PATTON Electronics Co.

SmartNode 4552 & 4562
ISDN SoHo VoIP Gateway Router

Getting Started Guide

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Important Information

To use virtual private network (VPN) and/or AES/DES/3DES encryption capabilities with the SmartNode 4552 & 4562, you may need to purchase additional licenses, hardware, software, network connection, and/or service. Contact sales@patton.com or +1 (301) 975-1000 for assistance.

Warranty Information

The software described in this document is furnished under a license and may be used or copied only in accordance with the terms of such license. For information about the license, see Appendix F, "End user license agreement" on page 65 or go to **www.patton.com**.

Patton Electronics warrants all SmartNode router components to be free from defects, and will—at our option—repair or replace the product should it fail within one year from the first date of the shipment.

This warranty is limited to defects in workmanship or materials, and does not cover customer damage, abuse or unauthorized modification. If the product fails to perform as warranted, your sole recourse shall be repair or replacement as described above. Under no condition shall Patton Electronics be liable for any damages incurred by the use of this product. These damages include, but are not limited to, the following: lost profits, lost savings and incidental or consequential damages arising from the use of or inability to use this product. Patton Electronics specifically disclaims all other warranties, expressed or implied, and the installation or use of this product shall be deemed an acceptance of these terms by the user.

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About this guide

This guide describes the SmartNode 4552 & 4562 hardware, installation and basic configuration. For detailed software configuration information refer to the *SmartWare Software Configuration Guide* and the available Configuration Notes.

Audience

This guide is intended for the following users:

- Operators
- Installers
- Maintenance technicians

Structure

This guide contains the following chapters and appendices:

- Chapter 1 on page 13 provides information about router features and capabilities
- Chapter 2 on page 19 contains an overview describing router operation and applications
- Chapter 3 on page 22 provides hardware installation procedures
- Chapter 4 on page 29 provides initial procedures for configuring the SmartNode router
- Chapter 5 on page 39 contains information on contacting Patton technical support for assistance
- Appendix A on page 42contains compliance information for the SmartNode
- Appendix B on page 44 contains specifications for the routers
- Appendix C on page 49 provides cable recommendations
- Appendix D on page 52 describes the router's ports and pin-outs
- Appendix E on page 55 lists the factory configuration settings for SmartNode 4552 & 4562
- Appendix F on page 65 provides license information that describes acceptable usage of the software provided with the SmartNode 4552 & 4562

For best results, read the contents of this guide *before* you install the router.

Precautions

Notes, cautions, and warnings, which have the following meanings, are used throughout this guide to help you become aware of potential problems. ***Warnings*** are intended to prevent safety hazards that could result in personal injury. ***Cautions*** are intended to prevent situations that could result in property damage or impaired functioning.

Note A note presents additional information or interesting sidelights.

The alert symbol and IMPORTANT heading calls attention to important information.

The alert symbol and CAUTION heading indicate a potential hazard. Strictly follow the instructions to avoid property damage.

The shock hazard symbol and CAUTION heading indicate a potential electric shock hazard. Strictly follow the instructions to avoid property damage caused by electric shock.

The alert symbol and WARNING heading indicate a potential safety hazard. Strictly follow the warning instructions to avoid personal injury.

The shock hazard symbol and WARNING heading indicate a potential electric shock hazard. Strictly follow the warning instructions to avoid injury caused by electric shock.

Safety when working with electricity

This device contains no user serviceable parts. The equipment shall be returned to Patton Electronics for repairs, or repaired by qualified service personnel.

The external power adaptor shall be a listed limited power source that incorporates a disconnect device and shall be positioned within easy reach of the operator. The mains outlet shall be within 10 feet (3 meters) of the device, shall be easily accessible, and protected by a circuit breaker.

Ensure that the power cable used with this devise meets all applicable standards for the country in which it is to be installed, and that it is connected to a wall outlet which has earth ground.

Hazardous network voltages are present in WAN ports regardless of whether power to the unit is ON or OFF. To avoid electric shock, use caution when near WAN ports. When detaching the cables, detach the end away from the device first.

Do not work on the system or connect or disconnect cables during periods of lightning activity.

Do not work on the system unless telephone network cables are disconnected in order to prevent contact with telephone line voltages.

In accordance with the requirements of council directive 2002/96/EC on Waste of Electrical and Electronic Equipment (WEEE), ensure that at end-of-life you separate this product from other waste and scrap and deliver to the WEEE collection system in your country for recycling.

General observations

- Clean the case with a soft slightly moist anti-static cloth
- Place the unit on a flat surface and ensure free air circulation
- Avoid exposing the unit to direct sunlight and other heat sources
- Protect the unit from moisture, vapors, and corrosive liquids

Typographical conventions used in this document

This section describes the typographical conventions and terms used in this guide.

General conventions

The procedures described in this manual use the following text conventions:

Table 1. General conventions

Convention	Meaning
Garamond blue type	Indicates a cross-reference hyperlink that points to a figure, graphic, table, or section heading. Clicking on the hyperlink jumps you to the reference. When you have finished reviewing the reference, click on the **Go to Previous View** button  in the Adobe® Acrobat® Reader toolbar to return to your starting point.
Futura bold type	Commands and keywords are in **boldface** font.
Futura bold-italic type	Parts of commands, which are related to elements already named by the user, are in ***boldface italic*** font.
Italicized Futura type	Variables for which you supply values are in *italic* font
Futura type	Indicates the names of fields or windows.
Garamond bold type	Indicates the names of command buttons that execute an action.
< >	Angle brackets indicate function and keyboard keys, such as <SHIFT>, <CTRL>, <C>, and so on.
[ ]	Elements in square brackets are optional.
{a | b | c}	Alternative but required keywords are grouped in braces ({ }) and are separated by vertical bars (|)
`blue screen`	Information you enter is in `blue screen` font.
`screen`	Terminal sessions and information the system displays are in `screen font`.
node	The leading IP address or nodename of a SmartNode is substituted with ***node*** in ***boldface italic*** font.
SN	The leading **SN** on a command line represents the nodename of the SmartNode
#	An hash sign at the beginning of a line indicates a comment line.

Chapter 1 General information

Chapter contents

SmartNode 4552 & 4562 overview

The SmartNode 4552 & 4562 ISDN Small Office/Home Office (SoHo) Gateway-Router (see figure 1) combines Ethernet switching, IP routing, VPN/Security, and Quality of Service with high-quality Voice over IP (VoIP) delivered on an ISDN S0 (S/T) Basic Rate Interface (BRI). This combination allows you to leverage low-cost Internet Telephony on existing ISDN Phones and PBX equipment for complete SoHo and branch office voice and data connectivity.

Figure 1. SmartNode 4552 & 4562

The SmartNode 4552 & 4562 is equipped with a 10/100Base-T Ethernet WAN port and an integrated 4-port 10/100Base-T Ethernet switch.

The SmartNode 4552 & 4562 Gateway-Router performs the following major functions:

- Two channels of Voice over IP and local voice switching via 2 ISDN BRI S0 ports, one NT port for connection to ISDN terminal equipment and one TE port for connection to the ISDN network/switch.
- A fallback cut-through relay between the two ISDN BRI ports electrically connects the NT and TE port in case of power failure and enables life-line calls to the public ISDN network (PSTN-supplied ISDN line must be used).
- Standard compliant VoIP in accordance with SIP or H.323 protocols.
- Internet access and IP Routing with IP Quality of Service (QoS) support for mixed voice and data traffic.

SmartNode 4552 & 4562 rear panel

The SmartNode 4552 & 4562 is a compact VoIP Gateway Router that supports two VoIP calls on two ISDN BRI ports (see figure 2). The SmartNode 4552 & 4562 rear panel ports are described in table 2.

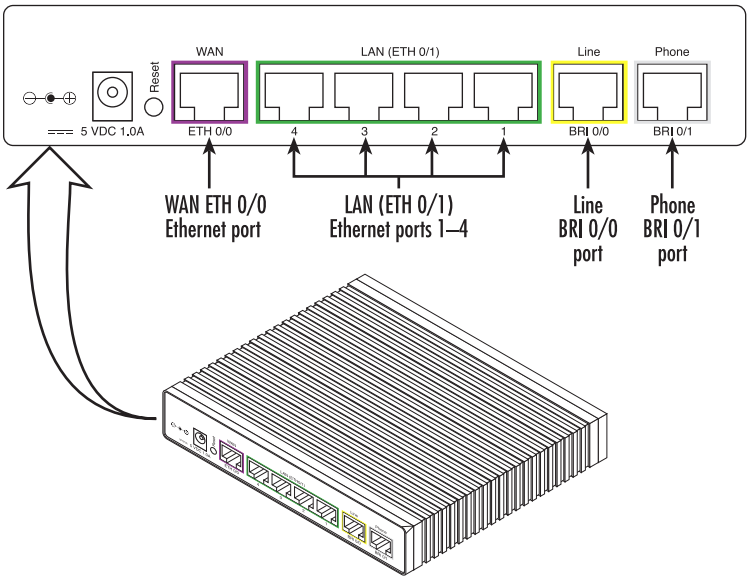


Figure 2. SmartNode 4552 & 4562 rear panel

Table 2. Rear panel ports

Port	Description
WAN ETH 0/0	Auto-MDX Fast-Ethernet port, RJ-45 (see figure 2), connects the unit to an Ethernet WAN device (for example, a cable modem, DSL modem, or fiber modem).
LAN (ETH 0/1) 1–4	Switched Auto-MDX Fast-Ethernet ports, RJ-45 (see figure 2), connect the unit to an Ethernet LAN (for example, a PC, printer, or wireless bridge).
Line (BRI 0/0)	ISDN BRI TE (Usr) port, RJ-45 S_0 (S/T)-interface (see figure 2), connects the unit to an ISDN NT. Point-to-point or point-to-multipoint configurable.
Phone (BRI 0/1)	ISDN BRI NT (Net) port, RJ-45 S_0 (S/T)-interface (see figure 2), connects the unit to an ISDN phone or PBX trunk-port. Point-to-point or point-to-multipoint configurable.
5V DC, 1.0A	The Model 4552 has a 5V DC power input (see figure 2).
Reset	The reset button (see figure 2) has three functions: • Restart the unit with the current startup configuration—Press (for less than 1 second) and release the *Reset* button to restart the unit with the current startup configuration. • Restart the unit with factory default configuration—Press the *Reset* button for 5 seconds until the *Power* LED (see figure 3 on page 16) starts blinking to restart the unit with factory default configuration. • Restart the unit in bootloader mode (to be used only by trained SmartNode technicians)—Starting with the unit powered off, press and hold the *Reset* button as you apply power to the unit. Release the *Reset* button when the *Power* LED starts blinking so the unit will enter bootloader mode.

