SmartNode SN4141E Series **Ruggedized Enterprise Session Border Controller and VoIP Gateway**

User Manual

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

REGULATORY MODEL NUMBER: 13260D4-001

CXR : **+33 237 62 88 00**
Technical Support: +33 237 62 88 04
E-mail: **support@cxr.com**
WWW: **www.cxr.com**

Part Number: **50000059 Rev. B**
Revised: **June 04, 2026**

Sales Office: **+1 (301) 975-1000**
Technical Support: **+1 (301) 975-1007**
E-mail: **support@patton.com**
WWW: **www.patton.com**

Part Number: **50000059 Rev. A**
Revised: **November 16, 2021**

CXR Networks
17 rue de l'ornette
28410 ABONDANT
France
support@cxr.com
Tel : +33237628804

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

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

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About this guide

This guide describes the SmartNode 5540E and 4140E Series hardware, installation and basic configuration. For detailed software configuration information refer to the *Trinity Command Line Reference Guide* and the available Configuration Notes.

Audience

This guide is intended for the following users:

- Operators
- Installers
- Maintenance technicians

Structure

This guide contains the following chapters and appendices:

- Chapter 1, starting on page 15, contains what you need to quickly start using the SmartNode device.
- Chapter 2, starting on page 18, provides information about router features and capabilities
- Chapter 3, starting on page 25, contains an overview describing router operation and applications
- Chapter 4, starting on page 29, provides SmartNode device installation procedures
- Chapter 5, starting on page 37, leads you through the steps to set up a new SmartNode device and download a configuration
- Chapter 6, starting on page 44, contains information on contacting Patton technical support for assistance
- Appendix A, starting on page 47, provides compliance info for the SmartNode devices
- Appendix B, starting on page 49, contains specifications for the routers
- Appendix C, starting on page 54, provides cable recommendations
- Appendix D, starting on page 58, describes the router's ports and pin-outs
- Appendix E, starting on page 61, describes how to obtain factory configuration settings for the SmartNode device
- Appendix F, starting on page 63, describes the *Reset* button functions
- Appendix G, starting on page 68, describes installing optional rack ears
- Appendix H, starting on page 70, describes installing optional DIN rail mounting clip
- Appendix I, starting on page 74, provides the End User License Agreement

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

Precautions

Notes and cautions, which have the following meanings, are used throughout this guide to help you become aware of potential SmartNode device problems. *Warnings* relate to personal injury issues, and *Cautions* refer to potential property damage.

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.

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.

- 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

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.

Table 1. General conventions (Continued)

Convention	Meaning
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 SN5540E/SN4140E Series Quick Start

Chapter contents

Default IP Settings

SN5540E and SN4140E/2ETH Models:

- ETH 0/0: DHCP Client
- ETH 0/1: DHCP Server:
  - 192.168.1.1 mask 255.255.255.0
  - or (smartnode.local)

SN4140E Models (with 1 Ethernet port only):

- ETH 0/0:
  - 192.168.200.20 | 255.255.255.0
  - DHCP Client

Default Login

Username: *admin*

Leave the password empty

Press the *Enter* key after the password prompt.

You are responsible for creating a new administrator account to maintain system security. Patton Electronics accepts no responsibility for losses or damage caused by loss or misuse of passwords. Refer to Chapter 4 "Accessing the CLI", section "Selecting a secure password" in the *Trinity Command Line Reference Guide* for more details.

Analog Port Pinout

FXS and FXO ports use an RJ-11 connector with 6 positions. The middle 2 positions (3 and 4) are used as shown in figure 1 on page 17 and described in table 2 on page 17.

Note Pins not listed are not used.

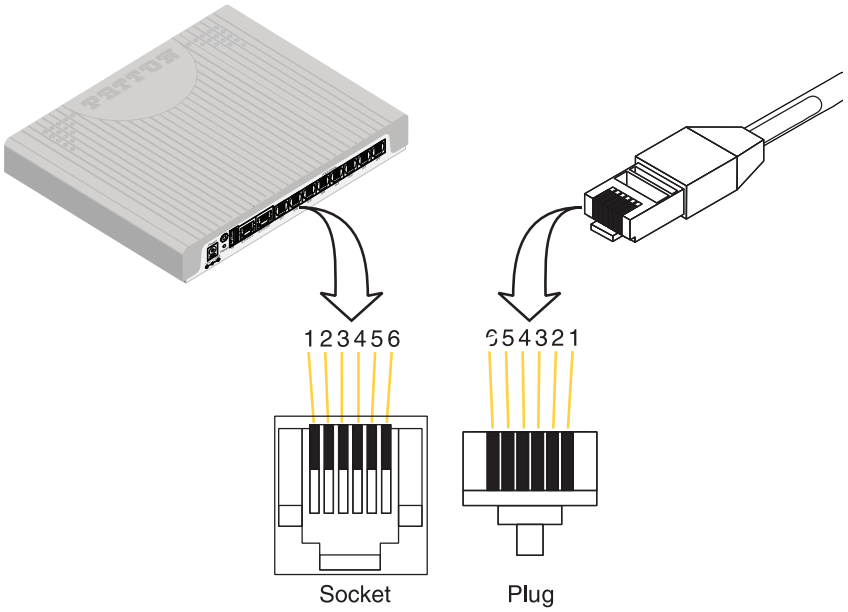


Figure 1. RJ-11 pin-outs

Table 2. RJ-11 pins 3 and 4

Pin	Signal
3	Ring (-)
4	Tip (+)

Chapter 2 General information

Chapter contents

SmartNode devices overview

SmartNode 5540E Enterprise Session Border Controllers (eSBCs) and SN4140E VoIP Gateways (see figure 2) combine IP routing, VoIP security, and quality of service (QoS) for up to 8 voice and FAX calls over any IP and provide the extended hardware characteristics, that are needed in harsh environments.

Figure 2. SmartNode 5540E and 4140E

The SmartNode 5540E eSBC and 4140E VoIP Gateway are equipped with up to 4 FXS/4 FXO analog interfaces or up to 8 FXS interfaces and provide the following major functions:

- Analog telephony to voice over IP (SIP) conversion for up to 8 FXS/FXO analog ports
- Fax T.38 and G711 bypass support
- Modem bypass support
- Optional Patton Cloud network monitoring
- One Ethernet port for the SN4140E and two ports for the SN5540E and SN4141E/2ETH
- Stateful Firewall
- QoS
- Extended operation temperature of -40 to 158°F (-40 to +70°C)
- Sustaining vibration and shock meeting IEC 60068-2-6 and IEC 60068-2-27 test standards
- Enhanced electrical protection, meeting MIL Standard 1275
- Option for conformal coating (project based)

The 2-Ethernet-port devices support:

- Two Ethernet ports (WAN/LAN configurable) (IP Routing requires license to enable)
- USB port

In addition, the eSBC supports:

- IP routing including GRE, BGP, VPN, LACP
- 4 SIP to SIP calls (license upgradeable up to a total of 200)
- SIP TLS/SRTP included
- SIP Registrar included

Section "SmartNode 5540E Series eSBC/IAD" on page 20 provides more information on the device. Section "On the products the following model code conventions apply:" on page 21 describes the SmartNode 4140E Series.

SmartNode 5540E Series eSBC/IAD

The SmartNode 5540E eSBC Series support up to 8 voice calls (FXS/FXO–VoIP) depending on the model (see figure 3) and up to 200 SIP-to-SIP calls (non-transcoded). By default there are 4 SIP to SIP calls enabled. Additional calls can be enabled by loading SNSW-1B licenses (additional charge).

The SmartNode 5540E Series LEDs, ports, and button are shown in figure 3 and described in table 3 on page 21.

Note The type and number of ports on your SN5540E will depend on the model (SKU) that you purchased.

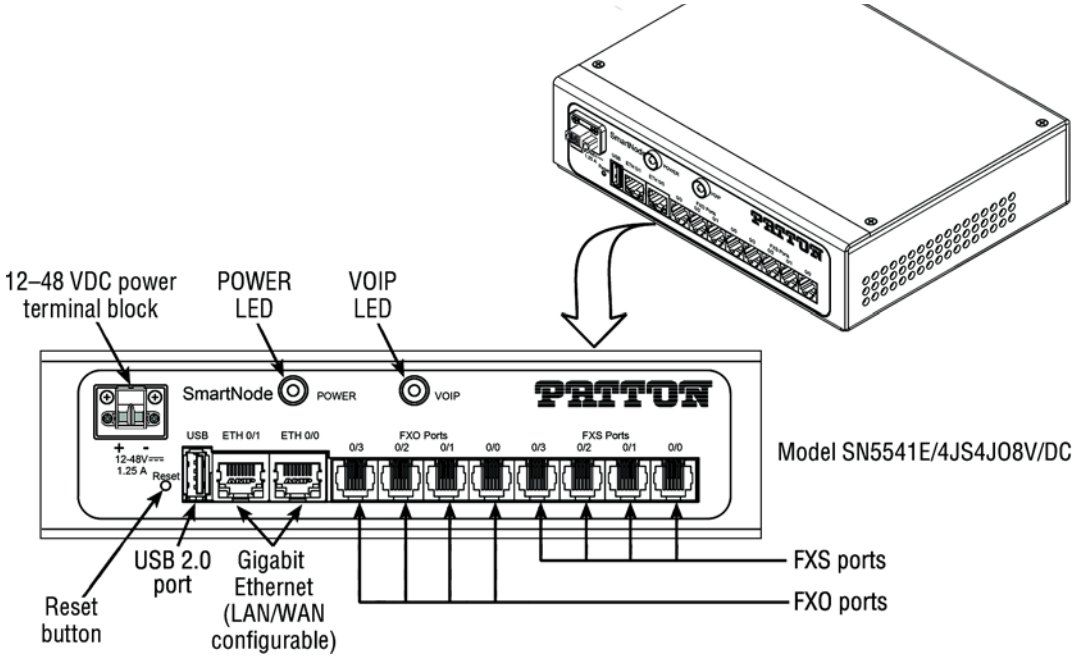
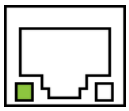
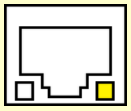


Figure 3. SN5540E LEDs, ports, and button

Table 3. SN5540E LEDs, ports, and button

Port	Description
Gigabit Ethernet ports ETH 0/0 & ETH 0/1	RJ-45 connectors that connect the SmartNode device to an Ethernet device (e.g., a cable or DSL modem, LAN hub or switch). These are LAN/WAN configurable.
Analog voice ports, FXS 0/0–0/7	FXS RJ-11(6 position, 4 wire) connectors that connect the device with an analog terminal (a telephone, for example). FXS on-hook voltage is 48V for each FXS port.
Analog voice ports, FXO 0/0–0/7	FXO RJ-11 (6 position, 4 wire) connectors. These ports connect to FXS devices such as the PSTN.
USB 2.0 port	USB 2.0 host port used to connect a USB 3G/4G cellular modem. A list of supported USB models can be found here Certified USB Modems
12–48 VDC power terminal block	The SmartNode device requires 12 VDC, 1.25 A power for operation.
POWER LED	When lit, indicates power is applied. Blinks fast during bootloader phase and blinks slow during the boot process. Constantly lit when the system is up and running.
VOIP LED	• When lit, indicates the SmartNode device is registered to a SIP server, or a SIP device has registered to the SmartNode device. • Off indicates the unit is not configured or registered, or has no active directly routed VoIP connection.
ETH 0/0 & ETH 0/1 ports Link/Activity LED (green) 	**On**: Connected to network
	Flashing: Data is received or transmitted
	Off: Not connected to network
ETH 0/0 & ETH 0/1 ports 1 Gbps Link LED (yellow) 	**On**: Connected to network at 1 Gbps
	Off: Connected to network at 10/100 Mbps or not connected to network
Reset button	The reset button has several functions, as described in appendix F, "Reset Button Functions" on page 63.

