 2 is the actual IPsec connection between the SINAUT MD741-1 and the VPN gateway of the remote station.

ISAKMP SA and IPsec SA encryption

The SINAUT MD741-1 also supports the following methods:

- 3DES-168
- AES-128
- AES-192
- AES-256

AES-128 is a commonly used method and is therefore set as default.

Note

The more bits in an encryption algorithm - specified by the appended number - the safer the algorithm is. The AES-256 method is therefore considered the most secure. However the encryption procedure takes more time and requires more computing power the longer the key is.

NAT-T

There may be a NAT router between the SINAUT MD741-1 and the VPN gateway of the remote network. Not all NAT routers allow IPsec frames to pass through. This means that it may be necessary to encapsulate the IPsec frames in UDP packets to be able to pass through the NAT router.

Dead peer detection

If the remote station supports the Dead Peer Detection protocol (DPD), the partners can recognize whether the IPsec connection is still valid or needs to be re-established. Without DPD and depending on the configuration, it may be necessary to wait until the SA lifetime has expired or the connection must be reinitiated manually. To check whether the IPsec connection is still valid, the Dead Peer Detection itself sends DPD queries to the remote station. If the remote station does not reply, the IPsec connection is considered to be interrupted after a number of permitted failures.

Note

Sending DPD queries increases the amount of data sent and received. This can lead to increased costs.

Requests to the VPN gateway of the remote network

To allow an IPsec connection to be established successfully, the VPN remote station must support IPsec with the following configuration:

- Authentication with X.509 certificates, CA certificates or Pre Shared Key
- ESP
- Diffie-Hellman group 1, 2 or 5
- 3DES or AES encryption
- MD5 or SHA-1 hash algorithms
- Tunnel mode
- Quick mode
- Main mode
- SA lifetime (1 second to 24 hours)

If the remote station is a computer with Windows 2000, the Microsoft Windows 2000 High Encryption Pack or at least service pack 2 must be installed.

If the remote station is downstream from a NAT router, the remote station must support NAT-T. Or, the NAT router must know the IPsec protocol (IPsec/VPN passthrough).

7.2 VPN Roadwarrior Mode

The Roadwarrior Mode makes it possible for the SINAUT MD741-1 to accept a VPN connection initiated by a remote station with an unknown IP address. The remote station must authenticate itself properly; in this VPN connection there is no identification of the remote station based on the IP address or the hostname of the remote station.

VPN connections in roadwarrior mode			
Enabled	Name	Connection settings	IKE settings
Yes <input type="checkbox"/>	Roadwarrior	Edit	Edit

Figure 7-1 IPsec VPN > Connections

Set the SINAUT MD741-1 up in accordance with what has been agreed with the system administrator of the remote station.

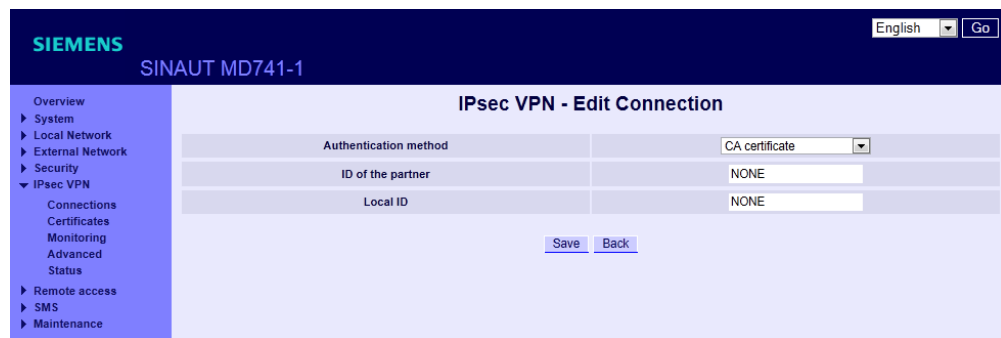


Figure 7-4
IPSec-VPN > Connections > Roadwarrior-Modus > Connection settings > Edit

Authentication method

You will find more information on the authentication method in the section 7.1.

In consultation with the administrator of the remote station, select one of the three following options from the drop-down list.

CA certificate

-

X.509 partner certificate: Specifies a X.509 partner certificate loaded on the SINAUT MD741-1 as the authentication method and you select the certificate from the following drop-down list.

See also section 7.4.

Pre-shared key:

With this option, you enter the pre-shared key that needs to be known by the communications partner.

With self-selected keys, you can enter a character string consisting of up to 30 upper and lowercase letters or numbers.

Partner certificate

If you have selected X.509 partner certificate as the authentication method, then a list of the remote certificates that you have already loaded into the SINAUT MD741-1 is displayed here. Select the certificate for the VPN connection.

ID of the partner

Enter the ID of the remote station in the input box or leave the setting "NONE".

Local ID

Enter the local ID in the input box or leave the setting "NONE".

Roadwarrior Mode Edit IKE

Here you can define the properties of the VPN connection according to your requirements and what you have agreed with the system administrator of the remote station.

The screenshot shows the 'IPsec VPN - IKE settings' configuration page for the SINAUT MD741-1 device. The page is organized into two main sections: Phase 1: ISAKMP SA and Phase 2: IPsec SA. Each phase has a table of settings. Phase 1 settings include Encryption (AES-128), Hash (checksum) (MD5), Mode (Main mode), and Lifetime (seconds) (86400). Phase 2 settings include Encryption (AES-128), Hash (checksum) (MD5), and Lifetime (seconds) (86400). Below these are additional settings: NAT-T (On), Enable Dead Peer Detection (DPD) (Yes), Delay after DPD query (seconds) (150), Timeout after DPD query (seconds) (60), and DPD: maximum number of unsuccessful attempts (5). The interface includes a 'Save' button and a 'Back' button.

Figure 7-2 IPsec-VPN > Connections > Roadwarrior Mode > IKE-settings > Edit

ISAKMP-SA encryption, IPsec-SA encryption

Agree with the administrator of the remote station which encryption method will be used for the ISAKMP-SA and the IPsec-SA. The SINAUT MD741-1 supports the following methods:

- 3DES-168
- AES-128
- AES-192
- AES-256

3DES-168 is a commonly used method and is therefore set as the default.

The method can be defined differently for ISAKMP-SA and IPsec-SA.

Note

The more bits in the encryption algorithm - indicated by the appended number - the more secure it is. The method AES-256 is therefore considered the most secure. However, the longer the key, the more time the encryption process takes and the more computing power is required.

ISAKMP-SA hash, IPsec-SA hash

Agree with the administrator of the remote station which method will be used for computing checksums/hashes during the ISAKMP phase and the IPsec phase. The following selections are available:

- MD5 or SHA-1 (automatic detection)
- MD5
- SHA-1

The method can be defined differently for ISAKMP-SA and IPsec-SA.

ISAKMP-SA mode

Agree with the administrator of the remote station which method will be used for negotiating the ISAKMP-SA. The following selections are available:

- Main mode
- Aggressive mode

Note:

When the authentication method Pre-Shared Key is used, Aggressive mode must be set in Roadwarrior mode.

ISAKMP-SA lifetime, IPsec-SA lifetime

The keys for an IPsec connection are renewed at certain intervals in order to increase the effort required to attack an IPsec connection.

Specify the lifetime (in seconds) of the keys agreed on for the ISAKMP-SA and IPsec-SA.

The lifetime can be defined differently for ISAKMP-SA and IPsec-SA.

NAT-T

There may be a NAT router between the SINAUT MD741-1 and the VPN gateway of the remote network. Not all NAT routers allow IPsec data packets to go through. It may therefore be necessary to encapsulate the IPsec data packets in UDP packets so that they can go through the NAT router.

On:

If the SINAUT MD741-1 detects a NAT router that does not let the IPsec data packets through, then UDP encapsulation is started automatically.

Force:

During negotiation of the connection parameters for the VPN connection, encapsulated transmission of the data packets during the connection is insisted upon.

Off:

The NAT-T function is switched off.

Enable Dead Peer Detection (DPD)

Notice

Sending DPD requests increases the amount of data sent and received via EGPRS or GPRS. This can lead to increased costs.

Yes

Dead peer detection is switched on. Independently of the transmission of user data, the SINAUT MD741-1 detects if the connection is lost, in which case it waits for the connection to be re-established by the remote stations.

No

Dead peer detection is switched off.

Delay after DPD query (seconds)

Time period in seconds after which DPD requests will be sent. These requests test whether the remote station is still available.

Timeout after DPD query (seconds)

Time period in seconds after which the connection to the remote station will be declared dead if no response has been made to the DPD requests.

DPD: maximum number of unsuccessful attempts

Number of failed attempts permitted before the IPsec connection is considered to be interrupted.

Factory settings

The factory settings for the SINAUT MD741-1 are as follows:

Name	Any
Enabled	No (switched off)
Authentication method	CA certificate
Remote ID	NONE
Local ID	NONE
Remote certificate	-
ISAKMP-SA encryption	3DES-168
IPsec-SA encryption	3DES-168
ISAKMP-SA hash	MD5
IPsec-SA hash	MD5
ISAKMP-SA mode	Main
ISAKMP-SA lifetime (seconds)	86400
IPsec-SA lifetime (seconds)	86400
NAT-T	On
Enable Dead Peer Detection	Yes
Delay after DPD query (seconds)	150
Timeout after DPD query (seconds)	60
DPD: maximum number of unsuccessful attempts	5

7.3 IPsec VPN Standard Mode

The VPN connections already created are shown. You can enable (Enabled = Yes) or disable (Enabled = No) each individual connection. You can use *New* to add additional VPN connections, *Edit Settings* and *Advanced Settings* to set them up, and *Delete* to remove a connection.



Figure 7-3 IPsec VPN > Connections > Standard mode

VPN Standard Mode - Edit Settings

IPsec VPN - Edit connection		
Connection name	NewConnection	
Address of the VPN gateway of the partner	NONE	
Authentication method	X.509 partner certificate	
Partner certificate	--	
ID of the partner	NONE	ID from SCALANCE S
Local ID	NONE	
IP address of the remote network	192.168.2.1	
Netmask of the remote network	255.255.255.0	
Enable 1:1 NAT for the remote network	No	
IP address of the local network	192.168.1.1	
Netmask of the local network	255.255.255.0	
Enable 1:1 NAT for the local network	No	
Wait for connection establishment by the partner	No	
Firewall rules for VPN tunnel	Edit	

Save Back

Figure 7-4 IPsec VPN > Connections > Standard mode > Connection settings > Edit

Connection name

Give the new connection a connection name here.

Address of VPN gateway of the partner

Specify the address of the remote station here, either as a hostname (e.g. myaddress.com) or as an IP address.

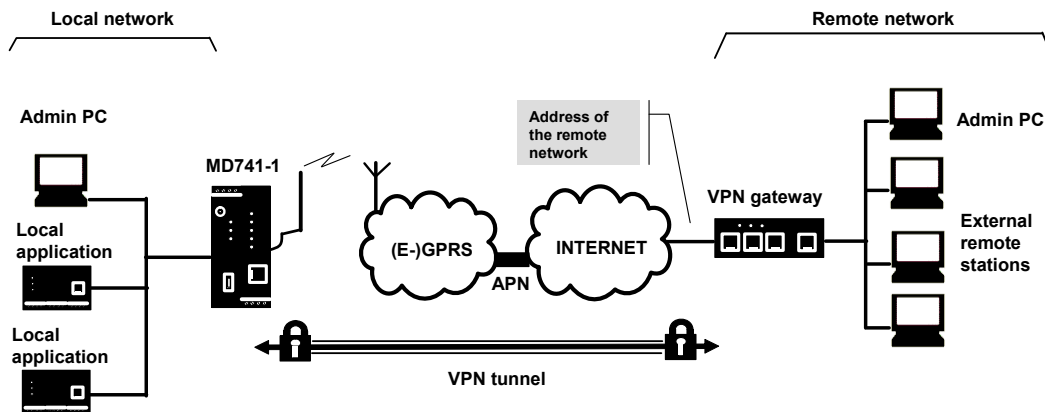


Figure 7-5 Address of the remote host

Authentication method

You will find more information on the authentication method in the section 7.1.

In consultation with the administrator of the remote station, select one of the three following options from the drop-down list.

CA certificate	-
X.509 partner certificate:	Specifies a X.509 partner certificate loaded on the SINAUT MD741-1 as the authentication method and you select the certificate from the following drop-down list. See also section 7.4.
Pre-shared key:	With this option, you enter the pre-shared key that needs to be known by the communications partner. With self-selected keys, you can enter a character string consisting of up to 30 upper and lowercase letters or numbers.

Partner certificate

In the drop-down list you will find the certificates of the remote station that have already been loaded on the SINAUT MD741-1.

Select the certificate for the VPN connection.

