SmartNode™ 5300 Series
Enterprise Session Border Router, IAD

User Manual

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

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About This Guide

This guide describes the SmartNode 5300 hardware, installation and basic configuration. For detailed software configuration information refer to the ***Trinity Software Configuration Guide*** and the available Configuration Notes in the Patton Support **Knowledgebase**.

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 2 provides information about SmartNode features and capabilities
- Chapter 2 on page 8 contains an overview describing SmartNode operation and applications
- Chapter 3 on page 10 provides hardware installation procedures
- Chapter 4 on page 15 provides quick-start procedures for configuring the SmartNode
- Chapter 5 on page 21 contains information on contacting Patton technical support for assistance
- Appendix A on page 24 contains compliance information for the SmartNode
- Appendix B on page 27 contains specifications for the SmartNodes
- Appendix C on page 31 provides cable recommendations
- Appendix D on page 34 describes the SmartNode's ports and pin-outs
- Appendix E on page 37 lists the factory configuration settings for the SmartNode 5300 Series
- Appendix F on page 42 provides license information that describes acceptable usage of the software provided with the SmartNode 5300 Series

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 is NOT intended nor approved for connection to the PSTN. It is intended only for connection to customer premise equipment.

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

Chapter 1 5300 General Information

Chapter contents

SmartNode 5300 Series Overview

The SmartNode 5300 Enterprise Session Border Router enables Universal SIP Trunking and provides a single Integrated Access Device with features like IP Routing, Redundancy, Security and a SIP registrar for survivability. The SN5300 connects to the Enterprise's LAN to an Internet telephony service provider (ITSP), creating a single conduit for multimedia components including voice, video and data.

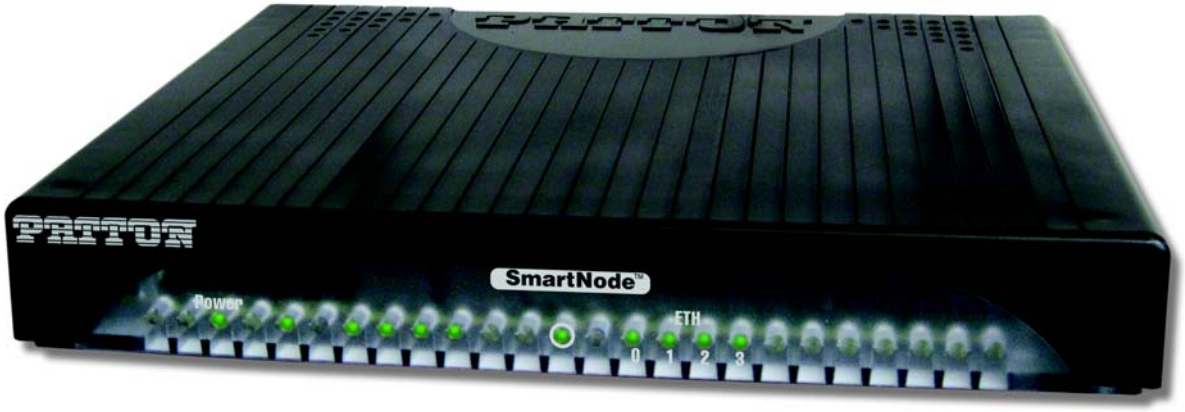

Figure 1. SmartNode 5300

The SmartNode 5300 Series Enterprise Session Border Router performs the following major functions:

- **Enterprise Session Border Router:** Enables up to 256 sessions between IPPBX customer premise equipment and ITSP`s SIP Trunks. Protocol conversion between SIP UDP and SIP TCP including SIP-TLS.
- **Secure Enterprise:** Enable NAT/NAPT, Access Control Lists with QoS to ensure the most efficient use of your bandwidth
- **IP Routing:** Policy based routing, Packet filtering, protocol based routing, packet length routing.
- **WAN access:** Support for G.SHDSL-EFM/ATM 4-wire and 8-wire interfaces for your WAN needs
- **Ethernet switch:** Vlan tagging, Switching and Bridging support
- **Configurable Security Profiles:** Built-in IP address and IP port filtering, ACLs and DoS attack detection creates a comprehensive security environment and secure provisioning (HTTPS), built in root CA.
- **Separate confg domain:** Provides 2 separate config domains for carrier deployments. One customer facing config and one core side config.
- **Quality of Service:** Supports upstream QOS, bandwith management, TOS and DSCP packet tagging

SmartNode 5300 Series Model Codes

The SmartNode 5300 Series consists of several models. The models differ in terms of possessing a WAN interface or not. All models come equipped with four 10/100 Base-T Ethernet ports.

Table 1. SmartNode 5300 Models

Model	Transcoding Sessions
SN5300/4B/EUI	Base model with 4 SIP sessions
SN5300/4B2G/EUI	Model with 4-wire G.SHDSL interface and 4 SIP sessions
SN5300/4B4G/EUI	Model with 8-wire G.SHDSL interface and 4 SIP sessions
SNSW-1B	License for additional SIP sessions

SmartNode 5300 Series Rear Panel

SmartNode 5300 Rear Panel (non G.SHDSL.bs models)

The SmartNode 5300 Series rear panel ports are described in Table 2.