On the products the following model code conventions apply:

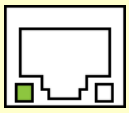
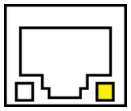
- *JS* stands for FXS ports
- *JO* stands for FXO ports
- *V* stands for the number of VoIP calls

Note For a complete listing of available models, refer to the SmartNode VoIP page at https://www.patton.com/products/voip-comparison.asp.

SmartNode 4140E Series VoIP Gateway

The SmartNode 4140E Series are compact VoIP Gateways that support 2 to 8 VoIP calls. The SmartNode 5540E Series LEDs, ports, and button are shown in figure 4 on page 23 and described in table 4.

Table 4. SN4140E LEDs, ports, and button

Port	Description
Gigabit Ethernet port ETH 0/0	RJ-45 connector that connects the SmartNode device to an Ethernet device (e.g., a cable or DSL modem, LAN hub or switch). It is LAN/WAN configurable.
Analog voice ports, FXS 0/0–0/7	FXS RJ-11(6 position, 4 wire) connectors that connect the device with an analog terminal (a telephone, for example). FXS on-hook voltage is 48V for each FXS port.
Analog voice ports, FXO 0/0–0/7	FXO RJ-11 (6 position, 4 wire) connectors. These ports connect to FXS devices such as the PSTN.
12–48 VDC power terminal block	The SmartNode device requires 12 VDC, 1.25 A power for operation.
POWER LED	When lit, indicates power is applied. Blinks fast during bootloader phase and blinks slow during the boot process. Constantly lit when the system is up and running.
VOIP LED	• When lit, indicates the SmartNode device is registered to a SIP server, or a SIP device has registered to the SmartNode device. • Off indicates the unit is not configured or registered, or has no active directly routed VoIP connection.
ETH 0/0 port Link/Activity LED (green) 	**On**: Connected to network
	Flashing: Data is received or transmitted
	Off: Not connected to network
ETH 0/0 port 1 Gbps Link LED (yellow) 	**On**: Connected to network at 1 Gbps
	Off: Connected to network at 10/100 Mbps or not connected to network
Reset button	The reset button has several functions, as described in appendix F, "Reset Button Functions" on page 63.

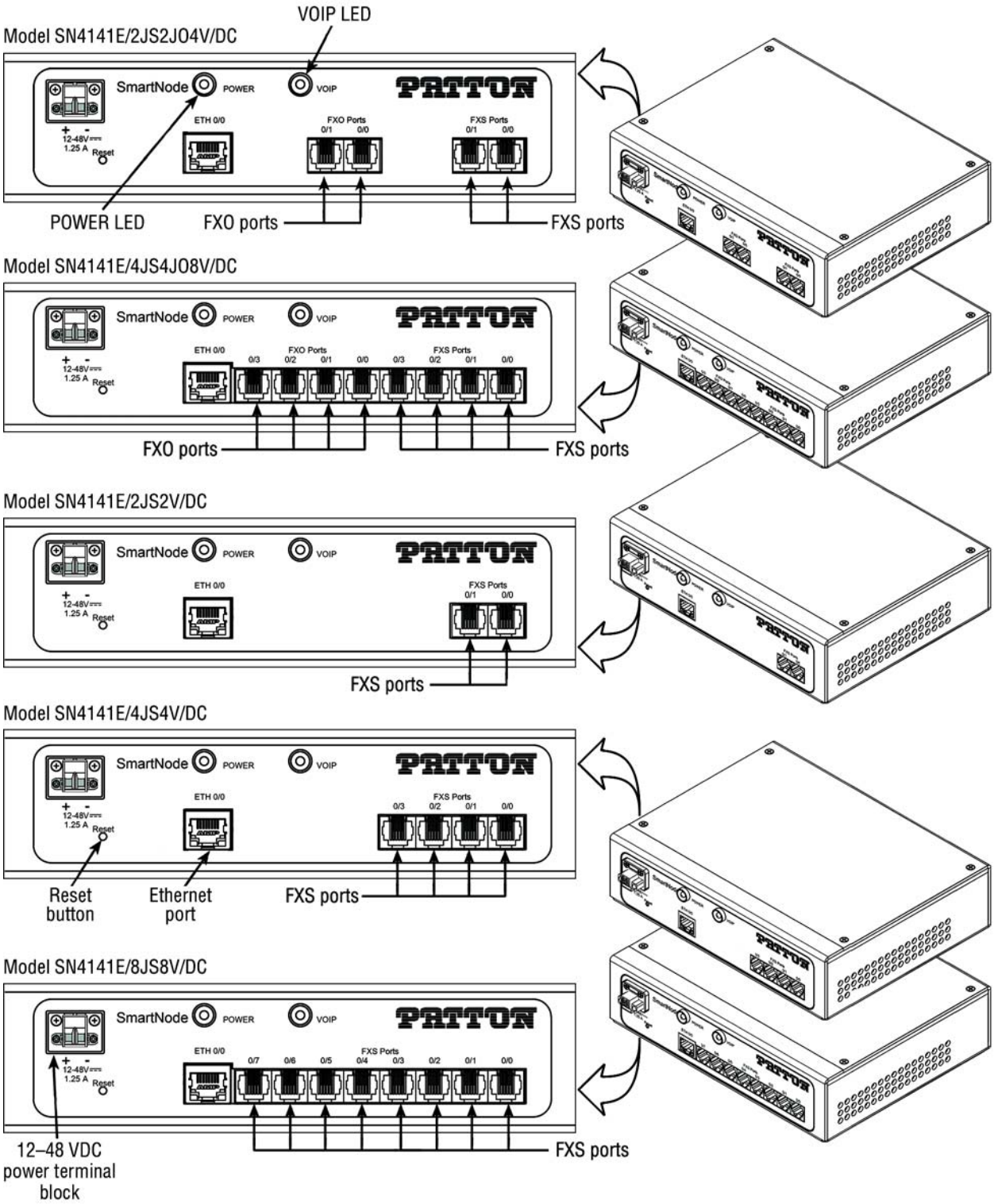


Figure 4. SN4140E LEDs, ports, and button

On the products the following model code conventions apply:

- *JS* stands for FXS ports
- *JO* stands for FXO ports
- *V* stands for the number of VoIP calls

Note For a complete listing of available models, refer to the SmartNode VoIP page at https://www.patton.com/products/voip-comparison.asp.

Chapter 3 Applications overview

Chapter contents

Introduction

The ruggedized SN5540E/SN4140E Industrial eSBC/VoIP Gateway series is ideal for delivering voice-over-IP telephony in outdoor or environmentally exposed environments where heating and cooling cannot be controlled. The unit can be vehicle-mounted and is suitable for military applications.

Patton's industrial VoIP gateway facilitates IP-based voice delivery for such applications as industrial automation, military communications, railways, public transportation, public and private outdoor phones—including emergency phones in parking lots, along roadways and railways and within underground tunnels.

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/session-border-controller/
- https://www.patton.com/voip-iad/
- www.patton.com/voip-gateway/

Application for SmartNode 5540E eSBC

The SmartNode 5540E eSBC, equipped with 2 Ethernet ports, acts as an Enterprise Session Border Controller securing the LAN from the WAN and it connects up to 8 Analog devices/lines integrating them in to an All-IP environment (see figure 5 on page 27).

The major functions of the SN5540E eSBC/IAD are:

- Network topology hiding
- Fraud prevention
- Service demarcation
- Optional Patton Cloud network monitoring[1]
- QoS (quality of service with downstream and upstream QoS)
- Number normalization and mapping
- Fallback and survivability call routing
- Fax, modem, PoS integration and VoIP conversion
- Solves interoperability issues between softswitches and IP PBXs
- 4G–LTE USB cellular modem WAN uplink[1]

1. Licensed feature at additional charge

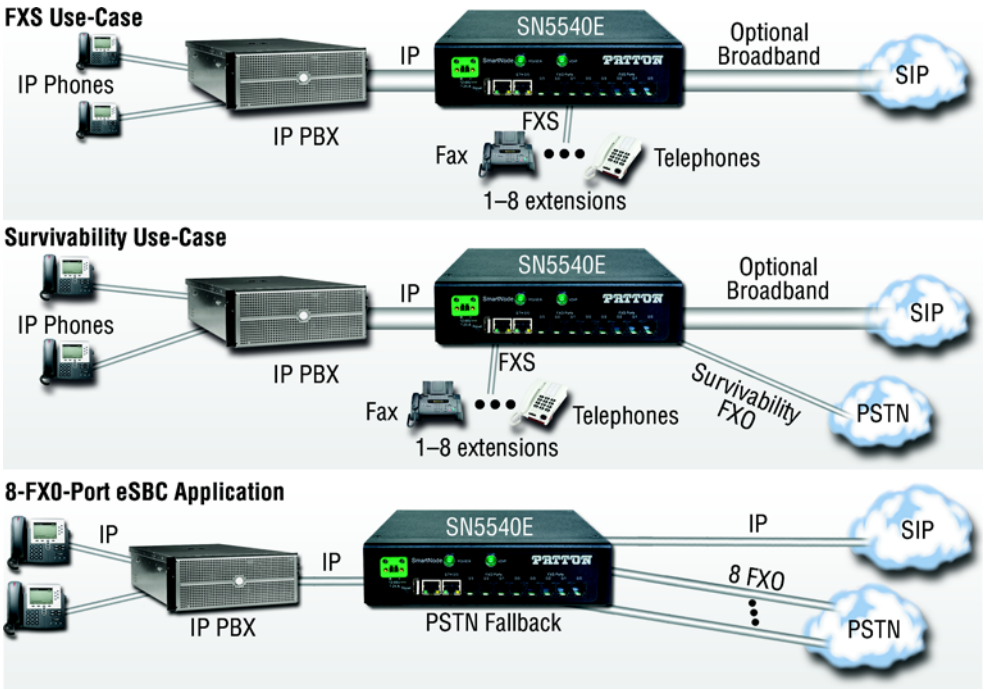


Figure 5. SN5540E application

Application for SmartNode 4140E VoIP Gateway

The SmartNode 4140E VoIP Gateway, equipped with 1 Ethernet port, acts as a VoIP Gateway connecting POTS equipment which cannot easily be replaced by an IP-ready device (such as alarm systems, fax machines, modems, PoS terminals, etc.) into an All-IP environment. In addition SN4140E models with FXO interfaces serve use-cases where survivability is desired (see figure 6 on page 28).

