

SIMATIC NET

EGPRS/GPRS-Router SINAUT MD741-1

System manual

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C79000-G8976-C212

Release 4/2008

Safety Guidelines

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



Danger

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



Warning

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



Caution

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

Caution

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

Notice

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

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

Qualified Personnel

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

Prescribed Usage

Note the following:



Warning

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

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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.

General

The product MD741-1 complies with European standard EN60950, 05.2003, Safety of Information Technology Equipment.

Read the installation instructions carefully before using the device.

Keep the device away from children, especially small children.

The device must not be installed or operated outdoors or at damp locations.

Do not operate the device if the connecting leads or the device itself are damaged.

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 2.6 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 2.6 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

Caution: GPRS costs

Note that data packets exchanged for setting 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

```
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```

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 relates to the following product versions

- GPRS/GSM modem MD741-1 hardware release 2.x

SIMATIC Technical Support

You can contact Technical Support for all A&D products

- Phone: +49 (0) 180 5050 222
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You will find further information on our Technical Support on the Web at

<http://www.siemens.com/automation/service>

Service & Support on the Internet

In addition to our documentation services, you can also make use of all our knowledge on the Internet:

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Here, you will find:

- Up-to-date product information (Updates), FAQs (Frequently Asked Questions), Downloads, Tips and Tricks.
- The Newsletter keeps you constantly up to date with the latest information on the products you use.
- The Knowledge Manager will find the documents you need.
- In the Forum, users and specialists exchange information and experience.
- You can find your local contact for Industry Automation in our contacts database.
- You will find information on local service, repairs, spares and much more under the rubric "Service".

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

Do you still have questions relating to the use of the products described in the manual? If so, then please talk to your local Siemens contact.

You will find the addresses in the following sources:

- On the Internet at: <http://www.siemens.com/automation/partner>
- On the Internet at <http://www.siemens.com/simatic-net> specifically for SIMATIC NET products
- In the catalog CA 01
- In the catalog IK PI specifically for SIMATIC NET products

Statements, certificates and other useful information about SINAUT MD741-1 are available at:

- <http://support.automation.siemens.com/WW/view/de/22811843>

SIMATIC training center

To familiarize you with the systems and products, we offer a range of courses. Please contact your regional training center or the central training center in

D-90327 Nuernberg.

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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

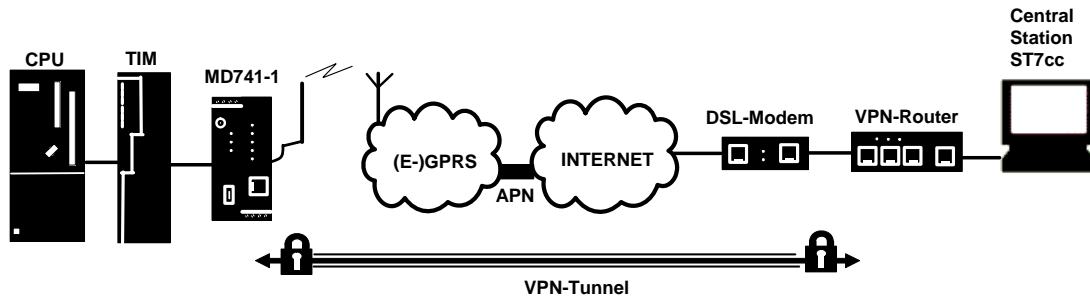


Figure 1-1 Connection between CPU and Central Station

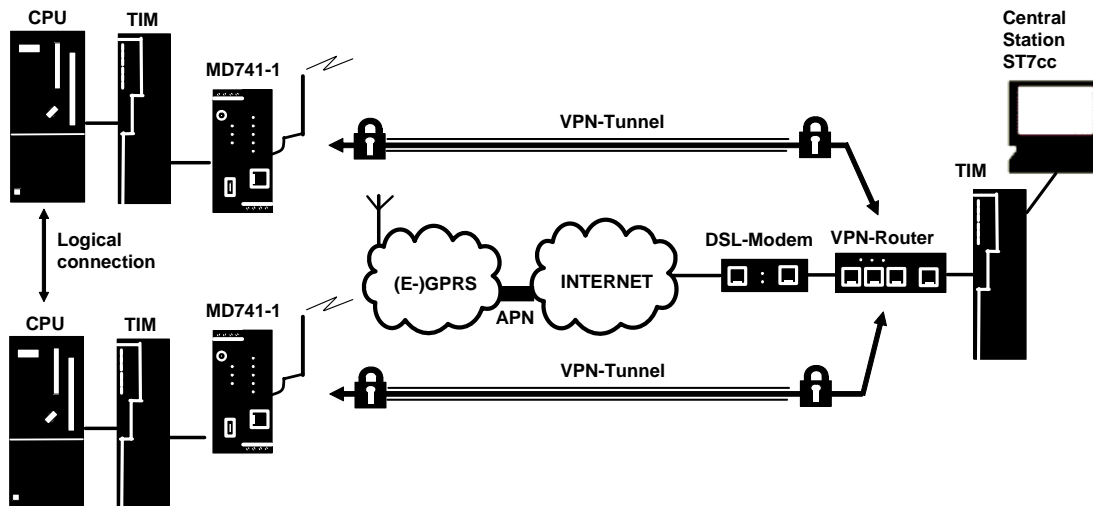


Figure 1-2 Connection between two CPU

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

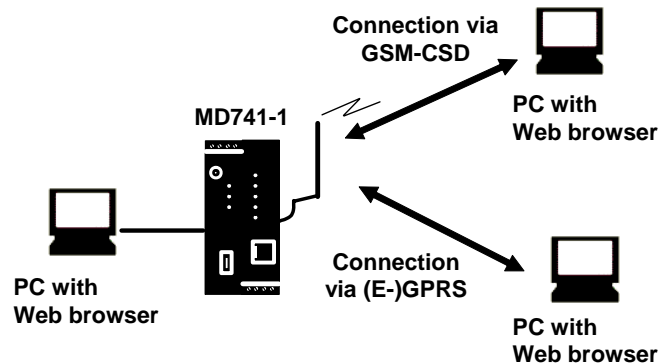


Figure 1-3 Configuration

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 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.	2.2
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 -2.6
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.	2.6
7.	Insert the SIM card in the device.	2.7
8.	Connect the antenna.	2.6
9.	Connect the SINAUT MD741-1 to the power supply.	2.6
10.	Set the SINAUT MD741-1 up in accordance with your requirements.	3 - 10
11.	Connect your local application.	2.6

2.2 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 2.6.

Power supply

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

See Chapter 2.6.

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.

2.3 Device front

Here are definitions of terms frequently used in this manual:

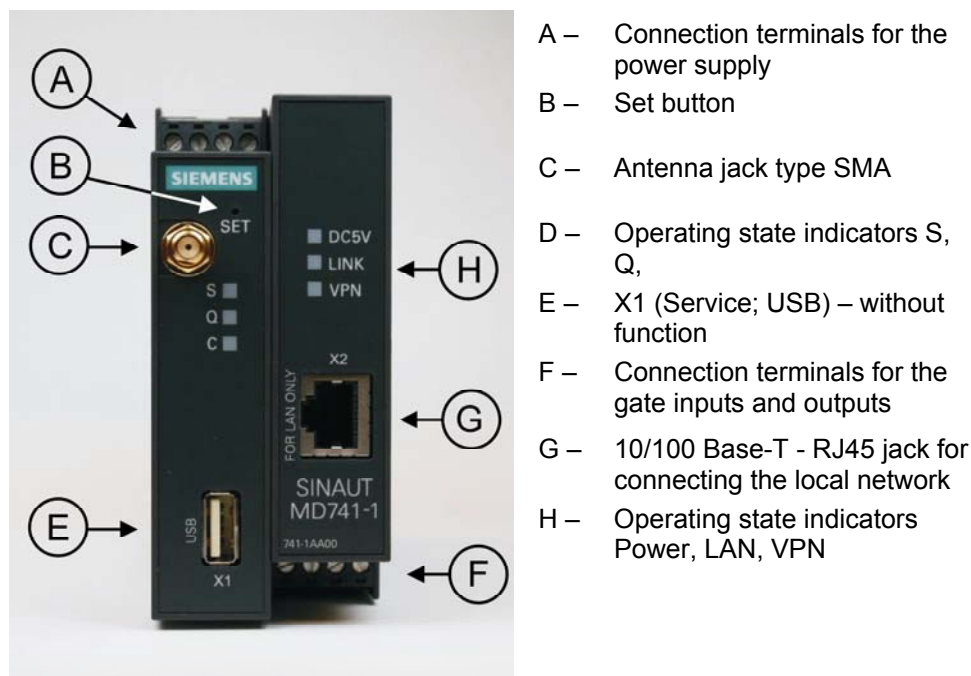


Figure 2-1 Operating elements

2.4 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.

2.5 Operating state indicators

The SINAUT MD741-1 has 7 indicator lamps (LEDs) to indicate the operating state.

The 3 indicator lamps on the left-hand side of the device indicate the state of the EGPRS wireless modem:

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

The 3 indicator lamps on the right-hand side of the device indicate the state of additional device functions:

LED	State	Meaning
<i>DC5V</i>	ON	Device switched on, operating voltage present
	OFF	Device switched off, operating voltage not present
<i>LINK</i>	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
<i>VPN</i>	ON	VPN connection active
	OFF	VPN connection active

2.6 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 power supply (24V / 0V)

Power supply

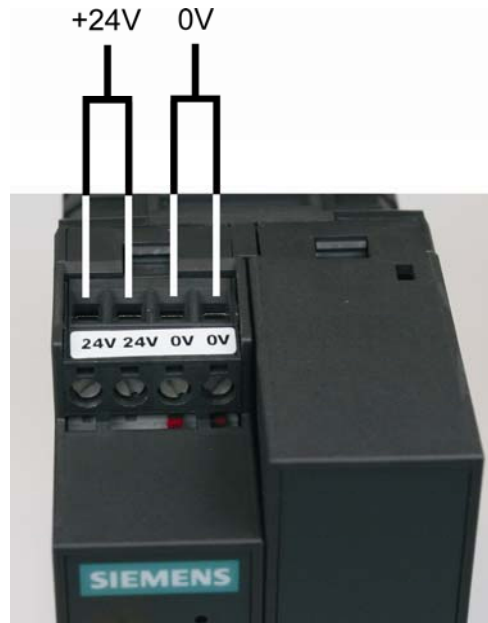


Figure 2-2 Screw terminals

The SINAUT MD741-1 operates with direct current of from 12-30 V DC, nominally 24 V DC. 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 510mA at 12V and 230mA at 30V.

Warning:

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

Field wiring instruction

Use copper wires only.

Solid wire: 0,5...3mm² (AWG 20...18)

Strained wire: 0,5...2,5mm²

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

2.7 Inserting the SIM card

Caution:

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.

Caution:

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.

2.8 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.

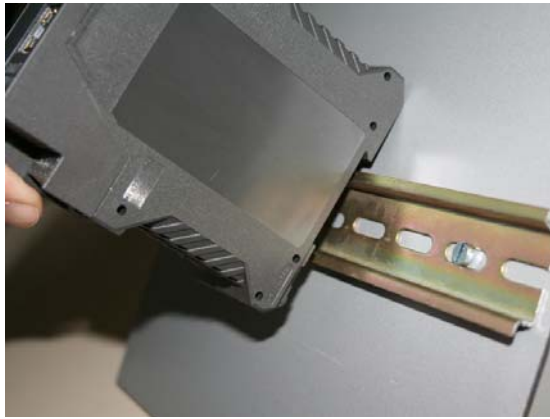


Figure 2-4 Top rail mounting

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)*.

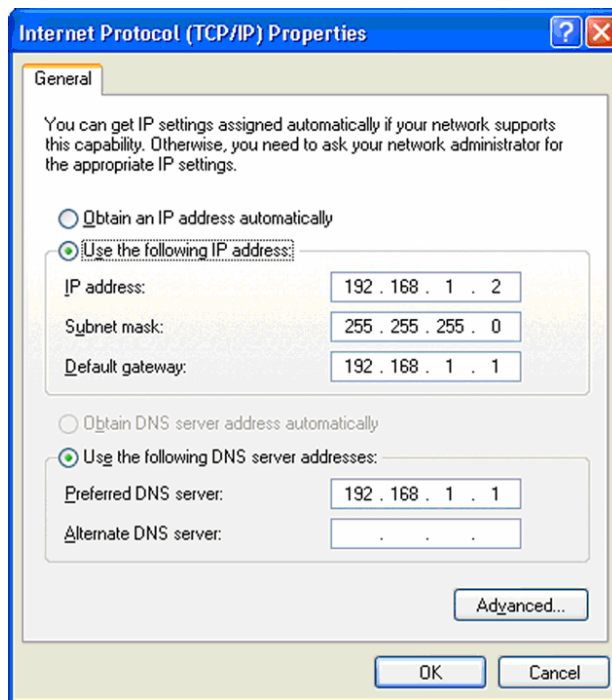


Figure 3-1 Properties of Windows Internet Protocol

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 setting**).

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

3.2 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

3. 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

4. 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

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

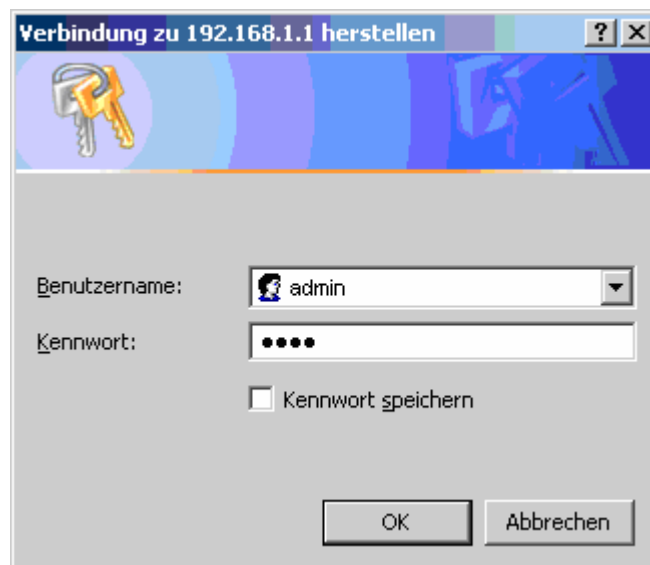


Figure 3-3 Enter user name and password

The factory setting is:

User name: **admin**

Password: **sinaut**

Note

You should change the password in any event. The factory setting is general knowledge and does not provide sufficient protection. Chapter 3.7 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 3.3.

