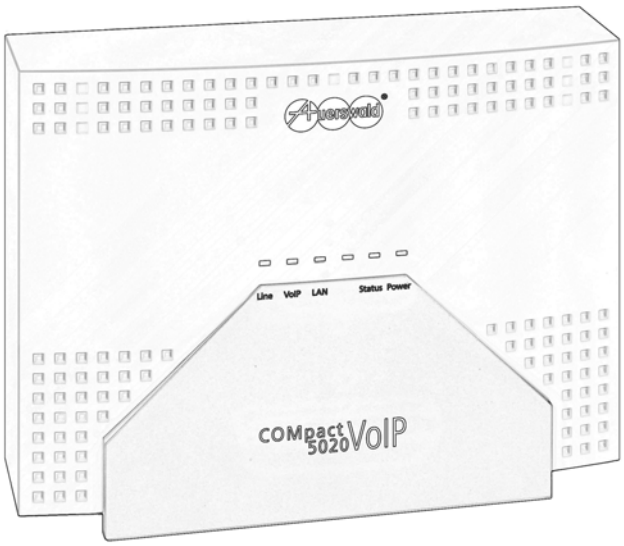
*Installation and Commissioning Instructions*

# *PBXs for analogue/ISDN and Internet telephony*

## *COMpact 5010 VoIP*
## *COMpact 5020 VoIP*

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# Important Information

This section includes necessary information for operating the devices safely. Before installing and commissioning the PBX, be sure to read the safety information listed here. Also become familiar with the proper use of the device as well as the technical data.

## Safety information

***Warning:*** *Improper handling of the device can result in life-threatening electrical shock.*

→ *Only a skilled electrician may open the casing. If necessary, have an authorised dealer commission the device.*

→ *Only a skilled electrician may perform installation work within an open casing or service work using the buttons inside the casing. If necessary, commission an authorised dealer to perform this work.*

***Warning:*** *Touching the voltage-carrying conductors or the telephone connections may cause a life-threatening electric shock.*

→ *Remove the power plugs for both the PBX and all peripheral equipment from the power socket before a skilled electrician opens the casing.*

→ *If necessary, also disconnect the devices from auxiliary power sources (for example, UPS).*

→ *Only open the blue protective cover. Do not remove the tightly screwed casing cover. This prevents accidental contact which may result in a shock from hazardous voltages. Make sure that any repairs requiring the casing cover to be removed are carried out by the manufacturer. Removing or destroying the protective caps covering the screws voids the warranty.*

→ *Only mount the components (for example, expansion modules) in a voltage-free state.*

→ *Only operate the device when the casing is closed.*

→ *Only operate the device when it is mounted on the wall.*

→ *For some installation and maintenance work, it is necessary to open the PBX while it is in operation. Make sure that the PBX is never left unattended while working with an open casing.*

→ *Make sure there is always adequate insulation if you touch voltage-carrying lines.*

→ *Be sure to follow the relevant -regulations when handling 230 V system voltage and devices attached to mains.*

***Warning:*** *Liquid penetrating the casing may cause a life-threatening electric shock and can damage or destroy the PBX.*

→ *Only operate PBX in closed, dry rooms.*

→ *Only clean the device with a soft moist cloth or anti-static cloth.*

***Warning:*** *Damaged connection lines as well as damage to the casing and to the PBX can cause life-threatening electrical shocks.*

→ *Only connect the device connection cable with sockets that are designed for that purpose.*

→ *Make sure that the Schuko socket for connecting the PBX is properly connected (according to VDE 0100). The power socket must be located near the PBX and be freely accessible at all times.*

→ *Replace damaged connection lines immediately.*

→ *Always have a professional carry out repairs immediately. Please contact your dealer or the manufacturer directly.*

***Warning:*** *Power surges, which can occur during electrical storms, can cause life-threatening electric shocks and may damage or destroy the PBX.*

→ *Therefore, do not mount the PBX during an electrical storm. Avoid disconnecting and connecting lines during an electrical storm.*

→ *Let a skilled electrician lay all the cables inside the building – including the cable to the door terminal system.*

→ *Protect the devices by installing overvoltage protection.*

***Attention:*** *Unauthorised changes to the device can damage the PBX or breach security and EMC regulations. If security-relevant radio services are disturbed, the Federal Network Agency can order decommissioning the device according to §14, section 6, Electromagnetic Compatibility Act.*

→ *Always have a professional carry out repairs. Please contact your skilled electrician or the manufacturer directly.*

***Attention:*** *Exceeding (even temporarily) the threshold values indicated in the technical data can damage or even destroy the PBX.*

→ *Note the threshold values indicated in the technical data for voltage, electricity, performance, ambient temperature and humidity.*

***Attention:*** *Electrostatic charges can destroy sensitive components.*

→ *Divert electrostatic charges from yourself before touching the circuit boards with your hands or any tools. To do this, touch a metal object, preferably earthed, for example, a heater or computer housing.*

***Important:*** *Mechanical loads and electro-magnetic fields can impair PBX operation.*

→ *Avoid mechanical loads (for example, vibrations).*

→ *Avoid proximity to devices that generate electromagnetic fields or react sensitively to them (for example, radio receivers, amateur radio sets, mobile phones, DECT systems, or similar).*

→ *Do not expose the device to direct sunlight or condensation.*

→ *Protect the device from soiling, excessive dust and condensation.*

→ *Note the values for ambient temperature and humidity indicated in the technical specifications.*

***Important:** A power failure, damaged connection lines/cable sockets or short-circuits in other devices in the building systems can put the PBX out of operation.*

→ *If you have an uninterruptible power supply, for example, the UPS-5115 Telecom (Auerswald optional accessory), you can continue operating a large part of the system during a power failure.*

→ *If at all possible, be sure to provide a separate electric circuit for the 230 V connection supplying the PBX.*

## Symbols and signal words used

The symbols and signal words used in this manual mean:

***Warning:***

Warns of personal injury, for example, caused by hazardous electrical voltage.

***Caution:***

Warns of damage to property.

***Important:***

Indicates possible application errors and conditions that, for example, could cause function limitations or malfunctions during operation.

***Note:***

Indicates supplementary information.

## Proper use

***Important:** Auerswald products are not designed, manufactured, or intended for use or resale in environments requiring fail-safe performance, such as in the operation of life-support systems and/or nuclear facilities. Use or sale of our products for these purposes is only allowed with prior written permission by Auerswald for each individual incident.*

*Improper use may cause, e.g. functional restrictions or interference, the destruction of the device or, in a worst case scenario, personal injury.*

→ *If you are still not sure of the intended use of the product after reading the following section, please contact your vendor.*

**General information**

The COMpact 5010 VoIP and COMpact 5020 VoIP devices are telecommunication systems; they will be referred to as PBXs in the following. These PBXs connect various internal devices with various public telecommunication networks, thereby enabling external and internal calls. For this purpose, the PBX provides a number of different ports/interfaces.

PBXs are suitable not only for use in the private sector but also for use in the commercial sector (small companies or small hotels).

PBXs have numerous features, including performing the following tasks:

- Call Distribution
- Ensuring reachability
- Charge and call data evaluation
- Cost control
- Central call answering machine (voice mail) and fax memory
- Group and team administration
- Transfers
- Call protection

***Important:** Many features are not available until they are set up via the PBX configuration manager.*

*In order to use of some of the features, it is necessary to contact the network provider about activating the feature.*

*In order to use some of the functions, these have to be released in the Upgrade Center.*

*In order to use some of the functions, it is necessary to extend the hardware.*

*There may be some incompatibility in combination with terminals and devices of other vendors that adversely influence the usability of functions.*

**External $S_0$ port**

An external $S_0$ port is designed for connecting an NT to the European protocol DSS1 (Euro ISDN). It supports the following connection types:

- Basis access as a PBX- connection
- Basis access as a Point-to-Multipoint connection

***Note:** On the NT with PBX connection, only one ISDN device may be operated, in this case, only the PBX.- All other ISDN devices are operated as internal subscribers of the PBX.*

*On the NT with a Point-to-Multipoint connection, other ISDN devices may be operated in addition to the PBX.- If the NT is equipped with a 230 V power cable and in addition to the PBX-, passive devices are connected to the NT, the NT must be connected with a 230-V power socket.*

Furthermore, it is possible to connect to a digital GSM gateway.

**External analogue port**

The external analogue port (not a part of the basic assembly) is tested in compliance with the former TBR21 standard and therefore suitable for connecting public analogue telephone networks across Europe. The country in which the PBX is operated over an analogue connection must be configured after the device has been put into operation. Germany is the original factory setting.

Furthermore, it is possible to connect to an analogue GSM gateway.

**Ethernet port**

The devices to be connected to the Ethernet port are dependent on their intended application. The applications listed at the end do not exclude each other.

For Internet telephony (VoIP), the Ethernet port can be connected to the Internet via a router. The PBX can manage the following number of VoIP accounts for up to 20 different VoIP providers:

- 10 (COMpact 5010 VoIP)
- 20 (COMpact 5020 VoIP)

The PBX supports two different types of VoIP account:

- VoIP accounts with one or more VoIP phone numbers (similar the Point-to-Multipoint connection on ISDN)
- VoIP accounts with a DDI number block (similar to the PBX connection on ISDN) based on the SIP-DDI feature (also known as SIP trunking)

***Important:*** *To support VoIP accounts with multiple phone numbers or a DDI number block, the PBX needs firmware version 3.0.*

For internal IP telephony, VoIP end devices can be connected to the Ethernet port via a switch/router.

***Important:*** *To support internal IP telephony, the PBX needs firmware version 3.0.*

The Ethernet port is suitable for connecting the following end devices (system telephones recommended):

- COMfortel 3500 system telephone

***Important:*** *To support the COMfortel 3500, the PBX needs firmware version 4.2A.*

- COMfortel VoIP 2500 AB system telephone
- COMfortel DECT IP1040 Bases for COMfortel DECT 900C and some GAP capable DECT handsets from other manufacturers (further information at www.auerswald.de)
- Standard VoIP telephone (SIP)
- Soft phone (SIP)

***Important:*** *Note that many standard VoIP* end devices *can use the functions on the PBX only to a limited extent.*

For configuration/administration purposes, the Ethernet port can either be connected to a single computer or to a local network (LAN).

For a CTI solution (LAN-TAPI), the Ethernet port can be connected to a local network (CTI server and CTI clients). This requires CTI software. We recommend the following software manufacturers:

- Estos (www.estos.de), supports Windows XP, Windows Vista and Windows 7
- ilink (direct.ilink.de), supports Mac OS X, version 10.4 and higher

The following telephones connected to the PBX are supported by the LAN-TAPI:

- COMfortel 3500 system telephone (as of firmware version 1.4A)
- COMfortel VoIP 2500 AB
- COMfortel 1600/2600 system telephone (as of firmware version 4.2A)
- COMfortel 1100/1500/2500/2500 AB system telephone (as of firmware version 3.6C)
- Analogue telephone
- ISDN telephone
- Standard VoIP telephone (SIP)

**Internal $S_0$ port**

An internal $S_0$ port has similar requirements, such as an ISDN connection with the Point-to-Multipoint connection type and is suitable for connecting to the following end devices:

- COMfortel 1600/2600 system telephone (as of firmware version 4.2A)
- COMfortel 1100/1500/2500 /2500 AB system telephone (as of firmware version 3.6C)
- COMfortel DECT system telephone
- ISDN telephone in compliance with the Euro ISDN Standard (DSS1)
- ISDN PC controller in compliance with the Euro ISDN Standard (DSS1)

***Important:*** *The power consumption of the end devices on an $S_0$ port may total a maximum of 4 W. The power consumption of all of the end devices on all of the $S_0$/$U_{P0}$ ports together may total a maximum of 24 W.*

**Internal $U_{P0}$ port**

An internal $U_{P0}$ port is a 2-core interface that, for example, becomes useful if existing 2-core lines in an analogue installation should be used. It is suitable for connecting one of the following end devices:

- COMfortel 1100/1500/2500 /2500 AB system telephone (as of firmware version 3.6C)

All other devices can only be connected to the $U_{P0}$ port using a $_{U}P0/S_0$ adapter. It performs a conversion from 2 to 4-core and therefore provides an $S_0$ port with two Western sockets. It is suitable for connecting the following end devices:

- COMfortel 1600/2600 system telephone (as of firmware version 4.2A)
- COMfortel 1100/1500/2500 /2500 AB system telephone (as of firmware version 3.6C)
- COMfortel DECT system telephone
- ISDN telephone in compliance with the Euro ISDN Standard (DSS1)
- ISDN PC controller in compliance with the Euro ISDN Standard (DSS1)

***Important:*** *The power consumption of the end devices on a $U_{P0}$ port may total a maximum of 4 W. The power consumption of all of the end devices on all of the $S_0$/$U_{P0}$ ports together may total a maximum of 24 W.*

**Internal analogue port**

An internal analogue port is suitable for connecting one of the following end devices:

- Analogue telephone with dual-tone multi-frequency
- Analogue telephone with pulse dialling
- Analogue fax machine
- Analogue answering machine
- Modem
- a/b door terminal system

***Important:*** *Devices using pulse dialling cannot use the full range of features.*

*Devices using dual-tone multi-frequency dialling must be equipped with a flash button.*

***Note:*** *When using a T-Net-capable analogue telephone, most T-Net functions can be used via the existing function keys on the telephone.*

**Switching relay**

A switching relay (not a part of the basic assembly basic design) is suitable for connecting or controlling the following devices:

- Door terminal system according to FTZ 123 D12-0 (for example, TFS-Dialog 100, TFS-Dialog or TFS-Dialog pro from Auerswald)
- Door opener
- Various devices to be switched (for example, alarm sirens)

***Important:*** *The module supplies no switching voltage to the relay contacts, meaning the devices to be switched must be supplied with external voltage.*

***Attention:*** *The relay contacts can handle a maximum load of 30 V/1 A (therefore, not suitable for a direct connection to 230 V system voltage).*

→ *For switching devices operated on voltage, you therefore need an additional load-switching relay that is compatible with the safety regulations.*

**Ringer/alarm input**

A ringer/alarm input (not a part of the basic assembly) is suitable for connecting or controlling the following devices:

- Door bell button
- Output devices for announcement, alarm and monitoring signals (for example, leak warning device)

**Music input/audio output**

A music input/audio output (not a part of the basic assembly) is suitable for connecting or controlling the following devices:

- Loudspeaker unit
- Active loudspeaker
- Music output devices (for example, MP3 or CD players)

**USB Host**

The USB host is suitable for connecting a USB printer for call data printouts.

**Basic assembly**

The basic assembly on both PBXs includes the following connection options:

- 1 port, switchable between $S_0$ external, $S_0$internal and $U_{P0}$ internal
- 1 port, switchable between $S_0$ external, $U_{P0}$ internal
- 6 (COMpact 5010 VoIP) or 10 (COMpact 5020 VoIP) internal analogue ports
- 1 Ethernet interface for administration and internal IP and Internet telephony over two VoIP channels (SIP-compliant according to RFC 3261, VoIP Codec G.711 µ-Law/a-Law)
- 1 USB host for printer

**Hardware Extensions**

Both PBXs have a VoIP slot for the following module:

- COMpact 2VoIP module – use this to extend the PBX with a total of four external VoIP channels as well as with the VoIP Codecs G.723.1, G.726, G.729A/E and iLBC. By inserting an appropriate USB memory stick into the PBX, you can make use of the voice mail and fax function with 20 voice mailboxes and 20 fax boxes as well as two voice mail/fax channels.
  The distribution options of the VoIP channels and the voice mail/fax channels are shown in the table below:

| Voice mail | Fax | VoIP |
|---|---|---|
| 2 | 1 | 0 |
| 1 | 1 | 2 |
| 0 | 0 | 4 |

- COMpact 6VoIP module (only for the COMpact 5020 VoIP) – use this to extend the PBX with a total of eight external VoIP channels as well as with the VoIP Codecs G.723.1, G.726, G.729A/E and iLBC. By inserting an appropriate USB memory stick into the PBX, you can make use of the voice mail and fax function with 20 voice mailboxes and 20 fax boxes as well as four voice mail/fax channels.
  The distribution options of the VoIP channels and the voice mail/fax channels for voice mail and fax are shown in the table below:

| Voice mail | Fax | VoIP |
|---|---|---|
| 4 | 1 | 0 |
| 3 | 1 | 2 |
| 2 | 1 | 4 |
| 1 | 1 | 6 |
| 0 | 0 | 8 |

***Important:*** *To support the COMpact 6VoIP module, the PBX needs firmware version 3.0.*

*To support the voice mail and fax function, the PBX needs firmware version 4.0 or higher.*

The COMpact 5010 VoIP has a universal slot and the COMpact 5020 VoIP has three universal slots for the following modules:

- COMpact POTS module – for extending the PBX with an external analogue port.
- COMpact 2POTS module – for extending the PBX with two external analogue ports.
- COMpact TSM module – for extending the PBX with three switching relays, two ringer/alarm inputs and a music input/audio output.
- COMpact 2ISDN module (only for the COMpact 5020 VoIP) – for extending the PBX with two port, separately switchable, between $S_0$ external, $S_0$ internal and $U_{P0}$ internal.

***Note:*** *Switching between the internal and external operating modes of the $S_0$ ports is done using jumpers.*

*Using the configuration manager, any number of available VoIP channels can be reserved for internal and external calls.*

*Using the configuration manager, you can define how many VoIP channels are to be used as voice mail/fax channels for the voice mail and fax function. One voice mail/fax channel corresponds to two VoIP channels.*

### Software Extensions

When the PBX is enabled in an Upgrade Centre, various extensions and other features can be activated .

***Note:*** *The system dongle required for the extension is a component part of the basic unit.*

You can extend the PBX with the following functions:

- Hotel function (only for the COMpact 5020 VoIP)
- Automatic reception
- Project numbers
- X.31 on an internal $S_0$ port

The following functions, some of which are already enabled, can be extended:

- LCR (number of subscribers from 8 to 64)
- LAN-TAPI (number of subscribers from 4 to 20)
- Call data recording (number of datasets from 2000 to 6000)
- Call Through (number of available lines from 1 to all)

In addition, the following phone numbers can be extended:

- Subscriber numbers (number of subscribers from 32 to 64)

### Maximum Extension

The COMpact 5020 VoIP can be operated with a maximum of six external analogue and ISDN channels. This means that in addition to the eight VoIP channels possible, a maximum of 14 external channels are possible.

***Note:*** *An $S_0$ port corresponds to two ISDN channels.*

The maximum number of individual ports and modules each is indicated in the following table:

| Ports/channels | Max. num. in the COMpact | |
|---|---|---|
| | 5020 VoIP | 5010 VoIP |
| External $S_0$ ports | 3 | 1 |
| External analogue ports | 6 | 2 |
| Internal $S_0$ ports | 8 | 2 |
| Internal $U_{P0}$ ports | 8 | 2 |
| Internal analogue ports | 10 | 6 |
| VoIP channels (internal and external) | 8 | 4 |
| voice mail/fax channels | 4 | 2 |

| Module | Max. num. in the COMpact | |
|---|---|---|
| | 5020 VoIP | 5010 VoIP |
| COMpact 2ISDN module | 3 | - |
| COMpact POTS module | 3 | 1 |
| COMpact 2POTS module | 3 | 1 |
| COMpact TSM module | 3 | 1 |
| COMpact 2VoIP module | 1 | 1 |
| COMpact 6VoIP module | 1 | - |

### Installation

The PBXs are intended to be operated in closed rooms. In addition, all of the devices connected to the system must be located in the building.

The PBXs enable you to connect some devices directly, inasmuch as they are close enough to the PBX. The dis-

tance depends on the length of the equipment connection cables up to a maximum of 10 m.

If no suitable connection sockets are available or are too far away, you must lay the installation cable permanently.

***Warning:*** *Power surges, which can occur during electrical storms, can cause life-threatening electric shocks*

→ *Let a skilled electrician lay all the cable inside the building – including the cable to the door terminal system.*

***Note:*** *Accessories and service parts can be bought in specialised stores or in the Internet shop distriCOM at http://www.districom.de. (Delivery is provided only in Germany and Austria.)*

**Configuration/administration**

The configuration manager on the PBX is contained in the integrated web server and can be opened with a browser. This prevents the need to install special programmes on the computer. You need only an IP-supported operating system and a compatible browser.

