SmartNode 5501
Enterprise Session Border Controller

User Manual

CE

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

REGULATORY MODEL NUMBER: 13269D4-001

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About this guide

This guide describes the SmartNode 5501 Enterprise Session Border Controller (eSBC) hardware, installation and basic configuration. For detailed software configuration information refer to the *Trinity Software Configuration Guide* and the available *Knowledgebase*, as well as the Wizard portal.

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 14 provides information about eSBC features and capabilities
- Chapter 2 on page 19 contains an overview describing eSBC operation and applications
- Chapter 3 on page 21 provides quick start hardware installation procedures
- Chapter 4 on page 26 provides quick-start procedures for configuring the SmartNode eSBC
- Chapter 5 on page 31 contains information on contacting Patton technical support for assistance
- Appendix A on page 34 contains compliance and regulatory information for the eSBC
- Appendix B on page 36 contains specifications for the eSBC
- Appendix C on page 40 provides cable recommendations
- Appendix D on page 44 describes the eSBC's ports and pin-outs
- Appendix E on page 47 lists the factory configuration settings for SmartNode 5501
- Appendix F on page 49 describes the *Reset* button functions
- Appendix G on page 54 provides license information that describes acceptable usage of the software provided with the SmartNode 5501

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

Precautions

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

Note Calls attention to important information.

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.

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

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

Safety when working with electricity

The SmartNode device contains no user serviceable parts, and is not be opened by the user. The equipment shall be returned to Patton Electronics for repairs or repaired by qualified service personnel.

Mains Voltage: In systems without a power switch, line voltages are present in the power supply when the power cord is connected. The mains outlet used to power the SmartNode device shall be within 10 feet (3 meters) of the device, be easily accessible, and protected by a circuit breaker.

For AC powered units, ensure that the power cable used meets all applicable standards for the country in which it is to be installed, and that it is connected to a wall outlet which has earth ground.

For units with an external power adapter, the adapter shall be a listed Limited Power Source.

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

Before handling the device, disconnect the telephone network cables to avoid contact with telephone line voltages. When detaching the cables, detach the end away from the SmartNode device first.

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

Deutsch

Warnhinweise:

Dieses Gerät ist NICHT für den Anschluss an das Telefonnetz (PSTN) bestimmt und auch NICHT dafür zugelassen. Es ist nur für den Anschluss an Endgeräte beim Kunden vorgesehen.

- Das Gerät entält keine austauschbaren Komponenten und ist vom Benutzer nicht zu öffnen. Bei Systemen ohne Netzschalter und ohne externes Netzteil liegt Netzspannung im Gerät an, wenn das Netzkabel angeschlossen ist.
- Bei Geräten mit externem Netzteil muss das Netzteil die Anforderungen an eine zugelassene Stromquelle mit begrenzter Leistung erfüllen. Die Steckdose, die für die Stromversorgung des Gerätes verwendet wird, sollte höchstens 3 Meter vom Gerät entfernt und leicht zugänglich sein sowie durch einen den örtlichen regulatorischen Anforderungen entsprechenden Schutzschalter abgesichert sein.
- Für mit Wechselstrom betriebene Geräte muss sichergestellt sein, dass das verwendete Netzkabel alle gültigen Normen des Landes erfüllt, in dem es eingesetzt werden soll.
- Für mit Wechselstrom betriebene Geräte, die 3-polige Netzstecker haben (L1, L2 u. GND oder Phase, Neutralleiter u. Schutzleiter), muss die Steckdose geerdet sein.
- Für mit Gleichstrom betriebene Geräte muss sichergestellt sein, dass die Verbindungskabel für Spannung, Strom, erwartete Temperatur, Entflammbarkeit und mechanische Wartbarkeit geeignet sind.
- WAN-, LAN- u. PSTN-Ports (Anschlüsse) können unter gefährlicher Spannung stehen, unabhängig davon, ob das Gerät ein- oder ausgeschaltet ist. PSTN bezieht sich auf Schnittstellen wie Telefon, FXS, FXO, DSL, xDSL, T1, E1, ISDN, Voice, usw. Diese sind als „gefährliche Netzwerkspannungen“ bekannt. Um einen elektrischen Schlag zu vermeiden, muss in der Nähe dieser Anschlüsse mit Vorsicht gearbeitet werden. Werden Kabel von diesen Anschlüssen getrennt, zuerst das Kabel am anderen Ende herausziehen.
- Während eines Gewitters darf nicht am Gerät gearbeitet werden und es dürfen keine Kabel angeschlossen oder vom Netz getrennt werden.

In Übereinstimmung mit den Anforderungen der Richtlinie 2002/96/EG über Elektro- und Elektronik-Altgeräte (WEEE) muss sichergestellt sein, dass Altgeräte von anderem Abfall und Schrott getrennt werden und dem Sammel- und Verwertungssystem für Elektro- und Elektronik-Altgeräte in Ihrem Land zum Recycling zugeführt werden.

General observations

Do not stack multiple SmartNode devices directly on top of one another, and do not place items on top of the device. If you will be installing equipment above the SmartNode device, leave at least 2 inches (5 cm) of clearance between the devices.

Furthermore, leave at least 2 inches (5 cm) to the left, right, front, and rear of the SmartNode device for proper ventilation.

- 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 aggressive 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.
Helvetica bold type	Commands and keywords are in **boldface** font.
Helvetica bold-italic type	Parts of commands, which are related to elements already named by the user, are in ***boldface italic*** font.
Italicized Helvetica type	Variables for which you supply values are in *italic* font
Helvetica type	Indicates the names of fields or windows.
Garamond bold type	Indicates the names of command buttons that execute an action.
< >	Angle brackets indicate function and keyboard keys, such as <SHIFT>, <CTRL>, <C>, and so on.
[ ]	Elements in square brackets are optional.
{a | b | c}	Alternative but required keywords are grouped in braces ({ }) and are separated by vertical bars (|)
`blue screen`	Information you enter is in `blue screen` font.
`screen`	Terminal sessions and information the system displays are in `screen font`.
node	The leading IP address or nodename of a SmartNode is substituted with ***node*** in ***boldface italic*** font.

