



# Basic Configuration



## Compact Routers

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**Purpose** This manual explains the installation and initial configuration of BinTec Compact Routers with software release 6.2.1 or later. 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](http://www.bintec.net).

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**Guidelines and standards** BinTec routers comply with the following guidelines and standards:

- R&TTE Directive 1999/5/EC
- CE marking for all EU countries



You will find further information in the Declarations of Conformity at [www.bintec.net](http://www.bintec.net).

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# 1 Welcome!

Congratulations on wisely choosing to buy a Compact Router from BinTec Communications AG. Your BinTec Communications AG data router is an X-Generation router from our personal access product group. This high-performance multiprotocol router enables you to connect small networks and your individual workstation or small company to the Internet and other partner networks (e.g. to a corporate network) at low cost. In addition, **X1200**, **X3200** and **X2300 Family** routers enable you to set up a high-speed access to the Internet. Your Compact Router further provides all the computers on the network with up-to-the-minute means of office communication (communications applications such as fax and file transfer).

This chapter tells you what your new Compact Router offers. It provides an overview of possible applications and what is supplied together with your Compact Router. This chapter also tells you about the structure and contents of this manual.

- Safety precautions** The safety precautions you must heed when working with your Compact Router are described in Safety Precautions in [chapter 2, page 25](#).
- Installation** How to connect your Compact Router is shown in [chapter 3, page 29](#). This chapter also tells you what preliminary tasks are necessary for configuration.
- Configuration** How to get your Compact Router running is explained in [chapter 4, page 51](#). There we show you how to start up your router within a few minutes from a Windows PC with the help of a Configuration Wizard and how to install other useful online assistants. At the end of the chapter, you will be in a position to surf the Internet, send or receive e-mails or faxes and set up a connection to a partner network, for example, to access data at your corporate headquarters.
- Password** If you are already familiar with configuring BinTec routers and want to get started right away, all you really need to know is the factory default user name and password.

User name	Password
admin	bintec



Remember to change the password immediately when you log in to your BinTec router for the first time. All BinTec routers are supplied with the same password, which means they are not protected against unauthorized access until you change the password. How to change the passwords is described in "[Changing the Password](#)", page 111.

The remaining chapters describe the options you have for accessing your Compact Router and how to carry out the configuration with the Setup Tool. This manual is supplemented by the technical data for your Compact Router, the glossary and finally the index. BinTec Communications AG wishes you lots of fun with your new product.

**Pick-up Service for  
X1000, X1200, X2300,  
X2300i and X2300is**

If you register as a BinTec customer online at [www.bintec.net](http://www.bintec.net) within 14 days of the date of purchase, BinTec Communications AG offers you a Pick-up Service for your **X1000** or **X1200** router or a router from the **X2300 Family**. If problems occur in the hardware of one of these devices within a period of one year, you can replace your router free of charge. The replacement equipment is usually delivered to you on the next working day and your defective equipment collected at the same time.

## 1.1 Possible Applications

**Connecting networks** Routers are used to interconnect networks and to exchange information between the networks. For example, you can connect to the network of your Internet Service Provider via your router as shown in [figure 1-1, page 13](#) and use the usual Internet services, such as the World Wide Web (WWW) or e-mail:

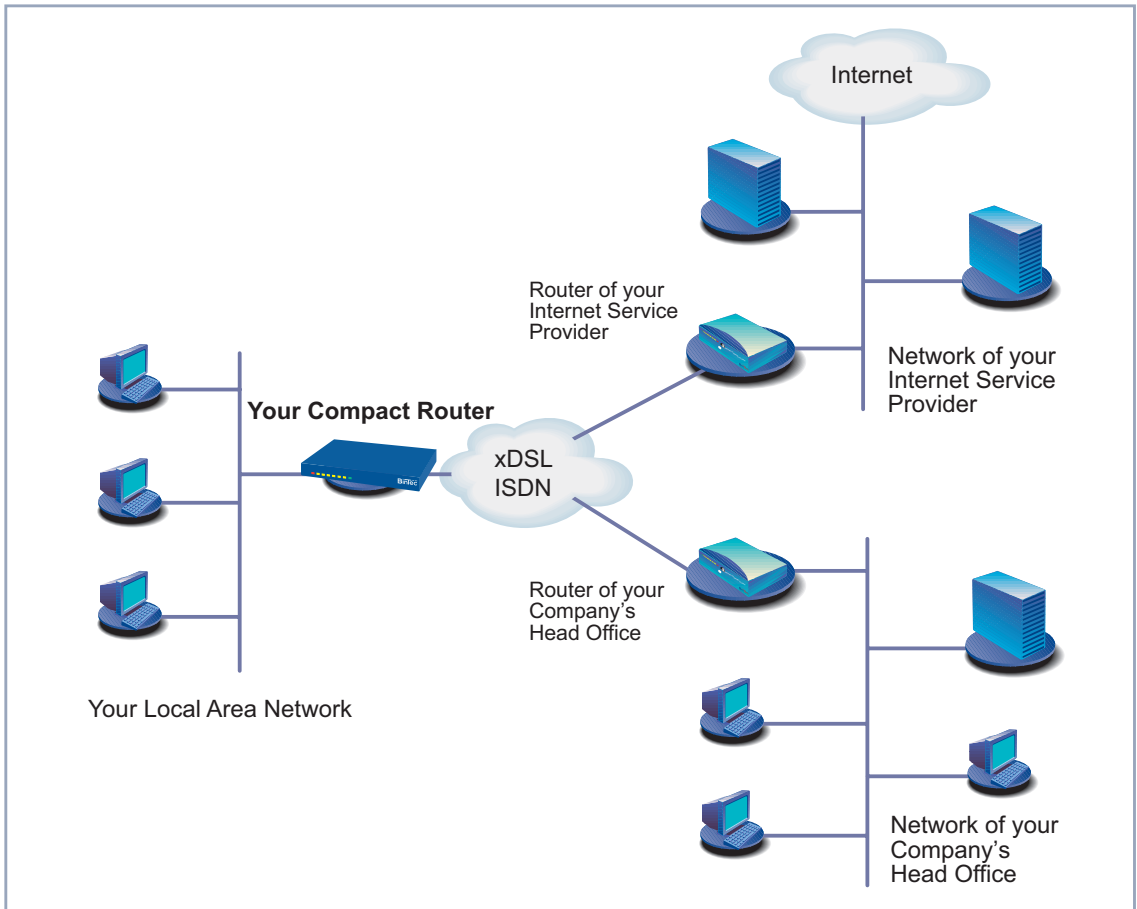


Figure 1-1: Basic scenario for Compact Routers from BinTec

**Access to head office** By connecting to another partner network, e.g. your company's head office, from your home or branch office, you can conveniently access any information

you may need from the headquarters, even if this is hundreds of kilometers away. These local networks are connected over an ISDN connection or possibly a DSL connection. The size of your own local network – whether it consists of several computers or just one workstation – is irrelevant.

**Your router is your link  
to the outside world**

Every router serves as a link between the individual local networks. Within each LAN, the router is connected to the network like a normal computer. Its task is to transmit information as necessary from its own network to an external network (e.g. to the network of your Internet Service Provider or your head office) and to find the most suitable routes for transmission. Conversely, it receives information and routes it to its own network.

**One router for  
everyone**

If you have a local network with several computers, you only need one single router to allow all computers in the network access to the Internet or the head office. The lower expenditure on equipment and administration for several computers in the network means substantial savings. When using ISDN cards or modems, every workplace would have to be equipped separately.

**xDSL – high-speed  
Internet access**

If you implement a high-speed Internet access with **X1200**, **X3200** or **X2300 Family** Compact Routers, all the users in the local network profit from shorter Internet access times. The bandwidth used with xDSL permits considerably faster Internet applications than conventional ISDN or modems. **X2300is** also provides an integrated 4-port switch.

**Serial leased line**

BinTec's **X2100** is a fully equipped, flexible IP router specifically developed for low-cost serial leased lines. **X2100** is compatible with the services of all major European carriers. It supports TCP/IP, Frame Relay, X.25, X.31, PPP and HDLC.

**Communications  
applications**

For communications applications on your PC, such as answering machine, fax, file transfer and Eurofile transfer, the same principle applies as for access to the Internet. All users in the LAN can use these services via the Remote CAPI, BinTec's own interface, but access a common ISDN connection via their router. The only precondition is that all users have installed suitable application software to support the so-called CAPI interface. This standard interface is, however, used by most communications applications. The compact router is supplied as standard with suitable software (RVS-COM Lite, single user license obtainable on registration). This software covers the spectrum of common communications applications.

- Automatic dialing and disconnection** Once configured, your router decides independently if and how it is to set up a connection to the Internet Service Provider. If you enter an external WWW address in your browser, for example, your router determines that the requested address lies outside your own LAN and establishes a connection to your Internet Service Provider and the Internet automatically. To save costs, your router disconnects the connection after a predefined time (short hold) if no more information is exchanged.
- Simple data access** If suitably configured, your router enables you to conveniently access data at another site, e.g. your head office. While running Windows, for example, you can connect a network drive to a computer at your head office. You then simply click the icon for this link in Windows Explorer and can surf in the directories and data of the remote computer just as if you were using your own hard disk. Your router takes care of setting up and clearing the connection.
- Security/firewall** Your Compact Router is provided with integrated firewall mechanisms and therefore provides extensive, low-cost features to meet all the requirements for access security. It protects your network against unauthorized external access. This is made possible by BinTec's SAFERNET functions such as NAT, encryption, filters and monitoring.
- Configuration and maintenance** A number of options are available for configuring your router. For example, you can use the **Configuration Wizard** to configure your router in Windows. Configuration with the Setup Tool, however, is independent of the operating system.
- The simplest method for configuration of your router in Windows is the **Configuration Wizard**. This configuration assistant guides you through the configuration step by step and helps you to make the most important settings on your router. Your router is ready for operation in only a few minutes. The **Configuration Wizard** enables you to configure a high-speed Internet access easily and quickly, as soon as a provider has made a suitable access available to the Internet.
- Remote administration** Your router can also be configured and administrated remotely. As soon as your router is connected to the ISDN – even in its ex works state, configuration settings can be carried out from a distant location (e.g. by the administrator at head office). This means you can leave the configuration of the system to be carried out by someone at HQ.

**Summary** Your Compact Router offers:

- A connection to the Internet or another partner network to allow everyone in your LAN to use the usual Internet services (e.g. e-mail, WWW, file transfer) and to access data at other locations.
- In the case of **X1200**, **X2300**, **X2300i**, **X2300is** and **X3200**: High-speed access to the Internet to allow everyone in the LAN to profit from the increased bandwidth of the DSL connection during access to the Internet.
- In the case of **X2100**: Serial X.21/V.35 interface for leased lines.
- Use of communications applications in the LAN (e.g. fax, answering machine) via a common ISDN connection.
- Simple configuration for you and remote administration by an administrator at head office.
- Independence from the operating system of your PC.
- Integrated firewall mechanisms.

There is no need to do without convenience and cost control.



## 1.2 Scope of Supply

Your router is supplied with the following parts:

- Cable sets/mains unit:
  - LAN cable (RJ45, red) for LAN connection to hub
  - ISDN cable (RJ45, black) for ISDN router
  - Serial cable (gray)
  - Adapter cable (CAT5, cross-over); together with red LAN cable necessary for connecting the LAN directly to the PC (for **X1000**, **X1200** and **X2300i** only)
  - ADSL cable (RJ45) for **X2300i** and **X2300is**
  - ADSL cable (RJ45) with split ferrite ring for **X2300**
  - Mains unit (for **X1000** and **X1200** only)
  - Desktop mains unit (for **X2300 Family** and **X2100** only; with split ferrite ring on equipment side for **X2300is**)
  - IEC AC power cord (for **X3200**, **X2300 Family** and **X2100** only)
- BinTec Companion CD
- Documentation:
  - **Basic Configuration**
  - **Release Notes**, if required
- RVS-COM Lite (single user license obtainable on registration)

## 1.3 BinTec Companion CD

You will find all the programs you need for the installation, configuration and administration of your router on your BinTec Companion CD.

### BRICKware for Windows

- The **Configuration Wizard** leads you step by step through the basic configuration.
- The **Activity Monitor** enables you to monitor the utilization of your router at a glance.
- You gain access to your router via the serial interface using the terminal program **Device at COM1** or **Device at COM2**.
- Remote CAPI Client  
The Remote CAPI Client allows you to use communications applications based on the standard CAPI interface (e.g. RVS-COM Lite).
- Token Authentication Firewall (TAF) program  
This software package is required if you are using the security system from RSA Security.
- 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 MIB tables and variables.
- **DIME Tools** are for monitoring and administration of your router.

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

### RVS-COM Lite

In addition to **BRICKware**, your BinTec Companion CD contains the RVS-COM Lite communications program that allows you to use all the typical communications applications on your PC, such as an answering machine, fax or file transfer. How to use these is explained in [chapter 4.4, page 83](#).



Please note: You can obtain a single user license for RVS-COM Lite on registration. You can purchase additional licenses from your dealer.

**What else?** The BinTec Companion CD also contains a range of other directories in which you can find the following, for example:

- Documentation in electronic form (see [chapter 1.4, page 20](#))
- A copy of the router software (in its unconfigured ex works state), if applicable
- UNIX Tools (administration)
- Adobe's Acrobat Reader
- MIB tables

## 1.4 Documentation from BinTec

This manual describes the basic configuration for **X1000**, **X1200**, **X3200**, **X2100** and **X2300 Family** routers.

The following documentation is currently available for Compact Routers from BinTec Communications AG:

- **Basic Configuration** (printed/PDF)  
This manual.
- Further documentation (English, PDF)  
Information about advanced configuration, security mechanisms, troubleshooting and important commands will in future be contained in the document **Advanced Configuration**. Until this document is published, refer to the **User's Guide X4100/200/300**, which you will find on your BinTec Companion CD.
- Reference manuals (English, PDF/HTML).
  - **Software Reference** (PDF)  
Online reference with detailed information about certain functions and reference for the internal MIB table structures and operation of the SNMP shell.
  - **MIB Reference** (HTML)  
HTML document with short descriptions about all MIB tables and variables for your router.
- **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 **Logic Release Notes**, you will find instructions to help you upgrade BOOTmonitor and/or firmware logic.
- UK information (English, PDF)  
Instructions for the operation of BinTec routers in Great Britain.

You received this documentation together with your router. The **Basic Configuration** manual is provided in printed form. Your BinTec Companion CD also contains the complete documentation in electronic form (PDF, HTML). In addition to your Companion CD documentation, you can download all the latest documentation free of charge from our WWW server at [www.bintec.net](http://www.bintec.net).

## 1.5 About this Manual

This chapter tells you about the structure of this manual, the contents of the individual chapters and the use of the symbols and typographical elements.

### 1.5.1 Contents

This manual is structured as follows:

Chapter	Contents
1: "Welcome!"	General introduction, scope of supply, BinTec Companion CD, documentation at BinTec, information about this manual.
2: "General Safety Precautions"	General safety precautions.
3: "Preparations"	Description of the preliminary tasks necessary for configuration: system requirements, setting up and connecting, installing <b>BRICKware</b> .
4: "Configuration with the Wizard and Configuration of Windows PCs"	Instructions on taking your router into operation in a few minutes using the <b>Configuration Wizard</b> and how to install and configure other useful software.
5: "Other Connection and Configuration Methods"	Description of other access and configuration options. A basis for working with the Setup Tool.
6: "Initial Configuration of Your Router with the Setup Tool"	How to get your router working with the Setup Tool (alternative to <b>Configuration Wizard</b> ).
7: "Configuration Management"	How to administrate configuration files and perform software updates.
8: "Technical Data"	The technical data for <b>X1000, X1200, X3200, X2100</b> and <b>X2300 Family</b> routers.

Table 1-1: List of chapters

## 1.5.2 Use of Typographical Elements

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.
	Predicts potential pitfalls and explains how to avoid them.
	Brings your attention to general and important points.
	Explains additional background information.
	Brings your attention to important safety precautions. Levels of danger are in accordance with ANSI: <ul style="list-style-type: none"> <li>■ Caution (indicates possible danger that, if unheeded, could cause material damage)</li> <li>■ Warning (indicates possible danger that, if unheeded, could cause bodily harm)</li> <li>■ Danger (indicates danger that, if unheeded, could lead to serious bodily harm or death)</li> </ul>

Table 1-2: List of visual aids

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

Typographical element	Meaning
➤	Here you are requested to do something.
■ — —	Lists including two levels.
<b>MENU ➤ SUBMENU</b>  <b>File ➤ Open</b>	Indicates menus and submenus in the Setup Tool.  Indicates menus and submenus in the Windows interface.
Non-proportional (Courier), e.g. ping 192.168.1.254	■ Indicates commands (e.g. in the SNMP shell) that you must enter as shown.  ■ Display in the Setup Tool.
<IP address>	Indicates inputs in which you enter a value for the term shown in the brackets. Do not enter the pointed brackets.
<b><i>bold, italics, e.g.</i></b> <b><i>BigBoss</i></b>	Indicates example terms.
<b>bold, e.g.</b> ➤➤ <b>MIB</b>	Indicates terms you can find in the glossary (for online texts, click the double arrow).
<b>bold, e.g.</b> <b>biboAdmLoginTable,</b> <b>Windows Start menu</b>	■ Indicates fields in the Setup Tool and MIB tables and variables.  ■ Indicates keys, key combinations and Windows terms.
<i>italics, e.g.</i> <i>none</i>	Indicates values that can be entered or set in the Setup Tool or MIB variables.
<a href="#">Online: blue</a>	Indicates hyperlinks.

Table 1-3: Typographical elements



## 2 General Safety Precautions

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

- Transport and storage**
- Only transport and store your router in its original packaging or use other suitable packaging to protect against knocking and shaking.
- Installation and operation**
- Read the information on the ambient conditions (see Technical Data and the chapter “Setting Up and Connecting”) before installing and operating your router.
  - Please comply with the general conditions applicable in your country when installing external ISDN Basic Rate Interfaces. 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.
  - 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.
  - Make sure the safety mains socket in the building is freely accessible. You must remove the mains plug to disconnect the equipment completely from the mains.
  - Make sure the line fuse for the mains connection is rated at maximum 16 A.
  - Make sure the nominal voltage on the label of the mains unit is the same as the local power source.
  - Make sure you follow the correct cabling sequence, as described in the manual.
  - Make sure the cabling is correct – especially the ISDN and LAN cables – before you turn on your router. The ISDN connection of your router must not be connected to the Ethernet connection of your PC or hub and the LAN connection of your router should not be connected to the ISDN connection.

- Use only the cables supplied or specified for the cabling – as described in the manual. If you use other cables, BinTec Communications AG cannot accept liability for any damage occurring or for any adverse effects on operation.
  - 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.
- Intended use and operation**
- Your router is intended for use in offices. As a multiprotocol router, your router sets up WAN connections in accordance with the system configuration. To avoid extra charges, you should carefully monitor the product.
  - Your router meets the relevant safety standards for information technology equipment for use in offices.
  - Proper operation of the system according to EN 60950 is only assured when the top of the housing is fitted (cooling, fire protection, RFI suppression).
  - The ambient temperature should not exceed 50 °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), disconnect the power supply immediately and notify customer service.
- Cleaning and repair**
- The equipment should only be opened by trained personnel. Only service centers authorized by BinTec should therefore carry out repairs to the equipment. Your dealer will tell you where the service centers are situated. Unauthorized opening and improper repairs can result in serious danger for the user (e.g. electric shock). Unauthorized opening of the equipment invalidates the terms of the guarantee and exempts BinTec Communications AG from any liability.

- 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.



## 3 Preparations

This chapter describes the following:

- System requirements for your system ([chapter 3.1, page 30](#))
- Connections for your BinTec Compact Router ([chapter 3.2, page 32](#))
- How to set up and connect your router ([chapter 3.3, page 39](#))
- What preparations you must make ([chapter 3.4, page 42](#))
- What to do in your Windows network ([chapter 3.5, page 46](#))
- How to install **BRICKware for Windows** ([chapter 3.6, page 49](#))



The basic configuration of your router with the **Configuration Wizard** is described in [chapter 4, page 51](#).

The basic configuration of your router without the **Configuration Wizard** is described in [chapter 6, page 119](#).

How you can optimize your configuration on completion of the basic configuration is described in the **User's Guide X4100/200/300**.

## 3.1 System Requirements

Your router can be configured from all conventional platforms. Your router is a stand-alone device that is independent of the PC or operating system to which it is connected. The router communicates with the PC over a LAN interface (10/100 Mbps) or a serial connection. Your router can therefore be used in many different operating system environments, such as DOS, Windows, UNIX, AS/400, Macintosh or Novell.

**For a Windows PC** If you use a Windows PC to configure your router, you need a terminal program for the serial connection, e.g. **HyperTerminal**. Make sure that **HyperTerminal** is also installed on the PC during the Windows installation.



Note that **HyperTerminal** is not included in the standard installation of Windows 98 and Windows ME.



Note that **X2100** cannot be configured with the **Configuration Wizard**.

**Configuration Wizard** If you want to use the **Configuration Wizard**, however, you will require the following:

- PC with serial interface (V.24)
  - Windows 95, Windows 98, Windows ME or Windows NT 4.0, or Windows 2000 or Windows XP
  - Installed network card (10 Mbps and/or 100 Mbps Ethernet)
  - Installed Microsoft TCP/IP protocol
- Before we start with the configuration, we will explain how you determine whether the required settings have been made on your PC or, if necessary, how you make these settings yourself.
- High color monitor (more than 256 colors) for correct display of graphics

**Remote CAPI** CAPI support for communications applications and Unified Messaging is available for the following systems:

- Windows 95, Windows 98, Windows ME or Windows NT 4.0, or Windows 2000 or Windows XP
- Novell Netware 3.1x, 4.0x and 5.x

## 3.2 Connections for Your Compact Router

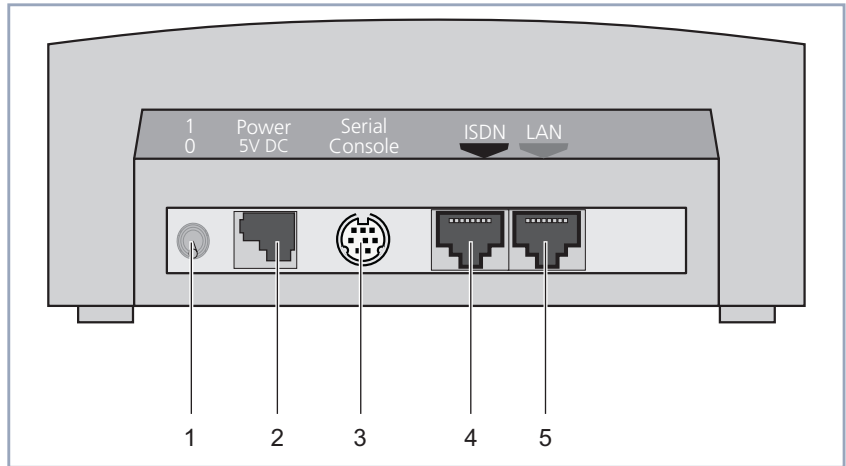
This chapter describes the connections for the following BinTec Compact Routers:

- Connections for **X1000** ([chapter 3.2.1, page 33](#))
- Connections for **X1200** ([chapter 3.2.2, page 34](#))
- Connections for **X3200** ([chapter 3.2.3, page 35](#))
- Connections for **X2300i** and **X2300** ([chapter 3.2.4, page 36](#))
- Connections for **X2300is** ([chapter 3.2.5, page 37](#))
- Connections for **X2100** ([chapter 3.2.6, page 38](#))



### 3.2.1 Connections for X1000

Here is a diagram of the rear of **X1000**:

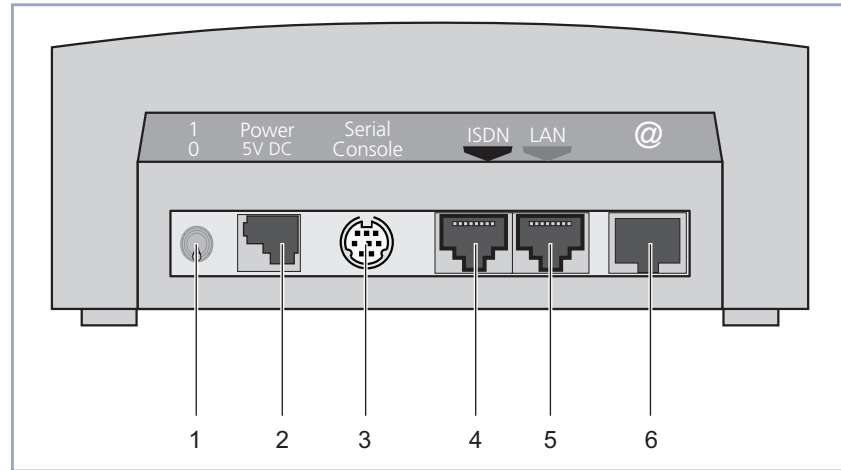


1	On/off switch	4	ISDN S <sub>0</sub> port
2	Power supply connection	5	LAN interface (10/100Base-T Ethernet), marked red on the equipment
3	Serial interface		

Figure 3-1: **X1000**: rear view

### 3.2.2 Connections for X1200

Here is a diagram of the rear of **X1200**:

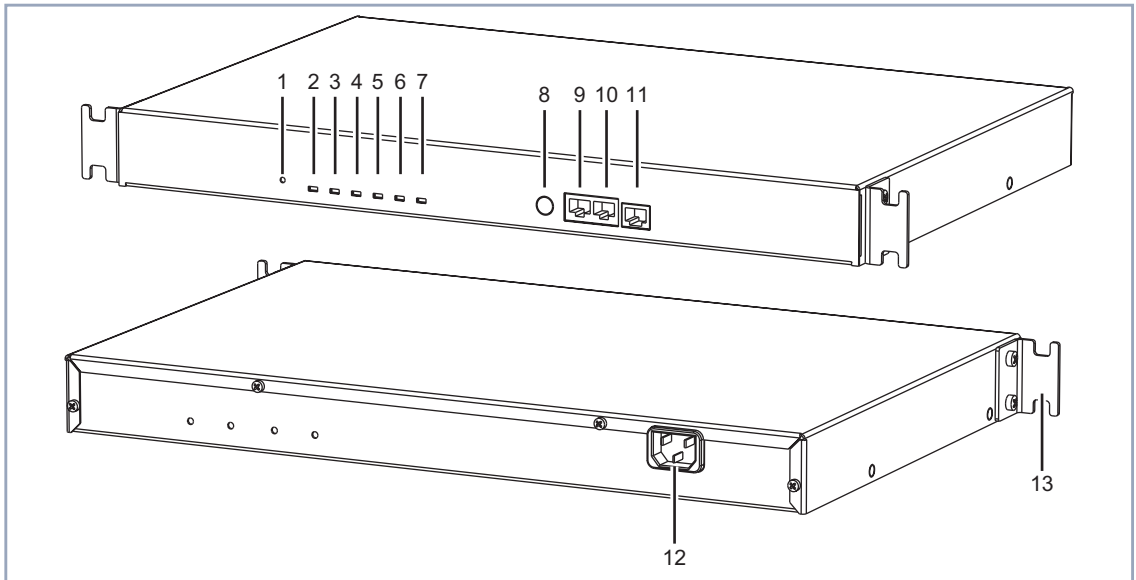


1	On/off switch	4	ISDN S <sub>0</sub> port
2	Power supply connection	5	LAN interface (10/100Base-T Ethernet), marked red on the equipment
3	Serial interface	6	High-speed Internet interface (10Base-T Ethernet), marked @ on the equipment

Figure 3-2: **X1200**: rear view

### 3.2.3 Connections for X3200

**X3200** is designed for installation in a 19-inch cabinet. All interfaces are located on the front of the equipment:

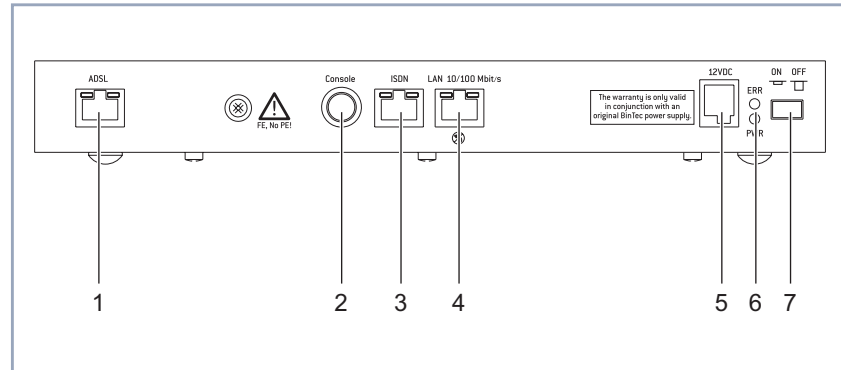


1	Reset switch	8	Serial interface
2	Power LED	9	ISDN S <sub>0</sub> port
3	xDSL LED	10	LAN interface (10/100Base-T Ethernet)
4	LAN LED	11	xDSL/high-speed Internet interface (10Base-T Ethernet)
5	S <sub>0</sub> 1 LED	12	Power supply
6	S <sub>0</sub> 2 LED	13	Mounting brackets
7	Error LED		

Figure 3-3: **X3200**: front and rear view

### 3.2.4 Connections for X2300i and X2300

Here is a diagram of the rear of **X2300i** and **X2300**:

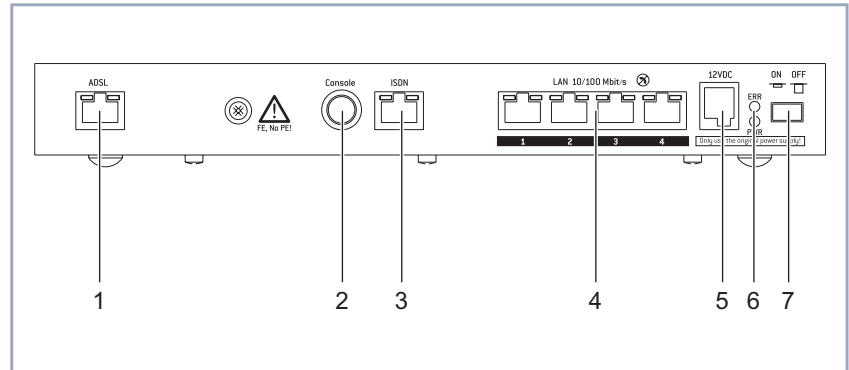


1	High-speed Internet/ADSL interface (RJ-45)	5	Power supply connection
2	Serial interface	6	LEDs, meaning as in <a href="#">chapter 8.4.2, page 258</a>
3	ISDN S <sub>0</sub> port	7	On/off switch
4	LAN interface (10/100Base-T Ethernet)		

Figure 3-4: **X2300i** and **X2300**: rear view

### 3.2.5 Connections for X2300is

Here is a diagram of the rear of **X2300is**:

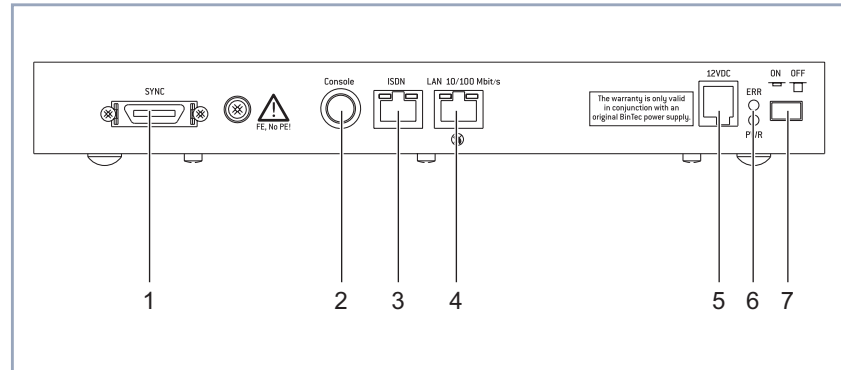


1	High-speed Internet/ADSL interface (RJ-45)	5	Power supply connection
2	Serial interface	6	LEDs, meaning as in <a href="#">chapter 8.5.2, page 265</a>
3	ISDN S <sub>0</sub> port	7	On/off switch
4	LAN interfaces 1 to 4 (10/100Base-T Ethernet, auto sensing; Auto-MDIX)		

Figure 3-5: **X2300is**: rear view

### 3.2.6 Connections for X2100

Here is a diagram of the rear of **X2100**:



1	X.21/V.35 interface	5	Power supply connection
2	Serial interface	6	LEDs, meaning as in <a href="#">chapter 8.6.2, page 272</a>
3	ISDN S <sub>0</sub> port	7	On/off switch
4	LAN interface (10/100Base-T Ethernet)		

Figure 3-6: **X2100**: rear view

### 3.3 Setting Up and Connecting



Alternatively, you can connect your ISDN router to the network card of your PC or, if you belong to a small network, to a hub. You only need to make sure you use the right cables.



You can connect your Compact Router to an ISDN socket, an **NTBA** adapter or a PABX. If you want to use functions specific to a PABX, connect your router to the PABX. This enables you to disable extensions, for example, so that these never reach your router at all. Or you can check the charges for the extensions you assign your router.



#### Caution!

**X1000** and **X1200**: The use of the wrong mains adapter may damage your router!

- Use only the mains unit supplied (5 V DC).
- Make sure the rated voltage marked on the mains unit conforms with the local voltage supply.



#### Caution!

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

- Make sure you connect the LAN interface of your router to the LAN interface of the PC/hub and the ISDN interface of your router to the ISDN connection.

Make the connections in the following order:

- Place your BinTec router on a firm, level base or mount **X3200** in a 19-inch cabinet.
- Serial connection** ➤ Connect the serial port of your PC (COM1 or COM2) to the serial interface of your router. Use only the serial cable (gray) supplied with the equipment.
- LAN connection** You can connect your router to your hub (LAN) or to the network card of your PC (single-user system).

To connect your router to your LAN, you need the red LAN cable supplied with the equipment.

- Connect the LAN interface of your router to your LAN.  
The speed of your LAN (10 Mbps or 100 Mbps) is detected automatically (auto sensing).

### Connecting the router to the PC

If you do not want to connect your router to a LAN, but directly to the network card of your PC (single-user system), you need an adapter cable (CAT5, cross-over; supplied with **X1000**, **X1200** and **X2300i**) as well as the red LAN cable. Only the LAN cable is necessary for **X2300is**.



Use only the cables supplied or specified for the cabling. If you use other cables, BinTec Communications AG cannot accept liability for any damage occurring or for any adverse effects on operation.

- **X1000, X1200, X3200, X2300 Family and X2100:** Connect the LAN interface of your router to your PC by connecting the red LAN cable to the LAN interface of your router. Connect the adapter cable (supplied as standard with **X1000**, **X1200** and **X2300i**) to the red cable. Connect the adapter cable to the network card of your PC.
- **X2300is:** Connect a LAN interface of your router to the network card of your PC. If applicable, connect other PCs to the other LAN interfaces of your router.

### ISDN connection

- If applicable, connect the ISDN interface of the router to your ISDN connection using the black ISDN cable (RJ45) supplied.

### DSL connection

**X1200, X3200 and X2300 Family:**



If you receive a special cable from your provider for connecting the modem, please use only this cable. If you need to extend this cable, use a standard Ethernet cable.





Ask your provider about any special features of your ►► **DSL/xDSL** connection that need to be considered.

The following applies to equipment with integrated modem:

BinTec Communications AG provides the **X2300i** and **X2300is** for

►► **G.992.1 Annex B** connections (see [chapter 8.7.4, page 280](#)).

For ADSL connections implemented with ►► **G.992.1 Annex A**, BinTec Communications AG provides the **X2300** (see [chapter 8.7.5, page 281](#)).

In Germany, Deutsche Telekom AG implements the ADSL connection for ISDN and analog lines with Annex B.

- **X1200** and **X3200**: Connect the Internet interface (marked @) of the router to the 10Base-T interface of the xDSL modem (e.g. ►► **T-DSL** modem of Deutsche Telekom AG).
- **X2300 Family**: Connect the Internet interface (marked ADSL) of the router to the ADSL interface of the splitter of your provider.  
This is done by connecting one end of the ADSL cable (with split ferrite ring attached for **X2300**) to your router and the other end of the ADSL cable to the ADSL connection of your provider's splitter.
- X.21 connection** ►► **X2100**: Connect the X.21/V.35 interface marked SYNC on the router to your X.21/V.35 connection. You can buy the X.21 (DB-15) DTE and V.35 (M34) DTE cables from your BinTec dealer.
- Power supply** ►► **X2300 Family** and **X2100**: Connect the IEC AC power cord to the desktop mains unit.
- Connect your router to the power supply with the mains adapter or IEC AC power cord supplied.
- Switch the router on with the on/off switch (if equipped).  
Your BinTec router performs a selftest. If all cables are correctly connected, the red ERR LED goes out at the end of the selftest and the green PWR LED (operating display) lights up.

## 3.4 Gathering Information

Before you start the configuration, you should gather the data ready for the following purposes:

- Basic configuration (obligatory)
- Internet access (optional)
- Connecting to a corporate network (optional)

The following table shows examples of possible values for the necessary access data. You should fill in the table with your personal data under the heading "Your value". Then you can refer to the values later when needed.

### Basic configuration

For the basic configuration of your Compact Router, you need information about your ISDN connection and network environment:

Access data	Example	Your value
ISDN extensions You received the ISDN extensions with your ISDN connection.	<b>967310</b> <b>967311</b> <b>967312</b>	
IP address of your router	<b>192.168.1.254</b>	
Netmask of your router	<b>255.255.255.0</b>	



For a point-to-multipoint connection, it is sufficient to enter the final digits of the ISDN extensions that differ for each number. If you have the following extensions (▶▶ **MSNs**), for example: **967310**, **967311** and **967312**, you only need to consider **10**, **11** and **12**.



A description of the settings required for connecting your router to an NTBA adapter is given below. If you are connecting to a PABX, note the special characteristics of your connection and refer to your PABX documentation if necessary.



If you configure a new network, you can use the given example values for IP addresses and netmask. If in doubt, ask your system administrator.

### Internet access

If you want to configure an Internet access, you will need an Internet Service Provider (ISP). If you have an ISP, you will also have received your personal access data. The terms of the required access data may vary from provider to provider, but the type of information you need for dialing in is basically the same. The following table lists the access data that your router also needs for a connection to the Internet.

Access data	Example	Your value
Provider name	<i>GoInternet</i>	
Dial-in number The ISDN extension you use to dial in to your ISP.	<i>1234567</i>	
User account Your user name	<i>MyName</i>	
Password	<i>TopSecret</i>	



If your router is connected to a PABX for which a "0" prefix is necessary for external line access, this "0" must be considered when entering the access number.

Some Internet Service Providers such as T-Online require additional information:

Access data	Example	Your value
T-Online number	<i>081512345678</i>	
Joint user account (other user code)	<i>0001</i>	



Some ISPs also offer the option of accessing the Internet without logging in first ("Internet by call"). This means you can check immediately whether your Internet access works with your router, even if you want to apply to another ISP for your personal access data later on.

### Corporate network connection

To connect to a WAN partner (e.g. head office), you will need some information about the remote terminal that is to take your call. The remote terminal must also know your details. These data must be agreed between both ends of the connection.

Your router and the router at your head office check the incoming data before every connection to see if they should take the call from the partner. To protect the network against unauthorized access, the call is accepted only after correct authentication. This authentication is based on a common password and two codes that you and your partner use for the connection.

Access data	Example	Your value
Partner's name Code of head office	<b>BigBoss</b>	
Dial-in number Extension of head office's router	<b>0911987654321</b>	
Local name Your own code. Your partner (at head office) must enter this name as a partner name on his router.	<b>LittleIndian</b>	
Password Common password for this connection	<b>Secret</b>	
Network address(es) of your head office	<b>10.1.1.0</b>	
Netmask(s) of your head office	<b>255.255.255.0</b>	



How to use other security mechanisms, e.g. authentication by means of the calling number (CLID) or concealing your own network to the outside (NAT), is explained in the **User's Guide X4100/200/300**.



If your router is connected to a PABX for which a "0" prefix is necessary for external line access, this "0" must be considered when entering the access number.



You only need the network address and netmask of the WAN partner (head office) if you configure Internet access in addition to a LAN-LAN connection. If you are not configuring Internet access, your router will be configured so that all data not destined for your own local network are automatically forwarded to the WAN partner (default route).

## 3.5 What to Do in Your Windows Network

The TCP/IP protocol must be installed before the PCs in your network can exchange data. You should therefore ensure that this protocol is installed on your PC before beginning configuration.

### 3.5.1 Checking the TCP/IP Protocol

Proceed as follows to check whether you have installed the TCP/IP protocol:

- Windows 95/98**
- Click the Windows Start button and then **Settings** ➤ **Control Panel**.
  - Double click **Network**.
  - Look for **TCP/IP** in the list of network components.
  - If you cannot find this entry, install the TCP/IP protocol as described in [chapter 3.5.2, page 47](#).
- Windows NT**
- Click the Windows Start button and then **Settings** ➤ **Control Panel**.
  - Double click **Network**.
  - Select the **Protocols** tab and look for **TCP/IP Protocol** in the list of network components.
  - If you cannot find this entry, install the TCP/IP protocol as described in [chapter 3.5.2, page 47](#).
- Windows 2000**
- Click the Windows Start button and then **Settings** ➤ **Network and DCN Connections**.
  - Double click **LAN Connection**.
  - Click the **General** tab and then **Properties**. Look for **Internet Protocol (TCP/IP)** in the list of network components.
  - If you cannot find this entry, install the TCP/IP protocol as described in [chapter 3.5.2, page 47](#).
- Windows ME**
- Click the Windows Start button and then **Settings** ➤ **Control Panel**. View all the control panel options.
  - Double click **Network**.

- Look for the entry **TCP/IP** in the **Configuration** tab.
- If you cannot find this entry, install the TCP/IP protocol as described in [chapter 3.5.2, page 47](#).

**Windows XP Professional** As soon as an Ethernet card is plugged into your PC, Windows XP detects this and automatically installs the TCP/IP protocol. Should problems still occur, consult the **Help and Support Center** or the **Network Setup Wizard** of Windows XP.

### 3.5.2 Installing the TCP/IP Protocol

Proceed as follows to install TCP/IP:

- Windows 95/98**
- Click **Add** in the **Network** dialog box.
  - Select **Protocol** in the list of network components and click **Add**.
  - Select **Microsoft** as manufacturer and **TCP/IP** as network protocol and click **OK**.
  - If you are in an existing network, you may have to make other settings at this point. Ask your system administrator.
  - If you are setting up a new network, click **OK**.
  - Follow the on-screen instructions and restart your PC when you have finished.
  - Repeat the installation for all the PCs in your network.
- Windows NT**
- Click the **Protocols** tab in the **Network** dialog box. Click **Add**.
  - Select **TCP/IP Protocol** from the list of network protocols. Click **OK**.
  - If setting up a new network, click **Yes** to answer the question.
  - In an existing network, ask your system administrator.
  - Follow the on-screen instructions and restart your PC when you have finished.
- Windows 2000**
- Click the Windows Start button and then **Settings** ➤ **Network and DCN Connections**.
  - Double click **LAN Connection**.

- Click the **General** tab and then **Properties**.
- Select the **General** tab and click **Install**.
- Select **Protocol** in the list of network components and click **Add**.
- Select **Internet Protocol (TCP/IP)** as network protocol and click **OK**.
- If you are in an existing network, you may have to make other settings at this point. Ask your system administrator.
- If you are setting up a new network, click **OK** and **Close**.
- Follow the instructions on the screen.

**Windows ME**

- Click the Windows Start button and then **Settings** ➤ **Control Panel**. View all the control panel options.
- Double click **Network**.  
The **Network** window opens.
- Click **Add** in the **Configuration** tab.  
The **Select Network Component Type** window opens.
- Tag the **Protocol** entry and click **Add**.
- Tag the network protocol **TCP/IP** in the **Select Network Protocol** window and click **OK**.
- Click **OK** in the **Network** window.
- Follow the on-screen instructions and restart your PC when you have finished.

**Finally**

- Repeat the installation for all PCs on the network if you wish to use the LAN-LAN connection, Internet access or communications applications over your router.



## 3.6 Installing BRICKware in Windows

Proceed as follows:

- Close all Windows programs on your PC.
- Place your BinTec Companion CD in the CD-ROM drive of your PC.  
The start window appears automatically after a short time.
- If the Start window does not open automatically, click your CD-ROM drive in Windows Explorer and double-click **setup.exe**.
- Select the desired language in the Start window or leave the default setting.
- Select **BRICKware**.  
The configuration assistant is activated.

If the version of **BRICKware** saved on your PC is older than version 5.2.1, you will be asked to deinstall this so that you can install the current version of **BRICKware**.

If the version is later than 5.2.1, you can carry out an update on your **BRICKware**.

If you already have the current version of **BRICKware** installed on your PC, you can select from various installation possibilities during a new installation.

**Deinstalling** If you are requested to deinstall **BRICKware**, follow the instructions on the screen to remove the program from your PC. The win.ini file is saved on your PC before deinstallation.

A window informs you as soon as **BRICKware** is deinstalled and you can now install the new software.

**New installation** Proceed as follows to install **BRICKware**:

- Confirm the welcome window by clicking **Next**.
- Enter the directory in which **BRICKware** is to be installed or accept the default directory.
- Click **Next**.
- Select the group that contains your BinTec router.
- Click **Next**.

- Select the software components you wish to install. You can accept the default selection or make another selection. Be careful not to cancel the marking of the **Configuration Wizard** if you want to use the **Configuration Wizard** to carry out a basic configuration of your router.
- Click **Next**.  
A list of the components selected for the installation appears.
- To install these components, click **Next**.  
The files are copied. A window appears after a short time telling you that the installation of **BRICKware** is completed.
- If you want to configure your router again, leave the default setting *Continue device configuration* and click **Finish**.  
The **Configuration Wizard** starts.
- For configuration using the Wizard, continue with [chapter 4.2, page 59](#).

**Update** If you have a later version of **BRICKware** than 5.2.1, you can carry out an update.

- Follow the instructions on the screen.  
The existing **BRICKware** files on your PC are replaced with new files. A window appears after a short time telling you that the **BRICKware** update is completed. Click **Finish** to end the update operation.

**Current BRICKware already available** If a current version of **BRICKware** is already saved on your PC, you can change the existing installation, restore a defective part of the program or remove **BRICKware** from your PC during a new installation.

- Follow the instructions on the screen.  
The files are copied or removed from your PC. A window appears after a short time telling you that the maintenance operations are completed. Click **Finish** to end the operation.

## 4 Configuration with the Wizard and Configuration of Windows PCs

This chapter describes the following:

- What configurations you can carry out with your BinTec Compact Router ([chapter 4.1, page 52](#))
- How to carry out the initial configuration with the Wizard ([chapter 4.2, page 59](#))
- How to configure your Windows PCs for your network ([chapter 4.3, page 75](#))
- How to configure your fax and answering machine ([chapter 4.4, page 83](#))
- How to test the configuration ([chapter 4.5, page 90](#))



You cannot configure **X2100** with the Wizard. Use the Setup Tool for initial configuration of your **X2100** router ([chapter 6, page 119](#)).

An explanation of how to use the Setup Tool can be found in [chapter 5.4, page 106](#).



The basic configuration of your router without the **Configuration Wizard** is described in [chapter 6, page 119](#).

How you can optimize your configuration on completion of the basic configuration is described in the **User's Guide X4100/200/300**.

## 4.1 Solution Scenarios

This section contains some configuration examples to explain some of the most frequently asked questions about configuration.



You can combine several suggested configurations in the **Configuration Wizard**.



You cannot configure **X2100** with the Wizard. Use the Setup Tool for initial configuration of your **X2100** router ([chapter 6, page 119](#)).

An explanation of how to use the Setup Tool can be found in [chapter 5.4, page 106](#).

