

SINAUT MD740-1

User Manual

SIEMENS



Safety precautions

General: The product SINAUT MD740-1 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 complies with IEC/EN60950 chapter 2.5 "Limited power sources" and UL1310 / NEC Class 2 respectively. The output voltage of the external power supply must not exceed 30VDC. The output of the external power supply must be short-circuit proof.

Warning

The power supply unit to supply the SINAUT MD740-1 must comply with NEC Class 2 circuits as outlined in the National Electrical Code (ANSI/NFPA 70) only

When connecting to a battery or accumulator, make sure that an all-pole circuit-breaker (main battery switch) with sufficient selectivity and a fuse with sufficient selectivity are provided between the device and the battery or accumulator.

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

Digital gate input: Make sure that the specified input voltage range is observed. Please pay regard to sections *Connecting the device* and *Technical Data* of this documentation.

Digital gate output: Switching voltage and switching current must not exceed the specified maximum values. Please pay regard to sections *Connecting the device* and *Technical Data* of this documentation.

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 *Inserting or changing the SIM card* of the installation 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: 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.

Antenna: Use only the antenna of the SINAUT TELECONTROL accessory program being released for the SINAUT MD740-1. Other antennas may cause damages and the device will lose official approvals like FCC.

Installing antennas: The emission limits as recommended by the Commission on Radiological Protection (13/14 September 2001) must be observed.

Installing an external antenna: When installing an antenna outdoors it is essential that the antenna is fitted correctly by a qualified person. Lightning Protection Standard VDE V 0185 Sections 1 to 4, in its current version, and further standards must be observed.

Lightning protection category for buildings: For outdoor installation, the antenna may be fitted only within the lightning protection zones O/E or 1. These lightning protection zones are prescribed by the lightning protection spherical radius.

The EMV lightning protection zone concept is to be observed. To avoid large induction loops a lightning protection equipotential bonding is to be used. If the antenna or antenna cable is installed near to the lightning protection system, the minimum distances to the lightning protection system must be observed. If this is not possible, insulated installation as described in VDE V 0185 Sections 1 to 4, in its current version, is essential.

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.

This device contains 900 MHz GSM and 1800 DCS functions that are not operational in U.S. territories.

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 MD720-3 with an antenna of the SINAUT MD720-3 accessory program.

The installation of the SINAUT MD720-3 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



Warning !

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."



Warning !

This is a class A equipment. This equipment can disturb other electric equipment in living areas; in this case the operator can be demanded to carry out appropriate measures.



Warning !

Please 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.

Product no. 3155
Doc. no. 3155AD001 Rev. 1.1

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1 Introduction

The SINAUT MD740-1 serves the following purpose:

The device establishes secure IP data connections by radio

- via the GPRS (**G**eneral **P**acket **R**adio **S**ervice) of a GSM network (**G**lobal **S**ystem for **M**obile Communication = mobile radio network).

- GPRS modem
- VPN router
- Firewall

To do so, the device combines the following functions:

- GPRS modem for flexible data communication via GPRS
- VPN router for secure data transfer via public networks (IPSec protocol, 3DES data encryption, AES encryption)
- Firewall for protection against unauthorised access. The dynamic packet filter inspects data packets using the source and destination address (stateful packet inspection) and blocks unwanted data traffic (anti-spoofing).

The device is configured simply using a Web browser.

VPN features

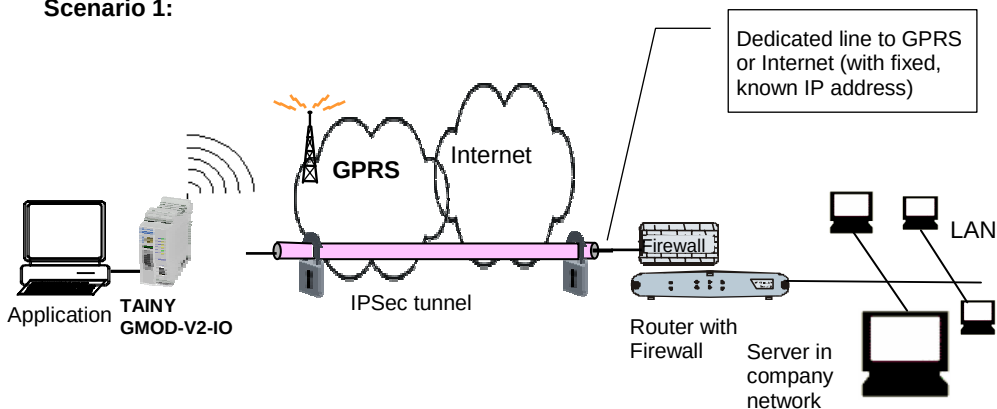
- Protocol: IPSec (tunnel and transport mode)
- IPSec DES encryption at 56 Bit
- IPSec 3DES encryption at 168 Bit
- IPSec AES encryption at 128, 192 and 256 Bit
- Packet authentication: MD5, SHA-1
- Internet Key Exchange (IKE) with Main and Quick Mode
- Authentication: Pre-Shared Key (PSK), X.509v3 certificates
- DynDNS
- NAT-T
- Dead Peer Detection (DPD)

Firewall features

- Stateful Packet Inspection
- Anti-spoofing
- NAT (IP Masquerading)
- Port Forwarding

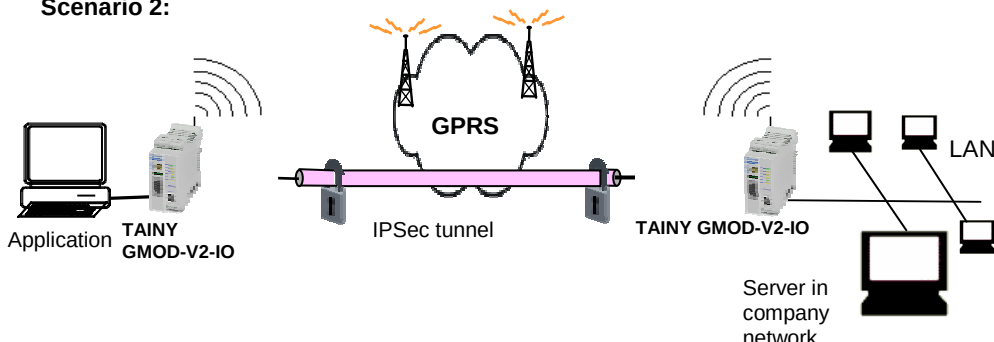
Other features

- DNS Cache
- DHCP Server
- NTP
- Remote Logging

Scenario 1:

The application is connected locally direct to the SINAUT MD740-1: e.g. statement printer, notebook or PC. This application uses the SINAUT MD740-1 in order to have secure access to a remote LAN as if it were connected direct to the LAN.

The remote site is a computer in a corporate network. The network, protected by a VPN router with firewall, is connected to the GPRS network or the Internet and has a known or definable IP address.

Scenario 2:

The remote site is another SINAUT MD740-1.



The direct connection of two GPRS end devices is not technically supported in all GSM/GPRS networks.

1.1 To be able to use the SINAUT MD740-1...

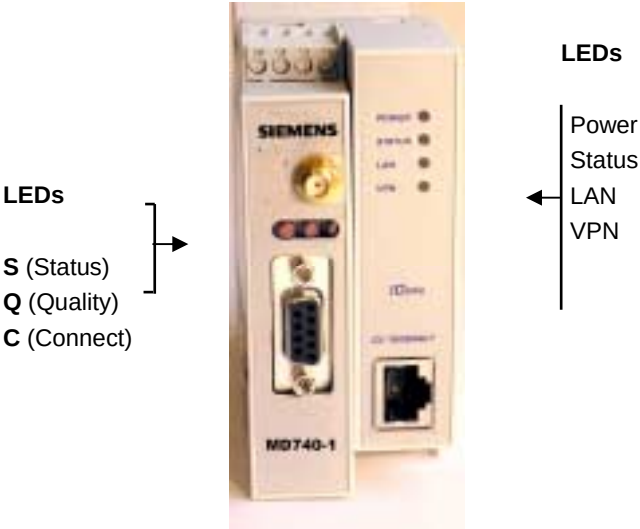
- you require...
- a subscriber contract with a GSM network operator (e.g. TD1, Vodafone, E-Plus, O2) that supports GPRS
 - release of the GPRS for the user in question by the network operator

1.2 IP address of the remote site

In order that a SINAUT MD740-1 can actively establish a VPN connection the remote site must have a fixed IP address (an IP address consists of a maximum of 4 numbers, separated by dots, which can each have up to three digits, e.g. 255.122.201.005). With many Internet Service Providers (ISPs), however, the IP addresses are assigned dynamically, i.e. the IP addresses of the computers or networks which have access to the Internet change. There are 3 ways of obtaining a fixed IP address:

- | | |
|--|---|
| Fixed IP address via dedicated line to GPRS | The communication partner is connected to the GPRS network via a leased dedicated line. In this case it has normally been assigned a fixed IP address by the network operator. |
| Fixed IP address via Internet service provider | The communication partner can be accessed via the Internet and has been assigned a fixed IP address by the Internet service provider (the address can be applied for from some Internet service providers). |
| Fixed IP address via DynDNS service | <p>To solve the problem of dynamic IP address assignment, DynDNS services can be used. With this kind of service, the SINAUT MD740-1, for example, or the remote computer, regardless of the dynamic IP address it currently possesses, is accessible via a fixed domain name. Each time the IP address changes, the SINAUT MD740-1 or the remote computer reports the new IP address to the DynDNS server, so that the current IP address is always assigned to the domain name on the DNS server - see glossary, page 95.</p> <p>The use of a DynDNS service requires a contract with the provider concerned, e.g. DynDNS.org or DNS4BIZ.com.</p> |

2 The LEDs of the SINAUT MD740-1



S (Status), Q (Quality), C (Connect)

LED	Status	Meaning
S, Q, C in sequence	Fast lighting in sequence Slowly lighting in sequence Synchronous fast blinking	Boot procedure Update* Error
S (Status)	Blinks slowly Blinks fast OFF ON	Device waiting for PIN input PIN error / SIM error No GPRS attach GPRS attach
Q (Quality)	Blinks slowly 1 x intermittent blinking 2 x intermittent blinking 3 x intermittent blinking ON always OFF	Booking into the GPRS network Field strength not sufficient or unknown** Field strength sufficient Field strength medium Field strength high Waiting for PIN input
C (Connect)	OFF ON	No connection Connection to server/remote station GPRS: Authentication on and IP allocation from network successful

* When updating the communication firmware, at first the LEDs are slowly blinking in sequence. Further in the process only the LED S is On.

** Shortly after booking into the GSM network, the quality LED blinks once, thus signalling the field strength as not sufficient or unknown. Cause: At this stage the device can only register availability

of signal, but not the signal quality. The field strength is then requested in a next check, 15 seconds later.

DC5V, STAT, LINL, VPN

LED	Colour	Status	Meaning
DC5V	Green	ON	Device switched on, operating voltage is on
		OFF	Device switched off, no operating voltage
STAT	Yellow	Blinking	IOVPN board operational
LINK	Yellow	ON	Ethernet connection to local PC / LAN established
		OFF	No Ethernet connection to local PC / LAN
VPN	Yellow	ON	VPN tunnel established*
		OFF	VPN-Tunnel not established

* Shortly after switching on of the SINAUT MD740-1, the LED VPN is set to on for a short period of time although the VPN tunnel has not yet been established. Cause: self-test of the components during starting procedure of the device.

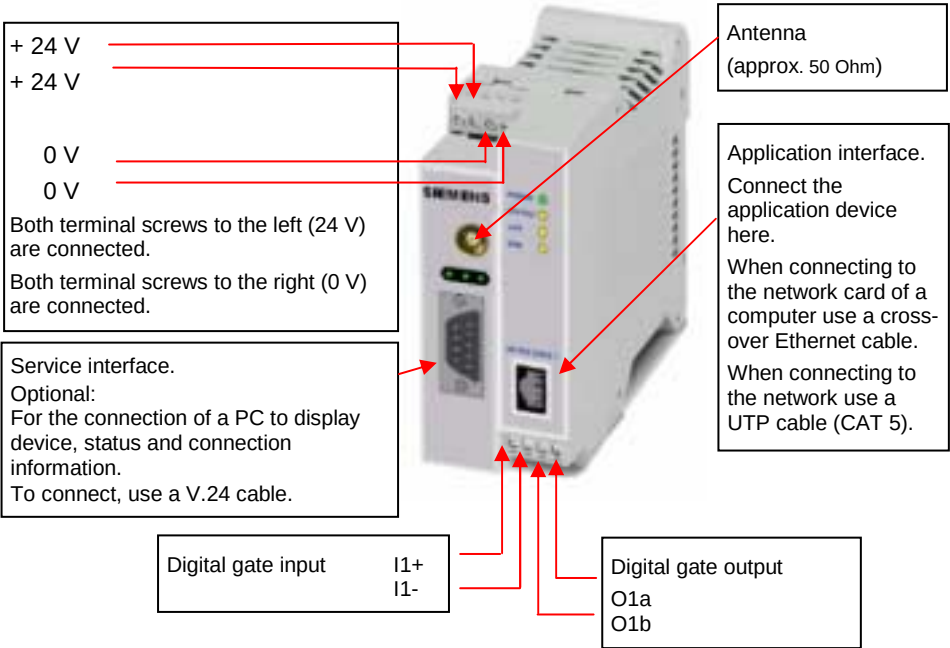
3 Putting the device into operation

To put the device into operation, perform the following steps in the order given:

	Page
1. Connect the device	12
2. Configure the PIN	14
3. Insert or change the SIM card	15
4. Perform further configuration	19
➡ First tell the device the PIN of the SIM card. Then insert the SIM card.	
➡ The device also supports SIM cards without a PIN. If your SIM card has no PIN you can also insert the SIM card before performing configuration.	
➡ The device must be switched off when you insert or remove the SIM card.	

3.1 Connecting the device

Current supply: The screw terminals on top of the device for connecting of the current supply: 24 V DC voltage (nominal), max. 600mA



Switching the device on/off

The SINAUT MD740-1 switches on as soon as the operating voltage is supplied (see *Connecting the device*, page 12).

The device switches off when disconnected from the supply voltage.

- When switching on
- When the device is switched on the *POWER* LED comes on first. If the device has a valid configuration and the SIM card is inserted the device automatically books into the GPRS network. When the *CONNECT* LED comes on a GPRS connection has been established.
- The device is designed in such a way that it can be left switched on permanently.

3.2 Configuring the PIN

In order for the SINAUT MD740-1 to be able to communicate via the GPRS network of your network operator you must tell the device the PIN (Personal Identification Number) of the SIM card. Then you can insert the SIM card into the device.

The device also supports SIM cards without a PIN. If your SIM card has no PIN it is not necessary to configure the PIN. You can then insert the SIM card immediately.

To configure the PIN, proceed as follows:

1. Using your Web browser (e.g. MS Internet Explorer), establish a configuration connection with the SINAUT MD740-1.

To do this, follow the description in section 4 *Configuration*, page 19 to 23.

2. When the Administrator website of the SINAUT MD740-1 appears, select **Network → GPRS**.

The screenshot shows the 'Configuration' page for the SINAUT MD740-1, specifically the 'Network > GPRS' section. The page has a blue header and a left sidebar with a tree view. The main content area contains several input fields: 'User', 'Password', 'APN', and 'PIN'. The 'PIN' field is highlighted with a red box, and a red arrow points from it to a text box on the left that says 'Enter PIN (in both fields)'. The 'PIN' field has a placeholder text '(Not configured yet)'. There is an 'Apply' button at the bottom right of the form.

Enter PIN
(in both fields)

In the *PIN* field, enter the PIN of the SIM card that you then want to insert into the device.

↻ Enter the same PIN in both fields.

Then click on **OK** or **Apply**.

Once the PIN is set, the message "Not configured yet" is no longer displayed.

3. You can close the connection by closing the Web browser.

3.3 Inserting or changing the SIM card

- ➡ SINAUT MD740-1 must be switched off when you insert or change the SIM card
- ➡ A plug-in SIM card (3 Volt) is used.

1. Make sure that the device is disconnected from the supply voltage.
2. The SINAUT MD740-1 must be opened to insert the SIM card.

The housing is fastened with clamps, two each on top of the housing and on the bottom side.

Clamps



Clamps

3. Release the two clamps on the housing part with antenna socket. For this purpose, press the clamps cautiously with a suitable object (see picture) so that catch opens.



4. Cautiously pull the unlocked housing part so that the housing opens.

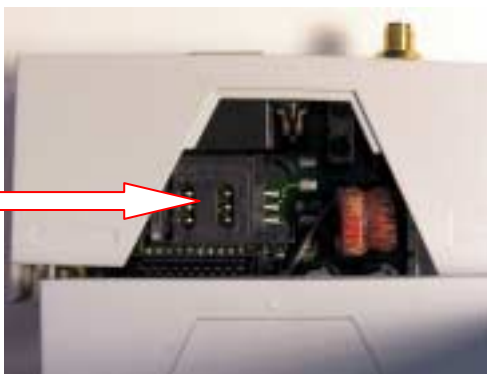


The boards in both front housing parts are connected by an IO cable. When opening the housing make sure that the cable connection is not loosened or damaged. If necessary, unlock both front housing parts and cautiously pull them out together.



