

# SmartNode™ 4980 & 4990 Series Multi-Port T1/E1/PRI VoIP Gateway-Router and IAD

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## User Manual



### Important

This is a Class A device and is not intended for use in a residential environment.

Note for SN4991/F models:

This product is intended for Fiber SFP modules only. If a copper SFP module is used, it may void the CE Certification.

Sales Office: +1 (301) 975-1000  
Technical Support: +1 (301) 975-1007  
E-mail: [support@patton.com](mailto:support@patton.com)  
[www.patton.com](http://www.patton.com)

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**Patton Electronics Company, Inc.**

7622 Rickenbacker Drive  
Gaithersburg, MD 20879 USA  
Tel: +1 (301) 975-1000  
Fax: +1 (301) 869-9293  
Support: +1 (301) 975-1007  
Web: [www.patton.com](http://www.patton.com)  
E-mail: [support@patton.com](mailto:support@patton.com)

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**Important Information**

To use virtual private network (VPN) and/or AES/DES/3DES encryption capabilities with the SmartNode 4980 and 4990 Series, you may need to purchase additional licenses, hardware, software, network connection, and/or service. Contact [sales@patton.com](mailto: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 62 or go to [www.patton.com](http://www.patton.com).

Patton Electronics warrants all SmartNode 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

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This guide describes the SmartNode 4980 and 4990 Series hardware, installation and basic configuration. For detailed software configuration information refer to the *SmartWare Software Configuration Guide* and the available Configuration Notes.

## Audience

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This guide is intended for the following users:

- Operators
- Installers
- Maintenance technicians

## Structure

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This guide contains the following chapters and appendices:

- [Chapter 1](#) on page 13 provides information about SmartNode features and capabilities
- [Chapter 2](#) on page 20 contains an overview describing SmartNode operation and applications
- [Chapter 3](#) on page 23 provides hardware installation procedures
- [Chapter 4](#) on page 29 provides quick-start procedures for configuring the SmartNode
- [Chapter 5](#) on page 34 contains information on contacting Patton technical support for assistance
- [Appendix A](#) on page 37 contains compliance information for the SmartNode
- [Appendix B](#) on page 41 contains specifications for the SmartNodes
- [Appendix C](#) on page 48 provides cable recommendations
- [Appendix D](#) on page 54 describes the SmartNode's ports and pin-outs
- [Appendix E](#) on page 58 lists the factory configuration settings for the SmartNode
- [Appendix F](#) on page 62 provides license information that describes acceptable usage of the software provided with the SmartNode

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

## 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



- Do not open the device when the power cord is connected. For systems without a power switch and without an external power adapter, line voltages are present within the device when the power cord is connected.
- For devices with an external power adapter, the power adapter shall be a listed *Limited Power Source*. The mains outlet that is utilized to power the device shall be within 10 feet (3 meters) of the device, shall be easily accessible, and protected by a circuit breaker in compliance with local regulatory requirements.
- For AC powered devices, ensure that the power cable used meets all applicable standards for the country in which it is to be installed.
- For AC powered devices which have 3 conductor power plugs (L1, L2 & GND or Hot, Neutral & Safety/Protective Ground), the wall outlet (or socket) must have an earth ground.
- For DC powered devices, ensure that the interconnecting cables are rated for proper voltage, current, anticipated temperature, flammability, and mechanical serviceability.
- WAN, LAN & PSTN ports (connections) may have hazardous voltages present regardless of whether the device is powered ON or OFF. PSTN relates to interfaces such as telephone lines, FXS, FXO, DSL, xDSL, T1, E1, ISDN, Voice, etc. These are known as “hazardous network voltages” and to avoid electric shock use caution when working near these ports. When disconnecting cables for these ports, detach the far end connection first.
- Do not work on the device or connect or disconnect cables during periods of lightning activity



This device contains no user serviceable parts. This device can only be repaired by qualified service personnel.



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.



Always follow ESD prevention procedures when removing and replacing cards.

Wear an ESD-preventive wrist strap, ensuring that it makes good skin contact. Connect the clip to an unpainted surface of the chassis frame to safely channel unwanted ESD voltages to ground.

To properly guard against ESD damage and shocks, the wrist strap and cord must operate effectively. If no wrist strap is available, ground yourself by touching the metal part of the chassis.

### 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 <b>Go to Previous View</b> button  in the Adobe® Acrobat® Reader toolbar to return to your starting point. |
| Futura bold type        | Commands and keywords are in <b>boldface</b> font.                                                                                                                                                                                                                                                                                                                                                                  |
| Futura bold-italic type | Parts of commands, which are related to elements already named by the user, are in <b>boldface italic</b> font.                                                                                                                                                                                                                                                                                                     |
| Italicized Futura type  | 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 (   )                                                                                                                                                                                                                                                                                                            |
| screen                  | Terminal sessions and information the system displays are in <code>screen</code> font.                                                                                                                                                                                                                                                                                                                              |
| node                    | The leading IP address or nodename of a SmartNode is substituted with <b>node</b> in <b>boldface italic</b> font.                                                                                                                                                                                                                                                                                                   |
| SN                      | The leading <b>SN</b> 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**

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## SmartNode 4980 and 4990 Series Overview

The SmartNode 4980 and 4990 T1/E1 PRI VoIP Router (see Figure 1) combines Universal SIP Trunking, IP routing, VPN/Security, and Quality of Service with high-quality Voice over IP (VoIP) delivered on 1 to 4 Primary Rate Interfaces (PRI T1/E1). This combination paves the way for enterprises' migration to unified communications by integrating legacy telephone systems with PSTN and VoIP networks.



Figure 1. SmartNode 4980 (left) and SmartNode 4990 (right)

The SmartNode 4980 Gateway-Router and SmartNode 4990 IAD perform the following major functions:

- **Up to 120 VoIP Calls**—Up to 120 simultaneous voice or T.38 fax calls with one to four T1/E1/PRI ports and dual Gigabit Ethernet ports. Use any CODEC or fax on any port, any time.
- **Unified Communications Agent™**—Provides any-to-any multi-path switching with VoIP and data survivability, VoIP-over-VPN security with AES/DES strong encryption, Internet Key Exchange (IKE), and SIP Registrar
- **Universal SIP and T.38 Support**—Softswitch-certified signaling support between all T1 RBS CAS, ISDN PRI, Q.SIG, SIP and H.323.
- **Secure Toll-Quality VoIP**—Patton's DownStreamQoS™ and Voice-over-VPN with adaptive traffic management and shaping for maximum voice quality and secure voice communication.
- **IP Routing**—RIP v1/v2, VRRP, policy-based routing, and loopback interface
- **Transparent Telephony Features**—Complex number manipulation and mapping for seamless integration with existing infrastructures, CLIP, CLIR, hold, transfer and much more.
- **Management & Provisioning**—Web-based management, SNMP, Command Line Interface. Automated provisioning for easy large-scale deployments.
- **Optional High Precision Clock**—Delivers DECT PBX interoperability with reliable fax performance.
- **G.SHDSL, ADSL, X.21, Fiber Broadband or Ethernet Access**—Complete Access Router with integrated G.SHDSL.bis WAN interface delivers symmetrical throughput up to 11.4 Mbps over four wires or up to 5.7 Mbps over two wires, 14 Mbps ADSL WAN interface, up to 2 Mbps X.21 interface or 100 Mbps / 1000 Mbps Fiber or 10/100 Mbps Ethernet RJ45 interface. Supports ATM QoS with multiple PVCs and outstanding DSLAM interoperability.

### SN4980 Series model codes

The SmartNode 4980-90 series consists of several models. They differ in the number of PRI ports and voice channels supported. All models come equipped with two 10/100/1000Base-T Ethernet ports.

The high precision SmartNode 4981 models have a Stratum III clock that provides a clock source of < 5 ppm. The SN4981 can provide a PSTN-equivalent clock for PBXs that used to rely on PSTN for an accurate clock source. The popular DECT PBX needs such high precision clocks.

### SN4990 Series model codes

The SmartNode 4990 series consists of several models. They differ in the number of PRI ports and voice channels supported. All SN4991 models come equipped with two 10/100/1000Base-T Ethernet ports and a high precision clock.

For SN4991 models, the Stratum III high precision clock provides a clock source of < 5 ppm. For PBXs that used to rely on PSTN for accurate clock source, the SmartNode 4991 can provide a PSTN-equivalent high precision clock. The popular DECT PBX needs such high precision clocks.

For additional specific model information, refer to the product [webpage](#).

## SmartNode 4980 and 4990 Series Rear Panels

The SmartNode 4980 and 4990 rear panel ports are described in [Table 2](#) on page 17.