ID of the partner

Enter the ID of the remote station in the input box or leave the setting "NONE".

Local ID

Enter the local ID in the input box or leave the setting "NONE".

The "ID from Scalance S" button

If you have loaded the certificate of a SCALANCE S device on the SINAUT MD741-1, you can read out the remote ID from the certificate by clicking the "ID from Scalance S" button. The value read out is then automatically adopted as the remote ID.

IP address of the remote network

Enter the IP address of the remote network in the box. The remote network can also be a single computer.

Netmask of the remote network

Enter the subnet mask of the remote network in the box. The remote network can also be a single computer.

Enable 1:1 NAT for the remote network

Select one of the following two options from the drop-down list:

- Yes: 1:1 NAT is enabled for the remote network.
- No: 1:1 NAT is disabled.

If you have enabled 1:1 NAT, the address of the frames sent from the local network to a remote network is changed. See the input box below.

Address for 1:1 NAT to the remote network

In the input box, enter a network address for frames that are sent to a remote network.

Local net address

Enter the IP address of the local network (for example 123.123.123.123) in the box. The local network can also be a single computer.

Local subnet mask

Enter the subnet mask of the local network (for example 255.255.255.0) in the box. The local network can also be a single computer.

Enable 1:1 NAT for the local network

Select one of the following two options from the drop-down list:

- Yes: 1:1 NAT is enabled for the local network.
- No: 1:1 NAT is disabled.

If you have enabled 1:1 NAT, the address of the frames sent from a remote network to a local network is changed. See the input box below.

Address for local 1:1 NAT in local network

In the input box, enter a network address for frames that are received from the remote network.

Wait for remote connection

Select one of the following two options from the drop-down list:

- Ja The SINAUT MD741-1 waits for the VPN gateway of the remote network to initiate establishment of the VPN connection.
- Nein: The SINAUT MD741-1 initiates the connection establishment itself.

Firewall rules for VPN tunnel

If you click the "Edit" button beside this entry, the mask appears in which you specify firewall rules for incoming and outgoing messages.

You will find more information on this topic in the section 7.5.

VPN Standard Mode - Edit IKE

Here you can define the properties of the VPN connection according to your requirements and what you have agreed with the system administrator of the remote station.

The screenshot shows the 'IPsec VPN - IKE settings' configuration page for the SINAUT MD741-1 device. The page is organized into two main sections: Phase 1: ISAKMP SA and Phase 2: IPsec SA. Each phase has a table of configuration options. Phase 1 includes Encryption (3DES-168), Hash (checksum) (MD5 or SHA-1), Mode (Main mode), and Lifetime (seconds) (86400). Phase 2 includes Encryption (3DES-168), Hash (checksum) (MD5 or SHA-1), Lifetime (seconds) (86400), DH/IPFS group (DH-2 1024), NAT-T (On), Enable Dead Peer Detection (DPD) (Yes), Delay after DPD query (seconds) (150), Timeout after DPD query (seconds) (60), and DPD: maximum number of unsuccessful attempts (5). The interface also features a 'Save' button and a 'Back' button at the bottom.

Figure 7-6 IPsec-VPN > Connections > Standard Mode > IKE-Settings > Edit

ISAKMP-SA encryption, IPsec-SA encryption

Agree with the administrator of the remote station which encryption method will be used for the ISAKMP-SA and the IPsec-SA. The SINAUT MD741-1 supports the following methods:

- 3DES-168
- AES-128
- AES-192
- AES-256

3DES-168 is a commonly used, and is therefore set as the default. The method can be defined differently for ISAKMP-SA and IPsec-SA.

Note:

The more bits in the encryption algorithm - indicated by the appended number - the more secure it is. The method AES-256 is therefore considered the most secure. However, the longer the key, the more time the encryption process takes and the more computing power is required.

ISAKMP-SA hash, IPsec-SA hash

Agree with the administrator of the remote station which method will be used for computing checksums/hashes during the ISAKMP phase and the IPsec phase. The following selections are available:

- MD5 or SHA-1 (automatic detection)
- MD5
- SHA-1

The method can be defined differently for ISAKMP-SA and IPsec-SA.

ISAKMP-SA mode

Agree with the administrator of the remote station which method will be used for negotiating the ISAKMP-SA. The following selections are available:

- Main mode
- Aggressive mode

ISAKMP-SA lifetime, IPsec-SA lifetime

The keys for an IPsec connection are renewed at certain intervals in order to increase the effort required to attack an IPsec connection.

Specify the lifetime (in seconds) of the keys agreed on for the ISAKMP-SA and IPsec-SA.

The lifetime can be defined differently for ISAKMP-SA and IPsec-SA.

DH/PFS group

The SINAUT MD741-1 supports the Diffie Hellmann key exchange (DH) with the Perfect Forward Secrecy (PFS) property. You have three DH groups available for the key exchange.

Select one of the three following options from the drop-down list.

- DH-1 768
- DH-2 1024
- DH-5 1536

NAT-T

There may be a NAT router between the SINAUT MD741-1 and the VPN gateway of the remote network. Not all NAT routers allow IPsec data packets to go through. It may therefore be necessary to encapsulate the IPsec data packets in UDP packets so that they can go through the NAT router.

On: If the SINAUT MD741-1 detects a NAT router that does not let the IPsec data packets through, then UDP encapsulation is started automatically.

Force: During negotiation of the connection parameters for the VPN connection, encapsulated transmission of the data packets during the connection is insisted upon.

Off: The NAT-T function is switched off.

Enable dead peer detection

Note

Sending DPD requests increases the amount of data sent and received via EGPRS or GPRS. This can lead to increased costs,

Select one of the two options from the drop-down list:

Yes: Dead peer detection is enabled. Regardless of whether user data is being transmitted, the SINAUT MD741-1 recognizes loss of the connection. In this case, the device waits for the connection to be re-established by the remote stations.

No: Dead peer detection is disabled.

If you select "Yes", the following three input boxes appear:

Delay after DPD query (seconds)

Enter a period in seconds in the input box after which DPD queries are sent. These queries test whether or not the remote station is still available.

Timeout after DPD query (seconds)

Enter a length of time in seconds in the input box. If there is no response to the DPD queries, the connection to the remote station is declared to be invalid after this time has elapsed.

DPD: maximum number of unsuccessful attempts

In the input box, enter the number of permitted failures before the IPsec connection is considered to be interrupted.

Factory settings

The factory settings for the SINAUT MD741-1 are as follows:

Name	NewConnection
Enabled	No (switched off)
Authentication method	CA certificate
Remote ID	NONE
Local ID	NONE

Remote certificate	-
Wait for remote connection	No
Remote net address	192.168.2.1
Remote subnet mask	255.255.255.0
Local net address	192.168.1.1
Local subnet subnet mask	255.255.255.0
ISAKMP-SA encryption	3DES-168
IPsec-SA encryption	3DES-168
ISAKMP-SA hash	MD5
IPsec-SA hash	MD5
DH/PFS group	DH-2 1024
ISAKMP-SA mode	Main
ISAKMP-SA lifetime (seconds)	86400
IPsec-SA lifetime (seconds)	86400
NAT-T	On
Enable Dead Peer Detection	Yes
Delay after DPD query (seconds)	150
Timeout after DPD query (seconds)	60
DPD: maximum number of unsuccessful attempts	5

7.4 Loading VPN certificates

Loading and administering certificates and keys.

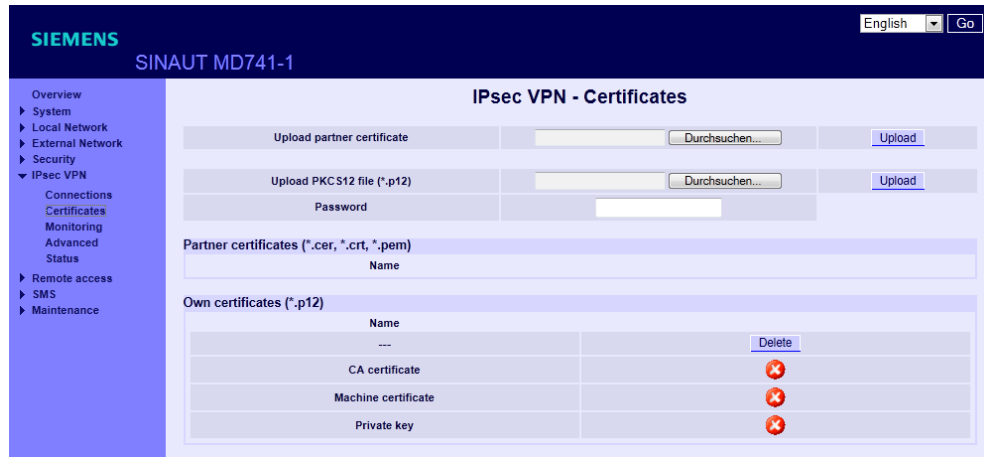


Figure 7-7 IPsec VPN > Certificates

Upload remote certificate

Here load key files (*.pem, *.cer or *.crt) with remote certificates and public key from remote stations into the SINAUT MD741-1. To do this, the files must be saved on the Admin PC. A remote certificate is only required for the authentication method with X.509 certificate.

Upload PKCS12 file (.p12)

Here load the certificate file (PKCS12 file) with the file extension .p12 into the SINAUT MD741-1. To do this, the certificate file must be saved on the Admin PC.

Caution

If there is already a certificate file in the device, then it must be deleted before loading a new file.

Password

The certificate file (PKCS12 file) is password-protected. Here enter the password that you received with the certificate file.

Remote certificates (*.pem, *.cer, *.crt,)

A list with all of the loaded remote certificates is shown here. You can use *Delete* to remove a remote certificates that is no longer needed.

Device certificates (.p12)

The name and status of the loaded certificate file (PKCS12 file) is shown here. A white check mark on a green dot indicates that the corresponding component of the certificate file is present, a white cross on a red dot indicates that the corresponding component is missing or that the wrong password was entered.

7.5 Firewall rules for VPN tunnel

The user interface for setting up the firewall rules for VPN tunnels can be found under IPsec VPN > Connections:

IPsec VPN - Edit connection	
Connection name	NewConnection
Address of the VPN gateway of the partner	NONE
Authentication method	X.509 partner certificate
Partner certificate	--
ID of the partner	NONE ID from SCALANCE S
Local ID	NONE
IP address of the remote network	192.168.2.1
Netmask of the remote network	255.255.255.0
Enable 1:1 NAT for the remote network	No
IP address of the local network	192.168.1.1
Netmask of the local network	255.255.255.0
Enable 1:1 NAT for the local network	No
Wait for connection establishment by the partner	No
Firewall rules for VPN tunnel	Edit

[Save](#) [Back](#)

Figure 7-8 IPsec-VPN > Connections > VPN connections in standard mode > Connections settings > Edit > Firewall rules for VPN tunnel

IPsec VPN – Edit Firewall Rules

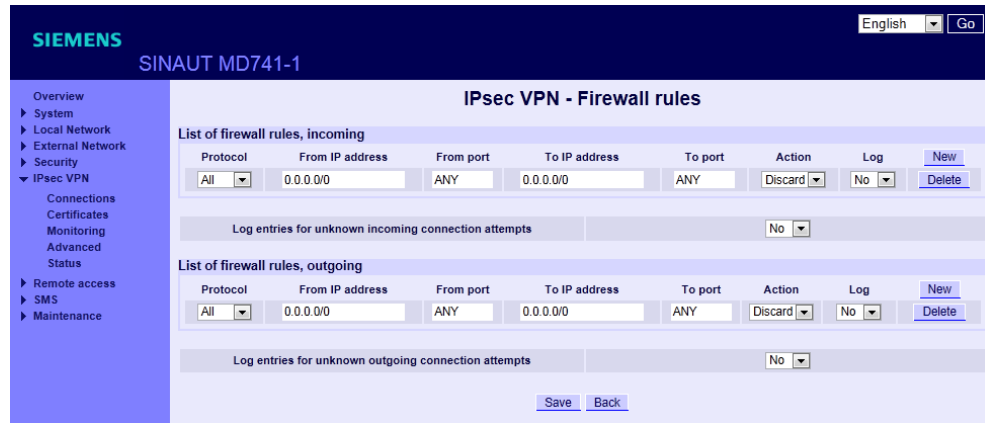


Figure 7-9 IPsec-VPN > Connections > VPN connections in standard mode > Connections settings > Edit > Firewall rules for VPN tunnel > Edit

Function

The IPsec VPN connection is viewed as fundamentally secure. Thus data traffic over this connection is not limited by default. It is possible, however, to create firewall rules for the VPN connection

To set up firewall rules for the VPN connection, proceed in the same way as for setting up the packet filter function of the general firewall (see Chapter 6.1). However, the rules defined here apply only to the specific VPN connection.

