

Remote Maintenance with WinCC flexible Communication via a Wide Area Network (WAN)

Communication via an ISDN Router

Issue 12/04

Foreword

This document describes a possible means of connecting a PC to the wide area network (WAN) via an ISDN router.

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Warranty

The entries relate to selected suggested solutions for queries with complex tasks which have been dealt with in Customer Support. We also wish to point out that current technology not does permit us to exclude the possibility of errors in software programs taking all application conditions into account. The entries have been compiled to the best of our knowledge. We cannot agree to accept any liability over and beyond the standard warranty for class C software in accordance with our "General Terms and Conditions for the Transfer of Software Products for Automation and Drive Technology". The programs are available on the Internet under individual licenses. They are non-transferable.

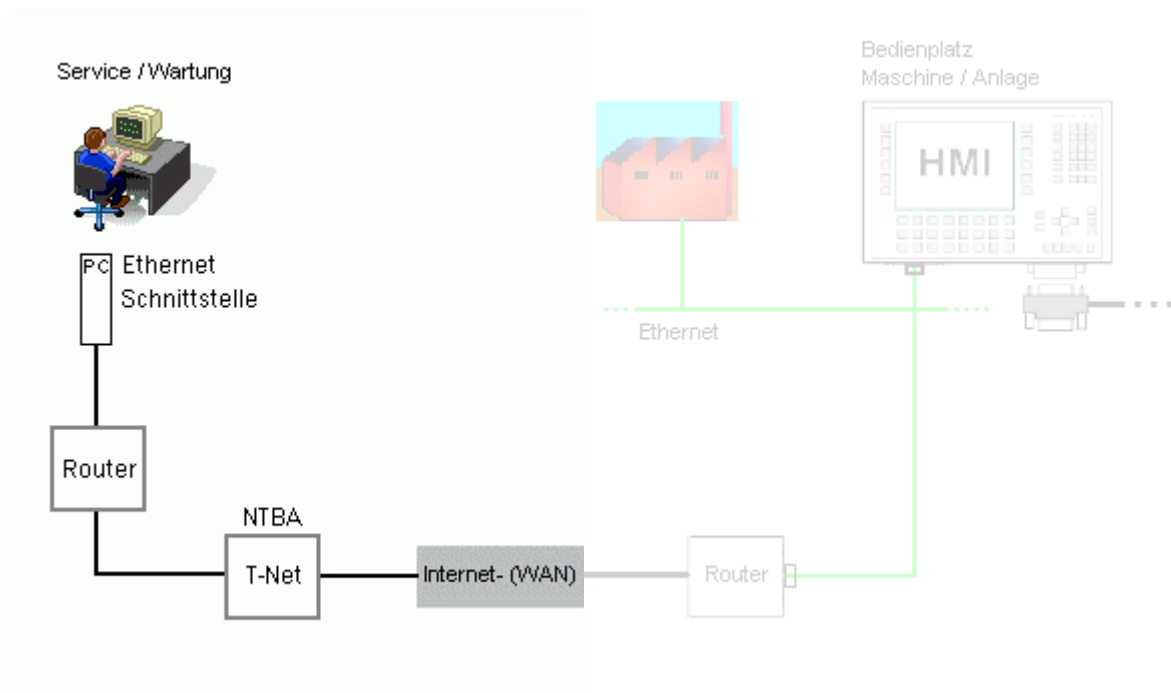
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1 Operator panel in communication via an ISDN router

1.1 Overview

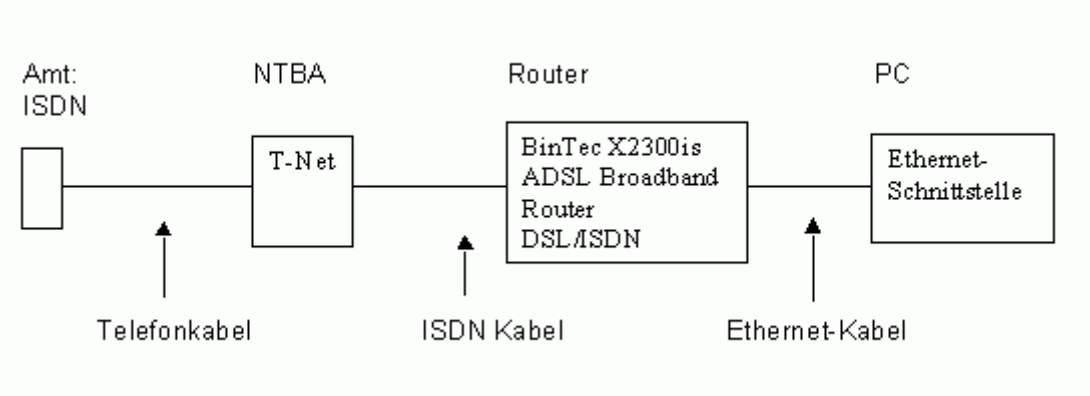
Fig. 1-1 / Fig. 1-2



1.1.1 Structure of the link via an ISDN router

Overview: Panel ↔ Exchange

Fig. 1-3



1.1.2 Hardware used

Table 1-1

Hardware	Manufacturer	Other details
Router X2300is	BinTec	The modern generation of routers also supports externally connected analog modems.
Telephone cable	Standard cable	Included with the NTBA
Uncrossed Ethernet cable	Generally included with the router	NTBA <--> Router
Uncrossed Ethernet cable	Included with the router	Router <--> PC/Panel
Serial cable		for configuring the router

1.1.3 Software used

Table 1-2

Software	Manufacturer	Other details
BRICKware	BinTec	

1.2 Installation and configuration of the ISDN connection via a router

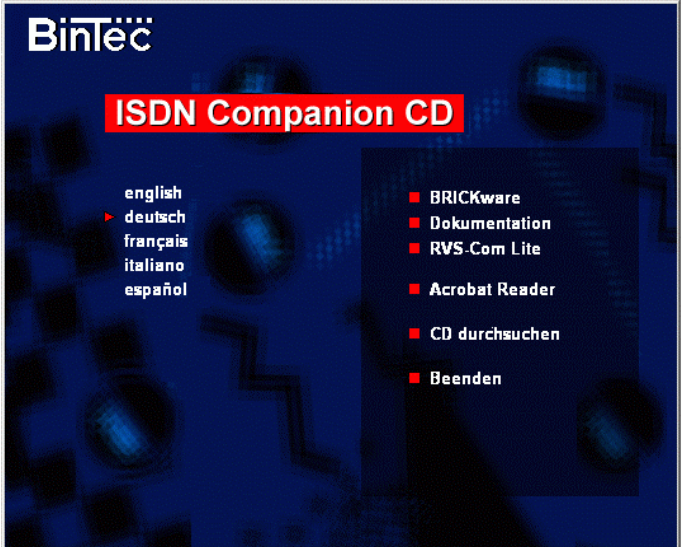
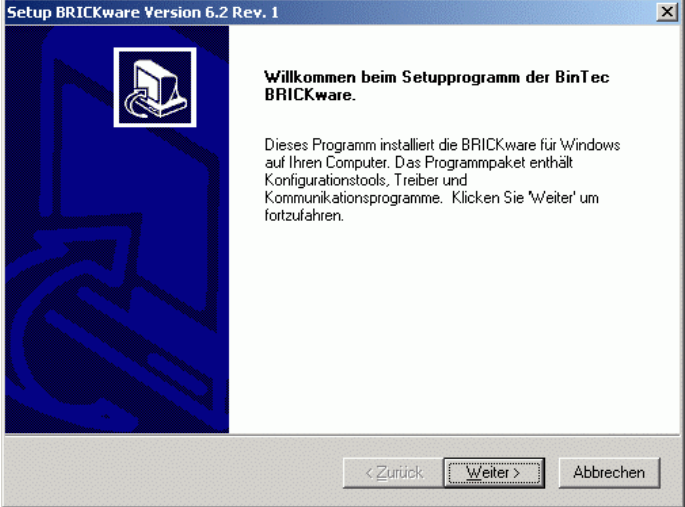
Only BRICKware is required for configuring the BinTec router that is used by us. The BRICKware software is supplied on a CD and has to be installed on the PC.

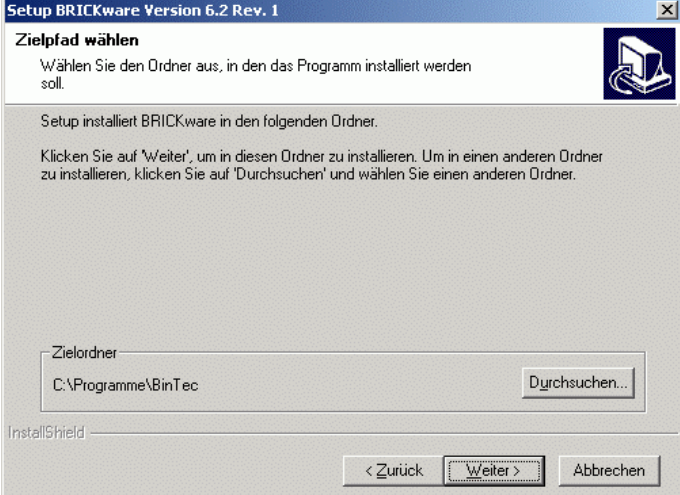
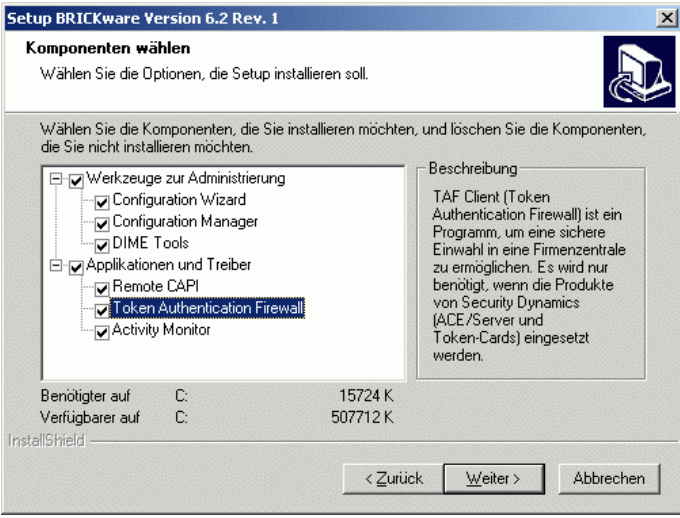
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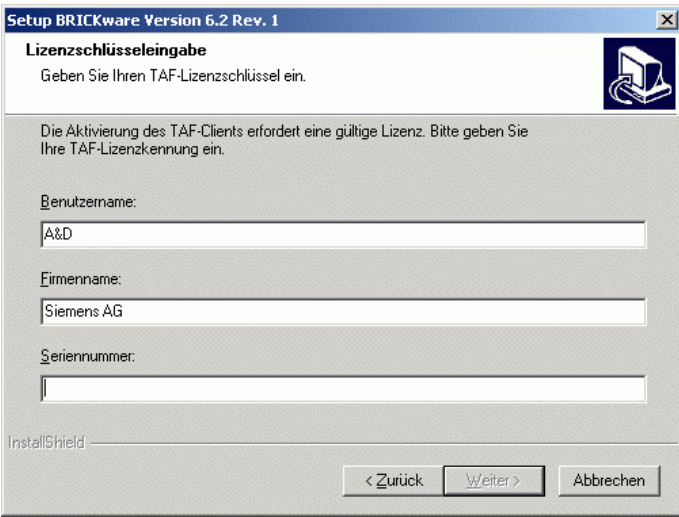
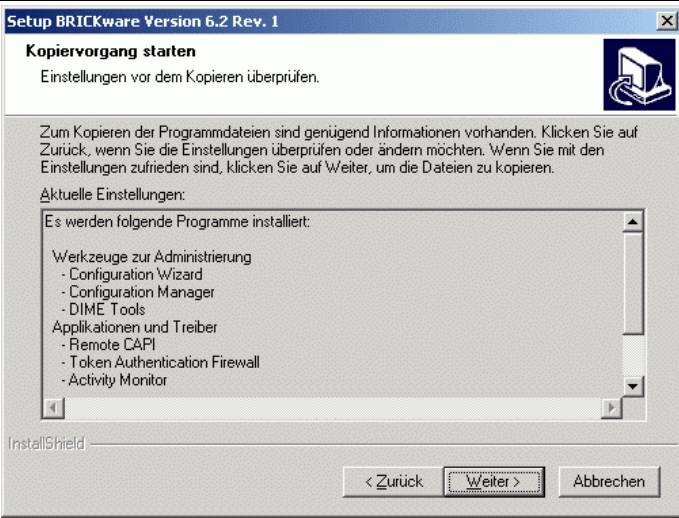
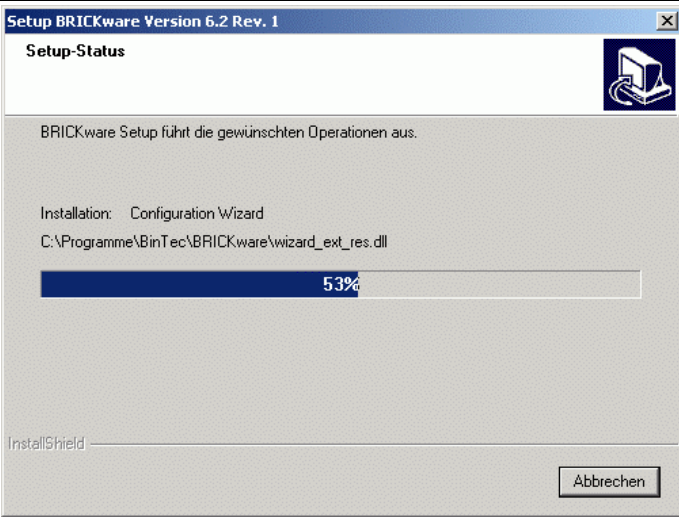
Depending on your PC settings, setup starts automatically or when "Setup.exe" which is contained on the CD is started manually.

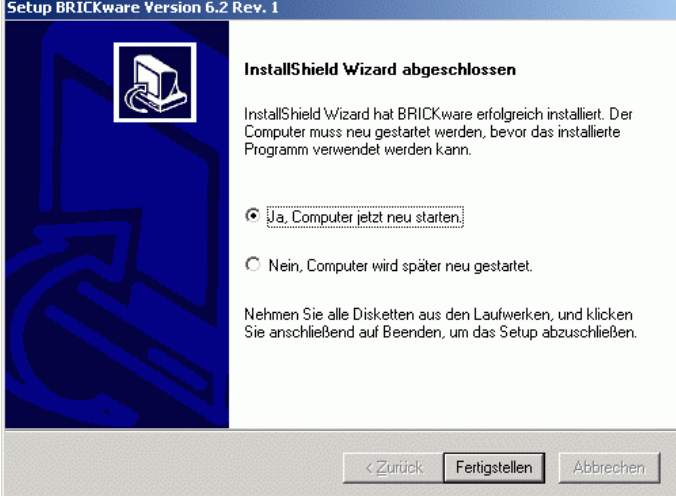
There is no need to install the whole package.


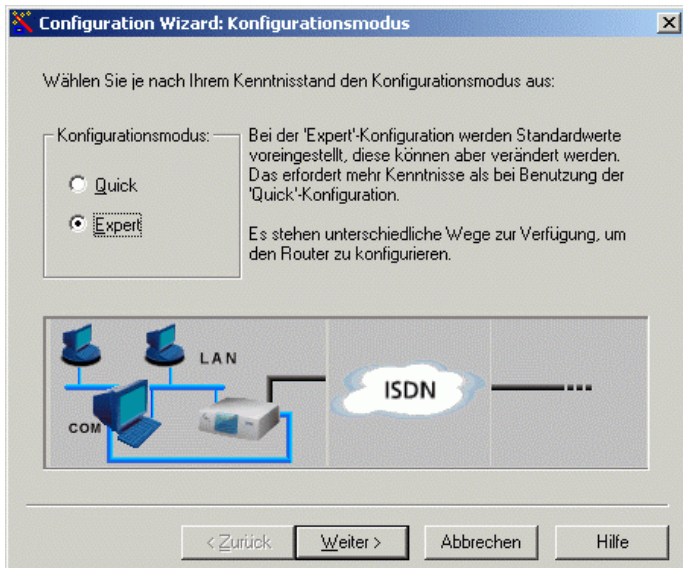
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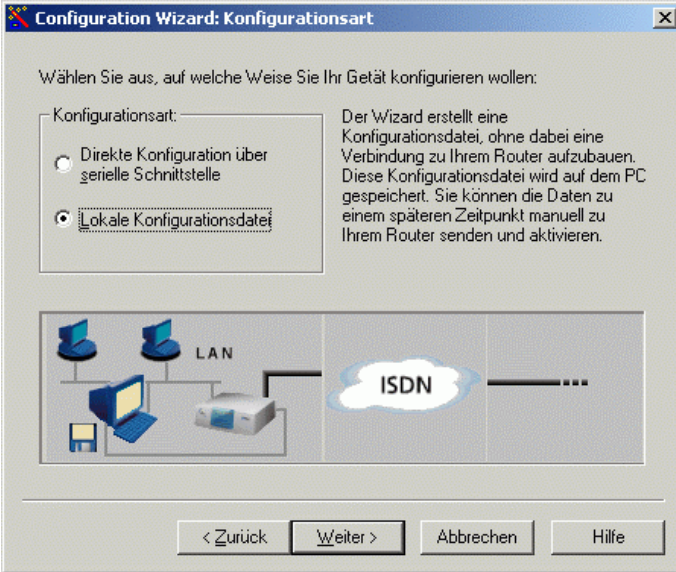
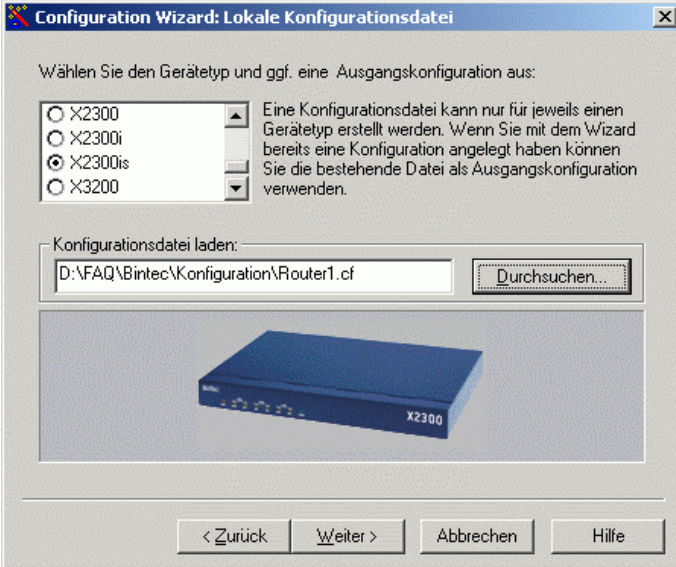
No.	Action	Note
1	After the CD is inserted, the following window appears in which you select the required installation language and start the BRICKware installation procedure..	
2	Welcome.....	

