Smart-DTA™
ISDN VoIP Telephone Adapter

Getting Started Guide

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.

Trademark Statement

The term *Smart-DTA* is a trademarks of Patton Electronics Company. All other trademarks presented in this document are the property of their respective owners.

Important Information

To use virtual private network (VPN) and/or AES/DES/3DES encryption capabilities with the Smart-DTA, 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 F, "End user license agreement" on page 55 or go to **www.patton.com**.

Patton Electronics warrants all Smart-DTA 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.

Summary Table of Contents

Table of Contents

List of Figures

List of Tables

About this guide

This guide describes the Smart-DTA hardware, installation and basic configuration. For detailed software configuration information refer to the *SmartWare 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 on page 13 provides information about router features and capabilities
- Chapter 2 on page 17 contains an overview describing router operation and applications
- Chapter 3 on page 20 provides hardware installation procedures
- Chapter 4 on page 25 provides quick-start procedures for configuring the Smart-DTA router
- Chapter 5 on page 35 contains information on contacting Patton technical support for assistance
- Appendix A on page 38 contains compliance information for the Smart-DTA
- Appendix B on page 41 contains specifications for the routers
- Appendix C on page 46 provides cable recommendations
- Appendix D on page 49 describes the router's ports and pin-outs
- Appendix E on page 51 lists the factory configuration settings for Smart-DTA
- Appendix F on page 55 provides license information that describes acceptable usage of the software provided with the Smart-DTA

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

Precautions

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

Note   A note presents additional information or interesting sidelights.

IMPORTANT   The alert symbol and IMPORTANT heading calls attention to important information.

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

CAUTION   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.

WARNING   **The alert symbol and WARNING heading indicate a potential safety hazard. Strictly follow the warning instructions to avoid personal injury.**

WARNING   **The shock hazard symbol and WARNING heading indicate a potential electric shock hazard. Strictly follow the warning instructions to avoid injury caused by electric shock.**

Safety when working with electricity

WARNING   **Mains Voltage: Do not open the case when the power cord is attached. The external power adapter shall be a listed limited power source that incorporates a disconnect device and shall be positioned within easy reach of the operator. The mains outlet shall be within 10 feet (3 meters) of the device, shall be easily accessible, and protected by a circuit breaker.**

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

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

WARNING

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.

ISDN connection

The device identified in this document is not intended nor approved for connection to the public ISDN tele-communication.

General observations

- Clean the case with a soft slightly moist anti-static cloth
- Place the unit on a flat surface and ensure free air circulation
- Avoid exposing the unit to direct sunlight and other heat sources
- Protect the unit from moisture, vapors, and corrosive liquids

Typographical conventions used in this document

This section describes the typographical conventions and terms used in this guide.

General conventions

The procedures described in this manual use the following text conventions:

Table 1. General conventions

Convention	Meaning
Garamond blue type	Indicates a cross-reference hyperlink that points to a figure, graphic, table, or section heading. Clicking on the hyperlink jumps you to the reference. When you have finished reviewing the reference, click on the **Go to Previous View** button ⬅ in the Adobe® Acrobat® Reader toolbar to return to your starting point.
Futura bold type	Commands and keywords are in **boldface** font.
Futura bold-italic type	Parts of commands, which are related to elements already named by the user, are in ***boldface italic*** font.
Italicized Futura type	Variables for which you supply values are in *italic* font
Futura type	Indicates the names of fields or windows.
Garamond bold type	Indicates the names of command buttons that execute an action.
< >	Angle brackets indicate function and keyboard keys, such as <SHIFT>, <CTRL>, <C>, and so on.
[ ]	Elements in square brackets are optional.
{a | b | c}	Alternative but required keywords are grouped in braces ({ }) and are separated by vertical bars (|)
`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 Smart-DTA is substituted with ***node*** in ***boldface italic*** font.
SN	The leading **SN** on a command line represents the nodename of the Smart-DTA
#	An hash sign at the beginning of a line indicates a comment line.

Chapter 1   General information

Chapter contents

Smart-DTA overview

The Smart-DTA ISDN Residential VoIP Digital Telephone Adapter (see figure 1) gives demanding ISDN users a quick and easy way to reap the benefits of state-of-the art Voice-over-IP technology while preserving their investments in ISDN phones and PBX equipment. Supporting two concurrent voice or fax calls over an IP network, the S-DTA is a simple and cost-effective way for home and home-office users to connect their ISDN terminals to the cost-saving world of Voice-over-IP.

The S-DTA provides an ISDN S_0 (S/T) Basic Rate Interface (BRI) that delivers high-quality Voice-over-IP (VoIP) to ISDN terminals, connected directly or via a residential S-bus. A 10/100 Base-T Ethernet port provides connection to either 1) an Internet Telephony Service Provider (ITSP) via a broadband access router and xDSL or cable modem, or 2) a remote IP-PBX over a corporate-private network.

Figure 1. Smart-DTA

The Smart-DTA performs the following major functions:

- Two channels of Voice or FAX-over-IP through a single Euro-ISDN BRI/S_0 port (NT orientation).

- Provides line power to connected ISDN phone or PBX terminals (TE orientation).

- Standards-compliant VoIP in accordance with SIP or H.323 protocols.

- 10/100Base-T Ethernet WAN port for connection to a router, xDSL, cable, or wireless modem.

