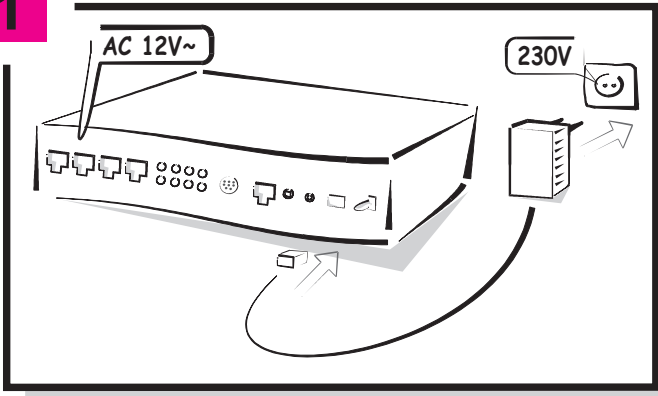
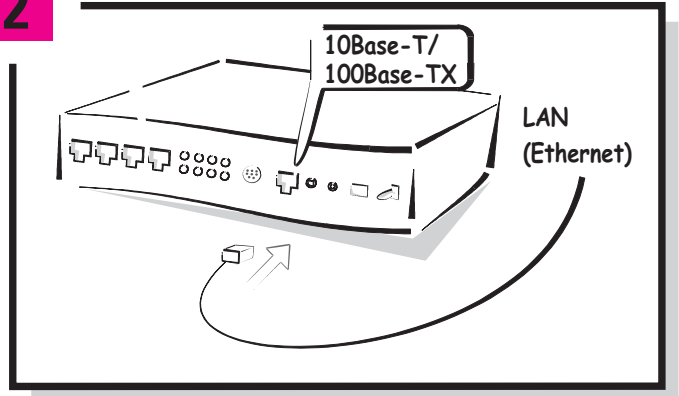