### 4.1.1 Configuring ISDN Access to the Internet

The diagram below shows a typical scenario:

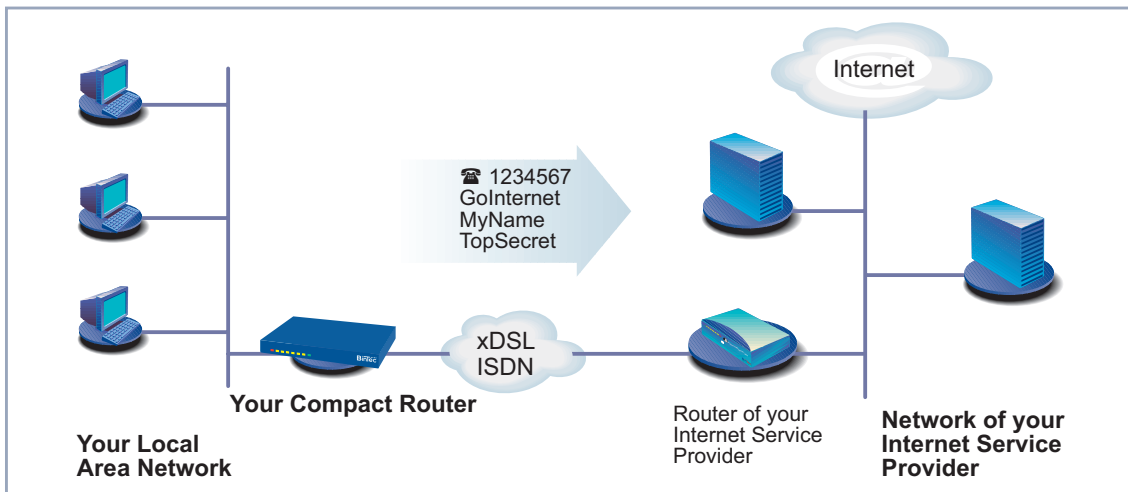


Figure 4-1: ISDN interface of your BinTec Compact Router and your Internet Service Provider

You can quickly and easily configure ISDN access to the Internet for your Bin-Tec Compact Router with the **Configuration Wizard**.

Proceed as described in [chapter 3, page 29](#) and [chapter 4.2, page 59](#). Follow the instructions on the screen. and note the following:

- Select the configuration options:
  - **General Settings** to make the basic router settings ([chapter 4.2.1, page 62](#)).
  - **Internet Access** to configure your Internet access ([chapter 4.2.2, page 66](#)).
- Complete the configuration as described in [chapter 4.2.4, page 72](#).
- If you want to access the Internet from several PCs, proceed as described in [chapter 4.3, page 75](#).
- Finally test your configuration (see [chapter 4.5, page 90](#)).

## 4.1.2 Configuring High-Speed Internet Access

A high-speed Internet access is available for **X1200**, **X3200** and **X2300 Family** routers.

Before you can use a high-speed access to the Internet, you need an xDSL connection (e.g. ➤➤ **T-DSL** from Deutsche Telekom AG, **X1200** and **X3200**) or an ➤➤ **ADSL** connection (**X2300 Family**).



Before configuring a high-speed access for **X2300is**, you should also read [chapter 4.1.3, page 55](#).

This is shown in the diagram below:

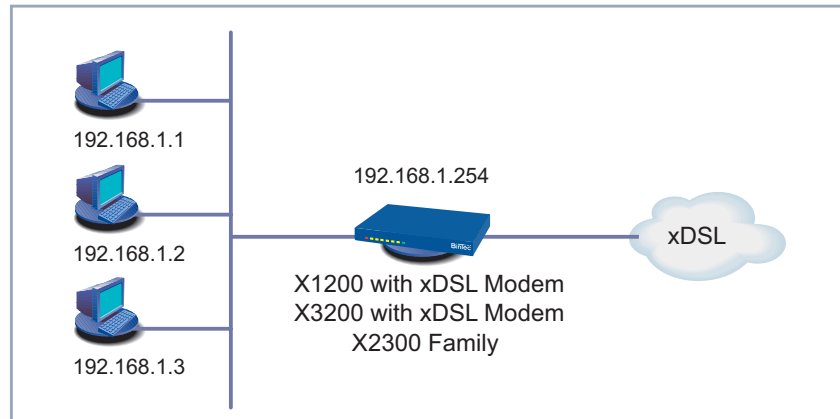


Figure 4-2: xDSL connection

You can quickly and easily configure a high-speed Internet access for your router under Windows using the **Configuration Wizard**.

Proceed as described in [chapter 3, page 29](#) and [chapter 4.2, page 59](#). Follow the instructions on the screen and note the following:

- Select the configuration options:
  - **General Settings** to make the basic router settings ([chapter 4.2.1, page 62](#)).
  - **Internet Access** to configure your Internet access ([chapter 4.2.2, page 66](#)).
- For the Internet access, select the ISP *T-Online* and the network *T-DSL* or if applicable another provider and his high-speed access.
- Complete the configuration as described in [chapter 4.2.4, page 72](#).
- If you want to access the Internet from several PCs, proceed as described in [chapter 4.3, page 75](#).
- Finally test your configuration (see [chapter 4.5, page 90](#)).

If you would like to use the Setup Tool for configuring the high-speed access, refer to the T-DSL configuration example for the Internet Service Provider T-Online (see [chapter 6.4, page 189](#)). Please also note the configuration example for an ADSL connection of the ISP Telekom Austria in the same chapter. Configur-

ing a high-speed access with the Setup Tool for **X2300 Family** routers is described in [chapter 6.5, page 198](#).

### 4.1.3 X2300is: High-Speed Access and Integrated Switch

BinTec Communications AG's **X2300is** is a router designed for high-speed connection to the Internet and equipped with an integrated 4-port switch. You can connect your PC directly to **X2300is**.

The diagram below shows a typical scenario with **X2300is**:

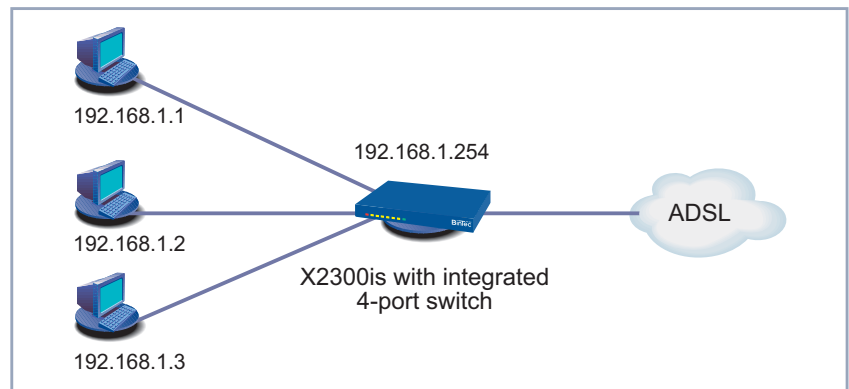


Figure 4-3: PC connected directly to **X2300is**

You can quickly and easily configure a high-speed Internet access for **X2300is** under Windows using the **Configuration Wizard**.

- Connect the desired PC to **X2300is**.
- Proceed as described in [chapter 4.1.2, page 53](#).

If you would like to use the Setup Tool for configuring the high-speed access, refer to the T-DSL configuration example for the Internet Service Provider T-Online (see [chapter 6.4, page 189](#)). Please also note the configuration example for an ADSL connection of the ISP Telekom Austria in the same chapter. Configuring a high-speed access with the Setup Tool for **X2300 Family** routers is described in [chapter 6.5, page 198](#).

### 4.1.4 Using Communications Applications

A diagram of a scenario with communications applications on PCs in your LAN is shown below:

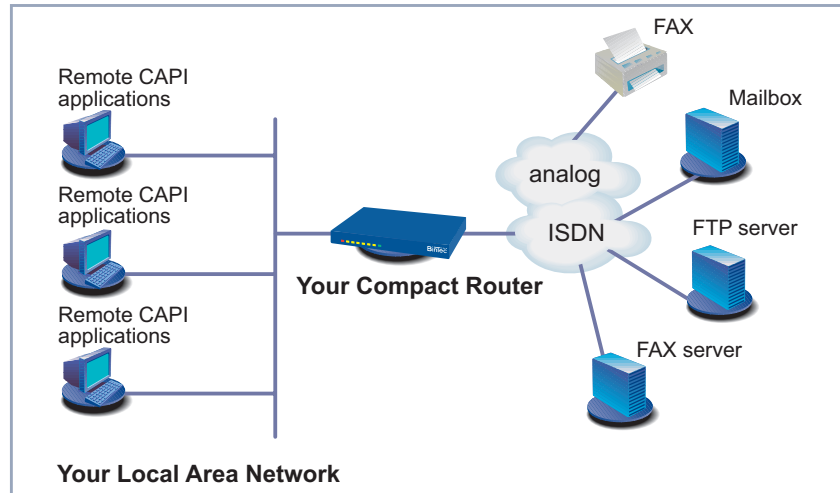


Figure 4-4: Your router with communications applications

Use the **Configuration Wizard** under Windows to use communications applications (e.g. fax and answering machine) from several PCs.

Proceed as described in [chapter 3, page 29](#) and [chapter 4.2, page 59](#). Follow the instructions on the screen, and note the following:

- Select the configuration option **General Settings** to make the basic router settings ([chapter 4.2.1, page 62](#)).
- Complete the configuration as described in [chapter 4.2.4, page 72](#).
- Configure the Remote CAPI interface (see [chapter 4.3.2, page 78](#)).
- Configure FAX and answering machine, if required ([chapter 4.4, page 83](#)).



## 4.1.5 Connecting a Branch Office to Head Office

This is shown in the diagram below:

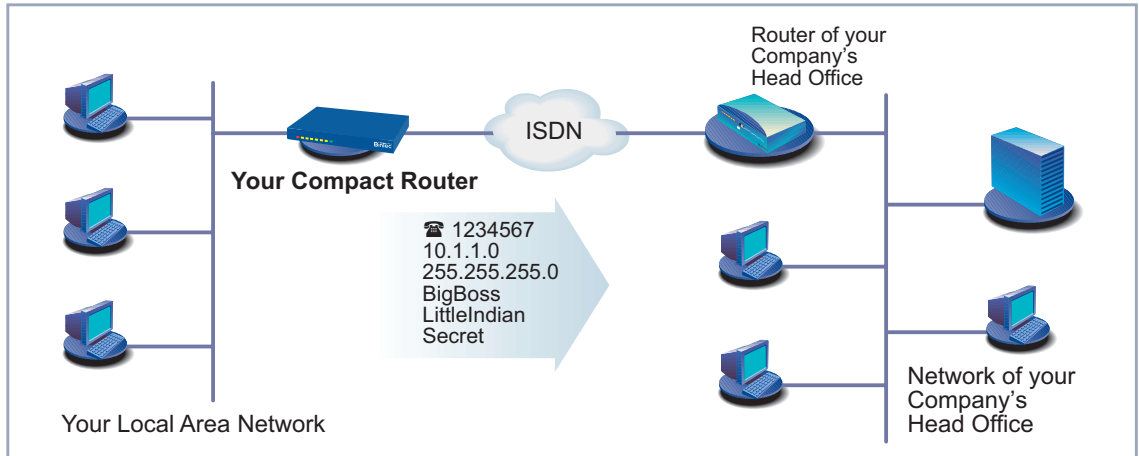


Figure 4-5: Your BinTec router in the branch office

You can quickly and easily connect branch offices or home offices to the head office using the **Configuration Wizard** under Windows. The employees in the branch office or home office can then access data at the head office as if they were in the head office (see [chapter 6.3.2, page 180](#)).

Proceed as described in [chapter 3, page 29](#) and [chapter 4.2, page 59](#). Follow the instructions on the screen, and note the following:

- Select the configuration options:
  - **General Settings** to make the basic router settings ([chapter 4.2.1, page 62](#)).
  - **Connection to Corporate Network**, e.g. for connecting to a head office ([chapter 4.2.2, page 66](#)).
- Complete the configuration as described in [chapter 4.2.4, page 72](#).
- Make additional settings on your PCs ([chapter 4.3, page 75](#)).

### 4.1.6 Providing Access to Head Office for Field Service Staff with Router Access (Dial-In)

This is shown in the diagram below:

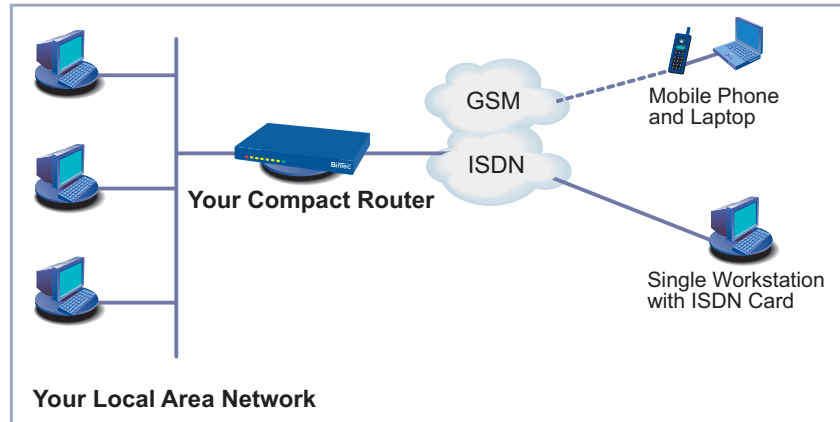


Figure 4-6: Your BinTec router in the head office

To provide field service or home office staff with access to data at their head office (called dial-in), you need the Setup Tool for configuring your router.

A PC in a home office can access the corporate network via an ISDN connection using **dialup** networking.

Field service staff can dial in to the head office via laptop and mobile phone over the GSM.

First you must carry out the basic configuration of the router. You can use the **Configuration Wizard** (cf. [chapter 4.2.1, page 62](#)) or the Setup Tool (see [chapter 6, page 119](#)) for this purpose.

Next you must configure the person who wants to access data at head office as a WAN partner. The exact configuration is explained using an example in [chapter 6.3.3, page 183](#).

## 4.2 Configuring Your Router with the Wizard

You have set up and connected your Compact Router, as described in [chapter 3.3, page 39](#). You started the **Configuration Wizard** in [chapter 3.6, page 49](#) and now you can use it to configure your router. Your router must first be ready for operation and connected serially to your PC.



You cannot configure **X2100** with the Wizard. Use the Setup Tool for initial configuration of your **X2100** router ([chapter 6, page 119](#)).

An explanation of how to use the Setup Tool can be found in [chapter 5.4, page 106](#).

The following configuration options are available:

- Basic configuration (obligatory, [chapter 4.2.1, page 62](#))
- Internet access (optional, [chapter 4.2.2, page 66](#))
- Corporate network connection to head office (optional, [chapter 4.2.3, page 69](#))



An extensive online Help Assistant is available if you have any questions during configuration. To activate our context-sensitive online Help Assistant:

- ▶ Press **F1** or click **Help**.



If you have already used the **Configuration Wizard** to create an existing configuration, the Wizard can load and use the values of this configuration (for the same router type). At the end of the configuration, the Wizard transfers the new configuration file to the router and also saves it to your PC.

You can also save your router's original configuration file at the end of configuration on your router (under `old_cfg`). For security reasons, this is only possible if you know the password for this configuration.



If you are operating your router directly at a point-to-point connection, you must make an entry in the Setup Tool in addition to the settings in the **Configuration Wizard**. In **CM-1BRI, ISDN S0** ► **INCOMING CALL ANSWERING**, set the mode for the comparison of numbers to *left to right (DDI)*. The **Configuration Wizard** does not make these settings automatically as this is not the standard case. See also [chapter 6.1.6, page 138](#).

### Starting the Configuration Wizard

If the **Configuration Wizard** has not yet been started, proceed as follows:

- Select the Windows Start menu and click **Program** ► **BRICKware** ► **Configuration Wizard**.

The start window of the **Configuration Wizard** opens:



Figure 4-7: **Configuration Wizard** start window

- Click **Next**.

### Setting the configuration mode

In the following window, choose between Quick and Expert Mode.

- If you are not very familiar with networking technologies, choose **Quick**. An explanation of how to configure using the Quick Mode is given below.
- If you are already familiar with networking technologies and router configuration, select **Expert** Mode.

In this mode, you can:

- Configure your router as a DHCP server.
- Configure different users for communications applications
- Assign different ISDN extensions to different services (e.g. fax)
- Define different filters



Configuration with the Quick Mode is sufficient in many cases. You can use Expert Mode to optimize a router configuration you have created in Quick Mode.

However, if you first use Expert Mode and then Quick Mode, the complete configuration will be overwritten and the previous configuration in Expert Mode will be lost.

### Setting up a serial connection

- Click **Next**.

A message window appears. The router restarts.

- Click **Next**.

The **Configuration Wizard** sets up a connection to your router. The router is then restarted and the type of router identified.



If the **Configuration Wizard** cannot set up a connection or an error message appears:

- Make sure your router is correctly connected.
- Check to see if a terminal program (e.g. **HyperTerminal**) or another program is running and occupying the serial interface. If yes, close the program.
- Check if you have changed your router's baud rate. The ex works setting is 9600 bps. If you have changed the baud rate, set it to 9600 bps again or use the **Configuration Wizard** in Expert Mode.
- If the **Configuration Wizard** could not boot your router, switch the router off and then on again. Wait until the LEDs stop blinking.
- Click **Next**.

### Selecting configuration options

- Click **OK** and then **Next**.

- Select one or more of the following options:

- **General Settings** to make the basic router settings ([chapter 4.2.1, page 62](#)).

- **Internet Access** to configure your Internet access ([chapter 4.2.2, page 66](#)). You can configure the Internet access – depending on router type – either as high-speed access over xDSL or as conventional access over ISDN.
- **Connection to Corporate Network**, e.g. for connecting to a head office ([chapter 4.2.3, page 69](#)).



You must always carry out the **General Settings** for initial configuration of your BinTec Compact Router.

- Click **Next**.  
A list of the selected configuration options is displayed.
- Click **Next**.  
The **Configuration Wizard** checks the settings of the PC on which it started and derives suggested values for the configuration.
- Continue with [chapter 4.2.1, page 62](#).

## 4.2.1 Basic Configuration

A diagram of a scenario with example values is shown below:

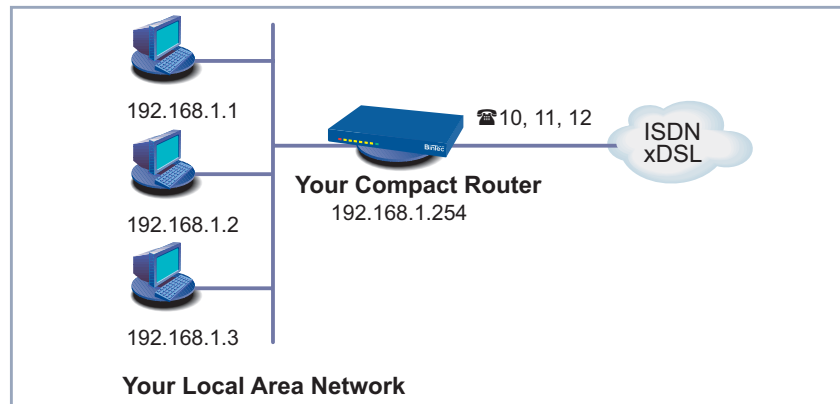


Figure 4-8: Example values for basic configuration

If you are configuring a new network, simply use the example values given.



You cannot configure **X2100** with the Wizard. Use the Setup Tool for initial configuration of your **X2100** router ([chapter 6, page 119](#)).

An explanation of how to use the Setup Tool can be found in [chapter 5.4, page 106](#).



The **Configuration Wizard** provides different configuration options, according to how your PC is configured.

#### Unconfigured network

- If your PC is still unconfigured, does not yet have an IP address and is configured as a DHCP client, the **Configuration Wizard** will ask you if your router should be configured as a DHCP server and if you wish to retain the suggested settings.



If you are familiar with networking technologies and do not want to configure a DHCP server or you want to configure the settings for a DHCP server and IP addresses yourself, proceed as follows:

- Deactivate the field **Use this Configuration**.
- Now enter your router's IP address and the corresponding netmask, e.g. **192.168.1.254** and **255.255.255.0**. Click **Next**.
- State whether you want to configure your router as a DHCP server. If you do, enter the IP address range for your PCs and define the number of IP addresses to be assigned by your router.

After configuration, remember to assign your PCs fixed IP addresses if no DHCP server is configured (cf. [chapter 4.3.1, page 75](#)).

- Click **Next**.

Your router receives the IP address **192.168.1.254** and automatically assigns all PCs in the network an IP address beginning with **192.168.1.1**.

#### An already configured network

- If your PC has a fixed IP address, the **Configuration Wizard** asks you in the **Router IP Address** window for your router's IP address in the LAN and the corresponding netmask. Enter the values, e.g. **192.168.1.254** and **255.255.255.0**.

- Click **Next**.
- You progress to password configuration.



### Caution!

All BinTec routers are shipped with the same user names and passwords. As long as the password remains unchanged, they are not protected against unauthorized use. How to change the passwords is described in "[Changing the Password](#)", page 111.

- You must therefore change your system password when requested to do so.
  - Enter a new password for your access authorization.
  - Click **Next**.
- All access authorizations are provided with this new password.

The following window opens (shown here with example values):

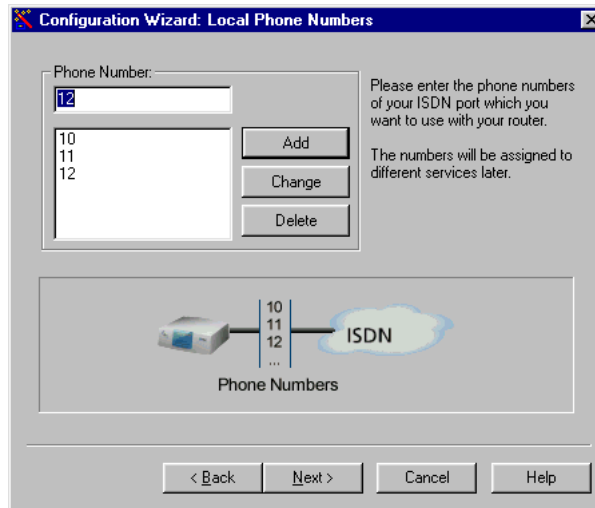


Figure 4-9: Entering extensions in the **Configuration Wizard**

- Enter the extensions of your ISDN port that you want to use with your router: Enter an extension in the **Extensions** field and click **Add**. Repeat the entry for all other extensions (cf. [figure 4-9, page 64](#)).



- Click **Next**.

The **Configuration Wizard** automatically assigns the extensions to certain services. A list is displayed.

- Continue with [chapter 4.2.2, page 66](#).

### Configuration in Expert Mode

This assignment can only be changed in Expert Mode:

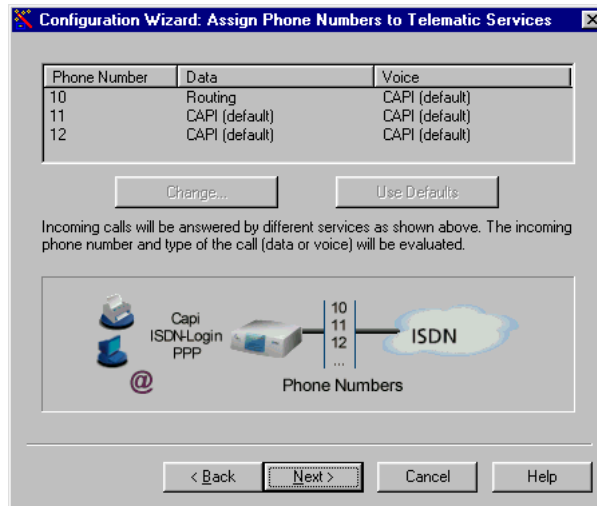


Figure 4-10: Extension assignment in the **Configuration Wizard** (Expert Mode)

- Click **Next**.

The basic configuration is now complete. A list of the configuration data appears.

- Continue with [chapter 4.2.2, page 66](#).

You can also do the following in Expert Mode:

- Change the system data.
- Specify the IP address of a DNS.
- Configure your router as a DHCP server.
- Receive the system time from a source other than ISDN.
- Enable ISDN login.

- Define different system passwords.
- Assign communications applications to different users and extensions.
- Set different filters (NetBIOS, CAPI and/or TAPI filters).
- Monitor activities (**Activity Monitor**).
- Log system messages.
- Monitor the utilization of your router.
- State the time when charging information is to be obtained from ISDN.
- Configure user accounts for telematic services (telecommunications applications).

## 4.2.2 Internet Access with Your Router

If you have selected **Internet Access**, continue as described in this chapter.

Here is a diagram with example values:

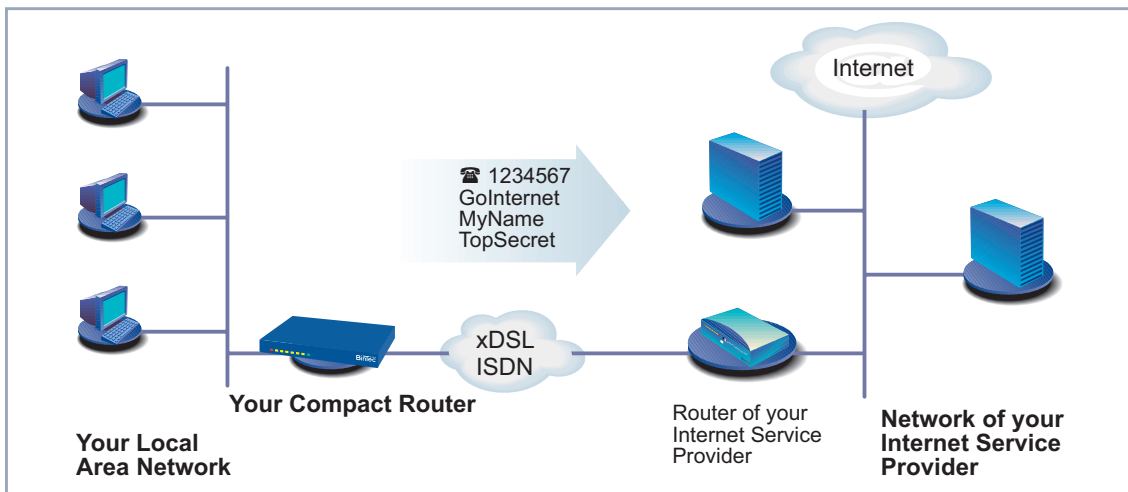


Figure 4-11: Your BinTec router and your Internet Service Provider

You have either completed the basic configuration of your router or have taken over a previous configuration without changing it (see [chapter 4.2.1, page 62](#)). The "Summary" window appears.

- Click **Next**.  
A message window opens.
- Click **Next** after reading the information in the window.
- First define your Internet Service Provider. If you cannot find your Internet Service Provider in the list, select *Other Internet Service Provider*.

### High-speed Internet access

You can set up a high-speed Internet access with **X1200**, **X3200** and **X2300 Family** routers. Various Internet Service Providers meanwhile offer high-speed access to the Internet.



Ask your provider about any special features of your ➤➤ **DSL/xDSL** connection that need to be considered.

The following applies to equipment with integrated modem:

BinTec Communications AG provides the **X2300i** and **X2300is** for ➤➤ **G.992.1 Annex B** connections (see [chapter 8.7.4, page 280](#)).

For ADSL connections implemented with ➤➤ **G.992.1 Annex A**, BinTec Communications AG provides the **X2300** (see [chapter 8.7.5, page 281](#)).

In Germany, Deutsche Telekom AG implements the ADSL connection for ISDN and analog lines with Annex B.

Proceed as follows to use the T-Online high-speed access:

- Select *T-Online* as Internet Service Provider.
- Click **Next**.
- Select *T-DSL* as connection to the Internet Service Provider.
- Click **Next**.
- Enter the user account (e.g. **123456789012**), the T-Online number (e.g. **081512345678**), the joint user account (e.g. **0001**) and the password.
- Click **Next**.

The configuration of your high-speed Internet access is now complete. A list of the configuration data is displayed.

**Internet test access (Internet by call)** If you would like to test your Internet access with your router immediately, you do not need personal access data from an Internet Service Provider, but can configure a so-called "Internet-by-call" access.

- Select a provider that offers access without first logging in. The text on the right of the selected provider gives you information about this.
- Click **Next**.
- Enter the access number of the Internet Service Provider, e.g. **1234567** or use the preset number.
- Click **Next**.
- Enter your user name and the associated password, e.g. **MyName** and **TopSecret**.
- Click **Next**.

The configuration of your Internet connection is complete. A list of the configuration data is displayed.

**Conventional Internet access** To configure a conventional Internet access, proceed exactly as for an Internet test access. In this case, you can set up a connection to any Internet Service Provider from which you have previously received access data.

If you want to configure a conventional Internet access via the Internet Service Provider T-Online, proceed as follows:

- Select *T-Online* as Internet Service Provider.
- Click **Next**.
- Select *ISDN* as connection to the Internet Service Provider. Enter the access number of the Internet Service Provider, e.g. **1234567** or use the preset number.
- Click **Next**.
- Enter the user account (e.g. **123456789012**), the T-Online number (e.g. **081512345678**), the joint user account (e.g. **0001**) and the password.
- Click **Next**.

The configuration of your Internet access is complete. A list of the configuration data is displayed.

**Configuration in Expert Mode** You can also do the following in Expert Mode:

- Keep a record of IP connection data.
- Enable data compression.
- More accurately define connection clearance (dynamic and static short hold).
- Activate channel bundling. (This option cannot be selected for all Internet Service Providers.)

### 4.2.3 Corporate Network Connection to Head Office

If you have selected **Connection to Corporate Network**, continue as described in this chapter.

A diagram of a scenario with example values is shown below:

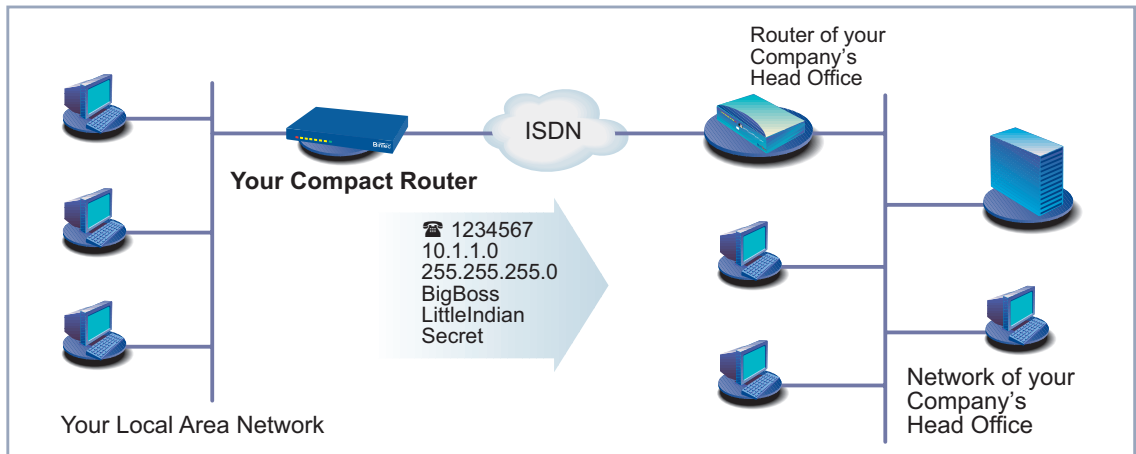


Figure 4-12: Your BinTec router and your head office

You have either completed the basic configuration of your router or have taken over a previous configuration without changing it (see [chapter 4.2.1, page 62](#)).

You have also completed the connection of your router to the Internet or have not selected this feature. The "Summary" window appears.

- Click **Next**.  
A message window opens.
- Read the information and click **Continue**.  
Another message window may appear.
- Read the information and click **Continue**.
- First enter the name of your WAN partner (e.g. your head office) and the corresponding access number e.g. **BigBoss** and **1234567**.  
The name of your WAN partner must be the same name as your partner uses as a local name. Your partner must accept calls to the given access number with the routing service.
- Click **Next**.
- Enter your local name and the common password, e.g. **LittleIndian** and **Secret**.  
Your local name must be the same name as your partner uses for you as a WAN partner.
- Click **Next**.
- Add a route to your head office.  
If you have not configured Internet access ([chapter 4.2.2, page 66](#)), select **Use Default Route**.  
If you have configured Internet access ([chapter 4.2.2, page 66](#)), enter the route yourself: Click **Add**. Enter the IP address or network address and the netmask, e.g. **10.1.1.0** and **255.255.255.0**. By setting the route, you are defining the path connecting you to your WAN partner (e.g. head office)
- Click **OK**.

The window for setting the routes to the WAN partner (with example values) is shown below:

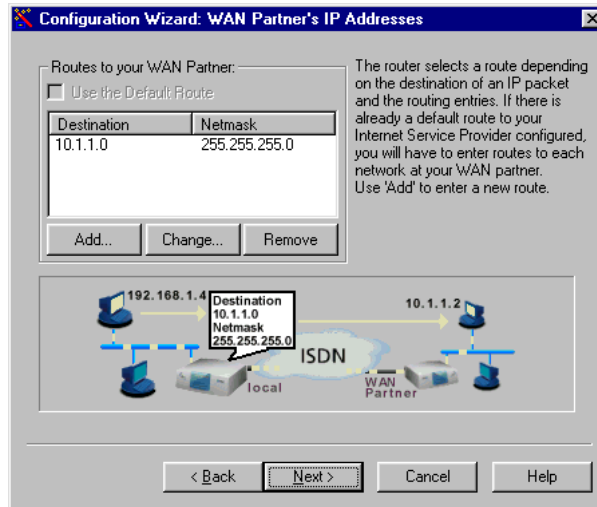


Figure 4-13: Defining the route to the WAN partner in the **Configuration Wizard**



Each route determines the path to a network or subnet of your WAN partner. A route is clearly defined by IP address/network address and netmask.

Instead of the network address, you can choose and enter any IP address from your partner's network. The **Configuration Wizard** determines the network address automatically using the corresponding netmask.

- If the network of your head office comprises several single networks (subnets) and you want access to each of these subnets, you must enter a route for each one of them.
- Click **Next**.  
The configuration of your WAN partner and corporate network connection is complete. A list of the configuration data appears.
- Continue with [chapter 4.2.4, page 72](#).

#### Configuration in Expert Mode

You can also do the following in Expert Mode:

- Configure an automatic callback function, so that only one of the two partners takes the telephone charges.

- Check the number of the caller: Calling Line Identification (CLID).
- Keep a record of IP connection data.
- Activate Back Route Verify to prevent the import of manipulated data packets.
- Define data compression, encryption and channel bundling.
- More accurately define connection clearance (dynamic and static short hold).

#### 4.2.4 Completing the Configuration

The "Summary" window appears. Proceed as follows to complete the configuration with the Wizard:

- Click **Next**.
- Select **Save the former configuration on the router** to save an existing configuration of your router before overwriting.
- Click **Finish** to complete the configuration.

The **Configuration Wizard** logs in to your router. An existing configuration is saved on the router as "old\_cfg". The new configuration is transferred to your router and also saved on your PC under the name "brick.cf". A message appears after a while saying that the configuration is completed.



If an error message appears saying that the **Configuration Wizard** could not log in to the router because the password has been changed, proceed as follows:

- If you know the password of the existing configuration, enter the password and click **OK**.  
The **Configuration Wizard** tries to log in to your router again.
- If you do not know the password, click **Unknown** and then **OK**.  
Your router is reset to the ex works state and all the previous configurations are lost.





The **Configuration Wizard** always saves your newly created configuration on the PC, even if errors occur during transmission to the router.

Further settings can be made to the configuration file saved on your PC using the Wizard.

➤ Click **OK**.

If you have configured your router as a DHCP server and your PCs as DHCP clients (the usual case), your router will now assign the PCs their IP addresses. This happens automatically under Windows NT, Windows ME, Windows XP and Windows 2000 (program IPCONFIG), but you must confirm the assignment under Windows 95/98 (program WINIPCFG).

➤ Click **Yes** to start WINIPCFG. Click **Renew** and then **OK**.

A message window opens asking if you want to configure the CAPI client.

➤ Click **Yes**.

The "Remote Clients Configuration" window opens (shown here with example values):

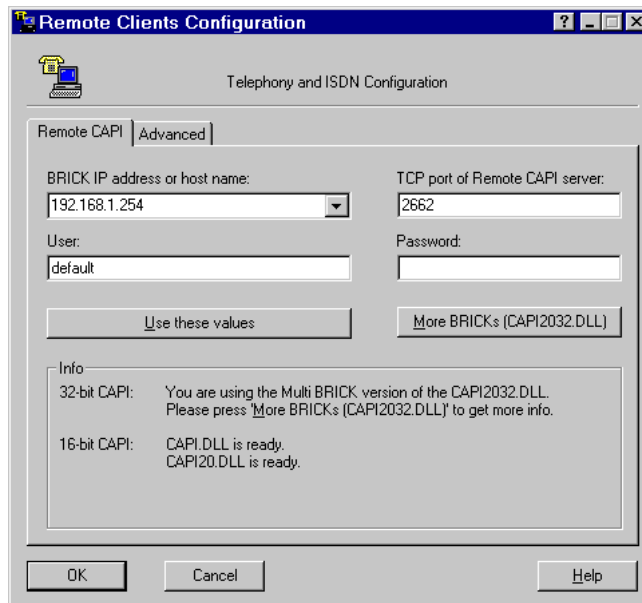


Figure 4-14: Remote CAPI configuration

➤ Continue with [chapter 4.3, page 75](#).

## 4.3 Configuring Windows PCs

To be able to make external connections from your network and use applications such as fax in your network, you may have to make additional settings to your PCs:

- If you have not configured your router as a DHCP server and the PCs have not yet been given any IP addresses, you must do the following (as per [chapter 4.3.1, page 75](#)):

- define the IP addresses now
- show the PCs "the way out" (gateway, DNS server)

If you have used the default settings of the **Configuration Wizard** and have configured your PCs as DHCP clients, you can ignore [chapter 4.3.1, page 75](#). In this case, your router provides the necessary information automatically.

- To enable CAPI applications on all PCs in the network, you must configure the Remote CAPI interface on all PCs ([chapter 4.3.2, page 78](#)).
- If you have configured a connection to a corporate network, you will certainly want to reach PCs from the partner LAN (e.g. head office) via Windows. To do this, you must proceed as described in [chapter 4.3.3, page 79](#).

### 4.3.1 Configuring the IP Address, Gateway and DNS Server on the PC

If you have not configured your router as DHCP server and your PCs do not yet have any IP addresses, you must now assign IP addresses to the PCs. You must also configure a way out for the PCs, e.g. how to get to the Internet. Proceed as follows:

- Windows 95/98**
- Click the Windows Start button and then **Settings** ➤ **Control Panel**.
  - Double click **Network**.
  - Click **TCP/IP** ➤ **Properties**.
  - Enter a unique IP address for your PC and the netmask in the **IP Address** tab, e.g. **192.168.1.1** and **255.255.255.0**.

- Enter the IP address of your router in the **Gateway** tab, e.g. **192.168.1.254**. Click **Add**.
  - If you do not have your own DNS, enter your router's IP address in the **DNS Configuration** tab under **DNS Server Search Order**, e.g. **192.168.1.254**.
- Windows NT**
- Click the Windows Start button and then **Settings** ➤ **Control Panel**.
  - Double click **Network**.
  - Select the **Protocols** tab. Click **TCP/IP Protocol** ➤ **Properties**.
  - Click **Specify IP Address** in the **IP Address** tab and set the IP address, netmask and default gateway, e.g. **192.168.1.254**, **255.255.255.0** and **192.168.1.1**. Enter the IP address of your router as default gateway.
  - If you do not have your own DNS, click **Add** under **DNS Server Search Order** in the **DNS** tab and enter the IP address of your router, e.g. **192.168.1.254**.
- Windows 2000**
- Click the Windows Start button and then **Settings** ➤ **Network and DCN Connections**.
  - Double click **LAN Connection**.
  - Click the **General** tab and then **Properties**.
  - Select the **Internet Protocol (TCP/IP)** in the **General** tab. Click **Properties**.
  - Activate the **Use next IP address** option in the **General** tab. Specify the IP address, netmask and standard gateway, e.g. **192.168.1.254**, **255.255.255.0** and **192.168.1.1**. Enter the IP address of your router as default gateway.
  - If you do not have your own DNS, enter the IP address of your router as DNS address. Activate the **Use next DNS server addresses** option.
  - Enter the address, e.g. **192.168.1.254** and click **OK**.
  - Close the open windows with **OK** and **Close**.
- Windows ME**
- Click the Windows Start button and then **Settings** ➤ **Control Panel**. View all the control panel options.
  - Double click **Network**.  
The **Network** window opens.

- Tag the **TCP/IP** entry for your Ethernet card in the **Configuration** tab and click **Properties**.
  - Click the option button **Specify IP Address** in the **IP Address** tab of the **TCP/IP Properties** window.
  - Enter the IP address and netmask, e.g. **192.168.1.1** and **255.255.255.0**.
  - Enter the IP address of your router in the **Gateway** tab under **New Gateway**, e.g. **192.168.1.254**. Click **Add**.
  - If you do not have your own DNS, enter your router's IP address in the **DNS Configuration** tab under **DNS Server Search Order**. Click **Add**.
  - Click **OK**.
  - Click **OK** in the **Network** window.
- Windows XP Professional**  
("Traditional Start menu")
- Click the Windows Start button and then **Settings** ➤ **Control Panel** ➤ **Network Connections** ➤ **LAN Connections**.
  - In the **LAN Connection Status** window in the **General** tab, click **Properties**.
  - In the **LAN Connection Properties** window in the **General** tab, tag the **Internet Protocol (TCP/IP)** entry and click **Properties**.
  - Click the option button for **Use Next IP Address**.
  - Enter the IP address, netmask and default gateway, e.g. **192.168.1.1**, **255.255.255.0** and **192.168.1.254**. Enter the IP address of your router as default gateway.
  - If you do not have your own DNS server, enter the IP address of your router as DNS server address under **Preferred DNS Server**.
  - Click **OK** and confirm the next windows with **Close**.
- And finally**
- Confirm all entries and restart your PC (not necessary for Windows 2000 and Windows XP).
  - Repeat the installation for all the PCs in your network.

### 4.3.2 Remote CAPI Interface on the PC

Enter your router as CAPI server in the **➤➤ Remote CAPI** configuration program.

The CAPI server of your router permits the following:

- Operation of communications applications on every PC in the network (e.g. fax services with RVS-COM Lite)
- ISDN access via communications applications from several PCs

You have already installed **BRICKware** on the first PC and have opened the configuration window for Remote CAPI configuration (cf. [figure 4-14, page 73](#)). You can shortly proceed with "[Configuring Remote CAPI](#)", [page 78](#). You must first install the **CAPI and TAPI Configuration** program and then configure the Remote CAPI interface for all other PCs in the network, as described in "[Configuring Remote CAPI](#)", [page 78](#).

#### Installing the Remote CAPI Client on all Other PCs

- If not yet done, install **BRICKware** as described in [chapter 3.6, page 49](#). If no administration tasks are to be executed from a PC, switch off the **Administration Tools**.
- Follow the instructions on the screen.
- Click **OK**.  
The Remote CAPI configuration window appears (cf. [figure 4-14, page 73](#)).
- Repeat the Remote CAPI installation on all PCs in the network on which you want to enable communications applications (e.g. fax) and configure Remote CAPI as described in "[Configuring Remote CAPI](#)", [page 78](#).

#### Configuring Remote CAPI

The "Remote Clients Configuration" window opens (see [figure 4-14, page 73](#)). Proceed as follows:

- Enter the IP address of your router in the **Remote CAPI** tab, e.g. **192.168.1.254**.

- If you have used Quick Mode in the **Configuration Wizard**, retain the entry **default** in the **User Name** field.
- If you have configured several users in the Expert Mode of the **Configuration Wizard**, enter your user name and password. The rights you have set for these users during configuration are therefore valid on the current PC.
- Click **Apply**.  
A message saying the Remote CAPI is ready appears after a short time.
- If no error message appears, click **OK**.



If an error message appears after clicking **Apply**, check the following:

- Is the IP address of your router correct?
  - Have you entered the license data correctly, if applicable?
  - Have you entered a valid user name and the correct password?
  - Have you entered the right port number 2662?
  - Have you configured your PC as a DHCP client and perhaps not yet given it an IP address?
- Repeat the Remote CAPI installation on all PCs in the network on which you want to enable communications applications (e.g. fax).



You can find a more detailed description of the Remote CAPI configuration in **BRICKware for Windows**. A description of the Multibrick CAPI for Windows NT is also included there, which allows you to define several BinTec routers in the network as CAPI servers.

### 4.3.3 Finding PCs on your Partner's Network

You have now configured your router for connecting to your partner's network. Let us suppose, for example, that you now want to establish contact between your PC and the Windows **BossPC** in your partner's network.

Note the following: Every PC in your LAN or in your partner's network requires a unique address, the IP address. In addition to IP addresses, an alternative means of addressing PCs that has developed is the use of computer or host



names (e.g. **BossPC**). Computer names are used especially in Windows networks. PCs, however, can only resolve IP addresses and not names. It is therefore necessary for the names to be translated (resolved) into their corresponding IP addresses. Typical examples of such name resolution are DNS or WINS servers. As you normally do not want to set up your own server in a small network, there is an alternative way of resolving the name **BossPC** into an IP address: the LMHOSTS file.

In the LMHOSTS file, IP addresses are arranged with their computer names in tabular form. If, for example, you are looking for **BossPC**, a PC located in your partner's network (e.g. head office), your PC searches its LMHOSTS file for the corresponding IP address and in this way is able to find the PC.



### Caution!

The following configuration can lead to increased connections and thus higher telephone bills. The conditions that lead to connections being set up are largely dependent on the respective network configuration. If you connect a network drive, for example, you must expect regular requests to increase the number of connections made.

- To avoid unwanted charges, you should certainly monitor your product in operation. Use the Credits Based Accounting System for this (see **User's Guide X4100/200/300**).



You can only use the following procedure if you have not configured extensive NetBIOS filtering with the **Configuration Wizard**. If you have configured extensive NetBIOS filtering, certain Windows functions such as a network drive connection cannot be used.

The assignment of IP address/name must be saved on every PC in your network that is to have access to the partner network.

You should also ensure that:

- you and your WAN partner are in the same domain or work group.
- you receive the necessary permission from the WAN partner to access PCs in your partner's network. If in doubt, ask your system administrator.





You can also log in to the Windows NT domain of a partner network. To test such a configuration, BinTec provides a test access for your use. How to configure this access is described at [www.bintec.net](http://www.bintec.net).

You can tell your PC the IP address of the **BossPC** by editing the LMHOSTS text file: This method is time-consuming and laborious, as you must make the necessary entries for every PC in your LAN. We recommend using DNS Proxy instead (see **User's Guide X4100/200/300**).

Proceed as follows to edit the LMHOSTS text file:

- Click the Windows Start button and then **Find** ➤ **Files and Folders...**
- Type in `lmhosts.*`.
- Click **Find now**.
- Open the file found with a text editor.
- Type in the IP address of the PC in the partner network, followed by a tab or space, followed by the name of the PC, e.g. `10.1.1.1 BossPC`. Save and close the file under the name `lmhosts`.
- Repeat the same procedure for each PC in the partner network that you want to reach over Windows.
- Click the Windows Start button and then **Find** ➤ **Computer...**
- Type in the name of the PC, e.g. **BossPC**, and click **Find now**. The name of the PC appears after a moment.

#### DNS configuration

- Also enter your router as DNS server on each PC ([chapter 4.3.1, page 75](#)).
- Configure your router as DNS Proxy (see **User's Guide X4100/200/300**).

#### Creating a shortcut on the desktop

- To avoid having to look for the **BossPC** every time you restart your PC, click the PC icon with the right mouse button and click **Create Shortcut**. You are then asked if you want the shortcut to be placed on the desktop.
- Click **Yes**.

Now you can connect to the **BossPC** on your partner's network at any time.

- Connecting a network drive** Another possible method of setting up a network drive connection is as follows:
- Open Windows Explorer, click **Tools**, then **Map network drive**.
  - Specify the drive and enter the path, e.g. *\\BossPC*.
  - Click **Reconnect at logon**.
  - Click **OK**.
- Now you can connect to the *BossPC* on your partner's network at any time.

## 4.4 Fax and Answering Machine with RVS-COM Lite

After you have configured your PC and router, you can install RVS-COM Lite. You will receive the license key necessary for activating the program when you register your router at [www.bintec.net](http://www.bintec.net). RVS-COM Lite offers you facilities for the following:

- Sending and receiving faxes
- Configuring an answering machine
- Configuring file transfer and Eurofile transfer services

In the following sections, we describe how to send faxes with your PC and router using RVS-COM Lite and how to configure an answering machine facility.



If you have any questions about RVS-COM Lite or problems with the installation, please consult the online help of RVS-COM Lite!



You have received a single user license for RVS-COM Lite. If you want to install RVS-COM Lite on several PCs, please contact RVS Datentechnik GmbH. You can obtain the address from RVS-COM Lite's online help.

### 4.4.1 Installing RVS-COM Lite

Proceed as follows to install RVS-COM Lite:

- Place your BinTec Companion CD in the CD-ROM drive of your PC. The start window appears automatically after a short time.
- If the Start window does not open automatically, click your CD-ROM drive in Windows Explorer and double-click **setup.exe**.
- Click **RVS-COM Lite** in the start window. The setup program starts.

