X8500

Hardware Installation Guide
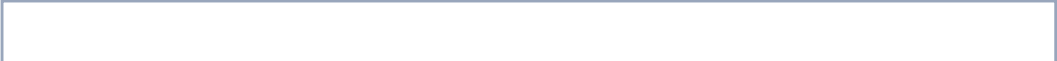
Hardware Installation

Version 1.3
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Purpose This manual explains the installation of **X8500**. For up-to-the-minute information and instructions concerning the latest software release, you should always read our release notes, especially when carrying out a software update to a later release level. The latest release notes can always be found at www.bintec.net.

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The information in this manual is subject to change without notice. Additional information, including changes and release notes for **X8500**, can be found at www.bintec.net.

As a multiprotocol router, **X8500** sets up WAN connections in accordance with the system configuration. To prevent unintentional charges accumulating, the operation of the product should be carefully monitored. BinTec Access Networks GmbH accepts no liability for loss of data, unintentional connection costs and damages resulting from unsupervised operation of the product.

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Guidelines and standards **X8500** complies with the following guidelines and standards:

■ R&TTE Directive 1999/5/EC

■ CE marking for all EU countries and Switzerland

For further information, see "Declaration of Conformity" at www.bintec.net.

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■■■■■ BinTec Access Networks GmbH

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1   Welcome!

Thank you for buying an **X8500** modular communications server from BinTec
Access Networks GmbH – a remote access server solution for central corpora-
tions and for Internet Service Providers.

Figure 1-1:   **X8500** - the central site router for professional applications

X8500 Feature List

System card The system card (X8A-SYS or X8A-SYS-VPN) is the control unit of **X8500**. With
its Basic Rate Interface, the two (or three respectively) Fast Ethernet ports and
the serial console port, the system card provides for local and remote configu-
ration, administration and monitoring of **X8500**.

Expansion cards Eight slots for expansion cards enable **X8500** to grow in line with your require-
ments. Thus a high degree of flexibility is assured.

Resource modules The expansion cards can also be provided with powerful and scalable resource
modules. This enables extremely high efficiency through high port or modem
density.

Module carrier card The module carrier card can be fitted with BIANCA/BRICK-XL2 or BIANCA/ BRICK-XM modules.

Hot Swap Any expansion card may be inserted into an unused slot while **X8500** is operating. Likewise, a PRI, G.703, DSP or SYNC expansion card can be replaced with a new one of the same type with the same licenses, as long as the new card has as many interfaces and as many modules as the old one.

Redundancy Two slots are provided for power supply units so you can set up a redundant power supply system with **X8500**.

Ergonomic design The well-proven BinTec "Setup Tool" for the router configuration interface ensures ergonomic and user-friendly design.

RAS The flexible remote access server **X8500** can be used for WAN access, remote CAPI server or LAN router. **X8500** supports the TCP/IP and X.25 protocols and is also suitable for bridging other protocols based on the spanning tree method.

Remote CAPI Using BinTec's remote CAPI software, applications based on the widely used CAPI interface can be used network-wide. Thus the available ISDN connections can be used more effectively.

Security The features supplied include BinTec's well-tried security package SAFER-NET^{TM}. This package contains security technologies such as filters, Network Address Translation (NAT) and access passwords. The security functions protect **X8500** and the network connected to it against unauthorized access.

The future New technologies and developments are vital for BinTec Access Networks GmbH. **X8500**'s flexible platform with eight expansion slots and a powerful processor permits the immediate integration of new WAN/LAN technologies and features. This makes **X8500** a future-oriented and migration-capable device.

You can download BinTec's current software at www.bintec.net.

1.1   BinTec's X8500 CD

You will find all the programs you need for the installation, configuration and administration of **X8500** on your **X8500** CD available with the first official release.

BRICKware for Windows

BRICKware for Windows contains the Windows utility programs:

■ **DIME Tools** are for monitoring and administration of your **X8500**.

■ You gain access to **X8500** via the serial interface using the terminal program **Device at COM1** or **Device at COM2**.

■ The **Configuration Manager** allows you to configure and administrate all BinTec routers in the network via a graphic interface. Here you can view and edit all SNMP tables and variables.

■ Remote CAPI Client:
The Remote CAPI Client allows you to use communications applications based on the standard CAPI interface.

■ Token Authentication Firewall (TAF) program (optional):
This software package is required if you are using the Security Dynamics security system.

■ The **Activity Monitor** enables you to monitor the utilization of **X8500** at a glance.

More detailed descriptions of all software programs can be found in our online document **BRICKware for Windows**.

What else?

On the **X8500** CD, you will find a range of other useful directories in which you can find the following, for example:

■ The documentation in electronic form (see also)

■ A copy of the router software

■ UNIX tools (administration)

■ Adobe's Acrobat Reader

1.2 Documentation from BinTec

Together with **X8500**, you will have received part of the documentation in print-ed form and all of it in electronic form (PDF, HTML). The electronic versions of the different documents are included on the BinTec **X8500** CD. In addition to your **X8500** CD documentation, you can download all the very latest BinTec documentation from our WWW server at www.bintec.net. The following documentation is currently available:

■ **Hardware Installation Guide**
This manual.

■ **Software Configuration Guide** (available on BinTec's WWW server with the official release of the system software X8A-BOSS)

■ Installation guide for the **X8500** expansion cards (included with the expansion card(s) you purchase)

■ Installation guide for the **X8500** power supply unit(s) (included with X8A-PS)

■ Installation guide for the **X8500** fan unit (included with X85-FAN)

■ Installation guide for rack-mounting **X8500** (included with X85-RACK)

■ Reference manuals (English, PDF/HTML)
– **Software Reference** (PDF)
Online reference with detailed information on functions described here, a reference for the internal SNMP table structures and the operation of the SNMP shell.
– **MIB Reference**
HTML document with short descriptions about all SNMP tables and variables for **X8500**.

■ **BRICKware for Windows** (English, PDF)
User's guide for Windows utility programs (**BRICKware**)

■ **Release Notes** (English, PDF and/or printed)
Up-to-the-minute information and instructions concerning the latest software release, description of all changes undertaken since the previous release.
In the **Release Notes Firmware Logic and BOOTmonitor Update**, you will find instructions to help you upgrade BOOTmonitor and/or firmware logic.

■ **Release Notes** for the operation of routers in UK (English, PDF)
Instructions for the operation of BinTec routers in Great Britain.

1.3   About this Manual

1.3.1   Contents

This manual is structured as follows:

Chapter	Contents
1: "Welcome!"	General introduction, scope of supply, information about this manual.
2: "General Safety Precautions"	General safety precautions.
3: "Scope of Supply"	Description of **X8500** components and scope of supply.
4: "Hardware Installation"	Description of the hardware (rack, expansion cards, connections). Instructions on how to rack-mount **X8500**, how to install and remove an expansion card, and how to connect the equipment. Description of boot sequence.
5: "Technical Data"	**X8500** technical data, expansion card and interface specifications.
6: "General Safety Precautions in German"	General safety precautions in German.

Table 1-1:   Short description of chapters

1.3.2 Meaning of Symbols

To help you locate and interpret information easily, this manual uses the following visual aids:

Symbol	Meaning
	Points out useful and relevant tips and tricks.
	Brings to your attention general and important points.
	Brings your attention to important safety precautions. Levels of danger are in accordance with ANSI: ■ Caution (indicates possible danger that, if unheeded, could cause material damage) ■ Warning (indicates possible danger that, if unheeded, could cause bodily harm) ■ Danger (indicates danger that, if unheeded, could lead to serious bodily harm or death)

Table 1-2:   List of visual aids

1.3.3 Typographical Elements

In order to help you find and interpret the information in this manual, the following typographical elements are used:

Typographical element	Meaning
➤	Here you are requested to do something.
■ –	Lists including two levels.
Online: blue	Indicates links.

Table 1-3: Typographical elements

2   General Safety Precautions

General Safety Precautions in English

The following sections contain safety precautions you are strongly advised to heed when working with your equipment.

Transport and storage
- Only transport and store **X8500** in its original packaging or use other appropriate packaging to protect against knocking and shaking.

Installation and operation
- Read the information on the ambient conditions (see Technical Data) before installing and operating **X8500**.

- Please comply with the general conditions applicable in your country when installing external ISDN basic rate accesses. In some cases, you may have to consult a technician who possesses the relevant approval. Obtain information about the special requirements of national regulations and make sure that your installation complies with these legal requirements.

- Electrostatic charges may cause damage to the equipment. You should therefore wear a grounded wrist strap or touch a grounded surface before you touch sockets or extension cards of **X8500**. Only grip extension cards at the edges and do not touch components or conductor tracks.

- Be sure to install the dummy front-panel sections in any unused slots to ensure that emissions causing electromagnetic interference are prevented.

- Condensation may occur externally or internally if the equipment is moved from a colder room to a warmer room. When moving the equipment under such conditions, allow ample time for the equipment to reach room temperature and to dry out completely before operating. Observe the ambient conditions under Technical Data.

- Never open the **X8500** power supply unit X8A-PS, as this can create a lethal danger through electric shock. Opening the **X8500** power supply unit invalidates the guarantee and the product liability.

- Make sure that the connection requirements for the power supply unit are observed.

■ Be sure to insert and fasten the **X8500** power supply unit properly before bringing **X8500** into operation. This ensures that the housing is reliably earthed.

■ Make sure to connect the power cord only to a power supply unit that has been properly inserted and fixed.

■ Make sure the local mains voltage is the same as the nominal voltages of the power supply unit. The **X8500** power supply unit X8A-PS may only be operated under the following conditions.
  – 100 - 240 V AC
  – 50/60 Hz
  – max. 3 A

■ Only connect the equipment to a safety mains socket that is grounded in accordance with the regulations (the equipment is equipped with a tested safety power cord).

■ Make sure the safety mains socket in the building is freely accessible.

■ Make sure you follow the correct cabling sequence, as described in the manual. Use only the cables supplied with the equipment or cables that meet the specifications in this manual. If you use other cables, BinTec Access Networks GmbH cannot accept liability for any damage occurring or for any adverse effects on operation. The equipment guarantee is invalidated in such cases.

■ Connect the equipment as described in the manual.

■ Arrange the cables so that they are not in the way and cannot be tripped over or damaged.

■ Do not connect, disconnect or touch the data lines during lightning storms.

■ Only connect terminals to **X8500** that meet the general safety requirements for telecommunications equipment. Terminals approved by CETECON (formerly BZT) meet these requirements. ISDN terminals connected to **X8500** must be approved for use with Euro ISDN (DSS1).

Operation according to the regulations   ■ **X8500** establishes WAN connections depending on the system configuration. To avoid extra charges, you should carefully monitor the product.

■ Ambient temperature should not exceed 40 ˚C. Avoid exposure to direct sunlight.

■ Make sure no foreign objects (e.g. paper clips) or liquids get into the equipment (risk of electric shock, short-circuit). Make sure the equipment is sufficiently cooled.

■ In an emergency (e.g. damaged housing or operating element, entry of liquid or foreign bodies), immediately disconnect the power supply and notify customer service.

Cleaning and repair ■ Never use water to clean this equipment. Water spillage can result in serious danger for the user (e.g. electric shock) and cause considerable damage to the equipment.

■ Never use scouring or abrasive alkaline cleaning agents on this equipment.

2   General Safety Precautions

3   Scope of Supply

X8500 is a fully modular Remote Access Server. This chapter lists the components of the **X8500** basic unit, and all individually purchasable **X8500** components and the respective scope of supply.

3.1   **X8500** Basic Unit

Basic unit   Your **X8500** basic unit consists of the X8A-RACK including fan unit, power supply unit, system card and the system software and looks like this:
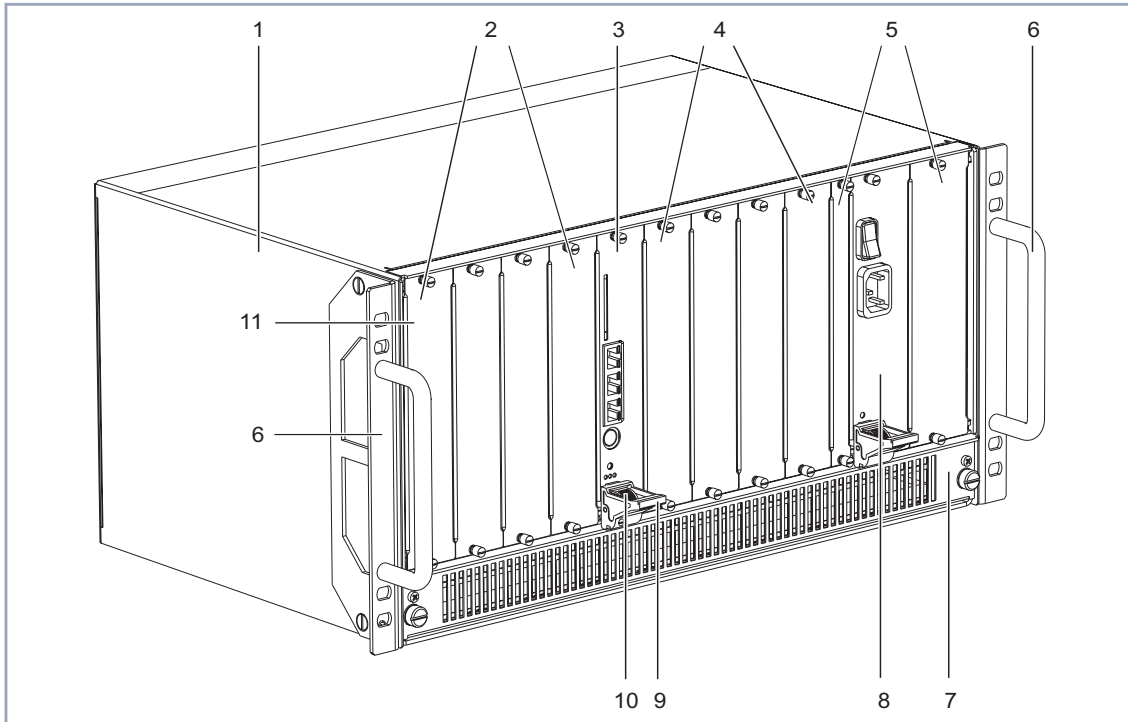
1	**X8500** case X85-RACK	7	**X8500** fan unit X8A-FAN
2	Expansion card slots 1 to 4	8	Power supply unit X8A-PS
3	System card slot with X8A-SYS or X8A-SYS-VPN respectively	9	Injector/ejector handle
4	Expansion card slots 5 to 8	10	Injector/ejector handle switch
5	Slots 9 and 10 for X8A-PS	11	Dummy front-panel section
6	Rack mounting handles		

Figure 3-1:   **X8500** basic unit

The system card (X8A-SYS or X8A-SYS-VPN) must be installed in the system card slot (3, figure 3-1, page 23).

Slots 1 to 4 and 5 to 8 (2 and 4, figure 3-1, page 23) are provided for the expansion cards.

For optimal performance of **X8500**, slots 1 to 4 should be fully equipped with expansion cards before slots 5 to 8 are used!

The **X8500** basic unit consists of following:

X85-RACK **X8500** case

- pre-assembled rack unit (with dummy front-panels)

- pre-assembled rack mounting handles

- installation guide (German and English)

X85-FAN Fan unit (fan cassette with fan insertion)

- form for maintenance contract

- installation guide (German and English)

X8A-PS Power supply unit

- including front panel and injector/ejector handle

- EC AC power cord

- installation guide (German and English)

X8A-BOSS System software

- **Hardware Installation Guide** (this guide)

- **Software Configuration Guide** (available on BinTec's WWW server with the official release, PDF on BinTec Companion CD)

- licenses, if purchased

- registration card

- Smart Media Flash Card

- BinTec **X8500** CD

■ release notes, if applicable

Moreover, the basic unit comes with one of two system cards:

X8A-SYS System card

■ printed circuit board including front-panel section and injector/ejector handle

■ serial cable for the console port

■ installation guide for the expansion cards and modules (German and English)

X8A-SYS-VPN High performance system card, e.g. for Virtual Private Network applications

■ printed circuit board including front-panel section and injector/ejector handle

■ serial cable for the console port

■ installation guide for the expansion cards and modules (German and English)

3.2 Optional Components

This chapter lists all individually purchasable **X8500** components and the respective scope of supply.

3.2.1 Expansion Cards

Following the optional expansion cards and scope of supply:

X8E-1E3 E3 interface expansion card

- ■ printed circuit board including front-panel section and injector/ejector handle
- ■ one licensed E3 port
- ■ installation guide for the expansion cards and modules (German and English)

X8E-2E3 E3 interface expansion card

- ■ printed circuit board including front-panel section and injector/ejector handle
- ■ two licensed E3 ports
- ■ installation guide for the expansion cards and modules (German and English)

X8E-2PRI Primary Rate Interface expansion card and resource carrier card

- ■ printed circuit board including front-panel section and injector/ejector handle
- ■ two licensed PRI ports
- ■ installation guide for the expansion cards and modules (German and English)

X8E-4PRI Primary Rate Interface expansion card and resource carrier card

- ■ printed circuit board including front-panel section and injector/ejector handle

- four licensed PRI ports

- installation guide for the expansion cards and modules (German and English)

X8E-2G703 G.703 interface expansion card and resource carrier card

- printed circuit board including front-panel section and injector/ejector handle

- two licensed G.703 ports

- installation guide for the expansion cards and modules (German and English)

X8E-4G703 G.703 interface expansion card and resource carrier card

- printed circuit board including front-panel section and injector/ejector handle

- four licensed G.703 ports

- installation guide for the expansion cards and modules (German and English)

X8E-DSP Expansion card (resource carrier card)

- printed circuit board including front-panel section and injector/ejector handle; to be fitted with resource modules

- installation guide for the expansion cards and modules (German and English)

X8E-2BC Expansion card (module carrier card)

- printed circuit board including front-panel section and injector/ejector handle; to be fitted with BIANCA/BRICK-XL2 or BIANCA/BRICK-XM modules

- 2 dummy front panels

- installation guide for the expansion cards and modules (German and English)

X8E-2SYNC Expansion card with two X.21/V.35 interfaces

■ printed circuit board including front-panel section and injector/ejector handle

■ 1 dummy front panel

■ two X.21/V.35 interfaces

■ installation guide for the expansion cards and modules (German and English)

X8E-4SYNC Expansion card with four X.21/V.35 interfaces

■ printed circuit board including front-panel section and injector/ejector handle

■ four X.21/V.35 interfaces

■ installation guide for the expansion cards and modules (German and English)

3.2.2 Resource Modules

Following and scope of supply of the optional resource modules that can be mounted on expansion cards:

XT-S ■ Resource module with 8 digital modems

■ installation guide for the expansion cards and modules (German and English)

XT-M ■ Resource module with 12 digital modems

■ installation guide for the expansion cards and modules (German and English)

XT-2M ■ Resource module with 24 digital modems

■ installation guide for the expansion cards and modules (German and English)

XT-L ■ Resource module with 30 digital modems

■   installation guide for the expansion cards and modules (German and English)

XT-VPN   ■   Resource module for public key acceleration and symmetrical encryption

■   installation guide for the expansion cards and modules (German and English)

XT-2SYNC   ■   Resource module with two X.21/V.35 interfaces to be mounted on the X8E-2SYNC expansion card

■   installation guide for the expansion cards and modules (German and English)

3.2.3   Hardware Licenses

X8S-2E3   Upgrade license to enable the second E3 port on X8E-1E3 and make it an X8E-2E3.