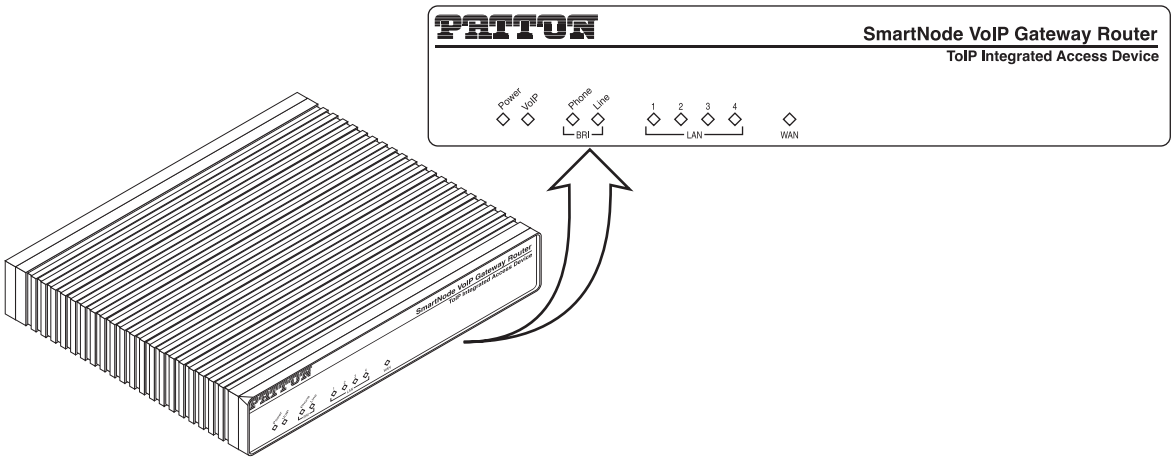


Figure 3. SmartNode 4552 & 4562 front panel

SmartNode 4552 & 4562 front panel

Figure 3 shows SmartNode 4552 & 4562 LEDs, the LED definitions are listed in table 3.

Table 3. SmartNode 4552 & 4562 LED definitions

LED	Description
Note	If an error occurs, all LEDs will flash once per second.
Power	When lit, indicates power is applied and the unit is in normal operation. Off indicates no power applied. Flashes once per second during boot (startup).
VoIP Link	• On indicates the gateway is registered to an H.323 gatekeeper/SIP server, or, in the case of direct routing, has at least one active VoIP connection. • Off indicates the unit is not configured or registered, or has no active direct-routed VoIP connection. • Flashing green indicates that the unit is attempting to register or has failed to register.
BRI (**Phone** and **Line**)	Off indicates no active calls. Blinking when one or two B-channels are connected.
Ethernet (**LAN 1–4** and **WAN**)	• On when the Ethernet connection on the corresponding port has a link indication. • Flashes when data is received or transmitted at the corresponding Ethernet port.

Chapter 2 Applications overview

Chapter contents

Introduction

Patton's SmartNode VoIP Media Gateway Routers deliver the features you need for advanced multiservice voice and data network applications. They combine high quality voice-over-IP with powerful *quality of service* routing functions to build professional and reliable VoIP and data networks. This chapter describes typical applications for which this SmartNode is uniquely suited.

Note Detailed configuration information for the applications can be found on the CD-ROM that was included with your SmartNode device or online from the Patton webserver at **www.patton.com**.

Application—Multi-service ISDN Internet telephony IAD

The SmartNode 4552 & 4562 with two ISDN BRI ports can be used to make and receive calls to and from the public ISDN network and Internet Telephony services on any ISDN Terminal (Phone or PBX) (see figure 4). Using individually configurable routing tables, an outbound call can be directed to the local PSTN connection or to an Internet telephony service provider (ISTP). Inbound calls from the Internet and the PSTN can ring the same phone.

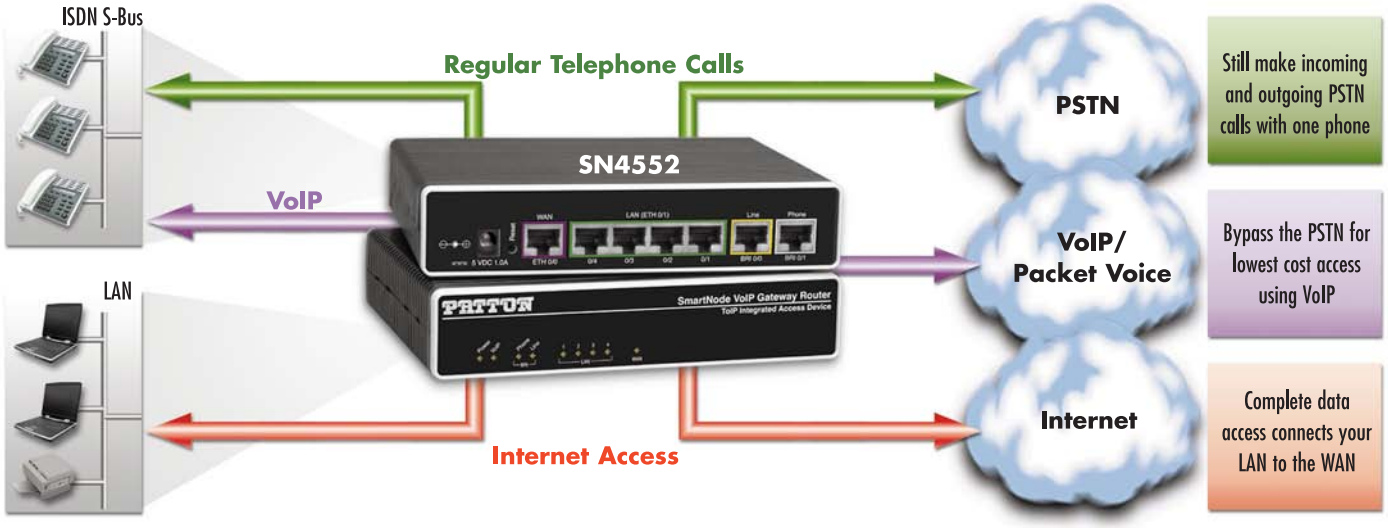


Figure 4. Internet telephony IAD application (SN4552 shown)

Broadband network connectivity integrates with any fixed IP, DHCP or PPPoE service. An integrated 10/100 Ethernet LAN switch, with advanced routing features such as NAT, Firewall/ACL, DynDNS as well as optional IPSec VPN, fulfills the requirements of demanding network users.

Quality of Service (QoS) features complete the offering with advanced voice prioritization and traffic management. Patton's patent-pending DownStreamQoS™ ensures voice without interruptions even over best-effort Internet connections.

Application—ISDN home or telecommuter connectivity

For a SoHo/telecommuter, the SmartNode 4552 & 4562 can provide an off-premise extension to the corporate network (see figure 5). Along with the access to the corporate ISDN PBX, the SmartNode provides Internet access and VPN connectivity to the main office. In this configuration, the remote user will appear to be local and can take advantage of services available to local telephony and LAN users (such as file-server access, station-to-station dialing, outside trunk access, and voice mail). Additionally, the home user can take advantage of corporate dialing rates.

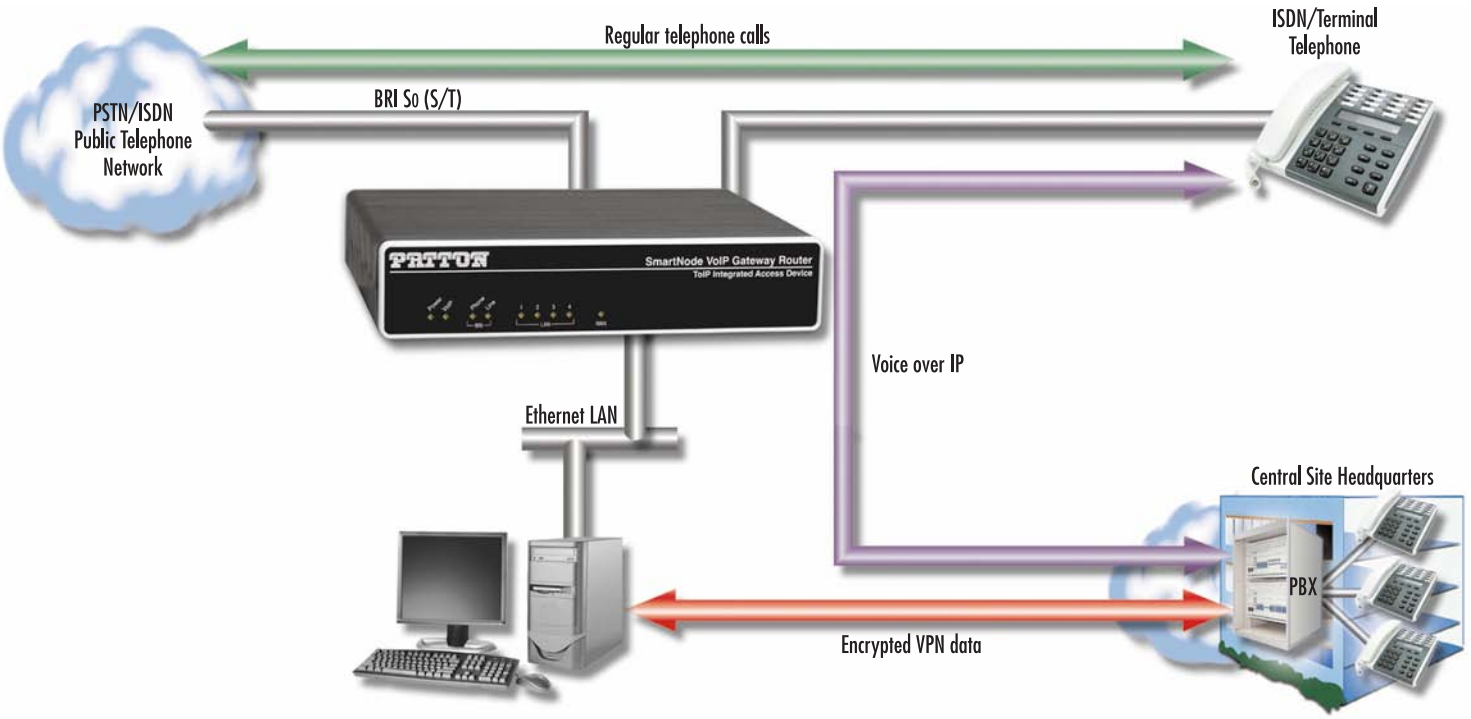


Figure 5. ISDN home or branch office application

Chapter 3 SmartNode installation

Chapter contents

Planning the installation

The mains outlet that is utilized to power the equipment must be within 10 feet (3 meters) of the device and shall be easily accessible.

