



# X4000

## Release Notes

System Software Release 5.1 Revision 5

June 15, 2000



## **New System Software**

### **System Software Release 5.1.5**

This document describes the features, changes and bug fixes of the system software in Release 5.1.5 for X4000.



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# 1 Updating System Software

- Get the latest system software from BinTec's WWW server at [www.bintec.de](http://www.bintec.de) (Products/Download section) or at [www.x4000.de](http://www.x4000.de).
- You can then update **X4000** with this system software (see chapter 10.2 "Updating Software" in your User's Guide).
- When you have installed Release 5.1 Version 5, you will certainly want to obtain the latest documentation as well (in Adobe's PDF format). You will also find this in the Download section of BinTec's WWW server. Please read the information in Last Minute Information!



When you update the system software, it is recommended that you also use the latest versions of BRICKware for Windows and the UNIX Tools. You can get both of these from BinTec's WWW server.

## 2 Features

### 2.1 Always On/Dynamic ISDN (AO/DI)

The multiprotocol router **X4000** provides AO/DI with System Software Release 5.1.5.

Always On/Dynamic ISDN (AO/DI) uses the existing ISDN infrastructure to configure a new service for the user without hardware changes: AO/DI is a permanently available (always on) but nevertheless low-cost connection from the end customer to the Internet Service Provider.

#### 2.1.1 Short Description

AO/DI uses X.25 data packet transmission in the D-channel (X.31) to set up a PPP connection (PPP over X.25). 9600 bps are available for data transmission in the D-channel (D-channel Mode). If more bandwidth is needed, one or two B-channels are dynamically added (Dynamic ISDN). Data transmission in this case is only in the B-channel or B-channels, i.e. the B-channels remain reserved for bandwidth-intensive applications (B-channel Mode).

AO/DI offers the following advantages:

- three full communication channels, which can be independent if required
- permanent connection to the Internet at low-cost
- transparent bandwidth control
- in D-Channel Mode
  - high reliability and guaranteed throughput times
  - volume-oriented charges independent of distance
- in B-Channel Mode:
  - time-dependent connection charges only for bandwidth-intensive applications

## 2.1.2 How Does AO/DI Work?

AO/DI is implemented in **X4000** via a special PPP interface. As soon as the interface is configured and ready for operation, the initial PPP connection is set up via X.31 (X.25 in the D-channel). This involves carrying out authentication of the PPP connection partner and assigning a dynamic IP address and DNS addresses, if applicable (AO/DI Client Mode).

The use of the B-channels is controlled by the data throughput or by application-dependent bandwidth management (Bandwidth on Demand, BOD for IP-based applications). Both Bandwidth on Demand and BOD for IP-based applications uses the Bandwidth Allocation Control Protocol (BACP/BAP to RFC 2125) in order to agree with the remote terminal on the circumstances under which B-channels are to be added or dropped. The use of BACP/BAP is agreed during the initial connection setup. As the D-channel connection is normally no longer ended after connection setup, it represents a permanently available (always on) connection to the provider.

As soon as the bandwidth of the D-channel is no longer adequate for data transmission, B-channels are added and data transmission takes place exclusively in the B-channels (Dynamic ISDN). This is implemented in **X4000** by an advanced configuration option in the IP subsystem. An interface is assigned filters, rules and rule chains similar to the concept for IP Access Lists (see User's Guide, chapter 9.2.8 "Filters (Access Lists)". These rules can be used to determine whether additional B-channels are to be set up for certain protocols, ports or IP addresses, or whether data transfer is to take place exclusively in the D-channel.

## 2.1.3 How is AO/DI Configured?

This chapter contains the following information:

- A summary of the configuration steps for AO/DI in **X4000** (see [Configuration Steps, page 8](#)).

- Configuration of **X4000** for AO/DI using the Setup Tool ([Configuration with the Setup Tool, page 9](#)).

You will find some configuration examples of BOD for IP-based applications in [chapter 2.1.4, page 18](#).

## Configuration Steps

The following steps are necessary for configuring **X4000** for AO/DI:

- Carry out X.31 configuration, i.e. reserve the TEI (Terminal Endpoint Identifier) value for X.25 (Packet Switch) (see [X.31 configuration, page 9](#))
- Carry out X.25 configuration (see [X.25 configuration, page 9](#)):
  - Link configuration for Datex-P
  - Call routing
- Configure AO/DI partner as WAN partner (see [Configuring AODI partner as WAN partner, page 11](#))
  - Select PPP parameters
  - Define the PPP interface as AO/DI interface
  - Enter X.25 destination address for initial connection setup
  - Control Bandwidth on Demand (dynamic B-channel bundling)
  - Control BOD for IP-based applications

Please note the following when carrying out X.25 configuration:

Some of the X.25 parameters must be adapted to the X.25 network connected. For Datex-P, the **Window size/Packetsize Neg.** field must be deactivated using the Setup Tool.

For **X4000**, the X.25 software is designed as an X.25 switch. This switch must be appropriately configured for AO/DI (see [X.25 configuration, page 9](#)).



## Configuration with the Setup Tool

This section describes all the necessary steps for configuring **X4000** for AO/DI with the Setup Tool.

### X.31 configuration

Proceed as follows to assign X.31/X.25:

- Go to **CM-1BRI, ISDN S0** ➤ **ADVANCED SETTINGS**.
- Select **X.31 TEI Value**: *specify*.
- Enter **Specify TEI Value**: *1*.
- Select **X.31 TEI Service**: *Packet Switch*.
- Press **SAVE**.

You have returned to the **CM-1BRI, ISDN S0** menu.

- Press **SAVE**.  
You have returned to the main menu. The main menu now contains the X.25 menu, which you need for the following configuration steps. Information about the X.25 parameters can be found in the Extended Features Reference at [www.bintec.de](http://www.bintec.de).

### X.25 configuration

Proceed as follows to make the preset link settings for X.25 configuration for Datex-P:

- Go to **X.25** ➤ **LINK CONFIGURATION**.
- Select the interface for which you want to configure X.25, e.g. *x31d2-0-1*.