Factory settings

The factory settings for the SINAUT MD741-1 are as follows:

Firewall rules for VPN tunnel

No limitations

7.6 Supervision of VPN connections

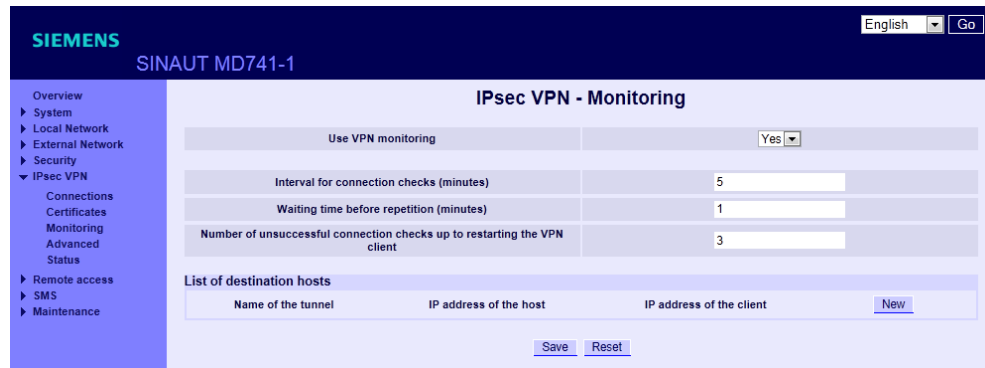


Figure 7-10 IPsec VPN > Monitoring

Function

With the supervision of VPN connections the SINAUT MD741-1 checks the condition of configured VPN connections. To check the VPN connection status the SINAUT MD741-1 sends periodically ping packets (ICMP) via the VPN connection to one or several remote stations (target hosts). This is made independently from payload data. For each VPN connection an own supervision can be configured.

If the SINAUT MD741-1 receives the answer for the ping packet from at least one addressed remote station, the VPN connection is still operational.

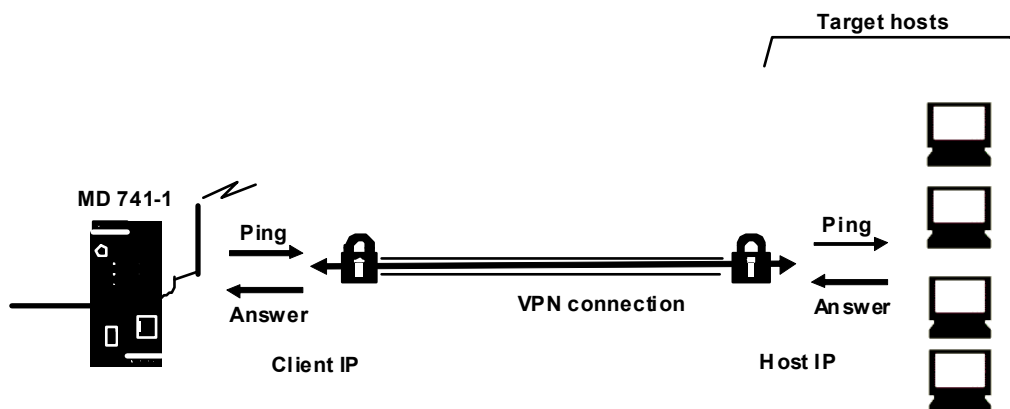


Figure 7-11 VPN connection supervision

Note

Do not ping a host downstream from the VPN Gateway! Here, the tunnel monitoring responds if a host can no longer be reached, for example due to ShutDown.

Ping the internal IP interface of the VPN Gateway!

If no remote station answers the ping packet the transmission of the ping packet will be repeated several times after a delay which can be configured. If all repetitions end without success, the VPN client in the SINAUT MD741-1 are will be restarted. This causes a reconnection of all existing VPN connections.

Notice

Sending ping packets (ICMPs) increases the amount of data sent and received via EGPRS or GPRS. This can lead to increased costs.

Enable VPN supervision

Yes: VPN supervision on.

No: VPN supervision off

Interval for connection check (minutes)

This parameter determines the time interval to send ping packets through the supervised VPN connection (VPN tunnel).

The value shall be given in minutes.

Waiting time before repetition (minutes)

This parameter determines the delay a ping packet is repeated after a failed ping check (ping packet not answered).

The value shall be given in minutes.

Number of unsuccessful connection checks up to restarting the VPN client

This parameter determines the number of allowed failed ping transmission retries before the VPN client inside the SINAUT MD741-1 are will be restarted.

Destination hosts

Tunnel name

Determine, which VPN connection (VPN tunnel) shall be supervised. Add a VPN connection by clicking the *New* button, delete a VPN connection by clicking the *Delete* button.

Host IP address

Enter the IP address of the remote station (target host) here.

Client IP address

Enter here any unused IP address of the local network related to the VPN connection.

Factory settings

The factory settings for the SINAUT MD741-1 are as follows:

Enable VPN supervision	Nein
Interval for connection check (minutes)	5
Waiting time before repetition (minutes)	1
Number of unsuccessful connection checks up to restarting the VPN client	3

7.7 Advanced settings for VPN connections

Setting special timeouts and intervals for VPN connections.

IPsec VPN - Advanced settings	
Keepalive interval for NAT-T (seconds)	60
Phase 1 timeout (seconds)	15
Phase 2 timeout (seconds)	10
Maximum number of connection establishment attempts up to restarting the VPN client	5
Maximum number of connection establishment attempts after restarting the VPN client until the next device restart	2
DynDNS tracking	Yes
Interval for DynDNS tracking (minutes)	5
Restart of the VPN clients with DPD	No

Save Reset

Figure 7-12 IPsec VPN > Advanced Settings

Keepalive interval for NAT-T (seconds)

If NAT-T is enabled, then keepalive data packets will be sent periodically by the SINAUT MD741-1 through the VPN connection. The purpose of this is to prevent a NAT router between the SINAUT MD741-1 and the remote station from interrupting the connection during idle periods without data traffic.

Here you can change the interval between the keepalive data packets.

Phase 1 timeout (seconds)

The Phase 1 timeout determines how long the SINAUT MD741-1 waits for completion of an authentication process of the ISAKMP-SA. If the set timeout is exceeded, the authentication will be aborted and restarted.

Here you change the timeout.

Phase 2 timeout (seconds)

The Phase 2 timeout determines how long the SINAUT MD741-1 waits for completion of an authentication process of the IPsec-SA. If the set timeout is exceeded, the authentication will be aborted and restarted.

Here you change the timeout.

Maximum number of connection establishment attempts up to restarting the VPN client

If the establishment of a VPN connection fails, the connection setup will be retried by the SINAUT MD741-1. Enter the number of unsuccessful retries, being performed before the SINAUT MD741-1 restart its VPN client before trying again the connection setup.

Maximum number of connection establishment attempts after restarting the VPN client until the next device restart

If the establishment of a VPN connection fails, the connection setup will be retried by the SINAUT MD741-1. Enter the number of unsuccessful retries, being performed before the SINAUT MD741-1 reboots and tries again the connection setup.

DynDNS tracking

If the VPN gateway of the remote stations uses a DynDNS service to get an IP address and no Dead Peer Detection is used, the SINAUT MD741-1 should periodically check, if the remote VPN gateway is still reachable. The DynDNS tracking function provides this function. *Yes* activates this function, *No* deactivate this function.

Interval for DynDNS tracking (minutes)

Configure here the interval it shall be checked, if the remote station is still reachable.

Restart of the VPN client with DPD

If the SINAUT MD741-1 does not receive any reply to its DPD queries from the remote station, the IPsec connection is considered to be interrupted after a number of permitted unsuccessful attempts. You can specify whether or not the SINAUT MD741-1 is rebooted in such a situation.

Remember that if you reboot, not only the failed connection but all existing VPN connections will be interrupted.

Select one of the two options:

- Yes: The device is restarted as soon as DPD is detected.
- No: The device is not restarted following DPD.

Factory settings

The factory settings for the SINAUT MD741-1 are as follows:

Keepalive interval for NAT-T (seconds)	60
Phase 1 timeout (seconds)	15
Phase 2 timeout (seconds)	10
Maximum number of connection establishment attempts up to restarting the VPN client	5
Maximum number of connection establishment attempts after restarting the VPN client until the next device restart	2
DynDNS tracking	Yes
Interval for DynDNS tracking (minutes)	5
Restart of the VPN client with DPD	No

7.8 Status of the VPN connections

Indicates the status of the enabled VPN connections and the option for loading a protocol file to the Admin PC.

The screenshot displays the 'IPsec VPN - Status' page for a SIEMENS SINAUT MD741-1 device. The page features a navigation menu on the left with the following items: Overview, System, Local Network, External Network, Security, IPsec VPN (selected), Connections, Certificates, Monitoring, Advanced, Status, Remote access, SMS, and Maintenance. The main content area is titled 'IPsec VPN - Status' and contains a table with the following structure:

List of active VPN connections			
Name	Remote Host	ISAKMP SA	IPsec SA
Number of VPN connection attempts (24 h)		0	
Download VPN protocol			Download

Figure 7-13 IPsec VPN > Status

Enabled VPN Connections

A white check mark on a green dot indicates that the specific Security Association (SA) has been successfully established- A white cross on a red dot indicates that the Security Association does not exist.

Number of VPN connection attempts (24 h)

This entry shows how often in the last 24 hours there was an attempt to establish a VPN connection.

Download VPN protocol

This function can be used to download the VPN protocol file to the Admin PC.

Remote access

8

8.1 HTTPS remote access

The HTTPS remote access (= *HyperText Transfer Protocol Secure*) allows secure access to the Web user interface of the SINAUT MD741-1 from an external network via EGPRS, GPRS or CSD.

Configuration of the SINAUT MD741-1 via the HTTPS remote access then takes place exactly like configuration via a Web browser via the local interface (see chapter 3).

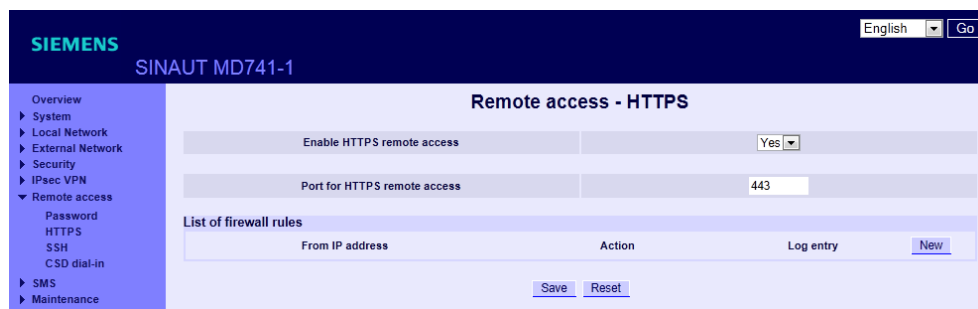


Figure 8-1 Access > HTTPS remote access

Enable HTTPS remote access

Yes

Access to the Web user interface of the SINAUT MD741-1 from the external network via HTTPS is allowed.

No

Access via HTTPS is not allowed.

HTTPS remote access port

Default: 443 (factory settings)

You can define a different port. However, if you have defined a different port, then the external remote station conducting the remote access must specify the port number after the IP address when specifying the address.

Example:

If this SINAUT MD741-1 can be accessed via the Internet using the address 192.144.112.5, and if port number 442 has been defined for the remote access, then the following must be specified in the Web browser at the external remote station:

<https://192.144.112.5:442>

Firewall rules for HTTPS remote access

New

Adds a new firewall rule for HTTPS remote access that you can then fill out.

Delete

Removes a firewall rule for HTTPS remote access that has been created.

From IP address (External)

Specify here the address(es) of the computer(s) for which remote access is allowed. You have the following options:

IP address or address range: **0.0.0.0/0** means all addresses. To specify a range, use the CIDR notation - see the Glossary.

Action

Define how access to the specified HTTPS port will be handled:

Accept means that the data packets can go through.

Reject means that the data packets are rejected, and the sender receives a message about the rejection.

Drop means that the data packets are not allowed through. They are discarded without the sender receiving any information about where they went.

Log

For each individual firewall rule you can define whether the event should be logged when the rule takes effect - set *Log* to *Yes*, or not - set *Log* to *No* (factory settings).

The log is kept in the firewall log,

Factory settings

The factory settings for the SINAUT MD741-1 are as follows:

Enable HTTPS remote access	No (switched off)
HTTPS remote access port	443
Default for new rules:	
From IP address (External)	0.0.0.0/0
Action	Accept
Log	No (switched off)

8.2 SSH remote access

The SSH remote access (= Secured SHell) allows secure access to the file system of the SINAUT MD741-1 from an external network via EGPRS, GPRS or CSD.

To do this, a connection must be established using an SSH-capable program from the external remote station to the SINAUT MD741-1.

Use the SSH remote access only if you are familiar with the LINUX file system.

