SmartNode 4970A Series
Multi-Port T1/E1/PRI VoIP Gateway

User Manual

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

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Important Information

To use virtual private network (VPN) and/or AES/DES/3DES encryption capabilities with the SmartNode 4970A, you may need to purchase additional licenses, hardware, software, network connection, and/or service. Contact sales@patton.com or +1 (301) 975-1000 for assistance.

Warranty Information

The software described in this document is furnished under a license and may be used or copied only in accordance with the terms of such license. For information about the license, see Appendix G, "End user license agreement" on page 60 or go to **www.patton.com**.

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 4970A hardware, installation and basic configuration. For detailed software configuration information refer to the *Trinity Software Configuration Guide* and the available Configuration Notes.

Audience

This guide is intended for the following users:

- Operators
- Installers
- Maintenance technicians

Structure

This guide contains the following chapters and appendices:

- Chapter 1, starting on page 13, contains what you need to quickly start using the SmartNode 4970A.
- Chapter 2, starting on page 16, provides information about router features and capabilities
- Chapter 3, starting on page 21, contains an overview describing router operation and applications
- Chapter 4, starting on page 23, provides hardware installation procedures
- Chapter 5, starting on page 28, provides quick-start procedures for configuring the SmartNode router
- Chapter 6, starting on page 34, contains information on contacting Patton technical support for assistance
- Appendix A, starting on page 37, contains compliance information for the router
- Appendix B, starting on page 40, contains specifications for the routers
- Appendix C, starting on page 44, provides cable recommendations
- Appendix D, starting on page 50, describes the router's ports and pin-outs
- Appendix E, starting on page 53, lists the factory configuration settings for SmartNode 4970A
- Appendix F, starting on page 55, describes the *Reset* button functions
- Appendix G, starting on page 60, provides license information that describes acceptable usage of the software provided with the SmartNode 4970A

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

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.
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 SN4970A Series Quick Start

Chapter contents

Default IP Settings

ETH 0/0:

- 192.168.200.10 | 255.255.255.0
- DHCP Client

Console port

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

Default Login

Username: *admin*

Leave the password empty

Press the *Enter* key after the password prompt.

IMPORTANT

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.

E1 & T1 PRI

The E1/T1 PRI is usually connected to a PBX or switch—local exchange (LE). Type and pin outs of these devices vary depending on the manufacturer. In most cases, a straight-through RJ-45 to RJ-45 can be used to connect the PRI with a PBX. A cross-over cable is required to connect to an NT device, as illustrated in figure 1 on page 15.

WARNING

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

WARNING

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

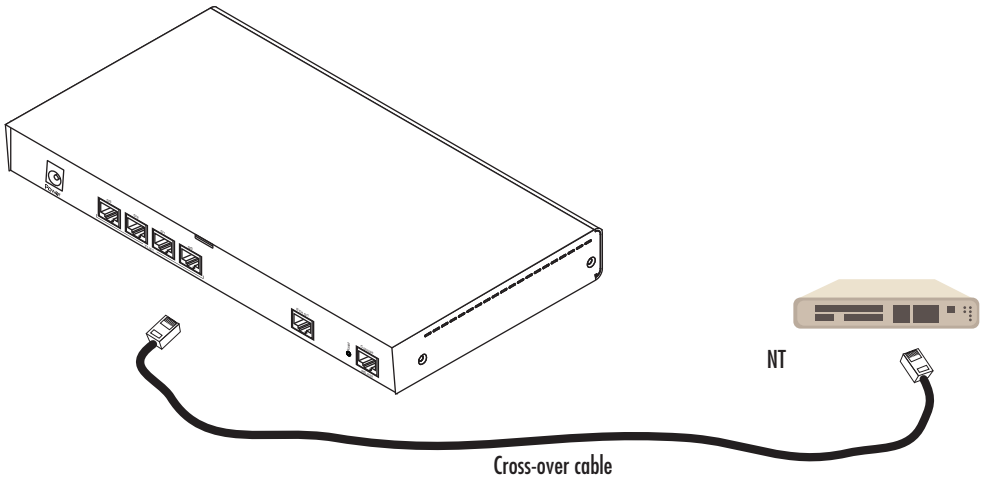

Figure 1. Connecting an E1/T1 PRI port to an NT device

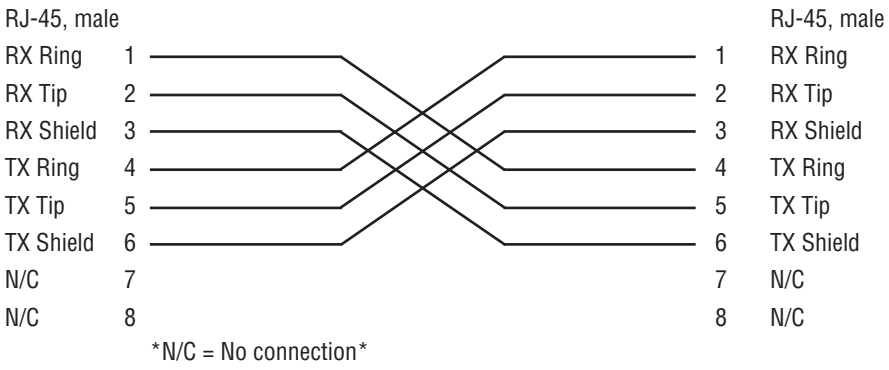

Figure 2. E1/T1 PRI crossover cable

PRI port pinout

Table 2. PRI: RJ-45 socket

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

Note Pins not listed are not used.

Chapter 2 General information

Chapter contents

SmartNode 4970A overview

As enterprises move toward unified communications, the SmartNode™ 4970A Enterprise VoIP Media Gateway (see figure 3) provides a smooth transition by either IP-enabling traditional PBX systems for SIP trunking over existing Internet connection, adding PSTN-breakout for number portability, or enabling PSTN access for IP PBX and unified communications systems. Preserve investment in legacy phone equipment while taking the next step toward unified communications with Patton's proven SmartNode™ VoIP solutions.