5. The SIM card holder is visible on the motherboard.

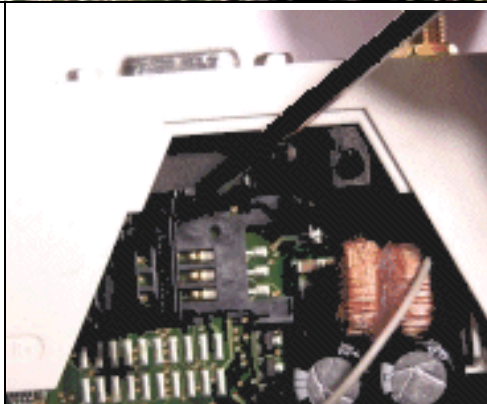
SIM card holder



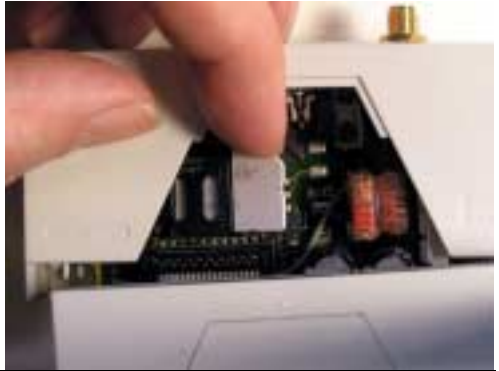
6. With a suitable object open the flap of the SIM card holder by moving it cautiously about 2mm to the left – in the direction of the arrow (see red arrow in the illustration) so that it can be raised.



7. Raise the flap of the SIM card holder so that you can insert the SIM card.
In the illustration below, the compartment into which you can insert the SIM card is emphasized in white.



8. Slide the SIM card into the flap of the SIM card holder, with the gold-coloured microchip pointing down. The flap has a groove for this purpose. The notched corner of the SIM card has to point towards the front of the device (see illustration).



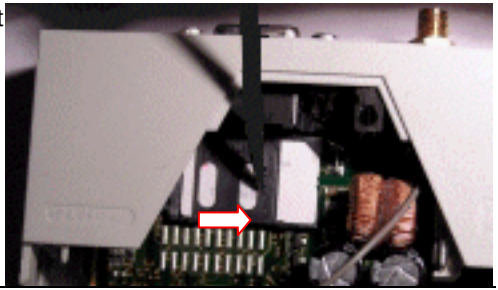
9. Slide the SIM card down into the flap as far as possible.



10. Lower the flap paying attention to the notched corner of the SIM card (see illustration).



11. With your fingernail or a suitable object move the flap about 2 mm to the right (in the direction of the arrow) until you can feel it click into place.



12. Now the SIM card holder is locked into position.



13. Check the connection of the internal IO connection cable.

Finally re-attach both housing parts:
Slide the motherboard into the rails on top and bottom inside the rear section of the housing. Close the housing by slightly pressing the housing parts together so that the clamps on the upper and lower parts of the housing engage.

The housing is locked when all clamps have clicked shut.



4 Configuration

Remote configuration

- ➔ Remote configuration is possible only if the SINAUT MD740-1 is configured for remote access (see page 64). In this case, proceed exactly as described as from section *Establish configuration connection*, page 20.

Prerequisites for local configuration

- The computer with which you are performing the configuration must either
 - be connected direct to the Ethernet socket of the SINAUT MD740-1 via cross-over network cable
 - or it must have direct access via LAN to the SINAUT MD740-1.
- The SINAUT MD740-1 must be switched on.
- The network adapter of the computer with which you are performing configuration must have the following TCP/IP configuration:
 IP address: **192.168.1.2**
 Subnet mask: **255.255.255.0**
 Default gateway: **192.168.1.1**
 Preferred DNS server: **address of the Domain Name Server**

TCP/IP configuration of the network adapter under Windows XP:

TCP/IP configuration of the network adapter

...under Windows XP

1. Click on **Start, Settings, Control Panel, Network Connections**: right-click on the icon for LAN adapter and click on **Properties** in the context menu.

On the *General* tab in the *Properties of LAN connection local network* dialogue box, select the **Internet Protocol (TCP/IP)** entry and then click on the **Properties** button to make the following dialogue box appear:



2. Enter the following:
IP address: **192.168.1.2**
Subnet mask: **255.255.255.0**
Default gateway: **192.168.1.1**
Preferred DNS server: **address of the Domain Name Server**

**...under
Windows 2000**

Under Windows 2000, proceed accordingly.

 **Preferred DNS
server**

If you call up addresses via a domain name (e.g. www.neuhaus.de), a Domain Name Server (DNS) has to look up which IP address belongs to the name. You can determine the following as the Domain Name Server:

- the DNS address of the network operator
- OR
- the local IP address of the SINAUT MD740-1, provided that it is configured to resolve hostnames in IP addresses, see *Services menu*.

To determine the Domain Name Server in the TCP/IP configuration of your network adapter, proceed as described above.

**Establish
configuration
connection**

Proceed as follows:

1. Start a Web browser.
(e.g. MS Internet Explorer from Version 5.0 or Netscape Communicator from Version 4.0; the Web browser must support SSL (i.e. https))
2. Make sure that the browser does not automatically dial up a connection when starting.
In MS Internet Explorer you make this setting as follows: menu **Tools, Internet Options...**, *Connections* tab: under *Dial-up and Virtual Private Network settings*, **Never dial a connection** must be activated.
3. In the address line of the browser, enter the full address of the SINAUT MD740-1. In accordance with the default setting, this is:

<https://192.168.1.1>

Consequence: the security alert shown on the next page appears.

IP address of the
SINAUT MD740-1:
<https://192.168.1.1>



**In case
the Administrator
website does not
appear...**

If the browser still tells you after several attempts that the page cannot be displayed, try the following:

- Check the hardware connection.
To do so on a Windows computer, enter the following command via the DOS prompt (menu **Start, Programs, Tools, Command Prompt**):

ping 192.168.1.1

If there is no message about the reception of the 4 sent packets within the prescribed time, 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 6.0) you make this setting as follows: menu **Tools, Internet Options...**, *Connections* tab: under *LAN Settings* click on the **Settings** button, in the *Settings for local area network (LAN)* dialogue box make sure that the **Use a proxy server for your LAN** entry is not activated.

- If there are other LAN connections active on the computer, deactivate them for the duration of configuration.
Under Windows menu **Start, Settings, Control Panel, Network Connections / Network and Dial-up Connections** right-click on the appropriate icon and select **Deactivate** in the context menu.
- Enter the address of the SINAUT MD740-1 plus slash:

https://192.168.1.1/

When the connection is successfully established...

4. Following the successful establishment of the connection the following security alert appears:

Explanation:

As the device can only be administered via encrypted accesses it is supplied with a self-signed certificate.



Acknowledge the security alert with **Yes**.

5. You are prompted to enter the user name and the password.



The default setting is:

User name: **admin**

Password: **tainy**

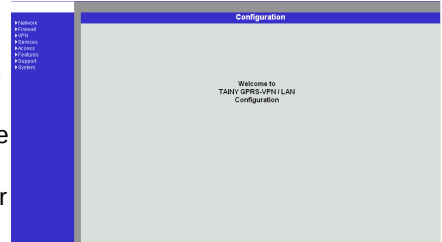
Start page of the Administrator website

6. Consequence: the Administrator website of the SINAUT MD740-1 appears - see next page.

Perform configuration

To perform the configuration, proceed as follows:

1. Call up the required setting area via the menu.
2. Make the required entries on the page concerned.
3. Confirm with **OK** or **Apply**, so that the settings are accepted by the device.



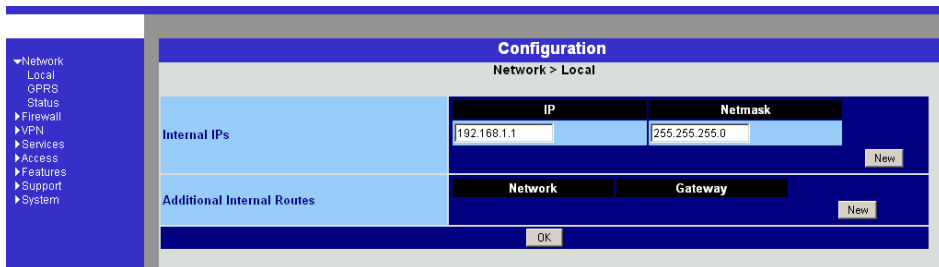
If a page is not up to date when next displayed because the browser is loading it from the cache, refresh the page display. To do so, click on the Refresh icon in the browser's icon bar.

- ➡ Depending on how you configure the SINAUT MD740-1, you may then have to adapt the network interface of the connected computer or network accordingly.
- ➡ When entering IP addresses, always enter the IP address sub-numbers without the leading zeros, e.g.: 192.168.0.8.

Please note:

In the following screenshots of the configuration pages of the SINAUT MD740-1 are displayed. The caption of these screenshots refers to another product from SIEMENS A&D. This product basically supports the same features as SINAUT MD740-1 (VPN, Firewall) but has a different housing.

4.1 Network menu



Network → Local Internal IPs

Local IP address of the SINAUT MD740-1 according to default setting:
192.168.1.1

An internal IP is the IP address at which the SINAUT MD740-1 can be accessed by devices of the locally connected network.

The default setting for the IP address is as follows:

IP address: **192.168.1.1**

Local netmask: **255.255.255.0**

You can determine further addresses at which the SINAUT MD740-1 can be accessed by devices of the locally connected network. This is helpful if, for example, the locally connected network is divided into subnets. In this case, several devices from different subnets access the SINAUT MD740-1 at different addresses.

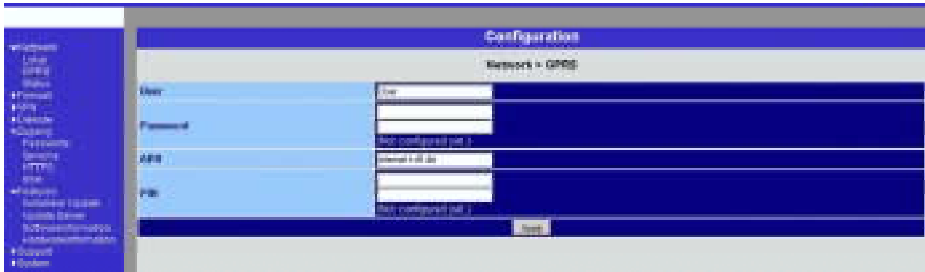
- If you want to determine a further internal IP, click on **New**.
You can determine any number of internal IPs.
- If you want to delete an internal IP, click on **Delete**.
(The first IP address in the list cannot be deleted.)

Additional Internal Routes

If further subnets are connected to the locally connected network, you can define additional routes.

See also *Network example diagram*, page 81.

- If you want to determine a further route to a subnet, click on **New**.
Enter the following:
 - the IP address of the subnet (network), and
 - the IP address of the gateway via which the subnet is connected.
 You can determine any number of internal routes.
- If you want to delete an internal route, click on **Delete**.



Network → GPRS

User (user name)

Password

When the SINAUT MD740-1 logs into the GPRS network it is generally asked for the user name and the password before it is given access to the network.

Some GSM/GPRS network operators dispense with access control via user name and/or password. In this case, enter **visitor** in the appropriate field.

INFO: Documentation from your network operator.

➤ Enter the password identically in both fields.

Once the password has been set, the message "Not configured yet" is no longer displayed.

APN (Access Point Name)

This denotes the gateway

- to the Internet. In this case the remote site can be reached via the Internet.

OR

- to the private network. In this case the remote site is connected to the GPRS network operator via a leased dedicated line.

INFO:

- Internet APN:

You will find the APN in the documentation or at the website of your GSM/GPRS network operator, or you can call the hotline and ask for it there.

- Private APN:

You can obtain the access data from your network operator.

When putting the device into operation:

- 1. Tell the device the PIN of the SIM card
- 2. Insert the SIM card

PIN of the SIM card inserted in the device

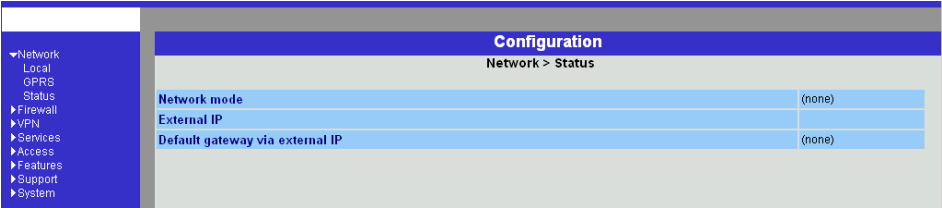
In order for the SINAUT MD740-1 to be able to operate with the SIM card of your network operator you must tell the device the PIN (Personal Identification Number) of the SIM card, provided that the SIM card has a PIN. Only after this should you insert the SIM card into the switched off(!) device.

To do so, enter the PIN and click on **OK** or **Apply**.

If a PIN has been set, the message "Not configured yet" is no longer displayed.

- ➡ Enter the PIN identically in both fields.
- ➡ The entered PIN must tally with the PIN of the SIM card with which the device is to operate.
- ➡ You cannot change the PIN of the SIM card with this device.

Confirm the entries on this configuration page by clicking on **OK** or **Apply**.



Network → Status

Display only:

Network mode

This indicates whether a GPRS connection has been established (display: "modem connected") or whether the GPRS modem is on standby and ready to establish a GPRS connection (display: "(none)" or "modem (later)").

External IP /GPRS:

The IP address at which the device can be reached from the outside. This IP address is assigned to the device by the operator of the GPRS network for the current connection.

Default gateway via external IP:

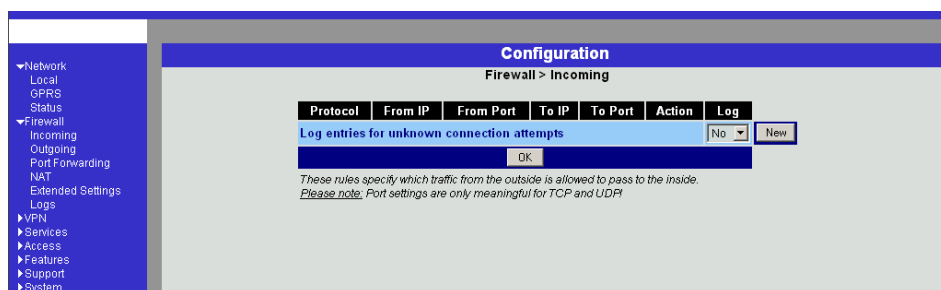
IP address of the integrated GPRS module.

4.2 Firewall menu

The SINAUT MD740-1 comes with a *Stateful Packet Inspection Firewall*. The connection data of an active connection are collected in a database (*connection tracking*). This means that rules are only to be defined for one direction, while data from the other direction of a connection, and only these, are allowed through automatically. A side effect of this is that existing connections are not interrupted as a result of reconfiguration, even if a corresponding new connection should no longer be established.

Default firewall setting:

- All incoming connections are rejected (except VPN).
- The data packets of all outgoing connections are rejected (except VPN and except connections to the integrated website which provides information about devices and connection data).
- ➔ VPN connections are not subject to the firewall rules determined under this menu item. You can determine firewall rules for each individual VPN connection under the menu **VPN → Connections**.
- ➔ If several firewall rules have been set, they are scanned in the order of the entries from top to bottom until a suitable rule is found. This rule is then applied. Should there also be rules further down in the list which would be also suitable, they are ignored.



Firewall → Incoming

This lists the fixed firewall rules. These apply to incoming data connections which have been initiated externally.

- If no rule has been set, all incoming connections (except VPN) are rejected (= default setting).

Deleting a rule

Click on **Delete** next to the entry concerned. Then click on **OK** or **Apply**.

Setting a new rule

If you want to set a new rule, click on **New**.

Set the required rule (see below), then click on **OK** or **Apply**.

You receive a system message as confirmation.

You can make the following possible entries:

Protocol: *All* means: TCP, UDP, ICMP and others.

IP address: *0.0.0.0/0* means all addresses. To denote a range, use CIDR syntax - see *CIDR (Classless InterDomain Routing)*, page 79.

Port:

(is evaluated only with TCP and UDP protocols)

any means any port.

startport:endport (e.g. 110:120) denotes the port area.

Individual ports can be entered either with the port number or with the corresponding service name: (e.g. 110 for pop3 or pop3 for 110).

Action:

Accept means that the data packets may pass.

Refuse means that the data packets are turned away so that the sender is informed of the refusal.

Reject means that data packets are not allowed to pass. They are "swallowed" so that the sender is not informed of their whereabouts.

Log:

For each individual firewall rule you can determine whether, when the rule is applied,

- the event is to be logged - set *Log* to **Yes**
- or not - set *Log* to **No** (default setting)

Log entries for unknown connection attempts:

This logs all connection attempts which are not recorded by the prevalent rules.

The screenshot shows the 'Configuration' window with 'Firewall > Outgoing' selected. A table lists two firewall rules. Below the table is a section for logging unknown connection attempts, and an 'OK' button. A note at the bottom states: 'These rules specify which traffic from the inside is allowed to pass to the outside. Please note: Port settings are only meaningful for TCP and UDP.'

Protocol	From IP	From Port	To IP	To Port	Action	Log	
TCP	192.168.1.0/24	any	192.168.0.8	http	Accept	No	Delete
TCP	192.168.1.0/24	any	192.168.0.8	ftp	Accept	No	Delete

Log entries for unknown connection attempts: No [New]

OK

These rules specify which traffic from the inside is allowed to pass to the outside.
Please note: Port settings are only meaningful for TCP and UDP

Firewall → Outgoing

This lists the fixed firewall rules. These apply to outgoing data packets which belong to GPRS connections initiated by the SINAUT MD740-1 to communicate with a remote site.