The major functions of the SmartNode 4140E VoIP Gateway are:

- Optional Patton Cloud network monitoring[1]
- QoS (packet tagging)
- Number normalization and mapping
- Fallback and survivability call routing to alternate SIP provider/IP-PBX
- Fax, modem, PoS integration and VoIP conversion
- Legacy telephone to VoIP conversion
- PSTN line integration for IP based on premise telephony setups

Note Additional functions can be unlocked by loading software licenses (such as an eSBC license bundle—see the product page under Ordering for more details).

1. Licensed feature at additional charge. See the following link for Certified USB modems: https://www.patton.com/products/trinity_usb_modems.asp

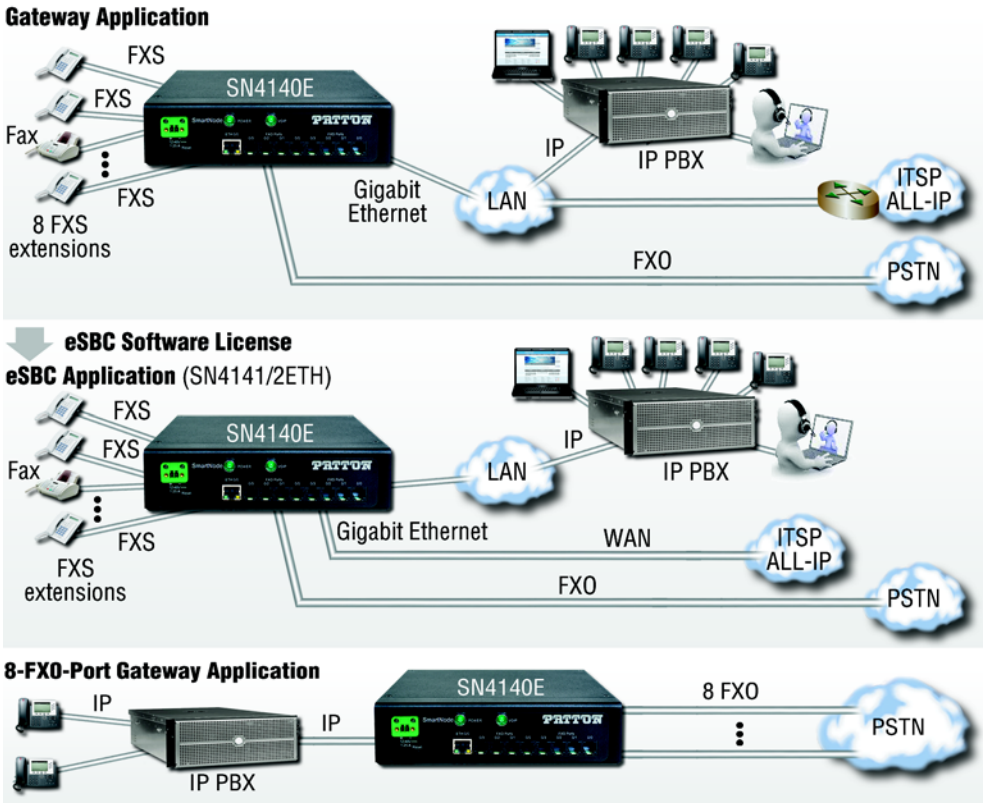


Figure 6. SN4140E application

Chapter 4 SmartNode Installation

Chapter contents

Planning the Installation

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

- **Create a network diagram** (see section "Network information" on page 30)
- **Gather IP related information** (see section "IP related information" on page 30 for more information)
- **Install the hardware and software needed to configure the SmartNode device**. (See section "Software tools" on page 31)
- **Verify power source reliability** (see section "Power source" on page 31).

When you finish preparing for SmartNode device installation, go to section "Installing the SmartNode device" on page 31 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 5.

Table 5. 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 Trinity 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 device 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

The simplest way configuring the SmartNode is through **Patton Cloud**.

Alternatively you may use the Web interface in combination with a Web wizard to get your unit up and running. For more details, see the **Wizard Portal**.

The Command Line Interface is also supported for configuration, and can be accessed through Telnet /SSH. Also see the **Knowledgebase** for config snippets when configuring your device through CLI.

Power source

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.

Installing the SmartNode device

SmartNode device installation consists of the following:

1. Placing the device at the desired installation location (see section "Placing the SmartNode device" on page 31)
2. Installing interface cables (see section "Connecting cables" on page 32)
3. Connecting power (see section "Connecting the power supply" on page 34)

When you finish installing the SmartNode device, go to Chapter 5, "Initial Configuration" on page 37.

Placing the SmartNode device

If you will be installing the SmartNode device in an equipment rack, see Appendix G, "Installing Optional Rack Ears" on page 68.

If you will be installing the SmartNode device on a DIN rail, see Appendix H, "Installing Optional DIN Rail Mounting Clip" on page 70.

Otherwise, 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.

Connecting cables

WARNING

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

WARNING

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. Installing the RJ-11 voice port (FXS) / (FXO) cable or cables (see section "Installing an interface cable on the FXS and FXO interface ports" on page 32)
2. Connect the 10/100/1000Base-T Ethernet LAN and WAN (see section "Connecting the 10/100/1000Base-T Ethernet LAN and WAN cables" on page 33)

Installing an interface cable on the FXS and FXO interface ports

The SmartNode comes with at least two FXS analog ports (see figure 7). Some models have FXO ports as well, with equal number of ports as for FXS. The FXS interfaces are connected to analog devices via cables (see figure 8 on page 33) terminated with RJ-11 connectors (see section "Analog FXS" on page 56), while the same type of cable and pinout is being used to connect a POTS line to the FXO ports of the device (see figure 9 on page 33).

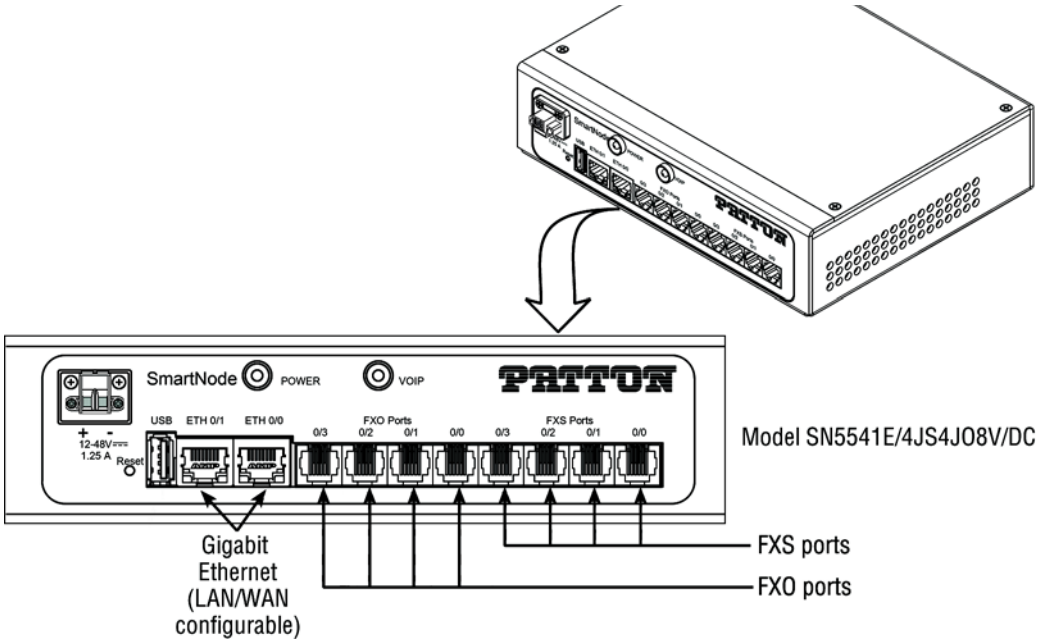


Figure 7. Location of Ethernet (LAN/WAN), FXS, and FXO connectors (SmartNode 5541E shown)