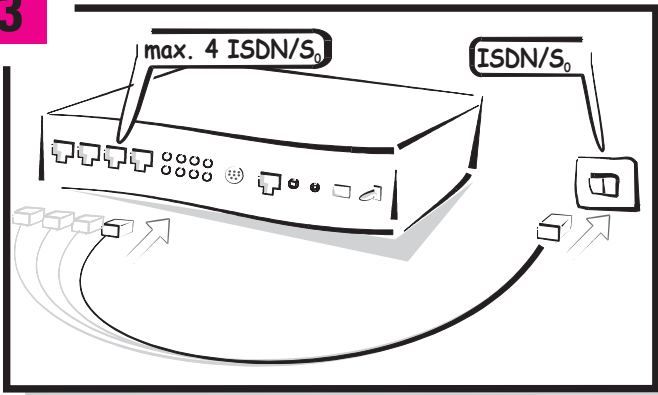
1



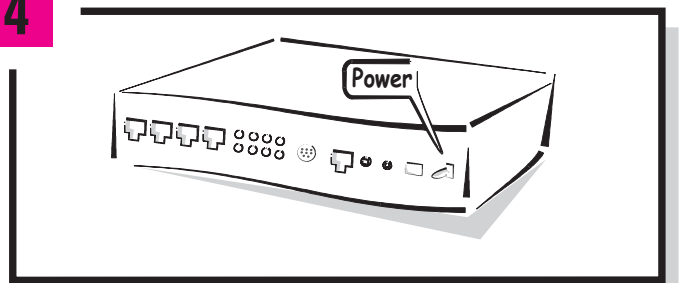
2



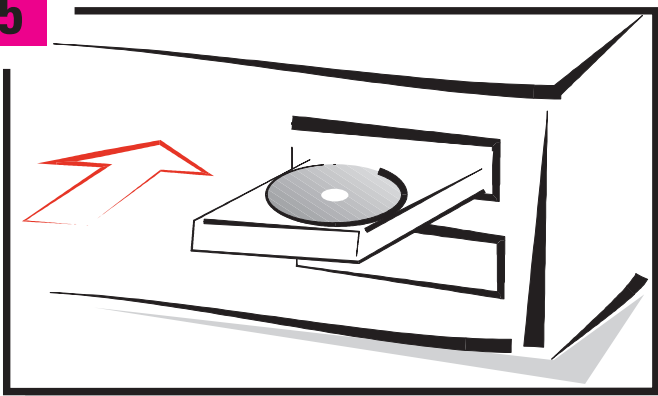
3



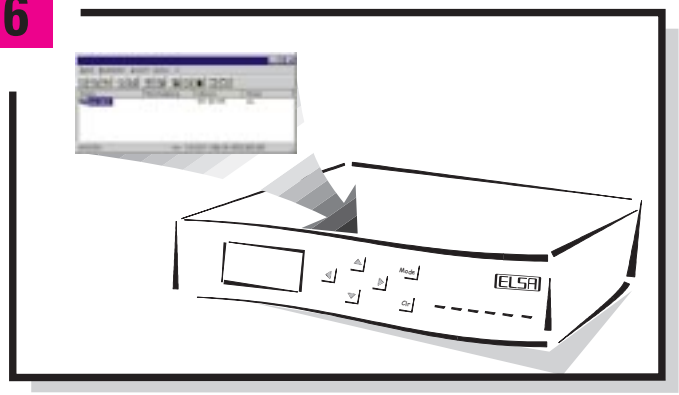
4



5



6



ELSA LANCOM Business

Dear ELSA Customer,

This Installation Guide will help you to get your device working as quickly as possible. The following information is intended for experienced users familiar with hardware and network configuration.

First, we will show you how to connect your new router and how to install the *ELSA LANconfig* configuration software under Windows 95, Windows 98 and Windows NT 4.0.

After that, we will explain, by means of three examples, how to configure common applications in no time. These examples include brief descriptions of the configuration work using *ELSA LANconfig* as well as with Telnet or a terminal program.

All further information (detailed configuration examples, complete descriptions of the software, glossaries, etc.) can be found in the User Manual.

First please check that the contents of the package are complete:

- ISDN line connection cables (4)
- Power supply
- Configuration interface cable
- Configuration cable adapter
- LAN connection cable
- Documentation
- CD containing *ELSA LANconfig*, other software and electronic documentation



This ISDN router is intended for use on up to four ISDN Basic Rate Interfaces. The connection is made using the RJ45/RJ45 cables supplied.

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First steps

1 Power supply

First, give your router the power it needs through the power supply unit!

2 LAN connection

Connect the unit to your local network using the 10/100Base TX connection.

3 WAN connection

Connect each required ISDN connection of the router to an ISDN/S₀ point-to-multipoint or point-to-point connection. To make the most of the charge protection and charge statistics features, as well as to ensure the automatic termination of unused connections, contact your telecommunications provider to have the 'advice of charges during connection' (AOCD) ISDN feature enabled.

4 Activating the unit

Switch the device on at the back. The individual stages of the self-test are displayed on the front panel of the unit during the boot process. The 'Power' LED will now light up. The 'Link' LED in the 'LAN' group indicates that your router is correctly connected to the LAN. The 'S₀ Status' LEDs on the back of the unit light up when an ISDN bus is active.

5 Software installation

Install the TCP/IP network protocol, followed by the *ELSA LANconfig* configuration software on the computer that will be used to set up the router. If the setup program does not start automatically when inserting the CD, simply open the Windows Explorer, click on 'autorun.exe' on the *ELSA LANCOM* CD and follow the on-screen instructions.

The following software components can also be installed using this setup program:

- *ELSA LANCAPI*
- *ELSA LANmonitor*
- *ELSA-RVS-COM, ELSA-ZOC, LapLink*

6 Configuration

The first time *ELSA LANconfig* is run, the new router is automatically detected on the TCP/IP network and can immediately be configured.

The configuration procedure prepares your router for your specific application. When configuring the router with *ELSA LANconfig*, you can use the setup wizards to quickly and conveniently guide you through the required settings.

Example configurations

Configuration—with or without the wizard

Configuration with the setup wizard



In this Installation Guide we mainly use the *ELSA LANconfig* configuration software to setup the router. Sections with the symbol shown on the left explain how to quickly and easily configure settings both with *ELSA LANconfig* and the wizards.

Configuration without the setup wizard



The individual settings are described in greater detail in the step-by-step instructions. If you do not wish to use the wizards or cannot use them (because, for example, you are using another operating system), you will find detailed instructions in the step-by-step guide for the menus in which settings can be made through a terminal program or Telnet connection.

With these step-by-step instructions you will achieve the same as when using *ELSA LANconfig* with the wizards.

Starting with the factory default settings, your ISDN router will be completely prepared for the selected task after running the wizards. In section 'General settings' towards the back of this Installation Guide you will find instructions on improving the configuration after running the wizards, e.g. on entering telephone numbers to which your router should respond.