X8S-2PRI   Upgrade license to enable two additional PRI ports on X8E-2PRI or X8E-2G703

X8S-2G703   Upgrade license to enable two additional G.703 ports on X8E-2PRI or X8E-2G703

X8S-2G703-2PRI   License to change two G.703 ports to two PRI ports

X8S-4G703-4PRI   License to change four G.703 ports to four PRI ports on X8E-4G703

4 Hardware Installation

Before you install **X8500**, make sure you have provided for the following:

■ You have read the general safety precautions in chapter 2, page 17.

■ You have selected a suitable location with adequate power where you can rack-mount **X8500** in a standard equipment 19-inch rack or cabinet.

■ You have the required installation tools and equipment to install the **X8500** hardware:
  – Antistatic wrist strap and mats.
  – Flathead and Phillips screwdrivers.

■ You can provide for one of the following access methods for initial configuration:
  – You can assign **X8500** an IP address and netmask through a connection to the serial port of **X8500** to a local PC or terminal.
  – You can assign **X8500** an IP address and netmask through a connection over the LAN interface with a BOOTP request via the BOOTP Server (included in the **DIME Tools**).
  – You can assign **X8500** an IP address and netmask remotely through a connection over the WAN interface via isdnlogin.

Contents   This chapter covers the following:

■ Mounting **X8500** in a 19-inch rack (see chapter 4.1, page 30)

■ Installing and replacing expansion cards (see chapter 4.2, page 32)

■ Installing and replacing the fan insertion (see chapter 4.3, page 48)

■ Installing and replacing the power supply unit (see chapter 4.4, page 55)

■ Setting up and connecting **X8500** (see chapter 4.5, page 62)

■ Boot sequence (see chapter 4.6, page 68)

4.1 Mounting **X8500** in a 19-Inch Rack

Caution!

Electrostatic charges can damage electronic components. Please observe the following precautions to avoid damaging components:

➤ Ground yourself before unpacking components and before carrying out installation work on the equipment.

➤ Only grip boards at the edges and do not touch cables or components.
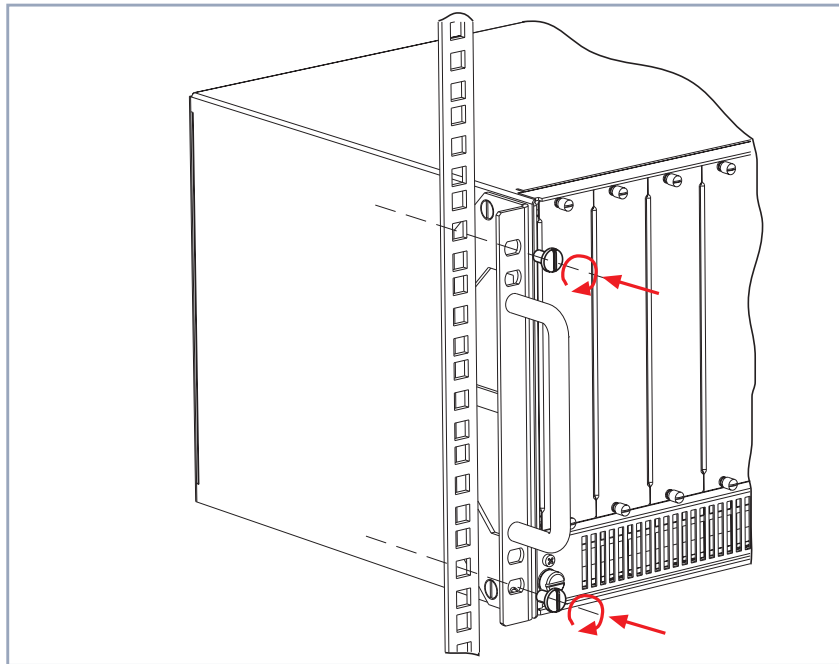
Following a diagram:

Figure 4-1: Fixing **X8500** to the 19-inch rack

To mount **X8500** into a 19-inch rack or cabinet, proceed as follows:

➤ Using a mechanical lift or a minimum of two installers, raise the unit to the proper height for installation.

➤ Insert the unit in the cabinet and screw it to the longitudinal sections of the rack or cabinet as shown in figure 4-1, page 30 (these screws are not supplied with **X8500**, but are included with the rack or cabinet).

This is what **X8500** should look like on completion of installation to the 19-inch rack or cabinet:
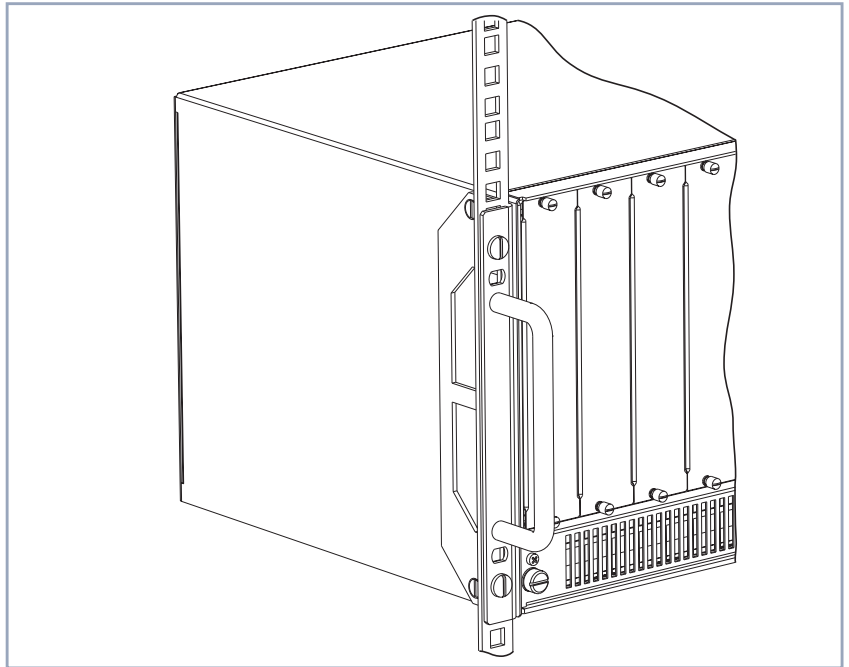

Figure 4-2:   **X8500** fixed to the 19-inch rack

Removal from 19-inch rack or cabinet To remove **X8500** from the 19-inch rack or cabinet, carry out the steps described above in the reverse order.

4.2 Installing or Replacing Expansion Cards

You can extend your **X8500** by adding up to eight expansion cards. The following table lists the **X8500** expansion cards available:

Card	Interface(s)	Port Capacity
X8A-SYS/	WAN	1 ISDN BRI port (RJ45 socket)
X8A-SYS-VPN	LAN	X8A-SYS: 2x10/100BTports (RJ45 sockets)
		X8A-SYS-VPN: 3x10/100BTports (RJ45 sockets)
	Console	1 serial console interface
	SMFC	Slot for Smart Media Flash Card
X8E-2BC		
option:	WAN: CM-BRI	1 ISDN BRI port (RJ45 socket)
option:	WAN: CM-2BRI	2 ISDN BRI ports (RJ45 sockets)
option:	WAN: CM-X21 (versions since November 2001; PROM labeling CM-X21 U1 V.1.2.1)	X.21 interface
option:	WAN: CM-PRI (hardware revision 2.0 and newer)	1 ISDN PRI port
option:	LAN: CM-100BT	1 Ethernet/LAN port
X8E-1E3	WAN: 1 E3	1 port for E3 conections
X8E-2E3	WAN: 2 E3	2 ports for E3 connections
X8E-2PRI	WAN: 2 PRI	2 ports for 60 B-channels
X8E-4PRI	WAN: 4 PRI	4 ports for 120 B-channels

Card	Interface(s)	Port Capacity
X8E-2G703	WAN: 2 G.703	2 ports for leased line
X8E-4G703	WAN: 4 G.703	4 ports for leased line
X8E-DSP	–	carrier card for up to 2 resource modules
X8E-2SYNC	WAN: X.21/V.35	2 X.21/V.35 interfaces
X8E-4SYNC	WAN: X.21/V.35	4 X.21/V.35 interfaces

Table 4-1:   Expansion cards available for **X8500**

The following table lists the **X8500** resource modules available:

Module XT	Port Capacity
XT-S	Resource module with 8 digital modems
XT-M	Resource module with12 digital modems
XT-2M	Resource module with 24 digital modems
XT-L	Resource module with 30 digital modems
XT-VPN	Resource module for public key acceleration and symmetrical encryption
XT-2SYNC	Resource module with 2 X.21/V.35 interfaces to be mounted on X8E-2SYNC

Table 4-2:   Resource modules available for **X8500**

For a more detailed technical specification of the **X8500** expansion cards and resource modules, see chapter 5, page 71.

4.2.1   Instructions

Now you can find out how to equip or replace expansion cards for **X8500**. Make sure you also follow the installation guide supplied with the expansion cards.

While **X8500** is operating, a PRI, G.703, DSP, SYNC or E3 expansion card can be exchanged with a new one of the same type. The new expansion card must be of the same type with the same licenses as the old one. It must also have the same number of interfaces and modules.

The system card or an X8E-2BC expansion card may only be exchanged if you power down **X8500** first.

Caution!

Replacing an X8E-2BC expansion card while **X8500** is operating may cause damage to **X8500**!

➤ While **X8500** is operating, only replace a PRI, G.703, DSP, SYNC or E3 expansion card. The new expansion card must be of the same type with the same licenses as the old one. It must also have the same number of interfaces and modules!

➤ Power down **X8500** before replacing X8E-2BC expansion cards!

Danger! Electric shock!

Do not touch any parts inside the expansion slots when installing or replacing the expansion cards. There is a risk of electric shock!

➤ Do not touch any parts inside the expansion slot of **X8500**!

Caution!

Electrostatic charges can damage electronic components. Please observe the following precautions to avoid damaging components:

➤ Ground yourself before unpacking components and before carrying out installation work on the equipment.

➤ Only grip boards at the edges and do not touch cables or components.

The same installation or removal procedure applies for all **X8500** expansion cards.

4.2.2   Installation

The system card (X8A-SYS or X8A-SYS-VPN) must be installed in the system card slot (3, figure 3-1, page 23).

Slots 1 to 4 and 5 to 8 (2 and 4, figure 3-1, page 23) are provided for the expansion cards.

For optimal performance of **X8500**, slots 5 to 8 should be fully equipped with expansion cards before slots 1 to 4 are used!

For the installation of an expansion card, perform the following steps:

➤ Make sure that **X8500** is powered down when installing the system card.
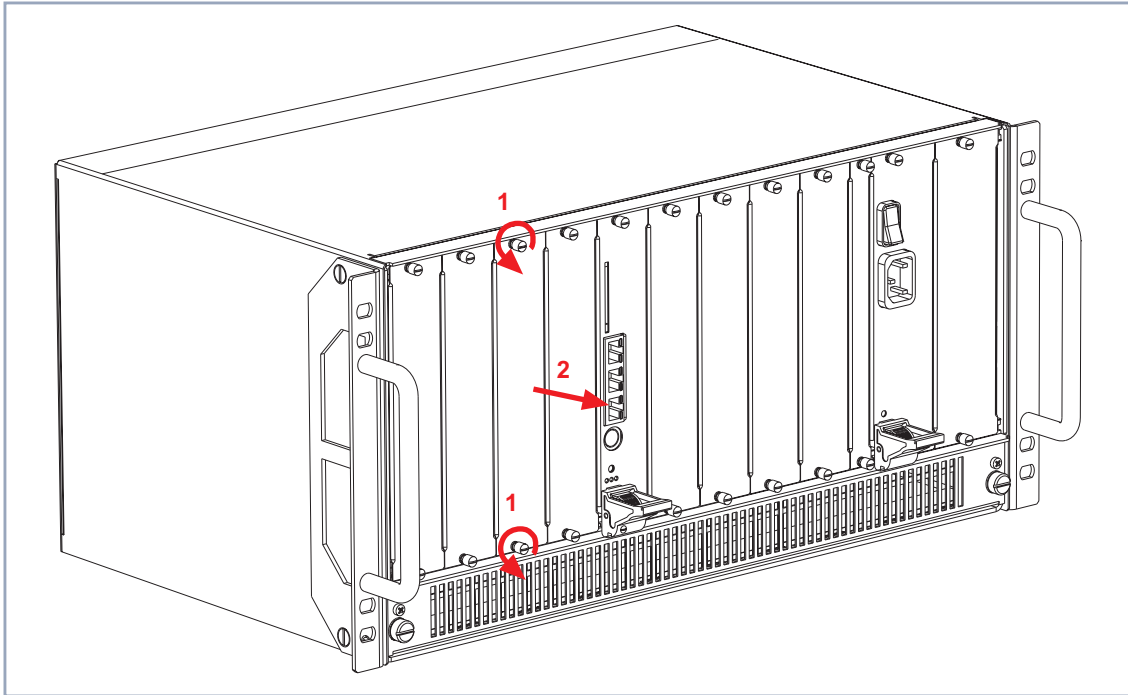
Removing dummy front panel:

Figure 4-3: Removing the dummy front panel

➤ Loosen the screws (see figure 4-3, page 36, arrows no. 1) of the dummy front panel.

➤ Remove the dummy front panel.

Prepare the new expansion card

➤ Have the new expansion card ready for installation (take it out of the anti-static bag).

Please note that if you want to install a system card, you first have to equip it with the internal Smart Media Flash Card (SMFC) as described in the **X8500 Installation Guide Expansion Cards and Modules**.

➤ Equip the system card (X8A-SYS or X8A-SYS-VPN) with the internal Smart Media Flash Card (SMFC), before you install the system card in **X8500**. The SMFC provides the operation system software BOSS for **X8500**. Consult the **X8500 Installation Guide Expansion Cards and Modules** supplied with your expansion card or module.

➤ Check if you require any additional installation on the expansion cards, like for example the installation of resource modules or the installation of BIANCA/BRICK communications modules.
Consult the **X8500 Installation Guide Expansion Cards and Modules** supplied with your expansion card or module.
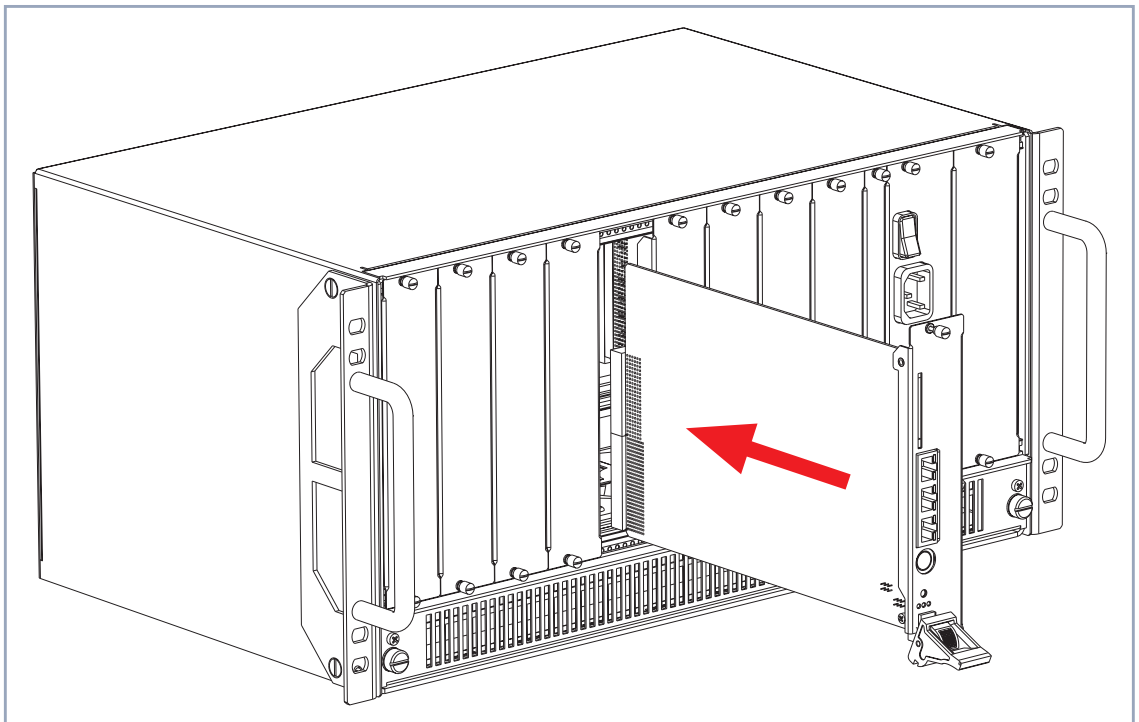
Proceed as follows:

Figure 4-4:   Inserting an expansion card

Insert expansion card

The system card must be installed in the system card slot (3, figure 3-1, page 23).

