T-Com

T-Comfort 930 DSL
Mounting and Commissioning

Contents

Features

The T-Comfort 930 DSL is a communications system for integrated voice and data communication. The outstanding feature of this communications system is its modular structure:

- Even with the smallest **T-Comfort 930 DSL** version, it is possible to use all the most important communications applications. The basic module enables telephony with system telephones, ISDN telephones and analogue terminals, Internet / intranet data communication, CTI applications, sub-system operation and system configuration using a standard Web browser.

  The expansion module of the T-Comfort 930 DSL provides three slots for further interface cards. Using different combinations of interface cards, the configuration of the T-Comfort 930 DSL can be tailored exactly to your communications requirements. The need for additional U_{pn} ports supporting DECT, further S_0 ports or more a/b ports can be met using one or more interface cards without changing the system.

- The base module of the T-Comfort 930 DSL's version 1can be expanded to connect an door entrance intercom and a serial interface. For a T-Comfort 930 DSL version 2 we recommend to connect a Doorline entrance intercom (see **Intercom System (for a/b)** starting on page 42).

- You can use an additional insertable memory card (CompactFlash) to operate further program packages.

- Another special interface card provides an internal U-R2 compatible T-DSL modem. Additional information can be found in the corresponding user manual of the DSL modem.

Cascading

Using the expansion module, the T-Comfort 930 DSL can be cascaded with a second T-Comfort 930 DSL communications system.

Telephony

The T-Comfort 930 DSL communications system is designed to be connected to an ISDN basic access using the DSS1 protocol. System access (point-to-point) and multi-terminal access (point-to-multipoint) are both supported. The two forms of access can be configured in parallel.

For this purpose

- the T-Comfort 930 DSL basic module includes two S_0 ports (one external one and one that can be switched between internal/external),

- the T-Comfort 930 DSL expansion module with additional interface cards provides up to eight further S_0 ports (switchable between internal/external). An overview of the available cards can be found under Interface Cards starting on page 31,

The firmware of the T-Comfort 930 DSL is designed for configuring up to 300 users.

You can connect the following devices to the T-Comfort 930 DSL:

- analogue terminals
- Euro-ISDN terminals
- T-Comfort 630, T-Comfort 730 and T-Comfort 830 system telephones
- Comfort Pro P 100, Comfort Pro P 300 and Comfort Pro P 500 system telephones
- T-Comfort 730 DECT base stations
- T-Comfort 830 handsets/Comfort Pro CM 300 handsets (via a T-Comfort 730 DECT base station on the DECT-enabled U_{pn} port of an interface card)

An S_0 port can be used by Euro-ISDN terminals working in accordance with DSS1.A U_{pn} port is suitable for the T-Comfort 630/730/830 Comfort Pro P100/300/500 system telephones. T-Comfort 730 DECT base stations can also be connected to the DECT-enabled U_{pn} ports on interface cards. An analogue port is used by standard analogue devices.

If the CNIP (calling name identification presentation) feature is supported by your network provider, the latter will show you the name of callers in addition to their number for each incoming trunk call. The T-Comfort 930 DSL supports the display of the name on system telephones. However, if you have created an entry in the telephone book of the T-Comfort 930 DSL under the number of the caller, this will be displayed instead.

The T-Comfort 930 DSL can be integrated into an existing network (LAN) and be used by all workstations as an Internet access router and mail client.

Configuration and programming of the T-Comfort 930 DSL is performed by means of a special Web browser (known as the “Web console”), which can be run on a connected PC.

The T-Comfort 930 DSL can be configured and maintained from the T-Com service centre via remote access.

A PC can be connected via a retrofitted V.24 module (only possible on the T-Comfort 930 DSL version 1) to the COM port for the purpose of configuring the system or transferring connection data.

To connect the T-Comfort 930 DSL to existing company hardware, two “actor” ports (output) and three “sensor” ports (input) can be provided by retrofitting a doorstation module (only possible on the T-Comfort 930 DSL version 1). For example, this can be used to operate a door opener and a doorbell via the T-Comfort 930 DSL (this requires additional equipment).

The T-Comfort 930 DSL allows you to use CTI (**C**omputer **T**elephony **I**ntegration) applications made by other manufacturers. This requires installation of a TAPI driver on a Windows PC (see **Setting up TAPI** starting on page 111). The T-Comfort 930 DSL also has an integrated dialling wizard: the Telefonie-Assistent. Via the Telefonie-Assistent users can call up and use telephone functions on PCs without first having to install a special TAPI driver.

The T-Comfort 930 DSL complies with the regulations for telecommunications equipment. The DSS1 protocol is implemented.

Packet data in the D channel

Some business applications, for instance POS terminals, cash registers or credit card terminals, require a permanent data connection over the X.25 packet data network. Packet data transfer through the ISDN D channel (according to X.31 via SAPI 16) can also be established between several S_0 interfaces of the T-Comfort 930 DSL. Simultaneous connections are distinguished by means of a TEI (Terminal Endpoint Identifier).

X.31 packet data can be forwarded between two S_0 interfaces (for instance an internal and external S_0 interface). Equally, data can be forwarded (“routed”) over permanent Q.SIG lines. It is possible to operate multiple terminals with the same TEI on different internal S_0 interfaces. A TEI mapping table allows these X.31 connections to be routed to the same external S_0 interface.

The routing table for X.31 packet data is set in the Configurator under **PBX Configuration**: **X.31**. Additional information can be found in the Configurator online help files.

Internet Access

It is possible to connect individual PCs to the T-Comfort 930 DSL via the internal S_0 ports, or to connect an entire LAN to the T-Comfort 930 DSL via the Ethernet port. These PCs can access the Internet via the T-Comfort 930 DSL. If Internet access is already available from an Internet service provider, this can be configured in the T-Comfort 930 DSL. If the client network is not IP-capable, the T-Comfort 930 DSL can administer the IP configuration necessary for Internet access. The T-Comfort 930 DSL has an integrated DHCP server and a DNS server, which in this case take over IP address administration and name resolution for the client PCs.

The T-Comfort 930 DSL enables Internet access for all connected PCs by means of a common IP address. Only this is externally visible. The local IP addresses of the client PCs are translated to the IP address of the T-Comfort 930 DSL by network address translation (NAT). In this way the client PCs in the LAN cannot be reached directly from the Internet. This protects them from direct external attack. The LAN is additionally protected by the T-Comfort 930 DSL filter lists, which can be customised individually (firewall function).

Note: We recommend you to read through the explanations under **Useful Information on Internet Access** starting on page 74.

DECT Data Communication

The T-Sinus 61 data, T-Sinus 620 data or the T-Comfort 830 handset enable PCs that are not connected to the T-Comfort 930 DSL via the internal S_0 ports or the Ethernet interface to access the Internet. These PCs can make full use of all the Internet and e-mail features of the T-Comfort 930 DSL.

Data is transmitted via the internal data interface of the T-Comfort 830 handset. For this the handset is connected via a supplied adapter with the serial port of the PC. The Internet can then be accessed directly via the remote data transfer (i.e. dial-up) network. The T-Comfort 830 handset sets up a data connection with the T-Comfort 930 DSL via the DECT air interface. The remainder of the connection set-up is either direct - through an ISDN B-channel - or indirect - through the internal RAS access of the T-Comfort 930 DSL. Indirect RAS access is preferable. This uses the routing function of the T-Comfort 930 DSL and thus also the security features of the shared Internet access.

Using the T-Sinus 61 data/T-Sinus 620 data a PC can set up an ISDN data connection via DECT. The T-Sinus 61 data/T-Sinus 620 data is connected to the PC via the USB interface.

For detailed information on the installation of the required driver software and the various types of configuration, refer to the chapter **T-Sinus 61 data/T-Sinus 620 data on the T-Comfort 930 DSL** starting on page 119 and the user guide for the T-Comfort 830 handset. For information on configuration of the T-Comfort 830 handset with a data interface, please refer to the online help documentation of the T-Comfort 930 DSL.

E-mail

The T-Comfort 930 DSL has an integrated e-mail function that is able to use the POP3, APOP or IMAP4 protocols to check the Internet service provider for incoming mail. When configuring the T-Comfort 930 DSL, e-mail account query can be configured for every member of staff. The T-Comfort 930 DSL then fetches the incoming e-mail headers (subjects) and senders from the mail server at set intervals, and forwards them to users' system terminal.

E-mail accounts for the sending e-mail can also can be configured for users. E-mails can then, for example, be sent directly from the **Telefonie-Assistent** to other users. In addition, users who have had a voicebox configured for themselves, can let themselves be notified of new voicebox messages via e-mail.

Important events and errors are kept by the T-Comfort 930 DSL in an internal log book: the error store. To inform or alert the system administrators, entries in the log book (system messages) can be sent via e-mail.

Further Network Features

You can offer staff the possibility of dialling into the LAN by means of RAS access.

A LAN-to-LAN link can also be implemented by ISDN. In this way two T-Comfort 930 DSLs can connect their LANs by dial-in on demand.

A NET-CAPI program (driver software on the system CD-ROM) allows you to use ISDN functions on those PCs that do not possess a built-in ISDN card.

Further Telephony Features

Installing an extra memory card allows you to operate a digital voice memory and voice information system. For more information, refer to the user guides called “Comfort Pro A IAB (integrated answering machine)” and “Comfort Pro A IAM (interactive call manager)”.

You can optimise your telephone communication by using the team functions and the call-queuing function.

With an additional licence, the web application “Comfort Pro A IVE (integrated connection data recording)” can be used. This web application enables you to register and store telephony connections and evaluate the connections with user defined filters. Further information can be found in the online help of the web console.

You can connect two T-Comfort 930 DSL communications system with each other (cascading). Using PBX cascading you can increase the number of connectible devices in a simple way.

As your company’s requirements grow, the T-Comfort 930 DSL can be networked with other telecom systems. The T-Comfort 930 DSL can then operate as a sub-system or DECT server. To operate the system as a DECT server the system’s U_{pn} ports must be DECT-capable. It is also possible to create a telecom system with several networked telecom installations.

Glossary

Refer to the explanations in the glossary (supplied as a PDF file on the system CD).

Factory Settings on Delivery

The following basic settings and features are active on delivery. We recommend that you configure the T-Comfort 930 DSL to your individual requirements before putting it into operation (see Configuration starting on page 53).

The factory settings apply to smallest version of the T-Comfort 930 DSL (only with the basic module). If an expansion module with interface cards exists, the additional interfaces are initially unconfigured. You must therefore first configure the slots of the expansion module to commission the interfaces.

Telephony Functions

- The $S_0$1 port is configured as a multi-terminal connection, and the $S_0$2 port as a system port.
- System telephones with the telephone numbers 30 to 32 are configured on the three U_{pn} ports.
- Analogue terminals with the telephone numbers 10 to 13 are configured on the four a/b ports.
- The T-Comfort 930 DSL is configured ready for operation in Germany.
- Analogue devices: The dialling mode (pulse dialling or DTMF) is automatically detected.
- All corded terminals connected to the basic module ring when there are incoming external calls.
- The system PIN, for example for remote-programmable call diversion, is set at “0000”.

Authorisations

The use of functions by a terminal on the T-Comfort 930 DSL is regulated by means of authorisations. Authorisation is configured by means of user groups to which the users with their terminals are then assigned.

Three user groups are preset: “Administrators”, “Standard” and “Guests”. “Administrators” have access to all functions of the T-Comfort 930 DSL and unrestricted configuration rights. Users in the “Guests” group cannot configure the T-Comfort 930 DSL, are not able to make external calls, and have only restricted use of the ter-

minal functions of the T-Comfort 930 DSL. The “Standard” user group, because of its default settings, is well suited as a starting point for the creation of user groups for normal users of the system (e.g. the staff members of a company).

Note: When the T-Comfort 930 DSL is commissioned, all connected terminals are initially in the “Administrators” group until a user logs on to the Web console. Subsequently, all terminals are automatically in the “Guests” group (see also the chapter entitled Configuring the T-Comfort 930 DSL starting on page 56). For more details on the configuration of user groups, refer to the online help in the chapter entitled “User Manager”.

The following terminal functions are factory preset to the “Administrators” group:

- External line access: international numbers can be dialled from all configured telephones. External lines must be seized by entering a prefixed code.
- Least cost routing is not active. As soon as LCR is configured, users can make calls via individually selected providers.
- “VIP call” is activated.
- Announcements to system telephones are possible.
- Baby calls can be configured.
- If a call key is configured for a user on more than one terminal, he can program this key for more than one outgoing call, i.e. he can use his various terminals to make parallel calls from this telephone number.
- “Pick-up” and “Pick-up selective” of calls from other telephones are activated. Pick-up protection is deactivated.
- “Call removal” is deactivated.
- Callback (on busy) can be activated.
- If more than one terminal is configured for a user under the same number, they can suppress the signalling of calls on the parallel terminals.
- Function “Reaction: Connection will be disconnected” is deactivated as callers trying to reach a terminal that cannot be reached or is busy will hear a busy signal.

- The “call queue” function is deactivated.
- Call forwarding to internal or external numbers can be activated. Call forwarding after delay is executed after 20 seconds. Door calls and MSN groups can be forwarded. Call forwarding for other users and call forwarding by other users are deactivated.
- It is possible to transfer an external call to an external subscriber.
- Three-party conferences can be set up.
- Connections can be parked.
- Call protection can be activated, call-waiting protection, announcement protection and pick-up protection can not be activated.
- Transmission of one’s own phone number (MSN or system access number) can be suppressed on a per-call basis.
- The telephone lock can be activated. The terminal PIN is “0000”.
- Interception of “malicious” callers is possible if this feature has been ordered from the network operator.
- The white list, black list and call filters are not preconfigured and thus not active. If these lists are configured, they can be activated for the user groups. A special list with emergency telephone numbers is preset and activated.
- Call lists on terminals list internal calls, external calls, calls from the door and calls that the user received while they were telephoning.
- Function keys can be programmed on system telephones, no keys are locked.
- The evaluation of connection data by external cost-recording programs is deactivated.
- The cost multiplier is set to 100%, i.e. the costs are not multiplied by any factor. There are no preset basic amounts for the charging of calls.
- Speed dialling is possible if this has been configured in the T-Comfort 930 DSL central telephone book.
- Keypad dialling can be used.
- The door opener can be activated from all terminals. Door calls can be forwarded.
- Time control is not active as there are no time groups configured.

- Call diversion for SMS calls in the fixed-line network is not activated.
- Calls can be marked with a booking number for the purpose of project based accounting.
- Users can use the Telefonie-Assistent to send short messages to other users.
- Every user can change the configuration of the T-Comfort 930 DSL.
- Every user can create a personal telephone book and edit entries in the central telephone book.
- Every user can read out the charges.
- Applications requiring a license (e.g. Comfort Pro A IVE) can be used after being activated.
- Access via RAS is not allowed.
- E-mail notification to system terminals is possible. There are no user accounts configured for the sending of e-mails, the authorisation for sending e-mails is not deactivated.
- The multi-company variant is not activated.

Internet Functions

- RAS access (with or without callback) can be set up for every T-Comfort 930 DSL user. RAS access requires activation of the RAS authorisation.
- More than one mail account query can be set up for every user.
- Every user with a system terminal can be informed automatically of the receipt of e-mails.
- Users can disconnect existing Internet connections (via the T-Comfort 930 DSL Web console and from a system terminal if the function has been configured on that terminal).

The following IP addresses are preset for the network configuration:

- Host name: host
- IP address: 192.168.99.254
- Network mask: 255.255.255.0

The following addresses are transmitted to the client PCs in the LAN via DHCP or PPP:

- Gateway address: 192.168.99.254
- Domain name: domain
- Domain name server: 192.168.99.254
- PPP addresses: 192.168.100.0 to 192.168.100.10
- DHCP addresses: 192.168.99.129 to 192.168.99.148

You can change the IP settings in the **Configurator**. Check with the network administrator responsible for the LAN if you wish to do this.

Installation

Scope of Delivery

The delivery consists of:

- One T-Comfort 930 DSL communications system in a basic version (with a basic module)
- One connection cable for the ISDN S_0 port
- One set of mounting screws and wall plugs
- One plug-in power supply (of the TR25240-E-01A13 type) to supply the basic module
- One set of short user guides
- One CD including the complete documentation and software

The T-Comfort 930 DSL expansion set consists of:

- One expansion module
- One AC adapter with a connection cable to supply the expansion module with power
- One mounting set with which to install the expansion module and the AC adapter in the T-Comfort 930 DSL housing
- One (short) Ethernet connection cable with which to connect the basic module to the expansion module.

Safety Precautions

Please note: Installation and maintenance should only be performed by specially trained personnel. Always remove the power plug and the plug-in power supply from the mains socket before connecting devices to the T-Comfort 930 DSL ports.

DANGER! This device contains hazardous voltages. To make the system powerless, remove the power plug and the plug-in power supply from the socket.

The T-Comfort 930 DSL may only be plugged into mains sockets with a protective earth conductor. Mount the T-Comfort 930 DSL only close to easily accessible sockets.

Only use the original plug-in power supply: No. 4512699 (TR25240-E-01A13 type) for the basic module.

The housing cover may only be opened by authorised personnel. Unauthorised opening of the housing cover and improper repair may damage the T-Comfort 930 DSL and invalidate the warrantee.

Caution!

Static charges can damage the T-Comfort 930 DSL. Make sure you discharge yourself and your tools before and while installing electrical and electronic components of the T-Comfort 930 DSL.

Only devices that deliver safety extra-low voltage (SELV) may be connected to the T-Comfort 930 DSL. Proper use of authorised devices meets this requirement.

Only devices meeting the technical requirements may be connected to the analogue ports. For details, refer to the section entitled a/b Ports starting on page 36.

Use a shielded Ethernet cable (STP cable, Shielded Twisted Pair cable) to connect the T-Comfort 930 DSL to a Local Area Network (LAN).

Do not allow any fluid to penetrate the T-Comfort 930 DSL, because this may cause electric shocks or short circuits.

Do not install the T-Comfort 930 DSL during a storm. Do not connect or disconnect lines during a storm.

The T-Comfort 930 DSL is designed for indoor use only. Lay the cables so that they cannot be walked on or tripped over.

The connection of external devices to the sensor/actor should be performed by a qualified electrician.

Mounting Location

The ambient temperature for operating the T-Comfort 930 DSL must be between +5 and +40 °C. The power supply must be 230 V/50 Hz AC. A separate fuse for the power supply is recommended.

To maintain the prescribed ambient temperature, mount the T-Comfort 930 DSL in a well-ventilated location, away from direct sources of heat.

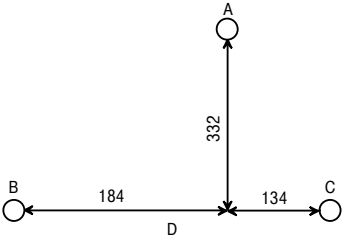
Do not position the T-Comfort 930 DSL

- in front of or above heat sources such as radiators,
- in direct sunlight,
- behind curtains,
- in small, unventilated, damp rooms,
- on or near inflammable materials,
- or near high-frequency devices such as transmitters, X-ray or similar apparatus.

Use a separate 230 V power circuit and install overvoltage protection.

Wall Mounting

The T-Comfort 930 DSL is mounted on the wall with three screws as shown in this diagram:



Mounting plan

To fasten the screws at points B and C, remove the cover of the T-Comfort 930 DSL and insert the screws in the holes provided for this purpose. The T-Comfort 930 DSL is suspended from the screw at point A, so there must be a space of 3 mm between the screw and the wall.

Installing an Expansion Set

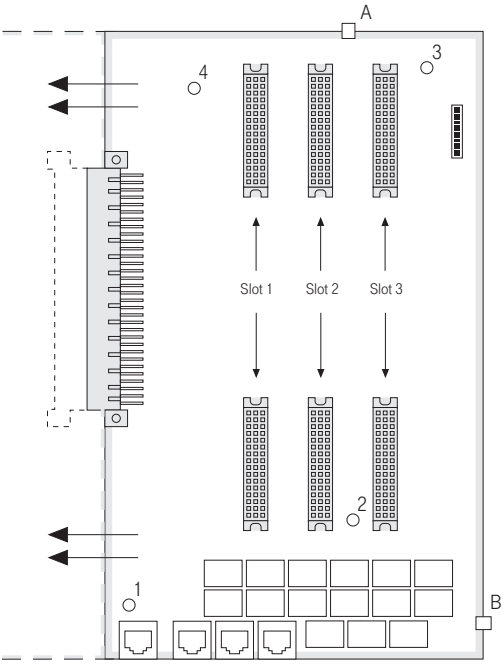
You can either install the expansion module when you first assemble the system or later as part of a system upgrade. In both cases, follow the mounting sequence as described here:

1. Turn off the T-Comfort 930 DSL. Unplug the plug-in power supply from the socket. You should not install the expansion module or install or uninstall additional interface cards while the T-Comfort 930 DSL is turned on.

2. Open the housing cover of the T-Comfort 930 DSL. In this case, carefully follow the Safety Precautions starting on page 19.

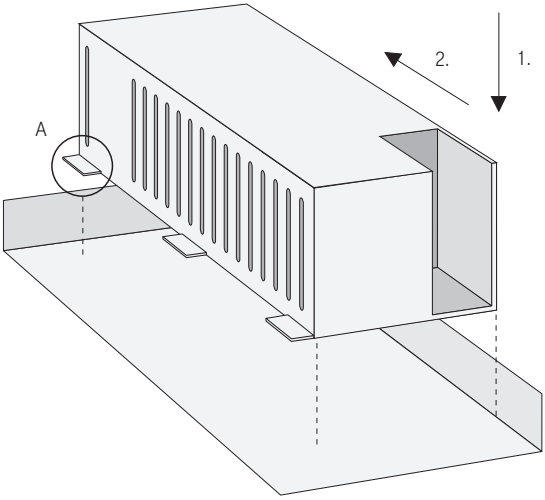
   The existing basic module is mounted in the left half of the housing. No components may be mounted in the right half of the housing.

3. Place the expansion module in the intended mounting location in the right half of the housing. Be sure to align the 96-pin connector properly to the socket on the basic module. Push the expansion module towards the basic module so that both modules are securely connected to one another via the 96-pin connector.



Installing the expansion module

4. Carefully press the expansion module at the top and bottom right, pushing it into the locking hooks provided (see “A” and “B” in the diagram). Secure the expansion module using the Phillips screws provided in the expansion set (see “1” to “4” in the diagram).



Installing the power supply for the expansion module

5. Place the power supply to the right of the expansion module. Carefully press the power supply into the mounting recess provided (shown in the diagram as “1”). Move the power supply forwards until it snaps into place in all six pressure terminals (“A”, “2”).

6. Connect the power supply output (flat conductor cable) to the appropriate jack of the expansion module. Insert the fully insulated connector of the mains supply in the power supply connection provided.

7. Establish an Ethernet connection between the LAN port of the basic module and the LAN1 port of the expansion module (see also **Positions of the Ports** starting on page 30). To do this, use the short Ethernet connection cable from the expansion set. The LAN0 port of the expansion module is intended for connection to a corporate LAN. You can connect an existing Ethernet connection cable to the LAN0 port of the expansion module.

You usually install at least one interface card on the expansion module. To do this, read the instructions in the following section.

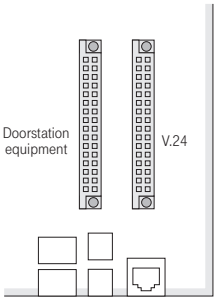
Please note: Two power supplies are provided for the T-Comfort 930 DSL with an expansion module. Always turn on the power supply of the expansion module first and then plug in the plug-in power supply.