The configuration manager enables you to do the following tasks:

- Configure the PBX
- Manage the recorded voice and fax messages
- Manage call data
- Manage telephone book entries
- Manage wake-up times
- Manage call allowance accounts
- Manage internal hold music/announcements
- Manage data for Least Cost Routing
- Service and maintenance

In order to limit the tasks the operator or user must perform, the configuration manager is divided according to three authorisation levels:

- Admin
- Sub-Admin
- User

***Important:*** *Make sure to take suitable measures for protecting your data and yourself from misuse.*

→ *Prevent unauthorised access to the PBX and its programming.*

→ *It is important to consistently use all of the available options for assigning passwords.*

→ *Make use of the permissions available (programming authorisation, exchange line authorisations, restricted numbers, etc.).*

→ *Regularly check the call data recording of your PBX and the LOGs of your NAT router for inconsistencies.*

→ *Additional advice against abuse may be found in the paper of the Bundesamt für Sicherheit in der Informationstechnik (Sicherer Einsatz von digitalen Telekommunikationsanlagen) as well as on the service portal at the Auerswald web site (Internet address: www.auerswald.de)*

# Technical data

**Power supply**

| | |
|---|---|
| Rated voltage | 230 V~ ± 10%, 50 Hz |
| Rated current | COMpact 5010 VoIP: max. 0.4 A<br>COMpact 5020 VoIP: max. 0.4 A |
| Protection class | I |
| Power | COMpact 5010 VoIP: 5 W min., 30 W max.<br>COMpact 5020 VoIP: 6 W min., 40 W max.<br>(dependent from the PBX´s expansion configuration) |
| Modules | Power supply from the PBX |

**Environmental requirements**

| | |
|---|---|
| Operation | +0° ... +40° Celsius, avoid direct sunlight! |
| Operating the modules | Installed in the PBX casing |
| Storage and shipping | -20° ... +70° Celsius |
| Humidity | 10-90%, non-condensing |

**Connection options on the basic unit**

| | |
|---|---|
| Analogue internal | COMpact 5010 VoIP: 6 internal analogue ports;<br>COMpact 5020 VoIP: 10 internal analogue ports |
| ISDN internal/external | 1 $S_0/U_{P0}$ port, optionally as internal $S_0$ port, internal $U_{P0}$ port or external $S_0$ port, switchable (jumper);<br>1 $S_0/U_{P0}$ port internal, optional as $S_0$ or $U_{P0}$ port, switchable (jumper) |
| VoIP internal/external, PC an LAN | 1 Ethernet port |
| Printer | 1 USB host for printer |

**Connection options on the COMpact POTS module**

| | |
|---|---|
| Analogue external | 1 |

**Connection options on the COMpact 2POTS module**

| | |
|---|---|
| Analogue external | 2 |

**Connection options on the COMpact 2ISDN module**

| | |
|---|---|
| ISDN internal/external | 2 $S_0$/$U_{P0}$ ports, optionally as internal $S_0$ port, internal $U_{P0}$ port or external $S_0$ port, switchable (jumper) |

**Connection options on the COMpact TSM module**

| | |
|---|---|
| Door station | 1 power supply outlet<br>1 door terminal input/output<br>2 relay outputs<br>2 ringer inputs; one of which is used when connecting an alarm/announcement contact |
| External devices to switch | 3 relay outputs; two of which are used when connecting a door station |
| Alarm/announcement contact | 1 alarm input |
| Loud speaker/ Playback device | 1 audio output/music input |

**Internal analogue port**

| | |
|---|---|
| Connection unit | Terminal clamp (2-core), for three port or TAE jacks |
| Type of dialling | Pulse or tone dialling |
| Open-circuit voltage | Max. 40 VDC |
| Contact current | Approx. 21 mA |
| Range | 2 x 50 Ω, approx. 800 m with 0.6 mm Ø |
| Ring tone | Approx. 45 $V_{eff}$, configurable: 25/50 Hz |
| Audible signals | 425 Hz ± 5%, interval ± 10% |
| Charge pulse | Configurable: 12/16 KHz |
| Impedances a/b | Depending on the country variant $Z_R$ (220 Ω + 820 Ω / 115 nF) or 600 Ω; symmetrical |

**Internal $S_0$- port**

| | |
|---|---|
| Connection unit | Terminal clamp (4-core), on the basic unit, Western/RJ-45 socket (optional) |
| Connection type | $s_0$ basis access as Point-to-Multipoint connection, EURO-ISDN (DSS1) |
| Supply voltage | 40 V + 5% / – 15% |
| Feeder | Max. 4 W |
| Devices | Max. 2 devices recommended (max. 8 ISDN devices, of which 2 max. devices are without in-house feed, for example, various ISDN telephones) |
| Range | Max. 100-200 m (when laying bus lines; for IAE connection technology, the European standards ENV 41001 [DINV 41001] and EN 28877 apply) |
| Terminators | Switchable; Factory setting: on |

**Internal $U_{P0}$ port**

| | |
|---|---|
| Connection unit | Terminal clamp (2-core), on the basic unit, Western/RJ-45 socket (optional) |
| Connection types | $U_{P0}$ with the Euro-ISDN protocol (DSS1); 2 B-channels per port, direct connection to a $U_{P0}$ telephone or to the $U_{P0}$/$S_0$ adapter |
| Range | Screened cable: up to 600 m; unscreened cable: up to 1000 m |
| Supply voltage | 40 V + 5% / – 15% |
| Feeder | Max. 4 W |

**External analogue port**

| | |
|---|---|
| Connection unit | RJ-11 socket |
| Type of dialling | DTMF |
| Reception amplification | configurable: 0 to +12 dB |
| Transmission amplification | Configurable: 0 to +12 dB |
| Ringer signal frequency | Configurable: 16/25/50 Hz |
| CLIP detection | Configurable: V.23 FSK/DTMF |
| End of Call detection | Configurable:<br>DTMF code “D”<br>Polarity reversal of the line<br>Loop current detection |
| Impedances a/b | Configurable:<br>600 Ohm<br>900 Ohm<br>270/275 Ohm + 750/780 Ohm \|\| 150nF<br>220 Ohm + 820 Ohm\|\|115/120nF<br>370 Ohm + 620 Ohm\|\|310nF<br>320 Ohm + 1050 Ohm\|\|230nF<br>370 Ohm + 820 Ohm\|\|110nF<br>275 Ohm + 780 Ohm\|\|115nF<br>120 Ohm + 820 Ohm\|\|110nF<br>350 Ohm + 1000 Ohm\|\|210nF<br>200 Ohm + 680 Ohm\|\|100nF<br>600 Ohm + 2.16uF<br>900 Ohm + 1.0uF<br>900 Ohm + 2.16uF<br>600 Ohm + 1.0uF<br>Global complex impedance |

**External $S_0$ port**

| | |
|---|---|
| Connection unit | Terminal clamp (4-core), optional Western socket |
| Connection type | $S_0$ basis access as Point-to-Multipoint connection or as a PBX connection, EURO-ISDN (DSS1), unit is powered locally |

**Ethernet port for internal IP and Internet telephony (VoIP) as well as for a PC connection**

| | |
|---|---|
| Connection unit | Western socket |
| Interface | 10/100 Base-T (10/100 Mbit/s, RJ-45 twisted-pair), Full/semi-duplex auto negotiation, Auto-MDIX |
| VoIP standard | SIP according to RFC 3261 |

| | |
|---|---|
| VoIP codecs on the exchange line | G.711 with VoIP module: G.711, G.723.1, G.726, G.729 A/E, iLBC |
| VoIP codecs, internal | G.711 with VoIP module: G.711, iLBC |
| End devices | 1 end device per internal VoIP channel |

**USB host for printer**

| | |
|---|---|
| Connection unit | USB A-socket |
| Interface | USB (Full Speed, V 1.1 or V 2.0) |
| Printer | PCL4-compatible printer (HP Laserjet)<br>ESC/P-compatible printer (Epson) |

**Power supply outlet**

| | |
|---|---|
| Connection unit | Terminal clamp (2-core) |
| Output voltage | 12 VDC, 100 mA |

**Door terminal input/output**

| | |
|---|---|
| Connection unit | Terminal clamp (2-core) |
| Interface | FTZ 123 D12-0 |

**Relay outputs**

| | |
|---|---|
| Connection unit | Terminal clamp (2 x 2-core and 1 x 3-core) |
| Type of contact | Potential-free, 2 operating current contacts (NC), 1 operating and quiescent current contact (NC and NO) |
| Contact load capacity | max. 30 V/1 A |

**Ringer/alarm inputs**

| | |
|---|---|
| Connection unit | Terminal clamp (2 x 2-core) |
| Input voltage | Configurable: 0 V or 5-15 VAC/DC via the door bell button (NC) |
| Active state | Contact is closed for more than 0.5 s. |

**audio output/music input**

| | |
|---|---|
| Connection unit | Cinch connector |
| Output level | Max. 1 $V_{eff}$ |
| Input level | Adjustable from -18 to +10 dB (1 $V_{eff}$) |
| Internal resistance | 1 kΩ |

**Miscellaneous**

| | |
|---|---|
| Cabinet | Plastic, chassis with lid and protective cover |
| Dimensions (W x H x D) | Basic unit: 301 mm x 243 mm x 86.5 mm<br>COMpact 2VoIP module: 37 x 43 x 3 mm<br>COMpact 6VoIP module: 52 x 53 x 3 mm<br>COMpact POTS module: 92 x 60 x 17 mm<br>COMpact 2POTS module: 92 x 60 x 17 mm<br>COMpact 2ISDN module: 92 x 60 x 16 mm<br>COMpact TSM module: 92 x 60 x 16 mm |
| Weight | Basic unit: approx. 1500 g<br>COMpact 2VoIP module: approx. 6 g<br>COMpact 6VoIP module: approx. 12 g<br>COMpact POTS module: approx. 50 g<br>COMpact 2POTS module: approx. 50 g<br>COMpact 2ISDN module: approx. 50 g<br>COMpact TSM module: approx. 50 g |
| Safety | CE, EN 60950 |

## Recommended number of system telephones for a complete system

| PBX | COMfortel VoIP 2500 AB | COMfortel 1100/ 1500/1600/2500/ 2500 AB/2600 | COMfortel 2500/ 2500 AB/2600 with power supply | COMfortel DECT 900 Base | | COMfortel DECT IP1040 Base | |
|---|---|---|---|---|---|---|---|
| | | | | COMfortel DECT 900 Base | COMfortel DECT 900/ 900C Handset | COMfortel DECT IP1040 Base | COMfortel DECT 900/ 900C Handset |
| COMpact 5010 VoIP | 4 | 4 | 4 | 2 | 6 | 10 | 4 |
| COMpact 5020 VoIP | 8 | 12 | 16 | 4 | 12 | 10 | 8 |

## Power consumption of the various end devices

| Power | End device | |
|---|---|---|
| Max. 2 W | COMfortel 1100/1500/1600/2500/2500 AB/2600 system telephones | |
| Max. 1 W | COMfortel DECT 900 Base system telephones, ISDN telephones | |
| 0 W | Devices with separate power supply | COMfortel 2500/2500 AB/2600/VoIP 2500 AB with optional power supply plug |
| | Devices that draw power from another device, for example, a computer or a router | ISDN PC controllers, COMfortel VoIP 2500 AB system telephones, COMfortel DECT IP1040 Base |

## Environmental notice

For the sake of environmental protection, please make sure that packaging materials are also properly disposed of.

Please consult your municipal administration authorities for options of proper and environmentally safe disposal of the device.

If you want us to take over the disposal, please send the device to us.

**Shipment which is not prepaid cannot be accepted**.

## Information about the accompanying instructions

**Additional instructions**

How to configure a PBX using the integrated web server is thoroughly described in the Configuration Manual. How to operate a PBX is thoroughly described in the User Manual. The Configuration Manual and the User Manual are located on the Auerswald Mega Disk included in the package under Manuals. Also note the information about the warranty, service, environment, CE symbol and declaration of conformity in the insert “Conditions of Guarantee, Information Service".

**The latest information**

After functional extensions have been installed during a firmware update, you have access to the current instructions on the support pages on the Auerswald web site (Internet address: www.auerswald.de).

**Copyright and trademarks**



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## Abbreviations used

| | |
|---|---|
| **CPU** | **C**entral **P**rocessing **U**nit |
| **CTI** | **C**omputer **T**elephony **I**ntegration |
| **DDI** | **D**irect **D**ialling **I**n |
| **DTMF** | **D**ual **T**one **M**ulti **F**requency |
| **GSM** | **G**lobal **S**ystem for **M**obile Communications |
| **LAN** | **L**ocal **A**rea **N**etwork |
| **LED** | **L**ight **E**mitting **D**iode |
| **MSN** | **M**ultiple **S**ubscriber **N**umber |
| **NTBA** | **N**etwork **T**ermination for ISDN **B**asic **A**ccess |
| **NTPM** | **N**etwork **T**ermination for **P**rimary rate **M**ultiplex access |
| **TAPI** | **T**elephone **A**pplication **P**rogramming **I**nterface |
| **USB** | **U**niversal **S**erial **B**us |
| **VoIP** | **V**oice **o**ver **I**nternet **P**rotocol |

# Preparation

This section describes the preparations required before installing and commissioning the device. In addition, how to open the casing, and how to attach it to the wall, as well as how to install modules on the PBX (not included in the delivery). In addition, this section describes how to select specific operation modes on the switchable ports, and how to enable and disable the terminators. The tables over the terminal area as well as over the modules should facilitate locating the various connection options. Planning the system configuration in advance should prevent needing to make changes later.

## Planning the PBX

**Steps to take**

1. Put some thought into what kind of end devices and how many of them you would like to connect to the system. Do the devices correspond to the intended use of the PBX?
2. Think about how many external call channels you need for smooth telephone operation.
3. Determine the number of internal and external ports you need. Do the existing ports suffice or do additional modules need to be installed?
4. Locate a suitable location to mount the PBX. This should preferably be placed in the immediate vicinity of the wall sockets of the network provider.

## Opening the casing

***Warning:*** *Improper handling of the device can result in life-threatening electrical shock.*

→ *Only a skilled electrician may open the casing. If necessary, have an authorised dealer commission the device.*

***Warning:*** *Touching the voltage-carrying conductors or the telephone connections may cause a life-threatening electric shock.*

→ *Remove the power plugs for both the PBX and all peripheral equipment from the power socket before a skilled electrician opens the casing.*

→ *If necessary, also disconnect the devices from auxiliary power sources (for example, UPS).*

***Warning:*** *Power surges, which can occur during electrical storms, can cause life-threatening electric shocks*

→ *Do not open the PBX during an electrical storm.*

**Steps to take**

1. Insert your index finger into the opening on the cover. See Fig. 1.
2. Unlatch the lock by pulling the protective cover towards yourself. See Fig. 1.
3. Lift the protective cover upwards and remove it entirely from the terminal area. See Fig. 1.

***Important:*** *Only open the blue protective cover. Do not remove the tightly screwed casing cover. This prevents accidental contact which may result in a shock from hazardous voltages. Make sure that any repairs requiring the casing cover to be removed are carried out by the manufacturer. Removing or destroying the protective caps covering the screws (Fig. 2) voids the warranty.*

Fig. 1: Opening the casing

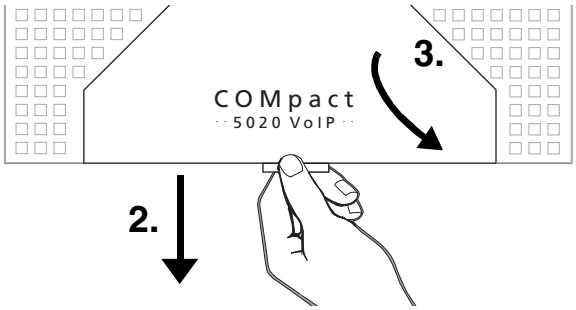
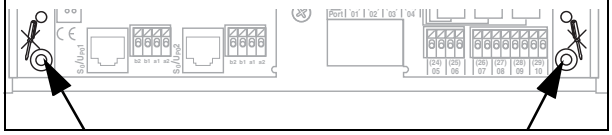



Fig. 2: Do not remove the protective caps



## Overview of terminal area

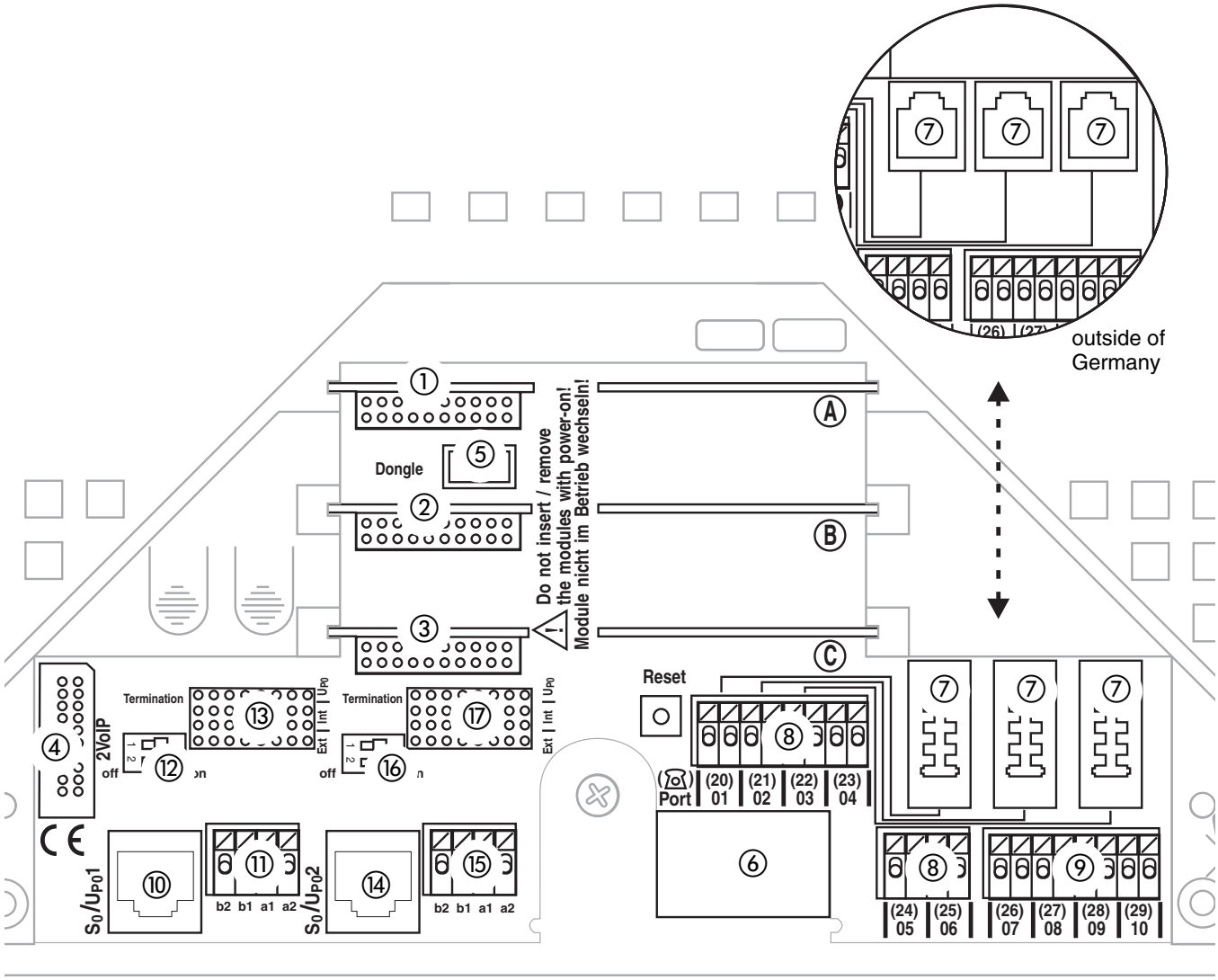



Fig. 3: Base circuit board, COMpact 5010/5020 VoIP

① Universal slot A

② Only for the COMpact 5020 VoIP: universal slot B

③ Only for the COMpact 5020 VoIP: universal slot C

④ VoIP slot

⑤ Expansion slot for the system dongle

⑥ Groove for input leads

⑦ TAE jacks or Western sockets (depending on the country variant) for connecting analogue end devices to the internal a/b ports 01-03

⑧ Terminal clamps for connecting analogue end devices to the internal a/b ports 01-06

⑨ Only for the COMpact 5020 VoIP: terminal clamps for connecting analogue end devices to the internal a/b ports 07-10