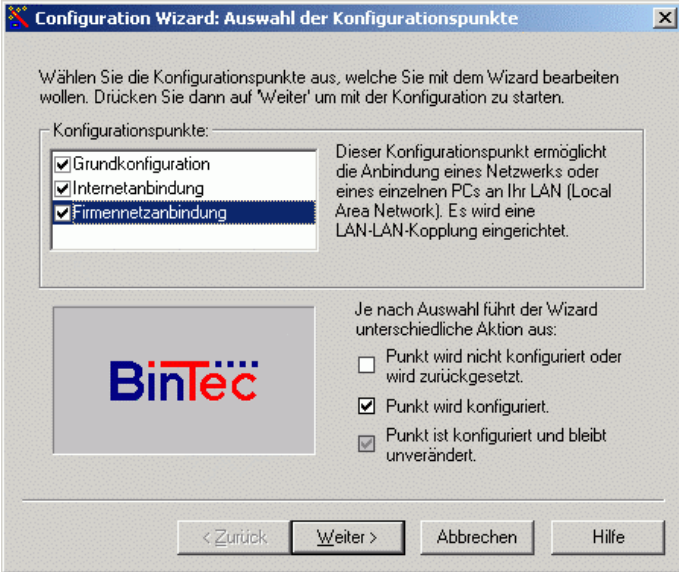

3	The installation of the software starts by selecting the destination folder.	
4	Select the individual components.	
5	<p>Note:</p> <p>If you are configuring a router for the first time as a beginner, we would advise you to install all the administration tools.</p> <p>In the case of professional routers, complete configuration is generally only possible with all the available tools.</p> <p>(For example, you require HyperTerminal and a TFTP server for firmware updates).</p> <p>Each tool performs one function.</p> <p>The configuration wizard only helps you to create a basic configuration. See section 2 for further settings</p> <p>You can use the configuration manager to refine your basic configuration. This is not described in any further detail in this document.</p> <p>The DIME tools contain a TFTP server and further tools for editing your router's settings, (such as BootP)</p>	

	Using the DIME tool Syslog Daemon, you can have LOG files created of your configuration, facilitating diagnostics later on in the event of an error.	
6	The following screenshots only show the remainder of the installation. After entering the serial number, you only need to click Next to confirm.	
7	Click Next to confirm..	
8	Setup status.	

9	<p>After you restart your PC, the configuration wizard opens automatically. Use it to configure the router for its first use via the serial cable (supplied).</p>	
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10	<p>Note:</p> <p>Only use this basic configuration for an initial function test, not for permanent operation. The basic configuration does not protect your local network.</p> <p>You can extend this configuration without any problem in the router with the configuration wizard that is already installed.</p> <p>BinTec also enables the router to be configured with the aid of the HyperTerminal.</p>
11	<p>Configuration wizard</p> 
12	<p>Select Expert mode when creating the basic configuration.</p> 

13	You can choose between creating a configuration file offline or performing the configuration directly.	
14	<p>Note:</p> <p>The offline configuration file can be transferred to the router later on with the aid of the configuration wizard or to the HyperTerminal together with a TFTP server. If you use the wizard to transfer the file, you have to perform all the installation steps once again. However, your settings have already been performed and saved.</p> <p>Transferring the configuration via the TFTP server is explained later on in this FAQ.</p>	
15	First of all select your router and then specify the path and name of the backup file.	

16	<p>The following configuration options should be enabled to allow you to access the Internet from the local network:</p> <ul style="list-style-type: none"> • Basic configuration • Link to Internet • Link to company Intranet <p>The link to the company Intranet is required for router-to-router coupling.</p>	 <p>Configuration Wizard: Auswahl der Konfigurationspunkte</p> <p>Wählen Sie die Konfigurationspunkte aus, welche Sie mit dem Wizard bearbeiten wollen. Drücken Sie dann auf 'Weiter' um mit der Konfiguration zu starten.</p> <p>Konfigurationspunkte:</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Grundkonfiguration <input checked="" type="checkbox"/> Internetanbindung <input checked="" type="checkbox"/> Firmennetzanbindung <p>Dieser Konfigurationspunkt ermöglicht die Anbindung eines Netzwerks oder eines einzelnen PCs an Ihr LAN (Local Area Network). Es wird eine LAN-LAN-Kopplung eingerichtet.</p> <p>Je nach Auswahl führt der Wizard unterschiedliche Aktion aus:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Punkt wird nicht konfiguriert oder wird zurückgesetzt. <input checked="" type="checkbox"/> Punkt wird konfiguriert. <input checked="" type="checkbox"/> Punkt ist konfiguriert und bleibt unverändert. <p>< Zurück Weiter > Abbrechen Hilfe</p>
17	Configuration wizard	 <p>Configuration Wizard: Zusammenfassung</p> <p>Die Konfigurationsdatei 'D:\FAQ\Bintec\Konfiguration\Router1.cf' wird für einen Router vom Typ 'X2300is' erstellt oder bearbeitet.</p> <p>Die folgenden Punkte werden konfiguriert, geändert oder entfernt:</p> <ul style="list-style-type: none"> 'Grundkonfiguration' konfigurieren. 'Internetanbindung' konfigurieren. 'Firmennetzanbindung' konfigurieren. <p>Der Configuration Wizard wird Sie durch die obigen Konfigurationspunkte leiten. Klicken Sie auf 'Weiter', um mit dem Konfigurieren zu beginnen.</p> <p>< Zurück Weiter > Abbrechen Hilfe</p>

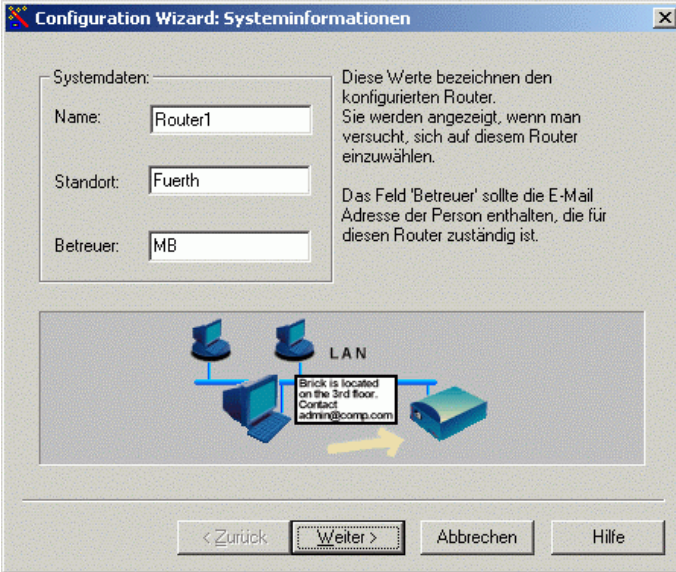
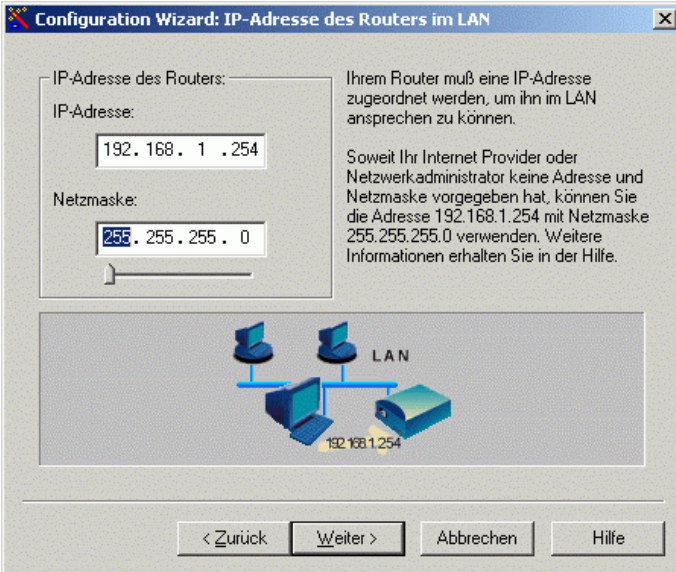
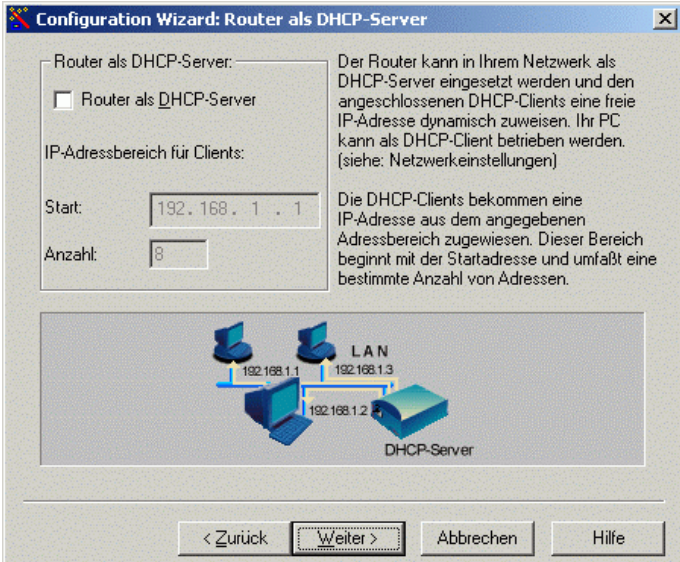
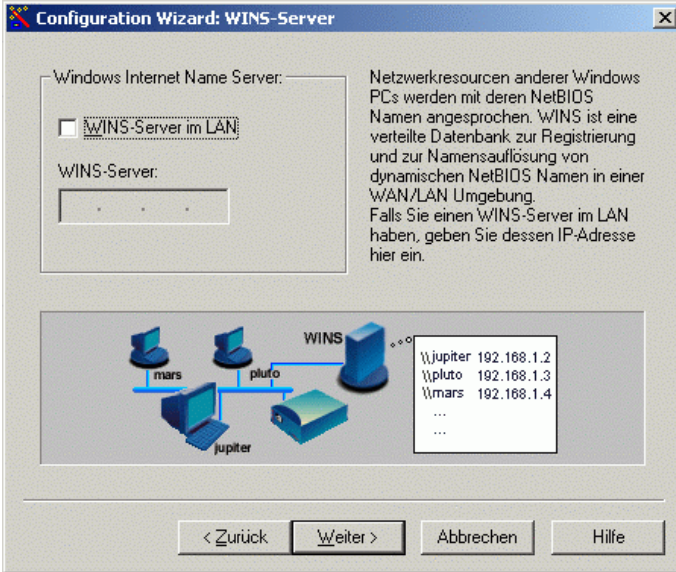
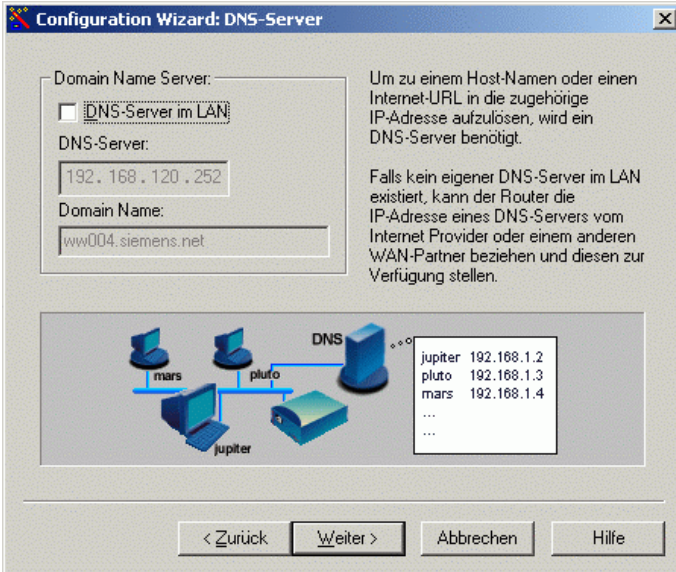
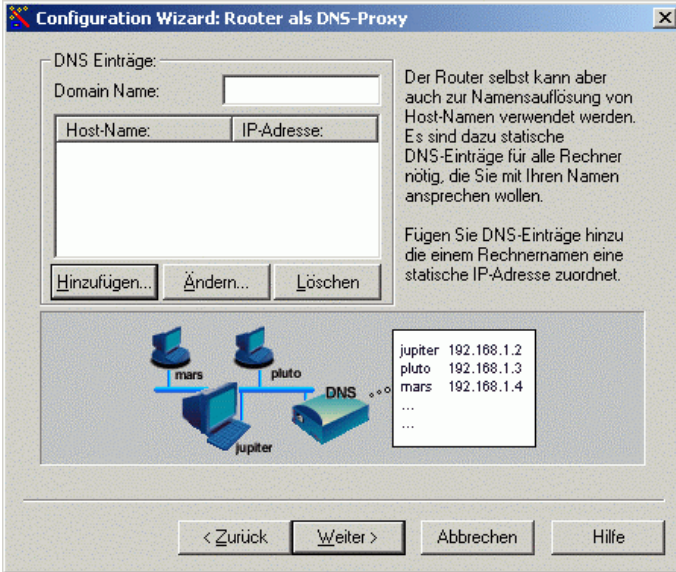
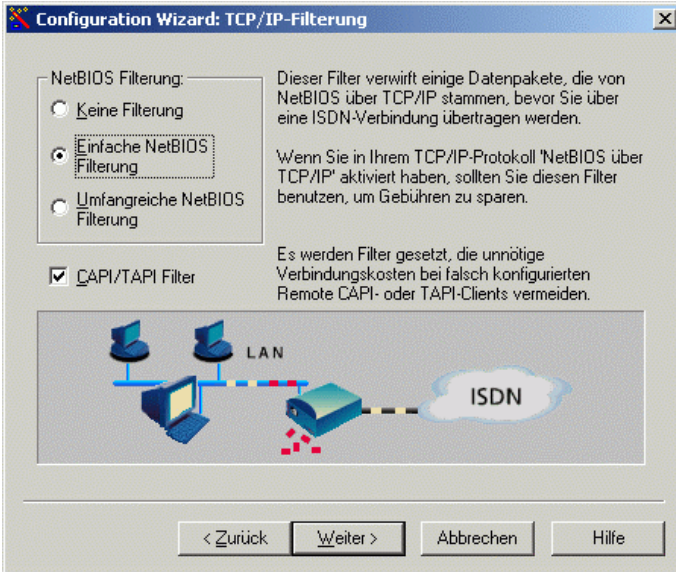
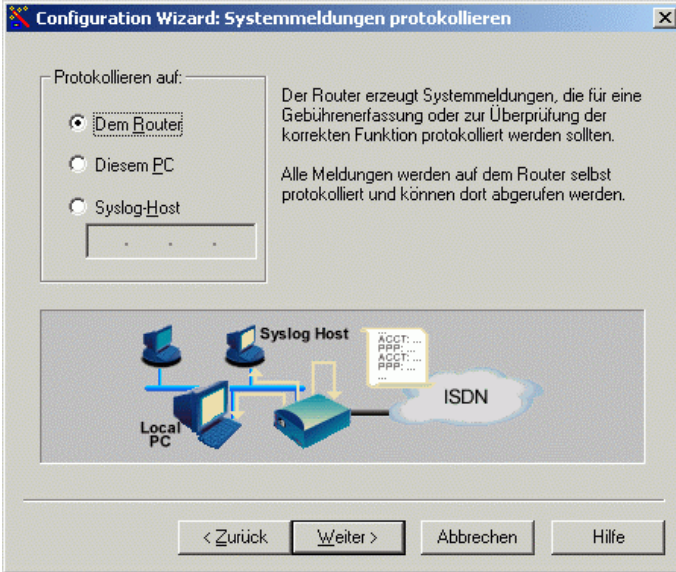
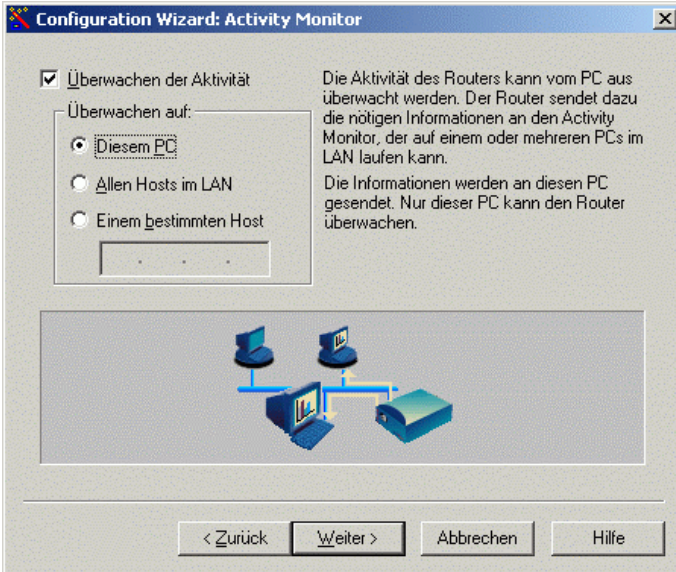
18	<p>In the dialogs which follow, specify the basic data for your network in order to give the router unique identification.</p> <p>The name of the router must be unique.</p> <p>It is used for identification purposes if there is more than one router combined within a company Intranet.</p>	
19	<p>In the basic configuration you can retain the proposed IP address or adapt it to suit your existing network.</p> <p>It is always advisable to choose the last address in an IP band so as to avoid having to change the configuration later on if the network is extended.</p> <p>The annex contains the principles for awarding IP addresses.</p>	