Installing Interface Cards

The expansion module and the basic module of the T-Comfort 930 DSL Version 1 can be expanded using interface cards.

Please note: Turn off the T-Comfort 930 DSL. Unplug the plug-in power supply and the main supply from the socket. You must not install or uninstall interface cards while the T-Comfort 930 DSL is turned on.

V.24 and Doorstation Equipment Slots



Slots on the basic module
(only T-Comfort 930 DSL Version 1)

The T-Comfort 930 DSL Version 1 has two smaller slots in which special interface cards can be operated (V.24 and doorstation equipment). You can see the location of these slots in the diagram entitled Position of the ports on the basic module (T-Comfort 930 DSL Version 1).

- The doorstation equipment module provides two “actor” ports and three “sensor” ports.
- The V.24 module provides a serial port.

Proceed as described below to install one or both of these interface cards:

1. Turn off the T-Comfort 930 DSL. Open the housing cover.

2. Remove the slot card from the transport packaging. Check that it is the correct type of slot card. (There is a sticker with the type name on the connector.)

Caution!
Static charges can damage electronic components. Pay attention to the regulations regarding the handling of electrostatically sensitive components.

3. Carefully insert the interface card in the slot provided. The component side must face to the right.

   Ensure the plug-in connection is sitting securely.

4. Connect the required port cable to the corresponding pressure terminals or RJ45 jacks (see also Positions of the Ports starting on page 30).

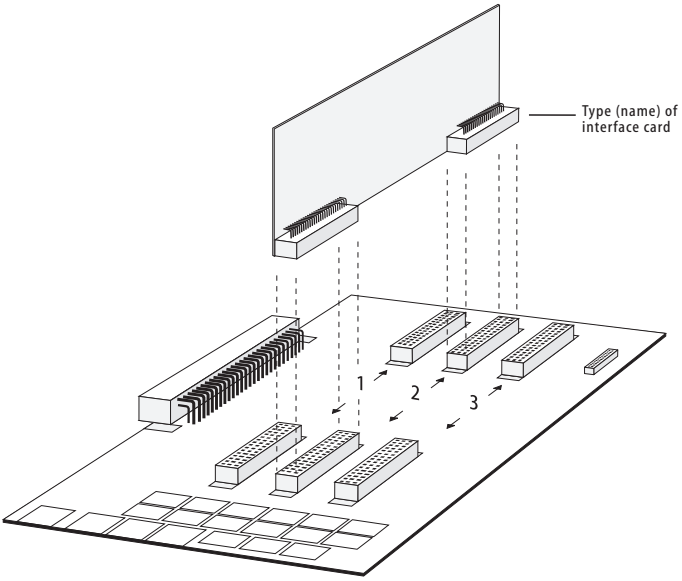
5. Close the housing cover. Turn on the T-Comfort 930 DSL.

You can query the status of the doorstation equipment module and the V.24 module in the Web console when the T-Comfort 930 DSL is operational again. To do this, call up the **PBX Configuration: Ports: Slots** menu page. The **Status** column in the table displays a green tick beside the name of the interface card.

Slots for Additional Interface Cards

The T-Comfort 930 DSL has three large slots in which you can operate interface cards. Each interface card is connected to via two port jacks. The following properties characterise the large slots:

- There is no prescribed order in which to use the jacks. You can, for example, therefore operate an interface card in slot 3 even though slot 2 is not occupied.
- Each of the slots is connected to a group of pressure terminals. Therefore there are also three pressure terminal groups on the expansion module. To be able to distinguish these, all the pressure terminals in a group are the same colour.
- The slots are not of the same type. Therefore some of the available interface cards may not be operated in all slots. Note the overview under Interface Cards starting on page 31.



Installing an interface card in an expansion module slot

Proceed as described below to install an interface card:

1. Turn off the T-Comfort 930 DSL. Open the housing cover.
2. Remove the slot card from the transport packaging. Check that it is the correct slot card type. There is a sticker with the type name on the connector.

Caution!
Static charges can damage electronic components. Pay attention to the regulations regarding the handling of electrostatically sensitive components.

3. Carefully insert the interface card in the slot provided. The component side must face to the right.

   Ensure the plug-in connection is sitting securely.
4. Connect the required port cable to the corresponding pressure terminals of the relevant pressure terminal group (see also Positions of the Ports starting on page 30).
5. Close the housing cover and turn on the T-Comfort 930 DSL again.

The software of the T-Comfort 930 DSL can detect the type of interface card present. The interface card must still be configured individually for commissioning.

You can query the status of the interface cards in the Web console when the T-Comfort 930 DSL is operational again. To do this, call up the **PBX Configuration: Ports: Slots** menu page. The **Status** column of the table displays a green tick beside the slot name (**0/1**, **0/2** and **0/3**). The column of the table must list the correct type of interface card.

Available Ports

The T-Comfort 930 DSL has the following ports (see also Positions of the Ports starting on page 30):

T-Comfort 930 DSL Version 1

The listed interfaces and ports are located on the basic module of the T-Comfort 930 DSL Version 1. Further interfaces and ports can be added by installing the expansion set and additional interface cards (see Installing an Expansion Set starting on page 22 and Installing Interface Cards starting on page 25).

- One S_0 port to connect to an external S_0 bus (usually the NTBA), designed as an RJ45 jack ($S_0$1)
- One switchable S_0 port ($S_0$2), which can be connected as either an internal or external S_0 bus. The internal connection is via a pressure terminal and the external connection via an RJ45 jack.
- Three U_{pn} ports, designed as pressure terminals (U_{pn}1 to U_{pn}3)
- Four analogue a/b ports, designed as pressure terminals (a/b1 to a/b4)
- One slot to incorporate a doorstation equipment module. The following ports can be used with such a card:

  two actor ports for connection to a door opener and the intercom of doorstation equipment. These are designed as pressure terminals (actor1 to activate a door opener and actor2 to activate doorstation equipment);

  three sensor ports for connection to the bell keys of doorstation equipment, designed as pressure terminals (sensor 1 to sensor 3)

- One slot to incorporate a V.24 module. The following port can be used with the V.24 module:

  one COM port to connect to a PC to configure and transmit connection data, designed as an RJ45 jack

- One port to the LAN (10BaseT), designed as an RJ45 jack
- One CompactFlash socket to incorporate a type I or type II CompactFlash memory card. These cards are necessary to operate the internal answering machine. Only use high speed memory cards acquired with the license. Other memory cards or “Microdrive” type memory cards may not be able to maintain the required access speed.
- One port jack to connect the plug-in power supply to power the basic module. Only use the original T-Comfort 930 DSL plug-in power supply provided in the supply scope to power the basic module.

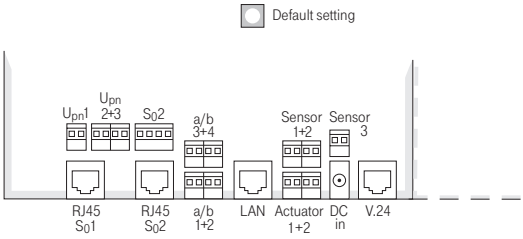
T-Comfort 930 DSL Version 2

The listed interfaces and ports are located on the basic module of the T-Comfort 930 DSL Version 1. Further interfaces and ports can be added by installing the expansion set and additional interface cards (see Installing an Expansion Set starting on page 22 and Installing Interface Cards starting on page 25).

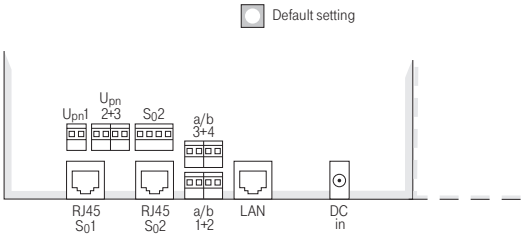
- One S_0 port to connect to an external S_0 bus (usually the NTBA), designed as an RJ45 jack ($S_0$1)
- One switchable S_0 port ($S_0$2), which can be connected as either an internal or external S_0 bus. The internal connection is via a pressure terminal and the external connection via an RJ45 jack.
- Three U_{pn} ports, designed as pressure terminals (U_{pn}1 to U_{pn}3)
- Four analogue a/b ports, designed as pressure terminals (a/b1 to a/b4)
- One CompactFlash socket to incorporate a type I or type II CompactFlash memory card. These cards are necessary to operate the internal answering machine. Only use high speed memory cards acquired with the license. Other memory cards or “Microdrive” type memory cards may not be able to maintain the required access speed.
- One port jack to connect the plug-in power supply to power the basic module. Only use the original T-Comfort 930 DSL plug-in power supply provided in the supply scope to power the basic module.

Positions of the Ports

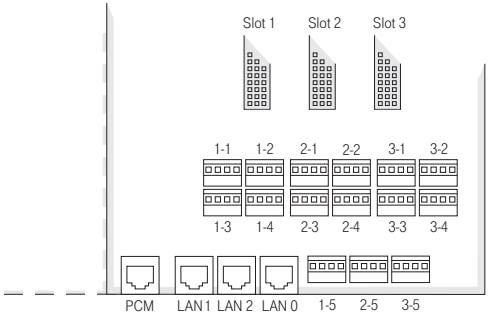
The following diagrams show the positions of the ports:



Position of the ports on the basic module (T-Comfort 930 DSL Version 1)



Position of the ports on the basic module (T-Comfort 930 DSL Version 1)

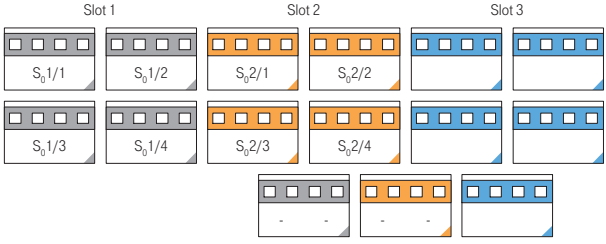


Position of the ports on the expansion module (T-Comfort 930 DSL)

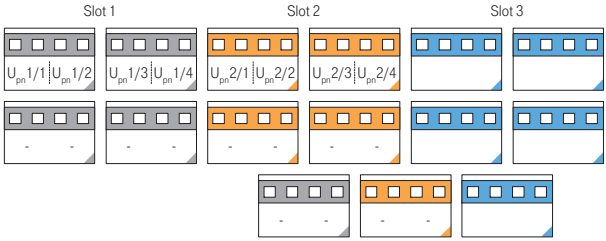
Interface Cards

The following overview shows the available interface cards.

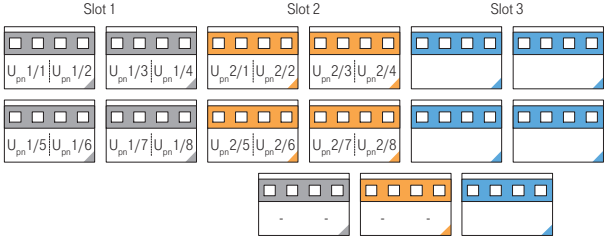
Interface card	Slots			Special features
	1	2	3	
4 x S_0	●	●		S_0 are switchable internally/externally
4 x U_{pn}	●	●		U_{pn} are DECT-enabled
8 x U_{pn}	●	●		U_{pn} are DECT-enabled
2 x S_0 and 6 x U_{pn}	●	●		U_{pn} are DECT-enabled S_0 are switchable internally/externally
2 x S_0 and 6 x a/b	●	●		S_0 are switchable internally/externally
4 x a/b	●	●	●	
8 x a/b	●	●	●	
DSL Modem for T-Comfort 930 DSL			●	DSL modem



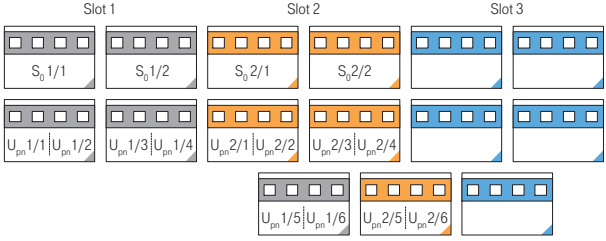
Ports: 4 x S_0



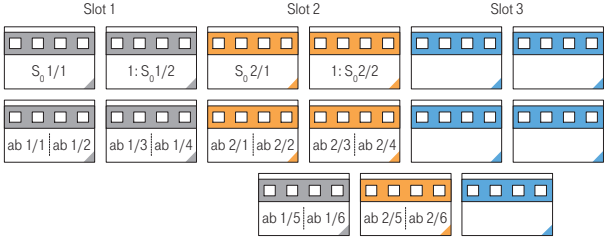
Ports: 4 x U_{pn}



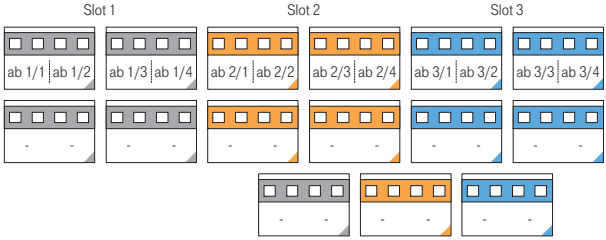
Ports: 8 x U_{pn}



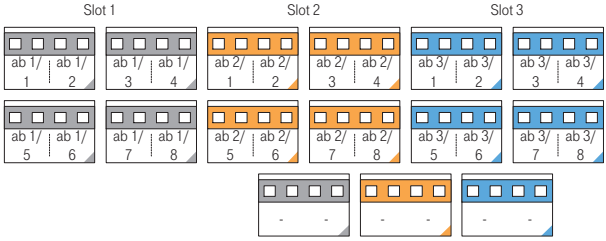
Ports: 2 x S_0 und 6 x U_{pn}



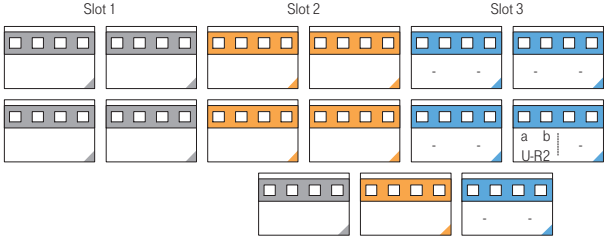
Ports: 2 x S_0 und 6 x a/b



Ports: 4 x a/b



Ports: 8 x a/b



DSL Modem for T-Comfort 930 DSL

Port Assignment, Termination, Cable Lengths

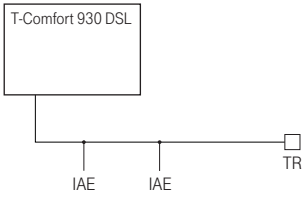
S_0 Ports

Whether you use the switchable S_0 ports for internal or external communication depends on your communications requirements and the existing basic accesses.

Note that the S_0 bus requires a terminating resistor of 100 ohms at each end.

In the case of the T-Comfort 930 DSL, the S_0 buses are terminated by software. You make this setting in the S_0 port configuration in the **Configurator** on the Web console.

You can connect up to eight terminals on every internal S_0 bus; up to three of the terminals can operate without an external power supply. The length of the four-wire cable of an internal S_0 bus must not exceed 150 m. The power consumption of each internal S_0 bus is approx. 2 W.

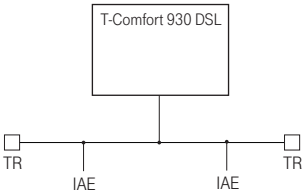


The S_0 bus is terminated at one end by the T-Comfort 930 DSL.

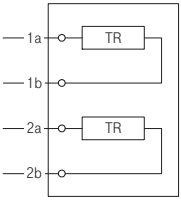
IAE = ISDN socket (German: “ISDN Anschluss Einheit”) or an ISDN terminal.

TR = terminating resistor, the S_0 termination. The TR must be at the termination of the line.

This can also be done by an appropriately wired IAE.

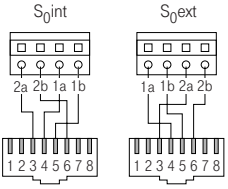


The S_0 bus is terminated by the TR at the ends.



Termination on an ISDN socket

S_0 Ports on Interface Cards



Switchable S_0 port on a pressure terminal

You can add further S_0 ports to the T-Comfort 930 DSL by installing suitable interface cards in a slot. These S_0 ports can be switched between internal and external operation.

In contrast to the basic module, the expansion module does not provide any additional RJ45 jacks for external S_0 ports. Therefore you can also use the pressure terminals of the expansion module for an external S_0 port. The port assignment of the pressure terminals is changed when the switch is made from internal to external operation. This can be seen in the diagram.

Tip

Let us say you have activated an IAE on an internal S_0 port, for example. If you switch this S_0 port to external operation, you require a crossed ISDN line to connect the IAE to an NTBA. The assignment of a crossed line is described in the chapter **PBX Networking** under **Direct Connection** starting on page 84.

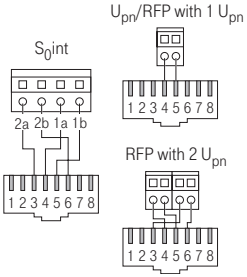
U_{pn} Ports

Each of the U_{pn} ports enable the connection of a T-Comfort 730 DECT base station, a T-Comfort 630/730/830 system telephone, or a Comfort Pro P 100/300/500 system telephone using a twin-wire cable.

The maximum permissible length of the twin-wire cable on a U_{pn} port is 500 m. This line may only be laid inside buildings.

The maximum permissible length of the twin-wire cable on a U_{pn} port of an interface card is 1,000 m when 0.6 mm cable (with twisted pairs) is used.

The power consumption of each U_{pn} port is approx. 3 W.



Pin assignment of the S_0 and U_{pn} ports

a/b Ports

The a/b ports are for operating analogue devices (e.g. a fax machine, modem or telephone). The maximum permissible length of the cable is 1,000 m when twin-wire 0.6 mm cable (with twisted pairs) is used.

Doorstation equipment can be activated on an a/b1 port of a T-Comfort 930 DSL Version 1. In this case, an electronic switch enables the low-frequency voltage to be separated from the feed.

Actor/Sensor

Note: With the T-Comfort 930 DSL Version 2 a door station of the type “DoorLine” can be operated (see **Intercom System (for a/b)** starting on page 42).

In order to operate an entrance intercom and door opener (only T-Comfort 930 DSL Version 1), you need four twin-wire cables:

- one cable between the entrance intercom and the a/b1 port,
- one cable between the door opener and the Actor1 port,
- one cable between the intercom input and the Actor2 port to activate the amplifier as well as
- one cable between the doorbell and the sensor port.

Only use entrance intercoms and door openers complying with the German FTZ Guideline no. 123D12.

LAN Port

The LAN port on the basic module enables integration of the T-Comfort 930 DSL into an existing in-house LAN by means of a 10 Mbit hub.

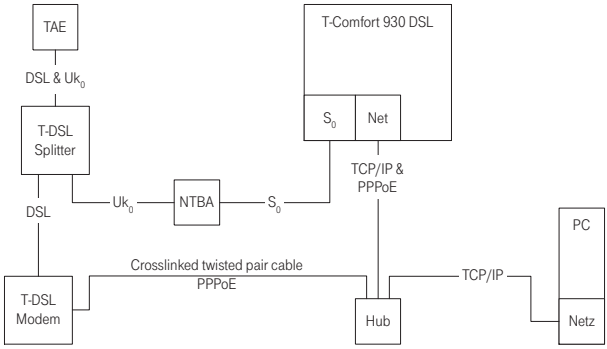
The LAN ports on the expansion module (LAN0, LAN1 and LAN2) lead to the Ethernet switch of the expansion module. These LAN ports support 10 Mbit/s and 100 Mbit/s transmission speeds in half- or full-duplex operation. The change in transmission rate and mode of operation is automatic (“auto-sensing function”). The switch is also automatic for connections which require a crossed LAN line. For this reason, you can also use an uncrossed LAN line for a connection to another hub or switch.

A LAN line (twisted-pair line in accordance with 10BaseT or 100BaseTX) can be up to 100 m long. Secure operation with 100 Mbit/s requires the use of category 5 lines and line sockets. Use a shielded Ethernet cable (STP cable, Shielded Twisted Pair cable).

T-DSL Port

With the T-Comfort 930 DSL, an external T-DSL modem as well as an internal T-DSL modem (realized as a special interface card) can be operated. Further explanations regarding the integrated U-R2 compatible DSL modem can be found in the “DSL Modem for T-Comfort 930 DSL” manual.

External T-DSL modems can be connected via the LAN port. In the case of the T-Comfort 930 DSL, the output of the T-DSL modem (NTBBA) is led to the LAN port of the T-Comfort 930 DSL via an external switch or hub. The router subsequently converts the T-DSL protocol to the TCP/IP protocol of the LAN.



Connecting the T-Comfort 930 DSL to the network via T-ISDN and T-DSL

Connection of the T-DSL modem is via a crossover twisted-pair line. You can also use a switchable port on the hub, which is usually indicated by an “X”.

Note: If an expansion module is installed, you can also use the unused LAN2 port to activate the T-DSL modem. Due to the “auto-crossover” function, you do not require a cross-wired line with a LAN port of the expansion module. If you are operating the T-Comfort 930 DSL as a slave system in a cascaded PBX, the LAN0 port on the expansion module of the slave system can be used instead (see PBX Cascading starting on page 77).

Power Failure

In the event of a power failure, all the contents in the memory (program and user data) are saved without change. The internal clock continues to run for 24 hours. If the power failure lasts longer than 24 hours, the time and date are reset to the factory setting when power is switched on again. When the first external outgoing call is made, the time and date are set to the current value as given by the exchange. With the T-Comfort 930 DSL Version 2, date and time generally will be adjusted after the first outgoing connection.

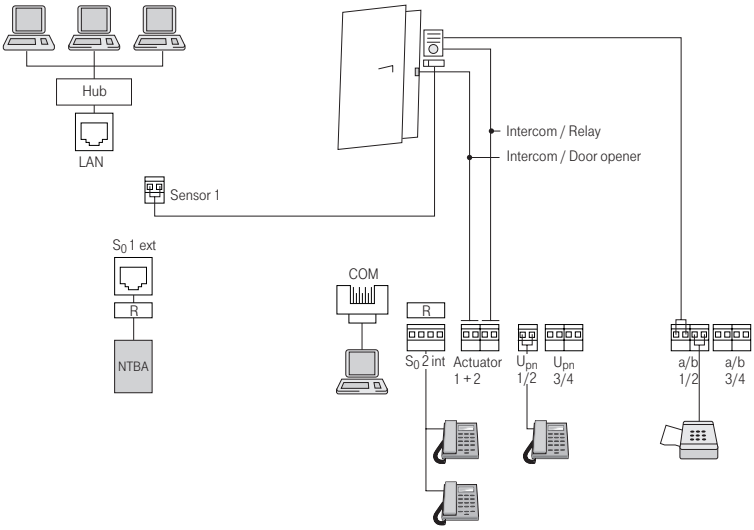
On the multi-terminal access, the T-Comfort 930 DSL Version 1 include an emergency service. In the event of a power failure, the external $S_0$1 port is switched over to the $S_0$2 port so that you can still use a connected telephone to make a call.

Emergency operation on a system access is not possible.

Connectible Devices

The T-Comfort 930 DSL ports already offer a large number of possibilities for connecting devices. By installing additional interface cards, the number of ports can be increased as required.

One of the many possible configurations is shown in the following diagram.



Example of port assignment of the T-Comfort 930 DSL with terminals

Internal/External S_0 Ports

All S_0 ports can be operated externally, i.e. on an ISDN network termination unit. The $S_0$2 port on the basic module can also be connected internally. S_0 ports on interface cards can also be switched external/internal. It is not possible to use both assignments simultaneously.