⑩ Western socket for connecting to the $S_0/U_{P0}$ port 1

⑪ Terminal clamps for connecting to the $S_0/U_{P0}$ port 1

⑫ DIP switches for terminators on the $S_0/U_{P0}$ port 1

⑬ Jumper for switching the operation mode on the $S_0/U_{P0}$ port 1

⑭ Western socket for connecting to the $S_{45}/U_{P0}$ port 2

⑮ Terminal clamps for connecting to the $S_0/U_{P0}$ port 2

⑯ DIP switches for terminators on the $S_0/U_{P0}$ port 2

⑰ Jumper for switching the operation mode on the $S_0/U_{P0}$ port 2

## Overview of the COMpact 2ISDN module

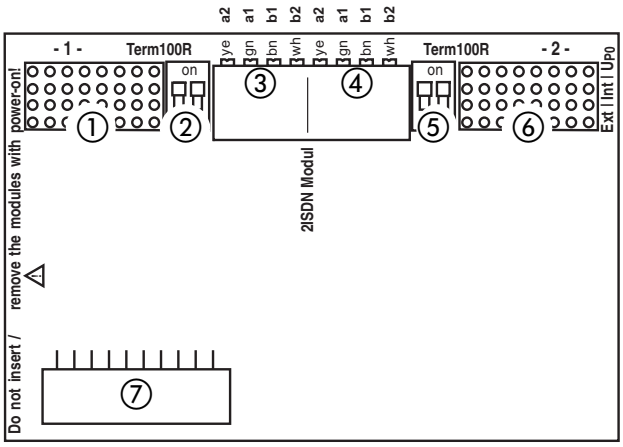



Fig. 4: COMpact 2ISDN module

① Jumper for switching the operation mode on the $S_0$/$U_{P0}$ port 1

② DIP switches for terminators on the $S_0$/$U_{P0}$ port 1

③ Terminal clamps for connecting to the $S_0$/$U_{P0}$ port 1

④ Terminal clamps for connecting to the $S_0$/$U_{P0}$ port 2

⑤ DIP switches for terminators on the $S_0$/$U_{P0}$ port 2

⑥ Jumper for switching the operation mode on the $S_0$/$U_{P0}$ port 2

⑦ Connector for insertion on the base circuit board (universal slot A-C)

## Overview of the COMpact 2POTS/POTS module

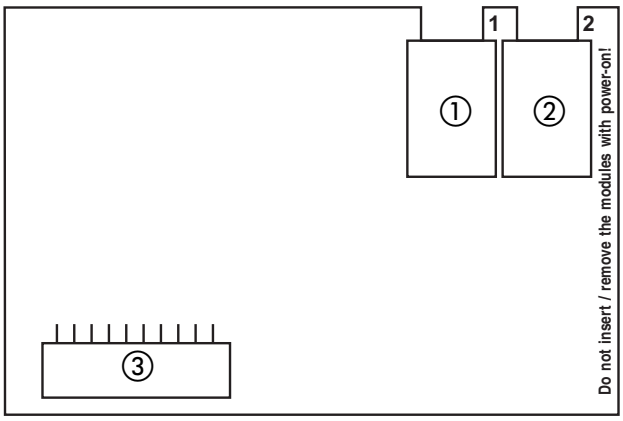



Fig. 5: COMpact 2POTS/POTS module

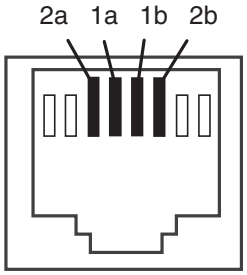
① Western socket for connecting to the external analogue port 1

② Only for the COMpact 2POTS module: Western socket for connecting to the external analogue port 2

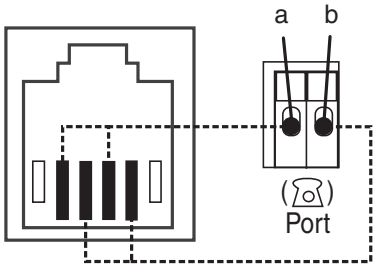
③ Connector for insertion on the base circuit board (universal slot A-C)

## Western socket assignment

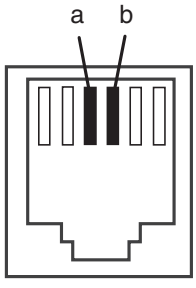
ISDN Western sockets




Internal analogue Western sockets (only outside of Germany)




External analogue Western sockets (POTS)



# Mounting the device on the wall

**Requirements**

– Hand tools and material:
  - Drill and screw driver
  - The accompanying drilling template
  - The accompanying screws and dowels
– The existing connections in the immediate vicinity of the mounting location:
  - A freely accessible 230 V Schuko socket
  - Wall socket/NT of the network provider; for great distances, hard wiring between the devices is necessary.

***Warning:*** *Liquid entering the casing can cause life-threatening electric shocks or damage/destroy the PBX.*

→ *Only operate the device in closed, dry rooms.*

***Attention:*** *Overheating can damage or destroy the system.*

→ *Note the ambient temperature values indicated in the technical specifications.*

→ *Make sure that heat produced by the device can be adequately vented into the environment. Do not install the system in a cabinet without adequate air circulation.*

***Important:*** *Mechanical loads and electro-magnetic fields can impair PBX operation.*

→ *Avoid mechanical loads (for example, vibrations).*

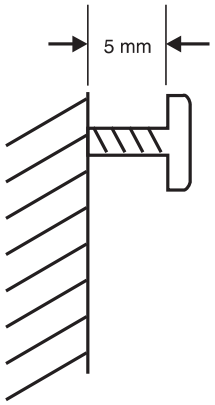
→ *Avoid proximity to devices that generate electromagnetic fields or react sensitively to them (for example, radio receivers, amateur radio sets, mobile phones, DECT systems, or similar).*

→ *Protect the device from soiling, dust and condensation.*

**Steps to take**

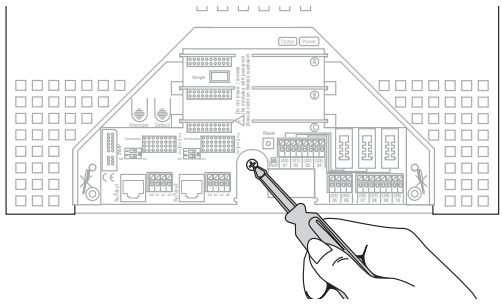
1. Hold the drilling template on the area where the device is to be mounted and place marks where the mounting holes are to be drilled into the wall.
2. Drill the mounting holes (∅ 6 mm) and insert dowels into the holes.
3. Screw in the two screws far enough that the screw head is about 5 mm away from the wall. See Fig. 6.

Fig. 6: Distance of the screws from the wall




4. Mount the PBX on the screws, then tighten the screws into the wall downwards until the stopper.
5. Fasten the PBX using the third screw. See Fig. 7.

Fig. 7: Tighten the casing



# Changing the operating mode for the switchable ports

***Attention:*** *Electrostatic charges can destroy sensitive components.*

→ *Divert electrostatic charges from yourself before touching the circuit boards with your hands or any tools. To do this, touch a metal object, preferably earthed, for example, a heater or computer housing.*

**Requirements**

– Previous system planning

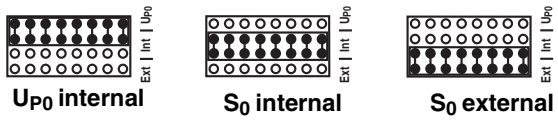
***Note:*** *Even after adding multiple modules, the COMpact 5020 VoIP may be operated with a maximum of six external analogue and ISDN channels (one $S_0$ port corresponds to two ISDN channels).*

*Port 2 on the base circuit board only supports the operating modes $S_0$ internal and $U_{P0}$ internal.*

**Steps to take**

1. Remove the jumper for the port to be switched.
2. Reinsert the jumper according to the desired operating mode. The correct jumper setting can be found on the circuit board label or the Fig. 8.

Fig. 8: Jumper setting




**$U_{P0}$ internal** **$S_0$ internal** **$S_0$ external**

## Switching terminators

***Attention:*** *Electrostatic charges can destroy sensitive components.*

→ *Divert electrostatic charges from yourself before touching the circuit boards with your hands or any tools. To do this, touch a metal object, preferably earthed, for example, a heater or computer housing.*

**Requirements**

– Previous system planning

– The following is a list of uses for the port in question (for enabling the terminators):
  - The PBX port in question is located at the beginning/end of a series of devices, for example, when laying an internal $S_0$ bus in one direction.
  - The PBX port in question is only connected to one device, for example, in a direct connection to an NT with a PBX connection.

– The following is a list of uses for the port in question (for disabling the terminators):
  - The PBX port in question is located in the middle of a series of devices, for example, when laying an internal $S_0$ bus in two directions.
  - The PBX port in question is connected to an existing socket, for example, to an NT with an external $S_0$ bus with terminators in the last socket.

**Steps to take**

1. Enabling: Push both buttons on the DIP switch to be switched to the “on” position. See Fig. 9.

   Disabling: Push both buttons on the DIP switch to be switched to the “off” position. See Fig. 9.

Fig. 9: Switch setting


**Enabled** **Disabled**

## Updating/upgrading the PBX

***Warning:*** *Touching the voltage carrying conductors or the telephone connections – including those on the modules – may cause a life-threatening electric shock.*

→ *Ten seconds before inserting or removing modules, remove the PBX power plug and the accessory power plug from the power socket.*

***Attention:*** *Electrostatic charges can destroy sensitive components.*

→ *Divert electrostatic charges from yourself before touching the circuit boards with your hands or any tools. To do this, touch a metal object, preferably earthed, for example, a heater or computer housing.*

**Requirements**

– Previous system planning

***Note:*** *Even after adding multiple modules, the COMpact 5020 VoIP may be operated with a maximum of six external analogue and ISDN channels (one $S_0$ port corresponds to two ISDN channels).*

*For multiple modules, first carry out the necessary settings and installations before you insert the module.*

**Steps to take**

1. Insert the module between the two circuit board guides. See Fig. 10 on page 19.

***Note:*** *There is no circuit board guide for the COMpact 2VoIP/6VoIP module slot.*

**2.** Press the module downwards and vertically towards the base circuit board.

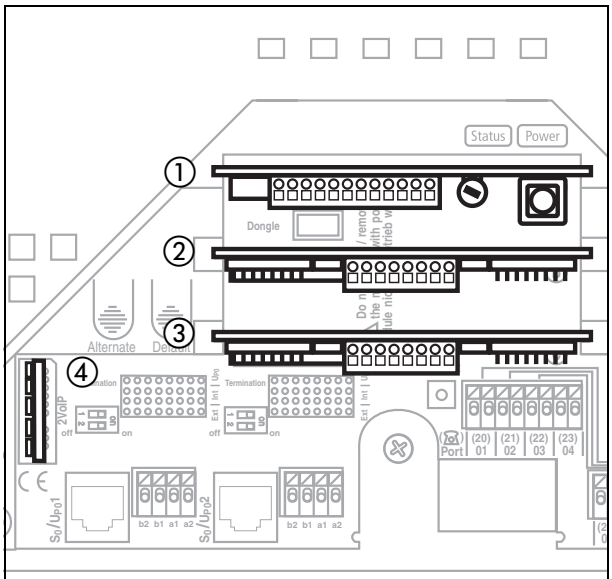



Fig. 10: Expansion slots on the base circuit board

① Universal slot A for
- COMpact POTS module
- COMpact 2POTS module
- COMpact TSM module
- COMpact 2ISDN module

② Only for the COMpact 5020 VoIP: Universal slot B for
- COMpact POTS module
- COMpact 2POTS module
- COMpact TSM module
- COMpact 2ISDN module

③ Only for the COMpact 5020 VoIP: Universal slot C for
- COMpact POTS module
- COMpact 2POTS module
- COMpact TSM module
- COMpact 2ISDN module

④ VoIP slot for
- COMpact 2VoIP module
- COMpact 6VoIP module

## Closing the casing

**Requirements**

– After installation, cables carefully reinserted into the cable space

***Important:*** *Make sure that the cable is not pressing against the VoIP module.*

**Steps to Take**

**1.** Put the protective cover back onto the casing.

# Connecting to the Network Provider

This section describes how to connect to the NT or to the analogue wall socket for the network provider. Whenever possible, a difference is made in whether the device is to be connected directly or the lines are to be laid permanently. In addition, this section describes how to connect the PBX to the Internet (VoIP) via a router. Both illustrations at the end provide an overview of how the two analogue connections and DSL are connected. (Fig. 11) as well as for an ISDN connection and DSL (Fig. 12).

***Warning:*** *Touching the voltage-carrying conductors or the telephone connections may cause a life-threatening electric shock.*

→ *Remove the power plugs for both the PBX and all peripheral equipment from the power socket before a skilled electrician opens the casing.*

***Important:*** *Improper use may cause, e.g. functional restrictions or interference, the destruction of the device or, in a worst case scenario, personal injury.*

→ *Only connect equipment that is compatible to the intended use of the PBX.*

Fig. 11: Two analogue connections and DSL

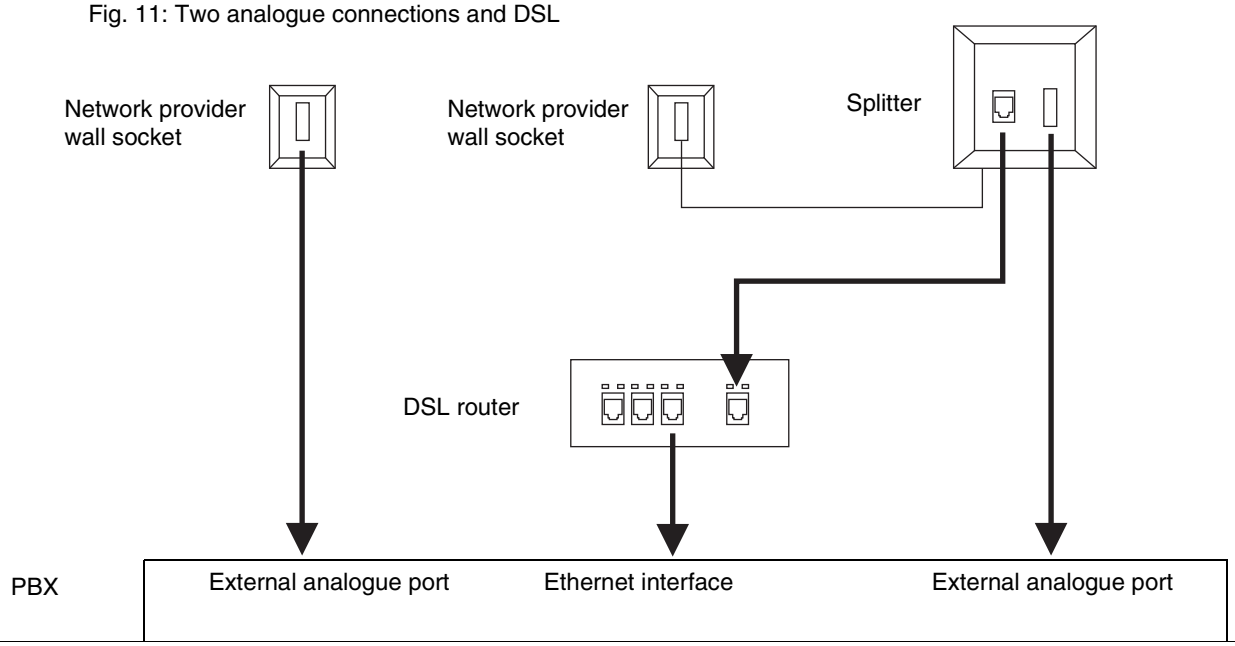
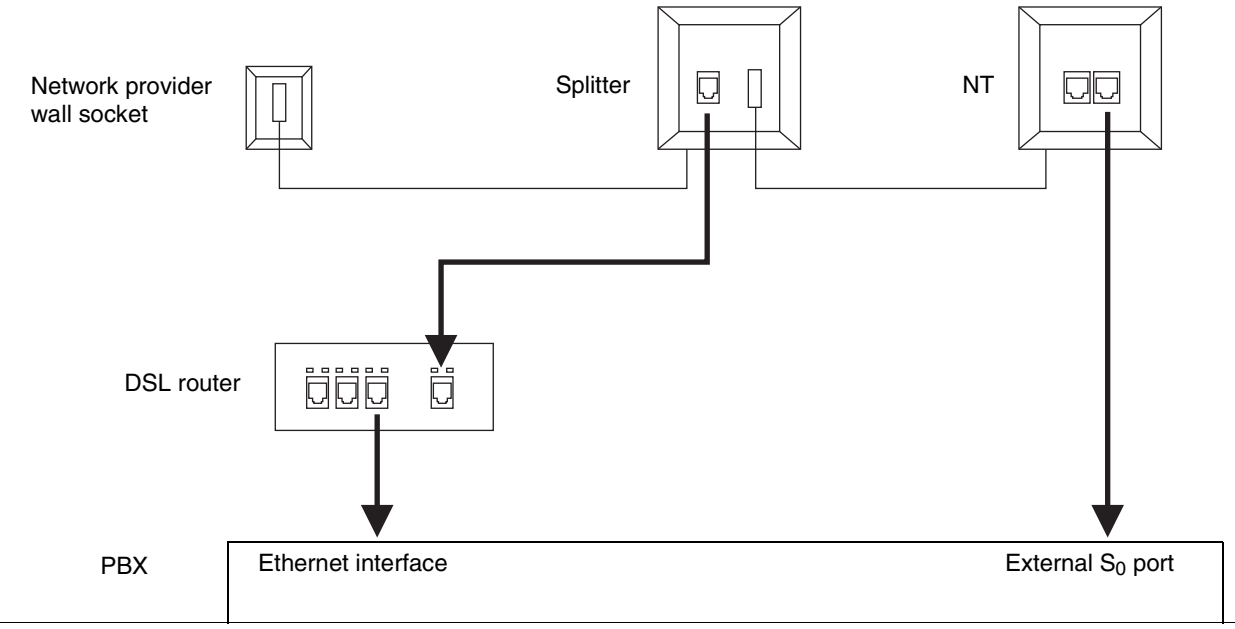



Fig. 12: ISDN connection and DSL



## Connecting the analogue connection directly to the external analogue port

**Requirements**

– Minimal distance between the devices

***Note:*** *If the analogue connection is relatively far away from the PBX, a cable must first be laid.*

– The RJ-11 (6P/4C) connection cable included in the COMpact POTS module package set to RJ-11 (6P/4c)

– In Germany, set the COMpact POTS module RJ-11 adapter included in the package to TAE-F

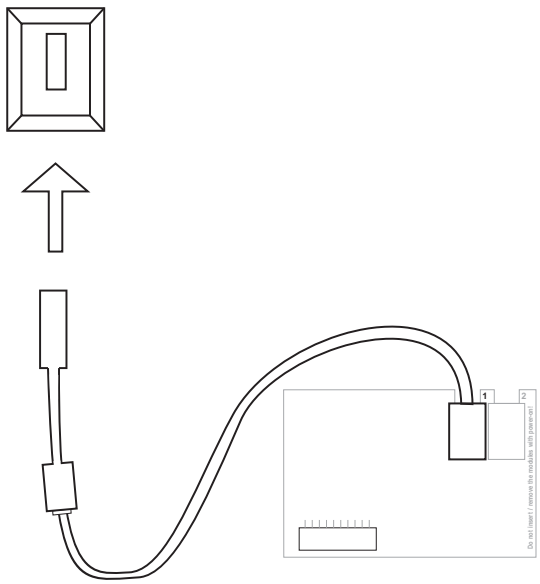
**Steps to take**

1. Insert one end of the connection cable into the Western socket on the COMpact POTS module. See Fig. 13.
2. In Germany: Insert the other end of the connection cable into the Western socket on the adapter. See Fig. 13.

***Warning:*** *Voltages that run through the connection socket of the network provider can cause life-threatening electric shocks.*

→ *Do not connect the PBX until the casing on the connection socket of the network provider is closed again.*

Fig. 13: Connecting the analogue connection



## Connecting the cable and the connection socket to the analogue connection

***Warning:*** *Power surges, which can occur during electrical storms, can cause life-threatening electric shocks or damage/destroy the PBX.*

→ *Let a skilled electrician lay all the cables inside the building.*

**Requirements**

– Installation cable (for example, J-Y(St)Y 2x2x0,6) with the following characteristics:
  - One twisted pair per analogue connection
  - Unscreened; however: screened for unfavourable conditions, for example, near a strong transmitter or an electrical power line

– One TAE jack with F-coding

***Note:*** *Outside of Germany, use an RJ-11 socket (6P/4C).*

– Distance/line length between the devices depends on the cable used:
  - Maximum 800 m for a cable with a pair diameter of 0.6 mm

**Steps to take**

1. Lay the line.

   ***Note:*** *Prevent interference. Avoid laying long lengths of parallel lines, especially next to mains. Twist the pairs.*
2. Attach the wires to the two terminal clamps in the external connection of the network provider.
3. Connect the wall socket to the terminal clamps on the external connection.

***Warning:*** *Voltages that run through the connection socket of the network provider can cause life-threatening electric shocks.*

→ *Do not connect the PBX until the casing on the connection socket of the network provider is closed again.*

## Connecting ISDN (NT) directly to the external $S_0$ port

**Requirements**

– Enabled operation mode “$S_0$ external” on the $S_0$ port in question. See Page 17.

– Enable the terminators at both ends of the connection – in the NT and in the PBX on the external $S_0$ port in question. See Page 18.

– Minimal distance between the devices

***Note:*** *If the NT is relatively far away from the PBX, a cable must first be laid.*

– For connecting the NT to the external $S_0$ port on the base circuit board: The connection cable included in the package for the PBX.

– For connecting the NT to the external $S_0$ port on the COMpact 2ISDN module: The connection cable included in the package for the module.