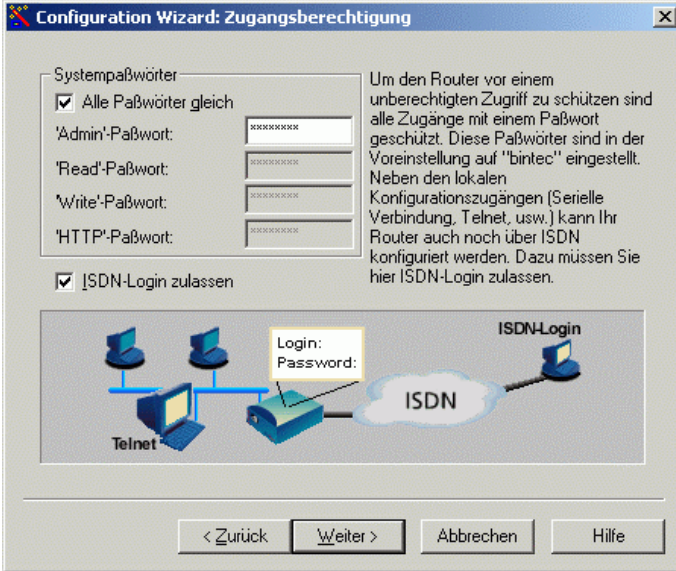
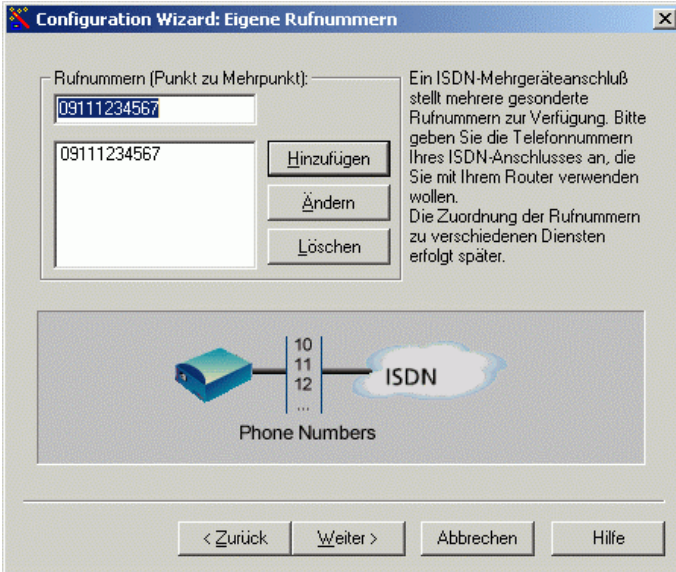
Table 1-4



No.	Action	Note
20	<p>The router can be configured as a DHCP server in the figure below. The IP addresses would then be distributed automatically to all the subscribers in your LAN in the IP band defined by you.</p> <p>To enable you to contact the subscribers in your network by name afterwards, you will require a DNS server that performs the name resolution for you.</p> <p>Only one list of names can be created in the BinTec router that is used by us; assign a permanent IP address to every computer name on the list.</p> <p>Every time the computer name is identified by the router, it assigns the same IP address. If there is a DNS server installed on a computer in the network, you have even more options for name resolution during configuration.</p>	
21	<p>Only permanently assigned IP addresses are used for the LAN in this example.</p>	 <p>Configuration Wizard: Router als DHCP-Server</p> <p>Router als DHCP-Server: <input type="checkbox"/> Router als DHCP-Server</p> <p>IP-Adressbereich für Clients: Start: 192.168.1.1 Anzahl: 8</p> <p>Der Router kann in Ihrem Netzwerk als DHCP-Server eingesetzt werden und den angeschlossenen DHCP-Clients eine freie IP-Adresse dynamisch zuweisen. Ihr PC kann als DHCP-Client betrieben werden. (siehe: Netzwerkeinstellungen)</p> <p>Die DHCP-Clients bekommen eine IP-Adresse aus dem angegebenen Adressbereich zugewiesen. Dieser Bereich beginnt mit der Startadresse und umfaßt eine bestimmte Anzahl von Adressen.</p> <p>Diagramm: LAN mit drei Computern (IPs: 192.168.1.1, 192.168.1.2, 192.168.1.3) und einem DHCP-Server.</p> <p>< Zurück Weiter > Abbrechen Hilfe</p>


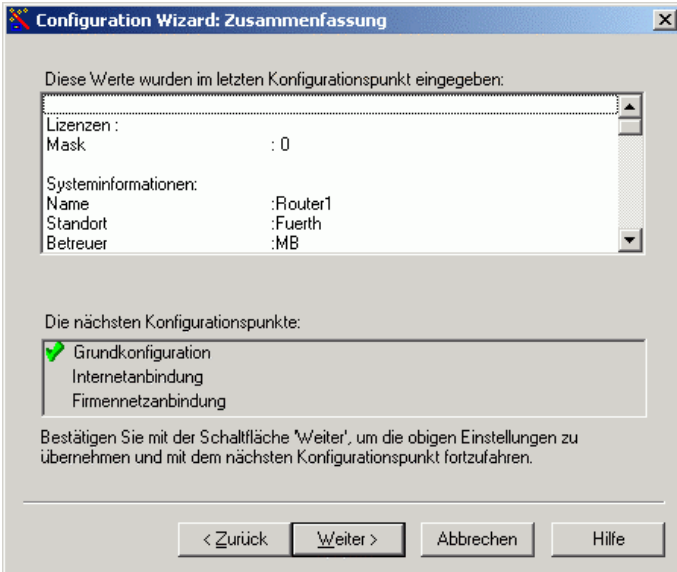
22	<p>No settings have to be configured in the dialogs below.</p> <p>Name resolution does not take place.</p> <p>Click Next to continue.</p>	 <p>Configuration Wizard: WINS-Server</p> <p>Windows Internet Name Server:</p> <p><input type="checkbox"/> WINS-Server im LAN</p> <p>WINS-Server:</p> <p>Netzwerkressourcen anderer Windows PCs werden mit deren NetBIOS Namen angesprochen. WINS ist eine verteilte Datenbank zur Registrierung und zur Namensauflösung von dynamischen NetBIOS Namen in einer WAN/LAN Umgebung. Falls Sie einen WINS-Server im LAN haben, geben Sie dessen IP-Adresse hier ein.</p> <p>\\jupiter 192.168.1.2 \\pluto 192.168.1.3 \\mars 192.168.1.4</p> <p>< Zurück Weiter > Abbrechen Hilfe</p>
23	<p>Click Next to continue.</p>	 <p>Configuration Wizard: DNS-Server</p> <p>Domain Name Server:</p> <p><input type="checkbox"/> DNS-Server im LAN</p> <p>DNS-Server:</p> <p>192.168.120.252</p> <p>Domain Name:</p> <p>www004.siemens.net</p> <p>Um zu einem Host-Namen oder einer Internet-URL in die zugehörige IP-Adresse aufzulösen, wird ein DNS-Server benötigt.</p> <p>Falls kein eigener DNS-Server im LAN existiert, kann der Router die IP-Adresse eines DNS-Servers vom Internet Provider oder einem anderen WAN-Partner beziehen und diesen zur Verfügung stellen.</p> <p>jupiter 192.168.1.2 pluto 192.168.1.3 mars 192.168.1.4</p> <p>< Zurück Weiter > Abbrechen Hilfe</p>

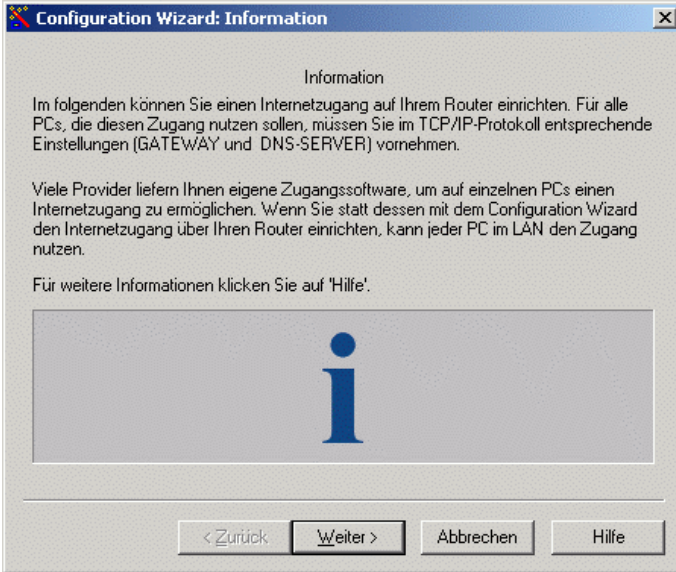
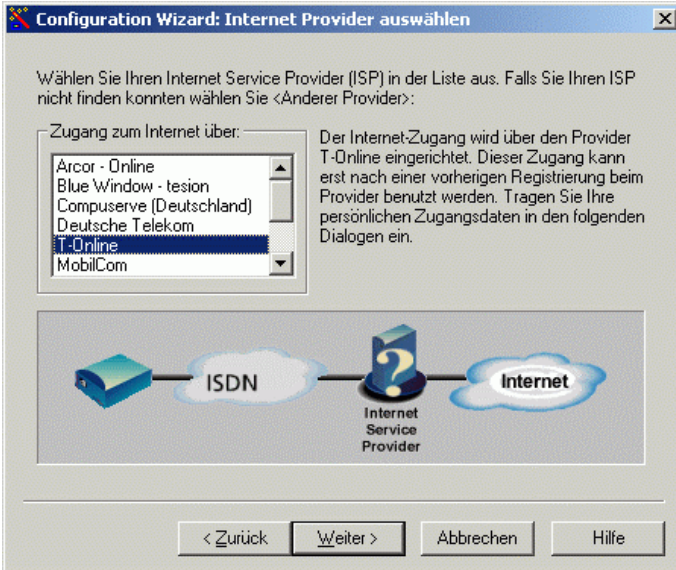
24	Click Next to continue.	
25	The NetBIOS filter used here saves you unnecessary Internet costs that can result from configuration errors or from applications either.	


26	<p>Logging to the router. Click Next to continue.</p>	 <p>Configuration Wizard: Systemmeldungen protokollieren</p> <p>Protokollieren auf:</p> <ul style="list-style-type: none"> <input checked="" type="radio"/> Dem Router <input type="radio"/> Diesem PC <input type="radio"/> Syslog-Host <p>Der Router erzeugt Systemmeldungen, die für eine Gebührenerfassung oder zur Überprüfung der korrekten Funktion protokolliert werden sollten.</p> <p>Alle Meldungen werden auf dem Router selbst protokolliert und können dort abgerufen werden.</p> <p>Diagram: Local PC, Syslog Host, ISDN</p> <p>< Zurück Weiter > Abbrechen Hilfe</p>
27	<p>The installation software for the BinTec router includes tools that enable you to monitor all the processes on the router.</p> <p>In the query below, either an individual PC or a whole network is enabled for monitoring.</p>	 <p>Configuration Wizard: Activity Monitor</p> <p><input checked="" type="checkbox"/> Überwachen der Aktivität</p> <p>Überwachen auf:</p> <ul style="list-style-type: none"> <input checked="" type="radio"/> Diesem PC <input type="radio"/> Allen Hosts im LAN <input type="radio"/> Einem bestimmten Host <p>Die Aktivität des Routers kann vom PC aus überwacht werden. Der Router sendet dazu die nötigen Informationen an den Activity Monitor, der auf einem oder mehreren PCs im LAN laufen kann.</p> <p>Die Informationen werden an diesen PC gesendet. Nur dieser PC kann den Router überwachen.</p> <p>Diagram: Local PC, Router</p> <p>< Zurück Weiter > Abbrechen Hilfe</p>

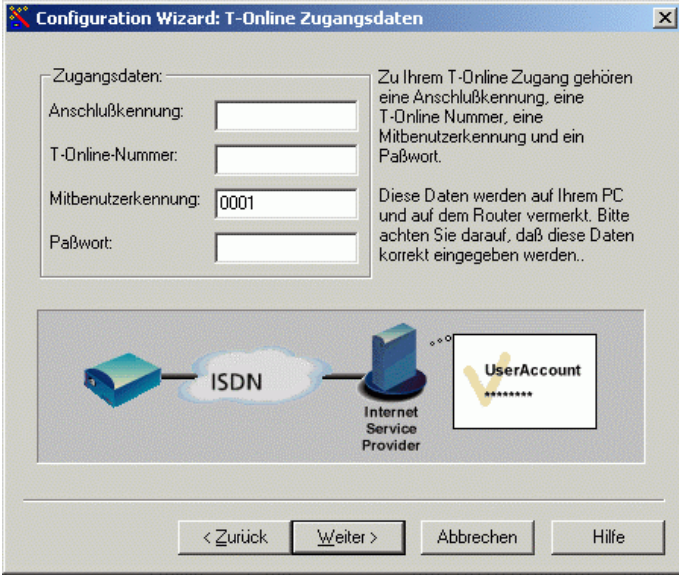
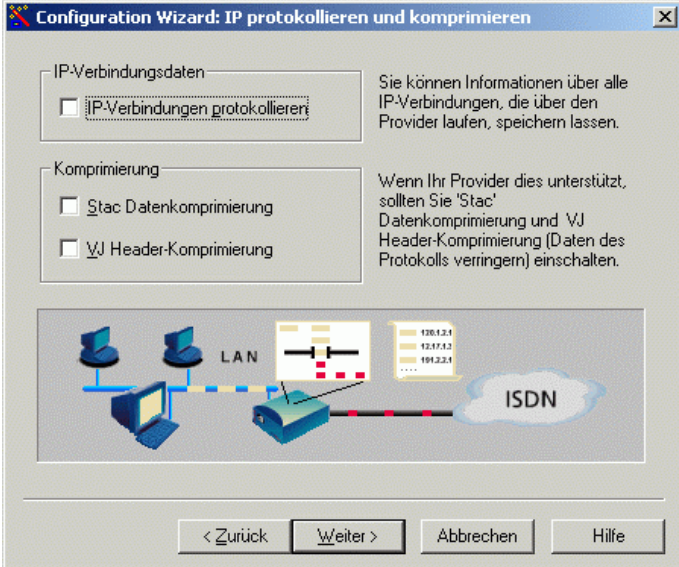
28	<p>The BinTec router also supports external access. Different passwords can be assigned in the dialog for different applications.</p> <p>The Permit ISDN login enables you to connect to the router from an external PC using Telnet software and to change the settings.</p> <p>The connection is established using one of the passwords that are used in the dialog.</p>	
29	<p>The phone number entered here is used later to call the router from an external phone line or from the company network router.</p>	
30	<p>Lists can be entered later on in the router that can be used to decide whether the caller is authorized to access the LAN. Phone number identification also has special significance in the case of the VPN connection, which is explained later.</p>	