In the factory settings this option is deactivated.

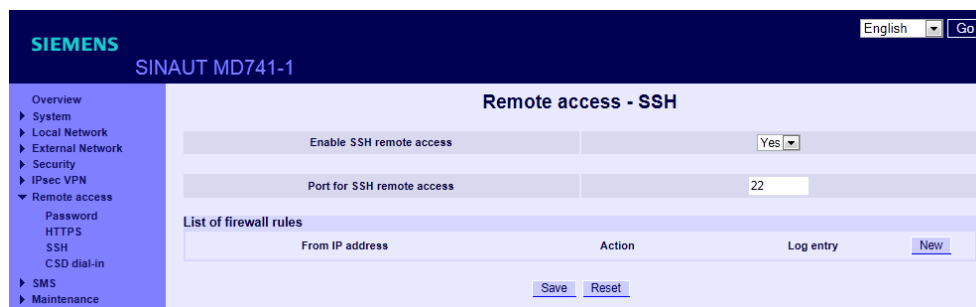


Figure 8-2 Access >SSHs

Caution

Via SSH remote access it is possible to derange the configuration of the device in such a way that it will have to be sent in for servicing. In this case contact your dealer or distributor.

Enable SSH remote access Yes

Access to the file system of the SINAUT MD741-1 from the external network via SSH is allowed.

No

Access via SSH is not allowed.

Port for SSH remote access

Default: 22 (factory settings)

You can define a different port. However, if you have defined a different port, then the external remote station conducting the remote access must specify the port number defined here in front of the IP address when specifying the address.

Example:

If this SINAUT MD741-1 can be accessed from the external network using the address 192.144.112.5, and if port 22222 has been defined for the remote access, then this port number must be specified in the SSH client (e.g. PUTTY) at the external remote station:

```
ssh -p 22222 192.144.112.5
```

Firewall rules for SSH remote access

New

Adds a new firewall rule for SSH remote access that you can then fill out.

Delete

Removes a firewall rule for SSH remote access that has been created.

From IP address

Specify here the address(es) of the computer(s) for which remote access is allowed. You have the following options:

IP address or address range: **0.0.0.0/0** means all addresses. To specify a range, use the CIDR notation - see the Glossary.

Action

Define how access to the specified SSH port will be handled:

Accept means that the data packets can go through.

Reject means that the data packets are rejected, and the sender receives a message about the rejection.

Drop means that the data packets are not allowed through. They are discarded without the sender receiving any information about where they went.

Log

For each individual firewall rule you can define whether the event should be logged when the rule takes effect - set Log to Yes, or not - set Log to No (factory settings).

The log is kept in the firewall log, see Chapter 6.4.

Factory settings

The factory settings for the SINAUT MD741-1 are as follows:

Enable SSH remote access	No (switched off)
Port for SSH remote access	22
Default for new rules:	
From IP (External)	0.0.0.0/0
Action	Accept
Log	No (switched off)

8.3 Remote access via dial-in connection

The CSD dial-in access makes it possible to access the Web user interface of the SINAUT MD741-1 via a dial-in data connection (CSD = Circuit Switched Data). To do this, call the SINAUT MD741-1 at the data call number using an analogue modem, or at the voice or data call number of its SIM card using a GSM modem. The SINAUT MD741-1 accepts the call if:

Figure 8-3 Access > CSD dial-In

- the call number of the telephone connection that you call from is saved in the list of permitted numbers in SINAUT MD741-1, and
- the call number is transmitted by the telephone network (CLIP function)

Dialling must be performed by a PPP client, for example via a Windows dial-up connection. In Windows, use the *New Connection Wizard*, and under *Connect to the network at my workplace* set up a *Dial-up connection*.

Enable CSD dial-in

Yes

Access to the Web user interface of the SINAUT MD741-1 from a dial-in data connection is allowed.

No

Access via dial-in data connection is not allowed.

PPP user name / password

Select a username and a password that must be used by a PPP client (e.g. a Windows dial-up connection) to log on to the SINAUT MD741-1. The same username and the same password must be entered in the PPP client.

Permitted call numbers (CLIP check)

Specify the call number of the telephone connection from which the dial-in data connection is established. The telephone connection must support Calling Line Identification Presentation (CLIP), and this function must be activated.

The call number entered in the SINAUT MD741-1 must be exactly the same as the call number reported, any may also have to include the country code and prefix, e.g. +494012345678.

If multiple call numbers of a private branch exchange are to have access authorisation, you can use the "*" symbol as a wildcard, e.g. +49401234*. Then all call numbers that begin with +49401234 will be accepted.

Note

Firewall rules entered for HTTPS and SSH access also apply for CSD access. The source IP address ("*From IP*") for CSD access is defined as 10.99.99.2.

New

Adds a new approved call number for CSD remote access that you can then fill out.

Delete

Removes a firewall rule for CSD remote access.

Factory settings

The factory settings for the SINAUT MD741-1 are as follows:

Enable CSD dial-in	No (switched off)
PPP user name	service
PPP password	service
Permitted call numbers	*

9.1 Log

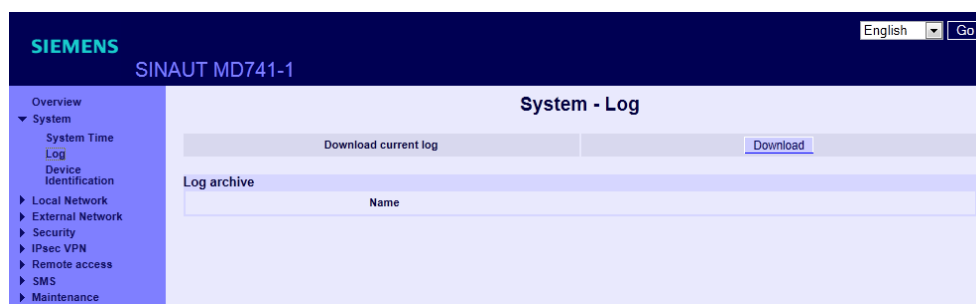


Figure 9-1 System > Log

Logfile

Important events in the operation of the SINAUT MD741-1 are saved in the log.

- Reboot
- Changes to the configuration
- Establishing of connections
- Interruption of connections
- Signal strength
- and operating messages

The log is saved to the log archive of the SINAUT MD741-1 when a file size 1 MByte, is reached, but after 24 hours at the latest.

Download current log

Download - the current log is loaded to the Admin PC. You can select the directory to save the file to, and can view the file there.

Log archive

Download - The archived log files are loaded to the Admin PC. You can select the directory to save the files to, and can view the files there.

Example:

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
13.12.2007 11:04	3173XX	(null)	(null)	(null)	SERVICE_MASK=0	4	UH	41	CURRENT SYSTEM VERSION	1.014					
13.12.2007 19:46	3173XX	(null)	(null)	(null)	SERVICE_MASK=0	4	UH	41	CURRENT SYSTEM VERSION	1.014					
13.12.2007 19:46	3173XX	CSQ=---	STAT=---	COPS=---	SERVICE_MASK=496591	4	APL	0	SYSTEM STARTING	Success					
13.12.2007 19:47	3173XX	CSQ=---	STAT=---	COPS=---	(null)	0	APL	5	CONNECTION ERROR	Missing or incorrect GSM parameter					
13.12.2007 20:03	3173XX	CSQ=8	STAT=1	COPS=26201	SERVICE_MASK=496591	4	APL	34	SYSTEM RUNNING SUCCESSFUL	CellID:4369	Version:1.014	TXS:	RXS:	TX:0	RX:0
13.12.2007 20:19	3173XX	CSQ=8	STAT=1	COPS=26201	SERVICE_MASK=496591	4	APL	34	SYSTEM RUNNING SUCCESSFUL	CellID:4369	Version:1.014	TXS:	RXS:	TX:0	RX:0
13.12.2007 20:36	3173XX	CSQ=8	STAT=1	COPS=26201	SERVICE_MASK=496591	4	APL	34	SYSTEM RUNNING SUCCESSFUL	CellID:4369	Version:1.014	TXS:	RXS:	TX:0	RX:0
13.12.2007 20:52	3173XX	CSQ=8	STAT=1	COPS=26201	SERVICE_MASK=496591	4	APL	34	SYSTEM RUNNING SUCCESSFUL	CellID:4369	Version:1.014	TXS:	RXS:	TX:0	RX:0
13.12.2007 21:09	3173XX	CSQ=8	STAT=1	COPS=26201	SERVICE_MASK=496591	4	APL	34	SYSTEM RUNNING SUCCESSFUL	CellID:4369	Version:1.014	TXS:	RXS:	TX:0	RX:0
13.12.2007 21:25	3173XX	CSQ=8	STAT=1	COPS=26201	SERVICE_MASK=496591	4	APL	34	SYSTEM RUNNING SUCCESSFUL	CellID:4369	Version:1.014	TXS:	RXS:	TX:0	RX:0
14.12.2007 12:15	3173XX	(null)	(null)	(null)	SERVICE_MASK=0	4	UH	41	CURRENT SYSTEM VERSION	1.014					
14.12.2007 12:16	3173XX	CSQ=---	STAT=---	COPS=---	SERVICE_MASK=496591	4	APL	0	SYSTEM STARTING	Success					
14.12.2007 12:16	3173XX	CSQ=---	STAT=---	COPS=---	SERVICE_MASK=496591	0	APL	5	CONNECTION ERROR	Missing or incorrect GSM parameter					
14.12.2007 12:16	3173XX	CSQ=---	STAT=---	COPS=---	SERVICE_MASK=496591	4	CH	9	CONFIGURATION FILE ACCESS	(write values)					
14.12.2007 12:16	3173XX	CSQ=---	STAT=---	COPS=---	SERVICE_MASK=496591	4	CH	9	CONFIGURATION FILE ACCESS	InternalPs.InternalIP:0.IP:192.168.1.1					
14.12.2007 12:16	3173XX	CSQ=---	STAT=---	COPS=---	SERVICE_MASK=496591	4	CH	9	CONFIGURATION FILE ACCESS	InternalPs.InternalIP:0.NetMask:255.255.255.0					
14.12.2007 12:16	3173XX	CSQ=---	STAT=---	COPS=---	(null)	4	CH	9	CONFIGURATION FILE ACCESS	InternalPs.InternalIP:1.IP:192.168.0.20					
14.12.2007 12:16	3173XX	CSQ=---	STAT=---	COPS=---	(null)	4	CH	9	CONFIGURATION FILE ACCESS	InternalPs.InternalIP:1.NetMask:255.255.255.0					
14.12.2007 23:05	3173XX	(null)	(null)	(null)	SERVICE_MASK=0	4	UH	41	CURRENT SYSTEM VERSION	1.014					
14.12.2007 23:08	3173XX	CSQ=---	STAT=---	COPS=---	SERVICE_MASK=496591	4	APL	0	SYSTEM STARTING	Success					
14.12.2007 23:08	3173XX	CSQ=---	STAT=---	COPS=---	(null)	0	APL	5	CONNECTION ERROR	Missing or incorrect GSM parameter					
14.12.2007 23:08	3173XX	CSQ=8	STAT=1	COPS=26201	SERVICE_MASK=496591	4	CH	9	CONFIGURATION FILE ACCESS	(write values)					
14.12.2007 23:08	3173XX	CSQ=8	STAT=1	COPS=26201	SERVICE_MASK=496591	4	CH	9	CONFIGURATION FILE ACCESS	(write values)					
14.12.2007 23:08	3173XX	CSQ=8	STAT=1	COPS=26201	SERVICE_MASK=496591	4	APL	3	GPRS CONNECTION ESTABLISHED	GPRS connect					
14.12.2007 23:10	3173XX	CSQ=8	STAT=1	COPS=26201	SERVICE_MASK=496591	4	APL	8	BIP ASSIGNED	172.25.105.9					
14.12.2007 23:11	3173XX	CSQ=8	STAT=1	COPS=26201	SERVICE_MASK=496591	4	CH	9	CONFIGURATION FILE ACCESS	(write values)					
14.12.2007 23:11	3173XX	CSQ=8	STAT=1	COPS=26201	SERVICE_MASK=496591	4	CH	9	CONFIGURATION FILE ACCESS	ICMPCheck.Enabled:true					
14.12.2007 23:11	3173XX	CSQ=8	STAT=1	COPS=26201	SERVICE_MASK=496515	4	CH	9	CONFIGURATION FILE ACCESS	(write values)					
14.12.2007 23:11	3173XX	CSQ=8	STAT=1	COPS=26201	SERVICE_MASK=496515	4	CH	9	CONFIGURATION FILE ACCESS	ICMPCheck.Enabled:true					
14.12.2007 23:12	3173XX	CSQ=8	STAT=1	COPS=26201	SERVICE_MASK=496515	4	CH	9	CONFIGURATION FILE ACCESS	(write values)					
14.12.2007 23:13	3173XX	CSQ=8	STAT=1	COPS=26201	SERVICE_MASK=496515	4	CH	9	CONFIGURATION FILE ACCESS	(write values)					
14.12.2007 23:13	3173XX	CSQ=8	STAT=1	COPS=26201	SERVICE_MASK=496515	4	CH	9	CONFIGURATION FILE ACCESS	NTP.Enabled:true					
14.12.2007 22:24	3173XX	CSQ=8	STAT=1	COPS=26201	SERVICE_MASK=499711	4	APL	34	SYSTEM RUNNING SUCCESSFUL	CellID:4369	Version:1.014	TXS:449	RXS:358	TX:1078	RX:358
14.12.2007 22:40	3173XX	CSQ=8	STAT=1	COPS=26201	SERVICE_MASK=499711	4	APL	34	SYSTEM RUNNING SUCCESSFUL	CellID:4369	Version:1.014	TXS:449	RXS:358	TX:1078	RX:358
14.12.2007 22:57	3173XX	CSQ=8	STAT=1	COPS=26201	SERVICE_MASK=499711	4	APL	34	SYSTEM RUNNING SUCCESSFUL	CellID:4369	Version:1.014	TXS:449	RXS:358	TX:1078	RX:358
14.12.2007 23:13	3173XX	CSQ=10	STAT=1	COPS=26201	SERVICE_MASK=499711	4	APL	34	SYSTEM RUNNING SUCCESSFUL	CellID:4369	Version:1.014	TXS:449	RXS:358	TX:1078	RX:358
14.12.2007 23:30	3173XX	CSQ=10	STAT=1	COPS=26201	SERVICE_MASK=499711	4	APL	34	SYSTEM RUNNING SUCCESSFUL	CellID:4369	Version:1.014	TXS:2737	RXS:3931	TX:3366	RX:3931
14.12.2007 23:46	3173XX	CSQ=10	STAT=1	COPS=26201	SERVICE_MASK=499711	4	APL	34	SYSTEM RUNNING SUCCESSFUL	CellID:4369	Version:1.014	TXS:3089	RXS:4469	TX:3718	RX:4469