- Enter the RVS-COM license number you received on registration.
- Click **Install**.  
The start window opens.
- Confirm the following two windows and enter the directory in which RVS-COM Lite should be installed. Click **Next**.  
The files are copied. After a moment a window appears saying the setup program is finished.
- Click **Exit**.

The start window of the configuration assistant appears:

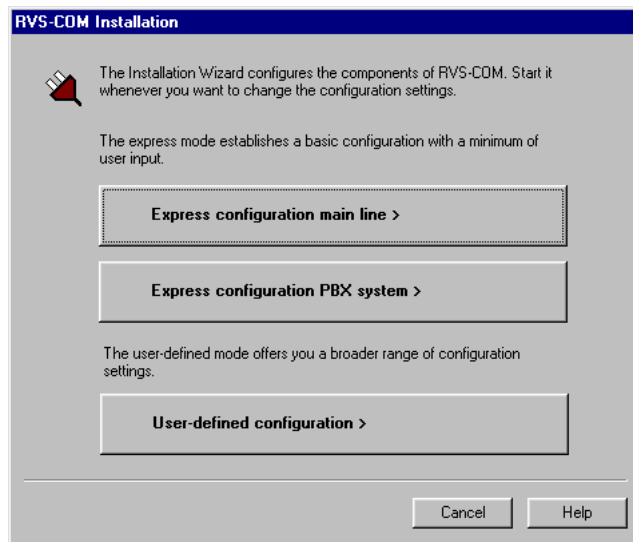


Figure 4-15: Start window of the RVS-COM Lite configuration assistant



Should an error message appear saying no CAPI interface has been installed:

- Make sure your router is connected to your ISDN connection.
- Make sure your Remote CAPI configuration is configured as described in [chapter 4.3.2, page 78](#).



To manage faxes with a Windows e-mail system instead of with the RVS inbox or to install RVS ISDN modems (also for ►► **DCN** network), select the configuration mode **User-Defined Configuration**.

- If your router is connected to a main line (e.g. NTBA adapter), click **Express configuration main line**.
- If your router is connected to a PABX, click **Express configuration PBX system**.
- Click **Next**.  
A message appears saying you have configured RVS-COM for operation with an ISDN adapter with a CAPI interface.
- Click **Next**.
- If a message appears saying you should change the dialing properties (e.g. area code, exchange number), confirm the message to set your dialing properties correctly. Adjust the settings (cf. [figure 4-16, page 86](#)).

The following window opens:

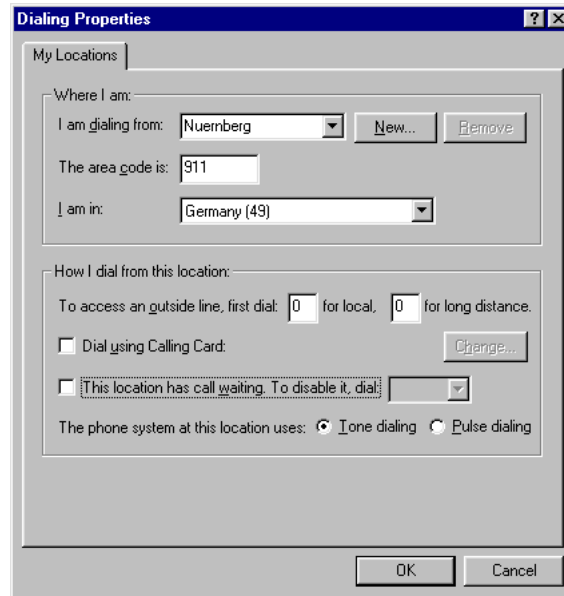


Figure 4-16: Dialing properties



The area code must be entered without the "0" prefix.

You only need the exchange number if you are operating your router with a PABX. Normally, the exchange numbers for local and long-distance calls are the same (see [figure 4-16](#), [page 86](#)).

- When you have adjusted the settings, click **Apply** and then **OK**.
- If you selected **Express configuration main line**, enter the extension of your ISDN connection in the next window. Select one of the extensions you have already entered with the **Configuration Wizard** and assigned to the CAPI service. You can only enter one extension with the configuration assistant, but you can add more later.
- If you selected **Express configuration PBX system**, enter in the next two windows the PABX extension number (number reported by PABX) and the telephone number for a point-to-multipoint connection. For a point-to-point connection, enter the telephone number and extension number of the extension.



If you are operating your router directly at a point-to-point connection, you must make an entry in the Setup Tool in addition to the settings in the **Configuration Wizard**. In **CM-1BRI, ISDN S0 ► INCOMING CALL ANSWERING**, set the mode for the comparison of numbers to *left to right (DDI)*. The **Configuration Wizard** does not make these settings automatically as this is not the standard case. See also [chapter 6.1.6, page 138](#).

- Click **Next**.
- Click **Next** in the following windows and finally **Exit**.  
The configuration with the configuration assistant is now complete.

## 4.4.2 Configuring RVS-COM Lite

In the following section, the numbers you have also set for the CAPI service with the **Configuration Wizard** must be allocated to the different communications applications (fax, answering machine).

The following diagram illustrates which number in our configuration example is to be used for a certain facility.

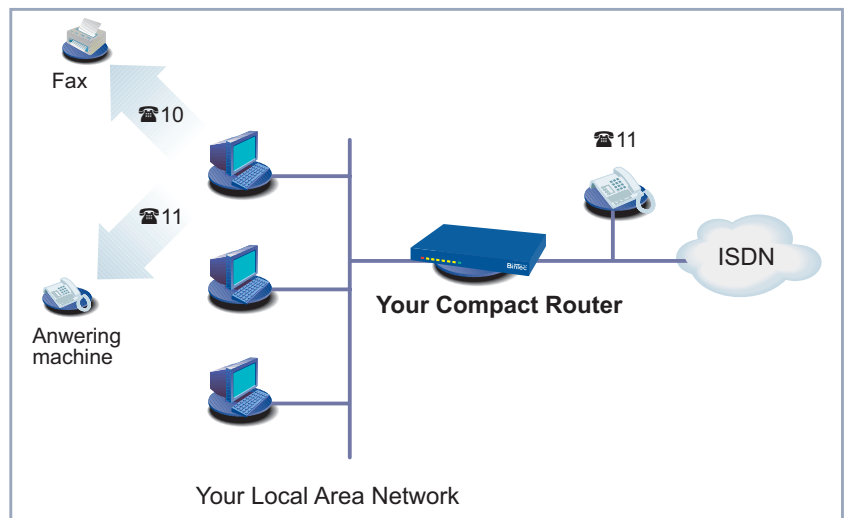


Figure 4-17: Scenario: 1 telephone, 1 PC with fax and answering machine



It is assumed in this scenario that a telephone responds to one of the numbers you have entered with the **Configuration Wizard** (11 in example).

- Select the Start button in the Windows menu and click **Program** ➤ **RVS-COM Lite** ➤ **CommCenter**.
- Click **Add** in the **Phone Numbers** tab to enter more phone numbers.

The following window opens:

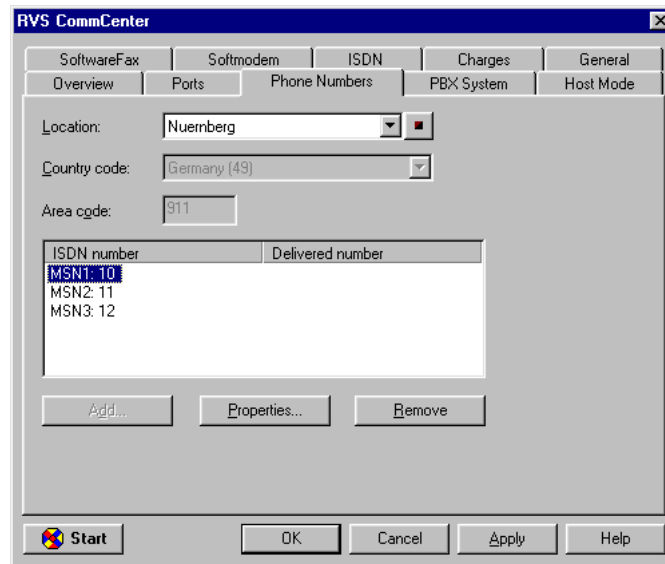


Figure 4-18: Phone number configuration in RVS-COM Lite

- Enter the numbers you have already used for router configuration with the **Configuration Wizard**.
- Click **Apply** after you have entered all the numbers. Make sure that the options **Use software fax for sending fax** and **Use software fax for receiving fax** are active in the **Software fax** tab.
- Click **Properties** in the **Ports** tab to allocate the numbers to the various services.



The following window opens:

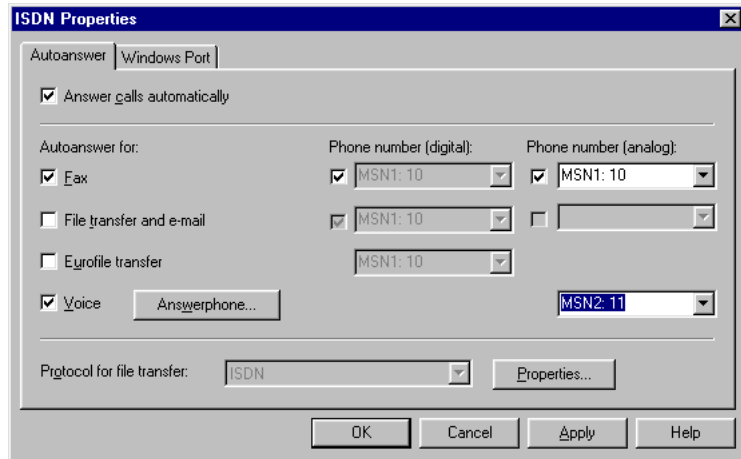


Figure 4-19: Allocation of phone numbers to services in RVS-COM Lite

- Allocate the first phone number to the fax service, the second number to voice (answering machine). Use different phone numbers.
- To adjust the answering service facility, click **Answerphone** and, if necessary, change the recorded message and the number of rings before the call is taken.
- Click **OK**.
- Click **Apply** and finally **OK**.

The following message appears in the list of connections: "ISDN: waiting for call." RVS CommCenter is ready to take calls and faxes.

## 4.5 Testing your Configuration

Now make sure your configuration settings work properly.



### Caution!

Unwanted connections and increased charges can occur! Monitor your router and make sure it does not establish unwanted connections (and charges).

- To avoid unnecessary charges, check whether the filters set in [chapter 6.1.5, page 134](#) are sufficient for your needs. You can configure more filters with the Setup Tool (**User's Guide X4100/200/300**, "Filters (Access Lists)").
- Watch the LEDs on your router (cf. [chapter 8, page 235](#)), use the monitor function of the Setup Tool (see **User's Guide X4100/200/300**, "Activity Monitoring") and check your settings with an SNMP Management Tool.

### 4.5.1 Testing Internet Access

Proceed as follows to test your Internet access:

- Configure your browser if you have not done so already. If you have received the IP address of a proxy server from your Internet provider, you can enter this address. Make sure you configure a connection over your local network.
- Try contacting us by typing [www.bintec.net](http://www.bintec.net) in your browser. The home page of BinTec Communications AG appears.

### 4.5.2 Sending and Receiving E-Mails

Proceed as follows to test your configuration:

- Open an account in the e-mail program if you have not already done so. You should have received the servers for incoming and outgoing mail from your Internet Service Provider. Make sure you configure a connection over your local network.

- Just send an e-mail to a good friend or – if you like – send one to BinTec! Use the e-mail address `testmail@bintec.de` and enter test mail as reference.  
You will receive an immediate reply from us to reassure you that the configuration was successful.

### 4.5.3 Sending a Fax

Send a friend a test fax or send it to yourself by using your own new fax number as the recipient's number.

First make sure that several attempts are made to send each fax if it cannot be sent at the first attempt.

- Select the Start button in the Windows menu and click **Program** ➤ **RVS-COM Lite** ➤ **CommCenter**.
- Click **Start** and then **Inbox**.  
You receive a list of the faxes received and sent.
- Click **Fax** ➤ **Fax Settings**.  
Set the number of attempts you want to make to send a fax and the time interval between each attempt in the **Schedule** tab.
- Enter the number of attempts, e.g. **3**.
- Enter the waiting time between attempts, e.g. **5** minutes.
- Click **OK**.

Create the desired fax and then send it.

- Do this by selecting the Windows Start button and then clicking **Program** ➤ **RVS-COM Lite** ➤ **Create New Fax**.  
The window **RVS Fax: Recipients** appears.
- Type in the extension, e.g. **967310**, and the name of the recipient.
- Click **Next**.
- Enter a reference and select the cover sheet **Normal**.
- Click **Next**.

- Type in a short message, e.g. **Test Fax**.
- Click **Next**.
- If you want, you can attach a file for sending with the fax.
- Click **Next** and finally **Send** to send your fax.

The RVS Mail Spooler appears and informs you about the status of the fax being sent.

If you have sent a fax to yourself, you should receive it right away (cf. [chapter 4.5.4, page 92](#)). This is the best way to check your fax application is working properly.



You can send a fax from any program (e.g. Word).

- Write your fax message (e.g. in Word).
- Print the document by using the RVS FAX printer driver from RVS-COM Lite. This is done in the **File** menu by clicking **Print** and setting the printer driver to **RVS Fax**.
- Confirm the print job.

The window **RVS Fax: Recipients** you used a short time ago appears.

#### 4.5.4 Receiving a Fax



As the fax solution with your router and RVS-COM Lite is a sofffax solution, the fax software must always be started if you want to receive faxes. RVS-COM Lite is created automatically in the Windows task bar during installation of RVS-COM Lite. The application is always ready to receive as long as you do not terminate RVS-COM Lite.

All incoming and outgoing faxes (including mailing errors) are displayed in the RVS-COM inbox, as are voice messages you receive over your RVS-COM answerphone.

- Select the Windows Start button and then click **Program** ➤ **RVS-COM Lite** ➤ **Inbox**.

All faxes and voice messages received are listed in the inbox.



Figure 4-20: RVS inbox

- Double-click the fax entry to open your received fax messages (including the test messages created by RVS-COM). The RVS Fax Viewer opens. If you have sent yourself a fax, you should find it in the inbox.



## 5 Other Connection and Configuration Methods

BinTec offers you other connection and configuration methods for your Compact Router in addition to the **Configuration Wizard**. This chapter describes the following:

- How to connect to your router ([chapter 5.1, page 96](#))
- How to log in to your router ([chapter 5.2, page 102](#))
- Which methods of configuration are available ([chapter 5.3, page 104](#))
- How the **Setup Tool** is constructed ([chapter 5.4, page 106](#))

## 5.1 Connection Methods

There are various possible methods of connecting to your router for configuration:

- Over the serial interface ([chapter 5.1.1, page 97](#))
- Over your >>> LAN ([chapter 5.1.2, page 99](#))
- Over an >>> ISDN connection ([chapter 5.1.3, page 100](#))

The possible methods of connection are shown in the diagram below:

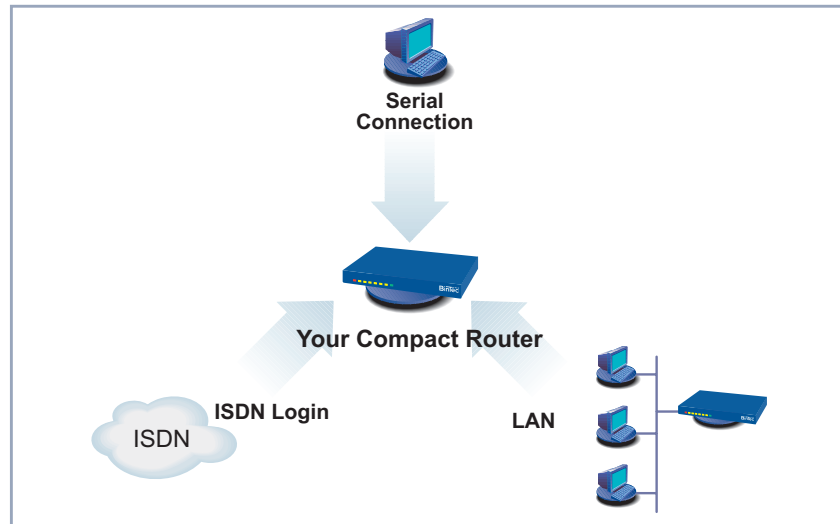


Figure 5-1: Possible methods of connection to your router

The various connection methods are presented below. Select the procedure to suit your needs.



If you use the >>> **Configuration Manager (BRICKware for Windows)** under Windows, you connect to your router over the LAN. If you use the **Configuration Wizard**, you connect to your router over the serial interface.



## 5.1.1 Connecting Over the Serial Interface

**Initial configuration** Connecting over the serial interface is very suitable if you carry out an initial configuration on your router before you have entered an IP address and net-mask. To connect your router to your PC over the serial interface, proceed as explained in [chapter 3.3, page 39](#).

**Windows** If you use a Windows PC, you need a terminal program for the serial connection, e.g. **HyperTerminal**.



Make sure that **HyperTerminal** is also installed on the PC during the Windows installation.

Note that **HyperTerminal** is not included in the standard installation of Windows 98 and Windows ME.

If you use **HyperTerminal** under Windows 2000, Windows ME or Windows XP, it is possible that the cursor keys for navigation in the Setup Tool do not work. In this case, use the tabulator key or **Ctrl+P** for moving forwards and **Ctrl+N** for navigation backwards.

**To do** Proceed as follows to connect to your router over the serial interface:

- Click the Windows Start button and then **Programs** ➤ **BRICKware** ➤ **Device at COM1** (or **Device at COM2** if you use the COM2 port of your PC) to start **HyperTerminal**.
- Press **Return** (at least once) after the **HyperTerminal** window opens.  
A window with the login prompt appears. You are now in the SNMP shell of your router.
- Continue with [chapter 5.2, page 102](#).



If the login prompt does not appear after pressing **Return** several times, the connection to your router has not been set up successfully. Check the COM1 or COM2 settings on your PC.

- Click **File** ➤ **Properties**.
- Click **Configure....** in the **Connect to** tab.  
The following settings are necessary:
  - Bits per second: 9600
  - Data bits: 8
  - Parity: none
  - Stop bits: 1
  - Flow control: none
- Enter the values and click **OK**.
- Set in the **Settings** tab:
  - Emulation: VT100
- Click **OK**.

The changes to the terminal program settings do not take effect until you disconnect the connection to your router and then make the connection again.



You can also use any other terminal program that can be set to 9600 bps, 8N1 (8 data bits, no parity, 1 stop bit), software handshake (none) and VT100 emulation.

**Unix** You will require a terminal program such as `cu` (under System V), `tip` (under BSD) or `minicom` (under Linux). The settings for these programs correspond to those listed above.

Example of a command line for using `cu`: `cu -s 9600 -c/dev/ttyS1`

Example of a command line for using `tip`: `tip -9600 /dev/ttyS1`

## 5.1.2 Connecting Over a LAN



You can reach your router from the LAN over the **telnet** service. Telnet is normally available on every PC. To be able to reach your router over the LAN, it should already have an **IP address** and **netmask**. If this is not the case and your router has therefore not yet been configured, you have two options:

- If you are using Windows, you can assign your router an IP address by using the **DIME Tools** assistant. If you have not yet installed **DIME Tools** together with **BRICKware for Windows**, proceed as explained in [chapter 3.6, page 49](#).
- If you are not working with Windows, use an alternative connection method for initial configuration (over the serial interface or ISDN).

**To do** Proceed as follows to connect to your router over the LAN:

- Connect your router to the LAN as explained in [chapter 3.3, page 39](#).

### Assigning IP addresses

Proceed as follows to assign your router an IP address (if necessary) with the **DIME Tools** assistant:

- Click the Windows Start button and then **Programs** ➤ **BRICKware** ➤ **DIME Tools**.  
If the **BootP** server is not started automatically, start it manually.  
The BootP server window opens after a short time if your router is still unconfigured.
- Enter the name and IP address of your router in the window under **Device Parameter**.  
(You will find examples of names and addresses in [chapter 3.4, page 42](#).)
- Click **OK**.
- Close **DIME Tools**.

### Running telnet

Now establish a connection to your router with telnet:

#### Windows

- Click **Run...** in the Windows Start menu.
- Enter `telnet <IP address of your router>`.

➤ Click **OK**.  
A window with the login prompt appears. You are now in the SNMP shell of your router.

➤ Continue with [chapter 5.2, page 102](#).

**Unix** ➤ Enter `telnet <IP address of your router>` in a terminal.  
A window with the login prompt appears. You are now in the SNMP shell of your router.

➤ Continue with [chapter 5.2, page 102](#).

**Configuration Manager** The ➤➤ **Configuration Manager** also connects to your router over the LAN. Communication between the PC and your router uses the SNMP protocol.

### 5.1.3 Connection Over ISDN

**Remote configuration** Connection over ➤➤ **ISDN** with ➤➤ **ISDN Login** is especially recommended if your router is to be configured or administrated remotely (remote LAN in [figure 5-2, page 101](#)). This is also possible even if your router has not been initially configured, i.e. is still in the ex works state. Connection is then obtained by means of a BinTec router that is already configured or an ISDN card in the remote LAN, using a number of your router's ISDN connection in your own LAN (e.g. **1234**).

This enables, for example, the administrator in the Remote LAN to configure your router remotely. Your router in your LAN only needs to be connected to the ISDN connection and switched on:

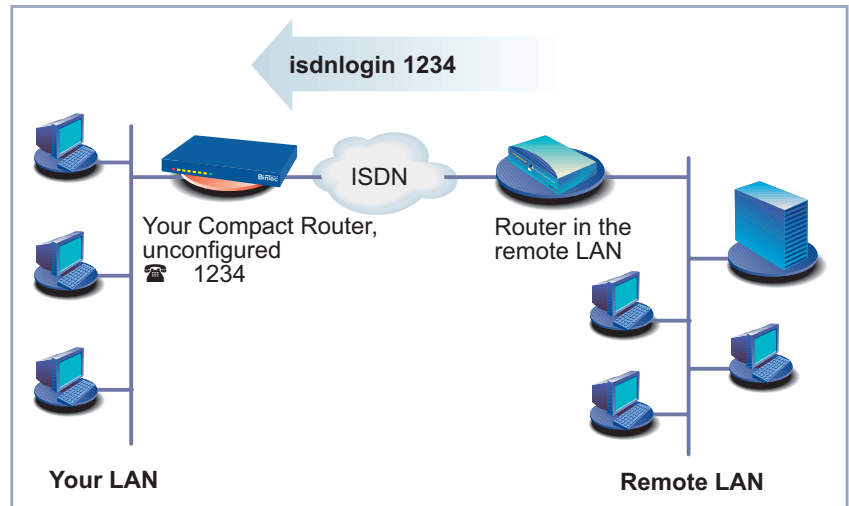


Figure 5-2: Connection over ISDN login for remote administration



Access over ISDN costs money. If your router and PC are in the same LAN, it is cheaper to access your router over the LAN or the serial interface.

**To do** To reach your router via ISDN Login, proceed as follows:

- Connect your router to the ISDN.
- Log in (administrator in Remote LAN) as usual on the BinTec router in the Remote LAN.
- In the SNMP shell, type in `isdnlogin <number of the ISDN connection of your router>`, e.g. `isdnlogin 1234`.

The login prompt will appear in the window. You are now in the SNMP shell of your router.

- Continue with [chapter 5.2, page 102](#).

## 5.2 About Logging In

Regardless of how you access your router, the **SNMP shell** of your router with the login prompt always appears first. Exceptions are the **Configuration Manager** and **Configuration Wizard** in Windows, which have their own user interface.

### 5.2.1 User Names and Passwords in the Ex Works State

In order to log in, you need to know the user name and password. In its ex works state, your router is provided with the following user names and passwords:

User name	Password	Permission
admin	bintec	Read and change system variables, save configurations, use the Setup Tool.
write	public	Read and write system variables (except passwords) (changes are lost when you switch off your router).
read	public	Read system variables (except passwords).
http	bintec	Call up HTTP status page of your router, read system variables (except passwords), no login.

Table 5-1: User names and passwords in ex works state

It is only possible to change and save configurations if you log in with the user name `admin`.

## 5.2.2 Logging In

Access information (user names and passwords) can also only be changed if you log in with the user name `admin`. For security reasons, passwords are not normally shown on the Setup Tool screen in plain language, but only as asterisks. The user names appear in plain language. The security concept of your router enables you to read all the other configuration settings with the user name `read`, but not the access information. It is therefore impossible to log in with `read`, read the password of the `admin` user and subsequently log in with `admin` and make changes to the configuration.

**To do** How to log in to the SNMP shell:

- Type in your user name (e.g. `admin`) and press **Return**.
- Type in your password (e.g. `bintec`) and press **Return**.

Your router displays an input prompt, e.g. `x3200:>`. The login was successful. You are now in the SNMP shell.



### Caution!

All BinTec routers are shipped with the same user names and passwords. As long as the password remains unchanged, they are not protected against unauthorized use. How to change the passwords is described in [chapter 5.4.4, page 111](#).

- Change the passwords to prevent unauthorized access to your router.
- Remember your password!  
If you have forgotten your password, you must reset your router to the ex works state, which means your configuration will be lost!

The permission rights of the user names and passwords can be found in [chapter 5.2.1, page 102](#).

**Closing the SNMP shell** To leave the SNMP shell after completing the configuration, enter `exit` and press **Return**.

## 5.3 Configuration Methods

This chapter first offers an overview of the various tools you can use for configuration of your Compact Router. This is followed by an introduction to using the Setup Tool.

**Overview** Methods of configuring your router:

- **Configuration Wizard**
- Setup Tool
- >> **SNMP** shell commands
- **Configuration Manager** and other SNMP managers

**Configuration Wizard** You have already learnt about configuration with the **Configuration Wizard** in [chapter 4.2, page 59](#). It is useful for quick, basic configuration of your router and can be used if you have a Windows PC. This usually covers most standard configurations. If you would like to make further settings, you can use the other configuration methods mentioned above. You could first configure your router with the **Configuration Wizard** and subsequently extend or change this initial configuration with one of the other tools. In many cases, the **Configuration Wizard** alone will be sufficient!

**Setup Tool** The Setup Tool is a menu-driven tool for configuration and administration of your router. Configuration with the Setup Tool is much easier and clearer than configuration with SNMP commands, although some settings can only be made with SNMP commands. The following chapters of this manual describe configuration with the Setup Tool. The Setup Tool is independent of the operating system of your PC. If a configuration step is only possible in isolated cases with the help of an SNMP command, the procedure for this is also explained.

**SNMP** >> **SNMP** (Simple Network Management Protocol) is a >> **protocol** that defines how you can access the configuration settings. All configuration settings are stored in the >> **MIB** (Management Information Base) in the form of MIB tables and MIB variables. You can access these directly via the SNMP shell.



**Configuration Manager  
and other SNMP  
managers**

The **Configuration Manager** is a Windows-based SNMP manager provided by BinTec Communications AG. You can use its interface based on Windows Explorer to access all MIB tables and variables of your router. You can also use other SNMP managers, such as SNM, HP Open View or Transview, to access and modify the MIB tables and variables. However, more detailed knowledge of the structure and interrelations of the tables and subsystems of your router is necessary for handling SNMP shell commands and SNMP managers; this method is therefore suitable for experienced users. Handling MIB tables and MIB variables is not described in this manual. You can find this information in the **Software Reference** and **MIB Reference**.

## 5.4 Using the Setup Tool

If you have logged in to your Compact Router as `admin` user, you can start the Setup Tool:

➤ Type `setup` after the input prompt and press **Return**.

The main menu of the Setup Tool appears:

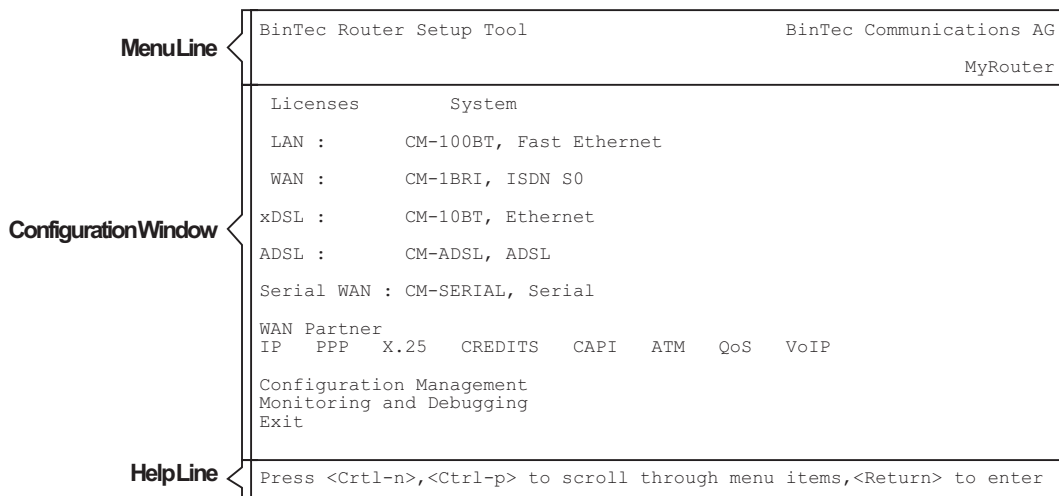


Figure 5-3: Explanation of Setup Tool menu



The following menus are not available for the following BinTec Compact Routers:

- The **xDSL**, **ADSL**, **SERIAL WAN** and **ATM** menus are not available for **X1000**.
- The **ADSL**, **SERIAL WAN** and **ATM** menus are not available for **X1200** and **X3200**.
- The **xDSL** and **SERIAL WAN** menus are not available for **X2300 Family** routers.
- The **xDSL**, **ADSL** and **ATM** menus are not available for **X2100**.



To use the Setup Tool, you must log in with the user name `admin!` If you do not know the corresponding password, you cannot open the Setup Tool (see [chapter 5.2, page 102](#)).

The Setup Tool is easy to use and you will have no problem finding your way around after a few minutes. Nevertheless, you should first familiarize yourself with the facilities offered by the Setup Tool.

**Setup Tool menu** Each Setup Tool menu consists of three parts (see [figure 5-3, page 106](#)):

- The menu line contains a navigation aid to show you where you currently are in the Setup Tool menu system. The system name of your router is also displayed. This is especially helpful if you are using several BinTec routers with different system names.
- The configuration window is where the actual entries are made and the respective settings displayed. The field in which the cursor is currently located is also marked.
- The help line at the bottom of the window tells you how to move around or how to change entries in the menu currently displayed.

### 5.4.1 Menu Navigation

You can use the following keys or key combinations to navigate the various menus in the Setup Tool:

Key combination	Meaning
<b>Tabulator</b>	To move to the next item in a menu.
<b>Return</b>	To open a submenu or activate a menu command (e.g. <b>SAVE</b> ).
<b>up or down</b> (arrow keys)	To move forwards or backwards between menu fields (functions with VT 100 emulation when using a terminal program).

Key combination	Meaning
<b>left or right</b> (arrow keys)	To scroll backwards or forwards in the same field to reveal a list of possible entries (functions with VT 100 emulation when using a terminal program).
<b>Esc Esc</b>	<b>Esc</b> twice in succession: To return to the previous menu. Cancels any changes made.
<b>Space</b>	To toggle the delete flag for list entries that are to be deleted. The tagged entry is marked with <i>D</i> . Pressing <b>Space</b> again removes the tag marking.  To select possible values of a variable (like arrow keys).
<b>Ctrl - l</b>	To redraw the screen.
<b>Ctrl - n</b>	To move to the next item in a menu.
<b>Ctrl - p</b>	To move to the previous item in a menu.
<b>Ctrl - f</b>	To scroll forward a page in a list that cannot all be displayed on the screen. An "=" sign at the bottom right indicates the end of the list or a "v" indicates more to come.
<b>Ctrl - b</b>	To scroll back a page in a list that cannot all be displayed on the screen. An "=" sign at the top right indicates the start of the list or a "^" indicates more to come.
<b>Ctrl - c</b>	Leave the Setup Tool.

Table 5-2: Navigation in the Setup Tool

## 5.4.2 Menu Commands

When you start moving around in the Setup Tool, you will notice that some menus have special command options, such as **DELETE**, **SAVE** and **CANCEL**. The meaning of the respective commands is explained below:

Menu Command	Meaning
<b>ADD</b>	To create or add an item to a list. A submenu opens for entering the desired settings.
<b>CANCEL</b>	To discard all changes made in the current menu.
<b>DELETE</b>	To delete all entries tagged with the <b>Space</b> bar for deletion from a list. These changes become effective immediately.
<b>OK</b>	To confirm the changes in the current menu. These changes become effective when <b>SAVE</b> is pressed in the next menu.
<b>SAVE</b>	All entries set in the current menu and all its submenus are saved to memory. These changes become effective immediately.
<b>EXIT</b>	To leave the current menu and return to the previous menu. Any entries made are lost.

Table 5-3: Buttons in the Setup Tool



To save the configuration to the flash memory, you must leave the Setup Tool with **Save as boot configuration and exit**.

### 5.4.3 Searching Lists

Some Setup Tool menus contain lists of items, e.g. the **WAN PARTNER** menu, which lists all **➤➤ WAN partners** currently configured.

```

BinTec Router Setup Tool                               BinTec Communications AG
[WAN]: WAN Partners                                   MyRouter

Current WAN Partner Configuration

  Partnername      Protocol      State
  -----
  BigBoss          ppp          dormant
  Partner1         ppp          dormant
  Partner2         ppp          dormant
  PROVIDER         ppp          dormant
  T_ONLINE         ppp          dormant

ADD                DELETE          EXIT

Press <Ctrl-n>, <Ctrl-p> to scroll, <Space> tag/untag DELETE, <Return>
to edit
Search: p

```

These lists are in alphabetical order according to the contents of the first field. An incremental search function is provided, which is very useful for searching for an item in long lists.

Proceed as follows:

- Enter the first letter of the item you are looking for, with the cursor located on an item in the list. Entries can be made in upper or lower case.
- As long as the search is active, you can enter more characters to refine the search.
- The **Backspace** or **Delete** key can be used to edit the search string. The cursor automatically jumps to the first match it finds in the list.

The characters entered for the search are displayed in the help line at the bottom of the menu.

Do not enter invisible characters, such as **Tabulator** or **Space**, as they stop the search and could lead to a function being executed.



Make sure the cursor is positioned in a list field. The search cannot run if the cursor is located in a command field, e.g. **ADD** or **DELETE**.

Example:

In the **WAN PARTNER** menu shown above, the entries provide the following search results:

Entry	Cursor moves to entry
p or P	<b>Partner1</b>
pr, Pr, pR, PR	<b>PROVIDER</b>
partner2	<b>Partner1</b> , on entering 2 to <b>Partner2</b>

Table 5-4: Search results

#### 5.4.4 Changing the Password

The procedure described below for changing the password applies to all passwords for your router: the access passwords for the user names `admin`, `read` and `write`, the HTTP server password, the PPP password, the provider password, the Activity Monitor password and the CAPI user passwords.

Any character may be used for entering a password. Passwords are only displayed as asterisks, even during password changes. The number of asterisks is the same as the number of characters in the password.



To start the Setup Tool of your router in a mode in which the passwords are displayed in plain language and can be changed once by editing, you must enter the command `setup -p`. This option only exists if you have logged in on your router under the user name `admin`.

### Changing the password



To change a password, proceed as follows:

In the password field, the **Backspace** key always deletes the complete entry, not just one character.

- Select the password field in the desired menu and enter the new password. The field changes to the change mode and the message `Change Password` appears in the help line.
- Now press **Return**, **Tabulator** or a **Cursor key** to confirm. The field changes to the confirm mode and `Confirm Password` is displayed in the help line.
- Now enter the new password again and confirm by pressing **Return**, **Tabulator** or a **Cursor key**. If you have entered the repeat password correctly, the password is changed. The new password is saved on leaving the menu with the **SAVE** button. If you leave the menu by pressing **CANCEL** or **Esc Esc**, the password change is not saved.  
  
If the two entries were not the same, the field is reset to the old password and the following message is displayed in the help line: "Password doesn't match. Try again." is displayed.



## 5.4.5 Menu Architecture

The main menu of the Setup Tool looks like this:

BinTec Router Setup Tool		BinTec Communications AG MyRouter					
Licenses	System						
LAN:	CM-100BT, Fast Ethernet						
WAN:	CM-1BRI, ISDN S0						
xDSL:	CM-10BT, Ethernet						
ADSL:	CM-ADSL, ADSL						
Serial WAN:	CM-SERIAL, Serial						
WAN partner							
IP	PPP	X.25	CREDITS	CAPI	ATM	QoS	VoIP
Configuration Management							
Monitoring and Debugging							
Exit							
Press <Ctrl-n>, <Ctrl-p> to scroll through items, <Return> to enter							

The Setup Tool menus available on your router are shown in [figure 5-4, page 114](#). Your router recognizes other menus activated by licensing and displays the corresponding menus (for entering license, see [chapter 6.1.1, page 122](#)).



The following menus are not available for the following BinTec Compact Routers:

- The **xDSL**, **ADSL**, **SERIAL WAN** and **ATM** menus are not available for **X1000**.
- The **ADSL**, **SERIAL WAN** and **ATM** menus are not available for **X1200** and **X3200**.
- The **xDSL** and **SERIAL WAN** menus are not available for **X2300 Family** routers.
- The **xDSL**, **ADSL** and **ATM** menus are not available for **X2100**.

The menu architecture (main menu and first submenus) of the Setup Tool looks like this:

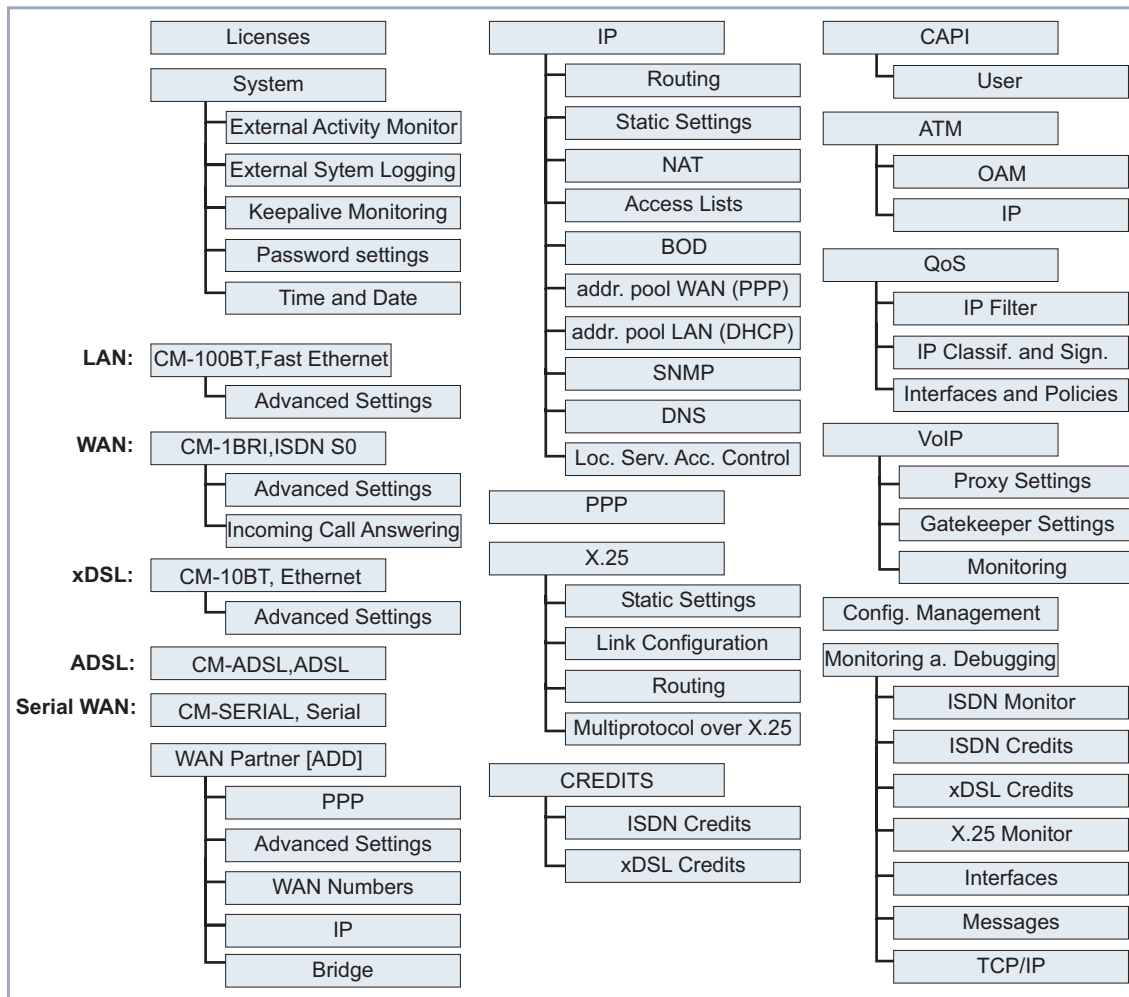


Figure 5-4: Setup Tool menu architecture

**Convention** The following convention is used in this manual:

- Example: "Go to **IP** ► **ROUTING**":  
Explanation: Tag the **IP** menu in the main menu of the Setup Tool and press **Return**. Tag the **ROUTING** submenu there and press **Return**.
- Example: "Go to **WAN PARTNER** ► **ADD** ► **WAN NUMBERS** ► **ADD** ► **ADVANCED SETTINGS**":  
Explanation: Tag the **WAN PARTNER** menu in the main menu of the Setup Tool and press **Return**. Tag the **ADD** button there and press **Return**. Tag the **WAN NUMBERS** submenu and press **Return**. Tag the **ADD** button there and press **Return**. Now tag the **ADVANCED SETTINGS** submenu and press **Return**.
- Example: "Go to **WAN PARTNER** ► **EDIT** ► **WAN NUMBERS**":  
Explanation: Tag the **WAN PARTNER** menu in the main menu of the Setup Tool and press **Return**. Select an existing entry there and press **Return**. Now tag the **WAN NUMBERS** submenu and press **Return**.

## Summary

To help you find your bearings during configuration, the menus are briefly explained below.

Menu	Function
<b>LICENSES</b>	Enter the license information in this menu. This menu is used for activating licenses.
<b>SYSTEM</b>	This menu is for entering the basic system settings of your router, e.g. system name and passwords.
<b>FAST ETHERNET</b>	This menu is for configuring the ►► <b>LAN</b> interface of your router. Here you enter data such as the IP address and netmask of the equipment.
<b>ISDN S0</b>	This menu is for configuring the ISDN interface of your router. Here you enter data such as the type of ISDN connection to which your router is connected.  The submenu <b>ISDN S0</b> ► <b>INCOMING CALL ANSWERING</b> is for assigning the available ISDN numbers to the desired services (e.g. PPP routing, ►► <b>CAPI</b> , ►► <b>ISDN Login</b> ).

Menu	Function
<i>xDSL</i>	This menu is for configuring the 10-BT Ethernet interface for xDSL connections (only <b>X1200</b> and <b>X3200</b> ).
<i>ADSL</i>	This menu is for configuring the ADSL interface of <b>X2300 Family</b> routers.
<i>SERIAL WAN</i>	This menu is for configuring the X.21/V.35 interface of <b>X2100</b> .
<i>WAN PARTNER</i>	Here you define all your WAN partners, e.g. your Internet Service Provider (►► <b>ISP</b> ). All the WAN partners entered are displayed in a list that includes the name of partner, protocol used and current status of each.
<i>IP</i>	Here you enter all the settings for the ►► <b>IP</b> protocol.
<i>PPP</i>	Includes generally valid ►► <b>PPP</b> settings, e.g. authentication protocol, that do not just refer to particular WAN partners. With these settings, the router can perform an authentication procedure for incoming calls, even if the calling party number cannot be identified (e.g. because the call is made from an analog line that does not transfer the calling party number).
<i>X.25</i>	This menu is for configuring the parameters for your X.25 connection, if applicable.
<i>CREDITS</i>	Here you administrate your router's Credits Based Accounting System.
<i>CAPI</i>	Includes the settings for BinTec's ►► <b>CAPI</b> user concept. You can use this to assign user names and passwords to users of your router's CAPI applications. This makes sure that only authorized users can receive incoming calls and make outgoing calls via CAPI.
<i>QoS</i>	This menu is for configuring all the settings for "Quality of Service".
<i>VoIP</i>	This menu is for configuring BinTec's Voice-over-IP features.
<i>ATM</i>	This menu is for configuring the ATM parameters for the PPPoE, PPPoA and IP Routing over ATM services ( <b>X2300 Family</b> only).
<i>CONFIGURATION MANAGEMENT</i>	Here you can administrate your router's configuration files. You can save them either locally on your router or on your PC, for example.
<i>MONITORING AND DEBUGGING</i>	Includes submenus that enable you to locate problems in your network and monitor activities, e.g. at your router's WAN interface.

Menu	Function
<i>EXIT</i>	Quit the Setup Tool with <i>EXIT</i> . You save the configuration file in the flash memory with <i>EXIT</i> ► <b>Save as boot configuration and exit</b> . This file is loaded on restarting your router. Leave the Setup Tool without saving the configuration in the flash memory with <i>EXIT</i> ► <b>Exit without saving</b> .

Table 5-5: Setup Tool menus



## 6 Initial Configuration of Your Router with the Setup Tool

This chapter tells you how to carry out the basic configuration steps for taking your router into operation using the Setup Tool.

The initial configuration of your router with the **Setup Tool** contains the same configuration steps as configuration with the **Configuration Wizard** ([chapter 4, page 51](#)). With the Setup Tool, however, you can work independently of the operating system and make additional settings.

This chapter is broken down as follows:

- Basic router settings ([chapter 6.1, page 121](#))
- Configuration of WAN partners ([chapter 6.2, page 151](#)).  
This chapter tells you how to configure your WAN partners.
- Examples of WAN partner settings ([chapter 6.3, page 177](#))
- Configuring broadband Internet access for **X1200** and **X3200** ([chapter 6.4, page 189](#))
- Configuring broadband Internet access for **X2300 Family** routers ([chapter 6.5, page 198](#))
- Configuring X.21/V.35 interface for **X2100** ([chapter 6.6, page 212](#))
- Saving the configuration ([chapter 6.7, page 218](#))  
How to save your configuration in the flash memory.
- Testing your configuration ([chapter 6.8, page 219](#))  
How to test your configuration.

### Extending existing configuration

This chapter also contains useful information on how to extend an existing configuration. The following actions are described:

- How to add additional **WAN partners**
- How to change passwords
- How to enter a license

- How to distribute ISDN extensions to the desired services ("Incoming Call Answering")
- How to setup your router as a >> **DHCP** server
- How to define a simple >> **NetBIOS** filter
- How to make routing entries

You will find descriptions of further configuration steps and safety mechanisms in the **User's Guide X4100/200/300**.



Use the Credits Based Accounting System function (see **User's Guide X4100/200/300**). This enables you to set a limit for connections to your router to prevent unnecessary charges accumulating as a result of mistakes made during configuration.



## 6.1 Initial Router Settings

The basic router settings mainly concern your router and the PCs in your local network. [figure 6-1, page 121](#) shows examples of **IP addresses**, extensions, etc. If you are setting up a new Local Area Network (LAN) and have not been assigned any IP addresses (e.g. from the system administrator at your head office), simply use the IP addresses given as examples:

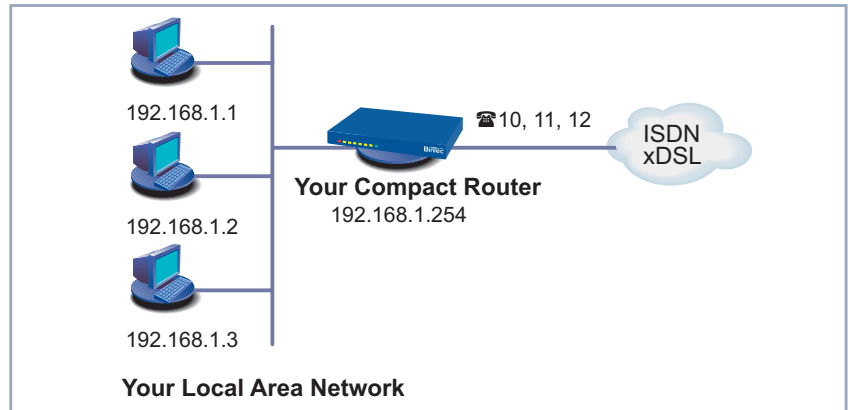


Figure 6-1: Initial router settings – your router in the LAN

The following steps are described:

- Entering a license, if applicable ([chapter 6.1.1, page 122](#))
- Entering system data, e.g. passwords ([chapter 6.1.2, page 124](#))
- Configuring the LAN interface ([chapter 6.1.3, page 127](#))
- Configuring your router as a DHCP server (optional, [chapter 6.1.4, page 131](#))
- Setting NetBIOS filters (optional, [chapter 6.1.5, page 134](#))
- Configuring the ISDN BRI Interface ([chapter 6.1.6, page 138](#))

How to configure the PCs in your network in Windows is described in [chapter 3.5, page 46](#).

