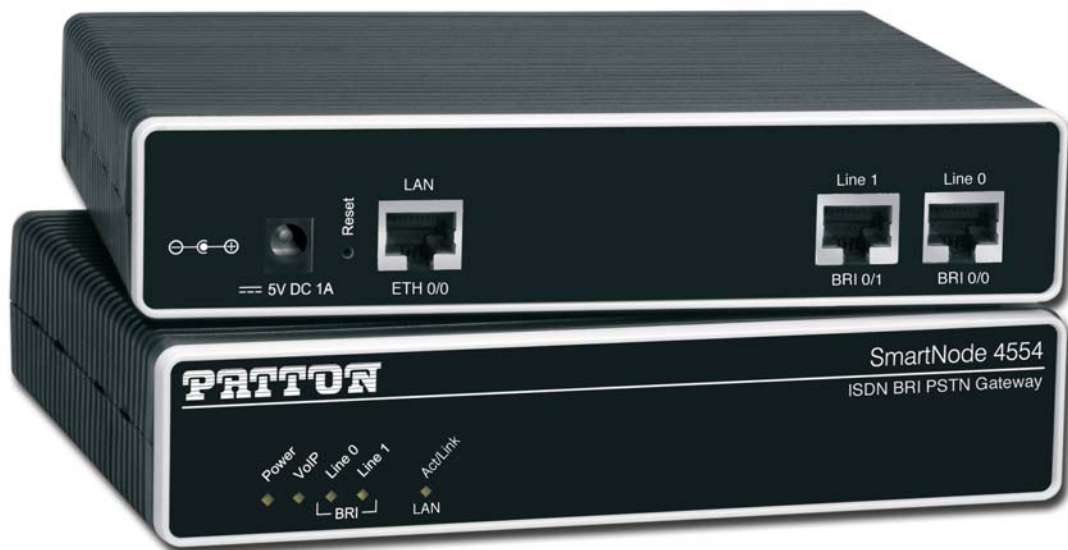


SmartNode 4554™ ISDN BRI PSTN Gateway

Getting Started Guide



Important

This is a Class A device and is intended for use in a light industrial environment. It is not intended nor approved for use in an industrial or residential environment.

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Document Number: **13236U1-001 Rev.C**
Part Number: **07MSN4554-GS**
Revised: **October 21, 2008**

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Important Information

To use virtual private network (VPN) and/or AES/DES/3DES encryption capabilities with the SN4554, 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 54 or go to www.patton.com.

Patton Electronics warrants all SN4554 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.

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About this guide

This guide describes the SN4554 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 17 contains an overview describing router operation and applications
- [Chapter 3](#) on page 19 provides hardware installation procedures
- [Chapter 4](#) on page 24 provides quick-start procedures for configuring the SN4554 router
- [Chapter 5](#) on page 34 contains information on contacting Patton technical support for assistance
- [Appendix A](#) on page 37 contains compliance information for the SN4554
- [Appendix B](#) on page 40 contains specifications for the routers
- [Appendix C](#) on page 45 provides cable recommendations
- [Appendix D](#) on page 48 describes the router's ports and pin-outs
- [Appendix E](#) on page 50 lists the factory configuration settings for SN4554
- [Appendix F](#) on page 54 provides license information that describes acceptable usage of the software provided with the SN4554

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



WARNING

Mains Voltage: Do not open the case when the power cord is attached. The external power adapter 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.



WARNING

The SmartNode 4554 is not shipped with power cables. For AC powered units, ensure that the power cable used 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.



WARNING

Hazardous network voltages are present in WAN ports regardless of whether power to the SN4554 is ON or OFF. To avoid electric shock, use caution when near WAN ports. When detaching cables, detach the end away from the SN4554 first.



WARNING

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



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.



IMPORTANT

This is a Class A device and is intended for use in a light industrial environment. It is not intended nor approved for use in an industrial or residential environment

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.
<i>Futura bold-italic type</i>	Parts of commands, which are related to elements already named by the user, are in boldface italic font.
<i>Italicized Futura type</i>	Variables for which you supply values are in <i>italic</i> 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 SN4554 is substituted with node in boldface italic font.
SN	The leading SN on a command line represents the nodename of the SN4554
#	An hash sign at the beginning of a line indicates a comment line.

Chapter 1 **General information**

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SN4554 overview

The SmartNode 4554 ISDN BRI PSTN Gateway (see [figure 1](#)) converts up to four simultaneous phone or fax calls from SIP or H.323 to BRI ISDN. It is a compact, reliable stand-alone VoIP gateway for IP-based voice systems which matches up to ISDN standards in terms of performance and quality.

Compared to PC-based solutions that combine IP-PBX and a PCI BRI card, the SN4554 has several advantages: No need to install additional drivers or software, new services can be installed without downtime, several SN4554 can be combined and serve as redundant cluster, no ventilation or hard disk required, scalable without limitation by the amount of PCI card slots available. Also, system administrators don't have to learn ISDN, as industry standard protocols like SIP or H.323 do the job of connecting PSTN to your voice system.

The SN4554 perfectly integrates in today's IP-PBX systems supporting their advanced functionality, while preserving the majority of ISDN comfort features. The following features are integrated into the SN4554: Advice of Change (AOC), Explicit Call Transfer (ECT), CLIP, CLIR, 64k transparent data calls, support for both MSN and DID lines, overlap dialing, call waiting, and call hold.