Up to eight devices per bus (ISDN telephones, ISDN fax machines, ISDN base stations, ISDN cordless telephones, ISDN adapters for the PC among others) can be connected to the internal S_0 ports by twin-pair cables. The power for three of these devices can be supplied by the bus; if more devices are used, they then require their own power supplies. The internal S_0 buses enable point-to-multi-point calls as per the DSS1 protocol (Euro-ISDN); the same features as with T-Net-ISDN from T-Com are supported.

U_{pn} Ports

A system terminal can be connected to every U_{pn} port by a twin-wire cable.

The system telephones T-Comfort 630/730/830 and Comfort Pro P 100/300/500 are cord-bound system terminals. The T-Comfort 730 DECT base station is required for the use of cordless system telephones (e.g. T-Comfort 830 handset, Comfort Pro CM 300 or Sinus 61 S). The T-Comfort 830 handset features an USB port on which you can transfer data and surf on the Internet.

Note: You can only operate DECT base stations on the ports of U_{pn} interface cards.

If this base station is connected to a U_{pn} port of an interface card, four simultaneous calls are possible with the handsets. If the base station is connected to two U_{pn} ports, eight simultaneous calls are possible. However, note that only as many external connections are possible as there are externally connected B-channels available.

a/b Ports

The a/b ports a/b1 to a/b4 can be used for connecting analogue terminals. These can be for voice or data communication, and use DTMF or pulse dialling, e.g.

- analogue telephones
- class 3 fax machines
- analogue modems (external or internal)
- external devices for music on hold
- external voice mail systems.

Additional a/b ports can be provided by installing interface cards.

Please note: Adhere to the following notes and recommendations regarding the connection of analogue devices. Devices not meeting the technical requirements of the T-Comfort 930 DSL can cause damage to it.

Analogue Telephones

If analogue telephones are to be used, we recommend the use of devices featuring voice-frequency (VF) signalling, as the additional features of the T-Comfort 930 DSL cannot be used with pulse dialling.

Modems

The maximum transmission rate for analogue modems is 33.6 kbit/s (V.34+).

Music on Hold

If you do not operate an external MoH device, the T-Comfort 930 DSL offers an internal MoH, which you can load in the Web console **Configurator** in the **SYS Configuration: Components** menu. For details, refer to the online Help.

Please note: Use only devices with an input impedance of 600 ohms, floating connection, for external music on hold. Incorrect input impedance can cause irreparable damage to the T-Comfort 930 DSL.

Voice Mail

If you are using an external voice mail system, it must be capable of handling the number of digits used for internal telephone numbers, e.g. five digits if you have configured five-digit internal numbers.

The external voice mail system can be connected to internal a/b ports as well as to internal S_0 ports. For both port types the voice mail system can activate the notification for system terminals with the code procedures ✱ 6 8 resp. # 6 8 .

Intercom System (for a/b)

The intercom systems “DoorLine T01/02” and “DoorLine T03/04” can be connected via the “DoorLine M06” to any a/b port. The “DoorLine” module provides the actor for the door opener contact.

Observe the following when connecting:

- The intercom system and the “DoorLine” module should be set to their factory settings.
- In the **PBX Configuration**: **Ports**: **a/b**: **Change** menu in the Configurator, select **Doorstation 2-wire** under **Type**. Activate the **Actuator** option, if you want to use the actor port of the T-Comfort 930 DSL

instead of the “DoorLine” relay. The “DoorLine” actor can be operated only when the speech channel is open at the same time. The internal actor can be operated at any time.

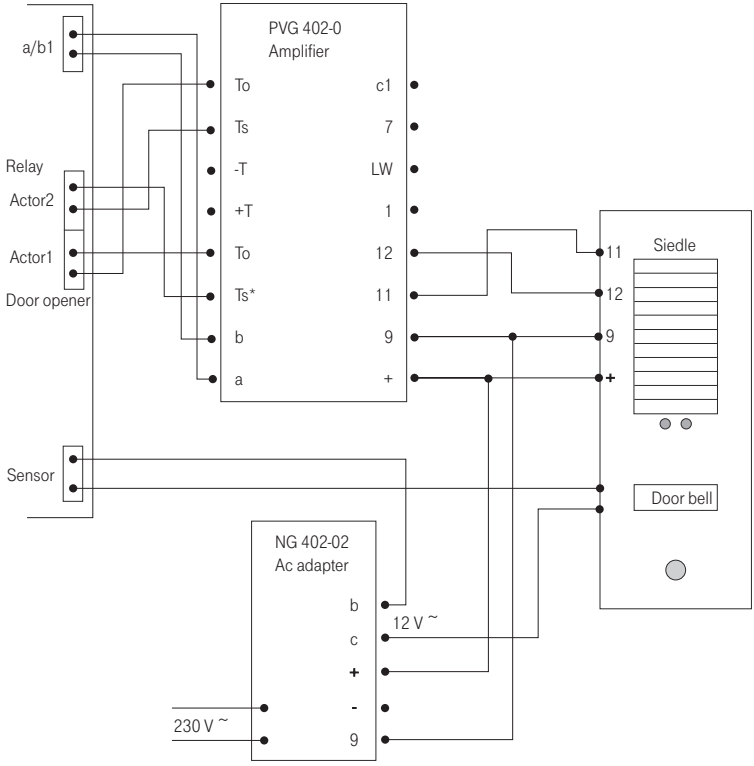
- The “DoorLine” intercom system has a number of bell keys to which you can assign different call numbers in the **PBX Configuration**: **Ports**: **Doorbell** menu in the Configurator.
- You can call the “DoorLine” intercom system by entering the code procedure ✳ 1 0 2 .
- The “DoorLine” intercom system can be connected to any a/b port. However, you can use only one “DoorLine” with the T-Comfort 930 DSL.

For details on installing and configuring the “DoorLine” intercom system, refer to the product user guide.

The intercom system should be installed by qualified personnel only as sensor/actor contacts will need to be connected to the “DoorLine” module.

Actor/Sensor Ports

For the assignment of the ports, refer to the section Available Ports starting on page 28. The T-Comfort 930 DSL also functions together with a Freehand Entry-Phone manufactured by Siedle or Behnke.



Connection of doorway equipment produced by Siedle

Note: The above diagram shows the usage of the “PVG 402-0” module (which merely serves as an example). Other modules can also be operated, such as its successor, “PVG 602-01”.

COM Port

By installing theV.24 module (only for T-Comfort 930 DSL Version 1) a serial port on the COM interface is provided.

Please note: The connection line for the COM port can be up to three metres long.

A PC for configuring the T-Comfort 930 DSL or transmitting call data can be connected to the COM port. This call data can be evaluated in detail with a call charge registration program (e.g. DGV at T-Comfort).

LAN Port

Using the LAN port (Ethernet) you can integrate an T-Comfort 930 DSL into your corporate network (local area network), and thus use it, among other things, as an IP router for accessing the Internet.

The LAN ports of the Ethernet switches on the expansion module process Ethernet data traffic with different degrees of priority. You should therefore assign the three LAN ports on the expansion module as follows:

- LAN2: Use this port if you cascade a second communications system as a slave system (see **PBX Cascading** starting on page 77).
- LAN1: Here connect the short Ethernet connection line to the basic module.
- LAN0: You should use the port with the lowest priority to connect to your corporate network.

Both internal LAN ports of the Ethernet switch are reserved for usage on interface cards.

Accessories and Adapters

The T-Comfort 730/830 system telephones have one or two slots on the rear for various adapters and other accessories. Further information on installing and operating these add-ons can be found in the "T-Comfort 630/730/830 System Telephone" user guide under "Add-ons (with & without an Adapter)".

In the following you will find technical details on the add-ons and a list of compatible accessories.

Note: Please contact the T-Com Technical Support if you need further equipment such as headsets, second handsets, recording devices, etc.

U_{pn} Adapter

The U_{pn} adapter is an adapter with a U_{pn} port for connecting another T-Comfort 630/730/ 830 system telephone and a socket for an extra plug-in power supply.

Weight: 70 g
Dimensions: 73 x 60 x 30 mm
Power consumption: max. 195 mW
Cable length: max. 30 m

Please note: The U_{pn} adapter may be used only for connecting the system terminals listed above. The U_{pn} extension cable must not exceed 30 m in length and must not be used outdoors.

Note: An extra plug-in power supply is required to operate combinations of equipment with a power consumption that exceeds the power output of the U_{pn} ports.

Audio Adapter

The audio adapter is an adapter extension with four different ports for external audio and signalling devices.

Weight: 70g

Dimensions: 73 x 60 x 30 mm

Power consumption: max. 260 mW (with relay active).

Audio Adapter Pin Assignment

Port		Used for	Socket	Assignment
1		Ear cap, second handset, headset, active speaker or microphone	RJ-10 (4-pin Western socket)	1: microphone - 2: speaker + 3: speaker - 4: microphone +
2		Recording device; relay contact generates signal for starting and stopping recording.	Stereo jack, 3.5 mm	1 (GND): recording signal, relay contact 1 2 (peak): recording signal + 3 (ring): relay contact 1
3		Not used on T-Comfort 930 DSL	Round power socket (4 mm)	-
4		Door display	RJ-11 or RJ-12 (6-pin Western socket)	4, 5: relay contact 2 1, 2, 3, 6: NC

Electrical Data of Ports

Port	Connection Values
Microphone, microphone of second handset, headset microphone	Electret microphone Typical sensitivity: 10 mV/Pa Power feed: I < 300 µA at 1.5 V
Ear cap, loudspeaker of second handset, headset, headset loudspeaker	Typical impedance: 150 ± 30 ohms Typical sensitivity: 94 dB/1 mW (0 dB = 20 µPa)
Active speaker	Max. output voltage: 1 V_{rms} at input impedance > 10 kOhms
Recording device audio input	Typical input sensitivity: 0.24 mV (microphone level)
Recording device start/stop (relay contact 1)	Max. switching voltage: 50 VDC/29 V AC Max. switching current: 1 ADC/0.7 A AC
Door display (relay contact 2)	Max. switching voltage: 50 VDC/29 V AC Max. switching current: 1 ADC/0.7 A AC

Device Combinations

You can use the following power values to calculate the power consumption of combined equipment:

- U_{pn} adapter: 195 mW
- Audio adapter: 260 mW
- T-Comfort 630 system telephone: 1,000 mW
- T-Comfort 730 system telephone: 1,025 mW
- T-Comfort 930 system telephone: 1,140 mW
- Up to three add-on keypad modules: 330 mW

These symbols are used in the following tables:

● This combination is possible.
❍ Reduced tone ringing, open listening and hands-free talking volume possible.

Configurations without Plug-in Power Supply (Range up to 500 m)

The following table shows examples of equipment combinations for which the maximum power consumption of 2.4 W is not exceeded.

Basic Unit: T-Comfort 730 System Telephone

Add-ons			2nd Terminal	Power
Audio adapter	U_{pn} adapter	up to 3 keypad modules		
–	–	–	–	1025 mW
●	–	–	–	1285 mW
–	●	–	T-Comfort 630 system telephone without adapter	2220 mW

Basic Unit: T-Comfort 730 System Telephone

Add-ons			2nd Terminal	Power
Audio adapter	U_{pn} adapter	up to 3 keypad modules		
–	●	–	T-Comfort 730 system telephone without adapter	2245 mW
–	●	–	T-Comfort 830 system telephone without adapter or keypad module	2360 mW

Basic Unit: T-Comfort 830 System Telephone

Add-ons			2nd Terminal	Power
Audio adapter	U_{pn} adapter	Up to 3 keypad modules		
–	–	–	–	1140 mW
–	–	●	–	1470 mW
●	–	●	–	1730 mW
–	●	–	T-Comfort 630 system telephone without adapter	2335 mW
–	●	–	T-Comfort 730 system telephone without adapter	2360 mW

Basic Unit: T-Comfort 830 System Telephone

Add-ons			2nd Terminal	Power
Audio adapter	**U_{pn} adapter**	**Up to 3 keypad modules**		
–	❍	–	T-Comfort 830 system telephone without adapter or keypad module	2475 mW

Configurations without Plug-in Power Supply (Range 500 to 1000 m)

The following table shows examples of equipment combinations for which the maximum power consumption of 2.2 W is not exceeded.

Basic Unit	Add-ons			Power
	Audio adapter	**U_{pn} adapter**	**Up to 3 keypad modules**	
T-Comfort 730 system telephone	●	–	–	1285 mW
T-Comfort 830 system telephone	–	–	●	1470 mW
	●	–	●	1730 mW

Configurations with Plug-in Power Supplies

The following table shows examples of equipment combinations operating with additional power from a plug-in power supply.

Basic Unit: T-Comfort 730 System Telephone					
Add-ons:			**2nd Terminal (System Telephone):**		
Up to 3 key-pad modules	Audio adapter	U_{pn} adapter and plug-in power supply	T-Comfort 630 without adapter	T-Comfort 730 without adapter	T-Comfort 830 without adapter and with 1 key-pad module
		●	●		
		●		●	
		●			●

Basic Unit: T-Comfort 830 System Telephone					
Add-ons:			**2. Terminal (System Telephone):**		
Up to 3 key-pad modules	Audio adapter	U_{pn} adapter and plug-in power supply	T-Comfort 630 without adapter	T-Comfort 730 without adapter	T-Comfort 830 without adapter and with 1 key-pad module
●		●	●		
●		●		●	
●		●			●
●	●	●	●		
●	●	●		●	
●	●	●			●

Configuration

Configuration and programming of the T-Comfort 930 DSL is performed by the **Configurator**, a special software application integrated into the system. The **Configurator** is operated via the Web console, which can be run on any PC connected to the T-Comfort 930 DSL.

The T-Comfort 930 DSL Web console

Using the Web console, you can:

- perform the initial configuration of the T-Comfort 930 DSL,
- configure users of the T-Comfort 930 DSL and authorise them to use certain system services,
- carry out further system maintenance,
- use PC-supported telephony functions,
- read out call charge information,
- access the T-Comfort 930 DSL telephone book.

The Web console has an integrated online help function that offers comprehensive information on configuration and maintenance of the T-Comfort 930 DSL (see **Loading the Online Help** starting on page 59).

For the initial configuration you can connect the PC to the T-Comfort 930 DSL via the Ethernet port. A COM port can also be used. The TCP/IP network protocol is used to set up a connection via one of these ports. You can then open the Web console of the T-Comfort 930 DSL and call up the **Configurator** from there.

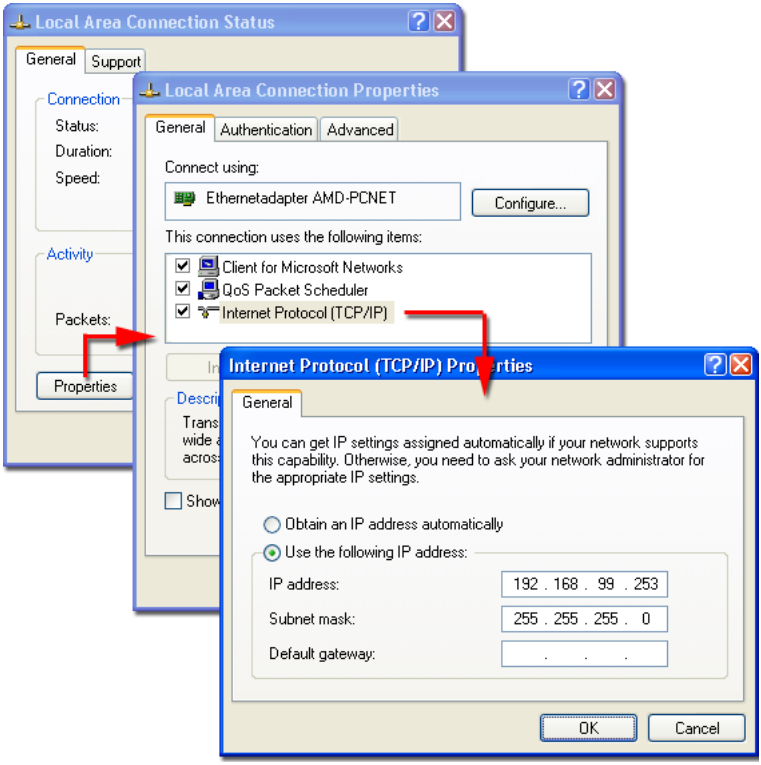
Note: To avoid problems with existing network installations, the T-Comfort 930 DSL's DHCP server is designed for static address assignment in its factory settings. The T-Comfort 930 DSL's IP address is always168.99.254 in its factory settings.

Brief Guide to Initial Configuration

Setting up a first connection is quite simple with a standard Windows PC:

1. Connect the PC's network card with one of the T-Comfort 930 DSL.'s LAN ports Use a cross-wired Ethernet cable to do this.
2. Windows 2000/XP: log on as a user with "Administrator" rights.
3. You will find the IP settings in Windows 2000/XP under **Start**: **Settings**: **Network connections**: **Local Area Connection**. Open the dialogue box **Local Area Connection Properties**, and then the dialogue box **Internet Protocol TC/IP Properties** (see figure: Setting the IP address in Windows XP on page 55).
4. Note down the existing settings so that you can restore them after completing the initial configuration.
5. Change the **IP Address** to 192.168.99.253. Change the **subnet mask** to 255.255.255.0, confirm with **OK** and **Close**.
6. Start a Web browser and in the address field enter "http://192.168.99.254/".

The Web console's log-on page will be displayed. Enter the user name "Administrator" without a password for the initial configuration. To support your next configuration steps, you should activate the **Assistant** mode on the entry page of the **Configurator**. Please also pay attention to the online help.



Setting the IP address in Windows XP

Tip

To find out the IP address of the Web console, enter the code digit procedure ✱ 1 8 2 on a connected system telephone. You can also view the net mask by entering the procedure ✱ 1 8 3 . The PC's IP address must be in this network range.

!

Note: Deactivate any connection via a proxy server which has been configured. Open the Internet Explorer, go to the menu **Extras** and open the **Internet options** dialogue box. Select the **Connections** register and deactivate the **Proxy Server**.

First Configuration via Serial Port

The serial port can also be used as alternative access for the first configuration. To do this, the V.24 module (only available for a T-Comfort 930 DSL version 1) must be installed. Additionally, you require a crossed serial line with RJ45 plug ("null modem").

1. Install the "Setup Dial-up Network Connection" program from the system CD. To do this, you must log on as an administrator under Windows NT or Windows 2000/XP.
2. Shut down the PC. Remove all connected network leads. Connect the serial port of the PC to the COM port of the T-Comfort 930 DSL.
3. Restart the PC. Set up a dial-up link with the icon configured on the desktop under step 1. Enter "Administrator" without a password as your user name.
4. Start the Web browser. Enter "http://192.168.99.254/" in the address box.

You will see the log-on page of the Web console. Enter the user name "Administrator" without a password for the initial configuration.

Configuring the T-Comfort 930 DSL

Preparing the Configuration

Before starting with the configuration, make sure you have the following documents at hand:

- An overview of the ports
- A list of the terminals to be connected
- A list of the IPEIs, if you wish to log on DECT terminals in the secure procedure
- A list of the users to be set up (staff entitled to use the services of the T-Comfort 930 DSL) with their names, departments, and the internal call numbers you want to allocate to them
- For Internet access: the Internet service provider access data.

Data not available for initial configuration can be updated or corrected at a later date.

Note: Use the **Configuration Guide** starting on page 121. This will assist you in making the settings in the correct sequence.

Starting the Web Console

1. Start your Web browser. Enter the T-Comfort 930 DSL IP address in the “Address” box: http://192.168.99.254/.

   If the configuration PC gets its IP address automatically from the T-Comfort 930 DSL or if the T-Comfort 930 DSL is entered as the domain name server, you can also start the Web console by entering the DNS name. The DNS name in the factory setting is **host.domain**. You can change this in the **Configurator** (**NET Configuration: LAN** menu).

2. This will call up the T-Comfort 930 DSL Web console.

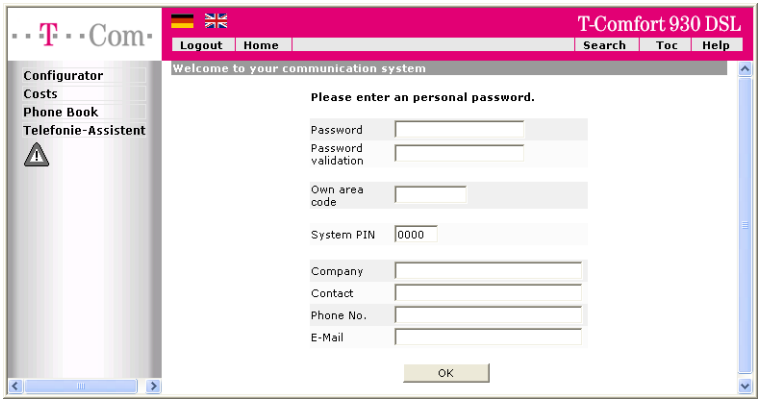
Please note: If the T-Comfort 930 DSL is brand new, you will now be asked to import current firmware. Please note the information on the interface informing you who to contact about this.

T-Comfort 930 DSL: log-on dialogue box

3. To commence configuration, you must first log on. For the initial configuration, enter your:

   - user name: “Administrator”
   - password: for the initial configuration, leave this box blank.

4. Confirm this by clicking on **OK**. This puts all connected terminals into the “Guest” user group with restricted user rights. In this way you prevent international external calls from the terminals, for example, while you are configuring the T-Comfort 930 DSL and the users.



T-Comfort 930 DSL: dialogue box for initial access

5. The software opens a dialogue for initial access. Determine an administrator password and enter it in this dialogue. Also fill in the other input fields.

6. Confirm your input with **Apply**.

7. Click on the **Configurator** button on the home page.

You will find notes on using the **Configurator** and in the online help. Click on **Help** in the menu bar or click on **TOC** to activate an overview of help topics.

Loading the Online Help

The online help can now be loaded in the Configurator:

1. Go to the **SYS Configuration: Components** menu. Select the entry **Online Help** and click on **Browse**.
2. Look for one of the language-specific ZIP files in the **OLH** directory of the product CD. Confirm your choice by clicking on **Open**.
3. Then click on **Load** to transfer the online help to the system.

Please note: After completion of the loading operation, the system will take a few minutes to analyse the transferred file.

Finishing the Configuration

1. When you have completed all the settings in the **Configurator**, you must save the configuration (see also Saving and Loading the Configuration on page 60).
2. Then select the **Log-off** command in the upper menu bar.

Remote Configuration

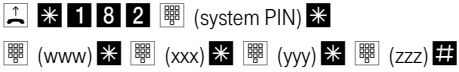
The T-Com service centre can also change or update the configuration of the T-Comfort 930 DSL using remote configuration The prerequisite for this is that access for remote configuration for the T-Com Service centre is activated in the T-Comfort 930 DSL. Please contact T-Com's technical customer services for further information.

Codes for IP Configuration

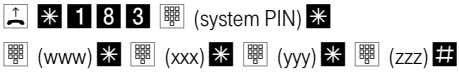
The IP configuration of the T-Comfort 930 DSL is performed on the Web console in the **Configurator**, in the **NET Configuration: LAN** menu.

In the event that the IP configuration of the T-Comfort 930 DSL has to be changed and access via the Web console is not possible, you can also use a code digit procedure to change these basic settings. Entry can be made from an analogue telephone, an ISDN telephone and from system telephones.

Set IP address



Set NET mask



Example

Enter: ✱ 1 8 3 0 0 0 0 ✱ 1 9 2 ✱ 1 6 8
✱ 9 9 ✱ 2 5 4 #

If required, initiate a system restart with this procedure:

Use the PIN you entered in the dialogue box for initial access. The factory setting is “0000”.