Table 1. General conventions (Continued)

Convention	Meaning
SN	The leading **SN** on a command line represents the nodename of the SmartNode
#	An hash sign at the beginning of a line indicates a comment line.

Chapter 1 General Information

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SmartNode 5501 Overview

The SmartNode 5501 Enterprise Session Border Controller (eSBC) (see figure 1) comes with built-in security features such as SIP TLS, SRTP, stateful firewall, and secure provisioning to protect the LAN networks from fraud strikes out of the Internet. Like all SmartNode eSBC devices, the SN5501 comes with the built in Web Wizard for ease of use and zero touch provisioning features such as HTTPS, TR-069, etc.

Figure 1. SmartNode 5501 eSBC

The SmartNode 5501 consists of several models: see the complete SKU list on the corresponding product page on **www.patton.com**.

All the SN5501 models come equipped with two 10/100/1000 Base-T Ethernet ports and one USB port.

The SmartNode 5501 eSBC performs the following major functions:

- Up to 200 sessions between IPPBX customer premise equipment and ITSP`s SIP Trunks. Protocol conversion between SIP UDP and SIP TCP including SIP-TLS.
- Non transcoded SIP calls; Supports 4 SIP to SIP calls and can be license upgraded to a total of 200* (additional cost)
- Transcoded SIP calls; from 4 up to 16 (licenses to be purchased at additional cost), dependend on model (8/P, /16P)
- 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
- SIP registrar, SIP TLS, and SRTP
- USB 2.0 host port for 3G/4G modem support, which can be used for Survivability applications as a data backup link.

> **Note** A list of supported USB Models can be found in the release notes and in the Software Configuration Guide.

*Supported under ideal conditions. Transcoding, debugging, and/or IP routing reduce processing capacity.

SmartNode 5501 Rear Panel

The SmartNode 5501 is a compact Enterprise Session Border Controller that supports up to 200 VoIP or Fax calls, by using either G.711, G.722, T.38 or any other codec as indicated under section "Voice Processing (signalling dependent)" on page 37. The SmartNode 5501 rear panel ports are described in table 2 on page 16.

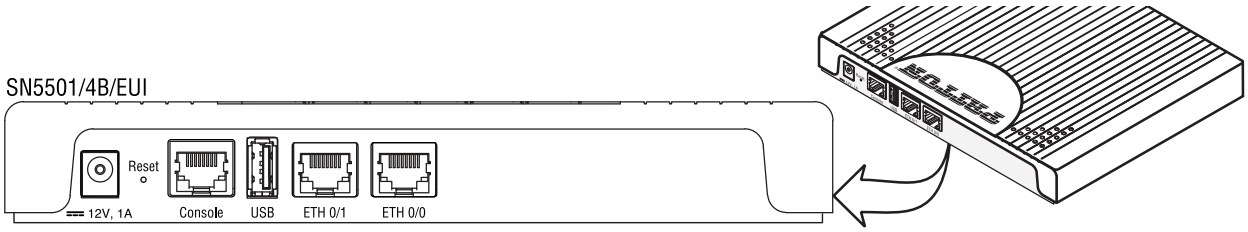

Figure 2. SN5501 rear panel

Ports descriptions

The SmartNode 5501 rear panel ports are described in table 2.

Table 2. Rear panel button and ports

Button/Port	Description
ETH 0/0 & ETH 0/1	Auto-MDX Fast-/Gigabit-Ethernet port, RJ-45 (see figure 2), connects the unit to an Ethernet WAN device (for example, a cable modem, DSL modem, or fiber modem).
USB 2.0	USB 2.0 host port (see figure 2) to connect a USB 3G/4G Cellular Modem. A list of supported USB Models can be found in the release notes and in the Software Configuration Guide
Console	Used for service and maintenance, the console port (see figure 2 on page 16) 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, 1A	Electricity supply socket. (see figure 2 on page 16)
Reset	The reset button has several functions, as described in appendix F, "Reset Button Functions" on page 49.

SmartNode 5501 Front Panel

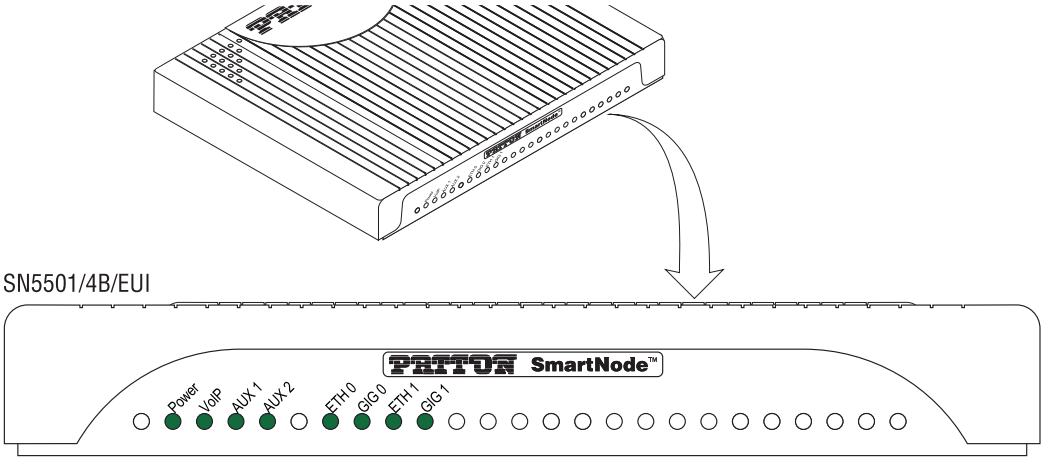

Figure 3. SmartNode 5501 front panels

Figure 3 shows SmartNode 5501 LEDs, the LED definitions are listed in table 3 on page 18.