- If no rule is set, all outgoing connections are prohibited (except VPN).
- Default setting: outgoing connections prohibited (except VPN and connections to the integrated website which provides information about devices and connection data).

Deleting a rule

Click on **Delete** next to the entry concerned. Then click on **OK** or **Apply**.

Setting a new rule

If you want to set a new rule, click on **New**.

Set the required rule (see below), then click on **OK** or **Apply**.

You receive a system message as confirmation.

You can make the following possible entries:

Protocol: *All* means: TCP, UDP, ICMP and others.

IP address: *0.0.0.0/0* means all addresses. To denote a range, use CIDR syntax - see *CIDR (Classless InterDomain Routing)*, page 79.

Port:

(is only evaluated with TCP and UDP protocols)

any means any port.

startport:endport (e.g. 110:120) denotes the port area.

Individual ports can be entered either with the port number or with the corresponding service name: (e.g. 110 for pop3 or pop3 for 110).

Action:

Accept means that the data packets may pass.

Refuse means that the data packets are turned away so that the

sender is informed of the refusal.

Reject means that data packets are not allowed to pass. They are swallowed so that the sender is not informed of their whereabouts.

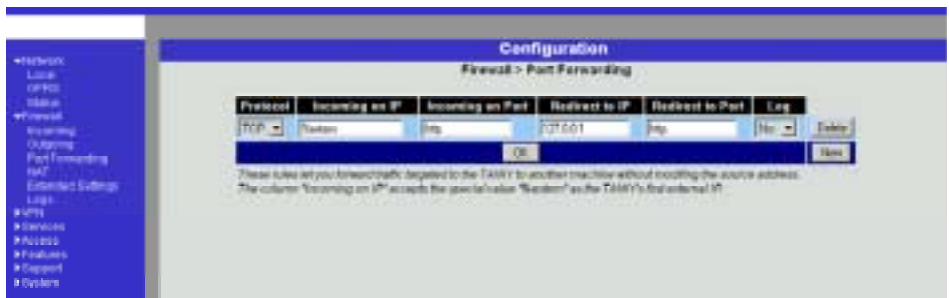
Log:

For each individual firewall rule you can determine whether, when the rule is applied,

- the event is to be logged - set *Log* to **Yes**
- or not - set *Log* to **No** (default setting)

Log entries for unknown connection attempts:

This logs all connection attempts which are not recorded by the prevalent rules.



Firewall → Port Forwarding

This lists the fixed rules for port forwarding.

With port forwarding the following takes place: the header of incoming data packets from the external network which are intended for the external IP address (or one of the external IP addresses) of the SINAUT MD740-1 and for a particular port of the SINAUT MD740-1 are rewritten in such a way that they are forwarded to the internal network to a particular computer and to a particular port of this computer. That means that the IP address and port number in the headers of incoming data packets are changed.

This method is also called Destination NAT.

➡ The rules set here take priority over the settings under **Firewall → Incoming**.

Deleting a rule

Click on **Delete** next to the entry concerned. Then click on **OK** or **Apply**.

Setting a new rule

If you want to set a new rule, click on **New**.

Set the required rule (see below), then click on **OK** or **Apply**.

Protocol

Here you enter the protocol to which the rule is to apply.

Incoming on IP

Here you enter the external IP address (or one of the external IP addresses) of the SINAUT MD740-1.

OR

Should a dynamic change of the external IP address of the SINAUT MD740-1 take place, so that it cannot be given, use the following variable: **%extern**.

The special value **%extern** refers to the first IP address in the list when using several static IP addresses for the external interface.

Incoming on Port

Original destination port that is given in incoming data packets.

Redirect to IP

Internal IP address to which the data packets are to be forwarded and to which the original destination addresses are rewritten.

Redirect to Port

Port to which the data packets are to be forwarded and to which the original destination addresses are rewritten.

You can make the following possible entries:

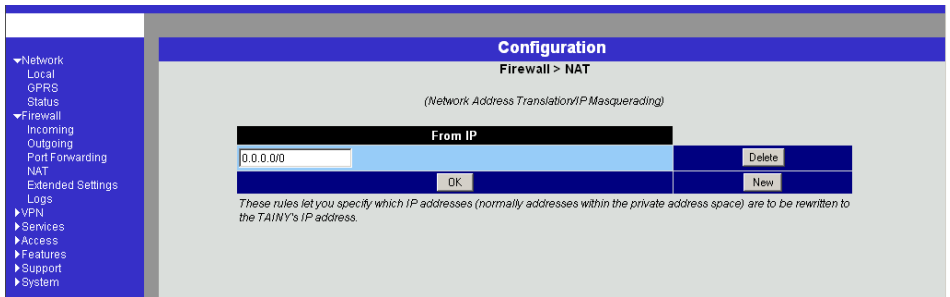
Port

You can only specify individual ports, either with the port number or with the corresponding service name: (e.g. 110 for pop3 or pop3 for 110).

Log

For each individual port forwarding rule you can determine whether, when the rule is applied,

- the event is to be logged - set **Log** to **Yes**
 - or not - set **Log** to **No** (default setting).
-



Firewall → NAT

This lists the fixed rules for NAT (**N**etwork **A**ddress **T**ranslation) and allows rules to be set or deleted.

For outgoing data packets the device can translate the given sender IP addresses from its internal network to its own external address, a technique known as NAT (Network Address Translation).

This method is used when the internal addresses cannot or should not be routed, e.g. because a private address range such as 192.168.x.x or the internal network structure is to be hidden.

This method is also called *IP Masquerading*.

- When using several static IP addresses for the external interface, the first IP address in the list is always used for IP Masquerading.

Default setting: NAT does not take place.

Deleting a rule

Click on **Delete** next to the entry concerned. Then click on **OK** or **Apply**.

Setting a new rule

If you want to set a new rule, click on **New**.

Set the required rule (see below), then click on **OK** or **Apply**.

You can make the following possible entries:

From IP

0.0.0.0/0 means all addresses, i.e. all internal IP addresses are subjected to the NAT procedure. To denote a range, use CIDR syntax - see *CIDR (Classless InterDomain Routing)*, page 79.

Configuration	
Firewall > Extended Settings	
All Modes	
Maximum size of connection tracking table	4096
Maximum number of new outgoing TCP connections (SYN) per second	75
Maximum number of new incoming TCP connections (SYN) per second	25
Maximum number of outgoing "ping" frames (ICMP Echo Request) per second	5
Maximum number of incoming "ping" frames (ICMP Echo Request) per second	3
Enable "FTP" NAT/Connection Tracking support	Yes
Enable "IRC" NAT/Connection Tracking support	Yes
Enable "PPTP" NAT/Connection Tracking support	No
ICMP from extern to the TAINY	Drop
OK	

Firewall → Extended Settings

These settings determine the basic behaviour of the firewall.

Standard settings

All Modes	
Maximum size of connection tracking table	4096
Maximum number of new outgoing TCP connections (SYN) per second	75
Maximum number of new incoming TCP connections (SYN) per second	25
Maximum number of outgoing "ping" frames (ICMP Echo Request) per second	5
Maximum number of incoming "ping" frames (ICMP Echo Request) per second	3
Enable "FTP" NAT/Connection Tracking support	Yes
Enable "IRC" NAT/Connection Tracking support	Yes
Enable "PPTP" NAT/Connection Tracking support	No
ICMP from extern to the TAINY	Drop
OK	

All Modes

Maximum number ...

These 5 entries determine upper limits. They are selected in such a way that they are never reached in normal practical operation. In the event of attacks, however, they can easily be reached, therefore the limitation represents built-in, additional protection. Should special requirements exist in your operating environment, you can increase the values.

Enable "FTP" NAT/Connection Tracking support

When an outgoing connection is established in the FTP protocol for the purpose of retrieving data, there are two possible forms of data transmission: with "enabled FTP" the called-up server in turn establishes an additional condition to the caller in order to transmit the data via this connection. With "disabled FTP" the client establishes this additional

connection to the server for data transmission. In order for the additional connections to be allowed through by the firewall, **Enable "FTP" NAT/Connection Tracking support** must be set to **Yes** (standard).

Enable "IRC" NAT/Connection Tracking support

Similar to FTP: when chatting on the Internet via IRC, incoming connections must be allowed following the active establishment of a connection if chatting is to work smoothly. For these connections to be allowed through by the firewall, **Enable "IRC" NAT/Connection Tracking support** must be set to **Yes** (standard).

Enable "PPTP" NAT/Connection Tracking support

Must only be set to **Yes** if the following condition is present:
A VPN connection using PPTP is to be established to an external computer from a local computer without the help of the SINAUT MD740-1.
The default setting of this switch is **No**.

ICMP from extern to the TAINY

With this option you can influence behaviour when receiving ICMP messages which are sent from the external network to the SINAUT MD740-1. You have the following possibilities:

- Reject:** All ICMP messages sent to the SINAUT MD740-1 are rejected.
- Accept ping:** Only ping messages (ICMP type 8) sent to the SINAUT MD740-1 are accepted.
- Accept all ICMPs:** All types of ICMP messages sent to the SINAUT MD740-1 are accepted.

Configuration	
▼Network	
Local	uptime 0 days 00:00:46.14842 klogd: fw-output-invalid-drop IN= OUT=eth1 SRC=192.168.1.1 DST=192.168.1.2 LEN
GRPS	uptime 0 days 00:00:47.14728 klogd: fw-output-invalid-drop IN= OUT=eth1 SRC=192.168.1.1 DST=192.168.1.2 LEN
Status	uptime 0 days 00:00:49.14750 klogd: fw-output-invalid-drop IN= OUT=eth1 SRC=192.168.1.1 DST=192.168.1.2 LEN
▼Firewall	uptime 0 days 00:00:51.18668 klogd: fw-output-invalid-drop IN= OUT=eth1 SRC=192.168.1.1 DST=192.168.1.2 LEN
Incoming	uptime 0 days 00:00:55.18636 klogd: fw-output-invalid-drop IN= OUT=eth1 SRC=192.168.1.1 DST=192.168.1.2 LEN
Outgoing	uptime 0 days 00:01:03.18699 klogd: fw-output-invalid-drop IN= OUT=eth1 SRC=192.168.1.1 DST=192.168.1.2 LEN
Port Forwarding	uptime 0 days 00:01:04.18655 klogd: fw-output-invalid-drop IN= OUT=eth1 SRC=192.168.1.1 DST=192.168.1.2 LEN
NAT	uptime 0 days 00:01:05.18661 klogd: fw-output-invalid-drop IN= OUT=eth1 SRC=192.168.1.1 DST=192.168.1.2 LEN
Extended Settings	uptime 0 days 00:01:05.18661
Logs	
►VPN	
►Services	
►Access	
►Features	
►Support	
►System	

Firewall → Logs

Display only:

If the logging of events (Log = Yes) has been determined during the setting of firewall rules you can then view all the log of all logged events here.

The format corresponds to that commonly used under Linux.

There are special evaluation programs which present the information from the logged data in a more easily legible format.

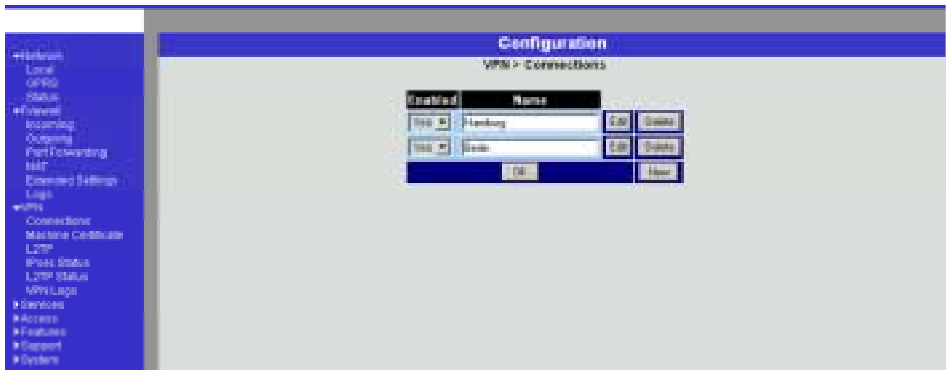
4.3 VPN menu

The general prerequisite for a VPN connection is that the IP addresses of the VPN partners are known and accessible. See *IP address of the remote site*, page 9.

- In order for an IPsec connection to be established successfully the VPN remote site must support IPsec with the following configuration:
 - Authentication via Pre-Shared Key (PSK) or X.509 certificates
 - ESP
 - Diffie-Hellman groups 2 or 5
 - DES, 3DES or AES encryption
 - MD5 or SHA-1 Hash algorithms
 - Tunnel or transport mode
 - Quick mode
 - Main mode
 - SA Lifetime (1 second to 24 hours)

If the remote site is a computer running under Windows 2000, the *Microsoft Windows 2000 High Encryption Pack* or at least *Service Pack 2* must be installed.

- If the remote site is behind a NAT router it must support NAT-T. Alternatively, the NAT router must recognise the IPsec protocol (IPsec/VPN Passthrough). In both cases, only IPsec tunnel connections are possible for technical reasons.



VPN → Connections

This lists the VPN connections already set up.

- You can enable (Enabled = **Yes**) or disable (Enabled = **No**) each individual connection.

Deleting a VPN connection

Click on **Delete** next to the entry concerned.

Then click on **OK** or **Apply**.

Setting up a new VPN connection

Click on **New**.

Give the connection a name and click on **Edit**.

Perform the desired or necessary settings (see below).

Then click on **OK** or **Apply**.

Editing a VPN connection

Click on the **Edit** button next to the connection concerned.

Perform the desired or necessary settings (see following illustration and explanations).

Then click on **OK** or **Apply**.

▼Network

Local

GPFS

Status

▼Firewall

Incoming

Outgoing

Port Forwarding

NAT

Extended Settings

Logs

▼VPN

Connections

Machine Certificate

L2TP

IPsec Status

L2TP Status

VPN Logs

►Services

►Access

►Features

►Support

►System

Configuration

VPN > Connections > Connection Hamburg

A descriptive name for the connection

Hamburg

Enabled

Yes

Address of the remote site's VPN gateway (either an IP address, a hostname, or %any)

%any

Connection type

Transport (Host ↔ Host)

Connection startup

Wait for connection from remote VPN gateway

ISAKMP SA (Key Exchange)

Authentication method

X.509 Certificate

Configure

Encryption Algorithm

3DES-168

Hash Algorithm

All algorithms

IPsec SA (Data Exchange)

Encryption Algorithm

3DES-168

Hash Algorithm

All algorithms

Perfect Forward Secrecy (PFS) (The remote site must have the same entry. Activation is recommended due to security reasons.)

Yes

Tunnel Settings

Local network address

192.168.1.1

The appropriate local netmask

255.255.255.255

Remote network address

192.168.254.1

The appropriate remote netmask

255.255.255.255

Firewall Incoming (untrusted port)

Protocol	From IP	From Port	To IP	To Port	Action	Log
All	0.0.0.0/0	any	0.0.0.0/0	any	Accept	No

Log entries for unknown connection attempts

No

Firewall Outgoing (trusted port)

Protocol	From IP	From Port	To IP	To Port	Action	Log
All	0.0.0.0/0	any	0.0.0.0/0	any	Accept	No

Log entries for unknown connection attempts

No

All Connections

OK

A descriptive name for the connection

You can name or rename the connection as you wish.

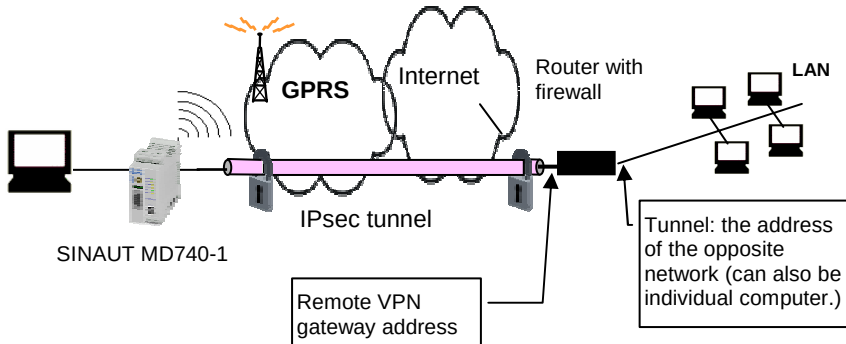
Enabled

Determine whether the connection is to be enabled (= Yes) or not (= No).

Address of the remote site's VPN gateway

- This denotes the address of the gateway to the private network in which the remote communication partner is located - see illustration below.

Devices and addresses of remote site



- If the SINAUT MD740-1 is to initiate and establish the connection actively with the remote site, then enter the remote site's IP address here. Instead of an IP address you can also enter a hostname (i.e. domain name in URL format in the form `www.xyz.de`).

If the VPN gateway of the remote site does not have a fixed and known address, a fixed and known address can nevertheless be simulated by using the DynDNS service. See *IP address of the remote site*, page 9.

- If the SINAUT MD740-1 is to be ready to accept the connection actively initiated and established by a remote site with any IP address to the local SINAUT MD740-1, then enter: **%any**

Then a remote site which is assigned its own IP address (by the Internet service provider) dynamically, i.e. has a changing IP address, can "call" the local SINAUT MD740-1.