### SN4980 Series rear panel

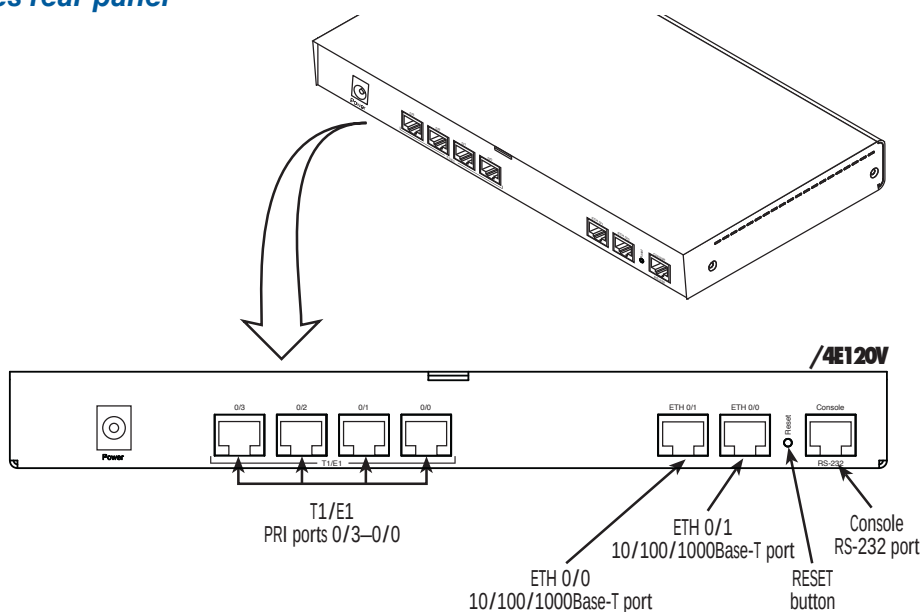


Figure 2. SN4980/SN4981 Rear Panel

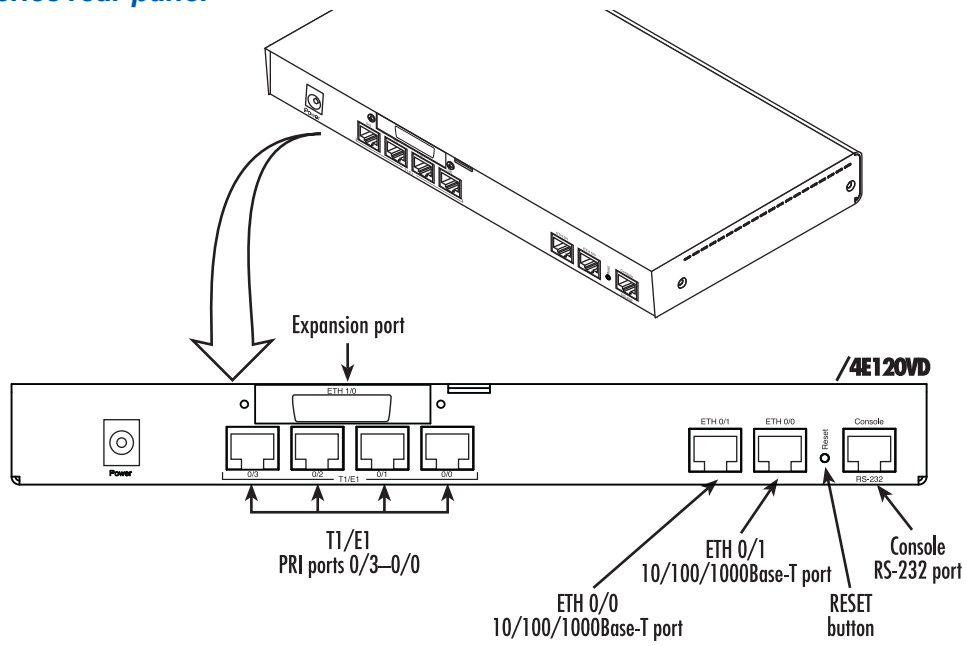
**SN4990 Series rear panel**

Figure 3. SN4991 Rear Panel

Table 2. Rear panel ports

| Port                                                                                                  | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ETH 0/0-0/1</b>                                                                                    | Auto-MDX Gigabit-Ethernet port, RJ-45 (see <a href="#">Figure 2</a> ), connects the unit to an Ethernet Expansion device (for example, a cable modem, DSL modem, or fiber modem) or to (a PC, printer, or wireless bridge). Note: Only full duplex modes are supported.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>PRI 0/0-0/3</b>                                                                                    | RJ-45 connector providing E1 (2.048Mbps) or T1(1.533 Mbps) PRI interface, meeting all requirements of ITU-T recommendations for G.703. Use a shielded E1 or T1 interface cable for 120 Ohm balanced connections to connect the SmartNode with an NT or ET, e.g. a PBX or LE.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Expansion Port<br/>G.SHDSL, ADSL,<br/>SFP, X.21, RJ45<br/>Ethernet<br/>(SN4991models<br/>only)</b> | The G.SHDSL, ADSL, SFP, X.21 or RJ45 Ethernet LEDs are located on either side of the DSL port. ACT (when lit or blinking) shows Activity, and LINK (when lit) shows that the DSL port is connected.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Console</b>                                                                                        | Used for service and maintenance, the Console port (see <a href="#">Figure 2</a> ), an RS-232 RJ-45 connector, connects the product to a serial terminal such as a PC or ASCII terminal (also called a dumb terminal).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>12V DC, 1.0A</b>                                                                                   | Electricity supply socket. (see <a href="#">Figure 2</a> ).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Reset</b>                                                                                          | <p>The reset button (see <a href="#">Figure 2</a>) has three functions:</p> <ul style="list-style-type: none"> <li>• 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.</li> <li>• Restart the unit with factory default configuration—Press the <i>Reset</i> button for 5 seconds until the <i>Power</i> LED starts blinking to restart the unit with factory default configuration.</li> <li>• Restart the unit in bootloader mode (to be used only by trained SmartNode 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.</li> </ul> |

## SmartNode 4980 and 4990 Series Front Panel

Figure 4 shows the SmartNode's front panel LEDs. The LED definitions are listed in Table 3.

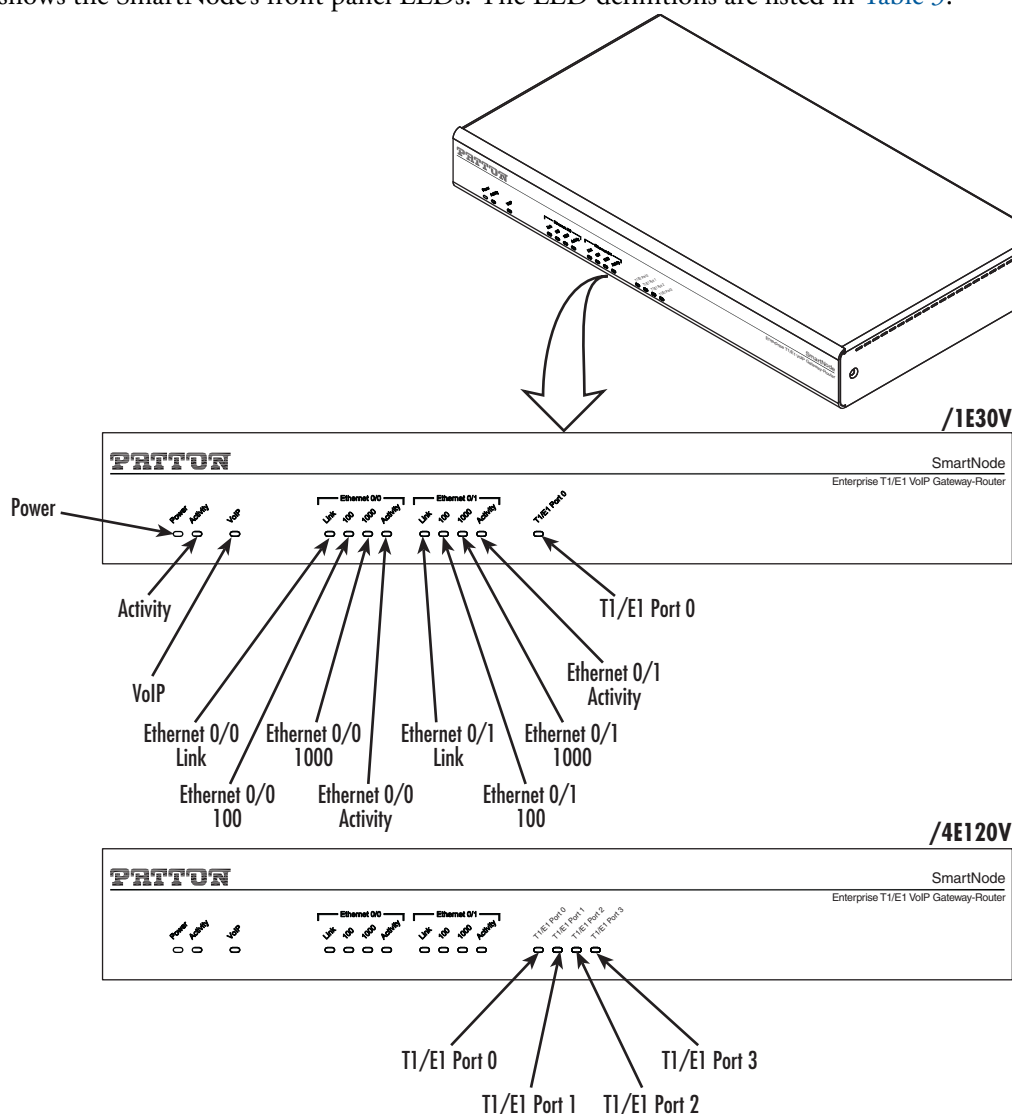


Figure 4. SmartNode 4980/4990 front panel

Table 3. LED Definitions

| LED          | Description                                                                               |
|--------------|-------------------------------------------------------------------------------------------|
| <b>Note</b>  | If an error occurs, all LEDs will flash once per second.                                  |
| <b>Power</b> | When lit, indicates power is applied.                                                     |
| <b>Run</b>   | When lit, the unit is in normal operation; flashes once per second during boot (startup). |