Entries in log

Column A:

Time stamp

Column B:

Product number

Column C:

Signal quality (CSQ value)

Column D:

GSM login status

STAT = --- = Function not activated yet

STAT = 1 = Logged in to home network

STAT = 2 = Not logged in; searching for network

STAT = 3 = Login rejected

STAT = 5 = Logged in to third-party network (roaming)

Column E:

Indication of the network operator identification with the 3-digit country code (MCC) and the 2-3-digit network operator code (MNC).

Example: 26201 (262 = country code / 01 = network operator code)

Column F:

Coded operating status (for Hotline)

Column G:

Category of the log report (for Hotline)

Column H:

Internal source of the log report (for Hotline)

Column I:

Internal report number (for Hotline)

Column J:

Log report in plain text

Columns K-P:

Additional information on the plain text report, such as:

- Cell ID (identification number of the active GSM cell)
- Software version
- TXS, RXS (IP packets transmitted in the current connection)
- TX, RX (IP packets transmitted since the last factory settings reboot)

9.2 Remote logging

The SINAUT MD741-1 can transfer the system log once per day via FTP (= File Transfer Protocol) to an FTP server.

The current system log and the system log files in the archive are transferred. After successful transfer the transferred logs are deleted in the SINAUT MD741-1.

If the transfer fails, the SINAUT MD741-1 tries once again to transfer the data after 24 hours.

Figure 9-2 Maintenance > Remote Logging

Enable remote logging (FTP upload)

Yes activates the function.

Time

Specifies the daily time, when the log files will be transmitted to the FTP server.

FTP Server

Specifies the address of the *FTP server*, to which the log files are to be transferred. The address can be specified as a hostname (e.g. ftp.server.de) or as an IP address.

Username

Specifies the username for logging in to the FTP server.

Password

Specifies the password for logging in to the FTP server.

Factory settings

The factory settings for the SINAUT MD741-1 are as follows:

Enable remote logging (FTP upload)	No (switched off)
Time	00:00
FTP Server	NONE
Username	guest
Password	guest

9.3 Snapshot

This function is used for support purposes.

The service snapshot downloads important log files and current device settings that could be important for fault diagnosis and saves them in a file.

If you contact our Hotline in the event of a problem with the SINAUT MD741-1, in many cases they will ask you for the snapshot file.

Note

This file contains the access parameters for EGPRS and GPRS and the addresses of the remote station. It does not contain the username and password for access to the SINAUT MD741-1.

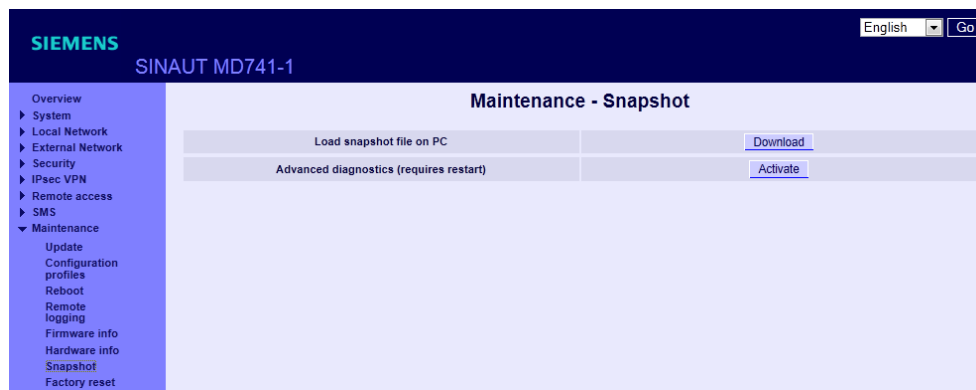


Figure 9-3 Maintenance > Snapshot

Load snapshot file on PC

Click on download. You can select the location on the Admin PC where the snapshot file will be saved.

The filename of the snapshot file has the following structure:

<hostname>_Snapshot_<Date&TimeCode>.tgz,

e.g.: md741_Snapshot_200711252237.tgz

Advanced diagnostics

Only *Activate* the *Advanced diagnosis* if asked to do so by our Hotline. In operation with advanced diagnosis, information is written to the diagnosis logs much more often. Some additional information is also saved. This is useful for systematic troubleshooting.

Note

When advanced diagnosis is active, the frequent write access to the non-volatile memory of the SINAUT MD741-1 can lead to a reduction of its service life.

Factory settings

The factory settings for the SINAUT MD741-1 are as follows:

Advanced diagnostics **Off (Activate)**

9.4 Hardware information

Shows important information for hardware identification. This information is often needed in the event of queries to our Hotline.

Maintenance - Hardware information	
CPU	Freescaler i.MX28
CPU clock frequency	454MHz
Application memory	128MB
System runtime	Fri Jan 11 11:32:17 UTC 2013
MAC address	00:60:4c:c7:0c:f7
IMEI	---
Module information	---, ---, ---
Product name	SINAUT-MD741
Serial number	NTGX4007589
Hardware product version	02-10

Figure 9-4 Maintenance > Hardware info

9.5 Software information

Shows important information for software identification. This information is often needed in the event of queries to our Hotline.

Planned updates are additionally shown. See also Chapter 10.4.

Maintenance - Software Info	
Current system version	1.027
MD741-1 control application	1.020
Mobile handler	1.020
lighttpd	1.4.15
ntpd	4.2.4p3
ezipupdate	3.0.11b7
sshd	4.5p1
DISMasq	2.39
IPtables	1.3.7
IPSec-Tools	0.7
CGI applications	1.021
German websites	1.021
English websites	1.021

Scheduled updates		
Update Id	From version -> to version	Timestamp

Figure 9-5 Maintenance > Software info

10.1 Service Center

The SINAUT MD741-1 also uses the Short Message Service (SMS) of the GSM network. You can specify a special SMS center.



Figure 10-1 SMS Center (SMSC)

Call number of the SMSC

To ensure that the SMS function works reliably, enter the call number of the service center (SMSC) here. If there is no entry made here, the default SMSC of your network provider will be used.

10.2 Alarm SMS

The SINAUT MD741-1 can transmit short alarm messages using the SMS (= Short M SINAUT MD741-1essage Service) of the GSM network. The sending of an alarm SMS message can be triggered by the following event:

- Event 1 No GPRS connection

For the event, you can specify a separate call number to which the alarm message will be sent. You can enter any text as the alarm message. The following characters are available:

a b c d e f g h i j k l m n o p q r s t u v w x y z A B C D E F G H I J K L M N O P Q R
S T U V W X Y Z 0 1 2 3 4 5 6 7 8 9 , ! ?



Figure 10-2 SMS > Alarm SMS

Alarm SMS for event 1: no GPRS connection

Event 1 The GPRS connection cannot be established despite multiple attempts. The SINAUT MD741-1 then transmits an alarm message.

Settings

Enable

With Yes, the alarm message is sent if the event occurs, with No, it is not.

Call number

Here, enter the call number of the end device to which the alarm message will be sent using SMS. The end device must support reception of SMS messages via GSM or fixed network.

Text

Here enter the text that will be sent as an alarm message.

Factory settings

The factory settings of the SINAUT MD741-1 are as follows:

SMS service center call number	-
Alarm SMS for event 1: no GPRS connection	No (turned off)
Call number	-
Text	-

10.3 SMS - Messaging from the local network

With the SMS messaging function, applications connected to the local interface of the SINAUT MD741-1 can send SMS messages via the GSM network.

Figure 10-3 SMS > SMS over IP

To send an SMS message, the application must establish a TCP/IP connection to the SINAUT MD741-1 via the local interface.

Via this TCP/IP connection, the application transfers the text of the SMS to the SINAUT MD741-1 that packs the text in an SMS message and sends it.

Frame format for the SMS message

The text must be transferred in a frame via the TCP/IP connection to the SINAUT MD741-1. The frame must have the following format:

Username#Password#CommandCode#Seq-Num;Callnumber;Message:

Example:

user#password#105#01;004943465789;my SMS text:

User name

Enter a user name to check the permission for sending an SMS message. Maximum of 10 characters.

Password

Enter the password belonging to the user name. Maximum of 10 characters.

CommandCode

Command to send an SMS message from the local network This value of 105 is fixed and must not be modified.

Seq-Num

The sequence number is used to assign several requests at the same time The function is not currently supported.

The sequence number consists of 2 numeric characters from 01 to 99

Call number

Call number of the SMS recipient with a maximum of 40 characters. International numbers (+49) are permitted.

Message

SMS text with a maximum of 160 characters

The following forbidden characters must not occur in the SMS text:

- # Separator for the first command level
- ; Separator for the second command level
- : Identifies the end of the message

Enable sending SMS from local network

Select *Yes* to be able to send SMS messages from the local network.

Select *No* if you do not want to send SMS messages from the local network.

User name

User name that must be included in the frame before the text is sent using SMS (see above: "Frame format"). Maximum of 10 characters.

Password

Password that must be included in the frame before the text is sent using SMS (see above: "Frame format"). Maximum of 10 characters.

Port number

TCP/IP port on which the SINAUT MD741-1 accepts the TCP/IP connection for sending SMS messages.

Firewall Rules

To allow the TCP/IP connection to be established for sending SMS messages, a firewall rule must be set up on the SINAUT MD741-1.

With *New*, you insert sources ("From IP") for the TCP/IP connection for sending SMS messages. With *Delete*, you remove the connections.

From IP address (internal)

Enter the IP address of the communications partner that is allowed to send IP packets to the local network. Do this by specifying the IP address or an IP range for the partner station. 0.0.0.0 means all addresses.

To specify a range, use the CIDR notation - see Glossary.

Action

The drop-down list below Action relates to the TCP/IP connection of the IP address shown to the left beside the drop-down list. The following three options are available:

- "Accept": Enables the TCP/IP connection for sending SMS messages.
- "Reject": The data packets are rejected, and the sender receives a message about the rejection.
- "Drop": The data packets may not pass and are discarded. The sender does not receive any notification of this.

Log entry

For each firewall rule, you can specify whether or not the event is logged (Log = Yes) or whether the factory default is retained (Log = No).

The log is kept in the firewall log, see section 6.4.

Factory settings

The factory settings of the SINAUT MD741-1 are as follows:

User name	User
Password	Password
Port number	26864
Firewall rules	Not active
From IP address	0.0.0.0
Action	Accept
Log	No

10.4 Software Update

The Update function can be used to load new operating software to the SINAUT MD741-1 and activate this software.

In an immediate update the new software will be unzipped. This process can take several minutes. After that the actual update process begins, which is indicated by the LEDs lighting up in sequence.

The settings of the SINAUT MD741-1 will be accepted insofar as the settings still have the same effect in the new software version as they did before the update.

