

***TAINY* ModemServer**

**Administrator Manual
for the TAINY ModemServer**



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Product no. DNT3137

Document no. 3137AD012 Version 1.0



Important information

Please observe the following notes, particularly when using networks subject to charges:

When (re-)establishing a connection, obtaining a connection and attempting to make a connection (e.g. server switched off, wrong destination address, etc.), data packets are exchanged. Whether the attempted connections are successful or unsuccessful is irrelevant. TAINY Connect Clients are usually configured in such a way that they conduct this connection handling automatically.

- The number of TAINY Connect Clients that can be logged in to the TAINY ModemServer is limited to the number of gate licenses available.
If more connections (also known as gates) have been imported or inserted than there are gates, the TAINY Connect Clients – regardless of their configuration – try in vain to establish or re-establish a connection to the TAINY ModemServer.
- The connection name and password on the TAINY ModemServer and the respective TAINY Connect Client must correspond. Otherwise logging in to the TAINY ModemServer is not possible.
- If a gate on the TAINY ModemServer is disconnected, the connection to the respective TAINY Connect Client is interrupted. The TAINY Connect Client in question cannot be reached again until it has logged in again, i.e. it has re-established the connection to the TAINY ModemServer.
- If a gate is deleted, the respective TAINY Connect Client – depending on its configuration – repeatedly attempts to redial.
- TAINY Connect Clients can also log in to the TAINY ModemServer when the relevant gate is inactive. However, they cannot establish a connection to other TAINY Connect Clients and cannot be reached by them. In this case, obtaining a connection and logging in again are performed exactly as with an active gate.
- If a TAINY Connect Client logs in to its respective gate in leased line mode even though no leased line connection has yet been set up, the gate is set to "deactivated" status.
- If a leased line is configured and if a corresponding gate or both are deactivated, the gate in question is closed, i.e. the connection to the respective TAINY Connect Client is interrupted. The device in question must log in again.
- If a leased line is closed, both connections between the TAINY ModemServer and the TAINY Connect Clients are interrupted. The corresponding TAINY Connect Clients must log back in to the TAINY ModemServer.
- If a leased line is deleted, only the link between two gates is deleted in effect. The individual gates on the TAINY ModemServer remain in place, however, and are set to "inactive" status when the TAINY Connect Clients log in again.

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1 The TAINY Connect System

TAINY Connect facilitates data connections via GPRS, Internet and Intranet by dial-up or leased line

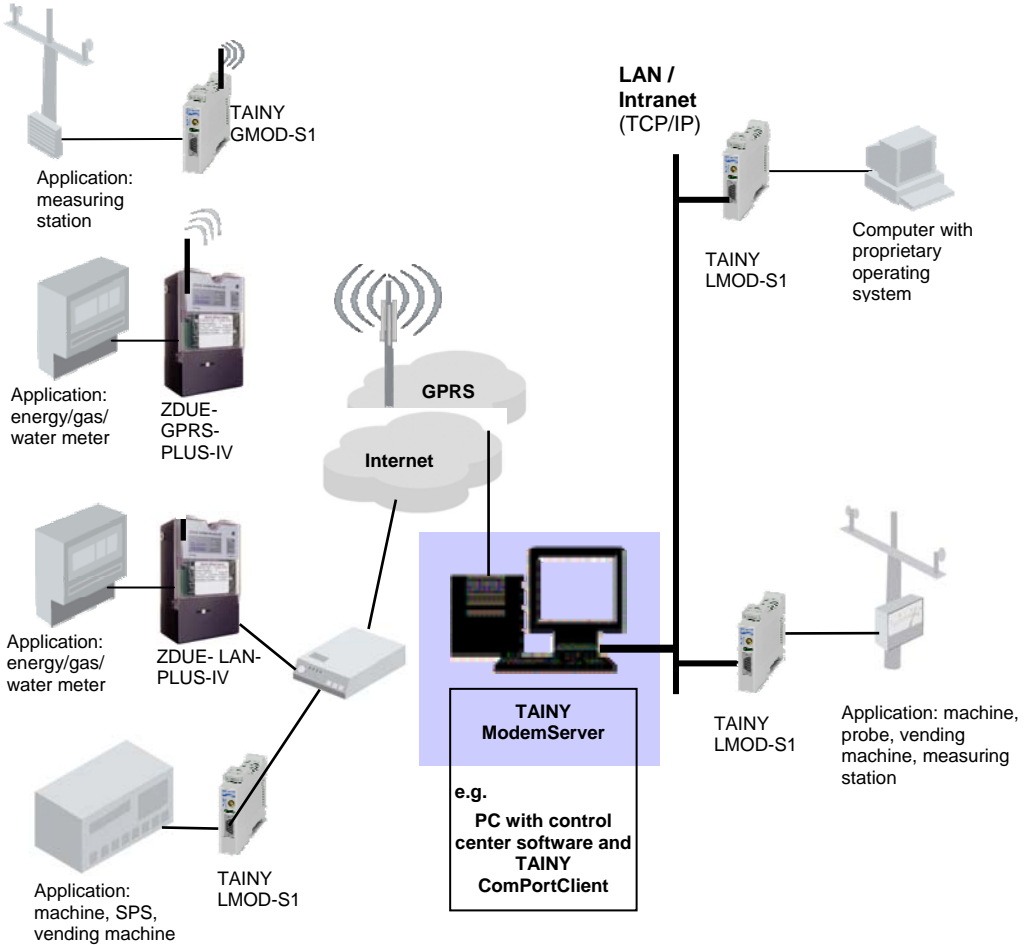
TAINY Connect from Dr. Neuhaus Telekommunikation is a transmission system for wireless and wired M2M (machine to machine) communications based on IP networks. The TAINY Connect is practically a "switchboard" for data communications via TCP/IP networks, and can be used by applications which themselves are not TCP/IP-capable. Possible transmission networks are all TCP/IP networks, such as the GPRS (**G**eneral **P**acket **R**adio **S**ervice) of a GSM network (**G**lobal **S**ystem for **M**obile **C**ommunication = mobile radio network), the Internet and corporate Intranets.

The heart of the TAINY Connect System is the "switchboard", the TAINY ModemServer – software run on a Windows PC or Windows server. Depending on the license purchased, the TAINY ModemServer (TMS) can provide up to 250 connections or gates. These are assigned to TAINY Connect Clients so that they can communicate with each other. TAINY Connect Clients are data communications devices with an implemented TSC protocol and TCP/IP protocol. TAINY Connect Clients are used for applications such as telemetric, telecontrol or remote configuration systems, as well as control stations which themselves are not TCP/IP-capable. With the TAINY Connect Clients these applications can exchange data bidirectionally with each other via the TAINY ModemServer via TCP/IP networks, via dial-up lines or leased lines.

The TSC protocol The TSC protocol is a protocol developed by Dr. Neuhaus for the exchange of user data as well as check and control information between the TAINY ModemServer and the TAINY Connect Clients via TCP/IP-based networks – both wired (Internet, Intranet (LAN)) and wireless (GPRS).

The TSC protocol is currently defined as an independent standard.

Overview of connection routes:



1.1 The functional principle of the TAINY ModemServer

The TAINY ModemServer works practically like a telephone switchboard designed for continuous operation and permanent accessibility: it routes or switches connections between the TAINY Connect Clients.

TAINY Connect Clients are

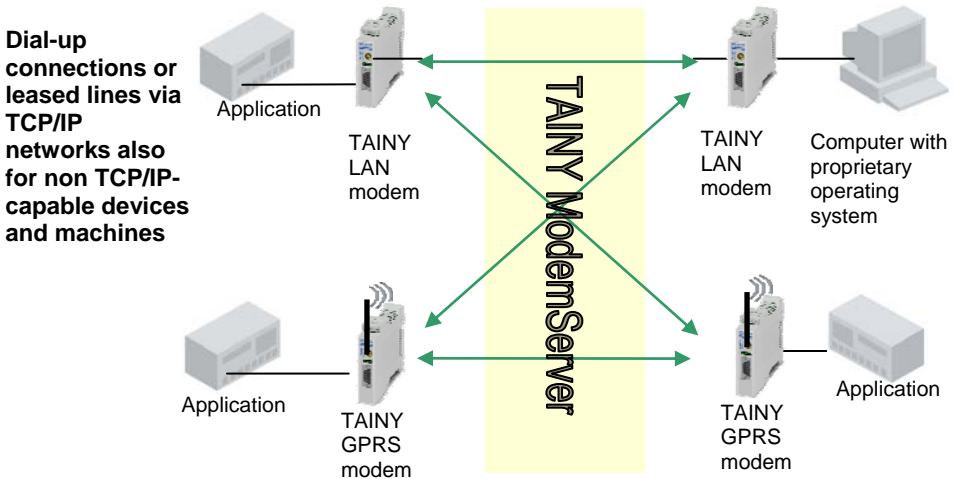
- GPRS or fixed network modems on a hardware or software basis with an implemented TSC protocol. They are connected just like conventional modems to machines, vending machines, control units and other applications, or installed on a PC. This enables the applications to establish dial-up lines via TCP/IP networks (e.g. GPRS, Internet) either in the telephone network as in the past or to communicate via leased lines. The remote unit can be another GPRS or fixed network modem with TSC protocol or a control center PC with an installed TAINY ComPortClient (software modem). In this case, TAINY ModemServer, TAINY ComPortClient and control center software are run on the same computer.