If only one particular remote site with a fixed IP address establishes the connection, you can enter this address to be on the safe side.

- ➡ In order for the SINAUT MD740-1 to accept a connection actively initiated and established by a remote site, the SINAUT MD740-1 requires a fixed IP address from the provider or by using a DynDNS service.
- ➡ In many GSM/GPRS networks it is not possible to set up connections initiated from a remote site to the GPRS device (SINAUT MD740-1).

Connection type

There are four options:

- Tunnel (network $\leftarrow \rightarrow$ network)
- Transport (host $\leftarrow \rightarrow$ host)
- Transport (L2TP Microsoft Windows)
- Transport (L2TP SSH Sentinel)

Tunnel (network $\leftarrow \rightarrow$ network)

This connection type is suitable in every case and it is also the safest. In this mode the IP datagrams to be transferred are completely encrypted and sent with a new header to the remote site's VPN gateway, the "end of the tunnel". There the transferred datagrams are decrypted and the original datagrams retrieved from them. These can then be sent to the destination computer.

Transport (host $\leftarrow \rightarrow$ host)

With this connection type only the data in the IP packets are encrypted. The IP header information is not encrypted.

Transport (L2TP Microsoft Windows)

If this connection is enabled on the remote computer, you should also set the SINAUT MD740-1 to *Transport (L2TP Microsoft Windows)*. The SINAUT MD740-1 will then work accordingly. The L2TP/PPP protocol creates a tunnel within the IPsec Transport connection. The locally connected L2TP computer is assigned its IP address dynamically by the SINAUT MD740-1.

If you select the connection type *Transport (L2TP Microsoft Windows)*, set *Perfect Forward Secrecy (PFS)* to **No** (see below). Also enable the L2TP server.



As soon as the IPsec/L2TP connection is started under Windows, a dialogue box appears, asking for the user name and login. You can enter anything here because authentication has already taken place via the X.509 certificates, so that the SINAUT MD740-1 ignores these entries.

Transport (L2TP SSH Sentinel)

If this connection is enabled on the remote computer, you should also set the SINAUT MD740-1 to *Transport (L2TP SSH Sentinel)*. The SINAUT MD740-1 will then work accordingly. The L2TP/PPP protocol creates a tunnel within the IPsec Transport connection. The locally connected L2TP computer is assigned its IP address dynamically by the SINAUT MD740-1. Also enable the L2TP server.

Connection startup

There are 2 possibilities:

- Start the connection to the remote site
- Wait for the remote site

Start the connection to the remote site

In this case the local SINAUT MD740-1 initiates the connection to the remote site. The fixed IP address of the remote site or its domain name must be entered in the *Remote site's VPN gateway address* field (see above).

Wait for the remote site

In this case the local SINAUT MD740-1 is ready to accept the connection actively initiated and established by a remote site to the local SINAUT MD740-1. **%any** can be entered in the *Remote site's VPN gateway address* field (see above).

If only one particular remote site with a fixed IP address establishes the connection, enter its IP address or host name to be on the safe side.

- ➡ In order for a connection to the SINAUT MD740-1 to be established, the SINAUT MD740-1 requires a fixed IP address from the provider or by using a DynDNS service.
- ➡ In many GSM/GPRS networks it is not possible to set up connections initiated from a remote site to the GPRS device (SINAUT MD740-1).

Authentication method

There are 2 possibilities:

- X.509 Certificate
- Pre-Shared Key

X.509 Certificate

This method is supported by most newer IPsec implementations. The SINAUT MD740-1 encrypts the authentication datagrams that it sends to the remote site - the "end of the tunnel" - with the remote site's public key (file name *.cer or *.pem). (You received this *.cer or *.pem file from the operator of the remote site, e.g. on a disk or by e-mail).

To make this public key available to the SINAUT MD740-1, proceed as follows:

Prerequisite:

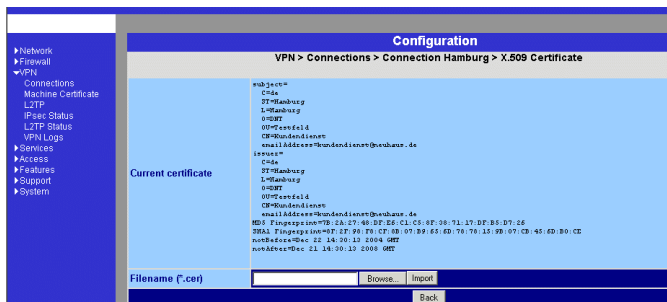
You have stored the *.cer or *.pem file on the locally connected computer.

1. Click on **Configure**.

Consequence: The VPN > Connections > Connection xyz > X.509 Certificate screen appears. ("xyz" is the name of the connection concerned.)

2. Click on **Browse...** and select the file.
3. Click on **Import**.

After importing, the content of the new certificate is displayed – see following illustration. You will find an explanation of the displayed information in section VPN → Machine Certificate, page 48.



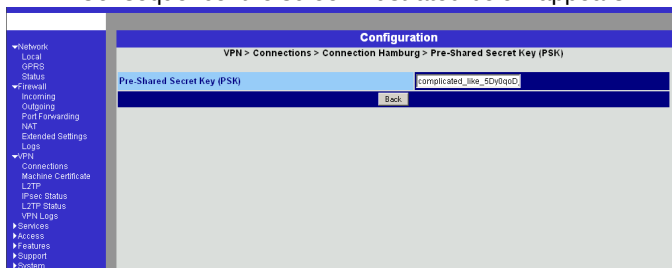
Pre-Shared Secret Key (PSK)

This method is supported mainly by older IPsec implementations. The SINAUT MD740-1 encrypts the datagrams which it sends to the remote site – the "end of the tunnel" – with an agreed sequence of characters.

To make this agreed key available to the SINAUT MD740-1, proceed as follows:

1. Click on **Configure**.

Consequence: the screen illustrated below appears:



2. Enter the agreed sequence of characters in the field *Pre-Shared Secret Key (PSK)*. To obtain security comparable to 3DES, the sequence of characters should consist of approx. 30 randomly selected lower and upper case characters and numerals.
3. Click on **Back**.

➡ *Pre-Shared Secret Key* cannot be used with dynamic (%any) IP addresses; only fixed IP addresses or hostnames on both sides are supported.

ISAKMP SA (Key Exchange)

Encryption algorithm

- Agree with the administrator of the remote site as to which encryption method is to be used.

3DES-168 is the most commonly used method and is therefore preset as the standard.

Basically, the following applies: the more bits an encryption algorithm has – indicated by the number shown – the more secure it is. The relatively new AES-256 method is therefore considered to be the safest, but it is not yet so widespread. The longer the key, the more time-consuming the encryption process. This aspect is of no consequence to the SINAUT MD740-1 because it works with hardware-based encryption technology. Nevertheless, this aspect could be significant for the remote site.

The selectable algorithm marked "Zero" contains no encryption at all.

Checksum algorithm/Hash

Leave the setting on *All algorithms*. Then it makes no difference whether the remote site works with MD5 or SHA-1.

IPsec SA (data exchange)

Unlike ISAKMP SA (Key Exchange) (see above) the method

for data exchange is determined here. This may differ from that of the Key Exchange, but not necessarily.

Encryption algorithm

See above.

Checksum algorithm/Hash

See above.

Perfect Forward Secrecy (PFS)

A method for the additional improvement of security during data transfer. With IPsec, the keys for data exchange are renewed at certain intervals. With PFS, new random numbers are negotiated with the remote site instead of deriving them from previously agreed random numbers.

Only if the remote site supports PFS, select **Yes**.

When selecting the connection type *Transport (L2TP Microsoft Windows)* set *Perfect Forward Secrecy (PFS)* to **No**.

Tunnel settings

Local network address

The appropriate netmask

With these two entries you give the address of the client (network or computer) that is connected locally to the SINAUT MD740-1 direct and which is protected by the das SINAUT MD740-1. This address defines the local endpoint of the connection.

Example:

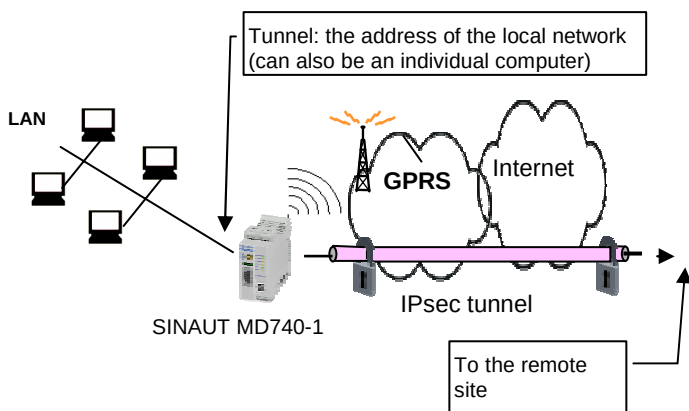
If the computer that you are also using for the configuration of the device is connected to the SINAUT MD740-1, then these data could be:

Local network address: 192.168.1.1

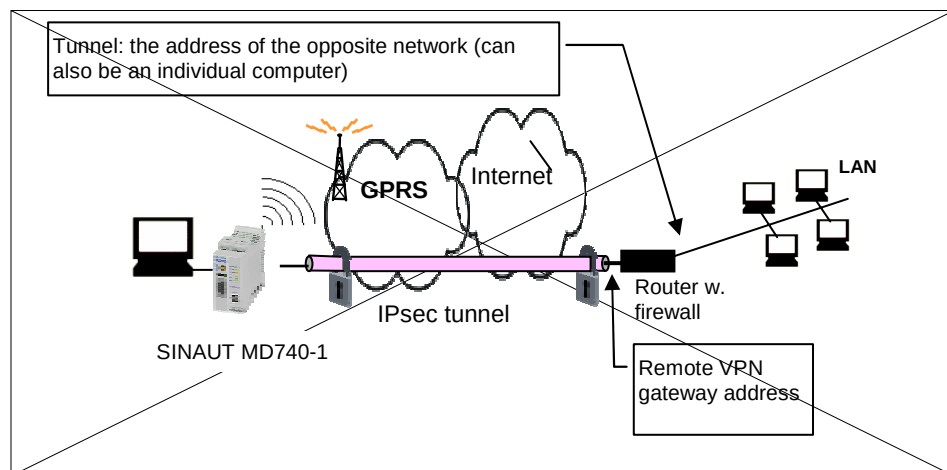
The appropriate netmask: 255.255.255.0

See also *Network example diagram*, page 81.

Local devices and addresses



Devices and addresses of remote site



Remote network address

The appropriate netmask

With these two entries you give the address of the network in which the remote communication partner is located. This address can also be that of a computer which is connected direct to the VPN gateway.

Firewall incoming, Firewall outgoing

While the settings performed under the menu item *Firewall* apply only to non-VPN connections (see above under *Firewall → Incoming*, page 27), the settings here apply only to the VPN connection defined here. In practical terms, that means: if you have defined several VPN connections, you can restrict access to each one from the outside or from the inside. Attempts to bypass the restrictions can be recorded in the log.

- ➡ According to the default setting the VPN firewall is set so that everything is permitted for this VPN connection.
However, the extended firewall settings which are defined and explained above still apply to each individual VPN connection, independent of each other (see *Firewall → Extended Settings*, page 33).
- ➡ If several firewall rules have been set, they are scanned in the order of the entries from top to bottom until a suitable rule is found. This rule is then applied. Should there also be rules further down in the list which would be also suitable, they are ignored.
- ➡ To set or delete a firewall rule, proceed exactly as described above (see *Firewall → Incoming*, page 27 and *Firewall → Outgoing*, page 29).

As there, you can make the following possible entries:

Protocol:

All means: TCP, UDP, ICMP and other IP protocols.

IP address:

0.0.0.0/0 means all addresses. To denote a range, use CIDR syntax - see *CIDR (Classless InterDomain Routing)*, page 79.

Port:

(is evaluated only with TCP and UDP protocols)

any means any port.

startport:endport (e.g. 110:120) denotes the port area.

Individual ports can be entered either with the port number or with the corresponding service name (e.g. 110 for pop3 or pop3 for 110).

Action:

Accept means that the data packets may pass.

Refuse means that the data packets are turned away so that the sender is informed of the refusal.

Reject means that data packets are not allowed to pass. They are swallowed so that the sender is not informed of their whereabouts.

Log

For each individual firewall rule you can determine whether, when the rule is applied,

the event is to be logged - set *Log* to **Yes**

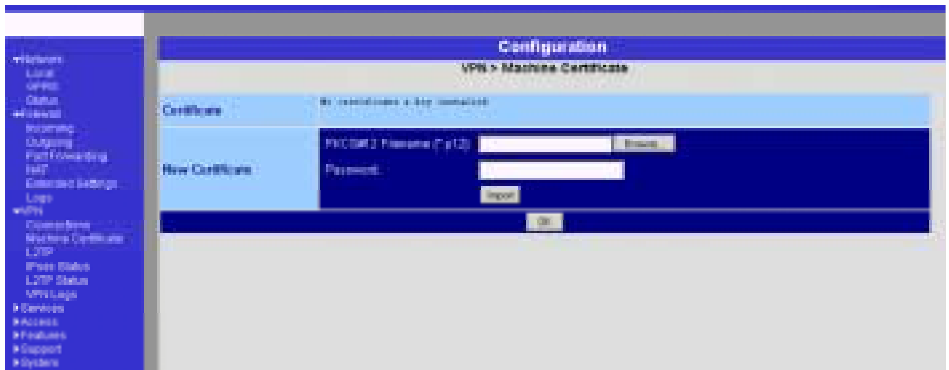
or not - set *Log* to **No** (default setting)

Log entries for unknown connection attempts:

This logs all connection attempts which are not recorded by the prevalent rules.



If several firewall rules have been set, they are followed in the order of the entries.



VPN → Machine Certificate

Certificate

This denotes the currently imported X.509 certificate with which the SINAUT MD740-1 identifies itself to other VPN gateways.

After a certificate has been imported the following information is displayed:

subject

The owner to whom the certificate has been issued.

issuer

The certification office which has signed the certificate.

C: Country

ST: State

L: Location

O: Organisation

OU: Organisation Unit

CN: Common Name

MD5, SHA1 Fingerprint

Fingerprint of the certificate for comparison with another one, e.g. on the telephone. Windows displays the fingerprint in SHA1 format at this point.

notBefore, notAfter

Validity period of the certificate. Is ignored by the SINAUT MD740-1 due to lack of an internal clock.

The imported certificate file (filename extension *.p12 or *.pfx) contains the information given above, as well the two keys: the public key for encryption, the private key for decryption. The appropriate public key can be assigned any number of connection partners, enabling them to send encrypted data.

In agreement with the remote site, the certificate must be made available to the operator of the remote site as a .cer or .pem file, e.g. handed over personally or by e-mail. If you do not have a secure mode of transfer, you should then compare the fingerprint displayed by the SINAUT MD740-1 via a secure channel.

Only one certificate file (PKCS#12 file) can be imported into the device.

➤ To import a (new) certificate, proceed as follows:

New certificate

Prerequisite:

The certificate file (file name = *.p12 or *.pfx) is generated and stored on the connected computer.

1. Click on **Browse...** to select the file.
2. Enter the password with which the private key of the PKCS#12 file is protected in the field *Password*.
3. Click on **Import**.
4. Then click on **OK** or **Apply**.

After importing, you receive a system message:

```
System Message
Changing system configuration:

Storing PKCS#12 file...
MAC verified OK
Parsed PKCS#12 file.
Stored certificate.
Stored private key.
cat: /var/run/mguard-router.extern.ip: No such file or directory
shack: Pluto is not running (no "/var/run/pluto.ctl")
runsvctrl: warning: /service/firestarter: unable to change directory: file does not exist

rewrote system configuration
```

Configuration	
VPN > L2TP	
Start L2TP Server for IPsec/L2TP?	No
Local IP for L2TP connections	10.106.106.1
Remote IPs for L2TP connections range	from 10.106.106.2 to 10.106.106.254
OK	

VPN → L2TP

Start L2TP Server for IPsec/L2TP? Yes / No

If you want to enable an L2TP connection, set this switch to **Yes**.

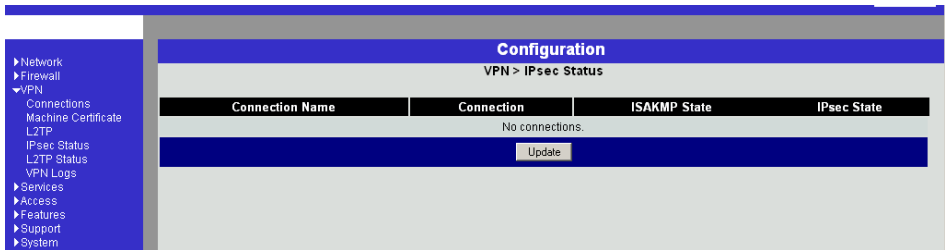
Within the IPsec transport connection the L2TP in turn contains a PPP connection. Consequently, a kind of tunnel is created between 2 networks. The SINAUT MD740-1 informs the remote site via PPP as to which addresses are being used: for itself and the remote site.

Local IP for L2TP connections

In the above screenshot the SINAUT MD740-1 is telling the remote site that the device itself has the address 10.106.106.1.

Remote IPs for L2TP connections range

In the above screenshot the SINAUT MD740-1 is telling the remote site that the remote site has the addresses from 10.106.106.2 (one computer) to 10.106.106.254 (several computers).