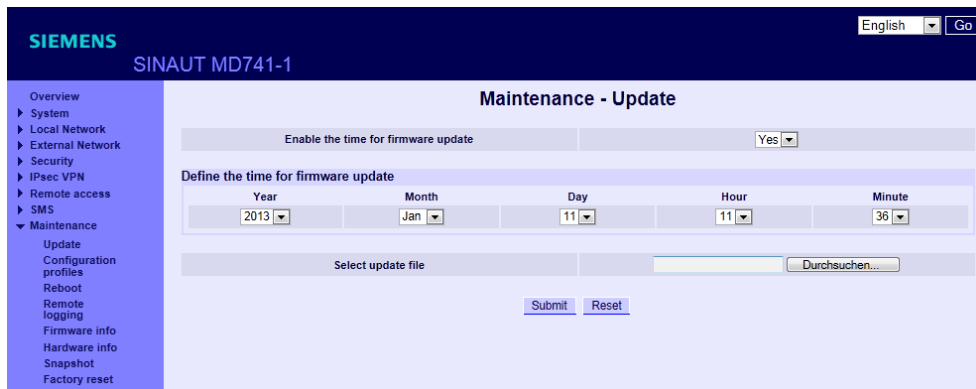


Figure 10-4 Maintenance > Update

Enable the time for firmware update

No

Immediate update - The new operating software is activated immediately after you load the software and click on *Submit*.

Yes

Time-controlled update - The new operating software is activated at the defined update time. The software must have been loaded already.

Define the ime for firmware update

If you want to have the update carried out with time control, specify the time when the new operating software is to be activated.

Specify the Year – Month – Day – Hour – Minute.

Select update file

Use *Browse* to select the file, which includes the new operating software, for example:

MD741_v1.024-v1.027.tgz

Load the firmware to the device with *Open*.

Submit

With *Submit* the operating software is either activated immediately or the operating software is activated at the specified time.

Technical Data

11

Interfaces	Application interface	10/100 Base-T (RJ45 plug) Ethernet IEEE802 10/100 Mbit/s
	Service interface	USB-A (reserved for later applications)
Security functions		Stateful inspection firewall Anti-spoofing Port forwarding
Additional functions		DNS cache, DHCP server, NTP, remote logging, connection monitoring, alarm-SMS
Management		Web-based administration user interface, ssh console
Wireless connection	EDGE / GPRS	EDGE Multislot class 12 / EDGE Multislot class 12
	Coding schemes GSM Module	CS-1, CS-2, CS-3, CS-4 EGPRS (EDGE) / Quad band
	EDGE (EGPRS)	Multislot Class 12 Mobile Station Class B Modulation and Coding Scheme MCS 1 – 9
	GPRS	Multislot Class 12 Full PBCCH support Mobile Station Class B Coding Scheme 1 – 4
	EDGE / GPRS	During the data transmission via EGPRS or GPRS the device automatically selects from the following classes: <ul style="list-style-type: none"> <input type="checkbox"/> from EGPRS Multislot Class 12 (4Tx slots) to EGPRS Multislot Class 10 (2Tx slots), <input type="checkbox"/> from EGPRS Multislot Class 10 (2Tx slots) to EGPRS Multislot Class 8 (1Tx), <input type="checkbox"/> from GPRS Multislot Class 12 (4Tx slots) to GPRS Multislot Class 8 (1Tx) <input type="checkbox"/> from GPRS Multislot Class 10 (2Tx slots) to GPRS Multislot Class 8 (1Tx)
	CSD / MTC	V.110, RLP, non-transparent 2.4, 4.8, 9.6, 14.4kbps
	SMS (TX)	Point to point, MO (outgoing)

	Max. transmitting power (acc. to output 99, V5)	Class 4 (+33dBm \pm 2dB) for EGSM850 Class 4 (+33dBm \pm 2dB) for EGSM900 Class 1 (+30dBm \pm 2dB) for GSM1800 Class 1 (+30dBm \pm 2dB) for GSM1900 Class E2 (+27dBm \pm 3dB) for GSM 850 8-PSK Class E2 (+27dBm \pm 3dB) for GSM 900 8-PSK Class E2 (+26dBm +3 /-4dB) for GSM 1800 8-PSK Class E2 (+26dBm +3 /-4dB) for GSM 1900 8-PSK
	Antenna connection	Nominal impedance: 50 ohms, jack: SMA
Ambient conditions	Temperature range	Operation: -20 °C to +60 °C Storage: -40 °C to +70 °C
	Air humidity	0-95 %, non-condensing
Housing	Design	Top-hat rail housing
	Material	Plastic
	Protection class	IP20
	Dimensions	114 mm x 45 mm x 99 mm
	Weight	approx. 280g
DE	CE	Yes
	GSM/EGPRS module Environment	Conforms to GCF, PTCRB The device complies with the European Directives RoHS and WEEE.
Power supply	Input voltage	12 - 30 V DC (24 V DC nominal)
	Input Current	510 – 230 mA DC
	Power input	4.4 W typical at 12 V 4.0 W typical at 24 V 4.5 W typical at 30 V
	Current consumption	See table below.
	Input current characteristic	<p>The figure contains two graphs showing the input current characteristic. The top graph is titled "I_{Burst} at 12V" and shows a series of sharp peaks reaching approximately 1300 mA on a 100ms scale. The bottom graph is titled "I_{Burst} at 24V" and shows a series of sharp peaks reaching approximately 600 mA on the same 100ms scale. Both graphs indicate a 4.62ms burst repeat rate.</p>

Current consumption ⁽³⁾	<i>Input voltage</i>	<i>Connected, no data transfer</i>	<i>Continuous data transfer with low signal quality</i> ⁽¹⁾	<i>Continuous data transfer with medium signal quality</i> ⁽²⁾	<i>Burst</i>
<i>Operating mode</i>	[V]	[mA]	[mA]	[mA]	[mA]
<i>GSM-CSD</i>	12	174	315	263	1000
	24	97	168	137	450
	30	82	137	116	360
<i>EGPRS / GPRS</i>	12	174	365	282	1260
	24	97	182	147	550
	30	82	150	121	420

⁽¹⁾ Measured at GSM900 Power Level 5 (33dBm transmitting power)

⁽²⁾ Measured at GSM900 Power Level 10 (23dBm transmitting power)

⁽³⁾ USB port not used

Note

The approvals that apply to the device are printed on the device.

12.1 EU Declaration of Conformance

Marking



Applied European directives

When used within the intended purpose, the equipment is compliant to the requirements of the following European directives:

- Directive 1999/5/EC (R&TTE) of the European Parliament and of the Council of 9 March 1999 on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity,
- Directive 2006/95/EC (LVD) of the European Parliament and of the Council of 12 December 2006 on the harmonization of the laws of Member States relating to electrical equipment designed for use within certain voltage limits,
- Directive 2004/108/EC (EMC) of the European Parliament and of the Council of 15 December 2004 on the approximation of the laws of the Member States relating to electromagnetic compatibility and repealing Directive 89/336/EEC
- Directive 94/9/EC (ATEX) of the European Parliament and the Council of 23 March 1994 on the approximation of the laws of the Member States concerning equipment and protective systems intended for use in potentially explosive atmospheres.

You will find the EU declaration of conformity for this product on the Internet at the following address:

Link to the declaration of conformity:

(<http://support.automation.siemens.com/WW/view/en/10805878>) → "Entry list" tab

Filter settings:

Entry type: "Certificates" → Certificate type: "Declaration of conformity" → Search item(s): <name of the module>

Directive 1999/5/EC (R&TTE)

Applied standards

- EN301 511: v.9.0.2
- 3GPP TS 51.010-1: v. 5.10.0

Classification

Telecommunication equipment, Radio equipment, Device class 1

Directive 2006/95/EC (LVD)

Applied standards

- EN 60950:2006

Directive 2004/108/EC (EMC)

Applied standards

- EN55022: 2006 Limit A
- EN55024:1998 + A1 : 2001 + A2 : 2003
- EN61000-6-2: 2001


Warning

The SINAUT MD741-1 is a Class A device. This device can cause radio interference in residential areas; in this case the user may be required to take appropriate measures.

Directive 94/9/EC (ATEX)

Additional marking (sample)

6NH9741-1AA00, SINAUT MD741-1 GSM/GPRS Router

 II 3 G Ex nA IIC T4 Ta= -20°C to 60°C

Applied standards

- EN60079-15 (Type of protection “n”)

Classification

Group II, Category 3, Gas Atmosphere, Non-sparking equipment, Temperature class T4, Ambient temperature range: -20°C ... +60°C

Specific Conditions of Use:

1. The SINAUT MD741-1 shall be installed in an Enclosure which maintains an ingress protection rating of IP54; meets the enclosure requirements of EN60079-0 and is only accessible with the use of a tool.
2. The USB (X1) port shall not be used.
3. On installation the SINAUT MD741-1 shall be provided with supply transient protection external to the apparatus such that the voltage at the supply terminals of the SINAUT MD741-1 shall not exceed 42 V.
4. When the Antenna is mounted external to the final Enclosure it shall be mounted and connected in a manner which maintains an ingress protection rating of IP54 and meets the enclosure requirements of EN60079-0.

12.2 Compliance to FM, UL and CSA

FM certification

Marking (sample)



CLI, DIV2, GP. A,B,C,D T4 Ta= -20°C to 60°C
CLI, Zone 2 IIC, T4 Ta= -20°C to 60°C

Applied standards

- Factory Mutual Approval Standard Class Number 3611

Classification

Class I, Division 2, Group A, B, C, D, Temperature class T4, Ambient temperature range: -20°C ... +60°C

Class I, Zone 2, Group IIC, 135°C maximum surface temperature, Ambient temperature range: -20°C ... +60°C

You can download the FM marking by follow the link:

<http://support.automation.siemens.com/WW/view/en/35029750>

UL/CSA Certification

Marking



Applied standards

- UL 60950, 1st edition
- CSA C22.2 No.60950

12.3 Compliance to FCC

Marking

SINAUT MD741-1
FCC ID: LYHMD741-1
contains MC75 FCC ID: QIPMC75

Applied standards

- FCC Part 15
- FCC Part 15.19
- FCC Part 15.21

Mandatory user information

FCC Part 15

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer / installer or an experienced radio/TV technician for help.

FCC Part 15.19

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. this device may not cause harmful interference, and
2. this device must accept any interference received, including interference that may cause undesired operation.

FCC Part 15.21

Modifications not expressly approved by this company could void the user's authority to operate the equipment.

Installation by qualified personnel only

You may only use the SINAUT MD741-1 with an antenna of the SINAUT MD741-1 accessory program.

The installation of the SINAUT MD741-1 and the antenna as well as servicing is to be performed by qualified technical personnel only. When servicing the antenna, or working at distances closer than those listed below, ensure the transmitter has been disabled.

Contains FCC ID: QIRMC75 (GSM Module)

This device contains GSM, GPRS Class12 and EGPRS Class 10 functions in the 900 and 1800 MHz Band which are not operational in U.S. Territories.

This device is to be used only for mobile and fixed applications. The antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

Users and installers must be provided with antenna installation instructions and transmitter operating conditions for satisfying RF exposure compliance. Antennas used for this OEM module must not exceed 8.4dBi gain (GSM 1900) and 2.9dBi (GSM 850) for mobile and fixed operating configurations. This device is approved as a module to be installed in other devices.

Glossary

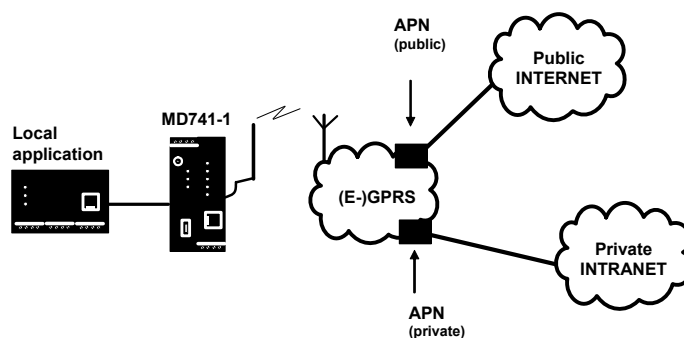
AES

Advanced Encryption Standard. The NIST (National Institute of Standards and Technology) has been developing the AES encryption standard jointly with industrial companies for years. This → symmetrical encryption is designed to replace the previous DES standard. The AES standard specifies three different key sizes with 128, 192 and 256 bits.

In 1997, the NIST launched the AES initiative and announced its conditions for the algorithm. Of the encryption algorithms proposed, the NIST short-listed five; the algorithms MARS, RC6, Rijndael, Serpent and Twofish. In October 2000, the encryption algorithm chosen was Rijndael.

APN (Access Point Name)

Trans-network connections, e.g. from a GPRS network to the Internet, are created in the GPRS network via so-called APNs.