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

Field	Meaning
<b>L3 Packet Size</b>	Permissible size of data packets for this connection on the third layer of the OSI model.
<b>Windowsize/Packetsize Neg.</b>	Negotiation of the size of <b>Windowsize</b> and <b>Packetsize</b> with the remote terminal. There is only one meaningful setting for Datex-P: <i>never</i> , i.e. negotiation is deactivated.
<b>Highest Two-Way-Channel (HTC)</b>	Defines the highest number of virtual channels.

Table 2-1: X.25 ► LINK CONFIGURATION ► EDIT

- Select **L3 Packet Size max: 256**.
- Select **Windowsize/Packetsize Neg.: never**.
- Enter **Highest Two-Way-Channel (HTC): 1**.
- Press **SAVE**.
- Leave **X.25 ► LINK CONFIGURATION** with **Exit**.

Proceed as follows to make the preset routing settings for X.25 configuration:

- Go to **X.25 ► ROUTING ► ADD**.

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

Field	Meaning
<b>Source Link</b>	Source interface of data packets.
<b>Destination Link</b>	Destination interface of data packets.
<b>Destination X.25 Address</b>	X.25 destination address

Table 2-2: X.25 ► ROUTING ► ADD

- Select **Source Link**: *local*.
- Select **Destination Link**, e.g. *x31d2-0-1*.
- Enter **Destination X.25 Address**, e.g. *019011*.
- Press **SAVE**.
- Leave **X.25** ➤ **ROUTING** ➤ **ADD** with **Exit**.
- Leave **X.25** ➤ **ROUTING** with **Exit**.  
You have returned to the main menu.

### Configuring AODI partner as WAN partner

To define an AO/DI-capable PPP interface, proceed as follows:

- Go to **WAN PARTNER** ➤ **ADD**.
- Enter **Partner Name**, e.g. *AODI partner*.
- Select **Encapsulation**: *PPP*.

Proceed as follows to make the PPP settings:

- Go to **WAN PARTNER** ➤ **ADD** ➤ **PPP**.
- Select **Authentication**, e.g. *CHAP*.
- Leave out **Partner PPP ID**.
- Enter **Local PPP ID**, e.g. *bintec\_router*.
- Enter **PPP Password** twice, e.g. *secret*.  
An asterisk appears on the screen as a place marker for each letter you enter for the password.
- Confirm with **OK**.

To activate AO/DI on the PPP interface and enter the X.25 address, proceed as follows:

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

The following part of the menu is relevant for this configuration step:

Field	Meaning
<b>Layer 1 Protocol</b>	Defines which Layer 1 Protocol <b>X4000</b> is to use. There is only one meaningful setting for AO/DI: <i>AO/DI</i> .
<b>Channel Bundling</b>	Defines whether or which type of channel bundling is to be used for connections to the WAN partner (see manual, chapter 7.2.2). If <i>AO/DI</i> is selected under <b>Layer 1 Protocol</b> , <i>dynamic</i> is set automatically for <b>Channel Bundling</b> .
<b>Total Number of Channels</b>	Defines the maximum number of channels that may be opened for dynamic channel bundling. Possible values for <b>X4000</b> : 1 or 2.
<b>Remote X.25 Address</b>	X.25 destination address. Appears only if <i>AO/DI</i> is selected under <b>Layer 1 Protocol</b> .

Table 2-3: **WAN PARTNER** ➤ **ADD** ➤ **ADVANCED SETTINGS**

- Select **Layer 1 Protocol**: *AO/DI*.
- Enter **Total Number of Channels**, e.g. *1*.
- Enter **Remote X.25 Address**, e.g. *019011*.

Proceed as follows to configure BACP/BAP for the "AO/DI client" access (control of Bandwidth On Demand):

- Go to **WAN PARTNER** ➤ **ADD** ➤ **ADVANCED SETTINGS** ➤ **EXTENDED INTERFACE SETTINGS (OPTIONAL)**.

The following part of the menu is relevant for this configuration step:

Field	Meaning
<b>Mode</b>	Defines which mode is used for BOD. Only the <i>BAP, Active Mode</i> setting is used for an AO/DI client.
<b>Line Utilization Weighting</b>	Weighting within the interval considered for adding and dropping B-channels.
<b>Line Utilization Sample (sec)</b>	Length of the interval over which the mean of the measured throughput data is taken and weighted with <b>Line Utilization Weighting</b> .
<b>Gear Up Threshold</b>	Utilization threshold at which another B-channel is added for a connection.
<b>Gear Down Threshold</b>	B-channels are dropped until the remaining channels have at least the percentage utilization degree remaining here.
<b>D-Channel Queue Length</b>	Threshold value for the number of bytes accumulated in the D-channel at which the system is to change to the B-Channel Mode.
<b>Maximum Number of Dialup Channels</b>	Maximum number of channels that may be opened. The value is defined in the <b>Total Number of Channels</b> field under <b>WAN PARTNER</b> ► <b>ADD</b> ► <b>ADVANCED SETTINGS</b> .

Table 2-4: **WAN PARTNER** ► **ADD** ► **ADVANCED SETTINGS** ► **EXTENDED INTERFACE SETTINGS (OPTIONAL)**

The following selection option in the **Mode** field is relevant for AO/DI:

Possible Values	Meaning
<i>BAP, Active Mode</i>	<p>The Bandwidth Allocation Protocol (BAP) knows three different options for negotiating a bandwidth change. It behaves as follows in Active Mode:</p> <ul style="list-style-type: none"> <li>■ Call Request: one of the two communication partners wants to add a B-channel; adding the channel is initiated if applicable.</li> <li>■ Callback Request: the remote terminal is requested to add a B-channel; adding the channel is not initiated but accepted if applicable.</li> <li>■ Link Drop Request: one communication partner wants to drop a B-channel; dropping is initiated or accepted if applicable.</li> </ul>

Table 2-5: **Mode** = *BAP, Active Mode*

- Select **Mode**: *BAP, Active Mode*.
- Use the preset values for the other fields of this menu.
- Press **SAVE**.
- Confirm with **OK**.