The TAINY ModemServer provides a maximum of 250 gates. Each TAINY Connect Client is assigned to one of these gates, together with a virtual call number at which the respective TAINY Connect Client can be reached. The TAINY ModemServer monitors and controls these gates and hence the links to the TAINY Connect Clients. This allows the TAINY Connect Clients to initiate calls to other TAINY Connect Clients, to receive calls from them and to close connections.

The machines, vending machines, control units, etc. – in short, the applications – can use AT commands like when using a conventional modem. With the ATD command, for example, they can effect the establishment of a connection to the remote unit, another TAINY Connect Client. If they transmit a call number together with the ATD command, a dial-up connection like in a telephone network can be switched to the TAINY Connect Client to which this call number is assigned. Alternatively to the dial-up lines, leased lines can be switched via the TAINY ModemServer.

1.2 Overview of benefits and possibilities

The TAINY Connect System establishes leased lines and dial-up connections via TCP/IP-based networks. Devices and machines with any kind of data communication interface can then exchange data with each other and/or control centers:



Dial-up connections or leased lines via TCP/IP networks also for non TCP/IP-capable devices and machines

Scalability

The system is optionally scalable, i.e. it can be used as a switching center for 5 devices, or for 250, depending on the license purchased.

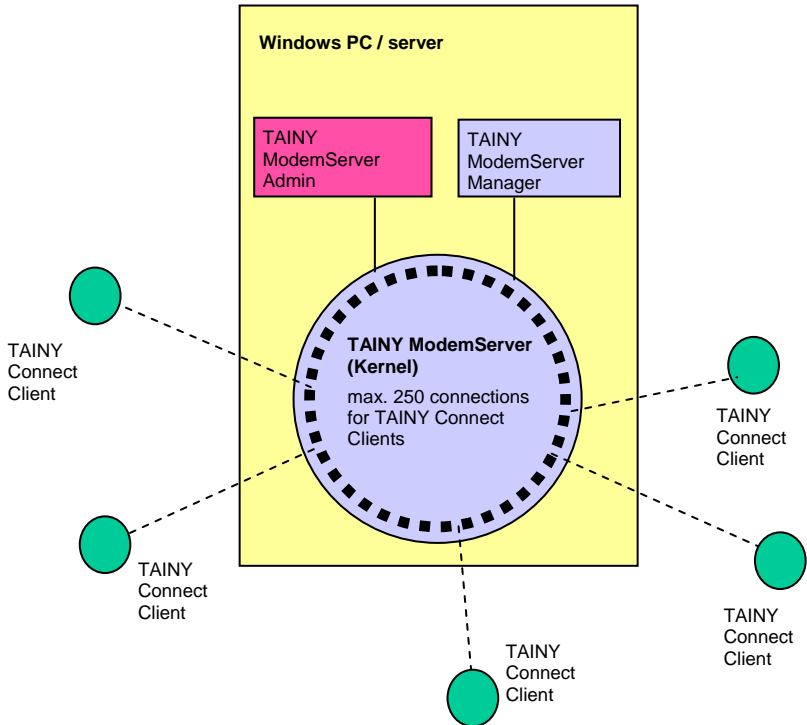
Status control

The connection statuses and the statuses of the connected devices can be monitored at any time in the central switchboard, the TAINY ModemServer.

Dial-up connections via TCP/IP data links using the TSC protocol

The TCP/IP transmission protocol is not designed for modem dial-up connections. This is only made possible by the TAINY Connect transmission system: in the TAINY Connect devices the TSC protocol is placed transparently over the TCP/IP transmission protocol. This protocol, developed by Dr. Neuhaus and easy to implement, serve to exchange user data, as well as monitoring and control information via TCP/IP-based networks. This means that all the TAINY Connect Clients in the system can be dialed up just like telephones in a telephone network.

You can connect all applications to each other as required using the TAINY Connect System for the – encrypted or unencrypted – exchange of data.

The TAINY ModemServer system

The TAINY ModemServer is administered using the administration software *TAINY ModemServer Admin* (for the administration of licenses and privileges) and *TAINY ModemServer Manager* (for configuration of the TAINY ModemServer).

1.3 Function components and their use

The TAINY ModemServer comprises several function components. To use them, corresponding licenses are required. For certain licenses the corresponding **License Key** must be inserted into the system using the administration software *TAINY ModemServer Admin*.

These are the available components and the corresponding licenses:

| Components | License required | |
|--|---|--|
| TAINY ModemServer Kernel (<i>Kernel</i> software) | Kernel License | 1 Administrator and 1 Manager Account are free, i.e. no License Key need be inserted. The License Keys for the Kernel and the Gate License are included and must be inserted. |
| TAINY ModemServer Admin (administration software) | + 1 Administrator License (1 account free) | |
| TAINY ModemServer Manager (administration software) | + 1 Manager License (1 account free) | |
| TAINY ModemServer Gates (= connections) | Gate License* | |

* The **Gate License Key** can also be inserted using the administration software *TAINY ModemServer Manager*.

The License Keys supplied with the TAINY ModemServer for the **Kernel** and the **Gate License** are inserted using the administration software *TAINY ModemServer Admin*.

- It is not possible to increase the number of licenses subsequently with TAINY ModemServer.

1.4 License Keys

Kernel License The **Kernel License Key** is purchased and supplied together with the software of the TAINY ModemServer.

By specifying the **Kernel License Key** in *TAINY ModemServer Admin* the Administrator receives access to the highest administration level of the Kernel.

Gate License The **Gate License Key** is inserted using the *TAINY ModemServer Admin* administration software, but can also be inserted using *TAINY ModemServer Manager*.

The Gate license provides the right to have as many TAINY

Connect Clients simultaneously logged in to the TAINY ModemServer and therefore capable of establishing connections, as stipulated in the Gate License in question. Although any number of the available gates can be configured, i.e. TAINY Connect Clients assigned, using *TAINY ModemServer Manager*, dial-up lines and/or leased lines can only be established between the TAINY Connect Clients which are logged in to the TAINY ModemServer.

Not until the connection between the TAINY ModemServer and a TAINY Connect Client is closed or interrupted, e.g. by one or several devices logging out, can a different TAINY Connect Client log in to the TAINY ModemServer.

With the TAINY ModemServer a Gate License is issued for the following types of TAINY Connect Clients:

| | |
|-----|---|
| DNT | Hardware from Dr. Neuhaus such as TAINY Connect Modems, e.g. ZDUE-GPRS-PLUS-IV, ZDUE-LAN-PLUS-IV, TAINY GMOD-Sx, TAINY LMOD-Sx, as well as the software modem TAINY ComPortClient |
| CPC | TAINY ComPortClients (software modem from Dr. Neuhaus) |

1.5 The administration of the TAINY ModemServer

There are two programs for the administration of the TAINY ModemServer:

- *TAINY ModemServer Admin*:
Mainly for the release and assignment of user and administration privileges – see below
- *TAINY ModemServer Manager*:
Mainly for the configuration of the connections (= gates) and their assignment to the TAINY Connect Clients; monitoring of device statuses and connections – see below

With the TAINY ModemServer these programs are installed and run

- **locally on the computer on which the Kernel of the TAINY ModemServer is installed and run.**

TAINY ModemServer Admin

This software is used to write information about user and administration privileges on to the database of the TAINY Modem Server and to perform status controls and settings for the overall system. The tasks include:

- Installation of License Keys
- Creation/changing of accounts in which the access data are determined for:
 - the TAINY ModemServer Administrator
 - the TAINY ModemServer Manager
- Assignment of privileges to the TAINY ModemServer Manager
- Status control
- System settings

TAINY ModemServer Manager

In particular, *TAINY ModemServer Manager* serves to perform the following tasks:

- Setup and configuration of connections (= gates). Each TAINY Connect Client must be assigned a gate of the TAINY ModemServer.
- Setup and configuration of leased lines between TAINY Connect Clients
- Viewing of statuses of leased lines and dial-up connections between TAINY Connect Clients

2 Addressing, operating requirements and security

2.1 Addressing the TAINY ModemServer by TAINY Connect Clients

The TAINY ModemServer communicates with the TAINY Connect Clients via the TCP/IP protocol. The TCP protocol placed over this organizes the transmission of the TSC functions and is transparent for the TCP/IP connections to the TAINY Connect Clients. This means that the computer on which the TAINY ModemServer Kernel is run can, like any other server, be integrated into existing TCP/IP networks.

| | |
|--|---|
| TCP/IP addressing using IP address | The TAINY ModemServer Kernel can be reached via the Ethernet connection of the network card of the PC on which it is run, i.e. via its IP address or equivalent (see <i>Operating requirement: fixed or known address of the TAINY ModemServer Kernel</i> , page 14). |
| Special port number for communication with the TAINY Connect Clients | <p>The distinction between the TCP/IP connections to TAINY Connect Clients and other TCP/IP connections is made via the port number which is included in the address of each TCP/IP data packet. A TSC Client logs in to the TSC via the IP address of the TAINY ModemServer Kernel and the default port 26862 on the TMS. Each socket connection then negotiates a port for communication.</p> <p>In other words, all TAINY Connect Clients use a special port number in addition to the IP address of the computer concerned, to address the TAINY ModemServer Kernel.</p> <p>(The distinction between the individual connections to the TAINY Connect Clients is made via the TSC protocol using the gate name.)</p> <p>The default setting of the TAINY ModemServer Kernel is such that it can respond to any IP addresses. This means that the IP address of the Ethernet connection of the computer can be determined as required on the operating system side.</p> |
| IP address and port number configurable | It is possible to configure the TAINY ModemServer Kernel in such a way that it responds only to a particular IP address. The port number via which the TAINY Connect Clients receive access can also be configured. |

2.2 Operating requirement: fixed or known address of the TAINY ModemServer Kernel

... for access from external networks The TAINY ModemServer Kernel must have a fixed or known IP address. Only then can a TAINY Connect Client actively establish a connection to the TAINY ModemServer Kernel from an external network (GPRS, Internet).