Table 3. SmartNode 5501 LEDs

LED	Description
	Note If an error occurs, all LEDs will flash solid for MORE than 5 seconds before the device reboots
Power	When lit, indicates power is applied. Blinks fast during bootloader phase and blinks slow during boot process of Trinity Software. Becomes solid when the system is up and running.
VoIP Link	• On indicates the gateway is registered to a SIP server, or, a SIP device has registered to the SN5501. • Off indicates the unit is not configured or registered, or has no active direct routed VoIP connection.
AUX 1	On when connected to Patton Cloud
AUX 2	Auxiliary LED for future use.
ETH 0 – ETH 1	• 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.
GIG 0 – GIG 1	• On when the Ethernet is connected to a 1000Mb network. • Off when the Ethernet is connected to a 10Mb or 100Mb network or not connected

Chapter 2 Applications Overview

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Introduction

Patton's SmartNode eSBC 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: **http://www.patton.com/session-border-controller/**.

Typical Application

The SN5501 enables universal SIP trunking and provides features like IP routing, redundancy, security and a SIP registrar for survivability.

In addition, the SN5501 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.

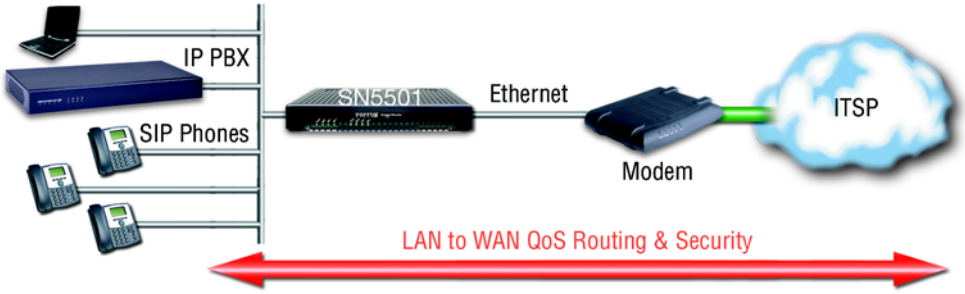

Figure 4. SmartNode 5501 typical application

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Planning the Installation

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

- **Create a network diagram** (see section "Network information" on page 22)
- **Gather IP related information** (see section "IP related information" on page 22 for more information)
- **Install the hardware and software needed to configure the SmartNode**. (See section "Software tools" on page 23)
- **Verify power source reliability** (see section "Power source" on page 23).

When you finish preparing for SmartNode installation, go to section "Installing the Patton SmartNode eSBC" on page 23 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 described for several types of network interfaces 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 5501 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 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 or Putty to configure the software on your SmartNode eSBC.
Also you may use your WEB browser to configure the unit. The Web wizard in this case reduces time to get your unit up and running. See more details on the *Knowledgebase*.

Power source

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

Location and mounting requirements

The SmartNode eSBC is intended to be placed on a desktop or similar sturdy, flat surface that offers easy access to 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 Patton SmartNode eSBC

Install the SmartNode device as follows:

- Placing the device at the desired installation location (see section "Placing the SmartNode device")
- Installing the interface and power cables (see section "Installing cables" on page 24)

When you finish installing the SmartNode, go to Chapter 4, "Initial Configuration" on page 26.

Placing the SmartNode device

Place the SmartNode device on a desktop or similar sturdy, flat surface. 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.

To prevent overheating and damaging the unit, proper ventilation is required when placing the device; leave at least 2 inches (5 cm) to the left, right, front, and rear of the SmartNode device.

The device should be installed in a dry environment with sufficient space to allow air circulation for cooling. Do not stack multiple SmartNode devices directly on top of one another, and do not place items on top of the device. If you will be installing equipment above the SmartNode device, leave at least 2 inches (5 cm) of clearance between the devices.

Installing cables

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

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

Connect the cables in the following order:

1. Connect the 10/100/1000Base-T Ethernet LAN and WAN (see section "Connecting the 10/100/1000Base-T Ethernet LAN and WAN cables")
2. Connect the power mains cable (see section"Connecting the Power Supply" on page 24)

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

The SmartNode 5501 has automatic MDX (auto-cross-over) detection and configuration on the Ethernet ports. Any of the two ports can be connected to a host or hub/switch with a straight-through wired cable.

1. Connect to the subscriber port of the broadband access modem (DSL, cable, WLL) to ETH 0/0.
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 40 and Appendix D, "Port pin-outs" on page 44.

Connecting the Power Supply

Do the following to connect the main power to the Model SN5501:

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

1. Insert the female end of the AC power supply cable to the mains port (see figure 2 on page 16).

There are no user-serviceable parts in the power supply section of the model SN5501. Contact Patton Electronics Technical Support at support@patton.com for more information

2. Verify that the AC power cord included with your device is compatible with local standards. If it is not, refer to "Contacting Patton for Assistance" on page 31 to find out how to replace it with a compatible power cord.
3. Connect the male end of the power cord to an appropriate power outlet.