Before installing the gateway router device, the following tasks should be completed:

- **Create a network diagram** (see section "Network information" on page 23)
- **Gather IP related information** (see section "IP related information" on page 24 for more information)
- **Install the hardware and software needed to configure the SmartNode.** (See section "Software tools" on page 24)
- **Verify power source reliability** (see section "Power source" on page 24).

After you have finished preparing for gateway router installation, go to section "Installing the gateway router" on page 24 to install the device.

Site log

Patton recommends that you maintain a site log to record all actions relevant to the system, if you do not already keep such a log. Site log entries should include information such as listed in table 4.

Table 4. Sample site log entries

Entry	Description
Installation	Make a copy of the installation checklist and insert it into the site log
Upgrades and maintenance	Use the site log to record ongoing maintenance and expansion history
Configuration changes	Record all changes and the reasons for them
Maintenance	Schedules, requirements, and procedures performed
Comments	Notes, and problems
Software	Changes and updates to SmartWare software

Network information

Network connection considerations that you should take into account for planning are provided for several types of network interfaces are described in the following sections.

Network Diagram

Draw a network overview diagram that displays all neighboring IP nodes, connected elements and telephony components.

IP related information

Before you can set up the basic IP connectivity for your SmartNode 4552 & 4562 you should have the following information:

- IP addresses used for Ethernet LAN and WAN ports
- Subnet mask used for Ethernet LAN and WAN ports
- IP addresses of central H.323 gatekeeper (if used)
- IP addresses and/or URL of SIP servers or Internet telephony services (if used)
- Login and password for PPPoE Access
- Login and password for SIP or H.323 based telephony services
- IP addresses of central TFTP server used for configuration upload and download (optional)

Software tools

You will need a PC (or equivalent) with Windows Telnet or a program such as *Tera Term Pro Web* (included on the SmartNode CD-ROM) to configure the software on your SmartNode router.

Power source

If you suspect that your AC power is not reliable, for example if room lights flicker often or there is machinery with large motors nearby, have a qualified professional test the power. Patton recommends that you include an uninterruptible power supply (UPS) in the installation to ensure that VoIP service is not impaired if the power fails.

Location and mounting requirements

The SmartNode router is intended to be placed on a desktop or similar sturdy, flat surface that offers easy access to the cables. Allow sufficient space at the rear of the chassis for cable connections. Additionally, you should consider the need to access the unit for future upgrades and maintenance.

Installing the gateway router

SmartNode hardware installation consists of the following:

- Placing the device at the desired installation location (see section "Placing the SmartNode")
- Connecting the interface and power cables (see section "Installing cables" on page 25)

When you finish installing the SmartNode, go to chapter 4, "Initial configuration" on page 29.

Placing the SmartNode

Place the unit on a desktop or similar sturdy, flat surface that offers easy access to the cables. The unit should be installed in a dry environment with sufficient space to allow air circulation for cooling.

Note For proper ventilation, leave at least 2 inches (5 cm) to the left, right, front, and rear of the unit.

Installing cables

Do not work on the system or connect or disconnect cables during periods of lightning activity.

The Interconnecting cables shall be acceptable for external use and shall be rated for the proper application with respect to voltage, current, anticipated temperature, flammability, and mechanical serviceability

Connect the cables in the following order:

1. Connect the ISDN terminals and NT to the BRI ports (see section "Connecting ISDN terminals and NT to the SmartNode's ISDN BRI ports").
2. Connect the 10/100Base-T Ethernet LAN and WAN (see section "Connecting the 10/100Base-T Ethernet LAN and WAN cables" on page 25)
3. Connect the power supply (see section "Connecting the power supply" on page 26)

Connecting ISDN terminals and NT to the SmartNode's ISDN BRI ports

The SmartNode comes with two ISDN BRI ports located on the rear panel (see figure 2 on page 15). Install the cables as follows:

1. Connect a cable between port *BRI 0/0 (Line)* of the Model 4552 and the S/T outlet of the ISDN NT.
2. Connect a cable between port *BRI 0/1 (Phone)* of the Model 4552 and the ISDN terminal (phone or PBX)

Note If there is no ISDN network termination in the installation and you require S-Bus line power for the connected terminals, you can install an S-Bus Phantom Power Supply on port BRI 0/0 (Patton part number *SN-PM-BRI-EXT/230/EU*). The SmartNode does not require S-bus line power to function.

For details on the BRI port pinout and ISDN cables, refer to Appendix C, "Cabling" on page 49 and Appendix D, "Port pin-outs" on page 52.

Connecting the 10/100Base-T Ethernet LAN and WAN cables

The SmartNode 4552 & 4562 has automatic MDX (auto-crossover) detection and configuration on all Ethernet ports. Any of the ports can be connected to a host or hub/switch with a straight-through wired cable.

1. Connect port ETH 0/0 to the subscriber port of the broadband access modem (DSL, cable, WLL).
2. Connect Ethernet ports 1 to 4 to your LAN devices (PC, printer, switches, etc.)

For details on the Ethernet port pinout and cables, refer to Appendix C, "Cabling" on page 49 and Appendix D, "Port pin-outs" on page 52.

Connecting the power supply

Do the following to connect the power supply to the Model 4552:

Note ***Do not connect the power cord to the AC power outlet at this time.***

1. Insert the barrel-type connector end of the AC power supply into the *5V DC, 1.0A* port (see figure 2 on page 15).

CAUTION

The external router power supply automatically adjusts to accept an input voltage from 100 to 240 VAC (50/60 Hz).

Verify that the proper voltage is present before plugging the power cord into the receptacle. Failure to do so could result in equipment damage.

2. Verify that the AC power cord included with your router is compatible with local standards. If it is not, refer to "Contacting Patton for assistance" on page 39 to find out how to replace it with a compatible power cord.
3. Connect the male end of the AC power supply power cord to an appropriate AC power outlet.

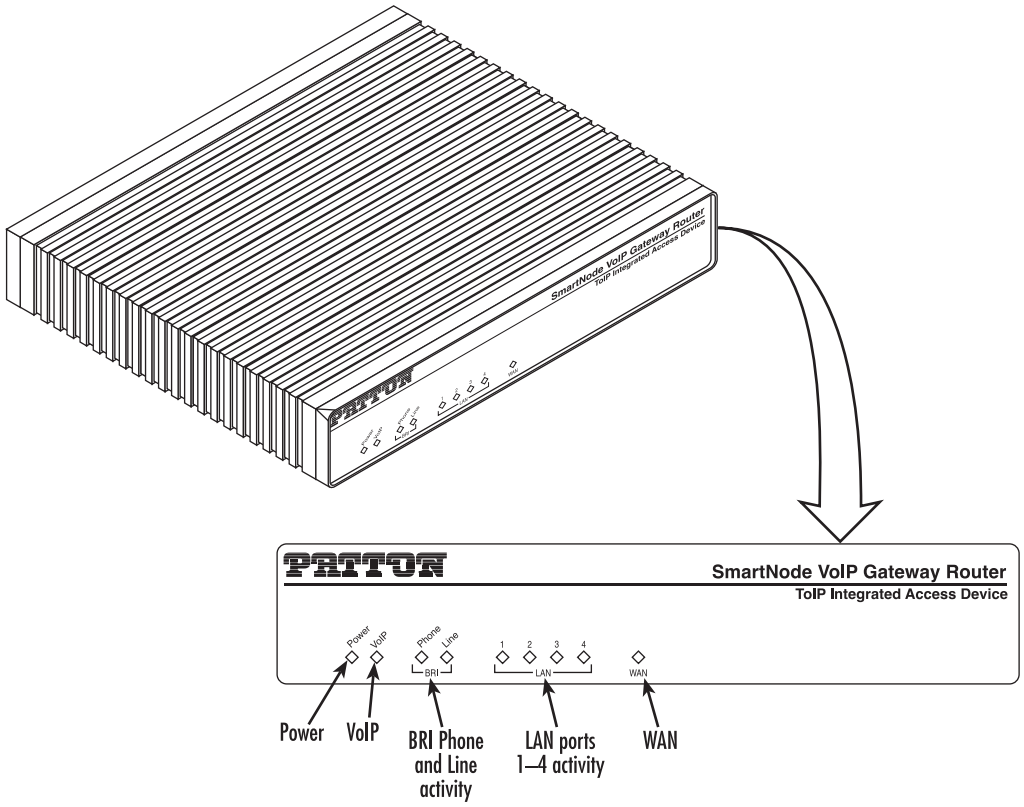


Figure 6. Router front panel LEDs

4. Verify that the green *Power* LED is lit (see figure 6).

External S-Bus power supply

Many ISDN telephone handsets require that 40-VDC power be supplied via the S-Bus connection. In other words, they have no separate or built-in power supply. In general, point-to-multipoint ISDN BRI network terminations supply line power to the S-Bus. Point-to-point configurations connected to a PBX generally do not supply line power.

The Model 4552 does not supply S-Bus line power on the BRI ports, however, there are two options to provide S-Bus line power:

- If one of the BRI ports is connected to an ISDN NT, the power supplied by the NT is fed through to the other BRI port.
- If line power is not available from the NT, but required for connected terminals, the PM-BRI-EXT S-Bus Phantom power supply can be used.

Table 5. PM-BRI-EXT S-Bus 40V power supply

Item	Phantom Power Supply; PM-BRI-EXT
Voltage Specifications	Input 230VAC, Output 40VDC

If you use a Phantom power supply other than that supplied by Patton Electronics Co., you must ensure that it conforms to ITU I.430 Section 9.7.3.2.2. which specifies that the maximum current delivered shall not exceed 200mA.