Figure 3. SmartNode 4970A

The SmartNode 4970A performs the following major functions:

- **Up to 120 VoIP Calls**—With four T1/E1/PRI ports and one Gigabit Ethernet port.
- **Proven Interoperability**—Interoperable with all the major-brand softswitches and IP-PBXs.
- **Management & Provisioning**—Web-based management, SNMP v1-v3, TR-069, Http, Https, Command Line Interface. Automated provisioning for easy large-scale deployments.
- **Comprehensive Signaling Protocol Support**—Supports SIP, ISDN, and T1/E1 telephony—plus T.38 and SuperG3 FAX—over TDM/PSTN and IP/Ethernet services simultaneously.
- **Transparent Telephony Features**—Complex number manipulation and mapping for seamless integration with existing infrastructures, CLIP, CLIR, hold, transfer and much more.
- **High Precision Clock**—Delivers DECT PBX interoperability with reliable fax performance.
- **Optionally, the product supports (at additional cost)**—SIP-TLS/SRTP; SIP Registrar
- **Secure Zero Touch Provisioning**

SN4970A model codes

The SmartNode 4970A series consists of several models. They differ in the number of PRI ports and voice channels supported. All models come equipped with one 10/100/1000Base-T Ethernet port and high precision Stratum III clock (< 5 ppm).

SmartNode 4970A rear panel

The SmartNode 4970A rear panel ports are described in table 3.

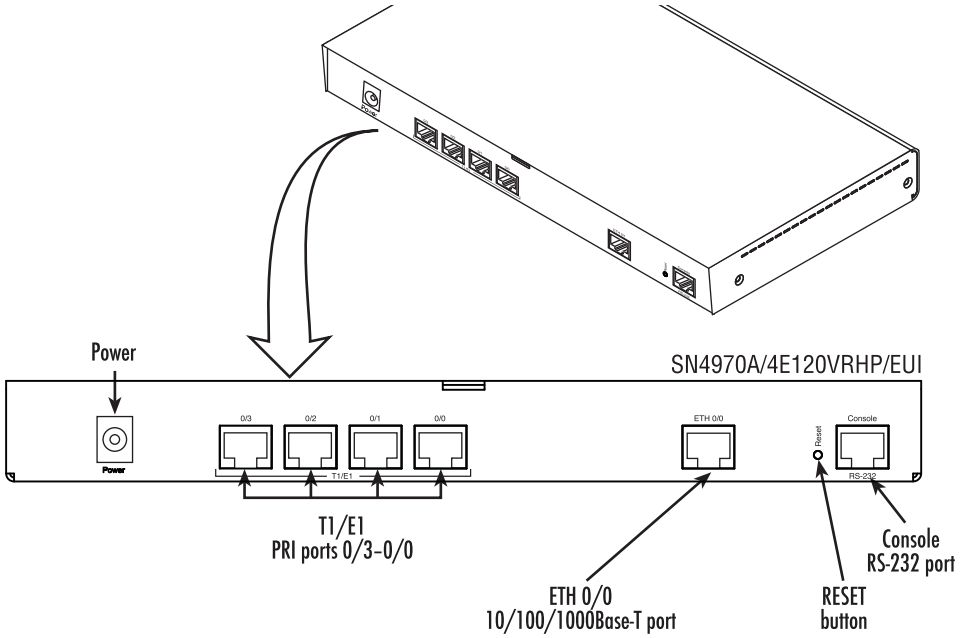

Figure 4. SN4970A rear panel

Table 3. Rear panel ports

Port	Description
ETH 0/0	Auto-MDX Gigabit-Ethernet port, RJ-45 (see figure 4), connects the unit to an Ethernet WAN device (for example, a cable modem, DSL modem, or fiber modem). Note: Only full duplex modes are supported.
PRI 0/0 - PRI 0/3	RJ-45 connector providing E1 (2.048Mbps) or T1(1.533 Mbps) PRI interface, meeting all requirements of ITU-T recommendations for G.703. Use a shielded E1 or T1 interface cable for 120 Ohm balanced connections to connect the SmartNode with an NT or ET, e.g. a PBX or LE.
Console	Used for service and maintenance, the Console port (see figure 4), 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**: 9600 bps, 8 bits, no parity, 1 stop bit, no flow control
DC power input	Electricity supply socket. (see figure 4).
Reset	The reset button has several functions, as described in appendix F, “Reset Button Functions” on page 55.

SmartNode 4970A front panel

Figure 5 shows SmartNode 4970A front panel LEDs, the LED definitions are listed in table 4 on page 19.