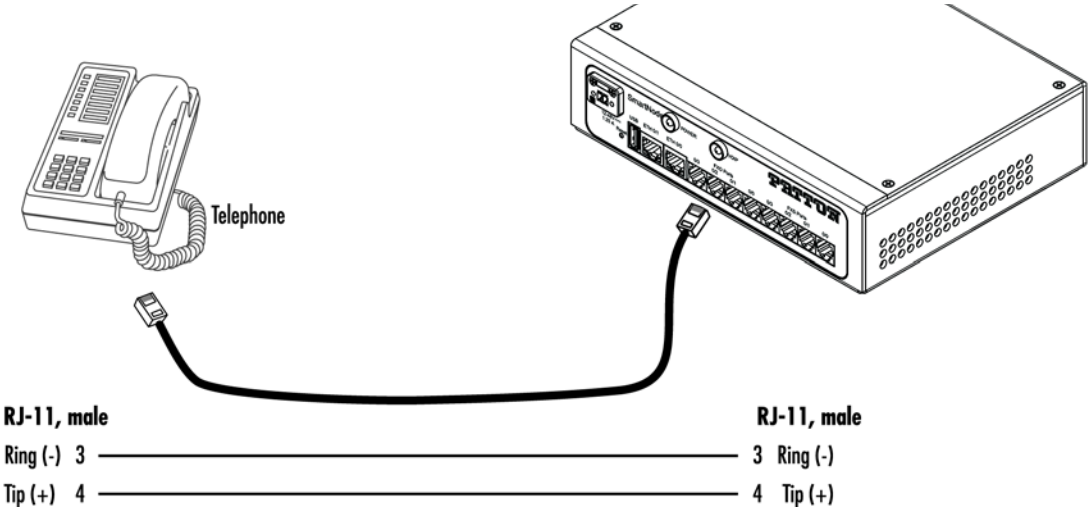


Figure 8. Analog FXS connection

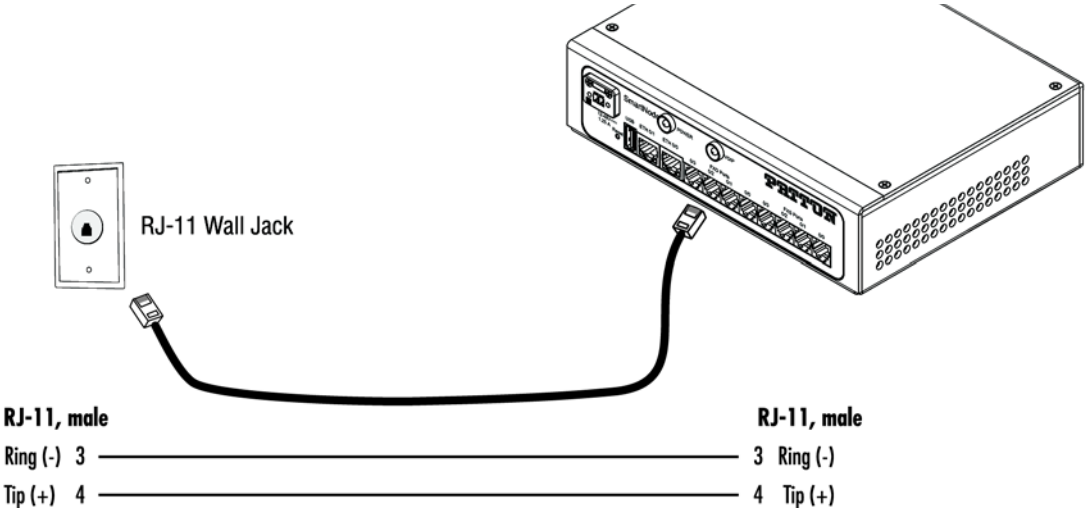


Figure 9. Analog FXO connection

Table 6. RJ-11 socket

Pin	Signal
3	Ring (-)
4	Tip (+)

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

The SmartNode device 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.

Refer to Appendix D, "Port pin-outs" on page 58 for interface port pin-outs.

Connecting the power supply

If you are connecting a Patton AC to DC power adapter (part no. 2500005) to the SmartNode device, go to section "Installing the Patton AC to DC power adapter". Otherwise, go to section "Installing the customer-provided DC power source" on page 35.

Installing the Patton AC to DC power adapter

Do the following to connect AC to DC power adapter (see figure 10) to the SmartNode device:

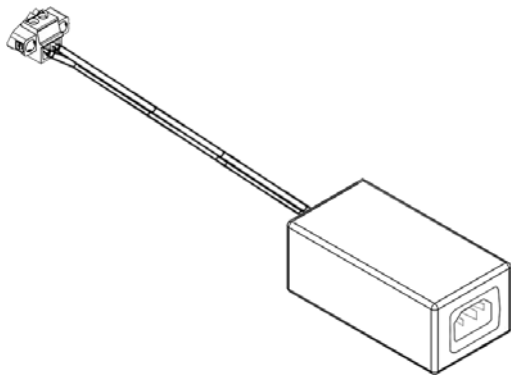


Figure 10. Patton AC to DC power adapter

1. Verify that the Patton AC to DC power adapter's AC power cable is compatible with local power standards. If it is not, refer to Chapter 6, "Contacting Patton for Assistance" on page 44 to find out how to replace it with a compatible cable.

   Note Positive and negative leads are pre-terminated in the terminal block connector when using the Patton AC to DC power adapter (part no. 25000005).

2. Remove the unneeded terminal block connector from the SmartNode device's terminal block socket, then plug the AC to DC power adapter connector into the socket.
3. Plug the AC power cable that came with the AC to DC power adapter into the adapter.
4. Plug the other end of the AC power cable into an AC power receptacle.

   Note The SmartNode device does not have a power switch; it powers on when the device is plugged in.

5. Verify that the green *POWER* LED is lit (see figure 11 on page 35). It blinks quickly during bootloader phase and blinks slowly during the boot process. It stay lit constantly when the system is up and running.

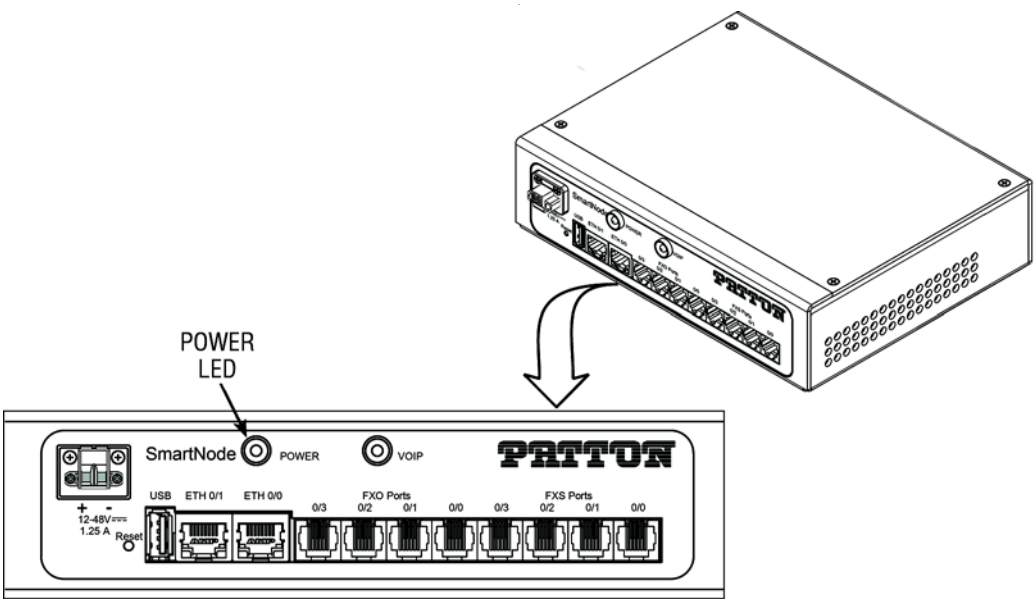


Figure 11. Power LED

Congratulations, you have finished installing the SmartNode device! Now go to Chapter 5, "Initial Configuration" on page 37.

Installing the customer-provided DC power source

Do the following:

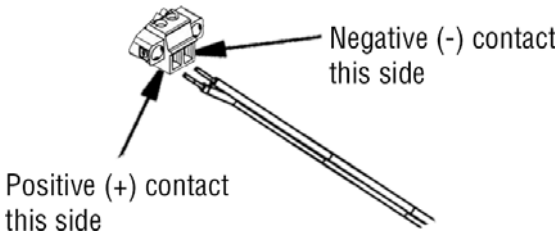


Figure 12. Power source leads installation

1. Verify that the power source is powered off and that it is compatible with the SmartNode device:

CAUTION

This device is not intended for use with power supplies that provide high instantaneous current (for example: lead acid batteries).

Note When applying direct DC power, it must be regulated 12 VDC ±5%, 1.25A minimum.

2. Determine which lead is positive and which lead is negative on the customer-supplied power adapter.

3. Insert the positive lead into the opening on the terminal block labeled **+** and the negative lead into the opening on the terminal block labeled **-**.
4. Tighten the screws on the block to secure the wires.
5. Apply power to the power source.

   Note The SmartNode device does not have a power switch; it powers on when the power source is activated.

6. Verify that the green *POWER* LED is lit (see figure 11 on page 35). It blinks quickly during bootloader phase and blinks slowly during the boot process. It stay lit constantly when the system is up and running.

Congratulations, you have finished installing the SmartNode device! Now go to Chapter 5, "Initial Configuration" on page 37.

Chapter 5 Initial Configuration

Chapter contents

Introduction

This chapter leads you through the basic steps to set up a new SmartNode device and to download a configuration.

Note If you haven't already installed the SmartNode device, refer to Chapter 4, "SmartNode Installation" on page 29.

If you are installing an SN5540E or SN4140E/2ETH, see section "Connecting the SN5540E or SN4140E/2ETH to your laptop PC". Otherwise, to install an SN4140E (with 1 Ethernet port), see section "Connecting the SN4140E to a laptop PC" on page 41.

Connecting the SN5540E or SN4140E/2ETH to your laptop PC

First, the SmartNode device 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 device is ready.

Note The SmartNode device is equipped with Auto-MDX Ethernet ports, so you can use straight-through cables for host or hub/switch connections (see figure 13).

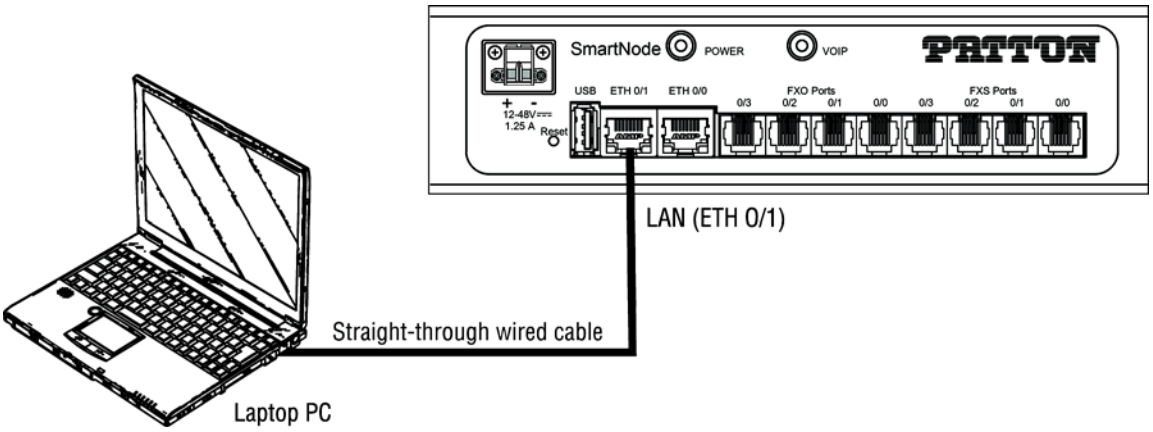


Figure 13. Connecting the SmartNode device to your laptop PC

The SmartNode device comes with a built-in DHCP server to simplify configuration. Therefore, to automatically configure the PC for IP connectivity to the SmartNode device, 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 7. 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 7. 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 device to the network" on page 40. 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 device 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 device is equipped with Auto-MDX Ethernet ports, so you can use straight through or crossover cables for host or hub/switch connections. (see figure 14).