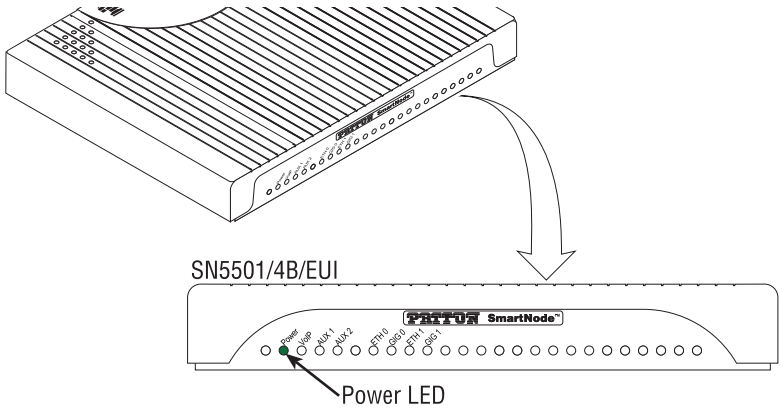

Figure 5. Power LED

4. Verify that the green *Power* LED is lit (see figure 5). Blinks fast during bootloader phase and blinks slow during boot process of Trinity Software. Becomes solid when the system is up and running.

Congratulations, you have finished installing the SmartNode Enterprise Session Border Controller! Now go to Chapter 4, "Initial Configuration" on page 26.

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 21.

- 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 main 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 5501 is equipped with Auto-MDX Ethernet ports, so you can use straight-through cables for host or hub/switch connections (see figure 6).

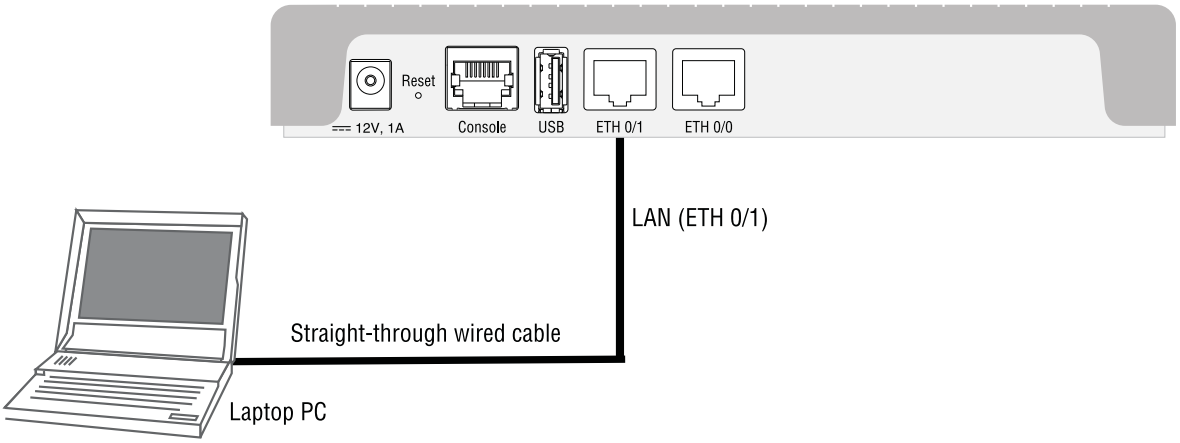

Figure 6. Connecting the SmartNode to your Laptop PC

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
```

Configure 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
WAN Interface Ethernet 0 (ETH 0/0)	DHCP	DHCP
LAN Interface Ethernet 1 (ETH 0/1)	192.168.1.1	255.255.255.0
DHCP Address Range	192.168.1.10–192.168.1.99	255.255.255.0

If these addresses match with those of your network, go to section "Connecting the SmartNode to the Network" on page 29. Otherwise, refer to the following sections to change the addresses and network masks.

Login

To access the SmartNode, start the Telnet application. Type either the host name
smartnode.local
or the default IP address into the address field of the Telnet application:
192.168.1.1
Accessing your SmartNode via a Telnet session displays the login screen. Type the factory default login: *admin* and leave the password empty. Press the Enter key after the password prompt.

```
login:admin
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 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]#no ipaddress DHCP
192.168.1.1(if-ip)[WAN]#ipaddress WAN 172.16.1.99/24
2002-10-28T00:09:40 : 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 you 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.

Note The modified configuration is applied immediately. It is not necessary to reboot the device when changing any configuration parameter.

```
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)* port. The SmartNode 5501 is equipped with Auto-MDX Ethernet ports, so you can use straight through or crossover cables for host or hub/switch connections. (see figure 7).

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.

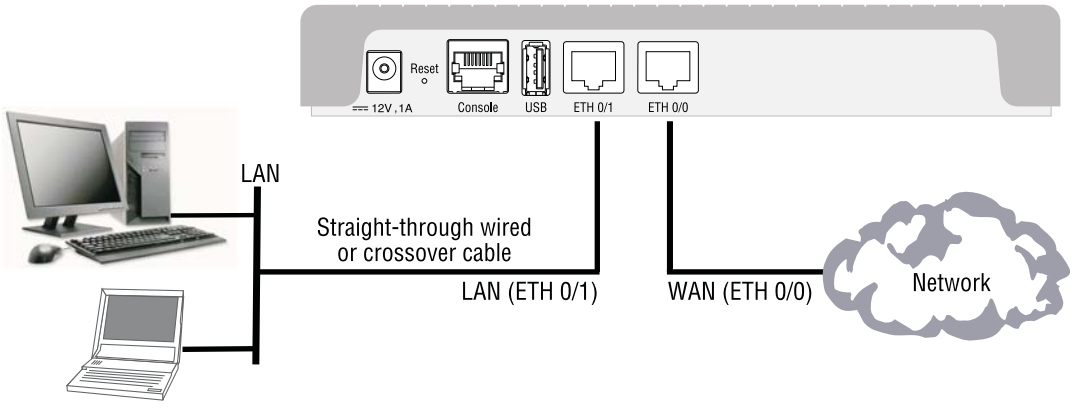

Figure 7. Connecting the SmartNode to the network

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 the Trinity Software Configuration Guide.)

Note Connecting both ethernet ports to the same switch will only work if the switch has separate ARP tables for each connection.

Loading the Configuration (optional)

Patton provides a collection of configuration templates on the support page at: **http://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 SmartNode Series Trinity 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
172.16.1.99(if-ip)[WAN]#
```

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

```
172.16.1.99(if-ip)[WAN]#reload
Press 'yes' to restart, 'no' to cancel :yes
The system is going down NOW
```

Additional Information

For detailed information about configuring and operating guidance, set up procedures, and troubleshooting, refer to the Trinity Software Configuration Guide available online at **www.patton.com/manuals**.