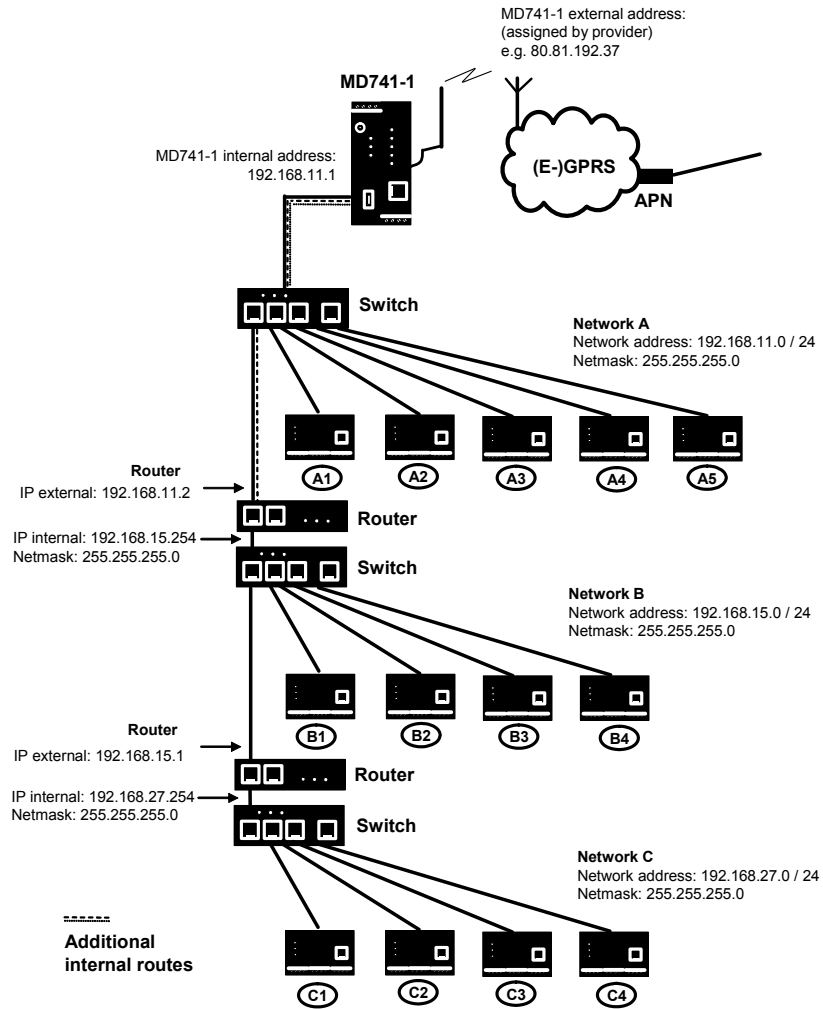


An end device that wants to establish a connection via the GPRS network specifies an APN to indicate which network it wants to be connected to: the Internet or a private company network that is connected via a dedicated line.

The APN designates the transfer point to the other network. It is communicated to the user by the network operator.

Additional Internal Routes

The following sketch shows how the IP addresses could be distributed in a local network with subnetworks, what network addresses result from this, and what the specification for an additional internal route could look like.



Network A is connected to the SINAUT MD741-1 and via it to a remote network. Additional internal routes show the path to additional networks (networks B, C), which are connected to each other via gateways (routers). For the SINAUT MD741-1, in the example shown networks B and C can both be reached via gateway 192.168.11.2 and network address 192.168.11.0/24.

Network A					
Computer	A1	A2	A3	A4	A5
IP address	192.168.11.3	192.168.11.4	192.168.11.5	192.168.11.6	192.168.11.7
Network mask	255.255.255.0	255.255.255.0	255.255.255.0	255.255.255.0	255.255.255.0
Network B					
Computer	B1	B2	B3	B4	Additional internal routes: Network: 192.168.15.0/24 Gateway: 192.168.11.2
IP address	192.168.15.3	192.168.15.4	192.168.15.5	192.168.15.6	
Network mask	255.255.255.0	255.255.255.0	255.255.255.0	255.255.255.0	
Network C					
Computer	C1	C2	C3	C4	Network: 192.168.27.0/24 Gateway: 192.168.11.2
IP address	192.168.27.3	192.168.27.4	192.168.27.5	192.168.27.6	
Network mask	255.255.255.0	255.255.255.0	255.255.255.0	255.255.255.0	

Asymmetrical encryption

In asymmetrical encryption, data are encrypted with one key and decrypted with a second key. Both keys are suitable for encryption and decryption. One of the keys is kept secret by its owner (Private Key), the other is issued to the public (Public Key), i.e. possible communication partners.

A message encrypted with a Public Key can only be decrypted and read by the recipient who has the corresponding Private Key. A message encrypted with the Private Key can be decrypted by any recipient who has the corresponding Public Key. Encryption with the Private Key shows that the message actually originates from the owner of the corresponding Public Key. We therefore speak of a digital signature.

Asymmetrical encryption methods such as RSA are, however, slow and vulnerable to certain attacks, which is why they are often combined with a symmetrical method (→ symmetrical encryption). On the other hand, concepts are also possible which avoid the complex administration of symmetrical keys.

CIDR**Classless Inter-Domain Routing**

IP netmasks and CIDR are notations for grouping a number of IP addresses into an address space. Thus a range of contiguous addresses is treated as a network.

The CIDR method reduces, for example the routing tables stored in routers by means of a postfix in the IP address. This postfix can be used to designate a network together with its subnetworks. This method is described in RFC 1518.

In order to specify a range of IP addresses to the SINAUT MD741-1, or when configuring the firewall, it may be necessary to specify the address space in the CIDR notation. The following table shows the IP netmask on the left-hand side, and to the far right the corresponding CIDR notation.

IP netmask	binary				CIDR
255.255.255.255	11111111	11111111	11111111	11111111	32
255.255.255.254	11111111	11111111	11111111	11111110	31
255.255.255.252	11111111	11111111	11111111	11111100	30
255.255.255.248	11111111	11111111	11111111	11111000	29
255.255.255.240	11111111	11111111	11111111	11110000	28
255.255.255.224	11111111	11111111	11111111	11100000	27
255.255.255.192	11111111	11111111	11111111	11000000	26
255.255.255.128	11111111	11111111	11111111	10000000	25
255.255.255.0	11111111	11111111	11111111	00000000	24
255.255.254.0	11111111	11111111	11111110	00000000	23
255.255.252.0	11111111	11111111	11111100	00000000	22
255.255.248.0	11111111	11111111	11111000	00000000	21
255.255.240.0	11111111	11111111	11110000	00000000	20
255.255.224.0	11111111	11111111	11100000	00000000	19
255.255.192.0	11111111	11111111	11000000	00000000	18
255.255.128.0	11111111	11111111	10000000	00000000	17
255.255.0.0	11111111	11111111	00000000	00000000	16
255.254.0.0	11111111	11111110	00000000	00000000	15
255.252.0.0	11111111	11111100	00000000	00000000	14
255.248.0.0	11111111	11111000	00000000	00000000	13
255.240.0.0	11111111	11110000	00000000	00000000	12
255.224.0.0	11111111	11100000	00000000	00000000	11
255.192.0.0	11111111	11000000	00000000	00000000	10
255.128.0.0	11111111	10000000	00000000	00000000	9
255.0.0.0	11111111	00000000	00000000	00000000	8
254.0.0.0	11111110	00000000	00000000	00000000	7
252.0.0.0	11111100	00000000	00000000	00000000	6
248.0.0.0	11111000	00000000	00000000	00000000	5
240.0.0.0	11110000	00000000	00000000	00000000	4
224.0.0.0	11100000	00000000	00000000	00000000	3
192.0.0.0	11000000	00000000	00000000	00000000	2
128.0.0.0	10000000	00000000	00000000	00000000	1
0.0.0.0	00000000	00000000	00000000	00000000	0

Example: 192.168.1.0 / 255.255.255.0 corresponds to CIDR:
192.168.1.0/24

Client / Server

In a client/server environment, a server is a program or computer that receives queries from a client program or client computer and answers them.

In data communication, a computer that establishes a connection to a server (or host) is also referred to as a client. That means that the client is the computer that is calling and the server (or host) is the one being called.

CSD 9600

CSD (9600) stands for Circuit Switched Data or dial-in data connection. Here a connection is created between two users (end points of the connection), similar to a telephone call over a public telephone network. User 1 dials the telephone number of user 2. The network signals to user 2 that there is a call, user 2 accepts the call and the network establishes the connection until one of the users terminates the connection again.

In a GSM network this service is called CSD, and allows data transmission at 9600 bit/s or 14400 bit/s, with transmission being either secured or unsecured. Possible connections are GSM modem to GSM modem, analog modem to GSM and ISDN modem to GSM modem.

CSQ / RSSI

The CSQ value is a value defined in the GSM standard for indicating the signal quality. CSQ values correspond to the received field strength RSSI (= Received Signal Strength Indication):

CSQ	RSSI
< 6	< -101 dBm
6...10	-101...-93 dBm
11...18	-91...-77 dBm
> 18	> 75 dBm
99	Not logged in

Datagram

In the transmission protocol TCP/IP, data are sent in the form of data packets, the so-called IP datagrams. An IP datagram has the following structure:

1. IP Header
2. TCP/UDP Header
3. Data (Payload)

The IP Header contains:

- the IP address of the sender (source IP address)
- the IP address of the recipient (destination IP address)
- the protocol number of the protocol of the next higher protocol layer (according to the OSI layer model)
- the IP Header Checksum for checking the integrity of the header upon receipt.

TCP/UDP Header contains the following information:

- the port of the sender (source port)
- the port of the recipient (destination port)
- a checksum for the TCP Header and a few items of information from the IP Header (source and destination IP addresses, etc.)

DES/3DES

The symmetrical encryption algorithm (→ symmetrical encryption) DES, originally developed by IBM and checked by the NSA, was determined in 1977 by the American National Bureau of Standards, the predecessor of today's National Institute of Standards and Technology (NIST), as the standard for American government institutions. As this was the first standardized encryption algorithm of all, it quickly established itself in industry and hence outside the USA. DES works with a key length of 56 bits, which is no longer considered secure due to the increase in computing power since 1977. 3DES is a variant of DES. It works with 3-times larger keys, i.e. 168 bits long. It is still considered secure today and is, among other things, also part of the IPsec standard.

DHCP

The Dynamic Host Configuration Protocol (DHCP) performs automatic dynamic assignment of IP addresses and other parameters in a network. The Dynamic Host Configuration Protocol uses UDP. It was defined in RFC 2131 and was assigned the UDP ports 67 and 68. DHCP uses the client – server method, in which the client is assigned the IP addresses by the server.

DNS

Addressing in IP networks is always by means of IP addresses. It is generally preferable, however, to specify the addressing in the form of a domain address (i.e. in the form www.abc.xyz.de). If the addressing is by means of the domain address, then the sender first sends the domain address to a domain name server (DNS) and gets back the associated IP address. Only then does the sender address its data to this IP address.

DynDNS provider

Also *Dynamic DNS provider*. Every computer that is connected to the Internet has an IP address (IP = Internet Protocol). An IP address consists of up to 4 three-digit numbers, with dots separating each of the numbers. If the computer is online via the telephone line via modem, ISDN or ADSL, then the Internet service provider dynamically assigns it an IP address, i.e. the address changes from session to session. Even if the computer is online for more than 24 hours without interruption (e.g. in the case of a flat rate), the IP address is changed periodically.

For a local computer to be accessible via the Internet, its address must be known to the external remote station. This is necessary for it to establish a connection to the local computer. This is not possible, however, if the address of the local computer constantly changes. It is possible, however, if the user of the local computer has an account with a DynamicDNS provider (DNS = Domain Name Server).

Then he can specify there a hostname under which the computer can be accessed in the future, e.g.: www.xyz.abc.de. Moreover, the DynamicDNS provider makes available a small program that has to be installed and executed on the computer concerned. In each Internet session of the local computer this tool reports to the DynamicDNS provider which IP address the computer has at the moment. Its domain name server registers the current hostname - IP address assignment and reports this to other domain name servers in the Internet.

If now an external computer wants to establish a connection with a local computer which is registered with the DynamicDNS provider, the external computer uses the hostname of the local computer as the address. In this way a connection is established with the responsible DNS (Domain Name Server) in order to look up there the IP address which is currently assigned to this hostname. The IP address is transmitted back to the external computer, and then used by it as the destination address. This now leads precisely to the desired local computer.

As a rule, all Internet addresses are based on this method: First a connection is established to a DNS in order to determine the IP addresses assigned to this hostname. Once that has been done, the IP address that was "looked up" is used to establish the connection to the desired remote station, which can be any Web site.