Smart-DTA rear panel

The Smart-DTA is an ISDN-to-VoIP Digital Telephone Adapter for home or home-office use that supports two VoIP calls via a single ISDN BRI port (see figure 2). The Smart-DTA rear panel ports are described in table 2.
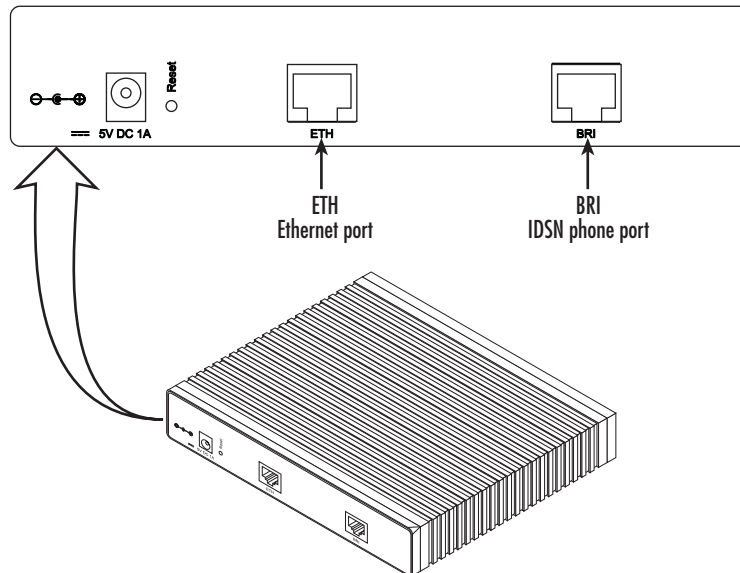
Figure 2. S-DTA rear panel

Table 2. Rear panel ports

Port	Description
ETH (WAN)	Switched Auto-MDX Fast-Ethernet port, RJ-45 (see figure 2), connect the unit to an Internet Telephony Service Provider (ITSP) [via an xDSL or cable modem] or a remote IP-PBX [via a private corporate network].
BRI (Phone)	ISDN BRI/S0 port. RJ-45 connector presents the NT (Net) side of the S/T interface (see figure 2) for connecting the S-DTA to an ISDN phone or PBX TE port. Configurable as point-to-point or point-to-multipoint.
5V DC, 1.0A	The Smart-DTA has a 5V DC 1A power input (see figure 2).
Reset	The reset button (see figure 2) has three functions: • Restart the unit with the current startup configuration—Press (for less than 1 second) and release the *Reset* button to restart the unit with the current startup configuration. • Restart the unit with factory default configuration—Press the *Reset* button for 5 seconds until the *Power* LED (see figure 3 on page 16) starts blinking to restart the unit with factory default configuration. • Restart the unit in bootloader mode (to be used only by trained Smart-DTA technicians)—Starting with the unit powered off, press and hold the *Reset* button as you apply power to the unit. Release the *Reset* button when the *Power* LED starts blinking so the unit will enter bootloader mode.
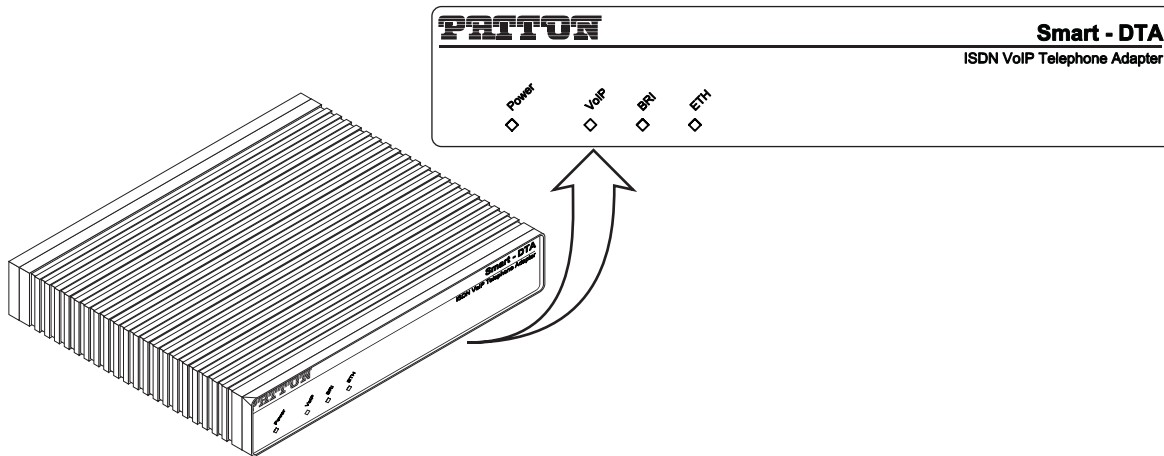
Figure 3. Smart-DTA front panel

Smart-DTA front panel

Figure 3 shows Smart-DTA LEDs, the LED definitions are listed in table 3.

Table 3. Smart-DTA LED definitions

LED	Description
Note	If an error occurs, all LEDs will flash once per second.
Power	When lit, indicates power is applied and the unit is in normal operation. Off indicates no power applied. Flashes once per second during boot (startup).
VoIP	• On indicates the gateway is registered to an H.323 gatekeeper/SIP server, or, in the case of direct routing, has at least one active VoIP connection. • 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.
BRI	Off indicates no active calls. Blinking when one or two B-channels are connected.
Ethernet	• On when the Ethernet connection has a link indication. • Flashes when data is received or transmitted at the corresponding Ethernet port.

Chapter 2   **Applications overview**

Chapter contents

Introduction

Patton's Smart-DTA Residential VoIP Digital Telephone Adapter provides home and home-office ISDN users a quick and easy migration path to the cost-saving world of IP telephony. This chapter describes typical applications for which the Smart-DTA is uniquely suited.

Whether you are connecting to an Internet Telephony Service Provider (ITSP) or the phone system at your main office, Smart-DTA provides the features you need for high-quality, state-of-the-art Voice-over-IP. In either scenario, Patton's robust and mature software provides call-property adaptation with regular-expression mapping between ISDN and SIP/H.323 signaling schemes. In the corporate private network, intelligent and configurable call-routing supports existing numbering plans for ultimate useability.

> **Note**   Detailed configuration information for the applications can be found on the CD-ROM that was included with your Smart-DTA device or online from the Patton webserver at **www.patton.com**.