The PM-BRI-EXT power supply unit is equipped with a transformer that is specially designed for S-Bus line power. The use of a general purpose DC power transformer may cause equipment damage.

Do not plug the Phantom power supply directly into any other port than BRI 0/0. Installing it on the Ethernet ports could result in serious equipment damage.

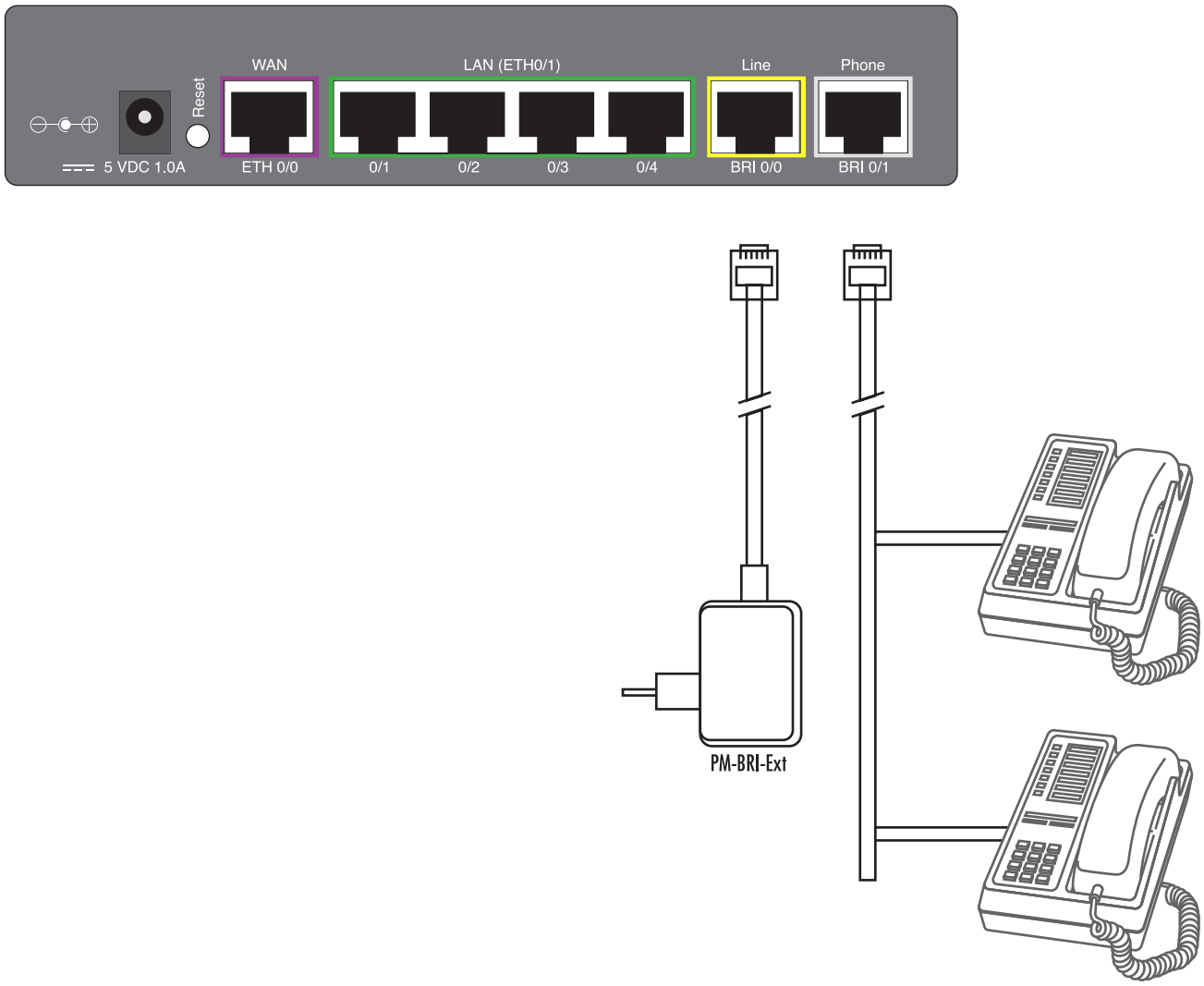


Figure 7. Model 4552 external 40-VDC power supply

Congratulations, you have finished installing the SmartNode Gateway Router! Now go to chapter 4, "Initial configuration" on page 29.

Chapter 4 Initial configuration

Chapter contents

Introduction

This chapter leads you through the basic steps to set up a new SmartNode:

- Powering up the SmartNode (section "1. Power up the SmartNode")
- Configuring your PC to use DHCP (section "2. Set your PC to DHCP")
- Connecting the PC to the SmartNode's LAN port (section "3. Connect the PC to the SmartNode LAN Port" on page 32)
- Accessing the Internet (section "4. Get Started" on page 33)

1. Power up the SmartNode

The interconnecting cables shall be acceptable for external use and shall be rated for the proper application with respect to voltage, current, anticipated temperature, flammability, and mechanical serviceability.

1. Connect the SmartNode to a power source using the included power supply and cable.
2. When the *Power* LED stops blinking and remains lit, the SmartNode is ready to configure.

2. Set your PC to DHCP

The interconnecting cables shall be acceptable for external use and shall be rated for the proper application with respect to voltage, current, anticipated temperature, flammability, and mechanical serviceability.

This guide will allow you to quickly access the configuration interface of a SmartNode and give an overview of the different elements you can or need to configure. For detailed information on all configuration parameters refer to the SmartWare software configuration guide.

The SmartNode has a built in DHCP Server which allows an automatic IP connection with a connected PC. To prepare the connection you need to configure the PC to use DHCP. The following paragraphs show how to do this on Windows. For other operating systems refer to the operating instructions of the PC.

1. Right-click on *My Network Places* and select *Properties* in the context menu (see figure 8).

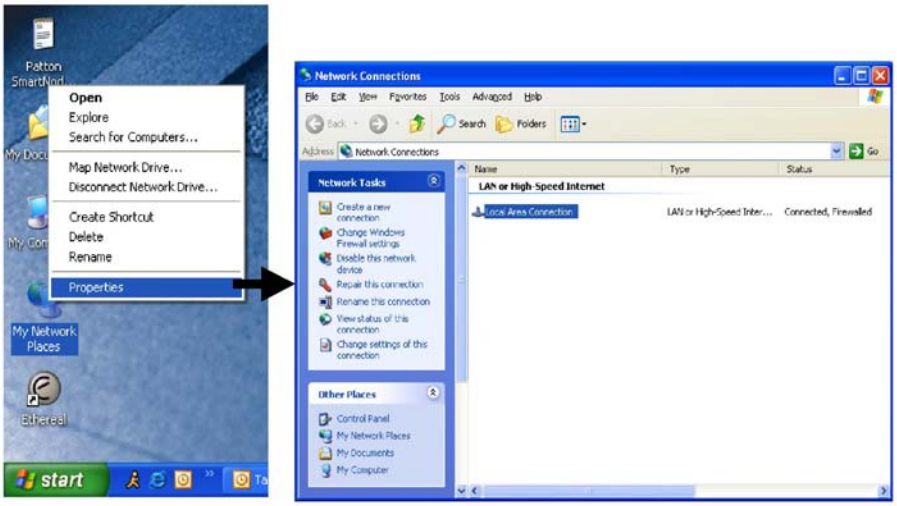


Figure 8. Displaying the Network Connections window

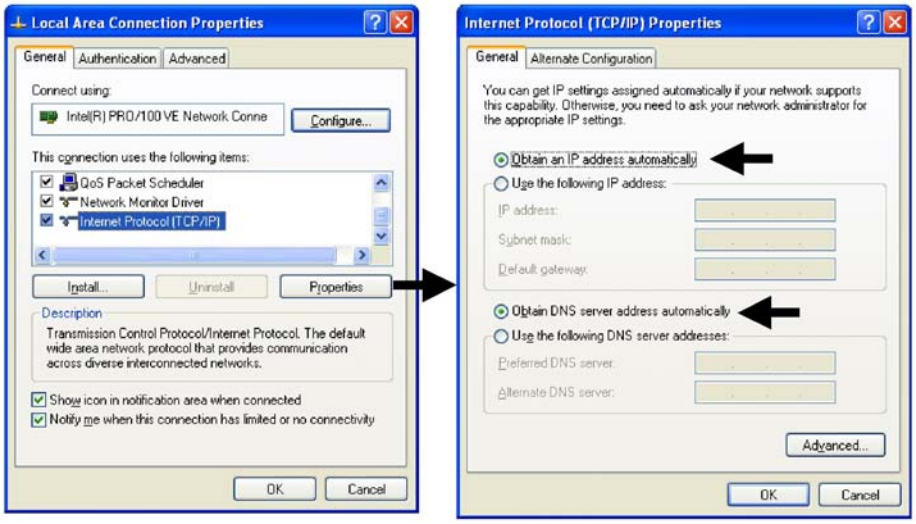


Figure 9. Displaying the Internet Properties (TCP/IP) Properties window

2. Double-click on *Local Area Connection* and click on **Properties** to open the *Internet Protocol (TCP/IP) Properties* window (see figure 9).
3. Select *Obtain an IP address automatically* and *Obtain DNS server address automatically* options.
4. Click **OK** to save changes and close the properties windows.

3. Connect the PC to the SmartNode LAN Port

CAUTION

The Interconnecting cables shall be acceptable for external use and shall be rated for the proper application with respect to voltage, current, anticipated temperature, flammability, and mechanical serviceability

Now use the included Ethernet cable to connect the configured PC to the SmartNode. The factory default configuration of the SmartNode defines Ethernet port 0/1 as the LAN port.

Note Most SmartNode Ethernet ports are Auto-MDIX which means that you can use a standard straight-wired Ethernet cable to connect to the PC or a hub/switch.