Chapter 5 Contacting Patton for Assistance

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Contact information 32
Contacting Patton Technical Services for Free Support 32
Warranty Service and Returned Merchandise Authorizations (RMAs) 32
Warranty coverage 32
Out-of-warranty service 33
Returns for credit 33
Return for credit policy 33
RMA numbers 33
Shipping instructions 33

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.

Contacting Patton Technical Services for Free Support

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 UTC/GMT - 4/5 hours	CET/CEDT UTC/GMT + 1/2 hours	CET/CEDT UTC/GMT + 1/2 hours	EET/EEDT UTC/GMT + 2/3 hours
Business Hours	Monday-Friday 8:00am to 5:00pm	Monday-Friday 09:00 to 12:00 13:30 to 17:30	Monday-Friday 8:30 to 17:00	Monday-Friday 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**
- By calling **+1 (301) 975-1007** and speaking to a Technical Support Engineer
- By sending an e-mail to **returns@patton.com**

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

Shipping instructions

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

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

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

Appendix A Compliance Information

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Safety 35
Radio and TV Interference (FCC Part 15) 35
EC Declaration of Conformity 35
Authorized European Representative 35

Compliance

EMC

- FCC Part 15, Class A
- EN55032, Class A
- EN55024

Safety

- UL 62368-1/CSA C22.2 N0. 62368-1
- IEC/62368-1
- AS/NZS 62368-1

Radio and TV Interference (FCC Part 15)

This equipment 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. This equipment has been tested and found to comply with the limits for a Class A computing device in accordance with the 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 equipment causes interference to radio or television reception, which can be determined by disconnecting the cables, 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).

EC Declaration of Conformity

We certify that the apparatus identified above conforms to the requirements of Council Directive 2014/30/EU on the approximation of the laws of the member states relating to electromagnetic compatibility; Council Directive 2014/35/EU on the approximation of the laws of the member states relating to electrical equipment designed for use within certain voltage limits; Council Directive 2011/65/EU as modified by Council Directive 2015/863/EU on the approximation of the laws of the member states relating to RoHS and REACH compliance; and Council Directive 2009/125/EC establishing a framework for the setting of ecodesign requirements for energy-related products.

Authorized European Representative

Martin Green
European Compliance Services Limited
Milestone house
Longcot Road
Shrivenham
SN6 8AL, UK

Appendix B Specifications

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Data Connectivity 37
Voice Processing (signalling dependent) 37
Fax and modem support 37
Voice Signalling 37
Voice Routing—Session Controller 38
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Physical 39

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

DSP

One or two 16-channel DSPs (depending on model)

Data Connectivity

Two 10/100/1000Base-TX Ethernet ports

All ports full duplex, autosensing, auto-MDX

Voice Processing (signalling dependent)

8 or 16 full-duplex SIP Calls with transcoding:

- G.711 A-Law/-Law (64 kbps)
- G.722 (64 kbps)
- G.726 (ADPCM 16,24,32,40 kbps)
- G.723.1 (5.3 or 6.3 kbps)
- G.729ab (8kbps)
- Transparent ISDN data
- ilbc-13.33k
- AMR-NB (4.75, 5.15, 5.9, 6.7, 7.4, 7.95, 10.2, 12.2 kbps)

G.168 echo cancellation (128ms)

DTMF detection and generation

Carrier tone detection and generation

Silence suppression and comfort noise

Adaptive and configurable dejitter buffer

Configurable tones (dial, ringing, busy, etc.)

Configurable transmit packet length

RTP/RTCP (RFC 1889)

SRTP (RFC 3711)

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

SIPv2 over IPv6

SIPv2 over TLS

SIP call transfer, redirect

Overlap or en-bloc dialing

DTMF in-band, out-of-band

Voice Routing—Session Controller

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
- Wildcard and regular expression matching

Regular expression number manipulation functions:

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

IP Services

IPv4 & IPv6 router (Dual Stack)

Routing functionalities:

- Programmable static routes and policy-routing
- BGP
- GRE
- RIP
- VRRP
- OpenVPN, L2TP, IPSec (License at additional charge)

ICMP redirect (RFC 792); Packet fragmentation

DiffServe/ToS set or queue per header bits

Packet Policing discards excess traffic

DHCP client and server (IPv4 and IPv6—Dual Stack)

DNS client and relay-server, DynDNS

Management

Patton Cloud Management

Web-based GUI; Trinity WEB Wizard

Industry standard CLI with remote Telnet and SSH access, fully documented

TR-069 for configuration & firmware provisioning through auto-configuration server (ACS)

Radius, TACACS+

HTTP web management and firmware loading

TFTP configuration & firmware loading

HTTPS configuration & firmware provisioning

SNMP v1 agent (MIB II and private MIB)

Built-in diagnostic tools (trace, debug)

Secure Auto-provisioning

System

Dual Core CPU Broadcom BCM53012 operating at 1GHz

Memory:

- 256 Mbytes DRAM
- 128 Mbytes Flash

Physical

Dimensions: 8.2 x 1.3H x 6.5D inch (20.8W X 3.4H x 16.5D cm)

Weight: <15.9 oz. (<450 g)