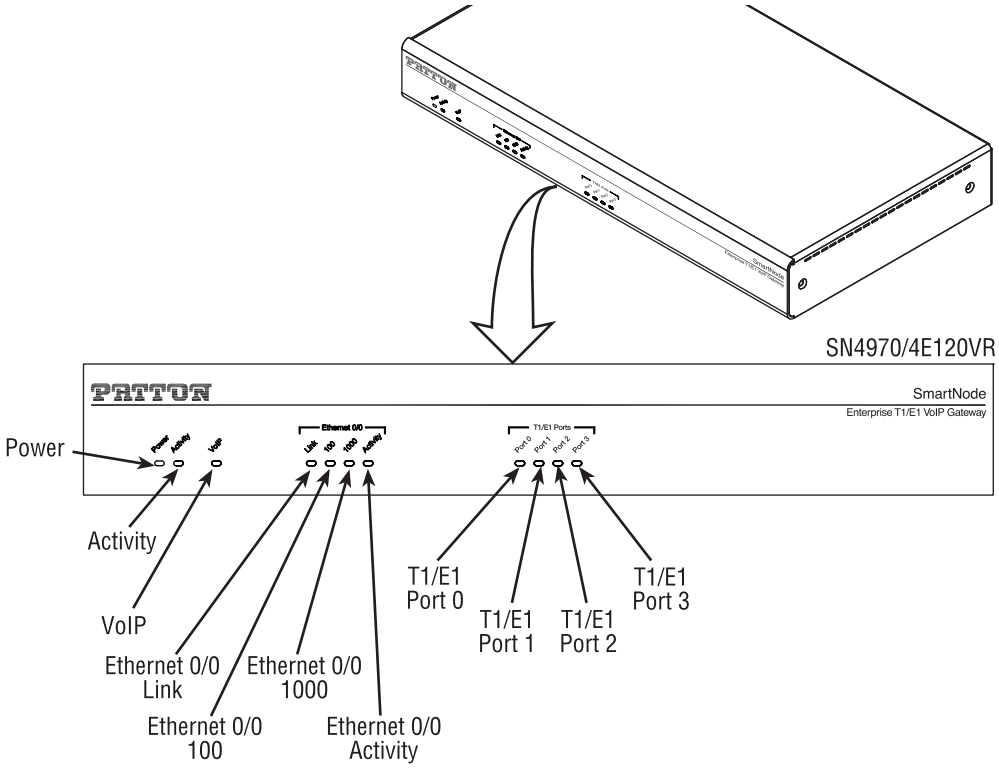

Figure 5. SmartNode 4970A front panel

Table 4. SN4970A Front and Rear panel LEDs

LED	Description
Note	If an error occurs, all LEDs will flash once per second.
Power	When lit, indicates power is applied.
Run	When lit, the unit is in normal operation. Flashes once per second during boot (startup).
VoIP Link	• On indicates the gateway is registered to a SIP server, or, in the case of direct routing, has at least one active VoIP connection. • Off indicates the unit is not configured or registered, or has no active direct-routed VoIP connection. • Flashing green indicates that the unit is attempting to register or has failed to register.
Ethernet Link	• On when the Ethernet connection on the corresponding port has a link indication.

Table 4. SN4970A Front and Rear panel LEDs (Continued)

LED	Description
Ethernet Speed 10/100	When the Ethernet Link LED is on, then: • On when the Ethernet is connected to a 100Mb network. • Off when the Ethernet is connected to a 10Mb network.
Ethernet Speed 1000	• On when the Ethernet is connected to a 1000Mb network.
Ethernet Activity	• Flashes when data is received or transmitted at the corresponding Ethernet port.
PRI Link/Status	• On when L1 and L2 are active. Flashes when there are ongoing calls. • Off when no line or PBX is connected, or the port is shut down.

Chapter 3 Applications overview

Chapter contents

Introduction

Patton's SmartNode Enterprise VoIP Media Gateways 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 and reliable VoIP and data networks. This chapter describes typical applications for which this SmartNode is uniquely suited.

Note Detailed configuration information for SmartNode applications can be found online at **www.patton.com/smartnode**.

Application—Convert Legacy PBX to VoIP

The SmartNode 4970A Series can be used to make and receive calls to and from the public ISDN network and Internet Telephony services on any ISDN Terminal (Phone or PBX) (see figure 6). Using individually configurable routing tables, an outbound call can be directed to the local PSTN connection or to an Internet telephony service provider (ISTP). Inbound calls from the Internet and the PSTN can ring the same phone.

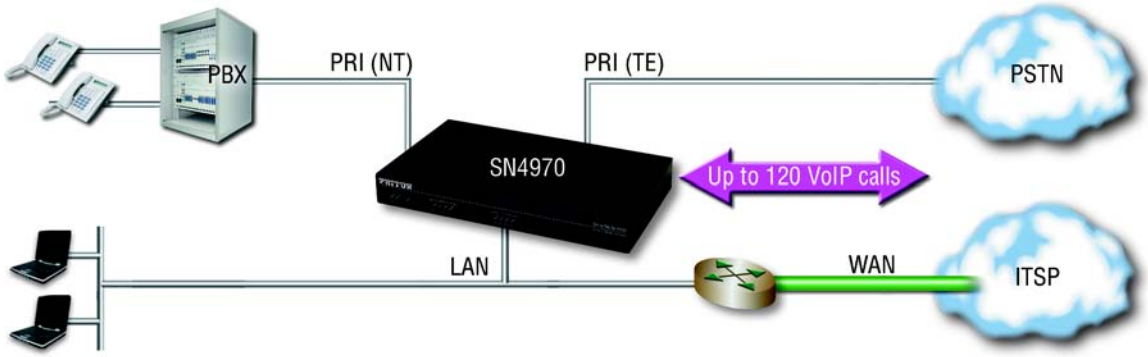

Figure 6. VoIP Gateway Application

For an installation where there are existing routers and access modems, the SN4970A is a cost-effective solution to bring SIP-trunking service to a traditional PBX.

Chapter 4 SmartNode installation

Chapter contents

Planning the installation

Before installing the gateway router device, the following tasks should be completed:

- **Create a network diagram** (see section "Network information" on page 24)
- **Gather IP related information** (see section "IP related information" on page 24 for more information)
- **Install the hardware and software needed to configure the SmartNode**. (See section "Software tools" on page 25)

After you have finished preparing for gateway router installation, go to section "Installing the gateway" on page 25 to install the device.

Site log

Patton recommends that you maintain a site log to record all actions relevant to the system, if you do not already keep such a log. Site log entries should include information such as listed in table 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 provided for several types of network interfaces are described in the following sections.

Network Diagram

Draw a network overview diagram that displays all neighboring IP nodes, connected elements and telephony components.

IP related information

Before you can set up the basic IP connectivity for your SmartNode 4970A you should have the following information:

- IP addresses used for Ethernet port
- Subnet mask used for Ethernet port
- IP addresses and/or URL of SIP servers or Internet telephony services (if used)
- 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 Web* to configure the software on your SmartNode router.

AC Power Mains

If you suspect that your AC power is not reliable, for example if room lights flicker often or there is machinery with large motors nearby, have a qualified professional test the power. Patton recommends that you include an uninterruptible power supply (UPS) in the installation to ensure that VoIP service is not impaired if the power fails. Refer to "Connecting the power supply" on page 27.

Location and mounting requirements

The SmartNode router is intended to be placed on a desktop or similar sturdy, flat surface that offers easy access to the cables. Allow sufficient space at the rear of the chassis for cable connections. Additionally, you should consider the need to access the unit for future upgrades and maintenance.

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

Installing the gateway

SmartNode hardware installation consists of the following:

- Placing the device at the desired installation location (see section "Placing the SmartNode" on page 25)
- Connecting the interface and power cables (see section "Installing cables")

When you finish installing the SmartNode, go to chapter 5, "Initial configuration" on page 28.