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 this setting 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/

3.3 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.

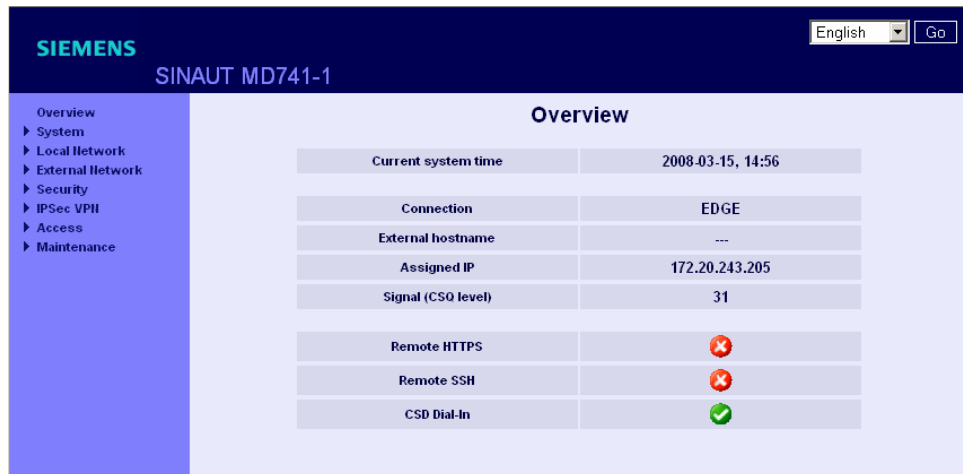


Figure 3-4 Overview

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

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)

External hostname

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

Signal (CSQ level)

Indicates the strength of the GSM signal as a CSQ value.

- CSQ < 6: Poor signal strength
- CSQ= 6..10: Medium signal strength
- CSQ=11-18: Good field strength
- CSQ > 18: Very good field strength
- CSQ = 99: No connection to the GSM network

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.

Note

It may occur that an EDGE (EGPRS) or GPRS connection and an assigned IP address are both shown, but the connection quality is still not good enough to transmit data. For this reason we recommend using the active connection monitoring (see Chapter 5.2).

Remote HTTPS

Shows whether remote access to the Web user interface of the SINAUT MD741-1 via EGPRS, GPRS or CSD is permitted (see Chapter 8.1).

- White check mark at green dot: Access is allowed.
- White cross at red dot: Access is not allowed.

Remote SSH

Shows whether remote access to the SSH console of the SINAUT MD741-1 via EGPRS, GPRS or CSD is permitted (see Chapter 8.2).

- White check mark at green dot: Access is allowed.
- White cross at red dot: Access is not allowed.

CSD Dial-In

Shows whether remote CSD service calls are allowed (see Chapter 8.3).

- White check mark at green dot: Access is allowed.
- White cross at red dot: Access is not allowed.

3.4 Language selection

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

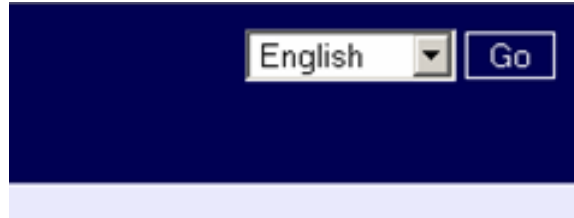


Figure 3-5 Language selection

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.

Deutsch

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

English

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

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

3.5 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.

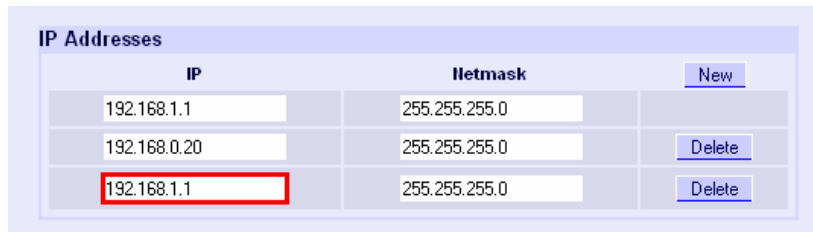


Figure 3-7 Indication of invalid entries

3.6 Configuration Profiles

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

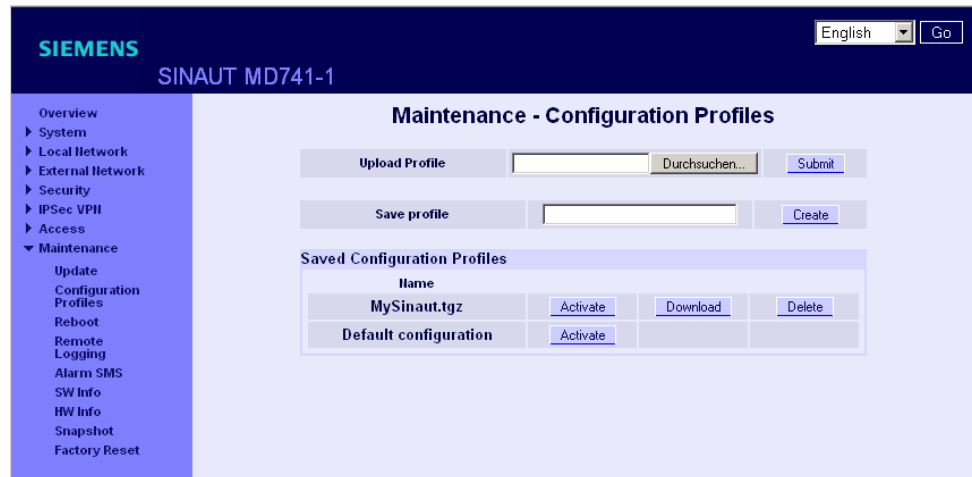


Figure 3-8 Maintenance > Configurations Profiles

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 names and then displays them in the table of saved configuration profiles.

Saved Configuration Profiles

The table of saved configuration profiles shows all of the profiles that are saved in the SINAUT MD741-1.

Download

Loads the profile to the Admin PC.

Activate

The SINAUT MD741-1 accepts the settings from the selected configuration profile and continues to work using them.

Delete

The configuration profile is deleted.

The profile *Default configuration* contains the factory settings, and cannot be deleted.

3.7 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

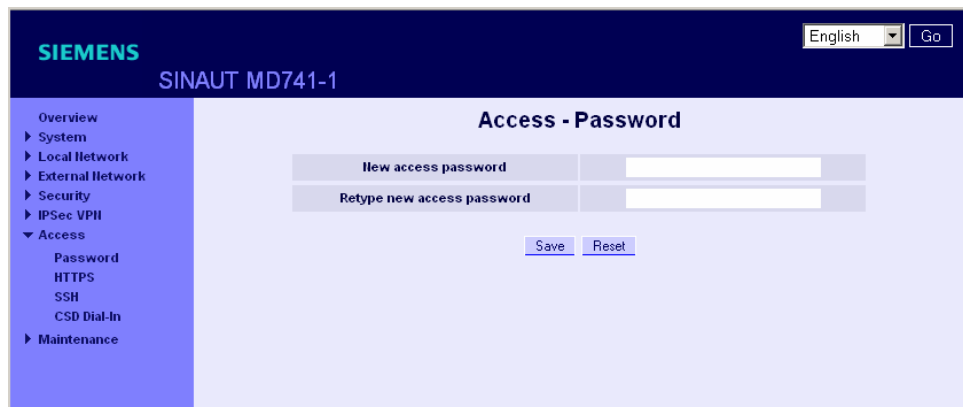


Figure 3-9 Access > Password

Access password (factory setting)

The factory setting for the SINAUT MD741-1 is:

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

Note

Change the password immediately after initial start-up. The factory setting is 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.

3.8 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.

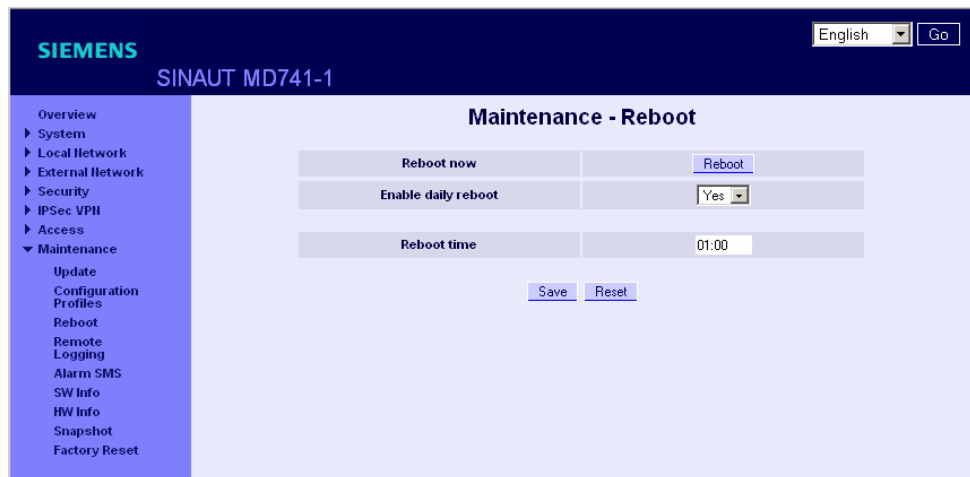


Figure 3-10 Maintenance > Reboot

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.

Factory setting

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

3.9 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 2.4).

Default configuration

If just the factory settings shall be loaded, without to delete the certificates, configuration profiles and the archived log files, just activate the default configuration as being described in chapter 3.6.

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.

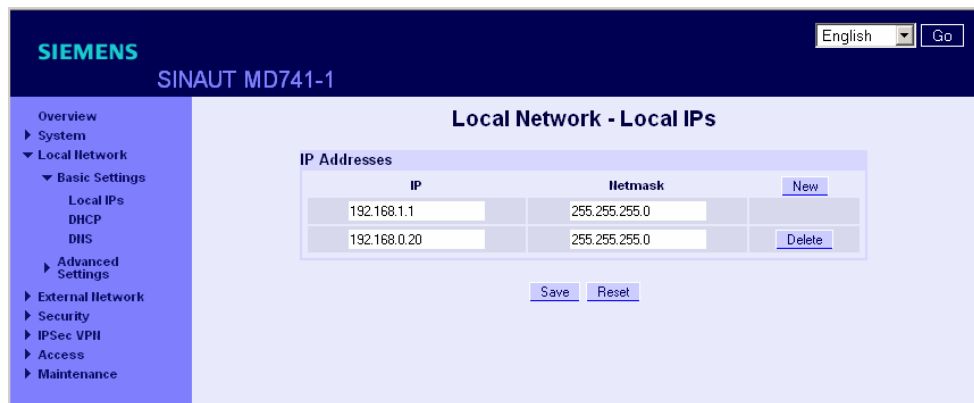


Figure 4-1 Local Network > Basic Settings > Local IPs

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).

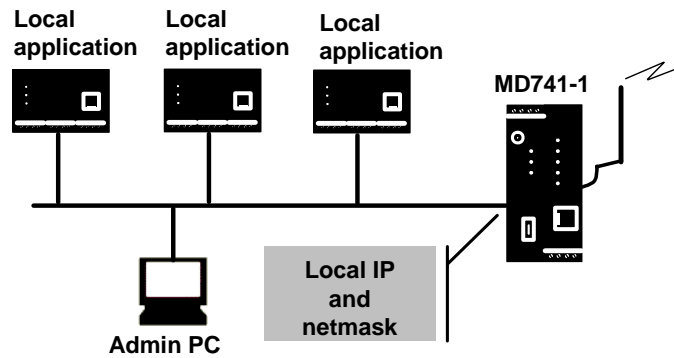


Figure 4-2 Local interface

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 the setting for obtaining the IP address and the configuration parameter automatically via DHCP is activated for the local applications.

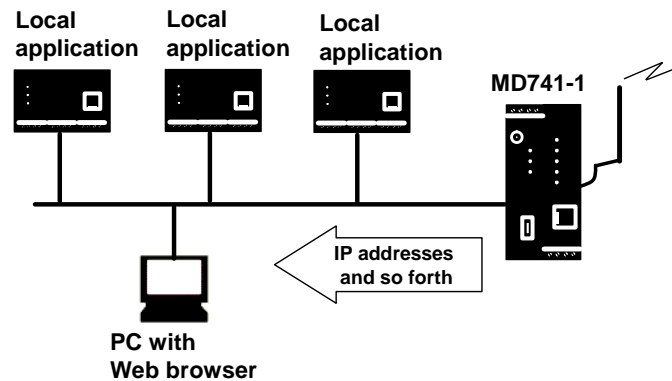


Figure 4-3 DHCP function on local interface

Local Network - DHCP	
Start DHCP server	Yes
Local netmask	255.255.255.0
Default gateway	192.168.1.1
DNS server	192.168.1.1
Enable dynamic IP address pool	Yes
DHCP range start	192.168.1.100
DHCP range end	192.168.1.199

Static Leases		
Client MAC address	Client IP address	
50:34:4f:56:67:eA	0.0.0.0	New Delete

Save Reset

Figure 4-4 Local Network > Basic Settings > Local IPs

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.

Default 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*.

DHCP range start

Specifies the first address of the dynamic address pool.

DHCP range end

Specifies the last address of the dynamic address pool.

Static Leases

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 setting

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
DHCP range start	192.168.1.100
DHCP 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).

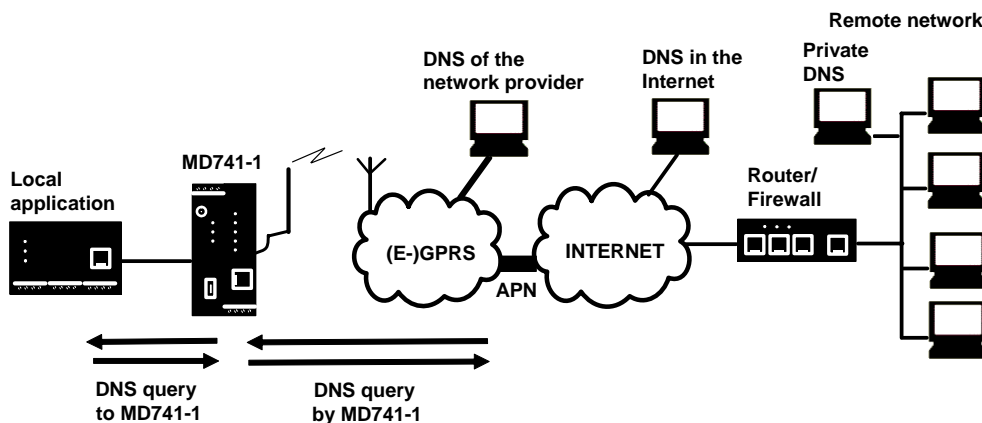


Figure 4-5 DNS function on local interface

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.

The screenshot shows the SIEMENS SINAUT MD741-1 web interface. The top header includes the SIEMENS logo, the device name 'SINAUT MD741-1', and a language dropdown set to 'English' with a 'Go' button. A navigation menu on the left lists: Overview, System, Local Network (expanded), Basic Settings (expanded), Local IPs, DHCP, DNS, Advanced Settings, External Network, Security, IPsec VPN, Access, and Maintenance. The main content area is titled 'Local Network - DNS' and contains a table with three rows: 'Hostname' with the value 'MD741', 'Searchpath' with the value 'example.local', and 'Selected nameserver' with a dropdown menu showing 'Provider Defined'. Below the table are 'Save' and 'Reset' buttons.

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.

Root Nameserver

Queries are directed to the root nameservers on the Internet whose IP addresses are stored in the SINAUT MD741-1. Select this setting only if the alternative settings do not work.

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 defined nameserver

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 setting

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

Selected nameserver	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*.

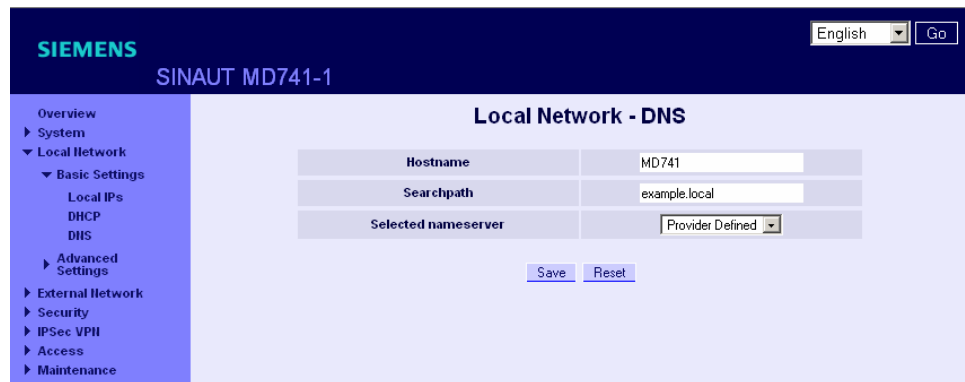


Figure 4-7 Local Network > Basic Settings > DNS

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

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 setting

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

Searchpath	example.local
Hostname	md741

4.5 System Time/NTP

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.