Power Consumption: <10W

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

Operating Humidity: up to 90%, non condensing

Appendix C **Cabling**

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Ethernet 42

Introduction

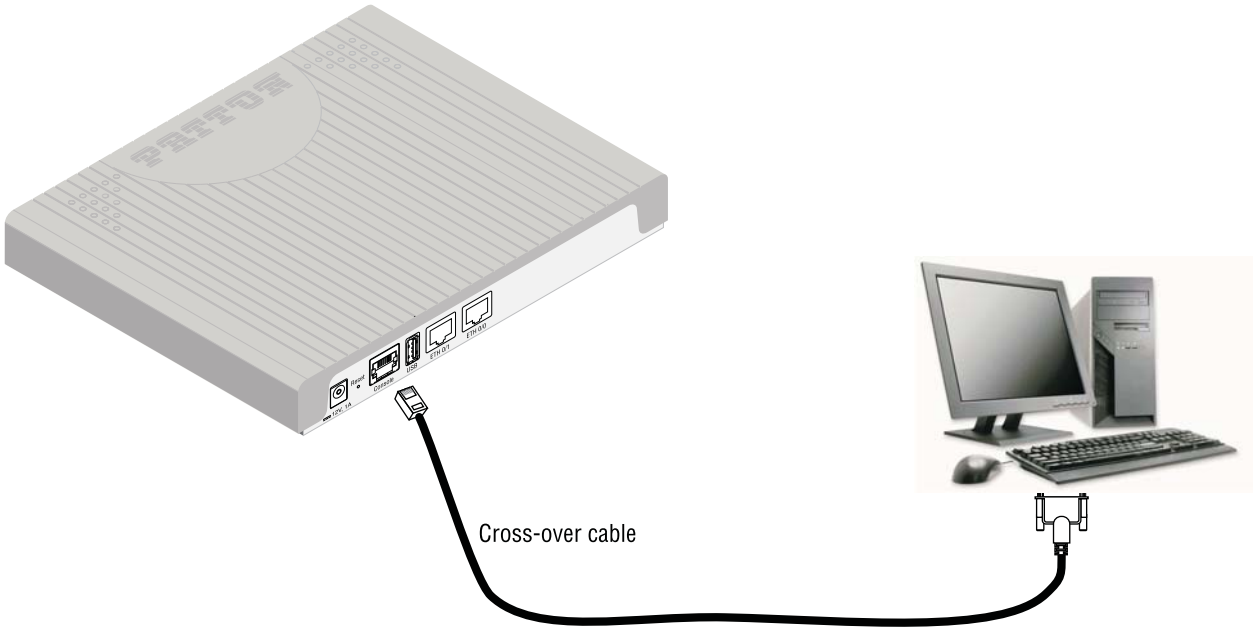
This section provides information on the cables used to connect the SmartNode to the existing network infrastructure and to third party products.

Serial Console

The SmartNode can be connected to a serial terminal over its serial console port, as depicted in figure 8.

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 serviceabilty.



Note A Patton Model 16F-561 RJ-45 to DB-9 adapter is included with each SmartNode Series device.

Figure 8. Connecting a serial terminal

Console Connection settings:

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

Note See section "Console port" on page 45 for console port pin-outs.

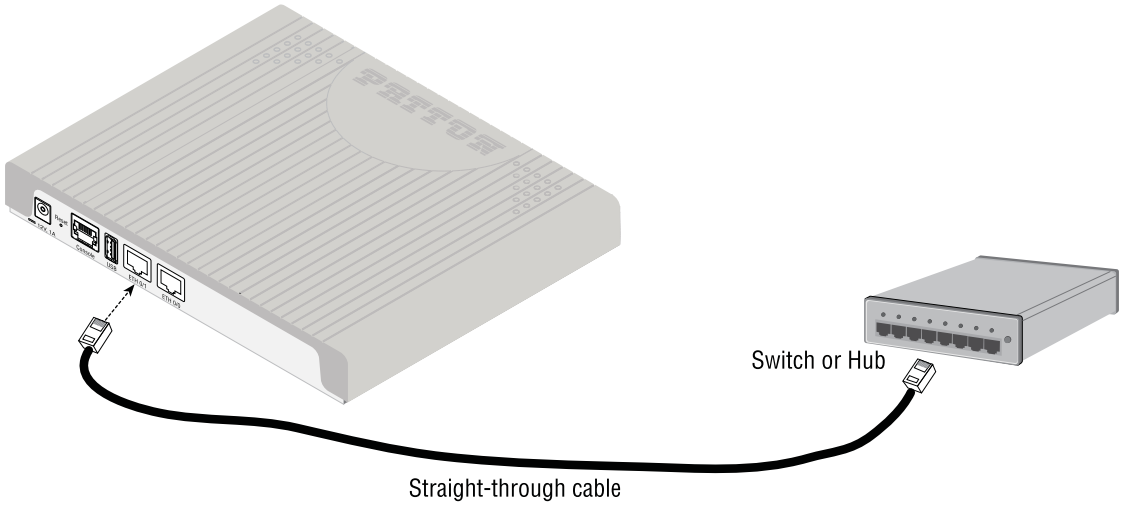
Ethernet

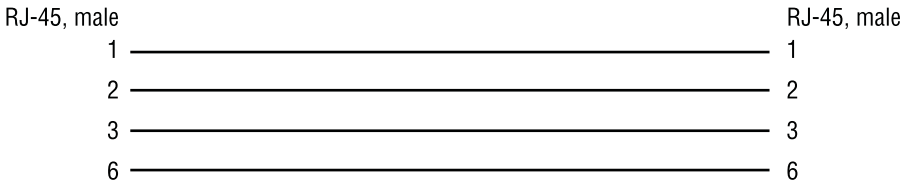
Ethernet devices (10/100/1000 Base-T) are connected to the SmartNode over a cable with RJ-45 plugs. All Ethernet ports on the SN5501 are Auto-MDX. Use any straight or crossover cable to a host, hubs, switches, PCs or other devices.

CAUTION

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

Note Connecting both Ethernet ports to the same switch will only work is the switch has separate ARP table for each connection.