Placing the SmartNode

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

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

Installing cables

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

Connect the cables in the following order:

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

1. Connect the T1/E1 cables to the PRI T1/E1 ports (see Appendix C on page 44 and Appendix D on page 50).
2. Connect the 10/100/1000Base-T Ethernet (see section "Connecting the 10/100/1000Base-T Ethernet cable" on page 26)
3. Connect the power mains cable (see section "Connecting the power supply" on page 27)

Connecting the PRI

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

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

Connecting the 10/100/1000Base-T Ethernet cable

The SmartNode 4970A has automatic MDX (auto-crossover) detection and configuration on the Ethernet port. The port can be connected to a host or hub/switch with a straight-through or cross-over wired cable. Connect the LAN network to *ETH 0/0*.

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

For details on the Ethernet port pinout and cables, refer to Appendix C, "Cabling" on page 44 and Appendix D, "Port pin-outs" on page 50.

Connecting the power supply

WARNING

- **Do not connect power to the AC Mains at this time.**
- **The external power adapter shall be a listed Limited Power Source.**
- **The 4970A external power supply automatically adjusts to accept an input voltage from 100 to 240 VAC (50/60 Hz). Verify that the proper voltage is present before plugging the power cord into the receptacle. Failure to do so could result in equipment damage.**

1. Insert the barrel type connector end of the AC power cord into the external power supply connector (see figure 7).
2. Insert the female end of the power cord into the internal power supply connector.

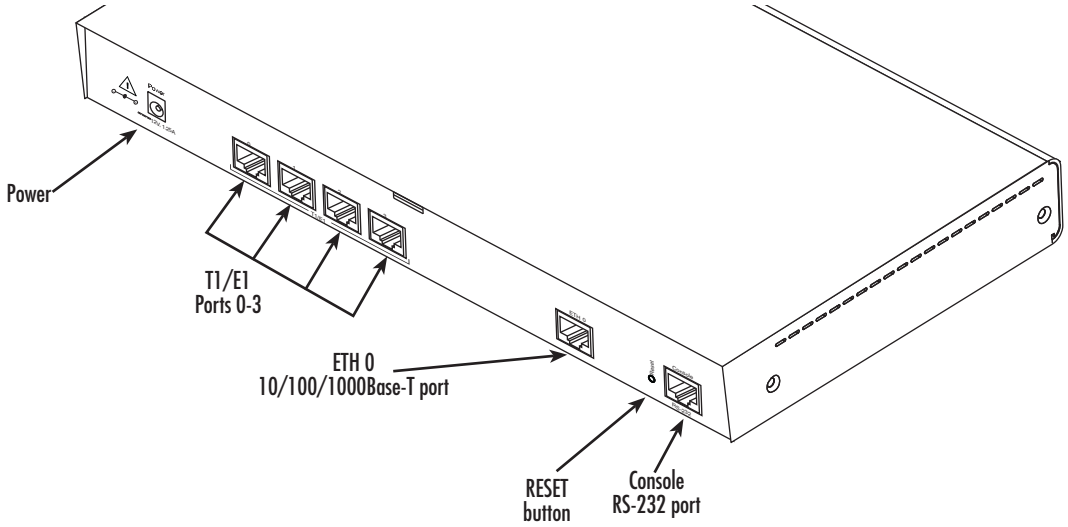

Figure 7. Power connector location on rear panel

3. Verify that the AC power cord included with your router is compatible with local standards. If it is not, refer to chapter 6, "Contacting Patton for assistance" on page 34 to find out how to replace it with a compatible power cord.
4. Connect the male end of the power cord to an appropriate power outlet.
5. Verify that the green *Power* LED is lit (see figure 7).

Chapter 5 Initial configuration

Chapter contents

Introduction

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

> **Note** If you haven't already installed the SmartNode, refer to Chapter 3, "SmartNode Installation" on page 22.

- Connecting the SmartNode to your laptop PC
- Configuring the desired IP address (see page 30)
- Connecting the SmartNode to the network (see page 31)
- Loading the configuration (optional) (see page 32)

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.

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.

CAUTION

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

The SmartNode is equipped with an Auto-MDX Ethernet port, so you can use straight-through cables for host or hub/switch connections (see figure 8).

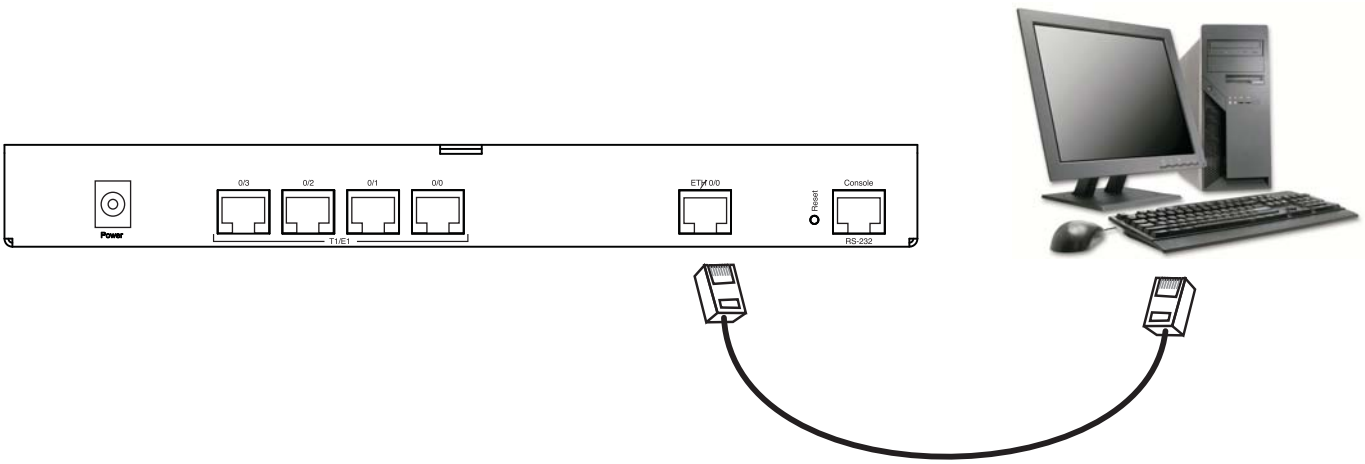

Figure 8. Connecting the SmartNode to your Laptop PC

The SmartNode comes with a built-in DHCP client and a fixed IP address to simplify configuration. The SmartNode will receive an IP address from the DHCP server in the network or it can be directly accessed using the static IP address.