The screenshot shows the 'System - System Time/NTP' configuration page. The current system time is 2008-03-15, 15:22. The 'Set system time' section allows setting the year (2008), month (Mar), day (15), hour (15), and minute (22). The local timezone is set to Hamburg. NTP synchronization is activated. One NTP server is listed with IP 192.53.103.108 and a poll interval of 18,2h. The system is configured to serve time to the local network.

Figure 4-8 System > System Time/NTP

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.

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.

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).

Poll 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.

Note

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 setting

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

Local timezone	UTC
Activate NTP synchronization	No
NTP server	192.53.103.108
Poll 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.

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 setting

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.

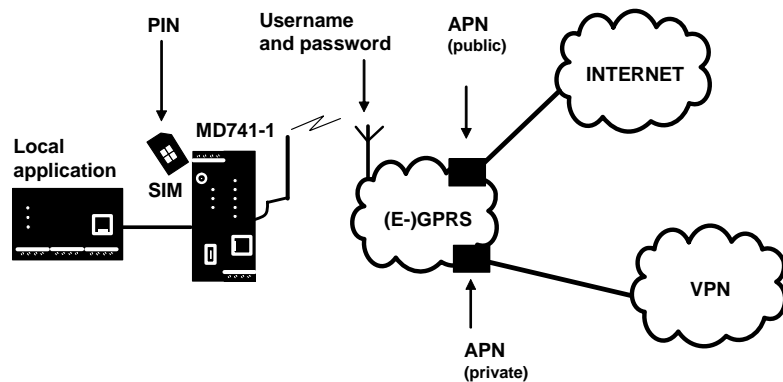


Figure 5-1 Access parameters to EGPRS/GPRS

The PIN protects the SIM card against unauthorised use. The user name and password protect the access to EGPRS and GPRS and 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).

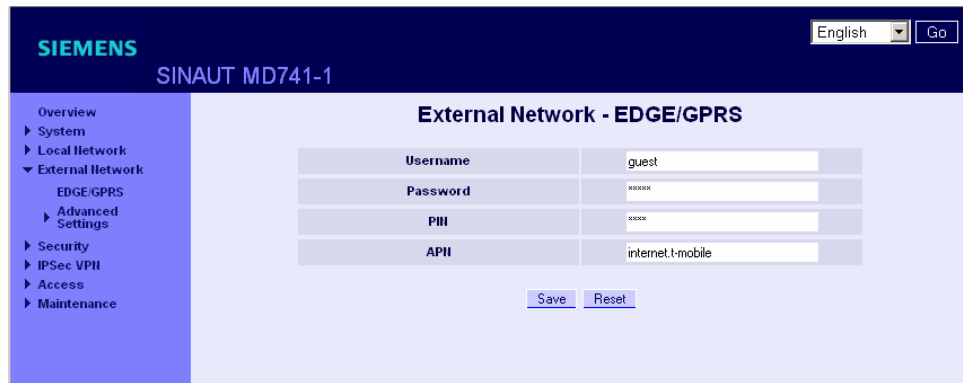


Figure 5-2 External Network > EDGE/GPRS

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.

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.

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.

Factory setting

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

PIN	NONE
User name	guest
Password	guest
APN	NONE

5.2 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.

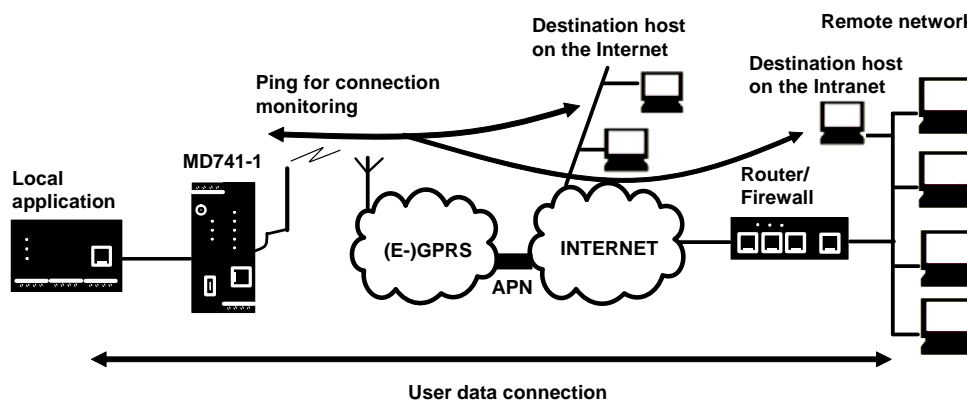


Figure 5-3 Connection Monitoring

Warning

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

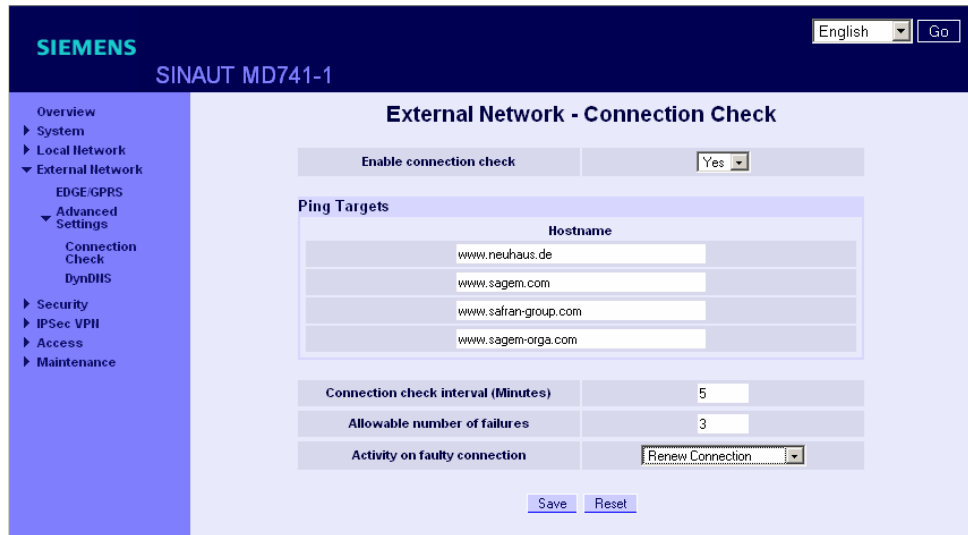


Figure 5-4 External Network > Connection Check

Enable connection check

Yes activates the function.

Ping Targets – Hostname

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.

Connection check interval (minutes)

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

Allowable number of failures

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

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

Factory setting

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

Enable connection check	No (switched off)
Hostname	-
Connection check interval	5 (minutes)
Allowable number of failures	3 (failed attempts)
Activity on faulty connection	Renew Connection

5.3 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.

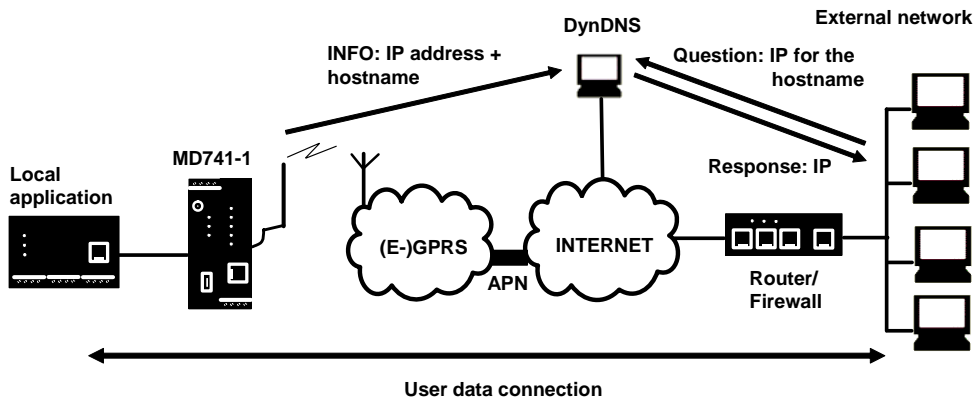


Figure 5-5 DynDNS Function

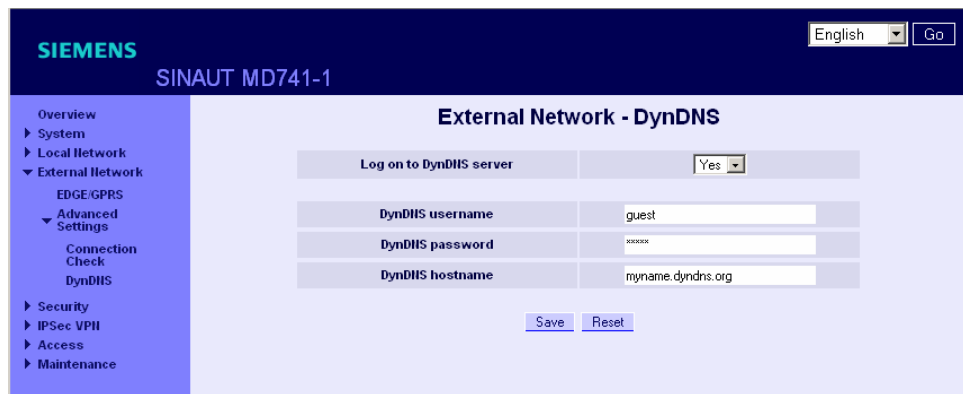


Figure 5-6 External Network > DynDNS

Log this SINAUT MD741-1 on to a DynDNS server

Select Yes if you want to use a DynDNS service.

DynDNS provider

The SINAUT MD741-1 is compatible to dyndns.org.

DynDNS username / password

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

DynDNS hostname

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

Factory setting

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

Log the MD741-1 on to DynDNS server	No (switched off)
DynDNS username	guest
DynDNS password	guest
DynDNS hostname	myname.dyndns.org

6.1 Packet Filter

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.

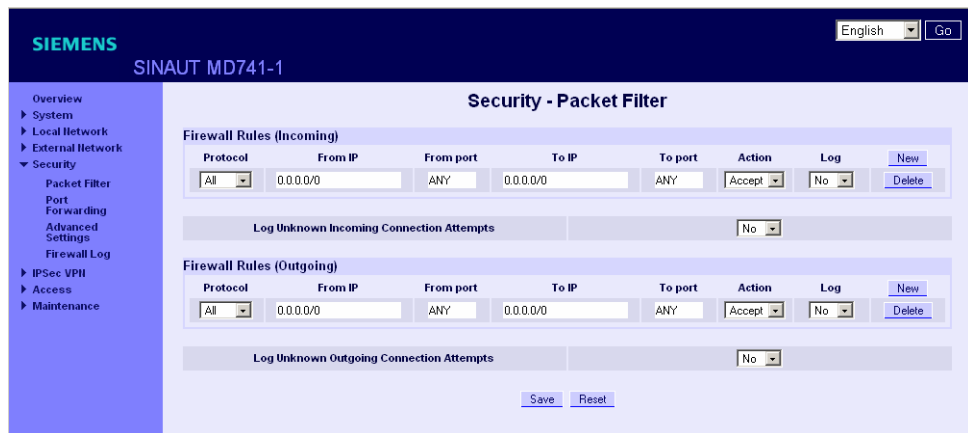


Figure 6-1 Security > Packet Filter

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 setting, 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

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

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 setting, 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

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

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 setting)

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

Log Unknown Connection Attempts

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

Factory setting

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

Incoming firewall

Firewall Rules (Incoming)	- (Everything blocked)
Protocol	All
From IP	0.0.0.0/0
From port	Any
To IP	0.0.0.0/0
To port	Any
Action	Accept
Log	No (switched off)
Log Unknown Connection Attempts	No (switched off)

Outgoing firewall

Firewall Rules (Outgoing)	- (Everything blocked)
Protocol	All
From IP	0.0.0.0/0
From port	Any
To IP	0.0.0.0/0
To port	Any
Action	Accept
Log	No (switched off)
Log Unknown 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.

Destination port

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

Forward to IP

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

Forward 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 setting)

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

Factory setting

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

Forwarding Rules	-
Protocol	All
Destination port	80
Forward to IP	127.0.0.1
Forward 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.

Security - Advanced Settings	
Maximum number of parallel connections	4096
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

Save Reset

Figure 6-3 Security > Advanced Settings

Maximum number ...

The entries

- Maximum number of parallel connections
- 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 setting

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

Maximum number of parallel connections	4096
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.

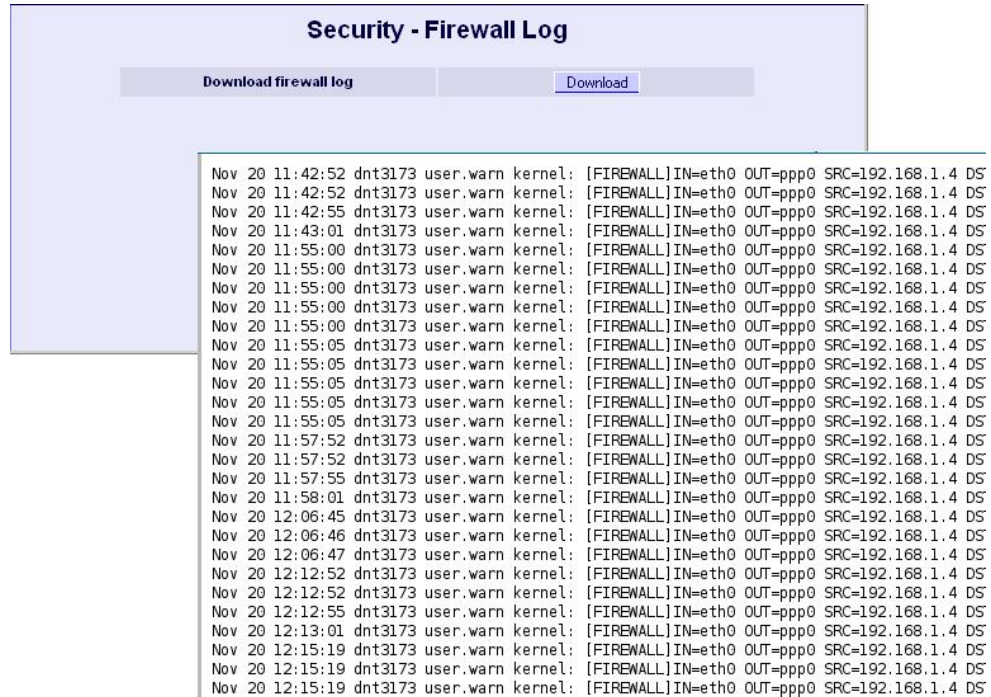


Figure 6-4 Security > Firewall Log

Caution

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

VPN connection

7

The SINAUT MD741-1 can connect the local network to a friendly remote network via a VPN tunnel. The IP data packets that are exchanged between the two networks are encrypted, and are protected against unauthorised tampering by the VPN tunnel. This means that even unprotected public networks like the Internet can be used to transfer data without endangering the confidentiality or integrity of the data.

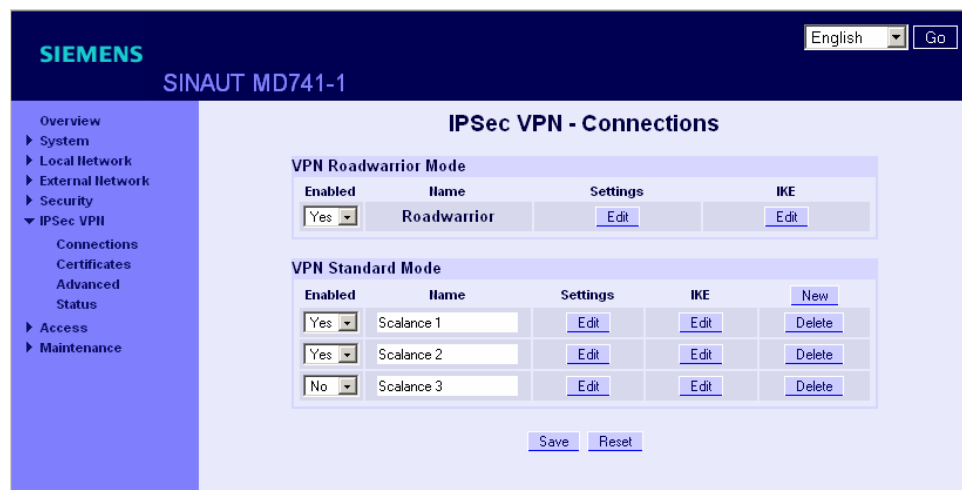


Figure 7-1 IPsec VPN > Connections

For the SINAUT MD741-1 to establish a VPN tunnel, the remote network must have a VPN gateway as the remote station for the SINAUT MD741-1.

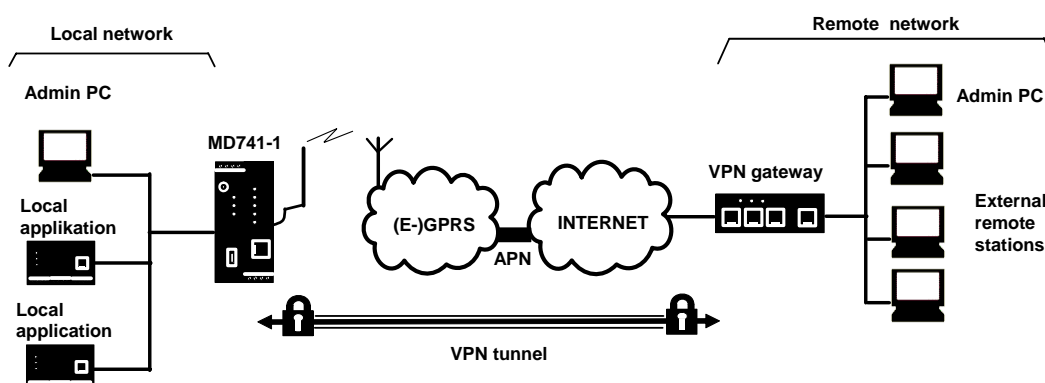


Figure 7-2 IPsec VPN - Connections

For the VPN tunnel, the SINAUT MD741-1 uses the IPsec method in tunnel mode. In this method the IP data packets to be transmitted are completely encrypted and provided with a new header before they are sent to the remote station's VPN gateway. There the data packets are received, decrypted, and used to reconstruct the original data packets. These are then forwarded to their destination in the remote network.

Differences between two VPN connection modes:

- In VPN Roadwarrior Mode the SINAUT MD741-1 VPN can accept connections from remote stations with an unknown address. These can be, for example, remote stations in mobile use that obtain their IP address dynamically. The VPN connection must be established by the remote station. Only one VPN connection is possible in Roadwarrior Mode. VPN connections in Standard Mode can be used at the same time.