**Steps to take**

1. Base circuit board: Insert one end of the ISDN cable into the Western socket “$S_0$1/$U_{P0}$1”. See Fig. 15.

   COMpact 2ISDN module: Attach the wires to the four terminal clamps in the $S_0$ port in question. While doing this, note the colours of the wires and the labels on the terminal clamps. See Fig. 14.

2. Insert the other end of the ISDN cable into the Western socket on the NT. See Fig. 15 and Fig. 14.

Fig. 14: Connecting the NT to the COMpact 2ISDN module

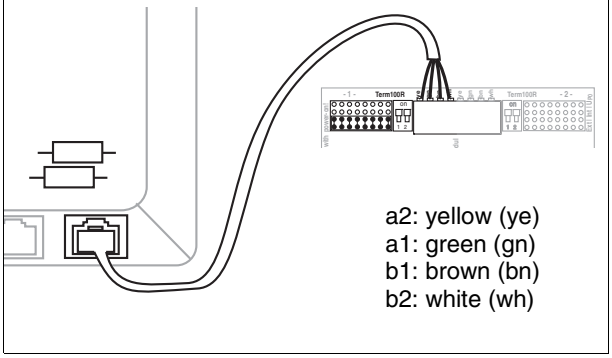
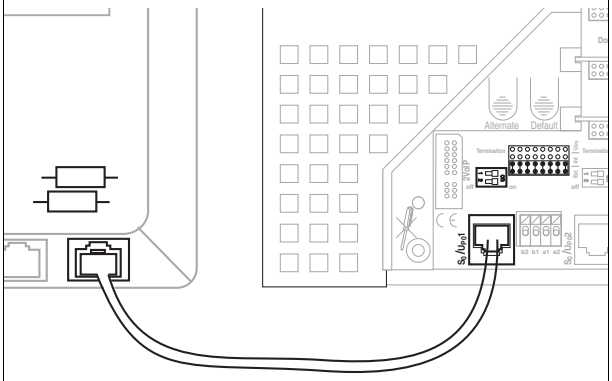



Fig. 15: Connecting the NT to the base circuit board



## Laying cable between the external $S_0$ port and ISDN (NT)

***Warning:*** *Power surges, which can occur during electrical storms, can cause life-threatening electric shocks or damage/destroy the PBX.*

→ *Let a skilled electrician lay all the cables inside the building.*

**Requirements**

– Enabled operation mode “$S_0$ external” on the $S_0$ port in question. See Page 17.

– Enable the terminators at both ends of the connection – in the NT and in the PBX on the external $S_0$ port in question. See Page 17.

– The distance/line length between the devices depends on the connection type:
  - Maximum 150 m for a Point-to-Multipoint connection
  - Maximum 1000 m for a Point-to-Point connection

– Installation cable (for example, J-Y(St)Y 2x2x0,6) with the following characteristics:
  - 4-core
  - Unscreened; however: screened for unfavourable conditions, for example, near a strong transmitter or an electrical power line
  - Preferably star quad stranding

***Note:*** *If you would like to install an external $S_0$ bus with wall sockets, please refer to Chapter Connecting the cable and wall sockets to the internal $S_0$ port (internal $S_0$ bus) on page 27.*

**Steps to take**

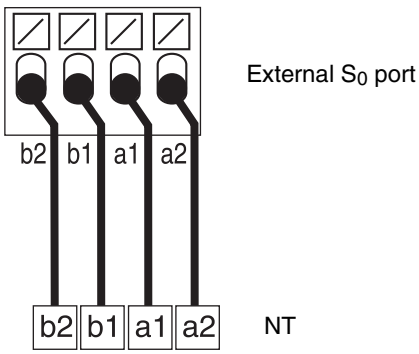
1. Attach the wires to the four terminal clamps in the NT.

   ***Note:*** *When assigning the individual wires, orient yourself with the identifiers subsequently listed or refer to VDE 0815 when identifiers deviate.*

| | | Cable with two twin wires | Cable with star quad |
|---|---|---|---|
| Physical circuit/ pair 1 | a1 | Red | Without ring |
| | b1 | Black | Single rings, 17 mm spacing |
| Physical circuit/ pair 2 | a2 | White | Double rings, 34 mm spacing |
| | b2 | Yellow | Double rings, 17 mm spacing |

**2.** Connect the NT to the four terminal clamps on the external $S_0$ port. See Fig. 16.

Fig. 16: Wire up the NT and the external $S_0$ port




## Connecting the Ethernet port to the Internet

***Important:*** *If you would like to integrate the PBX into an existing network, please contact the system administrator responsible for this. Making changes to an existing network may cause considerable malfunctions. In addition, please note the PBX factory settings for the Ethernet configuration described in* *Page 33**.*

### Requirements

- Line lengths between the devices shorter than 100 m
- Broadband Internet connection (for example, DSL router, TV cable router)
- Existing network (LAN) with the following characteristics:
  - Data transmission rate 100 Mbit/s

  ***Note:*** *For VoIP data communication in combination with the transmission of limited amounts of data, a data transmission rate in the LAN of 10 Mbit/s is sufficient under certain circumstances. For VoIP data communication in combination with the transmission of large amounts of data (for example, downloads), we recommend upgrading to a data transmission rate of 100 Mbit/s. For this purpose, replace not only all of the active network components (for example, the switch and router) but also all of the passive network components (for example, cables and wall sockets). For reliable support of 100 Mbit/s, you need cables and wall sockets of at least Category 5 (CAT5).*
  - To use DiffServ to prioritize speech packets: DiffServ support of all active network components available and enabled
  - A router that is specifically designed for VoIP data communication (“SIP aware”)

  *If this is not the case, several of the ports on the router necessary for VoIP data communication must be enabled (RTP port and SIP-UDP ports) (“Port Forwarding”). A list of the ports used in the PBX can be found in the configuration manager on the PBX under* ***Administration*** ▸ ***Port overview****.*
- The patch cable included in the package

### Steps to take

**1.** Insert the end of the cable into the Ethernet socket on the PBX.

**2.** Insert the other end of the cable into the output socket on the DSL router or into an existing network outlet.

***Note:*** *To connect the router to the network provider, please refer to the documentation provided by the network provider and included with the router. See also Fig. 11 and* *Fig. 12 on page 20**.*

### Further steps

▷ Configure the necessary network settings on the router and/or on the PBX at the end of commissioning. See Page 34.

# Connecting Analogue Devices

This section describes how to connect different analogue end devices to the a/b port. Whenever possible, a difference is made whether the device is connected directly or the fixed lines are laid.

***Warning:*** *Touching the voltage-carrying conductors or the telephone connections may cause a life-threatening electric shock.*

→ *Remove the power plugs for both the PBX and all peripheral equipment from the power socket before a skilled electrician opens the casing.*

***Important:*** *Improper use may cause, e.g. functional restrictions or interference, the destruction of the device or, in a worst case scenario, personal injury.*

→ *Only connect equipment that is compatible to the intended use of the PBX.*

## Connecting analogue end devices directly to the internal a/b port

**Requirements**

– Minimal distance between the devices

***Note:*** *If the end device is placed a considerable distance away from the PBX, the cable and the wall sockets must be permanently installed. See Page 24.*

– Using the first three internal a/b ports

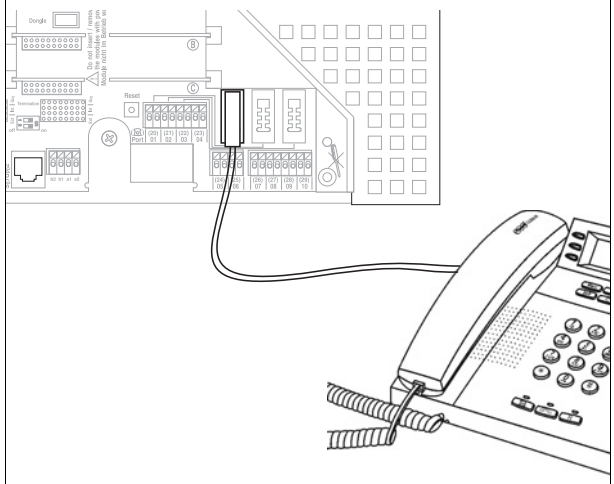
***Note:*** *Only terminal clamps are available for the other a/b ports.*

**Steps to take**

1. Connect the end device to an internal a/b port as shown in Fig. 17.

   ***Note:*** *The sockets on the PBX are equally suitable for all devices.*

Fig. 17: Connecting the analogue end device directly



## Installing cables and wall sockets for the internal a/b port

***Warning:*** *Power surges, which can occur during electrical storms, can cause life-threatening electric shocks or damage/destroy the PBX.*

→ *Let a skilled electrician lay all the cables inside the building.*

→ *Do not use the a/b ports to connect external private branch exchanges.*

**Requirements**

– Installation cable (for example, J-Y(St)Y 2x2x0,6) with the following characteristics:
  - One twisted pair per a/b port
  - Unscreened; however, screened for unfavourable conditions, for example, near a strong transmitter or an electrical power line

– A TAE jack with the following characteristics:
  - For telephones or combination fax/answering machines, a single TAE jack with F-coding (a socket labelled with an “F”)
  - For fax machines, modems and answering machines, a TAE jack that also has a socket with N-coding.

  ***Note:*** *Outside of Germany, use Western sockets or the analogue wall sockets normally used in the country in question.*

– Distance/line length between the devices depends on the cable used:
  - Maximum 800 m for a cable with a pair diameter of 0.6 mm

**Steps to take**

1. Lay the line.

   ***Note:*** *Prevent interference. Avoid laying long lengths of parallel lines, especially next to mains. Twist the pairs.*

2. Attach the wires to the two terminal clamps in the internal a/b port. See Fig. 18.

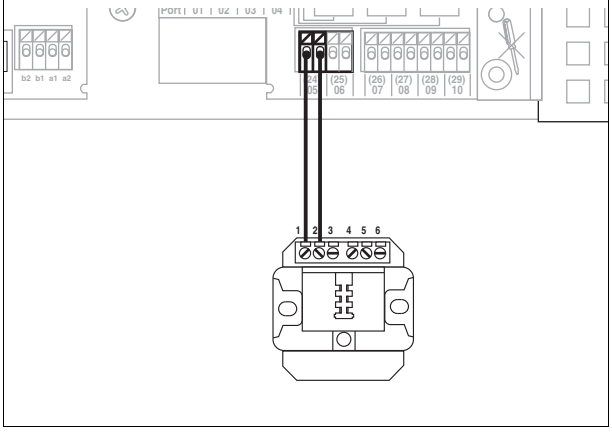
3. Connect the wall sockets to the terminal clamps in the internal a/b port. See Fig. 18.

**Further steps**

▷ Connect the end devices to the wall sockets.

***Note:*** *For TAE jacks, insert the connection plug for the telephones or combination fax/answering machines into the socket labelled with "F" and insert the connection plug of the remaining devices into the socket labelled with "N".*

Fig. 18: Wall sockets on the internal a/b port



# Connecting ISDN End devices

This section describes how to connect the different ISDN end devices to the $S_0$ or $U_{P0}$ port. If possible, a difference is made in whether the device is connected directly or the lines are permanently installed.

***Warning:*** *Touching the voltage-carrying conductors or the telephone connections may cause a life-threatening electric shock.*

→ *Remove the power plugs for both the PBX and all peripheral equipment from the power socket before a skilled electrician opens the casing.*

***Important:*** *Improper use may cause, e.g. functional restrictions or interference, the destruction of the device or, in a worst case scenario, personal injury.*

→ *Only connect equipment that is compatible to the intended use of the PBX.*

## Connecting ISDN end devices directly to the internal $S_0$ port

**Requirements**

- Enabled operation mode "$S_0$ internal" on the $S_0$ port in question. See Page 17.
- In the PBX, enabled the terminators on the internal $S_0$ port in question. See Page 18.
- Minimal distance between the devices. Maximum length of the connecting cables to be used: 10 m.

  ***Note:*** *If the end device is placed a considerable distance away from the PBX, the cable and the wall sockets must be permanently installed. See Page 27.*
- Using an internal $S_0$ port on the base circuit board

  ***Note:*** *The $S_0$ ports on the COMpact 2ISDN module are not equipped with a Western socket.*
- For connecting multiple end devices on one internal $S_0$ port: one ISDN multiplug

  ***Note:*** *The Auerswald ISDN Multiplug is available for this type of wiring as optional accessories in specialised stores.*

**Steps to take**

1. Single end device: Connect the end device as shown in Fig. 19 to an internal $S_0$ port.

   Multiple end devices: Connect the ISDN Multiplug as shown in Fig. 20 to an internal $S_0$ port.
2. Multiple end devices: Connect the end devices to the ISDN multiplug.

Fig. 19: Connecting the ISDN end device directly

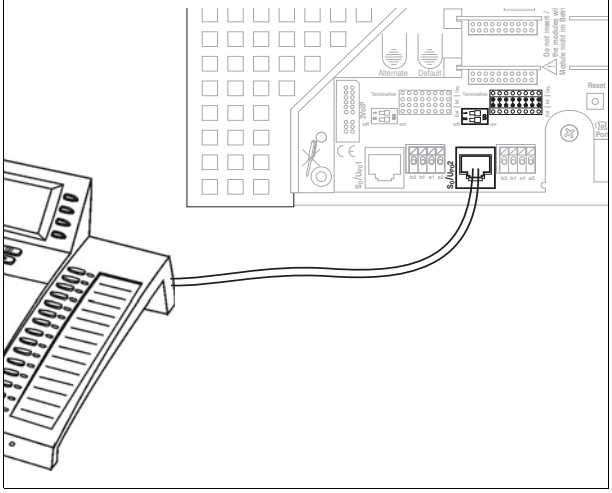
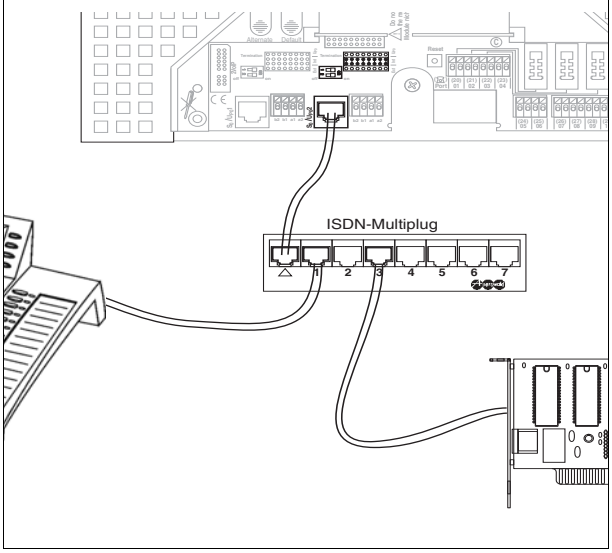


Fig. 20: End devices via an ISDN multiplug



# Connecting the cable and wall sockets to the internal $S_0$ port (internal $S_0$ bus)

***Warning:*** *Power surges, which can occur during electrical storms, can cause life-threatening electric shocks or damage/destroy the PBX.*

→ *Let a skilled electrician lay all the cables inside the building.*

**Requirements**

– Enabled operation mode "$S_0$ internal" on the $S_0$ port in question. See Page 17.

– In the PBX, enabled or disabled the terminators on the internal $S_0$ port in question, depending on the bus variant. See also Page 18.
  - Disabled for a short passive bus in two directions. See Fig. 22.
  - Enabled for a short passive bus in one direction, for extended passive bus and for Point-to-Point wiring. See Fig. 21, Fig. 23 and Fig. 24 on page 28.

– Installation cable (for example, J-Y(St)Y 2x2x0,6) with the following characteristics:
  - 4-core
  - Unscreened; however: screened for unfavourable conditions, for example, near a strong transmitter or an electrical power line
  - Preferably star quad stranding

– ISDN wall sockets (for example, IAE or UAE8)

  ***Note:*** *If possible, only use wall sockets of one type.*

– Two terminators (100 Ω; Load capacity min. 0.25 W) for the last wall socket

– Distance/line length between the devices as well as the number of wall sockets, depending on the bus variant:
  - Maximum of 150 m and twelve wall sockets for one short passive bus. This bus can be laid in one direction or in two directions from the internal $S_0$ port. See Fig. 21 and Fig. 22.

  ***Note:*** *Also for a bus with twelve wall sockets, this restriction applies to a max. of eight devices.*

***Note:*** *Wiring in more than two directions (star configuration) is not permitted.*
- Maximum of 500 m and four wall sockets for one extended passive bus. For this bus variant, the wall sockets are connected on the last 35 m. The first 465 m remain free. See Fig. 23.
- Maximum 1000 m and one wall socket for Point-to-Point wiring. See Fig. 24 on page 28.

Fig. 21: Short passive bus in one direction

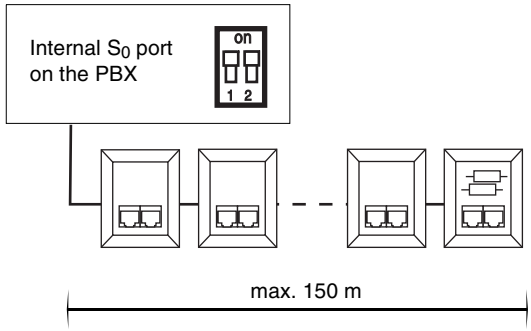



Fig. 22: Short passive bus in two directions

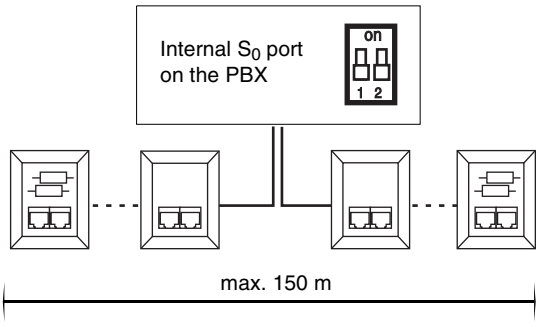



Fig. 23: Extended passive bus

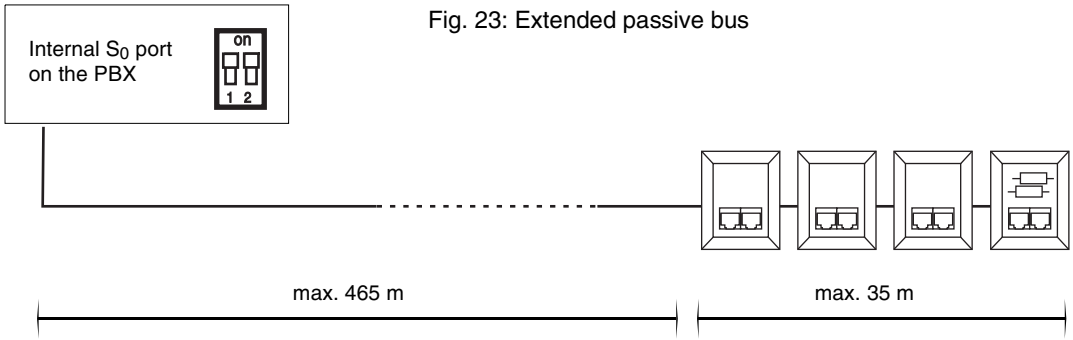
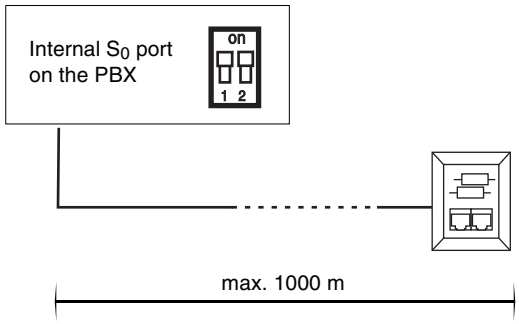


Fig. 24: Point-to-Point wiring




**Steps to take**

1. Lay the lines according to the selected bus variant.
2. Attach the wires to the four terminal clamps in the internal $S_0$ port.