Saving and Loading the Configuration

Configurations are saved in a file archive and can be loaded to the T-Comfort 930 DSL either locally from a connected configuration PC, or by remote configuration.

The following configuration and customer data can be saved and loaded again:

- Telephony and network parameters
- User data

- Telephone book entries
- LCR tables

For further information, refer to the online help documentation under the topic **SYS Configuration: Data backup**.

Receiving System Messages as E-Mail

Important events and errors are kept by the T-Comfort 930 DSL in an internal log book: the error store. To inform or alert the system administrators, entries in the log book (system messages) can be sent via e-mail.

In order not to notified of every error, the administrator can define corresponding log filters (in the **Configurator**, the **LOG Configuration: LOG Filter** menu). These filters define which errors (category, severity, number per time interval) should be notified. The e-mails always include an internal event or error number, as well as an explanation of the message. Further, extra parameters (such as the port number when a trunk line drops out) are also provided.

The mail account for this service (**Account for LOG filter**) is configured in the **Configurator**, **NET Configuration: E-Mail Access**.

Loading SW Updates

New versions of the system and terminal software can be loaded to the system.

New software versions of the T-Comfort 930 DSL are loaded from the configuration PC, which accesses the **Configurator** (see the **SYS Configuration: Firmware** menu). For information on connecting a configuration PC, see Brief Guide to Initial Configuration on page 54.

The terminal software is part of the T-Comfort 930 DSL software and is automatically loaded into the terminals via the T-Comfort 930 DSL.

Note: If you are operating an PBX cascade, new system software is automatically transferred to the slave system from the master system.

For further information, refer to the online help documentation under the item **SYS Configuration: Firmware**.

Resetting the System Data

You can restore the factory settings of the T-Comfort 930 DSL in the Configurator. If this is not possible, refer to the next section entitled Basic Hardware Settings Switch.

Please note: If this is done, all individual settings and the user data are then lost. For this reason, you should back up your configuration regularly, the best time to do so being after every change. For details, refer to the chapter entitled Saving and Loading the Configuration starting on page 60 and to the Web console online help.

Proceed as follows:

1. In the Configurator, call up the **SYS Configuration**: **Restart** menu.
2. Click on **Restart with Defaults**.
3. Confirm this by pressing "OK" when the query dialogue box opens.

Basic Hardware Settings Switch

The T-Comfort 930 DSL configuration can also be returned to the factory settings by means of the basic hardware settings switch.

Please note: If the factory settings are restored, all customer settings and user data will be lost.

To restore the T-Comfort 930 DSL basic settings, proceed as follows:

1. Switch off the T-Comfort 930 DSL by disconnecting the power plug and the plug-in power supply of the basic module.
2. Remove the cover.

Caution!
Static charges can damage electronic devices. Observe the regulations regarding electrostatically sensitive components.

3. The basic settings switch is designed as a key switch. The location of the switch can be found in the chapter entitled Interface Cards starting on page 31. Press and hold the switch.

4. Replace the power plug in the mains socket. Wait about 30 seconds until the indicator on the front of the T-Comfort 930 DSL constantly flashes.

5. Disconnect the power plug from the mains socket again.

6. Release the key switch.

   The system data is now reset.

7. Replace the power plug in the mains socket.

   The T-Comfort 930 DSL will now reboot in the default configuration. The procedure is completed when all connected system terminals show the time on their displays.

8. Log on to the Web console (see Starting the Web Console on page 57). Configure the T-Comfort 930 DSL (possibly by loading a saved configuration; see Saving and Loading the Configuration on page 60).

Generating Your Own MoH Files

The T-Comfort 930 DSL comes with an internal MoH file for Music on Hold. The T-Comfort 930 DSL product CD contains a number of MoH files with different volume levels, which you can load at a later time as necessary.

The file format for non-resident Music on Hold is *.wav. You can also save your own MoH in a *.wav file and load it into the T-Comfort 930 DSL.

If you have a Windows operating system, you can use the “Sound Recorder” program to generate your own MoH file. This program is usually located in the Windows directory called “Multimedia”.

The MoH file must be coded with 8000 Hz, 8 bit mono in accordance with CCITT, A-Law. This coding is required for the T-Comfort 930 DSL and can be set in the “Sound Recorder” when you save the file under **Format** (CCITT, A-Law) and **Attributes** (8000 Hz, 8 bit mono). The maximum allowable size for a MoH file is

256 KB (approx. 32 sec. play time). If a larger file is loaded then this will be “truncated” and thereby will also only be played for 32 seconds. The MoH capacity can be subdivided in a maximum of 5 files. These files can be used for different companies or for internal and external calls.

Note: If you don't have the Sound Recorder program or the appropriate codec on your Windows operating system, you should install these components from your Windows CD.

Load your MoH file in the Web console's **Configurator**, in the **SYS Configuration: Components** menu.

Note: When generating your own MoH file, you may incur a fee for the use of non-resident melodies (e.g. a GEMA fee in Germany or MCPS fee in the UK). The MoH files that come with your T-Comfort 930 DSL can be used free of charge.

Configuration Examples

T-Comfort 930 DSL in Computer Networks

One of the outstanding features of the T-Comfort 930 DSL is the integration of telephony and computer networks. Connect the T-Comfort 930 DSL via a computer network (LAN) with suitably configured workstations, and you can use its network features from these workstations. Using a Web browser you can access:

- the T-Comfort 930 DSL Configurator
- call charge administration
- the Telefonie-Assistent, with which telephone functions can be used on a PC
- the T-Comfort 930 DSL central telephone book and your personal telephone book as well as to the company telephone book (if the multi-company variant is activated).

In addition, the T-Comfort 930 DSL can be used as an Internet access server. RAS access can also be implemented using the T-Comfort 930 DSL, which enables the integration of external staff in the LAN.

In this chapter you will find several examples of configurations showing integration of the T-Comfort 930 DSL in a LAN. Which example applies to your situation depends on the size and properties of the existing or planned LAN infrastructure.

Note: Several menu entries mentioned in this chapter are available only, if you switch on the **Level: Expert** in the top level dialogue of the **Configurator**.

The following LAN prerequisites are possible:

Server configuration in the LAN	T-Comfort 930 DSL Functions
No IP server present	T-Comfort 930 DSL functions automatically as DHCP and DNS server
IP server present DHCP server present	T-Comfort 930 DSL functions automatically as DHCP client System Administrator must assign IP address and DNS name for T-Comfort 930 DSL
IP server present No DHCP server present	Special case when integrating the T-Comfort 930 DSL in a LAN; settings in the **NET Configuration: LAN** menu must be coordinated with the responsible system administrator

Introduction to TCP/IP

In a single LAN it is possible to use various protocols for the transmission of data. The connection between a workstation computer and the T-Comfort 930 DSL runs via the IP protocol (also named TCP/IP) used on the Internet. IP can be used together with other protocols (e.g. NetBEUI, AppleTalk or IPX/SPX) on the same network.

Every device participating in data transmission using IP requires a unique IP address. An IP address consists of four groups of digits from 0 to 255, each separated by a full stop. The supplementary protocols DHCP and PPP automatically assign IP addresses to devices. Class C networks normally use IP addresses in which the first three numbers are the same and the last number is uniquely assigned to a specific device in the LAN. On the Internet, unique addresses assigned by a special organisation created for this purpose are used. Within a LAN, you can use addresses which are not unique world-wide:

IP Range	Common Netmask	Comment
192.168.0.0-192.168.255.255	255.255.255.0	256 smaller networks
172.16.0.0-172.31.255.255	255.240.0.0	1 medium network
10.0.0.0-10.255.255.255	255.0.0.0	1 large network

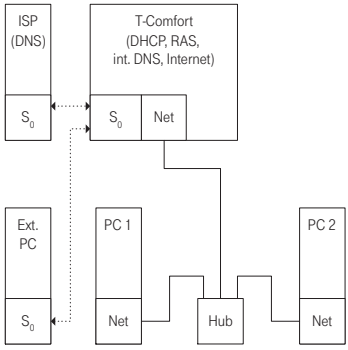
IP enables the establishment of connections via one or more intermediate stations. The decision whether to connect directly or indirectly to the partner device depends on the network mask. The network mask for a class C network is 255.255.255.0. If the IP address of the partner device does not fit the network mask, the connection is established via the default gateway. If a device knows several data routes to different intermediate stations, one speaks of a router.

The domain name system (DNS) resolves a plain text DNS name into an IP address. The DNS is a hierarchically structured database, distributed worldwide. A DNS server can supply information on the names and IP addresses for which it is responsible. For all other information, a DNS server contacts other DNS servers. For the establishment of every connection from the workstation, it is possible to give either an IP address, or a name that a DNS server resolves into an IP address.

Note: For further explanations of technical terms, refer to the Glossary on the CD supplied.

T-Comfort 930 DSL in a Serverless LAN

In a peer-to-peer network, the workstations are connected to one another via network cables. In many networks, the cables run in the form of a star from a central hub or switch. Such networks do not require special servers. This configuration example is also valid for a LAN with a server using a protocol other than IP (e.g. AppleTalk or IPX/SPX).



The T-Comfort 930 DSL in a serverless LAN

In a serverless LAN, the T-Comfort 930 DSL takes over the IP configuration of the connected workstations. All IP settings necessary for the workstations are assigned by the T-Comfort 930 DSL via DHCP (dynamic host configuration protocol). In this operating mode, an IP address space reserved for such networks is used:

192.168.99.254	T-Comfort 930 DSL IP address
255.255.255.0	Network mask (class C network)
192.168.99.254	DNS server IP address
192.168.99.254	Default gateway IP address

Install the IP network protocol and a Web browser for every workstation which is to have access to the T-Comfort 930 DSL network features.

DNS Name Resolution

In a serverless LAN, the internal DNS name resolution is performed by the T-Comfort 930 DSL. If you type the string “host.domain” into your browser, a DNS request is sent to the T-Comfort 930 DSL IP address. The T-Comfort 930 DSL responds with the correct IP address, so that the **Configurator** home page can be called up.

In a peer-to-peer network (Windows network), the workstations each have a name which is displayed in the network environment. These NetBIOS names can differ from the DNS names assigned to the workstations by the T-Comfort 930 DSL. The T-Comfort 930 DSL is not visible in the network environment.

Internet Access

If access to an ISP has been configured on the T-Comfort 930 DSL, the T-Comfort 930 DSL can be operated as an Internet access server without any additional configuration of the workstations. When you want to see a Web page, you simply type the URL (uniform resource locator; Internet address; “http://...”) in your browser. In a serverless LAN, the T-Comfort 930 DSL is configured as a DNS server and default gateway. The workstation therefore sends its Internet connection request to the T-Comfort 930 DSL.

In almost all cases, the request will contain a DNS name which is unknown in the internal network. When you type a URL into your browser, the T-Comfort 930 DSL receives the request to find the corresponding IP address. If the name is unknown in the LAN, the request is forwarded to an ISP's external DNS server.

Note: Workstation PCs automatically add a domain name to URLs without a dot. You specify this domain name in the **Configurator**. For example, if you have configured "firm.co.uk" as the domain name, an access request for "www.firm.co.uk" will be interpreted as a local DNS request which does not lead to the establishment of an Internet connection. For this reason, you should choose a name which is not used in the Internet as the domain name ("my-firm.co.uk" for example).

RAS Access

You can establish a connection to the T-Comfort 930 DSL from an external PC via an ISDN card.

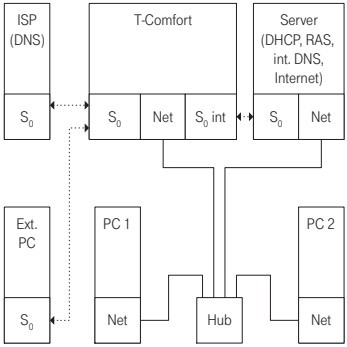
The necessary IP settings are transmitted by the T-Comfort 930 DSL on establishment of the connection. The computer that has dialled in has access to all services in the LAN that can be used via the IP protocol. The authorisation for RAS access is set up in the **Configurator** via the **User Manager: User Groups** menu.

The technical properties of the connection can be configured in the **Configurator** via the **NET Configuration**: **RAS** menu. Further information can be found in the online help of the web console.

In a serverless LAN, Windows uses the NetBIOS protocol for accessing files and printers via the network environment. NetBIOS can use NetBEUI, IPX/SPX or IP as the transport protocol. In the network environment, you can only access files and printers on workstations using IP for NetBIOS.

T-Comfort 930 DSL in a LAN with an IP-enabled Server

In a LAN with an IP-enabled server, you should coordinate integration of the T-Comfort 930 DSL with the responsible network administrator. You must decide on the IP address space to be used and which network services (DHCP, DNS, RAS, Internet access) the T-Comfort 930 DSL is to handle in the LAN.



The T-Comfort 930 DSL in a LAN with an IP-enabled server

In many cases, an IP-enabled server configures the IP settings via DHCP for all workstations. On starting, the T-Comfort 930 DSL requests IP settings via DHCP. If this request is responded to, the T-Comfort 930 DSL uses the IP settings received. You can then use a workstation to access the T-Comfort 930 DSL **Configurator** under the IP address assigned by the server.

In networks in which the IP settings are made manually, you have to enter the corresponding IP settings in the T-Comfort 930 DSL **Configurator** (**NET Configuration: LAN** menu). Here the T-Comfort 930 DSL acts as the DHCP server. A workstation requesting the IP settings via DHCP then receives the settings you made in the **Configurator**.

DNS Name Resolution

In a LAN with an IP-enabled server, the latter is also responsible for DNS name resolution. If you want to start the **Configurator** by entering a DNS name, you must link this name on the server with the IP address used by the T-Comfort 930 DSL. For further information, refer to the server documentation.

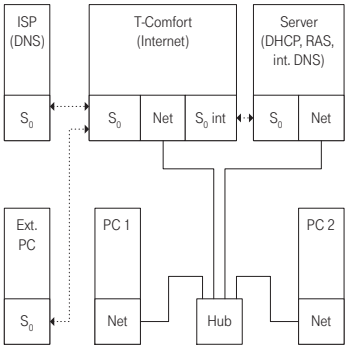
Note: To access the T-Comfort 930 DSL under the same IP address after a restart, you must specify this IP address permanently on a DHCP server. On a DHCP server it is possible to link the MAC address of a network card with a specific IP address. You will find details in the server documentation.

Internet Access

You can also use the T-Comfort 930 DSL as an Internet access server in a LAN with an IP-enabled server. To do this, you must enter the T-Comfort 930 DSL IP address on the server as the default gateway. In addition, you must edit the internal DNS server configuration so that the resolution of external DNS names is forwarded to the T-Comfort 930 DSL.

In this example, the Internet connection is established from a workstation via the server, which in turn requests Internet access from the T-Comfort 930 DSL.

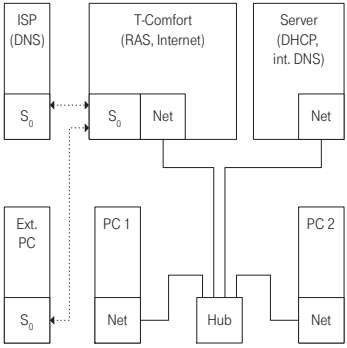
There are two different ways of suitably configuring the internal DNS server. You can enter the T-Comfort 930 DSL IP address as a DNS forwarder. If you require access to extended DNS information, you can also configure the DNS server for a recursive DNS request without the DNS forwarder. For further explanation, refer to the DNS server documentation.



The T-Comfort 930 DSL as a DNS server in a LAN with an IP server

RAS Access

In a LAN with an IP-enabled server you can also enable external computers to dial in via the T-Comfort 930 DSL. To do this, you should coordinate with the network administrator the IP address space which can be assigned to an external computer dialling in, and enter it in the **Configurator**, **NET Configuration: RAS**: **ISDN** menu, under **Address Range**.



RAS access by the T-Comfort 930 DSL in a LAN with an IP server

The user account administered by the T-Comfort 930 DSL, with which dialling in is permitted, only allows the establishment of direct and anonymous TCP/IP connections such as HTTP, FTP or SMTP connections. If you additionally want to allow file or printer access in the network, you must set up a suitable user account on the addressed server for network log-in. If you use the same log-in name for the T-Comfort 930 DSL user account and the same password for the network log-in, you have to enter this combination only once when dialling in.

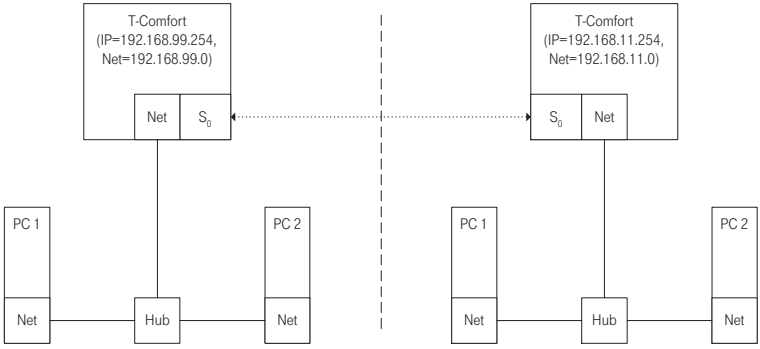
Note: In a larger Windows network with several segments, the lists of computer names visible in the network environment can no longer be established by broadcasts. In this case you use a special WINS server whose address the T-Comfort 930 DSL does not make known to the workstation when dialling in with ISDN. For this reason, you enter the address of a WINS server manually in the network settings of the workstation.

Branch Link

You can use the T-Comfort 930 DSL to interlink two LANs via ISDN.

To do this, you configure two T-Comfort 930 DSL systems so that they can dial in to each other.

In order for this to work, the two LANs must be configured for different IP address ranges (subnetworks). For at least one of the T-Comfort 930 DSL systems, change the prescribed address range for the LAN.



The T-Comfort 930 DSL in a LAN-to-LAN link

In the **Configurator**, **NET Configuration: Branch** menu you can configure the dial-in settings. The T-Comfort 930 DSL will set up a connection whenever a IP data transfer to the other LAN is requested.

Note that such a connection is only set up when specific requests are made. These can be for FTP file transfers, e-mails or downloading Web pages. Name resolution via broadcasts is not possible. If you wish to use the LAN-to-LAN link to access files and printers in the Windows network, you need an IP-enabled server that administers the name resolution for the Windows network.

As the IP address range, you can select one of the 256 class C subnetworks designed for local LANs. Select a class C sub-network in the range from 192.168.0.0 to 192.168.255.0.

Useful Information on Internet Access

Costs

The T-Comfort 930 DSL uses a router function to access the Internet, which means that it automatically establishes an Internet connection when required and terminates the connection after a certain period of time if no data are being transmitted.

Unfortunately, programs other than those typically intended to access the Internet (such as your browser or your e-mail software) may send out data packets which cause an Internet connection to be established, even if these programs are not strictly Internet-associated applications.

Examples of such programs are the Microsoft™ XP™ operating system, various multimedia programs such as Realplayer™ and anti-virus applications that may establish an Internet connection for automatic updates (the so-called “phone home function”).

It is therefore highly advisable to limit ISP access by specifying the maximum monthly connection time under **Connection time per month (maximal)** in the **NET Configuration**: **WAN**: **[Provider]** menu on the web console.

Using the Web

A Web browser not only enables you to use the T-Comfort 930 DSL **Configurator** from every workstation but also to obtain a wealth of information from the Internet. Simply enter the desired URL in the address field of

the browser. Access from a stand-alone PC via an online service differs from Internet access via the T-Comfort 930 DSL in the following respects:

- When you request a Web page, dialling in results automatically. There is no display of dialogues with manual confirmation of dialling in or hanging up.
- Requesting Web pages is not a connection-orientated service. When the Web page has been loaded completely, the TCP/IP connection is cleared. If you do not request further Web pages, the T-Comfort 930 DSL automatically releases the connection to the Internet after a certain, specifiable duration.
- It is possible to call up Web pages simultaneously from several workstations.
- The T-Comfort 930 DSL can block access to certain Web pages by means of filter lists.

E-mail

One of the most important services in the Internet is e-mail. E-mails are buffered in individual e-mail accounts on a mail server. Mail servers are operated by ISPs for example. With the T-Comfort 930 DSL you can set up one or more e-mail accounts for every user account configured on the T-Comfort 930 DSL. These e-mail accounts are then checked at regular intervals.

If there are new e-mails in an e-mail account, and the T-Comfort 930 DSL has been configured for this function, the user specified in the T-Comfort 930 DSL user account is notified of the new e-mail on his system terminal. T-Comfort 730/830 DSL system telephones can also display information such as the sender or the subject of the e-mail.

NAT

Network address translation (NAT) is activated on accessing the Internet (ISP). You require this feature in order to translate internal IP addresses to valid external IP addresses. This has three important consequences for Internet access:

- Several workstations can share a single Internet access. You do not require a LAN access, only a single account with the Internet service provider.

- The IP addresses used in the LAN are translated into IP addresses valid worldwide. So you require no such addresses for your LAN.
- Only IP connections triggered from a workstation can be established. Consequently, while you can call up Web pages from a workstation, you cannot install a Web server visible in the Internet on a workstation.

Certain protocols cannot be used when NAT is being used. This affects protocols with the following properties:

- IP addresses are transported in the useful load, e.g. NetBIOS over TCP/IP.
- The protocol requires an active, inward-directed connection establishment, e.g. ICQ.
- The protocol will function without TCP/UDP port numbers, e.g. ICMP or IGMP.

The T-Comfort 930 DSL NAT has suitable processes for ensuring the functions of many important protocols affected by these rules. These are the protocols FTP (in “active” mode), CuSeeMe (“videoconferencing”), IRC (“chat”), ICMP errors (“traceroute”) and ICMP echo (“ping”).

Protocols which require inward-directed connection establishment can be configured in the **Net Configuration**: **Port Access** menu. For further information, refer to the online help of this menu.

PBX Cascading

As requirements grow, the T-Comfort 930 DSL can be operated together with other PBX installations. If you merely need a larger number of connections, it is easy to link a second PBX (PBX Cascading). If you want to operate the T-Comfort 930 DSL at several locations with different PBXs, this is possible by PBX Networking (see page 81).

Variants of PBX Cascading

You can combine two PBXs in order to increase the number of terminals that can be connected. A master PBX and a slave PBX are connected to one another by means of two cables. The two PBXs essentially function like a single PBX with a higher number of ports. The master PBX controls the slave PBX. The following PBXs from the product family can be used for cascading:

Master system	Slave system
T-Comfort 930 DSL	T-Comfort 930 DSL

Functionality of PBX Cascading

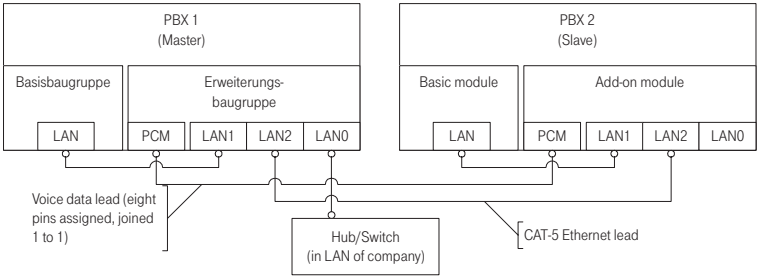
PBX cascading requires two twisted-pair leads with RJ45 plugs between the PBXs:

- Voice data: one lead with all eight pins wired 1 to 1. Connect this to the PCM ports of the PBXs. The shielded CAT-5 lead may be up to three meters long.

  The PCM port is on the add-on module of the T-Comfort 930 DSL. You must therefore install an add-on module in each of the two PBXs before they can be cascaded.