- In VPN Standard Mode the address (IP address or hostname) of the remote station's VPN gateway must be known for the VPN connection to be established. The VPN connection can be established either by the SINAUT MD741-1 or by the remote station's VPN gateway as desired.

Establishment of the VPN connection is subdivided into two phases: First in Phase 1 (ISAKMP = Internet Security Association and Key Management Protocol) the Security Association (SA) for the key exchange between the SINAUT MD741-1 and the VPN gateway of the remote station is established.

After that in Phase 2 (IPsec = Internet Protocol Security) the Security Association (SA) for the actual IPsec connection between the SINAUT MD741-1 and the remote station's VPN gateway is established.

Requirements for the remote network's VPN gateway

In order to successfully establish an IPsec connection, the VPN remote station must support IPsec with the following configuration:

- Authentication via X.509 certificates, CA certificates or pre-shared key (PSK)
- 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 running under Windows 2000, then the Microsoft Windows 2000 High Encryption Pack or at least Service Pack 2 must also be installed.

If the remote station is on the other side of a NAT router, then the remote station must support NAT-T. Or else the NAT router must know the IPsec protocol (IPsec/VPN passthrough).

7.1 VPN Roadwarrior Mode

The Roadwarrior Mode makes it possible for the SINAUT MD741-1 VPN 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.

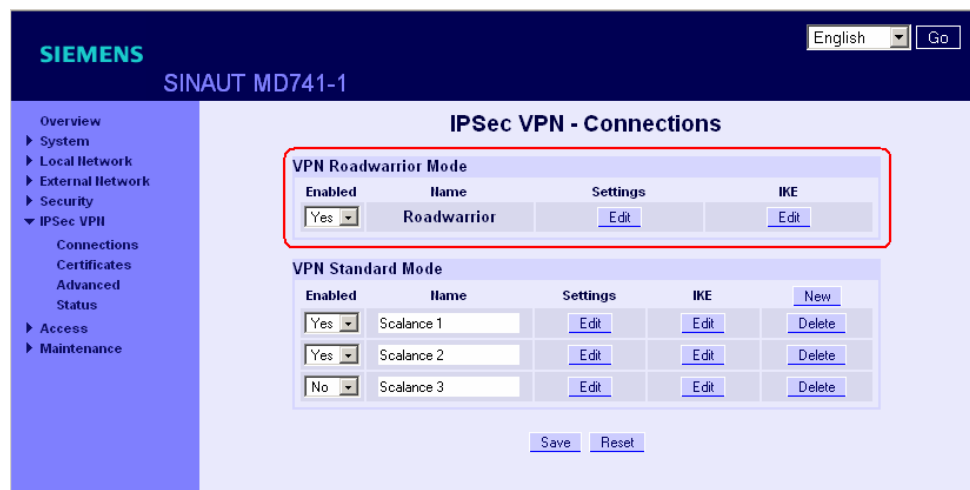


Figure 7-3 IPsec VPN > Connections

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

Roadwarrior Mode Edit Settings

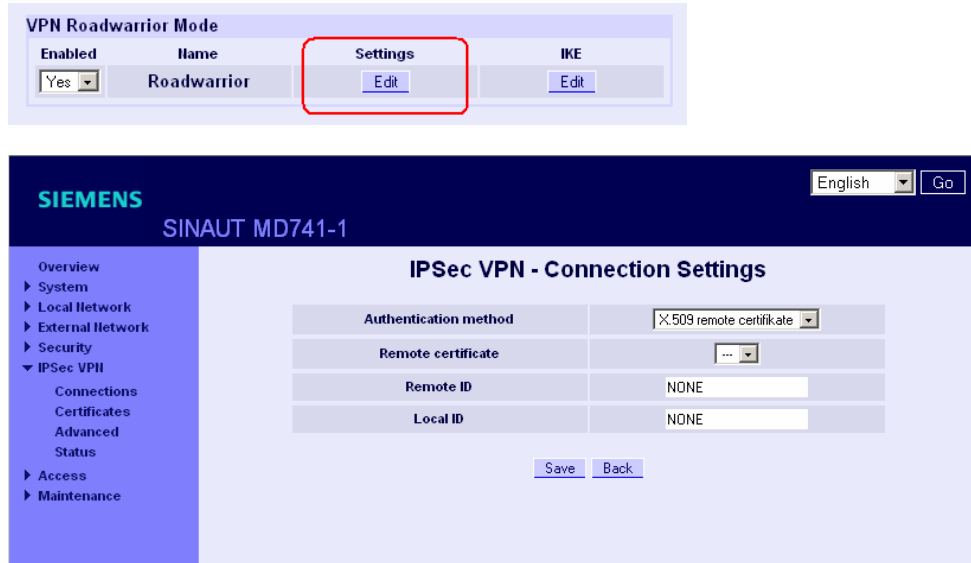


Figure 7-4 IPsec VPN > Connection Settings

Function

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

Authentication method

Select the authentication method in accordance with what you have agreed with the system administrator of the remote station.

The SINAUT MD741-1 supports three methods:

- X.509 certificate
- CA certificate
- Pre-shared key

X.509 certificate, CA certificate

In the authentication methods X.509 certificate and CA certificate, the keys used for authentication have first been signed by a Certification Authority (CA). This method is considered especially secure. A CA can be a service provider, but also, for example, the system administrator for your project, provided that he has the necessary software tools.

The CA creates a certificate file (PKCS12) with the file extension *.p12 for each of the two remote stations. This certificate file contains the public and private keys for the own station, the signed certificate from the CA, and the public key of the CA. For the authentication method X.509 there is additionally a key file (*.pem, *.cer or *.crt) for each of the two remote stations with the public key of the own station.

X.509 certificate

The public keys (files with extension *.pem, *.cer or *.crt) are exchanged between the SINAUT MD741-1 and the remote station's VPN gateway takes place manually, for example on a CD-ROM or via e-mail. To load the certificate, proceed as described in Chapter 7.3.

CA certificate

The public keys are exchanged between the SINAUT MD741-1 and the remote station's VPN gateway via the data connection when the VPN connection is established. Manual exchange of the key files is not necessary.

Pre-shared secret key (PSK)

This method is primarily supported by older IPsec implementations. Here authentication is performed with a character string agreed on beforehand. In order to obtain high security, the character string should consist of about randomly-selected 30 lower-case and upper-case letters and numerals.

Remote certificate

If you have selected X.509 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.

Remote ID, Local ID

The Local ID and the Remote ID are used by IPsec to identify the remote stations uniquely when establishing the VPN connection. The own Local ID constitutes the Remote ID of the remote station and vice versa.

For authentication with X.509 certificate or CA certificate:

- If you keep the factory setting *NONE*, then the Distinguished Names from the own certificate and from the certificate communicated by the remote station are automatically used as the Local ID and Remote ID.
- If you manually change the entry for the Local ID or the Remote ID, then the corresponding entries must be adapted at the remote station. The manual entry for Local or Remote ID must be made in the ASN.1 format, e.g. "C=XY/O=XY Org/CN=xy.org.org"

For authentication with pre-shared secret key (PSK):

- In Roadwarrior Mode the Remote ID must be entered manually. The Remote ID must have the format of a hostname (e.g. RemoteStation.de) or the format of an e-mail address (remote@station.de), and must be the same as the Local ID of the remote station.
The Local ID can be left on *NONE*. In this case the IP address is used as the local IP address. If you enter a Local ID; then it must have the format of a hostname (e.g. RemoteStation.de) or the format of an e-mail address (remote@station.de), and must be the same as the Local ID of the remote station.

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 displays the configuration interface for the SINAUT MD741-1. At the top, the 'VPN Roadwarrior Mode' section shows a table with columns for 'Enabled', 'Name', 'Settings', and 'IKE'. The 'IKE' column contains an 'Edit' button, which is highlighted with a red rectangle. Below this, the 'IPSec VPN - Advanced Connection Settings' page is shown. It features a left-hand navigation menu with options like 'Overview', 'System', 'Local Network', 'External Network', 'Security', 'IPSec VPN', 'Connections', 'Certificates', 'Advanced', 'Status', 'Access', and 'Maintenance'. The main content area is divided into 'Phase 1 - ISAKMP SA' and 'Phase 2 - IPSec SA' sections. Each section contains a table of configuration parameters: ISAKMP-SA encryption (AES-128), ISAKMP-SA hash (MD5), ISAKMP-SA mode (Main mode), and ISAKMP-SA lifetime (seconds) (86400). The Phase 2 section includes IPSec-SA encryption (AES-128), IPSec-SA hash (MD5), and IPSec-SA lifetime (seconds) (86400). Below these are HAT-T (On), Enable dead peer detection (Yes), DPD - delay (seconds) (150), DPD - timeout (seconds) (60), and DPD - maximum failures (5). 'Save' and 'Back' buttons are located at the bottom of the configuration area.

Figure 7-5 IPsec VPN > IKE bearbeiten

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

If the remote station supports the dead peer detection (DPD) protocol, then the partner in question can detect whether the IPsec connection is still valid or not, meaning that it may have to be re-established. Without DPD, depending on the configuration it may be necessary to wait until the SA lifetime elapses or the connection has to be re-initiated manually. To check whether the IPsec connection is still valid, the dead peer detection sends DPD requests to the remote station itself. If there is no answer, then after the permitted number of failed attempts the IPsec connection is considered to be interrupted.

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.

DPD - delay (seconds)

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

DPD - timeout (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 failures