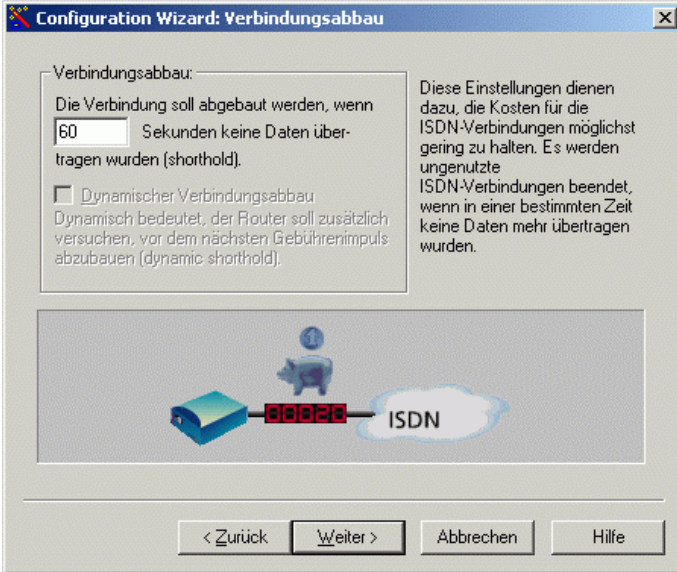
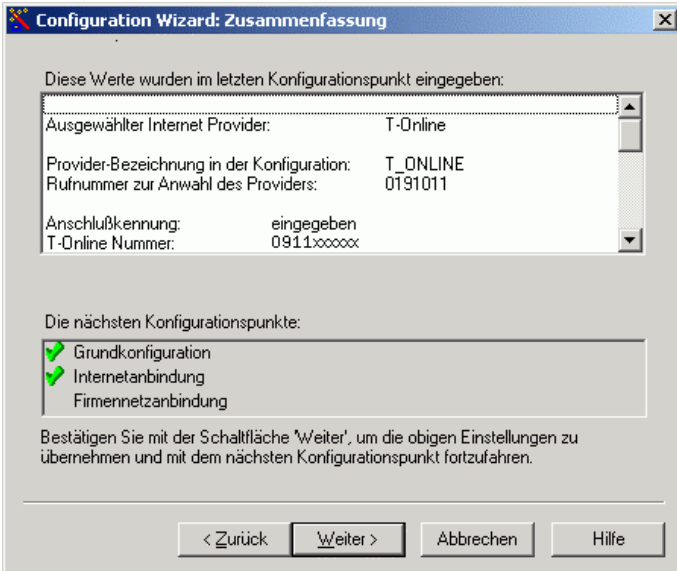
31	<p>No charges have been recorded in this example because they may also be dependent on the time of day and may, therefore, be imprecise. As you can tell from the note in this dialog, the router disconnects again after a defined period of time in order to avoid unnecessary costs.</p> <p>This setting only takes place once you have set up your Internet access data and can be changed at any time via the setup tool or configuration manager.</p>	
32	<p>Default user account Click Next to continue.</p>	

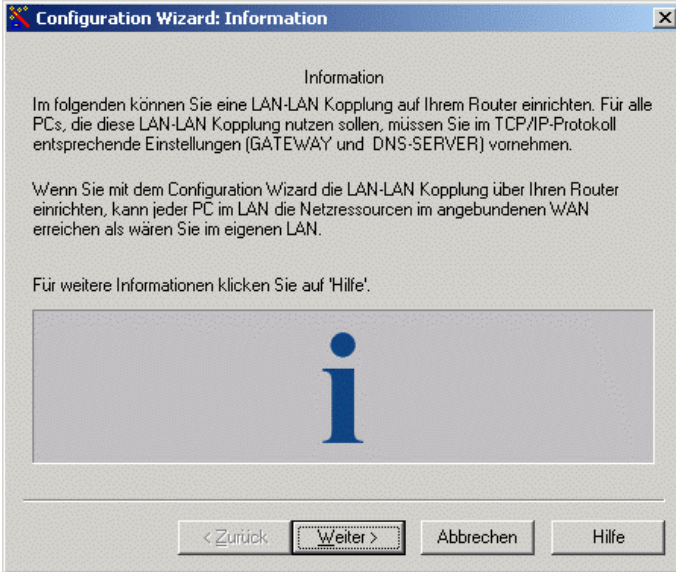

33	The CAPI services operate via the phone number that you assigned to your router beforehand.	
34	Click Next to continue.	
35	With the steps that have been carried out up to now, a basic configuration has been created which mainly relates to the LAN.	

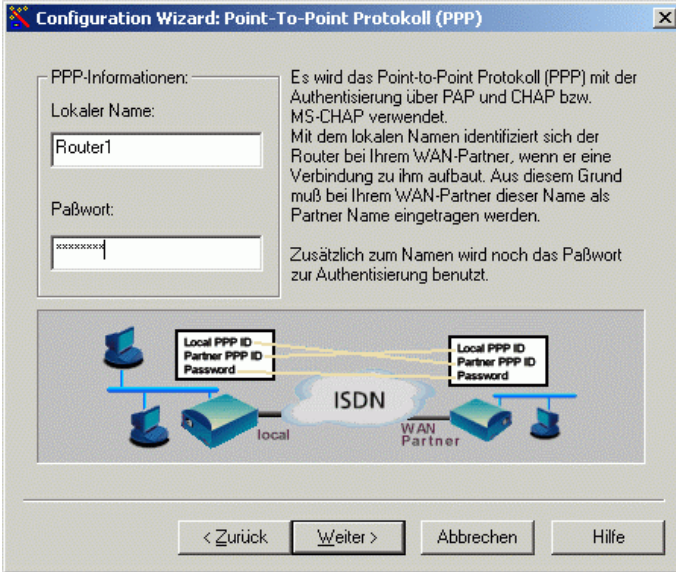
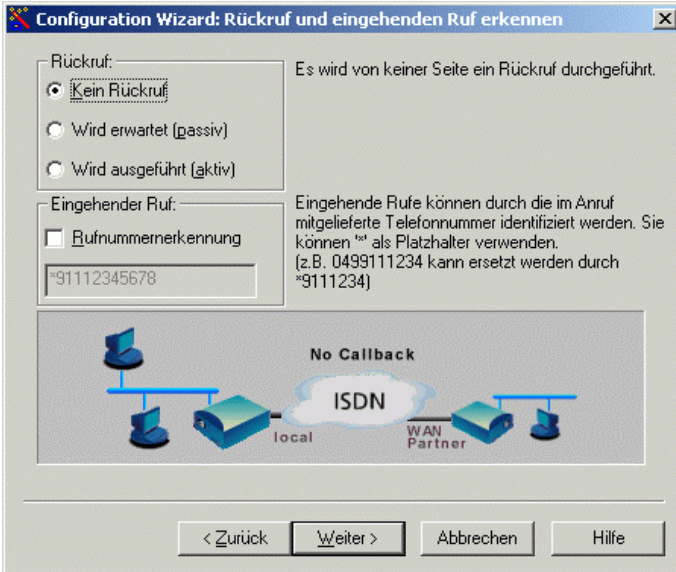
36	<p>To enable you to access the Internet or another partner network from your system, the steps described now must also be processed for setting up Internet and company Intranet access.</p>	
37	<p>The best known Internet service providers are already included in the software and can be selected without any restriction.</p> <p>In this case access is selected via Deutsche Telekom AG.</p>	


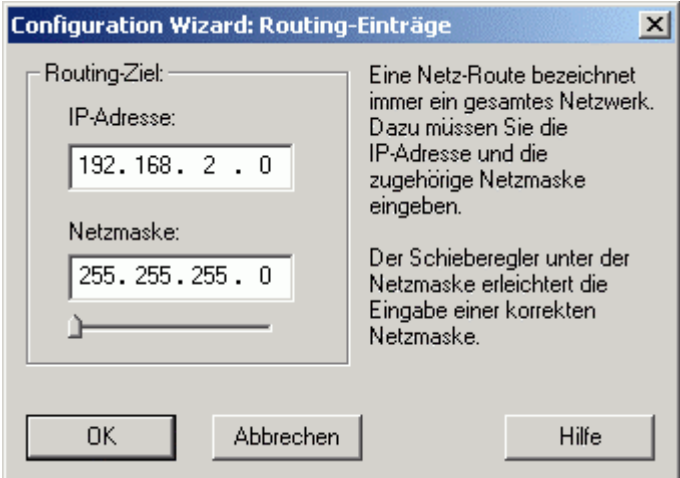
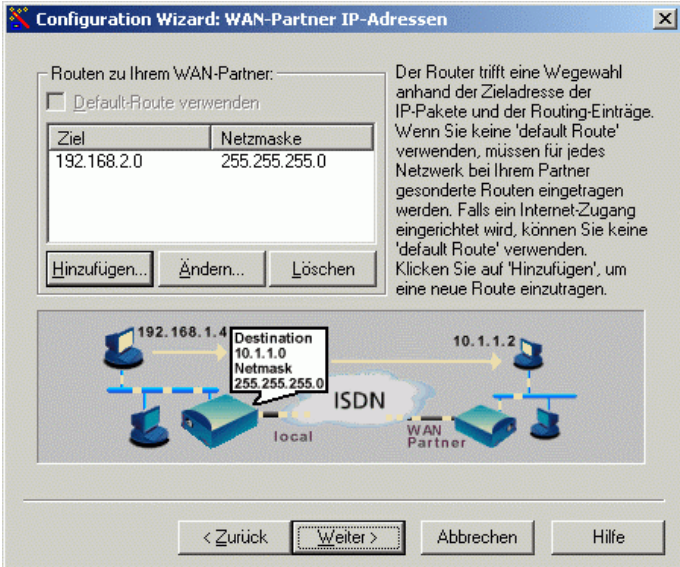
38	Select ISDN under Network .	
39	<p>Note:</p> <p>If your router supports access via both options (ISDN and DSL), only configure one connection in this basic configuration for the time being; the second connection can be added later on using the setup tool.</p> <p>The advantage of this configuration is that if one of the connections fails, the router can establish a backup connection, thus achieving greater security (this is mainly recommended in non-industrialized countries).</p> <p>Using an ISDN connection, you can be identified from the phone number or IP address without the router having to be permanently online.</p> <p>Note about the phone number:</p> <p>The phone number for the T-Online server is 0191011.</p> <p>When accessing via an extension, the phone number must be preceded by the exchange line seizure number (generally a zero).</p> <p>In the case of ISDN, you simply need to prefix the number (or exchange line seizure character), for example 00191011..</p> <p>Tip:</p> <p>The latest generation of routers also supports the connection of an analog modem using a serial cable that is available from BinTec.</p>	

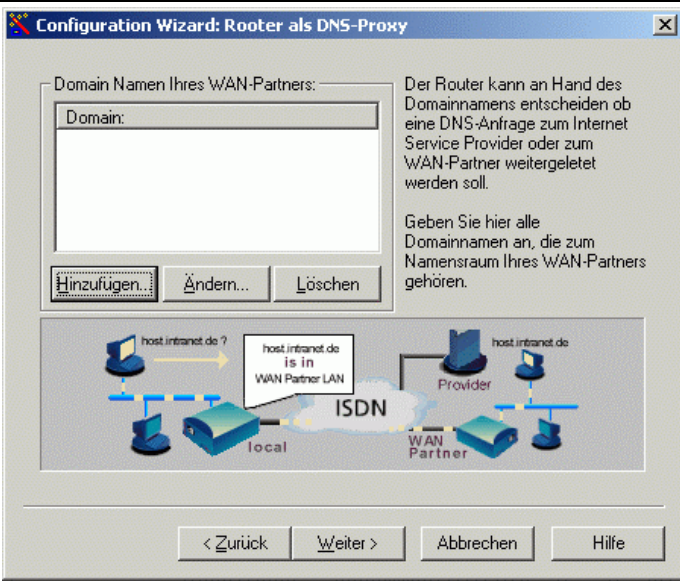

40	Now enter your T-Online access data.	
41	We do not use data compression because it always has to be supported by all the subscribers. Information about which subscriber supports this is not always available. Therefore, it is safer to avoid compression.	

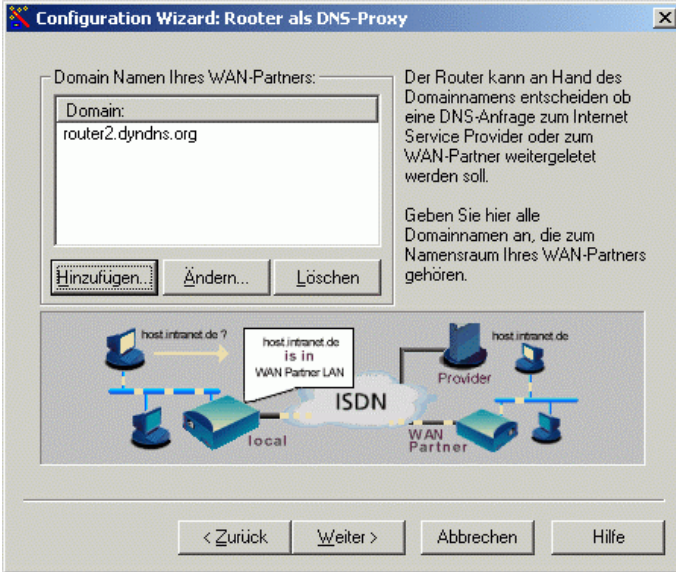

42	<p>The final step in configuring the Internet connection is to specify the shorthold time. As described in this figure, the ISDN connection is disabled if there has been no data transfer for this period of time.</p>	
43	<p>Note: Check the Internet traffic.</p> <p>Some programs create connections to the Internet and don't disconnect again independently. You can incur considerable costs as a result.</p> <p>There are freeware tools available on the Internet for checking which applications on your PC are still active. Search Google, for example, for "Active Ports".</p>	
44	<p>This concludes the setting up of the Internet connection.</p> <p>Click Next to continue.</p>	

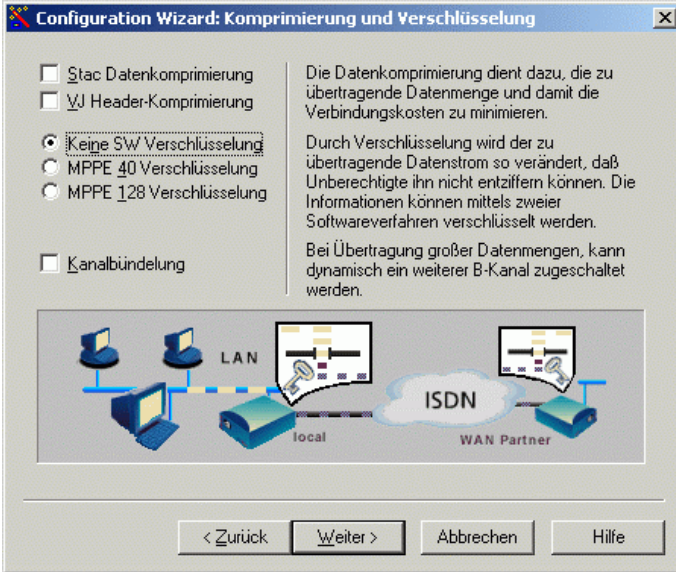

45	Click Next to continue.	
46	<p>First of all enter the name (Partner Name) of your company Intranet partner and its phone number.</p> <p>The router offers you several possibilities for identification that cannot all be configured with the wizard.</p> <p>Click Next to continue.</p>	

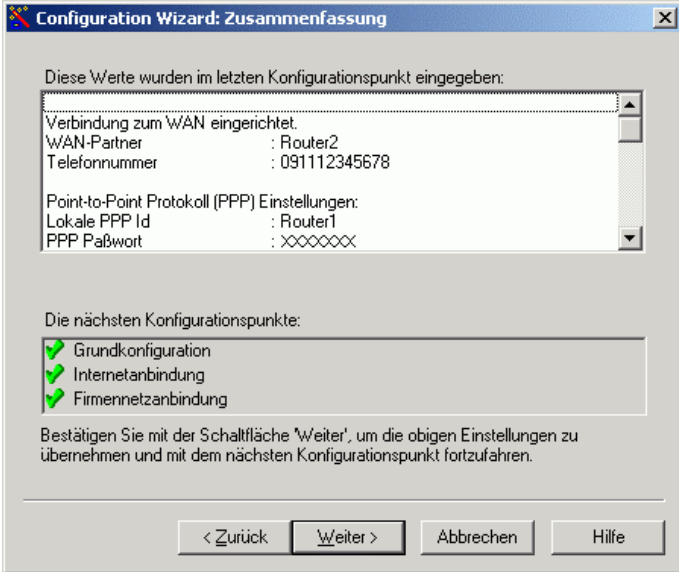
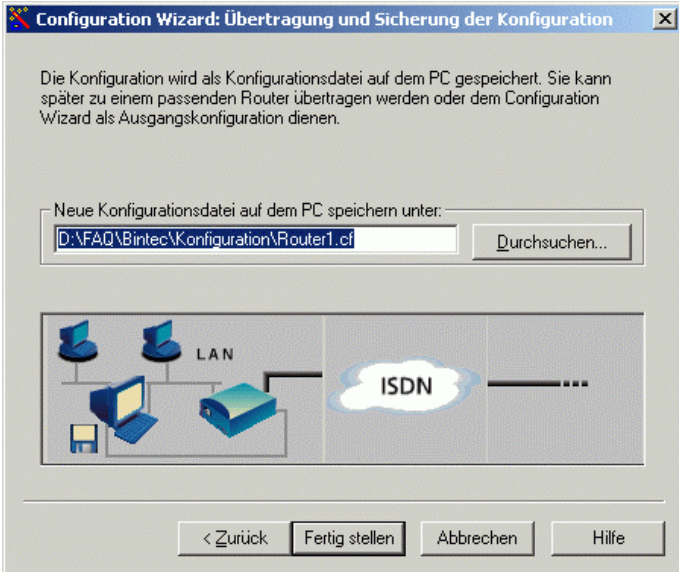
47	<p>The local data is used, on again, for identifying each other.</p> <p>Bear in mind that this is case-sensitive; identification cannot take place otherwise.</p> <p>Click Next to continue.</p>	
48	<p>The main reason to call back an ISDN partner is to share the costs.</p> <p>The advantage of this is that you can use a router in your network as a company switchboard and, thus, only incur Internet costs there too.</p> <p>Note:</p> <p>We don't want to lead you to believe at this stage that routers can only connect to one another via an ISDN line. The BinTec setup tool, which is explained later on, can be used to prioritize the DSL or ISDN connections, which are defined in your router, in a list.</p> <p>Example:</p> <p>The WAN partner is dialed via ISDN, and communication takes place via DSL, which is faster.</p> <p>Click Next to continue.</p>	