Note Other pins are not used.

Figure 9. Typical Ethernet straight-through cable diagram for 10/100Base-T

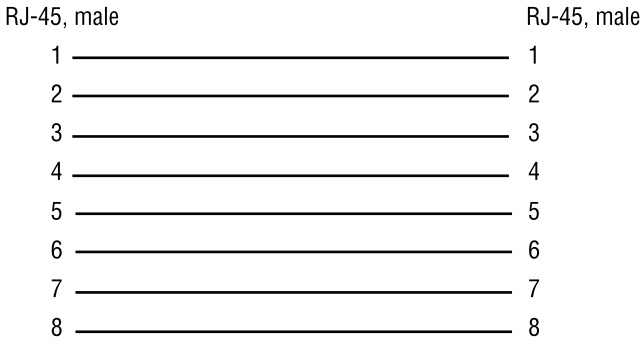


Figure 10. Typical Ethernet straight-through cable diagram for 1000Base-T

Appendix D **Port pin-outs**

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Ethernet 45

Introduction

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

Console port

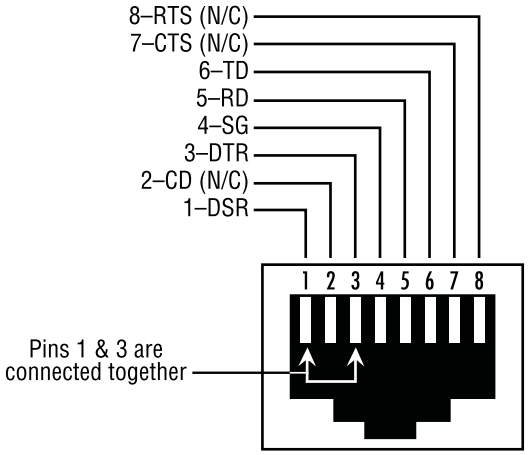

Figure 11. EIA-561 (RJ-45 8-pin) port

Note N/C means no internal electrical connection.

Console Connection Settings:

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

Ethernet

Table 6. 10/100 Base-T RJ-45 socket

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

Note Pins not listed are not used.

Table 7. 1000Base-T RJ-45 Socket

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

Appendix E SmartNode 5501 Factory Configuration

Chapter contents

Introduction 48

Introduction

The factory configuration settings for SmartNode 5501 can be obtained with the following command through the CLI;

```
login: admin
password: <Enter>
192.168.1.1>show config:shipping-config
```

Refer to Chapter 4, "Initial Configuration" on page 26 for more details about IP address settings for initial configuration.

Appendix F **Reset Button Functions**

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Resetting the SmartNode device when it is operating and the Power LED is lit 50
Resetting the SmartNode device when it is initially powered off 51
Very exceptional case—minimal config recovery 51

Introduction

The *Reset* button (see figure 12) is used to do the following:

- Reboot the SmartNode device (see section "Resetting the SmartNode device when it is operating and the Power LED is lit" on page 50)
- Erase the *startup-config* settings, which is followed by a SmartNode device reboot as indicated by the slow blinking of all LEDs (see section "Resetting the SmartNode device when it is operating and the Power LED is lit" on page 50)
- Factory reset, which is followed by a device reboot as indicated by the fast blinking of all LEDs (see section "Resetting the SmartNode device when it is operating and the Power LED is lit" on page 50)
- Troubleshoot the SmartNode device if it is not booting properly (see section "Resetting the SmartNode device when it is initially powered off" on page 51)

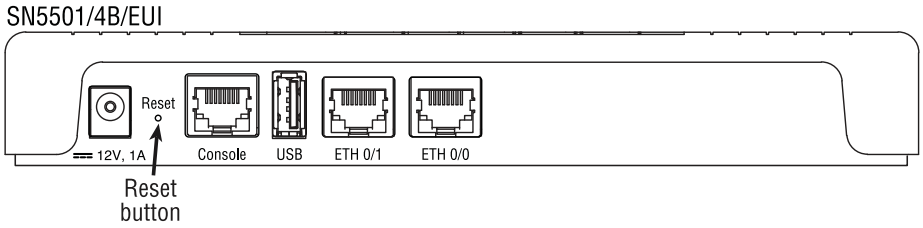

Figure 12. SN5500 *Reset* button

Resetting the SmartNode device when it is operating and the *Power* LED is lit

The *Reset* button has the following behaviors depending on how many seconds (see figure 13) the button is pressed (see table 8 on page 50 for the results from pressing the button).

Figure 13. Reset button periods (in seconds) for performing actions

Table 8. Results from pressing the Reset button

Period	Action
A (less than 1 second)	Reboot device
B (1 to 4 seconds)	No action
C (5 to 14 seconds)	• Erase *startup-config* • Reboot (indicated by the slow blinking of all LEDs

Table 8. Results from pressing the Reset button (Continued)

Period	Action
D (15 to 20 seconds)	• Factory reset which erases entire flash memory except for *shipping-config*, shipping wizards, default root CAs and software licenses • Reboot (indicated by fast blinking of all LEDs)

Resetting the SmartNode device when it is initially powered off

This procedure should **only** be performed if the SmartNode device is not booting properly. It should used by trained SmartNode technicians and Patton Support personnel only.

If the SmartNode device is not booting properly, the *Reset* button may remedy the problem by switching to the backup image.

The following procedure must be performed starting with the SmartNode device in a powered off state:

1. While pressing and holding the *Reset* button, apply power to the SmartNode device. The *Power* LED flashes quickly for 2 seconds, during which time the *Reset* button must remain pressed.
2. The *Power* LED will begin a series of blink pattern starting with 1-blink, pause (see table 9).