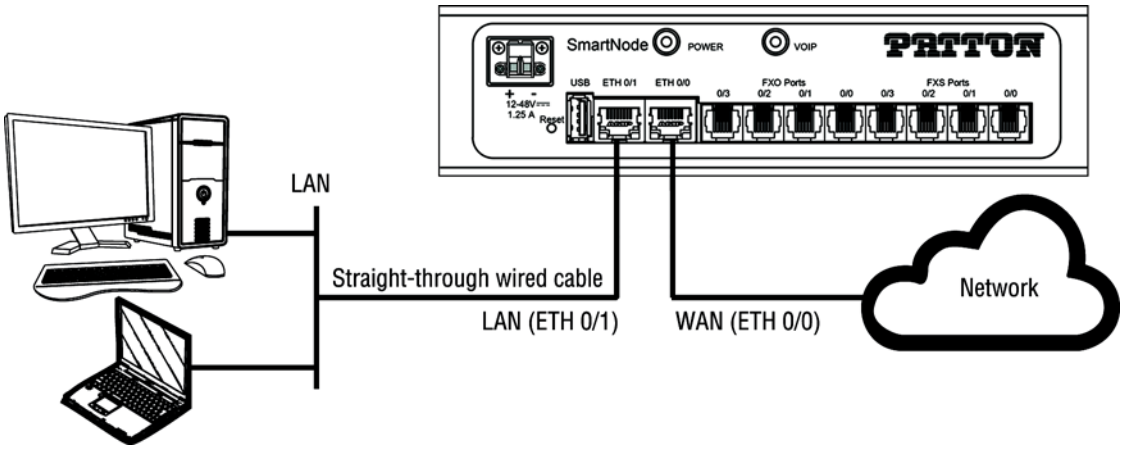


Figure 14. Connecting the SmartNode to the network

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.

Go to section “Loading the Configuration (optional)” on page 43.

Connecting the SN4140E to a laptop PC

First, the SmartNode device 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 device is ready.

Note The SmartNode device has a fixed IP and a DHCP client setup to simplify configuration. The Ethernet port is equipped with Auto-MDX so you can use a straight-through cable for host or hub/switch connection.

There are two options for configuring the SmartNode device:

1. The SmartNode device is connected to a laptop PC (see figure 15) that is configured with a fixed IP in the same range as the SmartNode device's IP address (for instance: PC's IP address; 192.168.200.20; mask: 255.255.255.0).

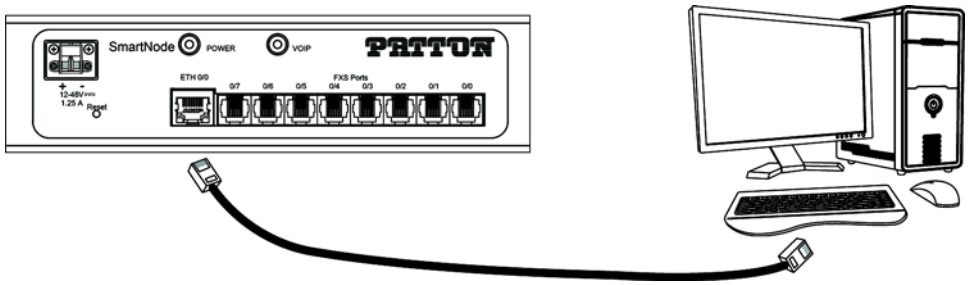


Figure 15. Connecting the SmartNode to a laptop PC

2. The SmartNode device is connected to a local area network (LAN) that has a DHCP server running which assigns an IP address to the SmartNode device (see figure 16). Using the SN Discovery tool, the SmartNode device's IP can be determined.

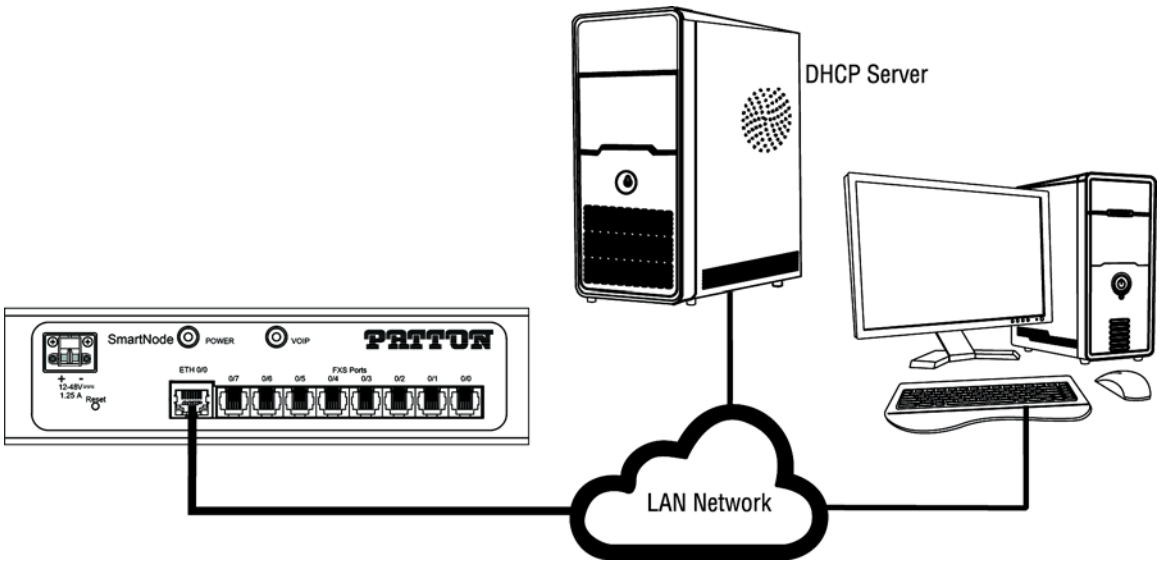


Figure 16. Connecting SmartNode device and PC to a LAN with DHCP server.

You can check the connection to the SmartNode by executing the ping command from the PC command window as follows:

```
ping 192.168.200.10
```

Configure the Desired IP Address

Factory-default IP Settings

The factory default configuration for the Ethernet interface is listed in table 7. The interface bound to *ETH 0/0 (WAN)* has a DHCP client running and a fixed IP address.

Table 8. Factory Default IP Address and Network Mask Configuration

WAN Interface Ethernet 0 (ETH 0/0)	IP Address	Network Mask
Fixed IP	192.168.200.10	255.255.255.0
DHCP client	DHCP	DHCP

If these addresses match with those of your network, go to section "Loading the Configuration (optional)" on page 43. 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 default IP address into the address field of the Telnet application:
192.168.200.10
Or use the *SN Discovery Tool* to find out the IP address previously assigned by the DHCP server.

Accessing your SmartNode device 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>
192.168.200.10>
```

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 (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).

```
192.168.200.10(ctx-ip)[Router]#interface WAN
 192.168.200.10(if-ip)[WAN]#no ipaddress
192.168.200.10(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 device can now be connected to your network.

Loading the Configuration (optional)

The WebWizard Community provides a collection of Wizards that help to reduce the setup time of a Patton device.

Simply download the appropriate Wizard to your device, execute it locally, and you are ready to do phone calls after the SmartNode has rebooted.

Optionally, you may execute the Wizard that matches your application online, and import the generated .cfg config into the SmartNode device.

In addition to that the Knowledgebase provides configuration file templates that may fit your application.

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 Command Line Reference 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 device 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 Command Line Reference Guide* available online at www.patton.com/manuals.

Chapter 6 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.

Contacting Patton Technical Services for Free Support

REGION	North America	Western Europe	Central & Eastern Europe
Location	**Maryland, USA**	**Bern, Switzerland**	**Budapest, Hungary**
Time Zone	EST/EDT UTC/GMT - 4/5 hours	CET/CEDT UTC/GMT + 1/2 hours	CET/CEDT UTC/GMT + 1/2 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
Email	support@patton.com	support@patton.com	support@patton.com
Phone	+ 1 301 975 1007	+41 31 985 25 55	+36 439 3835
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

Chapter contents

Compliance

EMC compliance
EN55032 and EN55024

Safety compliance
EN62368-1

CE compliance
- FCC Part 15 Class A
- RoHS Compliant

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; 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**

Chapter contents

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

Power Input

Terminal block, 12–48 VDC nominal

Two screws fasten the plug to the enclosure to lessen the chance of yanking it loose.

Note Optional extended temperature external AC to DC power adapter is available for extra charge.

Optional Power Input

Also offer a nominal 48V input (36–60 VDC range)

Mounting

DIN-rail mounting clip on unit. Optional shelf mounting with the clip removed

Enclosure

Metal enclosure to be installed in a cabinet on a DIN-rail or on a shelf

Vibration

IEC 60068-2-6, 7.5mm, 5–8 Hz, 2g, 11 ms

Shock

IEC 60068-2-27, 15 g, 11 ms

Electrical Protection

Power Input spike and surge protection per MIL STD 1275

Optional

Conformal coating for protection against condensation and frost. This is a viable option for the nonsealed version.

MIL STD 1275 protection

Capacity

Up to 8 simultaneous low- bandwidth voice or HD calls with SRTP or T.38 fax calls

Voice Signaling

SIPv2 over UDP/TCP or TLS**

SIP call transfer, redirect

Overlap dialing, PRACK, P-Header support

Multi instance, simultaneous support of multiple registrars and direct IP dialing)

DTMF in-band & out-of-band

Localization - All tones programmable (dial, ringing, busy)

B2BUA—eSBC capable**

Data Connectivity

Two 10/100/1000Base-TX Ethernet ports (SN5540E; SN4140E/2ETH)

One 10/100/1000Base-TX Ethernet port (SN4140E)

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

Voice Processing

G.722, G.711m/A-law

G.723.1 (6.4 kbps)

G.729, 729a, 729ab (8 kbps)

G.726 (16, 24, 32, 40 Kbps)

AMR-NB (4.75, 5.15, 5.9, 6.7, 7.4, 7.95, 10.2, 12.2 kbps)

Fax relay T.38, bypass G.711

iLBC at 13.33 kbps (SIP-SIP only)

G.168-2004 echo cancellation (128 ms)

Up to 8 simultaneous low-bandwidth voice or T.38 fax calls

Up to 8 HD calls with SRTP

Silence suppression and comfort noise

Adaptive and configurable dejitter buffer

Configurable RTP packet length

Call Switching and Services

Regular expression based call routing and number manipulation

Number blocking

Short-dialing

Digit collection, distribution and hunt groups

Transparent line extension

Fallback Routing: Soft fall back to alternative route(s)

FXS Connectivity

2-wire Loopstart on RJ-11/12

EuroPOTS (ETSI EG201188)

Programmable AC impedance, feeding, ring and onhook voltage

Caller-ID FSK and ITU V.23/Bell 202 generation

Long Reach FXS—10 km @ 3REN load

Secondary Surge Protection*

FXO Connectivity

2-wire Loopstart—RJ11/12

Programmable impedance

Ring detection, tone detection

Caller ID detection (FXS, DTMF)

Disconnect supervision

Connectivity

1 or 2 10/100/1000Base-T Ethernet ports (depending on model)

Auto-MDIX

USB 2.0 host port

DHCP Client & Server

PPPoE Client (multi-session)