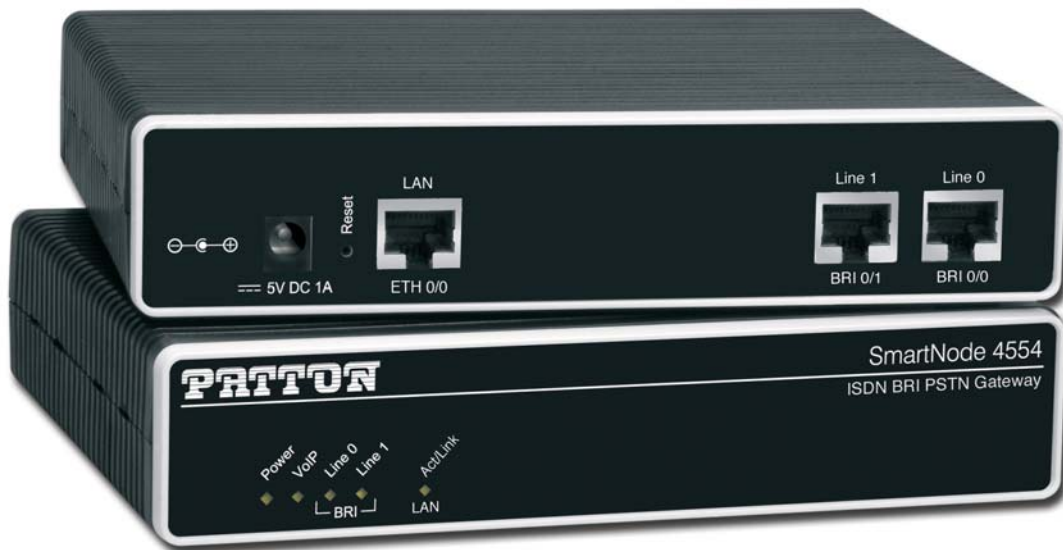


Figure 1. SN4554

The SN4554 performs the following major functions:

- Four channels of Voice or Fax-over-IP through two Euro-ISDN BRI/S ports (TE orientation).
- Standards-compliant VoIP in accordance with SIP or H.323 protocols.
- 10/100Base-T Ethernet WAN port for connection to a router, xDSL, cable, or wireless modem.

SN4554 rear panel

The SN4554 is an ISDN BRI PSTN Gateway for home or home-office use that supports two VoIP calls via a single ISDN BRI port (see [figure 2](#)). The SN4554 rear panel ports are described in [table 2](#).

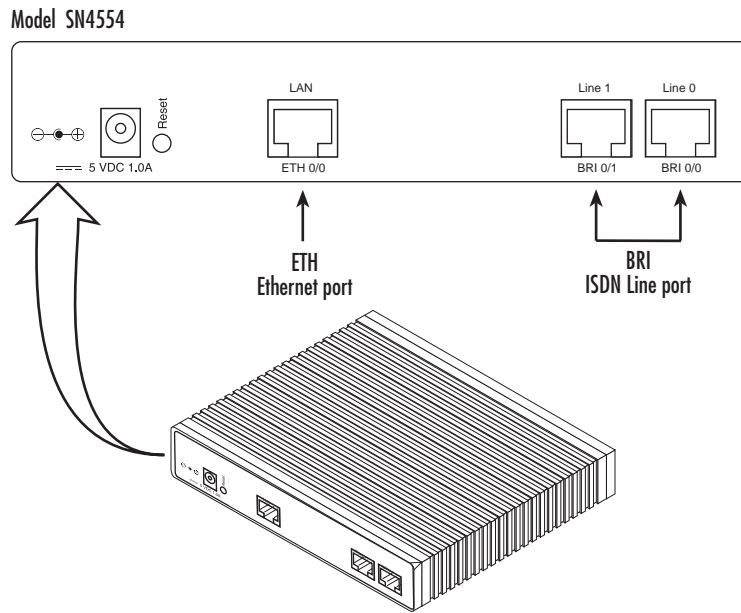


Figure 2. SN4554 rear panel

Table 2. Rear panel ports

Port	Description
ETH (LAN)	Switched Auto-MDX Fast-Ethernet port, RJ-45 (see figure 2), connect the unit to an Internet Telephony Service Provider (ITSP) [via an xDSL or cable modem] or a remote IP-PBX [via a private corporate network].
BRI (Line)	ISDN BRI/S0 port. RJ-45 connector presents the NET (User) side of the S/T interface (see figure 2) for connecting the SN4554 to a PBX NT port or an ISDN BRI NT.
5V DC, 1.0A	The SN4554 has a 5V DC 1A power input (see figure 2).
Reset	<p>The reset button (see figure 2) has three functions:</p> <ul style="list-style-type: none"> Restart the unit with the current startup configuration—Press (for less than 1 second) and release the <i>Reset</i> button to restart the unit with the current startup configuration. Restart the unit with factory default configuration—Press the <i>Reset</i> button for 5 seconds until the <i>Power</i> 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 SN4554 technicians)—Starting with the unit powered off, press and hold the <i>Reset</i> button as you apply power to the unit. Release the <i>Reset</i> button when the <i>Power</i> LED starts blinking so the unit will enter bootloader mode.