To enter the necessary ISDN extensions for adding the B-channel, proceed as follows:

- Go to **WAN PARTNER** ➤ **ADD** ➤ **WAN NUMBERS** ➤ **ADD**.
- Enter the **Number**, e.g. *0911123456*.
- Select **Direction**: *outgoing*.
- Press **SAVE**.

- Leave **WAN PARTNER** ➤ **ADD** ➤ **WAN NUMBERS** ➤ **ADD** with **Exit**.

For dynamic assignment of the IP address by the Internet Service Provider, proceed as follows:

- Go to **WAN PARTNER** ➤ **ADD** ➤ **IP**.
- Select **IP Transit Network**: *dynamic client*.
- Press **SAVE**.
- Press **SAVE**.
- Leave **WAN PARTNER** with **Exit**.  
You have returned to the main menu.

### **BOD for IP-based applications (optional)**

BOD for IP-based applications is configured by filters and rules in a similar way to Access Lists for IP packets (see manual, chapter 9.2.8 "Filters (Access Lists)"). First filters are defined that determine which IP packets (and thus applications) are to influence the available bandwidth. If several filters are defined, they can be interlinked using a rule chain.

Proceed as follows to define suitable filters:

- Go to **IP** ➤ **BANDWIDTH ON DEMAND (BOD)** ➤ **FILTER** ➤ **ADD**.
- Enter **Description**, e.g. *mail\_smtp\_out*.
- Select **Protocol**, e.g. *tcp*.
- Enter **Destination Address**, e.g. *172.16.08.15*.
- Enter **Destination Mask**, e.g. *255.255.255.255*.
- Select **Destination Port**: *specify*.
- Enter **Specify Port**, e.g. *25* (port for SMTP).
- Press **SAVE**.  
A list of all the previously defined filters appears.
- Leave **IP** ➤ **BANDWIDTH ON DEMAND (BOD)** ➤ **FILTER** with **Exit**.

A rule for BOD is configured similarly to a rule for IP packets (see manual, chapter 9.2.8 "Filters (Access Lists)"). Different rules normally consist of different filters and can be interlinked to form a rule chain. Each rule results in an action, but the direction of the data packets for which it is to apply can also be stated for each rule, i.e. for sent or received data packets.

Proceed as follows to define a rule for BOD:

➤ Go to **IP** ➤ **BANDWIDTH ON DEMAND (BOD)** ➤ **RULES FOR BOD** ➤ **ADD**.

In addition to the already familiar fields for definition of conventional rules (see manual, chapter 9.2.8 "Filters (Access Lists)"), the menu also contains the following fields:

Field	Meaning
<b>Direction</b>	Direction of data packets to which the rule is to be applied. Possible values: <ul style="list-style-type: none"> <li>■ <i>incoming</i>: incoming data packets</li> <li>■ <i>outgoing</i>: outgoing data packets</li> <li>■ <i>both</i>: incoming and outgoing data packets</li> </ul>
<b>Number of Channels</b>	Number of B-channels that are to be added. Possible values for <b>X4000</b> : 1 or 2.

Table 2-6: **IP** ➤ **BANDWIDTH ON DEMAND (BOD)** ➤ **RULES FOR BOD** ➤ **ADD**



The **Action** field, which indicates how a filtered out data packet is to be handled, contains the following selection options:

Possible values	Meaning
<i>invoke M</i>	B-channels are added if the rule matches.
<i>invoke !M</i>	B-channels are added if the rule does not match.
<i>deny M</i>	B-channels are not added if the rule matches.
<i>deny !M</i>	B-channels are not added if the rule does not match.
<i>ignore</i>	The rule is ignored or it is omitted if part of a rule chain.

**Table 2-7: Action**

- Select **Action**: *invoke M*.
- Select **Direction**: *outgoing*.
- Select **Number of Channels**: *1*.
- Select **Filter**, e.g. *mail\_smtp\_out*.
- Press **SAVE**.
- Leave **IP** ➤ **BANDWIDTH ON DEMAND (BOD)** ➤ **RULES FOR BOD** with **Exit**.
- Leave **IP** ➤ **BANDWIDTH ON DEMAND (BOD)** with **Exit**.  
You have returned to the main menu.

To apply a rule to an interface, proceed as follows:

- Go to **IP** ➤ **BANDWIDTH ON DEMAND (BOD)** ➤ **CONFIGURE INTERFACES FOR BOD**.
- Select the interface to which you wish to apply a rule, e.g. *aodclient*, and press **Return**.
- Select the rule you wish to apply to this interface, e.g. *mail\_smtp\_out*.
- Press **SAVE**.

- Leave **IP** ➤ **BANDWIDTH ON DEMAND (BOD)** ➤ **CONFIGURE INTERFACES FOR BOD** ➤ **EDIT** with **Exit**.
- Leave **IP** ➤ **BANDWIDTH ON DEMAND (BOD)** ➤ **CONFIGURE INTERFACES FOR BOD** with **Exit**.
- Leave **IP** ➤ **BANDWIDTH ON DEMAND (BOD)** with **Exit**.  
You have returned to the main menu.

## 2.1.4 Configuration Examples of BOD

### Additional Bandwidth for HTTP Connections

The following example shows a special configuration of **X4000** for connection setup of the PC with the IP address 172.16.77.11 (TCP Port 80) to the Internet. The system should always change to B-Channel Mode with one B-channel when an HTTP connection is set up to the Internet.

Proceed as follows to define the relevant filter for BOD:

- Go to **IP** ➤ **BANDWIDTH ON DEMAND (BOD)** ➤ **FILTER** ➤ **ADD**.
- Enter **Description**: *hostxy\_http\_out*.
- Select **Protocol**: *tcp*.
- Enter **Source Address**: *172.16.77.11*.
- Enter **Source Mask**: *255.255.255.255*.
- Select **Destination Port**: *specify*.
- Enter **Specify Port**: *80*.
- Press **SAVE**.  
A list of all the previously defined filters appears.
- Leave **IP** ➤ **BANDWIDTH ON DEMAND (BOD)** ➤ **FILTER** with **Exit**.