- Administration data: one CAT-5 Ethernet lead.

  Connect the LAN2 port of the master system's add-on module with a LAN2 port of the slave system's add-on module.



Cascaded PBX system

Putting a Cascaded PBX into Operation

Proceed as follows to put a cascaded PBX system into operation:

1. Take the additional slave system out of its packaging and place it in immediate proximity to the master system. Connect a system telephone to the slave system for a later performance check. Use the $U_{pn}1$ press-fit terminal of the basic module or one of the U_{pn} ports of an interface card.

2. Back up the master system data. For further information, refer to the online help topic **SYS Configuration: Data Backup**.

3. Switch off the master system if it is operating. Disconnect the module from the power supply by pulling out the mains plug.

4. If necessary, install the add-on module for the master system. If you use an T-Comfort 930 DSL as the slave system, you also have to install an add-on module.

5. Connect the two modules by means of two suitable cables as described above.

6. Power on the two PBXs. The order in which you do this does not matter.

7. In the **PBX Configuration: Ports: Slots** dialogue of the master system's Configurator, click on **Slave**. Select the slave **Type** in the **Slave: Change** dialogue.

   If a possible slave system was detected when the system was started, there is an additional entry in the **Type** field ("Online: PBX type"). If you select this entry, the settings for **Type** and **MAC address** are applied automatically.

Please note: If you change the type of slave system later on, the port settings that have been made will be deleted.

The master system then initialises the slave system. This may involve transfer of firmware (operating software) from the master system to the slave system. The transfer process is only executed for two T-Comfort 930 DSL PBXs. This can take a few minutes.

8. Configure the system telephone connected to the slave system for testing purposes in the **Configurator**. In the **PBX Configuration: Ports: Upn** dialogue, click on one of the additionally displayed entries of the type **Upn 1/0/n** (1: slave system, n: U_{pn} port number).

Note: Changes to the configuration while initialising the slave system may trigger error reports referring to the ongoing initialisation.

You can see that the initialisation has been completed from the display on the system telephone connected to the slave system.

Notes

Observe the following when operating a cascaded PBX system:

- All U_{pn}, S_0 and a/b ports of the slave system can be used with appropriate telephones. All features of system telephones on U_{pn} ports are available without restriction.
- The S_0 ports of the slave system can also be used for trunk lines or for PBX networking (see **PBX Networking** starting on page 81).
- It is not possible to operate a DECT base station on one of the U_{pn} ports of the slave system.
- The COM, actor/sensor and LAN ports of the slave system cannot be used. The LAN ports on the add-on module of slave system can be used without restriction.
- The two communications systems must have a direct Ethernet connection or be connected via a hub in order to exchange data. They cannot be connected through a router.
- The slave system cannot be addressed directly through a LAN. For configuration, always use the Web console of the master system.

- A memory card installed in the slave system (Comfort Pro A IAB (integrated answering machine) cannot be used.
- To operate the slave system again normally, you must reset it to its factory settings (refer to **Resetting the System Data** starting on page 62).

PBX Networking

T-Comfort 930 DSL provides all the features necessary for PBX networking. You need PBX networking in the following cases:

- To operate the T-Comfort 930 DSL as a subsidiary system on another PBX. This will also allow you to use the T-Comfort 930 DSL as a DECT server, for example.
- To network several T-Comfort 930 DSLs into a PBX system.
- To use flexible configuration possibilities of trunk lines for a T-Comfort 930 DSL.

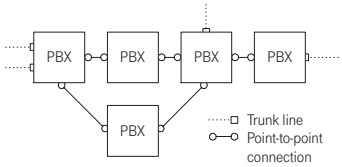
All settings that affect the configuration of PBX networking can be found in the Configurator menu **PBX Configuration: Trunks** and in the **PBX Configuration: System: Settings** dialogue under **System linking**. Refer also refer to the corresponding help topics in the T-Comfort 930 DSL online help.

Note: If you do not need the features of PBX networking, the simplified configuration is sufficient in most cases. For this purpose, assign the preconfigured trunk groups (bundles) **Multi-terminal access** or **System access** to the ports. The preconfigured route called **External trunk** now makes it possible to seize an external line immediately or by first dialling the prefix “0”. You can rename the preconfigured bundle and the preconfigured route if required, but you cannot delete them.

Connections

Networking two or more TK systems means interconnecting them. The T-Comfort 930 DSL allows you to use the following connections:

- ISDN trunk lines
- ISDN point-to-point connections (Q.SIG) on external S_0 ports



Example of a PBX network

Various line types and transmission protocols can be used for point-to-point connections. The required network topology (distance, connection capacity) determines which type of point-to-point connection is most suitable.

Protocol: Q.SIG or DSS1

The Q.SIG protocol, designed for ISDN point-to-point connections, is the preferable choice as the transmission protocol; alternatively, the DSS1 protocol, designed for ISDN dial-up connections in the Euro-ISDN, can be used. Certain PBX networking features can only be used with the Q.SIG protocol, however. In particular, the identifier indicating whether a call is internal or external cannot be transmitted using DSS1.

Both protocols implement communication on several protocol layers:

- L1: Layer 1 defines the physical line properties and the electrical coding of signals.
- L2: Layer 2 enables communication via individual error-protected channels that are independent of each other.
- L3: Layer 3 defines the administration of the individual channels and implements the features designed for ISDN.

Master/Slave

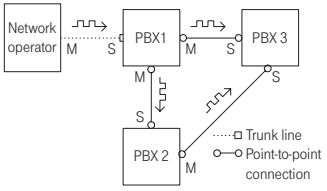
For an ISDN connection, it is possible to determine which PBX is the protocol master and which the protocol slave. This relationship can be determined for all three protocol layers independently of one another.

For each protocol layer, the PBX at the other end always has to be suitably configured. If one PBX is the protocol master for a layer, the other PBX must be the protocol slave for this same layer. Normally all three protocol layers are configured identically. In the case of a trunk line, the network operator is the protocol master for all three layers.

L1 Clock

To enable PBXs in the ISDN network to communicate with each other, they must be “clock-aligned”. The L1 protocol master sets the clock for layer 1, and the L1 protocol slave adopts (synchronises to) this clock.

When planning a PBX networking scheme, you must make sure that the L1 clock propagates from a master via a number of PBXs.



Example: propagation of the L1 clock

If more than one port with the setting **L1 Type** = “Slave” is configured on anT-Comfort 930 DSL and the setting **L1 sync possible** has been activated, then one of the ports is automatically defined as the L1 clock source. The T-Comfort 930 DSL will automatically switch the clock source to another port configured as an L1 clock source (if a line fails, for example).

Please note: Reciprocal or circular application of the L1 clock is not allowed.

Example: In the above case you could reverse the L1 slave/master setting for the connection between PBX 1 and PBX 3. However, if you then activate the setting **L1 sync possible** for the port of PBX 1, this may cause parts of the PBX network to stop functioning temporarily.

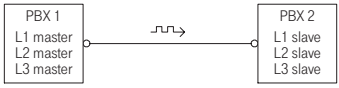
When applying the L1 clock of trunk lines, you can assume that the public network is “clock-aligned”. So, in the above example, you can connect additional trunk lines to one of the PBXs.

Types of Point-to-Point Connections

There are different types of connection available for an point-to-point connection between two PBXs, depending on the distance between them.

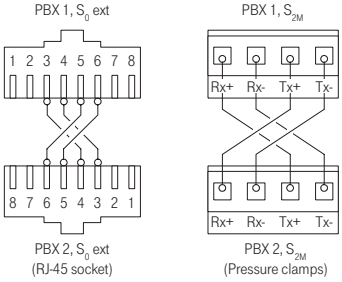
Direct Connection

This type of ISDN point-to-point connection joins the two systems directly to each other using a crossover twisted-pair cable. An S_0 connection can be used for distances up to 1,000 metres. Normally one PBX is the protocol master for all three layers, and the other PBX is the protocol slave for all three layers.



Direct connection

- Use the RJ45 jacks on one of the external S_0 ports for an S_0 connection between two T-Comfort 930 DSLs. You can use the corresponding pressure terminals for S_0 ports on interface cards.



Wiring of a direct connection

Note: If you use an S_0 port on an interface card (pressure terminal) and an S_0 port with an RJ45 jack for the direct connection, make sure you make the necessary changes to the port assignment (see **S0 Ports on Interface Cards** starting on page 35).

Connection via an Active Transmission System

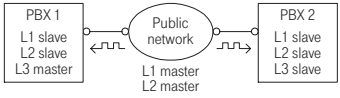
For distances exceeding the range of a direct connection, an active transmission system can increase the range to up to 50 km. Normally the L1 master is the transmission system for the two connected PBXs. For the protocol layers L2 and L3, one PBX is normally the protocol master and the other PBX is the protocol slave.

Connection by an active transmission system

Note: The active transmission system itself gets its L1 clock either from the network operator or from a clock generator connected by wire.

Connection via the Public Network

Point-to-point connections via the public network of a network operator can be used for bridging distances beyond 50 km. Due to the long distance involved, for technical reasons it is not possible to synchronise the L2 protocol. Consequently, the public network is normally the protocol master for protocol layers L1 and L2. One PBX is therefore the L3 master and the other PBX the L3 slave.



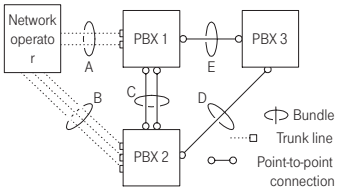
Point-to-point connection via a public network

Configuration

The possible configurations described below can be set up in the Web console using the **PBX Configuration: Trunks** menu.

Trunk groups

This is a group of lines of the same type and direction. A line can only be assigned to one **trunk group** (bundle).



Example of a PBX network with trunk groups

In the above example, the following trunk groups are configured for PBX 1:

- Two S_0 lines in a multi-terminal configuration to the network operator which are assigned to the “A” trunk group.
- Two S_0 point-to-point connections to PBX 2 which are assigned to the “C” trunk group.
- One S_0 point-to-point connection to PBX 3 which is assigned to the “E” trunk group.

!

Note: A line or a trunk group cannot be seized directly. It is always performed indirectly via a route.

Routes

A **route** is a group of trunk groups enabling a connection in one direction. If the first trunk group of a route is fully utilized, the next trunk group is seized ("trunk group overflow"). One trunk group can also be used for different routes.

In the above example, a route set up for PBX 1 allows a connection to PBX 2. Trunk groups "C," "E" and "A" are assigned to this route. If a user connected to PBX 1 wants to reach a party in PBX 2, lines will be seized in the following order:

- PBX 1 first searches for a free channel in the "C" trunk group.
- If all the lines in trunk group "C" are busy, the system tries to set up a connection via trunk group "E". PBX 3 switches the connection through, provided it is appropriately configured (refer to Numbering starting on page 87).
- If it was not possible to set up an indirect connection via PBX 3, the system tries again via trunk group "A". The "prefix" necessary for this can be configured with the route.
- The user does not get a busy signal until the attempt to set up an indirect connection via the network operator has also failed.

Note: If an internal connection is switched via a network operator, the call is signalled using the external number of the calling PBX.

For each route you can define a randomly selectable code digit for seizing the route. You can also configure whether a user is authorised to seize a particular route, whether LCR is to be used for one of the trunk groups.

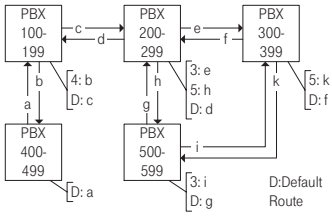
Numbering

A user can seize a particular route by pre-dialling a specific code digit. With this "open numbering", a user must always dial this code digit and then the telephone number in order to reach a party in another PBX.

If none of the telephone numbers in your PBX network occur twice, you can also configure "closed numbering", allowing the same telephone number to be used for reaching each user within the PBX network.

With closed numbering, the T-Comfort 930 DSL determines which route to seize from the telephone number dialled. The information needed for routing a call can be configured in a numbering table containing up to 100 entries. You use this table to assign telephone numbers and/or ranges of telephone numbers to a particular route.

A **default** entry in the numbering table makes it possible to seize a "default route" for all remaining unassigned numbers. In particular, this simplifies configuration of the T-Comfort 930 DSL as a subsidiary system: the only entry you assign to the **default** entry is the route to the host system



Example of closed numbering tables

The automatic switching of call requests (i.e. routing) by means of trunk group overflow or default numbering can lead to "circular switching".

To avoid this, a "transit" counter is incremented whenever a connection is switched through on Q.SIG lines. When the configured maximum value is reached, further switching stops.

Technical Details

A different PBX number must be set for each T-Comfort 930 DSL in a PBX network. This setting can be found in the Web console, in the menu **PBX Configuration: System: Settings** under the heading **System linking**. You can also set the maximum value for the transit counter there. This value depends on the topology of the PBX network and should allow the system to have the maximum number of further connections possible.

You can display the connection status of the lines at any time in the Configurator menu **System info: PBX: Trunks**. You should check this in particular after making changes to a configuration to see whether all the lines used for system networking are operable.

Some of the features possible in Q.SIG are not supported by T-Comfort 930 DSL with all their options, for example callback on busy within the Q.SIG network. The call categories defined in Q.SIG (e.g. Emergency Call, Operator, Normal) and the Q.SIG name transmission feature ("user names") are fully supported.

The code digits to be used for seizing a route with open numbering are not transmitted to the destination PBX and thus cannot be evaluated by it. To reseize a route (for example for a callback), you must set the appropriate digit prefixes in the trunk group configuration for the routes to be reseized.

Tip

If, for example, you are configuring a route which can be seized using routing code "5" and have selected one or more bundles for this route, change the **Prefix for dest. call number at incoming internal** setting to "5" for this bundle in order to enable the route to be reseized.

Owing to their hardware properties, not all S_0 ports of the T-Comfort 930 DSL can be used for PBX networking without restrictions. Depending on the type of system, some ports can only operate in the L1 master mode or L1 slave mode. The external S_0 ports can be set according to the following table.

	S_0 1	**S_0 2**	**S_0 3**	**S_0 4**	**S_0 5**
T-Comfort 930 DSL	S	M/S	-	-	-

Legend

S = Slave

M/S = Master/Slave

M = Master

!

Note: The S_0 ports on add-on cards can be operated in both L1 master and L1 slave mode.

Team Functions

Introduction

With the team functions you can manage your telephone communication tasks by assigning lines with separate call numbers to the keys of different terminals. The terminal users, or team members, can thus pick up one another's calls or telephone each other using the configured keys.

Team functions can only be configured on the T-Comfort 630/730/830 and Comfort Pro P 100/300/500 system telephones because only these have the required features.

Explanation of Keys

The team functions are programmed on the call keys of the T-Comfort 630/730/830 telephones. Depending on the terminal, different numbers of call keys are available:

System telephone	Number of keys
T-Comfort 630	One key with a display, five keys without a display
T-Comfort 730	Three keys with a display, five keys without a display
T-Comfort 830	Nine keys with a display
T-Comfort 830 with an additional keypad module	19 keys with a display: nine on the telephone itself and 10 on an add-on keypad module
Comfort Pro P 100	One key with a display, five keys without a display
Comfort Pro P 300	Three keys with a display, five keys without a display

System telephone	Number of keys
Comfort Pro P 300 with an additional keypad extension Comfort Pro P 300 TM	36 additional keys without a display Up to three of these keypad extensions can be used with a Comfort Pro P 300.
Comfort Pro P 500	Nine keys with a display
Comfort Pro P 500 with an additional keypad extension Comfort Pro P 500 TM	20 additional keys with a display Up to three of these keypad extensions can be used with a Comfort Pro P 500.

Note: Only one function or call number can be programmed for each call key.

The following keys can be used:

- **Trunk key**: Calls (for the programmed call number, e.g. 11) are signalled to this key, and you can make internal and external calls via this number. A trunk key can be programmed with a substitute function (with another team member acting as the substitute). Calls for you are then signalled to the terminal of another team member. A trunk key also provides functions for managing calls. For example, you can configure call protection if you do not want to be disturbed, or call diversion to another telephone.
- **Team key**: As with a trunk key, a team key can be used to receive or make calls. However, this key cannot be used to change the settings for managing calls; it is not possible, for example, to configure call diversion to another telephone. Calls made via a team key are signalled to all terminals with a trunk key that has been programmed with the same number. For example, the team key with the number 11 calls all trunk keys with the number 11.
- **Busy key:** The purpose of a busy key is to make the busy status of other team members visible. An incoming call for a busy team member is signalled on the other team member's busy key. That team member can take this call by pressing the busy key, which seizes his own terminal's trunk key. Calls taken via the busy key are not entered in the call list of the team member who was originally called. In addition, it is possible to call the respective team member via his busy key when his terminal is idle. You set up a call to this team member by pressing your own trunk key.

- **Direct call key**: Only outgoing calls can be made with a direct call key; they are signalled to all terminals with the same number programmed to a trunk key. Calls via a direct call key are signalled to the destination terminal even if that terminal has been programmed with a substitution function or call protection. If the destination terminal has been configured for call diversion, the direct call is not diverted.

Which key is suitable for which purpose?

- **Trunk keys** can be assigned call numbers for managing central communication tasks, for example, customer support. If the call numbers of the support department are assigned to trunk keys on all of its terminals, then all members of the support department can receive and manage calls and use the substitute function.
- **Team keys**, for example, can be used to create a project group within a department. Calls from customers of this group can then be answered by any team member who is not busy. The team members can call each other by the team keys.
- A **busy key** can be used to configure an enquiry station showing the status of the individual users. The enquiry station sees the status of the users and can put calls through by simply pressing the key.
- **Direct call keys**, for example, can be configured at a terminal in a conference room to call the secretary.

Team Configuration

You can create teams and program call keys in the **Configurator** of the T-Comfort 930 DSL (**PBX Configuration: Groups** and **Ports: Upn** menu).

Call key 1 is preset as a trunk key on all system telephones. This setting can be changed by the system administrator.

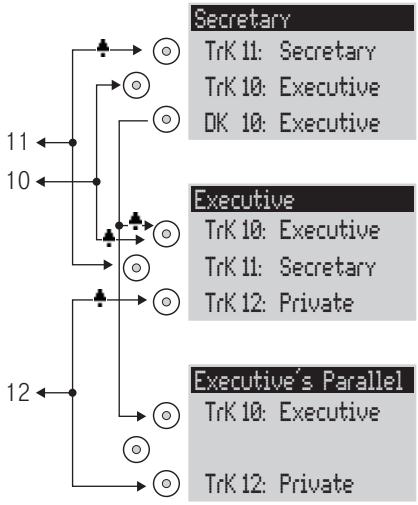
Examples of Use

The following examples illustrate the various uses of teams and team functions.

For information on the display texts and how to use the individual functions, refer to the chapter “Managing Calls in a Team” in the “T-Comfort 630/730/830” and “Comfort Pro P 100/300/500” user guide.

Executive/Secretary Team

In this example, the executive/secretary team comprises two members: the executive and the secretary. The secretary has one T-Comfort 730 system telephone, and the executive has two, one of which is used as a parallel telephone in a sofa suite.



Example: executive/secretary team

Line Seizure

The secretary can be reached on the call number 11 (trunk key TrK 11: secretary's office).

The executive can be reached on the call number 10 (trunk key TrK 10: executive's office). He can also answer calls from his parallel telephone. In addition, a private line is configured for both of the executive's telephones (trunk key TrK 12: private).

Call numbers 11 and 10 are both configured as a trunk key on the executive's and the secretary's terminal respectively. Thus the executive and the secretary can use either call number (for answering as well as making calls). Each can act as a substitute for the other.

The secretary's terminal also has the executive's call number configured as a direct call number (DK 10: executive's office). The secretary can therefore reach the executive and put through calls even if the executive has programmed a substitute.

Line Busy Indication

If a line is busy, e.g. TrK 11 secretary's office, the other terminal will indicate this. The executive's private calls via TrK 12 are not indicated on the secretary's terminal since no appropriate trunk key is configured on the latter's telephone.

Call Signalling

In this configuration example, calls to one's own call number are signalled acoustically on the following telephones:

- Call number 11 on the secretary's telephone
- Call numbers 10 and 12 on the executive's telephone.

Calls for the other team member's call number are indicated by an optical signal on one's own telephone (flashing trunk key LED).

The parallel telephone will indicate calls only by an optical signal.

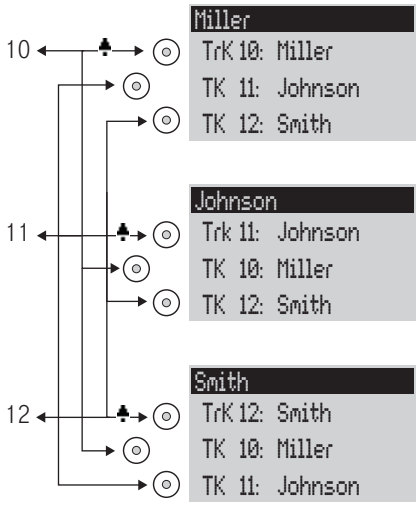
Time-delayed acoustic signalling can be configured for TrK 10 on the secretary's telephone. If the executive, for example, does not answer a call within 10 seconds, the secretary's telephone will start to ring.

If the executive activates a substitute function with the secretary as the substitute, calls for call number 10 will be indicated on the executive's telephone by an optical signal only, but signalled acoustically on the secretary's telephone. The secretary can also activate a substitute function. Calls for call number 11 are then signalled acoustically on the executive's telephone, and indicated by an optical signal on the parallel telephone and the secretary's telephone.

Three-member Team

The three-member team described here is an example of a team configuration within a project group, e.g. export sales.

Each team member has one T-Comfort 730 system telephone with all call keys programmed as trunk and team keys.



Example: three-member team

Line Seizure

Each team member's call number, e.g. call number 10 for Miller, is programmed as a trunk key on his telephone.

On the other telephones in the team, this call number is programmed as a team key (e.g. TK 10 on Johnson's and Smith's telephones). The team members can thus see which number a call is for and can answer it by pressing the appropriate team key.

The team members can call each other via the team keys. For example, Miller can call number 12 by pressing TK 12; the call is then signalled to Smith's telephone on TrK 12.

Line Busy Indication

If a line is busy, e.g. TrK 11 Johnson, the team keys 11 on Miller's and Smith's telephones will indicate this.

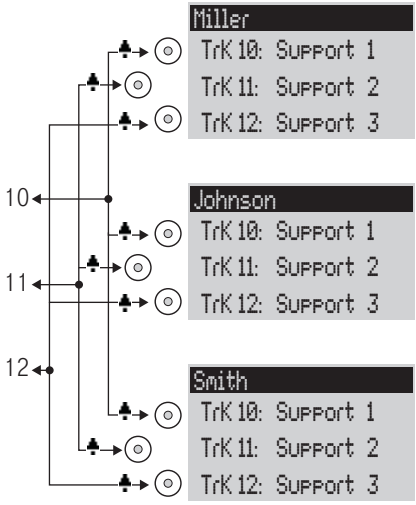
Call Signalling

In this example, calls via the trunk keys are signalled acoustically. Calls via the team keys are indicated by a visual signal (the team key LED flashes).

Unified Team

The unified team described here is an example of a team configuration within a department in which calls are to be managed quickly (e.g. support department).

Each team member has one T-Comfort 730 system telephone with all call keys programmed as trunk keys.



Example: unified team

Line Seizure

Call numbers 10, 11 and 12 are programmed as trunk keys on each team member's telephone (TrK 10 to TrK 12.

All team members can use these numbers for answering as well as making calls.