Table 9. Using the *Reset* button to switch to a backup image

LED Blink Pattern	Action
1-blink, pause	Boot normally
2-blinks, pause	Switch to backup image, then Boot normally

3. Repeatedly pressing and releasing the *Reset* button will cycle through the blink patterns.
4. When you get to the 2-blink pattern that will switch to backup image, release the *Reset* button. 10 seconds later, the device will switch to the backup image, then boot normally.

If the SmartNode device is still not working properly, see section "Very exceptional case—minimal config recovery".

Very exceptional case—minimal config recovery

If, after performing the procedure in section "Resetting the SmartNode device when it is initially powered off" on page 51, the SmartNode device is still not operational, the following may remedy the problem by erasing the entire contents of flash memory (no exceptions). However it is recommended that in such a case the device be sent to Patton for analysis and repair. See section "Warranty Service and Returned Merchandise Authorizations (RMAs)" on page 37 for details.

IMPORTANT

The following procedure is NOT standard and is NOT to be used to perform a factory reset. It should ONLY be used as a last resort for a minimal recovery of the device when it is in an undefined state, and if the instructions in section "Resetting the SmartNode device when it is initially powered off" on page 51 did not provide a remedy.

CAUTION

Performing the following procedure will result in loss of all data, including the shipping-config, software licenses, Wizards, backup-configs, etc. The device will have to be manually set up afterward.

Do the following:

1. While pressing and holding the *Reset* button, apply power to the SmartNode device. The *Power* LED flashes quickly for 2 seconds, during which time the *Reset* button must remain pressed.
2. The *Power* LED will begin a series of blink pattern starting with 1-blink, pause.

Table 10. Using the *Reset* button to switch to erase flash memory

LED Blink Pattern	Action
3-blinks, pause	Erase entire contents of flash memory (no exceptions), then boot. **Note** Erasing flash memory also deletes previously purchased and loaded software license keys.

3. Repeatedly pressing and releasing the *Reset* button will cycle through the blink patterns.
4. When you get to the 3-blink pattern that will erase the entire flash memory (see table 10), release the *Reset* button. 10 seconds later, flash memory will be erased, then the device will boot.
5. Once booted up, the device will run using the "minimal-config":

```
#-----------------------------------------------------------------#
#                                                                 #
# Minimal configuration file                                      #
#                                                                 #
#-----------------------------------------------------------------#

cli version 4.00

telnet-server
  shutdown

ssh-server
  no shutdown

web-server http
  shutdown

web-server https
  shutdown
```

```
context ip ROUTER

  interface LAN
    ipaddress LAN 192.168.200.10/24
    ipaddress DHCP dhcp

port ethernet 0 0
  bind interface ROUTER LAN
  no shutdown
```

Appendix G End User License Agreement

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End User License Agreement

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

1. Definitions

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

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

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

D) "Designated Equipment" shall mean the hardware on which the Program(s) have been designed and provided to operate by the End User.

2. Title

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

Patton does not convey any intellectual property title or rights in the Licensed Products to Licensee. All Licensed Products furnished by Patton, and all copies thereof, and compilations, programmatic extension, and all Patches, Updates, Upgrades and Platform Releases, are and shall remain the property of Patton or Patton's licensors, as applicable. Further, the Licensed Products provided under this Agreement are not custom software but are standard commercial software. Except for the license use rights otherwise expressly provided in this Agreement, no right, title or interest in Patton Licensed Products is granted hereunder. Licensee shall not use any proprietary information of Patton to create any computer software program or user documentation, which is substantially similar to the Licensed Products.

3. Term

The term of this Agreement is from the Effective Date until title of the Designated Equipment is transferred by End User or unless the license is terminated earlier as defined in section "6. Termination" on page 56.

4. Grant of License

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

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

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

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

5. Warranty

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

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

6. Termination

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

B) Patton Electronics Company may terminate this Agreement should End User violate any of the provisions of section "4. Grant of License" on page 55.

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

7. Notices

Patton devices may log, collect and report data related to installed software, licenses, feature utilization, product performance, device management, service quality and other parameters which is used for quality control, product improvement, license management, service level management and technical support. Collected data may be reported to Patton or a service provider delivering its services connected to the device.

Patton may use this information for other business purposes, such as to alerting you to updated products or services, securing access to software updates, and assisting in order processing.

Any and all information collected by Patton or its assigns will be kept strictly confidential and will not be sold, rented, loaned, or otherwise disclosed to any third party except as required by law.

8. 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 you pursuant to the LGPL license terms (**http://www.gnu.org/licenses/lgpl.html**).
- RedBoot (Red Hat Embedded Debug and Bootstrap) embedded system debug/bootstrap environment from Red Hat distributed to you pursuant to the eCos license terms (**ecos.sourceware.org/license-overview.html**) and GNU General Public License (GPL) terms (**www.gnu.org/copyleft/gpl.html**). Source code is available upon request.

9. Unenforceable Provisions

If any part of these terms and conditions are found to be invalid or unenforceable under applicable law, such part will be ineffective to the extent of such invalid or unenforceable part only, without in any way affecting the remaining parts of these terms and conditions.

10. Governing Law

The rights and obligations of the parties pursuant to these terms and conditions are governed by, and shall be construed in accordance with, the laws of the State of Maryland, USA.

User may be subject to other local, provincial or state and national laws. User hereby irrevocably submits to the exclusive jurisdiction of the courts of the State of Maryland, USA for any dispute arising under or relating to this agreement and waives user's right to institute legal proceedings in any other jurisdiction. Patton shall be entitled to institute legal proceedings in connection with any matter arising under this agreement in any jurisdiction where User resides, does business, or has assets.

11. Waiver

No waiver of any of the provisions of these terms and conditions will be deemed to constitute a waiver of any other provision nor shall such a waiver constitute a continuing waiver unless otherwise expressly provided in writing duly executed by the party to be bound thereby. Any other terms and conditions of sale, to the extent not inconsistent herein, regarding a Patton device, program, license or service remain in full force and effect.