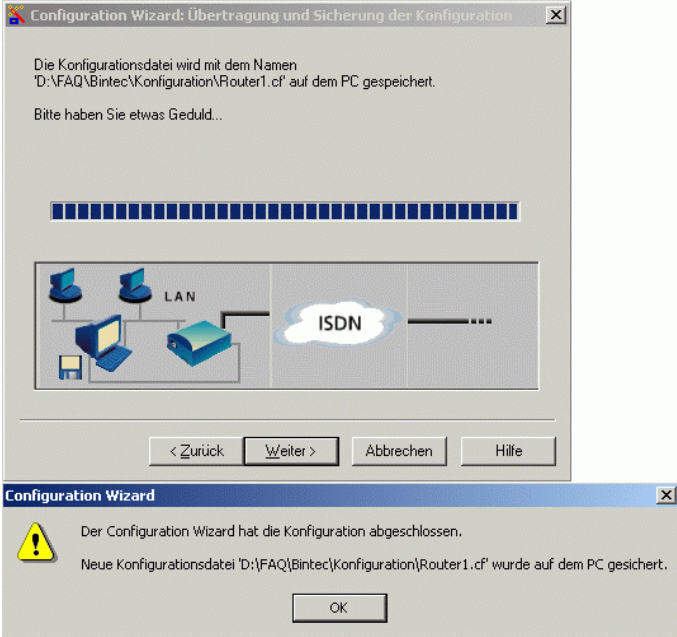
49	<p>Your router now still requires details about your partner's local network.</p> <p>Go to Add... and then enter your partner network's starting IP address and the subnet mask belonging to it.</p> <p>If you have more than one partner network, they can be specified now or added later on using the setup tool.</p>	
50	<p>Routing destination. (Partner network)</p>	
51	<p>Overview of the partner network connection that you have created.</p> <p>Click Next to continue.</p>	

52	<p>Every time you connect to the ISP, the router is assigned a new, unknown IP address. Therefore, it would make sense to register the router as a domain with a Dynamic DNS Provider, e.g. DYNDNS.ORG.</p> <p>This enables you to contact your partner router via a name.</p> <p>An example of this is an unprotected external connection to a display unit via port forwarding.</p> <p>In this case you can simply specify the name of your router in the network and the corresponding port number in order to reach your device. (for example, <a href="http://router1.dyndns.org:<port number>">http://router1.dyndns.org:<port number>)</p>
53	<p>After registering your router with a Dynamic DNS Provider, click Add... to add the domain name.</p> 
54	<p>Domain name entry.</p> 

55	<p>Overview of the domain name.</p> <p>Click Next to continue.</p>	
56	<p>No changes have been made to the dialog shown here.</p> <p>Using the setup tool, it is easier to specify which connections are permissible and what the router being used by you is meant to log.</p> <p>Click Next to continue.</p>	

57	<p>We don't use data compression or the data encryption that is shown here.</p> <p>Encryption, using VPN IPSec, for example, can be configured later on using the BinTec setup tool.</p> <p>Click Next to continue.</p>	
58	<p>Finally, specify the shorthold time again.</p> <p>Click Next to continue.</p>	

59	<p>This concludes the configuration. All you have to do now is save the settings.</p> <p>Click Next to continue.</p>	
60	<p>Please specify where to save the configuration and click Finish to confirm.</p> <p>If you selected the direct configuration option at the start, transmission to the router commences now.</p>	

61	The basic configuration is now complete.	 <p>Configuration Wizard: Übertragung und Sicherung der Konfiguration</p> <p>Die Konfigurationsdatei wird mit dem Namen 'D:\FAQ\Bintec\Konfiguration\Router1.cf' auf dem PC gespeichert.</p> <p>Bitte haben Sie etwas Geduld...</p> <p>LAN ISDN</p> <p>< Zurück Weiter > Abbrechen Hilfe</p> <p>Configuration Wizard</p> <p>Der Configuration Wizard hat die Konfiguration abgeschlossen.</p> <p>Neue Konfigurationsdatei 'D:\FAQ\Bintec\Konfiguration\Router1.cf' wurde auf dem PC gesichert.</p> <p>OK</p>
----	--	--

2 Specific Settings

The basic configuration that has been set up for your router does not provide convenient Internet access from the local network or external access to the LAN. If extra security measures are required, additional configurations need to be defined.

The configurations that are required now are no longer possible with the configuration wizard; they can be extended now using the BinTec setup tool that has been mentioned repeatedly.

This tool isn't an application on your computer, it is a program which is run directly on the router.

The connection to your router is established via a serial cable (supplied) and can also be created later on via the Internet.

The advantage of configuration via the Internet is that changes can be made without having to go to the system.

The settings listed below are covered in the following sections:

- Configuring a DNS server utility for accessing the Internet.
- Configuring the Telnet service and the Internet Control Message Protocol (ICMP)
- Configuring a DNS account for convenient access to the local area network (LAN).

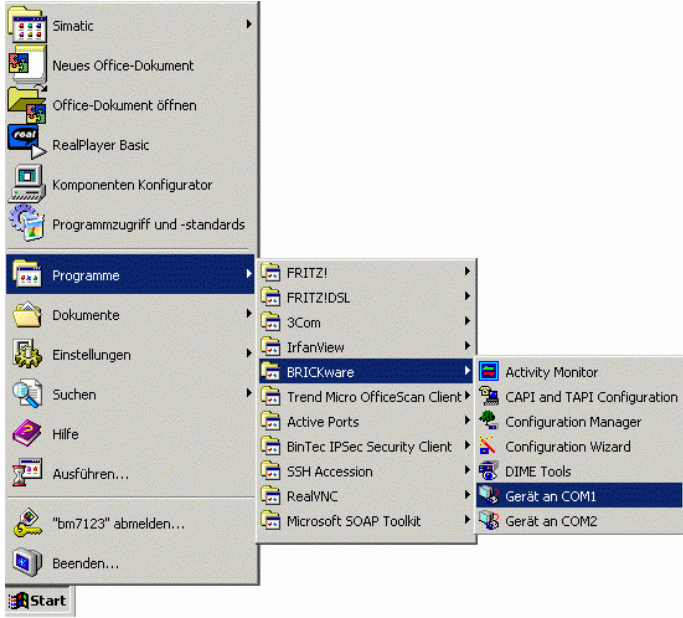
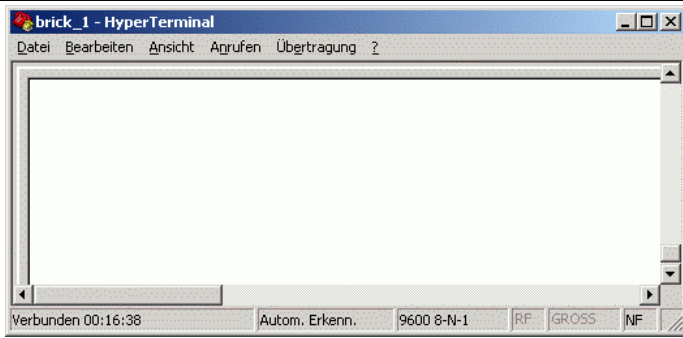
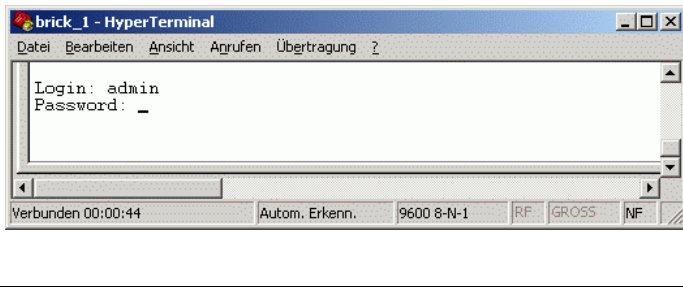
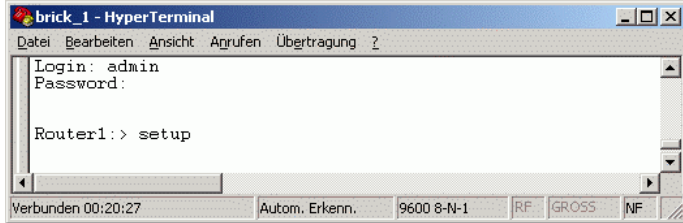
There are individual documents available on

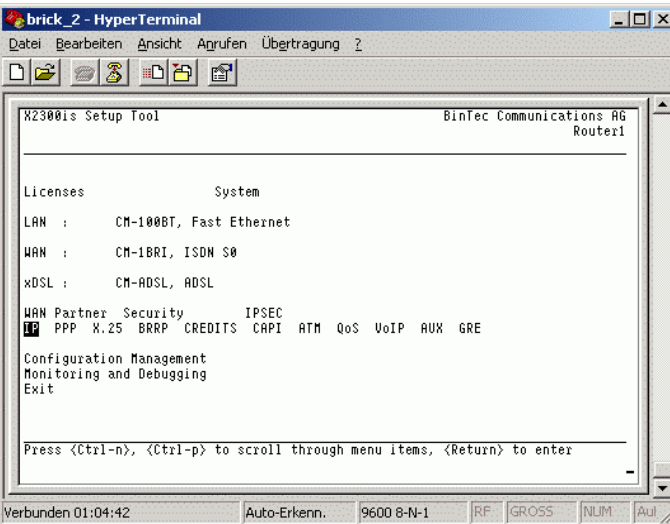
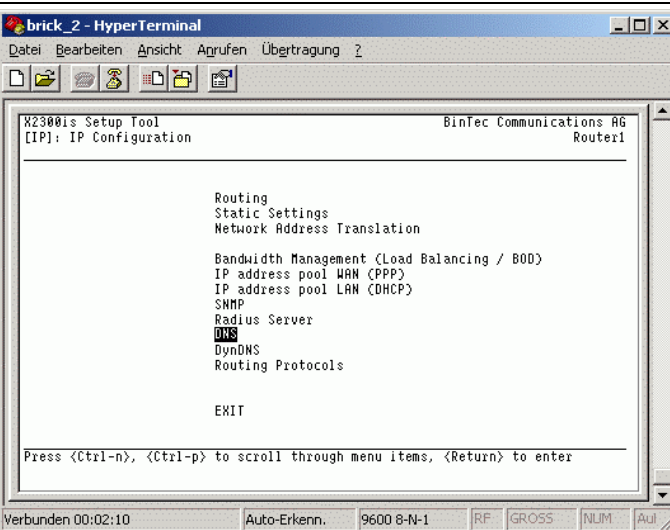
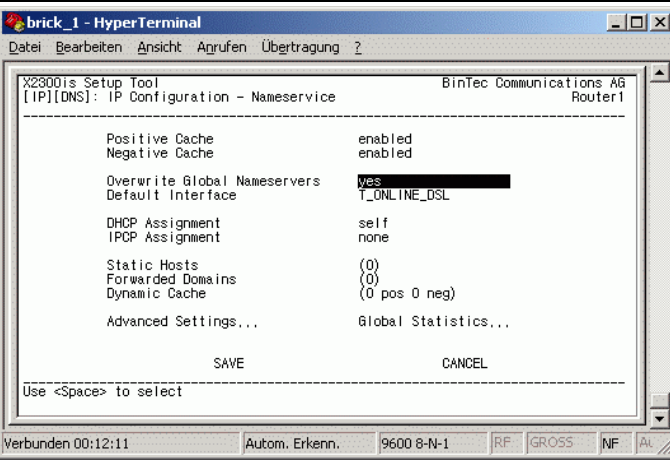
- Accessing panels in a local network with the aid of port forwarding.
- Connecting two LANs on the basis of a virtual private network (VPN).

To read about this, please refer to the main document, **Entry ID: 19865167**.

2.1 Configuring a DNS server utility

Table 2-1

No.	Action	Note
1	<p>The BRICKware from BinTec that is already installed contains two default connections to your router. Depending on the COM port being used, now select a connection; the Windows HyperTerminal opens.</p> <p>Start > Programs > BRICKware > Device at COM1</p>	
2	<p>HyperTerminal Press ENTER to continue.</p>	
3	<p>After you press Enter to confirm, a login prompt appears in which you enter the user data that is defined in your basic configuration. Enter admin as the login, for example, followed by Enter and then the relevant password.</p>	
4	<p>Following login, enter setup. This takes you to the setup tool</p>	

5	To give all subscribers convenient access to the Internet in their local network via the router, a setting is required first of all, which gives the local network access to your ISP's DNS server. In order to do this, open the IP menu.	
6	Select the DNS dialog.	
7	Change the Overwrite Global Nameservers setting to yes .	
8	Any of the subscribers in your network can be assigned the IP address of the router as a DNS server. It forwards web requests from the local computers to your Internet service providers (ISP's) DNS server.	

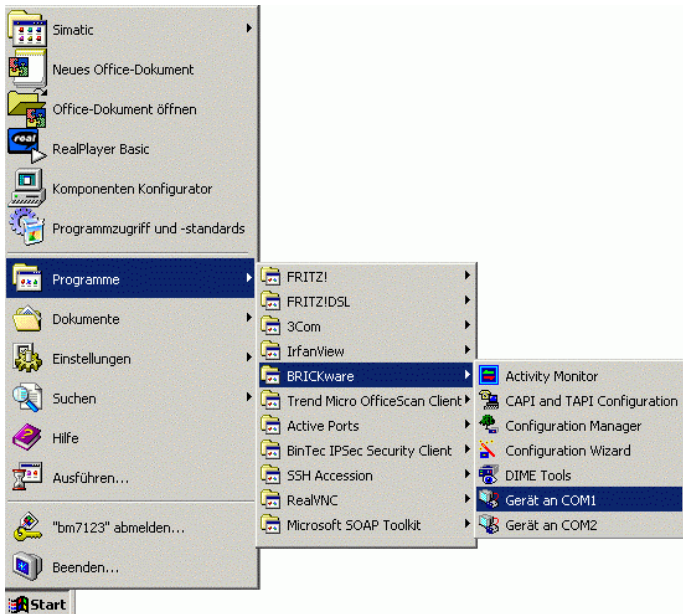
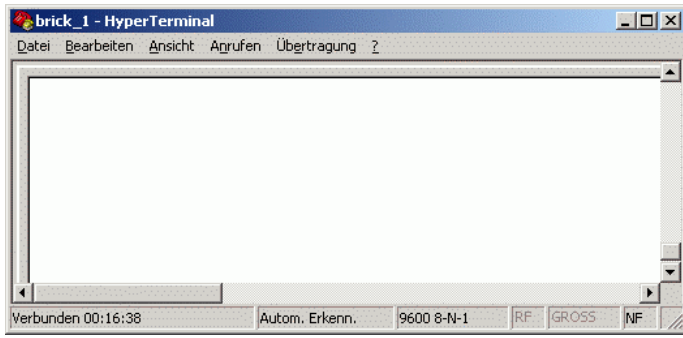
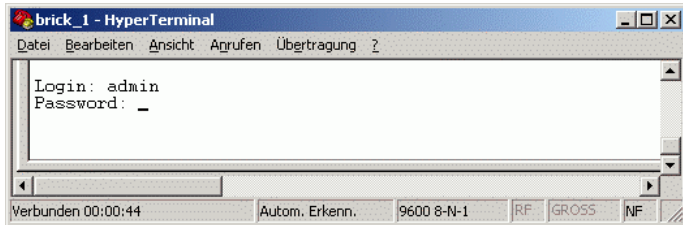
	Click Save to save the setting and Exit to go back to the main menu.
9	<div><div><div>This is how an example for one of your devices may look. 192.168.2.254 is the router's IP address. This is entered as a standard gateway and as a preferred DNS server.</div><div><div>Eigenschaften von Internetprotokoll (TCP/IP)</div><div><div>Allgemein</div><div><div>IP-Einstellungen können automatisch zugewiesen werden, wenn das Netzwerk diese Funktion unterstützt. Wenden Sie sich andernfalls an den Netzwerkadministrator, um die geeigneten IP-Einstellungen zu beziehen.</div><div><div><div><div><input type="radio"/> IP-Adresse automatisch beziehen</div><div><input checked="" type="radio"/> Folgende IP-Adresse verwenden:</div></div><div><div><div>IP-Adresse: 192 . 168 . 2 . 1</div><div>Subnetzmaske: 255 . 255 . 255 . 0</div><div>Standardgateway: 192 . 168 . 2 . 254</div></div></div><div><div><div><input type="radio"/> DNS-Serveradresse automatisch beziehen</div><div><input checked="" type="radio"/> Folgende DNS-Serveradressen verwenden:</div></div><div><div><div>Bevorzugter DNS-Server: 192 . 168 . 2 . 254</div><div>Alternativer DNS-Server: . . .</div></div></div><div><div>Erweitert...</div><div><div>OK</div><div>Abbrechen</div></div></div></div></div></div></div></div></div></div></div>