Tip

In this team configuration it is useful to program one of the function keys on each telephone with the "Hold" function. A call, e.g. for TrK 11, can then be put on hold by pressing the function key. If another team member then presses trunk key TrK 11 on his telephone, he can accept the call. For further information on function keys, refer to the "T-Comfort 630/730/830" and "Comfort Pro P 100/300/500" user guide.

Line Busy Indication

If a line is busy, e.g. TrK 11 Johnson, the trunk keys on the other team telephones will indicate this.

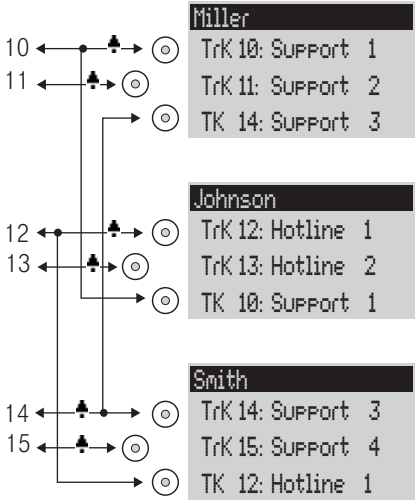
Call Signalling

In this example, calls via all trunk keys are signalled acoustically.

Toggle Team

The toggle team described here illustrates how a large number of call numbers can be managed efficiently with the help of team functions.

Each team member has one T-Comfort 830 system telephone with all call keys programmed as trunk and team keys.



Example: toggle team

Line Seizure

Each team member is assigned two call numbers, each programmed as a trunk key (LT 10 to LT 15).

The first number of each team member is programmed as a team key on the other member's telephone, e.g. LT 10 on Miller's telephone as TT 10 on Johnson's telephone. The assumption here is that most calls will go to the respective first call numbers, and team members can thus help each other out by answering one another's calls.

On each telephone it is possible to toggle between the calls on individual lines, e.g. TrK 10 and TrK 11, by pressing the appropriate key (toggling).

Every call on a trunk key can be transferred to any other party by means of the R key. For more information, refer to the chapter entitled "Consultation, Toggling, Transfer and Conference" in the "T-Comfort 630/730/830" and "Comfort Pro P 100/300/500" user guide.

Line Busy Indication

If a line is busy, e.g. TrK 10 on Miller's telephone, the appropriate team key will indicate this, e.g. TK 10 on Johnson's telephone.

Call Signalling

In this example, calls via trunk keys are signalled acoustically. Calls via team keys are indicated by a visual signal (the team key LED flashes).

Call Queue

Introduction

A queue can be activated for the telephone numbers of any type of telephone, i.e. for system, analogue, ISDN and DECT telephones.

If a call number with a queue is busy, calls to this number enter the queue. The caller first hears an announcement (if function “Announcer at busy” is configured) and then a dial tone.

Calls which remain in the queue for too long are cleared from the queue. The caller then gets a busy tone. If all the positions in the queue are taken then any further calls also hear the busy tone.

The time until an external call is cleared from a queue is defined by the network operator. In Germany this is usually two minutes and in other European countries usually three minutes.

If more than one telephone number (e.g. trunk or team keys) has been configured for a telephone, separate queues are used for each number.

On the T-Comfort 830 and Comfort Pro P 500 system telephone, additional calls are signalled by a brief tone in the loudspeaker and in the display. If calls are in the queue, a number at the beginning of the second line of the display on the T-Comfort 830 and Comfort Pro P 500indicates how full the queue is. If more than one telephone number with a queue is configured on the telephone, the total number of entries are displayed.

Calls in a queue are handled by the T-Comfort 930 DSL in the following order of priority: instant connection, door calls, automatic recalls, VIP calls, then other internal and external calls. Sensor calls thus have priority over other calls, for example. Calls of the same priority level are switched in the order of their arrival.

The system administrator sets the number of calls that can be placed in a queue individually for each user group. The value can lie between “0” and “99”. The “0” value deactivates the ”Call queue” function for a user group. When the maximum number of calls in the queue is reached, further callers hear a busy tone.

Note: As calling fax machines often operate with the “voice” service indicator (e.g. on analogue ports), you should assign ports for fax machines on the T-Comfort 930 DSL to a user group **without** a queue.

Queues can be combined with the “forwarding,” “pickup” and “hunt group” functions, for example, in order to configure an enquiry station for an operator.

Activation of Queues

Queues can be activated on a per user group basis. On delivery the default set, for all preset groups, is **off**.

When using queues, it often makes sense to activate call waiting protection. For this purpose, “Call waiting protection” authorisation must be allocated to the user group, and call waiting protection must be activated on the terminal.

Furthermore it is sensible to combine queues with the “Announcer at busy” function. When a caller calls a subscriber who is busy then they will hear a “central welcoming text”, for example, “Here is company XYZ. You will be immediately connected”. The function “Announcer at busy” can be set in the **PBX Configuration: Call Distribution: Incoming** menu. Central welcoming texts can be recorded using the program package **“Comfort Pro A IAB** (integrated answering machine)**”**.

You should configure a new user group (e.g. “Operators”) and activate the authorisations “Call queue”, “Call waiting protection” and, if necessary, “Call forwarding”. If users belong to this group, a queue will be activated automatically for all telephone numbers assigned to them.

Call Forwarding

Forwarded calls of the forwarding type “Immediately” and “On busy” have priority over queues. The queue of the forwarding telephone is not used for forwarding calls in this manner.

During the configuration of this type of call forwarding, the contents of the queue are **not** transferred to the target terminal. If there are still calls in the queue when the call forwarding function is activated, these calls can only be accepted on the source terminal.

If a call is to be forwarded “After delay”, it enters the queue. If the call has not been answered before the delay period expires, it will be forwarded to the target terminal and can then be answered there.

Pickup

The functions “Pickup” (from a pickup group) and “Pickup selective” can be used together with queues. A user who accepts a call using “Pickup” or “Pickup selective” picks up the next call from the queue.

Hunt Groups

Hunt groups of the “parallel” type are usually used together with queues, with the queues of each telephone in the group being synchronised to each other. When a call to the number of the hunt group arrives, the call enters all parallel queues. If a call from one of the queues is answered, it is removed from all other parallel queues.

Examples of Use

Note: Ports on a U_{pn} interface card are DECT enabled, so that DECT base stations can be connected to operate cordless system terminals.

Enquiry Station for an Operator with Two System Telephones

The operator switches all incoming calls and can either work on the T-Comfort 830/Comfort Pro P 500 or the mobile terminal, the T-Comfort 830 handset/Comfort Pro CM 300.

Configuration

- Configure the system access or access for multiple terminals under **PBX Configuration: Ports: S_0**.
- Configure the T-Comfort 830/Comfort Pro P 500 and a base station under **PBX Configuration: Ports: U_{pn}**.
- Configure a trunk key for the T-Comfort 830/Comfort Pro P 500 under **PBX Configuration: System telephones**.

- Configure the T-Comfort 830 handset/Comfort Pro CM 300under **PBX Configuration: Ports: DECT-PP** and assign the T-Comfort 830 handset/Comfort Pro CM 300 its own telephone number. Check in the T-Comfort 830 handset/Comfort Pro CM 300.
- Under **PBX Configuration: Call Distribution: Incoming** or **PBX Configuration: Call Distribution: Incoming PTP** route all incoming calls to the number of the T-Comfort 830/Comfort Pro P 500trunk key.
- In the **Configurator**, create a new group called “Operators” under **User Manager: User groups**. Activate “Call queue”, “Call waiting protection” and “Call forwarding” for this group and set the **Dial out: External** option appropriately.
- Create a user called “Operator 1” under **User Manager: User**. Assign this user to the “Operators” user group. Assign the telephone numbers of the T-Comfort 830/Comfort Pro P 500 trunk key and the number of the mobile T-Comfort 830 handset/Comfort Pro CM 300 to this user.
- Activate `Call wait. prot.` (call waiting protection) on both terminals in the `Protection` menu.
- Configure a function key on the T-Comfort 830/Comfort Pro P 500 which activates/deactivates a “call forwarding immediately” to the telephone number of the mobile T-Comfort 830 handset/ Comfort Pro CM 300 (in the menu `Call diversion: Divert phone: Immediately`).

Use

Incoming calls are routed to the T-Comfort 830/Comfort Pro P 500 manned by the operator, who then puts the calls through. A queue is used so that callers do not get a busy signal. The display on the T-Comfort 830/ Comfort Pro P 500 indicates how many calls there are in the queue.

If the operator wants to leave the workstation and take along the enquiry station, call forwarding to the T-Comfort 830 handset/Comfort Pro CM 300 is activated by pressing a function key. Calls which are in the T-Comfort 830/Comfort Pro P 500 queue must still be answered on this telephone. New calls are signalled on the mobile T-Comfort 830 handset/Comfort Pro CM 300 or enter its queue, allowing the T-Comfort 830 handset/Comfort Pro CM 300 to be used as a mobile enquiry station.

On returning to the workstation, the operator deactivates call forwarding by pressing a function key. Calls which are already in the queue are switched on the mobile T-Comfort 830 handset/Comfort Pro CM 300. New calls are signalled on the T-Comfort 830/Comfort Pro P 500 or enter its queue.

Group of Three Enquiry Stations

The enquiry stations switch all incoming calls. Incoming calls are administered in queues. Depending on the number of arriving calls, one to three enquiry stations in this group are manned. The enquiry stations are each equipped with a T-Comfort 830/a Comfort Pro P 500.

Configuration

- Configure the multi-terminal access or the system access under **PBX Configuration: Ports: S_0**.
- Configure the three T-Comfort 830/Comfort Pro P 500 telephones under **PBX Configuration: Ports: U_{pn}**.
- Configure a trunk key with its own telephone number for each of the T-Comfort 830/Comfort Pro P 500 telephones under **PBX Configuration: Devices: System telephones**.
- Configure a hunt group of the "parallel" type under **PBX Configuration: Groups: Hunt Group**, and include the three telephone numbers of the trunk keys in this hunt group.
- Under **PBX Configuration: Call Distribution: Incoming** or **PBX Configuration: Call Distribution: Incoming PTP** route all incoming calls to the number of the hunt group.
- In the **Configurator**, create a new group called "Operators" under **User Manager: User groups**. Activate "Call queue" and "Call waiting protection" for this group.
- In the **User Manager**, configure a u**ser** for each of the three operators and assign these settings to the user group called "Operators". Allocate each **User** the telephone number of the trunk key of their system telephone.
- Activate `Call wait. prot.` (call waiting protection) on all three terminals in the `Protection` menu.
- Program a function key with the function "Sign on/sign off from hunt group" on the three system telephones (in the menu `Calls: Hunt group`).

Use

Incoming calls are signalled in parallel to all signed-on enquiry stations. If the enquiry stations are busy, the incoming call joins the queue on each of the terminals in the hunt group. If one of the enquiry stations accepts a call from the queue, the call is removed from the queues of all the other enquiry stations. The display at each enquiry station (T-Comfort 830/Comfort Pro P 500) indicates how full the queue is.

If attendants leave the station, they sign off from the hunt group by means of a function key. In contrast to Example 1, further calls do not have to be processed after the sign-off, as the calls are also registered in the queues of the other signed-on enquiry stations.

Note: The last enquiry station remaining in the hunt group should not sign off, so that incoming calls can always be signalled to at least one station.

Multi-Company Variant

Communications systems are frequently shared by several companies. These companies want to jointly use the existing infrastructure (e.g. the existing lines and features of the system), while at the same time they wish to organise and pay for their communication completely independently of one another.

This “multi-company variant” can be implemented using the T-Comfort 930 DSL within a shared office, for example.

In the multi-company variant, the companies are essentially completely independent of one another. This allows them to have their own trunk lines, which is useful for billing purposes. The T-Comfort 930 DSL hardware and software are used equally by all the companies, however. It is possible to configure the T-Comfort 930 DSL for each company and define the extent to which the features of the system may be used.

In brief, the features of the multi-company variant are as follows:

- Up to five companies can be configured at the same time.
- Every user of the T-Comfort 930 DSL is assigned to a company.
- Each available trunk group is uniquely assigned to a company so that incoming external calls can be transferred to the correct internal subscriber.
- For each company, every route can have its own code. For example, it is possible to activate different routes with the code “0” for different companies. This enables separate charging for outgoing external calls, for example.
- An individual exchange (“operator”) can be set up for each company.
- Each company can maintain the communication data of its business partners in its own company telephone book.
- The charges can be billed individually for each company.

Configuring the Multi-Company Variant

The multi-company variant can be commissioned and configured by the system administrator of the T-Comfort 930 DSL without any major effort. In the multi-company variant, the communications system behaves in exactly the same way as the single-company variant. This is particularly of interest to users who want to expand their own system and at the same time operate it in a group.

The process in brief:

1. The feature must be activated (see **Activating the Multi-Company Variant** starting on page 106).
2. The required companies must be set up (see **Configuring and Managing Companies** starting on page 107).
3. The users of the T-Comfort 930 DSL are assigned to the individual companies (see **Assigning Users** starting on page 107).
4. In order that the T-Comfort 930 DSL can transfer incoming calls to the corresponding company (or its staff) correctly, the existing trunk groups must be uniquely assigned to the companies (see **Assigning Trunk Groups** starting on page 108).
5. In the case of outgoing external calls, the lines via which the members of a company can make a call must be defined (see **Allocating Routing Codes** starting on page 108).
6. An exchange must be set up for each company so that the T-Comfort 930 DSL can correctly process statuses in which a call should be routed to the exchange (see **Configuring the Company Exchange** starting on page 109).

Activating the Multi-Company Variant

To be able to configure several companies in the T-Comfort 930 DSL, the “Multi-company variant” feature must first be activated. This is done in the **Configurator** on the Web console in the **SYS Configuration: System** menu. Activate the **Multi company** option here.

Only when this option has been activated are the fields required to configure the multi-company variant available in the other menus of the Web console, for example in the **User Manager: User groups** menu or in the **PBX Configuration: Trunks menu**.

Configuring and Managing Companies

Up to five companies can be configured in the T-Comfort 930 DSL. By default, one company with the name "Company 1" is predefined. All configuration settings, e.g. in the user groups or in the trunk group configuration, apply to this predefined default company if not other company has been selected.

Companies are set up and managed in the **PBX Configuration: Companies** menu:

- A new company is created in this menu using the command **New**. Each company can be given a name up to 20 characters long. This name is then displayed in all configuration dialogue boxes in which company-specific settings can be defined.
- In this menu a company can be deleted again using the command **Delete**. If a company is deleted which is still used at other places (in the user groups, for example), the respective configuration is changed to the default company.
- The name of the default company can be changed, but the default company itself cannot be deleted.

Assigning Users

For each user you must define the company to which they belong. This assignment determines, for example, which company telephone book the user has access to and which company-specific configuration data apply to them.

As the T-Comfort 930 DSL manages users in groups, the assignment "user > company" is also established this way. The company to which each user group belongs must be defined for each group. A user group can only belong to one company, i.e. not to several. However, a company can have several user groups. It is therefore possible, in the same way as in the entire system, to allocate a range of authorisation rights for the use and configuration of features for each company.

When setting up a new **User group** (in the **User Manager** menu), you will find that the default company is predefined; another company can be assigned as long as no other companies have been set up.

Assigning Trunk Groups

Connections of the same type and in the same direction are arranged in a trunk group (e.g. S_0 multi-terminal connections). To be able to correctly transfer incoming calls to the members of the configured companies (the users) via the lines of a certain trunk group of the T-Comfort 930 DSL, each of the available trunk groups must be assigned to one of the companies. This is necessary to be able to transfer incoming external calls to the correct company exchange in cases where the called internal subscriber cannot be reached ("Connection to Operator"), for example.

The assignment of trunk groups to companies is done in the **PBX Configuration: Trunks: Bundle** menu.

For outgoing external calls which users set up via the lines of their company's trunk group, the assignment of the trunk group to the company is irrelevant: the charges are assigned according to the "source" principle.

Charges are billed to the company to which the user belongs who set up the connection. The T-Comfort 930 DSL recognises this on the basis of the assignment between user groups and companies and on the basis of the routing code with which a line of the trunk group was seized. For more information, please see the following section.

Allocating Routing Codes

Routes are used for automatic and selective seizure of trunk groups or connections for external calls. It is possible to seize a route by predialling a code.

In the **PBX Configuration: Trunks: Route** menu, you can define which company can seize each route. An individual **code** for the seizure is allocated per route for each company. The T-Comfort 930 DSL ensures that during configuration no seizure code is allocated twice (for two different routes) for each company. If during configuration of a route no code is allocated for one of the configured companies, the route concerned cannot be seized by the members (user groups) of this company.

Configuring the Company Exchange

An internal telephone number must be set up for each company which represents the exchange, i.e. “the operator”. The calls to specific extensions arriving at the exchange are routed to this number, for example, as are all external calls where the called subscriber (a user who belongs to this company) cannot be reached, as in the case of a timeout.

A company exchange is set up in the **PBX Configuration: Operator** menu. In this menu, you can specify an internal telephone number for each company and time group which then represents the exchange for this company.

Working with the Multi-Company Variant

All the features of the T-Comfort 930 DSL which the users may already be familiar with from the single-company variant are available in the multi-company variant. These features can be used to the same extent and can be used in exactly the same way.

The following section describes the features additionally available to the users in the multi-company variant.

Company Telephone Book

An individual company telephone book can be created for each company. In addition to this, “personal” and “central” telephone books exist:

- A personal telephone book is available for each user.
- The central telephone book can be used across the companies by all users of the T-Comfort 930 DSL.

The company telephone book is a central telephone book for the whole company. It is only available to the users/user groups who are assigned to this company. You can also define whether the members of each user group may edit the company telephone book or not.

The company telephone book is treated exactly the same way on the system terminals as the other types of telephone books. This means that the entries listed in the personal, central and company telephone books are displayed on the system phones at the same time.

Users can also use the telephone book of their company with the **Telefonie-Assistent** Web applications and **phone book**, assuming they are authorised to use these applications.

In addition, it is also possible to assign a user group with the authorisation to edit foreign company telephone books. This authorisation is useful if members of this group - e.g. the "Administrators" - service the entire system. Foreign telephone books can only be edited in the **Configurator** in the **Phone Book** menu.

The number of entries in a company telephone book is unrestricted. The T-Comfort 930 DSL can manage up to 2,000 entries in **all** telephone books (in the central, personal and company telephone books).

Making Calls Between Companies

All users of the T-Comfort 930 DSL can make internal calls to one another, irrespective of which company they belong to. Calls between users from the different companies are therefore not subject to any restrictions.

Billing Charges per Company

In the **Costs** Web application you can output the charges for each company.

Users who are authorised to use this application can view the charges for each company.

Configuring the PC Software

Further possibilities of use can be implemented on a workstation PC with the Windows operating system by installing drivers and programmes.You can find the installation programmes required for this on the product CD that comes with the T-Comfort 930 DSL.

Proceed as follows to install extra software:

1. Log on under Windows NT or Windows 2000/XP as the administrator.
2. Insert the product CD.

   If your PC is suitably configured, the CD will start automatically. Otherwise select **Run** from the Start menu. Click on the **Browse** button to look for the program “cd_start.exe” on the CD. Confirm this with **Open** and **OK**.
3. Select the required option from the start interface. Follow the program instructions.

Further instructions for various options that are available are given below.

Setting up TAPI

With a TAPI (**T**elephony **A**pplication **P**rogramming **I**nterface) you can operate a CTI application (**c**omputer **t**elephony **i**ntegration). Here, the CTI application uses the services of the T-Comfort 930 DSL with the help of the TAPI driver installed on a Windows PC.

Many telephony functions, such as enquiry, toggling, three-party conference, pick-up, call protection and call forwarding can be controlled using appropriate TAPI-compatible software.

Requirements
You require an active IP network connection between the PC and the communication system. CTI functions can be used only in conjunction with system telephones.

You must therefore have configured at least one user for a system telephone. In addition, you require a TAPI 2.1-compatible CTI application, for example the **Phone Dialer** included in the Windows operating system.

Installing the TAPI Driver

1. Call up the start mask from the product CD (see Configuring the PC Software on page 111).

2. Select **Software**: **TAPI Service Provider** from the start mask and follow the program instructions.

Configuring the TAPI Connection

Note: Under Windows NT or Windows 2000/XP you should log on as the user for whom you want to configure the TAPI connection.

1. In the Start menu, select **Settings**: **Control Panel**. Double-click on the **Telephony** icon (**Phone and Modem Options** icon under Windows 2000/XP).

2. Change to the **Telephony Drivers** tab (**Advanced Options** tab under Windows 2000/XP).

3. From the list of installed driver software, select **T-Comfort DSL Telephony Service Provider** and click on **Configure**.

4. In the following dialogue you will find a list with the configured connections for the user who is currently logged on. Click on **New**.

5. In the following dialogue you provide information for the new connection. In the **Connection name** box you can enter a descriptive name for the connection. In the **CTI server** box you must enter the DNS name or the IP address of the T-Comfort 930 DSL. Using the **[...]** button you can search for this in the LAN. In the boxes **Username** and **Password** you enter the user data of one of the users configured on the T-Comfort 930 DSL. This user must be allocated a system telephone. Confirm your entry with **OK**.

6. The new connection is now configured. Close the opened dialogues with **OK** and **Close**.

Testing the TAPI Function

1. In the Start menu, select **Programs**: **Accessories**: **Communication** and then start the program called **Phone Dialer**.

   Under Windows XP the **Phone Dialer** is started indirect by using the dialling function of the **Address book** (can be found in the start menu under **Programs**: **Accessories**). A manual start of the program file “Dialer.exe” in the “C:\Program files\Windows NT” folder is possible also.

2. In the **Tools** menu, select the item **Connect using...** to select the system telephone that is to use the CTI application. Under Windows 2000/XP you select the item **Options** from the **Edit** menu. In the **Lines** tab you then select the system telephone from the **Phone calls** list.

3. Enter a telephone number in the **Number** box and confirm with **Dial**. Under Windows 2000/XP you first click on the **Dial** icon and in the subsequent dialogue activate **Phone call**.

4. The number you entered is displayed on the selected system telephone. Lift the receiver to start dialling.

Note: This note is not relevant to Windows 2000/XP. If the "Phone Dialer" program is not installed, you will have to install it. To do this, you open the **Control Panel** and click on **Software**. In the **Windows Setup** tab you activate the **Connections** component.

Setting up NET CAPI

With a CAPI driver (**c**ommon **a**pplication **p**rogramming **i**nterface) Windows programmes are able to access services and functions of an ISDN card. With a network-based CAPI, the T-Comfort 930 DSL allows the use of ISDN functions also by PCs in which no ISDN card is integrated.

Requirements

You require an active IP network connection between the PC and the telephone system.

Please note: Before installing the CAPI driver for the T-Comfort 930 DSL, any existent ISDN card must be removed and any CAPI drivers on your PC must be de-installed.

Installing the NET CAPI driver

1. Call up the start mask from the product CD (see Configuring the PC Software on page 111).

2. Select **Software**: **NET CAPI Driver** from the start mask and follow the program instructions.

Configuring the NET CAPI Driver

The NET CAPI driver requires an extra internal number so that the "virtual ISDN card" on the T-Comfort 930 DSL can be addressed:

1. Go to the **Configurator, PBX Configuration**: **Devices**: **CAPI-ISDN** menu. Click on **Change**.

2. Activate the **Status** check box. Enter at least one unassigned, internal number in the boxes under **Parameters**. Confirm your entry with **Assign**.

3. Go to the C**onfigurator, User Manager: User** menu. Select one of the users shown. Enter the number just assigned in one of the boxes **No. 1** to **No. 10**. Confirm your entry with **Apply**.