Table 3. LED Definitions

| LED                                                                 | Description                                                                                                                                                                                                                                                                                                                                                                                                                   |
|---------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>VoIP Link</b>                                                    | <ul style="list-style-type: none"> <li>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.</li> <li>Off indicates the unit is not configured or registered, or has no active direct-routed VoIP connection.</li> <li>Flashing green indicates that the unit is attempting to register or has failed to register.</li> </ul> |
| <b>Ethernet Link</b>                                                | <ul style="list-style-type: none"> <li>On when the Ethernet connection on the corresponding port has a link indication.</li> </ul>                                                                                                                                                                                                                                                                                            |
| <b>Ethernet Speed 10/100</b>                                        | When the Ethernet Link LED is on, then: <ul style="list-style-type: none"> <li>On when the Ethernet is connected to a 100Mb network.</li> <li>Off when the Ethernet is connected to a 10Mb network.</li> </ul>                                                                                                                                                                                                                |
| <b>Ethernet Speed 1000</b>                                          | <ul style="list-style-type: none"> <li>On when the Ethernet is connected to a 1000Mb network.</li> </ul>                                                                                                                                                                                                                                                                                                                      |
| <b>Ethernet Activity</b>                                            | <ul style="list-style-type: none"> <li>Flashes when data is received or transmitted at the corresponding Ethernet port.</li> </ul>                                                                                                                                                                                                                                                                                            |
| <b>PRI Link/Status</b>                                              | <ul style="list-style-type: none"> <li>On = in frame, no errors</li> <li>Flash = Error</li> <li>Fast Flash = Signal detected but no frame synchronization or acquisition is in process</li> <li>Slow Flash = Framing synchronized, Signaling not established</li> </ul>                                                                                                                                                       |
| <b>G.SHDSL ACT (Rear panel)</b>                                     | <ul style="list-style-type: none"> <li>Flashes when data is received or transmitted</li> <li>Off = No activity</li> </ul>                                                                                                                                                                                                                                                                                                     |
| <b>G.SHDSL Link (Rear panel)</b><br><b>*note: SFP, ADSL or X.21</b> | <ul style="list-style-type: none"> <li>On when the G.SHDSL connection on the corresponding port has a link indication.</li> <li>Off = No G.SHDSL connection</li> </ul>                                                                                                                                                                                                                                                        |

Chapter 2    **Applications Overview**

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## Typical Application

IP-enable legacy PBX systems with an Enterprise-class SmartNode 4980 VoIP Gateway-Router or SmartNode 4990 Integrated Access Device. The SN4980 and SN4990 support up to 120 concurrent VoIP calls.

The SN4980 with built-in IP Router enables Enterprises to connect existing PBX systems with advanced IP telephony services and the PSTN. With built-in G.SHDSL, ADSL, Fiber or X.21, the SN4990 enables Broad-band Providers to connect existing PBX systems with advanced IP telephony services and the PSTN.

Combining a VoIP gateway with an IP router, the SmartNode 4980 and 4990 Series adds QoS and VPN security, making it the ideal solution for secure prioritized communications.

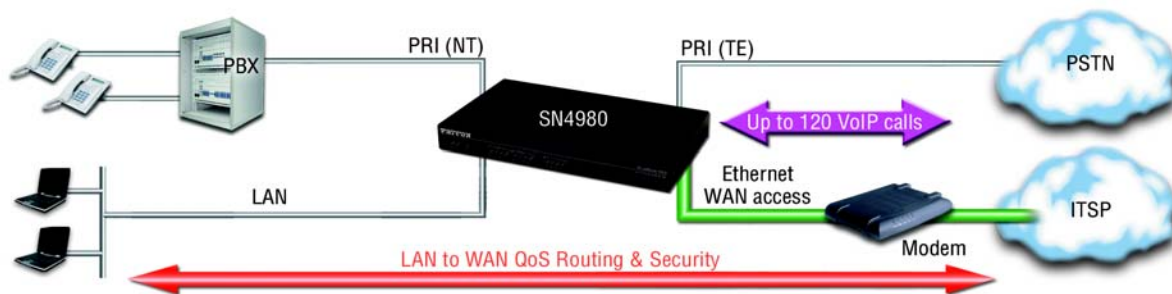


Figure 5. SN4980 application

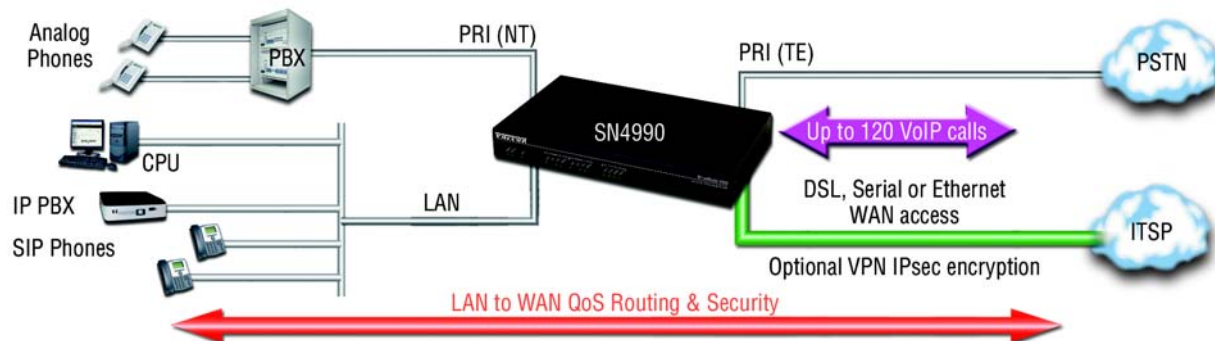


Figure 6. SN4990 application



Figure 7. WAN uplink redundancy

## Chapter 3    **SmartNode Installation**

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## Planning the Installation

Before installing the SmartNode, the following tasks should be completed:

- **Create a network diagram** (see section “[Network information](#)” on page 24)
- **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 25)
- **Verify power source reliability** (see section “[AC Power Mains](#)” on page 25).

After you have finished preparing for installation, go to the section “[Installing the SmartNode](#)” on page 25 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, 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* to configure the software on your SmartNode.

### AC Power Mains

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. Refer to “[Connecting the SmartNode to the power supply](#)” on page 28.

### Location and mounting requirements

The SmartNode 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.

**Note** Under the rack mount option, the chassis can be equipped with rack mount ears that allow for use in a 19” rack.

## Installing the SmartNode

SmartNode hardware installation consists of the following:

- Placing the device at the desired installation location (see section “[Placing the SmartNode](#)” on page 25)
- Connecting the interface and power cables (see section “[Installing cables](#)”)

When you finish installing the SmartNode, go to chapter 4, “[Initial Configuration](#)” on page 29.

### Placing the SmartNode

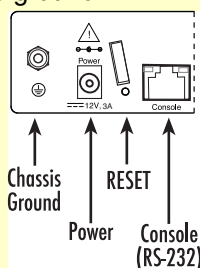
Place the unit on a desktop or similar sturdy, flat surface that offers easy access to the cables. The unit should be installed in a dry environment with sufficient space to allow air circulation for cooling.

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

## Ground Connection



To be compliant with safety regulations (EN60950-1, UL60950-1 and CAN/CSA-C22.2 No 60950), the ground terminal must be connected to a reliable ground.



## Installing cables



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

Connect the cables in the following order:



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 T1/E1 cables to the PRI T1/E1 ports (see [Appendix C on page 48](#) and [Appendix D on page 54](#)).
2. Connect the 10/100/1000Base-T Ethernet LAN and WAN (see section “[Connecting the 10/100/1000Base-T Ethernet LAN and WAN cables](#)” on page 27)
3. Connect the power mains cable (see section “[Connecting the SmartNode to the power supply](#)” on page 28)

## Connecting the PRI

The SmartNode comes with one or four PRI ports. These ports are usually connected to a PBX or switch (local exchange (LE)). Each PRI T1/E1 port is a RJ-48C receptacle. In most cases, a straight-through RJ-45 can be used to connect the PRI. Each port can be configured as NT (clock master) or TE (clock slave).

For details on the PRI port pin-out and ISDN cables, refer to Appendix C, “Cabling” on page 43 and Appendix D, “port pin-outs” on page 47.



For the ISDN connection to a carrier Network, it shall be connected to a Network Termination Device and not connected directly to an outside POTS line.

### ***Connecting the 10/100/1000Base-T Ethernet LAN and WAN cables***

The SmartNode 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 or cross-over wired cable.

1. Connect to the subscriber port of the broadband access modem (DSL, cable, WLL) to *ETH 0/0*.

**Note** The SmartNode Ethernet ports operate in Full Duplex mode only. Do not connect to Half Duplex ports. For best results, use auto-negotiation. Auto negotiation is mandatory when using 1000BaseT (Gigabit) Ethernet.