(An IP address consists of a maximum of 4 three-figure numbers, each separated by a full stop, e.g.: 255.122.201.005)

The following options to obtain a fixed IP address are available:

Fixed IP address using leased line The computer on which the TAINY ModemServer Kernel is run is connected to the GPRS via a leased line. This is then usually assigned a fixed IP address by the network operator.

Fixed IP address using Internet Service Provider or The computer with the TAINY ModemServer Kernel can be reached via the Internet and is assigned a fixed IP address by the Internet Service Provider (can be applied for with some Internet Service Providers).


DynamicDNS provider with dynamic IP address assignment If the computer with the TAINY ModemServer Kernel is assigned its IP address dynamically by the Internet Service Provider, the computer must be registered with a DynamicDNS provider (DNS = Domain Name Server), upon which it receives a fixed name (URL = Uniform Resource Locator) in URL format (see *DynamicDNS* providers, page 51). This name can then be used to address it.

... for access from the local network If TAINY Connect Clients are in the same local network as the computer with the TAINY ModemServer Kernel, the following addressing options are available for their access to the TAINY ModemServer Kernel:

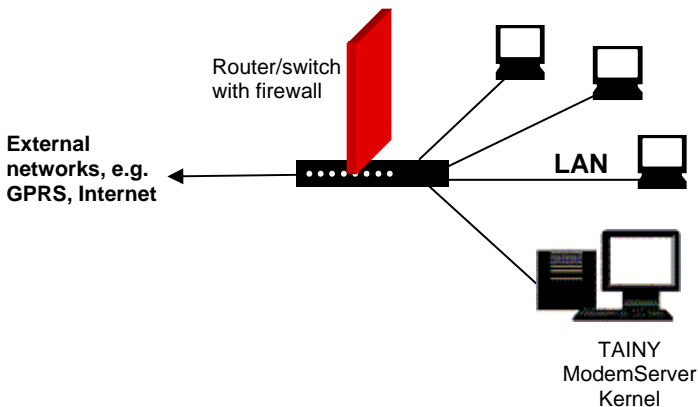
- Either they give the IP address of the computer on which the TAINY ModemServer Kernel is run

OR

- they use the name of the computer that it has in the LAN.

-  For TAINY Connect Clients no fixed or known IP address is required. You notify the TAINY ModemServer Kernel of your current IP address when you make contact with the TMS. The IP address is given in the individual data packets that you send. It therefore makes no difference if the IP address changes due to dynamic assignment. The TAINY ModemServer Kernel is therefore always informed of their currently valid IP addresses.

2.3 Security with firewalls



The TAINY ModemServer Kernel is integrated in the LAN like any other server. In accordance with the default setting, it can respond to all accesses to the LAN adapter of the computer, provided that the preset port number is addressed.

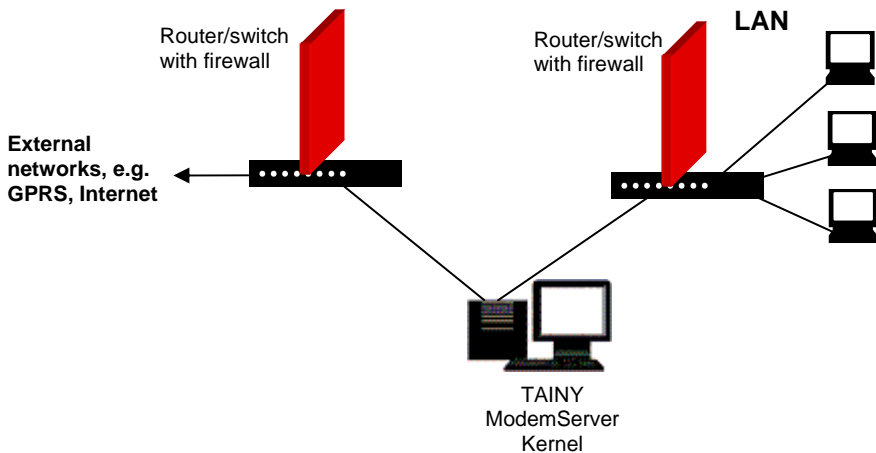
Complete encapsulation possible with firewalls

It is advisable to seal off the computer with the TAINY ModemServer Kernel from external networks using a firewall – see diagram above.

The PC on which the TAINY ModemServer is installed can also be fitted with several network cards, e.g. one for a connection to the Intranet (LAN), the other for the connection to the GPRS or Internet. In this case, the complete encapsulation of the TAINY ModemServer is possible using firewalls – see diagram below.

Because the IP addresses and port numbers to which the TAINY

ModemServer Kernel responses are configurable (see below), a tailored adjustment to existing or desired firewall landscapes can be made.



3 Installation and putting into operation; deinstallation

Prerequisites

- The CD containing the *TAINY ModemServer* software package is supplied. The Kernel License Key is also provided. This must be inserted following installation when starting *TAINY ModemServer Admin* for the first time - see page 27.
- PC with Windows 2000 Server or Windows Server 2003 server operating system; or PC with Windows 2000 Professional or XP Professional operating system.
Recommended: Windows 2000 Server or Windows Server 2003 server operating systems.
- Clock speed: at least 2 GHz recommended
- Main memory: at least 1 GByte recommended
- Hard disk: at least 10 GBytes free disk space
- Ethernet network adapter
- For the *TAINY ModemServer Admin* run on the same computer a screen resolution of at least 1024 x 768 pixels is required.
- To be able to install the program you must be registered with Windows as an administrator.

3.1 Installation

Run the installation program

1. Insert the TAINY ModemServer program CD into the CD-ROM drive of your computer. After the Installation Wizard has started, click the button for the installation of the *TAINY ModemServer Kernel*.

If the Wizard on the CD does not start automatically, start it manually:

- Click **Start, Run...**,
- After clicking on the **Browse...** button, change to the drive with the inserted CD.
- In the root folder, double-click the program name **install.exe**.

After the Wizard has started, click the button to install the Kernel software.

Effect:

The Installation Wizard is run.

Follow the instructions on the screen.

2. Follow the instructions on the screen.
-

Once installation is complete, the following software modules have been installed on the computer:

Installed software modules

- TAINY ModemServer Kernel
→ this manual, from page 20
- TAINY ModemServer Admin
→ this manual, from page 27
- TAINY ModemServer Manager
→ User Manual TAINY ModemServer Manager
- TAINY ComPortClient
→ User Manual TAINY ComPortClient

3.2 Further steps for putting the TAINY ModemServer into operation

Prompt to enter the Kernel License Key

1. Start *TAINY ModemServer Admin* for the first time.
→ *Start and login*, page 27 .
Enter the Kernel License Key as requested.
The first administration access with *TAINY ModemServer Admin* creates an Administrator Account.
-

2. Create a Manager Account using the administration software TAINY ModemServer Admin. This means determine the user name and password for accesses of the TAINY ModemServer Manager software.
→ *Manager Accounts*, page 32.
-

3. Set up and configure the connections (gates) of the TAINY ModemServer using the *TAINY ModemServer Manager* software.
→ User Manual TAINY ModemServer Manager
-

4. If required, insert a License Key to use the gates (Gate License):
→ *Licenses and License Keys*, page 43
-



The integration of the computer in networks and the configuration of firewalls requires corresponding network knowledge which is assumed in this manual. Ask your network administrator.

3.3 Deinstallation

You can uninstall the software modules of the TAINY ModemServer and the TAINY ComPortClient individually.
To do, proceed as follows:

Select

Start, All Programs, Neuhaus

→ **TAINY ModemServer Kernel**

OR

→ **TAINY ModemServer Admin**

OR

→ **TAINY ModemServer Manager**

OR

→ **TAINY ComPortClient**



uninstall

OR

You can also uninstall the software modules of the TAINY ModemServer and the TAINY ComPortClient via Windows Control Panel:

Start, Control Panel (classic view), Software.