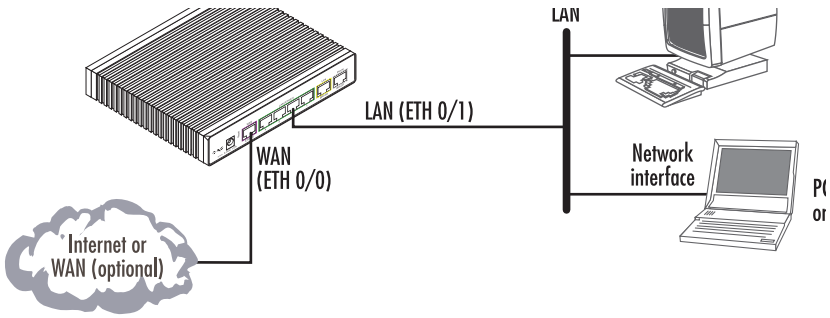


Figure 10. Connecting the SmartNode to the network

Model	Connect to port
SN1200/1400	ETH 0/1, use crossover cable or hub
SN4552 & SN4562	ETH 0/1 any one of the 4 ports, Auto-MDIX

Open the configuration interface

1. Once IP connectivity is established, use a web browser to get access to the SmartNode configuration interface. Enter "smart.node" in the address bar to get started (see figure 11).

Figure 11. Using a web browser to access the SmartNode configuration interface

Note Alternatively, you may enter the SmartNode's factory default IP address of *192.168.1.1*.

2. The *Connect to SmartNode* window asks you for the login credentials (see figure 12). The factory default login credentials are:

   User Name: ***administrator***

   Password: There is no password, leave this field empty

Figure 12. Login window

3. Click **OK**.

4. Get Started

After successful login you get to the SmartNode home page, and you can configure your device. You will be presented the following home page, which contains buttons to store the current configuration state, reload the device and restore to factory defaults. The home page also shows some system information. You can always go back to the home page by clicking *Home* in the navigation bar.

The GUI consists of the following main elements (see figure 13):

- The “Navigation Bar” on the left edge presents you with a menu listing giving access to the various configuration and status pages of the SmartNode.
- At the top of the page you see the “Current System Path” which displays the location and element currently presented in the main area.
- The rest of the page displays the configuration and status information for the different features of the SmartNode.

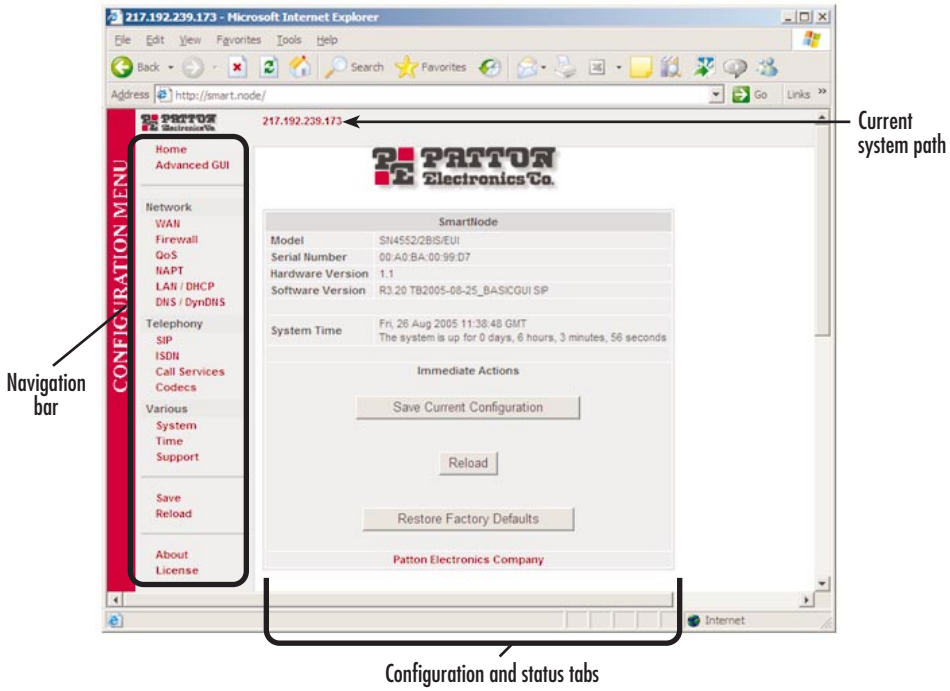


Figure 13. Main GUI elements

CAUTION

During the whole configuration process, all your changes are only applied—that is, saved in volatile memory (RAM). To store the settings in non-volatile memory (i.e. make them survive power failure or manual reload), return to the home page and press the **Save Current Configuration** button.

Accessing the Internet

Connect an Ethernet cable from the WAN port on the SmartNode to the upstream WAN Internet connection. Begin the configuration for Internet access with the WAN page.

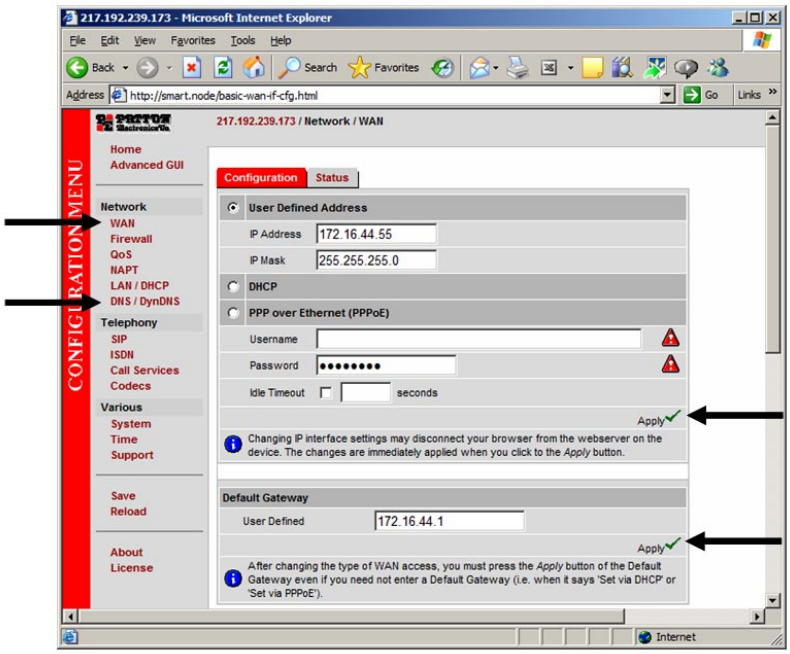


Figure 14. WAN page

Connecting a PC and logging in

Here are some special hints you may use when configuring your SmartNode:

For each box containing an "Apply" button, fill in the required fields and press "apply" once. The settings are applied immediately after the button is pressed. If there are several boxes with an "Apply" button on one page, fill in the information per box and press the button for each box separately. This saves the new configuration parameters in volatile memory (RAM) only.

The "alert" symbol shows you that somewhere a user input is missing for correct functionality. In the case of the present WAN page, you can ignore them, because the respective title bullet ("PPP over Ethernet") is not selected.

The "info" symbol denotes hints to ease configuration or to avoid pitfalls. Read them whenever you encounter them!

There are three different configuration options for the WAN Internet connection (see figure 14):

- **DHCP (client—factory default).** The SmartNode's WAN port has a DHCP client enabled that uses an established Internet connection to get the Internet connectivity parameters (IP address, default gateway) automatically from a DHCP server. Use this option when connecting the SmartNode to a DSL router, a cable modem, or to a company LAN (with a DHCP server). This is the factory default configuration so no

configuration is required, only the LAN and WAN Ethernet connections should be made to access the Internet immediately.

- **PPPoE.** The SmartNode establishes the connection with the Internet using PPPoE. This is most commonly used when the SmartNode is connected to a DSL *bridge*, or a DSL router that is configured in *bridge* mode (most routers are capable of this).

  Enter the DSL credentials (username and password) on the SmartNode and click on the **Apply** button.

- **User Defined Address.** The SmartNode uses an existing internet connection which does not provide an upstream DHCP server. In this case, you need to set the IP address, subnet mask, default gateway and DNS servers manually.

  - **IP Address**—The IP address of the WAN Ethernet port.
  - **IP Mask—**The mask for the WAN port's IP address.

Click on the *Apply* icon to apply the new configuration.

- **Default Gateway**—This is the IP address of the upstream router. Click on the *Apply* icon to apply the new configuration.
- **DNS/DynDNS**—In the Configuration Menu, go to DNS/DynDNS. Enter the IP addresses of the DNS servers and *Apply* the new settings.

Figure 14 on page 35 shows the third case—**User Defined Address** configuration of connectivity parameters. In this example the SmartNode's WAN IP address is 172.16.44.55 with an IP Mask of 255.255.255.0. The Default Gateway is 172.16.44.1.

Note Be sure to return to the *Home* configuration page to save the new configuration in non-volatile memory.

Advanced GUI

The "advanced GUI" leads you to the full universe of SmartNode configuration parameters. There are many more things that can be configured than you are presented on the "basic GUI" pages you see when the system starts. Be aware that configuration is quite a bit more complicated and requires some know-how about VoIP and the SmartNode configuration concepts. We recommend familiarizing yourself with the *SmartWare Software Configuration Guide* before switching to the advanced mode.

Bootloader

The bootloader ensures that basic operations, network access, and downloads are possible in case of interrupted or corrupted application image downloads. It offers console access to the Bootloader and the capability for downloading application images (e.g. SmartWare) via the serial link of the console.

Start Bootloader

To start the Bootloader, power on the SmartNode while pressing the reset button. Open a Telnet session to the SmartNode via one of the Ethernet interfaces, or open a CLI session via the console port (if available on the SmartNode). The login display will appear. Using the credentials admin / patton , log in to the SmartNode.

The following prompt will be displayed:

```
RedBoot>
```

Type **help** to display an overview of the available commands.

Start-up with factory configuration

Step	Command	Purpose
1	**RedBoot> fis load**	Copies the SmartWare application image from the persistent memory (flash:) to the volatile memory (RAM) from where it will be executed.
2	**RedBoot> go -s factory-config**	Starts the SmartWare application telling it to use 'factory-config' as startup configuration. You can also start-up with any other configuration available in the persistent memory (nvram:) by providing its name instead of 'factory-config'.

Load a new application image (SmartWare) via TFTP

The following procedure downloads the application image (SmartWare) for the mainboard. See the note below on how to download the respective CLI description file.