Slots 1 to 4 and 5 to 8 (2 and 4, figure 3-1, page 23) are provided for the expansion cards.

For optimal performance of **X8500**, slots 5 to 8 should be fully equipped with expansion cards before slots 1 to 4 are used!

Caution!

Forcing the expansion cards into the slots can damage the card or slot connector.

➤ Do not force the expansion card into the slot.

➤ Insert the expansion card into the selected slot until the red status LED is on (not for X8A-SYS or X8A-SYS-VPN).

➤ Push the expansion card further until the amber colored status LED is on (not for X8A-SYS or X8A-SYS-VPN).
Card guides ensure that the expansion card is reliably inserted.

➤ Push the expansion card further until it reaches the slot connector (see figure 4-4, page 37).
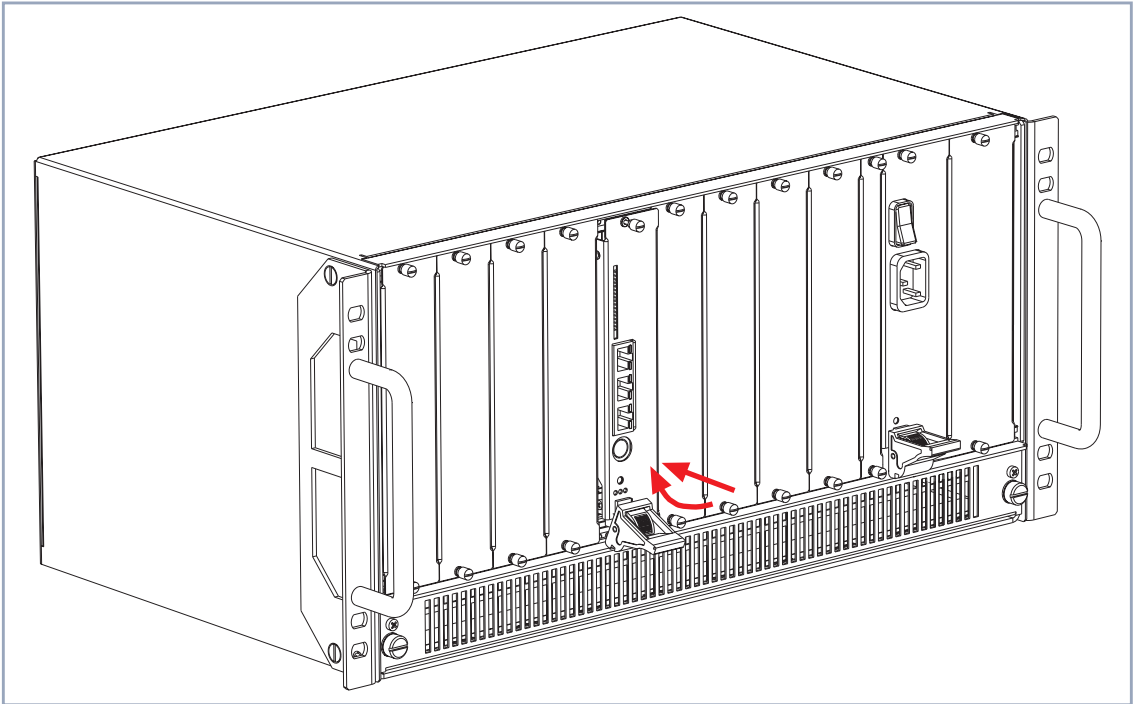
Proceed as follows:

Figure 4-5:   Installing the expansion card

Plug in the expansion card

➤ Once the expansion card reaches the connector, lift the injector/ejector handle until it is fixed to the cross section of the case front (see figure 4-5, page 39).
If the injector/ejector handle switch pops up, the card is plugged in correctly.

➤ Screw the front panel of the expansion card to the **X8500** case.

The expansion card is installed. See chapter 4.5, page 62 for connecting the card.

Be sure to install a dummy front panel in any unused slot to ensure that emissions causing electromagnetic interference are prevented.

4.2.3 Removal
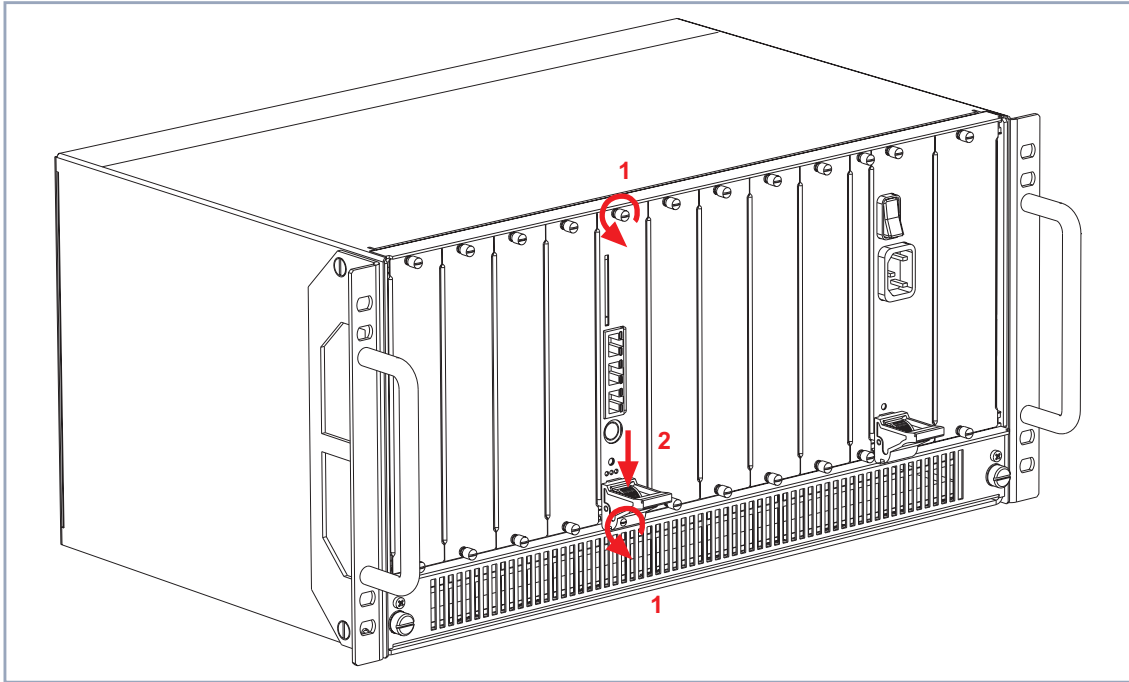
Following a diagram:

Figure 4-6:   Removing an expansion card, step 1

If you want to remove an expansion card, perform the following steps:

➤ Power down **X8500**.

➤ Loosen the screws of the front panel, see figure 4-6, page 40, arrows no. 1.

Unplug the expansion card

➤ Press the switch on the injector/ejector handle down in order to release the connection linked to the cross section of the case front, see figure 4-6, page 40, arrow no. 2.
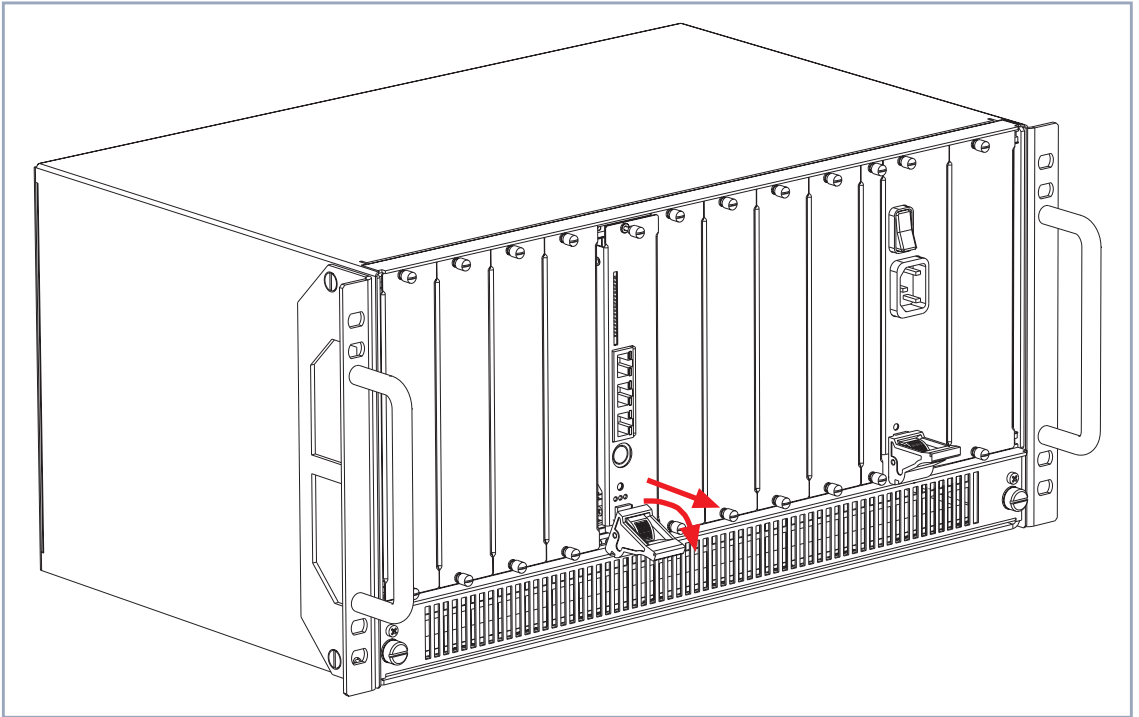
Following a diagram:

Figure 4-7:   Removing an expansion card, step 2

➤ Push the injector/ejector handle further down until the expansion card comes out of its position (see).
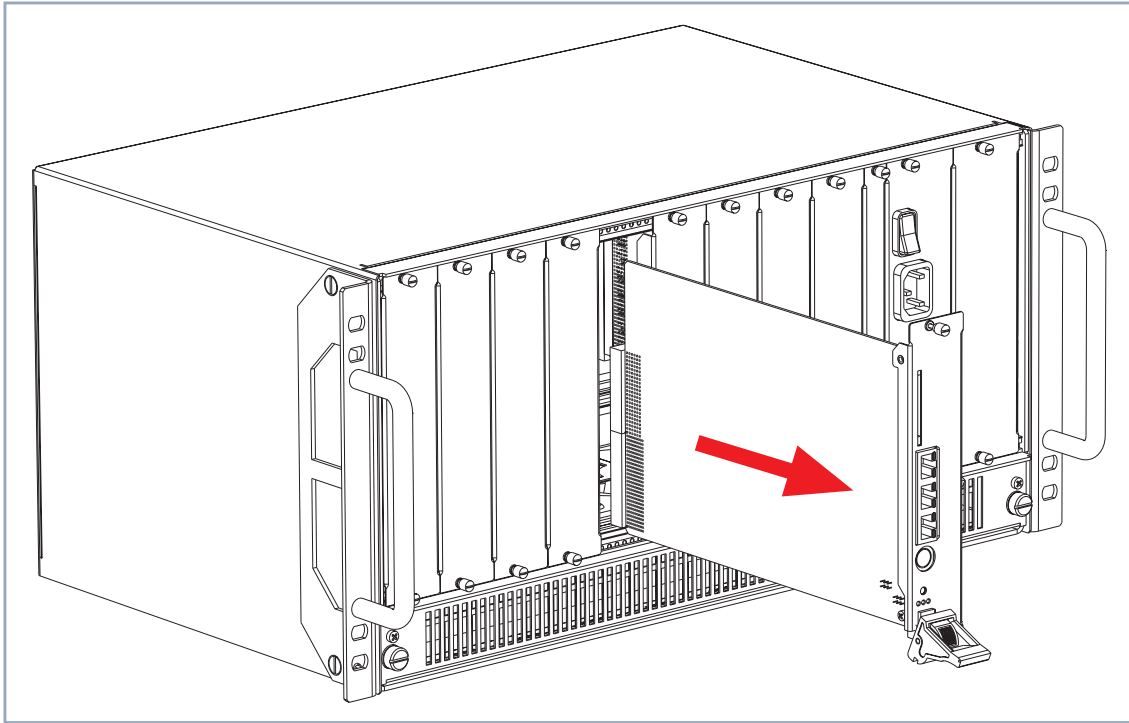
Following a diagram:

Figure 4-8:   Removing an expansion card, step 3

➤ Draw the expansion card out of the slot as shown in .
The expansion card is removed.

4.2.4   Replacement

While **X8500** is operating, a PRI, G.703, DSP, SYNC or E3 expansion card can be exchanged with a new one of the same type, as long as the new card has the same licenses, as many interfaces, and as many modules as the old one.

The new expansion card must be of the same type with the same licenses as the old one. It must also have the same number of interfaces and modules.

The system card or an X8E-2BC expansion card may only be exchanged if you power down **X8500** first.

Caution!

Replacing the system card or an X8E-2BC expansion card while **X8500** is operating may cause damage to **X8500**!

➤ While **X8500** is operating, only replace a PRI, G.703, DSP, SYNC or E3 expansion card. The new expansion card must be of the same type with the same licenses as the old one. It must also have the same number of interfaces and modules!

➤ Power down **X8500** before replacing the system card or an X8E-2BC expansion card!

If you want to replace an expansion card, perform the following steps:

➤ Power down **X8500** if you want to exchange the system card (X8A-SYS or X8A-SYS-VPN) or an X8E-2BC expansion card.

➤ Loosen the screws of the front panel, see figure 4-6, page 40, arrows no. 1.

Unplug the expansion card ➤ Press the switch on the injector/ejector handle down in order to release the connection linked to the cross section of the case front, see figure 4-6, page 40, arrow no. 2.

The amber colored status LED is on (not for X8A-SYS, X8A-SYS-VPN or X8E-2BC).

Caution!

Unplugging expansion cards which are not hot-swappable may

lead to damage of the device.

➤ Only draw the expansion card if the amber colored LED is on!

➤ Push the injector/ejector handle up again if the red, green and amber colored LEDs are on!
This expansion card is not hot-swappable.

➤ Push the injector/ejector handle further down until the expansion card comes out of its position (see figure 4-7, page 41).

The amber colored status LED is on (not for X8A-SYS, X8A-SYS-VPN or X8E-2BC).

➤ Draw the expansion card out of the slot as shown in .

Prepare the new expansion card

➤ Have the new expansion card ready for installation (take it out of the anti-static bag).

> Please note that if you want to install a system card, you first have to equip it with the internal Smart Media Flash Card (SMFC) as described in the **X8500 Installation Guide Expansion Cards and Modules**.

➤ If you want to install the system card, make sure that you have equipped it with the internal Smart Media Flash Card. The SMFC provides the operation system software BOSS for **X8500**.
Consult the **X8500 Installation Guide Expansion Cards and Modules** supplied with your expansion card or module.

➤ Check if you require any additional installation on the expansion cards, like for example the installation of resource modules or the installation of BIANCA/BRICK communications modules.
Consult the **X8500 Installation Guide Expansion Cards and Modules** supplied with your expansion card or module.

Insert expansion card

Caution!

Forcing the expansion card into the slot can damage the card or slot connector.

➤ Do not force the expansion card into the slot.

> The system card must be installed in the system card slot (3,).
>
> Slots 1 to 4 and 5 to 8 (2 and 4,) are provided for the expansion cards.
>
> For optimal performance of **X8500**, slots 5 to 8 should be fully equipped with expansion cards before slots 1 to 4 are used!

Caution!

Replacing the system card or an X8E-2BC expansion card while **X8500** is operating may cause damage to **X8500**!

➤ While **X8500** is operating, only replace a PRI, G.703, DSP, SYNC or E3 expansion card. The new expansion card must be of the same type with as many interfaces and modules!

➤ Power down **X8500** before replacing the system card or X8E-2BC expansion cards!

➤ Insert the expansion card into the selected slot until the red status LED is on (not for X8A-SYS, X8A-SYS-VPN or X8E-2BC).

➤ Push the expansion card further until the amber colored status LED is on (not for X8A-SYS, X8A-SYS-VPN or X8E-2BC).
Card guides ensure that the expansion card is reliably inserted.

➤ Push the expansion card further until it reaches the slot connector.

➤ Once the expansion card reaches the connector, lift the injector/ejector handle until it is fixed to the cross section of the case front (see figure 4-5, page 39).
If the injector/ejector handle switch pops up, the card is plugged in correctly.

➤ Screw the front panel of the expansion card to the **X8500** case.
The expansion card is installed. See chapter 4.5, page 62 for connecting the card.

Be sure to install a dummy front panel in any unused slot to ensure that emissions causing electromagnetic interference are prevented.

4.2.5   Optional SMFC on X8A-SYS and X8A-SYS-VPN

It is possible to install two SMFCs into X8A-SYS and X8A-SYS-VPN. One SMFC is located on the system card and is only accessible if the system card is not installed. The installation of this internal SMFC is described in the **X8500**

Installation Guide Expansion Cards and Modules supplied with your system card.