4 The TAINY ModemServer Kernel

4.1 Checking the installation of the TAINY ModemServer Kernel

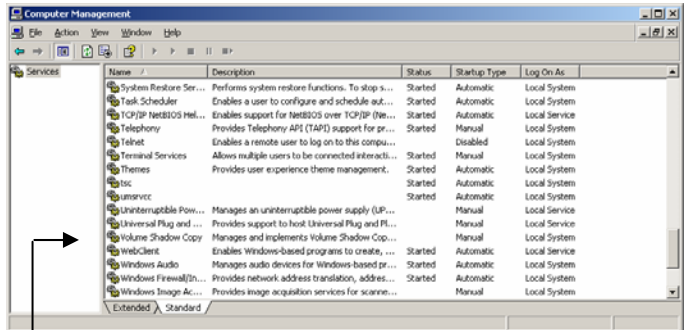
Check installation The TAINY ModemServer Kernel has been installed as a Windows service. It is run immediately following installation, and after each restart of the computer.

You can check it as follows (in Windows XP):

1. Click **Start, Control Panel**

2. In the *Control Panel* dialog box (classic view), double-click the **Computer Management** entry or icon.

3. In the *Computer Management* dialog box, double-click the **Services** entry or icon.



The entry "tsc" should be listed here.

To check whether the TAINY ModemServer Kernel is "listening" to the ports that are determined for the communication with TAINY Connect Clients, proceed as follows:

1. Click **Start, All Programs, Accessories, Command Prompt**

2. Enter: **netstat -a**

4.2 Configuration of IP address and port numbers

Configuration is normally not necessary. You can normally adopt the default setting. Only in special operating environments is it necessary to configure the IP address and/or port number.

Default setting

IP addresses
Port numbers

In accordance with the default setting, the TAINY ModemServer Kernel can respond to all IP addresses. This means that the IP address of the Ethernet connection of the computer can be determined as required in the operating system.

As soon as a TAINY Connect Client establishes the TCP/IP connection to the computer with the TAINY ModemServer Kernel, the TAINY ModemServer Kernel responds, provided that the correct port is addressed.

In the default setting, the following port number is set:

Port **26862** for accesses by TAINY Connect Clients (e.g. TAINY GMOD-S2, TAINY GPRS-RS232 (TSC))

Port **30370** for accesses by TAINY ModemServer Admin or TAINY **(Fixed setting)** ModemServer Manager

IP addresses and port numbers configurable

You can determine that the TAINY ModemServer Kernel reacts

- for accesses by TAINY Connect Clients only to a particular IP address - see page 24.

Irrespective of this, you can determine that other port numbers are used for communication

- with TAINY Connect Clients
- see page 24.

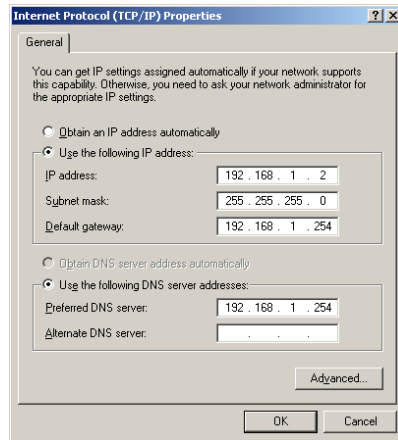


When changing IP addresses of the TAINY ModemServer Kernel, make sure that the new setting corresponds to the one made under Windows for the network connection in question.

Under Windows XP the IP address of the network connection can be determined as follows:

Click **Start, Control Panel, Network Connections**: right-click the LAN adapter icon and click **Properties** in the

context menu. In the *LAN connection properties local network* dialog box, mark the entry **Internet Protocol (TCP/IP)** under "This connection uses the following elements" on the *General* tab, then click the **Properties** button so that the *Internet Protocol (TCP/IP) Properties* dialog box appears. Then make the setting as required – see screenshot below.



Example



When changing IP addresses and/or port numbers of the TAINY ModemServer Kernel, make sure that the new setting harmonizes with the firewall settings of your network.



When changing port numbers, make sure that the TAINY Connect Clients each use the same port number. In the default setting, these are preset to the same port number as the one to which the TAINY ModemServer Kernel is preset in the default setting.



Also make sure that the TAINY Connect Clients use the IP address to which the TAINY ModemServer Kernel and the LAN adapter of its computer are set.

4. To enable the TAINY ModemServer Kernel to adopt the changes, end the running of the TAINY ModemServer Kernel and then restart it:

Click

**Start, All Programs, Neuhaus,
TAINY ModemServer Kernel,
Stop Service
or
Start Service**

(in accordance with the standard installation presettings for the Start menu entry).



Please note:

The TAINY ModemServer is designed for continuous operation and permanent accessibility. The TAINY Connect Clients are usually configured in such a way that they automatically log in to the TAINY ModemServer or, if the connection is interrupted, automatically log in again. If the TAINY ModemServer cannot be reached because, for example, the TAINY ModemServer Kernel (service) is terminated or restarted, the TAINY Connect Clients – irrespective of their configuration – continuously attempt a redial for which the data packets are transmitted over the network. Please bear this in mind in particular when using networks subject to charges.

4.3 Operation

Operational and configuration of the TAINY ModemServer system

The TAINY ModemServer Kernel is operated exclusively using

- *TAINY ModemServer Admin* (see page 27 ff.) and
- *TAINY ModemServer Manager* (see User Manual *TAINY ModemServer Manager*).

Starting and stopping operation

The TAINY ModemServer Kernel is started automatically when the computer is powered up.

Operation can be stopped and started as follows:

Click

**Start, All Programs, Neuhaus,
TAINY ModemServer Kernel,
Stop Service
or
Start Service**

(in accordance with the standard installation presettings for the Start menu entry).



Please note:

The TAINY ModemServer is designed for continuous operation and permanent accessibility. The TAINY Connect Clients are usually configured in such a way that they automatically log in to the TAINY ModemServer or, if the connection is interrupted, automatically log in again. If the TAINY ModemServer cannot be reached because, for example, the TAINY ModemServer Kernel (service) is terminated or restarted, the TAINY Connect Clients – irrespective of their configuration – continuously attempt a redial for which the data packets are transmitted over the network. Please bear this in mind in particular when using networks subject to charges.

Functions

During operation the TAINY ModemServer Kernel reacts to the queried connection requirements of the TAINY Connect Clients and establishes the connections.

A log is kept of all communication events and procedures. The log file is a pure text file stored in the folder *TMS Installation Folder*\log.

5 The TAINY ModemServer Admin program

5.1 Start and login

Start TAINY ModemServer Admin

Click **Start, All Programs, Neuhaus, TAINY ModemServer Admin, TAINY Admin**

(in accordance with the standard installation settings)

When the program starts you are asked to log in and authenticate yourself:



Example

Login with authentication

- **for first access** When accessing for the first time, you freely determine:

| | |
|------------------|----------------------|
| <i>Username:</i> | (max. 32 characters) |
| <i>Password:</i> | (max. 32 Characters) |

(For permissible parameter values and lengths, see section *Notes on parameter values and lengths*, p. 49)



Make a note of the username and the password as you must enter them in the future when logging in.

Enter the following in the *Server* box:

- Server:*
- As *TAINY ModemServer Admin* is being run on the same computer as the Kernel of the TAINY ModemServer, the address of the server is:

`localhost`

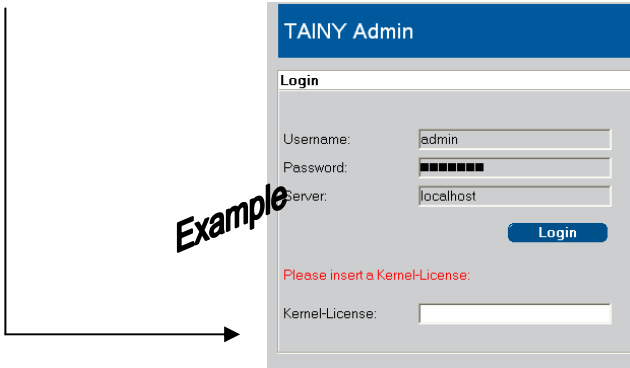
OR

`127.0.0.1`

Then click **Login**.



When, after clicking on **Login**, you are asked to insert the **Kernel License Key**, comply with this request.



After entering the Kernel License Key, click **Login** again.

Consequence:

The Kernel License Key is checked. If it is correct, the following message appears:

"Kernel License OK. Please log in again!"

Then click once again in **Login**.

Login with authentication

- **for later access** Enter the username and the password that were determined for the Administrator Account during the first access; for the server, enter: localhost or 127.0.0.1

Therefore enter as follows:

| | | |
|------------------|----|---|
| <i>Username:</i> | } | determined during 1st access – s. above |
| <i>Password:</i> | | |
| <i>Server:</i> | | localhost |
| | or | 127.0.0.1 |

Then click **Login**.