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 6. The Ethernet interface is activated upon power-up. The WAN interface uses DHCP client to automatically assign the IP address and network mask.

Table 6. Factory Default IP Address and Network Mask Configuration

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

Note On software versions 3.16.0, 3.15.*X*, 3.14.*X*, and older, the static IP address was*192.168.200.10*, and the network mask was *255.255.255.0*

If these addresses match with those of your network, go to section "Connecting the SmartNode to the Network" on page 31. Otherwise, refer to the following sections to change the addresses and network masks.

Login

If there is no DHCP server available, make sure your PC is configured with a static IP address (for example: 192.168.200.20).
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** run the SmartNode Discovery Tool, to access the SmartNode**.**

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>
192.168.200.10>
```

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

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.

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.

Connecting the SmartNode to the Network

In general, the SmartNode will connect to the network via the *WAN (ETH 0/0)* port. The SmartNode SN4970A is equipped with an Auto-MDX Ethernet port, so you can use straight through or crossover cables for host or hub/switch connections. (see figure 9 on page 32).

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.

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

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 con-

figuring the default gateway, refer to section “Set IP addresses” in the Trinity Command Line Reference Guide.)

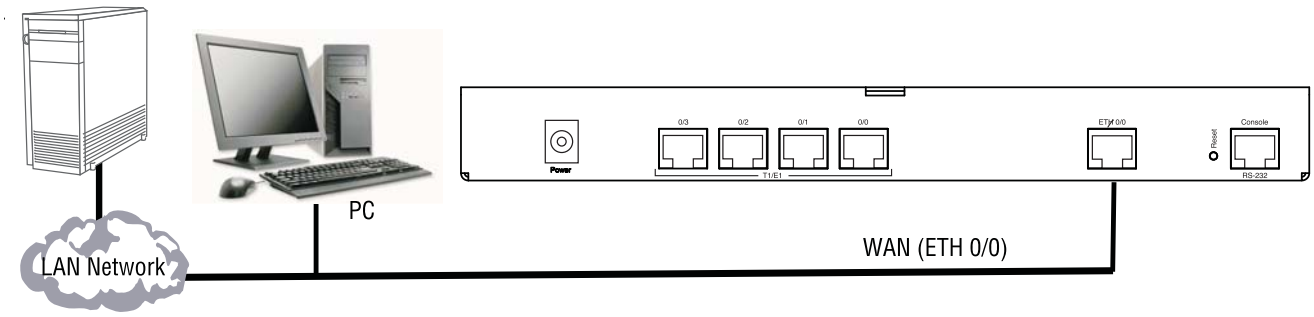

Figure 9. Connecting the SmartNode to the network

Loading the Configuration (optional)

The Patton Community provides several Web Wizards to help with setting up your SmartNode configuration.

http://www.patton.com/wizard

Patton also 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 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 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.

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

Chapter contents

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

PSTN Regulatory

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

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

Radio and TV Interference (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).

CE 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

Chapter contents

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

Voice connectivity

4 PRI T1/E1 ports on RJ48C connectors (1 port PRI T1/E1 - See SN4170 series)

Net/User configurable per port