What's needed—requirements

ELSA routers make address management on a local area network as easy as pie. Some settings may be required on the workstations:

- Install the TCP/IP network protocol on all computers on the network.
- Enable the 'Obtain an IP address automatically' option (usually the default setting). Thus the router, acting as a DHCP server, will be responsible for assigning all IP addresses on your network, provided there is no other DHCP server on the network.
- If you do not wish to use the DHCP functions of the router you must configure fixed IP addresses. To enable the workstations to use the router even without DHCP, configure the router's intranet address as the gateway **and** the DNS server on each of the workstations. The computers and the router must be on the same subnet (Example: computer = 10.0.0.2, router = 10.0.0.1, subnet mask = 255.255.255.0).

Just how you do that will be explained in section 'How to set up the workstation computers (Windows 95 or 98)' towards the back of this Installation Guide.

Getting started—basic settings



Fully automatic: the basic settings wizard

After boot-up, the *ELSA LANconfig* automatically looks for new devices on the network. If an unconfigured router is detected, the Basic Settings Wizard automatically starts up.

- ① In order for a router to be able to assign addresses to other devices on a TCP/IP network, it first needs a valid address itself.
 - If you have not used any IP addresses on your network so far, the router can automatically allocate the IP addresses itself during the automatic basic setup and takes the address '10.0.0.1' for itself as an internal IP address (intranet address), using the subnet mask '255.255.255.0'. If you are configuring these settings yourself, you can assign any address you like from the address space reserved for private use, e.g. '10.0.0.1' with the subnet mask '255.255.255.0'. You are thereby also defining the address space that the DHCP server will use for the other devices on the network. You will find more tips on the use of IP addresses in the Naming IP Addresses section in the manual.
 - If you have already configured IP addresses on the computers on the LAN, allocate a free address to the router from the address space you used previously.
- ② Only disable the 'Obtain an IP address from a DHCP server' option if you wish to use fixed IP addresses on your network or if you are already running another DHCP server.
- ③ Enter the subscriber numbers to which the router should respond for each S_0 bus, as well as the number required to get an outside line if the unit is connected to a PBX system.



Configuring the basic settings using Telnet

Establish a Telnet session to the address '10.0.0.254' or 'x.x.x.254' where 'x.x.x' is the address space already used on the network. Enter the following command:

- ① Intranet address and network mask:

```
set /setup/TCP-IP-module/Intranet adr. 10.0.0.1
set /setup/TCP-IP-module/Intranet mask 255.255.255.0.
```



You may have to reboot the router after changing the Intranet address.

- ② To switch off the DHCP function:

```
set setup/DHCP-module/operating off.
```

- ③ Enter the subscriber numbers to which the S₀ busses should respond:

```
set setup/WAN-module/router Interface-list
```

- ④ Enter the number required to access an outside line for each S₀ bus as required:

```
set setup/WAN-module/Interface-list/s0-x * 0.
```

Everybody's gone surfing—Internet access

You can use this configuration to take your company network onto the information superhighway using TCP/IP. All you need is a **single** account with an Internet service provider (ISP) or online service and a router. **All** computers on the network can then surf the Internet via the router.



In this example we are assuming that your Internet service provider is using the PPP protocol and provides an address which is valid on the Internet and the address of a DNS server every time it is dialed up.

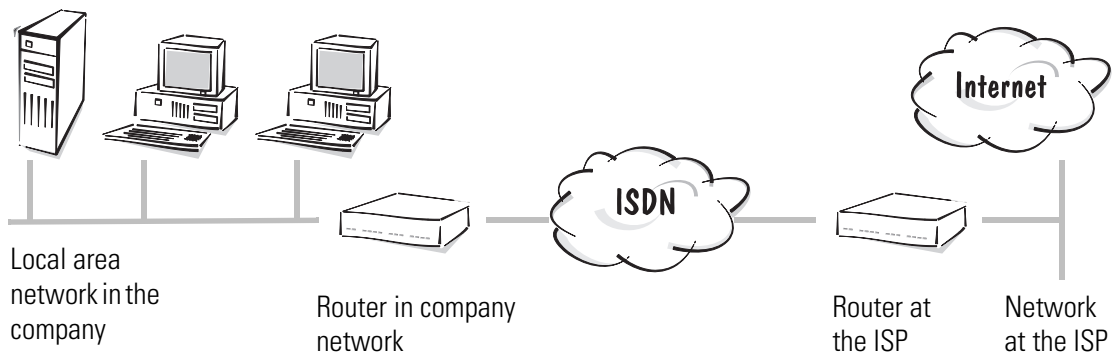
But how are the individual computers on the LAN given IP addresses they can use to access the Internet? By using IP masquerading. In short, this is what happens with IP masquerading:

The router is the only machine on the LAN to have a valid IP address on the Internet. This address can be allocated dynamically by the Internet service provider using PPP on dial-up (see above), for example. The network computers use addresses from a special address range (Private Address Space, addresses in the tens, for example). The entire local area network is now “hidden” by IP masquerading behind the registered IP address of the router. This process has two happy outcomes for the LAN:

- All the computers on the local area network can use the IP address of the router to the outside and so have access to the Internet.
- The computers on the local area network become invisible from outside. Only the IP address of the router will be known on the Internet. IP masquerading also acts as an effective firewall, preventing access to the network from outside.

Our example:

The network uses the TCP/IP protocol so that the individual workstation computers can access the Internet. It is up to you which operating system is used on the computers.





Learn to surf in two minutes: the Internet wizard

- ① The setup wizard starts automatically on completion of the Basic Settings Wizard. If the wizard does not start automatically, call it up with **Tools ► Setup Wizard**.
- ② Start the 'Set up Internet access' wizard and select first your country and your online service or provider in the next step. It will usually help to specify 'Default provider via PPP' if your service provider is not listed.
- ③ The wizard then briefly requests the required data (ISP access number, user name and password). Your router is now ready to access the Internet.



Step by step: which settings do you configure on the router?

Menu	Parameter	Comment or value
Setup/WAN-module/Name-list	Device-name	A meaningful name of your choice.
	Dialup-remote	ISP access number
	Time Out (B1-DT, B2-DT)	'90': specify the duration of each call unit for this connection, enabling units to be used as efficiently as possible.
Setup/WAN-module/PPP-list	WAN-Layer	Protocol used by the ISP (e.g. PPP-HDLC)
	Device-name	As defined in the host list
	Authent.	'none' because the router should not demand a password from the ISP.
	Key	Password for connection to ISP (case-sensitive)
Setup/IP-router-module/ IP-routing-table	Username	User name for ISP (case-sensitive)
	IP-address	'255.255.255.255' combined with the subnet mask defines the default route. All unknown addresses are searched for using this route.
	IP-netmask	'0.0.0.0'
	Router-name	Same as 'Device name' in the Name list.
	Masquerade	'on' hides the company's local area network behind the IP address assigned to the router by the provider for this connection.



If your Internet provider has provided you with an address for connecting via a proxy server, do not configure this address on the router but in the browsers of the individual PCs.

And we're off

That's it: Now you only need to start the browser and you're all set for the Internet...

Branch office calling head office—LAN to LAN coupling

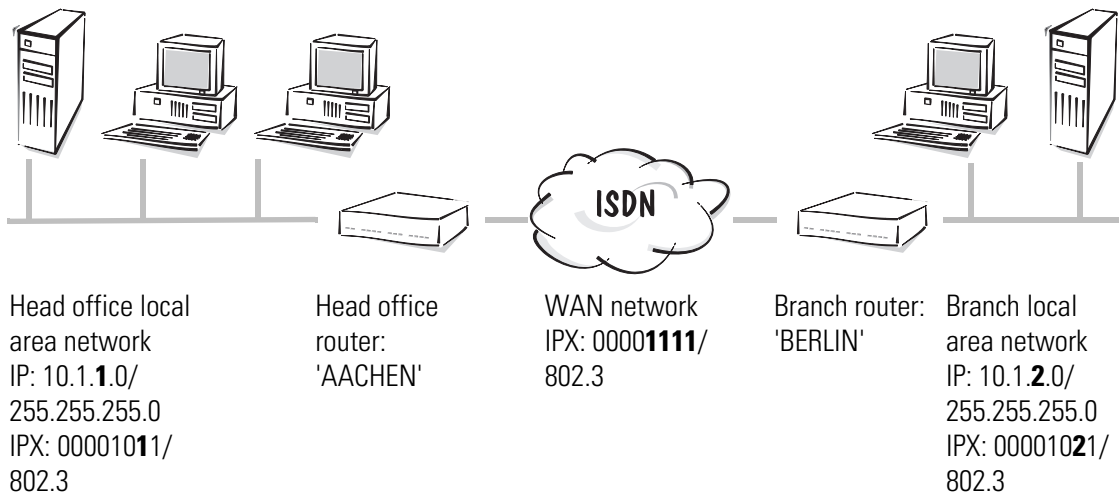
The story so far: Head Office plc. has set up a branch, Branch Office Ltd. Of course, Branch Office Ltd. also has its own network and should always be able to access the same data as Head Office plc. This is the solution: LAN to LAN coupling with ISDN routers.