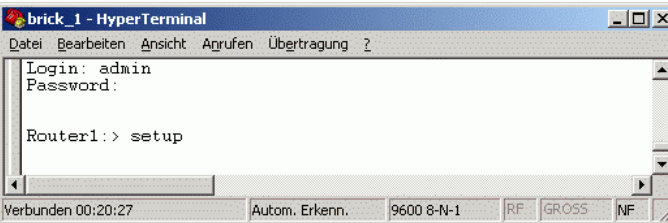
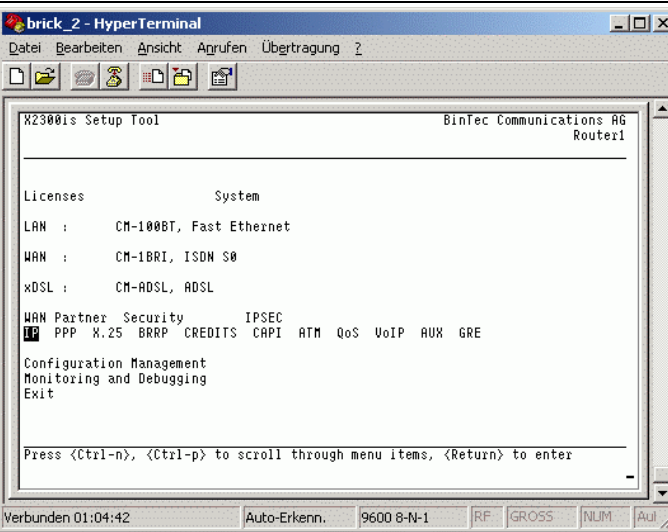
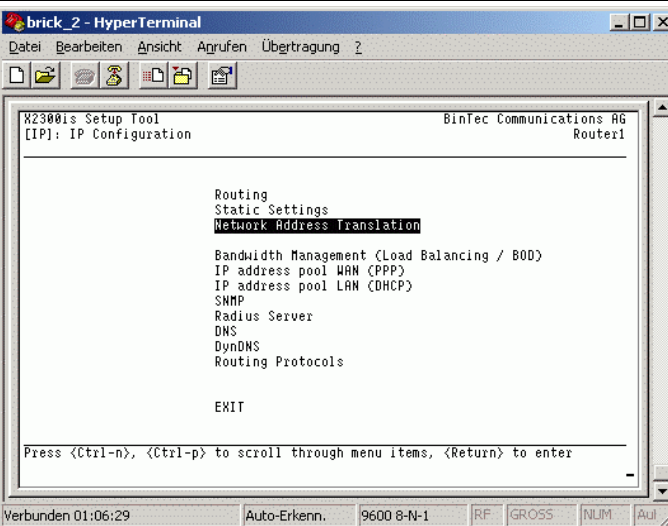
2.2 Configuring the Telnet service and the ICMP

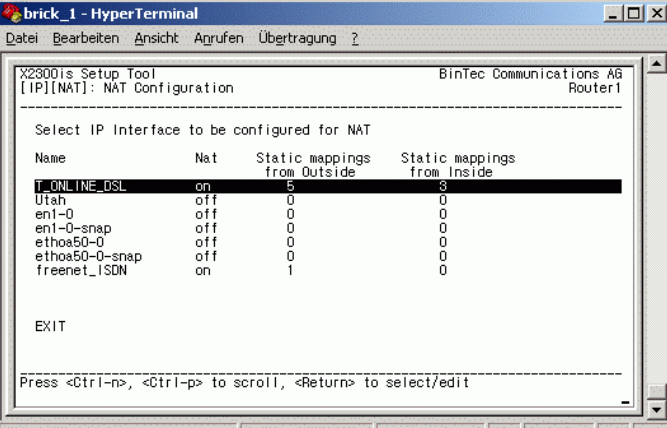
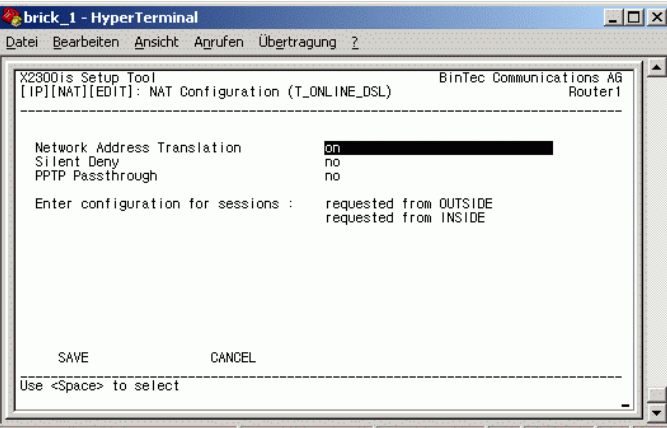
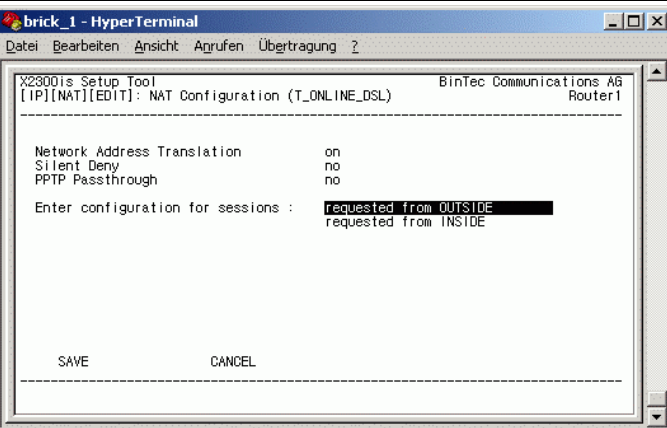
Telnet: This service enables you to configure the router via the Internet. Telnet is a Windows component.

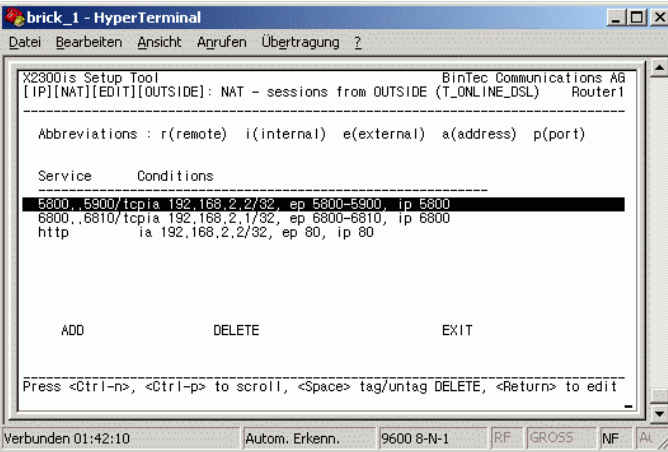
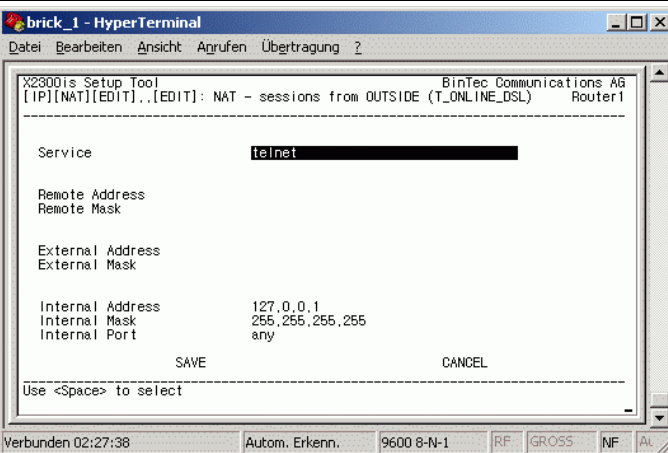
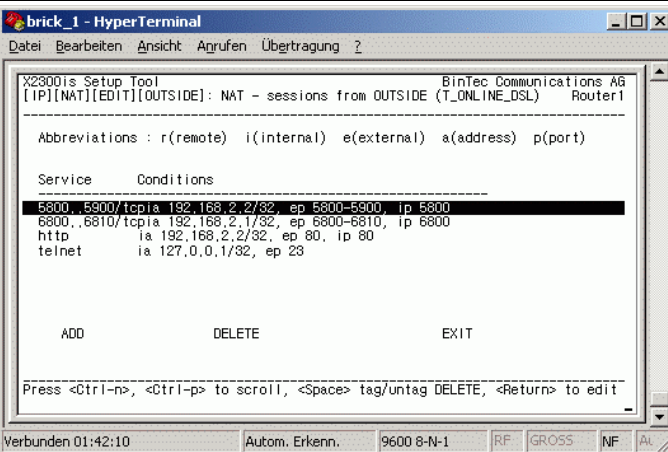
ICMP: With the Internet Control Message Protocol (ICMP) only the router's external IP address is known on the Internet.

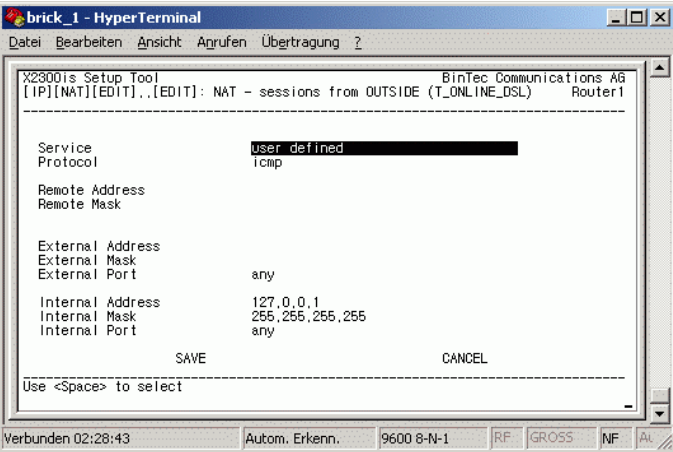
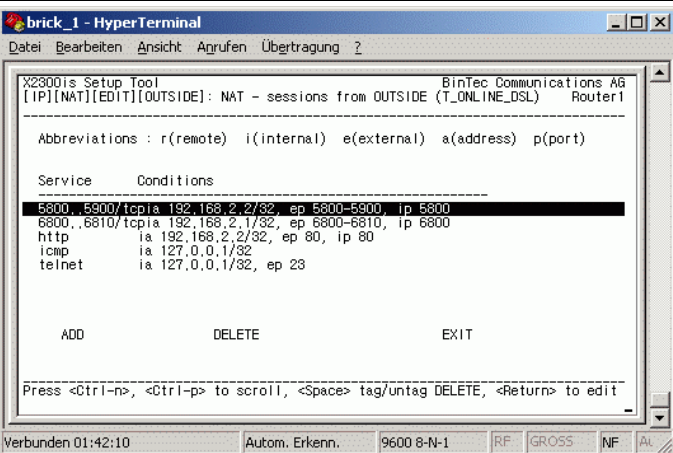
Table 2-2

No.	Aktion	Anmerkung
1	<p>The BRICKware from BinTec that is already installed contains two default connections to your router. Depending on the COM port being used, now select a connection; the Windows HyperTerminal opens.</p> <p>Start > Programs > BRICKware > Device at COM1</p>	
2	<p>HyperTerminal Press ENTER to continue.</p>	
3	<p>After you press Enter to confirm, a login prompt appears in which you enter the user data that is defined in your basic configuration. Enter admin as the login, for example, followed by Enter and then the relevant password.</p>	

4	Following login, enter setup . This takes you to the setup tool.	
5	Select the IP option.	
6	Open the Network Address Translation dialog.	

7	<p>The first step involves blocking the router for external requests.</p> <p>This takes place via Network Address Translation (NAT).</p> <p>Press ENTER to open the Internet connection which you have created.</p>	 <pre> X2300is Setup Tool [IP][NAT]: NAT Configuration BinTec Communications AG Router1 Select IP Interface to be configured for NAT Name Nat Static mappings from Outside Static mappings from Inside ----- T_ONLINE_DSL on 5 3 Utah off 0 0 en1-0 off 0 0 en1-0-snap off 0 0 ethoa50-0 off 0 0 ethoa50-0-snap off 0 0 freenet_ISDN on 1 0 EXIT Press <Ctrl-n>, <Ctrl-p> to scroll, <Return> to select/edit </pre>
8	<p>Enable NAT (on) to prevent access to the connection behind the router.</p> <p>To enable the router to be maintained via the Internet, set up access via Windows Telnet in the next dialog. In this dialog you can additionally specify whether or not the router should answer ping requests.</p>	 <pre> X2300is Setup Tool [IP][NAT][EDIT]: NAT Configuration (T_ONLINE_DSL) BinTec Communications AG Router1 Network Address Translation on Silent Deny no PPTP Passthrough no Enter configuration for sessions : requested from OUTSIDE requested from INSIDE SAVE CANCEL Use <Space> to select </pre>
9	<p>Open the requested from OUTSIDE dialog.</p>	 <pre> X2300is Setup Tool [IP][NAT][EDIT]: NAT Configuration (T_ONLINE_DSL) BinTec Communications AG Router1 Network Address Translation on Silent Deny no PPTP Passthrough no Enter configuration for sessions : requested from OUTSIDE requested from INSIDE SAVE CANCEL </pre>

<p>10</p>	<p>If no entries were defined during the basic configuration, click ADD to add the entry telnet.</p> <p>This service enables you to configure the router via the Internet.</p> <p>Telnet is a Windows component.</p> <p>You can start Telnet via Start > Run...>.</p> <p>Sample input: telnet router.dyndns.org or telnet 207.68.83.37</p> <p>You can call Telnet in conjunction with the router name or with the router IP address.</p>	
<p>11</p>	<p>Adding telnet.</p> <p>Copy the settings from the dialog</p> <p>Click Save to exit the dialog.</p>	
<p>12</p>	<p>Click ADD to define further entries.</p>	

13	<p>Adding ICMP. (Internet Control Message Protocol)</p> <p>With this protocol, you only reveal the router's external IP address on the Internet.</p> <p>Copy the settings from the dialog</p> <p>Click Save to exit the dialog.</p>	
14	<p>Overview of the services created.</p> <p>Click Exit to go back to the main menu. You can save the change and exit in the main menu by clicking the Save as boot configuration and exit link.</p>	
15	<p>Note:</p> <p>The Telnet entry is responsible for communication with your router via the external IP address or name (DYNDNS account) on the Internet; this can be configured after entering the user ID.</p> <p>The internal IP address is set to 127.0.0.1, corresponding to the address of a loop back to itself.</p> <p>The internal mask of 255.255.255.255 indicates that the router is the host.</p> <p>The ICMP entry only discloses the router's external IP address, it does not disclose any internal IP addresses.</p> <p>This is also brought about once again by the internal loop back, irrespective of which external subscriber submits the request.</p>	

2.3 Configuring a DNS account

A DNS account provides convenient access to the local area network (LAN).

DynDNS (Dynamic Domain Name System) supports the dynamic adaptation of the WAN IP address to a domain name, thus enabling a web/FTP/ e-mail server to be operated on the WAN side without a permanent IP address.

DNS (Domain Name System) is a hierarchical system for managing host names and IP addresses. This is used to specify a remote system by name and not by its IP address as names are easier to remember. N.B. The term domain in DNS has nothing to do with a Windows NT domain.

2.3.1 Creating a DNS account

You can create a DynDNS account with several providers. We have chosen the provider **DynDNS.org** directly for the purposes of our description.

The dynamic Domain Name Service (DNS) enables you to contact your router on the Internet using a permanent name.

The router is connected to the WWW (world wide web) at least once a day via the Internet service provider (ISP). It is assigned a new IP address every time by the Internet service provider (ISP).

This new address is then reported back to DynDNS.org by the router enabling the name resolution function to work.

Note:

The first time your router is connected to the Internet, a delay (of up to 3 minutes) may occur until the new IP address is registered with DynDNS.org.

Table 2-3

No.	Action	Note
1	Start the Internet Explorer and point your browser to www.dyndns.org .	 <p>Click Sign up Now to register.</p>

2 Note the following things on this page:

- Define your personal user name
- Enter your e-mail address
- Define your password

Note:

If you create more than one DynDNS account, they must have different names and e-mail addresses.