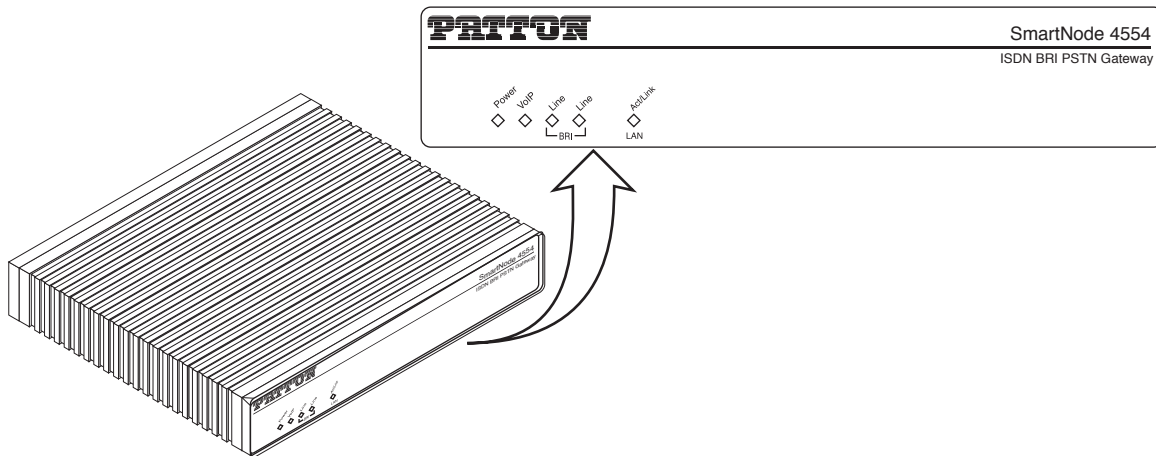


Figure 3. SN4554 front panel

SN4554 front panel

Figure 3 shows SN4554 LEDs, the LED definitions are listed in [table 3](#).

Table 3. SN4554 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	<ul style="list-style-type: none"> 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.
Line 0 and Line 1	Off indicates no active calls. Blinking when one or two B-channels are connected.
Ethernet	<ul style="list-style-type: none"> On when the Ethernet connection has a link indication. Flashes when data is received or transmitted at the corresponding Ethernet port.

Chapter 2 **Applications overview**

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ISDN BRI PSTN Gateway application

The SmartNode 4554 ISDN VoIP gateway enables any IP PBX to make calls to the ISDN PSTN. The compact, reliable stand-alone design allows enterprises to easily and flexibly integrate BRI lines into their VoIP system. It converts up to four simultaneous phone or fax calls from SIP or H.323 to BRI ISDN.

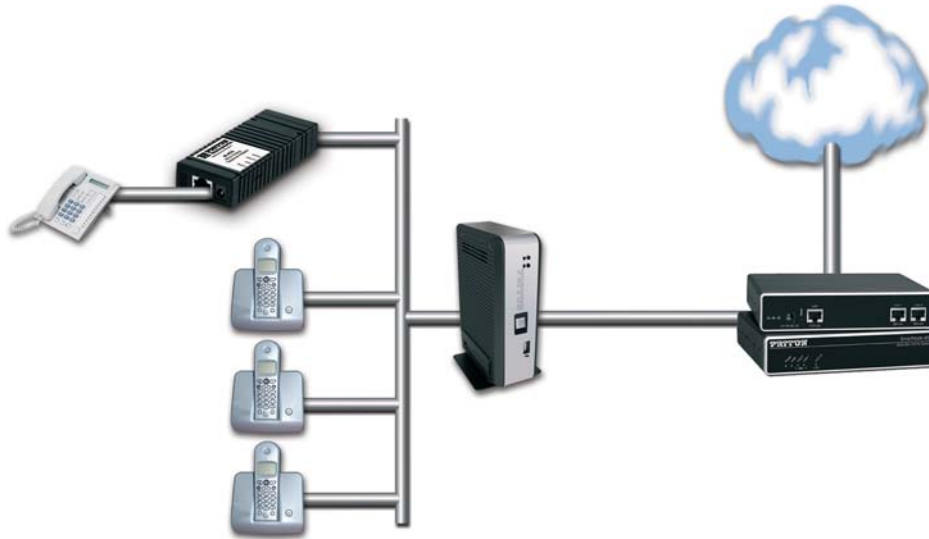


Figure 4. ISDN BRI PSTN Gateway application

Chapter 3 **SN4554 installation**

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Installing the SN4554

SN4554 hardware installation consists of the following:

- Placing the device at the desired installation location (see section “Placing the SN4554”)
- Connecting the interface and power cables (see section “Installing cables”)

When you finish installing the SN4554, go to chapter 4, “SN4554 initial configuration” on page 24.

Placing the SN4554

Place the SN4554 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 NT or PBX to the BRI port (see section “Connecting the SN4554 to the PBX or ISDN BRI NT” on page 21).
2. Connect the 10/100Base-T Ethernet WAN (see section “Connecting the SN4554 to the IP network” on page 21)
3. Connect the power supply (see section “Connecting the SN4554 to the power supply” on page 22)

Connecting the SN4554 to the PBX or ISDN BRI NT

The SN4554 comes with two ISDN BRI (TE) ports located on the rear panel (see [figure 2](#) on page 15) for connecting to the NT of an ISDN PBX or ISDN NT. Install the connection as follows:

1. Using an ISDN cable (see [Appendix C, “Cabling”](#) on page 45) connect the BRI (TE) port on the SN4554 to the NT PBX or ISDN NT.