Each port can be slave or master clock

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

Failover relay between ports 0/0–0/1 and 0/2–0/3 for specific models (/R in SKU code)

Data connectivity

One 10/100/1000Base-Tx Gigabit Ethernet port

All ports full duplex, autosensing, auto-MDX

Voice processing (signaling dependent)

Up to 120 full-duplex channels with Voice CODECS:

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

G.168 echo cancellation (128 ms)

Up to 120 simultaneous voice or T.38 fax calls

DTMF detection and generation

Carrier tone detection and generation

Silence suppression and comfort noise

Adaptive and configurable dejitter buffer

Configurable tones (dial, ringing, busy)

Configurable transmit packet length

RTP/RTCP (RFC 1889)

Fax and modem support

Automatic fax and modem detection

Codec fallback for modem-bypass

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

G.711 Fax-Bypass

Voice signaling

SIPv2, SIPv2 over IPv6

SIPv2 over TLS (separate license required - additional charge)

SIP call transfer, redirect

Overlap or en-bloc dialing

DTMF in-band, out-of-band

Configurable progress tones

Voice routing—session router

Local switching (hairpinning)

Least cost routing

Interface huntgroups

Call-Distribution groups

Number blocking

Call Routing Criteria:

- Interface
- Calling/called party number
- Time of day, day of week, date
- ISDN bearer capability
- Various other information elements (IEs) of the ISDN setup
- Wildcard and regular expression matching

Regular expression number manipulation functions:

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

IP services

IPv4 & IPv6 router (Dual Stack)

Routing functionalities (separate software license required - additional charge):

- 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

HTTP and HTTPs web management and firmware loading

TFTP configuration & firmware loading

HTTPS configuration & firmware provisioning

SNMP v1, v2, v3 agent (MIB II and private MIB)

Built-in diagnostic tools (trace, debug)

Secure Auto-provisioning

TR-069 config file and software image provisioning

System

CPU Motorola MPC8360 series operating at 400 MHz

Memory:

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

Physical

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

Weight: <21 oz. (<600g)

Power Consumption: < 16W

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

Operating humidity: up to 90%, non condensing

Appendix C **Cabling**

Chapter contents

Introduction

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

Console

The SmartNode can be connected to a serial terminal over its serial console port, as depicted in figure 10.

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.

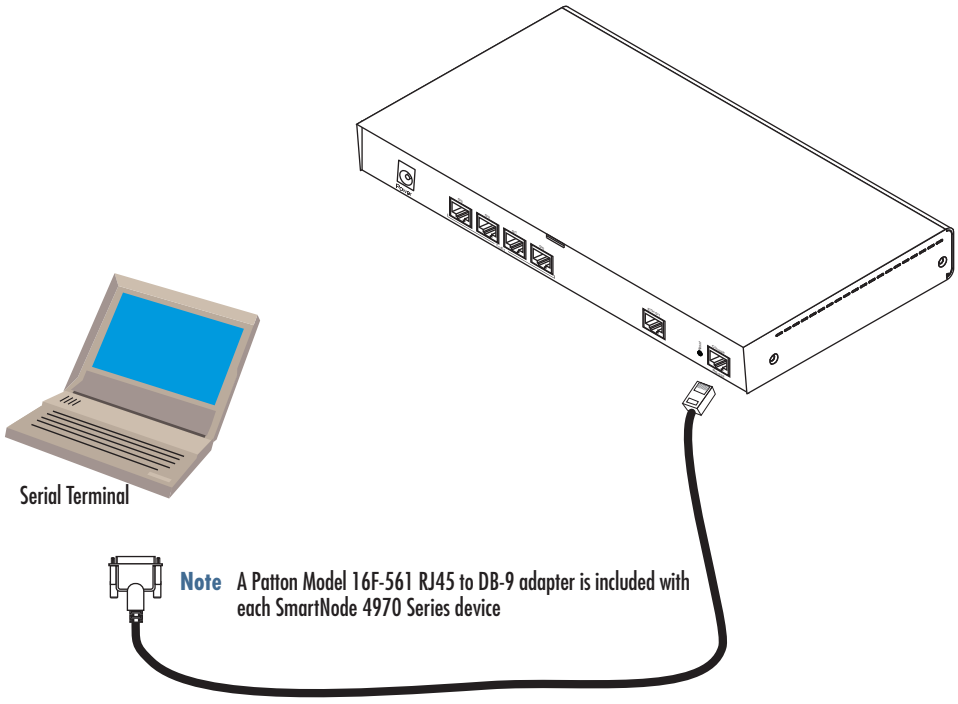

Figure 10. Connecting a serial terminal