VLAN support, Secondary IP

IPv4 & IPv6 dual stack

ICMP

ACL

DNS, DynDNS

SNTP Client

Quality of Service, SLA Assurance

Patton Cloud based Call Quality Monitoring & Alerting

Voice priority, DownStreamQoS™

Traffic Management, shaping policing

iEEE 802.1p, IEEE 802.1Q, 4096 VLANs (Tag insertion/deletion), TOS, DiffServ Labeling

Management

Patton Cloud Orchestrated, Advanced CDRs and Call Quality Metrics**

Customizable WebWizard, Webbased

GUI HTTP/HTTPS access, CLI Telnet / SSH

Secure Auto-Provisioning (Zero Touch) with built in root CA

Separate config domain (LAN side config and WAN side config)

TR-069 (CWMP-ACS), TFTP, HTTP, HTTPS configuration & firmware up- and download

Radius, TACACS+

SNMPv3 agent - MIB II and private MIB

Built-in diagnostic tools

Physical

Dimensions: 8-1/16 W x 6-3/16 D x 2-1/8 H in. (20.3 W x 15.8 D x 5.4 H cm)

Weight: 1 lb 15 oz (890 g)

Power Consumption: ~7.2 watts

Operating Temperature: -40 to 158°F (-40 to +70°C)

Humidity: 85% condensing. Conformal coating option available if 100% humidity is requested

Safety & Compliance

EMC compliance: EN55022 and EN55024

Safety compliance: EN 60950

CE compliance

FCC Part 15 Class A

TBR21 (FXS)

RoHS

ITU-T K.21 protection (FXS ports)**

* Specifications subject to change without notice. ** Internal power supplies available on special order basis. For more information, contact sales@patton.com

Appendix C **Cabling**

Chapter contents

Introduction

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

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 SmartNode device 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 if the switch has a separate ARP table for each connection.

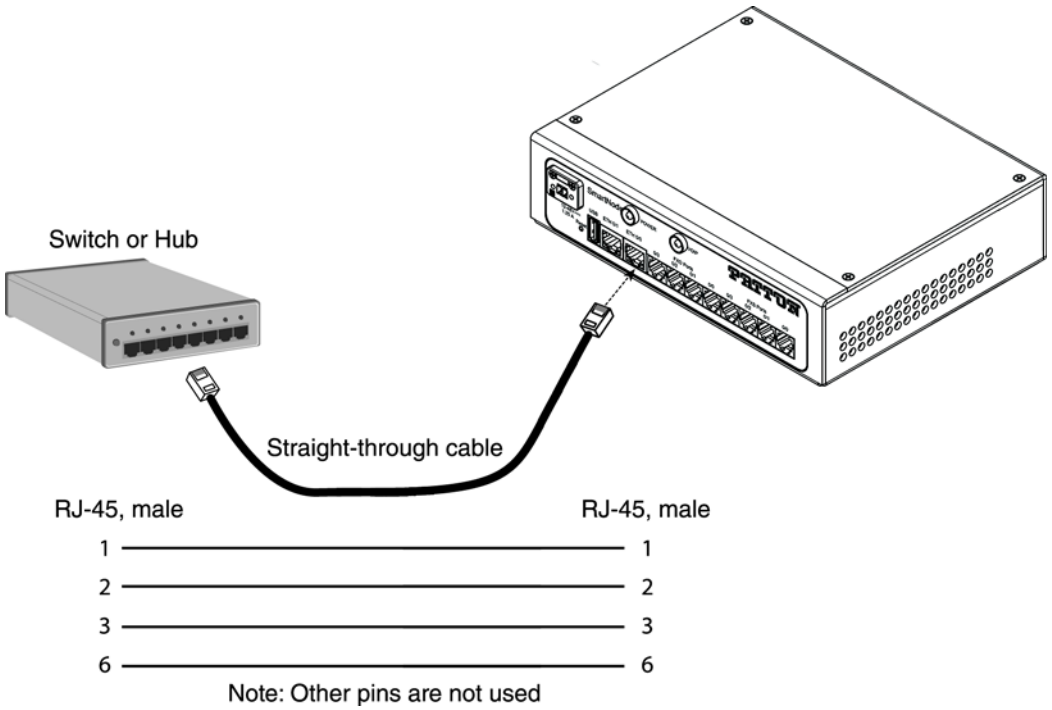


Figure 17. Typical Ethernet straight-through cable diagram for 10/100Base-T

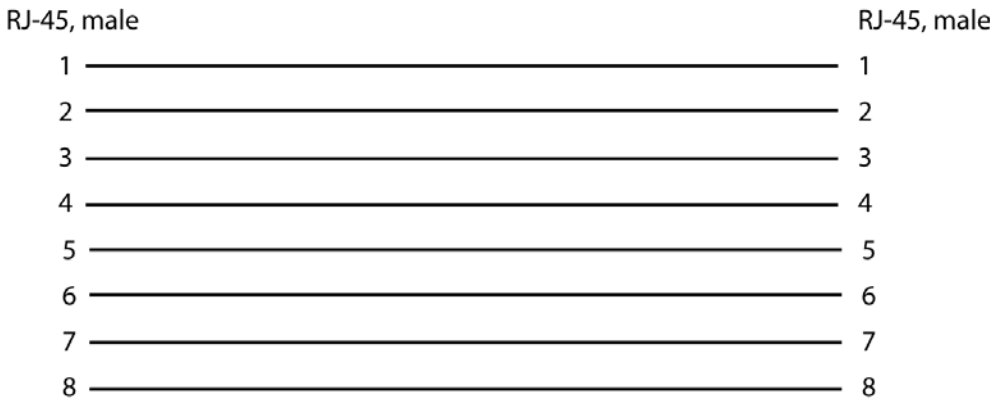


Figure 18. Typical Ethernet straight-through cable diagram for 1000Base-T

Analog FXS

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.

Applicable to SmartNode devices equipped with FXS ports. The FXS ports are connected to analog terminals (phones, fax machines, answering machines, etc.) via cables terminated with RJ-11 connectors (see section "FXS port" on page 59 for details on port pinouts).

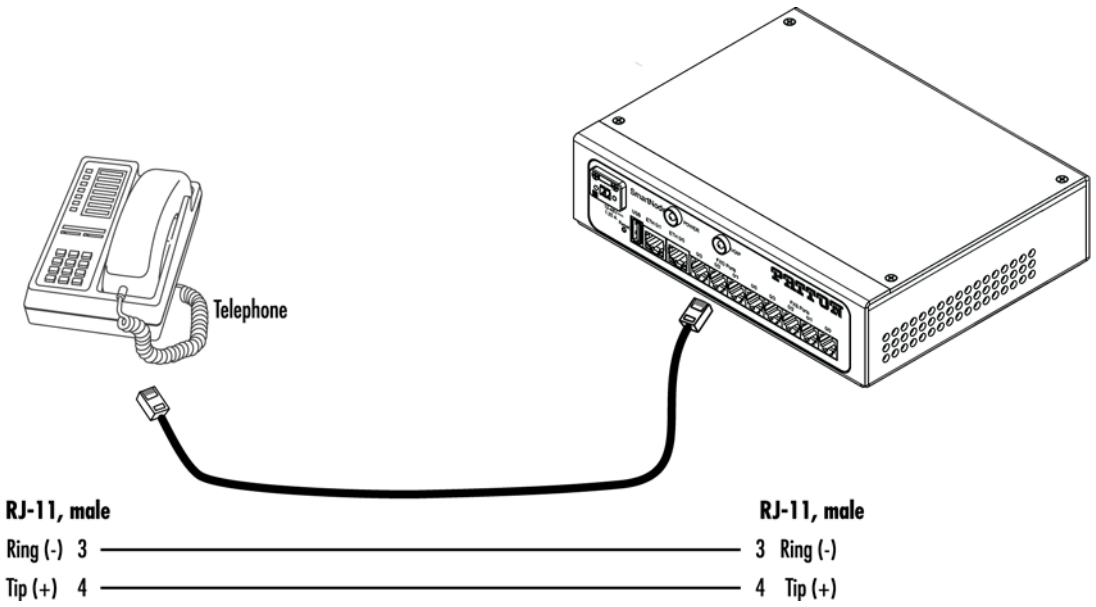


Figure 19. Connecting an FXS device

Analog FXO

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.

Applicable to SmartNodes equipped with FXO ports. The FXO ports are connected to analog phone lines via cables terminated with RJ-11 connectors (see section "FXO port" on page 60 for details on port pinouts).

Note The phone line socket (connector type and pinout) available from the public network vary from country to country. Refer to technical information available from your local operator for additional cabling information.

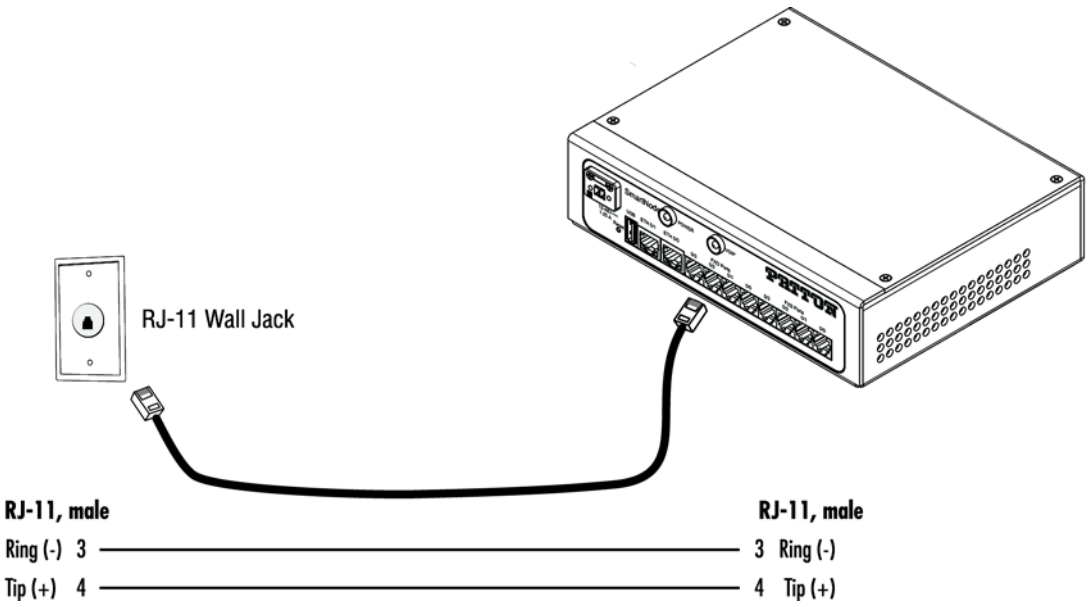


Figure 20. Connecting to an FXO line jack

Appendix D **Port pin-outs**

Chapter contents

Introduction

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

Ethernet

Table 9. 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 10. 1000Base-T RJ-45 Socket

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

FXS port

The FXS ports use an RJ-11 connector with 6 positions. The middle two positions 3 and 4 are used according to table 11 and figure 21 on page 60.