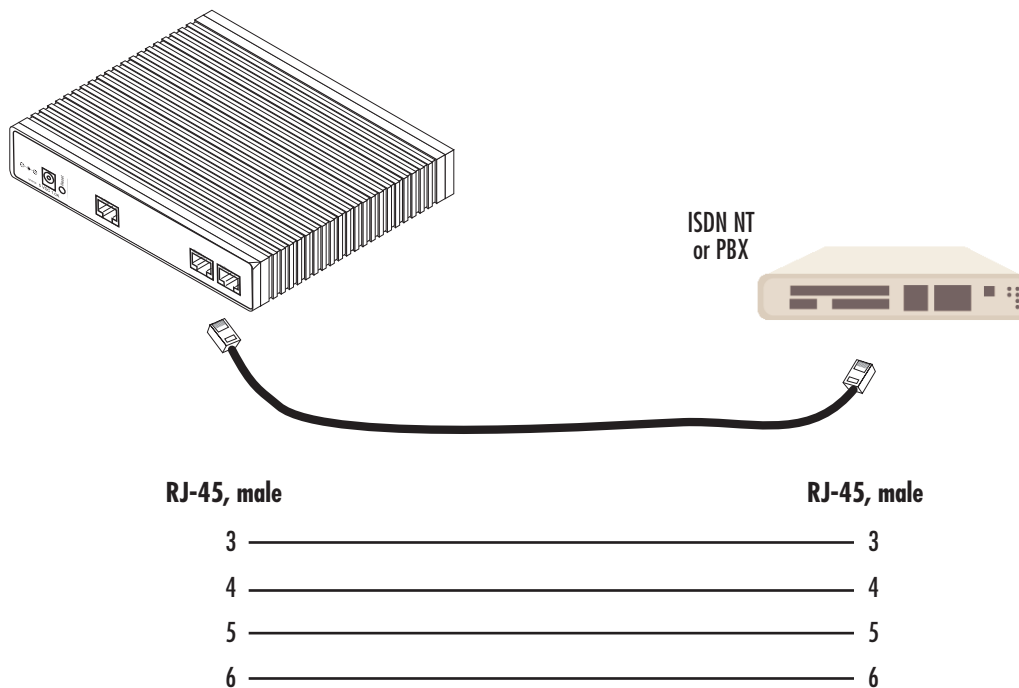


Figure 5. Connecting to an ISDN NT

For details on the BRI port pinout and ISDN cables, refer to [Appendix C, “Cabling”](#) on page 45 and [Appendix D, “Port pin-outs”](#) on page 48.

Connecting the SN4554 to the IP network

The SN4554 comes with a 10/100 Base-Tx Ethernet port for connection to an IP network. The Ethernet WAN interface is factory-configured as a DHCP client, so you must connect the SN4554 to an IP network that provides a DHCP server.

The Ethernet port (ETH) includes an automatic MDX (auto-crossover) feature that automatically detects the cable configuration and adjusts accordingly. The feature allow you to use a straight-through Ethernet cable to connect to an Ethernet hub or switch. Typically the hub or switch will connect to a router that provides the the local-residential IP network with broadband Internet access.

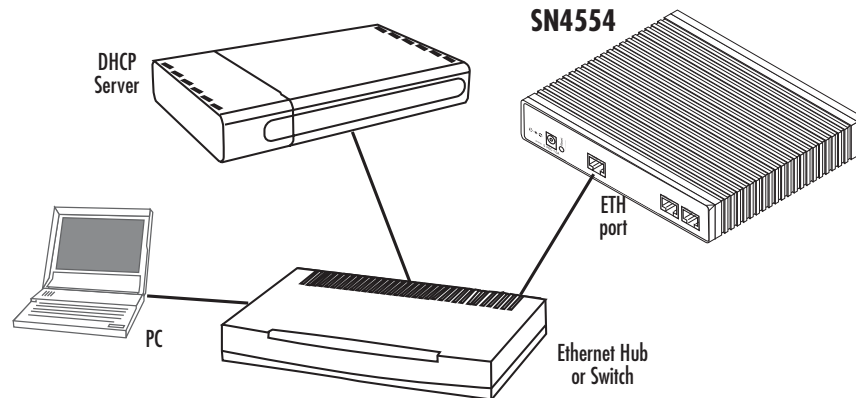


Figure 6. Connecting the SN4554 to the network via a hub or switch

1. Using the included black Ethernet cable, connect the RJ-45 Ethernet WAN port on your SN4554 (labeled ETH), to an Ethernet hub or switch on the same network as your PC.

For details on the Ethernet port pinout and cables, refer to [Appendix C, “Cabling”](#) on page 45 and [Appendix D, “Port pin-outs”](#) on page 48.

Connecting the SN4554 to the power supply

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).



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 chapter 5, [“Contacting Patton for assistance”](#) on page 34 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.