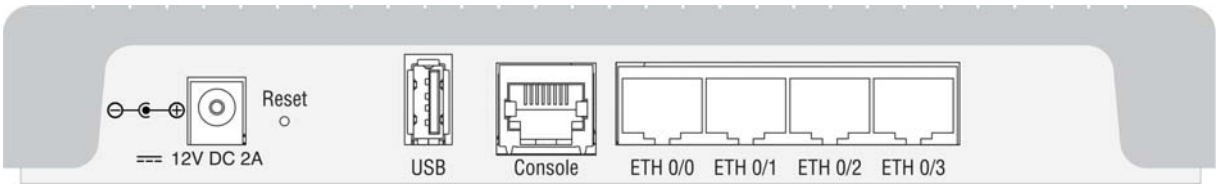

Figure 2. SmartNode 5300 rear panel (non G.SHDSL.bis)

Table 2. SmartNode 5300 rear panel ports (non G.SHDSL.bis)

Port	Description
ETH 0/0 - 0/3	Auto-MDX Ethernet ports, RJ-45 (see figure 2) connects the unit to an Ethernet Device. The four Ethernet ports can be configured independently to be used either as a WAN, LAN, or DMZ port.
Console	Used for service and maintenance, the Console port (see figure 2), 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). Configuration settings: • 19200 bps • 8 bits, no parity • 1 stop bit • flow control off
12V DC, 3.0A	Electricity supply socket. (See figure 2.)
Reset	The reset button (see figure 2) can be used to perform a hard reboot of the device.
USB	USB host port, for future use.

SmartNode 5300 Rear Panel (G.SHDSL.bis models)

The SmartNode 5300 Series rear panel ports are described in Table 3.

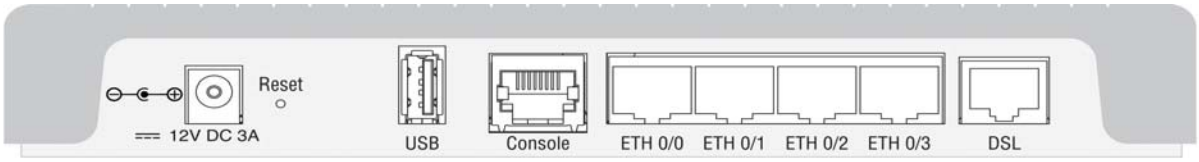

Figure 3. SmartNode 5300 rear panel (G.SHDSL.bis)

Table 3. SmartNode 5300 rear panel ports (G.SHDSL.bis)

Port	Description
ETH 0/0 - 0/3	Auto-MDX Ethernet ports, RJ-45 (see figure 3) connects the unit to an Ethernet Device. The four Ethernet ports can be configured independently to be used either as a WAN, LAN, or DMZ port.
WAN interface: **G.SHDSL-EFM/ATM**	/2G models: 2-pair G.SHDSL-EFM/ATM interface using an RJ45 connector to connect to an ATM or EFM D-SLAM /4G models: 4-pair
Console	Used for service and maintenance, the Console port (see figure 2), 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). Configuration settings: • 19200 bps • 8 bits, no parity • 1 stop bit • flow control off
12V DC, 1.0A	Electricity supply socket. (See figure 2.)
Reset	The reset button (see figure 2) can be used to perform a hard reboot of the device
USB	USB host port, for future

SmartNode 5300 Series Front Panels

SmartNode 5300 Front Panel (non G.SHDSL.bis models)

Figure 4 shows SmartNode 5300 Series front panel LEDs, the LED definitions are listed in Table 4.

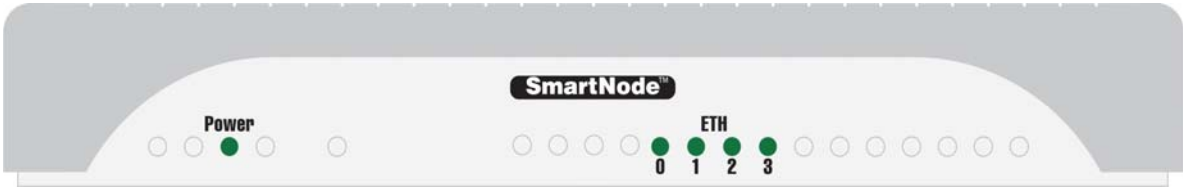

Figure 4. SmartNode 5300 front panel (non G.SHDSL.bis)

Table 4. SmartNode 5300 Front panel LEDs (non G.SHDSL.bis)

LED	Description
Note	If an error occurs, all LEDs will flash once per second.
Power	When lit, indicates power is applied.
Ethernet (ETH)	On when the Ethernet connection on the corresponding port has a link indication. Flashes when data is received or transmitted at the corresponding Ethernet port. During boot-up the ETH port LED is off. **Once the unit is up, the ETH LED is on or flashes. (requires a connection to another device)**

SmartNode 5300 Front Panel (G.SHDSL.bis models)

Figure 5 shows SmartNode 5300 Series front panel LEDs, the LED definitions are listed in Table 5.