The second SMFC slot is located on the front of the system card and is always accessible. It can be installed optionally.
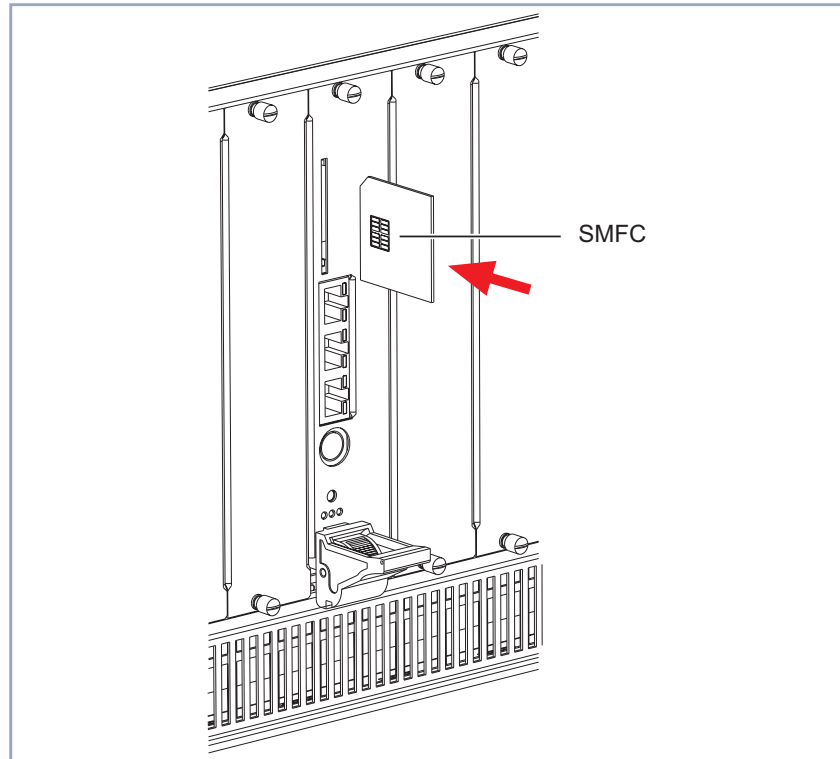
Proceed as follows:

Figure 4-9:   Insert SMFC into its slot

➤ Insert the optional Smart Media Flash Card into the "Smart Media Flash Card" slot on X8A-SYS or X8A-SYS-VPN (see figure 4-9, page 46, "SMFC").
Further information on X8A-SYS and X8A-SYS-VPN can be found in figure 5-1, page 77.

Information on how to connect your system card can be found in .

4.3 Installing or Replacing the Fan Insertion (X85-FAN)

The fan insertion, located in the fan cassette, can be installed or replaced easily. The fan insertion is hot swappable, meaning that you will be able to safely insert or remove the fan insertion while power is on.

The fan insertion is a wear part. BinTec Access Networks GmbH recommends to observe the necessary maintenance intervals after 3 years of operation.

Caution!

Electrostatic charges can damage electronic components. Please observe the following precautions to avoid damaging components:

➤ Ground yourself before unpacking components and before carrying out installation work on the equipment.

➤ Only grip boards and switches at the edges and do not touch cables or components.

Caution! Electric shock!

Do not touch any parts inside the slot when installing or replacing the fan cassette. There is a risk of electric shock!

➤ Do not touch any parts inside the slots of **X8500**!

4.3.1   Installation
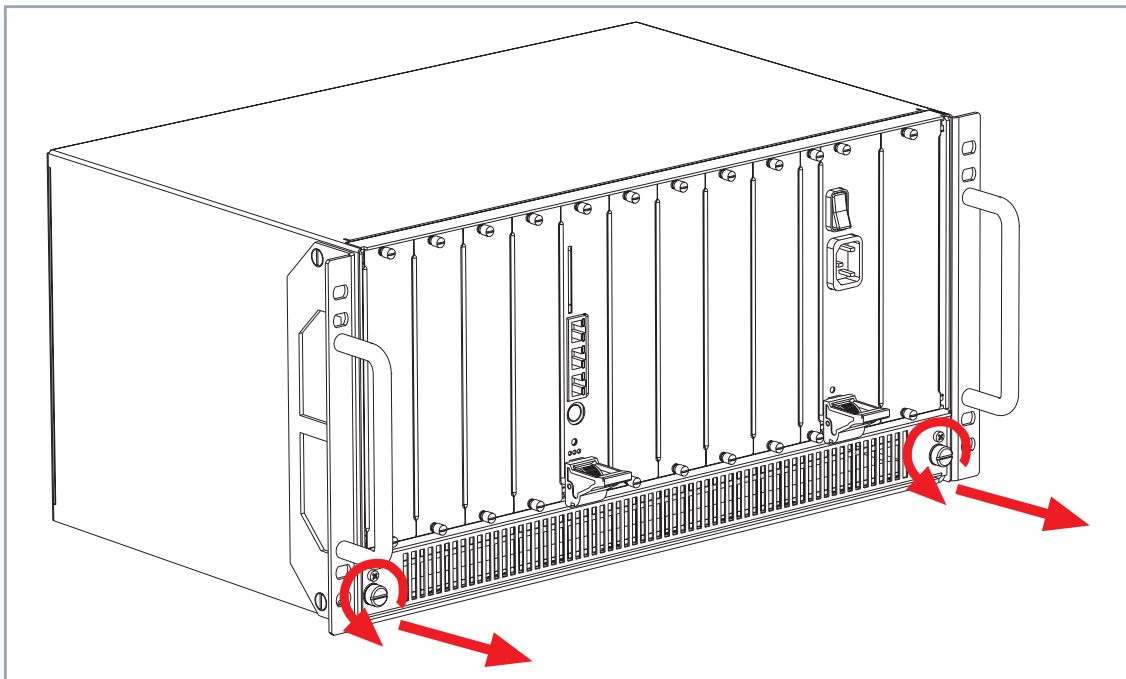
Following a diagram:

Figure 4-10:   Loosening the screws and removing the fan cassette

To install the fan insertion into the fan cassette, carry out the following steps:

➤ Loosen the two screws of the fan cassette by turning the screws to the left until they pop out of their position, see figure 4-10, page 49.

➤ Remove the fan cassette from the **X8500** case (see figure 4-11, page 50).
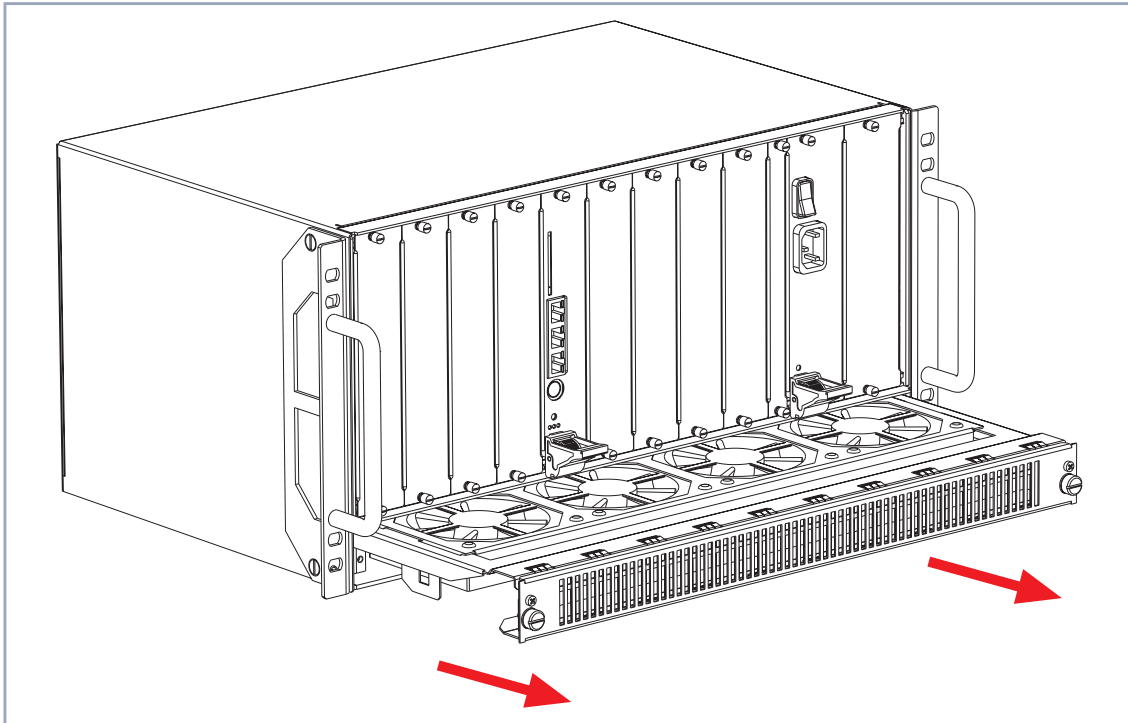
Removing the fan cassette:

Figure 4-11: Drawing out the fan cassette from the **X8500** case

➤ Turn the fan cassette upside down.

Prepare new fan insertion ➤ Have the new fan insertion ready for installation.

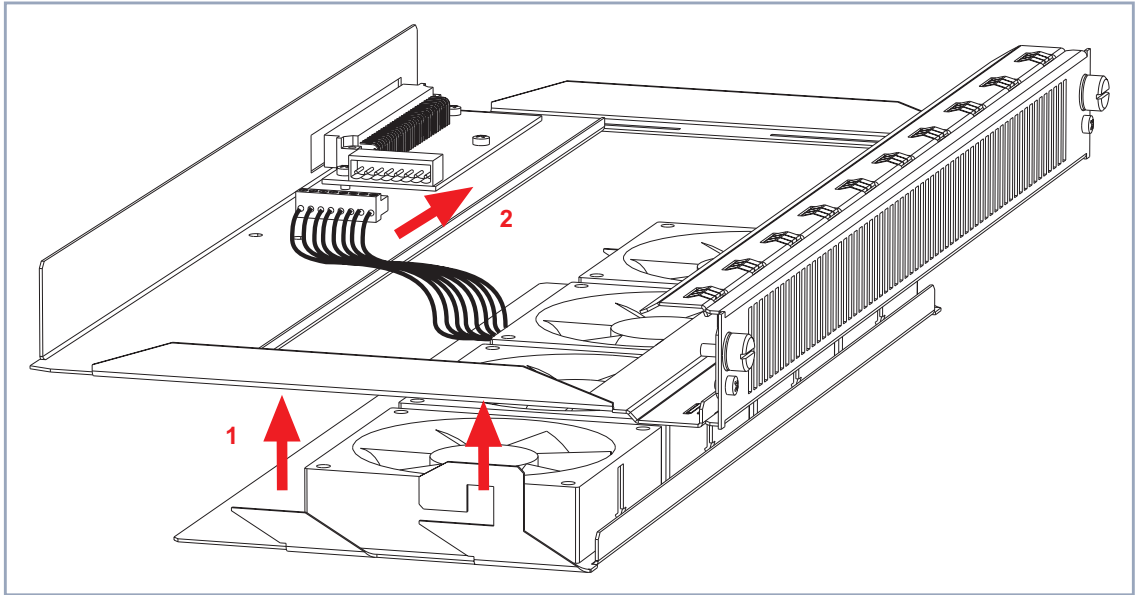Diagram of inserting and connecting the fan insertion:

Figure 4-12:   Inserting the fan insertion into the fan cassette

➤ Insert the fan insertion into the fan cassette as shown in figure 4-12, page 51, arrow no. 1.

➤ Connect the fan insertion plug to the fan cassette as shown in figure figure 4-12, page 51, arrow no. 2.
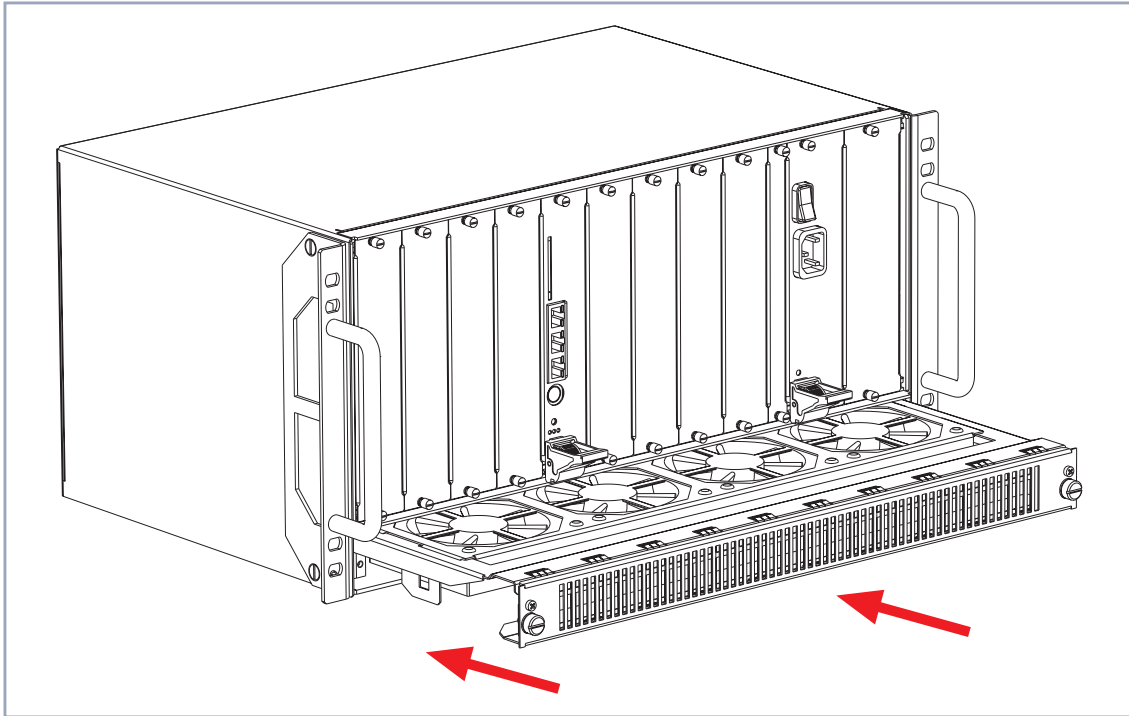
Diagram of inserting the fan cassette:

Figure 4-13:   Inserting the fan cassette into the fan slot

➤ Turn the fan cassette upside down again.

➤ Insert the fan cassette into the fan slot as shown in figure 4-13, page 52.

➤ Using the two screws you unfastened on the fan cassette, fasten the fan cassette to the **X8500** case by pressing and turning the screws to the right.

4.3.2   Removal

To remove the fan insertion, carry out the following steps:

➤ Loosen the two screws of the fan cassette by turning the screws to the left until they pop out of their position, see figure 4-10, page 49.

➤ Draw out the fan cassette from the **X8500** case, as shown in figure 4-11, page 50.

➤ Turn the fan cassette upside down.

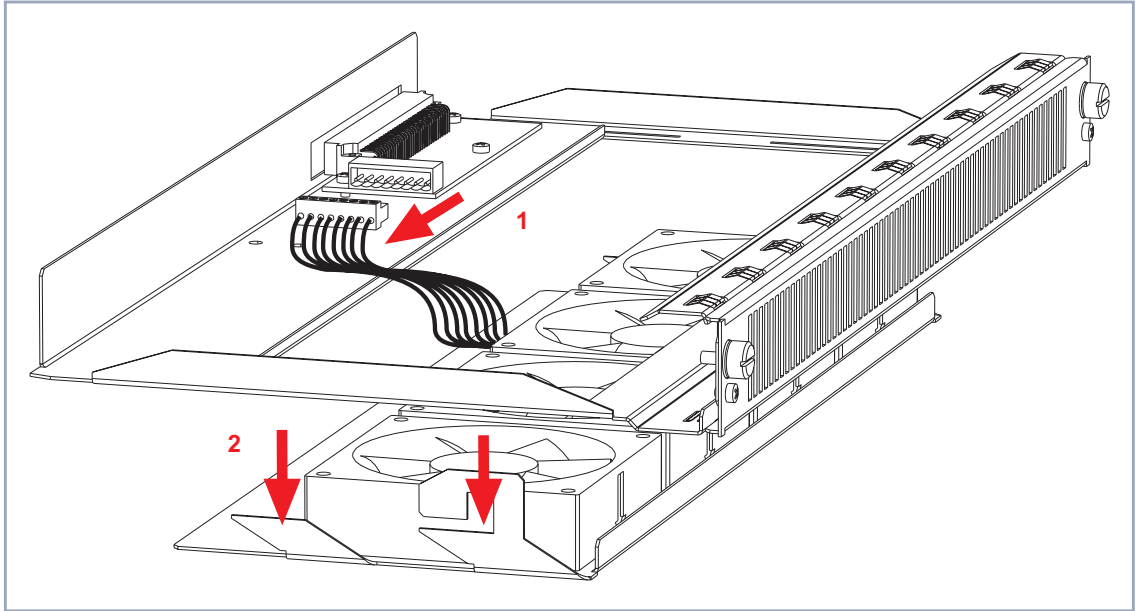Diagram of disconnecting the fan insertion from the fan cassette:

Figure 4-14:　Disconnecting the fan insertion from the fan cassette

➤ Disconnect the fan insertion plug from the fan cassette as shown in figure 4-14, page 53, arrow no. 1.

➤ Draw out the fan insertion from the fan cassette as shown in figure 4-14, page 53, arrow no. 2.

4.3.3　Replacement of Fan Insertion

To replace the fan insertion, carry out the following steps:

➤ Loosen the two screws of the fan cassette by turning the screws to the left until they pop out of their position, see figure 4-10, page 49.

➤ Draw out the fan cassette from the **X8500** case, as shown in figure 4-11, page 50.

➤ Turn the fan cassette upside down.

➤ Disconnect the fan insertion switch from the fan cassette as shown in figure 4-14, page 53, arrow no. 1.

➤ Draw out the fan insertion from the fan cassette as shown in figure 4-14, page 53, arrow no. 2.

➤ Insert the new fan insertion into the fan cassette as shown in figure 4-12, page 51, arrow no. 1.

➤ Connect the fan insertion plug to the fan cassette as shown in figure figure 4-12, page 51, arrow no. 2.

➤ Turn the fan cassette again.

➤ Insert the fan cassette into the fan slot as shown in figure 4-13, page 52.

➤ Using the two screws you unfastened on the fan cassette, fasten the fan cassette to the **X8500** case by pressing and turning the screws to the right.

4.4 Installing or Replacing the Power Supply Unit (X8A-PS)

The power supply unit X8E-PS can be installed and/or replaced like any of the **X8500** expansion cards.

X8500 will only be current-carrying, if the system card (X8A-SYS or X8A-SYS-VPN) and the power supply unit (X8A-PS) are installed.

4.4.1 Installation

This chapter describes how to install the power supply unit.

Danger! Electric shock!

The power supply unit X8A-PS is current-carrying after connection to the mains supply. There is a risk of electric shock.