VPN → IPsec Status

Display only:

Provides information on the status of the IPSec connections.

The names of the VPN connections are on the left, their current status on the right.

GATEWAY

denotes the communicating VPN gateways

TRAFFIC

denotes computers or networks communicating via the VPN gateways.

ID

denotes the Distinguished Name (DN) of an X.509 certificate.

ISAKMP Status

ISAKMP Status (Internet security association and key management protocol) is given as "established" if the two VPN gateways involved have established a channel for key exchange. In this case, they were able to contact each other and all entries up to and including "ISAKMP SA" on the configuration page of the connection were correct.

IPsec Status

IPsec Status is given as "established" when IPsec encryption is enabled during communication. In this case, the entries under "IPsec SA" and "Tunnel settings" were also correct.

If there are problems, it is recommended to look at the VPN logs of the computer to which the connection was established, because the initiating computer receives no detailed error messages for security reasons.

The message

ISAKMP SA established, IPsec State: WAITING

means:

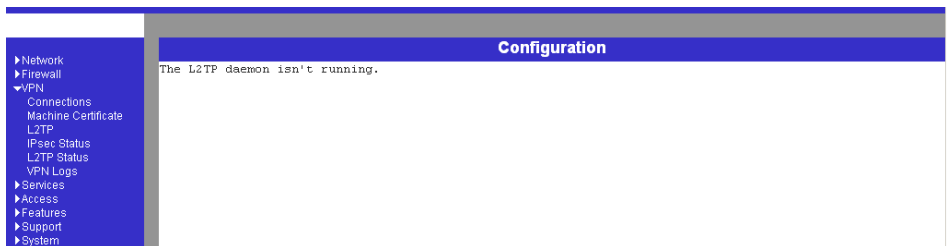
Authentication was successful, but the other parameters were not correct. Does the connection type (tunnel, transport) correspond? If tunnel was selected, do the network areas on both sides correspond?

The message

IPsec State: IPsec SA established

means:

The VPN has been successfully established and can be used. However, if this is not the case, then there are problems with the remote site's VPN gateway. In this case, tag the connection name and then click on **OK** or **Apply** to restart the connection.



VPN → L2TP Status

Display only:

Provides information the L2TP status if this has been chosen as the connection type. See *VPN → Connections*, page 37.

If this connection type was not selected, see the display illustrated.

- ▶ Network
- ▶ Firewall
- ▼ VPN
 - Connections
 - Machine Certificate
 - L2TP
 - IPsec Status
 - L2TP Status
 - VPN Logs
- ▶ Services
- ▶ Access
- ▶ Features
- ▶ Support
- ▶ System

Configuration

```
uptime 0 days 00:00:22.42627 firestarter: firing vpn connections with :
uptime 0 days 00:00:22.68187 firestarter: adding aaaaaaab (mccoy) to 10
uptime 0 days 00:00:25.79268 firestarter: initiating aaaaaaab (mccoy) t
uptime 0 days 00:00:25.81594 firestarter: 002 "aaaaaaab" #1: initiating
uptime 0 days 00:00:25.81618 firestarter: 104 "aaaaaaab" #1: STATE_MAIN
uptime 0 days 00:00:28.46541 firestarter: firing vpn connections with :
uptime 0 days 00:00:48.56206 firestarter: dns lookup aaaaaaaa (gateway)
uptime 0 days 00:00:48.57887 firestarter: failed to lookup aaaaaaaa , t
uptime 0 days 00:01:08.67172 firestarter: dns lookup aaaaaaaa (gateway)
```

VPN → VPN Logs***Display only:***

This lists all VPN events.

The format corresponds to that commonly used under Linux.

There are special evaluation programs which present the information from the logged data in a more easily legible format.

4.4 Services menu

The screenshot shows the 'Configuration' menu with 'Services > DNS' selected. The left sidebar lists various configuration options including Network, Firewall, VPN, Services, DNS, DynDNS Monitoring, DynDNS Registration, DHCP, NTP, Remote Logging, Access, Features, Support, and System. The main configuration area for DNS includes fields for Hostname mode (set to 'User defined (from field below)'), Hostname (set to 'itainy'), Domain search path (set to 'example.local'), Servers to query (set to 'DNS Root Servers'), and User defined name servers (with an 'IP' button and a 'New' button). An 'OK' button is at the bottom.

Services → DNS

If the SINAUT MD740-1 is to establish a connection to a remote site (e.g. VPN gateway or NTP server), it must know the die IP address of the remote site in question. If it is given the address in the form of a domain address (i.e. `www.abc.xyz.de`), then the device must consult a Domain Name Server (DNS) to see which IP address is behind the domain address.

You can configure locally connected clients in such a way that they can use the SINAUT MD740-1 to resolve hostnames into IP addresses. See *IP configuration with Windows clients*, page 59.

Hostname mode

With *Hostname Modus* and *Hostname* you can give the SINAUT MD740-1 a name. This name is then displayed, e.g. when logging in by SSH. Giving names simplifies the administration of several SINAUT MD740-1s.

User defined (from field below)

(Standard) The name entered in the field *Hostname* is set as the name for the SINAUT MD740-1.

Provider defined (e.g. via DHCP)

If the external setting of the hostname is enabled, e.g. as with DHCP, then the name supplied by the provider is set for the SINAUT MD740-1.

Hostname

If the option *User defined* is selected under *Hostname mode*, then you enter the name here which the SINAUT MD740-1 is to receive.

Otherwise, i.e. when the option *Provider defined* (e.g. via DHCP) is selected under *Hostname mode*, an entry in this field is ignored.

Domain search path

Makes it easier for the user to enter a domain name: if the user enters the domain name in abbreviated form, the SINAUT MD740-1 supplements his entry with the given domain suffix which is fixed here under domain search path.

Servers to query

Possibilities: *DNS Root Servers / Provider defined / User defined*

DNS Root Servers

Queries are directed to the DNS root servers on the Internet whose IP addresses are stored in the SINAUT MD740-1. These addresses rarely change. This setting should only be selected if the alternative settings do not work.

Provider defined (e.g. via PPPoE or DHCP)

The Domain Name Server of the Internet service provider is used who provides access to the Internet. You can select this setting with enabled DHCP (see *Services* → *DHCP*, page 57).

User defined (from field below)

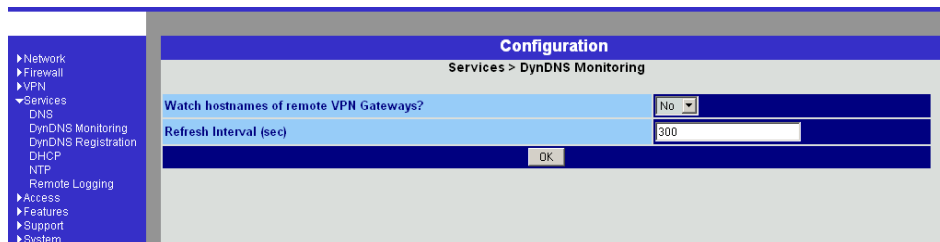
If this setting is selected, the SINAUT MD740-1 makes contact with the Domain Name Servers which are listed under **User defined name servers**.

User defined name servers

If you have set the option *User defined* under **Servers to query**, in this list you configure the IP addresses of the Domain Name Servers to be used.

- To enable the locally connected clients can obtain the resolution of hostnames in IP addresses from the SINAUT MD740-1, you must determine the local IP address of the SINAUT MD740-1 as the *Preferred DNS server* on the clients.

See *IP configuration with Windows clients*, page 59.



Services → DynDNS Monitoring

Watch hostname of remote VPN Gateways? Yes / No

If the address of the remote VPN Gateway has been given to the SINAUT MD740-1 as a hostname (see *VPN → Connections*, page 37), and if this Domain Name has been issued by a DynDNS service, then the SINAUT MD740-1 can check regularly whether any changes have been made to the DynDNS concerned. If so, the VPN connection is established to the new IP address.

Refresh Interval (sec)

Standard: 300 (sec)

►Network

►Firewall

►VPN

▼Services

DNS

DynDNS Monitoring

DynDNS Registration

DHCP

NTP

Remote Logging

►Access

►Features

►Support

►System

Configuration

Services > DynDNS Registration

Register this TAINY at a DynDNS Service?

No

Refresh Interval (sec)

420

DynDNS Provider

DynDNS.org

DynDNS Server

dyndns.org

DynDNS Login

DynDNS Password

DynDNS hostname

host.example.com

OK

Services → DynDNS Registration

To establish VPN connections at least the IP address of one of the partners must be known so that they can make contact with each other. This condition is not fulfilled if both participants are assigned their IP addresses dynamically by their Internet service providers. In this case, however, a DynDNS service such as DynDNS.org or DNS4BIZ.com can help. With a DynDNS service the currently valid IP address is registered under a fixed name. See also *IP address of the remote site*, page 9

Once you are registered with a DynDNS service supported by the SINAUT MD740-1 you can make the corresponding entries in this dialogue box.

Register this TAINY at a DynDNS Service? Yes / No

Select **Yes** if you are registered with a DynDNS provider and the SINAUT MD740-1 is to use the service. Then the SINAUT MD740-1 reports the current IP address assigned to its own Internet connection by the Internet service provider to the DynDNS service.

Refresh Interval (sec)

Standard: 420 (sec).

Whenever the IP address of the device's own Internet connection is or has been changed, the SINAUT MD740-1 informs the DynDNS service of the new IP address. For reliability reasons this message is also sent at the time intervals fixed here.

DynDNS Provider

The selectable providers support the same protocol that is also supported by the SINAUT MD740-1.

Enter the name of the provider with whom you are registered, e.g. DynDNS.org

DynDNS Server

Name of the server of the DynDNS provider selected above, e.g. *dyndns.org*

DynDNS Login, DynDNS Password

Here you enter the user name and the password assigned to you by the DynDNS provider.

DynDNS hostname

The hostname selected for this SINAUT MD740-1 with the DynDNS service – provided that you use a DynDNS service and have given the appropriate details above.

The screenshot shows the 'Configuration' window with the 'Services > DHCP' section selected. The left sidebar contains a navigation menu with options: Network, Firewall, VPN, Services (selected), DNS, DynDNS Monitoring, DynDNS Registration, DHCP, NTP, Remote Logging, Access, Features, Support, and System. The main configuration area has a table of settings:

Configuration	
Services > DHCP	
Start DHCP server	No
Enable dynamic IP address pool	Yes
DHCP range start	192.168.1.100
DHCP range end	192.168.1.199
Local netmask	255.255.255.0
Default gateway	192.168.1.1
DNS server	10.0.0.254
client MAC address	client IP address
New	
OK	

Services → DHCP

(DHCP = Dynamic Host Configuration Protocol) This function automatically assigns the required network configuration (IP address and subnet mask) to the client connected locally to the SINAUT MD740-1.

Start DHCP Server

Set this switch to **Yes** if you want to enable this function.

Enable dynamic IP address pool

Set this switch to **Yes** if you want to use the IP address pool selected by DHCP range start and DHCP range end.

Set this switch to **No** if only static assignments based on the MAC address are to be performed (see below).

Options:

If the DHCP server and the dynamic IP address pool are enabled you can indicate the network parameters to be used by the client

DHCP range start:	Start and end of the address range from which the DHCP server of the SINAUT MD740-1 is to assign IP addresses to the locally connected clients.
DHCP range end:	
Local netmask:	Default setting: 255.255.255.0
Default gateway:	Determines which IP address is to be used as the default gateway by the client. This is usually the local IP address of the SINAUT MD740-1.
DNS server:	Determines from where clients receive resolution of hostnames in IP addresses. If the DNS services of the SINAUT MD740-1 is enabled it can be the local IP address of the SINAUT MD740-1.

Client MAC address / client IP address

You can establish the MAC address of your client as follows:

Windows 95/98/ME: Start "winipcfg" in a DOS box

Windows NT/2000/XP: Start "ipconfig /all" in a prompt. The MAC address is displayed as a "physical address".

Linux: Call up "/sbin/ifconfig" or "ip link show" in a shell .

Delete address

Click on **Delete** next to the entry concerned, then **OK** or **Apply**.

Add address

If you want to add a new address, click on **New**.

Enter the address data (see below) and click on **OK** or **Apply**.

Enter:

Client MAC address

The MAC address (without spaces or hyphens) of the client.

Client IP address

The static IP that is to be assigned to the client's MAC address.

- The static assignments take priority over the dynamic IP address pool.
- Static assignments must not overlap with the dynamic IP address pool.
- An IP must not be used in several static assignments, otherwise this IP will be assigned to several MAC addresses.
- Only one DHCP server per subnet must be used.
- When you start the DHCP server of the SINAUT MD740-1 you must configure the locally connected clients in such a way that they receive their IP addresses automatically (see below).

➤ IP configuration with Windows clients

Under Windows XP, click on **Start, Control Panel, Network Connections**: right-click on the LAN adapter icon and click on **Properties** in the context menu. On the *General* tab in the *Properties of LAN connection local network* dialogue box, tag the **Internet Protocol (TCP/IP)** entry under "This connection uses the following items" and then click on the **Properties** button.

In the dialogue box *Properties of Internet Protocol (TCP/IP)*, make the required entries and settings.

Configuration														
Services > NTP														
Current system time (UTC)	Sat Jan 1 00:03:14 UTC 2000													
Current system time (local)	Sat Jan 1 00:03:14 UTC 2000													
NTP State	(disabled)													
Enable NTP time synchronization	No													
NTP servers to synchronize to	<table border="1"> <thead> <tr> <th>NTP Server</th> <th>Min. Poll</th> <th>Max. Poll</th> <th></th> </tr> </thead> <tbody> <tr> <td>pool.ntp.org</td> <td>18,2h</td> <td>18,2h</td> <td>Delete</td> </tr> <tr> <td colspan="4" style="text-align: center;">New</td> </tr> </tbody> </table>		NTP Server	Min. Poll	Max. Poll		pool.ntp.org	18,2h	18,2h	Delete	New			
NTP Server	Min. Poll	Max. Poll												
pool.ntp.org	18,2h	18,2h	Delete											
New														
Timezone in POSIX.1 notation (Eg. "CET-1" for the EU or "CET-1CEST,M3.5.0,M10.5.0/3" with automatic daylight saving time switching)	UTC													
Time stamp in filesystem (2h granularity)	No													
Apply														

Services → NTP

(NTP = Network Time Protocol)
Current system time (UTC)

Displays the current system time in Universal Time Coordinates (UTC). If *NTP time synchronization* is not yet enabled (see below) and *Time stamps in file system* are disabled, the clock begins with 1 January 2000.

Current system time (local)

If the possibly deviating current local time is to be displayed you must make the corresponding entry under *Time zone in POSIX.1 Notation...* (see below).

NTP State

Displays the current NTP state

Enable NTP time synchronization: Yes / No

As soon as the NTP is enabled the SINAUT MD740-1 sources the time from the Internet and displays it as the current system time. Synchronization may take a few seconds.

Only if this switch is set to **Yes** and at least 1 time server is given under *NTP servers to synchronize to* (see below) is the current system time provided.

NTP servers to synchronize to

NTP Server

Here you can enter one or more NTP servers from which the SINAUT MD740-1 is to source the current time. If you enter several time servers, the SINAUT MD740-1 automatically connects to all of them to ascertain the current time.

The SINAUT MD740-1 also provides the connected computers with the NTP time.



Enter the IP addresses (instead of the hostnames) of the required time servers.

Min. Poll / Max. Poll

Time synchronization takes place cyclically. Here you enter the interval at which the poll is to take place (poll interval).

The NTP client selects the poll interval dynamically between the two values. Make sure that the minimum value entered is smaller than the maximum value.

Time zone in POSIX.1 notation...

If you do not want the current Greenwich Mean Time to be displayed under Current system time, but the current local time (= deviating from Greenwich Mean Time), then you must enter here by how many hours your local time is ahead or behind.

Examples:

In Hamburg the time is 1 hour ahead of Greenwich Mean Time. So you enter: CET-1

If you want CET (= valid for Germany) to be displayed with

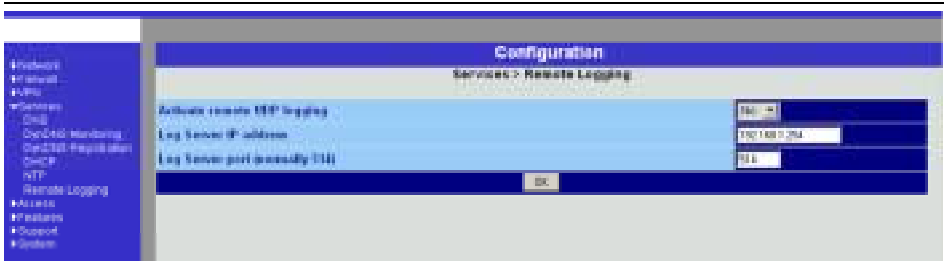
automatic switching to summer or winter time, enter:

CET-1CEST,M3.5.0,M10.5.0/3

Time stamp in file system (2h granularity): Yes / No

If this switch is set to **Yes**, the SINAUT MD740-1 writes the current system into its memory every 2 hours.

Consequence: If the SINAUT MD740-1 is switched off and then back on, after being switched on a time in this 2-hour time window will be displayed and not a time on 1 January 2000.



Services → Remote Logging

All log entries take place by default in the flash memory of the SINAUT MD740-1. If the maximum memory space for these logs is exhausted, the oldest log entries are automatically overwritten by new ones.