2. Connect port ETH 0/1 to your LAN.

For details on the Ethernet port pinout and cables, refer to [Appendix C, “Cabling”](#) on page 48 and [Appendix D, “Port Pin-outs”](#) on page 54.

### ***Installation cable requirements for the DSL WAN cable (SN4991 /2GS Models)***

The SmartNode Model 4991 comes with an option for a G.SHDSL or ADSL WAN interface. Use a straight-through RJ-45 cable to connect the G.SHDSL port.

For details on the G.SHDSL port pinout, refer to [“G.SHDSL Port \(/2GS models only\)”](#) on page 56.

### ***Installation cable requirements for the X.21 WAN cable (SN4991 /D Models)***

The SmartNode Model 4991 comes with an option for an X.21 serial interface. Insert the X.21 WAN cable's DB-15 male end into the DB-15 connector on the SN4991. Plug the other end of the cable into the X.21 device.

For details on the X.21 interface pinout, refer to [“X.21 DB-15 Connector \(/D models only\)”](#) on page 57.

### ***Installation cable requirements for the SFP for Fiber WAN module (SN4991)***

The SmartNode Model 4991 comes with an option for an SFP for Fiber WAN module. For details about the tested and compatible SFP modules see <http://www.patton.com/products/sfpmodules.asp>.

### ***Installation cable requirements for the Ethernet 10/100 WAN interface (SN4991 /I Models)***

The SmartNode Model 4991 comes with an option for a 3rd Ethernet 10/100 port to be used as a WAN interface for instance. Use a straight through RJ-45 cable to connect the Ethernet WAN port.

For details on the Ethernet port pinout, refer to [Appendix D on page 54](#).

### ***Connecting the SmartNode to the IP network***

The SmartNode comes with two 10/100/100 Base-Tx Ethernet ports (Gigabit) for connection to an IP network. (Some models come with 3 Ethernet ports, see /I Models). The Ethernet WAN interface is factory-configured as a DHCP client, so you must connect the SmartNode 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.

Using the included black Ethernet cable, connect the RJ-45 Ethernet WAN port on your SmartNode (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 on page 48](#) and [Appendix D on page 54](#).

### Connecting the SmartNode to the power supply



- Do not connect power to the AC Mains at this time.
- The external power adapter shall be a listed Limited Power Source.
- The 4980 external 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.



- The external 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.

1. Insert the barrel type connector end of the AC power cord into the *12V DC, 1.0A* port (see [Figure 8](#)).
2. Insert the female end of the power cord into the internal power supply connector.

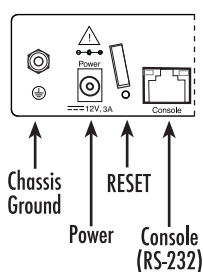


Figure 8. Power connector location on rear panel

3. Verify that the AC power cord included with your SmartNode 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.
4. Connect the male end of the power cord to an appropriate power outlet.
5. Verify that the green *Power* LED is lit (see [Figure 8](#)).

## Chapter 4    **Initial Configuration**

---

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## Introduction

This chapter leads you through the basic steps to set up a new SmartNode and to download a configuration. Setting up a new SmartNode consists of the following main steps:

**Note** If you haven't already installed the SmartNode, refer to chapter 3, “SmartNode Installation” on page 23.

- Connecting the SmartNode to your laptop PC
- Configuring the desired IP address
- Connecting the SmartNode to the network
- Loading the configuration (optional)

### 1. Connecting the SmartNode to your Laptop PC

First the SmartNode must be connected to the mains power supply with the power cable. Wait until the *Power* LED stops blinking and stays lit constantly. Now the SmartNode is ready.



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 SmartNode 4980 and 4990 Series is equipped with Auto-MDX Ethernet ports, so you can use straight-through cables for host or hub/switch connections (see [Figure 9](#)).

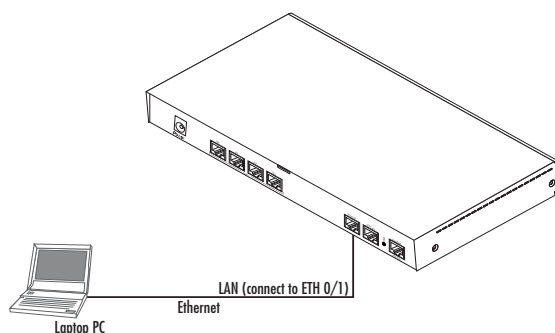


Figure 9. Connecting the SmartNode to your laptop PC

The SmartNode comes with a built-in DHCP server to simplify configuration. Therefore, to automatically configure the PC for IP connectivity to the SmartNode, the laptop PC must be configured for DHCP. The SmartNode will provide the PC with an IP address. You can check the connection to the SmartNode by executing the ping command from the PC command window as follows:

```
ping 192.168.1.1
```

## 2. Configuring the Desired IP Address

### Factory-default IP settings

The factory default configuration for the Ethernet interface IP addresses and network masks are listed in [Table 5](#). Both Ethernet interfaces are activated upon power-up. LAN interface *ETH 0/1 (LAN)* provides a default DHCP server, the WAN interface uses DHCP client to automatically assign the IP address and network mask.

Table 5. Factory default IP address and network mask configuration

|                                           | IP Address                | Network Mask  |
|-------------------------------------------|---------------------------|---------------|
| <b>WAN interface Ethernet 0 (ETH 0/0)</b> | DHCP                      | DHCP          |
| <b>LAN interface Ethernet 1 (ETH 0/1)</b> | 192.168.1.1               | 255.255.255.0 |
| <b>WAN interface Ethernet 2 (ETH 0/2)</b> | DHCP                      | DHCP          |
| <b>DHCP address range</b>                 | 192.168.1.10–192.168.1.99 | 255.255.255.0 |

If these addresses match with those of your network, go to section “[3. Connecting the SmartNode to the Network](#)” on page 32. Otherwise, refer to the following sections to change the addresses and network masks.

**Note** For configuring the IP address of the integrated WAN interface (G.SHDSL), please refer to Chapter 5, “[G.SHDSL Basic Configuration](#)” on page 36.

### Login

To access the SmartNode, start the Telnet application. Type the default IP address for the SmartNode into the address field: 192.168.1.1. Accessing your SmartNode via a Telnet session displays the login screen. Type the factory default login: *administrator* and leave the password empty. Press the *Enter* key after the password prompt.

```
login:administrator
password: <Enter>
192.168.1.1>
```

After you have successfully logged in you are in the operator execution mode, indicated by > as command line prompt. With the commands *enable* and *configure* you enter the configuration mode.

```
192.168.1.1>enable
192.168.1.1#configure
192.168.1.1(cfg)#
```

### Changing the WAN IP address

Select the context IP mode to configure an IP interface.

```
192.168.1.1(cfg)#context ip router
192.168.1.1(ctx-ip)[router]#
```

Now you can set your IP address and network mask for the interface *ETH 0/0 (WAN)*. Within this example a network 172.16.1.0/24 address is assumed. The IP address in this example is set to 172.16.1.99 (you should set this the IP address given to you by your network provider).

```
192.168.1.1(ctx-ip)[router]#interface WAN
192.168.1.1(if-ip)[WAN]#ipaddress 172.16.1.99 255.255.255.0
2002-10-29T00:09:40 : LOGINFO      : Link down on interface WAN.
2002-10-29T00:09:40 : LOGINFO      : Link up on interface WAN.
172.16.1.99(if-ip)[WAN]#
```

Copy this modified configuration to your new start-up configuration. This will store your changes in non-volatile memory. Upon the next start-up the system will initialize itself using the modified configuration.

```
172.16.1.99(if-ip)[WAN]#copy running-config startup-config
172.16.1.99(if-ip)[WAN]#
```

The SmartNode can now be connected to your network.

### 3. Connecting the SmartNode to the Network

In general, the SmartNode will connect to the network via the *WAN (ETH 0/0)* port. This enables the SmartNode to offer routing services to the PC hosts on *LAN (ETH 0/1)* port. The SmartNode 4980 and 4990 Series is equipped with Auto-MDX Ethernet ports, so you can use straight-through or crossover cables for host or hub/switch connections (see [Figure 10](#)).



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.

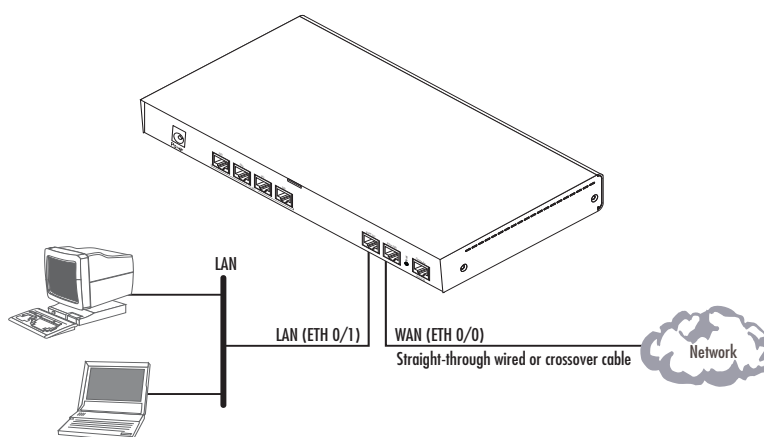


Figure 10. Connecting the SmartNode to the network

You can check the connection with the ping command from the SmartNode to another host on the network.

```
172.16.1.99(if-ip)[WAN]#ping <IP Address of the host>
```

**Note** If the WAN address is *not* set to DHCP, to ping a device outside your local LAN you must first configure the default gateway. (For information on configuring the default gateway, refer to section “Set IP addresses” in Appendix C, “Command Summary” of the *SmartNode Series SmartWare Software Configuration Guide*.)