   ***Note:*** *When assigning the individual wires, orient yourself with the identifiers subsequently listed or refer to VDE 0815 when identifiers deviate.*

| | | Cable with two twin wires | Cable with star quad |
|---|---|---|---|
| Physical circuit/ pair 1 | a1 | Red | Without ring |
| | b1 | Black | Single rings, 17 mm spacing |
| Physical circuit/ pair 2 | a2 | White | Double rings, 34 mm spacing |
| | b2 | Yellow | Double rings, 17 mm spacing |

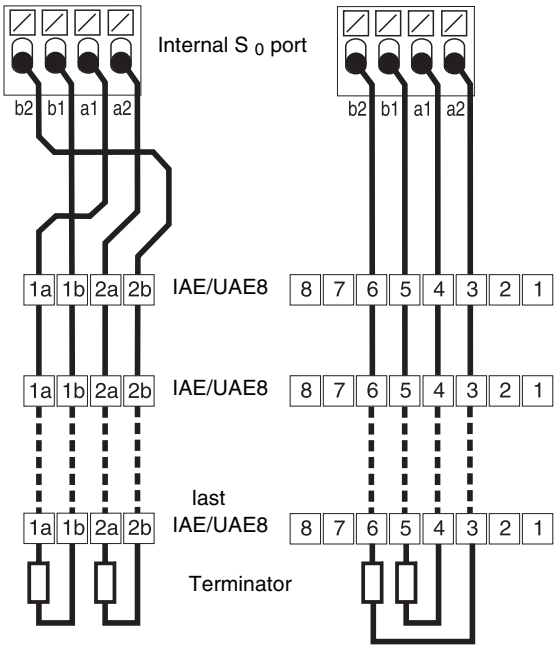
3. Connect the IAE or UAE8 sockets to the terminal clamps on the internal $S_0$- port. See Fig. 25.
4. Equip the last wall socket with two terminators. See Fig. 25.

   ***Note:*** *For a short passive bus in two directions, equip the wall sockets on both ends with terminators.*

**Further steps**

▷ Connect the end devices to the wall sockets.

Fig. 25: Wire the wall sockets to the internal $S_0$ port.




## Connecting ISDN end devices directly to the internal $U_{P0}$ port

**Requirements**

- Enabled operation mode "$U_{P0}$ internal" on the $S_0$ port in question. See Page 17.
- In the PBX, enable the terminators on the internal $U_{P0}$ port in question. See Page 18.
- Minimal distance between the devices. Maximum length of the connecting cables to be used: 10 m.

  ***Note:*** *If the end device is placed a considerable distance away from the PBX, the cable and the wall sockets must be permanently installed. See Page 29.*

- Using an internal $U_{P0}$ port on the base circuit board

  ***Note:*** *The $U_{P0}$ ports on the COMpact 2ISDN module are not equipped with a Western socket.*

- One $U_{P0}/S_0$ adapter

  ***Note:*** *To connect a single COMfortel 1100/1500/2500/2500 AB system telephone, no $U_{P0}/S_0$ adapter is required. If two COMfortel 1100/1500/2500/2500 AB system telephones should be connected to the $U_{P0}$ port, another $U_{P0}/S_0$ adapter is required.*

**Steps to take**

1. Single COMfortel 1100/1500/2500/2500 AB: Connect the COMfortel 1100/1500/2500/2500 AB to an internal $U_{P0}$ port. See Fig. 26 on page 29.

   Another end device or two COMfortel 1100/1500/2500/2500 AB units: Connect the $U_{P0}/S_0$ adapter as shown in Fig. 27 on page 29 to an internal $U_{P0}$ port.

**2.** Another end device or two COMfortel 1100/1500/2500/2500 AB units: Connect the end devices to the $U_{P0}/S_0$ adapter.

Fig. 26: Connect the COMfortel 1100/1500/2500/2500 AB directly

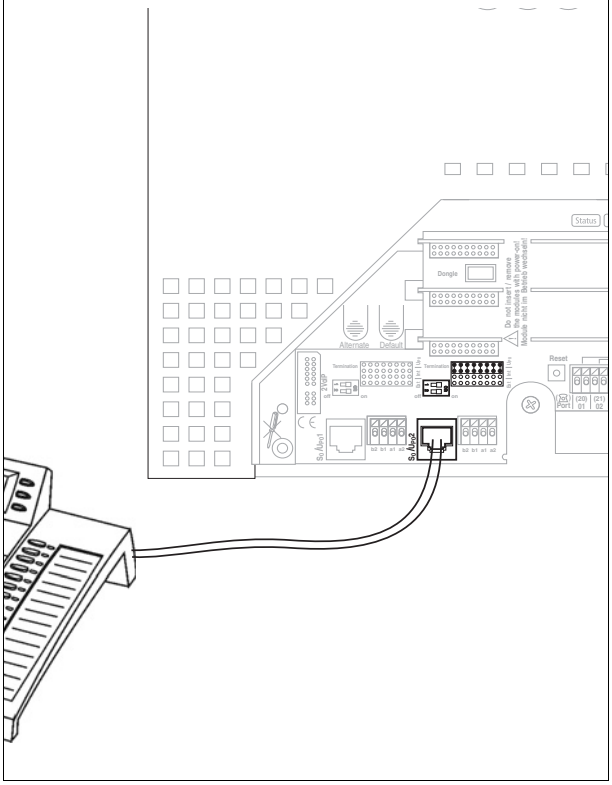
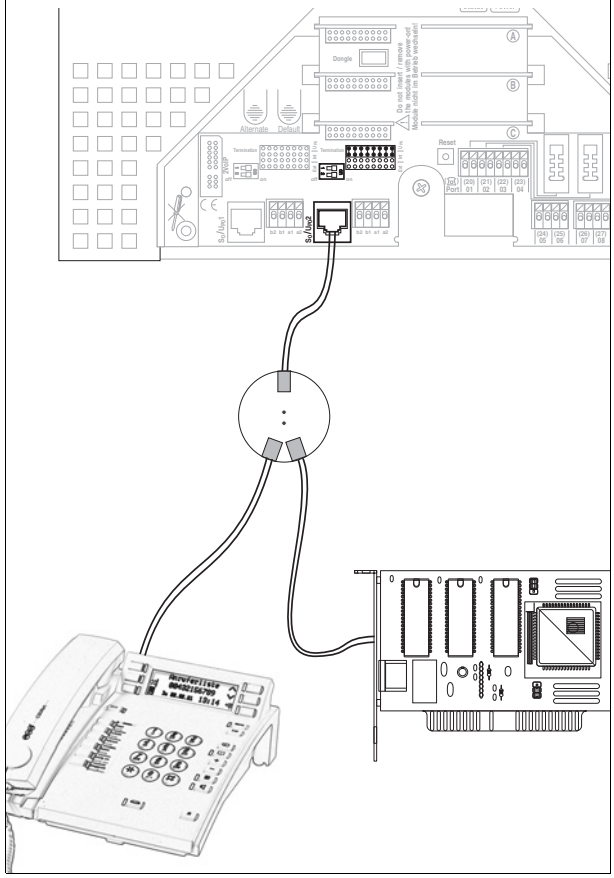


Fig. 27: Connect the end devices via the $U_{P0}/S_0$ adapter



## Installing the cable and wall socket for the internal $U_{P0}$ port

***Warning:*** *Power surges, which can occur during electrical storms, can cause life-threatening electric shocks or damage/destroy the PBX.*

→ *Let a skilled electrician lay all the cables inside the building.*

**Requirements**

– Enabled operation mode "$U_{P0}$ internal" on the $S_0$ port in question. See Page 17.

– In the PBX, enable the terminators on the internal $U_{P0}$ port in question. See Page 18.

– Installation cable (for example, J-Y(St)Y 2x2x0,6) with the following characteristics:

- One twisted pair per $U_{P0}$ port
- Unscreened; however: screened for unfavourable conditions, for example, near a strong transmitter or an electrical power line

– One ISDN wall socket (for example, IAE or UAE8)

***Attention:*** *Terminators integrated into the wall sockets are destroyed and can therefore cause damage to the device.*

→ *Do not install terminators on one end of a line connected to the $U_{P0}$ port, as opposed to the $S_0$ port. Terminators are already integrated into the end devices (COMfortel 1100/1500/2500/2500 AB or $U_{P0}/S_0$ adapters).*

→ *Remove the terminators already integrated in the wall sockets in order to use the sockets on the $U_{P0}$ port.*

– Distance/line length between the devices depends on the cable used:

- Maximum 600 m for a screened cable with a pair diameter of 0.6 mm
- Maximum 1000 m for a unscreened cable with a pair diameter of 0.6 mm

– One $U_{P0}/S_0$ adapter, depending on the device to be connected

***Note:*** *To connect a single COMfortel 1100/1500/2500/2500 AB system telephone, no $U_{P0}/S_0$ adapter is required. If two COMfortel 1100/1500/2500/2500 AB system telephones should be connected to the $U_{P0}$ port, another $U_{P0}/S_0$ adapter is required.*

***Note:*** *When using a $U_{P0}/S_0$ adapter, you do not need to use an ISDN wall socket. The $U_{P0}/S_0$ adapter can be mounted permanently on the wall and firmly connected with both screw terminals on the back of the PBX. See* Fig. 29.

**Steps to take**

1. Lay the line.

   ***Note:*** *Prevent interference. Avoid laying long lengths of parallel lines, especially next to mains. Twist the pairs.*

2. Attach the wires to the two middle terminal clamps in the internal $U_{P0}$ port. See Fig. 31.

3. With an ISDN wall socket: Connect the IAE or UAE8 socket to the terminal clamps on the internal $U_{P0}$ port. See Fig. 31, Fig. 28 and Fig. 30.

   Only for $U_{P0}/S_0$ adapters: Connect both screw terminals at the back of the $U_{P0}/S_0$ adapter to the terminal clamps on the internal $U_{P0}$ port. See Fig. 29.

4. With an ISDN wall socket: If necessary, connect the $U_{P0}/S_0$ adapter.

**Further steps**

▷ Connect the end devices to the wall socket or to the connection sockets on the $U_{P0}/S_0$ adapter.

Fig. 28: COMfortel 1100/1500/2500/2500 AB via an ISDN wall socket

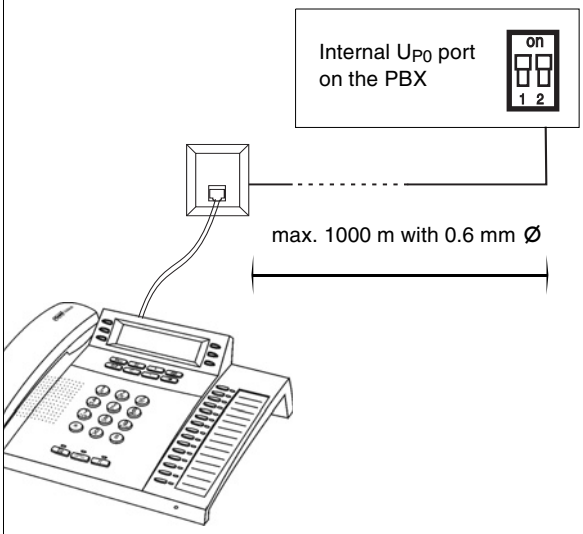



Fig. 29: Connection via a fixed $U_{P0}/S_0$ adapter

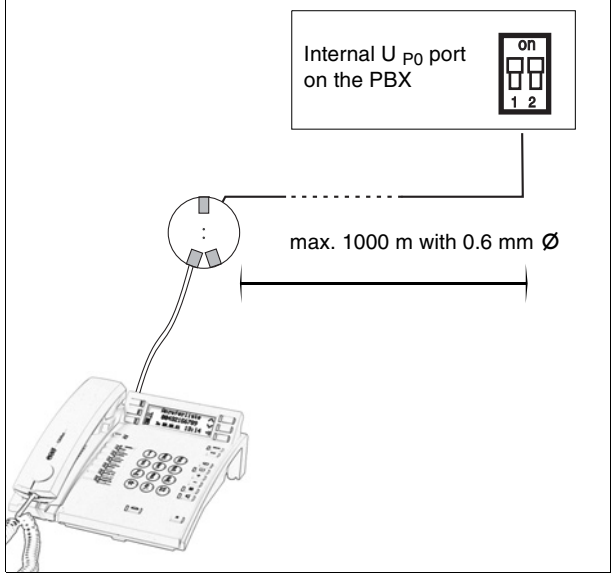



Fig. 30: Connection via a $U_{P0}/S_0$ adapter and an ISDN wall socket

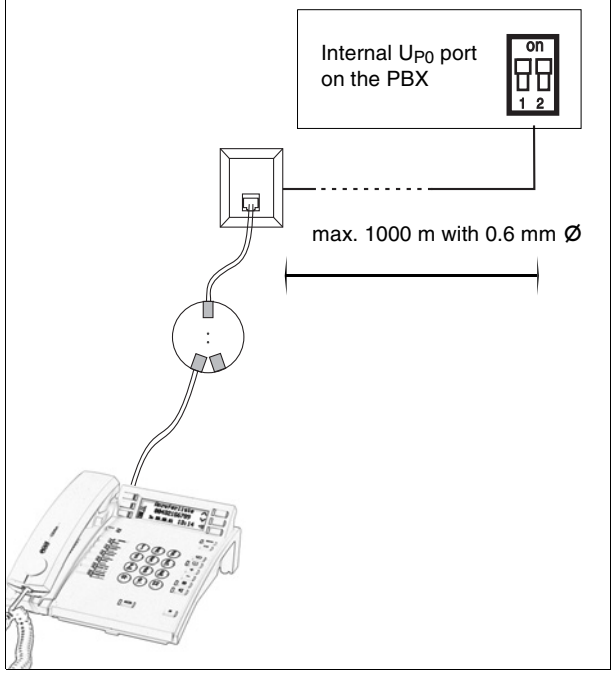
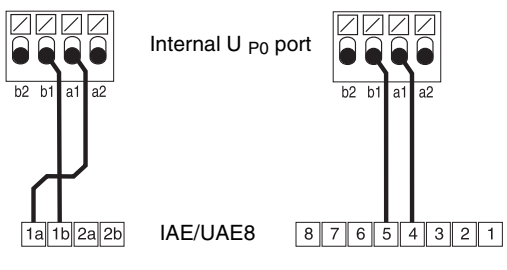



Fig. 31: Connecting the wall sockets to the internal $U_{P0}$ port



# Connecting VoIP End Devices

This section describes how to connect different VoIP end devices to the Ethernet port.

***Warning:*** *Touching voltage-carrying conductors or telephone connections may cause a life-threatening electric shock.*

→ *Remove the power plugs for both the PBX and all accessories from the power socket before a skilled electrician opens the casing.*

***Important:*** *Improper use may cause, for example, functional restrictions or interference, the destruction of the device or, in a worst case scenario, personal injury.*

→ *Only connect equipment that is compatible with the intended use of the PBX.*

## Connecting VoIP end devices to the Ethernet port

***Important:*** *If you would like to integrate the PBX into an existing network, please contact the system administrator responsible for this. Making changes to an existing network may cause considerable malfunctions. In addition, please note the PBX factory settings for the Ethernet configuration described on* *Page 33**.*

**Requirements**

– Single switch or existing network (LAN) with the following characteristics:

  ▪ Data transmission rate 100 Mbit/s

  ***Note:*** *For VoIP data communication in combination with the transmission of limited amounts of data, a data transmission rate in the LAN of 10 Mbit/s is sufficient under certain circumstances. For VoIP data communication in combination with the transmission of large amounts of data (for example, downloads), we recommend upgrading to a data transmission rate of 100 Mbit/s. For this purpose, replace not only all of the active network components (for example, the switch and router) but also all of the passive network components (for example, cables and wall sockets). For reliable support of 100 Mbit/s, you need cables and wall sockets of at least Category 5 (CAT5).*

  ▪ To use DiffServ to prioritize speech packets: DiffServ support on all active network components available and enabled

  ***Note:*** *When using a switch with PoE function, a separate power supply (for example, via a power plug) is not normally required for connected VoIP telephones.*

– Patch cable

**Steps to Take**

1. Insert the end of the cable into the Ethernet socket on the end device.
2. Insert the other end of the cable into the output socket on the switch or into an existing network outlet.

**Further Steps**

▷ To finish commissioning, you need to set up an internal phone number for each end device in the COMset configuration manager.

# Connecting Other Devices

This section describes how to connect a printer to the PBX for printing out call data.

***Warning:*** *Touching the voltage-carrying conductors or the telephone connections may cause a life-threatening electric shock.*

→ *Remove the power plugs for both the PBX and all peripheral equipment from the power socket before a skilled electrician opens the casing.*

***Important:*** *Improper use may cause, e.g. functional restrictions or interference, the destruction of the device or, in a worst case scenario, personal injury.*

→ *Only connect equipment that is compatible to the intended use of the PBX.*

## Connecting the printer

**Requirements**

– One USB cable

***Important:*** *The length of the USB cable may be a maximum of 3 m total.*

– A Printer compatible with PCL4 (HP Laserjet-compatible) or Esc/P (Epson-compatible)

**Steps to take**

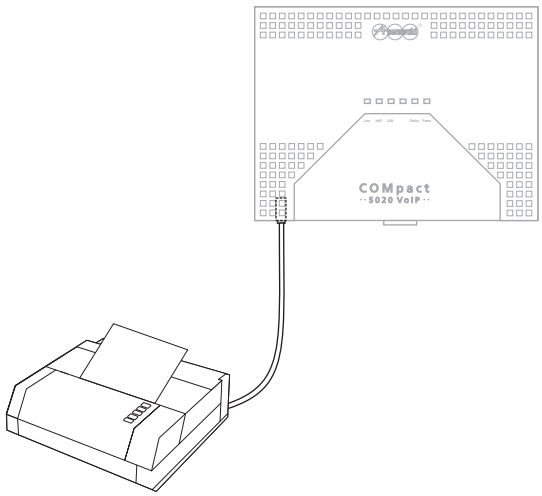
**1.** Insert the flat connector on the USB cable into the USB socket on the PBX, and insert the other connector into the USB socket on the printer. See Fig. 32.

**Further steps**

▷ Permanent call data printouts: At the end of commissioning, you need to turn on permanent call data display in the configuration manager COMlist and set it up depending on the printer used.

▷ Hotel printing function: At the end of commissioning, you need to enable the hotel function and set it up in the COMset configuration manager.

Fig. 32: Connecting the printer




## Connecting an USB memory stick

**Requirements**

– An USB memory stick 2.0 with a data transfer rate with at minimum 5 MByte/s and sufficient memory capacity.

***Important:*** *A rating scale for the memory capacity is: 100 MB of memory equates to ca. 200 minutes of recording time.*

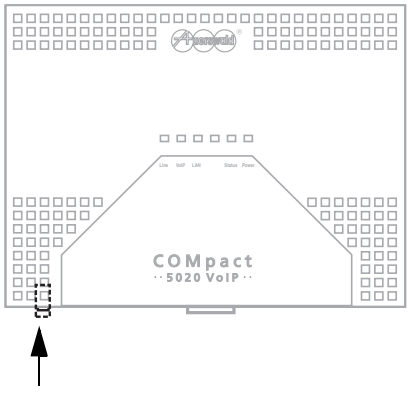
**Steps to take**

**1.** Insert the flat connector on the USB memory stick into the USB socket on the PBX. See Fig. 33.

**Further Steps**

▷ At the end of commissioning, you need to configure the voice mail/fax function using the configuration manager.

Fig. 33: Connecting an USB memory stick



# Commissioning

This section describes how to place the PBX into operation. This includes turning on the PBX, setting up the network connection between the computer and the PBX as well as logging into the web interface on the PBX for setting up the initial configuration. After this, you will learn how to put each individual end device into operation.

## Turning on the PBX

***Warning:*** *Touching the voltage-carrying conductors or the telephone connections may cause a life-threatening electric shock.*

→ *Therefore, close the casing before you put the PBX into operation.*

**Steps to take**

1. Connect the PBX with a freely accessible 230 V mains socket.

   The "Status" LED and the "Power" LED light up in read and orange for several seconds.

| LED "Status" | LED "Power" | PBX status |
|---|---|---|
| Red | Red | The boot partition is being tested. |
| Orange | Red | The kernel is being loaded from the boot partition. |
| Green | Red | The kernel is being initialised. |
| Green | Orange | The kernel modules are being loaded. |
| Green | Orange (blinking) | The database is being initialised/converted. |
| Green | Green | The PBX is ready for operation. |

   If both LEDs are lit green, the PBX is ready for operation.

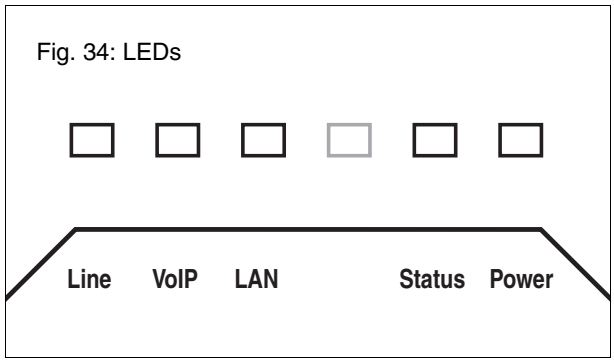
***Note:*** *If the "Power" LED remains continuously lit in red, an error has occurred. Please contact your dealer or the manufacturer directly.*

**Further steps**

▷ If applicable, hook up the analogue connections.

▷ Connect end devices with a separate power supply to the 230 V mains.