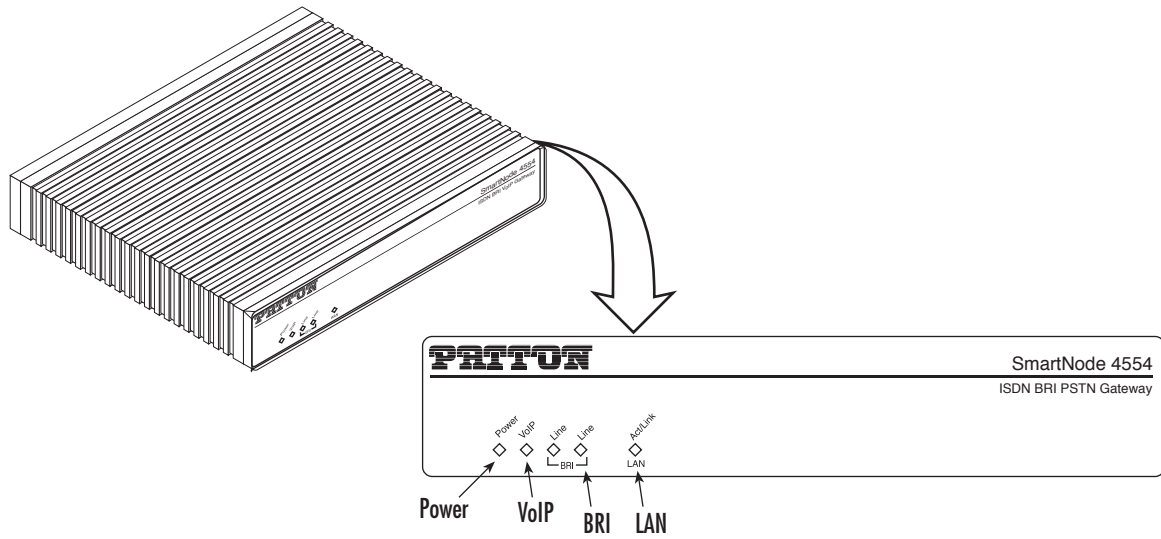


Figure 7. Router front panel LEDs

4. Verify that the green *Power* LED is lit (see [figure 7](#)).

Chapter 4 **SN4554 initial configuration**

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Introduction

This chapter leads you through the basic steps to set up a new SN4554:

- Start the SN4554 Discovery Tool (see section “1. Start the SmartNode Discovery Tool” on page 25)
- Access the Web Browser (GUI) Interface (see section “2. Access the Web Browser (GUI) Interface” on page 25)
- Configuring your SN4554 (see section “3. Configuring your SN4554” on page 27)

This section describes how to quickly access the configuration interface of a SN4554 and give an overview of the different elements you can configure. For detailed information on all configuration parameters refer to the SmartWare software configuration guide.

1. Start the SmartNode Discovery Tool

The SmartNode discovery tool provides a quick and easy way to access the management interfaces residing within your SN4554. The tool identifies any Patton VoIP devices installed on your network and displays the model number, IP address and MAC address of each unit. To use the discovery tool, do the following:

1. Insert the CD included with your SN4554 into the CD drive on your PC.
2. Copy the file named *SNDiscovery.exe* from the CD to your PC.

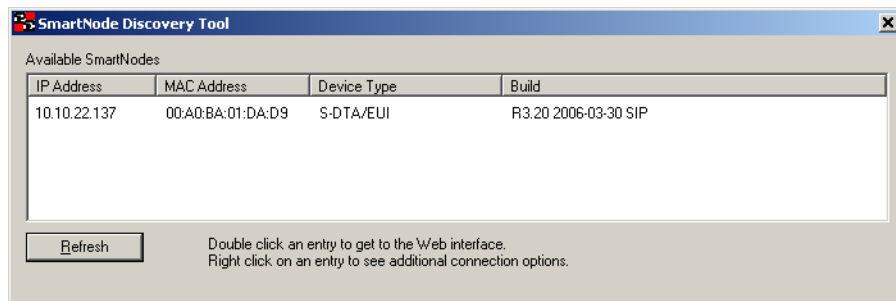


Figure 8. SmartNode Discovery Tool window

3. At your PC, double-click the *SNDiscovery.exe* file name to activate the tool. The SmartNode Discovery Tool window will display the IP Address, MAC Address, Device Type (model number) and Build (software release) of your SN4554.

If your SN4554 does not appear:

- Make sure the SN4554 and your PC are on the same routed subnet
- Make sure any firewall programs on your PC are disabled

2. Access the Web Browser (GUI) Interface

The SN4554 provides a web-browser-based graphical user interface (GUI) that makes it easy to configure, monitor and manage your SN4554. To access the web-browser interface, do the following:

1. In the SmartNode Discovery Tool window, select the line that displays the IP address of your SN4554.

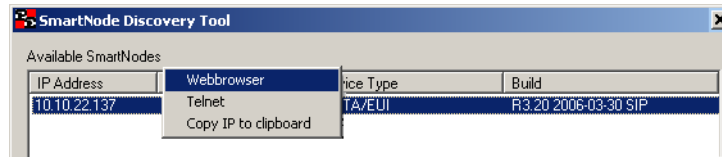


Figure 9. SmartNode Discovery Tool window with webbrowser selected

- Right-click the selected line, and select *Webbrowser*. The Login window will display.

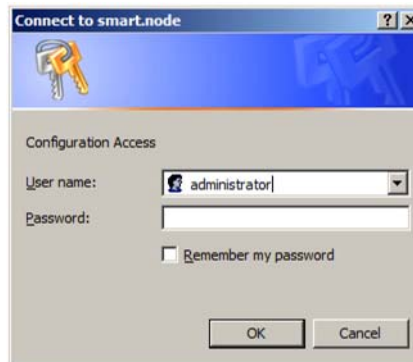


Figure 10. Login window

- Enter the username *administrator*. Do not enter a password. Instead simply click OK. Your web browser will display the SN4554 home page (see figure 11).