Step	Command	Purpose
1 optional	**RedBoot> ip_address - l** *local_ip_address* **[**/*mask_len*]	Sets the IP address and subnet mask of the Ethernet interface 0/0 which shall be used to receive the new application image. *mask_len* is the length of the network address (or the number of 1's within the subnet mask). See Note below.
2 optional	**RedBoot> ip_address -g** *gateway*	Sets the IP address of the default gateway.
3 optional	**RedBoot> ping -h** *tftp-server_ip_address*	Tests the connectivity to the TFTP server.
4	**RedBoot> load -r -v -h** *host* **-b** *base_address file_name*	Downloads an application image into the volatile memory (RAM) from where the SmartNode could directly execute it. *host*: IP address of the TFTP server *base_address*: memory location where to store the application image. Use the default address 0x1800100 *file_name*: path and name of the file on the TFTP server. Note: use the image file that contains the whole application, not the image parts.
5	RedBoot> fis delete -n 1	Deletes the first application image. Reply with 'y' to the confirmation request.

Step	Command	Purpose
6	RedBoot> fis create	Stores the downloaded application image to the permanent memory (flash:). Reply with 'y' to the confirmation request.
7	RedBoot> fis list -l	Checks whether the image has been successfully stored, whether it is the desired Release and Build, and whether it is valid.
8	RedBoot> go	Starts the application image that was downloaded into the volatile memory (RAM).

Note With the Bootloader, only the Ethernet interface 0/0 is available. The Bootloader applies the IP address, subnet mask, and default gateway that were last configured by the Bootloader itself or by another application (e.g. SmartWare). If an application configured the Ethernet interface 0/0 to use DHCP, the Bootloader will also use DHCP to learn the interface configuration. It can receive and apply the IP address, subnet mask, default gateway, and default (TFTP) server (transmitted as basic DHCP information 'Next server IP address').

Note This procedure does not download the respective CLI description file. Download it after starting up SmartWare with the following command:
`copy tftp://<tftp_server_address>/<server path>/b1 flash:`

Example: Downloading and storing a new application image (SmartWare)

```
RedBoot> ip -l 172.16.40.98/19
RedBoot> ip -g 172.16.32.1
RedBoot> ping -h 172.16.32.100
Network PING - from 172.16.40.98 to 172.16.32.100
.........PING - received 10 of 10 expected

RedBoot> load -r -v -h 172.16.32.100 -b 0x1800100 /Sn4xxx/image.bin
Using default protocol (TFTP)
-
Raw file loaded 0x01800100-0x0199ca6b, 1689964 bytes, assumed entry at 0x01800100

RedBoot> fis delete -n 1
Delete image 1 - continue (y/n)? y
... Erase from 0x60030000-0x601cc974: ......................

RedBoot> fis create
Use address 0x01800100, size 1684402 ? - continue (y/n)? y
... Erase from 0x60030000-0x601cb3ba: ......................
... Program from 0x00011eec-0x00011ef4 at 0x60030000: .
... Program from 0x01800100-0x0199b4b2 at 0x60030008: ......................
... Program from 0x00011eec-0x00011ef4 at 0x60030000: .
Image successfully written to flash

RedBoot> fis list -l
Id Address     Length    State          Description
   Entry       Load Addr                Version
```

```
------------------------------------------------------------------
1  0x60030000  1693438   valid          SmartWare R2.10 BUILD28015
   0x01800100  0x01800100               V2.10

RedBoot> go
Starting 'SmartWare R2.10 BUILD28015' at 0x01800100 via 0x01800100
```

Chapter 5 Contacting Patton for assistance

Chapter contents

Introduction

This chapter contains the following information:

- "Contact information"—describes how to contact Patton technical support for assistance.
- "Warranty Service and Returned Merchandise Authorizations (RMAs)"—contains information about the RAS warranty and obtaining a return merchandise authorization (RMA).

Contact information

Patton Electronics offers a wide array of free technical services. If you have questions about any of our other products we recommend you begin your search for answers by using our technical knowledge base. Here, we have gathered together many of the more commonly asked questions and compiled them into a searchable database to help you quickly solve your problems.

Patton support headquarters in the USA

- Online support: available at **www.patton.com**
- E-mail support: e-mail sent to **support@patton.com** will be answered within 1 business day
- Telephone support: standard telephone support is available five days a week—from **8:00 am** to **5:00 pm EST** (**1300** to **2200 UTC/GMT**)—by calling **+1 (301) 975-1007**
- Fax: **+1 (253) 663-5693**

Alternate Patton support for Europe, Middle East, and Africa (EMEA)

- Online support: available at **www.patton-inalp.com**
- E-mail support: e-mail sent to **support@patton-inalp.com** will be answered within 1 business day
- Telephone support: standard telephone support is available five days a week—from **8:00 am** to **5:00 pm CET** (**0900** to **1800 UTC/GMT**)—by calling **+41 (0)31 985 25 55**
- Fax: **+41 (0)31 985 25 26**

Warranty Service and Returned Merchandise Authorizations (RMAs)

Patton Electronics is an ISO-9001 certified manufacturer and our products are carefully tested before shipment. All of our products are backed by a comprehensive warranty program.

> **Note** If you purchased your equipment from a Patton Electronics reseller, ask your reseller how you should proceed with warranty service. It is often more convenient for you to work with your local reseller to obtain a replacement. Patton services our products no matter how you acquired them.

Warranty coverage

Our products are under warranty to be free from defects, and we will, at our option, repair or replace the product should it fail within one year from the first date of shipment. Our warranty is limited to defects in workmanship or materials, and does not cover customer damage, lightning or power surge damage, abuse, or unauthorized modification.

Out-of-warranty service

Patton services what we sell, no matter how you acquired it, including malfunctioning products that are no longer under warranty. Our products have a flat fee for repairs. Units damaged by lightning or other catastrophes may require replacement.

Returns for credit

Customer satisfaction is important to us, therefore any product may be returned with authorization within 30 days from the shipment date for a full credit of the purchase price. If you have ordered the wrong equipment or you are dissatisfied in any way, please contact us to request an RMA number to accept your return. Patton is not responsible for equipment returned without a Return Authorization.

Return for credit policy

- Less than 30 days: No Charge. Your credit will be issued upon receipt and inspection of the equipment.
- 30 to 60 days: We will add a 20% restocking charge (crediting your account with 80% of the purchase price).
- Over 60 days: Products will be accepted for repairs only.

RMA numbers

RMA numbers are required for all product returns. You can obtain an RMA by doing one of the following:

- Completing a request on the RMA Request page in the *Support* section at **www.patton.com**
- By calling **+1 (301) 975-1007** and speaking to a Technical Support Engineer
- By sending an e-mail to **returns@patton.com**

All returned units must have the RMA number clearly visible on the outside of the shipping container. Please use the original packing material that the device came in or pack the unit securely to avoid damage during shipping.

Shipping instructions

The RMA number should be clearly visible on the address label. Our shipping address is as follows:

Patton Electronics Company
RMA#: xxxx
7622 Rickenbacker Dr.
Gaithersburg, MD 20879-4773 USA

Patton will ship the equipment back to you in the same manner you ship it to us. Patton will pay the return shipping costs.

Appendix A **Compliance information**

Chapter contents

Compliance

EMC

- FCC Part 15, Class B
- EN55022, Class B
- EN55024

Safety

- IEC/EN 60950-1
- AS/NZS 60950-1

PSTN Regulatory

- TBR 3
- AS/ACIF S031:2001

Radio and TV interference

The SmartNode router generates and uses radio frequency energy, and if not installed and used properly-that is, in strict accordance with the manufacturer's instructions-may cause interference to radio and television reception. The SmartNode router have been tested and found to comply with the limits for a Class B computing device in accordance with specifications in Subpart B of Part 15 of FCC rules, which are designed to provide reasonable protection from such interference in a commercial installation. However, there is no guarantee that interference will not occur in a particular installation. If the SmartNode router does cause interference to radio or television reception, which can be determined by disconnecting the unit, the user is encouraged to try to correct the interference by one or more of the following measures: moving the computing equipment away from the receiver, re-orienting the receiving antenna and/or plugging the receiving equipment into a different AC outlet (such that the computing equipment and receiver are on different branches).

CE notice

We certify that the apparatus identified in this document conforms to the requirements of Council Directive 1999/5/EC on the approximation of the laws of the member states relating to Radio and Telecommunication Terminal Equipment and the mutual recognition of their conformity.

ISDN compliance

The device identified in this document is approved for connection to the public ISDN telecommunication network over a BRI/So interface.

Appendix B **Specifications**

Chapter contents

Note Refer to the software feature matrix for the most up-to-date specifications.

DSP

One 2-channel DSP

Voice connectivity

2 ISDN BRI So (S/T), 4-wire RJ45

One Usr (TE) port labeled *Line*, one Net (NT) port labeled *Phone*

Point-to-point, point-to-multipoint configurable

Life-line cut-through relay between *Line* and *Phone* ports

Power feed-through between *Line* and *Phone* ports

Data connectivity

10/100Base-TX Ethernet WAN port

4-port 10/100Base-TX Ethernet LAN switch

All ports full duplex, autosensing, auto-MDX

Voice processing (signalling dependent)

2 full-duplex channels of Voice CODECS:

- G.711 A-Law/μ-Law (64 kbps)
- G.726 (ADPCM 40, 32, 24, 16 kbps)
- G.723.1 (5.3 or 6.3 kbps)
- G.729ab (8 kbps)
- Transparent ISDN data

G.168 echo cancellation

DTMF detection and generation

Carrier tone detection and generation

Silence suppression and comfort noise

Configurable dejitter buffer

Configurable tones (dial, ringing, busy)

Configurable transmit packet length

RTP/RTCP (RFC 1889)

Fax and modem support

Automatic fax and modem detection

Codec fallback for modem-bypass

T.38 Fax-Relay (Gr. 3 Fax, 9.6 k, 14.4 k)

G.711 Fax-Bypass

Voice signalling

SIPv2

H.323v4

SIP call transfer, redirect

Overlap or en-bloc dialing

DTMF in-band, out-of-band

Configurable progress tones

Voice routing—session router

Local switching (hairpinning)

Interface huntgroups

Call-Distribution groups

Call Routing Criteria:

- Interface
- Calling/called party number
- Time of day, day of week, date
- ISDN bearer capability
- Various other information elements (IEs) of the ISDN setup
- Wildcard and regular expression matching

Number manipulation functions:

- Replace numbers
- Add/remove digits
- Pattern matching and replacement

IP services

IPv4 router; RIPv1, v2 (RFC 1058 and 2453)

Programmable static routes

ICMP redirect (RFC 792); Packet fragmentation

DiffServe/ToS set or queue per header bits

Pocket Policing discards excess traffic

802.1p VLAN tagging

IPSEC AH & ESP Modes

Manual Key; IKE optional

AES/DES/3DES Encryption

Note To use the IPSec VPN capabilities including AES/DES/3DES encryption with the SmartNode 4552 & 4562, you may need to purchase additional license keys.