Our example:

The networks use TCP/IP or IPX/SPX (or both) as their network protocol and must, therefore, be connected via the routing function. Unauthorized users will be prevented from accessing the LAN by prompting for a name.



For tips on securing access by means of the telephone number see chapter 'Security for your LAN' in the User Manual.



Linking networks in three minutes: The LAN wizard

- ① The setup wizard starts automatically on completion of the Basic Settings Wizard. If the wizard does not start automatically, call it up with **Tools ► Setup Wizard**.
- ② Select the 'Connect two local area networks' option.
- ③ The wizard briefly requests the required data (name and calling number of the router on the other network as well as network addresses). The first router is now ready to link to local networks. Run the wizard on the router on the other network correspondingly.

If you would like to link more than two networks, run the wizard again for each destination.



Step by step: configure these settings on the router at the head office

Menu	Parameter	Comment or value	
Setup	Name	'AACHEN': name of your own router.	
Setup/WAN-module	Protect	'Name' protects the local network from calls from unknown origins.	
Setup/WAN-module/Name-list	Device-name	'BERLIN': name of the router on the other network.	
	Dialup-remote	Call number of the other router.	
	Time Out (B1-DT, B2-DT)	'90': specify the duration of each call unit for this connection, enabling units to be used as efficiently as possible.	
	WAN-layer	'DEFAULT': layer, must be configured to the same setting on both networks.	
Setup/WAN-module/PPP-list	Device-name	'BERLIN': as defined in the Name list.	
	Authent.	'PAP': password protection using the Password Authentication Protocol.	
	Key	'*': indicated by asterisks when typing into the PPP list.	
	Try	'5': number of password checks using PAP.	
	Rights	Network protocols to be routed over this connection: IP, IPX, NTB (NetBIOS). NetBIOS always requires one of the other two protocols.	
Setup/WAN-module/PPP-list/Default	Authent.	'PAP': this setting must also be used for the default entry.	
<i>TCP/IP networks only</i>	Setup/IP-router-module/ IP-routing-table	IP-address	'10.1.2.0': address of the other LAN.
		IP-netmask	'255.255.255.0': corresponding subnet mask.
		Router-name	'BERLIN': name of the router on the other network.
<i>IPX networks only</i>	Setup/IPX-module/ LAN-config	Network	'00001011' or '00000000' if there is a Novell server on the network.
		Binding	'802.3' or 'Auto' if there is a Novell server on the network.
<i>IPX networks only</i>	Setup/IPX-module/ WAN-config/Routing-table	Remote-ID	'BERLIN': name of the router on the other network.
		Network	'00001111': network address of your choice, but must be unambiguous and distinct from all other network addresses (on WAN, LAN or internal to IPX).
		Binding	'802.3': also your choice, but must be the same on both routers.
		Backoff	May be switched off if there is no server on the other network.

	Menu	Parameter	Comment or value
<i>IPX networks only</i>	Setup/IPX-module	IPX-Router	'On': only switch the router on when all settings have been configured. Also, any modifications to the settings should only be carried out with the IPX router switched off. The RIP and SAP information will be updated when the router is switched back on.
<i>NetBIOS networks only</i>	Setup/NetBIOS-module	Operating	'On': activate NetBIOS-module.
		NT-Domain	'Marketing': The NetBIOS network of this workgroup is to be used by the remote station.
	Setup/NetBIOS-Module/ Remote-Table	Name	'BERLIN': Name of the router in the remote station's network.
		Type	'Router': A complete network can be reached via this access.

In addition, the appropriate route for the 'NetBIOS via IP' function must be set in the IP router module (see above).

And we're off

In a TCP/IP network, you can test the connection to other networks by "pinging" an IP address on the remote network. For example, enter the following command to access the head office network at the command prompt of a workstation in the branch office network:

```
ping 10.1.2.99
```

You should receive a reply from the head office network, provided that a server or the router has the intranet address 10.1.2.99.