4. If it is to be possible to call the "virtual ISDN card" externally, or if external calls are to be possible, the number must be included in call distribution (**Configurator**, **PBX Configuration: Call Distribution** menu).

5. After installing the NET CAPI driver, you will find an extra icon on the right side of the Windows Start bar. Click on this icon with the right mouse key. Select the **Log-on** command from the menu.

Note: In the subsequent dialogue you must log on NET CAPI first with the **user** (user name and password) for which you configured the CAPI telephone number in the **User Manager** (see Step 3).

You will find further information on the working of the NET CAPI driver and CAPI application programmes on the product CD.

Note on sending faxes

The NET CAPI can not address an analogue Group-3 fax. Use a CAPI-compatible modem-simulation driver or connect an analogue modem or analogue modem card to one of the T-Comfort 930 DSL's internal a/b ports for sending faxes.

Using the Systray Display

You can configure a systray display for the T-Comfort 930 DSL to appear in the information area of the Start bar of a workstation. This systray display constantly shows you whether a WAN, a RAS or a Branch connection via ISDN is active. It is also possible to display the current occupancy of the trunk lines.

Requirements

To use the systray display, you must first install TAPI; see **Setting up TAPI** starting on page 111.

Please note: The systray display requires a current version of TAPI. If you are using TAPI from an earlier version of the T-Comfort 930 DSL, you must first install the newer version from the product CD.

Installing the systray display

1. Call up the start mask of the product CD (see **Configuring the PC Software** on page 111).
2. From the start mask, select **Software**: **Install Systray**. Follow the program instructions.
3. Start the program with **Start**: **Run** and the configuration dialogue is displayed. Select one of the entries displayed under **Existing PBXs**. Enter your user name and password in the boxes under **Log-on**.
4. If you activate the **Autostart** check box, you will see the systray display even after restarting your PC.
5. Confirm the entries in the configuration dialogue with **OK** and the systray display logs on for the T-Comfort 930 DSL.
6. Right-click on the systray display in the Start bar. Select **Configuration** to call up the configuration dialogue. Select **Network Connections** or **Trunk Lines** to produce a status dialogue.

Browser for Telefonie-Assistent and Comfort Pro A Hotel

You can simplify the daily use of the **Telefonie-Assistent** and **Comfort Pro A Hotel** Web applications using the Web browser especially adapted for the T-Comfort 930 DSL. Each time the workstation is restarted, this browser program can automatically start and log you in. This means that the applications are always operational and can be accessed using the icon in the information area of the task bar.

Installing the browser

1. Call up the start mask from the product CD (see **Configuring the PC Software** on page 111).
2. From the start mask, select **Software**: **Install Browser for Telefonie-Assistent** or **Software**: **Install Browser for Hotel**. Follow the program instructions.
3. Follow the program instructions.

After installing the browser, there is a new menu entry in the Windows start menu under **Programs**: **Telefonie-Assistent Browser** respectively **Programs**: **Hotel Starter**.

Further information can be found in the online help of the browser program. To view this, click the top left corner in the **Telefonie-Assistent**-browser's program window on the system menu symbol or on the symbol in the information area of the task bar. Select the **Readme** command. You will find the **Hotel**'s readme in the installation directory of this browser program.

Note: Both browser programmes can be used simultaneously.

Setting up Video Telephony

You can use the **Telefonie-Assistent** to switch on the video function during an internal call. To be able do this, the Microsoft NetMeeting 3.0 program must be installed and set up on all participating workplace computers.

Note: NetMeeting is already pre-installed on the Microsoft Windows 2000 and XP operating systems.

Set up Microsoft NetMeeting 3.0

1. Connect a standard web cam to the workplace computer and install the driver.
2. In the Windows **Start** menu select **Run** and enter: "conf.exe". Confirm your selection with **OK**.
3. Follow the instructions of the Install Wizard. Registration in an Internet directory is not necessary and is not recommended. Select the installed web cam and exit the Install Wizard.
4. Run a functionality test. To do this, start the **NetMeeting** program. Click on the call button. Under **Address** enter the IP address or DNS host name of a external station. Confirm your selection with **Call**.

Note: If Firewall software is installed on the workplace computer, a warning will now appear. This shows that the computer is now ready to receive the NetMeeting. You must allow the NetMeeting, by activating the **Do not show this message for this program again** option for example.

Synchronising the PC Clock

With the network service SNTP (simple network time protocol) it is possible to synchronise the internal clock of a PC with the time of the T-Comfort 930 DSL.

Requirements

You must enter the time zone so that the T-Comfort 930 DSL can calculate the time of the internal clock back to the GMT (Greenwich Mean Time) required for SNTP:

1. Go to the **Configurator, SYS Configuration: System** menu. Click on **Change**.
2. Under **Internet time (SNTP)**, enter the **Time zone** for which the time of the T-Comfort 930 DSL applies and whether summer time is allowed for. Confirm this with **Assign**.

Configuring SNTP

For various operating systems, you can use one of the numerous SNTP programmes offered for downloading on the Internet. Configure the T-Comfort 930 DSL as an SNTP server for such programmes.

SNTP with Windows 2000

Here you configure the SNTP server as follows:

1. Log on as the administrator. Start the **Command Prompt** under **Start**: **Programs**: **Accessories**.
2. Enter the command line “net time /setsntp:192.168.99.254”. Confirm with the enter key. This command changes the setting for the SNTP server address in the system registry. Close the command line.
3. Open the **Services** dialogue under **Start**: **Settings**: **Control Panel**: **Administration**. Set the autostart type of the **Windows Timer** service to **Automatic**. Start the service with **Process**: **Start**. Every time the service starts, the PC clock is synchronised with the time of the T-Comfort 930 DSL.

Please note: In a Windows domain network, the PDC server (primary domain controller) should automatically assume the function of the timer.

SNTP with Windows XP

Here you configure the SNTP server by double-clicking on the time in the Start bar. Enter the T-Comfort 930 DSL as the **Server** in the **Internet time** tab.

Address Queries using LDAP

You can search the data of the central telephone book of the T-Comfort 930 DSL from a workstation in the LAN using LDAP (Lightweight Directory Access Protocol). When configuring an LDAP-enabled program, specify the IP address of the T-Comfort 930 DSL as the address of the LDAP server.

LDAP with Outlook Express

You can configure and operate the LDAP directory service with Outlook Express™, a Microsoft™ e-mail program, as follows:

1. Call up the **Accounts** command in the **Tools** menu.

   The **Internet Accounts dialogue box will then open**.

2. Click on **Add**. Select the **Directory Service** command from the pop-up menu.

   The **Internet Connection Wizard** dialogue box for Internet access will then open.

3. Under **Internet directory (LDAP) server, enter the address of the** T-Comfort 930 DSL. It is not necessary to log in to the **LDAP server**. Click twice on **Next**. Then click on **Finish**.

4. Check the function. In the **Edit** menu, call up the **Find**: **People** command.

   The **Find**: **People** dialogue box will then open.

5. In the **Look in** list, select the entry with the T-Comfort 930 DSL address. Enter a user in the **Name** input field, Administrator for example. Then click on Find now.

   The list of entries found should now display the address from the central telephone book.

Note: Only users can be found for whom an internal telephone number has been configured.

T-Sinus 61 data/T-Sinus 620 data on the T-Comfort 930 DSL

General Information

The T-Sinus 61 data and the T-Sinus 620 data provide a PC with a wireless ISDN data connection (DECT). The T-Sinus 61 data/T-Sinus 620 data is connected to the PC via the USB interface and uses the T-Comfort 730 DECT base station to create a connection to the T-Comfort 930 DSL and its network, to the telephone network and to the Internet.

Installation and Configuration

1. Connect the T-Comfort 730 DECT base station to a free U_{pn} interface on the T-Comfort 930 DSL. Instructions on how to do this can be found in the section **Upn Ports** starting on page 36.
2. Configure the T-Comfort 730 DECT base station in the **Configurator**, using the **PBX Configuration: Ports: U_{pn}** menu.
3. Install the software of the T-Sinus 61 data/T-Sinus 620 data and then connect the T-Sinus 61 data/ T-Sinus 620 data. Further information on this can be found in the chapter “Installation” of the manual (which is included with the T-Sinus 61 data/T-Sinus 620 data).
4. Create a new DECT device of the type **Sinus 61 data** in the **Configurator** (menu **PBX Configuration: Devices: DECT Phones**) and assign a telephone number for the data port.
5. Check the T-Sinus 61 data/T-Sinus 620 data in. Further information on how to do this can be found in the chapter “Installation” of the T-Sinus 61 data/T-Sinus 620 data manual and in the online help of the T-Comfort 930 DSL.
6. Assign a user to the telephone numbers of the USB DECT Box in the **Configurator** (menu **User Manager: User**).

Tip

We recommend that you create the Internet access indirectly via the RAS access of the T-Comfort 930 DSL

If you wish to use the T-Sinus 61 data/T-Sinus 620 data to dial up an Internet provider directly, follow the instructions in the corresponding chapter of the T-Sinus 61 data/T-Sinus 620 data manual. If you do this, you can omit the remaining steps.

Please note: The **direct** dial-up of an Internet provider offers **no** safety mechanisms, whereas accessing the Internet via the T-Comfort 930 DSL protects your network/PC by means of filter lists.

7. In the **Configurator** (menu **User Manager: User**), assign the user of the T-Sinus 61 data/T-Sinus 620 to a **User group** which is allowed to use RAS access.
8. Configure the Internet access in the T-Comfort 930 DSL **Configurator** (menu **NET Configuration: WAN**). You can edit/create suitable filter lists for the Internet access in the **NET Configuration: Firewall** menu.
9. Configure the RAS access in the **NET Configuration: RAS** menu.
10. Configure the communication network. To do this, follow the instructions in the corresponding chapter of the T-Sinus 61 data/T-Sinus 620 data manual. Do **not** enter the provider data, though. Instead, use the internal number of the RAS access and the user name and password of the T-Comfort 930 DSL user.

Detailed information can be found in the **Internet** starting on page 136 section of the **Frequently Asked Questions** chapter. The information concerning the Internet functionality of the T-Comfort 830 handset also applies to the T-Sinus 61 data/T-Sinus 620 data.

Technical Data

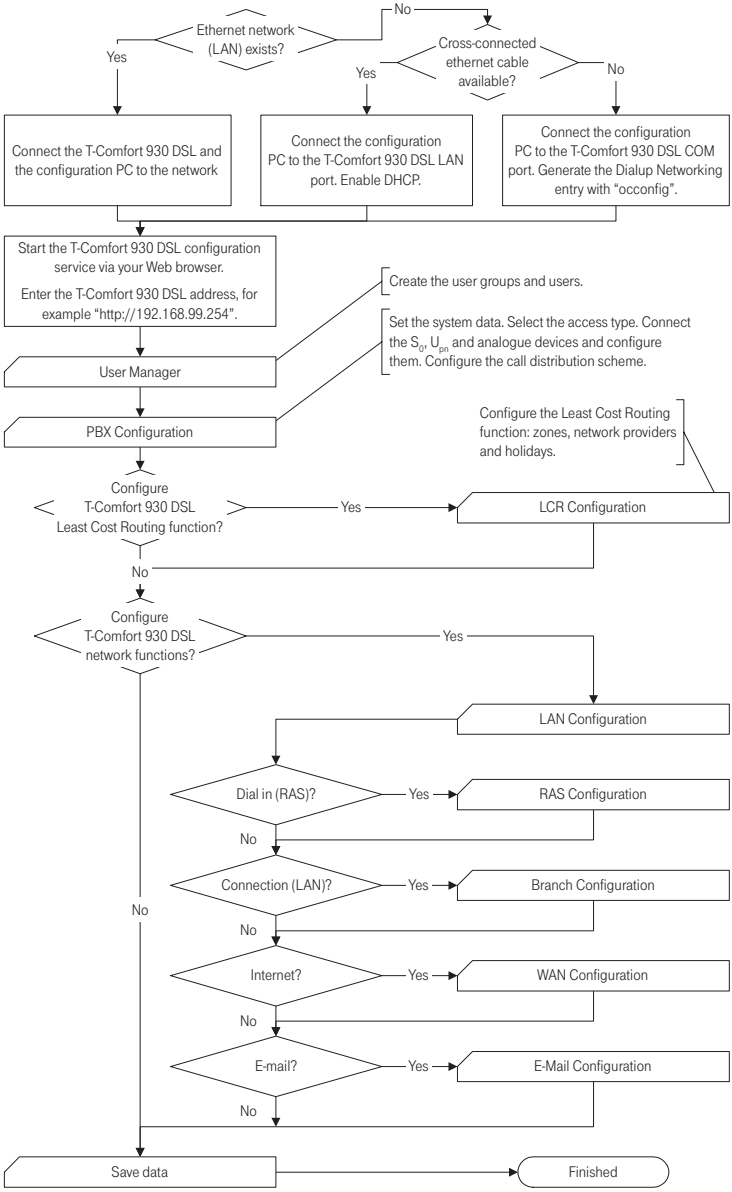
- Data transmission with RAS access / Internet access via the T-Comfort 930 DSL: Up to 64 kbit/s gross
- Data transmission with direct dial-up of a provider: Up to 128 kbit/s gross

Configuration Guide

The Configuration Guide contains a series of flowcharts that will help you to plan the configuration of the T-Comfort 930 DSL and guide you through the necessary settings step by step, focusing on the network settings. The individual charts are summarised below:

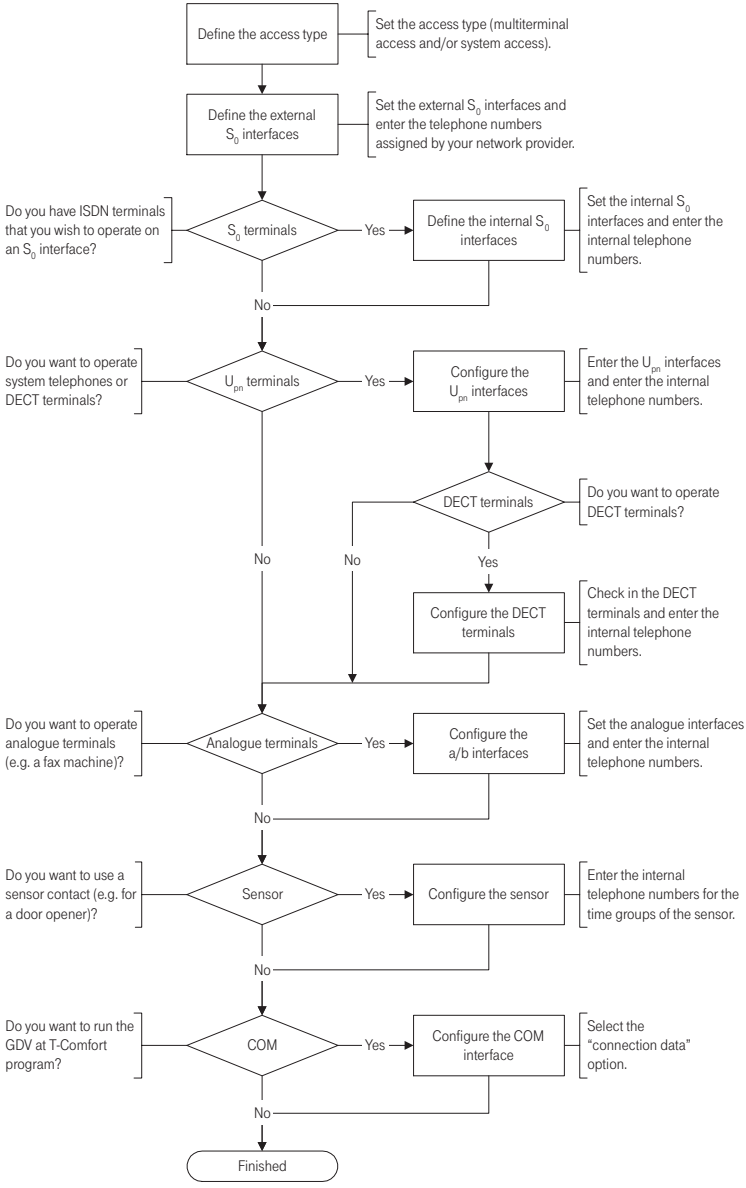
- **Overview**: This chart gives you an overview of the initial configuration of the T-Comfort 930 DSL.
- **Configuring PBX Ports**: This chart shows you the necessary steps for configuring ports and terminals.
- **Configuring Easy Access**: This chart guides you through TCP/IP settings for the T-Comfort 930 DSL.
- **Configuring ISP Settings**: These instructions support you in configuring the Internet access.
- **Configuring RAS Settings**: This chart guides you through the configuration of the RAS settings.
- **Configuring LAN-to-LAN Settings**: This chart guides you through the configuration of the LAN-to-LAN settings.
- **Configuring E-Mail**: This diagram tells you how to create the requirements needed for configuring the T-Comfort 930 DSL e-mail access function.
- **Configuring E-Mail Access**: This overview provides instructions on configuring the T-Comfort 930 DSL e-mail access server.