Table 11. RJ-11 socket

Pin	Signal
3	Ring (-)
4	Tip (+)

Note Pins not listed are not used.

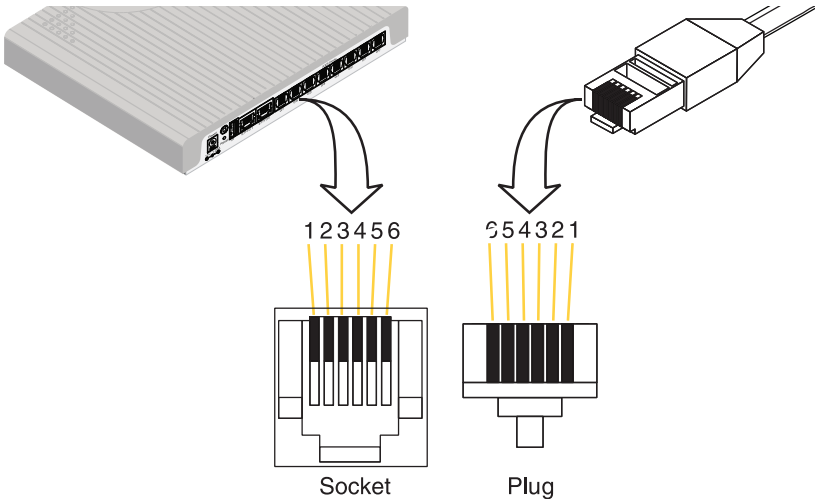


Figure 21. RJ-11 pinout diagram

FXO port

The FXO ports use an RJ-11 connector with 6 positions. The middle two positions 3 and 4 are used according to table 12.

Table 12. RJ-11 socket

Pin	Signal
3	Ring (-)
4	Tip (+)

Note Pins not listed are not used.

Appendix E SmartNode Device Factory Configuration

Chapter contents

Introduction

Factory configuration settings for the SmartNode device can be obtained with the following command through the CLI;

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

See Chapter 5, "Initial Configuration" on page 37 for more details about IP address settings for initial configuration.

Appendix F Reset Button Functions

Chapter contents

Introduction

The *Reset* button (see figure 22 for the SN4140E or figure 23 on page 65 for the SN5540E) 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 65)
- 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 65)
- 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 65)

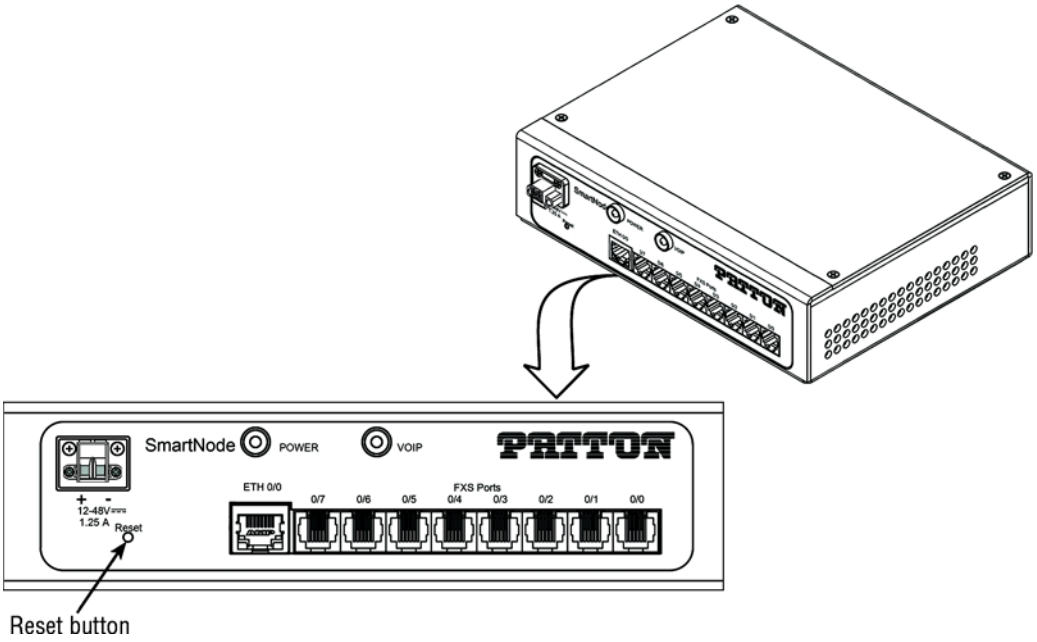


Figure 22. SN4140E *Reset* button

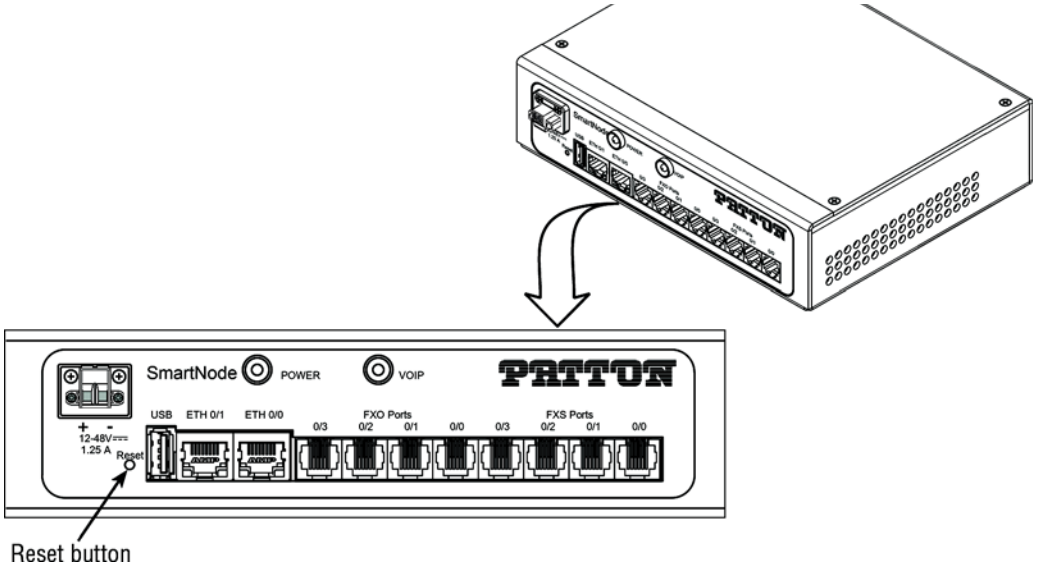


Figure 23. SN5540E *Reset* button

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 24) the button is pressed (see table 13 on page 66 for the results from pressing the button).

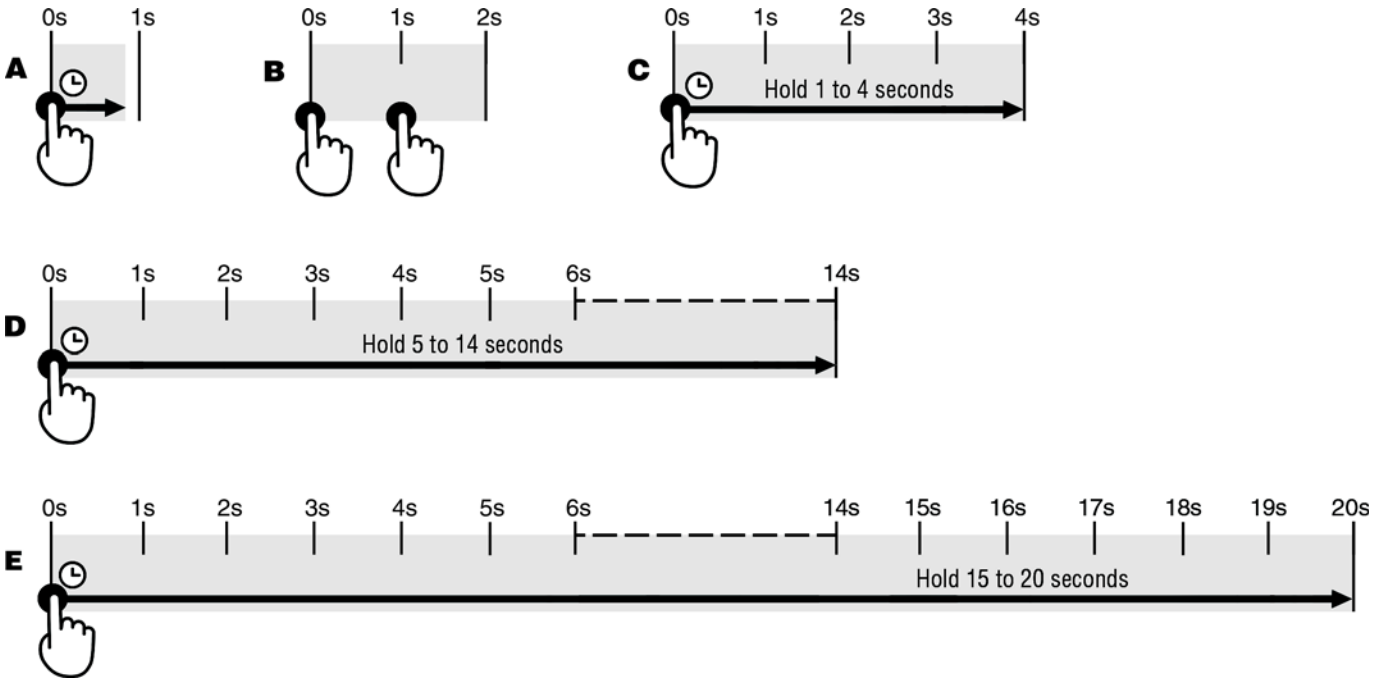


Figure 24. Reset button periods (in seconds) for performing actions

Table 13. Results from pressing the Reset button

Period	Action
A (less than 1 second)	Reboot device
B (press twice with 1-second gap between presses)	Patton Cloud On-boarding procedure. Do the following: 1. Log into Patton Cloud at https://patton.io. 2. Click on *Devices*. 3. Click on *Register Device(s)* to register the SmartNode device.
C (1 to 4 seconds)	No action
D (5 to 14 seconds)	• Erase *startup-config* • Reboot (indicated by the slow blinking of all LEDs
E (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)

Very exceptional case—minimal config recovery

If, after performing the procedure in section "Resetting the SmartNode device when it is operating and the POWER LED is lit" on page 65, 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 45 for details.

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 operating and the POWER LED is lit" on page 65 did not provide a remedy.