On an IPX network you can check the configuration by looking at the router's RIP and SAP tables:

```
/status/IPX/SAP/Table, status/IPX/RIP/Table
```

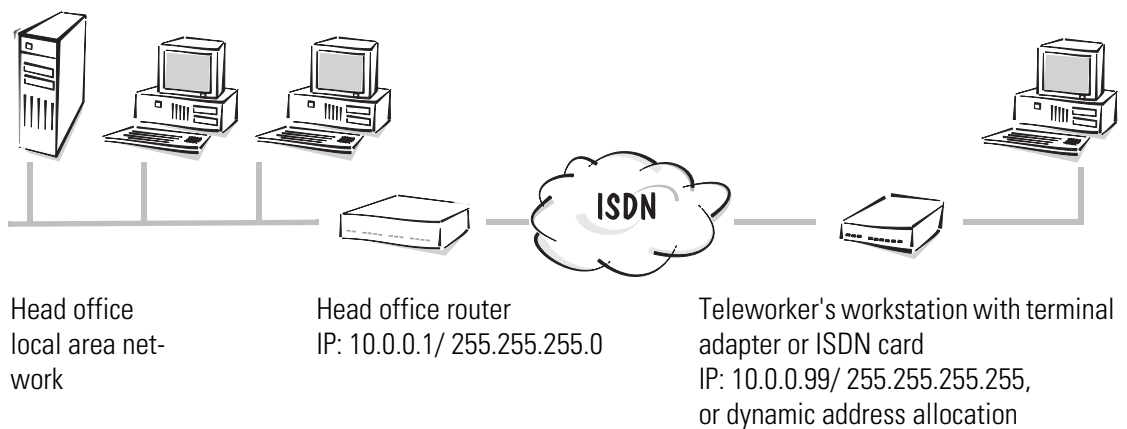
The services available on the networks (routes) that can be accessed are listed in these tables.

Teleworking and remote access

The solution for anyone who does not want to (or is unable to) spend every day in the office: access to the company network from anywhere.

Our example:

The teleworker has a workstation computer running Windows which has Dial-up Networking installed (of course, other operating systems with corresponding PPP clients also function with similar settings). He also has an ISDN connection and ISDN terminal adapter (or ISDN card) so that everything works nice and quickly. The company's LAN is to be protected against unauthorized access by using user names and passwords. Use PPP as the data transmission protocol since all common devices and operating systems support it.



Dial-up access within two minutes: the RAS wizard

- ④ The setup wizard starts automatically on completion of the Basic Settings Wizard. If the wizard does not start automatically, call it up with **Tools ▶ Setup Wizard**.
- ⑤ Select the 'Provide Dial-In access (RAS)' option.
- ⑥ The wizard briefly requests the required data (teleworker's name, password and telephone number as well as network addresses). You can select the network protocols to be routed over this connection (IP, IPX, NetBIOS). In addition, you can enter fixed IP addresses that will be assigned to individual teleworkers when they dial in. Alternatively, the IP addresses for teleworkers can be assigned dynamically from a pool of addresses. Thereafter, the company network is ready to be accessed from within the home office.



Step by step: which settings do you configure on the router?

Menu	Parameter	Comment or value		
Setup/WAN-module	Protect	'Name' protects the local network from calls from unknown origins.		
Setup/WAN-module/Layer-list	WAN-layer	'TELEWORK': name of the new layer being used for dial-up access.		
	Encaps.	'Trans'	Configures the new layer to the values that are necessary for normal PPP access.	
	Lay-3	'PPP'		
	Lay-2	'Trans'		
	L2-Opt.	'compr.'		
	Lay-1	'HDLC64k'		
Setup/WAN-module/Name-list	Device-name	'TELE01': name of the teleworker who is to be given access to the LAN.		
	Time Out (B1-DT, B2-DT)	'0': the teleworker can determine the duration of the connection.		
	WAN-layer	'TELEWORK': layer configured for RAS access.		
Setup/WAN-module/PPP-list	Device-name	'TELE01': as defined in the Name list.		
	Authent.	'PAP': password protection using the Password Authentication Protocol.		
	Key	'*': indicated by asterisks when typing into the PPP list.		
	Time	'0': for home offices operating under Windows.		
	Rights	'IP+NTB+IPX': network protocols to be routed over this connection: IP, IPX, NTB (NetBIOS). NetBIOS always requires one of the other two protocols.		
Setup/WAN-module/PPP-list/Default	Authent.	'PAP': this setting must also be used for the default entry.		
Setup/IP-router-module	Proxy-ARP	'On': allows the router to route data to destinations that actually are located on the same logical network.		
	Setup/IP-router-module/ IP-routing-table	IP-address	'10.0.0.99': address that will be assigned to the teleworker for the duration of connection. Must be on the same subnet as the router. Alternatively, dynamic assignments can be made using an address pool (see below).	
		IP-netmask	'255.255.255.255': the corresponding subnet mask.	
	Router-name	'TELE01': name of the teleworker.		
Setup/IP-router-module	Start-WAN-Pool	'10.0.0.200': start of the pool of addresses to be dynamically assigned to teleworkers. Must be on the same subnet as the router.		
Setup/IP-router-module	End-WAN-Pool	'10.0.0.250': end of the address pool.		