Connect ISDN terminals to an Internet Telephony Service Provider (ITSP)

Residential users can connect the Smart-DTA's built-in BRI/NT port directly to an ISDN phone, or to the ISDN S-bus in the home for two-channel VoIP calling using an ITSP VoIP service. (see figure 4).

The Smart-DTA replaces the network terminal adapter while providing an Ethernet connection to the home LAN for Internet access.

The Smart-DTA supports three types of Internet-access service, including fixed-IP address, DHCP, and PPPoE.
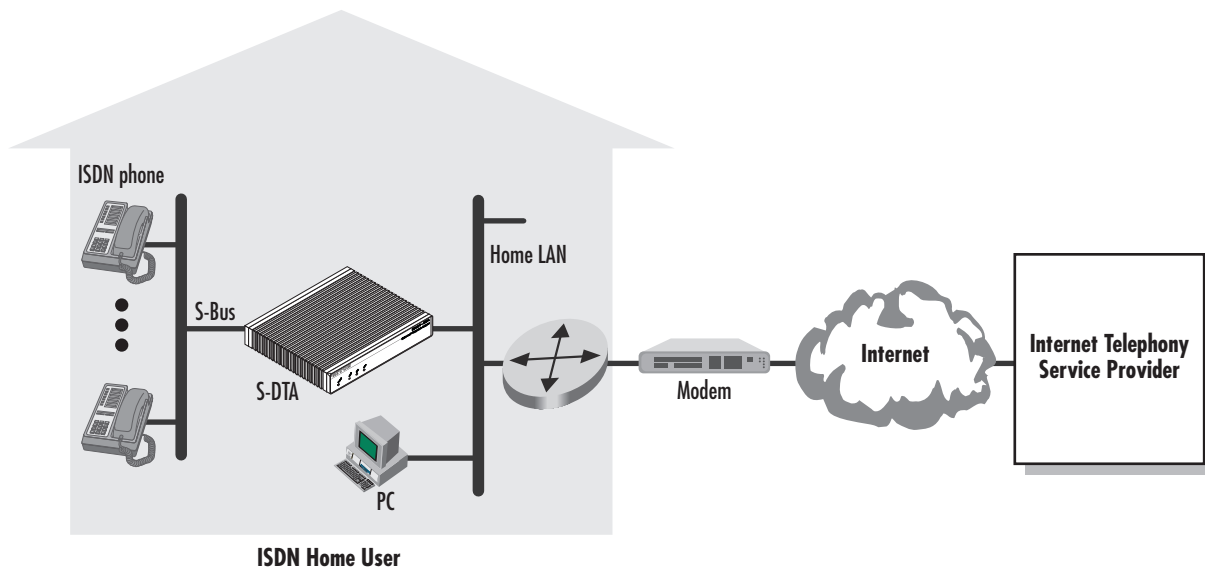
Figure 4. ISDN home-office application

ISDN telecommuter connection to a PBX via a corporate-private network

For a SoHo/telecommuter, the Smart-DTA can provide a home-office extension to the ISDN PBX at the corporate headquarters. The S-DTA routes the ISDN calls through the corporate-private network (see figure 5) using Voice-over-IP, so a home user avoids toll charges when making calls to headquarters. Remote users can make and receive calls as though located in the main office, with all the calling features and services available to callers connected directly to the PBX (such as station-to-station dialing, outside trunk access, and voice mail).
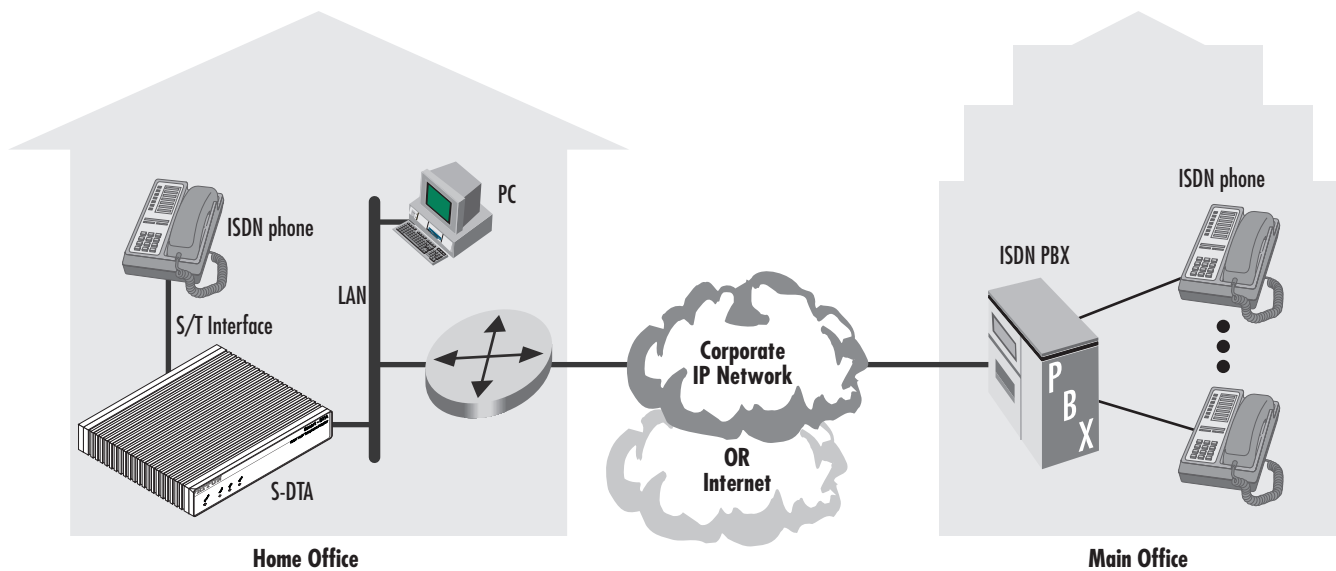
Figure 5. PBX extension to home office

Chapter 3 Smart-DTA installation

Chapter contents

Installing the Smart-DTA

Smart-DTA hardware installation consists of the following:

- Placing the device at the desired installation location (see section "Placing the Smart-DTA")

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

When you finish installing the Smart-DTA, go to chapter 4, "Smart-DTA Quick start" on page 25.