### 6.1.1 License(s)

**License** This chapter describes how to activate the functions of the software licenses you have purchased.

**License data** The license data include the hardware serial number (for the Compact Routers the **software license ID**) of your equipment, a PIN and a license serial number. You received the last two items with your license. For online licensing, you enter the above license data and receive a key. You then enter this key together with your license serial number (**Serial Number**) in the Setup Tool to activate the functions of your license in your router.

**Entering your license** To enter your license, proceed as follows:

- Log in to your router with the user name `admin`, as described in [chapter 5.2.2, page 103](#).
- Open the Setup Tool with `setup`.
- Go to **LICENSES**.

The subsystems available on your router are listed under **Available Licenses**:

BinTec Router Setup Tool		BinTec Communications AG	
[LICENSE]: Licenses		MyRouter	
Available Licenses:			
IP (built in), STAC, CAPI, BRIDGE, X25			
Software license ID: X2I120001460043			
Serialnumber	Used for	Description	State
builtin	feature mask 4731	composite	ok
ADD	DELETE	EXIT	
Press <Ctrl-n>, <Ctrl-p> to scroll, <Space> tag/untag DELETE, <Return> to edit			

**Ex works state** The following licenses are available on your router in the ex works state:

Licenses available in ex works state	Meaning
IP	IP routing
STAC	➤➤ <b>STAC</b> ➤➤ <b>data compression</b>
CAPI	➤➤ <b>Remote CAPI</b> interface makes communications applications possible on your PC, e.g. sending and receiving faxes.
BRIDGE	Bridging
X.25	X.25
LEASED LINE	Leased line ( <b>X3200</b> only)
FRAME RELAY	Frame Relay ( <b>X2100</b> only)

Table 6-1: Licensed subsystems in ex works state

**Subsystems obtainable with license** The following subsystems are available on your router after appropriate licensing.

Subsystems	Meaning
TUNNEL	Virtual Private Networking (VPN, PPTP)
IPSEC	Internet Protocol Security
FRAME RELAY	Frame Relay (for <b>X2300 Family</b> )
LEASED LINE	Leased line (for <b>X1000, X1200, X2100</b> and <b>X2300 Family</b> )

Table 6-2: Subsystems with license

**To do** To enter your license, proceed as follows:

- Add a new entry with **ADD**.  
Another menu window opens.
- Enter **Serial Number** (the license serial number you received on buying the license) and **Key** (received during online licensing).

- Press **SAVE**.

The entries are temporarily saved and activated. You have returned to the **LICENSES** menu. The subsystems activated by your license data are now listed. The license entered is displayed with the state *ok*.



If *not ok* is displayed as status:

- Enter the license data again.
- Check your hardware serial number.

If *not\_supported* is displayed as status, you have entered a license for a subsystem that your router does not support. This means you cannot use the functions of this license.

### Deactivating a license

Proceed as follows to deactivate a license:

- Go to **LICENSES**.
- Tag the desired license by pressing **Space**.  
The tagged entry is marked with *D*.
- Confirm with **DELETE**.

The license is deactivated. You can reactivate your extra license at any time by entering the valid **Keys** and **Serial Number** (license serial number).



It is possible that the licenses provided ex works are accidentally deleted. Proceed as follows to reactivate the deleted licenses:

- Go to **LICENSES** ➤ **ADD**.
- Enter the **Mask** *65535*.
- Leave all the other fields empty.
- Press **SAVE**.

The licenses provided ex works are reactivated.

## 6.1.2 Entering System Data

Now you should enter the basic system data for your router.

- Go to **SYSTEM**.

The following menu opens:

BinTec Router Setup Tool		BinTec Communications AG
[SYSTEM]: Change System Parameters		MyRouter
System Name		MyRouter
Local PPP ID (default)		BigBoss
Location		3rd floor
Contact		admin@BigBoss.com
Syslog Output on Serial Console		no
Message Level for the Syslog Table		info
Maximum Number of Syslog Entries		20
External Activity Monitor>		
External System Logging>		
Keepalive Monitoring>		
Password Settings>		
Time and Date>		
	SAVE	CANCEL
Enter string, max length = 34 chars		

The following fields of the menu are relevant for this configuration step:

Field	Meaning
<b>System Name</b>	Defines the system name of your router, is also used as PPP host name. Appears as input prompt when logging in to the equipment. If no system name is set, a warning appears on logging in with the user name admin.
<b>Local PPP ID</b>	This entry is necessary for identification of your router if <b>PPP authentication</b> (e.g. <b>PAP</b> or <b>CHAP</b> ) is carried out that is not specific to a partner (see <b>User's Guide X4100/200/300</b> , chapter "General PPP Settings").
<b>Location</b>	Indicates where your router is located (optional).
<b>Contact</b>	States the contact person responsible (optional). Here you can enter the e-mail address of the system administrator, for example.

Table 6-3: **SYSTEM**

**Passwords** Enter the passwords for your router in the submenu **SYSTEM** ► **PASSWORD SETTINGS**:

Field	Meaning
<b>admin Login Password/SNMP Community</b>	Password for user name admin.
<b>read Login Password/SNMP Community</b>	Password for user name read.
<b>write Login Password/SNMP Community</b>	Password for user name write.
<b>HTTP Server Password</b>	Password for the HTTP status page of your router.
<b>Activity Monitor Password</b>	Password for the <b>Activity Monitor</b> .

Table 6-4: **SYSTEM** ► **PASSWORD SETTINGS**



### Caution!

All BinTec routers are shipped with the same user names and passwords. As long as the password remains unchanged, they are not protected against unauthorized use. How to change the passwords is described in "[Changing the Password](#)", page 111.

► Change the passwords to prevent unauthorized access to your router.

The permission rights of the user names and passwords can be found in [chapter 5.2.1](#), page 102.

**To do** Proceed as follows to enter the relevant system data and passwords:

- Enter **System Name** of your router, e.g. **MyRouter**.
- Enter the **Local PPP ID**. The entry can be the same as the **System Name**.
- Enter your **Location**, e.g. **Europe**.
- Enter **Contact**, e.g. **SysAdmin**.
- Go to **SYSTEM** ► **PASSWORD SETTINGS**.

- Enter **admin Login Password/SNMP Community**.
- Enter **read Login Password/SNMP Community**.
- Enter **write Login Password/SNMP Community**.
- Enter an **HTTP Server Password**.
- Enter an **Activity Monitor Password**.
- Press **SAVE**.

You have returned to the **SYSTEM** menu.

- Press **SAVE**.

You have returned to the main menu. The entries are temporarily saved and activated.

### Advanced Configuration

The menu **SYSTEM** ➤ **EXTERNAL ACTIVITY MONITOR** contains the settings necessary for monitoring your router with the Windows **Activity Monitor** tool (see **User's Guide X4100/200/300**, chapter "Activity Monitor" or **BRICKware for Windows**).

The menu **SYSTEM** ➤ **EXTERNAL SYSTEM LOGGING** contains the settings for syslog messages (see **User's Guide X4100/200/300**, chapter "Syslog Messages").

The menu **SYSTEM** ➤ **KEEPLIVE MONITORING** contains the settings for the Keepalive Monitoring function (see **User's Guide X4100/200/300**, chapter "Keepalive Monitoring").

The menu **SYSTEM** ➤ **TIME AND DATE** contains the settings for manually entering the time and date in your router (see **User's Guide X4100/200/300**, chapter "System Time").

### 6.1.3 Configuring the LAN Interface

This chapter describes the configuration of the LAN interface (10/100Base-T Ethernet) of your router. The LAN interface is the physical interface to the local network. Enter the address in your router where it can be reached in the LAN in

the **CM-100BT, FAST ETHERNET** menu. As long as these parameters are not entered in your router, it cannot be recognized by other hosts in the network.

This chapter explains only the configuration of the **IP**. Retain the default value under **Bridging**.

### Example of subnets

If your router is connected to a LAN that consists of two subnets, you should enter a **Second Local IP Number** and a **Second Local Netmask** for the second subnet.

Example of a LAN with subnets:

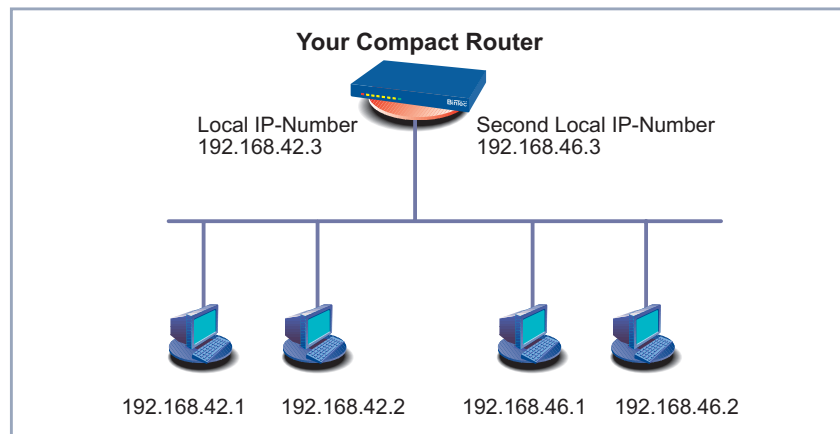


Figure 6-2: Your router with two different local IP addresses

The first subnet has two hosts with the **IP addresses** 192.168.42.1 and 192.168.42.2 and the second subnet has two hosts with the IP addresses 192.168.46.1 and 192.168.46.2. To be able to exchange data packets with the first subnet, your router uses the IP address 192.168.42.3, for example, and 192.168.46.3 for the second subnet. The **netmasks** for both subnets must also be indicated.

### IP address, netmask, encapsulation

Proceed as follows to configure the LAN interface:

➤ Go to **CM-100BT, FAST ETHERNET**.



The following menu opens:

BinTec Router Setup Tool		BinTec Communications AG
[LAN]: Configure LAN Interface		MyRouter
IP Configuration	Manual	
Local IP Number	192.168.1.254	
Local Netmask	255.255.255.0	
Second Local IP Number		
Second Local Netmask		
Encapsulation	Ethernet II	
Mode	Auto	
Bridging	disabled	
Advanced Settings>		
SAVE		CANCEL
Enter IP address (a.b.c.d or resolvable host name)		

The following fields of the menu are relevant for configuration of the LAN interface:

Field	Meaning
<b>IP Configuration</b>	Possible values: <ul style="list-style-type: none"> <li>■ <i>Manual</i>: Default value. IP address and netmask must be entered.</li> <li>■ <i>DHCP</i>: Your router obtains its IP address from a DHCP server.</li> </ul>
<b>Local IP Number</b>	IP address of your router in the LAN.
<b>Local Netmask</b>	Netmask of the network in which your router with <b>Local IP Number</b> is located.
<b>DHCP MAC Address</b>	Only for <b>IP Configuration DHCP</b> . MAC address of the corresponding Ethernet interface.  Some providers use hardware-independent MAC addresses to assign their clients IP addresses dynamically. If your provider has assigned you a MAC address, enter this here.

Field	Meaning
<b>Second Local IP Number</b>	Only for <b>IP Configuration Manual</b> . Second IP address of your router in the LAN.
<b>Second Local Netmask</b>	Only for <b>IP Configuration Manual</b> . Netmask of the network in which your router with <b>Second Local IP Number</b> is located.
<b>Encapsulation</b>	<p>Defines the kind of header added to the IP packets that run over this LAN interface. Possible values:</p> <ul style="list-style-type: none"> <li>■ <i>Ethernet II</i> (conforms to IEEE 802.3)</li> <li>■ <i>Ethernet SNAP</i></li> </ul> <p>You can generally retain the default value <i>Ethernet II</i>. The LAN interface is called en1 for <i>Ethernet II</i> and en1-snap for <i>Ethernet SNAP</i>.</p>
<b>Mode</b>	<p>Defines the mode in which the LAN interface is operated. Possible values:</p> <ul style="list-style-type: none"> <li>■ <i>auto</i> (default value) Automatic detection of the LAN parameters is activated and the LAN interface is operated in the appropriate mode.</li> <li>■ <i>10 Mbps Half Duplex</i></li> <li>■ <i>10 Mbps Full Duplex</i></li> <li>■ <i>100 Mbps Half Duplex</i></li> <li>■ <i>100 Mbps Full Duplex</i></li> </ul> <p>You should normally leave the default value at <i>auto</i>.</p>

Table 6-5: **CM-100BT, FAST ETHERNET**

**To do** Proceed as follows to configure the LAN interface of your router:

- Select *Manual* in **IP Configuration**.

- Enter **Local IP Number** of your router, e.g. **192.168.1.254**.
- Enter **Local Netmask**, e.g. **255.255.255.0**.
- If applicable, enter **Second Local IP Number** and **Second Local Netmask**.
- Select **Encapsulation**, e.g. **Ethernet II**.
- Select **Mode**, e.g. **auto**.
- Press **SAVE**.

You have returned to the main menu. The entries are temporarily saved and activated.

#### Advanced configuration

Information about bridging can be found in the **Software Reference**.

The menu **CM-100BT, FAST ETHERNET** ➤ **ADVANCED SETTINGS** contains settings for the Routing Information Protocol RIP, IP Accounting, Proxy ARP and Back Route Verification (see **User's Guide X4100/200/300**).

### 6.1.4 Configuring Your Router as a DHCP Server

#### IP addresses in the LAN

Each PC in your ➤➤ **LAN** and your router requires its own IP address. One option for assigning IP addresses in your LAN is the Dynamic Host Configuration Protocol (DHCP). If you configure your router as a ➤➤ **DHCP** server, the router automatically assigns ➤➤ **IP addresses** to requesting PCs in the LAN from a predefined IP address pool. A PC sends out an address request and in turn receives its IP address assigned by your router. You therefore do not need to assign fixed IP addresses to PCs, which reduces the amount of configuration work in your network. To do this, you set up a pool of IP addresses, from which your router assigns IP addresses to hosts in the LAN for a defined period of time. A DHCP server also transfers the netmask, the addresses of the Domain Name Servers entered statically or by PPP negotiation (➤➤ **DNS**), ➤➤ **NetBIOS** name servers (WINS) and standard ➤➤ **gateway**.

#### Configuring a DHCP server

Proceed as follows:

- Go to **IP** ➤ **IP ADDRESS POOL LAN (DHCP)** ➤ **ADD**.

The following menu opens:

BinTec Router Setup Tool		BinTec Communications AG
[IP][DHCP][ADD]: Add Range of IP Addresses		MyRouter
Interface	en1	
IP Address	192.168.1.1	
Number of Consecutive Addresses	8	
Lease Time (Minutes)	120	
MAC Address		
Gateway		
NetBT Node Type	not specified	
	SAVE	CANCEL
Use <Space> to select		

The menu contains the following fields:

Field	Meaning
<b>Interface</b>	An interface to which the next address pool is assigned. When an address request is received over <b>Interface</b> , one of the addresses in the address pool is assigned.
<b>IP Address</b>	First IP address in the address pool.
<b>Number of Consecutive Addresses</b>	Total number of IP addresses in the address pool, including the first IP address ( <b>IP Address</b> ).
<b>Lease Time (Minutes)</b>	Specifies the length of time an address from the pool can be assigned to a host. After the <b>Lease Time (Minutes)</b> expires, the address can be reassigned.
<b>MAC Address</b>	(optional) Only for <b>Number of Consecutive Addresses = 1</b> : <b>IP Address</b> is only assigned to the device with <b>MAC Address</b> .

Field	Meaning
<b>Gateway</b>	Defines which IP address is assigned to the DHCP client as gateway. If no IP address is entered here, the IP address of your router is transferred (value at <b>Interface</b> ).
<b>NetBT Node Type</b>	Defines how and in what order the assignment of NetBIOS names to IP addresses is attempted for the hosts of an address pool. You can accept the default value <i>not specified</i> . A detailed description of this function is given in the <b>Software Reference</b> .

Table 6-6: **IP ► IP ADDRESS POOL LAN (DHCP) ► ADD**

**To do** Make the following entries to configure your router as a DHCP server:

- Select **Interface**, e.g. **en1**.
- Enter **IP Address**, e.g. **192.168.1.1**.
- Enter **Number of Consecutive Addresses**, e.g. **8**.
- Enter **Lease Time (Minutes)**, e.g. **120**.
- Enter **MAC Address**, if applicable.
- Enter **Gateway**, if applicable.
- Select **NetBT Node Type**, e.g. **not specified**.
- Press **SAVE**.

The **IP ► IP ADDRESS POOL LAN (DHCP)** menu opens with a list of the IP address pools. The entries are temporarily saved and activated. You have defined an address pool, e.g. with eight IP addresses: 192.168.1.1 to 192.168.1.8.



You can also create several entries to define an IP address pool of unconnected address ranges, e.g. **192.168.1.20 - 192.168.1.29** and **192.168.1.35 - 192.168.1.40**.

### 6.1.5 Setting Filters

**NetBIOS filters** If you are working with Windows in your local network, you should set >> **NetBIOS** filters to save costs. This prevents connections being set up from the network, e.g. to the Internet Service Provider (>> **ISP**), in order to forward WINS requests from PCs in your network. That is, your router asks the ISP which >> **host name** can be assigned to an IP address. These connections are unnecessary because the ISP cannot resolve WINS names, but still cost money.

A more detailed explanation of >> **filters** and security can be found in **User's Guide X4100/200/300**.

**To do** To prevent these unnecessary connections, proceed as follows:



When configuring filters, make sure not to lock yourself out.

- > Use the serial interface or ISDN Login on your router for filter configuration.
- > If you still access your router over your LAN (e.g. telnet), before starting filter configuration select the menu **IP** ▶ **ACCESS LISTS** ▶ **INTERFACES** ▶ **EDIT** (for *en1*) : **First rule** = *none*.
- > Go to **IP** ▶ **ACCESS LISTS** ▶ **FILTER** ▶ **ADD**.

The following menu opens:

BinTec Router Setup Tool		BinTec Communications AG	
[IP][ACCESS][FILTER][ADD]: Configure IP Access Filter		MyRouter	
Description	wrong_dns		
Index	1		
Protocol	udp		
Source Address			
Source Mask			
Source Port	specify		
Specify Port	137		
Destination Address			
Destination Mask			
Destination Port	specify		
Specify Port	53		
Type of Service (TOS)	00000000	TOS Mask	00000000
	SAVE		CANCEL
Enter string, max length = 48 chars			

### Filters for WINS requests

Make the following entries to define a filter for WINS requests:

- Enter **Description**, e.g. *wrong\_dns*.
- Select **Protocol**: *udp*.
- Select **Source Port**: *specify*.
- Enter **Specify Port**: *137*.
- Select **Destination Port**: *specify*.
- Enter **Specify Port**: *53*.
- Press **SAVE**.

You have returned to **IP** ➤ **ACCESS LISTS** ➤ **FILTER** and the entries have been saved.

Now define a second filter as follows:

- Go to **IP** ➤ **ACCESS LISTS** ➤ **FILTER** ➤ **ADD**.
- Enter **Description**: *all*.
- Select **Protocol**: *any*.
- Select **Source Port**: *any*.

➤ Select **Destination Port**: *any*.

➤ Press **SAVE**.

You have returned to menu **IP** ➤ **ACCESS LISTS** ➤ **FILTER**. The entries are temporarily saved and activated and both filters are now listed.

**Filter rules** Proceed as follows to define rules for the filters:

➤ Go to **IP** ➤ **ACCESS LISTS** ➤ **RULES** ➤ **ADD**.

The following menu opens:

BinTec Router Setup Tool		BinTec Communications AG	
[IP][ACCESS][RULE][ADD]: Configure IP Access Rules		MyRouter	
Action	deny M		
Filter	wrong_dns (1)		
	SAVE		CANCEL
Use <Space> to select			

**First rule** Make the following entries to define a rule:

➤ Select **Action**: *deny M*.

➤ Select **Filter**, e.g. *wrong\_dns (1)*.

➤ Press **SAVE**.

You have returned to **IP** ➤ **ACCESS LISTS** ➤ **RULES**, and the entries have been saved.

**Second rule** Now define a second rule as follows:

➤ Go to **IP** ➤ **ACCESS LISTS** ➤ **RULES** ➤ **ADD**.

➤ Select **Insert behind Rule**, e.g. *RI 1 FI 1 (wrong\_dns)*.

➤ Select **Action**: *allow M*.

➤ Select **Filter**: *all (2)*.



➤ Press **SAVE**.

The entries are temporarily saved and activated. You have returned to **IP ➤ ACCESS LISTS ➤ RULES**,

and the entries have been saved and listed.

```

BinTec Router Setup Tool                               BinTec Communications AG
[IP][ACCESS][RULE]: Configure IP Access Rules         MyRouter

Abbreviations:  RI (Rule Index) M (Action if filter matches)
                 FI (Filter Index)!M (Action if filter does not match)
                 NRI (Next Rule Index)

RI  FI  NRI   Action  Filter      Conditions
1   1   2     deny  M  wrong_dns  udp, sp 137, dp 53
2   2   0     allow  M  all

                ADD                DELETE                REORG                EXIT

Press<Ctrl-n>,<Ctrl-p>to scroll,<Space>tag/untag DELETE,<Return>to
edit

```

**Assigning an interface** Proceed as follows:

➤ Go to **IP ➤ ACCESS LISTS ➤ INTERFACES**.

The following menu opens:

```

BinTec Router Setup Tool                               BinTec Communications AG
[IP][ACCESS][INTERFACES]: Configure First Rule       MyRouter

Configure first rules for interfaces

Interface  First Rule  First Filter
en1        1           1 (wrong_dns)
en1-snap   1           1 (wrong_dns)

EXIT

Press <Ctrl-n>, <Ctrl-p> to scroll, <Return> to edit/select

```

➤ Select the LAN interface of your router (**en1** or **en1-snap**) and confirm with **Return**.

➤ Select **First Rule**, e.g. **RI 1 FI 1 (wrong\_dns)**.

➤ Leave **Silent Deny** set to **no**.

➤ Leave **Reporting Method** set to *none*.

➤ Press **SAVE**.

The entries are temporarily saved and activated.

These entries ensure that DNS requests from source ➤➤ **port 137** to destination port 53 will be discarded. This means that no unnecessary connections will be established to resolve WINS names.

➤ Leave **IP** ➤ **ACCESS LISTS** ➤ **INTERFACES** with **EXIT**.

➤ Leave **IP** ➤ **ACCESS LISTS** with **EXIT**.

➤ Leave **IP** with **EXIT**.

You have returned to the main menu. The configuration of the basic router settings is complete. The entries are temporarily saved and activated.



To save the configuration to the flash memory, you must leave the main menu of the Setup Tool with **EXIT** and **Save as boot configuration and exit**.

## 6.1.6 Configuring the ISDN BRI Interface

The necessary steps for configuring the ISDN BRI interface of your router are described below step by step.

You can use the ISDN BRI interface of your router for both dialup and leased lines over ISDN.

Proceed as follows to configure the ISDN BRI interface:

- Entering the settings of your ISDN connection:  
Here you set the most important parameters of your ISDN connection.
- Configuring "Incoming Call Answering" (dialup connections only):  
Here you tell your router how the ISDN extensions are to be distributed to the services.

## Settings for ISDN Connection

Proceed as follows to make the settings for your ISDN connection:

➤ Go to **CM-1BRI, ISDN S0**.

The following menu opens:

BinTec Router Setup Tool [WAN]: WAN Interface	BinTec Communications AG MyRouter
<p>Result of Autoconfiguration: Euro ISDN, point-to-multipoint ISDN Switch Type                      autodetect on bootup</p> <p>D-Channel                                      dialup B-Channel 1                                    dialup B-Channel 2                                    dialup</p> <p>Incoming Call Answering&gt; Advanced settings&gt;</p> <p>    SAVE    CANCEL</p>	
Use <Space> to select	

The menu contains the following fields:

Field	Meaning
<b>Result of Autoconfiguration</b>	Status of ISDN autoconfiguration. Automatic ➤➤ <b>D-channel</b> detection runs until a setting is found or until the ISDN protocol is entered manually under <b>ISDN Switch Type</b> .

Field	Meaning
<b>ISDN Switch Type</b>	<p>Defines the ISDN <b>protocol</b> supplied by your ISDN provider. The following parameters are possible:</p> <ul style="list-style-type: none"> <li>■ <i>autodetect on bootup</i>: automatic D-channel detection (default setting)</li> <li>■ <i>Euro ISDN point-to-multipoint</i>: Euro ISDN for point-to-multipoint</li> <li>■ <i>Euro ISDN point-to-point</i>: Euro ISDN for point-to-point</li> <li>■ <i>1TR6 point to multipoint</i></li> <li>■ <i>1TR6 point to point</i></li> <li>■ <i>National ISDN 1 AT&amp;T NI1, EWSD NI1</i></li> <li>■ <i>AT&amp;T 5ESS Custom ISDN point to multipoint</i></li> <li>■ <i>AT&amp;T 5ESS Custom ISDN point to point</i></li> <li>■ <i>National ISDN 1 Northern Telecom DMS100</i></li> <li>■ <i>Japan NTT INS64</i></li> <li>■ <i>none</i></li> <li>■ <i>leased line B1 channel (64S)</i>: leased line over B-channel 1</li> <li>■ <i>leased line B1+B2 channel (64S2)</i>: leased line over both B-channels</li> <li>■ <i>leased line D+B1+B2 channel (TS02)</i>: leased line over D-channel and both B-channels</li> <li>■ <i>leased line B1+B2 different endpoints (digital 64S with dual connection)</i>: leased line to two different endpoints</li> </ul>

Field	Meaning
<b>D-Channel</b>	D-channel configuration. The selection can only be changed if <b>ISDN Switch Type</b> = <i>leased line D+B1+B2 (TS02)</i> . Possible values: <ul style="list-style-type: none"> <li>■ <i>leased dte</i> (default value)</li> <li>■ <i>leased dce</i></li> </ul>
<b>B-Channel 1</b>	Configuration of first <b>B-channel</b> . Possible values: <ul style="list-style-type: none"> <li>■ <i>dialup</i> (default setting)</li> <li>■ <i>not used</i></li> <li>■ <i>leased dte</i></li> <li>■ <i>leased dce</i></li> </ul>
<b>B-Channel 2</b>	Configuration of second B-channel. Possible values: <ul style="list-style-type: none"> <li>■ <i>dialup</i> (default setting)</li> <li>■ <i>not used</i></li> <li>■ <i>leased dte</i></li> <li>■ <i>leased dce</i></li> </ul>

Table 6-7: **CM-1BRI, ISDN S0**

**To do** Make the following entries:

- Select **ISDN Switch Type**: *autodetect on bootstrap*.

This setting enables your router to use its automatic D-channel detection. As long as the D-channel detection is running, *running* appears next to **Result of Autoconfiguration**. Once the setting has been found, it is displayed, e.g. **Euro ISDN, point-to-multipoint**.



For a leased line or if the ISDN protocol is not detected, it can be entered manually under **ISDN Switch Type**. The automatic D-channel detection is then switched off.

An incorrectly set ISDN protocol prevents ISDN connections being set up!



In most cases, you can accept the preset values for **D-Channel**, **B-Channel 1** and **B-Channel 2**.

If you use an ISDN leased line and have requested a special service from your service provider, it may be necessary to set the local side of the leased line at this point (DTE or DCE). You must then ensure that the far end has set the other value. You must also set **D-channel**, **B-channel 1** and **B-channel 2** to the same values, if you have selected several D-/B-channels under **ISDN Switch Type** and the values can be changed.

➤ Press **SAVE**.

You have returned to the main menu. The entries are temporarily saved and activated.

## Incoming Call Answering

If you use the ISDN BRI interface for dialup connections, you must now tell your router its own numbers for this interface (these settings are not possible for leased lines). Your router distributes the incoming calls to the internal services according to the settings in the menus below.

Your router supports the following services:

### ■ PPP (Routing):

The ➤➤ **PPP** service is your router's general routing service. This connects incoming data calls from WAN partners' dialup connections to your ➤➤ **LAN**. This enables partners outside your own local network to access hosts within your LAN. This subsystem also enables outgoing data calls to be set up to WAN partners outside your local network.

### ■ ISDN Login:

The ➤➤ **ISDN Login** service allows incoming data calls access to the ➤➤ **SNMP shell** of your router. This is how your router is remotely configured and administrated.

**■ CAPI:**

The **➤➤ CAPI** service allows connection of incoming and outgoing data and voice calls to communications applications on hosts in the LAN that access the **➤➤ Remote CAPI** interface of your router. This enables, for example, hosts connected to your router to receive and send faxes.

To be able to use CAPI applications (e.g. RVS COM Lite) from the hosts in the LAN with your router, you must also carry out the Remote CAPI configuration on the individual hosts (see [chapter 4.3.2, page 78](#)) in addition to distributing the extension numbers as described in this chapter.

The distribution of services is shown in the diagram below:

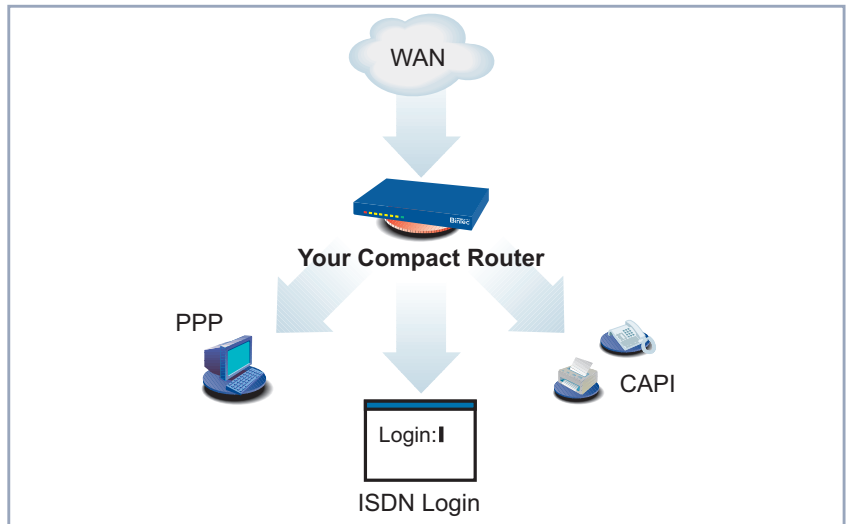


Figure 6-3: Distribution of incoming calls

When a call is received, your router first checks the Called Party Number (CPN) and the type of call (data or voice call). The CPN is the extension the partner has dialed to reach your router. The call is then forwarded to the corresponding service (see [figure 6-3, page 143](#)).

If your ISDN connection has more than three extensions, a practical allocation could look as follows:

Called party number	Data services	Voice services
10	PPP (routing)	
11	CAPI	CAPI
12	ISDN Login	

Table 6-8: Distribution of extensions to services



If no entry is specified in the following menu, every incoming ISDN call is accepted by the ISDN Login service. To avoid this, be sure to make the necessary entries here.

As soon as you have made one or more entries in this menu, the matching incoming calls are distributed to the corresponding services.



In the unconfigured ex works state, a user with the user name "default" and no password is always entered for the CAPI subsystem. All calls to the CAPI are offered to all CAPI applications in the LAN.

To distribute incoming calls for the CAPI subsystem to defined users with passwords, you should use BinTec's User Concept (see **User's Guide X4100/200/300**). You should then delete the user "default" without password.



All incoming calls that do not match an entry are passed on to the CAPI service.

### Entering Incoming Call Answering

Now set the entries for Incoming Call Answering:

➤ Go to **CM-1BRI, ISDN S0** ➤ **INCOMING CALL ANSWERING**.



This menu lists the previously completed assignment of systems to numbers:

BinTec Router Setup Tool		BinTec Communications AG	
[WAN][INCOMING]: Incoming Call Answering		MyRouter	
Item	Number	Mode	CAPI Username
ISDN Login	12	right to left	
PPP (routing)	10	right to left	
ADD	DELETE	EXIT	
Press<Ctrl-n>,<Ctrl-p>to scroll,<Space>tag/untagDELETE,<Return>to edit			

To make entries in the list, proceed as follows:

- Use **ADD** to add a new entry or select an existing entry.
- Confirm with **Return** to change the entry.

Another menu opens:

BinTec Router Setup Tool		BinTec Communications AG	
[WAN][INCOMING][ADD]: Incoming Calls		MyRouter	
Item	PPP (routing)		
Number	10		
Mode	right to left		
Bearer	data		
SAVE	CANCEL		
Use <Space> to select			

The menu contains the following fields:

Field	Meaning
<b>Item</b>	Service which shall accept a call to the <b>Number</b> below. Possible values: see <a href="#">table 6-10, page 147</a> .

Field	Meaning
<b>Number</b>	Phone number under which the service ( <b>Item</b> ) entered above can be reached.
<b>Mode</b>	Mode in which your router compares the digits of <b>Number</b> with the called party number of the incoming call: <ul style="list-style-type: none"> <li>■ <i>right to left</i> (default value)</li> <li>■ <i>left to right (DDI)</i>: Always select if your router is connected to a point-to-point connection.</li> </ul>
<b>CAPI Username</b>	(only for <b>Item</b> = <i>CAPI 1.1 EAZ 0...9 mapping</i> or <b>Item</b> = <i>CAPI 2.0</i> ) CAPI user name. Only necessary if you want to use the CAPI user concept (see <b>User's Guide X4100/200/300</b> ).
<b>Bearer</b>	Type of incoming call. Possible values: <ul style="list-style-type: none"> <li>■ <i>data</i>: data call</li> <li>■ <i>voice</i>: voice call (modem, voice, analog fax)</li> <li>■ <i>any</i>: both data and voice calls</li> </ul>

Table 6-9: **CM-1BRI, ISDN S0** ► **INCOMING CALL ANSWERING** ► **ADD**

The **Item** field includes the following selection:

Possible Values	Meaning
<i>PPP (routing)</i>	Default setting for ►► <b>PPP</b> routing. Also applicable for the PPP connections below.
<i>ISDN Login</i>	Enables logging in with ►► <b>isdnlogin</b> .
<i>PPP 64k</i>	Enables 64 kbps PPP data connections.
<i>PPP 56k</i>	Enables 56 kbps PPP data connections.

Possible Values	Meaning
<i>PPP Modem</i>	(only available for modular BinTec routers with modems)  Assigns incoming analog calls to the PPP routing service. The digital modem on the resource card that accepts this call uses the settings of Modem Profile 1, which were selected in the menu <b>MODEM ► PROFILE CONFIGURATION ► PROFILE 1</b> .
<i>PPP DOVB</i>	Data transmission Over Voice Bearer - useful in the USA, for example, where voice connections are sometimes cheaper than data connections.
<i>PPP V.110 (1200...38400)</i>	Permits PPP connections to V.110 at bit rates of 1200 bps, 2400 bps,..., 38400 bps.
<i>PPP V.120</i>	Permits incoming PPP connections with V.120.
<i>Pots</i>	Only available on BinTec routers with integrated exchange (e.g. XCENTRIC).
<i>PPP Modem Profile 1...8</i>	(only available for modular BinTec routers with modems)  Assigns incoming analog calls to the PPP routing service. The digital modem on the resource card that accepts this call uses the settings of Modem Profiles 1 to 8, which were selected in the menu <b>MODEM ► PROFILE CONFIGURATION ► PROFILE 1...8</b> .
<i>CAPI 1.1 EAZ 0...9 Mapping</i>	Enables connections with Remote CAPI applications.  Required for CAPI 1.1 applications only.
<i>X.25 PAD</i>	Enables data connections with X.25 PAD.
<i>CAPI 2.0</i>	Enables connections with Remote CAPI applications.  Only for CAPI 2.0 applications.

Table 6-10: **Item**



Make sure you enter the right number under **Number**, i.e. the number that actually arrives at your router! For example, if your router is connected to a

- **PABX**, only the PABX extension number arrives at your router.

If you are not sure which number arrives at your router, proceed as follows:

- Call your router with a conventional telephone using one of its extension numbers.
- Go to **MONITORING AND DEBUGGING** ➤ **ISDN MONITOR**.  
You can now see the incoming call in the menu.
- Place the cursor on the call and enter **d** (for details).  
Under **Local Number**, you can see the part of the number that arrives at your router.
- Enter this part of the number in **CM-1BRI, ISDN SO** ➤ **INCOMING CALL ANSWERING** ➤ **ADD** under **Number**.



If you use a communications application on your PC that is based on Remote CAPI 1.1 (current version: Remote CAPI 2.0), your router must translate the

- **MSNs** (= **Number**, multidigit) of the incoming call to
- **EAZs** (single digit) (CAPI 1.1 can only detect single-digit numbers). This is why the CAPI entry under **Item** is not simply called "CAPI" but "**CAPI 1.1 EAZ x Mapping**".

When using CAPI 1.1, you must therefore make sure you assign each CAPI application the corresponding EAZ(s) by "mapping". For example select for **Number** = 1234 the entry **Item** = **CAPI 1.1 EAZ 0 Mapping** and for **Number** = 5678 the entry **Item** = **CAPI 1.1 EAZ 1 Mapping**.

With CAPI 2.0, the MSN is evaluated directly, so "conversion" to EAZ is not necessary. You should certainly try to change your PC system to CAPI 2.0 so that you can also use new features.

#### Assigning extensions to services

Make the following entries:

- Select the **Item**, e.g. **PPP (routing)**.
- Enter **Number**, e.g. **10**.
- Select **Mode**, e.g. **right to left**.
- Select the **Bearer**, e.g. **data**.

- Press **SAVE**.

You have returned to the menu **CM-1BRI, ISDN S0** ➤ **INCOMING CALL ANSWERING**. The entries are temporarily saved and activated and displayed in the list.

You have now assigned one of your extensions (**10**) to a possible service (**PPP (routing)**). If a data call is received by called party number 10, it is therefore forwarded to the PPP (routing) service.

- Repeat these steps until you have assigned all phone numbers the services to be reached under these numbers.

You have now configured Incoming Call Answering: Your router distributes all incoming calls to the internal services.

### Advanced Configuration

- **CM-1BRI, ISDN S0** ➤ **ADVANCED SETTINGS** contains settings for X.31 TEI (see **User's Guide X4100/200/300**).
- If you use a leased line, you can implement a backup solution using the Bandwidth on Demand feature (see **User's Guide X4100/200/300**). If you use this facility, a dialup connection is set up to the connection partner if the leased line fails.

### Leased Line

You can also use the ISDN BRI interface for leased lines.

To configure the ISDN BRI interface for leased lines, you must set the **ISDN Switch Type** manually:

- Go to **CM-1BRI, ISDN S0**.
- Select the desired value for your leased line in the **ISDN Switch Type** field.



In most cases, you can accept the preset values for **D-Channel**, **B-Channel 1** and **B-Channel 2**.

If you use an ISDN leased line and have requested a special service from your service provider, it may be necessary to set the local side of the leased line at this point (DTE or DCE). You must then ensure that the far end has set the other value. You must also set **D-channel**, **B-channel 1** and **B-channel 2** to the same values, if you have selected several D-/B-channels under **ISDN Switch Type** and the values can be changed.

Example setting for leased line

```

BinTec Router Setup Tool                               BinTec Communications AG
[WAN]: WAN Interface                                   MyRouter

Result of autoconfiguration: autoconfiguration disabled
ISDN Switch Type           leased line B1 channel (64S)

D-Channel                   not used
B-Channel 1                 leased dte
B-Channel 2                 not used

Incoming Call Answering>
Advanced settings>

                                SAVE                       CANCEL

Use <Space> to select

```

➤ Press **SAVE**.

You have returned to the main menu. The entries are temporarily saved and activated.



A WAN partner is created automatically for leased lines. The **State** field in the **WAN PARTNER** menu should show the value *up*.

➤ Edit the entry you have just created for a leased line in the **WAN PARTNER** menu and enter the necessary parameters ([chapter 6.2.1, page 152](#)).

## 6.2 Configuring WAN Partners

To enable your router to make connections to networks or hosts outside your LAN, you must configure the partners you want to connect to as WAN partners on your router. This applies to outgoing connections (your router dials its WAN partner), as well as incoming connections (a WAN partner dials the number of your router) and leased lines.

If you want to access the Internet, you must set up your Internet Service Provider (►► **ISP**) as a WAN partner. If you wish to establish a LAN-LAN connection, e.g. between your LAN (head office) and the LAN of a branch office (corporate network connection), you have to configure the LAN of your branch office as a WAN partner.

If you have set up one or more leased lines on configuring the WAN interface(s) of your router, a WAN partner is already created automatically for each leased line in the **WAN PARTNER** menu. Edit this entry to suit your requirements.



If you would like to configure Internet access over Compuserve, please see [chapter 6.3.1, page 177](#).

**Basic procedure** Configuring a WAN partner generally involves the following steps:

- Configuring WAN partners ([chapter 6.2.1, page 152](#))
  - Defining a ►► **protocol** (encapsulation).
  - Entering extension(s).
  - Defining ►► **PPP** settings for authentication.
  - Defining ►► **short hold**.
  - Carrying out IP configuration.
- Creating a routing entry ([chapter 6.2.2, page 169](#))
- Activating Network Address Translation (►► **NAT**, optional, see [chapter 6.2.3, page 175](#))

You will find a scenario for a connection from your router to the WAN partners "Internet Service Provider" and "head office" in [figure 1-1, page 13](#).

**Examples** You will find a detailed configuration description of some frequently used scenarios in [chapter 6.3, page 177](#).

## 6.2.1 Configuring WAN Partners

If applicable, keep the access information at hand that you received from your ISP or system administrator (see [chapter 3.4, page 42](#)). The terms used may vary slightly from provider to provider.

**WAN partner configuration** Proceed as follows to configure a WAN partner:

- Go to **WAN PARTNER**.

This is where all WAN partners currently configured are listed with their **Partnername**, **Protocol** and **State**.

BinTec Router Setup Tool		BinTec Communications AG
[WAN]: WAN Partners		MyRouter
Current WAN Partner Configuration		
Partnername	Protocol	State
BigBoss	ppp	dormant
ADD	DELETE	EXIT
Press<Ctrl-n>, <Ctrl-p>to scroll, <Space>tag/untag DELETE, <Return>to edit		



A WAN partner (interface) is created automatically for leased lines.

- Edit this entry in the **WAN PARTNER** menu and enter the necessary parameters.

The **Partnername** field (see [table 6-12, page 156](#)) shows the names of the WAN partners created, **State** can assume the values shown in [table 6-11, page 153](#), and Protocol indicates the encapsulation for this WAN partner.



**State** can have the following values:

Possible Values	Meaning
<i>up</i>	connected
<i>dormant</i>	not connected (dialup connection)
<i>blocked</i>	not connected (an error occurred on setting up a connection, a renewed attempt is only possible after a specified number of seconds)
<i>down</i>	administratively set to <i>down</i> (deactivated); for leased line: not connected

Table 6-11: **State**

Proceed as follows to edit the list:

- Use **ADD** to add a new entry or select an existing entry. Confirm with **Return** to change the entry.

Another menu opens:

BinTec Router Setup Tool	BinTec Communications AG
[WAN][ADD]: Configure WAN Partner	MyRouter
Partner Name	BigBoss
Encapsulation	PPP
Encryption	none
Compression	none
Calling Line Identification	no
PPP >	
Advanced settings >	
WAN Numbers >	
Weekly Schedule >	
IP >	
Bridge >	
SAVE	CANCEL
Enter string, max length = 25 chars	

The menu contains the following fields:

Field	Meaning
<b>Partner Name</b>	Enter a name for uniquely identifying the WAN partner.
<b>Encapsulation</b>	<p>➤➤ <b>Encapsulation</b>. Defines how the</p> <p>➤➤ <b>data packets</b> are packed for transfer to the WAN partner. Possible values:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> <i>PPP</i></li> <li><input type="checkbox"/> <i>Multi-Protocol LAPB Framing</i></li> <li><input type="checkbox"/> <i>Multi-Protocol HDLC Framing</i></li> <li><input type="checkbox"/> <i>Async PPP over X.75</i></li> <li><input type="checkbox"/> <i>Async PPP over X.75/T.70/BTX</i></li> <li><input type="checkbox"/> <i>Async PPP over V.120 (HSCSD)</i></li> <li><input type="checkbox"/> <i>X.25_PPP</i></li> <li><input type="checkbox"/> <i>X.25</i></li> <li><input type="checkbox"/> <i>HDLC Framing (IP only)</i></li> <li><input type="checkbox"/> <i>LAPB Framing (IP only)</i></li> <li><input type="checkbox"/> <i>X31 B-Channel</i></li> <li><input type="checkbox"/> <i>X.25 No Signaling</i></li> <li><input type="checkbox"/> <i>X.25 PAD</i></li> <li><input type="checkbox"/> <i>X.25 No Configuration</i></li> <li><input type="checkbox"/> <i>Frame Relay</i></li> <li><input type="checkbox"/> <i>X.25 No Configuration, No Signaling</i></li> <li><input type="checkbox"/> <i>IP over ATM (IPoA): for X2300 Family routers only.</i></li> </ul>

Field	Meaning
<b>Encryption</b>	<p>Defines the type of encryption that should be used for data traffic to the WAN partner. Only possible if STAC compression is not activated for the connection. Possible values:</p> <ul style="list-style-type: none"> <li>■ <i>MPPE 40</i>: MPPE version 1 with 40-bit key</li> <li>■ <i>MPPE 56</i>: MPPE version 1 with 56-bit key</li> <li>■ <i>MPPE 128</i>: MPPE version 1 with 128-bit key</li> <li>■ <i>MPPE V2 40</i>: MPPE version 2 with 40-bit key</li> <li>■ <i>MPPE V2 56</i>: MPPE version 2 with 56-bit key</li> <li>■ <i>MPPE V2 128</i>: MPPE version 2 with 128-bit key</li> <li>■ <i>DES 56</i>: DES with 56-bit key (only with VPN license)</li> <li>■ <i>3DES 168</i>: Triple DES with 168-bit key (only with VPN license)</li> <li>■ <i>Blowfish 56</i>: Blowfish with 56-bit key (only with VPN license)</li> <li>■ <i>Blowfish 168</i>: Blowfish with 168-bit key (only with VPN license)</li> <li>■ <i>none</i>: No encryption</li> </ul> <p>These values are only available if <i>PPP</i>, <i>Async PPP over X.75</i>, <i>Async PPP over X.75/T.70/BTX</i>, <i>Async PPP over V.120 (HSCSD)</i> or <i>X.25_PPP</i> has been selected under <b>Encapsulation</b>.</p>

Field	Meaning
<b>Compression</b>	<p>Defines the type of compression that should be used for data traffic to the WAN partner. Possible values:</p> <ul style="list-style-type: none"> <li>■ <i>STAC</i></li> <li>■ <i>MS-STAC</i></li> <li>■ <i>none</i></li> </ul> <p>These values are only available if <i>PPP</i>, <i>Async PPP over X.75</i>, <i>Async PPP over X.75/T.70/BTX</i>, <i>Async PPP over V.120 (HSCSD)</i> or <i>X.25_PPP</i> has been selected under <b>Encapsulation</b> and <i>none</i> for <b>Encryption</b>.</p>
<b>Calling Line Identification</b>	<p>Indicates whether calls from this WAN partner should be identified by means of the calling party number (▶▶ <b>CLID</b>). The value of this field is dependent on <b>Direction</b> in the submenu <b>WAN NUMBERS</b> and cannot be set here.</p>

Table 6-12: **WAN PARTNER** ▶ **ADD**

### Defining a Protocol

**To do** Make the following entries:

- ▶ Enter **Partner Name**, e.g. *BigBoss*.
- ▶ Select **Encapsulation**, e.g. *PPP*.
- ▶ Select **Compression**, e.g. *none*, if applicable.
- ▶ Select **Encryption**, e.g. *none*, if applicable.

### Entering Extension Numbers

Proceed as follows to enter the extension numbers of the WAN partner:

- ▶ Go to **WAN PARTNER** ▶ **ADD** ▶ **WAN NUMBERS**.

This menu lists the currently entered extension numbers of the WAN partner:

```

BinTec Router Setup Tool                               BinTec Communications AG
[WAN][ADD][WAN NUMBERS]: WAN Numbers (BigBoss)       MyRouter

WAN Numbers for this partner:

WAN Number      Direction
0911987654321   outgoing

ADD              DELETE              EXIT

Press<Ctrl-n>,<Ctrl-p>to scroll,<Space>tag/untag DELETE,<Return>to
edit
    
```

Proceed as follows to edit the list:

- Use **ADD** to add a new entry or select an existing entry.
- Confirm with **Return** to change the entry.