5.2 The user interface

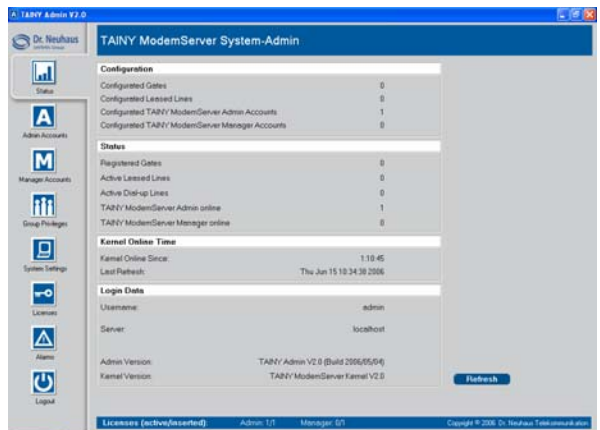
Operation

After the start and successful login the program offers administration and control functions on several tabs.

- The program is operated in the same way as other Windows programs; you click icons or buttons, and activate checkboxes or radio buttons, etc.
- In tabular displays you change the column width by dragging the column line in the column header. **Tip:** When you close the window using the *Logout* icon, the column width currently set is retained.

Icons to call up administration and control functions Using the icon bar on the left you can change to the required tab with the corresponding administration or control functions:

Icon bar



Status tab when logged in as Administrator



Status

Display of information on, for example

- the number of configured gates, configured leased line and configured Administration Accounts
 - the status of gates, dial-up lines and leased lines
 - the Kernel online time
- see *Status*, page 35



Admin Accounts

Display and changing of the Administrator Account

→ see *Administrator Accounts*, page 46



Set-up and configuration of the Manager Account; assignment of privileges with regard to the creation and deletion of gates and leased lines

Manager Accounts → see *Manager Accounts*, page 32



If TAINY Connect Clients have been put together to form groups, administration privileges of the TAINY ModemServer Manager can be limited or authorized with regard to these groups.

Group Privileges → see *Group Privileges*, page 35



Displays the TAINY ModemServer settings.

System Settings → see *System Settings*, page 39



Shows which licenses have been purchased and inserted.
Possibility to insert additional Gate License Keys.

Licenses → see *Licenses and License Keys*, page 43



Shows the table of recorded alarm messages.

These are reports of special events that have occurred in particular during communication with TAINY Connect Clients, e.g. establishment of a connection, failure of a connection, etc.

Alarms → see *Alarm*, page 42



Logout closes the current window, and the login window appears.

Logout → see *Logout*, page 48

Status bar Shows how many of the administration licenses purchased are currently in use.

Lizenzen (aktiv/registriert): Admin: 1/1 Manager: 0/1 Copyright © 2005 Dr. Neuhaus Telekommunikation

5.3 Ending the TAINY ModemServer Admin program

Ending TAINY ModemServer Admin

Click the *Close* icon in the top right corner of the program window.



6 Administration using TAINY ModemServer Admin

6.1 Manager Accounts

The creation and configuration of gates for TAINY Connect Clients and other control tasks are performed with the *TAINY ModemServer Manager* administration software. The access data for access with *TAINY ModemServer Manager* are recorded in the Manager Account.

Manager License A Manager License is provided. The use of this license in the form of a Manager Account is released automatically as soon the Manager Account is created, i.e. username and password for the *TAINY ModemServer Manager* have been determined. There is then no need to insert a License Key.

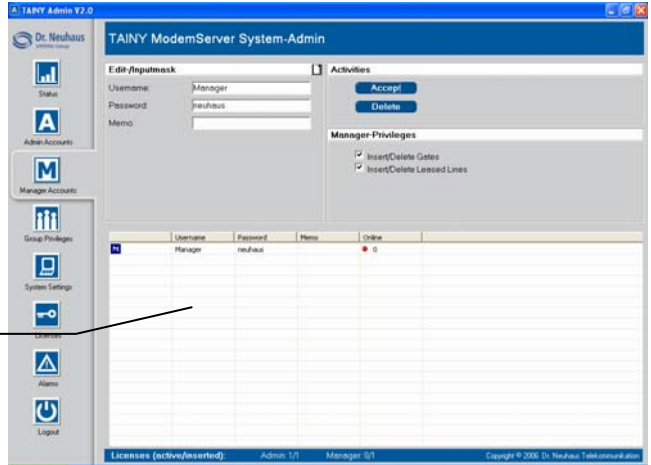
No additional Manager Accounts can be created on the TAINY ModemServer.

To create, view or change the Manager Account, proceed as follows:



Manager Accounts

Click the **Manager Accounts** icon to display the *Manager Accounts* tab.



Manager Account list



Only 1 Manager Account can be created on the TAINY ModemServer.

6.1.1 Setting up / changing / deleting a Manager Account

New / change


1. Creating a new Manager Account:

If necessary, click the **New**  icon to empty the input mask.

Then continue under 2.

Changing a Manager Account:

In the Manager Account list, select the entry of the account that you want to change.
Then continue under 2.

 The *Username* cannot be changed. If the username is to be changed, the existing Manager Account must be deleted and then a new account created.

2. Make the required entries in the input fields above the Manager Account list. Determine the following:

Username (max. 32 characters)


Password (max. 32 characters)

Description (max. 128 characters)

(For permissible parameter values and lengths, please consult the section *Notes on parameter values and lengths*, p. 49)

Make a note of these details



 ***Username and Password are the access data for the TAINY ModemServer Manager. They are to be handed over to the user in confidence.***

3. Determine which privileges the *TAINY ModemServer Manager* is to have.

Manager-Privileges

Insert/Delete Gates

Insert/Delete Leased Lines

Non-active checkboxes mean that the *TAINY ModemServer Manager* does not have the options given, i.e. to insert/delete gates or leased lines. He has reading rights only.

4. Finally, click the **Accept** button.

Effect:

The (changed) Manager Account is included and displayed in the Manager Account list. In addition, the account data are written into the account database of the TAINY ModemServer and put into effect.

Delete

Deleting a Manager Account:

1. In the Manager Account list, select the entry to be deleted.



You can only delete a Manager Account if it is not currently being used.

2. Then click the **Delete** button.
-

6.2 Status



Status

Display only

Click the **Status** icon to display the *Server Status* tab.

The screenshot shows the TAINY ModemServer System-Admin web interface. The left sidebar contains navigation icons for Status, Admin Accounts, Manager Accounts, Group Privileges, System Settings, Licenses, Alerts, and Logout. The main content area displays the following information:

| Configuration | |
|---|---|
| Configured Gates | 0 |
| Configured Leased Lines | 0 |
| Configured TAINY ModemServer Admin Accounts | 1 |
| Configured TAINY ModemServer Manager Accounts | 0 |

| Status | |
|----------------------------------|---|
| Registered Gates | 0 |
| Active Leased Lines | 0 |
| Active Dial-up Lines | 0 |
| TAINY ModemServer Admin online | 1 |
| TAINY ModemServer Manager online | 0 |

| Kernel Online Time | |
|----------------------|--------------------------|
| Kernel Online Since: | 1:10:45 |
| Last Refresh: | Thu Jun 15 10:34:38 2006 |

| Login Data | |
|-----------------|-------------------------------------|
| Username: | admin |
| Server: | localhost |
| Admin Version: | TAINY Admin V2.0 (Build 2006/05/04) |
| Kernel Version: | TAINY ModemServer Kernel V2.0 |

A **Refresh** button is located at the bottom right of the main content area. The status bar at the bottom shows: Licenses (active/inserted): Admin: 1/1 Manager: 0/1 Copyright © 2006 Dr. Neuhaus Telekommunikation.

The *Status* tab provides information on the general status of the TAINY ModemServer.

Refresh display

By clicking the **Refresh** button you bring the displayed data up to date. The data displayed include the following:

- the configuration:
the number of configured gates, configured leased lines and configured accounts for accesses for *TAINY ModemServer Manager* and *TAINY ModemServer Admin*
- the status:
of gates, dial-up lines and leased lines; also indicates how many *TAINY ModemServer Managers* or *TAINY ModemServer Adkins* are currently online (a maximum of 1 each with the TAINY ModemServer).
- Kernel online time
- Login data:
Displays e.g. the username with which you have logged in to the TAINY ModemServer as TAINY ModemServer Admin. Also displays the software versions of *TAINY ModemServer Admin* and TAINY ModemServer Kernel.

6.3 Group Privileges

Several gates or their TAINY Connect Clients can be put together

to form a group. For example, you could assign the meter data retrieval modems in a certain area to a particular group, the corresponding TAINY Connect Clients of another area to another group, etc.

Even if no group has been defined by the user, a default group exists (marked as *). All gates and their TAINY Connect Clients are automatically assigned to this group at first.

With the administration function *Group Privileges* the *TAINY ModemServer Admin* software can determine which privileges the *TAINY ModemServer Manager* has with regard to the groups.

To view the current assignment of privileges, to issue or restrict privileges, proceed as follows.