Placing the Smart-DTA

Place the Smart-DTA 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.

WARNING

Connect the cables in the following order:

1. Connect the ISDN terminal to the BRI port (see section "Connecting the S-DTA to the ISDN terminals" on page 22).

2. Connect the 10/100Base-T Ethernet WAN (see section "Connecting the Smart-DTA to the IP network" on page 22)

3. Connect the power supply (see section "Connecting the Smart-DTA to the power supply" on page 23)

Connecting the S-DTA to the ISDN terminals

The Smart-DTA comes with an ISDN BRI (NT) port located on the rear panel (see figure 2 on page 15) for connecting to the TE port of an ISDN terminal (phone, PBX, or residential S-bus). Install the connection as follows:

1. Using an ISDN cable (see Appendix C, "Cabling" on page 46) connect the BRI (NT) port on the Smart-DTA to the TE of the ISDN terminal (phone, PBX, or residential S-bus).

RJ-45, male		RJ-45, male
3		3
4		4
5		5
6		6

Note: Other pins are not used.
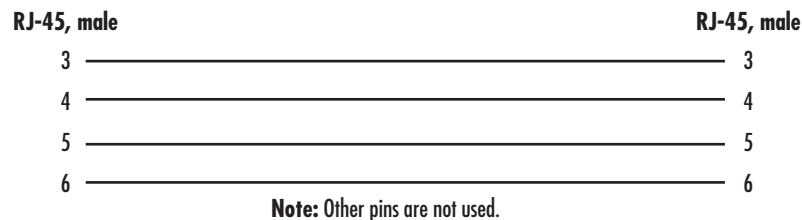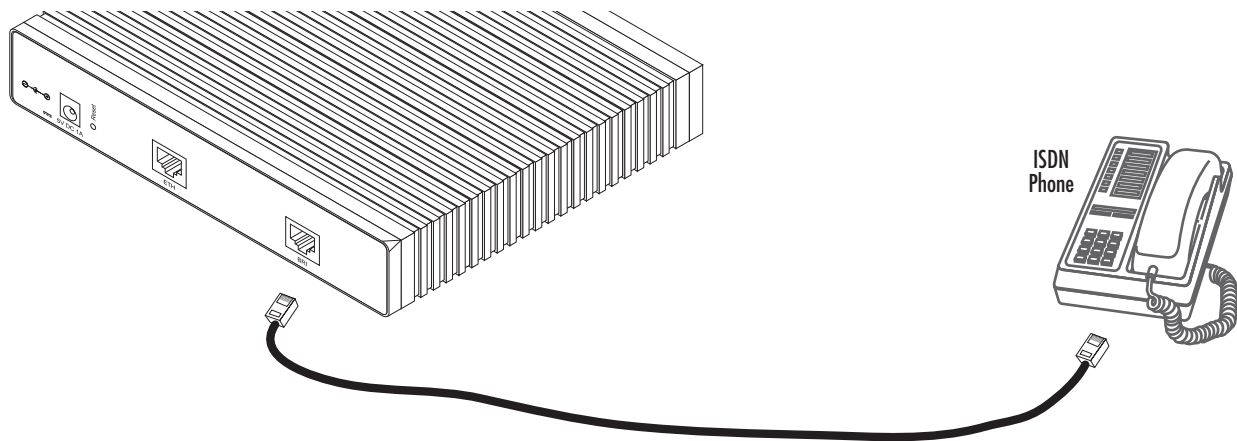
Figure 6. Connecting to an ISDN terminal

Note   The S-DTA BRI (NT) port delivers ISDN line power to any connected terminals.

⚠️ **CAUTION**   Never use an external Phantom supply!

For details on the BRI port pinout and ISDN cables, refer to Appendix C, "Cabling" on page 42 and Appendix D, "Port pin-outs" on page 45.

Connecting the Smart-DTA to the IP network

The Smart-DTA comes with a 10/100 Base-Tx Ethernet port for connection to an IP network. The Ethernet WAN interface is factory-configured as a DHCP client, so you must connect the Smart-DTA to an IP network that provides a DHCP server.

The Ethernet port (ETH) includes an automatic MDX (auto-crossover) feature that automatically detects the cable configuration and adjusts accordingly. The feature allow you to use a straight-through Ethernet cable to

connect to an Ethernet hub or switch. Typically the hub or switch will connect to a router that provides the the local-residential IP network with broadband Internet access.
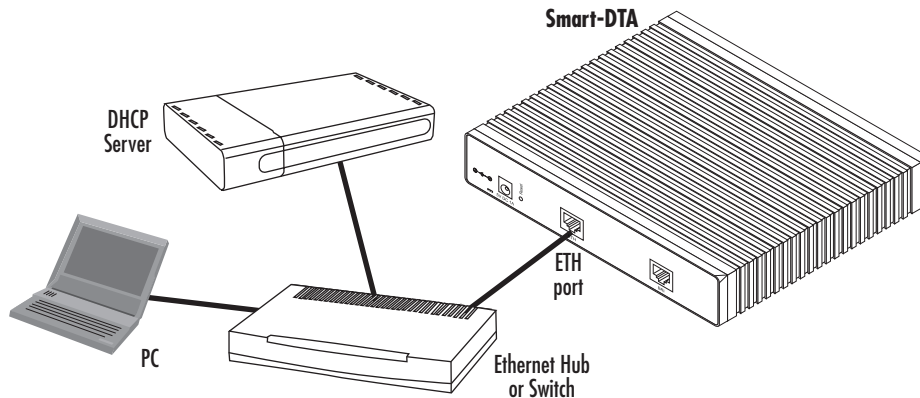
Figure 7. Connecting the Smart-DTA to the network via a hub or switch

1. Using the included black Ethernet cable, connect the RJ-45 Ethernet WAN port on your Smart-DTA (labeled ETH), to an Ethernet hub or switch on the same network as your PC.