Proceed as follows to define a rule for BOD:

- Go to **IP** ➤ **BANDWIDTH ON DEMAND (BOD)** ➤ **RULES FOR BOD** ➤ **ADD**.
- Select **Action**: *invoke M*.

- Select **Direction**: *outgoing*.
- Select **Number of Channels**: 1.
- Select **Filter**: *hostxy\_http\_out (1)*.
- Press **SAVE**.
- Leave **IP** ➤ **BANDWIDTH ON DEMAND (BOD)** ➤ **RULES FOR BOD** with **Exit**.

## Restricting Mail Reception to D-Channel

In the following configuration example, mail reception is restricted to the D-channel and there is no change to B-Channel Mode. The inquiry about whether new mails have been received does not cause a change to B-Channel Mode either.

Proceed as follows to define the relevant filter for BOD:

- Go to **IP** ➤ **BANDWIDTH ON DEMAND (BOD)** ➤ **FILTER** ➤ **ADD**.
- Enter **Description**: *mail\_pop3\_in*.
- Select **Protocol**: *tcp*.
- Enter **Destination Address**: *172.16.08.15*.
- Enter **Destination Mask**: *255.255.255.255*.
- Select **Destination Port**: *specify*.
- Enter **Specify Port**: *110*.
- Press **SAVE**.  
A list of all the previously defined filters appears.
- Leave **IP** ➤ **BANDWIDTH ON DEMAND (BOD)** ➤ **FILTER** with **Exit**.

Proceed as follows to define a rule for BOD:

- Go to **IP** ➤ **BANDWIDTH ON DEMAND (BOD)** ➤ **RULES FOR BOD** ➤ **ADD**.
- Select **Action**: *deny*.
- Select **Direction**: *incoming*.

- Select **Number of Channels**: 1.
- Select **Filter**: *mail\_pop3\_in* (2).
- Press **SAVE**.
- Leave **IP** ➤ **BANDWIDTH ON DEMAND (BOD)** ➤ **RULES FOR BOD** with **Exit**.

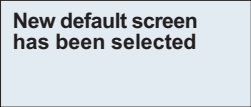
## 2.2 Man-Machine Interface (MMI)

BinTec's man-machine interface with display and input keys is equipped with a number of new features in Release 5.1.5.

### 2.2.1 Defining Default Screen

The logo is displayed as standard on the screen when the idle timer expires. If you want to use another screen as default screen for the MMI, proceed as follows:

- Use the input keys to indicate the desired screen.
- Keep the **C** key pressed for three seconds.



New default screen  
has been selected

- Confirm with **OK**.  
The selected screen is shown and used as default screen.

## 2.2.2 Saving the Configuration

Proceed as follows to save the current configuration of **X4000** using the input keys.

- Keep the **OK** key pressed for three seconds.

Do you want  
to save the current  
configuration?

- Press **OK**.

Saving  
configuration ...

Configuration  
saved

- Press **OK**.

## 2.2.3 Restarting X4000

Proceed as follows to restart **X4000** using the input keys:

- Keep the **OK** key and **C** key pressed for three seconds.

**ATTENTION!**  
Do you really want  
to reboot X4000?

➤ Press **OK**.

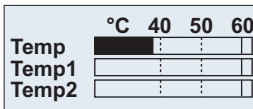
System reboot in  
5 seconds!

The restart is executed after 5 seconds.

System reboot ...  
Standby until  
X4000 is up again!

## 2.2.4 Monitoring the Operating Temperature

In the new **Monitoring** main menu, you can display the current operating temperature of **X4000** in °C by selecting **Current Temperature**.



The current operating temperature is always indicated by a black bar. **Temp** shows the temperature measured by a sensor in the basic unit, **Temp1** and **Temp2** show the temperature measured on the expansion card. A PRI expansion card is equipped with two temperature sensors and a BRI or LAN expansion card with one sensor (**Temp1**).

The current maximum permissible temperature is 60 °C and is indicated by a continuous line on the display. The maximum permissible temperature can be changed by editing the MIB variable **sysX4ConfigTempAlarmTrap** for the basic unit (Temp) and the MIB variables **sysX4ConfigTempAlarmTrapMod1** / **sysX4ConfigTempAlarmTrapMod2** for the expansion cards (Temp1 and Temp2). If this temperature is exceeded, **X4000** generates traps, which can be evaluated over the network.

## 3 Changes

### 3.1 Serial Interfaces

The **X4000** basic unit is equipped with two serial WAN interfaces, whose full range of features is available in Release 5.1.5:

- The first serial port (Setup Tool menu **CM-SERIAL, SERIAL, UNIT 0**) can be used as interface types
  - X.21/V.11
  - V.35/V.11
  - V.36/V.11

The setting in the Setup Tool **Connector** field (see [chapter 3.1.2, page 25](#)) enables the port to be changed so that **X4000** can be operated in both DCE and DTE Mode.



Making the relevant settings in the Setup Tool **Connector** field physically reverses the signal direction and the pin functions.

- The second serial port (Setup Tool menu **CM-SERIAL, SERIAL, UNIT 1**) can be used as interface type
    - X.21bis/V.28
- The change from DCE to DTE Mode and vice versa for this port can only be made by using a DCE or DTE cable.

	Interface Type	DTE Mode	DCE Mode
Port 1	X.21 V.35 V.36	Standard cable <b>Connector = <i>dte</i></b>	Standard cable <b>Connector = <i>dce</i></b>
Port 2	X.21bis	DTE cable	DCE cable

Table 3-1: Functionality of serial ports



Please note: If you have already used the first serial port for X.21 with a previous release, you must carry out the X.21 configuration again after the update to System Software 5.1.5 due to changes in the MIB.