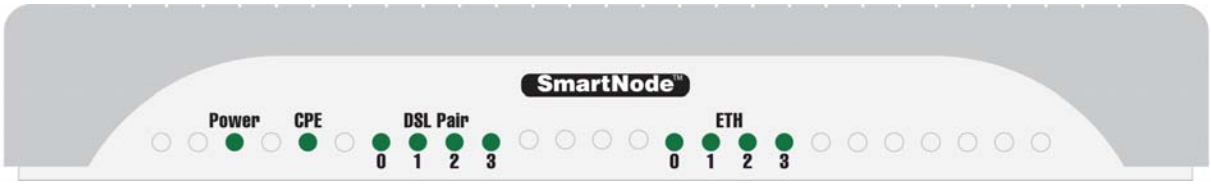

Figure 5. SmartNode 5300 front panel (G.SHDSL.bis)

Table 5. SmartNode 5300 Front panel LEDs (G.SHDSL.bis)

LED	Description
Note	If an error occurs, all LEDs will flash once per second.
Power	When lit, indicates power is applied.
Ethernet (ETH)	On when the Ethernet connection on the corresponding port has a link indication. Flashes when data is received or transmitted at the corresponding Ethernet port. **Once the unit is up, the ETH LED is on or flashes. (requires a connection to another device)**
WAN interface: G.SHDSL-EFM/ATM Link LED Activity	• LED OFF: Corresponding pair is DOWN, and traffic will not flow • LED ON: Corresponding pair is UP, and traffic will flow • LED Slow Blink: Handshake mode (looking for signal) • LED Fast Blink: Training mode (active communication with CPE / CO) • CPE ON: WAN is configured as CPE • CPE OFF: WAN is configured as CO1

Chapter 2 Applications Overview

Chapter contents

Introduction

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

Note Detailed configuration information for SmartNode applications can be found online at www.patton.com/voip-gateway.

Typical Application

The SN5300 enables Universal SIP Trunking and provides a single Integrated Access Device with features like IP Routing, Redundancy, Security and a SIP registrar for survivability.

In addition, the SN5300 enables protocol conversion between two networks to solve interop problems for devices using SIP TCP signaling only. The SmartNode is able to convert SIP TCP or SIP TLS signaling into SIP UDP signaling.

Using the built-in QoS engine, the SmartNode ensures that voice traffic gets top priority resulting in good voice quality across the SIP Trunk over a public network.

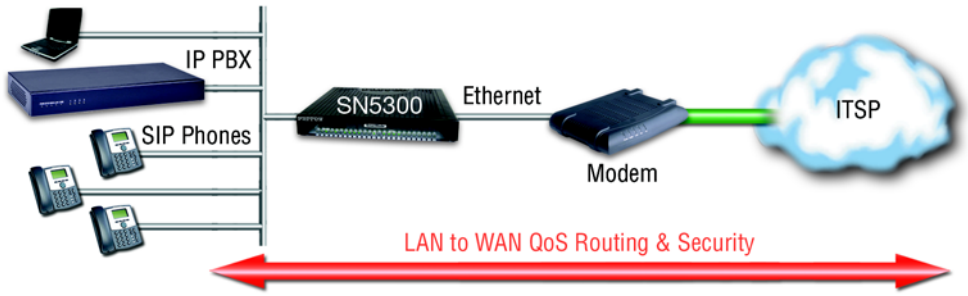

Figure 6. SmartNode 5300 typical application

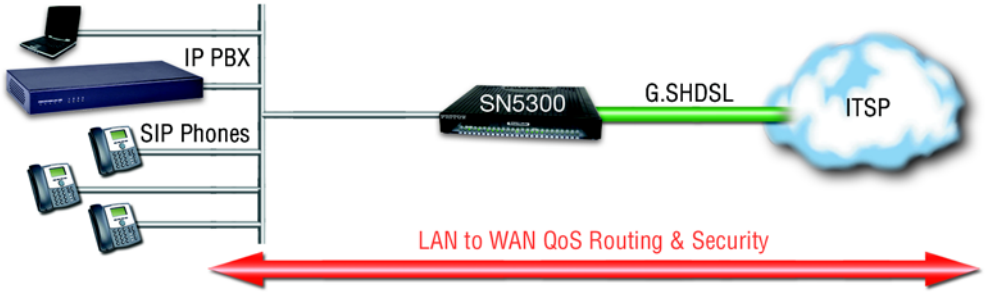

Figure 7. SmartNode 5300 typical application

Chapter 3 SmartNode Installation

Chapter contents

Planning the Installation

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

- **Create a network diagram** (see section "Network Information" on page 11)
- **Gather IP related information** (see section "IP Related Information" on page 11 for more information)
- **Install the hardware and software needed to configure the SmartNode**. (See section "Software Tools" on page 12)
- **Verify power source reliability** (see section "Connecting the power supply" on page 13).