For details on the Ethernet port pinout and cables, refer to Appendix C, "Cabling" on page 42 and Appendix D, "Port pin-outs" on page 45.

Connecting the Smart-DTA to the power supply
1. Insert the barrel-type connector end of the AC power supply into the *5V DC, 1.0A* port (see figure 2 on page 15).

> **CAUTION**
>
> The external router 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.

2. Verify that the AC power cord included with your router is compatible with local standards. If it is not, refer to chapter 5, "Contacting Patton for assistance" on page 35 to find out how to replace it with a compatible power cord.

3. Connect the male end of the AC power supply power cord to an appropriate AC power outlet.
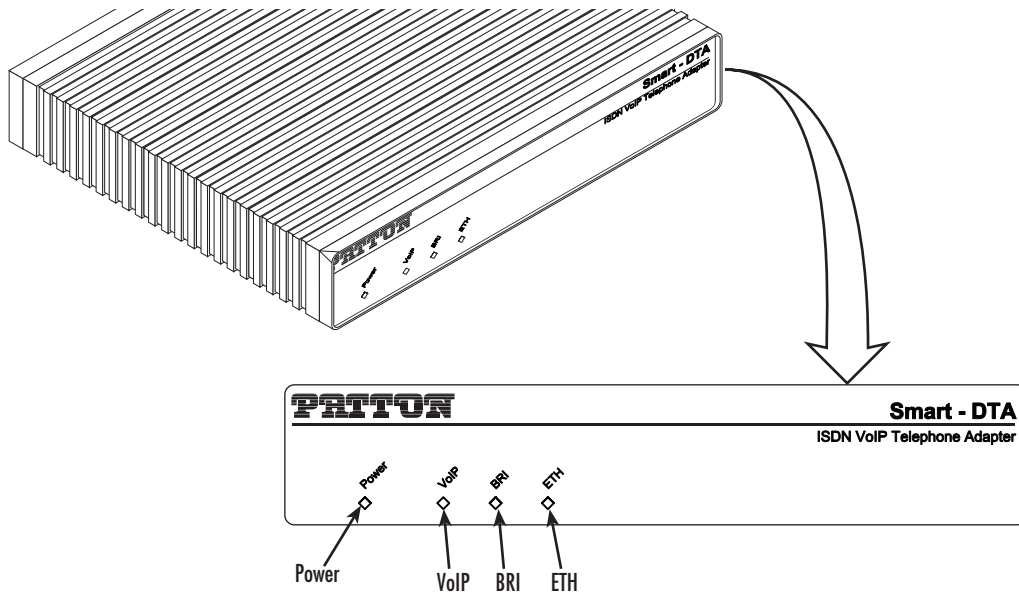
Figure 8. Router front panel LEDs

4. Verify that the green *Power* LED is lit (see figure 8).

External S-Bus power supply

Do not use an external power supplies for ISDN terminals connected to the Smart-DTA. The Smart-DTA supplies S-Bus line power to ISDN terminals connected to the BRI port, so external power supplies are not required for the ISDN terminals.

Congratulations, you have finished installing the Smart-DTA! Now go to chapter 4, "Smart-DTA Quick start" on page 25.

Chapter 4 Smart-DTA initial configuration

Chapter contents

Introduction

This chapter leads you through the basic steps to set up a new Smart-DTA:

- Start the Smart-DTA Discovery Tool (see section "1. Start the SmartNode Discovery Tool" on page 26)

- Access the Web Browser (GUI) Interface (see section "2. Access the Web Browser (GUI) Interface" on page 26)

- Configuring your Smart-DTA (see section "3. Configuring your Smart-DTA" on page 28)

This section describes how to quickly access the configuration interface of a Smart-DTA and give an overview of the different elements you can configure. For detailed information on all configuration parameters refer to the SmartWare software configuration guide.

1. Start the SmartNode Discovery Tool

The SmartNode discovery tool provides a quick and easy way to access the management interfaces residing within your Smart-DTA. The tool identifies any Patton VoIP devices installed on your network and displays the model number, IP address and MAC address of each unit. To use the discovery tool, do the following:

1. Insert the CD included with your Smart-DTA into the CD drive on your PC.

2. Copy the file named *SNDiscovery.exe* from the CD to your PC.
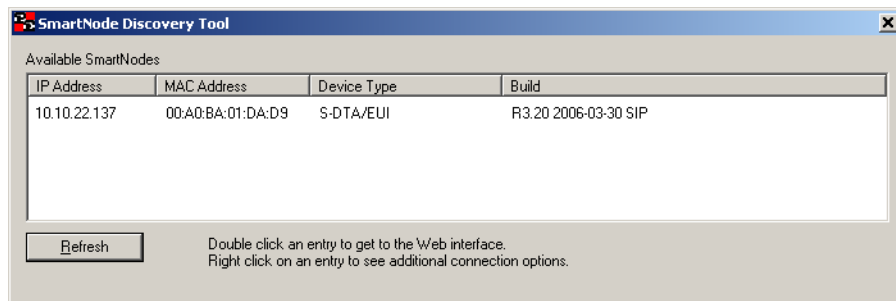
Figure 9. SmartNode Discovery Tool window

3. At your PC, double-click the *SNDiscovery.exe* file name to activate the tool. The SmartNode Discovery Tool window will display the IP Address, MAC Address, Device Type (model number) and Build (software release) of your Smart-DTA.