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

Factory setting

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
DPD - delay (seconds)	150
DPD – timeout (seconds)	60
DPD – maximum failures	5

7.2 VPN IPsec 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.

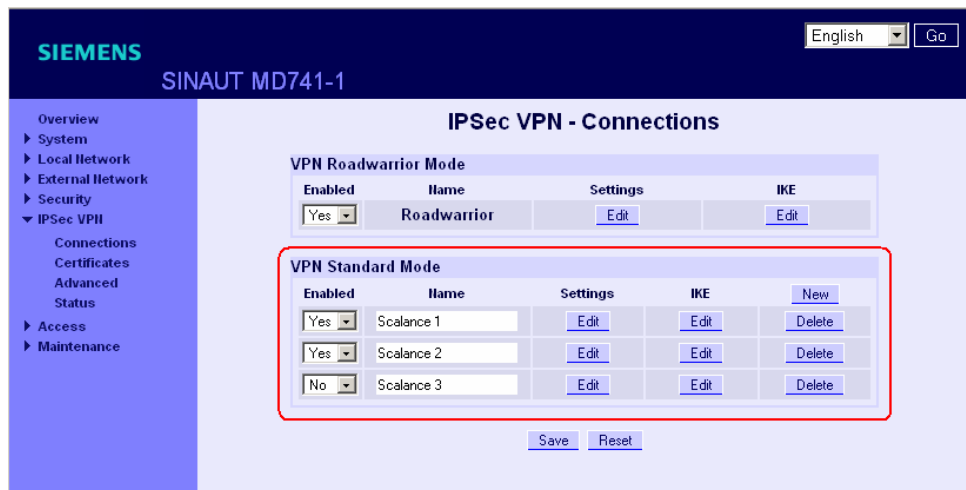


Figure 7-6 IPsec VPN > Connections

VPN Standard Mode - Edit Settings

The screenshot shows the 'VPN Standard Mode' interface. At the top, there is a table with columns: Enabled, Name, Settings, and IKE. The 'Settings' column for the entry 'Scalance 1' is highlighted with a red box. Below this, the 'IPSec VPN - Connection Settings' page is displayed. It features a sidebar menu on the left with options like Overview, System, Local Network, External Network, Security, IPsec VPN, Connections, Certificates, Advanced, Status, Access, and Maintenance. The main content area contains the following settings:

Connection name	Scalance 1
Address of the remote site's VPN gateway	NONE
Authentication method	CA certificate
Remote ID	NONE Scalance\$ID
Local ID	NONE
Remote net address	192.168.2.1
Remote subnet mask	255.255.255.0
Local net address	192.168.1.1
Local subnet mask	255.255.255.0
Wait for remote connection	No
Edit firewall rules for VPN tunnel	Edit

At the bottom of the settings page, there are 'Save' and 'Back' buttons.

Figure 7-7 IPsec VPN > Connection Settings

Connection name

Give the new connection a connection name here.

Remote host

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

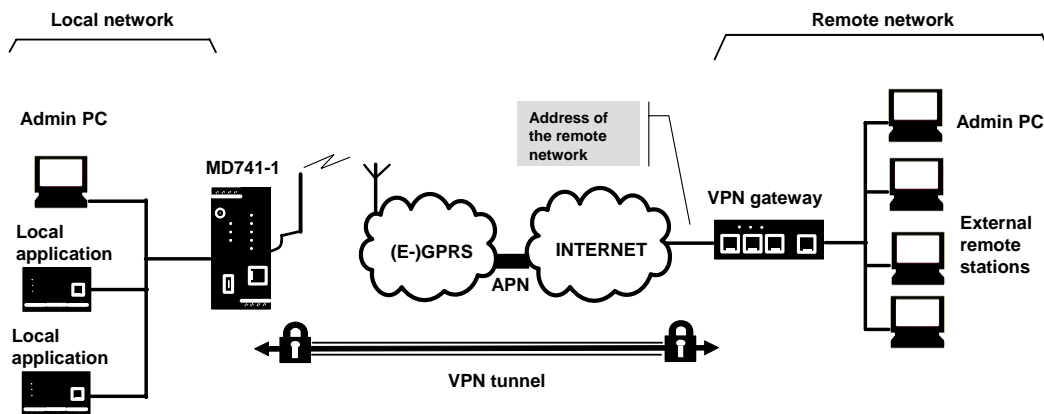


Figure 7-8 Address of the remote host

X.509 certificate, CA certificate

In the authentication methods X.509 certificate and CA certificate, the keys used for authentication have first been signed by a Certification Authority (CA). This method is considered especially secure. A CA can be a service provider, but also, for example, the system administrator for your project, provided that he has the necessary software tools. The CA creates a certificate file (PKCS12) with the file extension *.p12 for each of the two remote stations. This certificate file contains the public and private keys for the own station, the signed certificate from the CA, and the public key of the CA. For the authentication method X.509 there is additionally a key file (*.pem, *.cer or *.crt) for each of the two remote stations with the public key of the own station.

X.509 certificate

The public keys (files with extension *.pem, *.cer or *.crt) are exchanged between the SINAUT MD741-1 and the remote station's VPN gateway takes place manually, for example on a CD-ROM or via e-mail. To load the certificate, proceed as described in Chapter 7.3.

CA certificate

The public keys are exchanged between the SINAUT MD741-1 and the remote station's VPN gateway via the data connection when the VPN connection is established. Manual exchange of the key files is not necessary.

Pre-shared secret key (PSK)

This method is primarily supported by older IPsec implementations. Here authentication is performed with a character string agreed on beforehand. In order to obtain high security, the character string should consist of about randomly-selected 30 lower-case and upper-case letters and numerals.

Remote ID, Local ID

The Local ID and the Remote ID are used by IPsec to identify the remote stations uniquely when establishing the VPN connection.

For authentication with X.509 certificate or CA certificate:

- If you keep the factory setting NONE, then the Distinguished Names from the own certificate and from the certificate communicated by the remote station are automatically applied and used as the Local ID and Remote ID.
- If you manually change the entry for the Local ID or the Remote ID, then the corresponding entries must be adapted at the remote station. The own Local ID must be the same as the Remote ID of the remote station and vice versa. The entries for Local or Remote IDs must be made in the ASN.1 format, e.g. "C=XY/O=XY Org/CN=xy.org.org"

For authentication with pre-shared secret key (PSK):

- If you keep the factory setting NONE, then the own IP address is automatically used as the Local ID, and the IP address of the remote station is used as the Remote ID:
- If you manually change the entry for the Local ID or for the Remote ID, then the entries must have the format of a hostname (e.g. RemoteStation.de) or the format of an e-mail address (remote@station.de). The own Local ID must be the same as the Remote ID of the remote station and vice versa.

Note:

If with pre-shared secret key (PSK) the IP address is not used as the Remote ID, then the Aggressive Mode has to be set as the ISAKMP-SA mode.

Scalance S ID

If you have loaded a Scalance S certificate, by clicking the Scalance S button, you can load the Remote ID from the certificate.

Wait for remote connection

Yes

The SINAUT MD741-1 waits for the VPN gateway of the remote network to initiate establishment of the VPN connection.

No

The SINAUT MD741-1 initiates establishment of the connection.

Remote net address

Here enter the IP address (e.g. 123.123.123.123) of the remote network. The remote network can also be only a single computer.

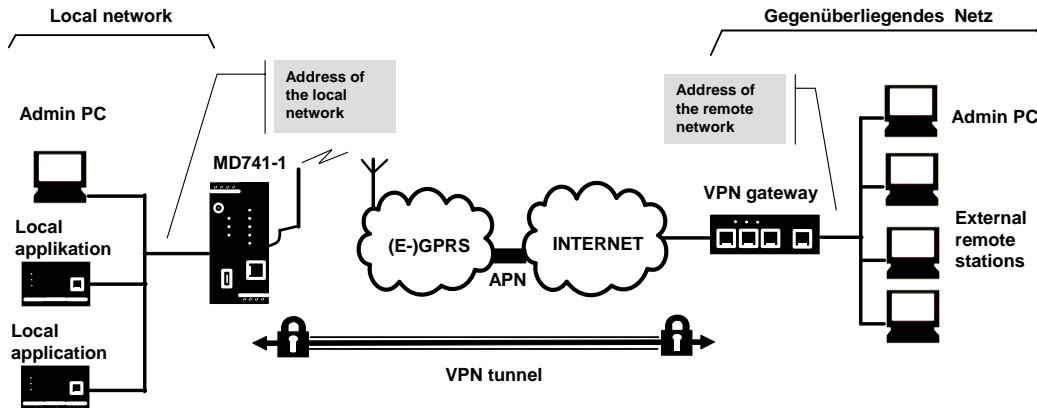


Figure 7-9 Remote net address

Remote subnet mask

Here enter the subnet mask (e.g. 255.255.255.0) of the remote network. The remote network can also be only a single computer.

Local net address

Here enter the IP address (e.g. 123.123.123.123) of the local network. The local network can also be only a single computer.

Local subnet subnet mask

Here enter the subnet mask (e.g. 255.255.255.0) of the local network. The local network can also be only a single computer.

Firewall rules for VPN tunnel

See Chapter 7.4

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 SIEMENS SINAUT MD741-1 web interface. At the top, there is a 'VPN Standard Mode' section with a table:

Enabled	Name	Settings	IKE	New
Yes	Scalance 1	Edit	Edit	Delete

The 'IKE' column is highlighted with a red box. Below this is the 'IPsec VPN - IKE Settings' page. The left sidebar shows a navigation menu with 'IPsec VPN' expanded. The main content area is divided into two sections:

Phase 1 - ISAKMP SA

ISAKMP-SA encryption	AES-128
ISAKMP-SA hash	MD5
ISAKMP-SA mode	Main mode
ISAKMP-SA lifetime (seconds)	86400

Phase 2 - IPsec SA

IPsec-SA encryption	AES-128
IPsec-SA hash	MD5
IPsec-SA lifetime (seconds)	86400

Below these are additional settings:

DH/PFS group	DH-21024
IAT-T	On
Enable dead peer detection	Yes
DPD - delay (seconds)	150
DPD - timeout (seconds)	60
DPD - maximum failures	5

At the bottom right of the settings area are 'Save' and 'Back' buttons.

Figure 7-10 IPsec > IKE Settings

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

DH/PFS group

Agree with the administrator of the remote station the DH group for the key exchange.

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

If the remote station supports the dead peer detection (DPD) protocol, then the partner in question can detect whether the IPsec connection is still valid or not, meaning that it may have to be re-established. Without DPD, depending on the configuration it may be necessary to wait until the SA lifetime elapses or the connection has to be re-initiated manually. To check whether the IPsec connection is still valid, the dead peer detection sends DPD requests to the remote station itself. If there is no answer, then after the permitted number of failed attempts the IPsec connection is considered to be interrupted.