Fig. 34: LEDs




## Configuring the PBX (quick setup)

**Requirements**

– A PC with the following features:
  - Intel Pentium 1 GHz or compatible processor
  - Windows XP (as of Service Pack 3), Windows Vista (as of Service Pack 2), Windows 7, Mac OS X, Linux as of SuSE 7.3
  - Memory (RAM: 256 MB, recommended 512 MB; for Windows Vista/7: 1024 MB, for 64-bit 2048 MB
  - Browser for the configuration: Recommended is Microsoft Internet Explorer as of version 7.0, Mozilla Firefox as of version 3.0, Safari as of version 5.0
  - Network card (the computer must be equipped with a network card and the required driver installed)
  - Internet protocol TCP/IP (**T**ransmission **C**ontrol **P**rotocol /**I**nternet **P**rotocol)
  - CD-ROM or DVD drive
  - Mouse or compatible pointing device
  - SVGA graphics card with a resolution of 1024 x 768, recommended 1280 x 1024, and 65536 colours (16 bit)

– Existing Ethernet connection between the computer and the PBX. See Page 36.

– Knowledge of the IP address that permits you to access the PBX in the network.

***Note:*** *The PBX is delivered with the following default network settings:*

| | |
|---|---|
| IP address | 192. 168. 0. 240 |
| Subnet mask | 255. 255. 255. 0 |
| Gateway | 0. 0. 0. 0 |
| DHCP | Disabled |
| additional IP address from the APIPA address range | 169. 254. 1. 240 |

*If the PBX is connected to a PC that automatically receives the IP address (default setting on Windows and Mac OS X) and if the connection is established either directly or via a router, you can access the PBX via the additional IP address 169.254.1.240 from the APIPA address range.*

*If the PBX is connected directly to a PC without APIPA support you can create a static IP address on the computer. See Page 34.*

*Alternatively, you can previously change the existing default network settings using your telephone if you would like to integrate the PBX into an existing network. See Page 35.*

***Important:** Please contact the responsible system administrator and configure the settings according to his instructions.*

**Steps to take**

1. Start a browser (e. g. Mozilla Firefox).
2. Enter the IP address of the PBX in the address field of the browser.
   An example for entering a permanent IP address from the APIPA address range **http://169.254.1.240**.

   ***Important:** In the case of some browsers, superfluous zeroes may cause problems. For this reason, you should not enter e.g. 192.168.021.002 instead of 192.168.21.2.*

   The browser settings are checked.

   The configuration manager configuration wizard opens.


3. Use the configuration wizard to carry out a quick setup of the PBX. During the course of the quick setup, all the basic settings are configured.

   ***Note:** If you would like to skip the quick setup and configure all of the settings directly in the configuration manager, do the following: On this page and the next, select the language and enter PIN and password, and then click **Next**. You can then jump to the end of the quick setup via the navigation bar to the left (by clicking the arrow to open).*

**Further steps**

▷ Configure all the rest of the settings using the configuration manager.

***Note:** The PBX configuration manual (available as a PDF on the accompanying Auerswald Mega Disk) includes configuration instructions as well as a detailed description of each feature on the PBX. It also includes information about the hardware and software requirements, about configuring the PBX as well as using the features. Please refer to the Online Help for additional information on the individual settings. This can be accessed from any page in the configuration manager by clicking the question mark icon [?].*

*If network integration is performed by a new Ethernet configuration, we recommend to disable the **Permanent IP address from the APIPA address range**.*

## Configuring the static IP address in the computer

**Steps to take**

***Note:** The following steps describe how to set the configuration on the operating systems, Windows XP, Vista and 7. If using another operating system or one with significant differences to the basic settings, refer to the documentation of your operating system.*

1. Click ***Start***.
2. Windows XP/Vista/7: Click ***Control Panel***.
3. Windows XP: Double-click ***Network Connections***.

   Windows Vista: Double-click ***Network and Sharing Center***, and then click ***Manage network connections***.

   Windows 7: Click ***Network and Internet*** and then click ***Network and Sharing Center***.

4. Windows XP/Vista: Right-click the network connection to be configured.

   Windows 7: Double-click ***LAN-Verbindung***.

5. Click ***Properties***.

6. Windows XP/Vista: Click ***Internet Protocol (TCP/IP)***.

   Windows 7: Double-click ***Internet Protocol Version 4 (TCP/IPv4)***.

7. Click ***Properties***.

8. Click ***Use the following IP address***.

9. Enter the IP address.

   ***Note:*** *If the Ethernet configuration on the PBX delivered from the factory has not been changed, the following IP addresses are available: 192. 168. 0. 1 to 192. 168. 0. 254 (except for the IP address of the PBX 192. 168. 0. 240).*
   *No DNS settings are necessary.*

10. Click ***OK***.

    ***Note:*** *You may have to restart the computer.*

## Changing the Ethernet configuration on the PBX

**Requirements**

- An internal telephone with tone dialling
- Authorization “Controlling of the PBX via telephone”

**Steps to take**

1. Pick up the telephone receiver.
2. Enter one of the number sequences:

| | |
|---|---|
| ## 8 * 93 0 * 1 # | Switches DHCP on. |
| ## 8 * 93 0 * 0 # | Switches DHCP off. |
| ## 8 * 93 1 * Address # | Changes the IP address. |
| ## 8 * 93 2 * Address # | Changes the subnet mask. |
| ## 8 * 93 3 * Address # | Changes the gateway address. |

   ***Note:*** *Always enter the address with 12 digits. For example, for the IP address 192.168. 21. 2, enter 192 168 021 002.*

   ***Note:*** *If the PBX is no longer configured with its factory settings, you need to enter the PBX admin PIN between the 8 and * .*

   You will then hear the confirmation tone (pulsating tone).

3. Hang up the receiver.

## Querying the Ethernet configuration on the PBX

**Requirements**

- An internal telephone with tone dialling and CLIP capability, in order to display CLIP information sent from the PBX
- Authorization “Controlling of the PBX via telephone”

**Steps to take**

1. Pick up the telephone receiver.
2. Enter one of the number sequences:

| | |
|---|---|
| ## 8 * 94 0 # | Query the DHCP client status. |
| ## 8 * 94 1 # | Query the IP address. |
| ## 8 * 94 2 # | Query the subnet mask. |
| ## 8 * 94 3 # | Query the gateway address. |

   You will then hear the confirmation tone (pulsating tone).

3. Hang up the receiver.

   The telephone rings.

   The setting is shown on the display.

4. Pick up the receiver and then hang it back up again in order to end the call and display.

## Connecting the PC to the Ethernet port

**Requirements**

– Minimal distance between the devices

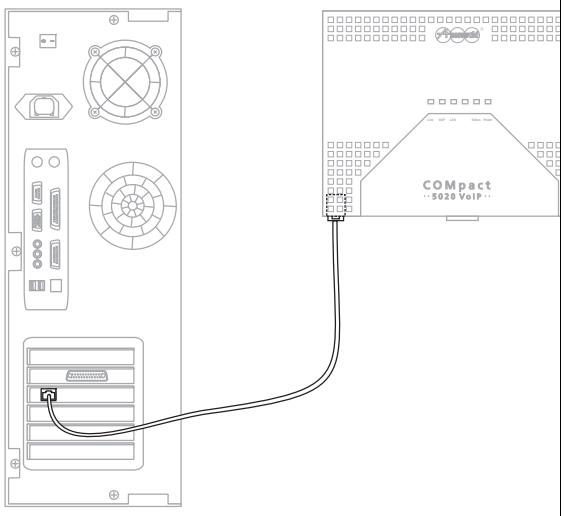
– The patch cable included in the package

**Steps to Take**

1. Insert one end of the patch cable into the network socket on the computer. See Fig. 35.
2. Insert the other end of the patch cable into the Ethernet socket on the PBX. See Fig. 35.

   ***Note:*** *Even if the Ethernet port on the PBX is already connected the internal network (LAN), you also need to connect the computer to the internal network. For more information, contact your system administrator.*

Fig. 35: Connecting the PC




## Putting standard ISDN end devices into operation

**Requirements**

– The internal phone number configured on the $S_0$ port in question

**Steps to Take**

1. Connect end devices with a separate power supply to the 230 V mains.
2. Enter the internal phone number as an MSN for the end device.

   The end device is ready for operation.

## Putting ISDN system telephones into operation

**Requirements**

– The internal phone number configured on the $S_0$ port in question

**Steps to Take**

1. Connect end devices with a separate power supply to the 230 V mains.
2. Select the language.
3. Enter the internal phone number as an MSN for the end device.

   The end device is ready for operation.

## Putting VoIP system telephones into operation

***Note:*** *The following description refers to the COMfortel VoIP 2500 AB. To put a COMfortel 3500 system telephone or a COMfortel DECT IP1040 Base into operation, please refer to the commissiong instructions of the relevant end device.*

**Requirements**

– The internal phone number configured for VoIP

– Recommended: The user password configured for the internal phone number

**Steps to Take**

1. Connect end devices with a separate power supply to the 230 V mains.
2. Select the language.
3. Enter the internal phone number as an MSN for the end device.
4. If it is configured, enter the user password for the end device.

   The end device logs into the PBX.

   ***Note:*** *The prerequisite for the execution described here is that the telephone be as a DHCP client in the network. If this is not the case, refer to the Commissioning Instructions for the telephone.*

## Putting standard VoIP end devices into operation

**Requirements**

– The internal phone number configured for VoIP

– Recommended: The user password configured for the internal phone number

**Steps to Take**

1. Connect end devices with a separate power supply to the 230 V mains.
2. When configuring the end device, create a provider named “PBX” and then enter the PBX IP address as the registrar and domain.
3. When configuring the end device, create an account for the provider “PBX” and enter the internal phone number for the user name and the associated user password as the password.

   The end device logs into the PBX.

# Connection Options

This section describes the various options for configuring the PBX – aside from the internal network configuration options described in the previous section. In addition, various options are described for configuring the connected system telephones.

## Configuring the PBX remotely with ARA Server via the Internet

**Requirements**

– Computer with existing connection to the Internet (DSL)

– PBX with existing connection to the Internet (DSL)

– DTMF-capable telephone or DTMF dialler

– For registration at ARA server: Access data for registration at protected Auerswald services

– Knowledge of the serial number of the PBX

– On the page ***COMset*** ▸ ***General settings*** ▸ ***Remote configuration*** enabled dealer access over the Internet

– On the page ***COMset*** ▸ ***General settings*** ▸ ***Remote configuration*** configured remote switching number and external PIN

***Note:*** *If no remote switching number and external PIN have been configured, the PBX must be enabled internally for remote configuration using the programming function. See* *Page 44**.*

– For log in into the configuration manager: Knowledge of a user name and password (admin, sub-admin or user) of the PBX

**Steps to Take**

1. Start a browser (e.g. Mozilla Firefox).
2. In the browser's address field, enter **http://remote-access.auerswald.de/remote-access**.
3. Enter the required data in the **User name/Customer number** and **Password/PIN** input fields, and click on ***Log in***.

   The user interface of the ARA server (ARA = Auerswald Remote Access) opens.
4. Register the PBX if this has not been done yet. Click ⊞ and in the **Serial number** entry field, enter the serial number of the PBX. Make further entries for the data set and click on ***Save***.
5. Call the PBX using the remote switching number.

   The PBX automatically accepts the call. You will hear the external confirmation tone (1 second).
6. Dial the following character string:
   **## 8 External PIN * 91 #**

   You will hear the external confirmation tone (1 second) again.
7. Select the previously registered PBX on the user interface of the ARA server, at the beginning of the line, and click on ⟳ behind **Connect**.

   The login window of the configuration manager opens.
8. Enter the user name and the associated password of the PBX.
9. Click ***Login***.

   The configuration manager opens.
10. Make the desired changes.

**Further steps**

▷ Once you have done all changes, click ***Disconnect*** on the user interface of the ARA server.

## Configuring the PBX remotely via the Internet (without ARA Server)

**Requirements**

– Existing Internet connection between the computer and the PBX (DSL)

– Permanent external IP address, or the use of VPN or DynDNS

– A router configured for this purpose

***Note:*** *Refer to the operating manual of your router.*

***Important:*** *An internal network is usually protected from external manipulation by, for example, a firewall integrated in the router. For questions about configuring your firewall, contact the system administrator responsible for this topic.*

– Knowledge of the port for the web server

– For log in into the configuration manager: Knowledge of a user name and password (admin, sub-admin or user) of the PBX

**Steps to Take**

1. Start a browser (for example, Mozilla Firefox).
2. Enter **http://** and the external IP address for the PBX as well as the **:** character and then the port into the address field of the browser.

   The browser settings are checked.

   The login window opens.
3. Enter the user name and the associated password of the PBX.
4. Click ***Login***.

   The configuration manager opens.
5. Make the desired changes.

## Configuring the PBX via an internal $S_0$ port (PPP internal)

***Important:*** *Before you can configure the PBX over a dial-up connection, the settings described in the following must first be configured over an Ethernet connection.*

**Requirements**

– On the page ***COMset*** ▸ ***General settings*** ▸ ***Remote configuration*** configured internal CAPI dial-in number

– On the page ***Administration*** ▸ ***Server configuration*** configured local IP address and remote IP address (factory settings: 192.168.193.240 and 192.168.193.241)

***Note:*** *The local IP address is the IP address for the PBX and is entered in the browser address field after dialling into the system to be maintained remotely. After login, the remote IP address is assigned as the IP address for the duration of the computer access. This means that the computer and the PBX are on the same network and can communicate.*

***Important:*** *If the factory-set remote IP address is already being used on the computer network, thereby causing IP addresses to overlap, complications will occur. To avoid this, you must change the remote IP address and therefore the local IP address at the same time. This should result in both IP addresses being again located on the same network.*

– Existing internal ISDN connection between a computer and a PBX via one of the following devices:
  - Auerswald USB device (e. g. a COMfortel 2500)
  - ISDN PC controller

– Completed installation of the device driver

***Note:*** *For an Auerswald USB device, this refers to the USB, the CAPI-2.0 and CoNDIS-WAN drivers. For more information about installing drivers, please refer to the CAPI/TAPI manual that came with the device.*

– The dial-up connection configured on the computer. See Page 43 for Windows XP and Page 44 Windows Vista.

– For the dial-up connection: Knowledge of a user name and password (admin, sub-admin or external) of the PBX

– For log in into the configuration manager: Knowledge of a user name and password (admin, sub-admin or user) of the PBX

**Steps to take**

***Note:*** *The following steps describe how to configure the settings on the operating systems Windows XP, Vista and 7. If using another operating system or one with significant differences to the basic settings, refer to the documentation of your operating system.*

1. Windows XP/Vista: Click ***Start***.

   Windows 7: Click ***Start***, ***Control Panel***, ***Network and Internet*** and then ***Network and Sharing Center***.
2. Windows XP: Click ***Connect to*** and then the name of the connection.

   Windows Vista: Click ***Connect to***, then the name of the connection, and then finally ***Connect***.

   Windows 7: Click ***Connect to a network***, then the name of the connection, and then finally ***Connect***.

   The connection dialogue window is now opened.
3. Under ***Password***, enter the PIN for the user name displayed.
4. Click ***Dial***.

   The connection symbol in the task bar (to the left next to the time) indicates whether the connection is active.

   
   
5. Start a browser (e. g. Mozilla Firefox).
6. Enter **http://** and the local IP address for PPP configuration in the address field of the browser.

   The browser settings are checked.

   The login window opens.
7. Enter your user name and the associated password.
8. Click ***Log-in***.

   The configuration manager is now opened.
9. Make your changes.

***Note:*** *When the PBX is restarted, the dial-up connection disconnects and you must dial into the PBX again.*

10. Once you have completely configured the PBX, click ***Logout***.

11. Then, disconnect the dial-up connection. To do this, right-click the connection symbol in the task bar, click ***Disconnect*** or ***Disconnect from*** and then the name of the connection.

## Configuring the PBX remotely via the external $S_0$ port (PPP external)

***Important:*** *Before you can configure the PBX over a dial-up connection, the settings described in the following must first be configured over an Ethernet connection.*

**Requirements**

– On the page ***COMset*** ▸ ***General settings*** ▸ ***Remote configuration*** configured remote switching number

***Note:*** *If no remote switching number has been configured, the PBX must be enabled internally for remote configuration using the programming function. See Page 44. After this, the PBX is accessible over each associated MSN/DDI.*

– On the page ***COMset*** ▸ ***General settings*** ▸ ***Remote configuration*** configured dealer access number

***Note:*** *You can enter up to four telephone numbers as dealer access numbers; one of these numbers must be transmitted during a remote configuration.*

***Note:*** *If no dealer access numbers have been entered or the telephone number transmitted does not correspond with the ones entered, the PBX must be enabled internally for remote configuration using the programming function. See Page 44.*

– On the page ***Administration*** ▸ ***Server configuration*** configured local IP address and remote IP address (factory settings: 192.168.193.240 and 192.168.193.241)

***Note:*** *The local IP address is the IP address for the PBX and is entered in the browser address field after dialling into the system to be maintained remotely. After login, the remote IP address is assigned as the IP address for the duration of the computer access. This means that the computer and the PBX are on the same network and can communicate.*

***Important:*** *If the factory-set remote IP address is already being used on the computer network, thereby causing IP addresses to overlap, complications will occur. To avoid this, you must change the remote IP address and therefore the local IP address at the same time. This should result in both IP addresses being again located on the same network.*

– Existing external ISDN connection between a computer and a PBX via one of the following devices:
  - Auerswald USB device (for example, a COMfortel 2500)
  - ISDN PC controller

– Completed installation of the device driver

***Note:*** *For an Auerswald USB device, this refers to the USB, the CAPI-2.0 and CoNDIS-WAN drivers. For more information about installing drivers, please refer to the CAPI/TAPI manual that came with the device.*

***Note:*** *Remote configuration over an analogue connection or a VoIP account is not possible.*

– The dial-up connection configured on the computer. See Page 43 for Windows XP and Page 44 Windows Vista.

– For the dial-up connection: Knowledge of a user name and password (admin, sub-admin or external) of the PBX

– For log in into the configuration manager: Knowledge of a user name and password (admin, sub-admin or user) of the PBX

– Enable the PBX immediately before remote configuration, if no dealer access number has been entered or the transmission of the numbers entered is not possible on the computer being used. See Page 44 for an internal telephone and Page 45 for an external telephone.

**Steps to take**

***Note:*** *The following steps describe how to configure the settings on the operating systems Windows XP, Vista and 7. If using another operating system or one with significant differences to the basic settings, refer to the documentation of your operating system.*

1. Windows XP/Vista: Click ***Start***.

   Windows 7: Click ***Start***, ***Control Panel***, ***Network and Internet*** and then ***Network and Sharing Center***.

2. Windows XP: Click ***Connect to*** and then the name of the connection.

   Windows Vista: Click ***Connect to***, then the name of the connection, and then finally ***Connect***.

   Windows 7: Click ***Connect to a network***, then the name of the connection, and then finally ***Connect***.

   The connection dialogue window is now opened.

3. Under ***Password***, enter the PIN for the user name displayed.

4. Click ***Dial***.

The connection symbol in the task bar (to the left next to the time) indicates whether the connection is active.


5. Start a browser (e. g. Mozilla Firefox).
6. Enter **http://** and the local IP address for PPP configuration in the address field of the browser.

   The browser settings are checked.

   The login window opens.
7. Enter your user name and the associated password.
8. Click ***Log-in***.

   The configuration manager is now opened.
9. Make your changes.

   ***Note:*** *When the PBX is restarted, the dial-up connection disconnects and you must dial into the PBX again.*
10. Once you have completely configured the PBX, click ***Logout***.
11. Then, disconnect the dial-up connection. To do this, right-click the connection symbol in the task bar, click ***Disconnect*** or ***Disconnect from*** and then the name of the connection.

## Configuring system telephones via the PBX

– Existing connection between the computer and the PBX using one of the following internal connection options:
  - USB connection of the computer to one of the internal system telephones
  - Ethernet connection

– Completed installation of the device driver.

***Note:*** *For a USB connection, this refers to the USB driver and possibly the CAPI-2.0 driver. For more information about installing drivers, please refer to the CAPI/TAPI manual that came with the device.*

– Installed COMfortel Set configuration software as of version 1.8.16.

***Note:*** *The configuration software can be installed from the Auerswald Mega Disk.*

***Note:*** *To support Windows Vista, the COMfortel Set configuration software requires at least the following version: 2.0 or higher.*

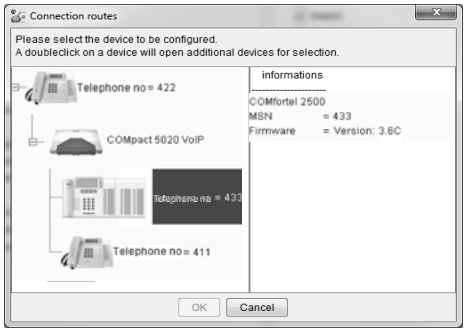
**Steps to take**

1. Start the COMfortel Set configuration software.
2. Click ***Option***.
3. Click ***Interface***.
4. USB connection: Select the **USB** interface, and click ***OK***.

   USB connection using the CAPI-2.0 driver installed: Select the **ISDN controller (CAPI 2.0)** interface, and click ***OK***.