It is possible to transfer the log entries to an external computer. This is advisable if, for example, logging is to be administered centrally.

Activate remote UDP logging: Yes / No

If all log entries are to be transferred to the external log server (specified below), set this switch to **Yes**.

Log Server IP address

Enter the IP address of the log server to which the log entries are to be transferred via UDP.

- ➡ The log server must have a fixed and known IP address.
- ➡ You must enter the IP address, not a hostname. Name resolution is not supported here because otherwise the breakdown of a DNS server could not be reported.

Log Server port

Enter the port of the log server to which the log entries are to be transferred via UDP. Default: 514

4.5 Access menu

►Network

►Firewall

►VPN

►Services

▼Access

Passwords

Language

HTTPS

SSH

►Features

►Support

►System

Configuration

Access > Passwords

Root Password
(Account: root)

Old Password:

New Password:

New Password (again):

Administrator Password
(Account: admin)

Enable User Password

No

User Password

Access → Passwords

The SINAUT MD740-1 offers 3 levels of user rights. To log in at a particular level the user must enter the password which is allocated to the privilege level in question.

Privilege level

Root	Provides extended rights for the parameters of the SINAUT MD740-1.  With SSH access at this privilege level it is possible to misconfigure the device in such a way that it has to be sent in for servicing. In this case, please contact your dealer or distributor. Default user name: root Default root password: root The user name root cannot be changed.
Administrator	Provides the rights for all configuration options which are also available via the web-based administrator interface. Default user: admin Default password: tainy The user name admin cannot be changed.
User	Once a user password has been determined and enabled, the user must then enter this password after each restart of the SINAUT MD740-1 when accessing any HTTP URL in order to facilitate VPN connections.

If you want to use this option, determine a user password in the corresponding entry field.

Root Password

Default setting: **root**

If you want to change the root password, enter the old password in the field *Old Password*, then enter the new password in the two fields below.

(unalterable user name: admin)

Administrator Password (Account: admin)

Default setting: **tainy**

(unalterable user name: admin)

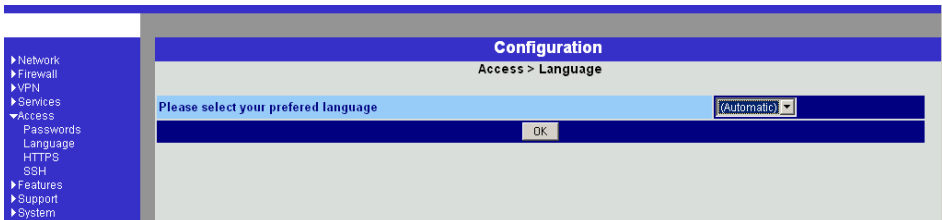
Enable User Password: Yes / No

User password protection is switched off as default.

If a user password has been determined below, user password protection can be enabled or disabled with this switch.

User Password

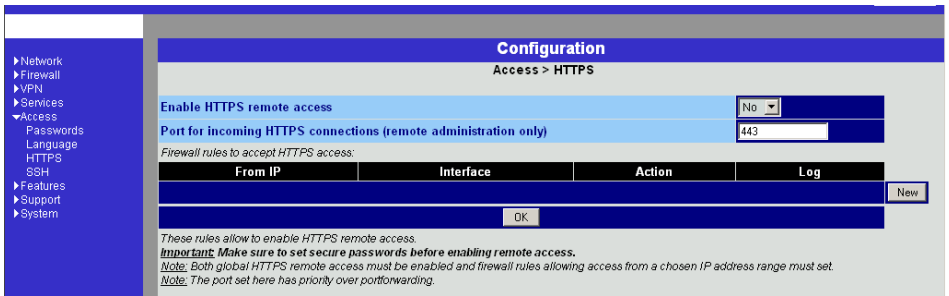
No user password is preset as default. To determine one, enter the required password identically in each of the two entry fields.



Access → Language

Please select your preferred language

If **(Automatic)** is selected in the language selection list, the device automatically adopts the language setting from the computer's browser.



Access → HTTPS

When HTTPS remote access is switched on, the SINAUT MD740-1 can be configured via its web-based administrator interface from a remote computer. This means that the browser on the remote computer is used to configure the local SINAUT MD740-1.

This option is switched off as default.

➡ N.B.:

When you enable remote access, make sure that a secure root and administrator password have been determined.

To enable HTTPS remote access, make the following settings:

Enable HTTPS remote access: Yes / No

If you want to enable HTTPS remote access, set this switch to **Yes**.

- ➡ In this case, make sure that the firewall rules on this page are set so that the SINAUT MD740-1 can be accessed from the outside.
- ➡ If you set this parameter to **No** by remote access, no further entries by HTTPS remote access are possible. This option must then be accepted again, either locally or by SSH remote access, provided that this has been configured.

Port for incoming HTTPS connections (remote administration only)

Default: 443

You can determine a different port.

- ➡ If you have determined a different port, the remote site which makes the remote access must then give the port number after the IP address in the address information.
Example:
If this SINAUT MD740-1 can be reached via the Internet using the address 192.144.112.5, and if the port number 442 has been determined for remote access, then the

following must be entered at the remote site in the web browser:

192.144.112.5:442

Firewall rules to accept HTTPS access

This lists the fixed firewall rules. They apply to the incoming data packet of a HTTPS remote access.

Delete rule

- Click on **Delete** next to the entry concerned.

Set new rule

- If you want to set a new rule, click on **New**.

Set the required new rule (see below) and click on **OK** or **Apply**.

From IP

Here you enter the address(es) of the computer(s) which is/are allowed remote access.

You can make the following possible entries:

IP address: **0.0.0.0/0** means all addresses. To denote a range, use CIDR syntax - see *CIDR (Classless InterDomain Routing)*, page 79.

Interface

extern (fixed)

Action

Possibilities: *Accept / Refuse / Reject*

Accept means that the data packets may pass.

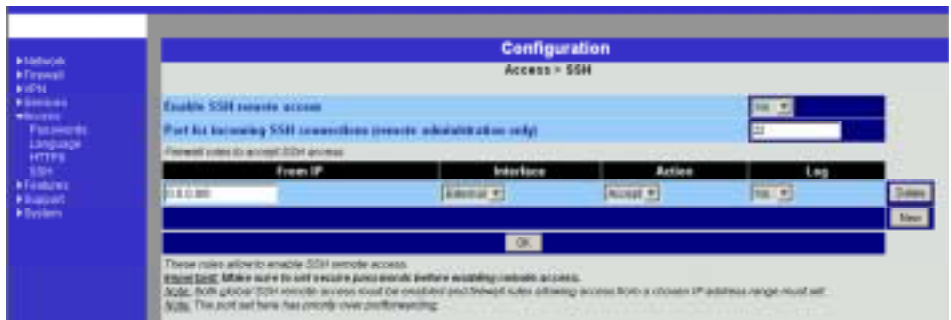
Refuse means that the data packets are turned away so that the sender is informed of the refusal.

Reject means that data packets are not allowed to pass. They are swallowed so that the sender is not informed of their whereabouts.

Log

For each individual firewall rule you can determine whether, when the rule is applied,

- the event is to be logged - set *Log* to **Yes**
 - or not - set *Log* to **No** (default setting).
-



Access → SSH

When SSH remote access is switched on, the SINAUT MD740-1 can be configured from a remote computer. To do so, a connection must first be established from the remote site to the SINAUT MD740-1 using an SSH-capable program. To perform settings in the SINAUT MD740-1 enter the command "gaiconfig" via the SSH console.

This option is switched off as default.

➤ N.B.:

When you enable remote access, make sure that a secure root and administrator password have been determined.

➤ N.B.:

With SSH access via the root password it is possible to misconfigure the device in such a way that it has to be sent in for servicing. In this case, please contact your dealer or distributor.

To enable SSH remote access, make the following settings:

Enable SSH remote access: Yes / No

If you want to enable SSH remote access, set this switch to **Yes**.

➤ In this case, make sure that the firewall rules on this page are set so that the SINAUT MD740-1 can be accessed from the outside.

Port for incoming SSH connections (remote administration only)

Default: 22

You can determine a different port.

➤ If you have determined a different port, the remote site which makes the remote access must then give the port number that is set here before the IP address in the address information.

Example:

If this SINAUT MD740-1 can be reached via the Internet using the address 192.144.112.5, and if a different port number has been set for remote access, then this number must be entered at the remote site in the SSH client (e.g. web browser), e.g.

```
ssh -p 22222 192.144.112.5
```

Firewall rules to accept SSH access

This lists the fixed firewall rules. These apply to the incoming data packets of an SSH remote access.

Delete rule

- Click on **Delete** next to the entry concerned.

Set new rule

- If you want to set a new rule, click on **New**.
Set the required new rule (see below) and click on **OK** or **Apply**.

From IP

Here you enter the address(es) of the computer(s) which is/are allowed remote access.

You can make the following possible entries:

IP address: **0.0.0.0/0** means all addresses. To denote a range, use CIDR syntax - see *CIDR (Classless InterDomain Routing)*, page 79.

Interface

extern (fixed)

Action

Possibilities: *Accept / Refuse / Reject*

Accept means that the data packets may pass.

Refuse means that the data packets are turned away so that the sender is informed of the refusal.

Reject means that data packets are not allowed to pass. They are swallowed so that the sender is not informed of their whereabouts.

Log

For each individual firewall rule you can determine whether, when the rule is applied,

- the event is to be logged - set *Log* to **Yes**
 - or not - set *Log* to **No** (default setting).
-

4.6 Features menu



Features → Install Update

Prerequisite: you have either

- stored a current software package locally on your configuration computer

OR

- been provided with a current software package via a remote server.

Ask your dealer or distributor whether and how you can obtain a software update.

- ⚠ Under no circumstances should you disconnect the power supply of the SINAUT MD740-1 during the update. The device could be damaged and can only be reactivated by the manufacturer.

If you have stored a current software update on your configuration computer, proceed as follows:

1. Click on **Browse...** then select the file.
2. Click on **Install Packages** to load them into the device.

Depending on the size of the update, this procedure can take several minutes.

If a reboot should be necessary following the system update, a corresponding message will appear.

- If you are provided with a current software update on a remote server, the server's address must be set - see *Features → Update Server*, page 69.

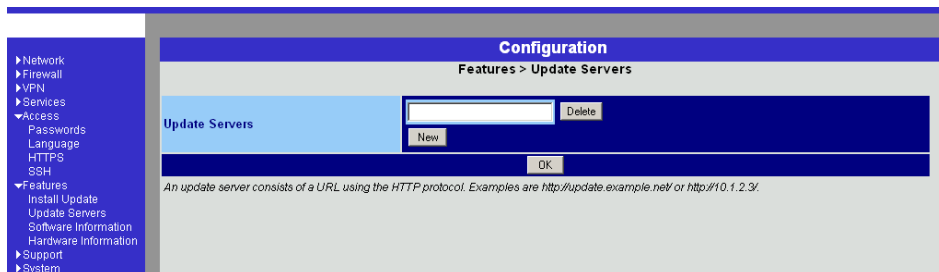
Proceed as follows:

1. Write the filename in the entry field.

2. Click on **Install Package Set** to load it into the device.

Depending on the size of the update, this procedure can take several minutes.

If a reboot should be necessary following the system update, a corresponding message will appear.



Features → Update Server

If you are provided with a software update (*Features → Install Update*, page 68) for the SINAUT MD740-1 on a remote server, enter the server's address here. This must always come before the protocol used.

Examples: `http://123.456.789.1` OR `http: //www.xyz.com/update`

►Network

►Firewall

►VPN

►Services

▼Access

Passwords

Language

HTTPD

SSH

▼Features

Install Update

Update Servers

Software Information

Hardware Information

►Support

►System

Configuration

Features > Software Information

Version

GPRS-2.1.0.neuhaus

Base

GPRS-2.1.0 Thu Nov 25 14:02:04 CET 2004

Updates

[none]

Package Versions

Package	Number	Version	Flavour
bridge-utils	0	0.8.5	default
busybox	0	0.64.7	default
chat	0	2.4.4	default
djbdns	0	1.5.0	default
ethtables	0	0.3.0	default
ez-ipupdate	0	3.0.12	default
fnord	0	1.8.0	default
freewan	0	1.107.0	default
gai	0	0.11.11	default
iproute	0	1.8.24	default
iptables	0	1.3.0	default
l2tpd	0	0.1.4	default
libc	0	2.4.0	default
libgmp	0	3.2.1	default
linux	0	4.2.18	neuhaus
tiny-base	0	0.5.10	neuhaus
tiny-console	0	0.1.0	neuhaus
tiny-dnscache	0	1.2.1	default

Features → Software Information

Display only:

This lists the software modules contained in the device. These are described as packets.

Serves update purposes: compare the displayed version numbers with the current version numbers of the appropriate packets. To do so, please contact your distributor.

Should new versions be available you can update the software in the device. See *Features → Install Update*, page 68.

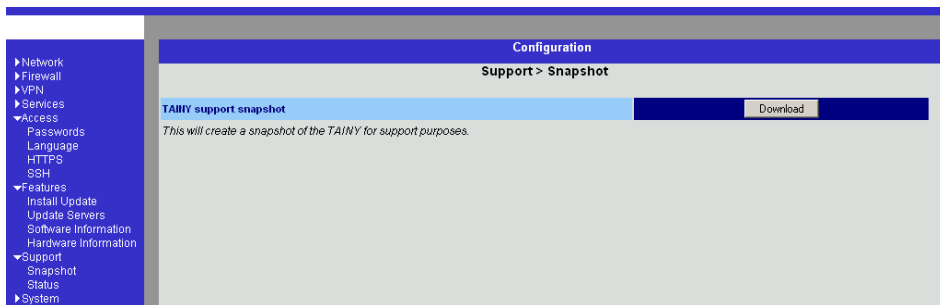
Configuration		
Features → Hardware Information		
- Features - Firewall - VPN - Settings - Network - Firewalls - Language - HTTP - Time - Features - Model Update - Update Drivers - Hardware Information - Hardware Information - Network - System	Hardware	
	CPU	Core i5-10210U (1.6GHz)
	CPU Family	10th Gen
	CPU Stepping	B0
	CPU Clock Speed	2.5GHz
	System Temperature	45.0°C
	System Uptime	0 min
	Free Space Memory	30800 MB
	MAC 1	90:86:01:01:00
	MAC 2	90:86:01:01:00
	Product Name	TABBY OPS VNU LAN
	Serial Number	00P-001-100000
	Manufacturer	ABT
	Date of Manufacturing	Wed Dec 31 15:23:43 UTC 2020
	Boot Loader at Production	0.1.1 main
	Hardware Version	00000000
	Backup System at Production	0.1.0 default
	Software at Production	1.0.3.gps
	Version Parameterset	1

Features → Hardware Information

Display only:

For experienced system administrators / support.

4.7 Support menu



Support → Snapshot

This function serves support purposes.

It creates a compressed file (in tar format) containing all the current configuration settings and log entries which could be relevant for a fault diagnosis. (This file contains no private information such as the private machine certificate or the passwords. However, any used Pre-Shared Keys from VPN connections are contained in the snapshots.)

To create a snapshot, proceed as follows:

1. Click on **Download**.
2. Store the file under the name *snapshot.tar.gz*

Make the file available to support if requested to do so.

Configuration	
Support > Status	
Network mode	(none)
External IP	
Default gateway via external IP	(none)
VPN (Total/Used/Up)	2 / 0 / 0
VPN User login	N/A
DynDNS registration	(none)
HTTPS remote access	no
SSH remote access	no
HTTP state	(disabled)
Software version	GPRS-2.1.0 neuhaus
System Uptime	2:55
Language	en

Support → Status

Display only:

Displays a summary of different status information for support purposes:

Network mode

Operating mode of the SINAUT MD740-1: *modem*

External IP

The IP address of the SINAUT MD740-1 at its connection for the external network (WAN or Internet).

Default gateway via external IP

The external IP address of the SINAUT MD740-1.

VPN (Total / Used / Up)

Possibilities: *Total / Used / Up*

Total : total number of VPN connections set up

Used : VPN connections used

Up : VPN connections currently active

VPN User login

Possibilities: *N/A / not logged in / logged in*

N / A : not available

not logged in : VPN closed

logged in : VPN open

DynDNS registration

Possibilities: *none / DynDNS server address / failure / trying*

none : no DynDNS server

DynDNS server address : address of the DynDNS server used by the SINAUT MD740-1 to resolve hostnames

failure : the SINAUT MD740-1 is trying unsuccessfully to connect to the DynDNS server.

trying :

the SINAUT MD740-1 is trying to connect to the DynDNS server.

HTTPS remote access

Possibilities: *no / yes*

SSH remote access

Possibilities: *no / yes*

NTP state

Possibilities: *synchronized / not synchronized*

synchronized :

the SINAUT MD740-1 is receiving the current time (Greenwich Mean Time) from a time server via the Network Time Protocol.

not synchronized :

the SINAUT MD740-1 is not connected to a time server and therefore cannot provide the current time.