Yes

Dead peer detection is switched on. Attempts are made to re-establish the IPsec connection if it has been declared dead, independently of the transmission of user data.

No

Dead peer detection is switched off.

DPD - delay (seconds)

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

DPD - timeout (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 failures

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

Factory setting

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
DPD - delay (seconds)	150
DPD – timeout (seconds)	60
DPD – maximum failures	5

7.3 Loading VPN certificates

Loading and administering certificates and keys.

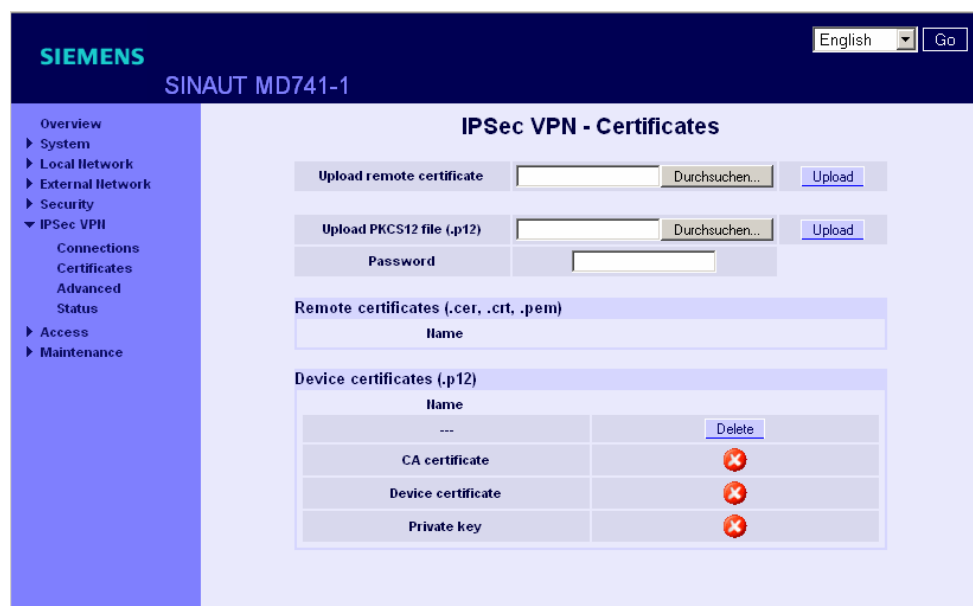


Figure 7-11 IPsec > Certificates

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.

7.4 Firewall rules for VPN tunnel

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

The screenshot shows the 'IPsec VPN - Connection Settings' page. The 'Settings' tab is highlighted with a red box. The 'Edit firewall rules for VPN tunnel' button is also highlighted with a red box. The page displays various configuration fields for the VPN connection, including connection name, remote site's VPN gateway, authentication method, remote and local IDs, and network addresses.

Field	Value
Connection name	Scalance 1
Address of the remote site's VPN gateway	NONE
Authentication method	CA certificate
Remote ID	NONE
Local ID	NONE
Remote net address	192.168.2.1
Remote subnet mask	255.255.255.0
Local net address	192.168.1.1
Local subnet mask	255.255.255.0
Wait for remote connection	No
Edit firewall rules for VPN tunnel	Edit

Figure 7-12 IPsec > Connection Settings

IPsec VPN – Edit Firewall Rules

The screenshot shows the 'IPsec VPN - Edit Firewall Rules' page. It displays configuration for incoming and outgoing firewall rules. The 'Log Unknown Incoming Connection Attempts' and 'Log Unknown Outgoing Connection Attempts' are both set to 'No'.

Protocol	From IP	From port	To IP	To port	Action	Log
All	0.0.0.0/0	ANY	0.0.0.0/0	ANY	Drop	No

Figure 7-13 IPsec > Edit Firewall Rules

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 setting

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

Firewall rules for VPN tunnel **No limitations**

7.5 Advanced settings for VPN connections

Setting special timeouts and intervals for VPN connections.

The screenshot shows the SIEMENS SINAUT MD741-1 web interface. The main content area is titled "IPsec VPN - Advanced Settings". It contains a table with the following settings:

NAT-T keepalive interval (seconds)	90
Phase 1 timeout (seconds)	15
Phase 2 timeout (seconds)	10
DynDNS tracking	Yes
DynDNS tracking interval (minutes)	5

At the bottom of the settings table, there are "Save" and "Reset" buttons. The left navigation menu includes: Overview, System, Local Network, External Network, Security, IPsec VPN (expanded), Connections, Certificates, Advanced, Status, Access, and Maintenance.

Figure 7-14 IPsec > Advanced Settings

NAT-T keepalive interval (seconds)

If NAT-T is enabled (cf. Chapter 7.2), 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.

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.

DynDNS tracking interval (minutes)

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

Factory setting

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

NAT-T keepalive interval (seconds)	60
Phase 1 timeout (seconds)	15
Phase 2 timeout (seconds)	10
DynDNS tracking	Yes
DynDNS tracking interval (minutes)	5

7.6 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.

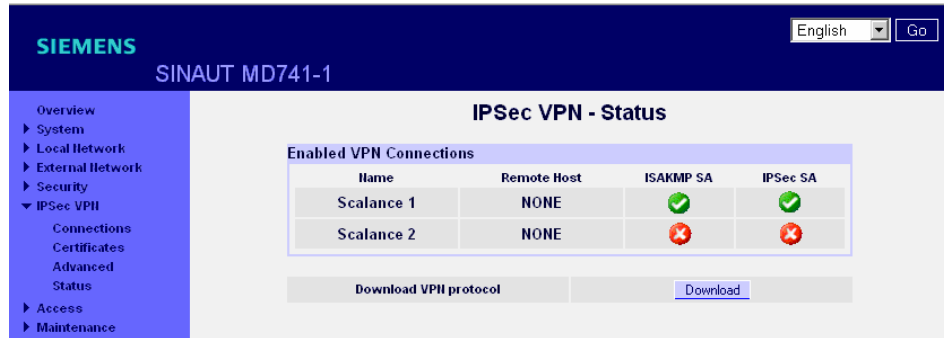


Figure 7-15 IPsec > Status

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.

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).

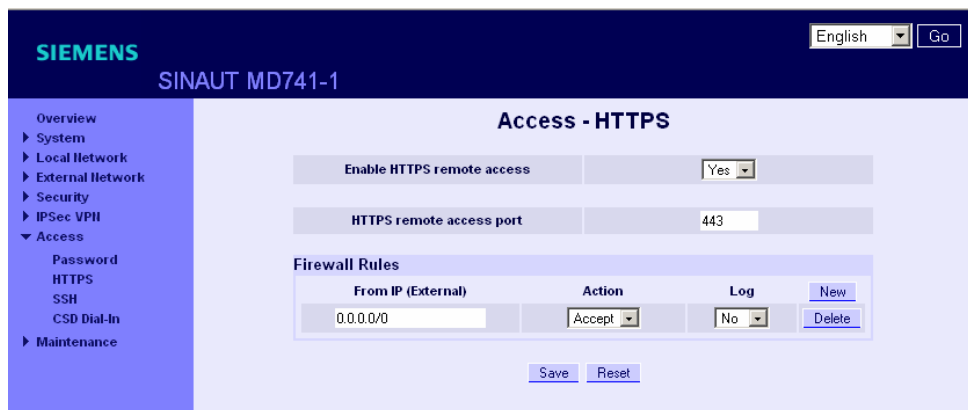


Figure 8-1 Access > HTTPS remote access

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 setting)

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 (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 setting).

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

Factory setting

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 (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 setting this option is deactivated.



Figure 8-2 Access >SSH remote access

Warning

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.

SSH remote access port

Default: 22 (factory setting)

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 (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 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 setting).

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

Factory setting

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

Enable SSH remote access	No (switched off)
HTTPS remote access port	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:

- 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*.

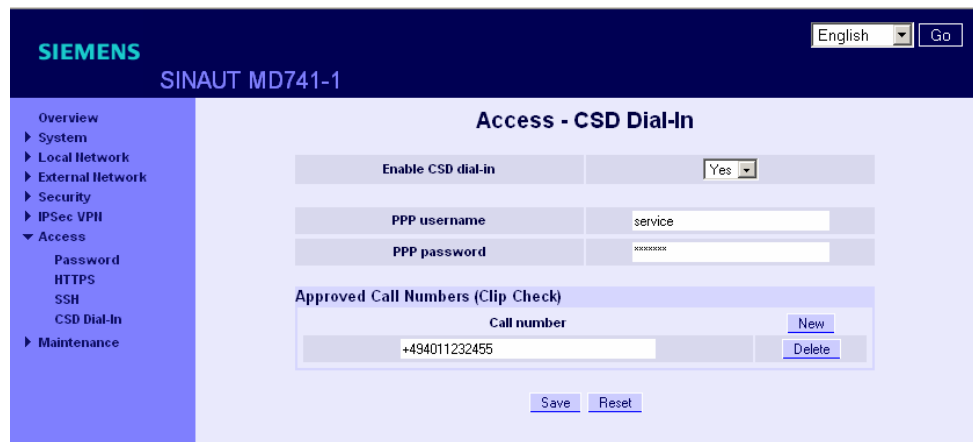


Figure 8-3 Access > CSD Dial-In

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 username / 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.

Approved Call Numbers

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 setting

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

Enable CSD dial-in	No (switched off)
PPP username	service
PPP password	service
Approved Call Numbers	*

9.1 System status display

The System-Status gives an overview about the current operating status of the SINAUT MD741-1.

System - Status	
Current system time	2008-03-15, 18:51
HTP synchronization	
Connection	EDGE
Connected since	Sat Mar 15 18:34:39 CET 2008
Used API	internet.t-mobile
External hostname	---
DynDNS	
Assigned IP	172.22.57.35
Signal (CSQ level)	30
IMSI	262016201235450
Bytes sent	1327
Bytes received	2116
Bytes sent since initial operation	1781651
Bytes received since initial operation	2728890
Remote HTTPS	
Remote SSH	
CSD Dial-In	
Number of active firewall rules	0
Current system version	1.027

Figure 9-1 System > Status

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

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

It may occur that an EDGE (EGPRS) or GPRS connection and an assigned IP address are both shown, but the connection quality is still not good enough to transmit data. For this reason we recommend using the active connection monitoring (see Chapter 5.2).

Connected since

Shows how long the current connection to EGPRS or GPRS has existed.

Used APN

Shows the APN (= Access Point Name) of the EGPRS or GPRS that is being used.

External hostname

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

DynDNS

Shows if a DynDNS service is activated.

- White check mark at green dot: DynDNS service activated.
- White cross at red dot: DynDNS service not activated

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 the EGPRS or GPRS service.

Signal (CSQ level)

Indicates the strength of the GSM signal as a CSQ value.

- CSQ < 6: Poor signal strength
- CSQ= 6..10: Medium signal strength
- CSQ=11-18: Good field strength
- CSQ > 18: Very good field strength