EDGE

EDGE (= Enhanced Data Rates for GSM Evolution) refers to a method in which the available data rates in GSM mobile phone networks are increased by introducing an additional modulation process. With EDGE, GPRS is expanded to become EGPRS (Enhanced GPRS), and HSCSD is expanded to become ECSD.

EGPRS

EGPRS stands for "Enhanced General Packet Radio Service", which describes a packet-oriented data service based on GPRS, which is accelerated by means of EDGE technology.

GPRS GPRS is the abbreviation for "General Packet Radio Service", a data transmission system of GSM2+ mobile phone systems. GPRS systems use the basestations of GSM networks as their wireless equipment, and their own infrastructure for coupling to other IP networks, such as the Internet. Data communication is packet-oriented; the Internet Protocol (IP) is used. GPRS provides data rates of up to 115.2 KBit/s.

GSM GSM (= Global System for Mobile Communication) is a standard that is used worldwide for digital mobile phone networks. In addition to the voice service for telephone calls, GSM supports various data services, such as fax, SMS, CSD and GPRS. Depending on the legal requirements in the various countries, the frequency bands 900 MHz, 1800 MHz or 850 MHz and 1900 MHz are used.

HTTPS HTTPS (=HyperText Transfer Protocol Secure) is a variant of the familiar HTTP, which is used by any Web browser for navigation and data exchange in the Internet. In HTTPS the original protocol is supplemented with an additional component for data protection. While in HTTP data are transmitted unprotected in plain text, in HTTPS data are transmitted only after an exchange of digital certificates, and in encrypted form.

IP address Every host or router on the Internet / an intranet has a unique IP address (IP = Internet Protocol). The IP address is 32 bits (= 4 bytes) long, and is written as 4 numbers (each in the range from 0 to 255), which are separated from each other by dots. An IP address has 2 parts: the network address and the host address. All hosts of a network have the same network address, but different host addresses. Depending on the size of the network in question - a distinction is made between networks of Class A, B and C - the two address components may be of different sizes:

	1st byte	2nd byte	3rd byte	4th byte
Class A	Netw. addr.	Host addr.		
Class B	Netw. addr.		Host addr.	
Class C	Netw. addr.			Host addr.

It can be seen from the first byte of the IP address whether the IP address designates a network of Class A, B or C. The following definitions apply:

	Value of the 1st byte	Bytes for the network address	Bytes for the host address
Class A	1-126	1	3
Class B	128-191	2	2
Class C	192-223	3	1

If you do the arithmetic, you can see that there can be a maximum of 126 Class A networks worldwide, and each of these networks can comprise a maximum of 256 x 256 x 256 hosts (3 bytes of address space). There can be 64 x 256 Class B networks, each of which can contain up to 65,536 hosts (2 bytes of address space: 256 x 256). There can be 32 x 256 x 256 Class C networks, each of which can contain up to 256 hosts (1 byte of address space).

IP packet	See Datagram
IPsec	<p>IP security (IPsec) is a standard that makes it possible to ensure the authenticity of the sender, the confidentiality and the integrity of the data in IP datagrams by means of encryption. The components of IPsec are the Authentication Header (AH), the Encapsulating Security Payload (ESP), the Security Association (SA), the Security Parameter Index (SPI) and the Internet Key Exchange (IKE).</p> <p>When communication starts the computers involved clarify the method used and its implications, e.g. Transport Mode or Tunnel Mode. In Transport Mode an IPsec header is inserted into each IP datagram between the IP header and the TCP or UDP header. As the IP header is not changed this mode is suitable only for a host-to-host connection. In Tunnel Mode an IPsec header and a new IP header are inserted in front of the entire IP datagram. This means that the original datagram is contained, encrypted as a whole, in the payload of the new datagram.</p> <p>The Tunnel Mode is used in the VPN: the devices at the tunnel ends perform the encryption and decryption of the datagrams, while the datagrams themselves remain completely protected as they pass through the tunnel, i.e. during transmission via a public network.</p>
NAT (Network Address Translation)	<p>In Network Address Translation (NAT) - often also referred to as <i>IP Masquerading</i> - an entire network is "hidden" behind a single device, the NAT router. This device is usually a router. The internal computers in the local network remain hidden with their IP addresses when they communicate to the outside via the NAT router. For the external communication partners only the NAT router with its own IP address appears.</p> <p>However, in order for internal computers to be able to communicate direct with external computers (on the Internet) the NAT router must change the IP datagrams passing from internal computers to the outside and from the outside to an internal computer.</p> <p>If an IP datagram is sent from the internal network to the outside the NAT router changes the datagram's IP and TCP headers. It replaces the source IP address and the source port with its own official IP address and its own, previously unused port. To this end it creates a table showing the correlation between the original values and the new ones.</p> <p>When receiving a reply datagram the NAT router recognises by means of the destination port specified that the datagram is actually intended for an internal computer. Using the table the NAT box exchanges the destination IP address and the destination port and forwards the datagram to the internal network.</p>

Network mask / Subnet mask A company network with access to the Internet is normally officially assigned only a single IP address, e.g. 134.76.0.0. In this example address it can be seen from the 1st byte that this company network is a Class B network, i.e. the last 2 bytes can be used freely for host addressing. Arithmetically that represents an address space of 65,536 possible hosts (256 x 256).

Such a huge network is not very practical. It is necessary here to form subnetworks. This is done using a subnet mask. Like an IP address, this is a field 4 bytes long. The value 255 is assigned to each of the bytes that represent the network address. The main purpose of this is to "hide" a part of the host address range in order to use it for the addressing of subnetworks. For example, in a Class B network (2 bytes for the network address, 2 bytes for the host address), by means of the subnet mask 255.255.255.0 it is possible to take the 3rd byte, which was actually intended for host addressing, and use it now for subnet addressing. Arithmetically that means that 256 subnets with 256 hosts each could be created.

Port number The Port Number field is a 2-byte field in UDP and TCP headers. The assignment of port numbers serves to identify various data flows that are processed simultaneously by UDP/TCP. The entire data exchange between UDP/TCP and the application processes takes place via these port numbers. The assignment of port numbers to application processes is performed dynamically and randomly. Fixed port numbers are assigned for certain frequently-used application processes. These are called Assigned Numbers.

PPPoE Acronym for Point-to-Point Protocol over Ethernet. It is based on the standards PPP and Ethernet. PPPoE is a specification for connecting users to the Internet via Ethernet using a jointly used broadband medium such as DSL, Wireless LAN or cable modem.

PPTP Acronym for Point-to-Point Tunneling Protocol. This protocol was developed by Microsoft, U.S. Robotics and others in order to transmit data securely between two VPN nodes (→ VPN) over a public network.

Private Key, Public key; Certification (X.509)	<p>In asymmetrical encryption algorithms 2 keys are used: a <i>Private Key</i> and a <i>Public Key</i>. The public key serves to encrypt data and the private key to decrypt them.</p> <p>The public key is provided by the future recipient of the data to those who will send the data to him in encrypted form. The private key is possessed only by the recipient and serves to decrypt the received data.</p> <p>Certification:</p> <p>So that the user of the public key (for encryption) can be certain that the public key conveyed to him really does come from the entity that is to receive the data to be sent, certification can be used: the verification of the authenticity of the public key and the consequent link between the identity of the sender and his key is performed by a <i>Certification Authority or CA</i>. This is done according to the rules of the CA, for example by the sender being required to appear in person. Following successful inspection the CA signed the sender's public key with its (digital) signature. A <i>certificate</i> is created.</p> <p>An X.509 certificate makes a connection between an identity in the form of an 'X.500 Distinguished Name' (DN) and a public key. This connection is authenticated by the digital signature of an X.509 Certification Authority (CA). The signature - an encryption with the signature key - can be checked with the private key issued by the CA to the certificate holder.</p>
Protocol, Transfer protocol	<p>Devices that communicate with each other must use the same rules. They have to "speak the same language". Such rules and standards are called protocols or transfer protocols. Frequently used protocols include IP, TCP, PPP, HTTP and SMTP. TCP/IP is the umbrella term for all protocols that are based on IP.</p>
Service provider	<p>Supplier, company or institution that gives users access to the Internet or to an online service.</p>
Spoofing, Anti-Spoofing	<p>In Internet terminology, spoofing means to specify a forged address. The forged Internet address is used to pose as an authorised user. Anti-spoofing means mechanisms to reveal or prevent spoofing.</p>
SSH	<p>SSH (Secure Shell) is a protocol that enables secure, encrypted data exchange between computers. Secure SHell is used for remote access to the input console from LINUX-based machines.</p>

Stateful inspection firewall

A stateful inspection firewall is a packet filtering method. Packet filters only let IP packets through if this has been defined previously using firewall rules. The following is defined in the firewall rules:

- which protocol (TCP, UDP, ICMP) can go through,
- the permitted source of the IP packets (From IP / From port)
- the permitted destination of the IP packets (To IP / To port)

It is likewise defined here what will be done with IP packets that are not allowed through (discard, reject).

For a simple packet filter it is always necessary to create two firewall rules for a connection:

- One rule for the query direction from the source to the destination, and
- a second rule for the query direction from the destination to the source.

It is different with a stateful inspection firewall. Here a firewall rule is only created for the query direction from the source to the destination. The firewall rule for the response direction from the destination to the source results from analysis of the data previously sent. The firewall rule for the responses is closed again after the responses are received or after a short time period has elapsed. Thus responses can only go through if there was a previous query. This means that the response rule cannot be used for unauthorised access. What is more, special procedures make it possible for UDP and ICMP data to also go through, even though these data were not requested before.

Symmetrical encryption

With symmetrical encryption the data are encrypted and decrypted using the same key. Examples of symmetrical encryption algorithms are DES and AES. These are fast, but require complex administration as the number of users increases.

TCP/IP (Transmission Control Protocol/Internet Protocol)	<p>Network protocol that is used to connect two computers on the Internet.</p> <p>IP is the basic protocol.</p> <p>UDP builds on IP, and sends individual packets. These can arrive at the recipient in a different sequence from the one they were sent in, or they can even get lost.</p> <p>TCP serves to secure the connection, and ensures, for example, that the data packets are forwarded to the application in the right sequence.</p> <p>UDP and TCP provide, in addition to the IP addresses, port numbers between 1 and 65535, which can be used to distinguish the various services.</p> <p>A number of additional protocols are based on UDP and TCP, such as HTTP (Hyper Text Transfer Protocol), HTTPS (Secure Hyper Text Transfer Protocol), SMTP (Simple Mail Transfer Protocol), POP3 (Post Office Protocol, Version 3), DNS (Domain Name Service).</p> <p>ICMP builds on IP, and contains control messages.</p> <p>SMTP is an e-mail protocol based on TCP.</p> <p>IKE is an IPsec protocol based on UDP.</p> <p>ESP is IPsec protocol based on IP.</p> <p>On a Windows PC, WINSOCK.DLL (or WSOCK32.DLL) handles both of these protocols.</p> <p>(→ Datagram)</p>
UDP	See TCP/IP
VPN (Virtual Private Network)	<p>A Virtual Private Network (VPN) connects several separate private networks (subnets) via a public network, e.g. the Internet, to form a shared network. Confidentiality and authenticity are ensured by using cryptographic protocols. A VPN therefore provides an inexpensive alternative to dedicated lines when it comes to setting up a supraregional corporate network.</p>

X.509

A kind of "seal" which proves the authenticity of a Public Key (→ asymmetrical encryption) and appendant data.

So that the user of the public key for encryption can be certain that the public key conveyed to him really does come from its issuer and hence from the entity that is to receive the data to be sent, certification can be used. This verification of the authenticity of the public key and the consequent link between the identity of the issuer and his key is performed by a *Certification Authority or CA*. This is done according to the rules of the CA, for example by the issuer of the public key being required to appear in person. Following successful inspection the CA signs the public key with its (digital) signature. A certificate is created. An X.509(v3) certificate therefore contains a public key, information about the key owner (given as Distinguished Name (DN)), permitted designated uses, etc. and the signature of the CA.

The signature is created as follows: from the bit sequence of the public key, the data on its owner and other data, the CA creates an individual bit sequence which can be up to 160 bits long, the HASH value. This is encrypted by the CA using its private key and added to the certificate. Encryption with the CA's private key is proof of authenticity, i.e. the encrypted HASH character sequence is the digital signature of the CA. Should the data of the certificate be changed without authorization, the HASH value is no longer correct and the certificate then becomes worthless.

The HASH value is also known as the fingerprint. As it is encrypted with the private key of the CA, anyone in possession of the corresponding public key can decrypt the bit sequence and thus check the authenticity of the fingerprint or signature in question.

Involving certification authorities means that not every key owner needs to know the other one, but only the certification authority used. The additional key information also simplifies the administrability of the key.

X.509 certificates are employed, e.g. in e-mail encryption, using S/MIME or IPsec.