Another menu opens:

```

BinTec Router Setup Tool                               BinTec Communications AG
[WAN][ADD][WAN NUMBERS][ADD]:Add or Change WAN Numbers(BigBoss)MyRouter

Number          0911987654321
Direction       outgoing

Advanced settings >

SAVE              Cancel

Enter string, max length = 40 chars
    
```

The menu contains the following fields:

Field	Meaning
<b>Number</b>	Extension of WAN partner.

Field	Meaning
<b>Direction</b>	Defines whether <b>Number</b> should be used for incoming or outgoing calls or for both. For possible values, see <a href="#">table 6-14, page 158</a> .

Table 6-13: **WAN PARTNER** ➤ **ADD** ➤ **WAN NUMBERS** ➤ **ADD**

The **Direction** field contains the following selection options:

Possible Values	Meaning
<i>outgoing</i>	For outgoing calls, where you dial your WAN partner.
<i>both (CLID)</i>	For incoming and outgoing calls.
<i>incoming (CLID)</i>	For incoming calls, where your WAN partner dials in to your router.

Table 6-14: **Direction**

If your router is connected to a PABX for which a "0" prefix is necessary for external line access, this "0" must be considered when entering the access number.

#### **Advanced configuration**

Configure "Closed User Group" in the **ADVANCED SETTINGS** submenu (see **User's Guide X4100/200/300**).

#### **Wildcards**

When entering the **Number**, you can either enter the extension digit for digit or you can replace single numbers or groups of numbers with wildcards. The **Number** can therefore be the same for several extensions.

The use of the wildcards shown in the following table has a different effect on incoming and outgoing calls:

Wildcard	Meaning		Example		
	Incoming calls	Outgoing calls	Number	Your router accepts incoming calls, e.g. with:	Outgoing calls, i.e. your router sets up a connection to the WAN partner with:
*	Matches a group of none or more digits.	Is ignored.	123*	123, 1234, 123789	123
?	Matches exactly one digit.	Is replaced by 0.	123?	1234, 1238, 1231	1230
[a-b]	Defines a range of matching digits.	The first digit of the specified range is used.	123[5-9]	1235, 1237, 1239	1235
[^a-b]	Defines a range of excluded digits.	The first digit after the specified range is used.	123[^0-5]	1236, 1238, 1239	1236
{ab}	Optional sequence to match.	Sequence is used.	{00}1234	001234 and 1234	001234

Table 6-15: Wildcards for incoming and outgoing calls



If the calling party number of an incoming call matches both a WAN partner's **Number** with wildcards and a WAN partner's **Number** without wildcards, the entry without wildcards is always used.

**To do** Make the following entries:

- Enter **Number**, e.g. **0911987654321**.
- Select **Direction**, e.g. **outgoing**.

- Press **SAVE**.  
The entries are saved and listed.
- Leave **WAN PARTNER** ➤ **ADD** ➤ **WAN NUMBERS** with **EXIT**.

### Defining PPP Settings for Authentication

Now enter the ➤➤ **PPP** settings of your WAN partner. These are used to authenticate your connection partner.

When a call is received, the Calling Party Number is always sent over the ISDN ➤➤ **D-channel**. This number enables your router to identify the caller (➤➤ **CLID**), provided the caller is entered as a WAN partner. After identification with CLID, the router can additionally carry out ➤➤ **PPP authentication** with the WAN partner before it accepts the call. The router needs the necessary data for this, which you should enter here. First establish the type of authentication process that should be performed, then enter a common password and two user names. You get this information, for example, from your Internet Service Provider (ISP) or the system administrator at your head office. If the data you entered in your router are the same as the caller's data, the call is accepted. The call is rejected if the data are not the same.

#### Defining PPP authentication of WAN partner

To set the PPP authentication for the WAN partner, proceed as follows:

- Go to **WAN PARTNER** ➤ **ADD** ➤ **PPP**.

The following menu opens:

BinTec Router Setup Tool	BinTec Communications AG
[WAN][ADD][PPP]: PPP Settings (BigBoss)	MyRouter
Authentication	CHAP + PAP
Partner PPP ID	BigBoss
Local PPP ID	LittleIndian
PPP Password	Secret
Keepalives	off
Link Quality Monitoring	off
OK	CANCEL
Use <Space> to select	



The menu contains the following fields:

Field	Meaning
<b>Authentication</b>	Authentication protocol
<b>Partner PPP ID</b>	ID of WAN partner.
<b>Local PPP ID</b>	ID of your router
<b>PPP Password</b>	Password
<b>Keepalives</b>	Activates Keepalive packets for checking the reachability of the distant PPP terminal. Possible values: <input type="checkbox"/> <i>off</i> (default value for dialup connection) <input type="checkbox"/> <i>on</i> (default value for leased line)
<b>Link Quality Monitoring</b>	Activates PPP Link Quality Monitoring as per RFC 1989. Possible values: <input type="checkbox"/> <i>off</i> (default value) <input type="checkbox"/> <i>on</i> Only necessary in exceptional cases, e.g. with Nokia Communicator.

Table 6-16: **WAN PARTNER** ► **ADD** ► **PPP**

The **Authentication** field contains the following selection options:

Possible Values	Meaning
<i>PAP</i>	Only run ►► <b>PAP</b> (PPP Password Authentication Protocol); the password is transferred uncoded.
<i>CHAP</i>	Only run ►► <b>CHAP</b> (PPP Challenge Handshake Authentication Protocol as per RFC 1994); the password is transferred coded.
<i>CHAP + PAP</i>	Run primarily CHAP, otherwise PAP.

Possible Values	Meaning
<i>MS-CHAP</i>	Only run MS-CHAP (MS Challenge Handshake Authentication Protocol).
<i>CHAP + PAP + MS-CHAP</i>	Primarily run CHAP, on denial, the authentication protocol required by the WAN partner.
<i>MS-CHAP V2</i>	Run MS-CHAP version 2 only.
<i>none</i>	Run no PPP authentication protocol.

Table 6-17: **Authentication**

**To do** Make the following entries:

- Select **Authentication**, e.g. *CHAP*.
- Enter **Partner PPP ID**, e.g. *BigBoss*.
- Enter **Local PPP ID**, e.g. *LittleIndian*.



How to enter the passwords is described in [chapter 5.4.4, page 111](#).

- Enter **PPP Password**, e.g. *Secret*.
- Select **Keepalives**, e.g. *off*.
- Select **Link Quality Monitoring**, e.g. *off*.
- Confirm with **OK**.

You have returned to **WAN PARTNER** ➤ **ADD**.



In some cases, the caller cannot be identified with ➤➤ **CLID**, although entered as a WAN partner. In this case, your router does not know which authentication protocol was set for this WAN partner. To enable the call to still be accepted, your router falls back on general settings in the PPP, which you can change as necessary (see **User's Guide X4100/200/300**).

## Defining Short Hold

Now set short hold to reduce charges. Your router then clears the ISDN connection when no more data flow. The short hold setting can be either static or dynamic and tells your router the duration of the idle time, after which it is to clear down the ISDN connection.

- Static** The static >> **short hold** setting determines how much time should pass between sending the last >> **data packet** and clearing the ISDN connection. Enter a fixed period of time in seconds.
- Dynamic** With the dynamic short hold setting, no fixed period of time is specified and the length of an ISDN charging unit is considered instead. Dynamic short hold is based on AOCD (advice of charge during the call).

When setting dynamic short hold, you specify how much time should pass after the last exchange of data before the connection is cleared. You enter a percentage based on the last charging unit. The value of the **Idle Timer for Dynamic Short Hold** can therefore change, just as the length of the charging unit changes (according to the time of day, weekend, weekday, etc.). If you enter 50%, for example, the **Idle Timer for Dynamic Short Hold** is 60 seconds if the preceding charging unit was 120 seconds, and 300 seconds if the preceding charging unit was 600 seconds. The connection is cleared on expiry of the **Idle Timer for Dynamic Short Hold** and shortly before the next charging unit starts.

Diagram of short hold:

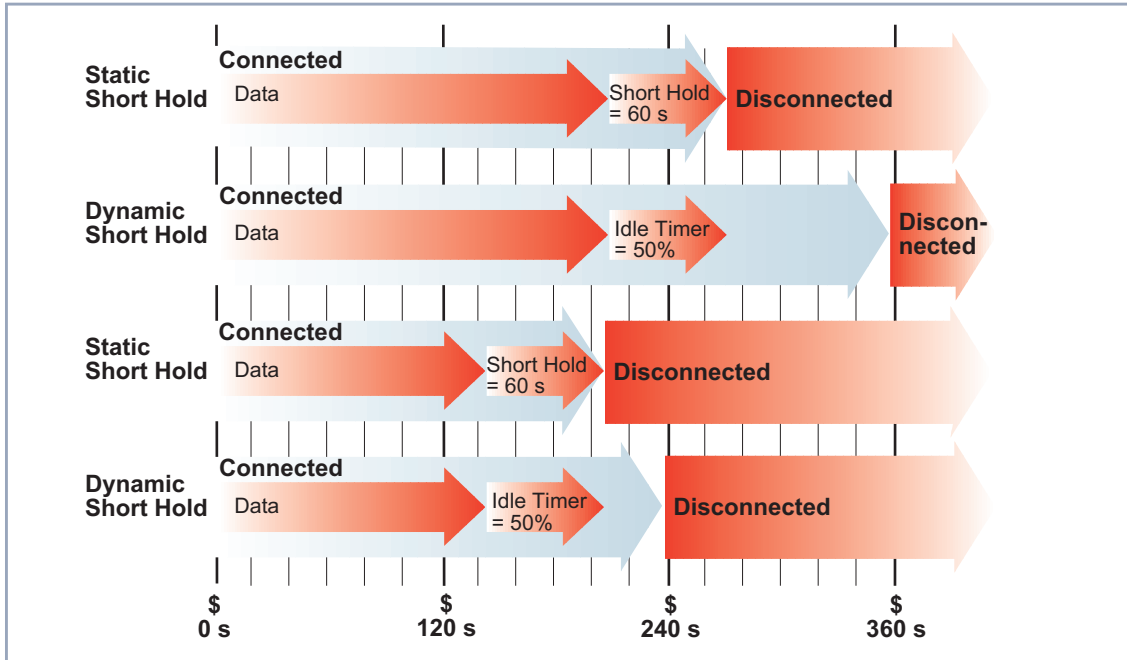


Figure 6-4: Dynamic and static short hold



Please note: You can only use dynamic short hold if you receive charging information during the connection. Ask your telephone company.



When using dynamic short hold, you must also set static short hold to prevent a switched connection if AOCD fails.

You should make sure static short hold comes into operation later than dynamic short hold. If not, your router always clears the connection based on static short hold and never gives dynamic short hold a chance to disconnect. In this case, enter a value for **Static Short Hold (sec)** that is a little more than the expected maximum dynamic idle time.

Proceed as follows:

➤ Go to **WAN PARTNER** ➤ **ADD** ➤ **ADVANCED SETTINGS**.

The following menu opens:

BinTec Router Setup Tool	BinTec Communications AG
[WAN][ADD][ADVANCED]: Advanced Settings (BigBoss)	MyRouter
Callback	no
Static Short Hold (sec)	20
Idle for Dynamic Short Hold (%)	0
Delay after Connection Failure (sec)	300
Layer 1 Protocol	ISDN 64 kbps
Channel Bundling	no
Extended Interface Settings (optional) >	
Special Interface Types	none
OK	CANCEL
Use <Space> to select	

The following fields of the menu are relevant for this configuration step:

Field	Meaning
<b>Static Short Hold (sec)</b>	Idle time in seconds for static short hold. Example values for trunk connections: 60, only effective if charging pulses are transmitted during the connection (AOCD), 20 otherwise.
<b>Idle for Dynamic Short Hold (%)</b>	Idle time in percent for dynamic short hold. Only effective if charging pulses are transmitted during the connection (AOCD).

Table 6-18: **WAN PARTNER** ➤ **ADD** ➤ **ADVANCED SETTINGS**

**To do** Make the following entries:

- Enter **Static Short Hold (sec)**, e.g. **90**.
- Enter **Idle for Dynamic Short Hold (%)**, e.g. **0**.

➤ Confirm with **OK**.

You have returned to **WAN PARTNER** ➤ **ADD**.



Tips on entering **Idle for Dynamic Short Hold %**:

- For interactive connections (e.g. ➤➤ **telnet**), specify a high value (e.g. **80...90**) to avoid clearing connections during short phases without data exchange.
- For Internet connections (e.g. WWW, http, etc.), specify a medium to high value (e.g. **50...80**) to avoid clearing connections while waiting.
- For data connections (e.g. ➤➤ **ftp**), specify a low value (e.g. **10...40**) to avoid the unnecessary continuation of a connection after data transfer has been completed.

## Carrying out IP Configuration

Now let's move on to the IP configuration of your WAN partner. Here you enter the ➤➤ **IP address** and ➤➤ **netmask** of your partner.

Proceed as follows:

➤ Go to **WAN PARTNER** ➤ **ADD** ➤ **IP**.

The following menu opens:

BinTec Router Setup Tool	BinTec Communications AG
[WAN][ADD][IP]: IP Configuration (BigBoss)	MyRouter
IP Transit Network	no
Local IP Address	
Partner's LAN IP Address	10.1.1.0
Partner's LAN Netmask	255.255.255.0
Advanced settings >	
SAVE	CANCEL
Use <Space> to select	

The menu contains the following fields:

Field	Meaning
<b>IP Transit Network</b>	<p>Defines whether your router sets up a transit network to the WAN partner. Possible values:</p> <ul style="list-style-type: none"> <li>■ <i>yes</i>: The transit network is used.</li> <li>■ <i>no</i>: The transit network is not used.</li> <li>■ <i>dynamic client</i>: Your router receives its IP address dynamically.</li> <li>■ <i>dynamic server</i>: Your router assigns IP addresses to dial-in clients.</li> </ul>
<b>Local IP Address</b>	<p>Only if <i>no</i> is set for <b>IP Transit Network</b>. IP address of your router. You do not normally need to make an entry here unless you wish to configure a transit network for one of your WAN partners (see <b>User's Guide X4100/200/300</b>).</p>
<b>Local WAN IP Address</b>	<p>Only if <i>yes</i> is set for <b>IP Transit Network</b>. WAN IP address of your router in the transit network.</p>
<b>Partner's WAN IP Address</b>	<p>Only if <i>yes</i> is set for <b>IP Transit Network</b>. WAN partner's WAN IP address in the transit network.</p>
<b>Partner's LAN IP Address</b>	<p>Only if <i>yes</i> or <i>no</i> is set for <b>IP Transit Network</b>. WAN partner's LAN IP address.</p>
<b>Partner's LAN Netmask</b>	<p>Only if <i>yes</i> or <i>no</i> is set for <b>IP Transit Network</b>. WAN partner's LAN netmask. If you make no entry, your router enters a default netmask for the net class used under <i>Partner's LAN IP Address</i>.</p>

Field	Meaning
<b>Default Route</b>	<p>Only if <i>dynamic client</i> is set for <b>IP Transit Network</b>.</p> <p>Possible values:</p> <ul style="list-style-type: none"> <li>■ <i>yes</i>: Route to this WAN partner is defined as default route.</li> <li>■ <i>no</i>: Route to this WAN partner is not defined as default route.</li> </ul>
<b>Enable NAT</b>	<p>Only if <i>dynamic client</i> is set for <b>IP Transit Network</b>.</p> <p>Possible values:</p> <ul style="list-style-type: none"> <li>■ <i>yes</i>: NAT is activated for this WAN partner.</li> <li>■ <i>no</i>: NAT is deactivated for this WAN partner.</li> </ul> <p>The settings in this menu correspond to NAT activation in the <b>IP ► NETWORK ADDRESS TRANSLATION ► EDIT</b> menu.</p>

Table 6-19: **WAN PARTNER ► ADD ► IP**

**To do** Make the following entries (normally sufficient for a corporate network connection):

- Select **IP Transit Network**, e.g. *no*.
- Enter **Partner's LAN IP Address**, e.g. *10.1.1.0*.
- Enter **Partner's LAN Netmask**, e.g. *255.255.255.0*.
- Press **SAVE**.
- Press **SAVE** again.

You have returned to the **WAN PARTNER** menu. Your entries are temporarily saved and activated.





If you are setting up access to the Internet, you do not normally know the IP address of your Internet Service Provider (ISP). Your router is assigned the **Local ISDN IP Address** either dynamically (for the duration of the connection) or statically by the ISP. In this case, make the following settings in the **WAN PARTNER ► ADD ► IP** menu:

The IP address is assigned either dynamically:

- Select **IP Transit Network**: *dynamic client*.

or the IP address is permanently assigned by the ISP (static IP address):

- Select **IP Transit Network**: *yes*.  
**Local ISDN IP Address**: Static IP address of your router, which you get from your ISP (often termed your gateway or router address).  
**Partner's ISDN IP Address**: Partner's IP address (if known), otherwise also your router's static IP address you get from your ISP.  
No entries for **Partner's LAN IP Address** and **Partner's LAN Netmask**.

You will find information about the transit network in the **User's Guide X4100/200/300**.



To be able to use the Domain Name Server of the ISP while connected, make the following settings in **WAN PARTNER ► ADD ► IP ► ADVANCED SETTINGS**:

- Select **Dynamic Name Server Negotiation**: *client (receive)*.

This setting is only necessary if you have not entered fixed IP addresses for DNS on the PCs of your network.

## 6.2.2 Creating a Routing Entry

You have just configured a WAN partner in your router in [chapter 6.2.1, page 152](#). A routing entry is created automatically in the routing table of your router for every WAN partner. You can edit existing routing entries and add new ones. For the connection to your Internet Service Provider, you should always configure a default route.

All the IP routes entered are listed in the menu **IP ► ROUTING**:

BinTec Router Setup Tool		BinTec Communications AG				
[IP][ROUTING]: IP Routing		MyRouter				
The flags are: U (Up), D (Dormant), B (Blocked), G (Gateway Route), I (Interface Route), S (Subnet Route), H (Host Route), E (Extended Route)						
Destination	Gateway	Mask	Flags	Met	Interface	Pro
192.168.1.1	192.168.1.254	255.255.255.0	US	0	en1	loc
10.1.1.0		255.255.255.0	DI	0	BigBoss	mgmt
default		0.0.0.0	DI	0	GoInternet	mgmt
ADD		ADDEXT		DELETE		EXIT
Press <Ctrl-n>, <Ctrl-p> to scroll, <Space> tag/untag DELETE, <Return> to edit						

**Flags** shows the current status (*Up*, *Dormant*, *Blocked*) and the type of route (*Gateway Route*, *Interface Route*, *Subnet Route*, *Host Route*, *Extended Route*). The protocol with which your router has "learned" the routing entry is displayed under **Pro**.

**Defining a route** To define a route, proceed as follows:

- Use **ADD** to add a new entry or select an existing entry. Confirm with **Return** to change the entry.



To create extended IP routing entries, press the **ADDEXT** button to open the relevant menu. In this case, refer to chapter "Extended IP Routing (XIPR)" in the **User's Guide X4100/200/300**.

Another menu opens:

BinTec Router Setup Tool		BinTec Communications AG
[IP][ROUTING][ADD]: IP Routing		MyRouter
Route Type	Network route	
Network	WAN without transit network	
Destination IP Address	10.1.1.0	
Netmask	255.255.255.0	
Partner / Interface	BigBoss	
Metric	1	
	SAVE	CANCEL
Use <Space> to select		

The menu contains the following fields:

Field	Meaning
<b>Route Type</b>	Type of route. Possible values: <ul style="list-style-type: none"> <li>■ <i>Host route</i>: Route to a single host</li> <li>■ <i>Network route</i>: Route to a network</li> <li>■ <i>Default route</i>: Is only used if no other suitable route is available.</li> </ul>
<b>Network</b>	Defines the type of connection (LAN, WAN). For possible values, see <a href="#">table 6-21, page 172</a> .
<b>Destination IP Address</b>	Only for <b>Route Type</b> <i>Host route</i> or <i>Network route</i> . IP address of the destination host or LAN.
<b>Netmask</b>	Netmask of the partner LAN (only possible for <b>Route Type</b> = <i>Network route</i> . If no entry is made, the router uses a default netmask).
<b>Partner / Interface</b>	WAN partner or interface (only possible for <b>Network</b> = <i>WAN without transit network</i> ).

Field	Meaning
<b>Gateway IP Address</b>	Only for <b>Network LAN</b> or <i>WAN with transit network</i> . IP address of the host to which your router should forward the IP packets.
<b>Metric</b>	The lower the value, the higher the priority of the route (possible values <i>0...15</i> ).

Table 6-20: **IP** ➤ **ROUTING** ➤ **ADD**

The **Network** field contains the following selection options:

Possible Values	Meaning
<i>LAN</i>	Route to a destination host or LAN that can be reached via your router's LAN connection.
<i>WAN without transit network</i>	Route to a destination host or LAN that can be reached via a WAN partner without including any transit network available.
<i>WAN with transit network</i>	Route to a destination host or LAN that can be reached via a WAN partner only via a transit network.
<i>Refuse</i>	Your router discards data packets using this route and sends the sender a message saying the destination of the packet is unreachable.
<i>Ignore</i>	Your router discards data packets using this route without sending a status message.

Table 6-21: **Network**



If you set up access to the Internet, you must configure the route to your Internet Service Provider (ISP) as a default route.

If, for example, you configure a corporate network connection, only enter the route to the head office or branch office as a default route if you do not configure Internet access over your router.

If, for example, you configure both Internet access and a corporate network connection, enter a default route to the ISP and a network route to the head office.



You can enter several default routes in your router, but only one default route can be active at any one time. If you enter several default routes, you should therefore make sure the values for **Metric** are different (see [table 6-20, page 172](#)).

#### Default route

To define a default route, proceed as follows:

- Select **Route Type**: *Default route*.
- Select **Network**: *WAN without transit network*.
- Select **Partner / Interface**: e.g. **GoInternet**.
- Enter **Metric**, e.g. **1**.
- Press **SAVE**.

You have returned to **IP** ➤ **ROUTING**. The entries are temporarily saved and activated. The route entered or changed is listed.



The corporate network can consist of several LANs with different network IP addresses and netmasks (➤➤ **subnets**). If you do not enter the access to such a network as a default route (e.g. because you have already set up your Internet access as a default route), then you must make a separate routing entry for each subnet you want to reach in this network.

**Network route** Diagram of a network with subnets:

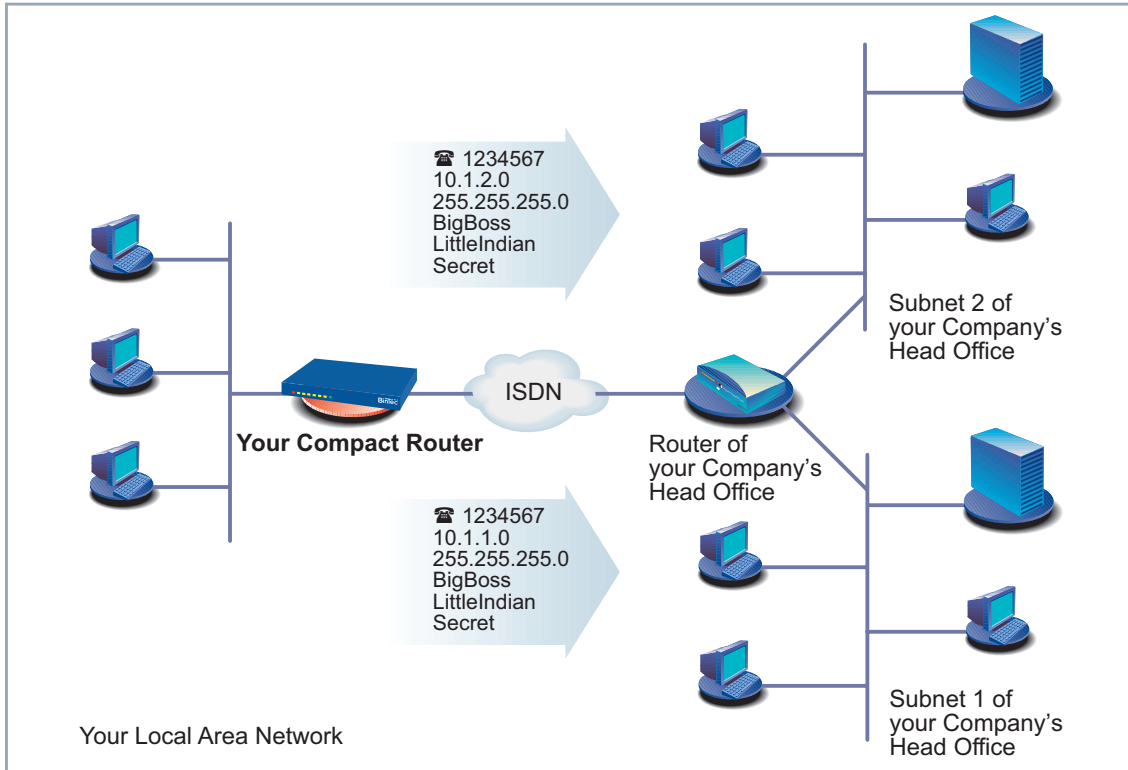


Figure 6-5: Network with subnets

Proceed as follows to establish a network route, e.g. for a corporate network connection (without a default route):

- Select **Route Type**: *Network route*.
- Select **Network**: *WAN without transit network*.
- Enter **Destination IP Address**, e.g. **10.1.2.0**.
- Enter **Netmask**, e.g. **255.255.255.0**.
- Enter **Partner / Interface**, e.g. **BigBoss**.
- Enter **Metric**, e.g. **1**.

- Press **SAVE**.

You have returned to **IP** ➤ **ROUTING**. The entries are temporarily saved and activated. The route entered or changed is listed.

- Repeat these steps if you have to enter several routes.

### 6.2.3 Activating Network Address Translation (NAT)

This chapter describes how to activate Network Address Translation (➤➤ **NAT**) for your WAN partner. This conceals your whole network to the outside world with just one IP address. You should certainly do this for your connection to the Internet Service Provider (ISP).

Detailed information about Network Address Translation (NAT) can be found in the **User's Guide X4100/200/300**.

**Activating NAT** Proceed as follows to activate NAT:

- Go to **IP** ➤ **NETWORK ADDRESS TRANSLATION**.

The following menu opens:

BinTec Router Setup Tool		BinTec Communications AG	
[IP][NAT]: NAT Configuration		MyRouter	
Select IP Interface to be configured for NAT			
Name	Nat	Static mappings from OUTSIDE	Static mappings from INSIDE
GoInternet	on	0	0
BigBoss	off	0	0
en1	off	0	0
en1-snap	off	0	0
enoa0	off	0	0
enoa0-snap	off	0	0
EXIT			
Press <Ctrl-n>, <Ctrl-p> to scroll, <Return> to edit/select			

- Mark the interface or the WAN partner for which you want to activate NAT (e.g. **GoInternet**) and press **Return**.

Another menu opens:

BinTec Router Setup Tool	BinTec Communications AG
[IP][NAT][CONFIG]: NAT Configuration (GoInternet)	MyRouter
Network Address Translation	on
Silent Deny	no
Enter configuration for sessions:	requested from OUTSIDE requested from INSIDE
SAVE	CANCEL
Use <Space> to select	

**To do** Make the following entries:

- Select **Network Address Translation**: *on*.
- Retain the setting of **Silent Deny**: *no*.
- Press **SAVE**.

Network Address Translation is activated for the selected interface or selected WAN partner and temporarily saved.

- Leave **IP** ➤ **NETWORK ADDRESS TRANSLATION** with **EXIT**.
- Leave **IP** with **EXIT**.

You have returned to the main menu.

Only outgoing sessions are allowed initially if NAT is activated. To allow certain connections from outside to hosts within the LAN, these must be explicitly defined and admitted. How to do this can be found in the **User's Guide X4100/200/300** in the chapter "NAT (Network Address Translation)".



## 6.3 Examples of WAN Partner Settings

The WAN partner settings for some example configurations are shown below:

- Internet Access over T-Online and Compuserve ([chapter 6.3.1, page 177](#))
- Corporate Network Connection to Head Office ([chapter 6.3.2, page 180](#))
- Corporate network connection: dial-in ([chapter 6.3.3, page 183](#))



How to enter the passwords is described in [chapter 5.4.4, page 111](#).

### 6.3.1 Internet Access

**T-Online** The following settings are necessary:

- In **WAN PARTNER** ► **ADD**:  
**Partner Name:** *T\_ONLINE*  
**Encapsulation:** *PPP*  
**Compression:** *none*  
**Encryption:** *none*
- In **WAN PARTNER** ► **ADD** ► **WAN NUMBERS** ► **ADD**:  
**Number** (= dial-in number): e.g. *0191011*  
**Direction:** *outgoing*
- In **WAN PARTNER** ► **ADD** ► **PPP**:  
**Authentication:** *PAP*  
**Local PPP ID** (= user account + T-Online number + joint user account): e.g.  
*123456789012081512345678#0001*  
**PPP Password:** e.g. *mycat*  
**Keepalives:** *off*  
**Link Quality Monitoring:** *off*

- In **WAN PARTNER** ► **ADD** ► **ADVANCED SETTINGS**:
  - Callback**: *no*
  - Static Short Hold (sec)**: e.g. **60**
  - Idle for Dynamic Short Hold (%)**: e.g. **0**
  - Delay after Connection Failure (sec)**: e.g. **300**
  - Channel Bundling**: *no*
  - Layer 1 Protocol**: *ISDN 64 kbps*
  - Special Interface Types**: *none*
- In **WAN PARTNER** ► **ADD** ► **IP**:
  - IP Transit Network**: *dynamic client*
- In **WAN PARTNER** ► **ADD** ► **IP** ► **ADVANCED SETTINGS**:
  - RIP Send**: *none*
  - RIP Receive**: *none*
  - Van Jacobson Header Compression**: *off*
  - Dynamic Name Server Negotiation**: *client (receive)*
  - IP Accounting**: *off*
  - Back Route Verify**: *off*
  - Route Announce**: *up or dormant*
  - Proxy Arp**: *off*
- In **IP** ► **ROUTING** ► **ADD**:
  - Route Type**: *Default route*
  - Network**: *WAN without transit network*
  - Partner / Interface**: *T\_ONLINE*
  - Metric**: e.g. **1**
- In **IP** ► **NETWORK ADDRESS TRANSLATION** ► **T\_ONLINE** ► **Return**:
  - Network Address Translation**: *on*
  - Silent Deny**: *no*

**Compuserve** The following settings are necessary:

- In **WAN PARTNER** ► **ADD**:
  - Partner Name**: *COMPUSERVE*
  - Encapsulation**: *Async PPP over X.75*
  - Compression**: *none*
  - Encryption**: *none*

- In **WAN PARTNER** ► **ADD** ► **WAN NUMBERS** ► **ADD**:  
**Number** (= dial-in number): e.g. **010880191919**  
**Direction**: *outgoing*
- In **WAN PARTNER** ► **ADD** ► **PPP**:  
**Authentication**: *none*  
**Keepalives**: *off*  
**Link Quality Monitoring**: *off*
- In **WAN PARTNER** ► **ADD** ► **ADVANCED SETTINGS**:  
**Callback**: *no*  
**Static Short Hold (sec)**: e.g. **120**  
**Idle for Dynamic Short Hold (%)**: e.g. **0**  
**Delay after Connection Failure (sec)**: e.g. **300**  
**Channel Bundling**: *no*  
**Layer 1 Protocol**: *ISDN 64 kbps*  
**Special Interface Types**: *none*
- In **WAN PARTNER** ► **ADD** ► **ADVANCED SETTINGS** ► **COMPUSERVE LOGIN**:  
**Provider**: Compuserve Network.  
**Host**: CIS.  
**User ID** (= your user name)  
**Password** (= your password)
- In **WAN PARTNER** ► **ADD** ► **IP**:  
**IP Transit Network**: *dynamic client*
- In **WAN PARTNER** ► **ADD** ► **IP** ► **ADVANCED SETTINGS**:  
**RIP Send**: *none*  
**RIP Receive**: *none*  
**Van Jacobson Header Compression**: *off*  
**Dynamic Name Server Negotiation**: *client (receive)*  
**IP Accounting**: *off*  
**Back Route Verify**: *off*  
**Route Announce**: *up or dormant*  
**Proxy Arp**: *off*

- In **IP** ► **ROUTING** ► **ADD**:  
**Route Type:** *Default route*  
**Network:** *WAN without transit network*  
**Partner / Interface:** *COMPUSERVE*  
**Metric:** e.g. *1*
- In **IP** ► **NETWORK ADDRESS TRANSLATION** ► **COMPUSERVE** ► **Return**:  
**Network Address Translation:** *on*  
**Silent Deny:** *no*

### 6.3.2 Corporate Network Connection to Head Office

This chapter explains how to configure your router step by step for a corporate network connection (LAN-LAN connection).

The diagram below shows a typical scenario:

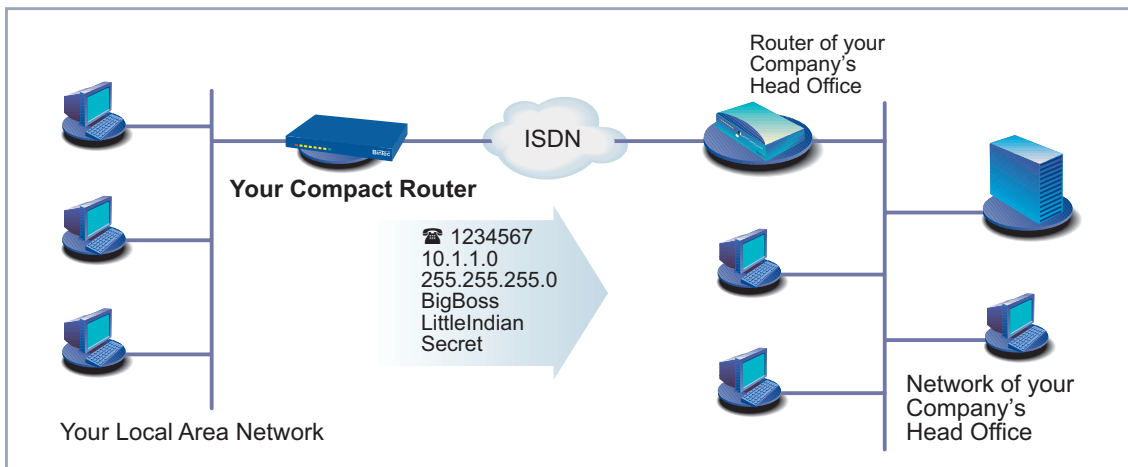


Figure 6-6: Your router and your head office

Keep at hand the data you have received from the system administrator of your head office (see [chapter 3.4, page 42](#)). If you are not sure about some points, refer to [chapter 6.2, page 151](#).

You have now completed the basic configuration of your BinTec Compact Router, as described in [chapter 4.2.1, page 62](#) and [chapter 6.1, page 121](#). Now proceed as follows to configure the head office as a WAN partner:

- Configuring WAN partners**
- Go to **WAN PARTNER** ➤ **ADD**.
  - Enter **Partner Name** (= user ID of head office), e.g. **BigBoss**.
  - Select **Encapsulation**: *PPP*.
  - Select **Compression**: *STAC*.
  - Select **Encryption**: *none*.
- Entering extensions**
- Select **WAN NUMBERS** and press **Return**.
  - Add a new entry with **ADD**.
  - Enter the **Number** (= the extension of your head office router), e.g. **1234567**.
  - Select **Direction**: *outgoing*.
  - Press **SAVE**.
- The number you use to dial your head office is now in the list.
- Leave **WAN PARTNER** ➤ **ADD** ➤ **WAN NUMBERS** with **EXIT**.
- Defining WAN partner PPP authentication**
- Select **PPP** and confirm with **Return**.
  - Select **Authentication**: *CHAP + PAP*.
  - Enter **Partner PPP ID** (= user ID of head office), e.g. **BigBoss**.
  - Enter **Local PPP ID** (= your own ID), e.g. **LittleIndian**.
  - Enter **PPP Password** (= common password for this connection), e.g. **Secret**.
  - Deactivate **Keepalives**: *off*.
  - Deactivate **Link Quality Monitoring**: *off*.
  - Confirm with **OK**.
- You have returned to the menu **WAN PARTNER** ➤ **ADD**.
- Setting short hold**
- Select **ADVANCED SETTINGS** and press **Return**.
  - Select **Callback**: *no*.

- Enter **Static Short Hold (sec)**, e.g. **20**.
- Enter **Idle for Dynamic Short Hold (%)**, e.g. **0**.
- Enter **Delay after Connection Failure (sec)**, e.g. **300**.
- Select **Layer 1 Protocol**: *ISDN 64 kbps*.
- Select **Channel Bundling**: *no*.
- Leave out **Extended Interface Settings (optional)**.
- Select **Special Interface Types**: *none*.
- Confirm with **OK**.

You have returned to the menu **WAN PARTNER** ➤ **ADD**.

#### Carrying out WAN partner IP configuration

- Select **IP** and press **Return**.
- Select **IP Transit Network**: *no*.
- Enter **Local IP Address** (= en1), e.g. **192.168.1.254**.
- Enter **Partner's LAN IP Address** (= network address of head office): e.g. **10.1.1.0**.
- Enter **Partner's LAN Netmask** (= netmask of head office), e.g. **255.255.255.0**.
- Select **ADVANCED SETTINGS** and press **Return**.
- Select **RIP Send**: *none*.
- Select **RIP Receive**: *none*.
- Activate **Van Jacobson Header Compression**: *off*.
- Select **Dynamic Name Server Negotiation**: *yes* (if you have configured Internet access) or *off* (if you have not configured Internet access).
- Activate **IP Accounting**: *off*.
- Activate **Back Route Verify**: *off*.
- Select **Route Announce**: *up or dormant*.
- Select **Proxy Arp**: *off*.
- Confirm with **OK**.

You have returned to the **WAN PARTNER** ➤ **ADD** ➤ **IP** menu.

- Press **SAVE**.  
You have returned to the menu **WAN PARTNER** ➤ **ADD**.
- Press **SAVE** again.  
You have returned to the **WAN PARTNER** menu. The entries are temporarily saved and activated.
- Leave **WAN PARTNER** with **EXIT**.  
Configuration of access to the corporate network is complete. You have returned to the main menu.

### Creating routing entry



If you have not configured any Internet access, then you can configure a default route for access to your head office (see [chapter 6.2.2, page 169](#)):

- Make the following entries in **IP** ➤ **ROUTING** ➤ **ADD**:
  - **Route Type:** *Default route*
  - **Network:** *WAN without transit network*
  - **Partner / Interface,** e.g. **BigBoss**
  - **Metric,** e.g. **1**



If the corporate network comprises several LANs (subnets) and you do not configure a default route to head office, then you must create a separate routing entry for each LAN you want to reach. See instructions in [chapter 6.2.2, page 169](#) and [figure 6-5, page 174](#).

- Repeat the steps for creating a routing entry until you have entered all the necessary routes.
- Press **SAVE**.
- Leave **IP** ➤ **ROUTING** with **EXIT**.
- Leave **IP** with **EXIT**.

### 6.3.3 Corporate Network Connection: Dial-in (without Router)

This chapter describes how to proceed if field staff or home office staff want to dial in to the head office.

The diagram below shows a typical scenario:

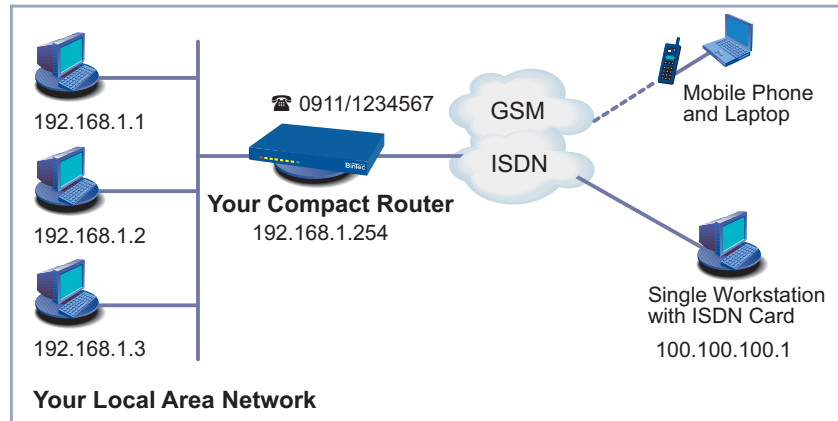


Figure 6-7: Scenario for dial-in

To access the data at head office, field service staff can dial in over laptop and mobile phone to the network at head office. If home office staff have no router, they need either an ISDN card in their PC or a modem. The configuration of your router and the PC or laptop is basically identical in all these cases. Field service staff using a Nokia Communicator mobile phone must make additional settings, which are described at the end of the next section.

The configuration is made in two or three steps:

- Configuration of your router
- Configuration of PC
- Configuration for Windows network (optional)

#### Configuration of your router

You have now completed the basic configuration of your BinTec Compact Router, as described in [chapter 4.2.1, page 62](#) and [chapter 6.1, page 121](#). Now proceed as follows to configure the desired dial-in partner as WAN partner:

#### Configuring WAN partners

- Go to **WAN PARTNER** ➤ **ADD**.
- Type in **Partner Name**, e.g. *Client Dialin*.
- Select **Encapsulation**: *PPP*.
- Select **Compression**: *none*.



- Defining WAN partner PPP authentication**
- Select **Encryption**: *none*.
  - Select **PPP** and confirm with **Return**.
  - Select **Authentication**: *CHAP*.
  - Enter **Partner PPP ID**, e.g. *clientdialin*.
  - Leave **Local PPP ID** (= your own ID) empty (for dial-in only).
  - Enter **PPP Password** (= common password for this connection).
  - Deactivate **Keepalives**: *off*.
  - Deactivate **Link Quality Monitoring**: *off*.
  - Confirm with **OK**.

You have returned to the menu **WAN PARTNER** ➤ **ADD**.

- Carrying out WAN partner IP configuration**
- Define the route to your dial-in partner:
- Select **IP** and press **Return**.
  - Select **IP Transit Network**: *dynamic server*.

- Defining address pool**
- Select **ADVANCED SETTINGS** and press **Return**.
  - Select **RIP Send**: *none*.
  - Select **RIP Receive**: *none*.
  - Deactivate **Van Jacobson Header Compression**: *off*.
  - Deactivate **Dynamic Name Server Negotiation**: *off*.
  - Enter **IP Address Pool**: *1*.
  - Deactivate **IP Accounting**: *off*.
  - Deactivate **Back Route Verify**: *off*.
  - Select **Route Announce**: *up or dormant*.
  - Select **Proxy Arp**: *off*.
  - Confirm with **OK**.
  - Press **SAVE**.

You have returned to the menu **WAN PARTNER** ➤ **ADD**. The entries are temporarily saved and activated.

- Setting short hold**
- Select **ADVANCED SETTINGS** and press **Return**.
  - Select **Callback**: *no*.
  - Enter **Static Short Hold (sec)**, e.g. **300**, i.e. a high value.
  - Enter **Idle for Dynamic Short Hold (%)**, e.g. **0**.
  - Enter **Delay after Connection Failure (sec)**, e.g. **300**.
  - Select **Layer 1 Protocol**: *ISDN 64 kbps*.
  - Select **Channel Bundling**: *no*.
  - Leave out **Extended Interface Settings (optional)**.
  - Select **Special Interface Types**: *none*.
  - Confirm with **OK**.  
You have returned to the menu **WAN PARTNER** ➤ **ADD**.
  - Press **Save**.  
You have returned to the **WAN PARTNER** menu. The entries are temporarily saved and activated.
  - Leave **WAN PARTNER** with **EXIT**.
- Entering IP address**
- Go to **IP** ➤ **IP ADDRESS POOL WAN (PPP)** ➤ **ADD**.
  - Enter **Pool ID**, e.g. **1**.
  - Enter **IP Address** (= IP address of your dial-in partner), e.g. **100.100.100.1**.
  - Enter **Number of Consecutive Addresses**, e.g. **1**.
  - Press **SAVE**.  
The entries are temporarily saved and activated.
  - Leave **IP** ➤ **IP ADDRESS POOL WAN (PPP)** with **EXIT**.
  - Leave **IP** with **EXIT**.
- Nokia Communicator**
- If you use a Nokia Communicator mobile phone, you must make the following additional entries to enable the mobile phone to set up a connection to the corporate network:
- Go to **PPP**.
  - Activate **PPP Link Quality Monitoring**: *yes*.

- Go to **WAN PARTNER** ➤ **EDIT** ➤ **PPP**.
- Activate **Link Quality Monitoring**: *on*.

### Configuration of PC in Windows NT

The necessary steps for configuration of your PC or laptop if you use the Windows NT operating system are given below. If you use Windows 95 or 98, you must observe basically the same points to complete the configuration successfully using the list. The following steps are necessary:

- Installing the ISDN/GSM card or modem together with the relevant data communications driver. (Refer to the documentation supplied with the card or modem and follow the instructions on the screen.)
- Check whether the TCP/IP protocol is installed (in the Windows Start menu under **Settings** ➤ **Control Panel** ➤ **Network**) or install this protocol if necessary (see [chapter 3.5, page 46](#)).
- Check the installed card (in the **Network Card** tab).
- Check whether the RAS service is installed and install if necessary (in the **Services** tab).
- Leave the **Network** menu with **OK**. The TCP/IP protocol is fixed on the dial-up adaptor. When the installation is successfully completed, the virtual modems are listed (**Settings** ➤ **Control Panel** ➤ **Modems**).
- Make a new entry for the connection in the directory (**Program** ➤ **Accessories** ➤ **DCN**). The telephone number must be entered under which your router accepts routing calls.
- Check the directory entry (**Continue** ➤ **Edit Entry and Modem Parameters** in the **Entries** tab).
- Only **TCP/IP** is to be selected as network protocol in the **Server** tab.
- Create connection (**Select**).
- Enter user name and password (= **Partner PPP ID** and **PPP Password** under **WAN PARTNER** ➤ **ADD** ➤ **PPP** in your router).
- The connection is set up on leaving the menu by pressing **OK**.



If you want to dial in to a Windows network, you must carry out a few additional configuration steps.

### **Configuration for Windows network**

If you want to log in to a Windows NT server, then you or the system administrator must make the relevant settings on the Windows NT Domain Server and on the Windows PC.

### **Windows NT server**

The administrator must carry out the following configuration steps at the Windows NT server:

- Configure a user in the User Manager.
- Configure the dial-in PC as a member of the domain.
- Name resolution must be carried out (WINS, or LMHOSTS file, DNS).

### **Windows client**

The following configuration steps must be carried out at the Windows PC:

- Enter the NetBIOS name of the PC and the group name or domain (i.e. the group name and the name of the NT domain must be identical in the **Identification** tab in the Windows Start menu under **Settings ▶ Control Panel ▶ Network**).
- Install the client for Microsoft networks and enter the domain of the server there (e.g. **BINTECDOM**).
- Create LMHOSTS file.

## 6.4 Broadband Internet Access (xDSL) with X1200 and X3200

For its **X1200** and **X3200** routers BinTec Communications AG offers the **PPP-over-Ethernet** (PPPoE) and PPP-over-PPTP protocols. These protocols are required, for example, for connecting terminals to the Internet over an **xDSL** connection to achieve increased bandwidth.

Two example configurations are given below; the first uses PPP-over-Ethernet, the second PPP-over-PPTP.

### Example 1: Deutsche Telekom



If you use the xDSL connection of a provider other than Deutsche Telekom, ask the provider about any special features of your xDSL connection that need to be considered.

Scenario for the following example configuration:

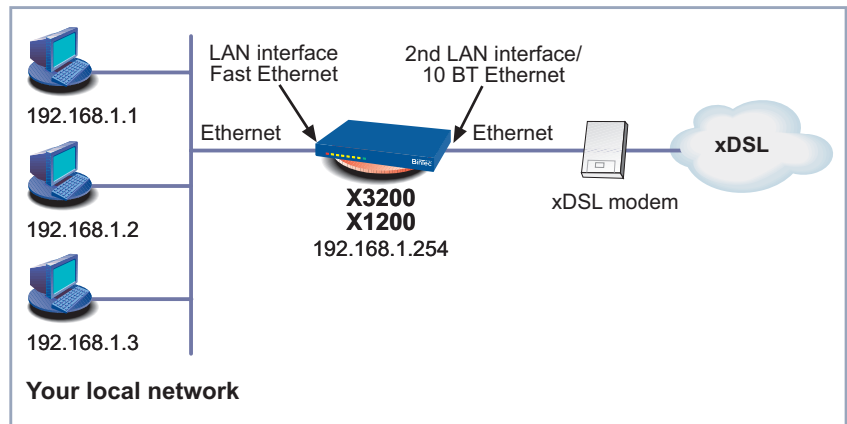


Figure 6-8: Example scenario

Your LAN is connected over the Fast Ethernet LAN interface of your router. The xDSL modem is connected to the 10Base-T Ethernet connection.