- CSQ = 99: No connection to the GSM network

IMSI

Shows the subscriber identity that is saved on the SIM card being used.

The IMSI (= International Mobile Subscriber Identity) is used by the GSM network operator to detect the authorisations and agreed services for the SIM card.

IMEI

Shows the serial number of the SINAUT MD741-1 as a GSM wireless device. The IMEI (= International Mobile Equipment Identity) is assigned uniquely worldwide.

Bytes sent / Bytes received

Shows the number of bytes that have been sent or received during the existing connection to GPRS. The counter is 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 GSM network operator's accounting.

Bytes sent / Bytes received since initial operation

Shows the number of bytes that have been sent via GPRS or received since the last time the factory settings were loaded. The counter is reset when the factory settings are loaded.

Remote HTTPS

Shows whether remote access to the Web user interface of the SINAUT MD741-1 via EGPRS or GPRS is permitted.

- White check mark at green dot: Access is allowed.
- White cross at red dot: Access is not allowed.

Remote SSH

Shows whether remote access to the SSH console of the SINAUT MD741-1 via EGPRS or GPRS is permitted.

- White check mark at green dot: Access is allowed.
- White cross at red dot: Access is not allowed.

CSD Dial-In

Shows whether remote CSD service calls are allowed.

- White check mark at green dot: CSD service calls are possible.
- White cross at red dot: CSD service calls are not possible.

Number of active firewall rules

Shows how many firewall rules are active.

Current system version

Shows the version number of the SINAUT MD741-1's software.

9.2 Log

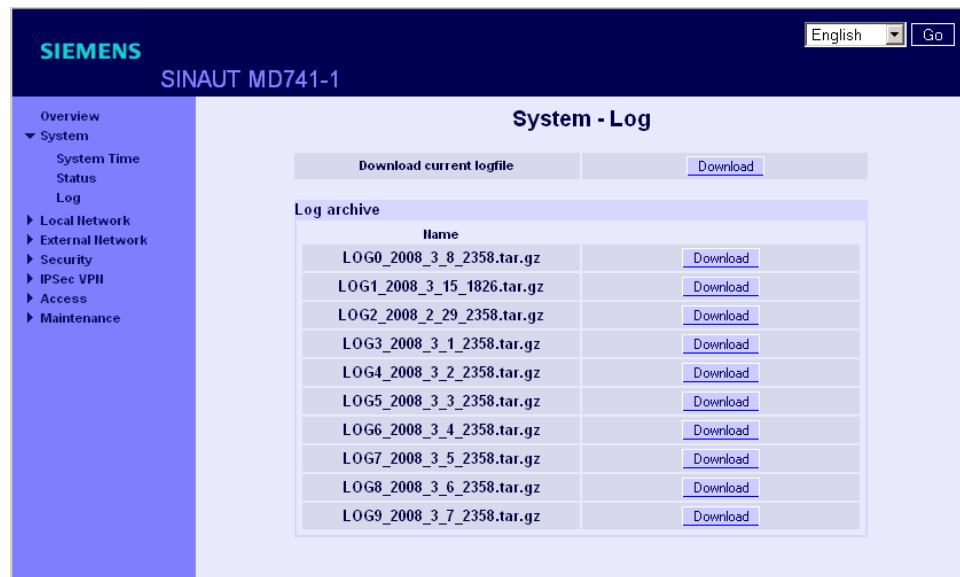


Figure 9-2 System > Log

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 logfile

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.

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	31730X	(null)	(null)	(null)	SERVICE_MASK=0	4	UH	41	CURRENT SYSTEM VERSION	1.014					
13.12.2007 19:46	31730X	(null)	(null)	(null)	SERVICE_MASK=0	4	UH	41	CURRENT SYSTEM VERSION	1.014					
13.12.2007 19:46	31730X	CSQ=---	STAT=---	COPS=---	SERVICE_MASK=496591	4	APL	0	SYSTEM STARTING	Success					
13.12.2007 19:47	31730X	CSQ=---	STAT=---	COPS=---	(null)	0	APL	5	CONNECTION ERROR	Missing or incorrect GSM parameter					
13.12.2007 20:03	31730X	CSQ=B	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	31730X	CSQ=B	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	31730X	CSQ=B	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	31730X	CSQ=B	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	31730X	CSQ=B	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 21:26	31730X	CSQ=B	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	31730X	(null)	(null)	(null)	SERVICE_MASK=0	4	UH	41	CURRENT SYSTEM VERSION	1.014					
14.12.2007 12:16	31730X	CSQ=---	STAT=---	COPS=---	SERVICE_MASK=496591	4	APL	0	SYSTEM STARTING	Success					
14.12.2007 12:16	31730X	CSQ=---	STAT=---	COPS=---	SERVICE_MASK=496591	0	APL	5	CONNECTION ERROR	Missing or incorrect GSM parameter					
14.12.2007 12:16	31730X	CSQ=---	STAT=---	COPS=---	SERVICE_MASK=496591	4	CH	9	CONFIGURATION FILE ACCESS	(write values)					
14.12.2007 12:16	31730X	CSQ=---	STAT=---	COPS=---	SERVICE_MASK=496591	4	CH	9	CONFIGURATION FILE ACCESS	InternalPc InternalIP 0 IP:192.168.1.1					
14.12.2007 12:16	31730X	CSQ=---	STAT=---	COPS=---	SERVICE_MASK=496591	4	CH	9	CONFIGURATION FILE ACCESS	InternalPc InternalIP 0 NetMask: 255.255.255.0					
14.12.2007 12:16	31730X	CSQ=---	STAT=---	COPS=---	(null)	4	CH	9	CONFIGURATION FILE ACCESS	InternalPc InternalIP 1 IP:192.168.0.20					
14.12.2007 12:16	31730X	CSQ=---	STAT=---	COPS=---	(null)	4	CH	9	CONFIGURATION FILE ACCESS	InternalPc InternalIP 1 NetMask: 255.255.255.0					
14.12.2007 23:05	31730X	(null)	(null)	(null)	SERVICE_MASK=0	4	UH	41	CURRENT SYSTEM VERSION	1.014					
14.12.2007 23:05	31730X	CSQ=---	STAT=---	COPS=---	SERVICE_MASK=496591	4	APL	0	SYSTEM STARTING	Success					
14.12.2007 23:06	31730X	CSQ=---	STAT=---	COPS=---	(null)	0	APL	5	CONNECTION ERROR	Missing or incorrect GSM parameter					
14.12.2007 23:08	31730X	CSQ=B	STAT=1	COPS=26201	SERVICE_MASK=496591	4	CH	9	CONFIGURATION FILE ACCESS	(write values)					
14.12.2007 23:09	31730X	CSQ=B	STAT=1	COPS=26201	SERVICE_MASK=496591	4	CH	9	CONFIGURATION FILE ACCESS	(write values)					
14.12.2007 23:09	31730X	CSQ=B	STAT=1	COPS=26201	SERVICE_MASK=496591	4	APL	3	GPRS CONNECTION ESTABLISHED	GPRS connect					
14.12.2007 23:10	31730X	CSQ=B	STAT=1	COPS=26201	SERVICE_MASK=496591	4	APL	0	IP ASSIGNED	172.25.105.9					
14.12.2007 23:11	31730X	CSQ=B	STAT=1	COPS=26201	SERVICE_MASK=496591	4	CH	9	CONFIGURATION FILE ACCESS	(write values)					
14.12.2007 23:11	31730X	CSQ=B	STAT=1	COPS=26201	SERVICE_MASK=496591	4	CH	9	CONFIGURATION FILE ACCESS	ICMPCheck Enabled true					
14.12.2007 23:11	31730X	CSQ=B	STAT=1	COPS=26201	SERVICE_MASK=496515	4	CH	9	CONFIGURATION FILE ACCESS	(write values)					
14.12.2007 23:11	31730X	CSQ=B	STAT=1	COPS=26201	SERVICE_MASK=496515	4	CH	9	CONFIGURATION FILE ACCESS	ICMPCheck Enabled true					
14.12.2007 23:12	31730X	CSQ=B	STAT=1	COPS=26201	SERVICE_MASK=496515	4	CH	9	CONFIGURATION FILE ACCESS	(write values)					
14.12.2007 23:12	31730X	CSQ=B	STAT=1	COPS=26201	SERVICE_MASK=496515	4	CH	9	CONFIGURATION FILE ACCESS	ICMPCheck Enabled true					
14.12.2007 23:13	31730X	CSQ=B	STAT=1	COPS=26201	SERVICE_MASK=496515	4	CH	9	CONFIGURATION FILE ACCESS	(write values)					
14.12.2007 23:13	31730X	CSQ=B	STAT=1	COPS=26201	SERVICE_MASK=496515	4	CH	9	CONFIGURATION FILE ACCESS	NTP Enabled true					
14.12.2007 23:24	31730X	CSQ=B	STAT=1	COPS=26201	SERVICE_MASK=499711	4	APL	34	SYSTEM RUNNING SUCCESSFUL	CellID 4369	Version 1.014	TXS 449	RXS 369	TX:1078	RX:368
14.12.2007 22:40	31730X	CSQ=B	STAT=1	COPS=26201	SERVICE_MASK=499711	4	APL	34	SYSTEM RUNNING SUCCESSFUL	CellID 4369	Version 1.014	TXS 449	RXS 369	TX:1078	RX:368
14.12.2007 22:57	31730X	CSQ=B	STAT=1	COPS=26201	SERVICE_MASK=499711	4	APL	34	SYSTEM RUNNING SUCCESSFUL	CellID 4369	Version 1.014	TXS 449	RXS 369	TX:1078	RX:368
14.12.2007 23:13	31730X	CSQ=B	STAT=1	COPS=26201	SERVICE_MASK=499711	4	APL	34	SYSTEM RUNNING SUCCESSFUL	CellID 4369	Version 1.014	TXS 449	RXS 369	TX:1078	RX:368
14.12.2007 23:30	31730X	CSQ=B	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	31730X	CSQ=B	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)

9.3 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.

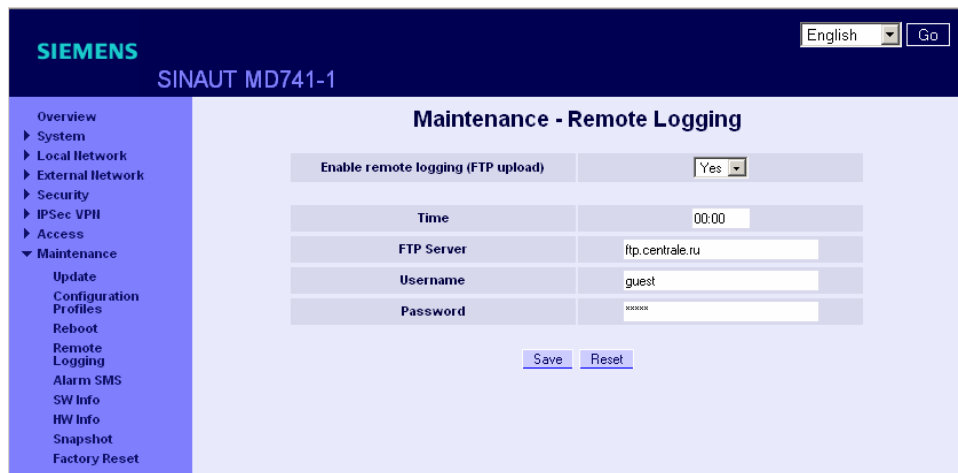


Figure 9-3 Maintenance > Remote Logging

Enable remote logging (FTP upload)

Yes activates the function.

Time

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 setting

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

9.4 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.

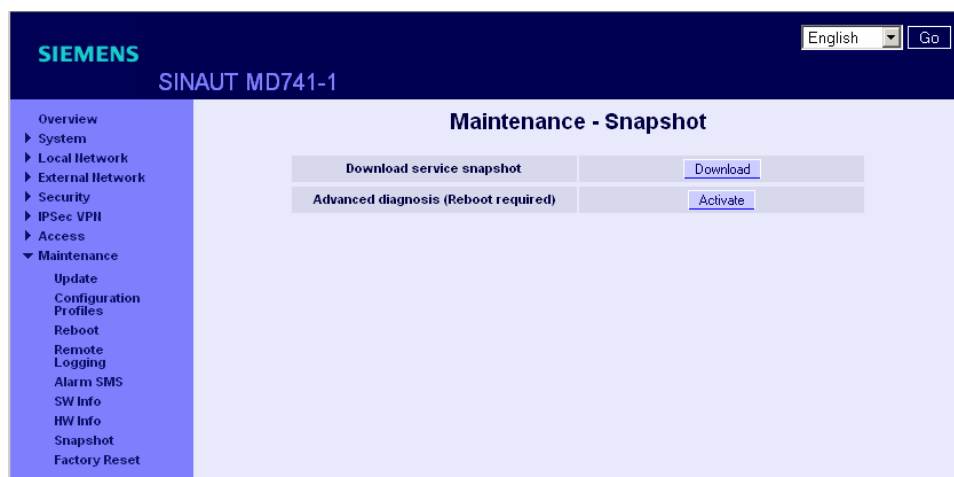


Figure 9-4 Maintenance > Snapshot

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.

Download service snapshot

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 diagnosis

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.

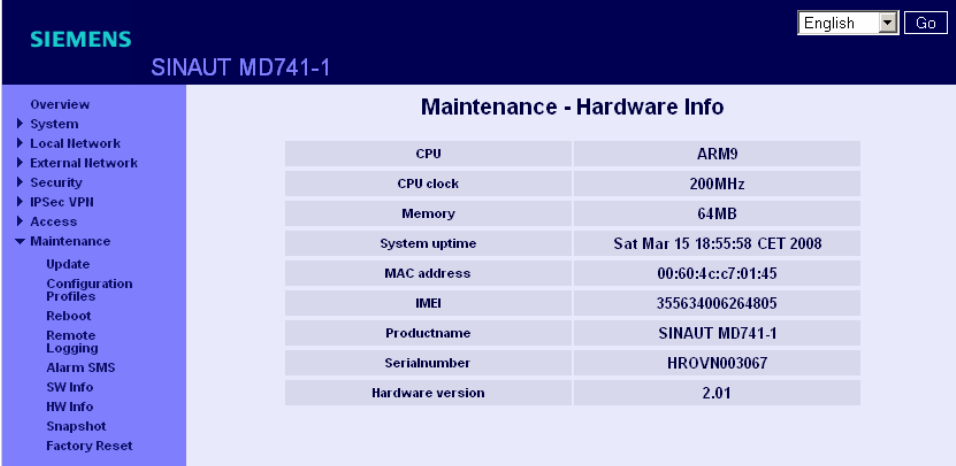
Factory setting

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

Advanced diagnosis	Off (Activate)
--------------------	-----------------------

9.5 Hardware information