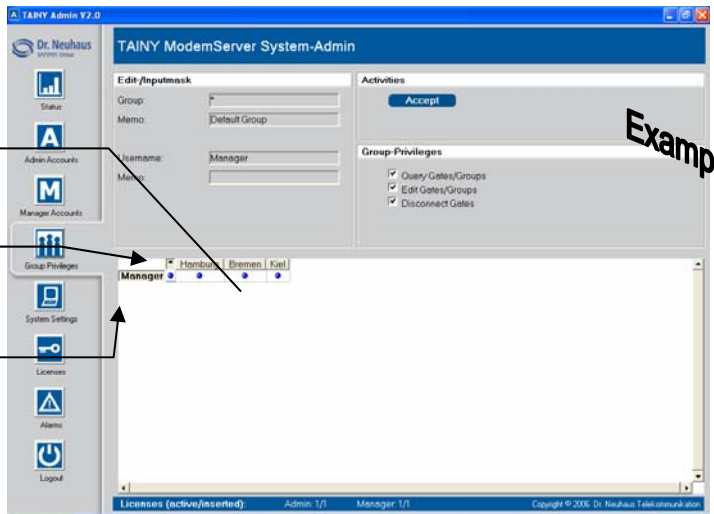
Group Privileges

Click the **Group Privileges** icon to display the *Group Privileges* tab:


GROUP MATRIX

Manager Accounts


Manager Account



The existing groups are listed in the column header of the matrix, and the TAINY ModemServer Manager Accounts in the line header.

A  placed at the intersection of column and line means that the TAINY ModemServer Manager Account has Group Privileges for the corresponding group.

View Group Privileges

To see exactly which privileges these are, click on the  in question. The exact privileges that the Manager Account currently has with regard to this group are then specified above the *Group Matrix* under *Group Privileges*:

Group Privileges

- *Query Gates / Groups* comprises reading privilege only with regard to the gates and groups created.
- *Edit Gates / Groups* comprises:
 - the insertion and deletion of gates,
 - the formation and deletion of groups and
 - the assignment of gates to groups.
- *Disconnect Gates* comprises the right to disconnect TAINY Connect Clients from the TAINY ModemServer, whereby existing dial-up lines and leased lines between the TAINY Connect Clients concerned are disconnected.



On the *Manager Accounts* tab you merely determine which privileges a TAINY ModemServer Manager has with regard to the **Default Group** *.

6.3.1 Assigning / revoking group privileges to a Manager Account

Assign privileges / 1. revoke privileges At the intersection of column (= Group) and line (= TAINY ModemServer Manager Account), mark (= click) the table cell that stands for the Group required.

The screenshot shows the 'Edit-/Inputmask' form with the following fields:

- Group: Kiel
- Memo: (empty)
- Username: Manager
- Memo: (empty)

The 'Group-Privileges' table is as follows:

| | Hamburg | Bremen | Kiel |
|---------|--------------------------|--------------------------|-------------------------------------|
| Manager | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

The 'Group-Privileges' section has the following options:

- Query Gates/Groups
- Edit Gates/Groups
- Disconnect Gates

An 'Accept' button is located in the 'Activities' section.

Consequence:

The group name concerned and the memo written for it are displayed in the *Edit/Input mask*.

Below this, the username of the Manager Account is displayed, plus the memo written for this Manager Account.

2. Define privileges:

1. By activating the relevant option box(es) under *Group Privileges*, define the privileges which the Manager Account

is to have with regard to the group indicated – For explanation of privileges see *Group Privileges*, page 37.

- Query Gates / Groups*
- Edit Gates / Groups*
- Disconnect Gates*

If the 2nd option box is active, the 1st is automatically active. If the 3rd option is active, the first two are also automatically active.

3. Click the **Accept** button.

6.4 System Settings

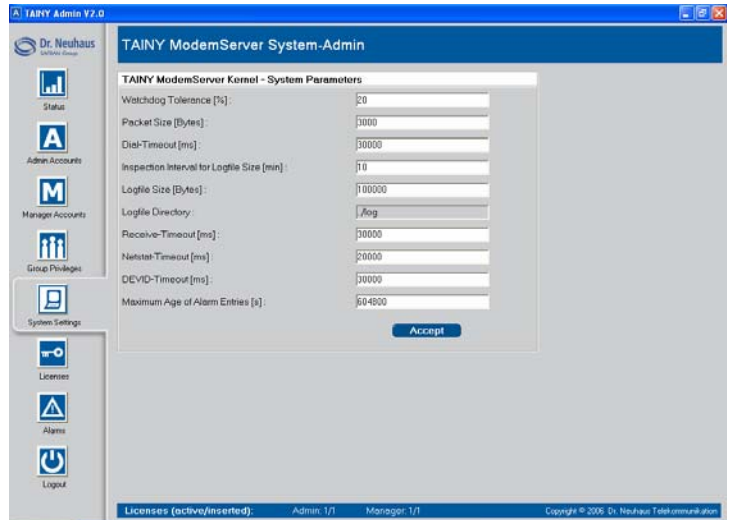
Displays important settings of the TAINY ModemServer system; possibility to change settings.

To view or change the currently effective system settings, proceed as follows:



System Settings

1. Click the **System Settings** icon to display the *System Settings* tab.



2. Enter the desired value in the appropriate box - see *Parameters for system settings*, page 39.
3. Click **Accept**.

6.4.1 Parameters for system settings

Watchdog Tolerance [%]

Default: 20%.

Watchdog is the time interval, given in minutes, after which the TAINY ModemServer expects a Watchdog packet from the TAINY Connect Client. This time interval is determined using *TAINY ModemServer Manager* for the individual gates.

The *Watchdog Tolerance* value determines the extent to which the time interval may exceed or fall short of the fixed

| | |
|--|---|
| | <p>value without such deviations being interpreted as the omission of the Watchdog packet.</p> <p>If the omission of the Watchdog packet is identified, the TAINY ModemServer closes the socket connection to the TAINY Connect Client, and the Client has to log in to the TAINY ModemServer again.</p> |
| Packet Size [Bytes] | <p>Default: 3,000.</p> <p>This value influences the size of the data packets transmitted by the TAINY ModemServer to the TAINY Connect Clients.</p> |
| Dial Timeout [ms] | <p>Default: 30,000 (= 30 seconds).</p> <p>If the TAINY ModemServer receives a request from a TAINY Connect Client to establish a dial-up line, the Dial Timeout value determines the time limit within which the destination TAINY Connect Client must have reacted. If the time is exceeded, the destination TAINY Connect Client is disconnected from the TAINY ModemServer, and this Client will then attempt to log in to the TAINY ModemServer again.</p> |
| Inspection Interval for Logfile Size [min] | <p>Default: 10</p> <p>Indicates the intervals at which the size of the logfile is to be inspected. Once the maximum size is reached, a new file is created.</p> |
| Logfile Size [Bytes] | <p>Default: approx. 10,000,000 Bytes (= approx. 10 MB)</p> |
| Logfile Directory | <p>Default: ../log. Cannot be changed.</p> <p>Directory in which the logfiles are created. A maximum of 10 logfiles can be created. If a further logfile is created, the oldest one is deleted. Logfiles carry the attribute <i>read only</i>.</p> |
| Receive Timeout [ms] | <p>Default: 30,000 (= 30 seconds)</p> <p>During data transmission to a TAINY Connect Client the TAINY ModemServer requests feedback from the TAINY Connect Client at certain time intervals to confirm that the TAINY Connect Client can still be reached. If this feedback is not received from the TAINY Connect Client, the TAINY ModemServer "knows" that the connection has been interrupted and stops the data transmission.</p> <p>The <i>Receive Timeout</i> value determines the intervals at which data transmissions are inspected to establish whether the connection is still intact. The inspection prevents the data stream from going nowhere during longer data transmissions, should the connection to the destination TAINY Connect Client be interrupted.</p> |
| Netstat Timeout [ms] | <p>Default: 20,000 (= 20 seconds)</p> <p>As soon as a TAINY Connect Client authenticates itself on</p> |

| | |
|-------------------------------|--|
| | <p>the TAINY ModemServer, the TAINY ModemServer requests certain device and status data from the TAINY Connect Client. If the TAINY ModemServer does not receive this data within the time limit fixed by <i>Netstat</i>, the TAINY ModemServer closes the socket connection to the TAINY Connect Client, and the Client must log in to the TAINY ModemServer again.</p> |
| DEVID Timeout [ms] | <p>Default: 30,000 (= 30 seconds)</p> <p>When the TAINY ModemServer requests the Device ID of a TAINY Connect Client it must receive the ID within the time determined by the DEVID Timeout. Otherwise the TAINY ModemServer closes the socket connection to the TAINY Connect Client, and the Client must log in to the TAINY ModemServer again.</p> |
| Max. Age of Alarm Entries [s] | <p>Default: 6,048,000 (= 70 days)</p> <p>The alarm entries are checked once a day with regard to their age, and alarms which have passed the maximum age are deleted.</p> |

**Please note:**

The TAINY ModemServer is designed for continuous operation and permanent accessibility. The TAINY Connect Clients are usually configured in such a way that they automatically log in to the TAINY ModemServer or, if the connection is interrupted, automatically log in again. If the TAINY ModemServer cannot be reached because, for example, the TAINY ModemServer Kernel (service) is terminated or restarted, the TAINY Connect Clients – irrespective of their configuration – continuously attempt a redial for which the data packets are transmitted over the network. Please bear this in mind in particular when using networks subject to charges.

6.5 Alarms

All events occurring during the establishment, maintenance and disconnection of lines are recorded as alarm messages in a table by the TAINY ModemServer while *TAINY ModemServer Admin* is running. This list also records any changes made to the configuration.