TCP/IP networks only

	Menu	Parameter	Comment or value
<i>IPX networks only</i>	Setup/TCP-IP-module	DNS-default	Your DNS server's intranet address. In the absence of a DNS server enter the router's own IP or intranet address. This will enable the teleworker to use the Domain Name Service (DNS) of the Internet service provider as well.
	Setup/IPX-module/ LAN-config	Network	'00000000' detects network address automatically if there is a server on the network.
		Binding	'Auto' detects the binding type automatically if there is a server on the network.
	Setup/IPX-module/ WAN-config/Routing-table	Remote-ID	'TELE01': name of the teleworker.
		Network	Any network address: your choice is not restricted, but it must be unambiguous and distinct from all other network addresses (on the WAN, LAN or internal to IPX).
		Binding	Also your choice.
		Backoff	'Off': we are assuming that there is no server in the teleworker's office.
<i>NetBIOS networks only</i>	Setup/IPX-module	IPX-Router	'On': only switch the router on when all settings have been configured.
	Setup/NetBIOS-module	Operating	'On': activate NetBIOS module
		NT-Domain	'Marketing': the teleworker would like to use the NetBIOS network of this workgroup.
	Setup/NetBIOS-Module/ Remote-Table	Name	'TELE01': name of the teleworker who is to be given access to the LAN.
		Type	'Workstation': only one computer dials in using this access.

When using fixed IP address assignments (rather than addresses from the IP pool), the appropriate route for the 'NetBIOS via IP' function must also be set in the IP router module (see above).

We're off with Windows 95 and Windows 98

- ① Define a new connection in Dial-Up Networking on the teleworker's computer with Windows 95 (**My Computer** ► **Dial-Up Networking** ► **Make New Connection**). Enter the user name and password and the router's access number.
- ② Right-click on the new connection to display its properties and switch to the 'Server Types' tab. The server type remains set to 'PPP: Windows 95, Windows NT 3.5, Internet'. The 'Require Encrypted Password' option must be disabled. Activate

'TCP/IP' and 'IPX', if required, as valid network protocols (i.e. if you would like to grant access to a Novell server). NetBIOS remains unchecked for this example.

- ③ Another click takes you to 'TCP/IP Settings'. Let the server assign the IP address and name server address. Normally, you do not need to change these settings.

We're off with Windows NT

- ① If the teleworker has a workstation with Windows NT, define a new connection in Dial-Up Networking. Enter the user name and password and the router's access number.
- ② Then edit the corresponding 'Phone book entry'. On the 'Server' tab the server type must remain set to 'PPP: Windows NT, Windows 95 Plus, Internet'. The 'Activate LCP Extensions for PPP' option must be enabled. Activate 'TCP/IP' and 'IPX', if required, as valid network protocols (i.e. if you would like to grant access to a Novell server). NetBIOS remains unchecked for this example.
- ③ Another click takes you to 'TCP/IP Settings'. Let the server assign the IP address and name server address. Normally, you do not need to change these settings.
- ④ Select the 'Accept any validity verification (incl. unencrypted)' option on the 'Security' tab.

General settings

Some more settings

Depending on which setup wizard you ran, your router may not have received a name yet. While a name is not absolutely necessary for some functions, it is advisable to help you maintain an overview of your equipment.

What's more, the subscriber numbers to which the router should respond have not been defined. The device will thus accept incoming calls for any number. The router will function correctly in this state. However, it will also answer calls not intended for it. We thus recommend that you assign subscriber numbers.

The following table shows you how to configure these settings.