## 4. Loading the Configuration (optional)

Patton provides a collection of configuration templates on the support page at [www.patton.com/smartnode](http://www.patton.com/smartnode)—one of which may be similar enough to your application that you can use it to speed up configuring the SmartNode. Simply download the configuration note that matches your application to your PC. Adapt the configuration as described in the configuration note to your network (remember to modify the IP address) and copy the modified configuration to a TFTP server. The SmartNode can now load its configuration from this server.

**Note** If your application is unique and not covered by any of Patton’s configuration templates, you can manually configure the SmartNode instead of loading a configuration file template. In that case, refer to the *SmartNode Series SmartWare Software Configuration Guide* for information on configuring the SmartNode device.

In this example we assume the TFTP server on the host with the IP address 172.16.1.11 and the configuration named *SN.cfg* in the root directory of the TFTP server.

```
172.16.1.99(if-ip)[WAN]#copy tftp://172.16.1.11/SN.cfg startup-config
Download...100%
172.16.1.99(if-ip)[WAN]#
```

After the SmartNode has been rebooted the new startup configuration will be activated.



When you issue the **reload** command, the SmartNode will ask if you want to copy the running configuration to the startup configuration. Since you just downloaded a configuration file to the startup configuration you must answer this question with **NO**. Otherwise, the downloaded configuration will be overwritten and lost!

```
172.16.1.99(if-ip)[WAN]#reload
Running configuration has been changed.
Do you want to copy the 'running-config' to the 'startup-config'?
Press 'yes' to store, 'no' to drop changes : no
Press 'yes' to restart, 'no' to cancel : yes
The system is going down
```

## Additional Information

For detailed information about configuring and operating guidance, set up procedures, and troubleshooting, refer to the *SmartNode Series SmartWare Software Configuration Guide* available online at [www.patton.com/manuals](http://www.patton.com/manuals).

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 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.

| REGION         | North America                     | Western Europe                                    | Central & Eastern Europe        | Middle East North Africa        |
|----------------|-----------------------------------|---------------------------------------------------|---------------------------------|---------------------------------|
| Location       | Maryland, USA                     | Bern, Switzerland                                 | Budapest, Hungary               | Beirut, Lebanon                 |
| Time Zone      | EST/EDT<br>UTC/GMT - 4/5 hours    | CET/CEDT<br>UTC/GMT + 1/2 hours                   | CET/CEDT<br>UTC/GMT + 1/2 hours | EET/EEDT<br>UTC/GMT + 2/3 hours |
| Business Hours | Monday-Friday<br>8:00am to 5:00pm | Monday-Friday<br>09:00 to 12:00<br>13:30 to 17:30 | Monday-Friday<br>8:30 to 17:00  | Monday-Friday<br>8:00am to 5pm  |
| Email          | support@patton.com                | support@patton.com                                | support@patton.com              | support@patton.com              |
| Phone          | + 1 301 975 1007                  | +41 31 985 25 55                                  | +36 439 3835                    | +96 1 359 1277                  |
| Fax            | +1 301 869 9293                   | +41 31 985 2526                                   |                                 |                                 |

## 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](http://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](mailto: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

---

### EMC

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

### Safety

- UL 60950-1/CSA C22.2 N0. 60950-1
- IEC/EN60950-1
- AS/NZS 60950-1

### PSTN Regulatory

- FCC Part 68
- CS-03
- TBR 4
- TBR 12 & 13
- AS/ACIF S016
- AS/ACIF S038
- AS/ACIF S043 (G.SHDSL card)
- NZ ISDN Layer 3 Supplement



For the ISDN connection to a carrier network, it shall be connected to a network termination device and not connected directly to an outside POTS line.

## 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 has been tested and found to comply with the limits for a Class A 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).

## FCC Part 68 (ACTA) Statement

---

This equipment complies with Part 68 of FCC rules and the requirements adopted by ACTA. On the bottom side of this equipment is a label that contains—among other information—a product identifier in the format US: AAAEQ##TXXXX. If requested, this number must be provided to the telephone company.

The method used to connect this equipment to the premises wiring and telephone network must comply with the applicable FCC Part 68 rules and requirements adopted by the ACTA.

If this equipment causes harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of service may be required. But if advance notice isn't practical, the telephone company will notify the customer as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe it is necessary.

The telephone company may make changes in its facilities, equipment, operations or procedures that could affect the operation of the equipment. If this happens the telephone company will provide advance notice in order for you to make necessary modifications to maintain uninterrupted service.

If trouble is experienced with this equipment, for repair or warranty information, please contact our company. If the equipment is causing harm to the telephone network, the telephone company may request that you disconnect the equipment until the problem is resolved.

Connection to party line service is subject to state tariffs. Contact the state public utility commission, public service commission or corporation commission for information.

## Industry Canada Notice

---

This equipment meets the applicable Industry Canada Terminal Equipment Technical Specifications. This is confirmed by the registration number. The abbreviation, IC, before the registration number signifies that registration was performed based on a Declaration of Conformity indicating that Industry Canada technical specifications were met. It does not imply that Industry Canada approved the equipment.

This Declaration of Conformity means that the equipment meets certain telecommunications network protective, operational and safety requirements. The Department does not guarantee the equipment will operate to the user's satisfaction. Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. In some cases, the company's inside wiring associated with a single line individual service may be extended by means of a certified connector assembly (telephone extension cord). The customer should be aware that compliance with the above condition may not prevent degradation of service in some situations. Repairs to some certified equipment should be made by an authorized maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment. Users should ensure for their own protection that the ground connections of the power utility, telephone lines and internal metallic water pipe system, are connected together. This protection may be particularly important in rural areas.

## CE Declaration of Conformity

---

We certify that the apparatus identified above conforms to the requirements of Council Directive 2004/108/EC on the approximation of the laws of the member states relating to electromagnetic compatibility; and Council Directive 2006/95/EC on the approximation of the laws of the member states relating to electrical equipment designed for use within certain voltage limits; Council Directive 2009/125/EC establishing a framework for the setting of Ecodesign requirements for energy-related products; and Council Directive 2011/65/EU on the approximation of the laws of the member states relating to RoHS compliance.

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

The signed Declaration of Conformity can be downloaded at [www.patton.com/certifications](http://www.patton.com/certifications).

## Authorized European Representative

---

**D R M Green**

European Compliance Services Ltd  
Avalon House  
Marcham Road  
Abingdon  
Oxon OX14 1UD, UK

## Appendix B **Specifications**

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

## Voice Connectivity

---

1 or 4 PRI T1/E1 ports on RJ48C connectors

Net/User configurable per port

Each port can be slave or master clock

Each port can be used to synchronize to an external clock master

Failover relay between ports 0/0 and 0/1 for specific models

## Data Connectivity

---

Two 10/100/1000Base-Tx Gigabit Ethernet ports

All ports full duplex, autosensing, auto-MDX

## Voice Processing (signaling dependent)

---

Up to 120 full-duplex channels with Voice CODECS:

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

G.168 echo cancellation (128 ms)

Up to 120 simultaneous voice or T.38 fax calls

DTMF detection and generation

Carrier tone detection and generation

Silence suppression and comfort noise

Adaptive and 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)

Least cost routing

Interface huntgroups

Call-Distribution groups

Number blocking

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

Regular expression 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

Packet Policing discards excess traffic

802.1p VLAN tagging

IPSEC AH & ESP Modes

Manual Key; IKE

AES/DES/3DES Encryption

## Management

---

Web-based GUI

Industry standard CLI with local console (RJ-45, RJ-231, 9600 bps, 8, N, 1) and remote Telnet access, fully documented

HTTP web management and firmware loading

TFTP configuration & firmware loading

SNMP v1 agent (MIB II and private MIB)

Built-in diagnostic tools (trace, debug)

Secure Auto-provisioning

## System

---

CPU Motorola MPC8360 series operating at 400 MHz

Memory:

- 256 Mbytes RAM (DDR, 400MHz)
- 32 Mbytes Flash

## Physical

---

**Dimensions:** 11.9W x 1.71H x 7.16D inch (302W x 44H x 182mm)

**Weight:** <21 oz. (<600g)

**Power Consumption:** < 16W

**Operating temperature:** 32–104°F (0–40°C)

**Operating humidity:** up to 90%, non condensing

## WAN Daughter Card (if applicable)

**Note** For information on configuring the WAN daughter card, see Chapter 5, “[G.SHDSL Basic Configuration](#)” on page 36.