Note See section "Console port" on page 51 for console port pin-outs.

Ethernet

Ethernet devices (10Base-T/100Base-T/1000Base-T) are connected to the SmartNode over a cable with RJ-45 plugs. The Ethernet port on the SN4970A is Auto-MDX and uses any straight or crossover cable to connect to hubs, switches, PCs or other devices.

CAUTION

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

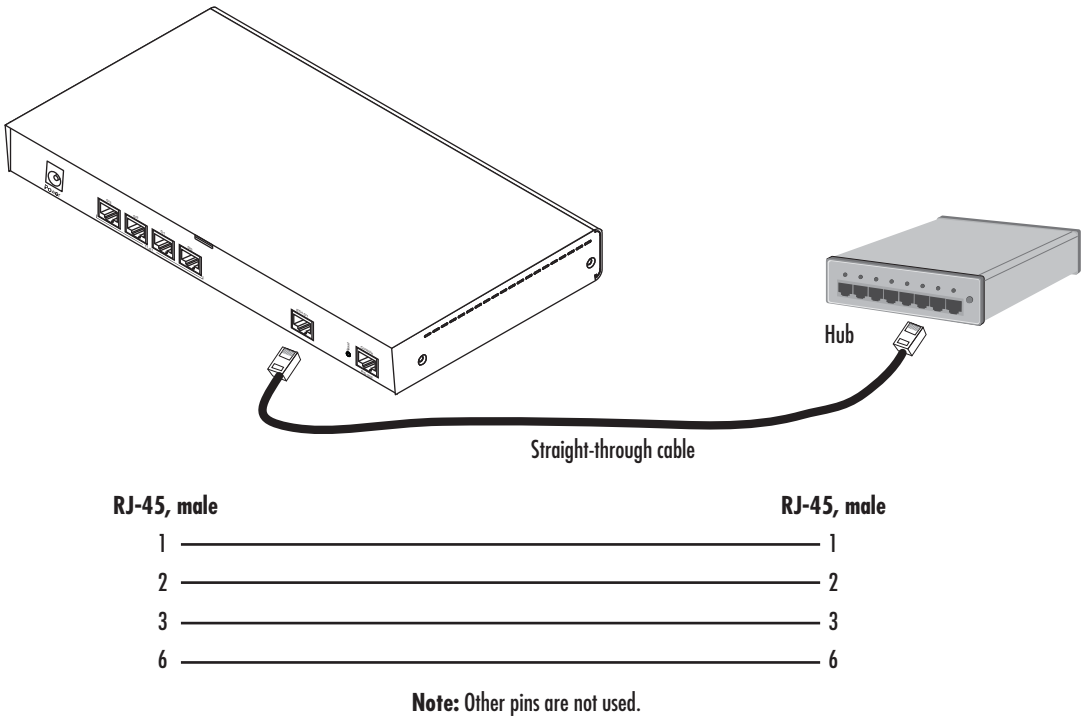

Figure 11. Typical Ethernet straight-through cable diagram for 10/100Base-T

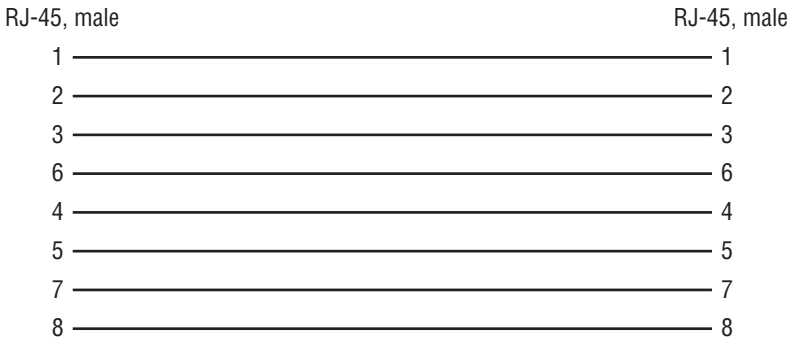

Figure 12. Typical Ethernet straight-through cable diagram for 1000Base-T

E1 PRI

The E1 PRI is usually connected to a PBX or switch—local exchange (LE). Type and pin outs of these devices vary depending on the manufacturer. In most cases, a straight-through RJ-45 to RJ-45 can be used to connect the PRI with a PBX. A cross-over cable is required to connect to an NT device, as illustrated in figure 13.

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

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

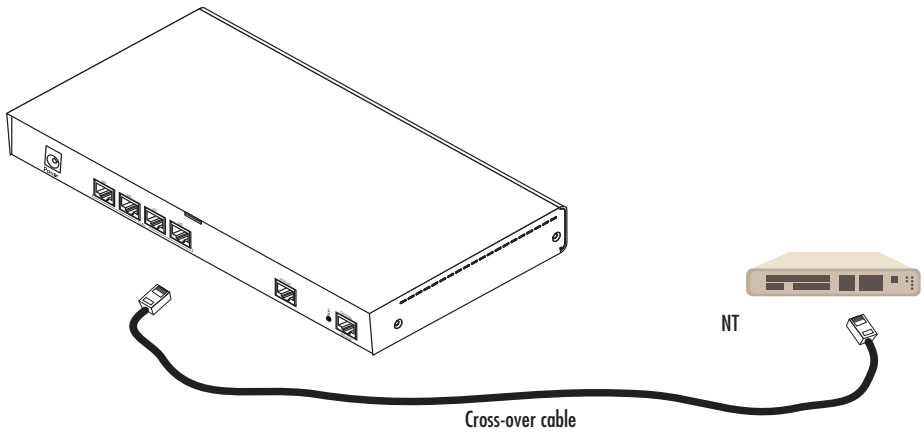

Figure 13. Connecting an E1/T1 PRI port to an NT device

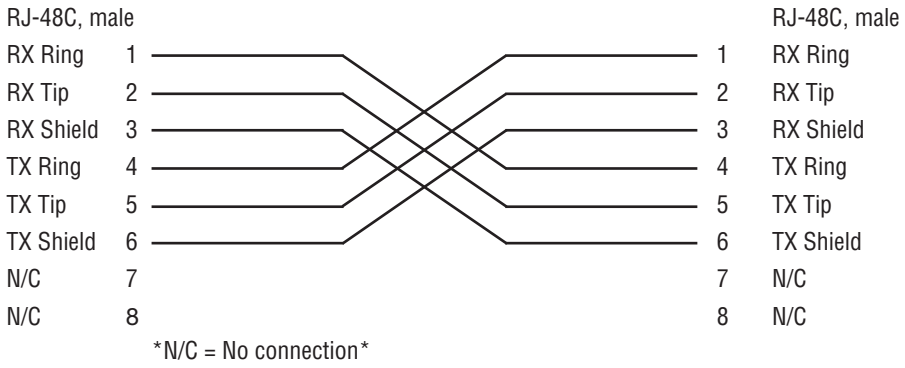

Figure 14. E1/T1 PRI crossover cable

T1 PRI

The T1 PRI is usually connected to a PBX or switch—local exchange (LE). Type and pin outs of these devices vary depending on the manufacturer. In most cases, a straight-through RJ-45 to RJ-45 can be used to connect the PRI with a PBX. A cross-over cable is required to connect to an NT device, as illustrated in figure 15 on page 48.

WARNING

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

WARNING

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

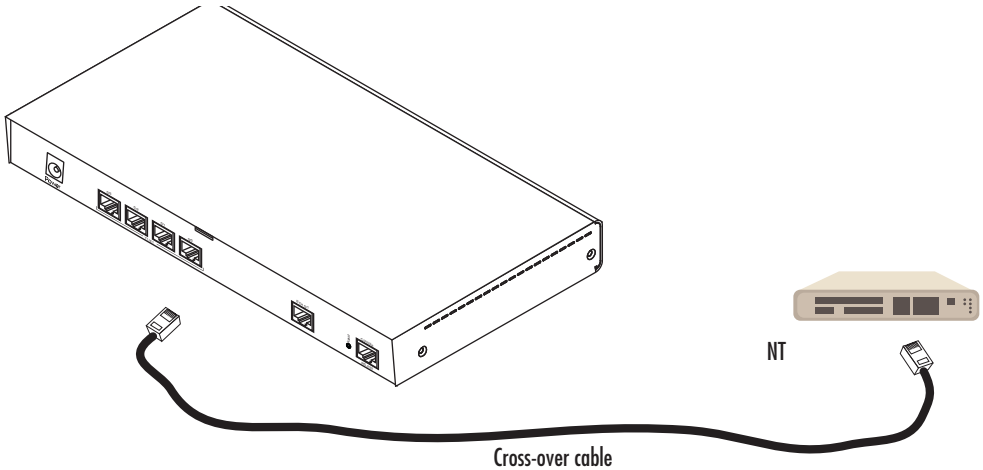

Figure 15. Connecting a T1 PRI port to an NT device

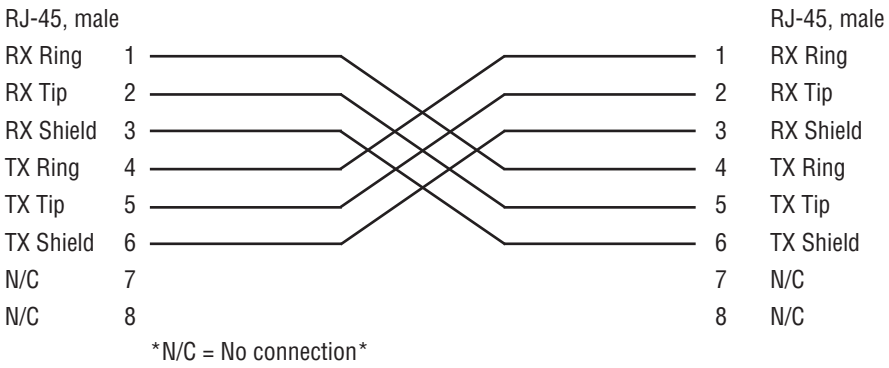

Figure 16. T1 PRI crossover cable

Appendix D **Port pin-outs**

Chapter contents

Introduction

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

Console port

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

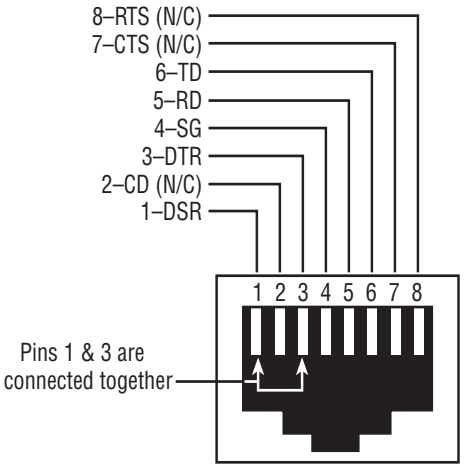

Figure 17. Console: EIA-561 (RJ-45 8-pin) port

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

Ethernet

Table 7. Ethernet: RJ45 socket 10/100Base-T

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

Note Pins not listed are not used.

Table 8. Ethernet: RJ45 socket 1000Base-T

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

Table 8. Ethernet: RJ45 socket 1000Base-T (Continued)

Pin	Signal
7	TRD3+
8	TRD3-

PRI port

Table 9. PRI: RJ-45 socket

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

NotePins not listed are not used.

Appendix E SmartNode 4970A 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>
192.168.200.10>show config:shipping-config
```