   Ethernet connection via the PBX: Select the **IP network** interface, enter the IP address for the PBX, and click ***OK***.
5. Click ***Open***.
6. Click ***Telephone***.

   The current connection to the PBX is displayed.




7. Double-click the system symbol to display all the connected system telephones.
8. Click system telephone to be configured, and then click ***OK***.

   The login window opens.


9. Select the authorisation level you want on the PBX, enter the applicable PIN, and click ***OK***.

   The configuration is loaded.
10. Configure the settings you want.

    ***Note:*** *Once you have configured all the settings to your satisfaction, first save the configuration as a file on the hard drive and then in the telephone.*
11. Click ***Save***.
12. Click ***File***.
13. Enter a name for the file and click ***OK***.

14. Click ***Save***.
15. Click ***Telephone***.

    The current connection to the PBX is displayed.
16. Double-click the system symbol to display all the connected system telephones.
17. Click system telephone to be configured, and then click ***OK***.

    The login window opens.
18. Select the authorisation level you want on the PBX, enter the applicable PIN, and click ***OK***.

    The configuration is saved.

## Configuring system telephones remotely via the PBX

***Important:*** *Before you can configure the system telephones remotely, you must first configure the settings listed at the end in the PBX.*

**Requirements**

– On the page ***COMset*** ▸ ***General settings*** ▸ ***Remote configuration*** configured remote switching number for system telephones

***Note:*** *If no remote switching number has been configured, the PBX must be enabled internally for remote configuration using the programming function. See Page 44. After this, the PBX is accessible over each associated MSN/DDI.*

– On the page ***COMset*** ▸ ***General settings*** ▸ ***Remote configuration*** configured dealer access number

***Note:*** *You can enter up to four telephone numbers as dealer access numbers; one of these numbers must be transmitted during a remote configuration.*

***Note:*** *If no dealer access numbers have been entered or the telephone number transmitted does not correspond with the ones entered, the PBX must be enabled internally for remote configuration using the programming function. See Page 44.*

– Existing external ISDN connection between a computer and a PBX via one of the following devices:
  - Auerswald USB device (for example, a COMfortel 2500)
  - ISDN PC controller

– Completed installation of the device driver

***Note:*** *For an Auerswald USB device, this refers to the USB, the CAPI-2.0 and CoNDIS-WAN drivers. For more information about installing drivers, please refer to the CAPI/TAPI manual that came with the device.*

***Note:*** *Remote configuration over an analogue connection or a VoIP account is not possible.*

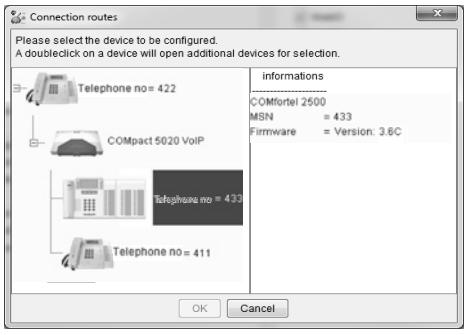
– Enable the PBX immediately before remote configuration, if no dealer access number has been entered or the transmission of the numbers entered is not possible on the computer being used. See Page 44 for an internal telephone and Page 45 for an external telephone.

**Steps to take**

1. Start the COMfortel Set configuration software.
2. Click ***Option***.
3. Click ***Interface***.
4. Select the **ISDN controller (CAPI 2.0)** interface, and click ***OK***.

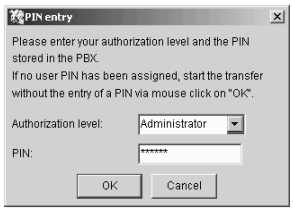
   Or select the **IP network** interface, enter the IP address for the PBX, and click ***OK***.
5. Click ***Open***.
6. Click ***Telephone***.
7. Enter the remote switching number for system telephones configured in the PBX (including local city code and exchange line access number), and click ***OK***.

   The current connection to the PBX is displayed.




8. Double-click the system symbol to display all the connected system telephones.
9. Click system telephone to be configured, and then click ***OK***.

   The login window opens.



**10.** Select the authorisation level you want on the PBX, enter the applicable PIN, and click ***OK***.

The configuration is loaded.

**11.** Configure the settings you want.

***Note:*** *Once you have configured all the settings to your satisfaction, first save the configuration as a file on the hard drive and then in the telephone.*

**12.** Click ***Save***.

**13.** Click ***File***.

**14.** Enter a name for the file and click ***OK***.

**15.** Click ***Save***.

**16.** Click ***Telephone***.

The current connection to the PBX is displayed.

**17.** Double-click the system symbol to display all the connected system telephones.

**18.** Click system telephone to be configured, and then click ***OK***.

The login window opens.

**19.** Select the authorisation level you want on the PBX, enter the applicable PIN, and click ***OK***.

The configuration is loaded.

## Setting up a dial-up connection on Windows XP

**Steps to take**

**1.** Click ***Start***.

**2.** Click ***All Programs***.

**3.** Click ***Accessories***.

**4.** Click ***Communications***.

**5.** Click ***New Connection Wizard***.

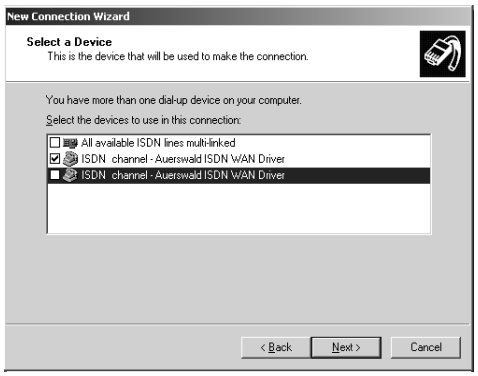
**6.** Click ***Next***.

**7.** Click ***Connect to the Internet***, and then click ***Next***.

**8.** Click ***Set up my connection manually***, and then click ***Next***.

**9.** Click ***Connect using a dial-up modem***, and then click ***Next***.

The available dial-up devices are displayed.




**10.** Enable the checkbox for the connection you want, and click ***Next***.

**11.** Under ***ISP Name***, enter any connection name, for example, “PBX + [customer name]” and click ***Next***.

**12.** Remote configuration: Under ***Phone number***, enter the remote switching number (including city code and exchange line access number) on the PBX, and click ***Next***.

Configuration via the internal $S_0$ port: Under ***Phone number***, enter the internal CAPI dial-in access number on the PBX, and click ***Next***.

**13.** Under ***User name***, enter the admin user name and under ***Password*** as well as under ***Confirm password***, enter the admin PIN on the PBX.

Or: Under ***User name***, enter “external” and under ***Password*** as well as under ***Confirm password***, enter the external PIN on the PBX.

Or: Under ***User name***, enter the internal telephone number of a sub-admin, and under ***Password*** as well as under ***Confirm password***, enter the associated sub-admin PIN.

**14.** Disable the checkbox for the three options offered, and click ***Next***.

**15.** Enable the checkbox ***Add a shortcut to this connection to my desktop***, and click ***Finish***.

## Setting up a dial-up connection on Windows Vista

**Steps to take**

1. Click ***Start***.
2. Click ***Connect to***.
3. Click ***Set up a connection or network***.
4. Click ***Set up a dial-up connection***, and click ***Next***.
5. Remote configuration: Under ***Dial-up phone number***, enter the remote switching number (including city code and exchange line access number) on the PBX.

   Configuration via the internal $S_0$ port: Under ***Dial-up phone number***, enter the internal CAPI dial-in access number on the PBX.
6. Under ***User name***, the admin user name and under ***Password***, enter the admin PIN on the PBX.

   Or: Under ***User name***, enter “external” and under ***Password***, enter the external PIN on the PBX.

   Or: Under ***User name***, enter the internal telephone number of a sub-admin, and under ***Password***, enter the associated sub-admin PIN.
7. Under ***Connection name***, enter any connection name, for example, “PBX + [customer name]” and click ***Connect***.
8. Click ***Skip***.
9. Click ***Set up the connection anyway***.

## Setting up a Dial-up Connection on Windows 7

**Steps to Take**

1. Click ***Start***.
2. Click ***Control Panel***.
3. Click ***Network and Internet***.
4. Click ***Network and Sharing Center***.
5. Click ***Set up a new connection or network***.
6. Click Set up a dial-up connection ***Set up a dial-up connection***, and click ***Next***.
7. Remote configuration: Under ***Dial-up phone number***, enter the remote switching number (including city code and exchange line access number) on the PBX.

   Configuration via the internal $S_0$ port: Under ***Dial-up phone number***, enter the internal CAPI dial-in access number on the PBX.
8. Under ***User name***, the admin user name and under ***Password***, enter the admin PIN on the PBX.

   Or: Under ***User name***, enter “external” and under ***Password***, enter the external PIN on the PBX.

   Or: Under ***User name***, enter the internal telephone number of a sub-admin, and under ***Password***, enter the associated sub-admin PIN.
9. Under ***Connection name***, enter any connection name, for example, “PBX + [customer name]” and click ***Connect***.
10. Click ***Close***.

## Enabling the PBX internally for remote configuration

**Requirements**

- Internal telephone for the PBX
- Authorization “Controlling of the PBX via telephone“

**Steps to take**

1. Pick up the receiver.
2. Dial the following character string:
   ## 8 PIN * 91 #

   ***Note:*** *The PIN can be, in this case, a sub-admin PIN or the user PIN that belongs to the telephone.*

   You will then hear the confirmation tone (pulsating tone).
3. Hang up the receiver.

   ***Note:*** *You usually dial in using the remote switching number on the PBX. If the remote switching number has not been configured and the PBX has been enabled, it is accessible over each associated MSN/DDI.*

## Enabling the PBX externally for remote configuration

**Requirements**

– DTMF-capable telephone or DTMF dialler

– On the page ***COMset*** ▸ ***General settings*** ▸ ***Remote configuration*** configured remote switching number and external PIN

**Steps to take**

**1.** Pick up the receiver.

**2.** Call the PBX using the remote switching number.

The PBX automatically accepts the call. You will hear the external confirmation tone (1 second).

**3.** Dial the following character string:
**## 8 External PIN * 91 #**

You will hear the external confirmation tone (1 second) again.

**4.** Hang up the receiver.

# Service and Maintenance

This section describes the functions available to you for detecting errors and troubleshooting. In addition, this section describes how to update the operating software (firmware) on the PBX and extend the range of features on the PBX by enabling functions that are available for purchase.

## Overview of functions

### Restart

A restart (reboot) is when you cause the PBX to reboot while it is already functioning.

A restart is required, for example, in the following situations:

- After the operating software on the PBX has been updated (firmware update)
- When the operating software on the PBX is changed (restore firmware)
- After the operating software on the PBX crashes
- After a change to the configuration that cannot be applied when the PBX is in operation

The following options are possible:

- Immediate restart. All the connections to the web server, all calls and all data services are closed. Unsaved data are lost.
- Delayed restart. Like an immediate restart, but performed in consideration of currently existing ISDN calls. As soon as all of the existing ISDN calls have ended (also before the expiration of the time specified), the PBX restarts. During the delay, the PBX prevents new calls from being established. If a call is still active when the timeout occurs, the call is interrupted in order to carry out the restart.
- Restricted restart: Only a part of the PBX functions is restarted. All calls are ended, and all data services are closed. The web server remains unaffected by this.

An immediate restart is automatically performed for the following functions:

- Immediate firmware update
- Firmware restoration
- Factory settings restoration

A restricted restart is automatically performed for the following functions:

- Configuration reset
- Configuration restoration
- Port configuration changes

How to perform this is described on the following pages:

- For an immediate restart at the push of a button on Page 50
- For an immediate or delayed restart at the push of a button on Page 50

***Note:*** *If possible, avoid interrupting active calls with a restart. Perform a delayed restart or wait to used a function that would cause an automatic restart until all calls have ended. The "Line" and "VoIP" LEDs indicate whether external calls are still active (see Page 48). A more detailed overview is available on the page* ***Administration ▸ Monitoring ▸ External call channel assignment*** *(see also Page 49).*

### Shutting down

It is a good idea to perform the PBX shutdown procedure when, for example, the PBX needs to be turned off. Do not remove the power plug for the PBX or accessories from the power socket until the shutdown procedure is complete.

During the shutdown procedure, all connections to the web server, all calls and all data services are ended and all internal processes are put into a specified idle state.

How to do this is described on Page 51.

### Firmware update

A firmware update is the process of updating the operating software (firmware) on the PBX.

A firmware update is required, for example, in the following situations:

- To resolve problems
- To integrate new features

The following options are possible:

- Immediate firmware update. The PBX immediately establishes a connection to a server and downloads the most current firmware, if available. After this, an immediate restart is automatically performed. If the feature is activated, the firmware on connected system telephones is also updated.
- Regular firmware update. Like an immediate firmware update, but at previously specified time intervals.
- Manual firmware update. A firmware file that has previously been saved on the hard disk is loaded onto the PBX. After this, a restart is carried out in order to activate the new firmware.

If the new firmware proves to be defective, the firmware used previously may be restored. The PBX retains not only the current firmware used but also the firmware last used in Flash memory. When the firmware is restored, you can switch back and forth between either firmware version. During an update, the currently inactive firmware is overwritten.

How to perform this is described on the following pages:

- For an immediate firmware update, on Page 53
- For a manual firmware update, on Page 53
- To restore the firmware using the computer, on Page 54
- To restore the firmware at the push of a button, on Page 54

***Note:*** *How to set up a regular firmware update is described in the PBX Configuration Manual.*

***Note:*** *How to find out the version of the current firmware is described on Page 48.*

***Note:*** *Except for the applicable connection fees, a firmware update is free of charge.*

### Saving and Reading Out the Configuration Data

The current configuration data on the PBX can be saved in a configuration file ("configuration.cfg") on the PC. If necessary, the file can be saved in the PBX again in order to restore an old configuration.

In addition to the configuration, the configuration data also include the network settings and PBX data. You can switch on or off the application or the readout of the network settings or PBX data.

The network settings include the following data:

- Ethernet configuration
- DNS configuration
- HTTP proxy configuration
- PPP configuration
- Port of the webserver

The PBX data include the following data:

- PBX name
- Admin user name
- Admin password
- Admin PIN
- Dealer data
- Country

How to do this is described on Page 52.

### Restoration Points

If a restoration point for the configuration data is set, the current configuration data is saved in a configuration file in the PBX. The configuration files are archived with information about the time and date they were created.

A maximum of ten restoration points are set. If an eleventh restoration point is set, the oldest of the current restoration points is overwritten.

An old configuration can be restored by loading a restoration point. The option as to whether the network settings should be restored can also be selected.

How to do this is described on Page 52.

***Note:*** *A restoration point is set automatically when the database version changes during a firmware update.*

### Restoring the factory settings

All the settings are deleted and the factory settings are restored.

How to do this is described on Page 52.

***Note:*** *If you would like to retain some of the settings, instead reset the configuration. See Page 52.*

***Note:*** *How to back up the existing configuration on a data storage medium beforehand is described on Page 51.*

### Resetting the configuration

Most of the settings will be deleted and reset to the factory settings. The following settings remain intact:

- Admin user name, password and PIN
- IP address settings
- Web server port setting
- Time
- NTP server settings
- Saved hold music and announcements
- Call data
- Provider information for Soft-LCR easy (only the data received from the update, settings are reset)

How to do this is described on Page 52.

***Note:*** *If you would like to delete all the settings without exception, instead restore the factory settings. See Page 52.*

***Note:*** *How to back up the existing configuration on a data storage medium beforehand is described on Page 51.*

### Checking the Channel Assignment

The "Line" and "VoIP" LEDs indicate whether external calls are still active. See Page 48.

For a more detailed overview, refer to the page ***Administration ▸ Monitoring ▸ External call channel assignment***. See also Page 49.

### Checking the Registration and VoIP Status

The overview on the page ***Administration ▸ Monitoring ▸ Status int. VoIP subscribers*** indicates whether an internal VoIP subscriber has been successfully registered on the PBX. See also Page 49.

The overview on page ***Administration ▸ Monitoring ▸ Status VoIP accounts*** indicates whether a VoIP account configured on the PBX has been successfully registered with the VoIP provider. See also Page 50.

### Service data

If the PBX ever displays a malfunction, various reports can be recorded. These reports can then be forwarded to technical departments (Service, Development) to help find the cause of the malfunction.

To make control and administrative information about the connections on the PBX, e.g.,visible, a D-channel log is started. The type of error and perhaps the cause can be determined by looking at the list of transmitted information. See also Page 56.

Log-in tracking is logged in the configuration manager. It can be viewed on the page ***Administration ▸ Log files ▸ Log in tracking***.

If the PBX exhibits a malfunction which is not caused by incorrect operation or external influences, a PBX unit image can be used to diagnose the malfunction. See also Page 56.

To log the Ethernet data stream, a network protocol in PCAP format can be recorded. This protocol can then be evaluated (e.g.,with Wireshark/Ethereal), for instance, to determine the cause any malfunctions which may have occurred. See also Page 56.

### Network Diagnosis

By sending a ping to a remote host (e.g. computer, PBX) in the network, you can check whether this host is reachable and how long the routing takes (there and back). See also Page 56.

### Testing the USB Memory Stick

If your PBX is equipped with a COMpact 2VoIP module or a COMpact 6VoIP module, you can make use of the voice mail and fax box function by inserting a USB memory stick. The inserted USB memory stick is only suitable for this function if it supports a write rate of at least 5 MBps. The program “H2testw” allows you to determine the write rate as well as any damages of the USB memory stick. The program is available for download free of charge in the Internet underwww.heise.de/software/download/h2testw/50539 heruntergeladen werden.

How to do the test is described on Page 57.

## Querying the firmware version/serial numbers

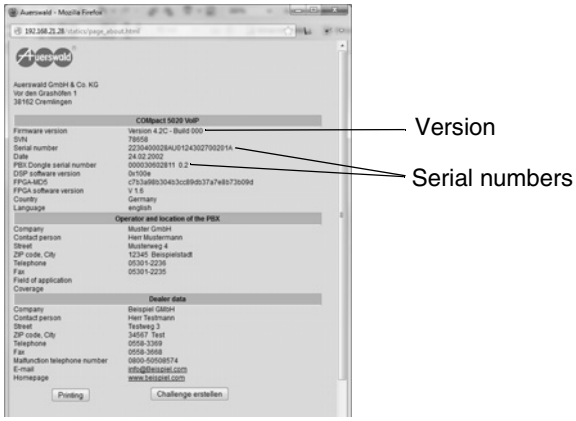
**Requirements**

– Open configuration manager (existing connection to the PBX web server)

**Steps to take**

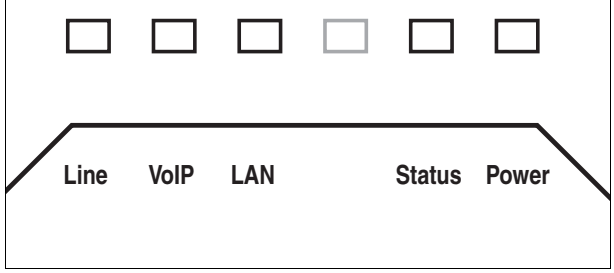
1. Click the Auerswald logo at the top left in the configuration manager.

   This opens a dialogue window. Besides the PBX data (e. g. firmware version, serial numbers) also the data of the operator and the dealer are displayed.