Table 6. G.SHDSL Daughter Card Specifications

| Factor                               | Specs                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>DSL</b>                           | <ul style="list-style-type: none"> <li>• ITU-T G.991.2 (and Amendment 2)</li> <li>• ITU-T G.991.2, Annex A, B, F, G</li> <li>• Upgradable to ITU-T G.shdsl.bis—Annex F and G</li> <li>• G.991.2 2/4 (1/2 pair) operation</li> <li>• G.994.1 (G.hs) (per G.991.2)</li> <li>• ITU-T G.991.2 Section E.9 (TPS-TC for ATM transport)</li> <li>• ITU-T G.991.2 Section E.11 (TPS-TC for PTM transport)</li> </ul>                                                    |
| <b>DSL Connection</b>                | RJ-45                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Management</b>                    | <ul style="list-style-type: none"> <li>• I.610 OAM F4/F5</li> <li>• Management interfaces: GUI and Telnet</li> <li>• Software upgrade: GUI and TFTP</li> </ul>                                                                                                                                                                                                                                                                                                  |
| <b>ATM Support</b>                   | <ul style="list-style-type: none"> <li>• Classical IPoA (RFC 1577/2225)</li> <li>• PPPoE Client (over ATM) (RFC 2516)</li> <li>• IPoA (RFC 2684/1483)</li> <li>• ATM AAL5 encapsulation</li> <li>• Max. 8 PVCs</li> <li>• User selectable VC MUX and LLC MUX (default)</li> <li>• Configurable auto-connection</li> <li>• ATM QoS: UBR (default), CBR, and VBR-rt, VBR-nrt, UBR: per VC queuing</li> <li>• Auto-configuration: TR-037 &amp; ILMI 4.0</li> </ul> |
| <b>Interworking/Interoperability</b> | <ul style="list-style-type: none"> <li>• G.SHDSL Interoperability: <ul style="list-style-type: none"> <li>- Alcatel</li> <li>- NEC</li> <li>- Lucent Anymedia</li> <li>- Lucent Stinger</li> </ul> </li> <li>• BRAS Interoperability: <ul style="list-style-type: none"> <li>- Cisco</li> <li>- Redback</li> </ul> </li> </ul>                                                                                                                                  |
| <b>Fiber</b>                         | <ul style="list-style-type: none"> <li>• 100Mbps and 1000Mbps Fiber SFP.</li> </ul> <p>(For a list of tested SFP modules, please refer to <a href="http://www.patton.com/products/sfpmodules.asp">http://www.patton.com/products/sfpmodules.asp</a>)</p>                                                                                                                                                                                                        |
| <b>Ethernet (ETH 0/2)</b>            | <ul style="list-style-type: none"> <li>• 10/100Mbps Fast Ethernet R45</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                |

## 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                                                                                         |
|------------------|-----------------------------------------------------------------------------------------------------|
| SN4980/1E15V     | .iso.org.dod.internet.private.enterprises.patton.products.sn4970.1<br>1.3.6.1.4.1.1768.100.4.22.1   |
| SN4980/1E24V     | .iso.org.dod.internet.private.enterprises.patton.products.sn4970.2<br>1.3.6.1.4.1.1768.100.4.22.2   |
| SN4980/1E30V     | .iso.org.dod.internet.private.enterprises.patton.products.sn4970.3<br>1.3.6.1.4.1.1768.100.4.22.3   |
| SN4980/4E15V     | .iso.org.dod.internet.private.enterprises.patton.products.sn4970.4<br>1.3.6.1.4.1.1768.100.4.22.4   |
| SN4980/4E24V     | .iso.org.dod.internet.private.enterprises.patton.products.sn4970.5<br>1.3.6.1.4.1.1768.100.4.22.5   |
| SN4980/4E30V     | .iso.org.dod.internet.private.enterprises.patton.products.sn4970.6<br>1.3.6.1.4.1.1768.100.4.22.6   |
| SN4980/4E48V     | .iso.org.dod.internet.private.enterprises.patton.products.sn4970.7<br>1.3.6.1.4.1.1768.100.4.22.7   |
| SN4980/4E60V     | .iso.org.dod.internet.private.enterprises.patton.products.sn4970.8<br>1.3.6.1.4.1.1768.100.4.22.8   |
| SN4980/4E96V     | .iso.org.dod.internet.private.enterprises.patton.products.sn4970.9<br>1.3.6.1.4.1.1768.100.4.22.9   |
| SN4980/4E120V    | .iso.org.dod.internet.private.enterprises.patton.products.sn4970.10<br>1.3.6.1.4.1.1768.100.4.22.10 |
| SN4980/4E30V120R | .iso.org.dod.internet.private.enterprises.patton.products.sn4970.21<br>1.3.6.1.4.1.1768.100.4.22.21 |
| SN4981/1E15V     | .iso.org.dod.internet.private.enterprises.patton.products.sn4970.11<br>1.3.6.1.4.1.1768.100.4.22.11 |
| SN4981/1E24V     | .iso.org.dod.internet.private.enterprises.patton.products.sn4970.12<br>1.3.6.1.4.1.1768.100.4.22.12 |
| SN4981/1E30V     | .iso.org.dod.internet.private.enterprises.patton.products.sn4970.13<br>1.3.6.1.4.1.1768.100.4.22.13 |
| SN4981/4E15VR    | .iso.org.dod.internet.private.enterprises.patton.products.sn4970.14<br>1.3.6.1.4.1.1768.100.4.22.14 |
| SN4981/4E24VR    | .iso.org.dod.internet.private.enterprises.patton.products.sn4970.15<br>1.3.6.1.4.1.1768.100.4.22.15 |
| SN4981/4E30VR    | .iso.org.dod.internet.private.enterprises.patton.products.sn4970.16<br>1.3.6.1.4.1.1768.100.4.22.16 |
| SN4981/4E48VR    | .iso.org.dod.internet.private.enterprises.patton.products.sn4970.17<br>1.3.6.1.4.1.1768.100.4.22.17 |
| SN4981/4E60VR    | .iso.org.dod.internet.private.enterprises.patton.products.sn4970.18<br>1.3.6.1.4.1.1768.100.4.22.18 |

Table 7. SmartNode Models and their Unique sysObjectID (Continued)

| SmartNode Model  | SysObjectID                                                                                         |
|------------------|-----------------------------------------------------------------------------------------------------|
| SN4981/4E96VR    | .iso.org.dod.internet.private.enterprises.patton.products.sn4970.19<br>1.3.6.1.4.1.1768.100.4.22.19 |
| SN4981/4E120VR   | .iso.org.dod.internet.private.enterprises.patton.products.sn4970.20<br>1.3.6.1.4.1.1768.100.4.22.20 |
| SN4981/4E30V120R | .iso.org.dod.internet.private.enterprises.patton.products.sn4970.22<br>1.3.6.1.4.1.1768.100.4.22.22 |
| SN4991/1E15V     | .iso.org.dod.internet.private.enterprises.patton.products.sn4970.1<br>1.3.6.1.4.1.1768.100.4.22.11  |
| SN4991/1E24V     | .iso.org.dod.internet.private.enterprises.patton.products.sn4970.2<br>1.3.6.1.4.1.1768.100.4.22.12  |
| SN4991/1E30V     | .iso.org.dod.internet.private.enterprises.patton.products.sn4970.3<br>1.3.6.1.4.1.1768.100.4.22.13  |
| SN4991/4E15VR    | .iso.org.dod.internet.private.enterprises.patton.products.sn4970.4<br>1.3.6.1.4.1.1768.100.4.22.14  |
| SN4991/4E24VR    | .iso.org.dod.internet.private.enterprises.patton.products.sn4970.5<br>1.3.6.1.4.1.1768.100.4.22.15  |
| SN4991/4E30VR    | .iso.org.dod.internet.private.enterprises.patton.products.sn4970.6<br>1.3.6.1.4.1.1768.100.4.22.16  |
| SN4991/4E48VR    | .iso.org.dod.internet.private.enterprises.patton.products.sn4970.7<br>1.3.6.1.4.1.1768.100.4.22.17  |
| SN4991/4E60VR    | .iso.org.dod.internet.private.enterprises.patton.products.sn4970.8<br>1.3.6.1.4.1.1768.100.4.22.18  |
| SN4991/4E96VR    | .iso.org.dod.internet.private.enterprises.patton.products.sn4970.9<br>1.3.6.1.4.1.1768.100.4.22.19  |
| SN4991/4E120VR   | .iso.org.dod.internet.private.enterprises.patton.products.sn4970.10<br>1.3.6.1.4.1.1768.100.4.22.20 |
| SN4991/4E30V120R | .iso.org.dod.internet.private.enterprises.patton.products.sn4970.21<br>1.3.6.1.4.1.1768.100.4.22.22 |

**Note** The SysObjectIDs for the SN4991 G.SHDSL, ADSL, Fiber, X.21 and RJ45 Ethernet models are the same as the corresponding SN4991 models listed above.

According to [Table 7](#), an SNMP get request to *.iso.org.dod.internet.mgmt.mib-2.system.sysObjectID* of a SmartNode 4980/1E15V/EUI device reads out a numeric OID of *1.3.6.1.4.1.1768.100.4.22.1*, which represents a SmartNode 4980/1E15V/EUI 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**

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## 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.

## Console

The SmartNode can be connected to a serial terminal over its serial console port, as depicted in [Figure 11](#).