After you have finished preparing for SmartNode installation, go to section "Installing the SmartNode" on page 12 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 6.

Table 6. 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 and/or URL of SIP servers or Internet telephony services (if used)

- Login and password for PPPoE Access
- Login and password for SIP based telephony services
- IP addresses of central TFTP, HTTP, or HTTPs 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 uninterrupted power supply (UPS) in the installation to ensure that VoIP service is not impaired if the power fails. Refer to "Connecting the power supply" on page 13.

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.

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 12)
- Connecting the interface and power cables (see section "Installing Cables")

When you finish installing the SmartNode, go to chapter 4, "Initial Configuration" on page 15.

Placing the SmartNode

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

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

Installing Cables

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

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 10/100 Base-T Ethernet LAN and WAN (see section "Connecting the 10/100 Base-T Ethernet LAN and WAN cables" on page 13)
2. If applicable, connect the DSL WAN port (see section "Installation cable requirements" on page 13)
3. Connect the power mains cable (see section "Connecting the power supply" on page 13)

Connecting the 10/100 Base-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) to *ETH 0/0*. (The behavior of the physical Ethernet port can be configured, to be used as either LAN, WAN, or DMZ interface).

   Note This SmartNodes supports full and half duplex mode. For best results, use auto-negotiation.

2. Connect port ETH 0/1 to your LAN. (The behavior of the physical Ethernet port can be configured to be used as either LAN, WAN, or DMZ interface).

For details on the Ethernet port pinout and cables, refer to Appendix C, "Cabling" on page 31 and Appendix D, "Port Pin-outs" on page 34.

Installation cable requirements

The following cable requirements are for the DSL WAN cable (SN5300/4B2G/EUI and SN5300/4B4G/EUI only).The SN5300/4B2G/EUI and SN5300/4B4G/EUI comes with a universal option for a G.SHDSL-EFM/ATM interface. Use a straight-through RJ-45 cable to connect the G.SHDSL-EFM/ATM port.

Connecting the power supply

The 5300 has an External AC Power Supply, see figure 8.

External AC Power Supply.

- Do not connect power to the AC Mains at this time.
- There are no user-serviceable parts in the power supply section of the Model 5300. Contact Patton Electronics Technical support at (301)975-1007, via our web site at http://www.patton.com, or by e-mail at support@patton.com, for more information.

1. Insert the female end of the AC power to the mains port.

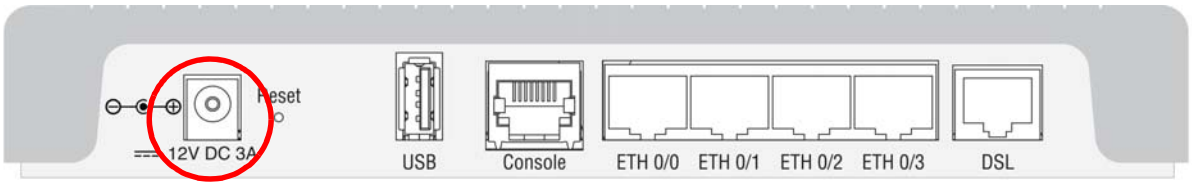

Figure 8. SmartNode 5300 rear panel

2. Verify that the AC power cord included with your SmartNode is compatible with local standards. If it is not, refer to "Contacting Patton for Assistance" on page 21 to find out how to replace it with a compatible power cord.
3. Connect the male end of the AC power cord to an appropriate AC power outlet.

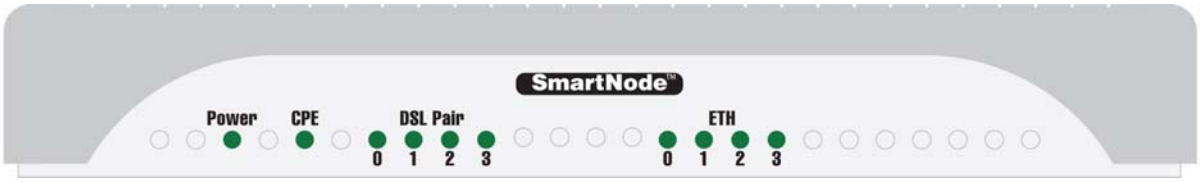

Figure 9. SmartNode 5300 Power LED

4. Verify that the green *Power* LED is lit (see figure 9).

Chapter 4 Initial Configuration

Chapter contents

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 10.

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

Connecting the SmartNode to Your Laptop PC

First the SmartNode must be connected to the mains power supply with the power cable.

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 5300 Series is equipped with Auto-MDX Ethernet ports, so you can use straight-through cables for host or hub/switch connections (see figure 10). Wait until the ETH port LED is on or is blinking. Now the SmartNode is ready.