The table can contain a maximum of 10,000 messages. Once this number of entries is reached, the 50 oldest entries are deleted to allow new entries to be written.

To display the recorded alarm messages, proceed as follows:



Alarms

Click the **Alarms** icon to display the *Alarms* window:

| ID | Alarm Time | Gate-Group Name | Alarm Description | Alarm Type |
|----|-------------------|-----------------|-------------------|-------------|
| 10 | Thu Jun 15 10:... | Bresen | change group p... | Group-Alarm |
| 9 | Thu Jun 15 10:... | Kiel | change group p... | Group-Alarm |
| 8 | Thu Jun 15 10:... | Manager | act insert | User-Alarm |
| 7 | Thu Jun 15 10:... | Manager | user online | User-Alarm |
| 6 | Thu Jun 15 10:... | Hamburg | insert group | Group-Alarm |
| 5 | Thu Jun 15 10:... | Bresen | insert group | Group-Alarm |
| 4 | Thu Jun 15 10:... | Kiel | insert group | Group-Alarm |
| 3 | Thu Jun 15 10:... | Hamburg | change group p... | Group-Alarm |

(You can alter the width of a column by dragging a column line in the column header.)

View particular alarm message

Select the entry in the alarm table (= click the entry).

Consequence:

The entry is displayed in the mask above the table.

Delete all alarm messages

Click **Delete Table**.

Effect:

All entries in the table are deleted.

6.5.1 Parameters displayed in the alarm table

Display only:

| | |
|--------------------------|---|
| id | Serial number of the alarm message |
| Alarm Time | Date and time of alarm issue |
| Gate/Group Name | Indicates the name of the user or group at whose gate the cause of the alarm message occurred. |
| Alarm Description | Brief description of the alarm. |
| Alarm Type | Indicates the alarm category. Typical administrator alarms are user alarms. Other alarm types are: dial-up line alarm, leased line alarm, gate alarm, group alarm. These are displayed in the TAINY ModemServer Manager. |

6.5.2 Exporting alarm messages to a file

You can export the alarm table to a file in csv format. (This is pure text with values separated by commas or semi-colons.)

Export To do so, proceed as follows:

1. Click **Export**.
-
2. Using the dialog box displayed, determine the folder and the file name under which the data are to be saved.
-

6.6 Licenses and License Keys

To use functions, corresponding licenses must be purchased. For

the TAINY ModemServer the following licenses are available:

- Kernel License
- Administrator License (free) - do not insert License Key!
- Manager License (free) - do not insert License Key!
- Gate License*

Kernel License:

Insert License Key during first administration access

The Kernel License is provided. The Kernel License Key is inserted when *TAINY ModemServer Admin* is run for the first time - see *Start and login*, page 27.

Administrator License:

License Key not inserted

1 Administrator License is provided. The use of this license in the form of an Administrator Account is released automatically during the first access of TAINY ModemServer Admin. It is not necessary to insert a License Key.

Manager License:

License Key not inserted

1 Manager License is provided. The use of this license in the form of a Manager Account is released automatically as soon as the Manager Account is created using *TAINY ModemServer Admin*, i.e. the username and password are determined for *TAINY ModemServer Manager*. It is not necessary to insert a License Key.

Gate License:

Insertion of License Key required

The Gate License for the use of a certain number of gates is provided. The corresponding Gate License Key is supplied with the software. The Gate License Key must be inserted using *TAINY ModemServer Admin**. Only then can TAINY Connect Clients establish connections with each other.

* Gate License Keys can also be inserted using the administration software *TAINY ModemServer Manager*.

6.6.1 Displaying registered licenses, inserting Gate License Key

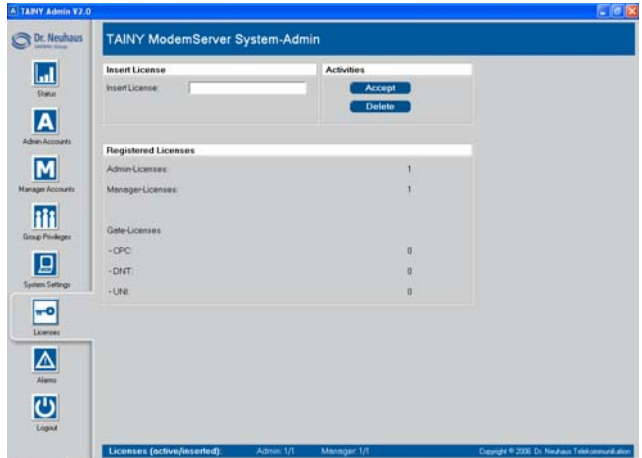
To view the current license status or to insert a License Key, proceed as follows:



Licenses

1. Click the **Licenses** icon to display the *Licenses* tab.

The *Licenses* tab shows which licenses have been registered and can therefore be used.



Display of the inserted licenses for the Administrator

Inserting License Key

Proceed as follows:

1. Enter the License Key in the **Insert License** box.
2. Click **Accept**.

Deleting license

Gate Licenses can be deleted from the database of the TAINY ModemServer.

Proceed as follows:

1. Enter the License Key in the **Insert License** box.
2. Click **Delete**.

6.7 Administrator Accounts

Administration access to the TAINY ModemServer using the *TAINY ModemServer Admin* administration software on the basis of a single Administrator Account is given automatically:

- following entry of the username and password (freely selectable), as well as the Kernel License Key. These data are requested by the TAINY ModemServer when accessing with the *TAINY ModemServer Admin* administration software for the first time.

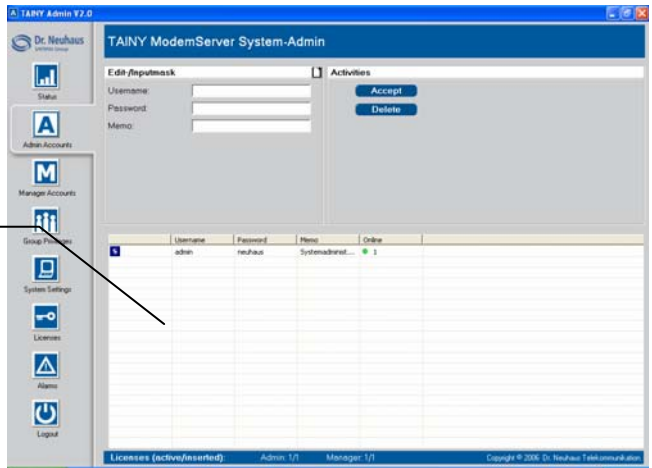
To view or change the Administrator Account, proceed as follows:



Admin Accounts

Click the **Admin Accounts** icon to display the *Admin Accounts* tab.

Admin Account list



Only 1 Administrator Account can be created on the TAINY ModemServer.

6.7.1 Changing or adding to the password / description of the Administrator Account

1. Select the entry of the account in the Admin Account table.

2. Make the required entries in the input fields above the Admin Account list. Determine the following:

Password (max. 32 characters)

Description (max. 128 characters)



The *Username* cannot be changed.

(For permissible parameter values and lengths, please consult the section *Notes on parameter values and lengths*, S. 49)



Make a note of these details

3. Finally, click the **Accept** button.


Effect:

The changed Administrator Account is included and displayed in the Admin Account table. In addition, the account data are written into the account database of the TAINY ModemServer and put into effect.

6.7.2 Data displayed in the Admin Account list

Display only:

Online


-  Green: Administrator access to the TAINY ModemServer Kernel is currently taking place via this account.

Counter

Indicates how many TSC Manager accesses are currently taking place.

Example:

If 3 TSC Managers have each logged in with admin/neuhaus:

| | User | Password | |
|--|-------|----------|---|
| | admin | neuhaus | 3  |

6.8 Logout

Logout closes the current window, and the login window appears.

6.8.1 Performing logout



Click the **Logout** icon.

Effect:

The login window appears.

Logout

7 Notes on parameter values and lengths

Permissible parameter values and lengths in the TAINY ModemServer for Username, Password and Description are given in the following.

Username

Max. 32 characters

Permissible: All displayable ASCII characters (20-7E hex) except "/" (slash)

!"#\$%&'()*+,:;<=>?@[^_{}~ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz0123456789

Password

Max. 32 characters

Permissible: All displayable ASCII characters (20-7E hex) except "/" (slash)

!"#\$%&'()*+,:;<=>?@[^_{}~ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz0123456789

Description

Max. 128 characters

Permissible: All displayable ASCII characters (20-7E hex) except "/" (slash, asterisk)

!"#\$%&'()*+,:;<=>?@[^_{}~ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz0123456789

8 Annex: Glossary

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 to denote 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.

COM Port, virtual COM Port The term "COM Port" (Communication Port) refers to a serial interface (V.24, RS-232) on a Windows PC. Application programs use COM Ports for data transmission to various devices, e.g. modems, PCs, terminals, etc. A COM Port can be a physical COM Port or a software interface in the PC (virtual COM Port). For application programs, virtual COM Ports behave like physical COM Ports, however the data can be rerouted to other interfaces.