If you receive a special cable from Deutsche Telekom AG or another provider for connecting the xDSL modem, please use only this cable.

### Configuring the IP address

You have now completed the basic configuration of your BinTec Compact Router, as described in [chapter 4.2.1, page 62](#) and [chapter 6.1, page 121](#).

### General PPP settings

The general PPP settings are configured in the **PPP** menu. Here you must configure an interface on which PPP-over-Ethernet is to run. You can leave all the other settings at the default value.

➤ Go to **PPP**.

The following field is relevant:

Field	Meaning
<b>PPPoE Ethernet Interface</b>	Defines the interface used for xDSL.

Table 6-22: **PPP**

Proceed as follows to define the necessary PPP settings:

➤ Select your **PPPoE Ethernet Interface**, e.g. **en3** (2nd LAN interface in [figure 6-8, page 189](#)).

➤ Press **SAVE**.

The entries are temporarily saved and activated.

### WAN partner settings

To configure a PPP-over-Ethernet partner, proceed exactly as for configuration of a WAN partner ([chapter 6.2, page 151](#)).



When configuring the WAN partner, make sure that Van Jacobson Header Compression is not activated in the menu **WAN PARTNER** ➤ **ADD** ➤ **IP** ➤ **ADVANCED SETTINGS**. The Bridging and Bandwidth on Demand functions cannot be used either.

➤ Go to **WAN PARTNER** ➤ **ADD**.

The following fields are relevant:

Field	Meaning
<b>Partner Name</b>	Enter a name for uniquely identifying the PPP-over-Ethernet partner.
<b>Encapsulation</b>	Defines how the data packets are packed for transfer to the WAN partner. PPP-over-Ethernet: Only <i>PPP</i> should be selected here.

Table 6-23: **WAN PARTNER** ➤ **ADD**

- Enter your WAN partner's name for PPP-over-Ethernet under **Partner Name**, e.g. *t-online*.
- Select **Encapsulation**: *PPP*.
- Select **Encryption**: *none*.
- Select **Compression**: *none*.
- Go to **WAN PARTNER** ➤ **ADD** ➤ **PPP**.

#### WAN partner PPP settings

The following fields are relevant:

Field	Meaning
<b>Partner PPP ID</b>	ID of WAN partner. Remains empty.

Field	Meaning
<b>Local PPP ID</b>	<p>Your T-Online user ID.</p> <p>Comprises the following elements:</p> <p>&lt;user account&gt;&lt;T-Online number&gt;#&lt;co-user number&gt;@t-online.de</p> <p>user account = the 12-digit user account (example: <b>000460004256</b>)</p> <p>T-Online number (example: <b>091169386</b>)</p> <p>co-user number = 4-digit co-user number (example: <b>0001</b>)</p> <p>The T-Online number and the co-user number must be separated by # if the T-Online number has less than 12 digits.</p>
<b>PPP Password</b>	Your T-Online password.
<b>Keepalives</b>	<p>Activates keepalive packets.</p> <p>The activated Keepalive function checks the interface status. This permits faster detection and signaling if the connection to the provider fails (for example, if the LAN cable is accidentally disconnected).</p>

Table 6-24: **WAN PARTNER** ➤ **ADD** ➤ **PPP**

- Select **Authentication**: *PAP*.
  - Make no entry under **Partner PPP ID**.
  - Enter your **Local PPP ID**,  
e.g. **000460004256091169386#0001@t-online.de**.
  - Enter your **PPP Password**.
  - Select **Keepalives**: *off*.
  - Deactivate **Link Quality Monitoring**: *off*.
  - Confirm with **OK**.
- You have returned to the **WAN PARTNER** ➤ **ADD** menu.



**Advanced settings** ➤ Go to **WAN PARTNER** ➤ **ADD** ➤ **ADVANCED SETTINGS**.

The following field is especially relevant:

Field	Meaning
<b>Layer 1 Protocol</b>	<i>PPP over Ethernet (PPPoE)</i> must be selected here for access to xDSL.

Table 6-25: **WAN PARTNER** ➤ **ADD** ➤ **ADVANCED SETTINGS**

- Select **Callback**: *no*.
- Enter **Static Short Hold (sec)**, e.g. **60**.
- Enter **Idle for Dynamic Short Hold (%)**: *0*.
- Enter **Delay after Connection Failure (sec)**, e.g. **300**.
- Select **Layer 1 Protocol**: *PPP over Ethernet (PPPoE)*.
- Leave out **Extended Interface Settings**.
- Leave **Special Interface Types** set to *none*.
- Confirm with **OK**.

You have returned to the **WAN PARTNER** ➤ **ADD** menu.

**WAN partner IP settings** ➤ Go to **WAN PARTNER** ➤ **ADD** ➤ **IP**.

The following field is especially relevant:

Field	Meaning
<b>IP Transit Network</b>	Defines whether your router uses a transit network to the WAN partner. The IP address is assigned dynamically if <i>dynamic client</i> is selected.

Table 6-26: **WAN PARTNER** ➤ **ADD** ➤ **IP**

- Select **IP Transit Network**: *dynamic client*.
- Press **SAVE**.

You have returned to the **WAN PARTNER** ➤ **ADD** menu.

- Press **SAVE**.  
You have returned to the **WAN PARTNER** menu. The entries are temporarily saved and activated.

- Leave **WAN PARTNER** with **EXIT**.

### Creating a default route

- Go to **IP** ➤ **ROUTING** ➤ **ADD**.

The following field is relevant:

Field	Meaning
<b>Partner / Interface</b>	Your PPPoE partner.

Table 6-27: **IP** ➤ **ROUTING** ➤ **ADD**

- Select **Route Type**: *Default route*.
- Select **Network**: *WAN without transit network*.
- Select **Partner / Interface**, e.g. *t-online*.
- Enter **Metric**, e.g. *1*.
- Press **SAVE**.  
You have returned to the **IP** ➤ **ROUTING** menu. The entries are temporarily saved and activated.
- Leave **IP** ➤ **ROUTING** with **EXIT**.  
You have returned to the **IP** menu.

### Activating Network Address Translation (NAT)

You can use NAT to ensure that

- no more accesses can be made to your network from the Internet,
- and that connections to the Internet appear only under a single dynamically assigned IP address.

Proceed as follows to activate NAT:

- Go to **IP** ➤ **NETWORK ADDRESS TRANSLATION**.
- Select the WAN interface on which you want to activate NAT, e.g. *t-online*, and confirm with **Return**.  
Another menu window opens.

The following field is relevant:

Field	Meaning
<b>Network Address Translation</b>	Here you can activate Network Address Translation (NAT) for your WAN partner. This conceals your whole network to the outside world with just one IP address.

Table 6-28: **IP ► NAT**

- Select **Network Address Translation**: *on*.
- Retain the setting of **Silent Deny**: *no*.
- Press **SAVE**.
- Leave **IP ► NETWORK ADDRESS TRANSLATION** with **EXIT**.
- Leave **IP** with **EXIT**.

You have returned to the main menu. The WAN interface for T-Online is configured. The entries are temporarily saved and activated.

### Example 2: Telekom Austria (high-speed Internet access)

Telekom Austria offers a high-speed access to the Internet (A-Online Speed), which is available in Austria.

- |                                   |  |
|-----------------------------------|--|
| <b>Configuring the IP address</b> | You have now completed the basic configuration of your BinTec Compact Router, as described in <a href="#">chapter 4.2.1, page 62</a> and <a href="#">chapter 6.1, page 121</a> .   |
| <b>General PPP settings</b>       | Proceed as follows: <ul style="list-style-type: none"> <li>► Go to <b>PPP</b>.</li> <li>► Select your <b>PPPoE Ethernet Interface</b>, e.g. <b>en3</b> (2nd LAN interface in <a href="#">figure 6-8, page 189</a>).</li> <li>► Press <b>SAVE</b>.</li> </ul> <p>The entries are temporarily saved and activated.</p> |
| <b>Configuring WAN partners</b>   | <ul style="list-style-type: none"> <li>► Go to <b>WAN PARTNER ► ADD</b>.</li> <li>► Enter <b>Partner Name</b> (= provider name), e.g. <b>Telekom_Austria</b>.</li> </ul>   |

- Select **Encapsulation**: *PPP*.
  - Select **Encryption**: *none*.
  - Select **Compression**: *none*.
- WAN partner PPP settings**
- Select **PPP** and confirm with **Return**.
  - Select **Authentication**: *CHAP*.
  - You do not need to enter a **Partner PPP ID**. This field remains empty.
  - Enter your **Local PPP ID** (= your user name), e.g. **3909987000**.
  - Enter your **PPP Password** (= password).
  - Deactivate **Keepalives**: *off*.
  - Deactivate **Link Quality Monitoring**: *off*.
  - Confirm with **OK**.
- You have returned to the menu **WAN PARTNER** ➤ **ADD**.
- Advanced settings**
- Go to **WAN PARTNER** ➤ **ADD** ➤ **ADVANCED SETTINGS**.
  - Select **Callback**: *no*.
  - Enter **Static Short Hold (sec)**, e.g. **90**.
  - Enter **Idle for Dynamic Short Hold (%)**: *0*.
  - Enter **Delay after Connection Failure (sec)**, e.g. **300**.
  - Select **Layer 1 Protocol**: *PPP over PPTP*.
  - Leave out **Extended Interface Settings**.
  - Leave **Special Interface Types** set to *none*.
  - Confirm with **OK**.
- You have returned to the menu **WAN PARTNER** ➤ **ADD**.
- WAN partner IP settings**
- Select **IP** and press **Return**.
  - Enter **VPN Partner's IP Address**, e.g. **10.0.0.138**.
  - Select **via IP Interface**, e.g. **en3** (2nd LAN interface in [figure 6-8, page 189](#)).
  - Enter **Local IP Address**, e.g. **10.0.0.140**.

➤ Leave out **Advanced Settings**.

➤ Press **SAVE**.

You have returned to the menu **WAN PARTNER** ➤ **ADD**. The entries are temporarily saved and activated.

➤ Press **SAVE**.

You have returned to the **WAN PARTNER** menu. The entries are temporarily saved and activated.

➤ Leave **WAN PARTNER** with **EXIT**.

#### Creating a default route

➤ Go to **IP** ➤ **ROUTING**.

➤ Add a new entry with **ADD**.

➤ Select **Route Type**: *Default route*.

➤ Select **Network**: *WAN without transit network*.

➤ Select **Partner / Interface**, e.g. *Telekom\_Austria*.

➤ Enter **Metric**, e.g. *1*.

➤ Press **SAVE**.

The entries are temporarily saved and activated.

➤ Leave **IP** ➤ **ROUTING** with **EXIT**.

You have returned to the **IP** menu.

#### Activating NAT

➤ Go to **IP** ➤ **NETWORK ADDRESS TRANSLATION**.

➤ Select *Telekom\_Austria* as IP interface and press **Return**.

➤ Select **Network Address Translation**: *on*.

➤ Retain the setting of **Silent Deny**: *no*.

➤ Press **SAVE**.

The entries are temporarily saved and activated.

➤ Leave **IP** ➤ **NETWORK ADDRESS TRANSLATION** with **EXIT**.

➤ Leave **IP** with **EXIT**.

You have returned to the main menu. The configuration of the high-speed access is complete.

## 6.5 Broadband Internet Access (ADSL) with X2300 Family Routers

The **X2300 Family** from BinTec Communications AG is a family of routers with integrated >> **ADSL** modem and >> **PPPoA**, >> **IPoA** and >> **PPPoE** protocols. These protocols are required, for example, for connecting terminals to the Internet over an ADSL connection to achieve increased bandwidth.



All the necessary parameters of the ADSL interface are preset for a T-DSL connection in the ex works state.

Ask your provider about any special features of your ADSL connection that need to be considered.

Here is a scenario with example values:

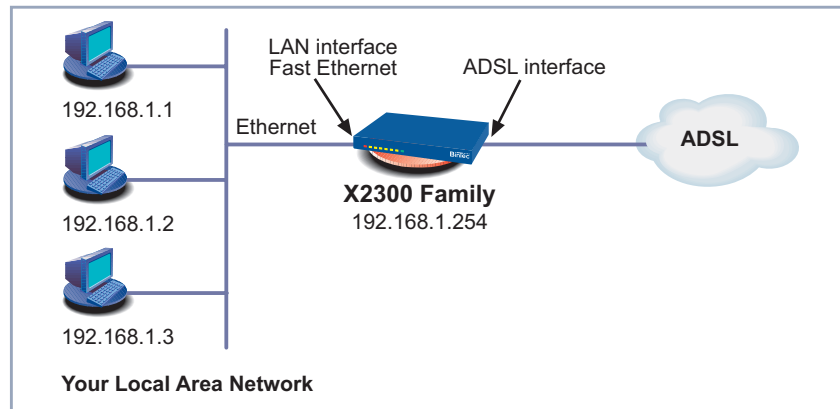


Figure 6-9: Example scenario

Your LAN is connected to the Fast Ethernet LAN interface of your router. Connect the ADSL interface of the **X2300 Family** router to the ADSL connection of your splitter (supplied by your provider).

## 6.5.1 Configuring an ADSL Interface



All the necessary parameters of the ADSL interface are preset for a T-DSL connection in the ex works state.

Proceed as follows:

➤ Go to **CM-ADSL, ADSL**.

The **CM-ADSL, ADSL** menu of your **X2300 Family** router opens:

BinTec Router Setup Tool [ADSL]: ADSL settings	BinTec Communications AG MyRouter
<p>Physical connection established: yes</p> <p>Transmit shaping: disabled</p> <p>SAVE CANCEL</p>	
Use <Space> to select	

The menu contains the following fields:

Field	Meaning
<b>Physical connection established</b>	Shows the status of the ADSL connection and cannot be edited. Possible values: <ul style="list-style-type: none"> <li>■ yes</li> <li>■ no</li> </ul>

Field	Meaning
<b>Transmit shaping</b>	<p>Defines if a <b>Maximum threshold (kb/s)</b> can be entered. Possible values:</p> <ul style="list-style-type: none"> <li>■ <i>disabled</i>: <b>Maximum threshold (kb/s)</b> cannot be entered.</li> <li>■ <i>enabled</i>: <b>Maximum threshold (kb/s)</b> can be entered.</li> </ul> <p>Default value: <i>disabled</i>.</p>
<b>Maximum threshold (kb/s)</b>	<p>Not visible if <b>Transmit shaping</b> <i>enabled</i>. Defines the maximum bandwidth for upstream, if this is not limited automatically by your provider.</p> <p>Possible values:</p> <ul style="list-style-type: none"> <li>■ 128</li> <li>■ 256</li> <li>■ 512</li> <li>■ 1024</li> </ul> <p>Default value: 128.</p>

Table 6-29: **CM-ADSL, ADSL**

**T-DSL** Proceed as follows to configure the ADSL interface for T-DSL:



If the physical connection of your ADSL connection is set up, **Physical connection established** should indicate *yes*. If this is not the case, check that you have connected your **X2300 Family** router properly ([chapter 3.3, page 39](#)) or contact your provider, if necessary!

- Select **Transmit shaping** *disabled*.
- Press **SAVE**.

You have returned to the main menu. The entries are temporarily saved and activated.



- Continue with [chapter 6.5.2, page 201](#).

### Other providers

Proceed as follows to configure the ADSL interface:



If the physical connection of your ADSL connection is set up, **Physical connection established** should indicate *yes*. If this is not the case, check that you have connected your **X2300 Family** router properly ([chapter 3.3, page 39](#)) or contact your provider, if necessary!

- Select the value received from your provider for **Transmit shaping**.
- Select the value received from your provider for **Maximum threshold (kb/s)**, e.g. **128**.
- Press **SAVE**.  
You have returned to the main menu. The entries are temporarily saved and activated.
- Continue with [chapter 6.5.2, page 201](#).

## 6.5.2 ATM Profile Description

This chapter describes the fields of the **ATM** menu and associated submenus.



The ➤➤ **ATM** profile is preset for a T-DSL connection in the ex works state.

### ATM menu

Proceed as follows:

- Go to **ATM**.

The following menu opens (shown here with example values):

```

BinTec Router Setup Tool                               BinTec Communications AG
[ATM]: ATM profile configuration                         MyRouter

Client          VPi/VCi      Encapsulation
IPoA            2/32        routed-non-iso
PPPoA          8/35        routed-iso
Ethernet (PPPoE, ...) 1/32        bridged-no-fcs

EXIT

Press <Ctrl-n>,<Ctrl-p> to scroll, <Return> to edit

```

The **ATM** menu contains a list of the profiles configured for ADSL connections.

**ATM ► EDIT menu** Proceed as follows:

- Select an entry, e.g. **Ethernet (PPPoE, ...)** from the list for T-DSL.
- Press **Return**.

The following menu opens (shown here with the values for the entry **Ethernet (PPPoE, ...)**):

```

BinTec Router Setup Tool                               BinTec Communications AG
[ATM][EDIT]: ATM profile configuration                 MyRouter

Client          Ethernet (PPPoE, ...)
VPi             1
VCi            32
Encapsulation   bridged-no-fcs

IP>
OAM>

                SAVE                                CANCEL

```

There is no **IP** submenu for the **PPPoA** entry.

The **ATM** ► **EDIT** menu contains the following fields:

Field	Meaning
<b>Client</b>	Shows the selected service and cannot be edited. Possible values: <ul style="list-style-type: none"><li>■ <i>IPoA</i></li><li>■ <i>PPPoA</i></li><li>■ <i>Ethernet (PPPoE, ...)</i></li></ul>
<b>VPI</b>	(Virtual Path Identifier) Only edit if the value from your provider differs from the default value set. Keep the default value for a T-DSL connection. Possible values: 0 to 15. Default value for T-DSL: 1.
<b>VCi</b>	(Virtual Circuit Identifier) Only edit if the value from your provider differs from the default value set. Keep the default value for a T-DSL connection. Possible values: 32 to 127. Default value for T-DSL: 32.

Field	Meaning
<b>Encapsulation</b>	<p>Type of encapsulation. Only edit if the value from your provider differs from the default value set. Keep the default value for a T-DSL connection.</p> <p>Possible values:</p> <ul style="list-style-type: none"> <li>■ <i>bridged-non-fcs</i>: Encapsulation to RFC 1483 without frame check sequence. Default value set for T-DSL.</li> <li>■ <i>vc-muxed</i>: Multiplex over an ATM Virtual Circuit.</li> <li>■ <i>routed-iso</i>: Encapsulation to RFC 1483.</li> <li>■ <i>routed-non-iso</i>: Encapsulation to RFC 1483.</li> <li>■ <i>bridged-fcs</i>: Encapsulation to RFC 1483 with frame check sequence.</li> </ul>

Table 6-30: **ATM** ► **EDIT****ATM** ► **EDIT** ► **IP**  
submenuThe **ATM** ► **EDIT** ► **IP** submenu contains the following fields:

Field	Meaning
<b>IP Configuration</b>	<p>Only edit if the value from your provider differs from the default value set. Keep the default value for a T-DSL connection. Possible values:</p> <ul style="list-style-type: none"> <li>■ <i>Manual</i>: Default value set for T-DSL.</li> <li>■ <i>DHCP</i></li> </ul>
<b>Local IP Number</b>	<p>IP address of your router in the LAN. No entry for T-DSL.</p> <p>Only edit if the value from your provider differs from the default value set. Keep the default value for a T-DSL connection.</p>

Field	Meaning
<b>Local Netmask</b>	<p>Netmask of the network in which your router with <b>Local IP Number</b> is located. No entry for T-DSL.</p> <p>Only edit if the value from your provider differs from the default value set. Keep the default value for a T-DSL connection.</p>
<b>Encapsulation</b>	<p>Defines the kind of header added to the IP packets that run over this LAN interface. Possible values:</p> <ul style="list-style-type: none"> <li>■ <i>none</i>: Default value set for T-DSL.</li> <li>■ <i>Ethernet II</i> (conforms to IEEE 802.3)</li> <li>■ <i>Ethernet SNAP</i></li> </ul> <p>Only edit if the value from your provider differs from the default value set. Keep the default value for a T-DSL connection.</p>

Table 6-31: **ATM** ➤ **EDIT** ➤ **IP****ATM** ➤ **EDIT** ➤ **OAM**  
submenuThe **ATM** ➤ **EDIT** ➤ **OAM** submenu contains the following fields:

BinTec Router Setup Tool	BinTec Communications AG
[ATM][EDIT][OAM]: OAM configuration for Ethernet	MyRouter
OAM flow level: F5	
Loopback:	
End to end:	disabled
Segment:	disabled
CC activation:	
End to end Request:	inactive
Segment Request:	inactive
Response:	confirm
SAVE	CANCEL
Use <Space> to select	

The **ATM** ► **EDIT** ► **OAM** submenu contains the following fields:

Field	Meaning
<b>OAM flow level</b>	Type of data flow. Cannot be edited. Set to default value <i>F5</i> for T-DSL.
<b>Loopback: End to end</b>	Only edit if the value from your provider differs from the default value set. Keep the default value for a T-DSL connection.  Possible values: <input type="checkbox"/> <i>disabled</i> : Default value set for T-DSL. <input type="checkbox"/> <i>enabled</i>
<b>Loopback: Segment</b>	Only edit if the value from your provider differs from the default value set. Keep the default value for a T-DSL connection.  Possible values: <input type="checkbox"/> <i>disabled</i> : Default value set for T-DSL. <input type="checkbox"/> <i>enabled</i>
<b>Loopback: Tx timer (s)</b>	Can only be set for <i>enabled</i> at <b>Loopback: End to end</b> or <b>Loopback: Segment</b> .  Possible values: <i>0..999</i> .
<b>Loopback: Tx count</b>	Can only be set for <i>enabled</i> at <b>Loopback: End to end</b> or <b>Loopback: Segment</b> .  Possible values: <i>1..999</i> .
<b>CC activation: End to end Request</b>	Only edit if the value from your provider differs from the default value set. Keep the default value for a T-DSL connection.  Possible values: <input type="checkbox"/> <i>inactive</i> : Default value set for T-DSL. <input type="checkbox"/> <i>active</i>

Field	Meaning
<b>CC activation: Segment Request</b>	<p>Only edit if the value from your provider differs from the default value set. Keep the default value for a T-DSL connection.</p> <p>Possible values:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> <i>inactive</i>: Default value set for T-DSL.</li> <li><input type="checkbox"/> <i>active</i></li> </ul>
<b>CC activation: Response</b>	<p>Only edit if the value from your provider differs from the default value set. Keep the default value for a T-DSL connection.</p> <p>Possible values:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> <i>confirm</i>: Default value set for T-DSL.</li> <li><input type="checkbox"/> <i>deny</i></li> </ul>
<b>Direction</b>	<p>Can only be set for <i>active</i> at <b>CC activation: End to end Request</b> or <b>CC activation: Segment Request</b>.</p> <p>Possible values:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> <i>B-A</i></li> <li><input type="checkbox"/> <i>A-B</i></li> <li><input type="checkbox"/> <i>two way</i></li> </ul>

Table 6-32: **ATM** ► **EDIT** ► **OAM****Configuring ATM profile**

Proceed as follows to configure your ATM profile for T-DSL:

- Go to **ATM**.
- Select an entry from the list, e.g. **Ethernet (PPPoE, ...)** for T-DSL, and press **Return**.  
You have returned to the **ATM** ► **EDIT** menu.
- Enter the desired value for **VPi**, e.g. **1** for T-DSL.
- Enter the desired value for **VCi**, e.g. **32** for T-DSL.

- Enter the desired value for **Encapsulation**, e.g. *bridged-non-fcs* for T-DSL.
- Keep the values in the **ATM** ➤ **EDIT** ➤ **IP** menu (see also [table 6-31, page 205](#)).
- Keep the values in the **ATM** ➤ **EDIT** ➤ **OAM** menu (see also [table 6-32, page 207](#)).
- Press **SAVE**.  
You have returned to the **ATM** menu. The entries are temporarily saved and activated.
- Leave the **ATM** menu with **EXIT**.  
You have returned to the main menu.
- Continue with [chapter 6.5.3, page 208](#).

### 6.5.3 Configuring WAN Partners for ADSL

**Configuring the IP address** You have now completed the basic configuration of your BinTec Compact Router, as described in [chapter 4.2.1, page 62](#) and [chapter 6.1, page 121](#).

Proceed as follows to configure the WAN partner for ADSL:

- General PPP settings**
- Go to **PPP**.
  - Select your **PPPoE Ethernet Interface**, e.g. *veth1* for T-DSL.
  - Press **SAVE**.  
You have returned to the main menu. The entries are temporarily saved and activated.
- WAN partner settings**
- Go to **WAN PARTNER** ➤ **ADD**.
  - Enter **Partner Name** (= provider name), e.g. *T-DSL*.
  - Select **Encapsulation**: *PPP*.
  - Select **Encryption**: *none*.
  - Select **Compression**: *none*.
- WAN partner PPP settings**
- Select **PPP** and confirm with **Return**.  
You enter the **WAN PARTNER** ➤ **ADD** ➤ **PPP** menu.



- Select **Authentication**: *PAP*.
- Make no entry under **Partner PPP ID**.  
This field remains empty.
- Enter **Local PPP ID** (= your user name),  
e.g. **000460004256091169386#0001@t-online.de**.
- Type in **PPP Password**.
- Deactivate **Keepalives**: *off*.
- Deactivate **Link Quality Monitoring**: *off*.
- Confirm with **OK**.  
You have returned to the menu **WAN PARTNER** ➤ **ADD**.

**Advanced settings**

- Go to **WAN PARTNER** ➤ **ADD** ➤ **ADVANCED SETTINGS**.
- Select **Callback**: *no*.
- Enter **Static Short Hold (sec)**, e.g. **90**.
- Enter **Idle for Dynamic Short Hold (%)**: *0*.
- Enter **Delay after Connection Failure (sec)**, e.g. **300**.
- Select **Layer 1 Protocol**: *PPP over Ethernet (PPPoE)*.
- Leave out **Extended Interface Settings**.
- Leave **Special Interface Types** set to *none*.
- Confirm with **OK**.  
You have returned to the menu **WAN PARTNER** ➤ **ADD**.

**WAN partner IP settings**

- Go to **WAN PARTNER** ➤ **ADD** ➤ **IP**.

The following field is relevant:

Field	Meaning
<b>IP Transit Network</b>	Defines whether your router uses a transit network to the WAN partner.  The IP address is assigned dynamically if <i>dynamic client</i> is selected.

Table 6-33: **WAN PARTNER** ➤ **ADD** ➤ **IP**

- Select **IP Transit Network**: *dynamic client*.
- Press **SAVE**.  
You have returned to the menu **WAN PARTNER** ➤ **ADD**.
- Press **SAVE**.  
You have returned to the **WAN PARTNER** menu. The entries are temporarily saved and activated.
- Leave **WAN PARTNER** with **EXIT**.  
You have returned to the main menu.

#### Creating a default route ➤ Go to **IP** ➤ **ROUTING** ➤ **ADD**.

The following field is relevant:

Field	Meaning
<b>Partner / Interface</b>	Your PPPoE partner.

Table 6-34: **IP** ➤ **ROUTING** ➤ **ADD**

- Select **Route Type**: *Default route*.
- Select **Network**: *WAN without transit network*.
- Select **Partner / Interface**, e.g. *T-DSL*.
- Enter **Metric**, e.g. *1*.
- Press **SAVE**.  
You have returned to the **IP** ➤ **ROUTING** menu. The entries are temporarily saved and activated.
- Leave **IP** ➤ **ROUTING** with **EXIT**.  
You have returned to the **IP** menu.

#### Activating Network Address Translation (NAT)

You can use NAT to ensure that

- no more accesses can be made to your network from the Internet,
- and that connections to the Internet appear only under a single dynamically assigned IP address.

Proceed as follows to activate NAT:

- Go to **IP** ➤ **NETWORK ADDRESS TRANSLATION**.
- Select the WAN interface on which you want to activate NAT, e.g. **T-DSL**, and press **Return**.  
Another menu window opens.

The following field is relevant:

Field	Meaning
<b>Network Address Translation</b>	Here you can activate Network Address Translation (NAT) for your WAN partner. This conceals your whole network to the outside world with just one IP address.

Table 6-35: **IP** ➤ **NAT**

- Select **Network Address Translation: on**.
- Select **Silent Deny: no**.
- Press **SAVE**.  
The WAN interface for xDSL is configured. The entries are temporarily saved and activated.

## 6.6 Serial WAN Interface with X2100

The **X2100** from BinTec Communications AG is a router with an integrated X.21/V.35 interface.

**Configuring the IP address** You have now completed the basic configuration of your BinTec Compact Router, as described in [chapter 6.1, page 121](#).

**Setup Tool** Proceed as follows:

➤ Go to **CM-SERIAL, SERIAL**.

The following menu opens:

BinTec Router Setup Tool	BinTec Communications AG
[SLOT 3 SERIAL]: Configure Serial Interface - Unit 0	MyRouter
Cable Detection	interface & connector type
Interface Type	V.35 (autodetected)
Connector	dte (autodetected)
Layer 2 Mode	auto
Interface Leads	disabled
SAVE	CANCEL
Use <Space> to select	

The menu contains the following fields:

Field	Meaning
<b>Cable Detection</b>	<p>Defines whether the interface and connector types used are to be detected automatically (<i>autodetected</i>) or set manually. Possible values:</p> <ul style="list-style-type: none"> <li>■ <i>interface &amp; connector type</i>: The interface and connector types are detected automatically.</li> <li>■ <i>interface type</i>: Only the interface type is detected automatically. The connector type must be set manually.</li> <li>■ <i>connector type</i>: Only the connector type is detected automatically. The interface type must be set manually.</li> <li>■ <i>manual</i>: Both the interface and connector type must be set manually.</li> </ul>
<b>Interface Type</b>	<p>Defines the interface type of the port used.</p> <p>If you select <i>interface type</i> or <i>interface &amp; connector type</i> for the <b>Cable Detection</b> field, the interface type is detected automatically. The detected value is displayed, e.g. <b>V.35 (autodetected)</b>.</p> <p>If you select <i>connector type</i> or <i>manual</i> for the <b>Cable Detection</b> field, you must set the <b>Interface Type</b> field manually. For possible values, see <a href="#">table 6-37, page 216</a>.</p>

Field	Meaning
<b>Connector</b>	<p>Defines the connector type of the port used.</p> <p>If you select <i>connector type</i> or <i>interface &amp; connector type</i> for the <b>Cable Detection</b> field, the connector type is detected automatically. The detected value is displayed, e.g. <i>dte (autodetected)</i>.</p> <p>If you select <i>interface type</i> or <i>manual</i> for the <b>Cable Detection</b> field, you must set the <b>Connector</b> field manually. For possible values, see <a href="#">table 6-38, page 217</a>.</p>
<b>Speed</b>	<p>Only if the <b>Connector</b> field is set to <i>dce</i>.</p> <p>Transmission rate of connection. Possible values:</p> <ul style="list-style-type: none"> <li>■ <i>2400 bps, 9600 bps, 14400 bps, 19200 bps, 38400 bps, 64000 bps</i></li> <li>■ <i>128 kbps, 256 kbps, 512 kbps</i></li> <li>■ <i>1 Mbps, 2 Mbps, 4 Mbps, 8 Mbps</i></li> <li>■ <i>custom</i>: The field for <b>Speed: value (bps)</b> appears. Scalable from <i>2400 bps</i> to <i>8 Mbps</i>.</li> </ul> <p>The value to be set depends on the quality and length of the cable, the connector type and the min./max. speed accepted at the DTE end. Up to 8 Mbps are possible over a short distance of up to 5 m if shielded twisted-pair cables are used.</p> <p>Default value: <i>64000 bps</i>.</p>

Field	Meaning
<b>Layer 2 Mode</b>	<p>Defines the value of the HDLC address field in the transmitted command frames (Layer 2). Possible values:</p> <ul style="list-style-type: none"> <li>■ <i>auto</i> (default value): The selection made for <b>Connector</b> is accepted. You can usually accept this setting, e.g. for access to a public data network such as Data-tex-P.</li> <li>■ <i>dte</i>: The address field has the value for DTE.</li> <li>■ <i>dce</i>: The address field has the value for DCE.</li> </ul>
<b>Interface Leads</b>	<p>Defines whether the router checks the status of the interface line. The same value should be set for both connection partners. Possible values:</p> <ul style="list-style-type: none"> <li>■ <i>enabled</i>: The Layer 1 signaling of the opposite station is checked on the signal line (I for X.21, CTS for V.35). The check correspondingly affects the variable <b>L1State</b>.</li> <li>■ <i>disabled</i> (default value): The Layer 1 signaling of the opposite station is not checked, your router assumes that the physical line is always "up". In this setting, you should monitor the interface line in some other way, e.g. with PPP Keepalive.</li> </ul>

Table 6-36: **X21[x]**

The **Interface Type** field contains the following selection options:

Possible Values	Meaning
<i>unknown (autodetected)</i>	No cable is connected to the port or the cable connected does not support autodetection.
<i>none</i>	The port is not used.
<i>X.21 (term)</i>	V.11 on all lines, 120-ohm terminating resistor on critical input lines.
<i>V.35</i>	V.35 on critical lines, V.28 on uncritical lines.
<i>V.36</i>	V.11 on critical lines, V.10 on uncritical lines.
<i>X.21bis</i>	V.28 on all lines.
<i>X.21 (not term)</i>	Unterminated V.11 on all lines.
<i>RS-449</i>	V.11 on critical lines, V.10 on uncritical lines.
<i>RS-530</i>	V.11 on critical lines, V.10 on uncritical lines.

Table 6-37: **Interface Type**



If you use an X.21 cable that supports autodetection, the value *X.21 (term)* is selected automatically. If you do not want termination, you must disable autodetection and make the configuration manually.



Data and clock lines are generally designated as critical lines.  
Control lines are generally designated as uncritical lines.

The field contains the following selection options:

Possible Values	Meaning
<i>unknown (autodetected)</i>	No cable is connected to the port or the cable connected does not support autodetection.



Possible Values	Meaning
<i>dte</i>	The pins are assigned as DTE interface. This setting is necessary, for example, if the router is connected to a public data network like Datex-P in Germany.
<i>dce</i>	The pins are assigned as DCE interface.

Table 6-38: Connector

**Configuration** Proceed as follows to configure **X2100**'s serial WAN interface:

- Select **Cable Detection**, e.g. ***interface & connector type***.  
The interface and connector types are detected automatically.
- If you have selected *connector type* or *interface & connector type* for the **Cable Detection** field, select **Interface Type**, e.g. ***X.21 (term)***.
- If you have selected *interface type* or *interface & connector type* for the **Cable Detection** field, select **Connector**, e.g. ***dte***.
- If you have selected *dce* for the **Connector** field, select **Speed**, e.g. ***64000 bps***.
- If you have selected *custom* for the **Speed** field, select the desired value for **Speed: value (bps)**.
- Select **Layer 2 Mode**, e.g. ***auto***.
- Select **Interface Leads**, e.g. ***disabled***.
- Press **SAVE**.  
You have returned to the main menu. The entries are temporarily saved and activated.

**Advanced configuration** If you use a leased line, you can implement a backup solution using the Bandwidth on Demand feature (see **User's Guide X4100/200/300**, "Bandwidth on Demand (BOD)"). If you use this facility, a dialup connection is set up to the connection partner if the leased line fails.

## 6.7 Saving the Configuration

Now that you have created a configuration on your router, make sure you save it:

- In the Setup Tool main menu, select **EXIT** and press **Return**.

Another menu opens:

```
BinTec Router Setup Tool                               BinTec Communications AG
[EXIT]: Exit Setup                                     MyRouter

Back to Main Menu
Save as boot configuration and exit
Exit without saving
```

You have three alternatives:

- Select **Back to Main Menu** to return to the Setup Tool main menu.
- Select **Save as boot configuration and exit** to save the configuration data as "boot" file in the flash memory.

The SNMP shell of your router opens with the command prompt. All the changes you have just made with the Setup Tool are saved in the flash. The configuration file you have just saved will be loaded the next time you start your router.

- Select **Exit without saving** to quit the Setup Tool without saving your changes in the flash.

The SNMP shell of your router opens with the command prompt. All settings or changes you have made with the Setup Tool will be lost when you turn off your router.

## 6.8 Testing your Configuration

Now make sure your configuration settings work properly.



### Caution!

Unwanted connections and increased charges can occur! Monitor your router and make sure it does not establish unwanted connections (and charges).

- To avoid unnecessary charges, check whether the filters set in [chapter 6.1.5, page 134](#) are sufficient for your needs. You can configure more filters with the Setup Tool (**User's Guide X4100/200/300**, "Filters (Access Lists)").
- Watch the LEDs on your router (cf. [chapter 8, page 235](#)), use the monitor function of the Setup Tool (see **User's Guide X4100/200/300**, "Activity Monitoring") and check your settings with an SNMP Management Tool.

### Testing the LAN connection

Test the connection to your router:

- In the start menu of your PC, click **Run** and enter `ping`, followed by a space and the IP address of your router, e.g. `ping 192.168.1.254`. If the configuration is correct, a window opens to indicate "Answer from 192.168.1.254...".

### Testing Internet access

- Test the Internet access by entering [www.bintec.net](http://www.bintec.net) in the Internet browser.

If the configuration is correct, BinTec's start page opens. BinTec's Internet site offers you the latest news, updates and documentation.



## 7 Configuration Management

This chapter contains instructions on the administration of your configuration files and on updating your router's software. The following areas are covered:

- Administration of configuration files ([chapter 7.1, page 222](#))
  - Where are the configuration files?
  - What is flash and memory?
  - How do I handle configuration files?
- Resetting **X1000, X1200, X3200, X2100** and **X2300 Family** routers to the ex works state ([chapter 7.2, page 230](#))
- Updating software ([chapter 7.3, page 232](#))
  - How do I keep in touch with the latest developments?
  - How do I load new system software?

## 7.1 Administration of Configuration Files

**Flash** Your router reads its configuration information from configuration files. These configuration files are stored in the flash EEPROM (electronically erasable, programmable read-only memory) of your router. Several different configuration files can be stored in the flash memory. The data also remains stored in the flash when your router is switched off.

**Memory** The current configuration and all changes you make during the operation of your router are stored in the working memory (RAM). The contents of the RAM are lost when your router is switched off. So if you modify your configuration and want to retain these changes for the next time you start your router, you have to save the modified configuration to the flash before switching off: **EXIT** ➤ **Save as boot configuration and exit** (see [chapter 6.7, page 218](#)). This file is then saved in the flash as a boot configuration file under the name "boot". When your router is started again, this very configuration file with the name "boot" is loaded into the RAM and becomes operative.

**Ex works state** If you reset your router to the ex works state and want to keep the stored configuration, this is possible by switching the equipment off and on (see [chapter 7.2, page 230](#)).

**Operations** Imagine the flash memory as a directory of configuration files. The files in this directory can be copied, moved, erased and newly created. It is also possible to transfer configuration files between your router and a remote host by TFTP.

**Windows** In Windows, you can use the TFTP server of **DIME Tools** (see **BRICKware for Windows**). You can then, for example, save a configuration file from your router on your local PC.

**Unix** A TFTP server is part of the system in Unix; please read the instructions included in the **Software Reference**.

You can perform the various operations with the Setup Tool:

➤ Go to the **CONFIGURATION MANAGEMENT** menu.

The following menu opens:

BinTec Router Setup Tool	BinTec Communications AG
[CONFIG]: Configuration Management	MyRouter
Operation	get (TFTP --> FLASH)
TFTP Server IP Address	192.168.1.1
TFTP File Name	my-configuration.cf
Name in Flash	boot
Type of last operation	get (TFTP --> FLASH)
State of last operation	done
START OPERATION	EXIT
Use <Space> to select	

The menu contains the following fields:

Field	Meaning
<b>Operation</b>	Operation you want to perform.
<b>TFTP Server IP Address</b>	The IP address or host name (if the host name can be resolved) of the TFTP server which you want to transfer a configuration file from or to.
<b>TFTP File Name</b>	Name of the configuration file on the TFTP server (without path data).
<b>Name in Flash</b>	Name of the configuration file in the flash.
<b>New Name in Flash</b>	Name of the configuration file to be newly created in the flash (with <b>Operation</b> = <i>move</i> or <i>copy</i> ).
<b>Type of last operation</b>	Type of last operation (since the last router start).
<b>State of last operation</b>	The state of the last operation executed.

Table 7-1: **CONFIGURATION MANAGEMENT**

The **Operation** field contains the following selection options:

Possible Values	Meaning
<i>save</i> (MEMORY --> FLASH)	Save all current settings from memory to flash as configuration file <Name in Flash>. <Name in Flash> is overwritten or recreated.
<i>load</i> (FLASH --> MEMORY)	Loading the configuration file <Name in Flash> from flash to memory. The settings in <Name in Flash> take immediate effect.
<i>move</i> (FLASH --> FLASH)	Rename configuration file <Name in Flash> to <New Name in Flash>.
<i>copy</i> (FLASH --> FLASH)	Copy configuration file <Name in Flash> as <New Name in Flash>.
<i>delete</i> (FLASH)	Delete configuration file <Name in Flash>.
<i>put</i> (FLASH --> TFTP)	Transfer configuration file <Name in Flash> from flash to TFTP host with the IP address <TFTP Server IP Address>. <TFTP File Name> is then overwritten or recreated on the TFTP host with the contents of <Name in Flash>. <TFTP File Name> is saved in ASCII format and can be edited.
<i>get</i> (TFTP --> FLASH)	Transfer configuration file <TFTP File Name> from TFTP host with the IP address <TFTP Server IP Address> to flash. <Name in Flash> is then overwritten and recreated with the contents of <TFTP File Name>. As the configuration file is transferred to flash and not to memory, the file must then be loaded (FLASH --> MEMORY), so that the settings can take effect on your router.
<i>state</i> (MEMORY --> TFTP)	Save all current settings in the memory as <TFTP File Name> on the TFTP host with the IP address <TFTP Server IP Address>. <TFTP File Name> is then overwritten or recreated.



Possible Values	Meaning
<i>reboot</i>	Restart your router. All settings in the memory are replaced by "boot" settings from the flash.

Table 7-2: **Operation**

The **State of last operation** field can display the following:

Possible Values	Meaning
<i>todo</i>	The operation has not yet been started.
<i>running</i>	The operation is being executed.
<i>done</i>	The operation has been executed successfully.
<i>error</i>	The operation could not be completed (see chapter "Syslog Messages" in the <b>User's Guide X4100/200/300</b> ).

Table 7-3: **State of last operation**

If an error should occur while running *get (TFTP --> FLASH)* and the operation is aborted, the file to be overwritten in the flash is deleted. So if you transfer a "boot" file, your router's boot file will be deleted and your router cannot load a configuration on restarting. If necessary, rename the file to be transferred!



To run *put (Flash --> TFTP)*, *get (TFTP --> Flash)* and *state (MEMORY --> TFTP)*, you need a TFTP server on the host to or from which you can transfer a configuration file.

If the TFTP host is a Windows PC, click **Program** ► **BRICKware** ► **DIME Tools** in the Windows Start menu to open **DIME Tools** and activate the TFTP server with **File** ► **TFTP Server** before you run the operation in question.



If you want to use your Windows PC as a TFTP host but are not sure what the IP address of the PC is, proceed as follows:

Windows 95 and 98:

- Click **Run** in the Windows Start menu.
- Type in `winipcfg`.  
A window opens where you can see the IP address of your PC and other network information.

Windows NT, 2000, ME and XP:

- Click **Program** ➤ **Command Prompt** in the Windows Start menu.
- Enter `ipconfig` or `ipconfig/all` to request the IP address of your PC and other network information.

**Running an operation** To run an operation, proceed as follows:

- Select the desired **Operation** in the **CONFIGURATION MANAGEMENT** menu.
- Activate a TFTP server if you have selected *put*, *get* or *state* as the **Operation**.
- Select all the necessary settings in **CONFIGURATION MANAGEMENT** or enter the required values.
- Select **START OPERATION** and press **Return**.

As long as the operation is being carried out, *OPERATING* appears in the help line of the Setup Tool and **State of last operation** displays *running*.

When the operation has been successfully executed, it is shown under **Type of last operation**. **State of last operation** shows the value *done*.



If *error* is displayed under **State of last operation**, check your settings:

- Have you entered the right IP address under **TFTP Server IP Address**?
- If using older versions of **BRICKware for Windows**: Does the name of the configuration file consist of maximum eight characters and the extension of maximum three characters (when using **DIME Tools**)?
- Does the host support TFTP? (Did you start the TFTP server of **DIME Tools** before starting the operation?)
- Is the source file in the configured directory of the TFTP path of **DIME Tools** (when **Operation** = *get*)? To change the TFTP path, refer to **BRICKware for Windows**.

If no errors are found in the above points, proceed as follows to find the cause of the problem:

- Leave the Setup Tool.
- Type in the following in the SNMP shell: `debug config &`.
- Reopen the Setup Tool with `setup`.
- Carry out the desired operation in **CONFIGURATION MANAGEMENT**.

If an error occurs, an error message with the cause of the error appears in the help line of the Setup Tool.

- Leave **CONFIGURATION MANAGEMENT** with **EXIT**.

**Example** You have created the configuration file `my-configuration.cf`. You have not transferred the file over the serial interface of your router; `my-configuration.cf` is located on your PC. Your PC has the IP address **192.168.1.1**. Proceed as follows to transfer `my-configuration.cf` from your PC to your router:

- For a Windows PC: Click the Windows Start button then **Program** ➤ **BRICKware** ➤ **DIME Tools** to start **DIME Tools**. The TFTP server must be activated and refer to the directory in which `my-configuration.cf` is located.
- Activate a TFTP server under Unix: see the **Software Reference**.
- Go to **CONFIGURATION MANAGEMENT**.

**TFTP host --> flash** ➤ Select **Operation**: *get* (*TFTP --> FLASH*).

- Type in **TFTP Server IP Address**, e.g. **192.168.1.1**.
- Type in **TFTP File Name**: *my-configuration.cf*.



If an error should occur while running *get (TFTP --> FLASH)* and the operation is aborted, the file to be overwritten in the flash is deleted. So if you transfer a "boot" file, your router's boot file will be deleted and your router can no longer load a configuration on restarting. If necessary, rename the file to be transferred!

- Type in **Name in Flash**, e.g. **boot**.
- Select **START OPERATION** and press **Return**.

As long as the operation is being carried out, *OPERATING* appears in the help line of the Setup Tool and **State of last operation** displays *running*.

When the operation has been successfully executed, *get (TFTP --> FLASH)* is displayed under **Type of last operation**; **State of last operation** assumes the value *done*.

The configuration file *my-configuration.cf* is, for example, stored in your router's flash under the name "boot".

**Flash --> memory** Proceed as follows to make the settings in *my-configuration.cf* take immediate effect on your router:

- Reselect **Operation**: *load (FLASH --> MEMORY)*.
- Select **Name in Flash**, e.g. **boot**.
- Select **START OPERATION** and press **Return**.

As long as the operation is being carried out, *OPERATING* appears in the help line of the Setup Tool and **State of last operation** displays *running*.

When the operation has been successfully executed, *load (FLASH --> MEMORY)* is displayed under **Type of last operation**; **State of last operation** assumes the value *done*.

The configuration file "boot" has been loaded into your router's memory and the settings have been activated.

- Leave **CONFIGURATION MANAGEMENT** with **EXIT**.  
You have returned to the main menu.



There is another way to transfer configuration files using the XMODEM protocol over the serial interface. The procedure for this is explained in the **Software Reference**.

## 7.2 Resetting Your Router to the Ex Works State

You can reset your router to the "factory reset" (ex works) state with a special reset sequence (switching on and off). This state corresponds to a booted router in the ex works state. You can then dial in to the equipment from another location using ISDN Login (see [chapter 5.1.3, page 100](#)).

In the "factory reset" state, the default configuration is used and any existing boot configuration is ignored but not deleted.