Parameter	with <i>ELSA LANconfig</i>	via Telnet/terminal program
Device-name	'Management' configuration area, 'General' tab	set setup/name
Password for the configuration	'Management' configuration area, 'Security' tab	set password
Limit configuration via LAN and WAN	'Management' configuration area, 'Security' tab	set setup/config-modul/LAN-config set setup/config-modul/WAN-config
Call numbers for router operation	'Communication' configuration area, 'General' tab, Router interfaces button	set setup/WAN-module/Router Interface-list
Call numbers for <i>LANCAPi</i> operation	'LANCAPi' configuration area, 'General' tab, LANCAPi interfaces button	set setup/LANCAPi-module/EAZ-MSN(s)
Password for remote management (default access via PPP)	'Communication' configuration area, 'Protocol' tab, PPP List button	set setup/wan/PPP/default
Call number for remote management	'Management' configuration area, 'Security' tab	set setup/config-module/Farconfig (EAZ-MSN)



If you are operating your router on a PBX it is usually only necessary to enter the extension numbers as the call numbers. If in doubt, please consult the person who looks after your PBX. In the 'Error Search' chapter in the User Manual you will find tips on analyzing the router.

Channel assignment for channel bundling

When channel bundling is activated in one of the examples, a maximum of two channels are used by default. To bundle more than two channels, an entry must be made in the channel list.

- ① Open the configuration dialog by clicking on the appropriate entry in the device list.
- ② Go to the 'Communications' section and open the channel list on the 'Remote Stations' tab.
- ③ Select the appropriate entry as the 'remote station' and specify the minimum and maximum number of channels to be used for the bundled connection. If the order of the channels to be used is relevant—for example, if specific channels are to be reserved for dial-up connections—specify the channels to be used for the bundled connection here.

Alternatively, establish a Telnet connection to the unit. At the command prompt, enter:

```
/Setup/WAN-module/channel-list Internet 1 3 3-1;3-2;4-1
```

In the following example, a single channel is initially used for Internet access. A maximum of three channels can be bundled as required. Both channels of the third ISDN bus and the first channel of the fourth bus are used for this connection.

How to set up the workstation computers (Windows 95 or 98)

We will now briefly show you how the workstation computers must be set up (e.g. under Windows 95 and Windows 98) to ensure problem-free communication between the computers on the TCP/IP network and the router, if this has not already been done.

■ TCP/IP installation

Install TCP/IP by clicking **Start ► Settings ► Control Panel ► Network ► Add ► Protocol**. Select 'Microsoft' under Manufacturers and 'TCP/IP' under Network Protocols.

■ Obtain IP addresses automatically (use DHCP)

If you are running the router as a DHCP server configure the workstation computers to obtain IP addresses automatically: **Start ► Settings ► Control Panel ► Network ► TCP/IP ► Properties ► IP Address ► Obtain an IP address automatically**. You may also have to delete any existing DNS server and gateway settings (on the 'Gateway' and 'DNS Configuration' tabs). After rebooting, the

computer will search for a DHCP network on the server and will obtain an IP address from it.

- Configuring fixed IP addresses (not using DHCP)

If you do not wish to use a DHCP server on your network you should configure fixed IP addresses on your workstation computers: **Start ▶ Settings ▶ Control Panel ▶ Network ▶ TCP/IP ▶ Properties ▶ IP Address ▶ Specify an IP address.**

Allocate unique IP addresses, e.g. from a reserved address space. For example, the workstation computers could all have addresses between '10.1.1.2' and '10.1.1.253', the router would be '10.1.1.1' and all of them would use the subnet mask '255.255.255.0'. To test if the IP address intended for the router, e.g. '10.1.1.1' really is free, run `ping 10.1.1.1` in a DOS box. If you do not receive a reply to this request the address is probably still unused.

- Specifying the gateway and the DNS server (not necessary if using DHCP)

Configure the workstation computers to use the router's address as the gateway and as the Domain Name Server (DNS server): **Start ▶ Settings ▶ Control Panel ▶ Network ▶ TCP/IP ▶ Properties ▶ Gateway and DNS Configuration.** You must also specify a host name for the DNS configuration. Use the name of the PC for reasons of consistency, which, ideally, should be the same as the user name.

- Checking the IP configuration

Check the current IP configuration of the computer under Windows 95 or Windows 98 by selecting **Start ▶ Run ▶ winipcfg**. Among other information, you can see the IP address assigned to the computer by the DHCP server and the addresses conveyed for the DNS server and gateway.