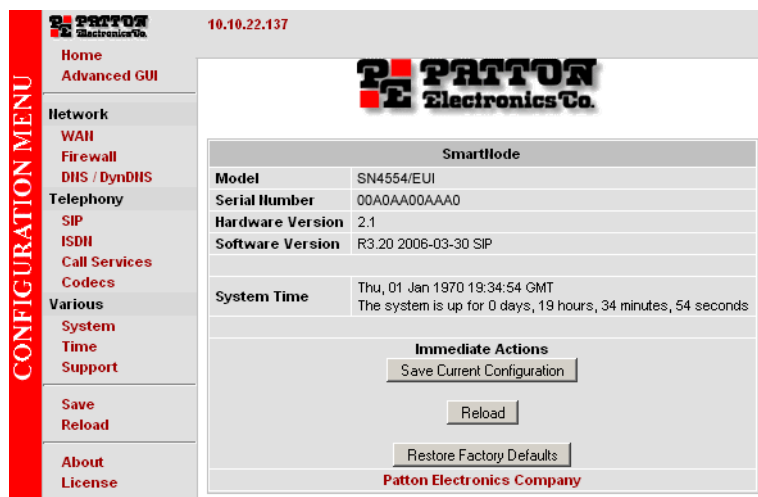


Figure 11. SN4554 home page

The SN4554 home page displays three action buttons that allow you to store the current configuration state, reload the device, and restore to factory defaults. The home page also displays certain basic system information. You can always return to the home page by clicking Home in the navigation bar.



Figure 12. Main GUI elements

The GUI consists of the following main elements (see [figure 12](#)):

- The “Navigation Bar” on the left edge presents you with a menu listing giving access to the various configuration and status pages of the SN4554.
- 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 SN4554.

3. Configuring your SN4554

Once you have logged in you can use the browser-based graphical user interface (GUI) to configure and manage your SN4554. The information in this section is intended to introduce the configuration tools and get you started. For more detailed information about configuring your SN4554, please refer to the *SmartWare Configuration Guide*.



CAUTION

The SN4554, immediately applies your changes whenever you modify the configuration. However, your new settings ARE NOT PERMANENTLY SAVED in non-volatile memory [RAM]. To survive power failure or manual reload you must store your new settings in non-volatile memory. To save your changes: return to the home page and press the Save Current Configuration button.

You may find the following hints helpful when configuring your SN4554:



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!

Accessing the Internet

The SN4554 supports three types of WAN (Internet or corporate-Private) access:

- DHCP (factory default)
- PPPoE
- Fixed IP address

To modify the WAN access configuration, go to the SN4554 WAN page:

1. In the configuration menu pane, click *WAN*.

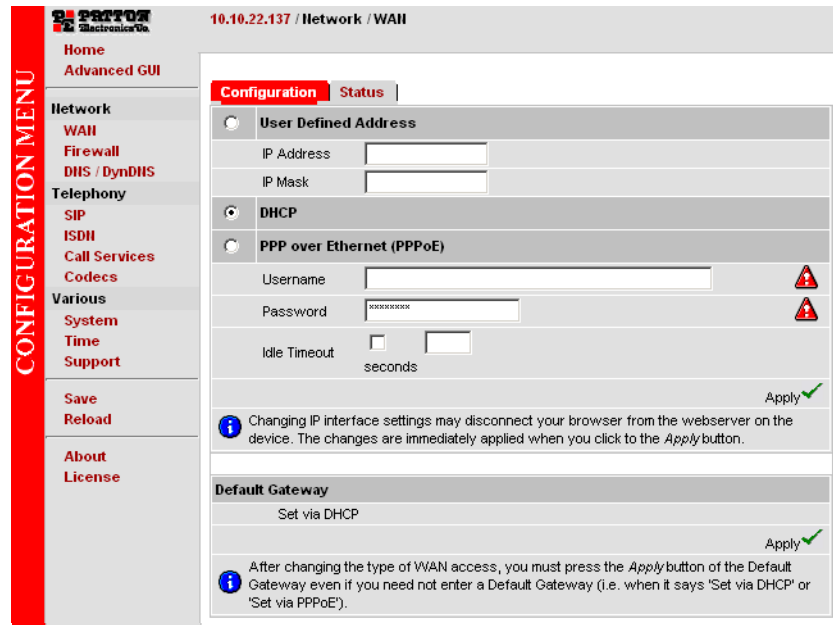


Figure 13. WAN page

The SN4554 supports three configuration options for the WAN connection (see figure 13), as described in the following paragraphs:

- **DHCP (client—factory default).** The SN4554'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 SN4554 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 SN4554 establishes the connection with the Internet using PPPoE. This is most commonly used when the SN4554 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 SN4554 and click the **Apply** icon.

- **User Defined Address.** The SN4554 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 the **Apply** icon to activate the new configuration.

- **Default Gateway**—This is the IP address of the upstream router. Click 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.

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 complement 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 more complicated and requires knowledge about VoIP as well as 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. 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 <i>local_ip_address</i> [/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. <i>mask_len</i> 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 <i>gateway</i>	Sets the IP address of the default gateway.
3 optional	RedBoot> ping -h <i>tftp-server_ip_address</i>	Tests the connectivity to the TFTP server.
4	RedBoot> load -r -v -h <i>host -b</i> <i>base_address file_name</i>	Downloads an application image into the volatile memory (RAM) from where the SmartNode could directly execute it. <i>host</i> : IP address of the TFTP server <i>base_address</i> : memory location where to store the application image. Use the default address 0xc00100 <i>file_name</i> : 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.
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.