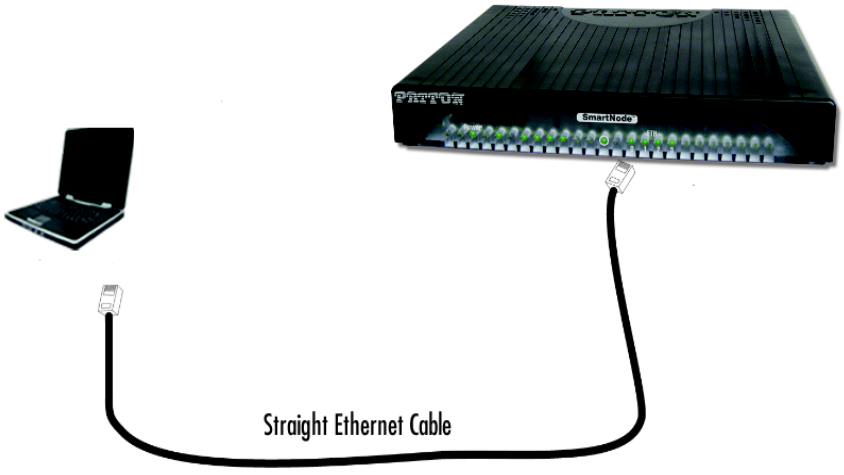

Figure 10. Connecting the SmartNode to your laptop PC

The SmartNode by default has a static IP address configured (192.168.200.10) and DHCP client is running on the same Ethernet port 0/0. There are two options to connect to the SmartNode:

1. Configure a static IP on your Laptop PC (e.g. IP 192.168.200.5 netmask 255.255.255.0).

2. Connect to the IP assigned by the DHCP server to the SmartNode.

Connecting the SmartNode to Your Laptop PC via Console Access

The SmartNode can be connected to a serial terminal over its serial console port, as depicted in figure 11.

CAUTION

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

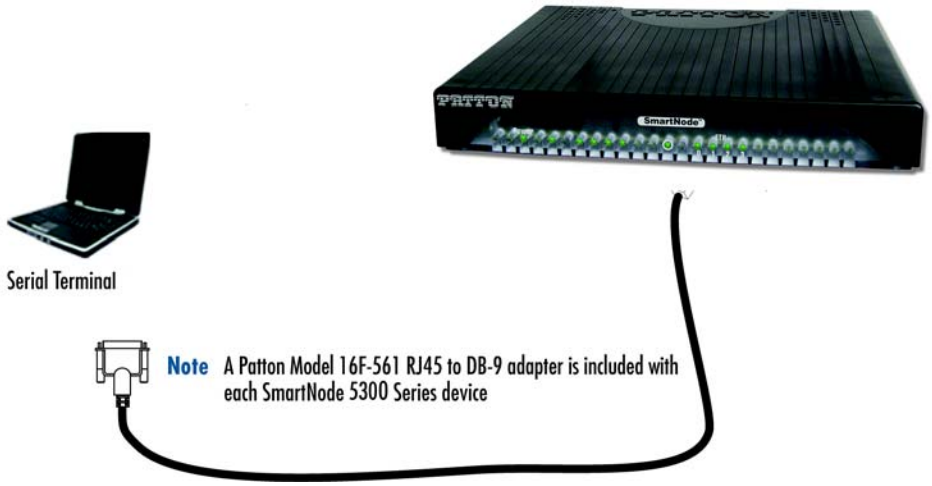

Figure 11. Connecting SmartNode to Laptop via console access

Configuration settings:

- 19200 bps
- 8 bits, no parity
- 1 stop bit
- flow control off

Note See section "Console Port" on page 35 for console port pin-outs.

Configuring the Desired IP Address

Factory-default IP Settings

The factory default configuration for the Ethernet interface and its IP addresses and network masks are listed in Table 7. The Ethernet port 0/0 is activated upon power-up. On this port the SmartNode has a static IP assigned also it acts as DHCP client to get an IP address assigned by a DHCP server in the network.

Table 7. Factory default IP address and network mask configuration

	IP Address	Network Mask
Ethernet Interface ETH 0/0	DHCP 192.168.200.10	DHCP 255.255.255.0

If these addresses match with those of your network, go to section "Connecting the SmartNode to the Network" on page 19. Otherwise, refer to the following sections to change the addresses and network masks.

Login

To access the SmartNode, start the Telnet application. Type the default IP address for the SmartNode into the address field: **192.168.200.10**. 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>
192.168.200.10>
```

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.

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

Changing the WAN IP Address

Select the context IP mode to configure an IP interface.

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

Now you can set your IP address and network mask for the interface *ETH 0/0*. 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 LAN
192.168.1.1(if-ip)[LAN]#ipaddress LAN 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)[LAN]#
```

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.

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; 0/2; 0/3)* ports. The SmartNode 5300 is equipped with Auto-MDX Ethernet ports, so you can use straight-through or crossover cables for host or hub/switch connections (see figure 12).

CAUTION

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

Figure 12. 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 configured manually a default route should be configured pointing to the network default gateway. (For information on configuring the default gateway, refer to section “Set IP addresses” in the ***Trinity CLIconfiguration reference Guide***).