### 3.1.1 Connecting

The cables to be used are not supplied with **X4000**, 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!

Refer to the description of the interfaces in [chapter 3.1.3, page 30](#).



### 3.1.2 Configuration with the Setup Tool

The configuration of the serial interfaces has been slightly modified over previous releases. The relevant Setup Tool menus in Release 5.1.5 are as follows:

X4000 Setup Tool	BinTec Communications AG
[SLOT 3 UNIT 0 SERIAL]:Configure Serial Interface	MyRouter
Interface Type	X.21
Connector	dte
Clock Mode	auto
Speed	64000 bps
Layer 2 Mode	auto
Interface Leads	disabled
SAVE	CANCEL
Use <Space> to select	

The menus have the following fields:

Field	Meaning
<b>Interface Type</b>	<p>Defines the interface type of the port used. Possible values:</p> <ul style="list-style-type: none"> <li>■ <i>none</i> (default value): Interface is not used.</li> <li>■ <i>X.21</i>: Use as X.21/V.11 interface</li> <li>■ <i>V.35</i>: Use as V.35/V.11 interface</li> <li>■ <i>V.36</i>: Use as V.36/V.11 interface</li> <li>■ <i>X.21bis</i>: Use as X.21bis/V.28 interface</li> </ul>
<b>Connector</b>	<p>Defines the pin assignment of the port (see <a href="#">table 3-3, page 29</a>).</p> <p>This setting only affects the pin assignment for the first serial port <b>CM-SERIAL, SERIAL, UNIT 0</b>; a suitable DCE or DTE cable must be used for the second serial port <b>CM-SERIAL, SERIAL, UNIT 1</b>!</p> <p>Possible values:</p> <ul style="list-style-type: none"> <li>■ <i>dte</i> (default value): The pins are assigned as DTE interface. This setting is necessary, for example, if <b>X4000</b> is connected to a public data network (e.g. Datex-P in Germany).</li> <li>■ <i>dce</i>: The pins are assigned as DCE interface.</li> </ul>

Field	Meaning
<b>Clock Mode</b>	<p>Defines which connection partner sends the clock signal for synchronization between transmitter and receiver. Possible values:</p> <ul style="list-style-type: none"> <li>■ <i>auto</i> (default value): The setting is based on the <b>Connector</b> selected: <ul style="list-style-type: none"> <li>– <b>X4000</b> sends the clock signal if <b>Connector</b> = <i>dce</i>.</li> <li>– <b>X4000</b> receives the clock signal if <b>Connector</b> = <i>dte</i>.</li> </ul> <p>You can usually accept this setting.</p> </li> <li>■ <i>external</i>: <b>X4000</b> receives the clock signal, irrespective of the setting selected under <b>Connector</b>.</li> <li>■ <i>internal</i>: <b>X4000</b> sends the clock signal, irrespective of the setting selected under <b>Connector</b>.</li> </ul>
<b>Speed</b>	<p>Transmission rate of connection, scalable from <i>2400 bps</i> to <i>8 Mbps</i>.</p> <p>The value to be set depends on the quality and length of the cable and on the connection type (balanced/unbalanced). Up to 8 Mbps are possible over a short distance of up to 5 m if shielded 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, i.e. <ul style="list-style-type: none"> <li>– if <b>Connector</b> = <i>dte</i>, the value of the address field is 0x01.</li> <li>– if <b>Connector</b> = <i>dce</i>, the value of the address field is 0x03.</li> </ul> <p>You can usually accept this setting, e.g. for access to a public data network such as Datex-P.</p> </li> <li>■ <i>dte</i>: The value of the address field is 0x01.</li> <li>■ <i>dce</i>: The value of the address field is 0x03.</li> </ul>
<b>Interface Leads</b>	<p>Defines whether <b>X4000</b> checks the status of the interface lines. The same value should be set for both connection partners. Possible values:</p> <ul style="list-style-type: none"> <li>■ <i>enabled</i>: The status of the signal line (I for X.21, CTS for V.35, V.36 and X.21bis) is checked and transferred as <b>L1State</b>.</li> <li>■ <i>disabled</i> (default value): The status is not checked; 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 3-2: **CM-SERIAL, SERIAL, UNIT 0** or **CM-SERIAL, SERIAL, UNIT 1**

	Connector = DTE (default value)	Connector = DCE	Port
Function	DTE	DCE	1
Cables	Standard cable		
Pin assignment	X.21: see <a href="#">table 3-4, page 31</a> V.35: see <a href="#">table 3-5, page 33</a> V.36: see <a href="#">table 3-6, page 35</a>		
Function	DTE	DCE	2
Cables	DTE cable	DCE cable	
Pin assignment	X.21bis: see <a href="#">table 3-7, page 36</a>		

Table 3-3: Using **Connector** in the Setup Tool

Proceed as follows to configure the serial interfaces (the example values given are necessary if you connect **X4000** to Datex-P):

- Go to **CM-SERIAL, SERIAL, UNIT 0** or **CM-SERIAL, SERIAL, UNIT 1**.
- Select **Interface Type**, e.g. **X.21**.
- Select **Connector**, e.g. **dte**.
- Select **Clock Mode**, e.g. **auto**.
- Select **Speed**, e.g. **64000 bps**.
- Select **Layer 2 Mode**, e.g. **auto**.
- Select **Interface Leads**, e.g. **disabled**.
- Press **SAVE**.