Data packet, Datagram In the transfer protocol →TCP/IP data are sent in the form of data packets known as IP datagrams. An IP datagram is structured as follows:

| | | |
|-----------|----------------------------|----------------|
| IP header | TCP, UDP, ESP, etc. 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)

DynamicDNS providers

offer the option to be accessible via a fixed Internet address

Also *Dynamic DNS providers*. Each computer that is connected to the Internet has an IP address (IP = Internet Protocol). An IP address consists of 4 numbers, separated by full stops, which can each have up to three digits. If the computer is online via a telephone line by modem, ISDN, GPRS 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 supplies a small program which has to be installed and run on 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 assignment 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 assigned to this hostname. The IP address is transmitted back to the remote computer which now uses it as the destination address. This now leads to exactly the desired local computer.

In principle, 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.

You will find DynamicDNS providers on the Internet at the following address: <http://netzadmin.org/ddns-provider.php>

**Gate
(=connection)
active / inactive**

An inserted and configured gate can be deactivated. An assigned TAINY Connect Client can then log in to the TAINY ModemServer, but cannot establish or receive a connection – neither dial-up line nor leased line.

Gateway

This term is often used to mean the same as *Router*. It is a device which connects physically separated networks via a telecommunications line. This change in meaning is due not least to the fact that Microsoft systems request the IP address for the default router as the gateway address.

In actual fact, a gateway is a device (usually a fully-fledged computer) which can connect networks with completely different address types, incompatible protocols, etc.

GPRS

GPRS (**General Packet Radio Service**) is an additional service of GSM network operators (GSM = **G**lobal **S**ystem for **M**obile **C**ommunications) specially for data transmissions. Compared with other services of mobile radio networks such as telephone and SMS (**S**hort **M**essage **S**ervice) GPRS offers the following advantages:

- Permanent availability of the GPRS network for immediate transmissions: Since data are not transmitted over the GPRS network as a data stream but in packets with packet-switching technology there is a permanent virtual connection between the communicating computers. In contrast to, for example, telephony no fixed transmission channel is switched which is exclusively available to the communicating subscribers for the duration of the connection. Instead the available network resources are used jointly with others in a time-slot process. The individually addressed data packets are passed to the network and find their way through the network infrastructure to the recipient. The consequence of this: The communicating computers are permanently online, almost as if they were connected via a leased line. If a volume rate is charged, only the volume of the data has to be paid for.
- Network capability: GPRS also establishes connections via the Internet to any other computer with an Internet connection. And if this computer is also installed in a company-internal Intranet then a connection to this network is also possible.
- Fast transmission: With downloads up to 4 x 9600 bps are achieved and with uploads up to 1 x 9600 bps (GPRS Class 10).

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 full stops.

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 address | | |
| Class B | Net. addr. | | Host address | |
| Class C | Network address | | | 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 | No. of bytes for the network addr. | No. of 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 x 256 x 256 hosts (3 bytes address space). Class B networks can occur 64 x 256 times and can each contain up to 65,536 hosts (2 bytes address space: 256 x 256). Class C networks can occur 32 x 256 x 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 x 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.

online / offline

A TAINY Connect Client "connected" or logged in to an active gate is online when it transmits Watchdog data packets to the TAINY ModemServer and thus signals that it is accessible. Otherwise it is offline.

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.

**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.

Router A device that forwards data packets across networks to their destination. It connects at least 2 networks, normally a LAN and a WAN (Wide Area Network), e.g. the local network to the Internet, but also LANs or WANs.

Routers communicate with each other e.g. via the ICMP protocol in order to ascertain the best route between remote hosts. Using the resulting routing tables the data packets to be forwarded are taken to their destination by the fastest route.

Leased Line mode (LL mode) in the TAINY ModemServer In LL mode (LL – Leased Line) a different TAINY ModemServer gate is firmly assigned to the gate in question. This means that the two TAINY Connect Clients connected to these gates in LL mode are connected to each other as via a leased line. The initiation of a call by a TAINY Connect Client or the application run on it is then redundant, as is the specification of a destination call number.

Configuration is performed using the TAINY ModemServer Manager – see the *TAINY ModemServer Manager* manual.

Switch A device, connected to the network cards of computers, to connect the computers to each other as a network. The switch reads the addresses of the data packets to be transmitted and then routes the data packets only to the desired destination address or destination computer. A switch therefore functions differently to a *hub* which was formerly used to link several computers. A hub simply forwards the data packets to be transmitted to all the computers in the network.

TCP/IP (Transmission Control Protocol/ Internet Protocol) Network protocols which are used for the connection of two computers in the Internet. (→ Data Packet, Datagram)

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.

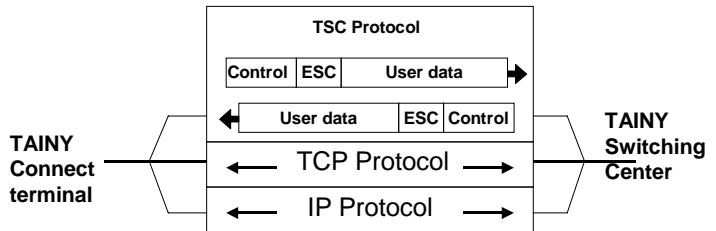
On a Windows PC the WINSOCK.DLL (or WSOCK32.DLL) takes over the handling of both these protocols.

TSC Protocol

The TSC protocol is a standard determined by Dr. Neuhaus for the exchange of user data as well as check and control information between the TAINY ModemServer and the TAINY Connect Clients via TCP/IP-based networks – both wired (Internet, Intranet (LAN)) and wireless (GPRS) networks.

Communication between the TAINY Connect Clients and the TAINY ModemServer takes place via the TSC protocol. Placed over the TCP/IP protocol, the TSC protocol bidirectionally transmits the user data as well as control and status information, the beginning of which is indicated by Escape characters. All user data are transmitted in encrypted form to avoid the transmission of the data in clear text.

The endpoints of the TSC protocol are the TAINY Connect Client on the one side, and the relevant gate of the TAINY ModemServer on the other. Here the data received by the TAINY Connect Client are unpacked from the TSC protocol, then repacked into the TSC protocol for transmission to the destination Client.



Elements of the TSC Protocol

Login process

The TSC protocol contains the procedures for the login of the TAINY Connect Clients to the TAINY ModemServer. These include the checking of the gate name and password, the handing over of the Session Key for the encryption of the user data, and the exchange of the preset Watchdog time intervals.

Exchange of Watchdog packets

Watchdog packets are transferred via the TSC protocol in configurable time intervals. In this way, the link to the connected TAINY Connect Client is monitored.

Line active / not active

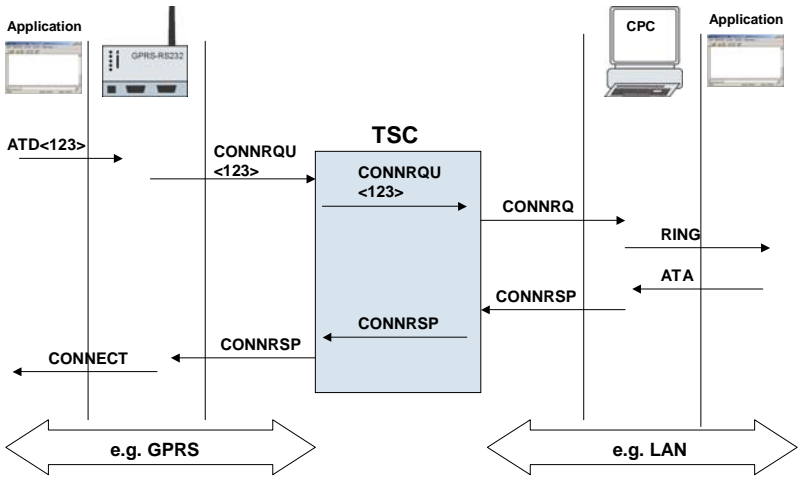
A line to a TAINY Connect Client is active as soon as a dial-up line has been initiated or a leased line established. For a dial-up line the "active" status is reached when the TAINY Connect Client has successfully logged in to the TAINY ModemServer with its gate name and password and has requested a dial-up line to another TAINY Connect Client. A dial-up line is no longer active as soon as the line has been disconnected.

A leased line is active as soon as it is set up on the TAINY ModemServer – provided that the relevant TAINY Connect Clients are online. A leased line is no longer active as soon as the line is disconnected – on the TAINY ModemServer, or by one of the TAINY Connect Clients no longer being online.

Circuit-Switched mode (CS mode) in the TAINY ModemServer

In CS mode (CS – Circuit Switched) the gate in question waits to be requested by the TAINY Connect Client connected here to establish a connection to another connected TAINY Connect Client.

To do this, the calling TAINY Connect Client sends the command to establish a connection, including the call number of the destination gate or destination Client. The TAINY ModemServer analyses this command and forwards it the gate with this call number. From here, the call signal is forwarded to the TAINY Connect Client connected here which, like a conventional modem, emits a RING to the application that is run on it.



The application accepts the call (e.g. with the ATA command) and the called TAINY Connect Client signals the acceptance of the call to the TAINY ModemServer. The TAINY ModemServer signals the call acceptance to the calling TAINY Connect Client. The connection between the two TAINY Connect Clients and the applications run on them is then established.

The line is disconnected correspondingly.