Loading the Configuration (optional)

Patton provides a collection of configuration templates on the support page at **www.patton.com/support/kb.asp** - 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 *Trinity CLI Configuration Reference Guide* for information on configuring the SmartNode device.

Note 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 askif you want to restart/halt the unit.Type **yes** to proceed.

172.16.1.99(if-ip)[WAN]#**reload**
Type 'yes' to restart/halt, anything else 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 ***Trinity CLI Configuration Reference Guide***.

Chapter 5 Contacting Patton for Assistance

Chapter contents

Introduction

This chapter contains the following information:

- "Contact Information"—describes how to contact Patton technical support for assistance.
- "Warranty Service and Returned Merchandise Authorizations (RMAs)"—contains information about the 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 (301) 869-9293**

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 **9:00 am** to **5:30 pm MET** (**0800** to **1630 UTC/GMT**)—by calling **+41 (0)31 985 25 55**
- Fax: **+41 (0)31 985 25 26**

Warranty Service and Returned Merchandise Authorizations (RMAs)

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

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

Warranty Coverage

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

Out-of-warranty service

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

Returns for credit

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

Return for credit policy

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

RMA Numbers

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

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

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

Shipping instructions

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

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

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

Appendix A **Compliance Information**

Chapter contents

Compliance

EMC

- FCC Part 15, Class A
- EN55022, Class A
- EN55024
- EN50581

Safety

- UL60950-1/CSA C22.2 No. 60950-1
- IEC/EN60950-1, 2nd edition

PSTN Regulatory

- This device is not intended nor approved for connection to the PSTN

CE Declaration of Conformity

Patton Electronics, Inc declares that this device is in compliance with the essential requirements and other relevant provisions of Directive 2004/108/EC relating to electromagnetic compatibility, Directive 2006/95/EC relating to electrical equipment designed for use within certain voltage limits and Directive 2011/65/EC relating to RoHS compliance. The Declaration of Conformity may be obtained from Patton Electronics, Inc at www.patton.com/certifications.

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

Authorized European Representative

D R M Green

European Compliance Services Limited.

Greyfriars Court

Paradise Square

Oxford, OX1 1BE, UK

Appendix B **Specifications**

Chapter contents

Data Connectivity

All ports full duplex, auto-sensing, auto-MDX

Voice Processing (signaling dependent)

Up to 256 simultaneous SIP sessions. The SN5300 does not have transcoding capabilities and is therefore doing codec negotiation between the 2 SIP endpoints.

However the supported codec`s for signaling are as follows:

- G.711 A-Law/µ-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

Fax and Modem Support

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

G.711 Fax-Bypass (SIP signaling only)

Voice Signaling

SIPv2 (over UDP or TCP)

SIPv2 over TLS

SIP call transfer, redirect

IP Services

IPv4 router

IPv6 router

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

Management

Web-based GUI with customizable Config-Wizard

Industry standard CLI with local console (RJ-45, RJ-231, 19200 bps, 8, N, 1) and remote Telnet access, fully documented

HTTP web management

Firmware loading by TFTP, HTTP, and HTTPs

Configuration & firmware loading

SNMP v1 agent (MIB II and private MIB)

Built-in diagnostic tools (trace, debug)

Secure Auto-provisioning using HTTPs (root CA built in)

Physical

Dimensions: 7.3 x 6.6 x 1.62 in. (185 x 168 x 41 mm)

Weight: <21 oz. (<600g)

Power Consumption: < 16W

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

Operating humidity: up to 90%, non condensing

WAN Interface (if applicable)

Table 8. G.SHDSL Interface Specifications (G.SHDSL.bis only)

Factor	Specs
G.SHDSL (ATM/EFM)	• Support ITU-T G991.2/G.99 • 4.1 standards • Support ITU-T G.998.1 (G.bond) • TC-PAM line modulation 16,32,64 & 128 • CO or CPE Mode • IEEE 802.3 2Base-TL (aka 802.3ah) compliant • Rate negotiating/manually rate adaptation configuration • 2-8 wire mode auto detect • Data rate selections: Up to Nx239 (5.7 Mbps) per pair • Support bonding based on EFM • Line interface: up to 4 pairs on a single RJ45 connector
DSL Connection	RJ-45 (2-8wire) (depending on model)
Management	• SNMP v1, v2, v3 • Telnet/SSH/RS-232 • HTTP/HTTPS/Provisioning • SYSLOG • TACACS + • TFTP, HTTP & HTTPS file management

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 9).

Table 9. SmartNode Models and their Unique sysObjectID

SmartNode Model	SysObjectID
SN5300/4B/EUI	.iso.org.dod.internet.private.enterprises.patton.products.sn5300.1 1.3.6.1.4.1.1768.100.4.27.1
SN5300/4B2G/EUI	.iso.org.dod.internet.private.enterprises.patton.products.sn5300.3 1.3.6.1.4.1.1768.100.4.27.3
SN5300/4B4G/EUI	.iso.org.dod.internet.private.enterprises.patton.products.sn5300.3 1.3.6.1.4.1.1768.100.4.27.4

According to Table 9, an SNMP get request to .iso.org.dod.internet.mgmt.mib-2.system.sysObjectID of a Smart- Node 5300/4B/EUI device reads out a numeric OID of 1.3.6.1.4.1.1768.100.4.27.1. The mapping of the sysObjectID to each of the SmartNode model is realized with the SmartNode product identification MIB.