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 14. 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-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 14), 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 **Installing Optional Rack Ears**

Chapter contents

Installing the rack ears

Do the following:

1. While holding the rack ear in place where shown in figure 25, use a cross-tip screwdriver to install three mounting screws (included with the rack ears kit) to secure the rack ear.
2. Repeat step 1 to install the remaining rack ear on the other side of the device.

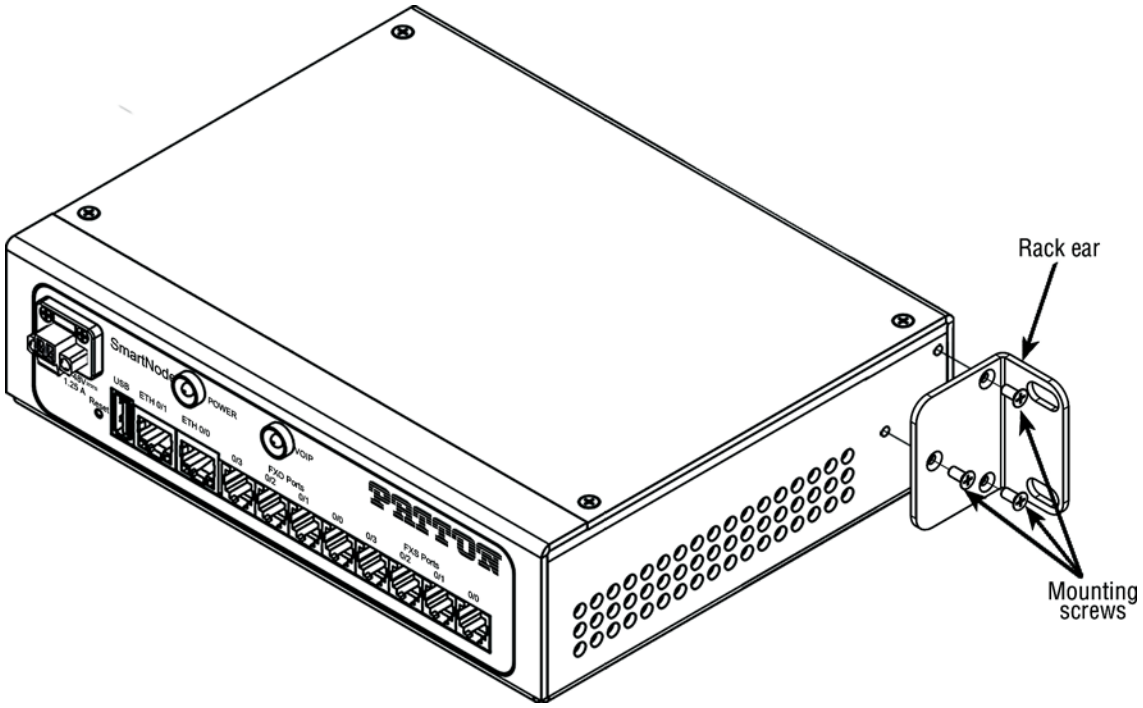


Figure 25. Connecting the 552-GS2 to a CL1300R

3. Install the device in a 9-inch rack using mounting screws (not supplied).

Congratulations! The rack ears are installed.

If you have a DIN rail mounting clip to install, go to Appendix H, "Installing Optional DIN Rail Mounting Clip" on page 70. Otherwise, go to section "Connecting cables" on page 32.

Appendix H Installing Optional DIN Rail Mounting Clip

Chapter contents

DIN rail mounting clip installation

1. With the SmartNode device oriented top side up, place the mounting clip as shown figure 26.
2. Using a cross-tip screwdriver, install the two mounting screws (included with the DIN rail mounting clip kit) to secure the clip.

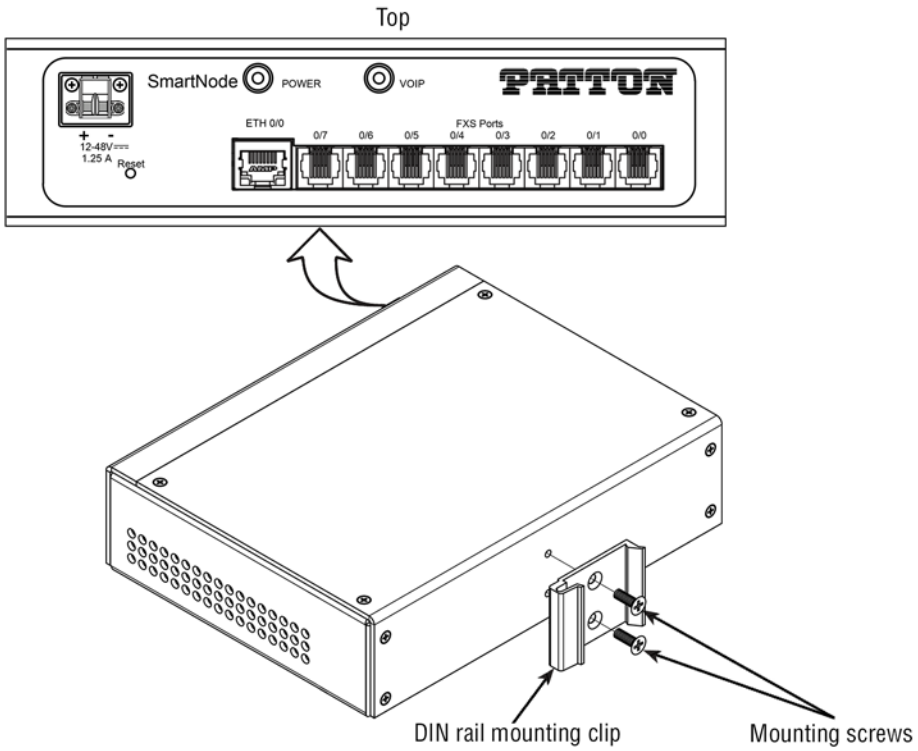


Figure 26. DIN rail mounting clip location

Attaching the SmartNode device to a DIN rail using the mounting clip

Do the following:

1. Rotate the SmartNode device so the clip is oriented as shown in figure 27 on page 72.

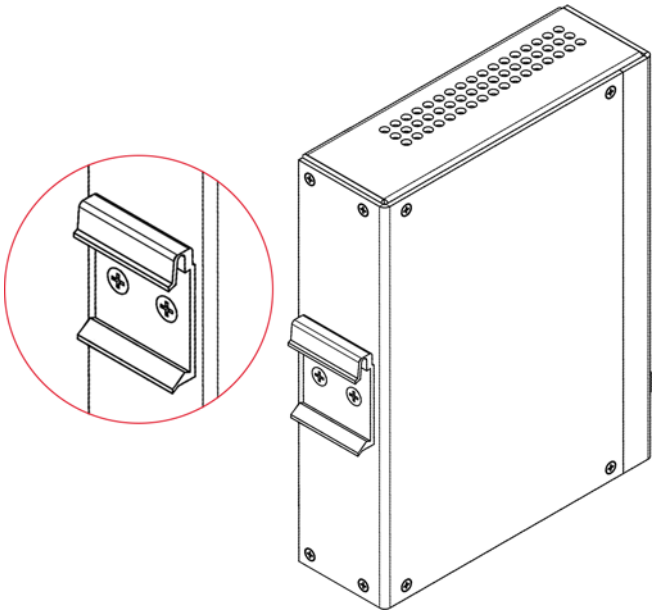


Figure 27. Mounting clip oriented for installation on DIN rail

2. The SmartNode device can be attached to top hat NS 35/7.5 (35 H × 7.5 D mm) and NS 35/15 (35 H × 15 D mm) section types of DIN rail (see figure 28).

   Install the device onto the DIN rail by inserting the upper DIN rail lip into the upper DIN rail clip slot (see callout 1 on figure 29 on page 73).

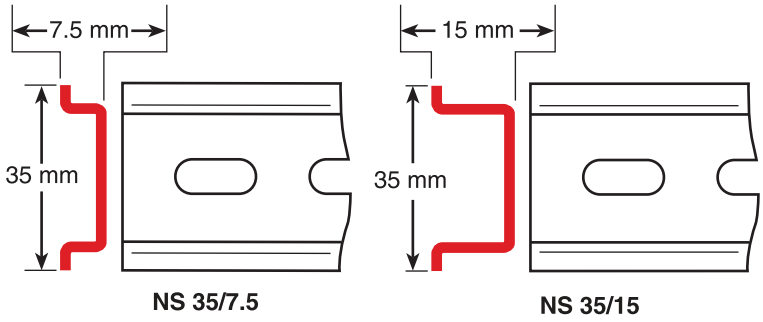


Figure 28. DIN rail types

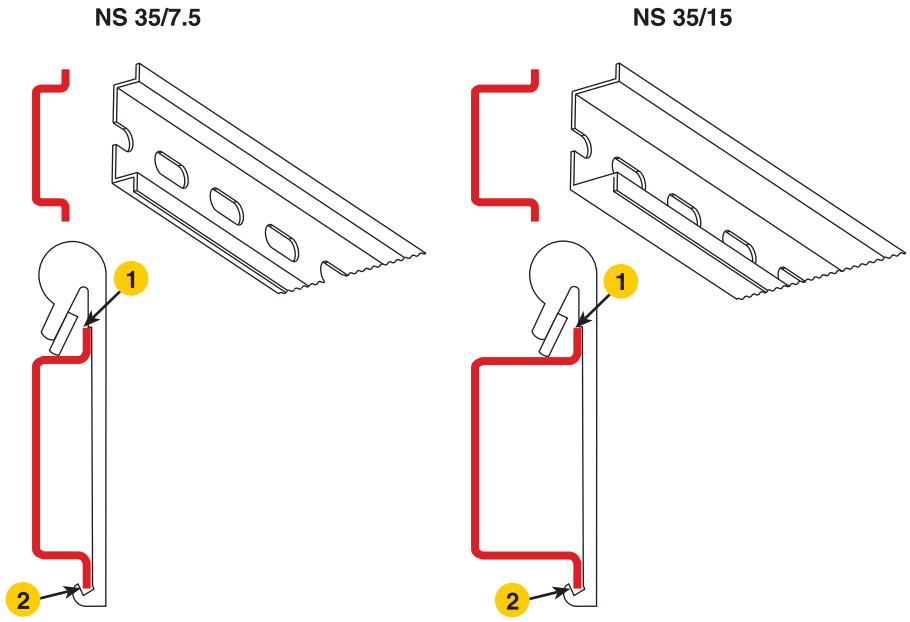


Figure 29. Installing the device onto the DIN rail

3. Rotate the device until the lower DIN rail lip snaps into the lower DIN rail clip slot (see callout 2 on figure 29).

The device has been installed onto the DIN rail; proceed to section "Connecting cables" on page 32.

Appendix I End User License Agreement

Chapter contents

End User License Agreement

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

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