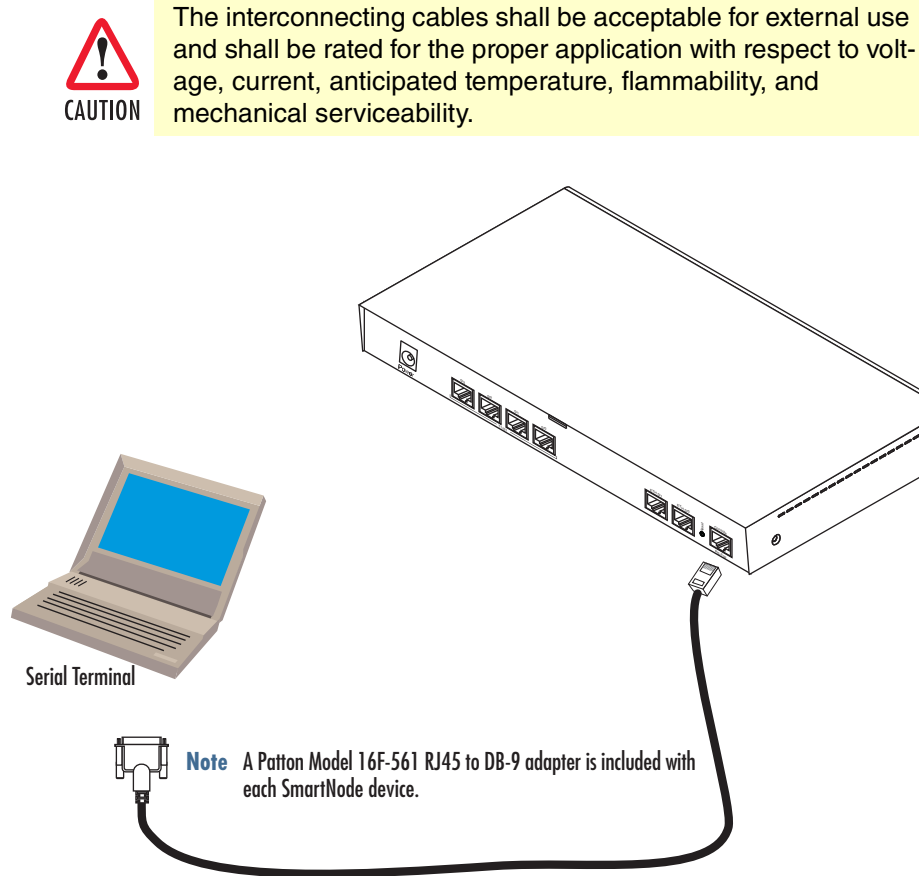


Figure 11. Connecting a serial terminal

**Note** See section “[Console Port](#)” on page 55 for console port pin-outs.

## Ethernet

Ethernet devices (10Base-T/100Base-T/1000Base-T) are connected to the SmartNode over a cable with RJ-45 plugs. All Ethernet ports on the SmartNode are Auto-MDX use any straight or crossover cable to connect to hubs, switches, PCs or other devices

**Note** For the 3rd Ethernet port (ETH0/2), only figure 11 below applies. There is no 1000Base-T (Gigabit) Ethernet support on (ETH0/2).



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.

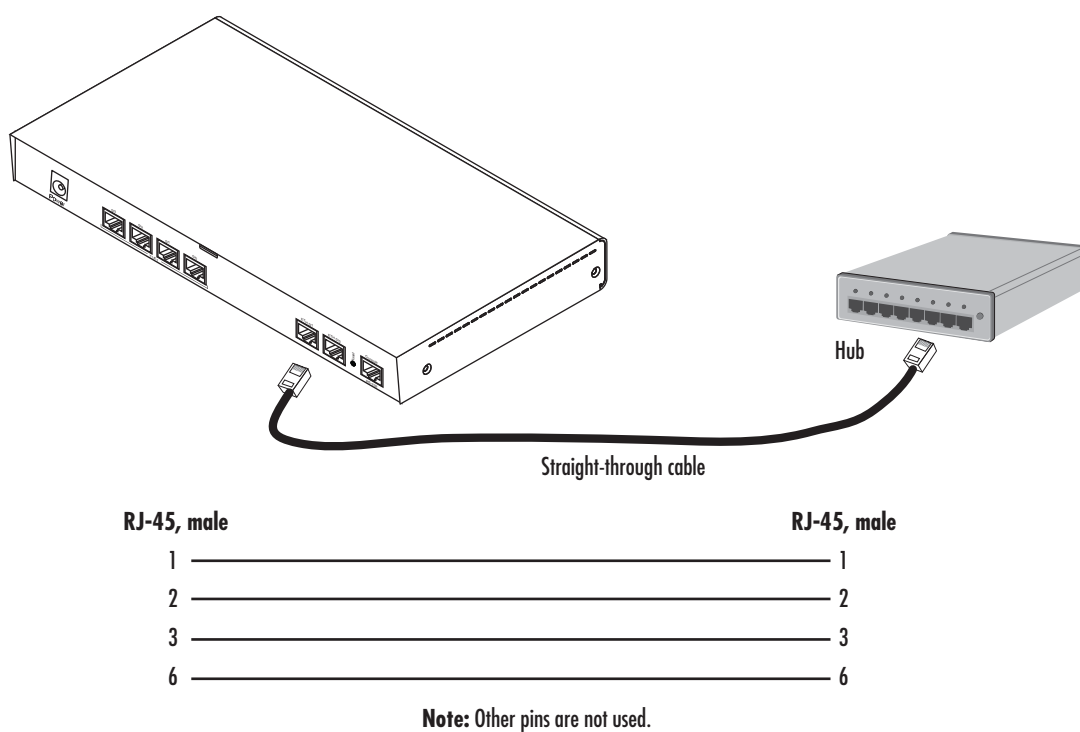


Figure 12. Typical Ethernet straight-through cable diagram for 10/100Base-T

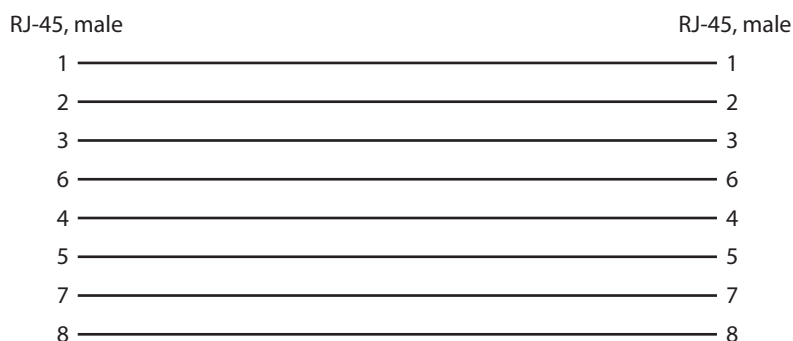


Figure 13. Typical Ethernet straight-through cable diagram for 1000Base-T

## E1 PRI

The E1 PRI is usually connected to a PBX or switch—local exchange (LE). Type and pin outs of these devices vary depending on the manufacturer. In most cases, a straight-through RJ-45 to RJ-45 can be used to connect the PRI with a PBX. A cross-over cable is required to connect to an NT device, as illustrated in [Figure 14](#) on page 52.



WARNING

**Hazardous network voltages are present in the PRI cables. If you detach the cable, detach the end away from the SmartNode or interface card first to avoid possible electric shock. Network hazardous voltages may be present on the device in the area of the PRI port, regardless of when power is turned OFF.**



WARNING

To prevent damage to the system, make certain you connect the PRI cable to the PRI port only and not to any other RJ-45 socket.

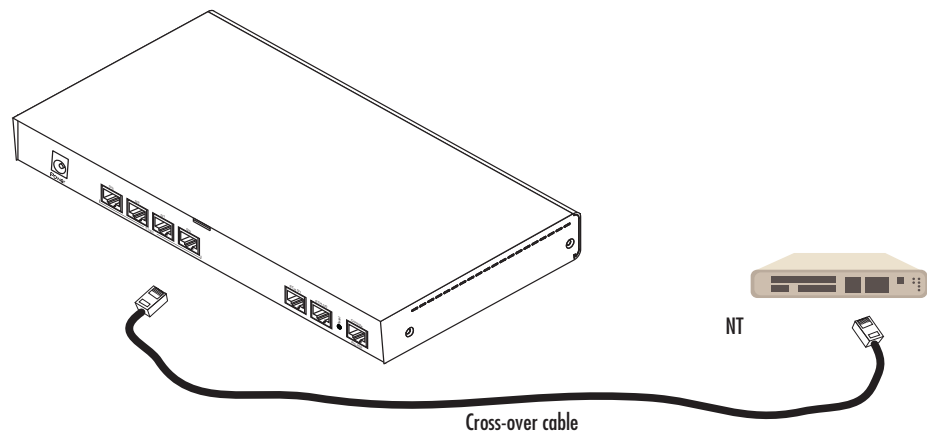


Figure 14. Connecting an E1 PRI port to an NT1

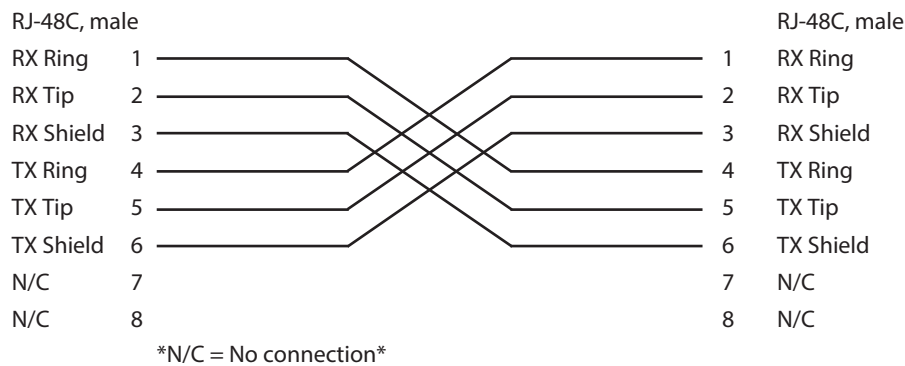


Figure 15. E1 PRI port crossover cable

T1 PRI

The T1 PRI is usually connected to a PBX or switch—local exchange (LE). Type and pin outs of these devices vary depending on the manufacturer. In most cases, a straight-through RJ-45 to RJ-45 can be used to connect the PRI with a PBX. A cross-over cable is required to connect to an NT device, as illustrated in [Figure 16](#) on page 53.