Appendix C **Cabling**

Chapter contents

Introduction

This section provides information on the cables used to connect the SmartNode and it`s interfaces 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 13.

CAUTION

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

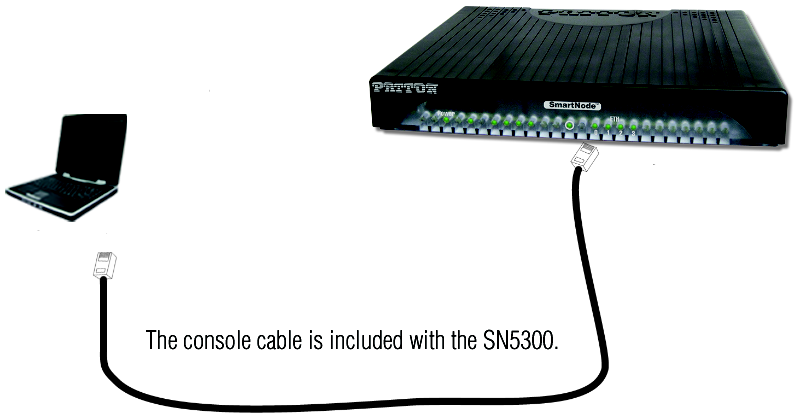

Figure 13. Connecting a serial terminal

Console Connection settings:

- 19200 bps
- 8 bits, no parity
- 1 stop bit
- flow control off

Note See section “Console Port” on page 35 for console port pin-outs and serial port speed.

Ethernet

Ethernet devices (10Base-T/100Base-T) are connected to the SmartNode over a cable with RJ-45 plugs. All Ethernet ports on the 5300 are Auto-MDX use any straight or crossover cable to connect to hubs, switches, PCs or other devices.

CAUTION

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

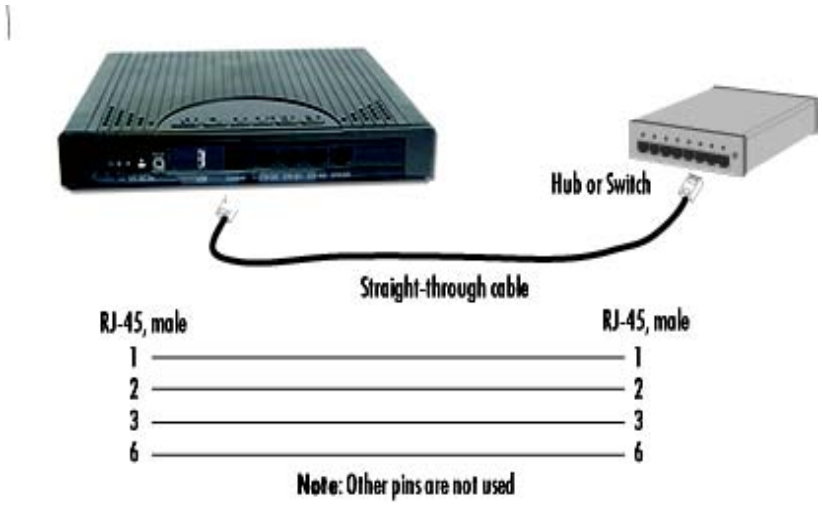

Figure 14. Typical Ethernet straight-through cable diagram for 10/100Base-T

Appendix D **Port Pin-outs**

Chapter contents

Introduction

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

Console Port

Configuration settings: 19200 bps, 8 bits, no parity, 1 stop bit, no flow control

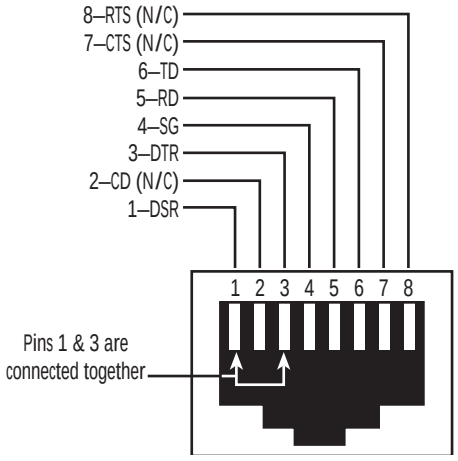

Figure 15. EIA-561 (RJ-45 8-pin) port

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

Ethernet

Table 10. Ethernet RJ45 socket 10/100Base-T

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

Note Pins not listed are not used.