If your Smart-DTA does not appear:

- Make sure the Smart-DTA and your PC are on the same routed subnet

- Make sure any firewall programs on your PC are disabled

2. Access the Web Browser (GUI) Interface

The Smart-DTA provides a web-browser-based graphical user interface (GUI) that makes it easy to configure, monitor and manage your S-DTA. To access the web-browser interface, do the following:

1. In the SmartNode Discovery Tool window, select the line that displays the IP address of your Smart-DTA.
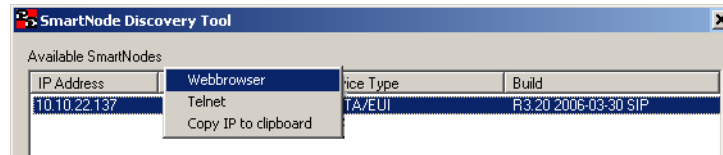
Figure 1. SmartNode Discovery Tool window with webbrowser selected

2. Right-click the selected line, and select *Webbrowser*. The Login window will display.
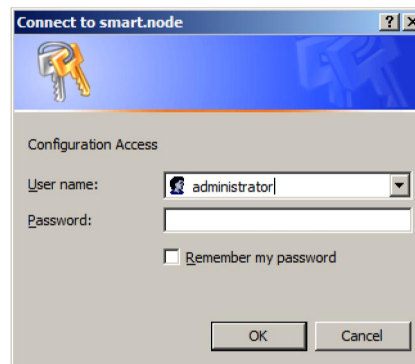
Figure 2. Login window

3. Enter the username *administrator*. Do not enter a password. Instead simply click OK. Your web browser will display the Smart-DTA home page (see figure 10).
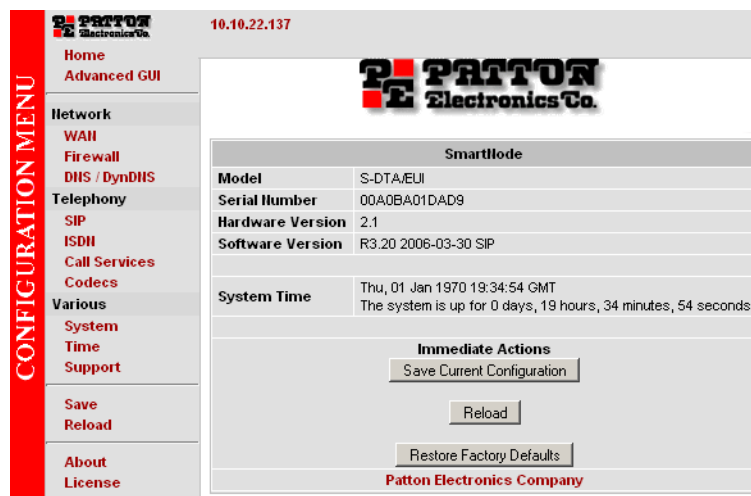
Figure 10. Smart-DTA home page

The Smart-DTA home page displays three action buttons that allow you to store the current configuration state, reload the device, and restore to factory defaults. The home page also displays certain basic system information. You can always return to the home page by clicking Home in the navigation bar.

Figure 11. Main GUI elements

The GUI consists of the following main elements (see figure 11):

• The "Navigation Bar" on the left edge presents you with a menu listing giving access to the various configuration and status pages of the Smart-DTA.

• At the top of the page you see the "Current System Path" which displays the location and element currently presented in the main area.

• The rest of the page displays the configuration and status information for the different features of the Smart-DTA.

3. Configuring your Smart-DTA

Once you have logged in you can use the browser-based graphical user interface (GUI) to configure and manage your S-DTA. The information in this section is intended to introduce the configuration tools and get you started. For more detailed information about configuring your S-DTA, please refer to the *SmartWare Configuration Guide.*

⚠️ **CAUTION**

The Smart-DTA, immediately applies your changes whenever you modify the configuration. Howver, your new settings ARE NOT PERMANENTLY SAVED in non-volatile memory [RAM]. To survive power failure or manual reload you must store your new settings in non-volatile memory. To save your changes: return to the home page and press the Save Current Configuration button.

You may find the following hints helpful when configuring your Smart-DTA:

Apply✔   For each box containing an "Apply" button, fill in the required fields and press "apply" once. The settings are applied immediately after the button is pressed. If there are several boxes with an "Apply" button on one page, fill in the information per box and press the button for each box separately. This saves the new configuration parameters in volatile memory (RAM) only.

⚠️   The "alert" symbol shows you that somewhere a user input is missing for correct functionality. In the case of the present WAN page, you can ignore them, because the respective title bullet ("PPP over Ethernet") is not selected.

ⓘ   The "info" symbol denotes hints to ease configuration or to avoid pitfalls. Read them whenever you encounter them!

Accessing the Internet

The Smart-DTA suports three types of WAN (Internet or corporate-Private) access:

• DHCP (factory default)

• PPPoE

• Fixed IP address

To modify the WAN access configuration, go to the Smart-DTA WAN page:

1. In the configuration menu pane, click *WAN.*
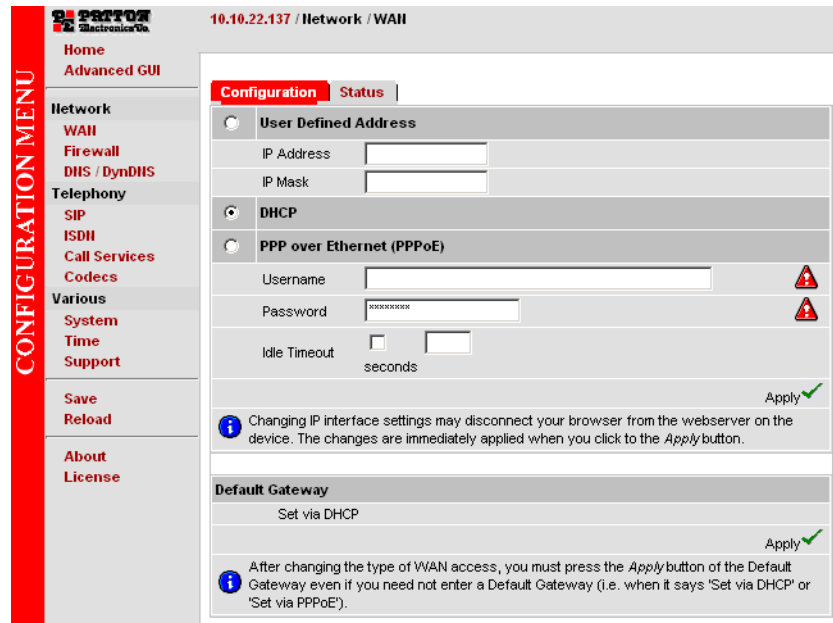
Figure 12. WAN page

The Smart-DTA supports three configuration options for the WAN connection (see figure 12), as described in the following paragraphs:

- **DHCP (client—factory default).** The Smart-DTA's WAN port has a DHCP client enabled that uses an established Internet connection to get the Internet connectivity parameters (IP address, default gateway) automatically from a DHCP server. Use this option when connecting the Smart-DTA to a DSL router, a cable modem, or to a company LAN (with a DHCP server). This is the factory default configuration so no configuration is required, only the LAN and WAN Ethernet connections should be made to access the Internet immediately.

- **PPPoE.** The Smart-DTA establishes the connection with the Internet using PPPoE. This is most commonly used when the Smart-DTA is connected to a DSL *bridge*, or a DSL router that is configured in *bridge* mode (most routers are capable of this).

  Enter the DSL credentials (username and password) on the Smart-DTA and click the **Apply** icon.

- **User Defined Address.** The Smart-DTA uses an existing internet connection which does not provide an upstream DHCP server. In this case, you need to set the IP address, subnet mask, default gateway and DNS servers manually.

  - **IP Address**—The IP address of the WAN Ethernet port.

  - **IP Mask—**The mask for the WAN port's IP address.

Click the **Apply** icon to activate the new configuration.

- **Default Gateway**—This is the IP address of the upstream router. Click the **Apply** icon to apply the new configuration.

- **DNS/DynDNS**—In the Configuration Menu, go to DNS/DynDNS. Enter the IP addresses of the DNS servers and *Apply* the new settings.

Note   Be sure to return to the *Home* configuration page to save the new configuration in non-volatile memory.

Advanced GUI
The "advanced GUI" leads you to the full complement of SmartNode configuration parameters. There are many more things that can be configured than you are presented on the "basic GUI" pages you see when the system starts. Be aware that configuration is more complicated and requires knowledge about VoIP as well as SmartNode configuration concepts. We recommend familiarizing yourself with the *SmartWare Software Configuration Guide* before switching to the advanced mode.

Bootloader

The bootloader ensures that basic operations, network access, and downloads are possible in case of interrupted or corrupted application image downloads. It offers console access to the Bootloader and the capability for downloading application images (e.g. SmartWare) via the serial link of the console.

Start Bootloader

To start the Bootloader, power on the SmartNode while pressing the reset button. Open a Telnet session to the SmartNode via one of the Ethernet interfaces, or open a CLI session via the console port (if available on the SmartNode). The login display will appear. Using the credentials admin / patton , log in to the SmartNode. The following prompt will be displayed:

```
RedBoot>
```

Type **help** to display an overview of the available commands.

Start-up with factory configuration

Step	Command	Purpose
1	**RedBoot> fis load**	Copies the SmartWare application image from the persistent memory (flash:) to the volatile memory (RAM) from where it will be executed.
2	**RedBoot> go -s factory-config**	Starts the SmartWare application telling it to use 'factory-config' as startup configuration. You can also start-up with any other configuration available in the persistent memory (nvram:) by providing its name instead of 'factory-config'.

Load a new application image (SmartWare) via TFTP

The following procedure downloads the application image (SmartWare) for the mainboard. See the note below on how to download the respective CLI description file.

Step	Command	Purpose
1 optional	**RedBoot> ip_address - l** *local_ip_address* **[/***mask_len***]**	Sets the IP address and subnet mask of the Ethernet interface 0/0 which shall be used to receive the new application image. *mask_len* is the length of the network address (or the number of 1's within the subnet mask). See Note below.
2 optional	**RedBoot> ip_address -g** *gateway*	Sets the IP address of the default gateway.
3 optional	**RedBoot> ping -h** *tftp-server_ip_address*	Tests the connectivity to the TFTP server.
4	**RedBoot> load -r -v -h** *host* **-b** *base_address file_name*	Downloads an application image into the volatile memory (RAM) from where the SmartNode could directly execute it. *host*: IP address of the TFTP server *base_address*: memory location where to store the application image. Use the default address 0x1800100 *file_name*: path and name of the file on the TFTP server. Note: use the image file that contains the whole application, not the image parts.
5	RedBoot> fis delete -n 1	Deletes the first application image. Reply with 'y' to the confirmation request.
6	RedBoot> fis create	Stores the downloaded application image to the permanent memory (flash:). Reply with 'y' to the confirmation request.
7	RedBoot> fis list -l	Checks whether the image has been successfully stored, whether it is the desired Release and Build, and whether it is valid.

Step	Command	Purpose
8	RedBoot> go	Starts the application image that was downloaded into the volatile memory (RAM).

Note   With the Bootloader, only the Ethernet interface 0/0 is available. The Bootloader applies the IP address, subnet mask, and default gateway that were last configured by the Bootloader itself or by another application (e.g. SmartWare). If an application configured the Ethernet interface 0/0 to use DHCP, the Bootloader will also use DHCP to learn the interface configuration. It can receive and apply the IP address, subnet mask, default gateway, and default (TFTP) server (transmitted as basic DHCP information 'Next server IP address').