Step	Command	Purpose
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 0xc00100 /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
```


Load a new application image (SmartWare) via the serial link

The Bootloader supports the 'X-Modem' and 'Y-Modem' protocols to download application images via the serial link of the console. Do the following to initiate the download:

Step	Command	Purpose
1	RedBoot> load -r -v -m { xmodem ymodem } -b base_address	Downloads an application image into the volatile memory (RAM) from where the SmartNode could directly execute it. 'xmodem' or 'ymodem': Specify the protocol to be used, X-Modem or Y-Modem <i>base_address</i> : memory location where to store the application image. Use the default address 0xc00100 Execute the above RedBoot command first, then start the transfer from the terminal program with the command 'Send file via X-Modem' (or similar).
5	RedBoot> fis delete -n 1	Deletes the first application image. Reply with 'y' to the confirmation request.
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 to the volatile memory (RAM).

Note This type of download takes about **25 minutes** since it uses a serial link at only 9600 bps.

Chapter 5 **Contacting Patton for assistance**

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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**

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Compliance

IMPORTANT – This is a Class A device and is intended for use in a light industrial environment. It is not intended nor approved for use in an industrial or residential environment.

EMC

- EN55022, Class A
- EN55024

Safety

- IEC 60950-1
- EN60950-1
- AS/NZS 60950

Telecom

- TBR3
- AS/ACIF S031
- NZ ISDN Layer 3 Supplement

CE Declaration of Conformity

(See section “EG-Konformitätserklärung” on page 39 for German version.)

Product Description: SN4554

The products described above in the form as delivered are in conformity with the provisions of the following European Directive:

R&TTE Directive 1999/5/EC

Guidelines of the European Parliament and the Committee for the Harmonization of the Legal Regulations of the Member States concerning radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity.



The safety advice in the documentation accompanying the products shall be obeyed. The conformity to the above directive is indicated by the CE sign on the device.

The signed Declaration of Conformity can be downloaded from www.patton.com/certifications/.

EG-Konformitätserklärung

(see section “CE Declaration of Conformity” on page 39 for English version)

Produktbezeichnung: SN4554

Die bezeichneten Produkte stimmen in der von uns in Verkehr gebrachten Ausführung mit den Vorschriften folgender Richtlinie überein:

R&TTE 1999/5/EG

Richtlinie des europäischen Parlaments und des Rates zur Angleichung der Rechtsvorschriften der Mitgliedstaaten über Funkanlagen und Telekommunikations-Endeinrichtungen und die gegenseitige Anerkennung ihrer Konformität.



Die Sicherheitshinweise in der mitgelieferten Produktdokumentation sind zu beachten. Die Konformität mit der oben erwähnten Richtlinie wird durch das CE-Zeichen auf dem Gerät bestätigt.

Die unterzeichnete Konformitätserklärung kann heruntergeladen werden von:
www.patton.com/certifications/.

Authorized European Representative

D R M Green

European Compliance Services Limited.

Oakdene House, Oak Road

Watchfield,

Swindon, Wilts SN6 8TD, UK

Appendix B **Specifications**

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

DSP

One 4-channel DSP

Voice connectivity

Dual ISDN BRI SO (TE), 4-wire RJ45 port labeled BRI 0/0 and BRI 0/1

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

Data connectivity

10/100Base-TX Ethernet WAN port

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 (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

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

DiffServe/ToS set or queue per header bits