## LED functions

Fig. 36: LEDs




| LED “Line” | Operational/busy state of the existing fixed network lines |
|---|---|
| Orange | All call channels are being used. |
| Orange (blinking) | At least one call channel is being used. |
| Green | All call channels are ready and available. |
| Off | At least one call channel is not ready. (This overridden by display of the busy state.) |

| LED “VoIP” | Operational/busy state of the existing VoIP channels and accounts |
|---|---|
| Orange | All VoIP channels are being used. |
| Orange (blinking) | At least one VoIP channel is being used. |
| Green | All VoIP accounts and channels are ready and available. |
| Off | At least one VoIP account is not ready. (This overridden by display of the busy state.) |

| LED "LAN" | Status of the Ethernet interface |
|---|---|
| Orange | An Ethernet connection to a computer/network exists. |
| Orange (blinking) | An Ethernet connection exists and packets are being transmitted. |
| Off | No Ethernet connection to a computer/network exists. |

| LED "Status" | Menu prompt (after pressing the "Default" and the "Alternate" keys) |
|---|---|
| Red (blinks 50/50 ms) | Pressing the "Default" key has been detected. |
| Red (blinks 0.5/0.5 s) | "Default" key has been pressed long enough. |
| Orange (blinks 50/50 ms) | Pressing the "Alternate" key has been detected. |
| Orange (blinks 0.5/0.5 s) | "Alternate" key has been pressed long enough. |

| LED "Status" | LED "Power" | PBX status (after restart) |
|---|---|---|
| Red | Red | The boot partition is being tested. |
| Orange | Red | The kernel is being loaded from the boot partition. |
| Green | Red | The kernel is being initialised. |
| Green | Orange | The kernel modules are being loaded. |
| Green | Orange (blinking) | The database is being initialised/converted. |
| Green | Green | The PBX is ready for operation. |

| LED "Status" | LED "Power" | PBX status (errors) |
|---|---|---|
| red (blinks 1/1 s) | Red | No valid boot partition was found. System is paused. |
| orange (blinks 1/1 s) | Red | No consistent kernel data has been found on either boot partition. System is paused. |

***Note:*** *If the "Power" LED remains constantly lit even after a restart, an error has occurred. Please contact your dealer or the manufacturer directly.*

## Checking the call channel assignment

**Requirements**

– Opened configuration manager (with an existing connection to the PBX web server)

**Steps to Take**

1. Open the page ***Administration*** ▸ ***Monitoring*** ▸ ***External call channel assignment***.

   The status of the call channel is indicated by a coloured dot.

| | |
|---|---|
| Red | Call channel in use |
| Green | Call channel available |

***Note:*** *VoIP channels that have not been reserved for internal or external calls are indicated by an orange dot when the channel is assigned to an internal subscriber. A red dot also indicates that the channel is assigned to an external call.*

## Checking the registration of internal VoIP subscribers

**Requirements**

– Opened configuration manager (with an existing connection to the PBX web server)

**Steps to Take**

1. Open the page ***Administration*** ▸ ***Monitoring*** ▸ ***Status internal VoIP subscribers***.

   The status of the registration is indicated by a coloured dot.

| | |
|---|---|
| Green | Registration successful |
| Grey | Registration not yet completed |
| Red | Defective registration |

## Checking the VoIP account registration

**Requirements**

– Opened configuration manager (with an existing connection to the PBX web server)

**Steps to Take**

1. Open the page ***Administration*** ▸ ***Monitoring*** ▸ ***Status VoIP accounts***.

   The status of the registration is indicated by a coloured dot.

| | |
|---|---|
| Green | The REGISTER request sent to the VoIP provider was successful. |
| Grey | The STUN request failed or a the system was restarted. The sector must be rechecked in order to display the current status. Until a response is received, a grey dot (undetermined) is displayed. |
| Red | Defective registration |

## Restart performed immediately or delayed by computer

**Requirements**

– Open configuration manager (existing connection to the PBX web server)

**Steps to take**

1. Open the page ***Administration*** ▸ ***Firmware update/ restart***.
2. Under ***Reset of the PBX (Reboot)***, select the desired waiting time (if currently active ISDN calls should not be immediately terminated) or retain the setting ***immediately***.
3. Click ***Restart***.
4. Click ***OK***.

   The “Status” LED and the “Power” LED remain lit in green until all of the ISDN calls or at the latest until the end of the waiting time.

   The “Status” LED and the “Power” LED light up in red and orange for several seconds during the restart. See also the table on Page 48.

   If both LEDs light up in green again, the restart is complete and the PBX is ready for operation.

***Note:*** *If the “Power” LED remains continuously lit in red, an error has occurred. Please contact your dealer or the manufacturer directly.*

## Restart performed immediately via the keyboard

**Requirements**

– Open casing (blue protective cover)

***Warning:*** *Improper handling of the device can result in life-threatening electrical shock.*

→ *Only a skilled electrician may open the casing and carry out service work using the buttons inside of the casing. If necessary, commission an authorised dealer to perform this work.*

**Steps to take**

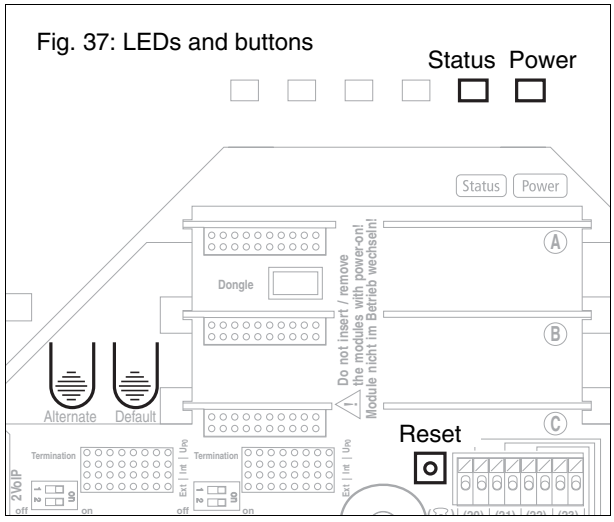
1. Press the “Reset” button. See Fig. 37.

   The “Status” LED and the “Power” LED light up in read and orange for several seconds. See also the table on Page 48.

   If both LEDs light up in green again, the restart is complete and the PBX is ready for operation.

***Note:*** *If the “Power” LED remains continuously lit in red, an error has occurred. Please contact your dealer or the manufacturer directly.*

Fig. 37: LEDs and buttons



## Shutting down the PBX

**Requirements**

– Open configuration manager (existing connection to the PBX web server)

**Steps to take**

1. Open the page ***Administration ▸ Firmware update/ restart***.
2. Click ***Power down***.
3. Click ***OK***.

   The “Power” LED lights up in red and the “Status” LED lights up in green, which indicate that you may now shut down the PBX. This state remains active for 90 seconds.

***Note:*** *If you do not shut down the PBX, it restarts after 90 seconds. The “Status” LED lights up in red. If both LEDs light up in green again, the restart is complete and the PBX is ready for operation.*

## Backing up configuration data on a data storage medium

**Requirements**

– Open configuration manager (existing connection to the PBX web server)

**Steps to take**

1. Open the page ***Administration ▸ Data backup***

   ***Note:*** *Under* ***Read configuration data from the PBX****, additionally enable the checkbox* ***Read network settings*** *if you want to read the network settings from the PBX, as well.*

   ***Note:*** *Under* ***Read configuration data from the PBX****, additionally enable the checkbox* ***Read PBX data*** *if you want to read the PBX data from the PBX, as well.*
2. Click ***Read from PBX***.
3. Follow the instructions for your browser for saving the file.

## Restoring the configuration

**Requirements**

– Open configuration manager (existing connection to the PBX web server)

– The configuration file previously saved on a data storage medium

**Steps to take**

1. Open the page ***Administration ▸ Data backup***
2. Click ***Browse***, and select the configuration file.

   ***Note:*** *Under* ***Store configuration data in the PBX****, additionally enable the checkbox* ***Apply network settings*** *if you want to apply the network settings, as well.*

   ***Note:*** *Under* ***Store configuration data in the PBX****, additionally enable the checkbox* ***Apply PBX data*** *if you want to apply the PBX data, as well.*
3. Click ***Store in the PBX***.

   If you have the status bar enabled in your browser, for example, in Microsoft Internet Explorer, the progress is displayed.

   As soon as the configuration has been saved in the PBX, you will receive a message.

   The “Power” LED blinks in orange during a restart.

   If the LED lights up in green again, the restart is complete and the PBX is ready for operation.

## Inserting a Restoration Point for Configuration Data

**Requirements**

– Open configuration manager (existing connection to the PBX web server)

**Steps to take**

1. Open the page ***Administration*** ▸ ***Data backup***
2. Click ***Insert restoration point***.
3. Click ***OK***.

   The restoration point is inserted. It is available in the ***Configuration file*** list field under ***Restore old configuration data***.

## Restoring Configuration Data from a Restoration Point

***Important:*** *Restoring an old configuration overwrites the current configuration data.*

***Note:*** *A configuration file that was created with an older firmware version, may possibly not contain all of the configuration data (for example, data for new functions that were added by a firmware update).*

**Requirements**

– Open configuration manager (existing connection to the PBX web server)

– Inserted restoration point

**Steps to take**

1. Open the page ***Administration*** ▸ ***Data backup***
2. In the ***Configuration file*** list field under ***Restore old configuration data***, select the restoration point for which configuration data should be restored.

   ***Note:*** *Under* ***Restore old configuration data****, additionally enable the checkbox* ***Restore network settings*** *if you want to restore the network settings, as well.*
3. Click ***Restore***.

## Resetting the configuration

**Requirements**

– Open configuration manager (existing connection to the PBX web server)

**Steps to take**

1. Open the page ***Administration*** ▸ ***Data backup***
2. Click ***Reset***.
3. Click ***OK***.

   The “Power” LED blinks in orange during a restart.

   If the LED lights up in green again, the restart is complete and the PBX is ready for operation.

**Further steps**

▷ Create a new configuration.

## Restoring the factory settings

**Requirements**

– Open casing (blue protective cover)

***Warning:*** *Improper handling of the device can result in life-threatening electrical shock.*

→ *Only a skilled electrician may open the casing and carry out service work using the buttons inside of the casing. If necessary, commission an authorised dealer to perform this work.*

***Note:*** *This function requires performing the steps rapidly. Make sure you are comfortable with the procedure before you begin.*

**Steps to take**

1. Press the “Reset” button. See Fig. 38.
2. Within the space of 2 seconds, push the “Default” button and hold it.

   The “Status” LED starts to quickly blink in red.

   After a few seconds, the blinking of the “Status” LED will slow down.
3. Let go of the “Default” button.

   The “Status” LED and the “Power” LED light up in red and orange for several seconds/minutes during the restart. See also the table on Page 48.

If both LEDs light up in green again, the restart is complete and the PBX is ready for operation.

***Note:*** *If the "Power" LED remains continuously lit in red, an error has occurred. Please contact your dealer or the manufacturer directly.*

**Further steps**

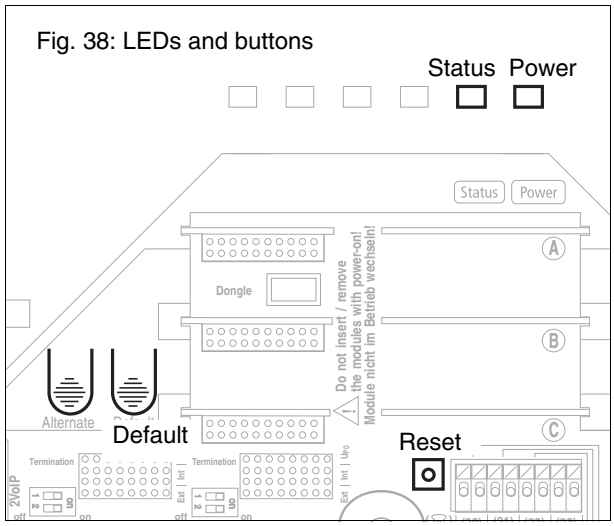
▷ Check the configuration.

***Note:*** *If the old configuration is still present, you have held the "Default" button for too long and must therefore repeat the procedure.*

▷ Create a new configuration.

***Important:*** *Note that the IP addresses on the PBX have also been reset to factory settings. This means you now need to reconfigure the network configuration. See Page 34. Exception: If the PBX had been configured as a DHCP client (DHCP on), this setting has been retained.*

Fig. 38: LEDs and buttons




## Performing an immediate firmware update

**Requirements**

– Open configuration manager (existing connection to the PBX web server)

– Connection via broadband Internet access (for example, a DSL connection)

– The address of the update server registered on the page ***Administration*** ▸ ***Server configuration***: www.auerswald-update.de

– The address of the DNS server registered on the page ***Administration*** ▸ ***Server configuration***

***Important:*** *When performing a firmware update, the PBX should be in the idle state.*

**Steps to take**

**1.** Open the page ***Administration*** ▸ ***Firmware update/ restart***.

***Note:*** *Under* ***Instant firmware update via update server****, enable the checkbox for the* ***COMfortel firmware update*** *if you would also like to perform a firmware update for the system telephones.*

**2.** Click ***Update***.

The "Status" LED and the "Power" LED are lit in green during data transmission.

The "Status" LED and the "Power" LED light up in red and orange for several seconds/minutes during the restart. See also the table on Page 48.

If both LEDs light up in green again, the restart is complete and the PBX is ready for operation.

**Further steps**

▷ To use new features after a firmware update, you normally need a new version of the operating manual and the configuration manual. Both are available per download from the support pages at the Auerswald web site (Internet address: www.auerswald.de).

## Saving the firmware file in the PBX (manual firmware update)

**Requirements**

– Open configuration manager (existing connection to the PBX web server)

– The firmware file saved on the hard drive

***Note:*** *You can download the firmware file from the support pages at the Auerswald web site (Internet address: www.auerswald.de).*

***Important:*** *When performing a firmware update, the PBX should be in the idle state.*

**Steps to take**

1. Open the page ***Administration*** ▸ ***Firmware update/ restart***.
2. Click ***Browse*** and select the firmware file.
3. Click ***Store in the PBX***.

   If you have the status bar enabled in your browser, for example, in Microsoft Internet Explorer, the progress is displayed.

   As soon as the firmware file has been saved in the PBX, you will receive a message.

***Note:*** *The new firmware is currently not yet enabled. The old firmware is retained for the moment.*

**Further steps**

▷ Restart the PBX in order to enable the new firmware. See also Page 49.

▷ In order to use new features after a firmware update, you normally need a new version of the operating manual and the configuration manual. Both are available per download from the support pages at the Auerswald web site (Internet address: www.auerswald.de).

## Restoring firmware using the computer

**Requirements**

– Open configuration manager (existing connection to the PBX web server)

**Steps to take**

1. Open the page ***Administration*** ▸ ***Firmware update/ restart***.
2. Click ***Restore firmware***.
3. Click ***OK***.

   The “Status” LED and the “Power” LED light up in red and orange for several seconds/minutes during the restart. See also the table on Page 48.

   If both LEDs light up in green again, the restart is complete and the PBX is ready for operation.

***Note:*** *If the “Power” LED remains continuously lit in red, an error has occurred. Please contact your dealer or the manufacturer directly.*

## Restoring firmware with a button

**Requirements**

– Open casing (blue protective cover)

***Warning:*** *Improper handling of the device can result in life-threatening electrical shock.*

→ *Only a skilled electrician may open the casing and carry out service work using the buttons inside of the casing. If necessary, commission an authorised dealer to perform this work.*

***Note:*** *This function requires performing the steps rapidly. Make sure you are comfortable with the procedure before you begin.*

**Steps to take**

1. Press the “Reset” button. See Fig. 39.
2. Within the space of 2 seconds, push the “Alternate” button and hold it.

   The “Status” LED starts to quickly blink in orange.

   After a few seconds, the blinking of the “Status” LED will slow down.
3. Let go of the “Alternate” button.

   The “Status” LED and the “Power” LED light up in red and orange for several seconds/minutes during the restart. See also the table on Page 48.

   If both LEDs light up in green again, the restart is complete and the PBX is ready for operation.

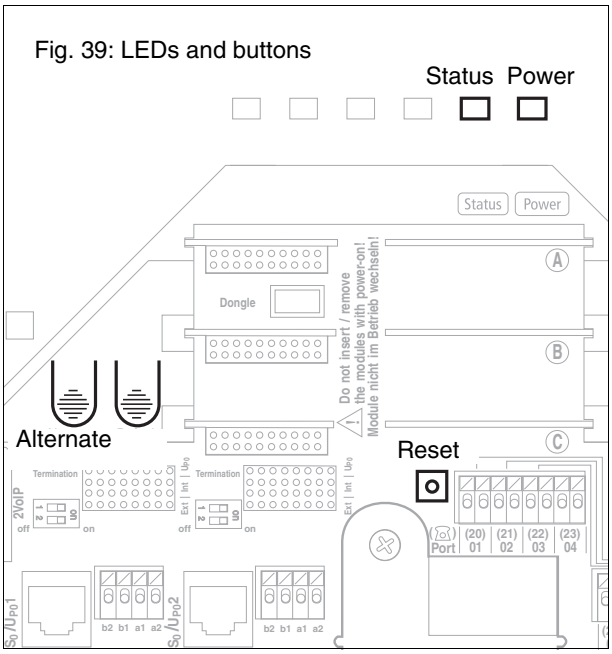
***Note:*** *If the “Power“ LED remains continuously lit in red, an error has occurred. Please contact your dealer or the manufacturer directly.*

**Further steps**

▷ Check the firmware version.

***Note:*** *If the old configuration is still present, you have held the “Alternate” button too long and must therefore repeat the procedure.*

Fig. 39: LEDs and buttons




## Starting the D-channel protocol

**Requirements**

- Computer with a connection to the PBX web server
- PC application, D-channel decoder, installed as of version 2.5.2 Beta

  ***Note:*** *The computer application can be installed from the Auerswald Mega Disk.*

- On the page ***Administration*** ▸ ***Server configuration*** enabled D-channel log over IP
- The IP address for the PBX is known (192.168.0.240 - factory setting).

  ***Note:*** *Remote recording/logging of a D-channel protocol is also possible. For this purpose, please refer to* *Chapter Configuring the PBX remotely via the external $S_0$ port (PPP external) on page 40**. Instead of logging into the web interface, start the D-channel protocol. Under "**IP address**", enter the local IP address for the PPP configuration on the PBX (**http://192.168.193.240** is the factory setting).*

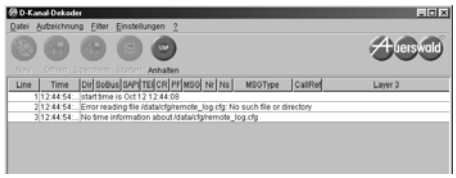
  ***Note:*** *For external access from the Internet via a router, the D-channel decoder uses port 42225. This means that within the router configuration, port 42225 must be rerouted to the IP address of the COMpact 5010/5020 VoIP.*

  ***Note:*** *When entering the IP address in the "Schnittstellenauswahl" dialogue, it is possible that an existing port will need to be omitted.*

**Steps to take**

1. Start the computer programme.
2. Click ***Start***.
3. Select the ***Schnittstelle IP***.
4. Enter the IP address for the PBX.
5. Click ***OK***.

   The protocol log is displayed.




***Note:*** *If you would like to end a recording, click **Anhalten**.*

## Creating a PBX Image

**Requirements**

– Open configuration manager (existing connection to the PBX web server)

**Steps to Take**

1. Open the page ***Administration*** ▸ ***Log files*** ▸ ***Service data***.
2. Click ***Load backup image*** with the right mouse button.
3. Click ***Save target as ...*** (this text depends on the operating system used).

   A dialogue for downloading the file opens.
4. Save the file.

## Logging the Network Data Stream

***Important:*** *Observe the following legal notes prior to recording a network data stream.*
*The recorded network data stream may contain the following components:*

- *Data streams of other computers in the network*
- *Connection data sets with destination, source, and time information of a telecommunication connection*
- *The spoken word of both ends of a telecommunication connection*
- *Configuration data of the PBX and connected telephones, as well as the corresponding PINs*

→ *Prior to recording, all subscribers of the telecommunication connection have to be informed that the contents are going to be recorded and as to who will process the data retrieved.*

→ *If you want to provide the recorded data to your authorized vendor or to Auerswald for the purpose of error analysis, you have to ensure that the applicable legal requirements are met.*

**Requirements**

– Open configuration manager (existing connection to the PBX web server)

– Deactivated pop-up blocker in the browser or defined exception rule

**Steps to Take**

1. Open the page ***Administration*** ▸ ***Log files*** ▸ ***Network data stream***.
2. Accept the legal notes by entering ***ok*** in the entry field next to the notes.
3. Click ***Start trace***.

   A dialogue for downloading the “ethernet-trace.pcap” file is opened.
4. Save the file.

   Recording the network protocol is started.
5. To stop the recording of the network protocol, click ***Stop trace***.

## Sending a Ping to a Destination Address

**Requirements**

– Configuration manager, opened with the authorization level administrator (existing connection to the PBX web server)

– Host name as destination: DNS configuration and, if required, http proxy configuration

**Steps to Take**

1. Open the page ***Administration*** ▸ ***Monitoring*** ▸ ***Network diagnosis***.
2. In the ***Destination*** entry field under ***Ping (check availability of a host)***, enter the IP address or host name.
3. Select the desired protocol from the ***Protocol*** list field.
4. If required, enter the port you want to reach with the ping into the ***Port*** entry field.
5. Click ***Start*** under ***Ping (check availability of a host)***.

   The result of the ping will be shown (max. one ping).

# Testing the USB Memory Stick

**Requirements**

– File ***h2testw.exe*** downloaded

– USB memory stick inserted in the PC

**Steps to Take**

**1.** Start the program by double-clicking the downloaded file h2testw.exe.

**2.** Click ***Select target***.

A dialogue opens where you can select the USB memory stick.

**3.** Select the USB memory stick, and click ***OK***.

The USB memory stick will now be tested. This process may take a few minutes. During the test, several files (*.h2w) will be created on the USB memory stick.

***Note****: If you wish to cancel the test, click* ***Cancel****.*

After completion of the test, the write rate of the USB memory stick will be displayed along with further information. At least 5 MBps are required. If the write rate is lower, the USB memory stick is not suitable.

**4.** Delete the test files (*.h2w) from the USB memory stick.

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