G.SHDSL-EFM/ATM Port

Table 11. G.SHDSL-EFM/ATM Port RJ-45 connector

Pin	Signal	Pair
1	Tip	1
2	Ring	1
3	Tip	2
4	Ring	0
5	Tip	0
6	Ring	2
7	Tip	3
8	Ring	3

Appendix E SmartNode 5300 Series Factory Configuration

Chapter contents

Introduction

The factory configuration settings for SmartNode 5300/4B/EUI is as follows:

```
#-----------------------------------------------------------------#
#                                                 #
# Shipping Configuration                            #
#                                                 #
#-----------------------------------------------------------------#

cli version 4.00
snmp shutdown
rtp-port-range 6000 9999
timer PROVISIONING now + 3 minutes "provisioning execute PF_PROVISIONING_CONFIG"

profile aaa DEFAULT
  method 1 local rule required
  method 2 none rule required

console
  use profile aaa DEFAULT

telnet-server
  use profile aaa DEFAULT
  no shutdown

ssh-server
  use profile aaa DEFAULT
  no shutdown

web-server http
  use profile aaa DEFAULT
  no shutdown

ntp
  server pool.ntp.org
  no shutdown

dns-server
  no shutdown

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=$(system.sw.minor);swDate=$(syste
   m.sw.date);productName=$(system.product.name);cliMajor=$(cli.major);cliMi-
   nor=$(cli.minor);osName=Trinity;subDirTrinity=/Trinity;subDirSmart-
   Ware=;dhcp66=$(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
```

```
profile voip DEFAULT
  codec 1 g711alaw64k rx-length 20 tx-length 20
  codec 2 g711ulaw64k rx-length 20 tx-length 20

profile sip DEFAULT

context ip ROUTER

  interface LAN
    ipaddress LAN 192.168.200.10/24
    ipaddress DHCP

  routing-table DEFAULT

profile ppp DEFAULT

context bridge

context switch-group DEFAULT
  shutdown

port ethernet 0 0
  bind interface ROUTER LAN
  no shutdown

port ethernet 0 1
  shutdown

port ethernet 0 2
  shutdown

port ethernet 0 3
  shutdown
```

The factory configuration settings for SmartNode 5300/4B4G/EUI is as follows:

```
#-----------------------------------------------------------------#
#                                                                 #
# Shipping Configuration                                          #
#                                                                 #
#-----------------------------------------------------------------#

cli version 4.00
snmp shutdown
rtp-port-range 6000 9999
timer PROVISIONING now + 3 minutes "provisioning execute PF_PROVISIONING_CONFIG"

profile aaa DEFAULT
  method 1 local rule required
  method 2 none rule required

console
```

```
  use profile aaa DEFAULT

telnet-server
  use profile aaa DEFAULT
  no shutdown

ssh-server
  use profile aaa DEFAULT
  no shutdown

web-server http
  use profile aaa DEFAULT
  no shutdown

ntp
  server pool.ntp.org
  no shutdown

dns-server
  no shutdown

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=$(system.sw.minor);swDate=$(syste
   m.sw.date);productName=$(system.product.name);cliMajor=$(cli.major);cliMi-
   nor=$(cli.minor);osName=Trinity;subDirTrinity=/Trinity;subDirSmart-
   Ware=;dhcp66=$(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

profile voip DEFAULT
  codec 1 g711alaw64k rx-length 20 tx-length 20
  codec 2 g711ulaw64k rx-length 20 tx-length 20

profile sip DEFAULT

context ip ROUTER

  interface LAN
    ipaddress LAN 192.168.200.10/24
    ipaddress DHCP

  routing-table DEFAULT

profile ppp DEFAULT

context bridge
```

```
  bridge-group LAN
    bind interface ROUTER LAN
    no shutdown

context switch-group DEFAULT
  bind bridge-group LAN
  no shutdown

  interface ETHERNET_0_0

  interface ETHERNET_0_1

  interface ETHERNET_0_2

  interface ETHERNET_0_3

port ethernet 0 0
  bind switch-group DEFAULT ETHERNET_0_0
  no shutdown

port ethernet 0 1
  bind switch-group DEFAULT ETHERNET_0_1
  no shutdown

port ethernet 0 2
  bind switch-group DEFAULT ETHERNET_0_2
  no shutdown

port ethernet 0 3
  bind switch-group DEFAULT ETHERNET_0_3
  no shutdown

port dsl 0 0
  service-mode 8-wire
  mode cpe
  bind bridge-group LAN
  no shutdown
  mtu 1522
```

Appendix F End User License Agreement

Chapter contents

End User License Agreement

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

Definitions

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.

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

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

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

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.

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 "Termination" on page 44.

Grant of License

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.

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.

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.

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.

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.

Termination

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

Patton Electronics Company may terminate this Agreement should End User violate any of the provisions of section "Grant of License" on page 43.

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)

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 the LGPL (Lesser General Public License) open source license distributed to your pursuant to the LGPL license terms (http://www.gnu.org/licenses/lgpl.html).

SmartWare licenses

- A routing license is included at no charge.
- MGCP and VPN capabilities will require the purchase of an additional license.

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.