### 3.1.3 Pin Assignment of Interfaces

The description below first deals with the connectors that are generally used for X.21, V.35, V.36 and X.21bis interfaces:

- DB-15 connector for X.21 (see [DB-15 Connector for X.21, page 31](#))
- M34 connector for V.35 (see [M34 Connector for V.35, page 32](#))
- DB-37 connector for V.36 (see [DB-37 Connector for V.36, page 34](#))
- DB-25 connector for X.21bis (see [DB-25 Connector for X.21bis, page 36](#))

This is followed by a description of the two serial **X4000** ports used for implementing the stated interfaces in **X4000**:

- 26-pole mini Delta ribbon socket for X.21, V.35 and V.36 (see [Pin Assignment of X.21/V.35/V.36 Interface X4000, page 37](#))
- 20-pole mini Delta ribbon socket for X.21bis (see [Pin Assignment of X.21bis Interface of X4000, page 40](#))

### DB-15 Connector for X.21

A DB-15 connector to ISO 4903 is normally used for an X.21 interface:

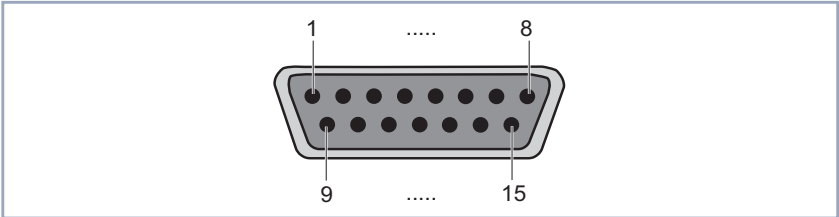


Figure 3-1: DB-15 connector (DTE)

The DB-15 connector (DTE) and socket (DCE) has the following pin assignment:

Variable connector = DTE		Signal direction Pin no.	Variable connector = DTE	
ITU-T	Signal		Signal	ITU-T
101	PG	— 1 —	PG	101
102	SG	— 8 —	SG	102
103	T+	9 —>	R+	104
103	T-	2 —>	R-	104
104	R+	<— 11	T+	103
104	R-	<— 4	T-	103
105	C+	10 —>	I+	106
105	C-	3 —>	I-	106
106	I+	<— 12	C+	105
106	I-	<— 5	C-	105
115	S+	<— 13	S+	114
115	S-	<— 6	S-	114

Table 3-4: Pin assignment of DB-15 connector for X.21 (ISO 4903)

### M34 Connector for V.35

An M34 connector to ISO 2593 is normally used for a V.35 interface:

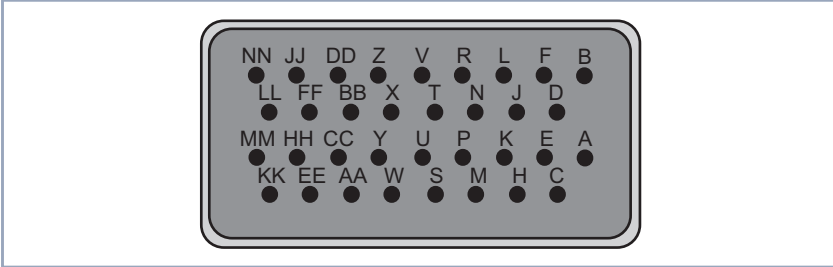


Figure 3-2: M34 connector



The M34 connector has the following pin assignment:

Variable connector = DTE		Signal direction Pin no.	Variable connector = DTE	
ITU-T	Signal		Signal	ITU-T
101	ChGND	— A —	ChGND	101
102	SigGND	— B —	SigGND	102
103	TDA	P —→	RDA	104
103	TDB	S —→	RDB	104
104	RDB	<— R	TDB	103
104	RDA	<— T	TDA	103
105	RTS	C —→	CTS	106
106	CTS	<— D	RTS	105
115	RCA	<— V	TCA	114
115	RCB	<— X	TCB	114
108/2	DTR	H —→	DSR	107
109	DCD	<— F	DCD	109
107	DSR	<— E	DTR	108/2
114	TCB	<— Y	TCB	114
114	TCA	<— AA	TCA	114

Table 3-5: Pin assignment of M34 connector for V.35 (ISO 2593)

### DB-37 Connector for V.36

A DB-37 connector to ISO 4902 is normally used for a V.36 interface:

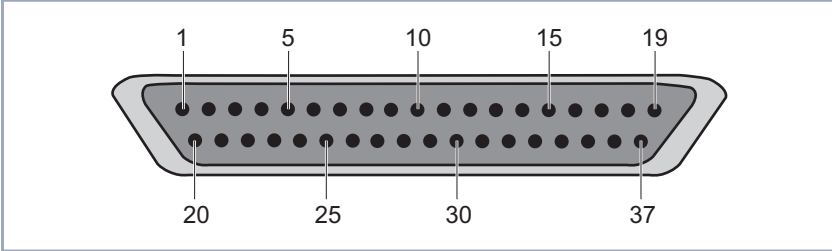


Figure 3-3: DB-37 connector

The DB-37 connector has the following pin assignment:

Variable connector = DTE		Signal direction Pin no.	Variable connector = DCE	
ITU-T	Signal		Signal	ITU-T
101	ChGND	— 1 —	ChGND	101
102	SigGND	— 19 —	SigGND	102
103	TDB	22 —>	RDB	104
103	TDA	4 —>	RDA	104
104	RDB	<— 24	TDB	103
104	RDA	<— 6	TDA	103
105	RTSB	25 —>	RTSB	106
105	RTSA	7 —>	CTSA	106
106	RTSB	<— 27	RTSB	105
106	CTSA	<— 9	RTSA	105
115	RCB	<— 26	TCB	114
115	RCA	<— 8	TCA	114
108/2	DTRB	30 —>	DSRB	107
108/2	DTRA	12 —>	DSRA	107
109	DCDB	<— 31	DCDB	109
109	DCDA	<— 13	DCDA	109
107	DSRB	<— 29	DTRB	108/2
107	DSRA	<— 11	DTRA	108/2
114	TCB	<— 23	TCB	114
114	TCA	<— 5	TCA	114

Table 3-6: Pin assignment of DB-37 connector for V.36 (ISO 4902)

## DB-25 Connector for X.21bis

A DB-25 connector to ISO 2110 is normally used for a X.21bis interface:

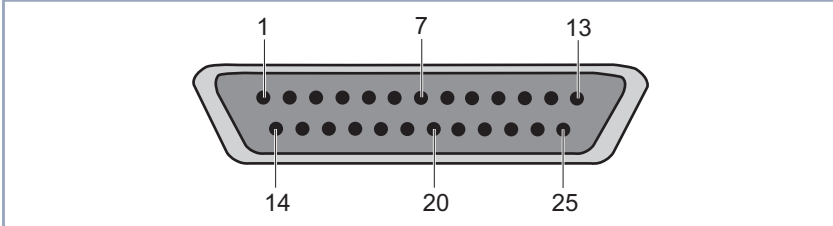


Figure 3-4: DB-25 connector

The DB-25 connector has the following pin assignment:

DTE cable		Signal direction	DCE cable	
ITU-T	Signal		Signal	ITU-T
101	ChGND	—— 1 ——	ChGND	101
103	TD	2 —>	RD	104
104	RD	<— 3	TD	103
105	RTS	4 —>	CTS	106
106	CTS	<— 5	RTS	105
107	DSR	<— 6	DTR	108/2
102	SigGND	—— 7 ——	SigGND	102
109	DCD	<— 8	DCD	109
114	TxC	<— 15	TxC	114
115	RxC	<— 17	RxC	115
108/2	DTR	20 —>	DSR	107
113	XTC	24 —>	RxC / TxC	114/115
	VCC +5V	—— 25 ——	VCC +5V	

Table 3-7: Pin assignment of DB-25 connector for X.21bis (ISO 2110)

### Pin Assignment of X.21/V.35/V.36 Interface X4000

The serial X.21/V.35/V.36 interface of **X4000** is designed as a 26-pole mini Delta ribbon socket. The interface can be used for X.21, V.35 or V.36, depending on the setting under **Interface Type**.

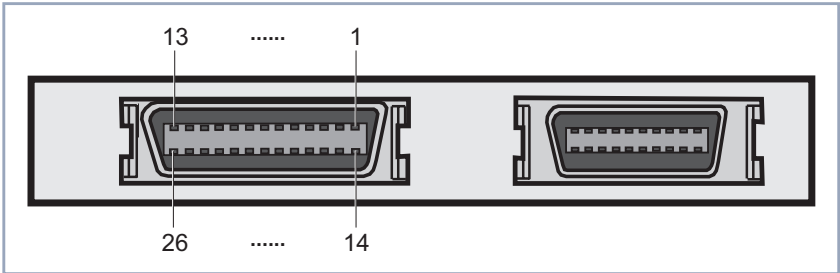


Figure 3-5: 26-pole mini Delta ribbon socket (first serial port, left)

The 26-pole mini Delta ribbon socket has the following pin assignment (DTE mode):

ITU-T	Direction and pin no.	X.21 pin (DB-15)		V.35 pin (M34)		V.36 pin (DB-37)	
101	— 1 —	1	PG	A	ChGND	1	ChGND
102	— 2 —	8	SG	B	SigGND	19	SigGND
103	3 —>	9	T+	S	TDB	22	TDB
103	4 —>	2	T-	P	TDA	4	TDA
104	<— 5	11	R+	T	RDB	24	RDB
104	<— 6	4	R-	R	RDA	6	RDA
105	7 —>	10	C+			25	RTSB
105	8 —>	3	C-	C	RTS	7	RTSA
106	<— 9	12	I+			27	CTSB
106	<— 10	5	I-	D	CTS	9	CTSA
115	<— 11	13	S+	X	RCB	26	RCB
115	<— 12	6	S-	V	RCA	8	RCA
108/2	15 —>					30	DTRB
108/2	16 —>			H	DTR	12	DTRA
109	<— 17					31	DCDB
109	<— 18			F	DCD	13	DCDA
107	<— 19					29	DSRB
107	<— 20			E	DSR	11	DSRA
114	<— 21			AA	TCB	23	TCB
114	<— 22			Y	TCA	5	TCA
VCC+5V	— 25 —						

Table 3-8: Pin assignment of 26-pole mini Delta ribbon socket (DTE mode)

The 26-pole mini Delta ribbon socket has the following pin assignment (DCE mode):

ITU-T	Richtung und Pin-Nr.	X.21-Pin (DB-15)		V.35-Pin (M34)		V.36-Pin (DB-37)	
101	— 1 —	1	PG	A	ChGND	1	ChGND
102	— 2 —	8	SG	B	SigGND	19	SigGND
104	3 —>	9	R+	S	RDB	22	RDB
104	4 —>	2	R-	P	RDA	4	RDA
103	<— 5	11	T+	T	TDB	24	TDB
103	<— 6	4	T-	R	TDA	6	TDA
106	7 —>	10	I+			25	RTSB
106	8 —>	3	I-	C	CTS	7	CTSA
105	<— 9	12	C+			27	RTSB
105	<— 10	5	C-	D	RTS	9	RTSA
114	<— 11	13	S+	X	TCB	26	TCB
114	<— 12	6	S-	V	TCA	8	TCA
107	15 —>					30	DSRB
107	16 —>			H	DSR	12	DSRA
109	<— 17					31	DCDB
109	<— 18			F	DCD	13	DCDA
108/2	<— 19					29	DTRB
108/2	<— 20			E	DTR	11	DTRA
114	<— 21			AA	TCB	23	TCB
114	<— 22			Y	TCA	5	TCA
VCC+5V	— 25 —						

Tabelle 3-9: Pin assignment of 26-pole mini Delta ribbon socket (DCE mode)

### Pin Assignment of X.21bis Interface of X4000

The serial X.21bis interface of **X4000** is designed as a 20-pole mini Delta ribbon socket.