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



The screenshot shows the SIEMENS SINAUT MD741-1 web interface. The top navigation bar includes the SIEMENS logo, the device name SINAUT MD741-1, and a language dropdown set to English with a Go button. A left sidebar menu lists various system functions, with 'Maintenance' expanded to show sub-options like Update, Configuration Profiles, Reboot, Remote Logging, Alarm SMS, SW Info, HW Info, Snapshot, and Factory Reset. The main content area is titled 'Maintenance - Hardware Info' and contains a table with the following data:

CPU	ARM9
CPU clock	200MHz
Memory	64MB
System uptime	Sat Mar 15 18:55:58 CET 2008
MAC address	00:60:4c:c7:01:45
IMEI	355634006264805
Productname	SINAUT MD741-1
Serialnumber	HROVN003067
Hardware version	2.01

Figure 9-5 Maintenance > Hardware info

9.6 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 10.2.

The screenshot shows the Siemens SINAUT MD741-1 web interface. The top navigation bar includes the Siemens logo, the device name 'SINAUT MD741-1', and a language dropdown set to 'English' with a 'Go' button. A left-hand navigation menu lists various system functions, with 'Maintenance' expanded to show sub-options like 'Update', 'Configuration Profiles', 'Reboot', etc. The main content area is titled 'Maintenance - Software Info' and contains a table of software versions.

Component	Version
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

Below the table is a section titled 'Scheduled updates' with a table header:

Update Id	From version -> to version	Timestamp
-----------	----------------------------	-----------

Figure 9-6 Maintenance > Software info

10.1 Alarm SMS

The SINAUT MD741-1 can transmit short alarm messages via the SMS (= Short Message Service) of the GSM network. Two events can trigger transmission of an alarm message via SMS:

- Event 1: No GPRS connection

A separate call number for sending the alarm message to can be specified for each of these two events. The text of the alarm message can also be freely defined. The following characters are available: A-Z a-z 0123456789,!?

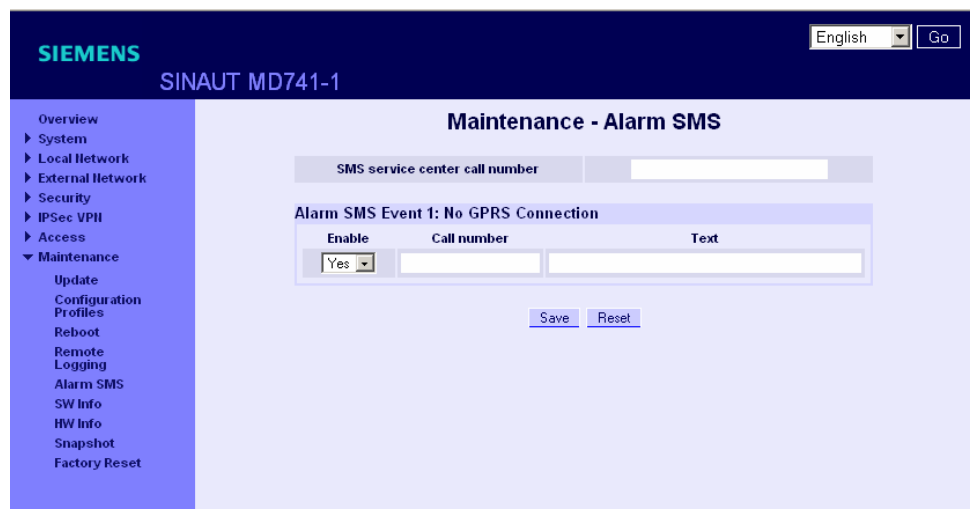


Figure 10-1 Maintenance > Alarm SMS

Alarm SMS Event 1: No GPRS Connection In Port

The GPRS connection is not established despite multiple attempts. The SINAUT MD741-1 then transmits an alarm message.

SMS service center call number

So that the SMS function will function reliably, enter the call number of the service center here. Without an entry in this location the default SMS service center of your network operator will be used.

Settings

Enable

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

Call number

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

Text

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

Factory setting

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

SMS service center call number	-
Alarm SMS Event 1: No GPRS	No (switched off)
Call number	-
Text	-

10.2 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.

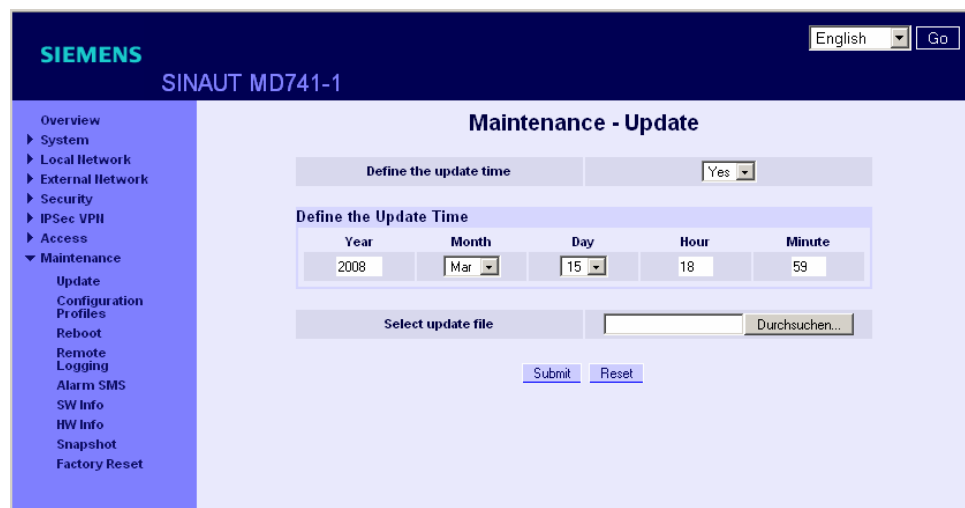


Figure 10-2 Maintenance > Update

Define the update time

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 update time

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 ±2dB) for EGSM850 Class 4 (+33dBm ±2dB) for EGSM900 Class 1 (+30dBm ±2dB) for GSM1800 Class 1 (+30dBm ±2dB) for GSM1900 Class E2 (+27dBm ± 3dB) for GSM 850 8-PSK Class E2 (+27dBm ± 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 (I_{Burst}) over time. The top graph is for 12V and shows a series of sharp peaks reaching approximately 1300 mA on a 100ms scale. The bottom graph is for 24V and shows a series of sharp peaks reaching approximately 700 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

Applied Standards and Approvals

12

12.1 Equipment

Product name

SINAUT MD741-1

Manufacturer

Siemens Aktiengesellschaft, Industry Automation

Intended purpose

(E-)GPRS-VPN-Router for industrial application

12.2 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.

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) – Approval pending – applied for approval

Additional marking

 II 3 G EEx nA T4A Ta=-20°C-60°C
FM xx ATEX xxxx X

Applied standards

- EN50021 (Type of protection “n”)


Classification

Group II, Category 3, Gas Atmosphere, Non-sparking equipment, 135°C maximum, surface temperature, Ambient temperature range: -20°C ... +60°C

12.3 Compliance to FM, UL and CSA

FM certification – Approval pending – applied for approval

Marking

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

Applied standards

- Factory Mutual Approval Standard Class Number 3611

Classification

Class I, Division 2, Group A, B, C, D, 135°C maximum, surface temperature, Ambient temperature range: -20°C ... +60°C

Class I, Zone 2, Group IIC, 135°C maximum, surface temperature, Ambient temperature range: -20°C ... +65°C

UL/CSA Certification

Marking



Applied standards

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

12.4 Compliance to FCC

Approval pending – applied for approval

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.

RF Exposure mobile

Caution

Typically, the antenna connected to the transmitter is an omni-directional antenna with 0dB gain. Using this antenna the total composite power in PCS mode is smaller than 1 watt ERP.

The internal / external antennas used for this mobile transmitter must provide a separation **distance of at least 20 cm from all persons** and must not be co-located or operating in conjunction with any other antenna or transmitter."

Contains FCC ID: QIPMC75

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 4.4dBi 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

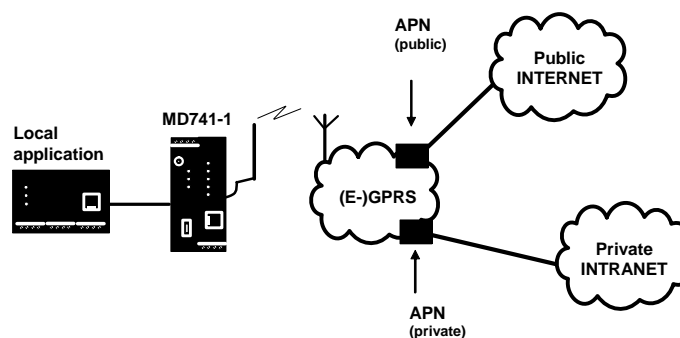
AES

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.

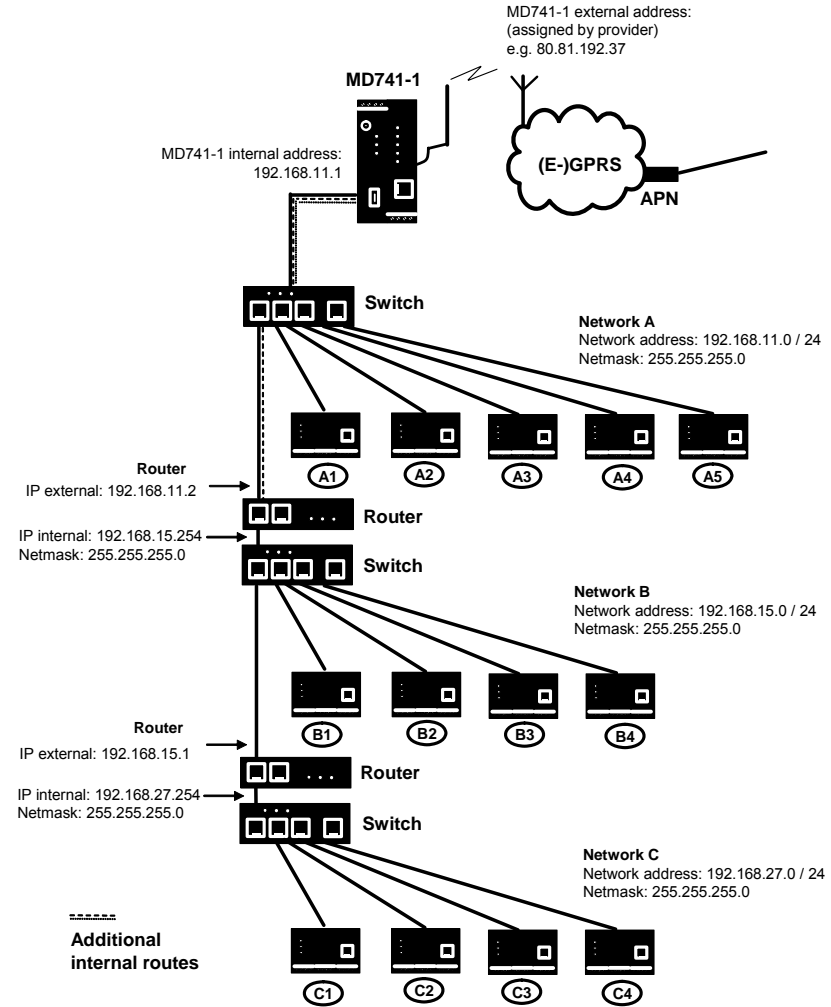


An end device that wants to establish a connection via the GPRS network specifies an APN to indicate which network it wants to be connected to: the Internet or a private company network that is connected via a dedicated line.

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 Network: 192.168.27.0/24 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	
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 dBm ... -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

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).

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.

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.

NAT (Network Address Translation) In Network Address Translation (NAT) - often also referred to as *IP Masquerading* - 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. 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. 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. 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.

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	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.
Service provider	Supplier, company or institution that gives users access to the Internet or to an online service.
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.</p> <p>Anti-spoofing means mechanisms to reveal or prevent spoofing.</p>
SSH	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.

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.