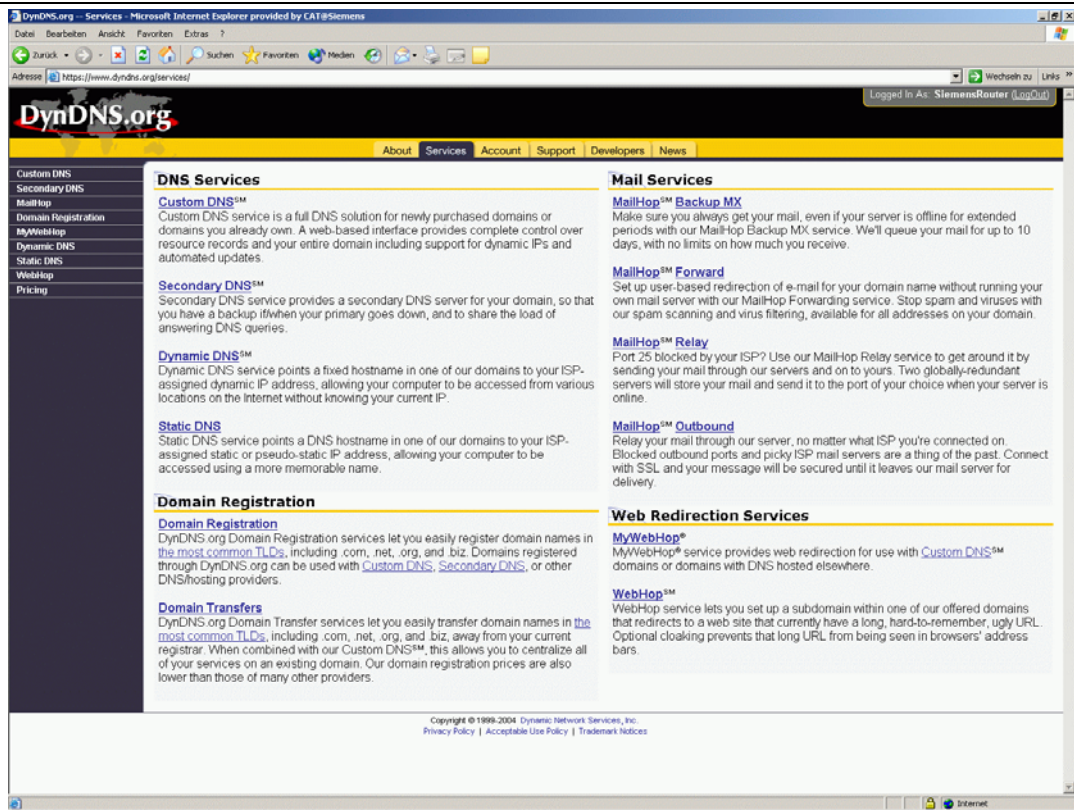
You can register several devices under one account. You do not need to have several accounts.

The screenshot shows the 'Create Account' page on DynDNS.org. The browser window title is 'DynDNS.org - Account - Create Account - Microsoft Internet Explorer provided by CAT@Siemens'. The address bar shows 'https://www.dyn dns.org/account/create.html'. The page has a yellow header with navigation links: 'About', 'Services', 'Account', 'Support', 'Developers', 'News'. On the left is a sidebar with links: 'Create Account', 'Login', 'Lost Password?', 'Billing', 'Account Upgrades', 'SLA'. The main content area is titled 'Create Account' and contains the following text: 'Please complete the form below to create your account. You will receive an e-mail containing instructions to activate your account. If you do not follow these directions within 48 hours, you will need to recreate your account.' Below this is a scrollable area for the 'Policy Last Modified: May 4, 2004' and '1. ACKNOWLEDGMENT AND ACCEPTANCE OF TERMS OF SERVICE'. The policy text states: 'All services provided by Dynamic Network Services, Inc. ("DynDNS") are provided to you (the "Member") under the Terms and Conditions set forth in this Acceptable Use Policy ("AUP") and any other operating rules and policies set forth by DynDNS. The AUP comprises'. Below the policy is a checkbox: 'I have read and agree to the Acceptable Use Policy above:'. The form has four main sections: 'Username' with a text input field; 'E-mail Address' with two text input fields (one for 'E-Mail Address' and one for 'Confirm E-Mail Address'); 'Password' with two text input fields (one for 'Password' and one for 'Confirm Password'). At the bottom of the form are two buttons: 'Create Account' and 'Reset Form'. The footer of the page reads: 'Copyright © 1999-2004 Dynamic Network Services, Inc. Privacy Policy | Acceptable Use Policy | Trademark Notices'.

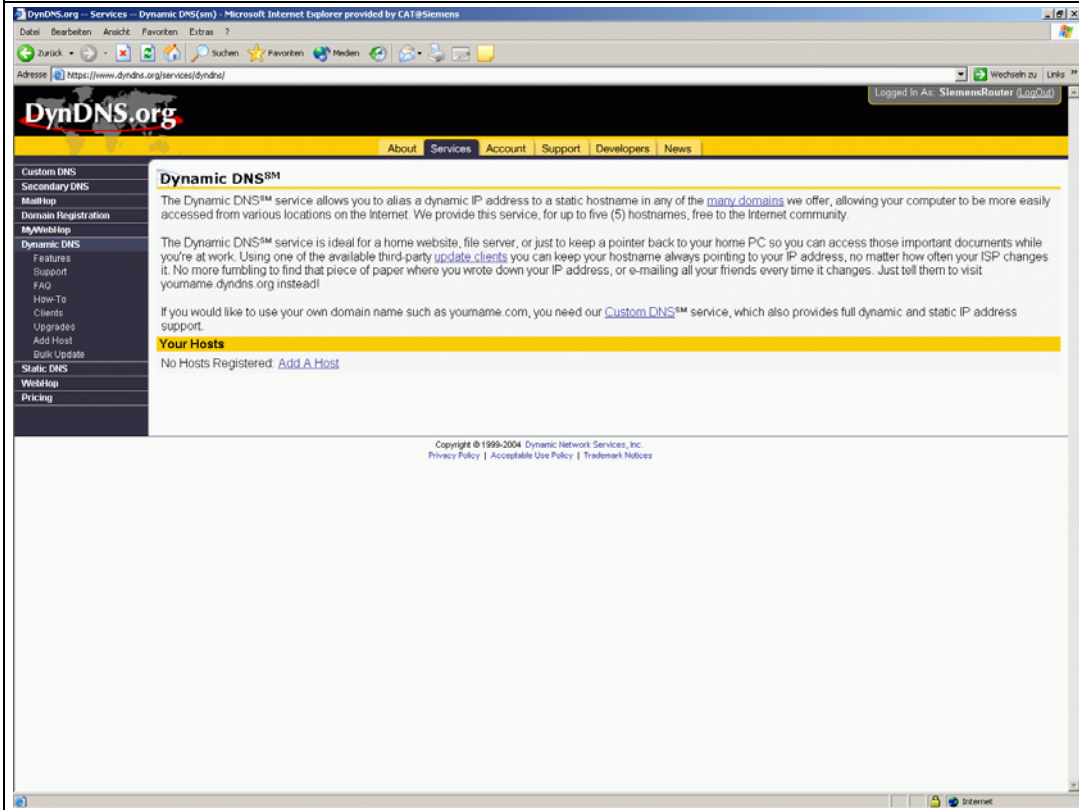
Click **Create Account** to confirm your entries.

- 3 You then receive confirmation by e-mail, and a confirmation dialog appears on this website.

Following login, click the **Services** tab and select the **Dynamic DNS** link.



4 You can define your router's data under **Add Host**.



- 5 Keep a record of the data selected by you. This is required later on during router configuration.

The screenshot shows the DynDNS.org website in a Microsoft Internet Explorer browser. The page title is 'DynDNS.org - Dynamic DNS(sm) - Add Host'. The browser address bar shows 'https://www.dyn dns.org/services/dyn dns/add.html'. The page has a navigation menu with links like 'About', 'Services', 'Account', 'Support', 'Developers', and 'News'. On the left, there is a sidebar with links for 'Custom DNS', 'Secondary DNS', 'Mailtop', 'Domain Registration', 'MyWebtop', 'Dynamic DNS', 'Features', 'Support', 'FAQ', 'How-To', 'Clients', 'Upgrades', 'Add Host', 'Bulk Update', 'Static DNS', 'Webtop', and 'Pricing'. The main content area is titled 'New Dynamic DNS Host' and contains the following form fields:

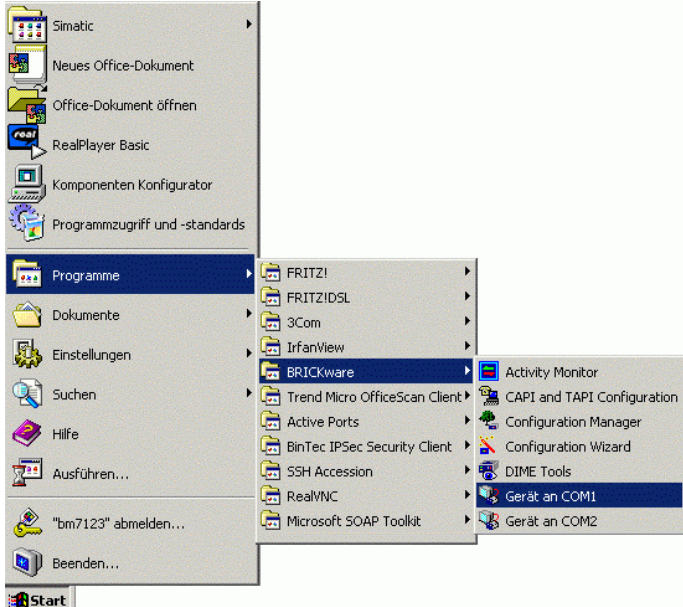
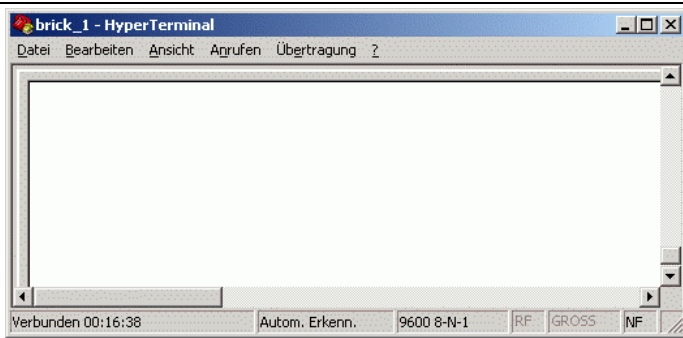
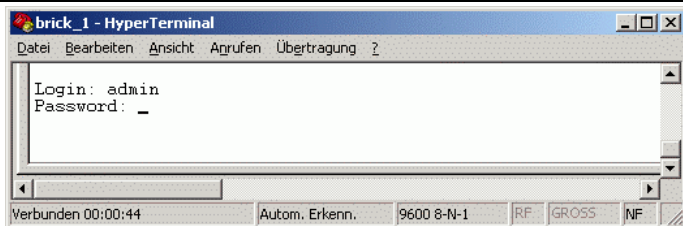
- Hostname: WinCCflexibelRouter1 (selected from a dropdown menu)
- IP Address: 194.138.39.97
- Enable Wildcard: ☒
- Mail Exchanger (optional):

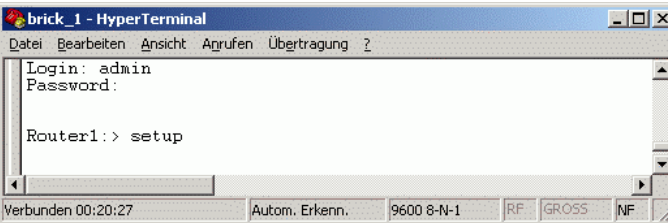
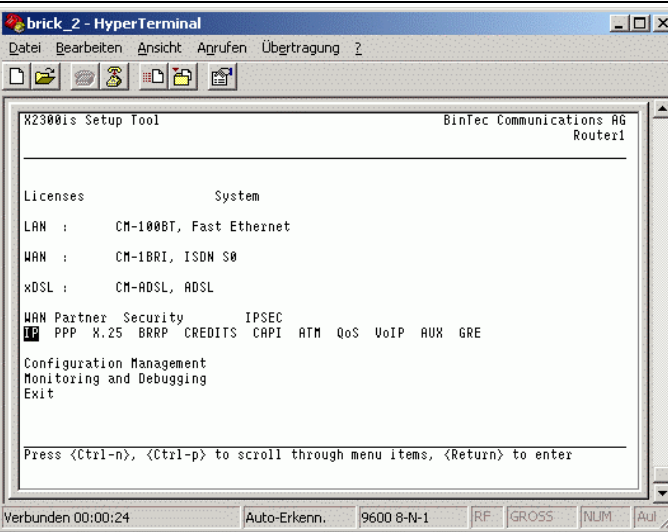
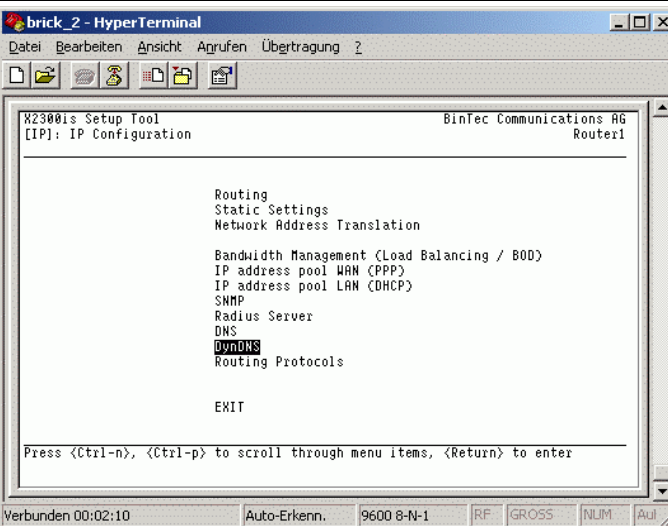
At the bottom of the form, there are two buttons: 'Add Host' and 'Reset Form'. Below the form, there is a copyright notice: 'Copyright © 1999-2004 Dynamic Network Services, Inc. Privacy Policy | Acceptable Use Policy | Trademark Notices'.

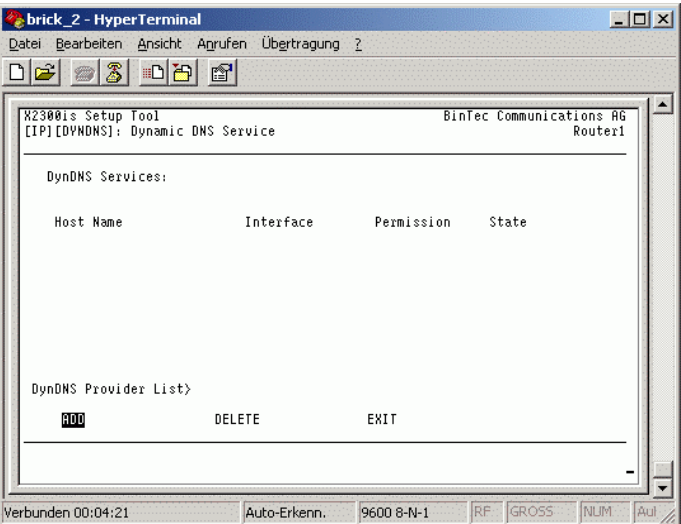
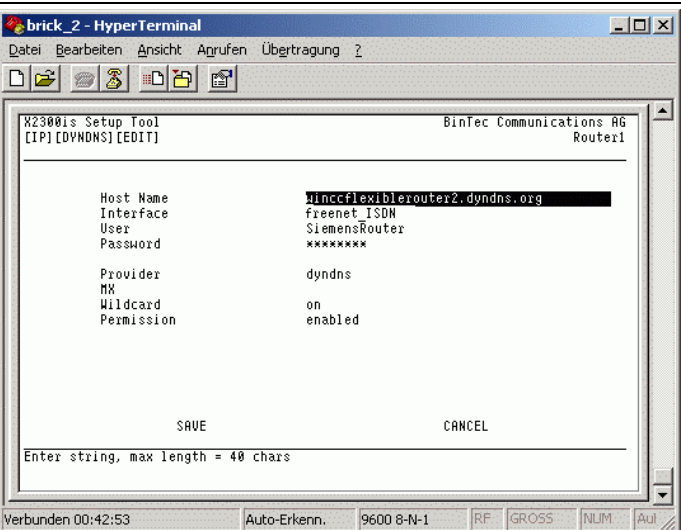
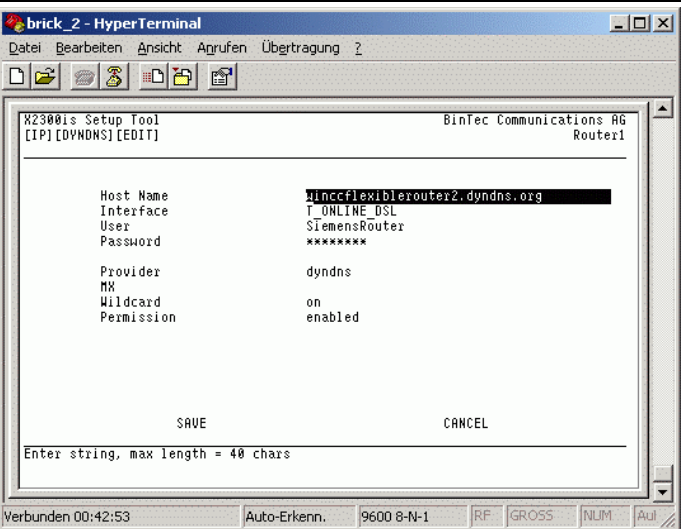
- 6 If you have configured the right settings in the router, the router transmits its present IP address to DynDNS.org. It can then always be contacted by name. For reasons of security the router is disconnected from the ISP once a day and then reconnects. When this happens, the router is always assigned a new IP address which it, in turn, reports to DynDNS.org. This refresh process can last up to 5 minutes although it generally only takes a few seconds.