➤ Connect the power supply unit X8A-PS with the mains supply only after installing it into **X8500**.
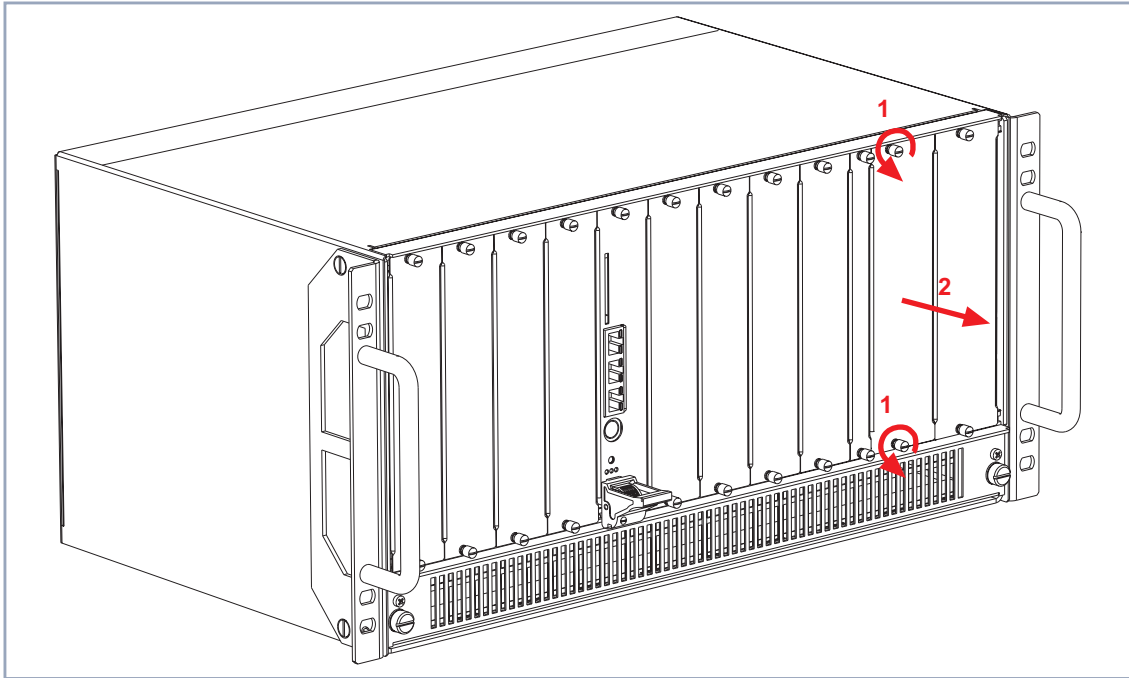
Proceed as follows:

Figure 4-15: Removing the power supply unit dummy front panel

➤ Loosen the screws of the power supply dummy front panel as shown in , arrow no. 1.

➤ Remove the dummy front panel as shown in , arrow no. 2.

Insert new power supply unit

➤ Insert the new power supply unit into the power supply slot until it reaches the slot connector.
Card guides ensure that the power supply unit is reliably inserted.

Caution!

Forcing the power supply unit into the power supply slot can damage the card or slot connector.

➤ Do not force the power supply unit into the power supply slot.

➤ Once the power supply unit reaches the connector, fix the injector/ejector handle to the cross section of the case front.
If the injector/ejector handle switch pops up, the power supply unit is plugged in correctly.

➤ Screw the front panel of the power supply to the **X8500** case.

Information on how to connect X8A-PS can be found in .

4.4.2   Removal

This is how to remove the power supply unit:

➤ Power down **X8500** and remove the mains plug to disconnect **X8500** completely from the power supply.
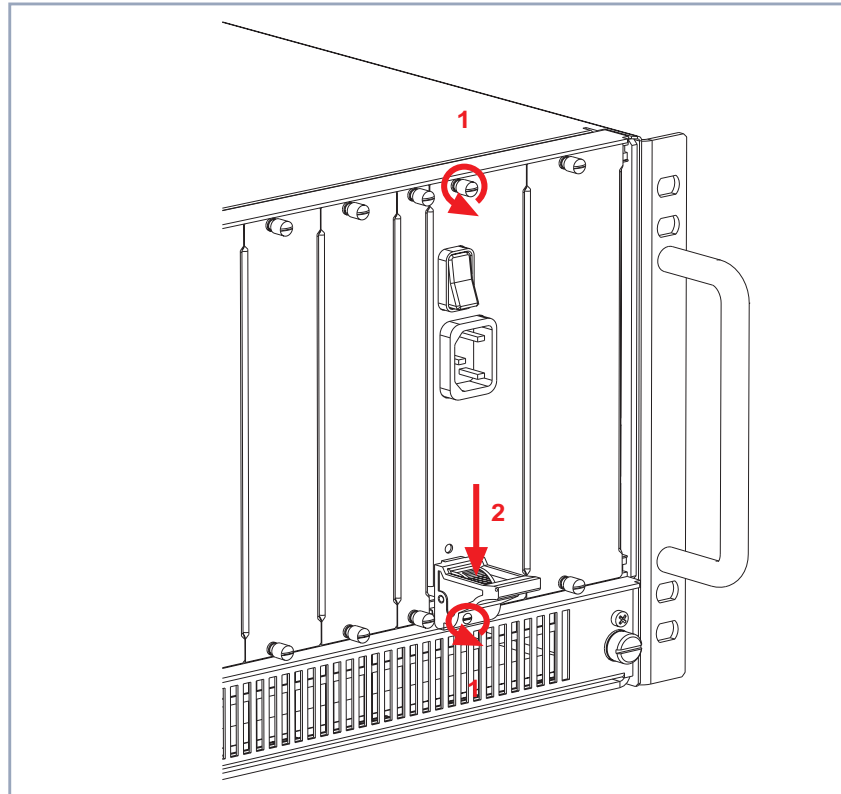
Proceed as follows:

Figure 4-16:   Removing the power supply unit

➤ Loosen the screw of the power supply front panel as shown in figure 4-16, page 58, arrows no. 1.

➤ Press the switch on the injector/ejector handle down in order to release the connection linked to the cross section of the case front, see figure 4-16, page 58, arrow no. 2.
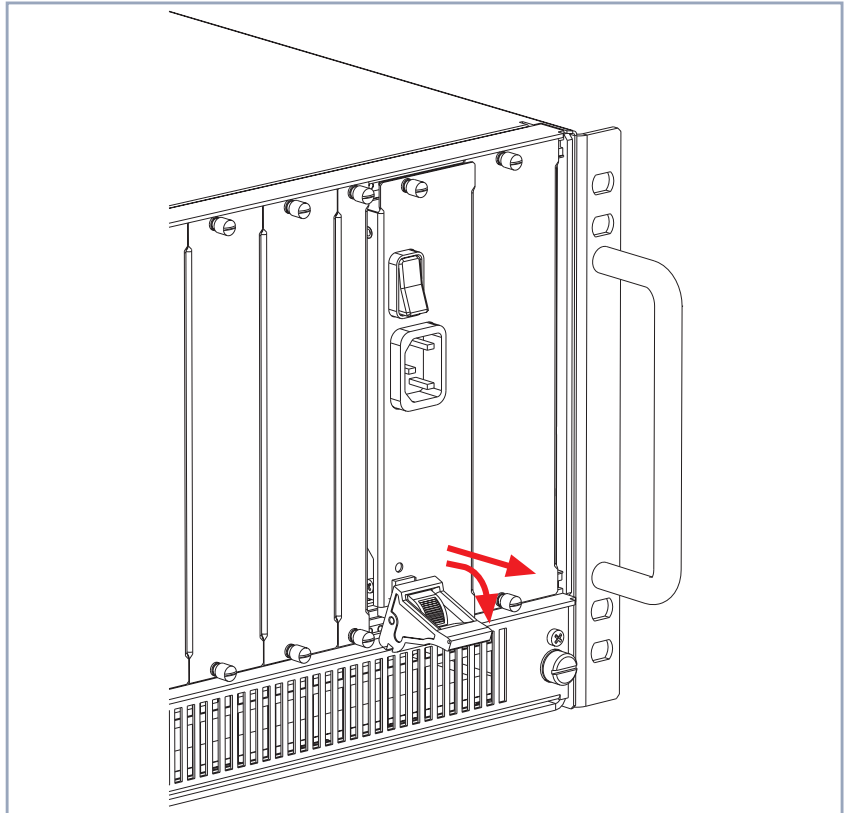
Proceed as follows:

Figure 4-17:   Replacing X8A-PS

➤ Push the injector/ejector handle (see figure 4-17, page 59) further down until the power supply unit comes out of its position.

➤ Draw the power supply unit out of the slot.

   The power supply unit is removed.

For a more detailed technical specification of the **X8500** power supply unit, see chapter 5.3, page 74.

4.4.3   Replacement

This is how to replace the power supply unit:

➤ Power down **X8500** and remove the mains plug to disconnect **X8500** completely from the power supply.

➤ Loosen the screw of the power supply front panel as shown in figure 4-16, page 58, arrows no. 1.

➤ Press the switch on the injector/ejector handle down in order to release the connection linked to the cross section of the case front, see figure 4-16, page 58, arrow no. 2.

➤ Push the injector/ejector handle (see figure 4-17, page 59) further down until the power supply unit comes out of its position.

➤ Draw the power supply unit out of the slot.

Insert new power   ➤ Insert the new power supply unit into the power supply slot until it reaches
supply unit   the slot connector.
Card guides ensure that the power supply unit is reliably inserted.

Caution!

Forcing the power supply unit into the power supply slot can damage the card or slot connector.

➤ Do not force the power supply unit into the power supply slot.

➤ Once the power supply unit reaches the connector, fix the injector/ejector handle to the cross section of the case front.
If the injector/ejector handle switch pops up, the power supply unit is plugged in correctly.

➤ Screw the front panel of the power supply to the **X8500** case.

The power supply unit is replaced.

Information on how to connect X8A-PS can be found in chapter 4.5.3, page 66.

4.4.4 Creating a Redundant System

When **X8500** runs with two power supply units, you can create a redundant power supply system.

N+1 redundancy system For an n+1 redundancy system two power supply units have to be fitted into the **X8500** power supply slots. As soon as a second power supply unit is plugged in, the two power supply units mutually supply **X8500** with power via load sharing. The n+1 redundancy also ensures that if one power supply unit is removed or damaged, the other will automatically take over the power supply of the system.

Please note that if you want to maintain an uninterrupted power supply system, make sure that both power supply units are operating and functioning.

Perform the following tasks to enable a redundancy system:

➤ Plug in a second power supply unit as described in "Installation", page 55.

In order to create a redundant power supply system, you can purchase a second power supply unit from your local distributor.
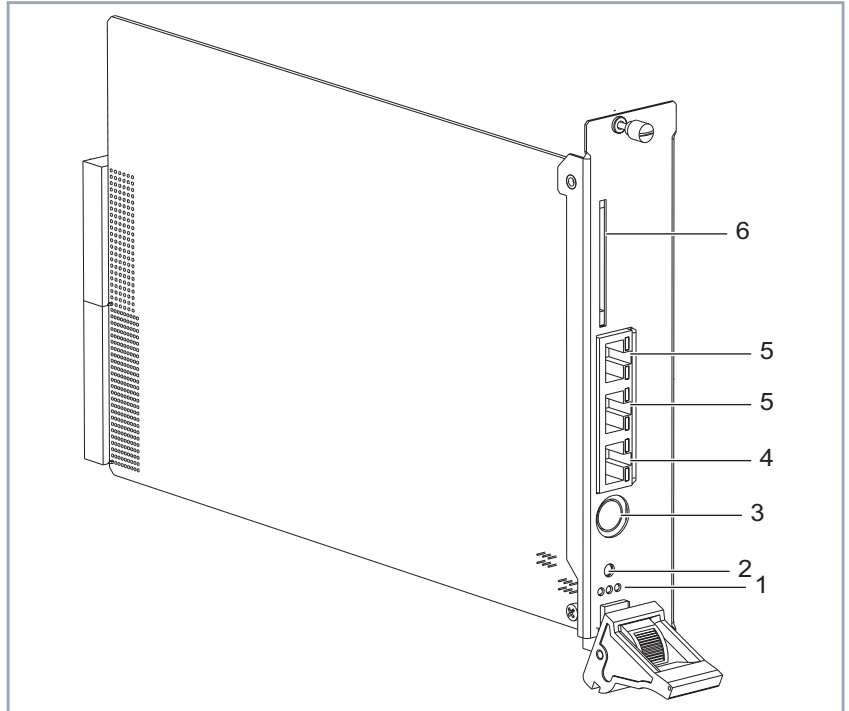
4.5 Setting up and Connecting

This chapter covers:

■ Connecting the X8A-SYS or X8A-SYS-VPN (see)

■ Connecting expansion cards (see)

■ Connecting **X8500** the power supply (see)

4.5.1   Connecting the X8A-SYS and X8A-SYS-VPN

This is what X8A-SYS looks like:

1	Status LEDs	4	ISDN/WAN Basic Rate Interface
2	Reset button	5	10/100 Mbps LAN 1 and LAN 2 Fast Ethernet Interfaces
3	Serial console interface	6	Smart Media Flash Card slot

Figure 4-18:   The X8A-SYS system card

Connecting X8A-SYS to the serial port

Proceed as follows:

➤ Connect the serial port of your PC (COM1 or COM2) or terminal to the console interface of X8A-SYS (see figure 4-18, page 63, no. 3) if you want to carry out your initial configuration steps via the serial console port. Use only the serial cable supplied with the equipment.

**Connecting X8A-SYS
to the LAN**

⚠️ **Caution!**

Incorrect cabling of ISDN or LAN interfaces can cause your router to malfunction!

➤ Only connect the LAN interface of **X8500** to the LAN interface of the hub and the ISDN interface of **X8500** to the ISDN connection.

➤ Connect the LAN interface (see figure 4-18, page 63, no. 5) of the X8A-SYS card to your hub. Use only LAN cables suitable for CAT5. A poorer quality cable can cause **X8500** to malfunction.

**Connecting X8A-SYS
to the WAN**

Please note that the X8A-SYS expansion card requires that you use Twisted Pair (shielded or unshielded) cables as WAN cables.

➤ Connect the X8A-SYS card's ISDN/WAN interface (see figure 4-18, page 63, no. 4) to your ISDN connection using a RJ-45 cable, if you want to use it for initial configuration, e.g. via isdnlogin.

X8A-SYS-VPN

The high performance system card X8A-SYS-VPN is connected exactly in the same way as X8A-SYS even though its appearance is different:
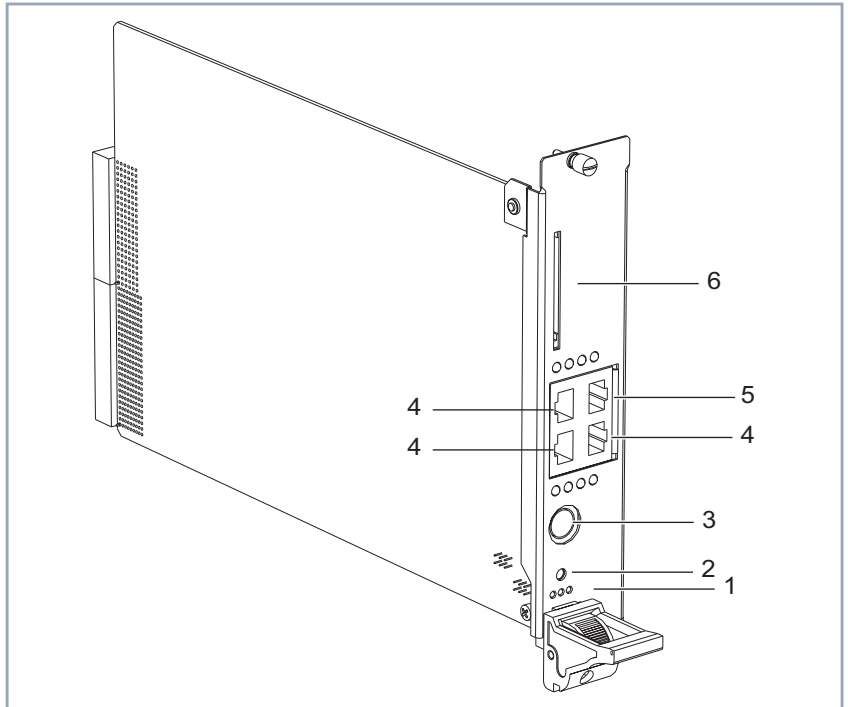
1	Status LEDs	4	10/100 Mbps LAN 1 and LAN 2 Fast Ethernet Interfaces
2	Reset button	5	ISDN/WAN Basic Rate Interface
3	Serial console interface	6	Smart Media Flash Card slot

Figure 4-19:   The X8A-SYS-VPN system card

To connect this system card, proceed as is described above.

4.5.2 Connecting the X8500 Expansion Cards

Proceed as follows to connect your expansion card:

Please note that expansion cards for WAN connections require that you use Twisted Pair (shielded or unshielded) cables as WAN cables.

➤ Plug the necessary interface cables of your expansion card into the sockets provided.

Two RJ45 sockets – IN and OUT – are available per interface on the PRI (resp. G.703) expansion cards:

➤ Connect the expansion card by connecting the cable to the IN socket.
You can connect a backup router via the OUT socket as an option, which can then take over the function of the first router if this is switched off or fails.

4.5.3 Connecting X8500 to the Power Supply

Proceed as follows:

X8500 will only be current-carrying, if the system card (X8A-SYS or X8A-SYS-VPN) and the power supply unit (X8A-PS) are installed.

➤ Connect **X8500** to a mains socket or to the power supply of the 19-inch cabinet using the IEC AC power cord supplied with the equipment.

➤ Switch on **X8500**.

The green LED of the power supply unit lights after five seconds.

X8500 selftest   **X8500** carries out a selftest (see chapter 4.6, page 68). If you have connected all the cables correctly, the red LED on the system card turns off at the end of the selftest.

The status messages of the expansion cards displayed by LEDs are described in chapter 5, page 71.

4.6 Boot Sequence

X8500 passes through various functional states on booting:

■ Start Mode

■ BOOTmonitor Mode

■ Normal Operation Mode

After several selftests have been successfully performed, **X8500** arrives at the BOOTmonitor Mode. The BOOTmonitor prompt is displayed if you are connected to **X8500** via a terminal program.

To log on to **X8500**, please refer to the **Software Configuration Guide** of **X8500**.

The **Software Configuration Guide** for **X8500** will be available on BinTec's WWW server with the official release.