Software version

Version of the software installed in the SINAUT MD740-1

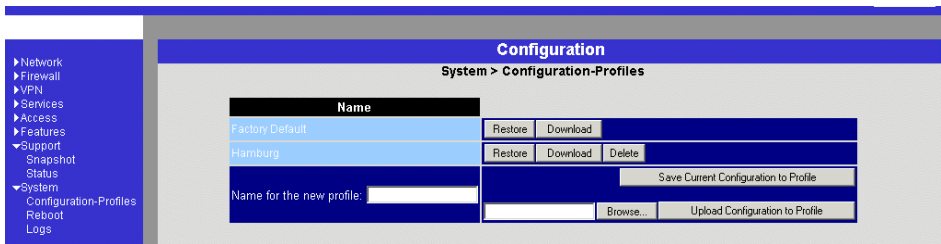
System Uptime

Uptime since the last start-up of the SINAUT MD740-1

Language

Language currently set

4.8 System menu



System → Configuration Profiles

You have the possibility to save the settings of the SINAUT MD740-1 as a configuration profile under any name in the SINAUT MD740-1. You can create several such configuration profiles. You can then activate whichever configuration profile you require when using the SINAUT MD740-1 in different operating environments.

Furthermore, you can save configuration profiles as files on the hard disk of the configuration computer. Vice versa, you can upload a configuration file created in this way to the SINAUT MD740-1 and put it into effect.

In addition, you have the possibility to put the default setting (back) into effect at any time.

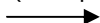
- ➡ When a configuration profile is saved, password and user names are not saved with it.

Save Configuration to Profile in the SINAUT MD740-1

1. Enter the required name in the field *Name for the new profile*.
2. Click on the button **Save Current Configuration to Profile**.

Display / activate / delete a configuration profile saved in the SINAUT MD740-1

Names of configuration profiles created (examples)



Configuration			
System > Configuration-Profiles			
Name			
Factory Default	Restore	Download	
Hamburg	Restore	Download	Delete
Name for the new profile:	Save Current Configuration to Profile		
		Durchsuchen...	Upload Configuration to Profile

Prerequisite:

At least one configuration profile has been created and saved in the SINAUT MD740-1 (see above).

Display configuration profile

Click on the name of the configuration profile.

Activate configuration profile

Click on the **Restore** button to the right of the configuration profile concerned.

Delete configuration profile

Click on the **Delete** button to the right of the configuration profile concerned.

Display / activate default setting

The default setting is saved as a configuration profile under the name *Factory Default* in the SINAUT MD740-1.

Display: Click on the name *Factory Default*.

Activate: Click on the **Restore** button next to the name *Factory Default*.

➡ It is not possible to delete the *Factory Default* configuration profile.

Save configuration profile as a file on hard disk

1. Click on the **Download** button next to the name of the configuration profile concerned.
2. In the dialogue box displayed, determine the file name and folder under/in which the configuration profile is to be saved as a file.

(You can give the file any name.)

Upload configuration profile from hard disk to the SINAUT MD740-1

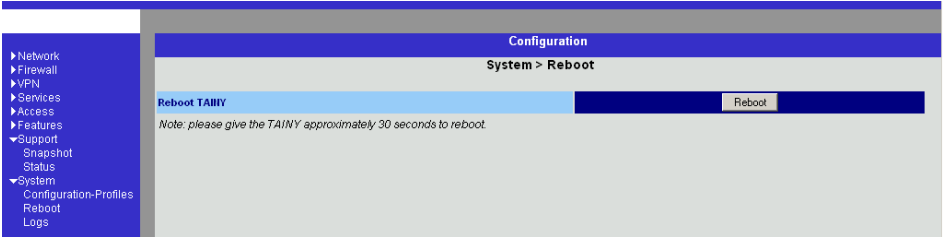
Prerequisite:

Following the procedure described above, you have saved a configuration profile as a file on the hard disk of the configuration computer.

- 1. In the field *Name for the new profile*, enter the name for the configuration profile to be uploaded.
- 2. Click on the **Browse** button and then select the file.
- 3. Click on the button **Upload Configuration to Profile**.

Consequence: the uploaded configuration is displayed in the list of configuration profiles.

If the uploaded configuration profile is to be activated, click on the **Restore** button next to the name.

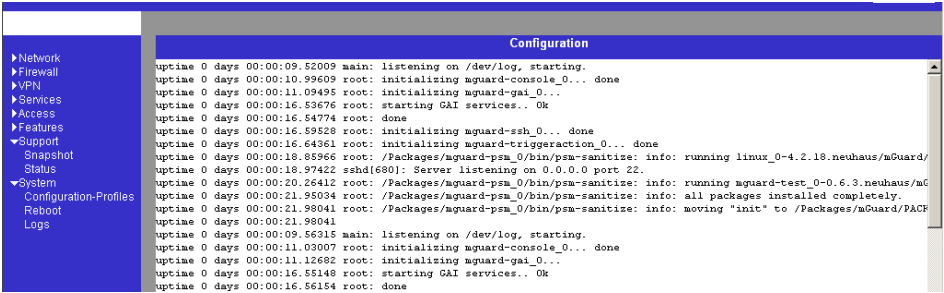


System → Reboot

A reboot is required in the event of an error. It may also be necessary after a software update.

At the end of the reboot the text "Rebooted" is displayed.

A reboot can also be effected by switching the device off and back on again.



System → Logs

Display only:

Displayed all recorded log entries (total log).

The format corresponds to that commonly used under Linux.

There are special evaluation programs which present the information from the logged data in a more easily legible format.

You can transfer the log entries to an external server. See *Services* → *Remote Logging*, page 61.

- ➡ Following a reboot of the device, entries are already made in the log file before the device can synchronize the system time. In this case, the time stamps are not chronologically arranged. The entries are, however, in chronological order.

4.9 CIDR (Classless InterDomain Routing)

IP netmasks and CIDR are notations which aggregates several IP addresses to form one address range. A range of consecutive addresses is treated as a network.

The CIDR scheme reduces, for example, the routing tables stored in routers by means of a postfix in the IP address. With this postfix, a network and the networks lying below it can be denoted in a summarized form. The method is described in RFC 1518.

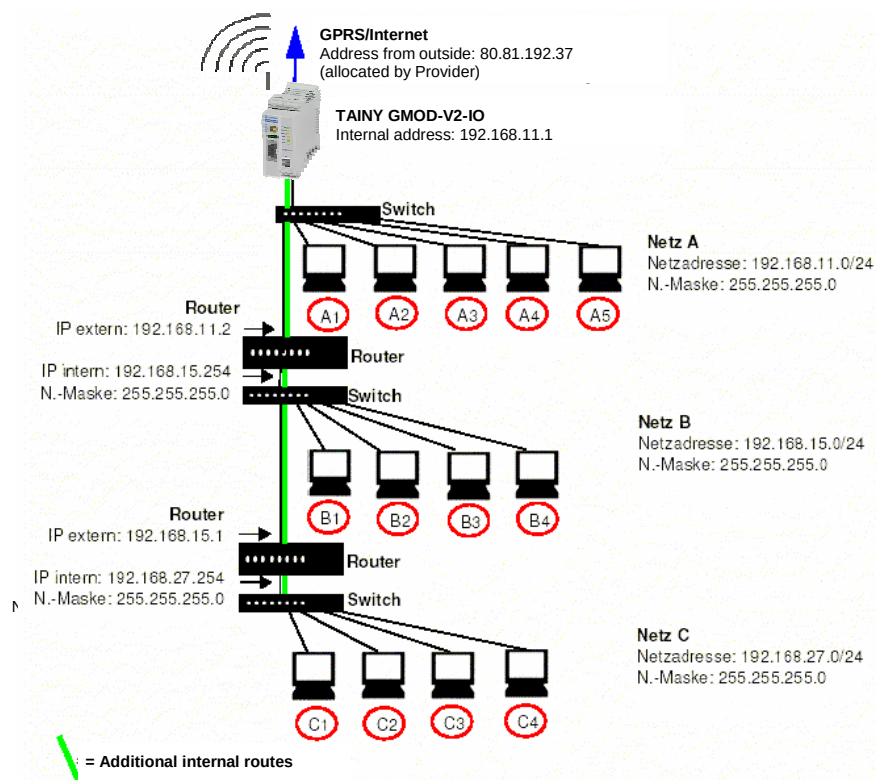
To advise a range of IP addresses to the SINAUT MD740-1, e.g. when configuring the firewall, it may be necessary to give the address space in CIDR syntax. The following table shows the IP netmask on the left, with the corresponding CIDR syntax on the far right.

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

4.10 Network example diagram

The following diagram shows how the IP addresses could be distributed in a local network with subnets, which network addresses result and what the specification of an additional internal route could be in the SINAUT MD740-1.



Network A					
Computer = Additional internal routes			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 SINAUT MD740-1Network: 192.168.15.0/24 Gateway: 192.168.11.2
IP address	192.168.15.2	192.168.15.3	192.168.15.4	192.168.15.5	
Network mask	255.255.255.0	255.255.255.0	255.255.255.0	255.255.255.0	
Network C					
Computer	C1	C2	C3	C4	Network: 192.168.27.0/24 Gateway: 192.168.11.2
IP address	192.168.27.1	192.168.27.2	192.168.27.3	192.168.27.4	
Network mask	255.255.255.0	255.255.255.0	255.255.255.0	255.255.255.0	

- ➡ Further settings of the routers, e.g. internal routers for communication from Network B to Network C, are not taken into consideration in the above example.

5 Integrated website showing device and connection data

The SINAUT MD740-1 has an integrated Web server. The Web server provides a website with information on device and connection data. There are different ways of accessing the website using a Web browser:

- locally via the service interface - see page 83
- locally via the application interface (10/100 BASE-T connector) - see page 86
- from a remote computer via the GPRS network (network-dependent) - see page 87.

5.1 Accessing the Web server locally via the service interface

Via dial-up connection:

To address the SINAUT MD740-1 via its service interface the following conditions must be fulfilled:

- The computer you intend to use must be connected to the service interface of the SINAUT MD740-1 via one of its COM ports.
- An appropriate dial-up connection must be set up on this computer (see below). This must contain the following data:

Dial-up no.: ***98#**

User name.: **service**

Password: **service**

- the character string for dialling up the service interface: ***98#**

- user name and password: **service** in each case

- modem or device via which the connection is to be established: **TAINY GMOD Service**. The modem driver file must have been installed previously (see below).

Installing the modem for access to the service interface

To install the modem driver under Windows XP, proceed as follows.

Installation under Windows 98 or Windows 2000 is done accordingly

➡ When using Windows 2000 or XP you must be registered as the administrator. In this case, make sure that no other modem drivers have been or are installed for the selected interface.

1. Click on **Start, Control Panel** so that the *Control Panel* dialogue box appears.
Switch to "Classic View".
2. Double-click on the **Phone and modem options** icon.
3. In the *Phone and modem options* dialogue box, click on the **Add...** button in the *Modems* tab.
4. The *Add New Hardware Wizard* for the installation of a new modem appears.

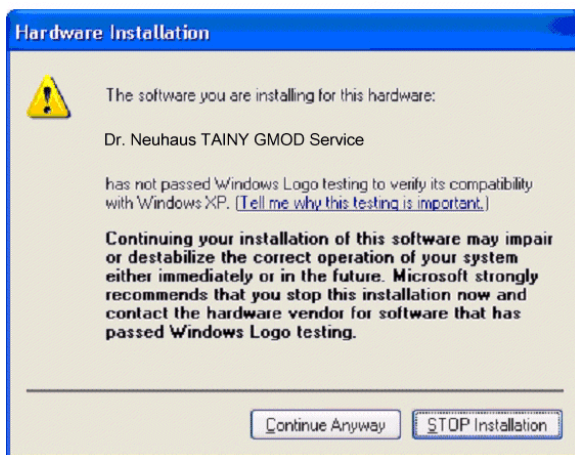
Follow the instructions of the *Add New Hardware* Assistant:

Determine that you will select the modem yourself, i.e. that automatic recognition does not take place.

When choosing the modem, select the file **TAINY_GMODService.inf**.

This is located in the *Drivers* folder on the data carrier supplied.

➡ If this dialogue box is displayed...



Click on **Continue Anyway**.

Creating the dial-up connection for the service interface To create the dial-up connection for the service interface, proceed as follows:

Windows 2000:

1. Click on **Start - Settings - Network and Dial-up connections - Make New Connection** to launch the Network Connections Wizard.
2. Select **Connect to the Internet, Set up my connection manually..., Connect using a dial-up modem**.
Follow the instructions in the dialogue boxes.
Make sure that no area codes or local access numbers are entered.

Windows XP:

1. Click on **Start - Control Panel**: in classic view, double-click on **Network and Internet connections**, then click on **Create a New Connection** to launch the *New Connections Wizard*.
 2. Select **Connect to the Internet, Set up my connection manually, Connect using a dial-up modem**.
Follow the instructions in the dialogue boxes.
Make sure that no area codes or local access numbers are entered.
-

Making a connection to the SINAUT MD740-1 website

1. Double-click on the dial-up connection icon that has been created for the CSD dial-up.
The *Make a connection* dialogue box appears.
The user name and password are both: **service**
2. Click on **Select**.

Effect:

User name.: **service**

Password: **service**

The computer is connected to the SINAUT MD740-1 in such a way that the integrated Web server can be addressed.

3. Start your Web browser, e.g. MS Internet Explorer.
Enter the address of the internal website in the browser's address line. The address is:

http://192.168.0.8

Effect:

The start page of the website stored in the SINAUT MD740-1 is displayed - see *The website of the SINAUT MD740-1* page 88.

4. Click on the hyperlink of the required HTML pages to view them.
 5. Then close the dial-up connection.
-

Closing the service connection

In the Info section in the bottom right corner of the screen, right-click on the connection icon and then click on **Close connection** in the opened menu.

5.2 Accessing the Web server locally via the application interface (10/100 BASE-T connector)

Prerequisites

- A GPRS connection must be active, i.e. the LED C of the SINAUT MD740-1 is lit and indicates that an IP address has been assigned by the GPRS network.
- NAT must take place for the address of the locally connected computer that is to access the internal website (see Firewall → NAT, page 27).
- The firewall of the SINAUT MD740-1 must allow the data packets that the locally connected computer sends to the Web server of the SINAUT MD740-1 to pass (see *Firewall* → *Outgoing*, page 29)

Example:

If the computer you are also using for the configuration of the SINAUT MD740-1 (own address 192.168.1.2) is to have access to the website stored in the SINAUT MD740-1, the settings are, for example, as follows:

Setting for Firewall → NAT:

Possible address entries: 192.168.1.2 or 192.168.1.0/24

Setting for Firewall → Outgoing:

<i>Prot.</i>	<i>From IP</i>	<i>From Port</i>	<i>To IP</i>	<i>To Port</i>	<i>Action</i>
TCP	192.168.1.2	any	192.168.0.8	any	Accept
or					
TCP	192.168.1.0/24	any	192.168.0.8	any	Accept

Making a connection to the SINAUT MD740-1 website

1. Start your Web browser, e.g. MS Internet Explorer.

Enter the address of the internal website in the browser's address line. The address is:

http://192.168.0.8

Effect:

The start page of the website stored in the SINAUT MD740-1 is displayed - see *The website of the SINAUT MD740-1* page 88.

2. Click on the hyperlink of the required HTML pages to view them.

5.3 Accessing the Web Server of the SINAUT MD740-1 from a remote computer via the GPRS network

Prerequisites

- Access is dependent on the configuration of the GPRS network and on how your LAN is linked to the GPRS.
- A GPRS connection to the remote SINAUT MD740-1 must be active, i.e. the LED C of the SINAUT MD740-1 is lit and indicates that an IP address has been assigned by the GPRS network.

Making a connection to the SINAUT MD740-1 website

1. Start your Web browser, e.g. MS Internet Explorer.
Enter the external address of the SINAUT MD740-1 in the browser's address line.

Effect:

The start page of the website stored in the SINAUT MD740-1 is displayed - see *The website of the SINAUT MD740-1* page 88.

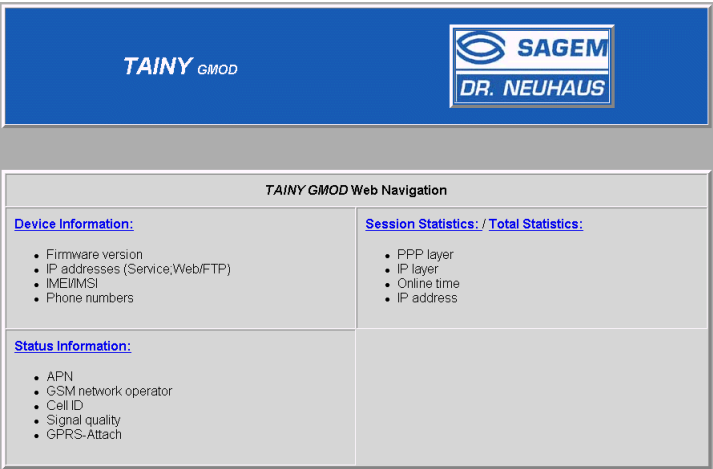
2. Click on the hyperlink of the required HTML pages to view them.

5.4 The website of the SINAUT MD740-1

To be able to view the website of the SINAUT MD740-1 with a Web browser the appropriate preparatory measures must be taken, depending on whether you want to access the website with your Web browser

- locally via the service interface (see page 83)
- locally via the application interface (10/100 BASE-T connector) (see page 86)
OR
- from a remote computer via the GPRS network (network-dependent) (see page 87).