Note The SmartNode 4562 is loaded with the VPN license from the factory.

Management

Industry standard CLI with remote Telnet access

HTTP web management and firmware loading

TFTP configuration & firmware loading

SNMP v1 agent (MIB II and private MIB)

Built-in diagnostic tools (trace, debug)

Operating environment

Operating temperature

32–104°F (0–40°C)

Operating humidity

5–80% (non condensing)

System

CPU Motorola MC875 operating at 66 MHz

Memory:

- 16 Mbytes SDRAM
- 4 Mbytes Flash

Dimensions

7.3W x 1.6H x 6.1D in. (18.5H x 4.1W x 15.5D cm)

Weight and power dissipation

See table 6.

Table 6. SmartNode weight and maximum power specifications

SmartNode model	Weight	Maximum power dissipation
SN4552 & SN4562	30.5 oz./500 g	5W

Identification of the SmartNode devices via SNMP

All SmartNode devices have assigned sysObjectID (.iso.org.dod.internet.mgmt.mib-2.system.sysObjectID) numbers (see table 7).

Table 7. SmartNode Models and their Unique sysObjectID

SmartNode Model	SysObjectID
SN4552	.iso.org.dod.internet.private.enterprises.patton.products.sn455x.1 1.3.6.1.4.1.1768.2.4.6.1
SN4562	.iso.org.dod.internet.private.enterprises.patton.products.sn455x.2 1.3.6.1.4.1.1768.100.4.6.2

According to table 7, an SNMP get request to *.iso.org.dod.internet.mgmt.mib-2.system.sysObjectID* of a SmartNode 4552 device reads out a numeric OID of *1.3.6.1.4.1.1768.2.4.6.1*, which represents a SmartNode 4552 device. The mapping of the sysObjectID to each of the SmartNode model is realized with the SmartNode product identification MIB.

The SNMP agent running in SmartWare is SNMP version 1 (SNMPv1) compliant. SNMP version 2 (SNMPv2) and SNMP version 3 (SNMPv3) are not currently supported.

Appendix C **Cabling**

Chapter contents

Introduction

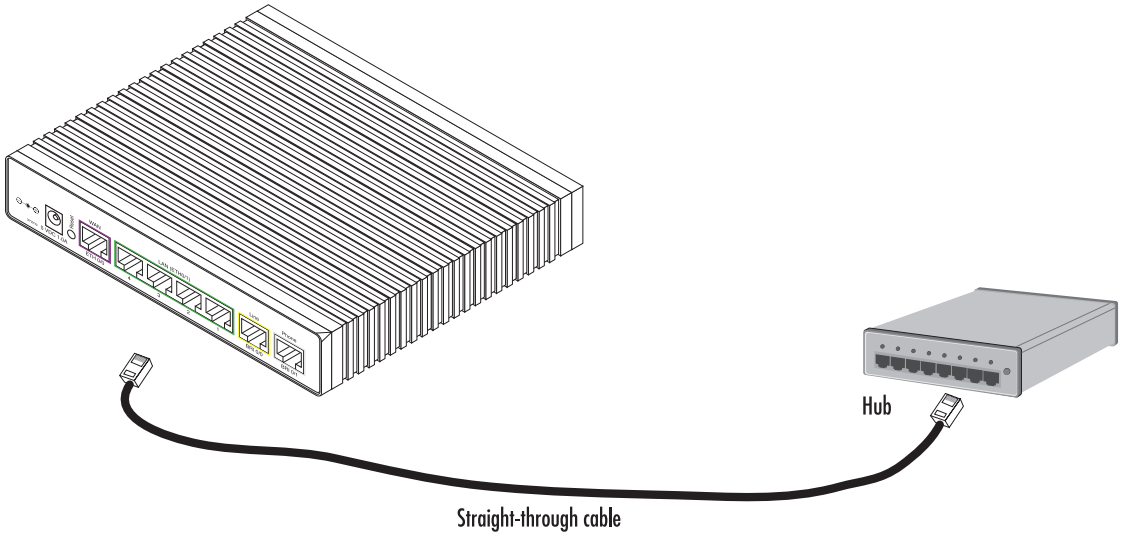
This section provides information on the cables used to connect the SmartNode and the interface cards to the existing network infrastructure and to third party products.

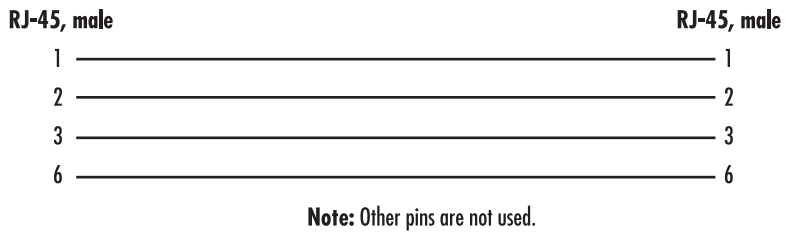
Ethernet

CAUTION

The Interconnecting cables shall be acceptable for external use and shall be rated for the proper application with respect to voltage, current, anticipated temperature, flammability, and mechanical serviceability

Ethernet devices (10Base-T/100Base-T) are connected to the SmartNode over a cable with RJ-45 plugs. All Ethernet ports on the SN4552 & SN4562 are Auto-MDX and use any straight or crossover cable to connect to hubs, switches, PCs or other devices.





Note: Other pins are not used.

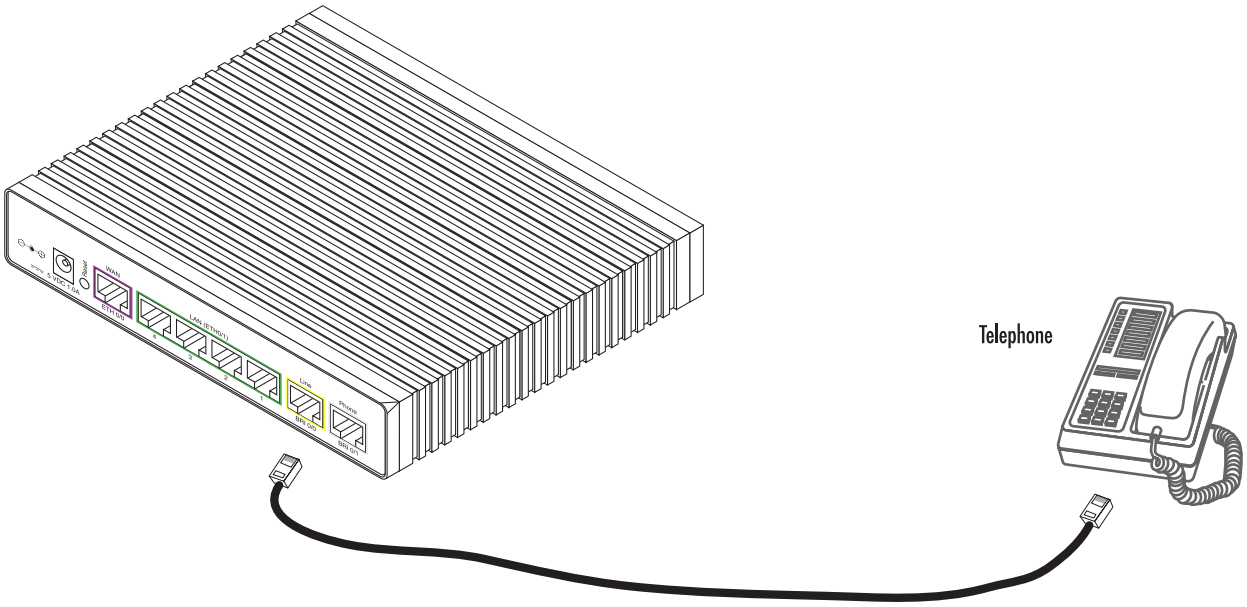
Figure 15. Typical Ethernet straight-through cable diagram

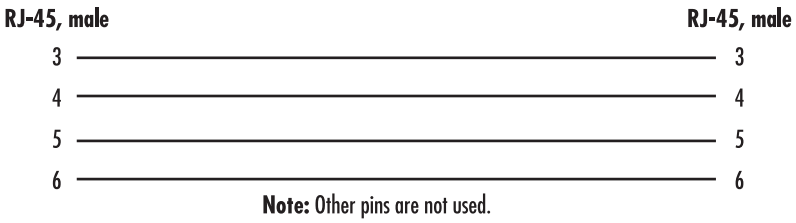
ISDN BRI

CAUTION

The Interconnecting cables shall be acceptable for external use and shall be rated for the proper application with respect to voltage, current, anticipated temperature, flammability, and mechanical serviceability

The ISDN ports are connected to ISDN terminals (Phones, PBXs) or an ISDN NT using cables terminated with RJ-45 connectors. Use straight-though cables to connect to the S/T port of your NT or phones/PBX.





Note: Other pins are not used.

Figure 16. Connecting an ISDN device

Appendix D **Port pin-outs**

Chapter contents

Introduction

This section provides pin-out information for the ports of the SmartNode.

Ethernet

Table 8. RJ-45 socket

Pin	Signal
1	TX+
2	TX-
3	RX+
6	RX-

Note Pins not listed are not used.

ISDN BRI 0/1 Phone (NT/Net) port

The BRI phone port uses an 8-pin RJ-45 connector (the pinout is shown in table 9).

Table 9. RJ-45 socket

Pin	Signal
3	Rx+
4	Tx+
5	Tx-
6	Rx-

Note Pins not listed are not used.

Note All pins between the *Phone* and *Line* ports are connected during power failure.
Fallback relay operation:

- When the unit is not powered, the fallback relay connects pins 3, 4, 5, and 6 of the net and the user ports (fallback) together. This enables you to place calls to the PSTN even if the unit is powered down.
- Line power applied to the *Line* port is fed through to the *Phone* port at all times and independent of the fallback relay's status.

ISDN BRI 0/0 Line (TE/Usr) port

The BRI *Line* port uses an 8-pin RJ-45 connector (the pinout is shown in table 9).

Table 10. RJ-45 socket

Pin	Signal
3	Rx+
4	Tx+
5	Tx-
6	Rx-

Note All pins between the *Phone* and *Line* ports are connected during power failure.