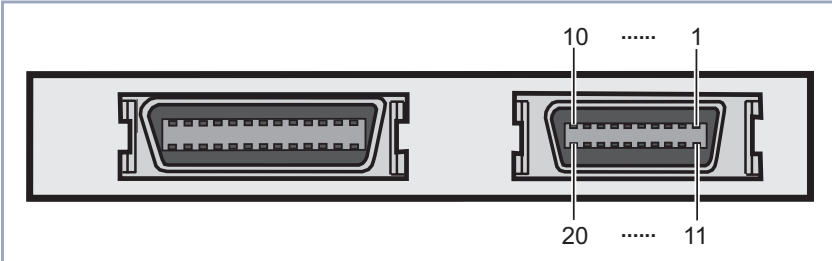


Figure 3-6: 20-pole mini Delta ribbon socket (second serial port, right)



The 20-pole mini Delta ribbon socket has the following pin assignment (DTE cable for DTE Mode, DCE cable for DCE Mode):

DTE/DCE			
ITU-T	Signal	Signal direction Pin no.	X.21bis (DB-25)
101	ChGND	— 1 —	1
103	TD	2 —>	2
104	RD	<— 3	3
105	RTS	4 —>	4
106	CTS	<— 5	5
107	DSR	<— 6	6
102	SigGND	— 7 —	7
109	DCD	<— 8	8
108/2	DTR	9 —>	20
113	XTC	11 —>	24
114	TxC	<— 12	15
115	RxC	<— 13	17
	VCC +5V	— 14 —	

Table 3-10: Pin assignment of 26-pole mini Delta ribbon socket

## 3.2 Encryption

### 3.2.1 Additional Encryption Protocols Supported

Release 5.1.5 of BinTec's **X4000** supports the MPPE V2, DES and Blowfish encryption algorithms. DES and Blowfish are implemented as BinTec proprietary solutions.

#### MPPE V2

The MPPE Version 2 encryption protocol, the successor to MPPE, has been developed by Microsoft and also uses a 40-bit or 56-bit key. These are generated on authentication.

If a larger key length is set in **X4000** than in the dial-in client, the connection is not set up.

If one connection partner is set to MPPE V1 as encryption protocol, MPPE V2 is also accepted on connection setup if the set key length is the same.

#### DES and Blowfish



The DES and Blowfish encryption algorithms are only supported if a license for VPN is entered in **X4000**.

If these proprietary encryption algorithms are used, either **X4000** can generate a key automatically or you can define an individual key statically in consultation with the connection partner.

## Configuration with the Setup Tool

For **Encryption** in the **WAN PARTNER** ► **EDIT** menu, the following encryption protocols are now offered for selection (only available if **Encapsulation** is set to *PPP*, *Async PPP over X.75*, *Async PPP over X.75/T.70/BTX* or *X.25\_PPP*):

Possible Values	Meaning
<i>MPPE 40</i>	MPPE version 1 with 40-bit key
<i>MPPE 56</i>	MPPE version 1 with 56-bit key
<i>MPPE V2 40</i>	MPPE version 2 with 40-bit key
<i>MPPE V2 56</i>	MPPE version 2 with 56-bit key
<i>DES 56</i>	DES with 56-bit key
<i>Blowfish 56</i>	Blowfish with 56-bit key
<i>none</i>	No encryption

Table 3-11: **WAN PARTNER** ► **EDIT**

If DES or Blowfish are used, the key can be generated automatically with authentication or defined statically. The following new fields have been added to the **WAN PARTNER ► EDIT ► ADVANCED SETTINGS ► EXTENDED INTERFACE SETTINGS (OPTIONAL)** menu for this purpose:

Field	Meaning
<b>Encryption Key Negotiation</b>	<p>Defines whether a key for the connection to the WAN partner is generated automatically or defined statically.</p> <p>Possible values:</p> <ul style="list-style-type: none"> <li>■ <i>authentication</i> (default value): Key is generated automatically by <b>X4000</b>.</li> <li>■ <i>static</i>: The key is defined statically and must be entered under <b>Encryption Key (TX)</b> and <b>Encryption Key (RX)</b>.</li> </ul>
<b>Encryption Key (TX)</b>	<p>(Only for <b>Encryption Key Negotiation = static</b>)</p> <p>Key (in hexadecimal format) for encryption of outgoing data (must be the same as the entry under <b>Encryption Key (RX)</b> at the connection partner's).</p>
<b>Encryption Key (RX)</b>	<p>(Only for <b>Encryption Key Negotiation = static</b>)</p> <p>Key (in hexadecimal format) for encryption of incoming data (must be the same as the entry under <b>Encryption Key (TX)</b> at the connection partner's).</p>

Table 3-12: **WAN PARTNER ► ADD ► ADVANCED SETTINGS ► EXTENDED INTERFACE SETTINGS (OPTIONAL)**

## Example

Proceed as in the following example to exchange data in encrypted form with a WAN partner:

- Go to **WAN PARTNER** ➤ **EDIT**.
- Select **Encryption**, e.g. *DES 56*.
- Go to **WAN PARTNER** ➤ **ADD** ➤ **ADVANCED SETTINGS** ➤ **EXTENDED INTERFACE SETTINGS (OPTIONAL)**.
- Select **Encryption Key Negotiation**, e.g. *static* (if you wish to define the key yourself).
- Enter **Encryption Key (TX)**, if applicable, e.g. *1A35EFC17B56*
- Enter **Encryption Key (RX)**, if applicable, e.g. *89A1288CD131*
- Press **SAVE**.
- Confirm with **OK**.
- Press **SAVE**.

## 3.3 IPX

### 3.3.1 Default Value for NetBIOS Broadcast Replication Changed to *no*

Until now, *yes* was the preset default value for **NetBIOS Broadcast Replication** in the **IPX** menu. In Release 5.1.5, the default setting is *no*.

These settings prevent unwanted WAN connections through sending NetBIOS requests, which cause costs.

## 4 Bugfixes

### 4.1 Frame Relay

Description: It was not possible to transmit data from **X4000** to the remote terminal over a point-to-point connection configured over frame relay. Outgoing packets were incorrectly encapsulated by **X4000** and rejected by the remote terminal.

Current status: This bug has been fixed in Release 5.1.5.

### 4.2 OSPF

Description: OSPF could not be used, as **X4000** could send multicast frames but not receive them.

Current status: This bug has been fixed in Release 5.1.5.