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 SN4554, you may need to purchase additional license keys.

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 MC85 operating at 66 MHz

Memory:

- 16 Mbytes SDRAM
- 4 Mbytes Flash

Dimensions

4.2W x 1.5H x 5.00D in. (3.9H x 10.6W x 12.70D cm)

Weight and power dissipation

See [table 4](#).

Table 4. SmartNode weight and maximum power specifications

SmartNode model	Weight	Maximum power dissipation
SN4554	<15.9 oz./450 g	4W

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 5](#)).

Table 5. SmartNode Models and their Unique sysObjectID

SmartNode Model	SysObjectID
SN4554	.iso.org.dod.internet.private.enterprises.patton.products.sn4554.4 1.3.6.1.4.1.1768.100.4.6.4

According to [table 5](#), 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.



IMPORTANT

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**

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Introduction

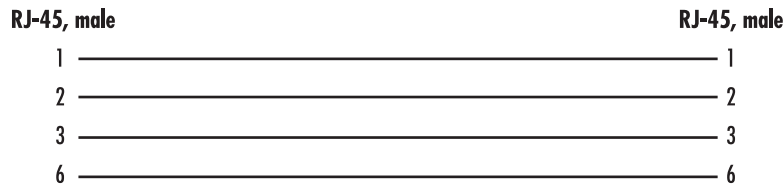
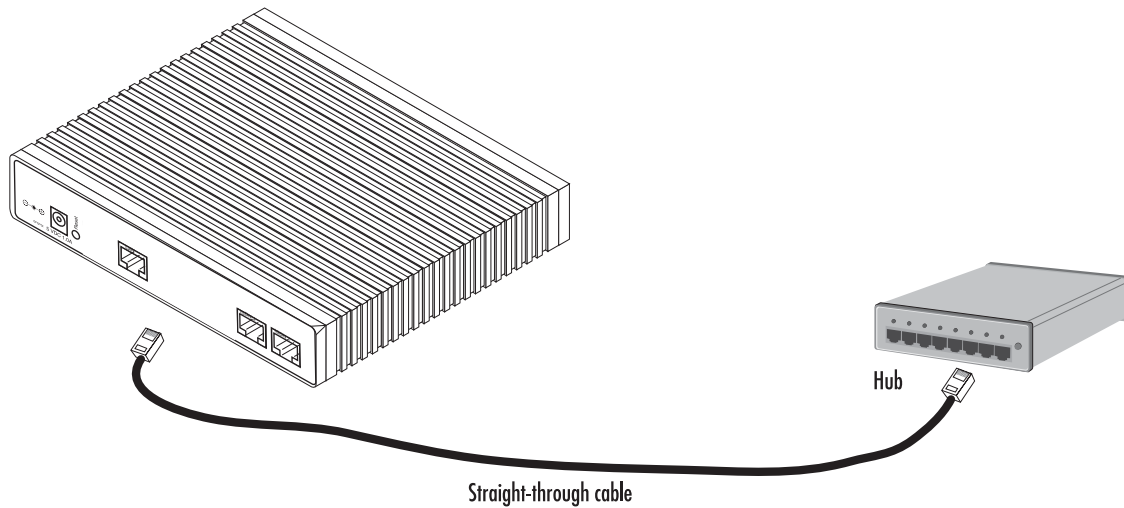
This section provides information on the cables used to connect the SN4554 and the interface cards to the existing network infrastructure and to third party products.



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

Ethernet devices (10Base-T/100Base-T) are connected to the SN4554 over a cable with RJ-45 plugs. All Ethernet ports on the SN4554 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 14. Typical Ethernet straight-through cable diagram

ISDN BRI

The ISDN port connects to ISDN terminals (PBXs) or an ISDN S-BUS using cables terminated with RJ-45 connectors. Use straight-through cables to connect to the NT port of your PBX, or residential S-BUS.

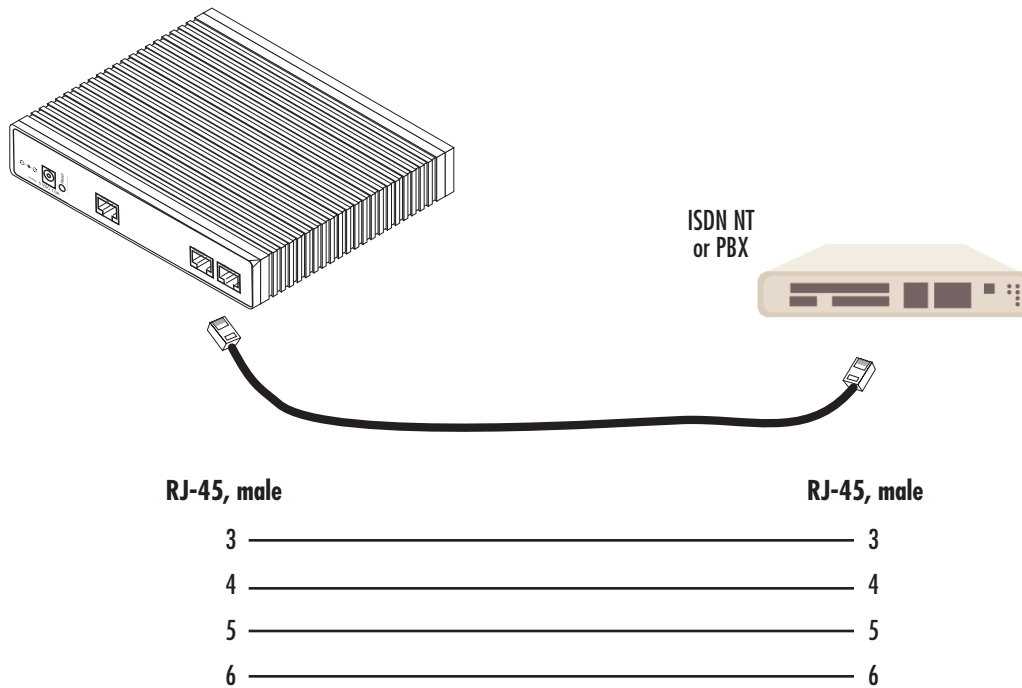


Figure 15. Connecting an ISDN device

Appendix D **Port pin-outs**

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Introduction

This section provides pin-out information for the ports of the SN4554.

Ethernet

Table 6. RJ-45 Ethernet socket

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

Note Pins not listed are not used.

ISDN BRI Terminal (TE/User) port

The BRI terminal port uses an 8-pin RJ-45 connector (the pinout is shown in [table 7](#)).

Table 7. RJ-45 BRI (NT/Net) socket

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

Note Pins not listed are not used.

Appendix E **SN4554 factory configuration**

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Introduction

The factory configuration settings for the SN4554 are shown below.

```
#-----#
#                                             #
# SN4554 Series                               #
# R3.xx BUILDxxxxx SIP                       #
# 2005-08-25T00:00:00                         #
# Factory configuration file                  #
#                                             #
#-----#

gui type basic
webserver port 80 language en

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 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

context ip router

  interface IF_IP_WAN
    ipaddress dhcp
    use profile acl ACL_WAN_PERMIT_ALL_MGMT in

context ip router

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-interface IF_SIP_SERVICE

  routing-table called-e164 RT_INCOMING
    route default dest-interface IF_S0_00 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_SPEED_DIAL
    use profile tone-set Europe
    isdn-date-time

  interface isdn IF_DEVO

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

```
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
  medium auto

  pppoe

  session SES_PPPOE
    bind subscriber SUB_PPPOE
    shutdown

port ethernet 0 0
  no shutdown

port bri 0 0
  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_00 switch

port bri 0 0
  no shutdown
```

Appendix F **End user license agreement**

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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 56.

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 55.
- 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.