BOOTmonitor Press the **Space bar** within four seconds of the display of the BOOTmonitor prompt if you want to use the BOOTmonitor functions. If you do not make an entry within four seconds, **X8500** changes back to normal operation mode.

Functions The BOOTmonitor makes the following functions available, which you select by entering the relevant digit (for more detailed information, refer to **Software Reference**):

■ (1) Boot System:
X8500 loads the compressed boot file from the flash memory to the working memory. This happens automatically when started.

■ (2) Software Update via TFTP:
X8500 performs a software update via a TFTP server.

■ (3) Software Update via XMODEM:
X8500 performs a software update over a serial interface with XMODEM.

■ (4) Delete Configuration:
X8500 is reset to the unconfigured ex works state. All configuration files are deleted and the BOOTmonitor settings are set to the default values.

■ (5) Default BOOTmonitor Parameters:
You can change the default settings of the **X8500** BOOTmonitor, e.g. the baud rate for serial connections.

If you change the baud rate (the preset value is 9600 baud), make sure the terminal program used also uses this baud rate. If this is not the case, you will not be able to establish a serial connection to **X8500**!

5 Technical Data

This chapter provides for the technical data of **X8500**. The following is covered:

- ■ **X8500** case (X85-RACK, equipped with power supply and fan unit, see)

- ■ Fan unit X85-FAN (see)

- ■ Power supply unit X8A-PS (see)

- ■ System cards X8A-SYS and X8A-SYS-VPN (see)

- ■ Expansion card for E3 (see)

- ■ Expansion card for PRI/G.703 (see)

- ■ Expansion card for X.21/V.35 interfaces ()

- ■ Expansion card X8E-2BC and communication modules (see)

- ■ Expansion card X8E-DSP (see)

- ■ Resource modules (see)

- ■ Status LEDs (see)

- ■ Interface specifications (see)

5.1 **X8500** Case Specification

General **X8500** features:

Feature	Description
Dimensions	W x H x D in mm, including handles 482.6 x 220 x 320
Weight (incl. fan unit, mains unit)	10 kg
Transport weight (incl. documentation, cabling, packaging)	13 kg
Ambient requirements: Storage temperature Operating temperature Relative humidity Room classification	 max. 40 ˚C 0 ˚C to 40 ˚C 20 to 90 % non-condensing in operation 5 to 95 % non-condensing in storage Operate only in dry rooms
Printed documentation supplied with equipment	**Hardware Installation Guide** (supplied with X8A-BOSS) **Software Configuration Guide** (available on BinTec's WWW server with the official release of X8A-BOSS) **Installation Guide** for the expansion cards and resource modules (supplied with each expansion card or resource module) **Installation Guide** for the fan unit (supplied with the fan unit) **Installation Guide** for the power supply unit (supplied with the power supply unit) **Installation Guide** for the rack (supplied with X85-RACK)

Table 5-1: **X8500** technical data

5.2   Fan Unit (X85-FAN) Specification

Technical data:

Feature	Description
Electrical connection	12 V DC
Max. power consumption	1.1 A
Max. volume flow	ca. 200 m^3/h
Nominal speed	3250 rpm
Ambient temperature	0-40˚C
MTBF	70,000 hours
Dimension	410 x 142 x33 mm
Weight	ca. 0.9 kg

Table 5-2:   Fan unit technical data

5.3 Power Supply Unit (X8A-PS) Specification

Connect the IEC AC socket of the power supply unit X8A-PS to the power supply using the power cord supplied with the equipment.

Technical data:

Feature	Description
Max. power consumption	3 A
Input: Wide auto range input Frequency range	 100 to 240 VAC 50/60 Hz
Output: Single output Maximum power Minimum load Connector	 12 VDC +- 0,5V 200 W 0 W DIN 41612, type C male
Environment: Max. operating temperature Relative Humidity Mean Time between Failures (MTBF)	 0-70 ˚C 5 - 95 % (Non-condensing) 50,000 hours
Dimension	174 x 46 x 268 mm
Mounting position	vertical
Weight	ca. 1.1 kg

Feature	Description
Control:	
LED	green, indicating ON/OFF
Redundancy	yes, with max. 2 power supplies; N+1 operation
Load sharing	passive; N+1 operation
internal I^2C	for temperature sensor and control signal read-out
Power Factor Correction (PFC)	active

Table 5-3:   X8A-PS technical data

5.4 X8A-SYS / X8A-SYS-VPN Specifications

The expansion card X8A-SYS or X8A-SYS-VPN is the control unit of **X8500**. One BRI port, one serial console interface, and two resp. three Fast Ethernet ports are available for local and remote configuration, routing, data transfer, administration and monitoring of **X8500**.
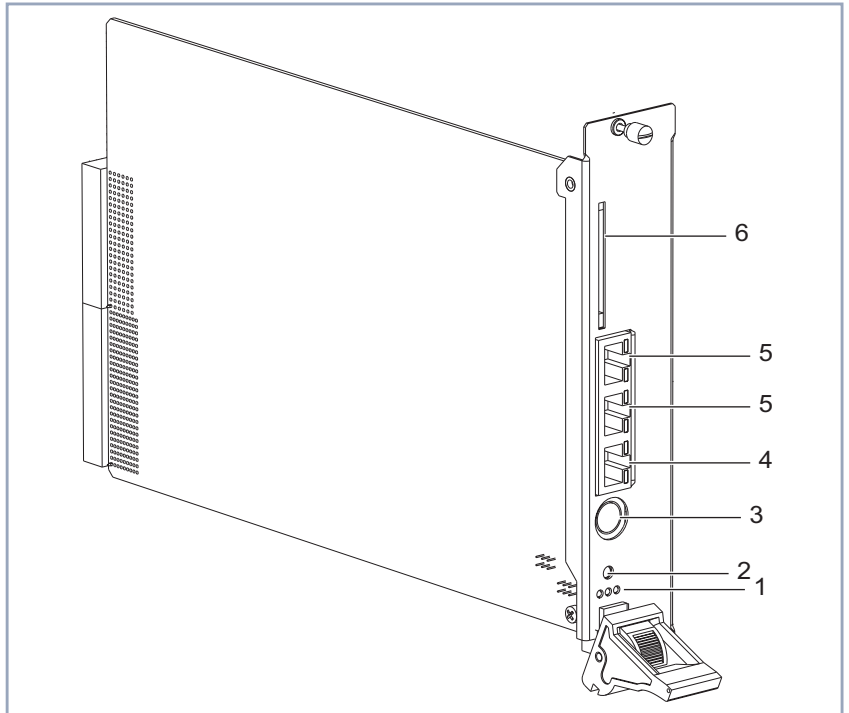
Note that X8A-SYS-VPN supports the following Communication Modules (mounted on an X8E-2BC expansion card):

■ CM-BRI

■ CM-2BRI

■ CM100BT

CM-X21 and CM-PRI are no longer supported, but you can use the **X8500** native X8E-SYNC or X8E-2/4PRI/G.703 expansion card instead.

X8A-SYS supports all Communication Modules.

**Diagram of X8A-SYS** An X8A-SYS expansion card looks like this:

1	Status LEDs (see chapter 5.11, page 96)	4	ISDN/WAN Basic Rate Interface (with two LEDs)
2	Reset button	5	10/100 Mbps LAN 1 and LAN 2 Fast Ethernet Interfaces (with two LEDs each)
3	Serial console interface	6	Smart Media Flash Card slot

Figure 5-1:   X8A-SYS expansion card

Diagram of X8A-SYS-VPN   An X8A-SYS-VPN expansion card looks like this:
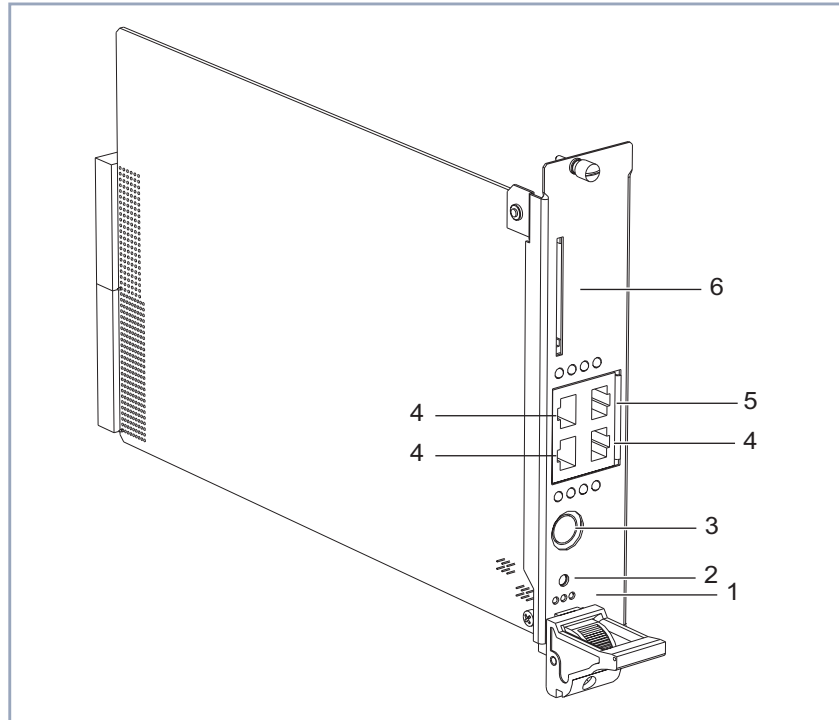
1	Status LEDs (see chapter 5.11, page 96)	4	10/100 Mbps LAN 1 and LAN 2 Fast Ethernet Interfaces
2	Reset button	5	ISDN/WAN Basic Rate Interface
3	Serial console interface	6	Smart Media Flash Card slot

Figure 5-2:   X8A-SYS-VPN system card

X8A-SYS and X8A-SYS-VPN status messages via LEDs

LAN LEDs   The LAN interfaces (see table 5-1, page 77, no. 5) have two LEDs per interface. The following table lists the status messages:

LED	State	Meaning
Red	On	LAN traffic: transmitting or receiving packets.
Green	Off	Network interface down.
	On	10 Mbps mode enabled.
	Blinking	100 Mbps mode enabled.

Table 5-4:   System card LAN interface LED status messages

BRI LEDs   The BRI interface (see table 5-1, page 77, no. 4) has two LEDs. The following table lists the status messages:

LED	State	Meaning
Red	Off	No connection.
	On	1 B-channel in use.
	Blinking	2 B-channels in use.
Green	Off	ISDN cable not connected (error).
	On	D-channel protocol found (OK).
	Slow Blinking	D-channel protocol found and Layer 1 is activated (OK).
	Fast Blinking	Layer 1 is activated but no D-channel protocol was found (error).

Table 5-5:   System card Basic Rate Interface LED status messages

Technical data The following table lists the technical data of the X8A-SYS and X8A-SYS-VPN expansion cards:

| Feature	Description
1 external slot	for Smart Media Card (SMC)
1 internal slot	for Smart Media Card (SMC)
1 SODIMM slot	exchangeable memory module
Interfaces	X8A-SYS: 2 x 10/100 Base-T auto sensing X8A-SYS-VPN: 3 x 10/100 Base-T auto sensing 1 BRI 1 serial
Operating temperature	0 ˚C to 40 ˚C
Relative humidity	20 to 90 % non-condensing in operation 5 to 95 % non-condensing in storage

Table 5-6:   Technical data X8A-SYS and X8A-SYS-VPN

5.5   E3 Expansion Card Specifications

An E3 expansion card is available with either one or two E3 interfaces licensed. An X8E-1E3 card can be upgraded to an X8E-2E3 card by purchasing a hardware upgrade license. See chapter 3.2.1, page 25 and chapter 3.2.3, page 28 for further information.

Diagram of an E3 expansion card   An X8AE-1/2E3 card looks like this:
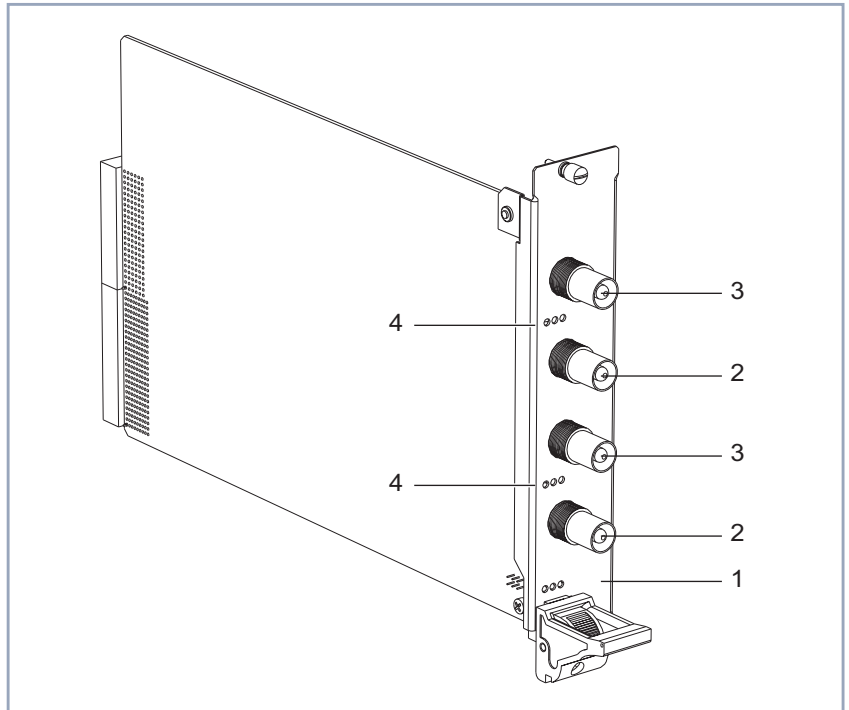
1	Status LEDs (see chapter 5.11, page 96)	3	E3 socket for Rx
2	E3 socket for Tx	4	E3 LEDs

Figure 5-3:   E3 expansion card

LEDs The E3 interfaces have three LEDs per port (three for each two sockets). The following table lists the status messages:

LED	State	Meaning
Red	On	Error transmitting a packet.
Amber	On	Data packets are being sent or received.
Green	On	E3 link is established.

Table 5-7:   E3 LED status messages

Technical data The following table lists the technical data of the PRI/G.703 expansion card:

Feature	Description
Interfaces	2 interfaces for E3 connections with two sockets each (Rx and Tx).
Operating temperature	0 ˚C to 40 ˚C
Relative Humidity	20 to 90 % non-condensing in operation 5 to 95 % non-condensing in storage

Table 5-8:   Technical data E3 expansion card

5.6 PRI/G.703 Expansion Card Specifications

A PRI/G.703 expansion card is available with either two or four PRI/G.703 ports licensed, as described in chapter 3.2.1, page 25. It is also a resource carrier card and can be equipped with resource modules.

Diagram of the PRI/ G.703 expansion card

The PRI/G.703 expansion card looks as follows:
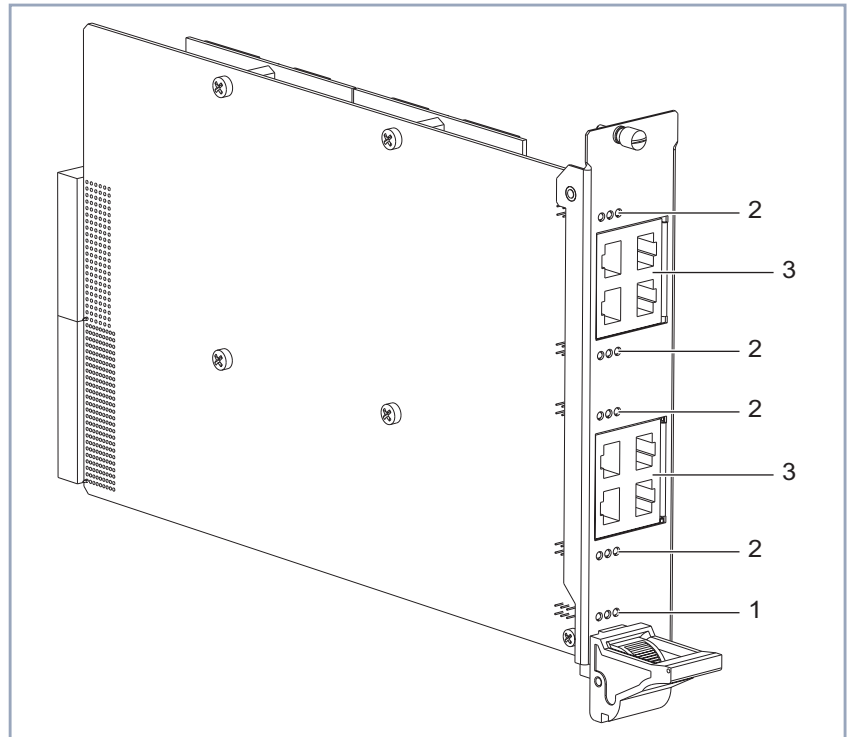
1	Status LEDs (see chapter 5.11, page 96)	3	ISDN PRI/G.703 ports with IN and OUT sockets
2	ISDN PRI/G.703 LEDs		

Figure 5-4:   PRI/G.703 expansion card

LEDs   The PRI/G.703 interfaces have three LEDs per port. The following table lists the status messages:

LED	State	Meaning
Red	On	One to 15 B-channels are in use.
Red	Blinking	More than 15 B-channels are in use.
Amber	On	D-channel currently in use, protocol stack is loaded.
Green	On	Layer 1 of ISDN connection is stable.