Appendix E SmartNode 4552 & 4562 factory configuration

Chapter contents

Introduction

The factory configuration settings for SmartNode 4552 & 4562 are as follows:

```
#-----------------------------------------------------------------#
#                                                                 #
# 4552 & 4562                                                         #
# R3.xx BUILDxxxxx SIP                                            #
# 2005-08-25T00:00:00                                             #
# Factory configuration file                                      #
#                                                                 #
#-----------------------------------------------------------------#


gui type basic
dns-relay
webserver port 80 language en
sntp-client
sntp-client server primary 129.132.2.21 port 123 version 4


profile acl ACL_WAN_PERMIT_ALL_MGMT
  permit 1 ip any any


profile acl ACL_WAN_PERMIT_SEL_MGMT
  deny 1 tcp any any eq 23
  deny 2 tcp any any eq 80
  deny 3 udp any any eq 161
  permit 4 ip any any


profile acl ACL_WAN_BLOCK_ALL_MGMT
```

```
    deny 1 tcp any any eq 23
    deny 2 tcp any any eq 80
    deny 3 udp any any eq 161
    permit 4 ip any any

profile service-policy SP_WAN_OUT
    rate-limit 100000 header-length 18 voice-margin 0

    source traffic-class local-voice
      priority

    source traffic-class default
      priority

profile service-policy SP_WAN_IN
    rate-limit 100000 header-length 18 voice-margin 200

    source traffic-class local-voice
      priority

    source traffic-class default
      queue-limit 4

profile napt NAPT_WAN

profile call-progress-tone US_DIAL_TONE
    play 1 0 350 -13 440 -13
```

```
profile call-progress-tone US_RB_TONE
  play 1 2000 440 -19 480 -19
  pause 2 4000

profile call-progress-tone US_BUSY_TONE
  play 1 500 480 -24 620 -24
  pause 2 500

profile call-progress-tone US_CONGESTION_TONE
  play 1 250 480 -24 620 -24
  pause 2 250

profile tone-set Europe

profile tone-set UnitedStates
  map call-progress-tone dial-tone US_DIAL_TONE
  map call-progress-tone ringback-tone US_RB_TONE
  map call-progress-tone busy-tone US_BUSY_TONE
  map call-progress-tone release-tone US_BUSY_TONE
  map call-progress-tone congestion-tone US_CONGESTION_TONE

profile voip VOIP
  codec 1 g729 rx-length 20 tx-length 20
  codec 2 g711alaw64k rx-length 20 tx-length 20
  codec 3 g711ulaw64k rx-length 20 tx-length 20
  dejitter-mode static
  dejitter-max-delay 120
```

```
profile dhcp-server DHCPS_LAN
  network 192.168.1.0 255.255.255.0
  include 1 192.168.1.10 192.168.1.19
  lease 2 hours
  default-router 1 192.168.1.1
  domain-name patton.com
  domain-name-server 1 192.168.1.1

context ip router

  interface IF_IP_WAN
    ipaddress dhcp
    use profile acl ACL_WAN_PERMIT_ALL_MGMT in
    use profile service-policy SP_WAN_IN in
    use profile service-policy SP_WAN_OUT out
    use profile napt NAPT_WAN
    tcp adjust-mss rx 582
    tcp adjust-mss tx 1440

  interface IF_IP_LAN
    ipaddress 192.168.1.1 255.255.255.0
    icmp router-discovery

context ip router
  dhcp-server use DHCPS_LAN

subscriber ppp SUB_PPPOE
```

```
    dial out
    authentication chap
    authentication pap
    bind interface IF_IP_WAN router

  context cs switch

    routing-table called-e164 RT_SPEED_DIAL
      route T dest-table RT_NR_BLOCKING MT_SPEED_DIAL

    routing-table called-e164 RT_NR_BLOCKING
      route default dest-table RT_CALL_ROUTING MT_SET_CNPN

    routing-table called-e164 RT_CALL_ROUTING
      route default dest-service SER_HG_PSTN_FALLBACK

    routing-table called-e164 RT_INCOMING
      route default dest-interface IF_S0_01 MT_NR_TRANSLATION

    mapping-table called-e164 to called-e164 MT_SPEED_DIAL

    mapping-table calling-e164 to calling-e164 MT_SET_CNPN

    mapping-table called-e164 to called-e164 MT_NR_TRANSLATION

    interface isdn IF_S0_00
      route call dest-table RT_INCOMING
```

```
interface isdn IF_S0_01
  route call dest-table RT_SPEED_DIAL
  use profile tone-set Europe
  isdn-date-time

interface isdn IF_DEV0

interface sip IF_SIP_SERVICE
  bind gateway GW_SIP
  service default
  route call dest-table RT_INCOMING
  use profile voip VOIP

service hunt-group SER_HG_PSTN_FALLBACK
  timeout 6
  drop-cause normal-unspecified
  drop-cause no-circuit-channel-available
  drop-cause network-out-of-order
  drop-cause temporary-failure
  drop-cause switching-equipment-congestion
  drop-cause access-info-discarded
  drop-cause circuit-channel-not-available
  drop-cause resources-unavailable
  drop-cause no-route-to-destination
  route call 1 dest-interface IF_SIP_SERVICE
  route call 2 dest-interface IF_S0_00
```

```
context cs switch
  no shutdown

gateway sip GW_SIP
  bind interface IF_IP_WAN router

  service default

gateway sip GW_SIP
  no shutdown

port ethernet 0 0
  bind interface IF_IP_WAN router

  pppoe

    session SES_PPPOE
      bind subscriber SUB_PPPOE
      shutdown

port ethernet 0 0
  no shutdown

port ethernet 0 1
  bind interface IF_IP_LAN router
  no shutdown
```

```
port bri 0 0
  clock auto
  encapsulation q921

  q921
    protocol pmp
    uni-side auto
    encapsulation q931

    q931
      protocol dss1
      uni-side user
      encapsulation cc-isdn
      bind interface IF_S0_00 switch

port bri 0 0
  no shutdown

port bri 0 1
  clock auto
  encapsulation q921

  q921
    protocol pmp
    uni-side auto
    encapsulation q931

    q931
```

```
        protocol dss1
        uni-side net
        encapsulation cc-isdn
        bind interface IF_S0_01 switch


port bri 0 1
  no shutdown
```

Appendix F End user license agreement

Chapter contents

End User License Agreement

By opening this package, operating the Designated Equipment or downloading the Program(s) electronically, the End User agrees to the following conditions:

1. Definitions

A) *Effective Date* shall mean the earliest date of purchase or download of a product containing the Patton Electronics Company Program(s) or the Program(s) themselves.

B) *Program(s)* shall mean all software, software documentation, source code, object code, or executable code.

C) *End User* shall mean the person or organization which has valid title to the Designated Equipment.

D) *Designated Equipment* shall mean the hardware on which the Program(s) have been designed and provided to operate by Patton Electronics Company.

2. Title

Title to the Program(s), all copies of the Program(s), all patent rights, copyrights, trade secrets and proprietary information in the Program(s), worldwide, remains with Patton Electronics Company or its licensors.

3. Term

The term of this Agreement is from the Effective Date until title of the Designated Equipment is transferred by End User or unless the license is terminated earlier as defined in section "6. Termination" on page 67.

4. Grant of License

A) During the term of this Agreement, Patton Electronics Company grants a personal, non-transferable, non-assignable and non-exclusive license to the End User to use the Program(s) only with the Designated Equipment at a site owned or leased by the End User.

B) The End User may copy licensed Program(s) as necessary for backup purposes only for use with the Designated Equipment that was first purchased or used or its temporary or permanent replacement.

C) The End User is prohibited from disassembling; decompiling, reverse-engineering or otherwise attempting to discover or disclose the Program(s), source code, methods or concepts embodied in the Program(s) or having the same done by another party.

D) Should End User transfer title of the Designated Equipment to a third party after entering into this license agreement, End User is obligated to inform the third party in writing that a separate End User License Agreement from Patton Electronics Company is required to operate the Designated Equipment.

5. Warranty

The Program(s) are provided *as is* without warranty of any kind. Patton Electronics Company and its licensors disclaim all warranties, either express or implied, including but not limited to the implied warranties of merchantability, fitness for a particular purpose or non-infringement. In no event shall Patton Electronics Company or its licensors be liable for any damages whatsoever (including, without limitation, damages for loss of business profits, business interruption, loss of business information, or other pecuniary loss) arising out of the use of or inability to use the Program(s), even if Patton Electronics Company has been advised of the possibility of such damages. Because some states do not allow the exclusion or limitation of liability for consequential or incidental damages, the above limitation may not apply to you.

If the Program(s) are acquired by or on behalf of a unit or agency of the United States Government, the Government agrees that such Program(s) are *commercial computer software* or *computer software documentation* and that, absent a written agreement to the contrary, the Government's rights with respect to such Program(s) are limited by the terms of this Agreement, pursuant to Federal Acquisition Regulations 12.212(a) and/or DEARS 227.7202-1(a) and/or sub-paragraphs (a) through (d) of the "Commercial Computer Software - Restricted Rights" clause at 48 C.F.R. 52.227-19 of the Federal Acquisition Regulations as applicable.

6. Termination

A) The End User may terminate this agreement by returning the Designated Equipment and destroying all copies of the licensed Program(s).

B) Patton Electronics Company may terminate this Agreement should End User violate any of the provisions of section "4. Grant of License" on page 66.

C) Upon termination for **A** or **B** above or the end of the Term, End User is required to destroy all copies of the licensed Program(s)

7. Other licenses

The Program may be subject to licenses extended by third parties. Accordingly, Patton Electronics Company licenses the Programs subject to the terms and conditions dictated by third parties. Third party software identified to the Programs includes:

- A routing license is included at no charge.
- MGCP and VPN capabilities will require the purchase of an additional license.
- The LGPL (Lesser General Public License) open source license distributed to you pursuant to the LGPL license terms (**http://www.gnu.org/licenses/lgpl.html).**
- RedBoot (Red Hat Embedded Debug and Bootstrap) embedded system debug/bootstrap environment from Red Hat distributed to you pursuant to the eCos license terms (**http://ecos.sourceware.org/license-overview.html**) and GNU General Public License (GPL) terms (**http://www.gnu.org/copyleft/gpl.html**). Source code is available upon request.