Proceed as follows to reset your router to the "factory reset" state:

- **X1000, X1200, X2100 and X2300 Family** routers: If the router is in operation, switch it off and then on again.  
The router runs through the boot sequence (see [chapter 8.8, page 288](#)).
- **X3200**: If the router is in operation, press the reset button.  
The router runs through the boot sequence (see [chapter 8.8, page 288](#)).
- Observe the LEDs on the front of your router.  
After the router runs through the start mode, the yellow LEDs light at the same time (BOOTmonitor mode, as described in [chapter 8.1.2, page 238](#), [chapter 8.2.2, page 245](#), [chapter 8.3.2, page 251](#) and [chapter 8.4.2, page 258](#)).  
If the router is connected to your PC over the serial interface and **HyperTerminal** is started (see [chapter 5.1.1, page 97](#)), the message `Press <sp> for boot monitor or any other key to boot system` now appears on the screen.
- **X1000, X1200, X2100 and X2300 Family** routers: Switch off the router while the yellow LEDs light. You have four seconds to do this.
- **X3200**: Press the reset button again while the yellow LEDs light. You have 4 seconds to do this.
- **X1000, X1200, X2100 and X2300 Family** routers: Repeat the on/off operation twice.  
Your router has now been switched on and off three times altogether.

- **X1000, X1200, X2100 and X2300 Family** routers: Switch on your router for the fourth time.
- **X3200**: Press the reset button another two times (you have now pressed the reset button four times altogether).

If you do not interrupt the boot sequence this time, the router starts in the "factory reset" state.

This state is indicated by the yellow LEDs flashing three times.

To protect your router against unauthorized access in the "factory reset" state, you need the password of the previously active boot configuration for dialing in.

You can log in with ISDN Login and this password, e.g. for loading, modifying and saving the boot configuration.

As an option, you can enter `erase bootconfig` after the login prompt. This command deletes all the existing configurations and the router is rebooted.

If you switch the equipment off and on again or press the reset button, it starts with the saved boot configuration.

## 7.3 Updating Software

As BinTec Communications AG is constantly improving the software for all its products and you certainly want to use the latest features for your router, this chapter tells you how to update your software.

**www.bintec.net** If you want to update your software, load new system software (boot image) in your router. Every system software version includes new features, better performance and any necessary bugfixes from the previous version. You will find the most up-to-date system software available from BinTec Communications AG free on the World Wide Web at [www.bintec.net](http://www.bintec.net). Here you can also find current product-specific documentation (**User's Guides**, **Release Notes**) and general product documentation (**Software Reference**, **BRICKware for Windows**).



If you want to update your software, make sure you read the corresponding **Release Notes**. The release notes describe the changes provided by the new system software.

**update** There are various ways to update software. This chapter will show you how to update with the help of the update command in the SNMP shell, which is described step for step. The alternatives to this method can be found in the **Software Reference** and in [chapter 8.8, page 288](#).



### Caution!

An update of the module logic, BOOTmonitor and/or firmware logic is also recommended in isolated cases. If this should be the case with a new release, this is clearly noted in the corresponding **Release Notes**. The procedure and recommendations can then be found in the **Release Notes** for the "BOOTmonitor and Firmware Logic Update" at [www.bintec.net](http://www.bintec.net).

The result of incorrect updating operations (e.g. power cut during the update) could be that your router no longer boots!

➤ Update the module logic, BOOTmonitor or firmware logic only if BinTec Communications AG explicitly recommends such action!



**To do** To update the software (boot image), proceed as follows:



### Caution!

The result of interrupted updating operations could be that your router no longer boots!

- Do not turn your router off during the update!
- Before starting the update, deactivate auto logout by entering `tl 0` in the SNMP shell.
- Enter the ➤➤ **URL** `www.bintec.de` in your browser (e.g. Internet Explorer or Netscape Navigator).  
BinTec's home page opens. Here you will find the latest software and documentation for your router under the relevant heading.
- Save the current system software (boot image), e.g. **b6102.x3b** in the desired directory on your PC. You can use the same name.  
The system software is saved on your PC.
- Activate a TFTP server on your PC.  
For a Windows PC: Click the Windows Start menu and then **Program** ➤ **BRICKware** ➤ **DIME Tools** to start **DIME Tools** (for installation of **BRICKware**, see [chapter 3.6, page 49](#)). Activate the TFTP server.  
For a Unix computer: Follow the instructions in the **Software Reference**.
- Log in to your router if you have not already done so.
- Deactivate auto logout with `tl 0`.
- In the SNMP shell, type in `update <IP address> <file name>`.  
The `<IP address>` is the IP address of the TFTP server, e.g. the IP address of your Windows PC on which the TFTP server of **DIME Tools** is running and on which you have saved the new system software (e.g. **192.168.1.1**).  
`<File name>` is the name of the system software you have saved on your PC.  
The file `<file name>` is first transferred to your router's memory and checked.  
The following appears in the SNMP shell: `Perform update (y or n)?`

- Enter `y` and confirm with **Return**.

The software update is carried out. The new system software is loaded into the flash memory.



Your router requires a connected block of free working memory that is somewhat larger than the new system software. If insufficient memory is available on your router, the router offers an incremental update, in which the system software is loaded directly to the flash memory in "chunks" without checking. Proceed as follows:

If insufficient memory is available, a query will appear in the SNMP shell:  
Do you want to perform an incremental update (y or n)?

- First enter `n`.
- Enter `update -v <IP address> <file name>`.

The system software is checked, but not yet loaded.

If the system software check was successful:

- Type in `update <IP address> <file name>`.  
The following appears in the SNMP shell: `Perform update (y or n)?`
- Enter `y` and confirm with **Return**.

Your router performs an incremental update and the system software is loaded to the flash memory. This procedure takes longer than a normal update!



### Caution!

If the incremental update is interrupted, your router will no longer boot!

- Make sure the "incremental update" is not interrupted!

The following appears in the SNMP shell: `Reboot now (y or n)?`

- Enter `y` and confirm with **Return**.

Your router starts with the new system software. The existing configuration is transferred.

## 8 Technical Data

This chapter provides the technical data for the following routers:

- **X1000** technical data ([chapter 8.1, page 236](#))
- **X1200** technical data ([chapter 8.2, page 242](#))
- **X3200** technical data ([chapter 8.3, page 249](#))
- **X2300i** and **X2300** technical data ([chapter 8.4, page 256](#))
- **X2300is** technical data ([chapter 8.5, page 263](#))
- **X2100** technical data ([chapter 8.6, page 270](#))

The pin assignments of the interfaces are described in [chapter 8.7, page 277](#).

The boot sequence (BOOTmonitor) can be found at the end of this chapter ([chapter 8.8, page 288](#)).

## 8.1 X1000 Technical Data

This chapter describes the technical data for **X1000**:

- General product features ([chapter 8.1.1, page 236](#))
- LEDs ([chapter 8.1.2, page 238](#))
- Rear panel and connections ([chapter 8.1.3, page 241](#))

### 8.1.1 General Product Features of X1000

The general product features cover **X1000**'s performance features and the technical requirements for installation and operation:

Feature	Data
Product name:	<b>X1000</b>
Dimensions/weight (B x H x D):	
Dimensions without cables	141 mm x 50 mm x 145 mm
Space for installation/maintenance	150 mm x 60 mm x 210 mm
Weight	420 g
Transport weight (incl. documentation, cabling, packaging)	approx. 2 kg
Memory:	8 MB DRAM, 2 MB flash ROM
LEDs:	5 (1 power, 3 function, 1 error)
Power consumption of equipment:	3 W (typical)
Voltage supply:	AC/DC adapter Input: 230 V~50 Hz / 70 mA Output: 5 V/800 mA 4 VA

Feature	Data
Ambient requirements: Storage temperature Ambient temperature Relative humidity Room classification	-20° to +85°C 0 to 50 °C 20 to 90 % non-condensing in operation 5 to 95 % non-condensing in storage Operate only in dry rooms
MTBF:	100 000 hours
Available interfaces: Serial interface V.24 Ethernet IEEE 802.3 LAN ISDN WAN S <sub>0</sub>	Built-in, supports the following baud rates: 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 bauds Built-in (twisted-pair only), 10/100 Mbps, auto sensing Built-in
Plugs used: Serial interface Ethernet interface ISDN interface	8-pole mini DIN RJ45 RJ45
Application interface:	Dual Remote CAPI (v1.1 and 2.0), R-CAPI driver for Windows 95/98/2000/NT/ME/XP and Novell Netware. Source code library for other systems (e.g. Unix, AS400).
Data compression:	PPP LZS STAC compression rate up to 4:1.
SAFERNET™ security technology:	Community passwords, PAP, CHAP, MS-CHAP, Callback, Access Control Lists, Allow Lists, CLID, NAT, MPPE Encryption.

Feature	Data
Licenses:	Licenses included as standard for CAPI, IP, STAC, Bridge and X.25. Licenses obtainable for VPN, IPSec and leased lines.
Software included:	RVS-COM Lite (communications application) <b>BRICKware for Windows</b> <b>BRICKtools for Unix</b>
Printed documentation included:	<b>Basic Configuration</b> (User's Guide for BinTec Compact Routers)
Documentation in PDF format:	<b>BRICKware for Windows</b> (Engl.) <b>Software Reference</b> (Engl.) <b>User's Guide X4100/200/300</b>

Table 8-1: General product features of **X1000**

## 8.1.2 LEDs on X1000

There are five LEDs on the front panel for indicating the current status of **X1000**:

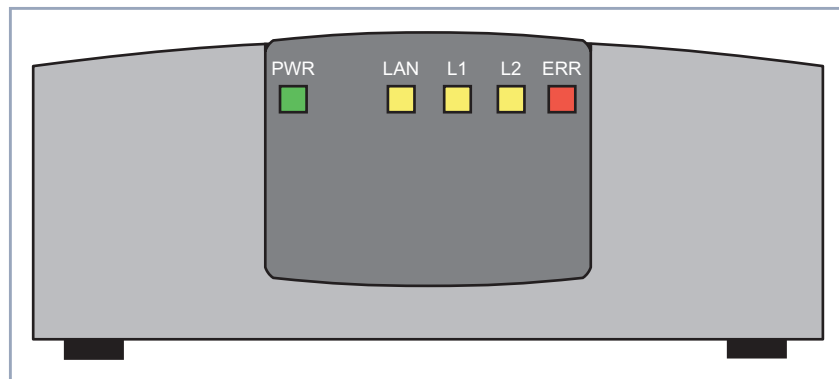


Figure 8-1: **X1000**: front panel

Each LED can convey different information according to which mode **X1000** is in. All LEDs light for half a second after the equipment is switched on to show that they are working.

When **X1000** starts up, it changes between different functional states:

- Start Mode
- BOOTmonitor Mode (see [chapter 8.8, page 288](#))
- Normal Mode

The meaning of the LEDs in their different states is described in the following tables.

**Start Mode** Meaning of LEDs in Start Mode:

LED	State	Meaning
PWR	On	Power supply connected.
LAN	On	LAN (100BT) test is in progress.
L1	On	ISDN test is in progress.
L2	On	Memory test is in progress.
ERR	On	An error has occurred during a test.

Table 8-2: **X1000**: LEDs in Start Mode

The corresponding function LED lights as long as a test is in progress and goes out when the test is completed. If an error occurs during the test, the Error LED lights together with the corresponding function LED.

**BOOTmonitor Mode** Meaning of LEDs in BOOTmonitor Mode:

LED	State	Meaning
PWR	On	Power supply connected.
LAN, L1, L2	On	Ready for resetting to ex works state.
LAN, L1, L2	Blinking (three times)	Resetting <b>X1000</b> to the ex works state was successful.

LED	State	Meaning
LAN	On	Data packet passing through the LAN interface.
L1, L2	On	BOOTmonitor is active (or waiting for a keyboard entry).
L1, L2	Blinking	BOOTmonitor is compressing system software.
ERR	On	An error was detected during the last action executed.

Table 8-3: **X1000**: LEDs in BOOTmonitor Mode**Normal Mode** Meaning of LEDs in Normal Mode:

LED	State	Meaning
PWR	On	Power supply connected.
LAN	On	Data packet passing through the LAN interface.
L1	Blinking	ISDN B1-channel: connection is being set up.
L1	On	ISDN B1-channel: connection is active. (1)
L2	Blinking	ISDN B2-channel: connection is being set up.
L2	On	ISDN B2-channel: connection is active. (1)
ERR	On (intermittently)	LAN error or collision has occurred.
ERR	On (permanently)	System stopped, restart is necessary.

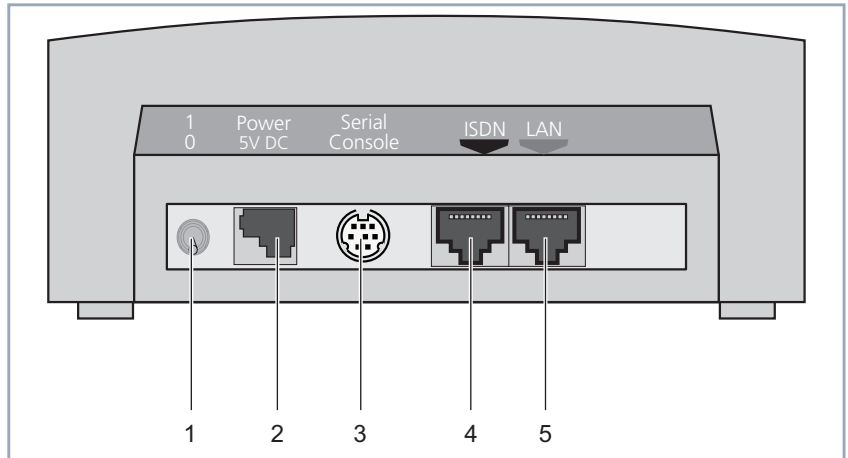
Table 8-4: **X1000**: LEDs in Normal Mode

(1) Charges are incurred.



### 8.1.3 Connections for X1000

Here is a diagram of the rear of **X1000**:



1	On/off switch	4	ISDN S <sub>0</sub> port
2	Power supply connection	5	LAN interface (10/100Base-T Ethernet), marked red on the equipment
3	Serial interface		

Figure 8-2: **X1000**: rear panel

## 8.2 X1200 Technical Data

This chapter describes the technical data for **X1200**:

- General product features ([chapter 8.2.1, page 242](#))
- LEDs ([chapter 8.2.2, page 245](#))
- Rear panel and connections ([chapter 8.2.3, page 248](#))

### 8.2.1 General Product Features of X1200

The general product features cover **X1200**'s performance features and the technical requirements for installation and operation:

Feature	Data
Product name:	<b>X1200</b>
Dimensions/weight (B x H x D):	
Dimensions without cables	141 mm x 50 mm x 145 mm
Space for installation/maintenance	150 mm x 60 mm x 210 mm
Weight	420 g
Transport weight (incl. documentation, cabling, packaging)	approx. 2 kg
Memory:	8 MB DRAM, 2 MB flash ROM
LEDs:	6 (1 power, 4 function, 1 error)
Power consumption of equipment:	3 W (typical)
Voltage supply:	AC/DC adapter Input: 230 V~50 Hz / 70 mA Output: 5 V/800 mA 4 VA

Feature	Data
Ambient requirements: Storage temperature Ambient temperature Relative humidity Room classification	-20° to +85°C 0 to 50 °C 20 to 90 % non-condensing in operation 5 to 95 % non-condensing in storage Operate only in dry rooms
MTBF:	100 000 hours
Available interfaces: Serial interface V.24 Ethernet IEEE 802.3 LAN ISDN WAN S <sub>0</sub> Ethernet IEEE 802.3 LAN	Built-in, supports the following baud rates: 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 bauds Built-in (twisted-pair only), 10/100 Mbps, auto sensing Built-in Built-in (twisted-pair only), 10 Mbps
Plugs used: Serial interface Ethernet interfaces ISDN interface	8-pole mini DIN RJ45 RJ45
Application interface:	Dual Remote CAPI (v1.1 and 2.0), R-CAPI driver for Windows 95/98/2000/NT/ME/XP and Novell Netware. Source code library for other systems (e.g. Unix, AS400).
Data compression:	PPP LZS STAC compression rate up to 4:1.

Feature	Data
SAFERNET™ security technology:	Community passwords, PAP, CHAP, MS-CHAP, Callback, Access Control Lists, Allow Lists, CLID, NAT, MPPE Encryption.
Licenses:	Licenses included as standard for CAPI, IP, STAC, Bridge and X.25. Licenses obtainable for VPN, IPSec and leased lines.
Software included:	RVS-COM Lite (communications application) <b>BRICKware for Windows</b> <b>BRICKtools for Unix</b>
Printed documentation included:	<b>Basic Configuration</b> (User's Guide for BinTec Compact Routers)
Documentation in PDF format:	<b>BRICKware for Windows</b> (Engl.) <b>Software Reference</b> (Engl.) <b>User's Guide X4100/200/300</b>

Table 8-5: General product features of **X1200**

## 8.2.2 LEDs on X1200

There are six LEDs on the front panel for indicating the current status of **X1200**:

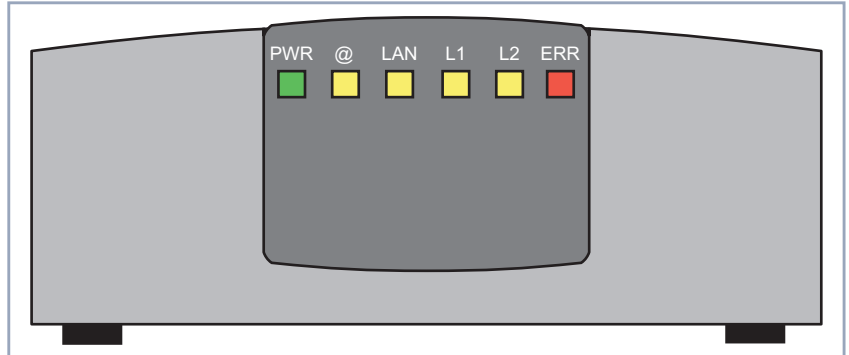


Figure 8-3: **X1200**: front panel

Each LED can convey different information according to which mode **X1200** is in. All LEDs light for half a second after the equipment is switched on to show that they are working.

When **X1200** starts up, it changes between different functional states:

- Start Mode
- BOOTmonitor Mode (see [chapter 8.8, page 288](#))
- Normal Mode

The meaning of the LEDs in their different states is described in the following tables.

**Start Mode** Meaning of LEDs in Start Mode:

LED	State	Meaning
PWR	On	Power supply connected.
@	On	LAN (10BT) test is in progress.
LAN	On	LAN (100BT) test is in progress.
L1	On	ISDN test is in progress.

LED	State	Meaning
L2	On	Memory test is in progress.
ERR	On	An error has occurred during a test.

Table 8-6: **X1200**: LEDs in Start Mode

The corresponding function LED lights as long as a test is in progress and goes out when the test is completed. If an error occurs during the test, the Error LED lights together with the corresponding function LED.

#### **BOOTmonitor Mode** Meaning of LEDs in BOOTmonitor Mode:

LED	State	Meaning
PWR	On	Power supply connected.
@, LAN, L1, L2	On	Ready for resetting to ex works state.
@, LAN, L1, L2	Blinking (three times)	Resetting <b>X1200</b> to the ex works state was successful.
LAN	On	Data packet passing through the LAN interface.
L1, L2	On	BOOTmonitor is active (or waiting for a keyboard entry).
L1, L2	Blinking	BOOTmonitor is compressing system software.
ERR	On	An error was detected during the last action executed.

Table 8-7: **X1200**: LEDs in BOOTmonitor Mode

#### **Normal Mode** Meaning of LEDs in Normal Mode:

LED	State	Meaning
PWR	On	Power supply connected.

LED	State	Meaning
@	On	Data packet passing through the LAN interface.
@	Blinking	Connection is being set up (ADSL). (2)
@	On	Connection is active (ADSL). (1) (2)
LAN	On	Data packet passing through the LAN interface.
L1	Blinking	ISDN B1-channel: connection is being set up.
L1	On	ISDN B1-channel: connection is active. (1)
L2	Blinking	ISDN B2-channel: connection is being set up.
L2	On	ISDN B2-channel: connection is active. (1)
ERR	On (intermittently)	LAN error or collision has occurred.
ERR	On (permanently)	System stopped, restart is necessary.

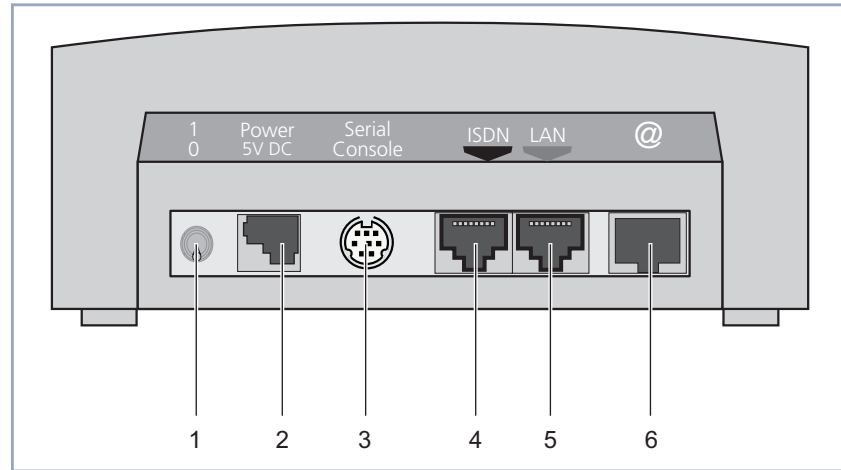
Table 8-8: **X1200**: LEDs in Normal Mode

(1) Charges are incurred.

(2) Applies only if interface is configured for PPPoE.

### 8.2.3 Connections for X1200

Here is a diagram of the rear of **X1200**:



1	On/off switch	4	ISDN S <sub>0</sub> port
2	Power supply connection	5	LAN interface (10/100Base-T Ethernet), marked red on the equipment
3	Serial interface	6	High-speed Internet interface (10Base-T Ethernet), marked @ on the equipment

Figure 8-4: **X1200**: rear panel



## 8.3 X3200 Technical Data

This chapter describes the technical data for **X3200**:

- General product features ([chapter 8.3.1, page 249](#))
- Sectional view of front panel and LEDs ([chapter 8.3.2, page 251](#))
- Sectional view of front panel and connections ([chapter 8.3.3, page 255](#))

### 8.3.1 General Product Features of X3200

The general product features cover **X3200**'s performance features and the technical requirements for installation and operation:

Feature	Data
Product name:	<b>X3200</b>
Dimensions/weight (B x H x D):	
Dimensions without cables	440 mm x 42 mm x 273 mm
Weight	2,915 g
Transport weight (incl. documentation, cabling, packaging)	approx. 6 kg
Memory:	8 MB DRAM, 2 MB flash ROM
LEDs:	6 (1 power, 4 function, 1 error)
Power consumption of equipment:	8 W (at 230 V)
Voltage supply:	Internal wide-range mains unit, 100 to 240 V AC, 50/60 Hz, 800 mA

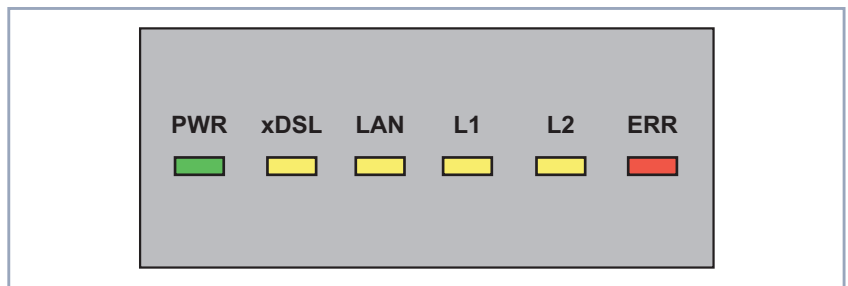
Feature	Data
Ambient requirements: Storage temperature Ambient temperature Relative humidity  Room classification	-20° to +85°C 0 to 50 °C 20 to 90 % non-condensing in operation 5 to 95 % non-condensing in storage Operate only in dry rooms
MTBF:	100 000 hours
Available interfaces: Serial interface V.24  Ethernet IEEE 802.3 LAN  ISDN WAN S <sub>0</sub> Ethernet IEEE 802.3 LAN	Built-in, supports the following baud rates: 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 bauds  Built-in (twisted-pair only), 10/100 Mbps, auto sensing  Built-in  Built-in (twisted-pair only), 10 Mbps
Plugs used: Serial interface Ethernet interfaces ISDN interface	8-pole mini DIN RJ45 RJ45
Application interface:	Dual Remote CAPI (v1.1 and 2.0), R-CAPI driver for Windows 95/98/2000/NT/ME/XP and Novell Netware. Source code library for other systems (e.g. Unix, AS400).
Data compression:	PPP LZS STAC compression rate up to 4:1.

Feature	Data
SAFERNET™ security technology:	Community passwords, PAP, CHAP, MS-CHAP, Callback, Access Control Lists, Allow Lists, CLID, NAT, MPPE Encryption.
Licenses:	Licenses included as standard for CAPI, IP, STAC, Bridge, X.25 and leased lines.  Licences obtainable for VPN and IPSec.
Software included:	RVS-COM Lite (communications application) <b>BRICKware for Windows</b> <b>BRICKtools for Unix</b>
Printed documentation included:	<b>Basic Configuration</b> (User's Guide for BinTec Compact Routers)
Documentation in PDF format:	<b>BRICKware for Windows</b> (Engl.) <b>Software Reference</b> (Engl.) <b>User's Guide X4100/200/300</b>

Table 8-9: General product features of **X3200**

### 8.3.2 LEDs on X3200

There are six LEDs on the front panel for indicating the current status of **X3200**:

Figure 8-5: **X3200**: LEDs (sectional view)

Each LED can convey different information according to which mode **X3200** is in. All LEDs light for half a second after the equipment is switched on to show that they are working.

When **X3200** starts up, it changes between different functional states:

- Start Mode
- BOOTmonitor Mode (see [chapter 8.8, page 288](#))
- Normal Mode

The meaning of the LEDs in their different states is described in the following tables.

#### **Start Mode** Meaning of LEDs in Start Mode:

LED	State	Meaning
PWR	On	Power supply connected.
xDSL	On	LAN (10BT) test is in progress.
LAN	On	LAN (100BT) test is in progress.
L1	On	ISDN test is in progress.
L2	On	Memory test is in progress.
ERR	On	An error has occurred during a test.

Table 8-10: **X3200**: LEDs in Start Mode

The corresponding function LED lights as long as a test is in progress and goes out when the test is completed. If an error occurs during the test, the Error LED lights together with the corresponding function LED.

#### **BOOTmonitor Mode** Meaning of LEDs in BOOTmonitor Mode:

LED	State	Meaning
PWR	On	Power supply connected.
xDSL, LAN, L1, L2	On	Ready for resetting to ex works state.

LED	State	Meaning
xDSL, LAN, L1, L2	Blinking (three times)	Resetting <b>X3200</b> to the ex works state was successful.
LAN	On	Data packet passing through the LAN interface.
L1, L2	On	BOOTmonitor is active (or waiting for a keyboard entry).
L1, L2	Blinking	BOOTmonitor is compressing system software.
ERR	On	An error was detected during the last action executed.

Table 8-11: **X3200**: LEDs in BOOTmonitor Mode**Normal Mode** Meaning of LEDs in Normal Mode:

LED	State	Meaning
PWR	On	Power supply connected.
xDSL	On	Data packet passing through the LAN interface.
xDSL	Blinking	Connection is being set up (ADSL). (2)
xDSL	On	Connection is active (ADSL). (1) (2)
LAN	On	Data packet passing through the LAN interface.
L1	Blinking	ISDN B1-channel: connection is being set up.
L1	On	ISDN B1-channel: connection is active. (1)
L2	Blinking	ISDN B2-channel: connection is being set up.
L2	On	ISDN B2-channel: connection is active. (1)

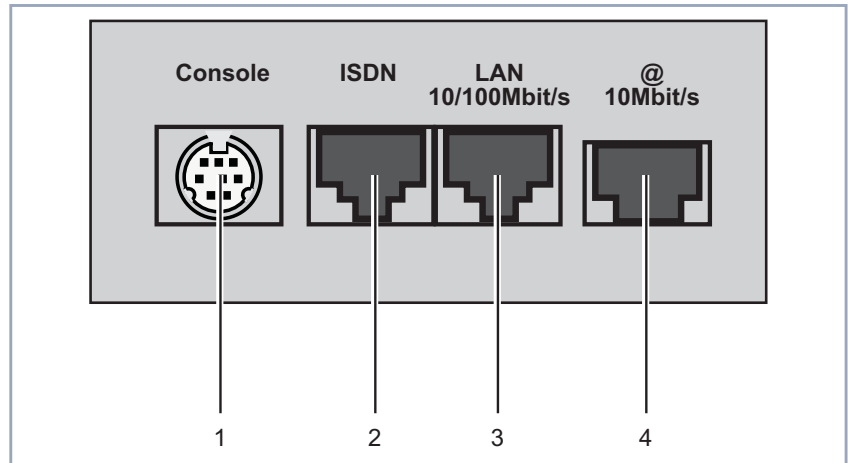
LED	State	Meaning
ERR	On (intermit- tently)	LAN error or collision has occurred.
ERR	On (perma- nently)	System stopped, restart is necessary.

Table 8-12: **X3200**: LEDs in Normal Mode

- (1) Charges are incurred.
- (2) Applies only if interface is configured for PPPoE.

### 8.3.3 Connections for X3200

The figure below shows a sectional view of the front panel and connections of X3200:



1	Serial interface	3	LAN interface (10/100Base-T Ethernet)
2	ISDN S <sub>0</sub> port	4	High-speed Internet interface (10Base-T Ethernet)

Figure 8-6: X3200: connections (sectional view)

## 8.4 X2300i and X2300 Technical Data

This chapter describes the technical data for **X2300i** and **X2300**:

- General product features ([chapter 8.4.1, page 256](#))
- Front panel and LEDs ([chapter 8.4.2, page 258](#))
- Rear panel and connections ([chapter 8.4.3, page 262](#))

### 8.4.1 General Product Features of X2300i and X2300

The general product features cover the performance features of **X2300i** and **X2300** and the technical requirements for installation and operation:

Feature	Data
Product name:	<b>X2300i</b> and <b>X2300</b>
Dimensions/weight (B x H x D):	
Dimensions without cables	268 mm x 30 mm x 155 mm
Weight	1200 g
Transport weight (incl. documentation, cabling, packaging)	approx. 3200 g
Memory:	16 MB DRAM, 4 MB flash ROM
LEDs:	8 (1 power, 6 function, 1 error)
Power consumption of equipment:	8 W
Voltage supply:	External mains unit (AC/DC adapter) Input: 100-240 V, 50/60 Hz, Output: 12 V/833 mA, 10 VA



Feature	Data
Ambient requirements: Storage temperature Ambient temperature Relative humidity Room classification	-20° to +85°C 0 to 50 °C 20 to 90 % non-condensing in operation 5 to 95 % non-condensing in storage Operate only in dry rooms
MTBF:	100 000 hours
Available interfaces: Serial interface V.24 Ethernet IEEE 802.3 LAN ISDN WAN S <sub>0</sub> ADSL	Built-in, supports the following baud rates: 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 bauds Built-in (twisted-pair only), 10/100 Mbps, auto sensing Built-in Built-in
Plugs used: ADSL interface Serial interface ISDN interface Ethernet interface	RJ45 8-pole mini DIN RJ45 RJ45
Application interface:	Dual Remote CAPI (v1.1 and 2.0), R-CAPI driver for Windows 95/98/2000/NT/ME/XP and Novell Netware. Source code library for other systems (e.g. Unix, AS400).
Data compression:	PPP LZS STAC compression rate up to 4:1.

Feature	Data
SAFERNET™ security technology:	Community passwords, PAP, CHAP, MS-CHAP, Callback, Access Control Lists, Allow Lists, CLID, NAT, MPP Encryption.
Licenses:	Licenses included as standard for CAPI, IP, STAC, Bridge and X.25. Licenses obtainable for VPN, IPsec, Frame Relay and leased lines.
Software included:	RVS-COM Lite (communications application) <b>BRICKware for Windows</b> <b>BRICKtools for Unix</b>
Printed documentation included:	<b>Basic Configuration</b> (User's Guide for BinTec Compact Routers)
Documentation in PDF format:	<b>BRICKware for Windows</b> (Engl.) <b>Software Reference</b> (Engl.) <b>User's Guide X4100/200/300</b>

Table 8-13: General product features of **X2300i** and **X2300**

## 8.4.2 LEDs on X2300i and X2300

There are eight LEDs on the front panel for indicating the current status of **X2300i** and **X2300**:

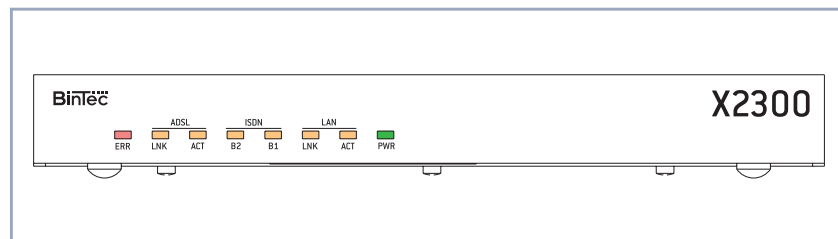


Figure 8-7: **X2300i** and **X2300**: front panel (**X2300** as example)

Each LED can convey different information according to which mode **X2300i** or **X2300** is in. All LEDs light for half a second after the equipment is switched on to show that they are working. When **X2300i** or **X2300** starts up, it changes between different functional states:

- Start Mode
- BOOTmonitor Mode (see [chapter 8.8, page 288](#))
- Normal Mode

The meaning of the LEDs in their different states is described in the following tables.

**Start Mode** Meaning of LEDs in Start Mode:

LED	State	Meaning
PWR	On	Power supply connected.
ADSL: LNK	Off	–
ADSL: ACT	Off	–
ISDN: B1	On	ISDN test is in progress.
ISDN: B2	On	Memory test is in progress.
LAN: LNK	On	LAN (100BT) test is in progress.
LAN: ACT	Off	–
ERR	On	An error has occurred during a test.

Table 8-14: **X2300i** and **X2300**: LEDs in Start Mode

The corresponding function LED lights as long as a test is in progress and goes out when the test is completed. If an error occurs during the test, the Error LED lights together with the corresponding function LED.

**BOOTmonitor Mode** Meaning of LEDs in BOOTmonitor Mode:

LED	State	Meaning
PWR	On	Power supply connected.

LED	State	Meaning
ADSL: LNK	Off	–
ADSL: ACT	Off	–
ISDN: B1	On	BOOTmonitor is active (or waiting for a keyboard entry).
ISDN: B2	On	BOOTmonitor is active (or waiting for a keyboard entry).
B1, B2	Blinking	BOOTmonitor is compressing system software.
ADSL: LNK, ADSL: ACT, LAN: ACT, LAN: LNK, B1, B2	On	Ready for resetting to ex works state.
ADSL: LNK, ADSL: ACT, LAN: ACT, LAN: LNK, B1, B2	Blinking (three times)	Resetting <b>X2300i</b> and <b>X2300</b> to the ex works state was successful.
LAN LNK	On	Level 1 connection is set up.
LAN ACT	On	Data packet passing through the LAN interface.
ERR	On	An error was detected during the last action executed.

Table 8-15: **X2300i** and **X2300**: LEDs in BOOTmonitor Mode**Normal Mode** Meaning of LEDs in Normal Mode:

LED	State	Meaning
PWR	On	Power supply connected.
ADSL: LNK	On	Connection is set up (ADSL).

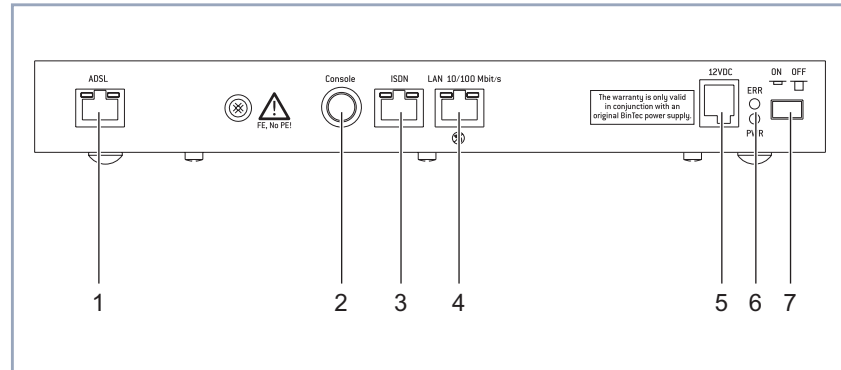
LED	State	Meaning
ADSL: ACT	On	Connection is active. (1)
ISDN: B1	On	ISDN B1-channel: connection is active. (1)
ISDN: B1	Blinking	ISDN B1-channel: connection is being set up.
ISDN: B2	On	ISDN B2-channel: connection is active. (1)
ISDN: B2	Blinking	ISDN B2-channel: connection is being set up.
LAN: LNK	On	Level 1 connection is set up.
LAN: ACT	On	Data packet passing through the LAN interface.
ERR	On (intermittently)	LAN error or collision has occurred.
ERR	On (permanently)	System stopped, restart is necessary.

Table 8-16: **X2300i** and **X2300**: LEDs in Normal Mode

(1) Charges are incurred.

### 8.4.3 Connections for X2300i and X2300

Here is a diagram of the rear of **X2300i** and **X2300**:



1	High-speed Internet/ADSL interface (RJ-45)	5	Power supply connection
2	Serial interface	6	LEDs, meaning as in <a href="#">chapter 8.4.2, page 258</a>
3	ISDN S <sub>0</sub> port	7	On/off switch
4	LAN interface (10/100Base-T Ethernet)		

Figure 8-8: **X2300i** and **X2300**: rear panel

## 8.5 X2300is Technical Data

This chapter describes the technical data for **X2300is**:

- General product features ([chapter 8.5.1, page 263](#))
- Front panel and LEDs ([chapter 8.5.2, page 265](#))
- Rear panel and connections ([chapter 8.5.3, page 269](#))

### 8.5.1 General Product Features of X2300is

The general product features cover **X2300i**'s performance features and the technical requirements for installation and operation:

Feature	Data
Product name:	<b>X2300is</b>
Dimensions/weight (B x H x D):	
Dimensions without cables	268 mm x 30 mm x 155 mm
Weight	1200 g
Transport weight (incl. documentation, cabling, packaging)	approx. 3200 g
Memory:	16 MB DRAM, 4 MB flash ROM
LEDs:	8 (1 power, 6 function, 1 error)
Power consumption of equipment:	8 W
Voltage supply:	External mains unit (AC/DC adapter) Input: 100-240 V, 50/60 Hz, Output: 12 V/833 mA, 10 VA

Feature	Data
Ambient requirements: Storage temperature Ambient temperature Relative humidity  Room classification	-20° to +85°C 0 to 50 °C 20 to 90 % non-condensing in operation 5 to 95 % non-condensing in storage Operate only in dry rooms
MTBF:	100 000 hours
Available interfaces: Serial interface V.24  4 x Ethernet IEEE 802.3 LAN  ISDN WAN S <sub>0</sub> ADSL	Built-in, supports the following baud rates: 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 bauds  Built-in (twisted-pair only), 10/100 Mbps, auto sensing; automatic MDI/MDIX crossover.  Built-in Built-in
Plugs used: ADSL interface Serial interface ISDN interface Ethernet interfaces	RJ45 8-pole mini DIN RJ45 RJ45
Application interface:	Dual Remote CAPI (v1.1 and 2.0), R-CAPI driver for Windows 95/98/2000/NT/ME/XP and Novell Netware. Source code library for other systems (e.g. Unix, AS400).
Data compression:	PPP LZS STAC compression rate up to 4:1.

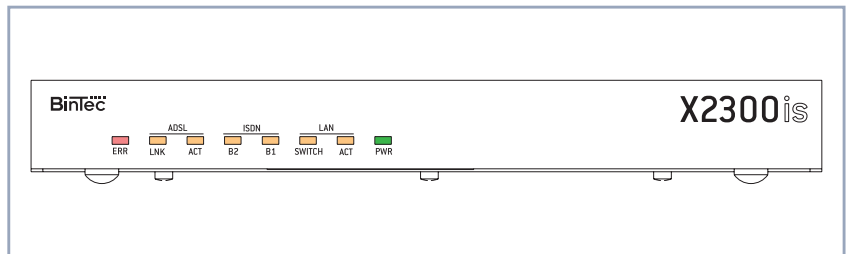


Feature	Data
SAFERNET™ security technology:	Community passwords, PAP, CHAP, MS-CHAP, Callback, Access Control Lists, Allow Lists, CLID, NAT, MPP Encryption.
Licenses:	Licenses included as standard for CAPI, IP, STAC, Bridge and X.25. Licenses obtainable for VPN, IPSec, Frame Relay and leased lines.
Software included:	RVS-COM Lite (communications application) <b>BRICKware for Windows</b> <b>BRICKtools for Unix</b>
Printed documentation included:	<b>Basic Configuration</b> (User's Guide for BinTec Compact Routers)
Documentation in PDF format:	<b>BRICKware for Windows</b> (Engl.) <b>Software Reference</b> (Engl.) <b>User's Guide X4100/200/300</b>

Table 8-17: General product features of **X2300is**

## 8.5.2 LEDs on X2300is

There are eight LEDs on the front panel for indicating the current status of **X2300is**:

Figure 8-9: **X2300is**: front panel

Each LED can convey different information according to which mode **X2300is** is in. All LEDs light for half a second after the equipment is switched on to show that they are working. When **X2300is** starts up, it changes between different functional states:

- Start Mode
- BOOTmonitor Mode (see [chapter 8.8, page 288](#))
- Normal Mode

The meaning of the LEDs in their different states is described in the following tables.

**Start Mode** Meaning of LEDs in Start Mode:

LED	State	Meaning
PWR	On	Power supply connected.
ADSL: LNK	Off	–
ADSL: ACT	Off	–
ISDN: B1	On	ISDN test is in progress.
ISDN: B2	On	Memory test is in progress.
LAN: SWITCH	On	LAN (100BT) test is in progress.
LAN: ACT	Off	–
ERR	On	An error has occurred during a test.

Table 8-18: **X2300is**: LEDs in Start Mode

The corresponding function LED lights as long as a test is in progress and goes out when the test is completed. If an error occurs during the test, the Error LED lights together with the corresponding function LED.

**BOOTmonitor Mode** Meaning of LEDs in BOOTmonitor Mode:

LED	State	Meaning
PWR	On	Power supply connected.

LED	State	Meaning
ADSL: LNK	Off	–
ADSL: ACT	Off	–
ISDN: B1	On	BOOTmonitor is active (or waiting for a keyboard entry).
ISDN: B2	On	BOOTmonitor is active (or waiting for a keyboard entry).
B1, B2	Blinking	BOOTmonitor is compressing system software.
ADSL: LNK, ADSL: ACT, LAN: SWITCH, LAN: ACT, B1, B2	On	Ready for resetting to ex works state.
ADSL: LNK, ADSL: ACT, LAN: SWITCH, LAN: ACT, B1, B2	Blinking (three times)	Resetting <b>X2300is</b> to the ex works state was successful.
LAN: SWITCH	On	Level 1 connection is set up.
LAN: ACT	On	Data packet passing through the LAN interface.
ERR	On	An error was detected during the last action executed.

Table 8-19: **X2300is**: LEDs in BOOTmonitor Mode**Normal Mode** Meaning of LEDs in Normal Mode:

LED	State	Meaning
PWR	On	Power supply connected.
ADSL: LNK	On	Connection is set up (ADSL).

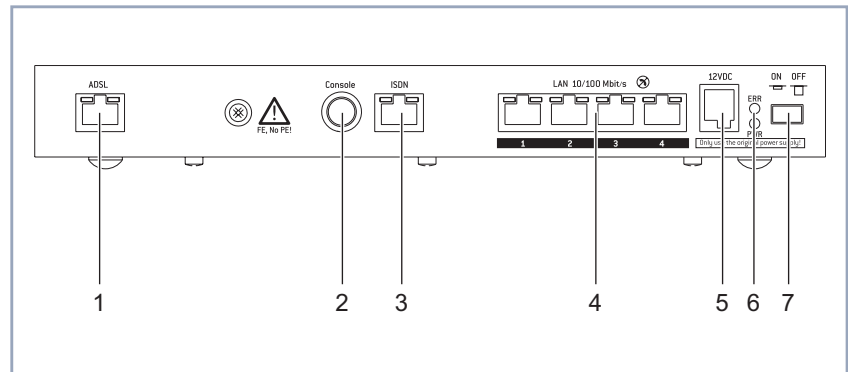
LED	State	Meaning
ADSL: ACT	On	Connection is active. (1)
ISDN: B1	On	ISDN B1-channel: connection is active. (1)
ISDN: B1	Blinking	ISDN B1-channel: connection is being set up.
ISDN: B2	On	ISDN B2-channel: connection is active. (1)
ISDN: B2	Blinking	ISDN B2-channel: connection is being set up.
LAN: SWITCH	On	Switch is active.
LAN: ACT	On	Data packet passing through the LAN interface.
ERR	On (intermittently)	LAN error or collision has occurred.
ERR	On (permanently)	System stopped, restart is necessary.

Table 8-20: **X2300is**: LEDs in Normal Mode

(1) Charges are incurred.

### 8.5.3 Connections for X2300is

Here is a diagram of the rear of **X2300is**:



1	High-speed Internet/ADSL interface (RJ-45)	5	Power supply connection
2	Serial interface	6	LEDs, meaning as in <a href="#">chapter 8.5.2, page 265</a>
3	ISDN S <sub>0</sub> port	7	On/off switch
4	LAN interfaces (10/100Base-T Ethernet, auto sensing; auto MDIX)		

Figure 8-10: **X2300is**: rear panel

## 8.6 X2100 Technical Data

This chapter describes the technical data for **X2100**:

- General product features ([chapter 8.6.1, page 270](#))
- Front panel and LEDs ([chapter 8.6.2, page 272](#))
- Rear panel and connections ([chapter 8.6.3, page 276](#))

### 8.6.1 General Product Features of X2100

The general product features cover **X2100**'s performance features and the technical requirements for installation and operation:

Feature	Data
Product name:	<b>X2100</b>
Dimensions/weight (B x H x D): Dimensions without cables Weight Transport weight (incl. documentation, cabling, packaging)	268 mm x 30 mm x 155 mm 1200 g approx. 3200 g
Memory:	16 MB DRAM, 4 MB flash ROM
LEDs:	8 (1 power, 6 function, 1 error)
Power consumption of equipment:	8 W
Voltage supply:	External mains unit (AC/DC adapter) Input: 100-240 V, 50/60 Hz, Output: 12 V/833 mA, 10 VA

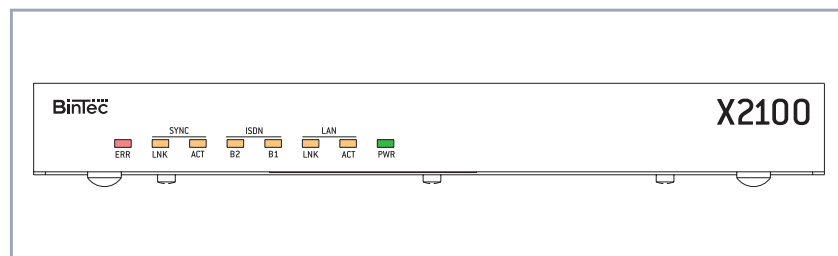
Feature	Data
Ambient requirements: Storage temperature Ambient temperature Relative humidity Room classification	-20° to +85°C 0 to 50 °C 20 to 90 % non-condensing in operation 5 to 95 % non-condensing in storage Operate only in dry rooms
MTBF:	100 000 hours
Available interfaces: Serial interface V.24 Ethernet IEEE 802.3 LAN ISDN WAN S <sub>0</sub> Serial WAN interface X.21/V.35	Built-in, supports the following baud rates: 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 bauds Built-in (twisted-pair only), 10/100 Mbps, auto sensing Built-in Built-in
Plugs used: Serial interface ISDN interface Ethernet interface Serial WAN interface X.21/V.35	8-pole mini DIN RJ45 RJ45 26-pole mini Delta ribbon (for DB-15 or M34)
Application interface:	Dual Remote CAPI (v1.1 and 2.0), R-CAPI driver for Windows 95/98/2000/NT/ME/XP and Novell Netware. Source code library for other systems (e.g. Unix, AS400).
Data compression:	PPP LZS STAC compression rate up to 4:1.