**Hazardous network voltages are present in the PRI cables. If you detach the cable, detach the end away from the SmartNode or interface card first to avoid possible electric shock. Network hazardous voltages may be present on the device in the area of the PRI port, regardless of when power is turned OFF.**



To prevent damage to the system, make certain you connect the PRI cable to the PRI port only and not to any other RJ-45 socket.

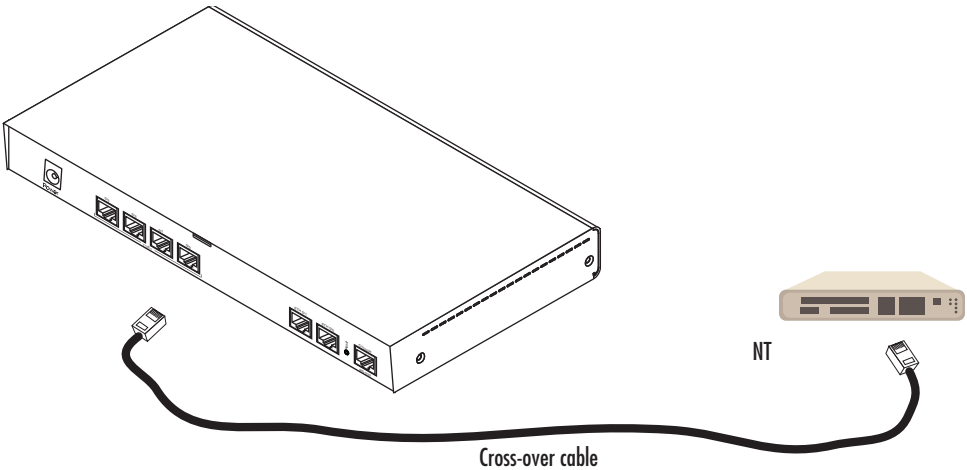


Figure 16. Connecting a T1 PRI port to an NT device

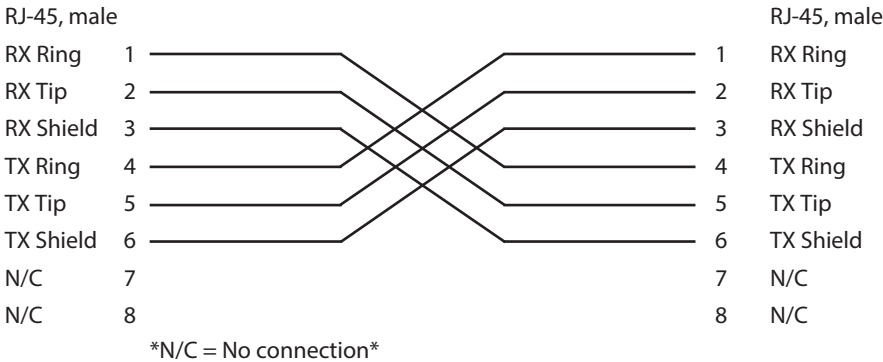


Figure 17. T1 PRI crossover cable

# Appendix D **Port Pin-outs**

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Introduction

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

Console Port

**Configuration settings:** 9600 bps, 8 bits, no parity, 1 stop bit, no flow control

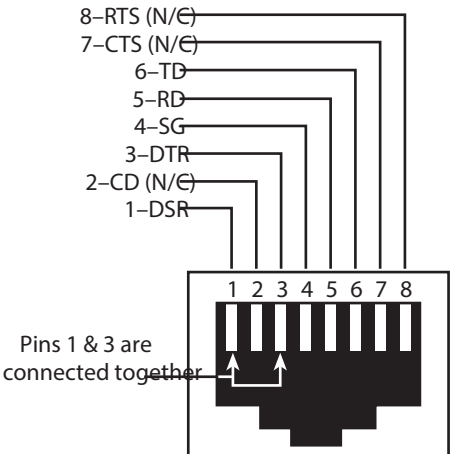


Figure 18. EIA-561 (RJ-45 8-pin) port

**Note** N/C means no internal electrical connection.

Ethernet

Table 8. RJ45 socket 10/100Base-T

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

**Note** Pins not listed are not used.

Table 9. RJ45 socket 1000Base-T

| Pin | Signal |
|-----|--------|
| 1   | TRD0+  |
| 2   | TRD0-  |
| 3   | TRD1+  |
| 6   | TRD1-  |
| 4   | TRD2+  |
| 5   | TRD2-  |
| 7   | TRD3+  |
| 8   | TRD3-  |

## PRI Port

---

Table 10. RJ-45 socket

| Pin | USR       |
|-----|-----------|
| 1   | RX Ring   |
| 2   | RX Tip    |
| 3   | RX Shield |
| 4   | TX Ring   |
| 5   | TX Tip    |
| 6   | TX Shield |

**Note** Pins not listed are not used.

## G.SHDSL Port (/2GS models only)

---

Table 11. RJ-45 connector

| Pin | Signal |
|-----|--------|
| 3   | Tip 2  |
| 4   | Tip 1  |
| 5   | Ring 1 |
| 6   | Ring 2 |

**Note** Pins not listed are not used.

## ADSL Port (/A models only)

Table 12. ADSL Port: RJ-45 connector

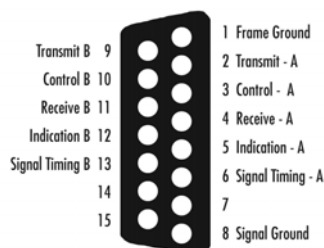
| Pin | Signal |
|-----|--------|
| 4   | Tip    |
| 5   | Ring   |

**Note** Pins not listed are not used

## Fiber Ports (/F models only)

For tested and approved modules, please refer to the list of SFP's Patton has tested at <http://www.patton.com/products/sfpmodules.asp>

## X.21 DB-15 Connector (/D models only)



## 10/100 Fast Ethernet Port

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

**Note** Pins not listed are not used

Appendix E

SmartNode Factory Configuration

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## Introduction

---

The factory configuration settings for the SmartNode 4980 and 4990 are as follows:

```
#-----#
#
# Factory configuration file
#
#-----#

dns-relay

timer PROVISIONING now + 1 minute "provisioning execute PF_PROVISIONING_CONFIG"

sntp-client

sntp-client server primary pool.ntp.org

profile provisioning PF_PROVISIONING_CONFIG

    destination configuration

    activation reload immediate

location 1 http://redirect.patton.com/
$(system.mac);mac=$(system.mac);serial=$(system.serial);hwMajor=$(system.hw.major);hwMinor
=$(system.hw.minor);swMajor=$(system.sw.major);swMinor=$(system.sw.minor);swDate=$(system.
```

```
sw.date);productName=$(system.product.name);cliMajor=$(cli.major);cliMinor=$(cli.minor);os
Name=$(cli.major>=4|Trinity|SmartWare);subDirTrinity=$(cli.major>=4|/Trinity);subDirSmart-
Ware=$(cli.major<4|/SmartWare);dhcp66=$(dhcp.66);dhcp67=$(dhcp.67)

location 2 $(dhcp.66)

location 3 $(dhcp.66)/$(system.mac).cfg

location 4 http://$(dhcp.66)/$(dhcp.67)

location 5 http://$(dhcp.66)/$(system.mac).cfg

location 6 tftp://$(dhcp.66)/$(dhcp.67)

location 7 tftp://$(dhcp.66)/$(system.mac).cfg


system


ic voice 0


profile napt NAPT_WAN


profile dhcp-server DHCP_S_LAN

network 192.168.1.0 255.255.255.0

include 1 192.168.1.10 192.168.1.99

lease 2 hours

default-router 1 192.168.1.1

domain-name-server 1 192.168.1.1


context ip router


interface WAN

ipaddress dhcp

use profile napt NAPT_WAN

tcp adjust-mss rx mtu

tcp adjust-mss tx mtu
```

```
interface LAN

    ipaddress 192.168.1.1 255.255.255.0

    tcp adjust-mss rx mtu

    tcp adjust-mss tx mtu
```

```
context ip router

    dhcp-server use DHCP_SERVER
```

```
port ethernet 0 0

    medium auto

    encapsulation ip

    bind interface WAN router

    no shutdown
```

```
port ethernet 0 1

    medium auto

    encapsulation ip

    bind interface LAN router

    no shutdown
```

Appendix F

End User License Agreement

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## End User License Agreement

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

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