Table 5-9:   PRI/G.703 LED status messages

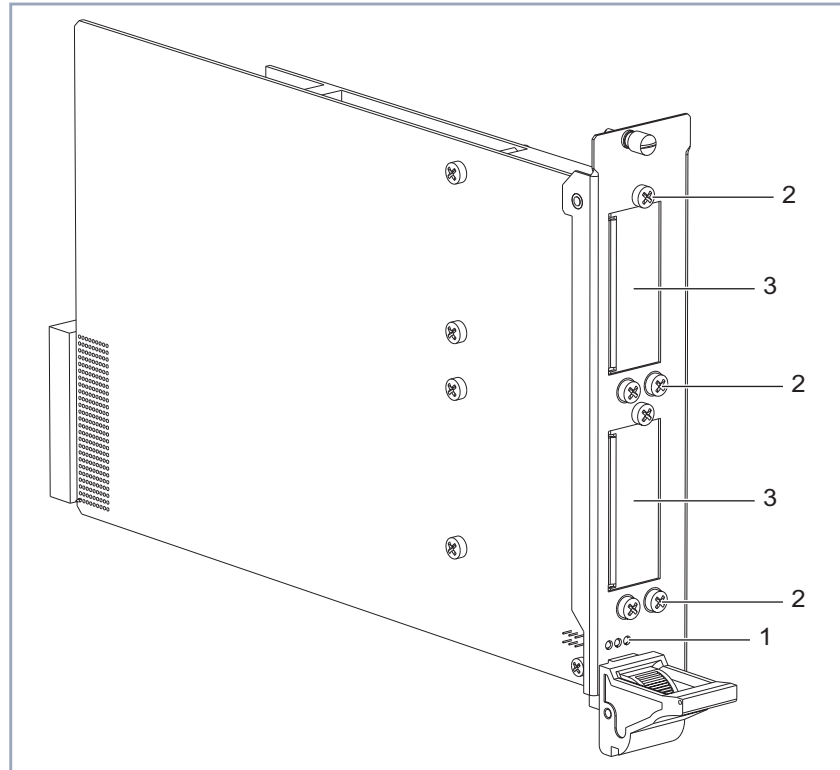**Technical data**   The following table lists the technical data of the PRI/G.703 expansion card:

Feature	Description
Interfaces	4 interfaces for ISDN PRI/G.703 with 2 sockets each (IN and OUT) If **X8500** is switched off, the IN socket is looped to the OUT socket.
Operating temperature	0 ˚C to 40 ˚C
Relative Humidity	20 to 90 % non-condensing in operation 5 to 95 % non-condensing in storage
Extensions	2 slots for resource module with digital modem

Table 5-10:   Technical data PRI/G.703 expansion card

5.7   X.21/V.35 Expansion Card Specifications

The X.21/V.35 expansion card is available with two our four X.21/V.35 interfaces, as described in chapter 3.2.1, page 25. The X8E-2SYNC expansion card is also a resource carrier card and can be equipped with one XT-2SYNC resource module.

Diagram of X21/V.35 expansion card

This is what X8E-4SYNC looks like:
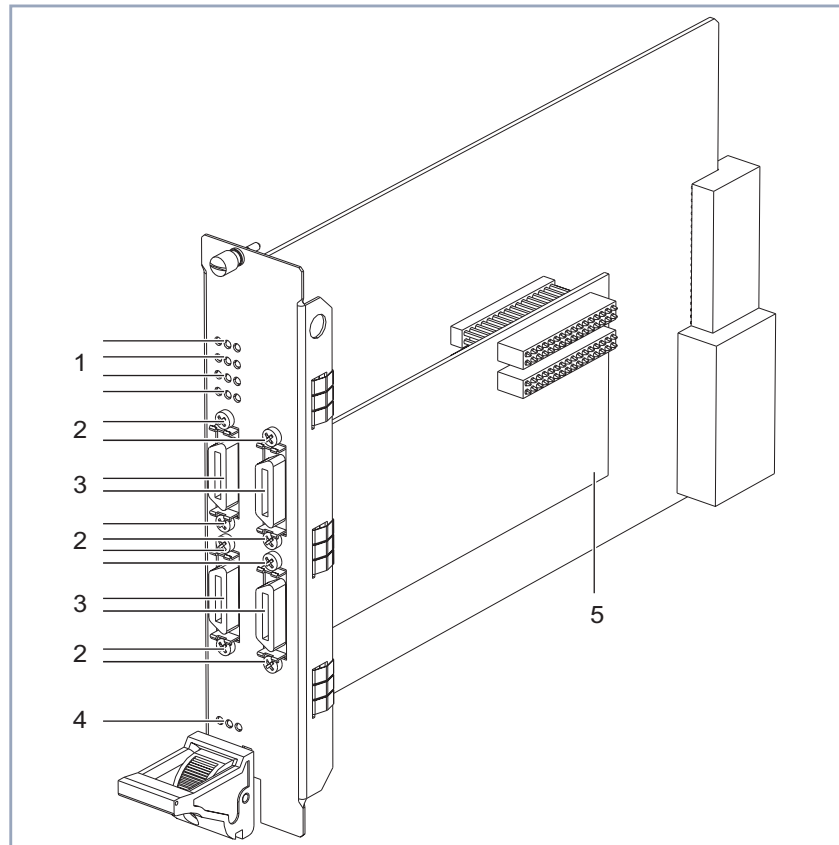
1	X.21/V.35 port LEDs	4	Status LEDs (see chapter 5.11, page 96)
2	M2.5 screws	5	XT-2SYNC
3	X.21/V35 ports		

Figure 5-5:   X8E-4SYNC expansion card

LEDs   The X.21/V.35 interfaces have three LEDs per port. The following table lists the status messages:

LED	State	Meaning
Red	On	Error transmitting a packet.
Amber	On	Frame being sent/received.
Green	On	Layer 1 is active (i.e. incoming and outgoing calls are possible).

Table 5-11:   X.21/V.35 LED status messages

Technical data   The following table lists the technical data of the X.21/V.35 expansion card:

Feature	Description
Interfaces	2/4 interfaces for X.21/V.35
Operating temperature	0 ˚C to 40 ˚C
Relative Humidity	20 to 90 % non-condensing in operation 5 to 95 % non-condensing in storage
Extension (only X8E-2SYNC)	1 slot for resource module XT-2SYNC

Table 5-12:   Technical data X.21/V.35 expansion card

5.8   X8E-2BC Specifications

The expansion card X8E-2BC is a module carrier card and can be equipped with BIANCA/BRICK communications module(s).

Diagram of X8E-2BC   This is what X8E-2BC looks like:

1	Status LEDs (see chapter 5.11, page 96)	3	Dummy covers
2	Screws		

Figure 5-6:   X8E-2BC expansion card

Technical data   The following table lists the technical data of the X8E-2BC expansion card:

Feature	Description
Extensions	2 slots for BIANCA/BRICK communications modules
Interfaces	depending on mounted BIANCA/BRICK communications modules
Operating temperature	0 ˚C to 40 ˚C
Relative Humidity	20 to 90 % non-condensing in operation 5 to 95 % non-condensing in storage

Table 5-13:   Technical data X8E-2BC

BRICK communication modules   The following BIANCA/BRICK communications module(s) can be mounted onto the X8E-2BC expansion card:

- CM-BRI (chapter 5.8.1, page 90)
- CM-2BRI (chapter 5.8.2, page 90)
- CM-X21 (chapter 5.8.3, page 91)
- CM-PRI (chapter 5.8.4, page 91)
- CM-100BT (chapter 5.8.5, page 92)

Note that X8A-SYS-VPN supports the following Communication Modules (mounted on an X8E-2BC expansion card):

- CM-BRI
- CM-2BRI
- CM100BT

CM-X21 and CM-PRI are no longer supported, but you can use the **X8500** native X8E-SYNC or X8E-2/4PRI/G.703 expansion card instead.

X8A-SYS supports all Communication Modules.

5.8.1 CM-BRI LEDs

The CM-1BRI is a basic rate interface adapter with one BRI port supporting the standard D-channel for signalling, and two B (bearer) channels for data transfers.

Status messages via LEDs:

LED	State	Meaning
Red	On	One B-channel is in use.
Red	Blinking	Two B-channels are in use.
Amber	On	D-channel currently in use, protocol stack is loaded.
Green	On	Layer 1 of ISDN connection is stable.

Table 5-14:   CM-BRI LED status messages

5.8.2 CM-2BRI LEDs

The CM-2BRI is a basic rate interface adapter with two BRI ports supporting four B-channels and two D-channels for signalling.

Status messages via LEDs (3 LEDs per interface):

LED	State	Meaning
Red	On	One B-channel is in use.
Red	Blinking	Two B-channels are in use.
Amber	On	D-channel currently in use, protocol stack is loaded.
Green	On	Layer 1 of ISDN connection is stable.

Table 5-15:   CM-2BRI LED status messages

5.8.3   CM-X21 LEDs

The CM-X21 module provides a standard X.21 interface which complies with the V.11 recommendation. The X.21 interface provides a full-duplex synchronous mode and can be configured to operate as either a DTE (passive mode) or DCE (active mode). When in active mode the X.21 interface can be set to operate at baud rates between 2.4 and 2048 kbps.

Status messages via LEDs (3 LEDs per interface):

LED	State	Meaning
Red	On	Error transmitting a packet.
Amber	On	Frame being sent/received.
Green	On	Layer 1 is active (i.e. incoming and outgoing calls are possible).

Table 5-16:   CM-X21 LED status messages

5.8.4   CM-PRI LEDs

The CM-PRI is a Primary Rate Interface adapter with one S_{2M}-interface (marked IN), and one OUT port which can be used with internal relays for PRI Circuit Switching. This allows a connected PRI line to be automatically switched over to a backup router if **X8500** is powered down.

The CM-PRI supports one D-channel for signalling and up to 30 B-channels for data transfer. In addition, the CM-PRI is prepared to work with BinTecs modem modules.

For the CM-PRI communication module, hardware revision 2.0 and newer are supported.

Status messages via LEDs (3 LEDs per interface):

LED	State	Meaning
Red	On	One to 15 B-channels are in use.
Red	Blinking	More than 15 B-channels are in use.
Amber	On	D-channel currently in use, protocol stack is loaded.
Green	On	Layer 1 of ISDN connection is stable.

Table 5-17:   CM-PRI LED status messages

5.8.5   CM-100BT LEDs

The CM-100BT is a 10/100 Mbps Ethernet module. The back plane offers a twisted pair port for the attachment of a switch or hub using Category 5 STP cable.

Status messages via LEDs (3 LEDs per interface):

Color	State	Meaning
Red	On	Receiving packets.
Amber	On	Transmitting packets.
Green	On	10 Mbps mode enabled.
	Blinking	100 Mbps mode enabled.
	Off	Network interface down.

Table 5-18:   CM-100BT LED status messages

5.9   X8E-DSP Specifications

The expansion card X8E-DSP is a resource carrier card and allows you to equip **X8500** with the XT resource modules (see chapter 5.10, page 95) e.g. for digital modems. In conjunction with e.g. X8E-4PRI, with X8E-DSP you can extend your WAN connections to up to 240 modem connections.

Diagram of X8E-DSP   This is what X8E-DSP looks like:

| 1 | Status LEDs (see chapter 5.11, page 96) |
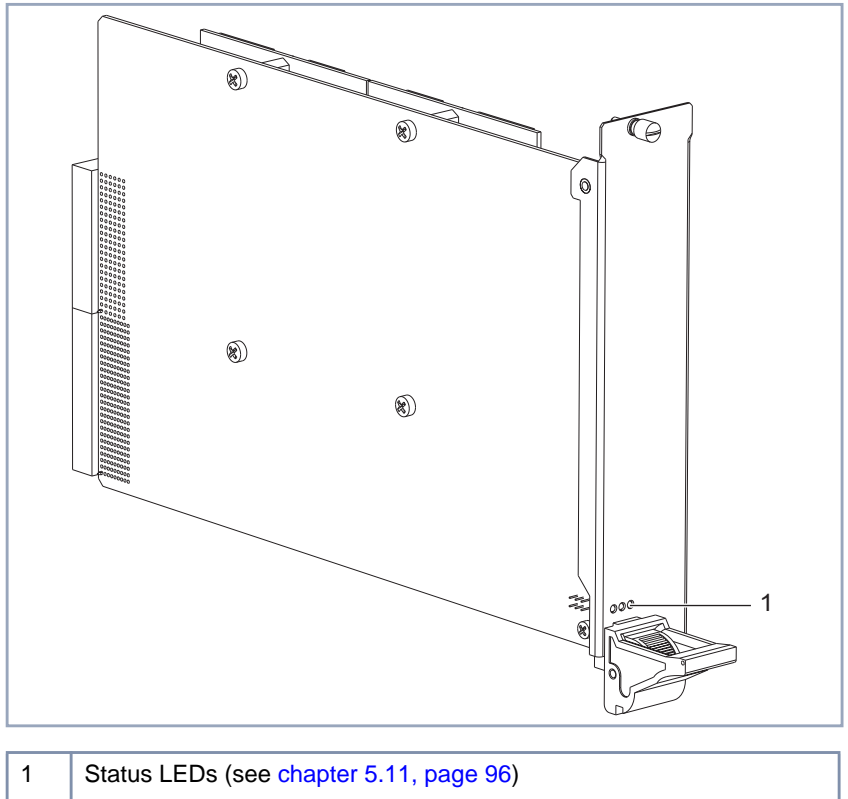
Figure 5-7:   X8E-DSP

Technical data The following table lists the technical data of the X8E-DSP expansion card:

Feature	Description
Extensions	2 slots for resource modules with e.g. digital modems or compression engines
Interfaces	no external interfaces
Operating temperature	0 ˚C to 40 ˚C
Relative Humidity	20 to 90 % non-condensing in operation 5 to 95 % non-condensing in storage

Table 5-19: Technical data X8E-DSP

5.10   Resource Module Specifications

The resource module XT-2SYNC can be mounted on an X8E-2SYNC expansion card. The module offers two X.21/V.35 interfaces.

The resource modules XT-S, XT-M, XT-2M, XT-L and XT-VPN can be mounted on a PRI/G.703 or X8E-DSP expansion card.

All resource modules (see chapter 3.2.2, page 27) have the following the ambient requirements:

Feature	Description
Operating temperature	0 ˚C to 40 ˚C
Relative humidity	20 to 90 % non-condensing in operation 5 to 95 % non-condensing in storage

Figure 5-8:   Ambient requirements of resource modules XT-S/M/2M/L/VPN/2SYNC

5.11 Status LEDs

There are three status LEDs on the front panel of each expansion card (including the system card) indicating the current status of the respective card. Each LED can convey different information according to which mode the expansion card is in.

The following modes are differentiated:

■ Insertion
With insertion we mean the process of inserting, plugging and fastening an expansion card. While inserting the expansion card, the ejector switch is open. Once the expansion is fully inserted, the ejector switch is closed.

■ Operation mode
The expansion cards are inserted, plugged and fastened. The ejector switch is closed.

■ Removal
With removal we mean the process of unfastening, unplugging and drawing an expansion card. The ejector switch is open.

Caution!

Removing an expansion card while all three status LEDs are on can cause damage to the system!

➤ Do not remove any expansion card while all three status LEDS are on!

Insertion   The following table lists the status messages the status LEDs show when you insert the card:

LED	State	Ejector Switch	Meaning
Red	On	Open	The expansion card is connected to the backplane but not fully inserted.
Amber	On	Open	The card power is OK, push further.
Red, then Green	On	Closed	The expansion card is fully inserted and ready to be integrated into the system (Red); the expansion card is running (Green) and in operation mode.

Table 5-20:   LED status messages for expansion cards, insertion mode

Operation mode   The following table lists the status messages the status LEDs show in operation mode:

LED	State	Ejector Switch	Meaning
Red	On	Closed	**X8500** boots.
Green	On	Closed	Expansion card is running.
Red and Green	Blinking, alternately	Closed	An error occurred either in hard- or software. Check syslog messages.

Table 5-21:   LED status messages for expansion cards, operation mode

Removal The following table lists the status messages the status LEDs show when the ejector switch is open and you remove the card:

LED	State	Ejector Switch	Meaning
Red, Green and Amber	On	Open	The expansion card is still running and the system begins to stop the drivers for hot swap supported devices. Do not remove the card in this state!
Amber	On	Open	The card is stopped. It is now safe to remove the card.

Table 5-22: LED status messages for expansion cards, removal mode

5.12 Interface Specifications

This chapter covers the interface specifications of:

- Serial console (X8A-SYS or X8A-SYS-VPN), see chapter 5.12.1, page 99

- LAN interface, see chapter 5.12.2, page 100

- ISDN BRI interface, see chapter 5.12.3, page 100

- ISDN PRI/G.703 interface, see chapter 5.12.4, page 101

- X.21/V.35 interface, see chapter 5.12.5, page 102

- E3 interface, see chapter 5.12.6, page 107.