Feature	Data
SAFERNET™ security technology:	Community passwords, PAP, CHAP, MS-CHAP, Callback, Access Control Lists, Allow Lists, CLID, NAT, MPP Encryption.
Licenses:	Licenses included as standard for CAPI, IP, STAC, Bridge, X.25 and Frame Relay.  Licenses obtainable for VPN, IPsec and leased lines.
Software included:	RVS-COM Lite (communications application) <b>BRICKware for Windows</b> <b>BRICKtools for Unix</b>
Printed documentation included:	<b>Basic Configuration</b> (User's Guide for BinTec Compact Routers)
Documentation in PDF format:	<b>BRICKware for Windows</b> (Engl.) <b>Software Reference</b> (Engl.) <b>User's Guide X4100/200/300</b>

Table 8-21: General product features of **X2100**

## 8.6.2 LEDs on X2100

There are eight LEDs on the front panel for indicating the current status of **X2100**:

Figure 8-11: **X2100**: front panel



Each LED can convey different information according to which mode **X1200** is in. All LEDs light for half a second after the equipment is switched on to show that they are working. When **X2100** starts up, it changes between different functional states:

- Start Mode
- BOOTmonitor Mode (see [chapter 8.8, page 288](#))
- Normal Mode

The meaning of the LEDs in their different states is described in the following tables.

**Start Mode** Meaning of LEDs in Start Mode:

LED	State	Meaning
PWR	On	Power supply connected.
SYNC: LNK	Off	–
SYNC: ACT	Off	–
ISDN: B1	On	ISDN test is in progress.
ISDN: B2	On	Memory test is in progress.
LAN: LNK	On	LAN (100BT) test is in progress.
LAN: ACT	Off	–
ERR	On	An error has occurred during a test.

Table 8-22: **X2100**: LEDs in Start Mode

The corresponding function LED lights as long as a test is in progress and goes out when the test is completed. If an error occurs during the test, the Error LED lights together with the corresponding function LED.

**BOOTmonitor Mode** Meaning of LEDs in BOOTmonitor Mode:

LED	State	Meaning
PWR	On	Power supply connected.

LED	State	Meaning
SYNC: LNK	Off	–
SYNC: ACT	Off	–
ISDN: B1	On	BOOTmonitor is active (or waiting for a keyboard entry).
ISDN: B2	On	BOOTmonitor is active (or waiting for a keyboard entry).
B1, B2	Blinking	BOOTmonitor is compressing system software.
SYNC: LNK, SYNC: ACT, LAN: ACT, LAN: LNK, B1, B2	On	Ready for resetting to ex works state.
SYNC: LNK, SYNC: ACT, LAN: ACT, LAN: LNK, B1, B2	Blinking (three times)	Resetting <b>X2100</b> to the ex works state was successful.
LAN LNK	On	Level 1 connection is set up.
LAN ACT	On	Data packet passing through the LAN interface.
ERR	On	An error was detected during the last action executed.

Table 8-23: **X2100**: LEDs in BOOTmonitor Mode**Normal Mode** Meaning of LEDs in Normal Mode:

LED	State	Meaning
PWR	On	Power supply connected.
SYNC: LNK	On	Connection is set up (SYNC).

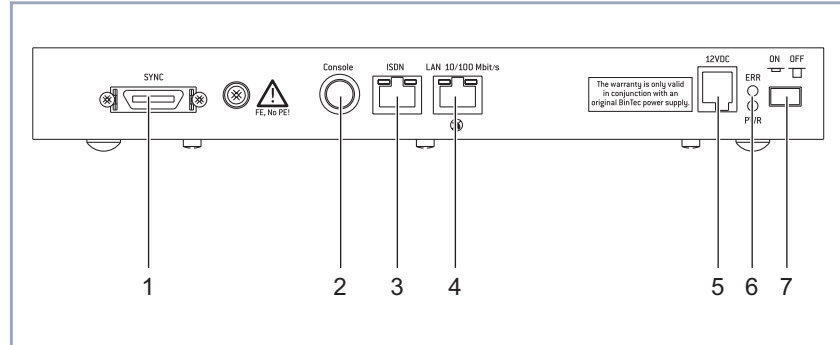
LED	State	Meaning
SYNC: ACT	On	Connection is active. (1)
ISDN: B1	On	ISDN B1-channel: connection is active. (1)
ISDN: B1	Blinking	ISDN B1-channel: connection is being set up.
ISDN: B2	On	ISDN B2-channel: connection is active. (1)
ISDN: B2	Blinking	ISDN B2-channel: connection is being set up.
LAN: LNK	On	Level 1 connection is set up.
LAN: ACT	On	Data packet passing through the LAN interface.
ERR	On (intermittently)	LAN error or collision has occurred.
ERR	On (permanently)	System stopped, restart is necessary.

Table 8-24: **X2100**: LEDs in Normal Mode

(1) Charges are incurred.

### 8.6.3 Connections for X2100

Here is a diagram of the rear of **X2100**:



1	X.21/V.35 interface	5	Power supply connection
2	Serial interface	6	LEDs, meaning as in <a href="#">chapter 8.6.2, page 272</a>
3	ISDN S <sub>0</sub> port	7	On/off switch
4	LAN interface (10/100Base-T Ethernet)		

Figure 8-12: **X2100**: rear panel

## 8.7 Pin Assignments

This chapter describes the pin assignments of the interfaces of your BinTec Compact Router:

- Serial interface ([chapter 8.7.1, page 277](#))
- ISDN S<sub>0</sub> port ([chapter 8.7.2, page 278](#))
- LAN interface (RJ45, [chapter 8.7.3, page 279](#))
- ADSL interface of **X2300i** and **X2300is** (RJ45, [chapter 8.7.4, page 280](#))
- ADSL interface of **X2300** (RJ45, [chapter 8.7.5, page 281](#))
- X.21/V.35 interface of **X2100** ([chapter 8.7.6, page 282](#))

### 8.7.1 Serial Interface

The serial interface is shown in the diagram below:

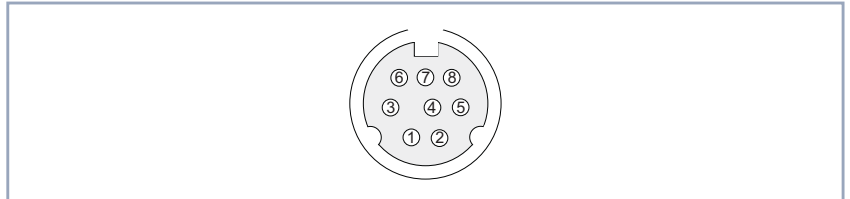


Figure 8-13: 8-pole mini DIN socket

As console port, your router has a serial interface with an 8-pole mini DIN socket. The equipment supports baud rates between 1200 and 115200.

The pin assignment for the 8-pole mini DIN socket is as follows:

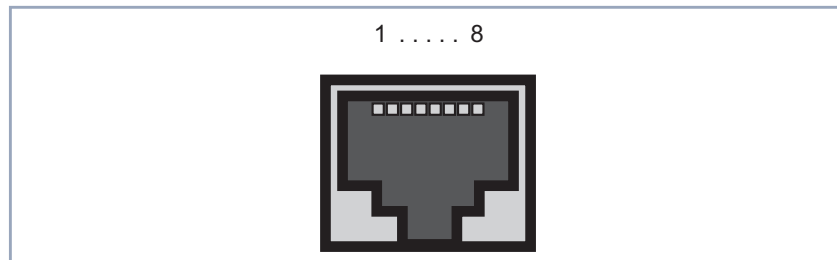
Pin	Function
1	For future applications.
2	For future applications.
3	T

Pin	Function
4	GND
5	R
6	NC
7	NC
8	NC

Table 8-25: Pin assignment of serial interface

## 8.7.2 ISDN S<sub>0</sub> Port

Here is a diagram of the ISDN S<sub>0</sub> BRI port (RJ45 socket):

Figure 8-14: ISDN S<sub>0</sub> BRI port (RJ45 socket)

The pin assignment for the ISDN S<sub>0</sub> BRI port (RJ45 socket) is as follows:

Pin	Function
1	Not used
2	Not used
3	Send (+)
4	Receive (+)
5	Receive (-)
6	Send (-)

Pin	Function
7	Not used
8	Not used

Table 8-26: Pin assignment of ISDN S<sub>0</sub> BRI port (RJ45 socket)

### 8.7.3 LAN Interface

Here is a diagram of the Ethernet 10Base-T interface and Ethernet 10/100Base-T interface (RJ45 socket):

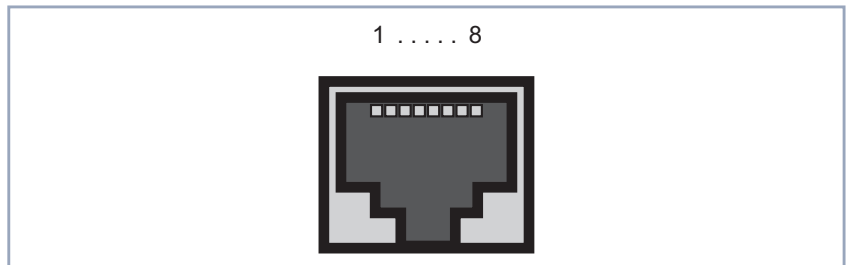


Figure 8-15: Ethernet 10Base-T interface and Ethernet 10/100Base-T interface (RJ45 socket)

The pin assignment for the Ethernet 10Base-T interface and the Ethernet 10/100Base-T interface (RJ45 socket) is as follows:

Pin	Function
1	TD+
2	TD-
3	RD+
4	Not used
5	Not used
6	RD-
7	Not used

Pin	Function
8	Not used

Table 8-27: Pin assignment of Ethernet 10Base-T interface and Ethernet 10/100Base-T interface (RJ45 socket)



If you want to connect your router's LAN interface directly to the Ethernet card of your PC and not to an external hub, you need an adapter cable (CAT5, cross-over) in addition to the red LAN cable.

### 8.7.4 ADSL Interface (RJ45) of X2300i and X2300is

In Germany, Deutsche Telekom AG implements the ADSL connection for ISDN and analog lines with ►► **G.992.1 Annex B**. BinTec Communications AG provides the **X2300i** and **X2300is** routers for Annex B connections.

Here is a diagram of the ADSL interface of **X2300i** and **X2300is** (RJ45 socket):

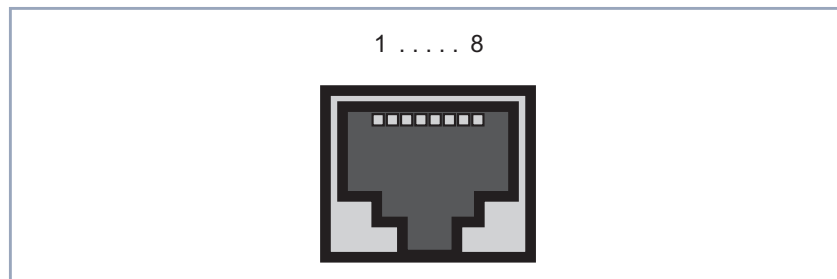


Figure 8-16: ADSL interface of **X2300i** and **X2300is** (RJ45 socket)

The pin assignment for the ADSL interface of **X2300i** and **X2300is** (RJ45 socket) is as follows:



U-R2 is the designation of the ADSL connections at Deutsche Telekom AG; "a" and "b" are data lines (based on telephone lines).



Pin	Function
1	Not used
2	Not used
3	Not used
4	U-R2 a (DSL)
5	U-R2 b (DSL)
6	Not used
7	Not used
8	Not used

Table 8-28: Pin assignment of ADSL interface of **X2300i** and **X2300is** (RJ45 socket)

### 8.7.5 ADSL Interface (RJ45) of **X2300**

For ADSL connections implemented with ►► **G.992.1 Annex A**, BinTec Communications AG provides the **X2300** router.

Here is a diagram of the ADSL interface of **X2300** (RJ45 socket):

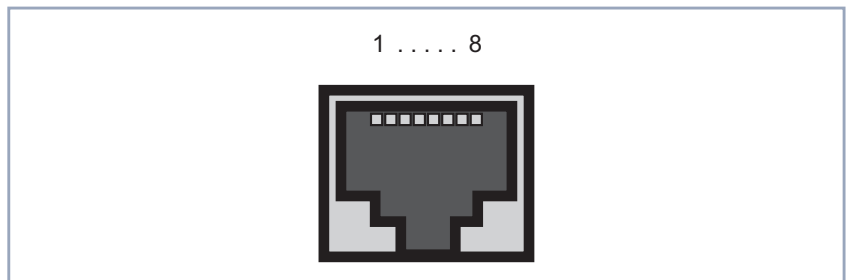


Figure 8-17: ADSL interface of **X2300** (RJ45 socket)

The pin assignment for the ADSL interface of **X2300** (RJ45 socket) is as follows:



"a" and "b" are data lines (based on telephone lines).

Pin	Function
1	Not used
2	Not used
3	Not used
4	a (DSL)
5	b (DSL)
6	Not used
7	Not used
8	Not used

Table 8-29: Pin assignment of ADSL interface of **X2300** (RJ45 socket)

### 8.7.6 X.21/V.35 Interface of **X2100**

The serial port of **X2100** can be used as the following types of interface:

- X.21/V.11
- V.35/V.11

The cables to be used are not supplied with **X2100**, 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 following plugs are normally used for X.21 DTE and V.35 DTE interfaces:

■ "DB-15 Plug for X.21", page 283

■ "M34 Plug for V.35", page 284

**Socket** The serial port provided on **X2100** is described in "26-Pole Mini Delta Ribbon Socket for X.21 and V.35", page 285.

### 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:

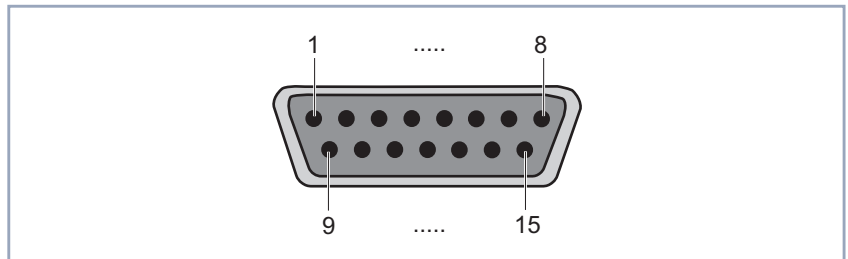


Figure 8-18: DB-15 plug (DTE)

### Pin assignment for DB-15 plug

The DB-15 plug (DTE) and socket (DCE) have the following pin assignment:

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

Signal	Pin no.	Source	Signal description
S (A)	6	DCE	Transmit and receive clock
S (B)	13		

Table 8-30: 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:

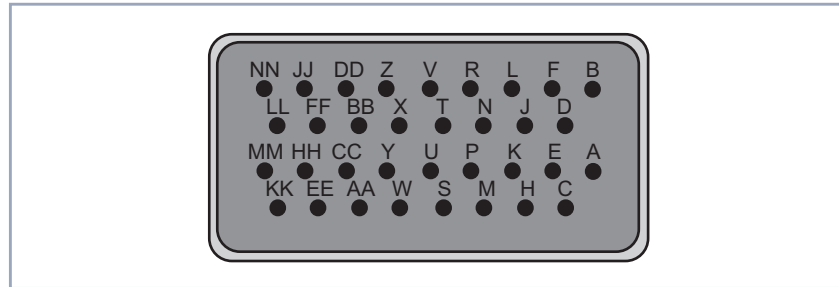


Figure 8-19: M34 plug

**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
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

ITU-T	Signal	Pin no.	Source	Signal description
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 8-31: 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 of **X2100** is designed as a 26-pole mini Delta ribbon socket. The interface can be used for X.21 or V.35, depending on the setting under **Interface Type**.

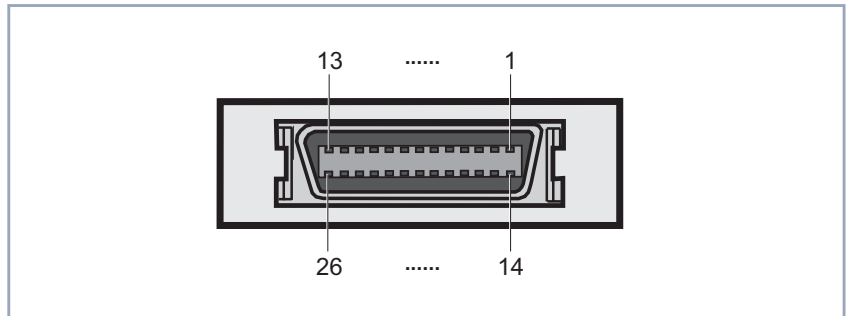


Figure 8-20: 26-pole mini Delta ribbon socket

### Pin assignment of mini Delta ribbon socket



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

The pin assignments highlighted in [table 8-32, page 287](#) are recommendations. These cable types are not supplied with **X2100** and cannot be purchased from BinTec.

You can buy the X.21 (DB-15) DTE and V.35 (M34) DTE cables from your BinTec dealer.

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
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

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
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 8-32: Pin assignment of 26-pole mini Delta ribbon socket

## 8.8 BOOT Sequence

Your router passes through various functional states on starting (see [chapter 8.1.2, page 238](#), [chapter 8.2.2, page 245](#), [chapter 8.3.2, page 251](#), [chapter 8.4.2, page 258](#), [chapter 8.5.2, page 265](#) and [chapter 8.6.2, page 272](#)):

- Start Mode
- BOOTmonitor Mode
- Normal Mode

After several selftests have been performed successfully in Start Mode, your router changes to the BOOTmonitor Mode. The BOOTmonitor prompt is displayed if you are connected to your router via a serial connection.

**BOOTmonitor** Press the **Space Bar** within 4 seconds when the BOOTmonitor prompt is displayed if you want to use the functions of the BOOTmonitor. If you do not make an entry within 4 seconds, your router changes back to Normal Mode.

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

- (1) Boot system:  
Your router loads the compressed boot file from the flash memory to the RAM memory. This happens automatically when started.
- (2) Software update via TFTP:  
Your router performs a software update via a TFTP server.
- (3) Software update via XMODEM:  
Your router performs a software update over a serial interface with XMODEM.
- (4) Delete configuration:  
Your router is reset to the 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 your router's BOOTmonitor, e.g. the baud rate for serial connections.
- (6) Show system information:  
Shows useful information about your router, e.g. serial number, MAC address and software versions.



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



- 100Base-T** Twisted pair connection, Fast Ethernet. Network connection for 100-Mbps networks.
- 10Base-2** Thin Ethernet connection. Network connection for 10-Mbps networks with BNC connector. T-connectors are used for the connection of equipment with BNC sockets.
- 10Base-T** Twisted pair connection. Network connection for 10-Mbps networks ➤➤ **RJ45** connector.
- 1TR6** D-channel protocol used in the German ISDN. Today the more common protocol is the ➤➤ **DSS1**.
- Access list** A rule that defines a set of packets that should or should not be transmitted by the router.
- Accounting** Recording of connection data, e.g. date, time, connection duration, charging information and number of data packets transferred.
- ADSL** Asymmetric ➤➤ **Digital Subscriber Line**
- The data rate is up to 640 kbps ➤➤ **upstream** and 1.5 - 9 Mbps ➤➤ **downstream** over ranges of up to 5.5 km (ITU-T standard ➤➤ **G.992.1**).
- The main ADSL applications are: Internet access, video-on-demand (digital and compressed) and high-speed data communication over ➤➤ **POTS**.
- ARP** Address Resolution Protocol
- ARP belongs to the ➤➤ **TCP/IP protocol family**. ARP resolves IP addresses into their corresponding ➤➤ **MAC addresses**.
- Asynchronous transmission** A method of data transmission in which the time intervals between transmitted characters can vary in length. This allows computers and peripheral devices to intercommunicate without being synchronized by clock signals. The beginning and end of the transmitted characters must be marked by start and stop bits – in contrast to ➤➤ **synchronous transmission**.
- ATM** Asynchronous Transfer Mode

The ATM technology can be used to implement switched, connection-based LANs and WANs. It permits a theoretically unlimited number of high-speed leased lines dedicated to network users for use between users and to servers. ATM is based on fast cell switching, which allows variable bit rates and supports different types of data traffic, such as voice, video and data.

**B-channel** A bearer channel of an **▶▶ ISDN Basic Rate Interface** or a **▶▶ Primary Rate Interface** for the transmission of traffic (voice, data). An ISDN Basic Rate Interface consists of two B-channels and one **▶▶ D-channel**. A B-channel has a data transmission rate of 64 kbps.

The data transmission rate of an ISDN Basic Rate Interface with your router can be increased to up to 128 kbps using **▶▶ channel bundling**.

**BOD** Bandwidth on Demand

Bandwidth on Demand is an extended method of **▶▶ channel bundling**, in which it is also possible to connect **▶▶ dialup connections** to **▶▶ leased lines** or to configure dialup connections as a backup facility for leased lines.

**BootP** Bootstrap protocol

Based on **▶▶ UDP** or **▶▶ IP protocol**. Automatically assigns an **▶▶ IP address**. **DIME Tools** contain a BootP server that you can start on your PC to assign the as yet unconfigured router an IP address.

**Bridge** Network components for connecting homogeneous networks. As opposed to a **▶▶ router**, bridges operate at layer 2 (data link layer) of the **▶▶ OSI model**, are independent of higher-level protocols and transmit data packets using **▶▶ MAC addresses**. Data transmission is transparent, which means the information contained in the data packages is not interpreted.

Bridges are used to physically decouple networks and to reduce network data traffic. This is done by using filter functions that allow data packets to pass to certain network segments only.

Some BinTec routers can be operated in Bridging Mode.

**Broadcast** Broadcasts (data packages) are sent to all stations in a network in order to exchange information. Generally, there is a certain address (broadcast address) in the network that allows all stations to interpret a message as a broadcast.

- Bus** A data transmission medium for use by all the devices connected to a network. Data is forwarded over the entire bus and received by all devices on the bus.
- Called party number** Number of the terminal called.
- Calling party number** Number of the calling terminal.
- CAPI** Common ISDN Application Programming Interface
- A software interface standardized in 1989 that allows application programs to access ISDN hardware from the PC. Most ISDN-specific software solutions (communications programs such as RVS-COM Lite) work with the CAPI interface. Such communications applications enable you, for example, to send and receive faxes or transfer data over the ISDN from your PC. See also [➤➤ Remote CAPI](#).
- CCITT** Consultative Committee for International Telegraphy and Telephony
- A predecessor organization of the [➤➤ ITU](#) that passed recommendations for the development of communications standards for public telephony and data networks and data transmission interfaces.
- Channel bundling** Channel bundling
- Function of your router. Channel bundling is a method of increasing the data throughput. The data throughput is doubled by switching in a second [➤➤ B-channel](#) for data transmission. Channel bundling can be either dynamic (= on demand) or static (= always).
- CHAP** Challenge Handshake Authentication Protocol
- A security mechanism during the establishment of a connection with a [➤➤ WAN partner](#) using [➤➤ PPP](#). This protocol is used for checking the WAN partner name and the password defined for the WAN partner. If the partner name and password at both ends are not the same, a connection is not set up. The user name and password are encoded in CHAP before they are sent to the partner – as opposed to [➤➤ PAP](#).
- CLID** Calling Line Identification

A security mechanism during the establishment of a connection with a **➤➤ WAN partner**. A caller is identified by means of his ISDN extension number before the connection is established. If the extension number is not the same as the extension number you have defined for a WAN partner, a connection is not established.

**Client** A client uses the services provided by a **➤➤ server**. Clients are usually workstations.

**Configuration Manager** Windows application (similar to the Windows Explorer), which uses SNMP commands to request and carry out the settings of your router. The application was called the **DIME Browser** before **BRICKware** version 5.1.3.

**Data compression** A process for reducing the amount of data transmitted. This enables higher throughput to be achieved in the same transmission time. Examples of this technique include **➤➤ STAC**, **➤➤ VJHC** and **➤➤ MPPC**.

**Datagram** A self-contained **➤➤ data packet** that is forwarded in the network with minimum protocol overhead and without an acknowledgment mechanism.

**Data packet** A data packet is used for information transfer. Each data packet contains a prescribed number of characters (information and control characters).

**DCE** Data Circuit-Terminating Equipment

Data Circuit-Terminating Equipment (see **➤➤ V.24**)

**D-channel** Control and signaling channel of an **➤➤ ISDN Basic Rate Interface** or **➤➤ Primary Rate Interface**. The D-channel has a data transmission rate of 16 kbps. In addition to the D-channel, each ISDN BRI has two **➤➤ B-channels**.

**DCN** Data communications network

**DHCP** Dynamic Host Configuration Protocol

A Microsoft protocol that provides a mechanism for dynamic assignment of **➤➤ IP addresses**. A DHCP server allocates each **➤➤ client** in a network an IP address from a defined address pool compiled by the system administrator. Prerequisite: **➤➤ TCP/IP** must be configured at the clients so that they can request their IP address from the server. Your BinTec router can be used as a DHCP server.

- Dialup connection** A connection is set up when required by dialing an extension number, in contrast to a **▶▶ leased line**.
- DIME** Desktop Internetworking Management Environment
- DIME Tools** are a collection of tools for configuration and monitoring of routers over Windows applications. They are included with all BinTec routers free of charge.
- DIME Browser** Old name for **▶▶ Configuration Manager**.
- Direct dialing range** See **▶▶ extension numbers range**
- DNS** Domain Name System
- Each device in a **▶▶ TCP/IP network** is usually located by its **▶▶ IP address**. Because **▶▶ host names** are often used in networks to reach different devices, it is necessary for the associated IP address to be known. This task can be performed by a DNS server, which resolves the host names into IP addresses. Alternatively, name resolution can also take place over the HOSTS file, which is available on all PCs.
- Domain** A domain refers to a group of devices in a network, whose host names share a common suffix, the domain name. Thus, in the **▶▶ Internet**, a part of a naming hierarchy (e.g. bintec.de).
- Downstream** Data transmission rate from the **▶▶ ISP** to the client.
- DSL/xDSL** Digital Subscriber Line
- Data transmission technique that enables high transmission rates to be achieved on normal telephone lines.
- The data rate is dependent on the distance to be covered and the quality of the line.
- xDSL is used as a bookmark for the different DSL variants, such as **▶▶ ADSL**, **▶▶ RADSL**, **▶▶ VDSL**, **▶▶ HDSL**, **▶▶ SDSL**, **▶▶ U-ADSL**, etc., which are part of the family of DSL techniques.
- DSS1** Digital Subscriber Signalling System.
- A common D-channel protocol used in the Euro ISDN.
- DTE** Data Terminal Equipment

Data Terminal Equipment (see >> **V.24**)

**DTMF** Dual Tone Multi Frequency (tone dialing system)

Dialing method for telephony systems. In this method, pressing a key on the telephone keypad generates two simultaneous tones, which are correspondingly evaluated by the PABX or exchange.

**E1/T1** E1: European variant of the 2.048 Mbps >> **ISDN** >> **Primary Rate Interface**, which is also called the E1 system.

T1: American variant of the ISDN Primary Rate Interface with 23 basic channels and one D-channel (1.544 Mbps).

**EAZ** Terminal Selection Digit

Is only used in the >> **1TR6** system and designates the last digit of an extension number. It is used for dialing various terminals connected to the ISDN Basic Rate Interface (e.g. fax). This occurs by attaching one digit between 0 and 9 to the actual ISDN telephone number. In Euro ISDN (DSS1), the complete extension number, >> **MSN**, is transferred instead of the EAZ.

**Encapsulation** Encapsulation of >> **data packets** in a certain protocol for transmitting the packets over a network that the original protocol does not directly support (e.g. NetBIOS over TCP/IP).

**Encryption** Refers to the encoding of data, e.g. >> **MPPE**.

**Ethernet** A local network that connects all devices in the network (PC, printers, etc.) via a twisted pair or coaxial cable.

**Extension** An extension is an internal number for a terminal or subsystem. In >> **point-to-point ISDN accesses**, the extension is usually a number from the >> **extension numbers range** assigned by the telephone provider. In point-to-multipoint connections, it can be the MSN or a part of the MSN.

**Extension numbers** (direct dialing range)

**range**

A **point-to-point ISDN access** includes a >> **PABX number** and an extension numbers range. The PABX number is used to reach the PABX. The extension numbers range is a group of numbers used for selecting terminals within the >> **PABX**.



- Filters** A filter comprises a number of criteria (e.g. protocol, port number, source and destination address). These criteria can be used to reject a packet from the traffic flow. Such a packet can then be handled in a specific way. For this purpose, a certain action is associated with the filter, which creates a filter rule.
- Firewall** Designates the whole range of mechanisms to protect the local network against external access. Your router provides protection mechanisms such as [▶▶ NAT](#), [▶▶ CLID](#), [▶▶ PAP/CHAP](#), access lists, etc.
- FTP** File Transfer Protocol
- A TCP/IP protocol used to transfer files between different hosts.
- G.992.1** Data transmission recommendation for ADSL: ITU-T G.992.1
- See also [▶▶ G.992.1 Annex A](#) and [▶▶ G.992.1 Annex B](#).
- G.992.1 Annex A** Data transmission recommendation for ADSL: ITU-T G.992.1 Annex A
- Annex A of the recommendation describes the transmission of ADSL data over POTS lines [▶▶ upstream](#) in the frequency range from 25 kHz to 138 kHz and [▶▶ downstream](#) from 138 kHz to 1104 kHz. Annex A is used mainly in countries in which ISDN is not widespread, e.g. France. BinTec's **X2300** router supports this recommendation.
- G.992.1 Annex B** Data transmission recommendation for ADSL: ITU-T G.992.1 Annex B
- Annex B of the recommendation describes the transmission of ADSL data over ISDN lines [▶▶ upstream](#) in the frequency range from 138 kHz to 276 kHz and [▶▶ downstream](#) from 276 kHz to 1104 kHz. BinTec's **X2300i** and **X2300is** routers support this recommendation.
- Gateway** Entrance and exit, transition point
- Component in the local network that offers access to other networks, also offers transitions between different networks, e.g. [▶▶ LAN](#) and [▶▶ WAN](#).
- HDSL** High Data Rate [▶▶ DSL](#)
- The [▶▶ upstream](#) and [▶▶ downstream](#) data rates are: [▶▶ T1](#) 1.554 Mbps and [▶▶ E1](#) 2.048 Mbps over ranges up to 4 km.
- The main HDSL applications are: High-speed data communication over leased lines.

**HDSL2** High Data Rate >>> **DSL**, version 2

The >>> **upstream** and >>> **downstream** data rate is 1.554 Mbps over ranges up to 4 km.

The main HDSL applications are: High-speed data communication over leased lines.

**Host name** A name used in >>> **IP networks** instead of the corresponding >>> **IP address**. A host name consists of an ASCII string that uniquely identifies the host computer.

**Hub** Network component used to connect several network components together to form a local network (star-shaped).

**ICMP** Internet Control Message Protocol

An extension to the Internet Protocol (>>> **IP**), which permits IP-based error messages, test packets and information messages. Defined in STD 5, RFC 792.

**Internet** The Internet consists of a range of regional, local and university networks. The >>> **IP protocol** is used for data transmission in the Internet.

**IP** Internet Protocol

One of the >>> **TCP/IP** suite of protocols used for the connection of Wide Area Networks (>>> **WANs**).

**IP address** The first part of the address by which a device is identified in an IP network, e.g. 192.168.1.254. See also >>> **netmask**.

**IPoA** IP over ATM

IPoA enables IP data packets to be transported directly over an >>> **ATM** network (RFC 2684).

**ISDN** Integrated Services Digital Network

The ISDN is a digital network for the transmission of voice and data. There are two possible subscriber connections for ISDN, the >>> **ISDN Basic Rate Interface** and the >>> **Primary Rate Interface**. ISDN is an international standard. For ISDN protocols, however, there is a range of variations.



- ISDN Basic Rate Interface** An ISDN subscriber interface. The Basic Rate Interface consists of two **B-channels** and a **D-channel**. Compare **Primary Rate Interface**.  
The interface to the subscriber is provided by an **S<sub>0</sub> bus**.
- ISDN BRI** ISDN Basic Rate Interface  
**ISDN Basic Rate Interface**, also **S<sub>0</sub> interface**.
- ISDN Login** Function of your router. Your router can be configured and administrated remotely using ISDN Login. ISDN Login operates on routers in the ex works state as soon they are connected to an ISDN connection and therefore reachable via an extension number.
- ISDN PRI** ISDN Primary Rate Interface  
ISDN **Primary Rate Interface**, also **S<sub>2M</sub> interface**.
- ISO** International Standardization Organization  
An international organization for the development of world-wide standards, e.g. **OSI model**.
- ISP** Internet Service Provider  
Allows companies or private individuals access to the Internet.
- ITU** International Telecommunication Union  
International organization that co-ordinates the construction and operation of telecommunications networks and services.
- LAN** Local Area Network  
A network covering a small geographic area and controlled by its owner. Usually within the confines of a building or corporate center.
- Layer 1** Layer 1 of the **ISO OSI Model**, the bit transfer layer.
- Leased line** Leased line  
Fixed connection to a subscriber. In contrast to a **dialup connection**, neither an extension number nor connection setup or clearing is necessary.
- MAC address** Every device in the network is defined by a fixed hardware address (MAC address). The network card of a device defines this internationally unique address.

**MIB** Management Information Base

The MIB is a database that describes all the manageable devices and functions connected to a network. All MIBs (including the BinTec MIB) contain objects specific to the manufacturer. ➤➤ **SNMP** is based on MIB.

**Modem** Modulator/Demodulator

An electronic device used to convert digital signals to analog tone signals and vice versa, so that data can be transmitted in an analog medium.

**MPPC** Microsoft Point-to-Point Compression

➤➤ **data compression** procedure for

**MPPE** Microsoft Point-to-Point Encryption

Data encryption process.

**MSN** Multiple Subscriber Number

Multiple number for an ISDN BRI in Euro ISDN. The MSN is the extension number that permits a terminal to be addressed specifically on the ➤➤ **S<sub>0</sub> bus** in Euro ISDN. An MSM has up to eight digits. (For example, in the number 49 911 7654321, the MSN is 7654321.)

Usually three such MSNs are assigned to each ISDN BRI (point-to-multipoint connection) in Germany.

**Multiprotocol router** A ➤➤ **router** that can route several protocols, e.g. ➤➤ **IP**, ➤➤ **X.25**, etc.

**NAT** Network Address Translation

Security mechanism of your router. Using NAT conceals your complete network to the outside world. The IP addresses of all devices in your own network remain confidential, only one IP address is made known for connections to the outside.

**NetBIOS** Network Basic Input Output System

A programming interface that activates network operations on a PC. It is a set of commands for transmitting and receiving data to and from other Windows PCs on the network.

**Netmask** The second part of an address in an IP network, used for identification of a device, e.g. 255.255.255.0. See also [➤➤ IP address](#).

**Network address** A network address designates the address of a complete local network.

**NT** Network Termination

An NT adapter is the network termination unit of an [➤➤ ISDN](#) connection. In Germany, this is obtained from Deutsche Telekom AG. It is used to connect a private network ([➤➤ S<sub>0</sub> bus](#)) to the public ISDN network. It is equivalent to the terminal socket used for connecting an analog telephone.

**NTBA** Network Termination for Basic Access.

An NTBA adapter is the network termination unit of an [➤➤ ISDN](#) Basic Rate Interface. In Germany, this is obtained from Deutsche Telekom AG. It is used to connect a private network ([➤➤ S<sub>0</sub> bus](#)) to the public ISDN network. It is equivalent to the terminal socket used for connecting an analog telephone.

**OAM** Operation and Maintenance

Monitor functions for the administrator of the [➤➤ ADSL](#) line.

**OSI model** OSI = Open Systems Interconnection

[➤➤ ISO](#) reference model for networks. Defines interface standards between computer manufacturers for software and hardware requirements.

**OSPF** Open Shortest Path First

Routing protocol used in networks to exchange information (routing tables) between [➤➤ routers](#).

**PABX** Private Automatic Branch Exchange

An ISDN PABX is a telephone exchange with [➤➤ S<sub>0</sub> interface](#) and [➤➤ 1TR6](#) or other manufacturer-specific [➤➤ D-channel protocols](#) on the subscriber side.

Exchanges allow internal connections between the PABX extensions without the need to connect to the telephone service provider. Not all BinTec routers contain an exchange.

An ISDN PABX is used to set up an internal telephone infrastructure. Both analog terminals (e.g. fax, modem) and digital terminals can be connected to a PABX. The internal network provides free telephoning and connection switching. The individual terminals are given different extension numbers.

**PABX number** A point-to-point ISDN access includes a PABX number and an **extension numbers range**. The PABX number is used to reach the PABX. A certain terminal of the **PABX** is then dialed via one of the numbers of the extension numbers range.

**PAP** Password Authentication Protocol

Authentication process for connecting over **PPP**. Functions like **CHAP**, except that the user name and password are not encoded before being transmitted to the partner.

**Ping** Packet Internet Groper

Command that can be used to determine the range to remote network components. Ping is also used for test purposes to determine if the remote device can actually be reached at all.

**Point-to-multipoint** Point-to-multipoint

Feature of a connection that is permanently connected between three or more data stations or set up via switching systems.

**Point-to-multipoint connection** Point-to-multipoint (**Point-to-multipoint**)

Several different terminals can be connected to a point-to-multipoint connection. The individual terminals are addressed via certain extension numbers (**MSNs**).

**Point-to-point** Point-to-point

Feature of a connection between two data stations only. The connection can be permanently switched or set up via switching systems.

**Point-to-point ISDN access** Point-to-point (**point-to-point**)

A point-to-point ISDN access is used for the connection of a [▶▶ PABX](#). The PABX can forward calls to a number of terminals. A point-to-point access includes a [▶▶ PABX number](#), via which the PABX is reached from outside and a group of numbers ([▶▶ extension numbers range](#)), with which the terminals connected to the PABX can be dialed.

**Port** Input/output

The port number is used to decide to which service (telnet, WWW) an incoming data packet should be sent.

**POTS** Plain Old Telephone System

The traditional analog telephone network.

**PPP** Point-to-Point Protocol

A protocol suite for authentication of the connection parameters of a [▶▶ point-to-point connection](#). PPP is used to connect local networks over the [▶▶ WAN](#). Multiprotocol packets are encapsulated ([▶▶ encapsulation](#)) in a standard format before transmission. Establishing a connection involves a number of other components and subprotocols, such as the authentication mechanisms [▶▶ PAP/CHAP](#).

**PPP authentication** Security mechanism. A method of authentication using passwords in [▶▶ PPP](#).

**PPPoA** Point to Point Protocol over Ethernet [▶▶ ATM](#)

The PPP-over-ATM (PPPoA) protocol enables PPP data packets to be transported directly over an ATM network (RFC 2364).

**PPPoE** Point to Point Protocol over Ethernet

The PPP-over-Ethernet (PPPoE) protocol permits Internet access over Ethernet via an [▶▶ xDSL](#) modem or xDSL router (RFC 2516).

**Primary Rate Interface (PRI)** An ISDN subscriber interface. The PRI consists of a D-channel and 30 B-channels (in Europe). (In America: 23 B-channels and a D-channel.) Compare [▶▶ ISDN Basic Rate Interface](#).

**Protocol** Protocols are used to define the manner and means of information exchange between two systems. Protocols control and rule the course of data communication at various levels (decoding, addressing, network routing, control procedures, etc.).

**Proxy ARP** ARP = Address Resolution Protocol  
Process used to determine the associated >> **MAC address** for a host whose >> **IP address** is known.

**RADSL** Rate-Adaptive >> **Digital Subscriber Line**  
The data rate is up to 640 kbps >> **upstream** and 1.5 - 9 Mbps >> **downstream** over ranges of up to 18.5 km.

The main RADSL applications are: Internet access, video-on-demand (digital and compressed) and high-speed data communication over >> **POTS**.

**Real Time Clock (RTC)** Hardware clock with buffer battery

**Remote** Remote, as opposed to local.

If a far station is not located in your own local network (LAN), but in another LAN, this is referred to as remote.

This LAN must be connected to the local LAN over a WAN connection (over your router).

**Remote access** Opposite to local access, see >> **Remote**.

**Remote CAPI** BinTec's own interface for >> **CAPI**.

The Remote CAPI interface enables all subscribers of a network to use CAPI services, but over your router to a single ISDN connection. All subscribers must have the corresponding application software installed to support the CAPI interface. This standard interface is, however, used by most communications applications.

Your router is supplied as standard with suitable software (RVS-COM Lite).

BinTec's CAPI interface is implemented as a dual-mode CAPI. CAPI 1.1 and 2.0 applications can access ISDN resources parallel to one another. This means new CAPI 2.0 applications can be used on the network or on the same PC parallel to old applications based on CAPI 1.1.



- RIP** Routing Information Protocol
- Routing protocol used in networks to exchange information (routing tables) between **▶▶ routers**.
- RJ45** Plug or socket for maximum eight wires. Connection for digital terminals.
- Router** A device that connects different networks at layer 3 of the **▶▶ OSI model** and routes information from one network to the other.
- Routers are able to recognize blocks of information and evaluate addresses (as opposed to a **▶▶ bridge**, which operates with a transparent protocol). The best paths (routes) from one point to another are chosen by using routing tables. In order to keep the routing tables up to date, routers exchange information between themselves via routing protocols (e.g. **▶▶ OSPF**, **▶▶ RIP**).
- Modern routers like your router are **▶▶ multiprotocol routers** and thus capable of routing several protocols (e.g. IP and X.25).
- S<sub>0</sub> bus** All ISDN sockets and the **▶▶ NTBA** of an ISDN point-to-multipoint connection. All S<sub>0</sub> buses consist of a four-wire cable. The lines transmit digital ISDN signals. The S<sub>0</sub> bus is terminated with a terminating resistor after the last ISDN socket. The S<sub>0</sub> bus starts at the NTBA and can be up to 150 m long. Any ISDN devices can be operated on this bus. However, only two devices can use the S<sub>0</sub> bus at any one time, as only two **▶▶ B-channels** are available.
- S<sub>0</sub> interface** See **▶▶ ISDN Basic Rate Interface**
- S<sub>2M</sub> interface** See **▶▶ ISDN Primary Rate Interface**
- SDSL** Single line **▶▶ Digital Subscriber Line**
- The **▶▶ upstream** and **▶▶ downstream** data rate is up to 768 kbps over ranges up to 3.5 km.
- The main SDSL applications are: **▶▶ E1/T1** and **▶▶ POTS**.
- Server** A server offers services used by **▶▶ clients**. Often refers to a certain computer in the LAN, e.g. DHCP server.
- In client-server architecture, a server is the software part that executes functions for its clients, e.g. **▶▶ TFTP server**. In such a case, the server is not necessarily a computer server.

- Setup Tool** Menu-driven tool for the configuration of your router. The Setup Tool can be used as soon as the router has been accessed (serial, >> **ISDN Login**, >> **LAN**).
- Short hold** Is the defined amount of time, after which a connection is cleared if no more data is transmitted. Short hold can be set to static (fixed amount of time) or dynamic (according to charging unit).
- SNMP** Simple Network Management Protocol
- A protocol in the >> **TCP/IP protocol suite** that is used to transport management information about network components. Every SNMP management system contains an >> **MIB**. SNMP can be used to configure, control and administrate various network components from one system. Such an SNMP tool is included in your router, the **Configuration Manager**. As SNMP is a standard protocol, you can use any other SNMP managers, e.g. HP OpenView.
- SNMP shell** Input level for SNMP commands.
- SOHO** Small Offices and Home Offices
- Small offices and home offices.
- Spoofing** Technique for reducing data traffic (and thus saving costs), especially in WANs.
- The router answers as proxy for remote PCs to cyclically transmitted data packets with monitoring function (e.g. sign of life messages).
- STAC** Data compression procedure.
- Subnet** A network scheme that divides individual logical networks into smaller physical units to simplify routing.
- Switch** LAN switches are network components with a similar function to >> **bridges** or even >> **routers**. They switch data packets between the input and output port. In contrast to bridges, switches have several input and output ports. This increases the bandwidth in the network. Switches can also be used for conversion between networks with different speeds (e.g. 100-Mbps and 10-Mbps networks).
- Synchronous** Transmission process in which the transmitter and receiver operate with exactly the same clock signals – in contrast to >> **asynchronous**. Spaces are bridged by a stop code.

- TAPI** Telephony Application Program Interface
- Standard Microsoft software interface used by many telephony programs. Telephony programs enable database-supported telephoning on the PC, such as the Windows utility. TAPI services are only supported by routers with an integrated >> **PABX**.
- All users of a network can use TAPI services via BinTec's Remote TAPI.
- TCP** Transmission Control Protocol
- One of the >> **TCP/IP** suite of protocols used for the connection of Wide Area Networks (>> **WANs**).
- TCP/IP** Transmission Control Protocol/Internet Protocol
- A protocol suite for the connection of Wide Area Networks (>> **WANs**). The two parts of this protocol suite are >> **IP** (layer 3 of the OSI model) and >> **TCP** (layer 4 of the OSI model).
- T-DSL** Product name used by Deutsche Telekom AG for its >> **DSL** services and products.
- TE** Terminal Equipment
- Terminal equipment for subscriber access, e.g. telephone, fax or PC.
- TEI** Terminal Endpoint Identifier
- The TEI in >> **ISDN** is an address field in layer 2 that is used for identifying a certain terminal.
- Telematics** Telematics is a combination of telecommunication and computer technology and describes data communication between systems and devices.
- Telnet** Protocol from the >> **TCP/IP protocol suite**. Telnet enables communication with a remote device in the network.
- TFTP** Trivial File Transfer Protocol
- Protocol for data transmission.
- TFTP server software is a part of >> **DIME Tools**. It is used for the transfer of configuration files and software to and from the router.
- U-ADSL** Universal >> **Asymmetric Digital Subscriber Line**

This version of ADSL technology allows the parallel use of various communication techniques, e.g. >> **ISDN** and >> **POTS**. It is designed to serve as a worldwide standard in spite of different communication technologies, line qualities and line lengths.

The use of a splitter is not intended. The data rate is up to 512 kbps >> **upstream** and up to 1.5 Mbps >> **downstream** over ranges of up to 5.5 km.

**UDP** User Datagram Protocol

A transport protocol similar to >> **TCP**. UDP offers no control or acknowledgment mechanisms, but is faster than TCP. UDP is connectionless in contrast to TCP.

**Upstream** Data transmission rate from the client to the >> **ISP**.

**URL** Universal/Uniform Resource Locator

Address of a file on the Internet

**V.11** ITU-T recommendation for balanced dual-current interface lines (up to 10 Mbps).

**V.24** CCITT and ITU-T recommendation that defines the interface between a PC or terminal as Data Terminal Equipment (>> **DTE**) and a modem as Data Circuit-terminating Equipment (>> **DCE**).

**V.28** ITU-T recommendation for unbalanced dual-current interface line.

**V.35** ITU-T recommendation for data transmission at 48 kbps in the range from 60 to 108 kHz.

Depending on the quality and length of cable used, the connector type and the min./max. acceptable speed on the DTE side, appreciably higher data transmission rates are possible. Up to 8 Mbps are possible over a short distance of up to 5 m if shielded twisted-pair cables are used.

**V.36** Modem for >> **V.35**.

**V.42bis** Data compression procedure.

- V.90** ITU standard for 56 kbps analog modems. In contrast to older V.34 modems, data is sent in digital form to the client when the V.90 standard is used and does not need to be first converted from digital to analog on one side of the modem (provider), as was the case with V.34 and earlier modems. This makes higher transmission rates possible. A maximum speed of 56 kbps can be achieved only under optimum conditions.
- VDSL** Very high bit rate >>> **Digital Subscriber Line** (also called VADSL or BDSL). The data rate is 1.5 to 2.3 Mbps >>> **upstream** and 13 to 52 Mbps >>> **downstream** over ranges of 300 m to 14 km. The main VDSL applications are: as for >>> **ADSL**, but at higher transmission rates and with synchronization over short ranges.
- VJHC** Van Jacobson Header Compression >>> **data compression** procedure for IP header compression.
- VPN** Virtual Private Network The use of existing structures such as the >>> **Internet** structure for connecting private networks (e.g. SOHO exchange). The data can be encrypted between the two endpoints of the VPN to meet increased security requirements.
- WAN** Wide Area Network Wide Area Network connections, e.g. over ISDN, X.25.
- WAN interface** WAN interface WAN interfaces connect the local network to the (>>> **WAN**). This is usually done by means of analog or digital telephone lines (>>> **switched** or >>> **leased lines**).
- WAN partner** Remote station that is reached over a >>> **WAN**, e.g. ISDN.
- X.21** The X.21 recommendation defines the physical interface between two network components in packet-switched data networks (e.g. Datex-P).
- X.21bis** The X.21bis recommendation defines the >>> **DTE**/**DCE** interface to V-series synchronous modems.
- X.25** An internationally agreed standard protocol that defines the interface between network components and a packet-switched data network.

**X.31** ITU-T Recommendation on the integration of X.25-compatible DTEs in ISDN (D-channel).

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