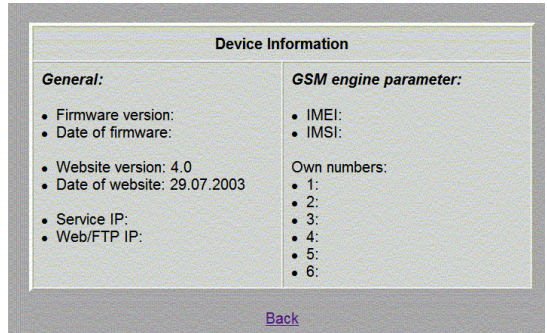
When you enter the address **http://192.168.0.8 (or the external IP address** of the device if you are accessing the website from a remote computer, see page 87) in your Web browser the start page of the website of the SINAUT MD740-1 appears.



By clicking on the appropriate hyperlink you can have the corresponding HTML page displayed in the browser.

Device Information page

If you wish to view this page click on the **Device Information** hyperlink on the start page.



Explanation of terms:

Firmware version:	Version of the firmware currently in the device
Date of firmware:	Date of the last firmware update
Website version:	Version of the HTML files in the device
Date of website:	Date on which the HTML pages were created
Service IP:	IP address of the service interface
Web/Ftp-IP:	IP address of the internal Web and FTP server

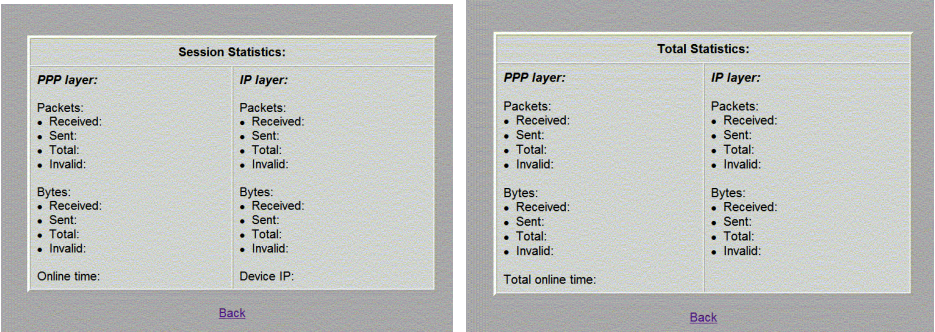
GSM module data

IMEI:	International M obile station E quipment I ntity. Unique, unchangeable CODE which is assigned to the internal mobile module (device number).
IMSI:	International M obile S ubscriber I ntity. The IMSI serves to uniquely identify subscribers in wireless and wire-based communications services in accordance with Internal Telecommunication Union (ITU) standards. In the case of mobile phones the IMSI is stored on the SIM card.
Own numbers:	The (own) telephone numbers stored on the SIM card.
(1..6):	If available the voice, data and fax numbers are displayed.

Session Statistics and Total Statistics pages

If you wish to view these pages click on the **Session Statistics** or **Total Statistics** hyperlink on the start page.
Then perform the **Refresh** command in the browser to load the current data.

Information on the PPP layer is displayed on the left, for the IP layer on the right.



Explanation of terms:

PPP layer (PPP - Point-to-Point-Protocol)

Packets:

Received:	Number of PPP frames (data packets) received
Sent:	Number of PPP frames sent
Total:	Sum total of all PPP frames sent and received during the online connection
Invalid:	Number of incorrect (invalid) PPP frames

Bytes:

Received:	Number of data bytes received within a PPP frame
Sent:	Number of bytes sent in a PPP frame
Total:	Sum total of all bytes sent and received at PPP level
Invalid:	Number of incorrect bytes
Online time:	Specifies the duration of the current GPRS connection. Displayed as " Hours.Minutes.Seconds ".

IP layer (IP - Internet Protocol)**Packets:**

Received:	Number of IP frames received
Sent:	Number of IP frames sent
Total:	Sum total of all IP packets sent and received during the online connection
Invalid:	Number of incorrect (invalid) IP frames

Bytes:

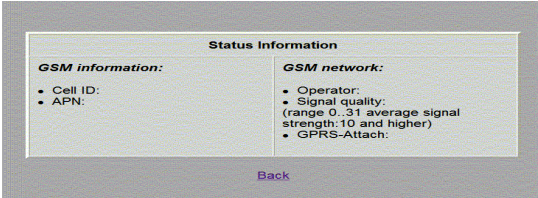
Received:	Number of data bytes received within an IP frame
Sent:	Number of bytes sent in an IP frame
Total:	Sum total of all bytes sent and received at IP level during the online connection
Invalid:	Number of incorrect bytes within an IP packet

Device IP: The IP address which the *SINAUT MD740-1* has received from the network provider on establishment of the connection into the GPRS network. This dynamic IP address is assigned to the device and is the IP address for incoming data packets. It can be assumed that the *SINAUT MD740-1* is (dynamically) assigned a different IP address by the provider each time it connects to the GPRS network.

Status Information page

If you wish to view this page click on the **Status Information** hyperlink on the start page.

This page provides information on the GSM network and the network operator.



Explanation of terms:

GSM information:

- Cell ID:** The Cell ID is a unique identification number for a cell.
- APN:** **Access Point Name.** A logical, defined interface on the GGSN which establishes a connection to the desired service (e.g. Internet, Wap, corporate network, ...)

GSM network:

- Operator:** Name of the network operator. (e.g. T-D1 etc. ...)
- Signal quality:** This number specifies the current signal quality of the connection in the GPRS network.
The meanings of the displayed values are shown in the table below.

Signal quality (value)	Meaning/Signal
0	-113dBm or worse
1	-111dBm
2...30	-109dBm to -53dBm
31	-51dBm or better
99	cannot be read / unknown

- GPRS-Attach:** **Yes** or **No** is used to specify whether or not the *SINAUT MD740-1* is booked into the GPRS network.
Yes = booked in (Attach)
No = not booked in

6 Firmware update via the integrated FTP server

The SINAUT MD740-1 has an integrated FTP server (FTP = File Transfer Protocol). This can be used to load an update - if available - of the communication software into the SINAUT MD740-1.

We recommend using an FTP program (downloadable as Freeware from the Internet) to establish a connection with the FTP server of the SINAUT MD740-1.

To establish an FTP connection, proceed as follows:

Prerequisite:

The firmware file is located on the service PC

1. To make a connection to the FTP server of the SINAUT MD740-1, proceed exactly as when accessing the Web server
 - locally via the service interface - see page 83
 - locally via the application interface (10/100 BASE-T connector) - see page 86
 - from a remote computer via the GPRS network (network-dependent) - see page 87.
2. Instead of a Web browser, start an FTP program.
Enter as follows
Address: **192.168.0.8 (or external IP address, see page 87).**
User name: **service**
Password: **service**
Example: You are using the FTP program of the Windows operating system. Click on **Start, Run**. After **Open**, enter: **ftp 192.168.0.8** You will then be asked to enter the user name and the password.
3. When the connection has been established, load the firmware file (*.bin, e.g. gprsvpn.bin) into the SINAUT MD740-1.
After the firmware file has been transferred, load the file !cmdfile into the device. This is the command for the SINAUT MD740-1 to accept the firmware.
4. Finally, close the FTP connection using the FTP program.

7 Glossary

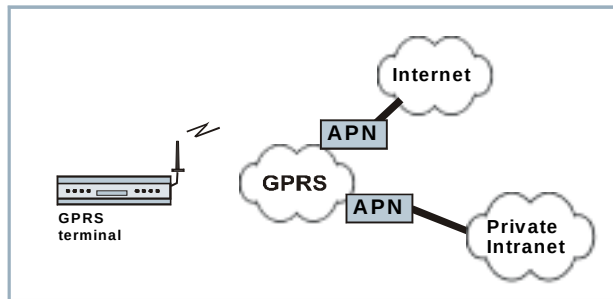
AES

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)

Cross-network connections, e.g. from the GPRS network into the Internet are established in the GPRS network via so-called APNs.



A terminal wishing to establish a connection via the GPRS network specifies the network with which it wishes to be connected via the APN:

- the Internet,
- a private corporate network connected via a dedicated line.

The APN denotes the point of access to the other network.

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.

DynDNS provider

Also *Dynamic DNS provider*. Each computer that is connected to the Internet has an IP address (IP = Internet Protocol). An IP address consists of 4 numbers, separated by dots, which can each have up to three digits. If the computer is online using a telephone line via modem, ISDN or ADSL, it is dynamically assigned an IP address by the Internet service provider, i.e. the address changes from one session to another. Even if the computer is online for 24 hours without interruptions (e.g. with a flat rate) the IP address is changed from time to time.

If a local computer is to be accessible via the Internet it must have an address which is known to the remote communication partner. Only in this way can the communication partner establish a connection to the local computer. However, if the address of the local computer continually changes this is not possible, unless the operator of the local computer has an account with a DynamicDNS provider (DNS = Domain Name Server).

The operator can then determine a hostname with the provider at which the computer is to be reached in the future, e.g. www.xyz.abc.de. In addition, the DynamicDNS provider provides a small program which has to be installed and executed in the computer in question. In each Internet session of the local computer this tool informs the DynamicDNS provider of the computer's current IP address. The provider's Domain Name Server registers the current Hostname / IP address allocation and informs other Domain Name Servers on the Internet accordingly.

If a remote computer now wants to establish a connection to the local computer which is registered with the DynamicDNS provider, the remote computer uses the local computer's hostname as the

address. This establishes a connection to the responsible DNS (Domain Name Server), where a scan is made for the IP address which is currently allocated to this hostname. The IP address is transferred back to the remote computer which now uses it as the destination address. This now leads to exactly the desired local computer.

Basically, all Internet addresses are based on this system: first, a connection is established to the DNS in order to ascertain the IP address assigned to this hostname. Once this has taken place, the connection to the desired remote site, which can be any Internet presence, is established with this "referenced" IP address.

**TCP/IP
(Transmission
Control
Protocol/Internet
Protocol)**

Network protocols which are used for the connection of two computers in the Internet.

IP is the basic protocol.

UDP is based on IP and sends individual packets. These may arrive at the recipient in a different order to that in which they were sent, or they can even be lost.

TCP serves to protect the connection and, for example, ensures that the data packets are forwarded in the correct order to the application.

UDP and TCP, in addition to the IP addresses, include port numbers between 1 and 65535, by means of which the different services are distinguished.

UDP and TCP form the basis for a number of other protocols, e.g. 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).

ICMP is based on IP and contains control messages.

SMTP is an e-mail protocol based on TCP.

IKE is an IPsec protocol based on UDP.

ESP is an IPsec protocol based on IP.

On a Windows PC the WINSOCK.DLL (or WSOCK32.DLL) takes over the handling of both these protocols.

(→ datagram)

Service Provider

A company or institution which provides users with access to the Internet or an online service.

**Protocol,
transmission
protocol**

Devices which communicate with one another must use the same rules for this communication. They must "speak the same language". Such rules and standards are collectively referred to as a protocol or transmission protocol. Frequently used protocols are, for example, IP, TCP, PPP, HTTP or SMTP. TCP/IP is the generic term for all protocols based on IP.

Client / Server

In a client/server environment a server is a program or computer which receives and answers queries from the client program or client computer.

In data communication the term client is also used for the computer which establishes a connection to a server (or host), i.e. the client is the calling computer and the server (or host) is the called computer.

PPPoE

Acronym for **P**oint-to-**P**oint **P**rotocol **o**ver **E**thernet. Based on the standards PPP and Ethernet. PPPoE is a specification to connect users by Ethernet to the Internet via a shared broadband medium such as DSL, Wireless LAN or cable modem.

PPTP

Acronym for **P**oint-to-**P**oint **T**unneling **P**rotocol. This protocol was developed by Microsoft, U.S. Robotics and others to transmit data securely between two VPN nodes (→ VPN) via a public network.

**VPN (Virtual
Private Network)**

A **V**irtual **P**rivate **N**etwork (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 supranational corporate network.

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.

Private Key, Public key; Certification (X.509)

In asymmetrical encryption algorithms 2 keys are used: a *Private Key* and a *Public Key*. The public key serves to encrypt data and the private key to decrypt them.

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.

Certification:

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 *Certification Authority or CA*. 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 *certificate* is created.

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.

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.

Datagram

In the TCP/IP transfer protocol data are sent in the form of data packets or datagrams. An IP datagram is structured as follows:

IP header	TCP/UDP header	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 highest protocol layer (according to the OSI layer model)
- the IP header checksum to check the integrity of the header upon reception.

The 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 some information from the IP header (e.g. source and destination IP address)

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.

Spoofing, anti-spoofing

In Internet terminology, spoofing means giving a false address. By giving a false Internet address someone is pretending to be an authorised user. Anti-spoofing refers to mechanisms designed to detect or prevent spoofing.

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.

Port number

The port number field is a 2-byte field in UDP and TCP headers. Assigning port numbers serves to identify the different data streams handled simultaneously by UDP/TCP. The entire data exchange between the UDP/TCP and the application processes takes place via these port numbers. The assignment of port numbers to application processes takes place dynamically and randomly. Fixed port numbers are assigned to certain frequently used application processes. These are known as assigned numbers.

IP address

Each host or router on the Internet / 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 region from 0 to 255) separated by dots.

An IP address consists of 2 parts: the network address and the host address.

Network address	Host address
-----------------	--------------

All hosts in a network have the same network address, but different host addresses. Depending on the size of the network concerned - a distinction is made between Class A, B and C networks - the two parts of the address can differ in length:

	1st byte	2nd byte	3rd byte	4th byte
Class A	Net. addr.	Host addr.		
Class B	Network addr.		Host addr.	
Class C	Network addr.			Host addr.

Whether an IP address denotes a device in a Class A, B or C network can be identified by the first byte in the IP address. The following are fixed values:

	Value of 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

In terms of figures, there can only be a maximum of 126 Class A networks in the world, with each of these networks encompassing a maximum of $256 \times 256 \times 256$ hosts (3 bytes address space). Class B networks can occur 64×256 times and can each contain up to 65,536 hosts (2 bytes address space: 256×256). Class C networks can occur $32 \times 256 \times 256$ times and can each contain up to 256 hosts (1 byte address space).

Subnet mask

Normally, a corporate network with access to the Internet is officially assigned only one single IP address, e.g. 134.76.0.0. In this address example it can be seen from the 1st byte that this corporate network is a Class B network, i.e. the last 2 bytes can be used freely for host addresses. In terms of figures, this results in address space for 65,536 possible hosts (256×256).

Such a huge network makes little sense. It becomes necessary to form subnets. The *subnet mask* serves this purpose. Like an IP address, this a field 4 bytes long. The value 255 is assigned to each of the bytes representing the network address. This serves mainly to "borrow" a part from the host address area in order to use it to address subnets. In a Class B network, for example, (2 bytes for the network address, 2 bytes for the host address) the 3rd byte, which is normally reserved for the host address, can now be used for subnet addresses by applying the subnet mask 255.255.255.0. In terms of figures, this means that 256 subnets can be created, each with 256 hosts.

X.509 Certificate

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.

8 Technical Data

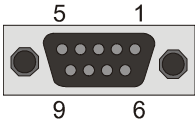
Application Interface	10/100 Base-T (RJ45 plug) Ethernet IEEE802 10/100 Mbit/s
Service Interface	DSUB-9 plug, PIN assignment RS232
Virtual Private Network	Protocol: IPSec (tunnel and transport mode) Encryption: 3DES, AES, DES Packet authentication: MD5, SHA-1 Internet Key Exchange (IKE), authentication: Pre-Shared Key (PSK), X.509v3 certificates NAT-T, DynDNS, Dead Peer Detection (DPD)
Firewall	Stateful Packet Inspection Anti-Spoofing NAT (IP Masquerading) Port Forwarding
Other	DNS Cache, DHCP Server, NTP, Remote Logging
Management	Web based administration
Connection	GPRS: Multislot class 10; Coding schemes: CS-1, CS-2, CS-3, CS-4
Transmission Power	Quad Band; GSM 850 MHz: max. 2 Watt, GSM 900 MHz: max. 2 Watt, DCS 1800 MHz: max. 1 Watt, PCS 1900 MHz: max. 1 Watt
Antenna Connection	Impedance nominal: 50 Ohm, socket: SMA
Power supply	Un 18-30 VDC In 450-260mA ; Iburst = 1,3 A
Temperature range	Operating: -20 °C up to +50 °C Storage: -40 °C up to +85 °C Humidity: 0-95 %, not condensing
Mechanics	Construction: top-hat rail housing Material: synthetic material Protection class: IP20 Dimensions: 114 mm x 45 mm x 99 mm Weight: approx. 280g
Approvals	CE R&TTE (GSM) GSM/GPRS engine with GCF approval EMV/ESD: EN 55024 EN 55022 Class A EN 61000-6-2 Electrical safety: EN 60950

Pin assignment interface Service

Signals
(Signal direction DTE)

Pin1	DCD	Output
Pin2	RXD	Output
Pin3	TXD	Input
Pin4	DTR	Input
Pin5	GND	Signal ground
Pin6	DSR	Output
Pin7	RTS	Input
Pin8	CTS	Output
Pin9	RI	Output

SUB-D9 socket, Pin assignment RS232

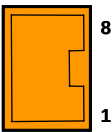


Pin assignment interface 10/100 BASE-T

Signals
(Signal direction DTE)

Pin1	RD+
Pin2	RD-
Pin3	TD+
Pin4	Not connected
Pin5	Not connected
Pin6	TD-
Pin7	Not connected
Pin8	Not connected

RJ45 socket - Ethernet



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Product no. 3172

Doc. no. 3172AD001 Rev. 1.1