See Chapter 5, "Initial configuration" on page 28 for more details about IP address settings for initial configuration.

Appendix F **Reset Button Functions**

Chapter contents

Introduction

The *Reset* button (see figure 18 on page 56) 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 57)
- 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 57)
- 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 57)

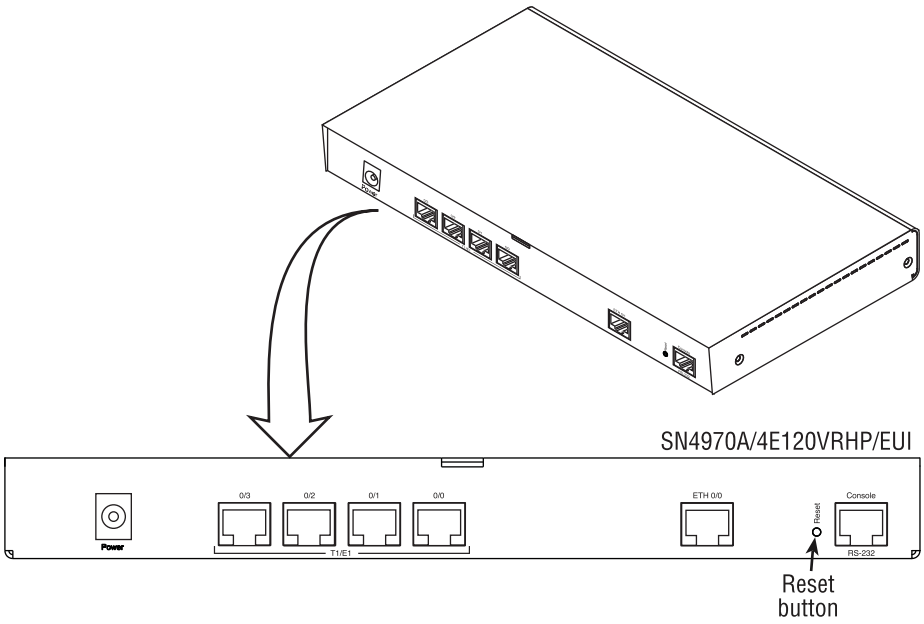

Figure 18. SN4970A *Reset* button

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 19) the button is pressed (see table 10 for the results from pressing the button).

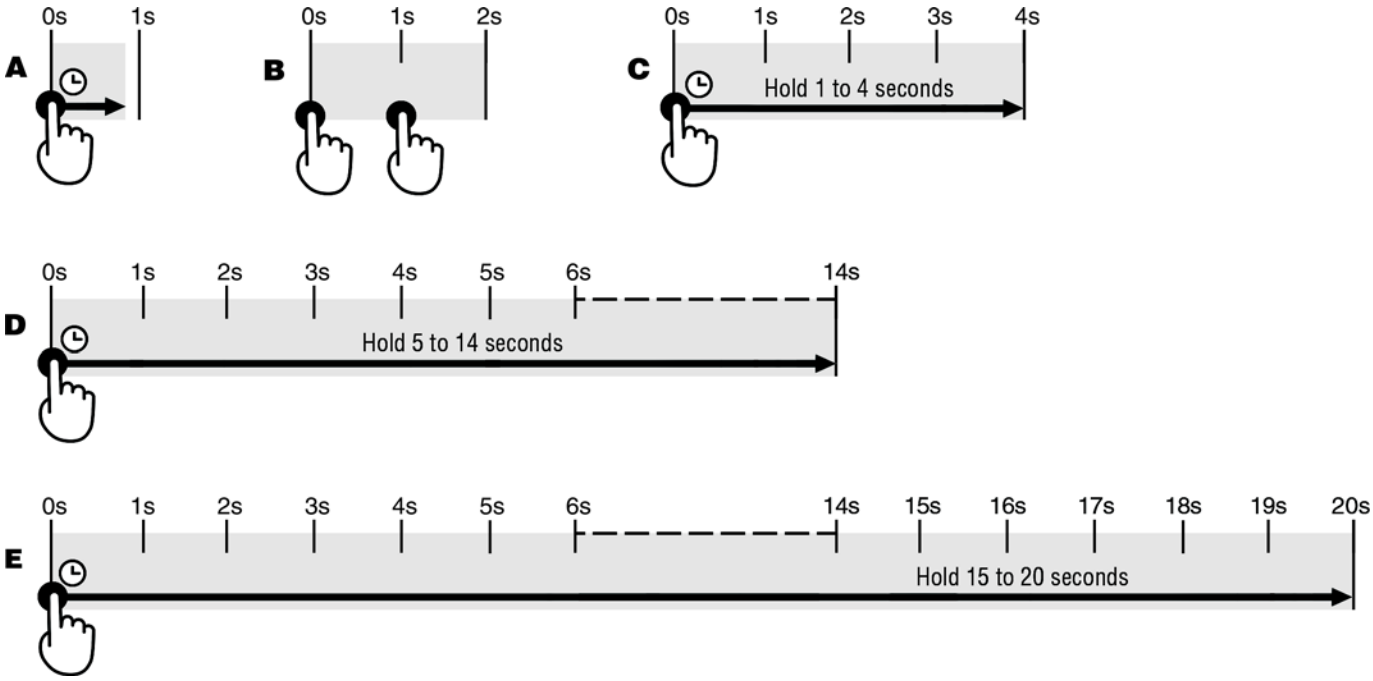

Figure 19. Reset button periods (in seconds) for performing actions

Table 10. 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 57, 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 35 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 57 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 11. Using the *Reset* button to switch to a backup image

LED Blink Pattern	Action
1-blink, pause	Boot normally
2-blinks, pause	Boot normally (device only has a single image)
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 11), 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 192.168.200.20/24
    ipaddress DHCP dhcp

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

Appendix G End user license agreement

Chapter contents

End User License Agreement

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

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 62.

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 61.

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.