5.12.1 Serial Console Interface

Pin assignment of serial console interface of the system board (X8A-SYS or X8A-SYS-VPN) (8-pole mini-DIN socket):
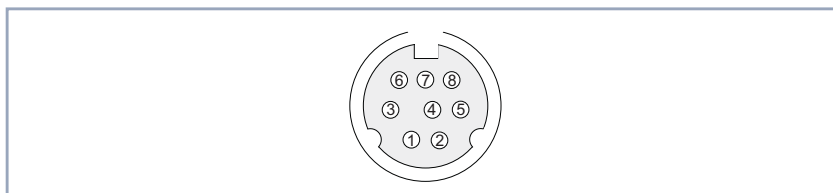
1	For test purposes	5	RXD
2	For test purposes	6	NC
3	TXD	7	NC
4	GND	8	NC

Figure 5-9:   Serial console interface with pin assignment

5.12.2 LAN Interface for 10/100 Mbps

Pin assignment   The LAN interfaces (RJ45 sockets) have the following pin assignment:
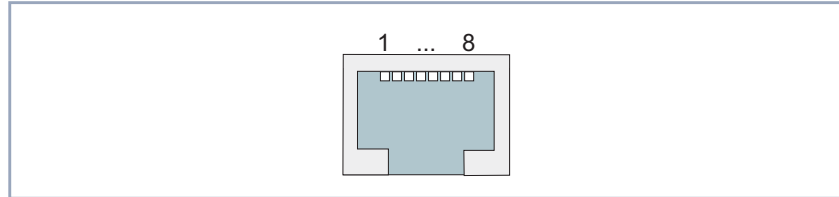
1	T+	5	Shield
2	T-	6	R-
3	R+	7	Shield
4	Shield	8	Shield

Figure 5-10:   LAN interface (RJ45 socket) with pin assignment

5.12.3 ISDN BRI Interface

Pin assignment   The ISDN BRI interface (RJ45 socket) has the following pin assignment:
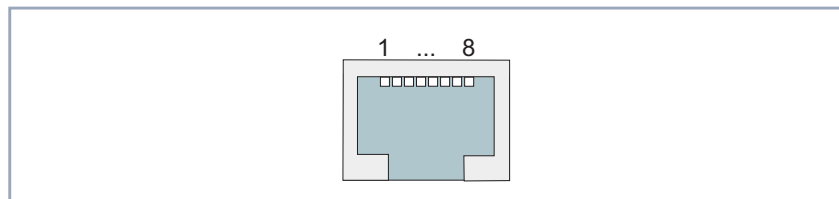
1	NC	5	R-
2	NC	6	T-
3	T+	7	NC
4	R+	8	NC

Figure 5-11:   ISDN BRI interface (RJ45 socket) with pin assignment

5.12.4   PRI/G.703 – WAN Interface

Pin assignment   Diagram of the ISDN PRI/G.703 interface:
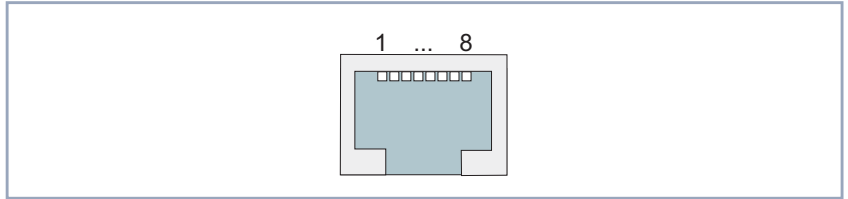
Figure 5-12:   ISDN PRI/G.703 interface (RJ45 socket) of PRI/G.703 expansion card

The ISDN PRI/G.703 interfaces have the following pin assignment:

Pin	Function	Normal marking on NT
1	Receive, NT to TE (+)	S2Mab/a
2	Receive, NT to TE (–)	S2Mab/b
3	Not used	
4	Transmit, TE to NT (+)	S2Man/a
5	Transmit, TE to NT (–)	S2Man/b
6-8	Not used	

Table 5-23:   ISDN PRI/G.703 interface (RJ45 socket)

For the installation of an NT (Network Terminator) for the PMX, it is advisable to install an appropriate main-socket with the above mentioned pin assignments for send and receive lines.

This will allow for easy connection of the BRICK's PRI interface using the included cable. Additionally, note that for the NT, a separate voltage supply (60 V) needs to be installed. The company that installs your NT should be informed that this voltage supply needs to be installed separately and is not being provided for by the connected end devices (usually a PBX for S_{2M} interfaces).

Special Note for NTs in Germany

In Germany, the send lines (NT->TE) on the connector block are often marked with S2Mab (a and b), and the receive lines (TE->NT) with S2Man (a and b).

On the NT itself, there are usually several LEDs provided for displaying various status conditions. The following indicators and their meanings seem to be somewhat standardized. In doubt, please refer to the operators manual for your NT:

LED	Marked	Meaning
1: Color green	NT	LED-on normally means that the proper voltage is being supplied.
2: Color red	UK2	LED-on (or blinking) normally means that the S_{2M} interface has not been activated at the switching station. In such cases, you will have to contact your local telephone company to have the interface activated.
3: Color red	S2M	LED-on normally means that signals are not being received from the end device.

Table 5-24:   NT LEDs and status conditions

5.12.5   X.21/V.35 – Serial WAN Interface

The serial port for X.21/V.35 can be used as the following types of interface:

■ X.21

■ V.35

You can choose the setting of the field **Connector** in the Setup Tool (see **Software Configuration Guide**) manually so that **X8500** can be operated in both DCE and DTE Mode.

The cables to be used are not supplied with **X8500**, but can be ordered from your dealer.

> We recommend you use original BinTec cables, which you can buy from your dealer.
>
> The use of other cables may cause damage to your equipment and invalidates the guarantee!

Plugs   The plugs generally used to connect **X8500** to X.21 and V.35 devices:

■

■

Socket   The socket provided as connector to **X8500** is described in .

DB-15 Plug for X.21

DB-15 plug for X.21   A DB-15 plug to ISO 4903 is normally used for an X.21 interface:
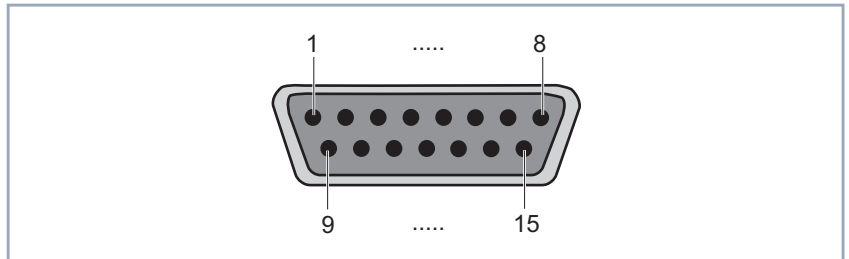
Figure 5-13:   DB-15 plug (DTE)

Pin assignment for DB-15 plug   The DB-15 plug (DTE) has the following pin assignment:

Signal	Pin no.	Source	Signal description
	1		Protection ground (shielding)
G	8		Signal ground
T (A) T (B)	2 9	DTE	Transmit data

Signal	Pin no.	Source	Signal description
R (A) R (B)	4 11	DCE	Receive data
C (A) C (B)	3 10	DTE	Control
I (A) I (B)	5 12	DCE	Indication
S (A) S (B)	6 13	DCE	Transmit and receive clock

Table 5-25:   Pin assignment of DB-15 plug for X.21 (ISO 4903)

M34 Plug for V.35

M34 plug for V.35   An M34 plug to ISO 2593 is normally used for a V.35 interface:
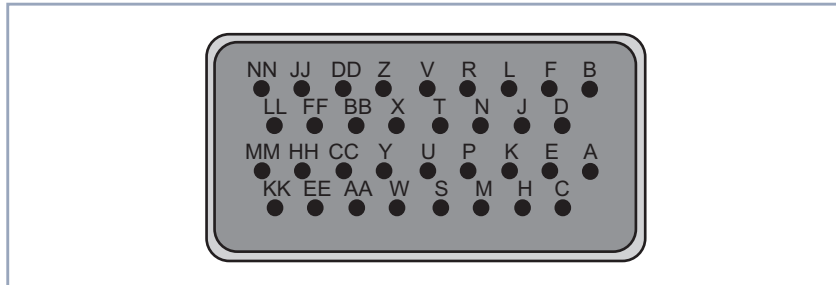
Figure 5-14:   M34 plug

Pin assignment of M34 plug   The M34 plug has the following pin assignment:

ITU-T	Signal	Pin no.	Source	Signal description
		A		Protective ground (shielding)
102	SG	B		Signal ground / return conductor
103	TD (A) TD (B)	P S	DTE	Transmit data

ITU-T	Signal	Pin no.	Source	Signal description
104	RD (A) RD (B)	R T	DCE	Receive data
105	RTS	C	DTE	Request To Send
106	CTS	D	DCE	Clear To Send
107	DSR	E	DCE	Data Set Ready
108	DTR	H	DTE	Data Terminal Ready
109	DCD	F	DCE	Data Carrier Detect
113	TxC (A) TxC (B)	U W	DTE	Transmit clock – used in special cases instead of 114
114	TxC (A) TxC (B)	Y AA	DCE	Transmit clock
115	RxC (A) RxC (B)	V X	DCE	Receive clock

Table 5-26:   Pin assignment of M34 plug for V.35 (ISO 2593)

Mini Delta ribbon socket for X.21 and V.35

26-Pole Mini Delta Ribbon Socket for X.21 and V.35

The serial X.21/V.35 interface is implemented using a 26-pole mini Delta ribbon socket. The interface can be used for X.21 or V.35, depending on the setting of the field **Interface Type**.
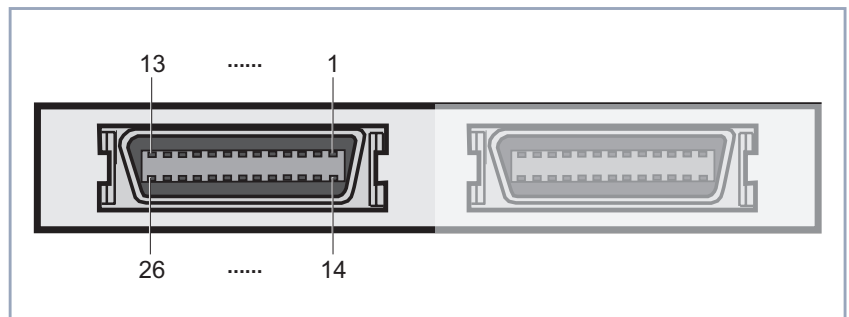
Figure 5-15:   26-pole mini Delta ribbon socket

Pin assignment of mini Delta ribbon socket

The 26-pole mini Delta ribbon socket has the following pin assignment:

The highlighted pin assignments given in table 5-27, page 107 are recommendations only. Those cable types are not supplied with **X8500** and cannot be ordered from BinTec.

Your BinTec vendor can supply you with the cable types X.21 (DB-15) DTE and V.35 (M34) DTE.

Signal	Pin no.	X.21 (DB-15)		V.35 (M34)		V.36 (DB-37)		EIA-530 (DB-25)	
		DTE	DCE	DTE	DCE	DTE	DCE	DTE	DCE
Shield	A1 (1)	1	1	A	A	1	1	1	1
GND	A2 (2)	8	8	B	B	19	19	7	7
TxD (B)	A3 (3)	9	11	S	T	22	24	14	16
TxD (A)	A4 (4)	2	4	P	R	4	6	2	3
RxD (B)	A5 (5)	11	9	T	S	24	22	16	14
RxD (A)	A6 (6)	4	2	R	P	6	4	3	2
RTS (B)	A7 (7)	10	12			25	27	19	13
RTS (A)	A8 (8)	3	5	C	D	7	9	4	5
CTS (B)	A9 (9)	12	10			27	25	13	19
CTS (A)	A10 (10)	5	3	D	C	9	7	5	4
RxC (B)	A11 (11)	13	14	X	W	26	35	9	11
RxC (A)	A12 (12)	6	7	V	U	8	17	17	24
Mode DCE	A13 (13)		8		B		19		7
Mode 0	B1 (14)					19	19		
DTR (B)	B2 (15)					30	29	23	22
DTR (A)	B3 (16)			H	E	12	11	20	6
DCD (B)	B4 (17)					31	31	10	10

Signal	Pin no.	X.21 (DB-15)		V.35 (M34)		V.36 (DB-37)		EIA-530 (DB-25)	
		DTE	DCE	DTE	DCE	DTE	DCE	DTE	DCE
DCD (A)	B5 (18)			F	F	13	13	8	8
DSR (B)	B6 (19)					29	30	22	23
DSR (A)	B7 (20)			E	H	11	12	6	20
TxC (B)	B8 (21)			AA	AA	23	23	12	12
TxC (A)	B9 (22)			Y	Y	5	5	15	15
Mode 1	B10 (23)							7	7
Mode 2	B11 (24)	8	8						
TxCE (B)	B12 (25)		13	W	X	35	26	11	9
TxCE (A)	B13 (26)		6	U	V	17	8	24	17

Table 5-27:   Pin assignment of 26-pole mini Delta ribbon socket

5.12.6   BNC Socket for E3

The E3 board uses standard BNC sockets and plugs (one socket for Rx and one for Tx):

1	Shield	2	Signal
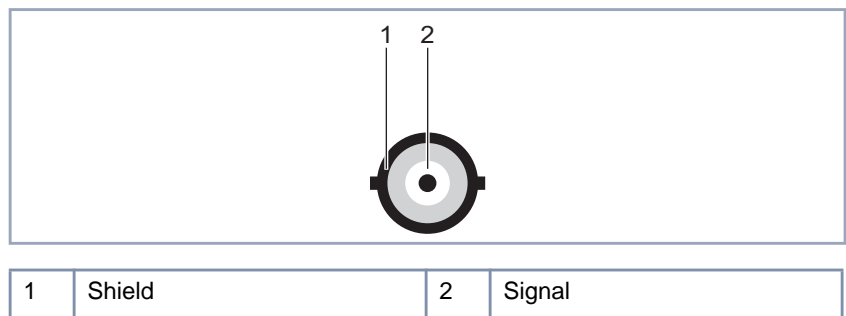
Figure 5-16:   BNC socket for E3

6   General Safety Precautions in German

Allgemeine Sicherheitshinweise in deutsch

In den nachfolgenden Abschnitten finden Sie Sicherheitshinweise, die Sie beim Umgang mit Ihrem Gerät unbedingt beachten müssen.

Transport und Lagerung

■ Transportieren und lagern Sie **X8500** nur in der Originalverpackung oder in einer anderen geeigneten Verpackung, die Schutz gegen Stoß und Schlag gewährt.

Aufstellen und in Betrieb nehmen

■ Beachten Sie vor dem Aufstellen und Betrieb von **X8500** die Hinweise für die Umgebungsbedingungen (vgl. Technische Daten).

■ Beachten Sie bei der Installation externer ISDN-Basisanschlüsse die jeweils gültigen Rahmenbedingungen Ihres Landes. Gegebenenfalls ist ein Techniker erforderlich, der über die entsprechende Zulassung verfügt. Informieren Sie sich über die Besonderheiten nationaler Verordnungen und beachten Sie deren rechtliche Grundlagen bei der Installation.

■ Elektrostatische Aufladungen können zu Geräteschäden führen. Tragen Sie daher eine geerdete Manschette um das Handgelenk oder berühren Sie eine geerdete Fläche, bevor Sie Buchsen oder Erweiterungskarten von **X8500** berühren. Berühren Sie die Erweiterungskarten grundsätzlich nur an den Rändern und fassen Sie nicht auf Bauteile oder Leiterbahnen.

■ Halten Sie nicht benutzte Erweiterungssteckplätze mit der Blindabdeckung verschlossen, um elektromagnetische Störung zu vermeiden.

■ Wenn das Gerät aus kalter Umgebung in den Betriebsraum gebracht wird, kann Betauung sowohl am Geräteäußeren als auch im Geräteinneren auftreten. Warten Sie, bis Ihr Gerät temperaturangeglichen und absolut trokken ist, bevor Sie es in Betrieb nehmen. Beachten Sie die Umweltbedingungen in den Technischen Daten.

■ Öffnen Sie nicht das Netzteil, da sonst Lebensgefahr durch einen Stromschlag besteht. Bei Öffnen des Netzteils erlöschen außerdem die Gerätegarantie und die Produkthaftung.

■ Achten Sie darauf, daß die für das Netzteil angegebenen Anschlußwerte eingehalten werden.

■ **X8500** darf nur eingeschaltet werden, wenn das Netzteil vollständig eingesteckt und komplett verschraubt wurde. Hierdurch wird die zuverlässige Schutzerdung des Gehäuses sichergestellt.

■ Das Netzkabel darf nur an ein vollständig eingestecktes und verschraubtes Netzteil angeschlossen werden.

■ Prüfen Sie, ob die örtliche Netzspannung mit den Nennspannungen des Netzteils übereinstimmt. Das **X8500**-Netzteil X8A-PS darf nur unter folgenden Bedingungen betrieben werden:
    – 100 - 240 VAC
    – 50/60 Hz
    – max. 3 A

■ Schließen Sie das Gerät nur an eine vorschriftsmäßig geerdete Schutzkontakt-Steckdose an (das Gerät ist mit einer sicherheitsgeprüften Netzleitung ausgerüstet).

■ Stellen Sie sicher, daß die Schutzkontakt-Steckdose der Installation frei zugänglich ist.

■ Beachten Sie beim Verkabeln die Reihenfolge, wie im Handbuch beschrieben. Verwenden Sie nur Kabel, die den Spezifikationen in diesem Handbuch genügen oder original mitgeliefert wurden. Falls Sie andere Kabel verwenden, übernimmt BinTec Access Networks GmbH für auftretende Schäden oder Beeinträchtigung der Funktionalität keine Haftung. Die Gerätegarantie erlischt in diesen Fällen.

■ Beachten Sie beim Anschluß des Geräts die Hinweise im Handbuch.

■ Verlegen Sie Leitungen so, daß sie keine Gefahrenquelle (Stolpergefahr) bilden und nicht beschädigt werden.

■ Schließen Sie Datenübertragungsleitungen während eines Gewitters weder an noch ziehen Sie sie ab oder berühren Sie diese.

■ Schließen Sie an **X8500** nur Endgeräte an, die den allgemeinen Sicherheitsanforderungen für Kommunikationsgeräte ensprechen. Endgeräte mit einer Zulassung durch das CETECON (ehemals BZT) entsprechen diesen

Anforderungen. ISDN-Endgeräte, die an **X8500** angeschlossen werden, müssen für das Euro-ISDN (DSS1) zugelassen sein.

Bestimmungsgemäße Verwendung, Betrieb

- ■ **X8500** baut in Abhängigkeit von der Systemkonfiguration WAN-Verbindungen auf. Um ungewollte Gebühren zu vermeiden, sollten Sie das Produkt unbedingt überwachen.

- ■ Die Umgebungstemperatur sollte 40˚C nicht übersteigen. Vermeiden Sie direkte Sonneneinstrahlung.

- ■ Achten Sie darauf, daß keine Gegenstände (z. B. Büroklammern) oder Flüssigkeiten ins Innere des Geräts gelangen (elektrischer Schlag, Kurzschluß). Achten Sie auf ausreichende Kühlung.

- ■ Unterbrechen Sie in Notfällen (z. B. beschädigtes Gehäuse oder Bedienelement, Eindringen von Flüssigkeit oder Fremdkörpern) sofort die Stromversorgung und verständigen Sie den Service.

Reinigung und Reparatur

- ■ Das Gerät darf auf keinen Fall naß gereinigt werden. Durch eindringendes Wasser können erhebliche Gefahren für den Benutzer (z. B. Stromschlag) und erhebliche Schäden am Gerät entstehen.

- ■ Niemals Scheuermittel, alkalische Reinigungsmittel, scharfe oder scheuernde Hilfsmittel benutzen.