Overview



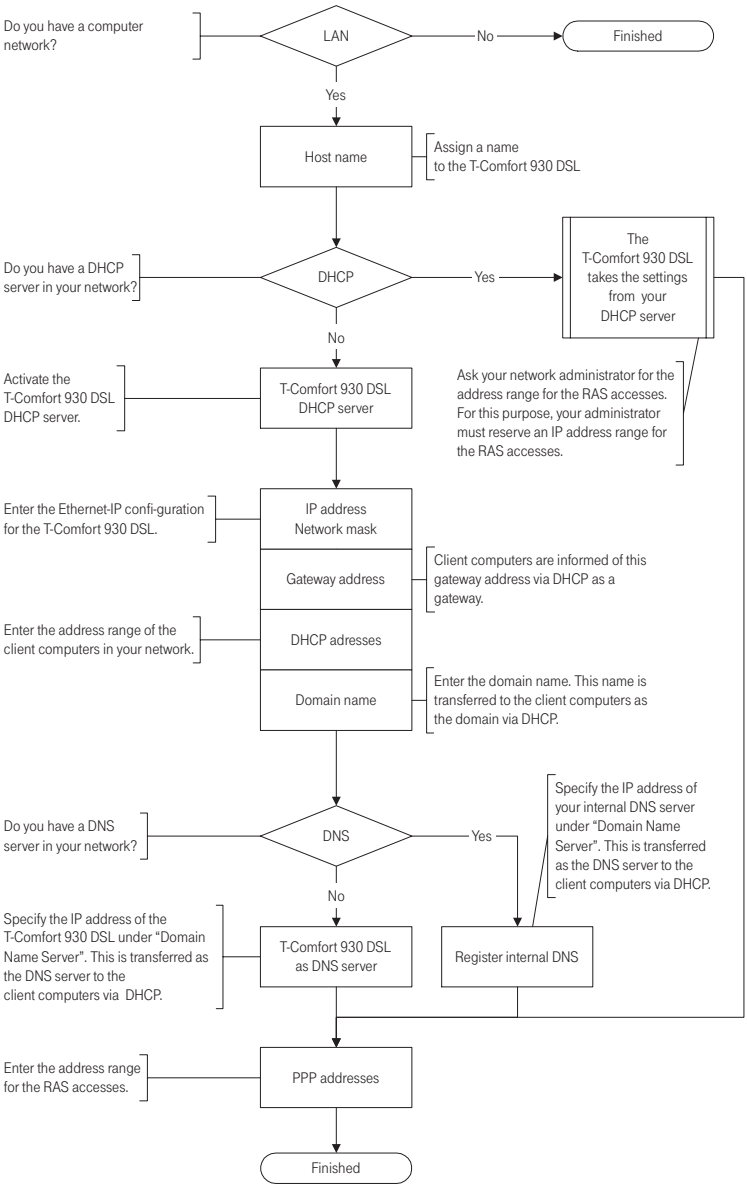
Flowchart: Overview

PBX Ports



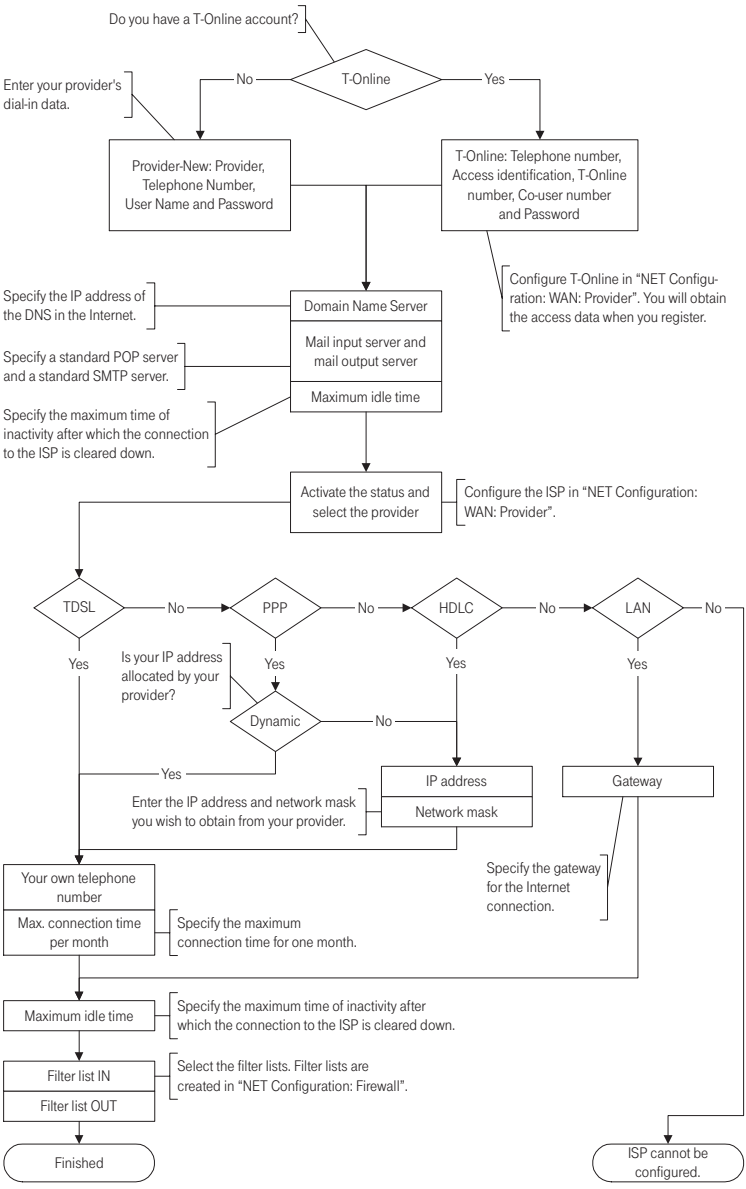
Flowchart: Configuring the PBX Ports

LAN



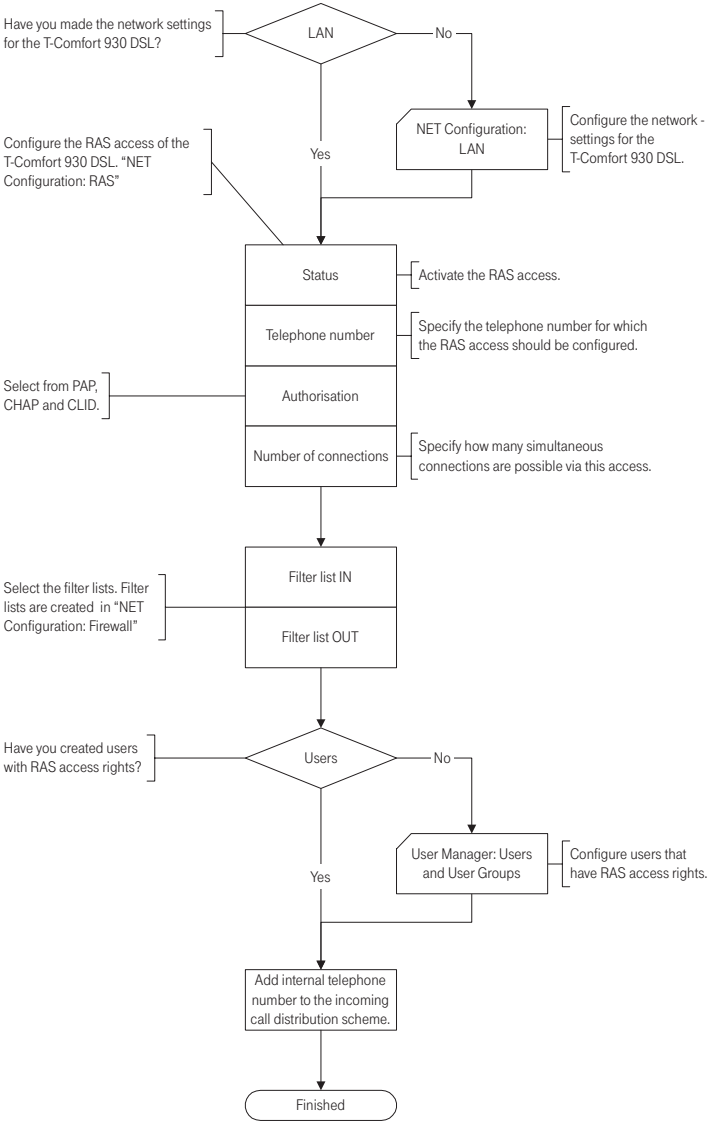
Flowchart: Configuring Easy Access

WAN Settings



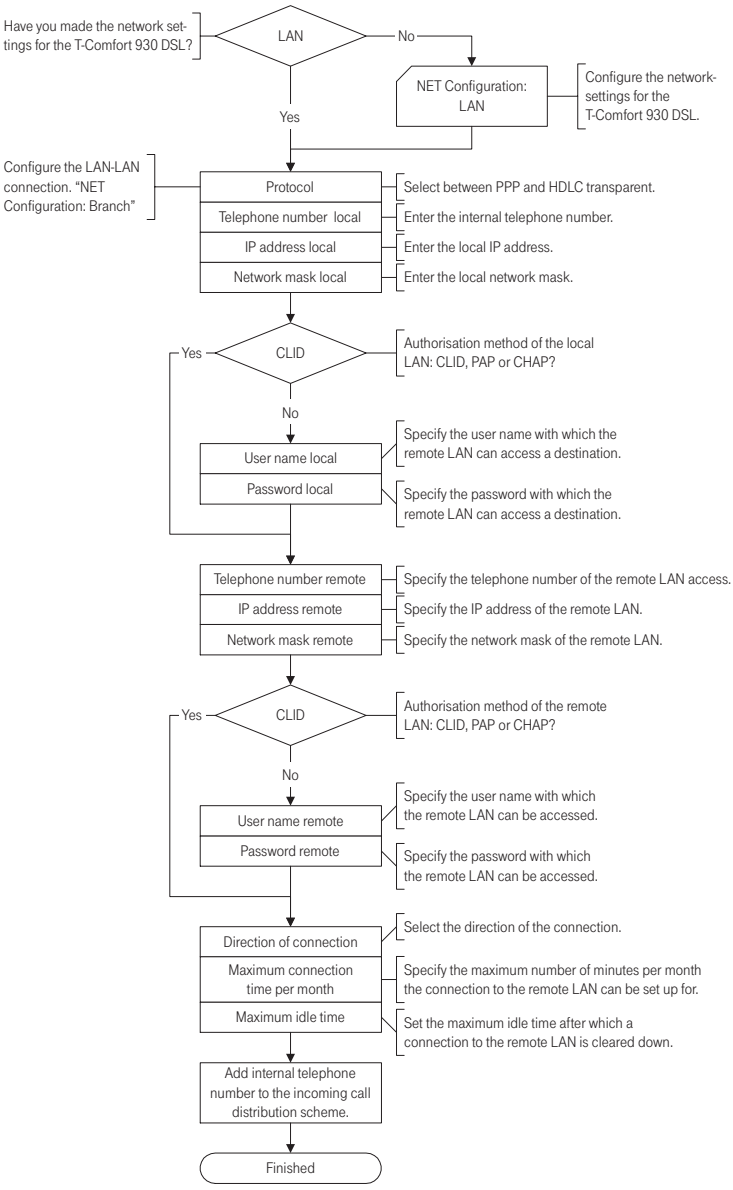
Flowchart: Configuring the ISP Settings

RAS Settings



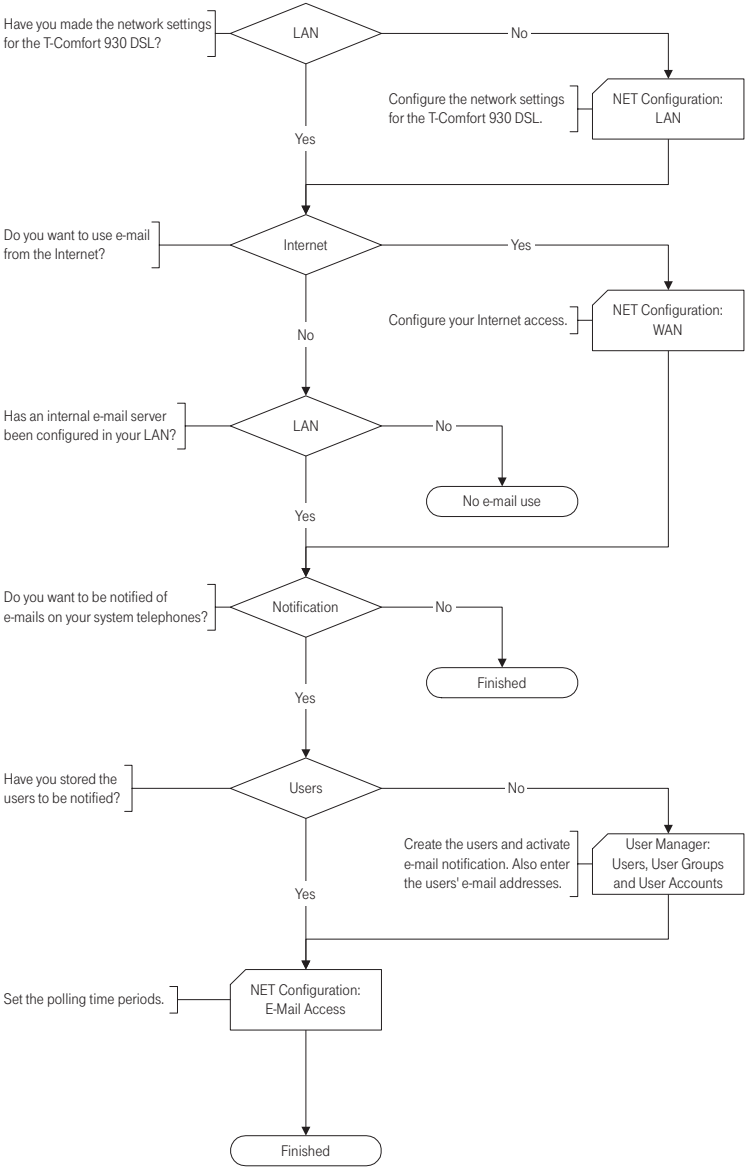
Flowchart: Configuring the RAS Settings

Branch Settings



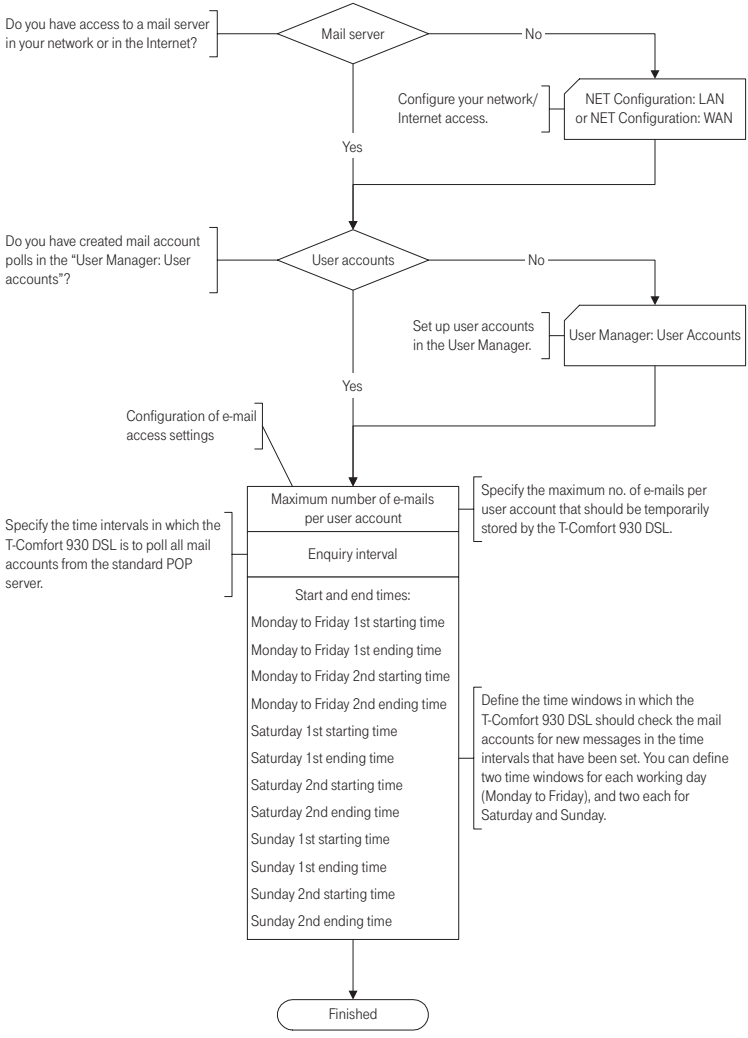
Flowchart: Configuring the LAN-to-LAN Settings

E-mail Function



Flowchart: Configuring the E-mail Function

E-mail Access



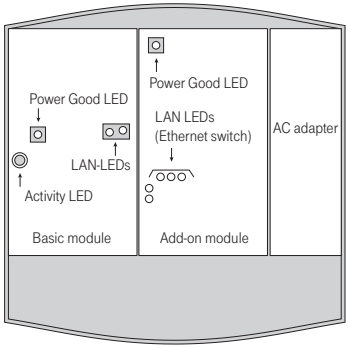
Flowchart: Configuring E-mail Access

Frequently Asked Questions

This chapter provides tips and information on how to deal with any malfunctions or faults you may experience with the T-Comfort 930 DSL.

Please note: Repairs to the T-Comfort 930 DSL should only be carried out by qualified personnel.

The following LEDs indicate that the T-Comfort 930 DSL is ready for operation:



Position of LEDs on the T-Comfort 930 DSL

General/Hardware

The T-Comfort 930 DSL is not functioning.

Check whether the plug-in power supply is properly connected. If an add-on module is installed: Make sure the mains plug is properly connected.

Plug another device into the mains socket to check whether there is any voltage.

The mains plug is connected, the mains socket is supplying output, but the T-Comfort 930 DSL still does not function.

DANGER! This device contains hazardous voltages. To make the system dead, remove the power plug and the plug-in power supply from the socket.

Take the housing cover off. Is the “Power Fine” LED illuminated?

If not, contact your service centre. The AC adapter plug of the T-Comfort 930 DSL may be defective.

After restarting the T-Comfort 930 DSL, nothing is indicated on the displays of any connected terminals.

It takes a short while for the T-Comfort 930 DSL to start up.

After the restart, check whether the activity LED flashes at a rate of 10s / 1s. This flash cycle indicates that the T-Comfort 930 DSL has started up correctly and is ready for operation.

If the T-Comfort 930 DSL has not restarted properly, reset the T-Comfort 930 DSL to its original factory setting (refer to the chapter entitled Resetting the System Data starting on page 62).

Telephony

It is not possible to make external calls.

Check the connection between the NTBA and the T-Comfort 930 DSL.

In the **Configurator**, check whether the external S_0 ports are configured correctly (**PBX Configuration: S_0** menu):

– Configuration of System- / Multi-terminal access OK?
– Port is connected to the NTBA?
– Faultless Cabling?
– Terminating resistors properly configured?

The T-Comfort 930 DSL is connected to an NTBA with a multi-terminal configuration. Why is it not possible to establish external connections?

With the original factory setting, an additional external S_0 port is set for an NTBA in the system configuration; this additional port will be used first to seize a trunk line.

Deactivate the corresponding S_0 port in the **Configurator** (**PBX Configuration: S_0** menu).

One of the telephones is not functioning at all.

Make sure the telephone has been properly connected.

Check also whether the appropriate port has been configured correctly in the **Configurator** (**PBX Configuration: Ports** menu).

It is not possible to make external calls with one of the telephones.

Check whether a user is configured for the telephone. Otherwise the settings of the Guests user group are valid for the telephone. To standard, this user group has no external call authorisation.

Make sure the user configured for this telephone belongs to a user group with external line access (**Configurator**, **User Manager: User groups** menu).

Check also whether the internal call number of this telephone has been configured for incoming call distribution (**Configurator**, **PBX Configuration: Call Distribution** menu).

One of the features (e.g. call diversion) on one of the telephones cannot be used even though the feature has been configured in the Configurator of the T-Comfort 930 DSL.

Make sure the user configured for this telephone belongs to a user group that has access to this feature (**Configurator**, **User Manager: User** and **User groups** menus). Some features cannot be used until the system PIN is changed.

Nothing is indicated on the display of one of the connected ISDN telephones.

You have connected the ISDN telephone to an external S_0 port (RJ-45 socket). These ports are intended for connection to the NTBA only. Connect the telephone to an internal S_0 port (pressure terminal).

Calls can be made but not received with one of the ISDN telephones.

The internal call number that has been configured for this ISDN telephone in the **Configurator** (**PBX Configuration: Ports: S0** menu) must also be configured as an MSN on the ISDN telephone itself. For further information, refer to the User Guide of your ISDN telephone.

An ISDN telephone always rings, if another telephone on the S_0 bus is being called.

This case also requires configuring the MSN on the ISDN telephone (see above answer).

It is not possible to configure Call Distribution: Outgoing for multi-terminal access.

You have configured multi-terminal access and system access in parallel. All outgoing calls are therefore established via system access, and outgoing call distribution can be configured for system access only (**Configurator**, **Call Distribution** menu).

A specific MSN can be seized for individual calls by means of a code number procedure. For further information, refer to the “Operation on Standard Terminals”user guide.

What are some of the causes for problems when sending and/or receiving faxes?

In frequent cases, the reason may be found in a problem with the ISDN-L1 reference clock distribution. The L1 clock is delivered from the network provider. An unclean L1 clock distribution and the intro-

duced signalling jitter is overheard by the human ear. Nevertheless, data and fax transmissions may be disturbed by the jitter. Please check, which ISDN lines will deliver the L1 clock. Details can be found under **L1 Clock** starting on page 83.

DECT

Note: In the following explanations it is assumed that a U_{pn} interface card has been installed.

The LED of the T-Comfort 830/ Comfort Pro CB 300 DECT base station is flashing, but none of the DECT devices is functioning.

Make sure the terminal setting for the corresponding U_{pn} port is set to **T-Comfort 830/Comfort Pro CB 300** (**Configurator**, **PBX Configuration: Ports: U_{pn}** menu).

If multiple **T-Comfort 830/Comfort Pro CB 300** base stations are installed, the blinking LED indicates that synchronisation is not finished.

The LED of the T-Comfort 830/ Comfort Pro CB 300 is continuously lit up, but one of the cordless DECT devices is indicating "No connection".

You have not registered this DECT device. Configure a port in the **Configurator** and start the enrolment procedure (**PBX Configuration: Devices: DECT Phones** menu).

Is it possible to increase the time for the enrolment procedure?

You must manually enter the IPEI of the DECT device in the **Configurator**. The enrolment time is then increased to one hour (**PBX Configuration: Devices: DECT Phones** menu).

Another manufacturer's DECT device is not functioning.

Check whether the DECT device supports the DECT GAP standard. In the **Configurator**, also make sure **GAP** is set for this DECT device (**PBX Configuration: Devices: DECT Phones** menu).

The startup procedure of the T-Comfort 830/ Comfort Pro CB 300 take a long time? What is the reason?

This behaviour may indicate a problem with the reference clock. Refer also to **What are some of the causes for problems when sending and/or receiving faxes?** starting on page 133.

LAN

Why is it not possible to establish a network connection with the T-Comfort 930 DSL?

Check whether the LEDs for the switch and the PC's network card are indicating a connection.

Check the LEDs for the LAN functions of the T-Comfort 930 DSL. The green LAN LED at the top indicates whether the network cable has been properly connected. The red LAN LED indicates whether there is any network traffic on the line.

If you have installed an add-on module, also check the LAN LEDs of the Ethernet switch. The Ethernet line between the basic module (LAN port) and the add-on module (LAN1 port) are properly connected if the centre LED lights up. The Ethernet line between the hub of the corporate network and the LAN0 port is properly connected if the right-hand LED lights up.

To check whether there is a network connection with your T-Comfort 930 DSL, enter the "ping IP address" command in "Run" in the Windows Start menu (e.g. ping 192.168.99.254).

How can I determine the IP address of the T-Comfort 930 DSL?

To find out what the IP address is, enter the code number ✳ 1 8 2 on one of the connected system telephones.

The code-number procedure ✳ 1 8 3 also displays the network mask.

The network connection is functioning, but nothing is displayed in the browser.

Enter the complete IP address of the T-Comfort 930 DSL along with the protocol identifier, for example http://192.168.99.254/.

Check whether the browser has been configured for connection through a proxy server. If so, deactivate the "Connect through proxy server" setting.

You have just configured the T-Comfort 930 DSL via the network. Why is it not possible now to establish a remote data transfer network connection?

The network card and the communication (remote data transfer) adapter cannot be run with the same routing setting. Deactivate the network card before connecting via the dial-up network.

Our network has grown over time, with several segments connected by one central router. How can PCs from all segments connect to the T-Comfort 930 DSL?

If several routers are configured for your network in different segments, you can enter extra static routes in the **NET Configuration: LAN: Routes** menu.

In our network the T-Comfort 930 DSL dynamically issues the IP addresses by DHCP. Can I firmly assign the IP address for our internal server PCs (mail, Web)?

You need a static address assignment for these PCs. Make the appropriate host assignment entries in the Configurator (**NET Configuration**: **LAN**: **Hosts** menu). Create a static DHCP entry for each host assignment in the **NET Configuration**: **LAN**: **DHCP Server** menu. Activate "Dynamic and static address" for the DHCP server.

Internet

I cannot access our company Web site.

Outside your system, your company Web site is accessed at "www.firm.com", but in the **Configurator** you have entered "firm.com" as the domain. Your company's site URL thus counts as an internal URL and can only be accessed by entering the direct IP address. If required, change the domain setting in the **NET Configuration**: **LAN** menu.

Why do some Internet services not work even though they can be used when dialling in directly via a modem?

Some Internet services require an active connection coming from the Internet. But the configured filter rules prevent this. Plus, it is not possible to establish incoming Internet connections with the PCs directly owing to the network address translation process.

It is possible to redirect incoming connections in the **Configurator**, menu **NET Configuration**: **Port Forwarding**. You should secure the redirection target (PC or server) with a suitable firewall software.

It is not possible to access the Internet with the T-Comfort 830 handset.

The requirement for this is that the set should be configured as **Handset+data**. The telephone number used by the T-Comfort 830 handset to establish an Internet connection must also be specified in the respective user profile (**Configurator**, **User Manager: User** menu).

With the T-Comfort 830 handset, the Internet can be accessed either directly via the remote data transfer network or indirectly via RAS access on the T-Comfort 930 DSL. For direct access you can directly dial any provider. Indirect access uses the routing function of the T-Comfort 930 DSL, accompanied by the configured security features, for example.

Directly via remote data transfer network

If the Internet is accessed directly via the remote data transfer network, make sure that

- the remote data transfer network is properly installed on your PC and that the correct ISP access data is configured,
- the internal number used by the T-Comfort 830 handset to establish the data connection is configured for outgoing call distribution (**Configurator**, **PBX Configuration: Call Distribution: Outgoing** menu).

Indirectly via RAS access

If the Internet is accessed indirectly via RAS, the system administrator should make sure that:

- permission has been given for Internet access via RAS (**Configurator**, **Net Configuration: Firewall** menu),
- an internal number is configured for RAS access (**Configurator**, **Net Configuration: Connections: RAS** menu),
- your user group has been granted RAS access rights (**Configurator**, **User Manager: User Groups** menu).

For information on the installation of software and on configuring Internet access, refer to the T-Comfort 830 handset's user guide.

More Questions?

If you suppose a defect of your telephone line, please contact the service department of your telephony provider. For T-Com, the "Technische Kundendienst" is available either by freecall 0800 330 2000 or on the Internet: http://www.t-com.de/kundendienst/.

Technical Specifications

System data	
Mains power supply	230 V ~ 50 Hz
Rated power	Basic module: ..... 25 VA Add-on module: ..... 80 VA
Safety class	2
Permissible temperatures stationary, weatherproofed	+5 °C to +40 °C
Dimensions (W x H x D)	396 x 390 x 100 mm
Weight	Basic module and power supply unit:..... 1,900 g Add-on module and power supply unit: ..... 1,000 g
S_0 ports	
Euro ISDN external (S_0 external) for basic access, DSS1 protocol	Basic module: ..... 1x Add-on module: ..... –
Euro ISDN switchable (S_0 external / S_0 internal) for basic access, DSS1 protocol, or for ISDN terminals, DSS1 protocol	Basic module: ..... 1x Add-on module: ..... up to 8 x; possible interface cards: – 4 x S_0 – 2 x S_0 and 6 x U_{pn} – 2 x S_0 and 6 x a/b
– Supply voltage	40 V ± 10%
– Supply power	3 VA for internal
– Range	150 m internal

U_{pn} ports		
for system terminals and T-Comfort 730/Comfort Pro CB 300 DECT base stations	Basic module:	..... 3x to connect system terminals, not DECT-enabled
	Add-on module	..... up to 16 x all DECT-enabled; possible interface cards: – 4 x U_{pn} – 8 x U_{pn} – 2 x S_0 and 6 x U_{pn}
– Supply voltage	40 V ± 10%	
– Supply power	3 VA per U_{pn} bus	
– Range	1000 m	
a/b port		
for analogue terminals with pulse or DTMF dialling, flash duration of 60 to 310 ms	Basic module:	..... 4x
	Add-on module:	..... up to 24 x; possible interface cards: – 4 x a/b – 8 x a/b – 2 x S_0 and 6 x a/b
– Supply voltage	40 V ± 10%	
– Supply power	1.2 VA	
– Feed current	25 mA	
– Range	1,000 m	
V.24 module (COM)		
for connection of a PC	Basic module:	..... 1x (optional)
– Range	3 m	

Doorstation equipment module	
for connection of doorstation equipment	Basic module: ..... 1x (optional)
Contact load of actor	2 A / 125 V
– Voltage range	$U_{\approx}$ = 5 V... 30 V
Sensor	Switched by low AC voltage
– Voltage range	U~ = 6 V... 24 V

Note: The online help provides an overview of the limits that should be observed when configuring the T-Comfort 930 DSL.

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Notes

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As of 01.09.2006

Deutsche Telekom AG
T-Com, Bereich Endgeräte
Postfach 20 00
53105 Bonn