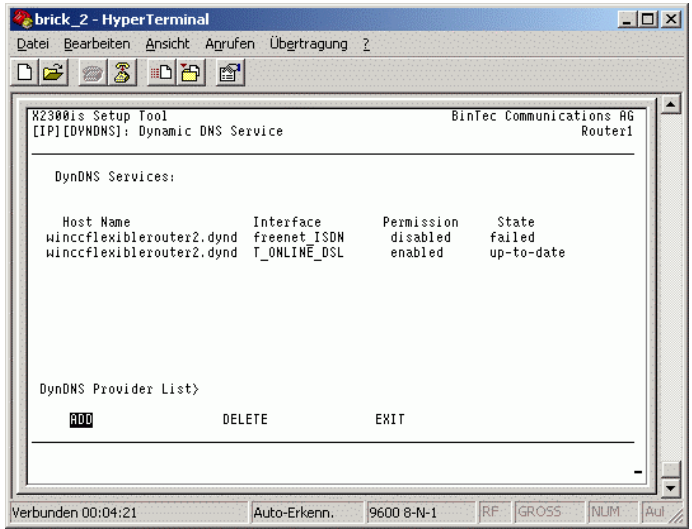
2.3.2 Router settings

Table 2-4

No.	Action	Note
1	<p>The BRICKware from BinTec that is already installed contains two default connections to your router. Depending on the COM port being used, now select a connection; the Windows HyperTerminal opens.</p> <p>Start > Programs > BRICKware > Device at COM1</p>	
2	<p>HyperTerminal Press ENTER to continue.</p>	
3	<p>After you press Enter to confirm, a login prompt appears in which you enter the user data that is defined in your basic configuration. Enter admin as the login, for example, followed by Enter and then the relevant password.</p>	

4	Following login, enter setup . This takes you to the setup tool.	
5	<p>Connect to your router once again via the serial connection and start the setup tool.</p> <p>Start > Programs > BRICKware > Device at COM1</p> <p>In the setup tool, go to the IP option.</p>	
6	<p>Select the DynDNS entry in the next dialog.</p> <p>Open this entry in order to save the DynDNS account in the router.</p>	

7	<p>Click ADD to create a new entry.</p> <p>If you have configured several interfaces to the Internet, an entry must be created for each one.</p> <p>The BinTec router selected by us can be configured in such a way that an ISDN connection is established automatically if the DSL line fails. Consequently, we require an entry for both connections.</p>	 <p>The screenshot shows the 'X2300is Setup Tool' window with the title 'BinTec Communications AG Router1'. The main area is titled '[IP] [DYNDNS]: Dynamic DNS Service'. Below this, there's a section for 'DynDNS Services' with a table header: 'Host Name', 'Interface', 'Permission', and 'State'. At the bottom, there's a 'DynDNS Provider List' with three buttons: 'ADD', 'DELETE', and 'EXIT'. The 'ADD' button is highlighted.</p>
8	<p>Creating an ISDN connection.</p> <p>Click SAVE to save the settings.</p>	 <p>The screenshot shows the 'X2300is Setup Tool' window with the title 'BinTec Communications AG Router1'. The main area is titled '[IP] [DYNDNS] [EDIT]'. It shows a configuration for a DynDNS service. The fields are: 'Host Name' (winccflexiblerouter2.dyndns.org), 'Interface' (freenet ISDN), 'User' (SiemensRouter), 'Password' (*****), 'Provider' (dyndns), 'MX' (on), 'Wildcard' (on), and 'Permission' (enabled). At the bottom, there are 'SAVE' and 'CANCEL' buttons. Below the buttons, it says 'Enter string, max length = 40 chars'.</p>
9	<p>Click ADD to create further connections.</p> <p>Creating a DSL connection.</p> <p>Click SAVE to save the settings.</p>	 <p>The screenshot shows the 'X2300is Setup Tool' window with the title 'BinTec Communications AG Router1'. The main area is titled '[IP] [DYNDNS] [EDIT]'. It shows a configuration for a DynDNS service. The fields are: 'Host Name' (winccflexiblerouter2.dyndns.org), 'Interface' (T_ONLINE DSL), 'User' (SiemensRouter), 'Password' (*****), 'Provider' (dyndns), 'MX' (on), 'Wildcard' (on), and 'Permission' (enabled). At the bottom, there are 'SAVE' and 'CANCEL' buttons. Below the buttons, it says 'Enter string, max length = 40 chars'.</p>

10	<p>All the connections created can be viewed here.</p> <p>Click Exit to go back to the main menu. You can save the change and exit in the main menu by clicking the Save as boot configuration and exit link.</p>	
11	<p>The router is now able to report its new IP address to DynDNS.org via the ISDN connection.</p>	

3 Annex

3.1 Information about IP addressing / IP address classes

IP addresses

IP addresses enable computers and routers to identify a computer's location easily and to determine the best route to it for the data package.

There are two parts to the IP address:

- a network part which shows where a computer is located (this is comparable to a city's name and postcode)
- a "computer" or "host" part
(comparable to the street and house number).

Structure of the IP addresses

An IP address comprises 4 octets ("bytes") which are normally shown in decimal form and are separated by decimal points, (dotted decimal notation; e.g. 194.62.15.2)

Since the computer's binary function only works internally, only the first two places (the highest value bits) are of significance to it, in actual fact. (11000010.00111110.00001111.00000010 – the decimal points are only for guideline purposes)

These two bits are used to distinguish between the address classes listed below.

The two parts of the address ("network part" and "host part") are not assigned permanently (e.g. the first two bytes for the network part and the last two for the host part), they are variable, depending on the highest value bits in the highest value byte. Distinctions are made between different classes of address on the basis of the bit assignment. The table below shows the different address classes with the associated starting values of IP address and the division into "network part" and "host part".

Address class	Value of the first bit (definition)	Resulting value range of the first byte (decimal)	Network (N) part / host (H) part	Number of available computer addresses
Class A	0xxx xxxx	0 - 127	N.H.H.H	16.777.216
Class B	10xx xxxx	128 - 191	N.N.H.H	65.536
Class C	110x xxxx	192 - 223	N.N.N.H	256

The address 127.0.0.1

The address 127.0.0.1 plays a special role; by definition, it always serves as the address of the local/user's own computer.

This address is generally always assigned the name "localhost". According to the standard, the network 127.x.x.x may not be used.

However, we will use this address when we configure the router with the setup tool later on. Consequently, 127.0.0.1 can (only) be used to check the installation of our own computer (layers 3 to 7)!

The subnet mask / Creating subnets

The subnet mask is an internal function in the computer for assigning the network part and the host part.

It is structured in the same way as an IP address (32 bits or 4 bytes). By definition, all the bits of the "network part" are to be set to 1 and all the bits of the "host part" are to be set to 0.

Consequently, this gives rise to the following subnet masks for the address classes.

Address class	Subnet mask (binary)	Subnet mask (decimal)
Class A	11111111.00000000.00000000.00000000	255.0.0.0
Class B	11111111.11111111.00000000.00000000	255.255.0.0
Class C	11111111.11111111.11111111.00000000	255.255.255.0

This subnet mask (also called the "default subnet mask") can be overwritten manually.

This means that the "zeroes" can be replaced by "ones" bit-by-bit. As a result, individual bits are of relevance to the network (not just whole bytes). For every bit set to "1", the number of available networks is doubled, and the number of computers in them is halved.

In your chosen IP address range 192.168.1.0 and subnet mask 255.255.255.0, only 255 addresses can be assigned in the LAN. If you set some of the bits in the last byte to 1 as well, this range is restricted further.

Addresses for private networks (private IP addresses)

Three addresses or address classes have been reserved for use in private networks; they are never assigned on the public Internet. The addresses / address ranges in question are as follows:

Range	Address class
10.x.x.x	= one class A address
from 172.16.x.x to 172.31.x.x	= 16 class B addresses
192.168.x.x	= 256 class C addresses

These addresses are not assigned on the Internet and are, therefore, not routed either; as a result, they are not visible there. This means that they can be used as often as you wish for company networks.

Following this brief excursion, we will continue with the basic configuration of the router.

You can also find the following entry on the Internet at www4.ad.siemens.de; Entry ID: 2073614:

Guidelines for the award of IP addresses and subnet masks in TCP/IP networks.

4 Glossary

Table 4-1

No.	Abbreviation	Description
1	ADSL	<p>Stands for Asymmetric Digital Subscriber Line.</p> <p>ADSL supports the use of the infrastructure in the existing phone network for broadband utilities. Additional data for Internet utilities is transmitted on the copper two-core conductors of the analog and digital telephone lines (POTS or ISDN) in the case of ADSL. For this purpose, the spectrum of frequency used by ADSL is divided into several sections. This enables the telephony and data signals to be transported side-by-side between the subscriber's line and the local exchange. There is a splitter on either side to separate and combine the signals.</p> <p>In ADSL, the maximum transmission rate that can be achieved is asymmetric in both directions, upstream and downstream. ADSL supports upstream transmission of up to 1.5 MBit/s and downstream of up to 8 MBit/s. However, as the transmission rate which can be achieved drops significantly the further apart the local exchange and subscriber are, these values cannot be achieved in practice for the majority of lines.</p> <p>The asymmetric DSL variants, in which there is a speed of up to 256 kBit/s available for upstream and up to 3 MBit/s available for downstream, are particularly suitable for private users and small businesses who do not wish to make large volumes of frequently requested Internet content available on their PC for other users.</p>
2	BBAE	<p>Abkürzung für Breitband-Anschlusseinheit (engl. Broadband Access Equipment).</p> <p>The BBAE represents a subscriber's physical terminal to a line that is used for broadband. It separates the provider network from the subscriber line cable and conditions the signals for transmission via the connection element.</p> <p>In the case of ADSL connections, the BBAE generally also features the splitter that separates the broadband and narrow band signals from one another and combines them again.</p>
3	CAPI	<p>Stands for Common Application Programming Interface.</p> <p>A standardized software interface for communication between software and hardware.</p> <p>CAPI is the name of a program which is supplied with an ISDN card and which is used to activate it. Other programs that wish to transmit data via the card only have to pass this data on to the CAPI driver.</p>
4	DSL	<p>Stands for Digital Subscriber Line.</p> <p>DSL technology enables data transmission to be accelerated substantially via conventional phone lines, making it especially suitable for high-speed Internet use. ISDN services or analog telephony continue to run undisrupted on the same line. The high</p>

		<p>transmission rates are achieved by enlarging the frequency range used. For example, ADSL supports transmission rates of up to 8 MBit/s. Lines with capacities of 768 kBit/s are very common.</p> <p>The name DSL represents a whole family of technologies that are combined under the collective term xDSL. In Germany, lines for private customers are mainly offered with asymmetric DSL (ADSL) and single pair DSL (SDSL) technologies. ADSL, which is much more common, transmits the Internet data in the existing telephone network above telephony frequencies between 138 and 1,104 kHz. For example, ADSL is also the basis for the T-DSL product offered by Deutsche Telekom AG.</p>
5	DynDNS	<p>The term DynDNS stands for dynamic DNS and is meant to indicate that you as the customer can enter the IP address belonging to a name in the DNS server yourself.</p> <p>The partner's IP address is contacted, and the connection is established. However, since fixed IP addresses are expensive, most users connect to service providers and are assigned a dynamic IP address.</p> <p>This changes every time you connect (hence the term dynamic), making it impossible to locate a partner with a dynamic IP address. DynDNS servers on the Internet offer assistance in this respect. They enable partners to be located despite their dynamic IP address. If the partner is known, i.e. if its IP address is known, there is nothing to prevent communication. In the interests of security, communication with the partner can be encrypted with the aid of IPSec, for example, in a second step.</p>
6	IPsec (Internet Protocol Security)	<p>IPSec is a protocol that can be used to establish a secure IP connection.</p> <p>A distinction is made between two modes:</p> <ol style="list-style-type: none"> 1. Tunnel mode The entire IP package is encrypted in this mode. Tunnel mode is primarily used to transmit data between two company locations or between a private PC and a company network (to enable staff to work from home, for example) via the Internet secure from monitoring (VPN). 2. Transport mode Here only the data part is encrypted. This is used to transmit critical data, e.g. in passwords.
7	ISDN	<p>Stands for Integrated Services Digital Network.</p> <p>The striking feature of ISDN phone lines is that there are at least two basic access channels (B-channels) available for use simultaneously. This means that a subscriber is contactable by phone whenever it is online or sending a fax. It also supports two parallel phone calls from one line. In addition, higher transmission rates are possible than with an analog line. Each B-channel can transmit 64 kBit/s, i.e. the two together support 128 kBit/s.</p> <p>ISDN digital transmission and switching technology supports diverse</p>

		<p>forms of communication on the phone line such as telephony, faxing or Internet connections.</p> <p>ISDN continues to use the cabling from the previous analog telephone network in order to connect the customers to the exchange. However, ISDN technology uses this with much greater efficiency and flexibility. Connections can be established more quickly, speech quality is much improved, and not only is data transmission is quicker, it is also extremely reliable thanks to error correction.</p>
8	NTBA	<p>Stands for Network Termination Basic Rate Access.</p> <p>The NTBA forms the network termination to the public ISDN network. It converts the signal from the network provider from its two-wire line (UK0 bus) to a four-wire line (S0 bus).</p> <p>The exchange supplies current to the NTBA via the ISDN supply voltage – the NTBA, in turn, supplies the S0 bus. In normal operating mode, power is also fed to the NTBA via a power supply unit. In this mode it can supply up to four terminals which are connected to the S0 bus and which do not possess a power supply of their own.</p> <p>If the NTBA is operated without an additional power supply unit or if the power supply fails, the NTBA uses the network provider's ISDN supply voltage in order to operate on standby.</p>
9	Port Forwarding	<p>Port forwarding is a technology which supports the mapping of ports to IP addresses in NAT networks (Network Address Translation), i.e. if router ports have to be forwarded permanently to a specific IP address. This mapping technology is a function offered by many of the current DSL routers. For this purpose, the advanced settings for the router generally include a table in which a port that has to be mapped is permanently allocated to a specific local IP address.</p>
10	Routers	<p>Routers are first and foremost hardware devices or software programs that can be used to connect one or more computers or whole networks to other networks.</p> <p>The router acts as the control center in order to forward connection requests to the required network or the service.</p> <p>In addition to their basic functionality, hardware routers and, in particular, the current ISDN or DSL routers possess DHCP services or servers which can be used to manage address allocation and control centrally. Depending on the settings, IP addresses can be supplied in this way to whole networks, which is beneficial to inexperienced users, in particular.</p>
11	Splitters	<p>Splitters</p> <p>In ADSL lines, the splitter divides the incoming signal from the provider network into the broadband ADSL signal and the narrow band ISDN signal or analog telephone signal. For transmission in the opposite direction, the two parts of the signal are combined to facilitate simultaneous transmission via the subscriber line.</p> <p>The splitter is frequently contained directly in the broadband access equipment (BBAE).</p>

12	TCP	TCP, which stands for Transmission Control Protocol, is an important component of the TCP/IP protocol. It is based on connections and requests receipt of confirmation for every package sent.
13	TCP/IP	TCP/IP stands for Transmission Control Protocol/Internet Protocol. This generally refers to the whole family of protocols. It was developed to facilitate connection between computers in different networks. Nowadays TCP/IP is used in many LANs (Local Area Networks) and is the basis for the world wide web.
14	T-DSL	Deutsche Telekom has been offering DSL lines under the name T-DSL since the late 90s. T-DSL is the most commonly used variant of DSL, which also makes it the most common type of broadband Internet access in Germany. Deutsche Telekom is not the only organization which offers T-DSL access to the Internet via its subsidiary T-Online, this is also available from a relatively large number of resellers. However, they all use Deutsche Telekom infrastructure to establish the physical link to the customer. The remaining providers primarily use their own versions of ADSL or else SDSL, although this works symmetrically and supports data rates of up to 2.3 MBit/s.
15	VPN (Virtual Private Network)	Company employees can use a Virtual Private Network (VPN) to connect to the company network (Intranet) from home or from locations outside the company via the Internet. A number of company sites can also be linked this way. The advantage of this is that there is no need for modem links or leased channels, simply a connection to the Internet. The employee connects to the Internet first of all. An encrypted channel (tunnel) is then established between the VPN client and VPN server. Following authentication via user name and password or public key/certificate, an encrypted IPsec tunnel is set up via which data can be transmitted without risk of being monitored.
16	WAN	The term WAN (Wide Area Network) refers to networks which transmit data over a larger distance than a LAN (Local Area Network).

5 Warranty and Support

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