Note   This procedure does not download the respective CLI description file. Download it after starting up SmartWare with the following command:
```
copy tftp://<tftp_server_address>/<server path>/bl flash:
```

Example: Downloading and storing a new application image (SmartWare)

```
RedBoot> ip -l 172.16.40.98/19
RedBoot> ip -g 172.16.32.1
RedBoot> ping -h 172.16.32.100
Network PING - from 172.16.40.98 to 172.16.32.100
..........PING - received 10 of 10 expected

RedBoot> load -r -v -h 172.16.32.100 -b 0x1800100 /Sn4xxx/image.bin
Using default protocol (TFTP)
-
Raw file loaded 0x01800100-0x0199ca6b, 1689964 bytes, assumed entry at 0x01800100

RedBoot> fis delete -n 1
Delete image 1 - continue (y/n)? y
... Erase from 0x60030000-0x601cc974: .........................

RedBoot> fis create
Use address 0x01800100, size 1684402 ? - continue (y/n)? y
... Erase from 0x60030000-0x601cb3ba: .........................
... Program from 0x00011eec-0x00011ef4 at 0x60030000: .
... Program from 0x01800100-0x0199b4b2 at 0x60030008: .........................
... Program from 0x00011eec-0x00011ef4 at 0x60030000: .
Image successfully written to flash

RedBoot> fis list -l
Id Address     Length     State         Description
   Entry       Load Addr                Version
----------------------------------------------------------------
1  0x60030000  1693438    valid         SmartWare R2.10 BUILD28015
   0x01800100  0x01800100               V2.10

RedBoot> go
Starting 'SmartWare R2.10 BUILD28015' at 0x01800100 via 0x01800100
```

Load a new application image (SmartWare) via the serial link

The Bootloader supports the 'X-Modem' and 'Y-Modem' protocols to download application images via the serial link of the console. Do the following to initiate the download:

Step	Command	Purpose
1	**RedBoot> load -r -v -m { xmodem | ymodem } -b** *base_address*	Downloads an application image into the volatile memory (RAM) from where the SmartNode could directly execute it. 'xmodem' or 'ymodem': Specify the protocol to be used, X-Modem or Y-Modem *base_address*: memory location where to store the application image. Use the default address 0x1800100 Execute the above RedBoot command first, then start the transfer from the terminal program with the command 'Send file via X-Modem' (or similar).
5	RedBoot> fis delete -n 1	Deletes the first application image. Reply with 'y' to the confirmation request.
6	RedBoot> fis create	Stores the downloaded application image to the permanent memory (flash:). Reply with 'y' to the confirmation request.
7	RedBoot> fis list -l	Checks whether the image has been successfully stored, whether it is the desired Release and Build, and whether it is valid.
8	RedBoot> go	Starts the application image that was downloaded to the volatile memory (RAM).

Note This type of download takes about **25 minutes** since it uses a serial link at only 9600 bps.

Chapter 5 Contacting Patton for assistance

Chapter contents

Introduction

This chapter contains the following information:

- "Contact information"—describes how to contact Patton technical support for assistance.

- "Warranty Service and Returned Merchandise Authorizations (RMAs)"—contains information about the RAS warranty and obtaining a return merchandise authorization (RMA).

Contact information

Patton Electronics offers a wide array of free technical services. If you have questions about any of our other products we recommend you begin your search for answers by using our technical knowledge base. Here, we have gathered together many of the more commonly asked questions and compiled them into a searchable database to help you quickly solve your problems.

Patton support headquarters in the USA

- Online support: available at **www.patton.com**

- E-mail support: e-mail sent to **support@patton.com** will be answered within 1 business day

- Telephone support: standard telephone support is available five days a week—from **8:00 am** to **5:00 pm EST** (**1300** to **2200 UTC/GMT**)—by calling **+1 (301) 975-1007**

- Fax: **+1 (253) 663-5693**

Alternate Patton support for Europe, Middle East, and Africa (EMEA)

- Online support: available at **www.patton-inalp.com**

- E-mail support: e-mail sent to **support@patton-inalp.com** will be answered within 1 business day

- Telephone support: standard telephone support is available five days a week—from **8:00 am** to **5:00 pm CET** (**0900** to **1800 UTC/GMT**)—by calling **+41 (0)31 985 25 55**

- Fax: **+41 (0)31 985 25 26**

Warranty Service and Returned Merchandise Authorizations (RMAs)

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

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

Warranty coverage

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

Out-of-warranty service

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

Returns for credit

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

Return for credit policy

•   Less than 30 days: No Charge. Your credit will be issued upon receipt and inspection of the equipment.

•   30 to 60 days: We will add a 20% restocking charge (crediting your account with 80% of the purchase price).

•   Over 60 days: Products will be accepted for repairs only.

RMA numbers

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

•   Completing a request on the RMA Request page in the *Support* section at **www.patton.com**

•   By calling **+1 (301) 975-1007** and speaking to a Technical Support Engineer

•   By sending an e-mail to **returns@patton.com**

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

Shipping instructions

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

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

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

Appendix A **Compliance information**

Chapter contents

Compliance

EMC Compliance

- FCC Part 15, Class A

- EN55022, Class A

- EN55024

Safety Compliance

- IEC 60950-1

- EN60950-1

Radio and TV interference

The Smart-DTA router generates and uses radio frequency energy, and if not installed and used properly—that is, in strict accordance with the manufacturer's instructions—may cause interference to radio and television reception. The Smart-DTA router have been tested and found to comply with the limits for a Class B computing device in accordance with specifications in Subpart B of Part 15 of FCC rules, which are designed to provide reasonable protection from such interference in a commercial installation. However, there is no guarantee that interference will not occur in a particular installation. If the Smart-DTA router does cause interference to radio or television reception, which can be determined by disconnecting the unit, the user is encouraged to try to correct the interference by one or more of the following measures: moving the computing equipment away from the receiver, re-orienting the receiving antenna and/or plugging the receiving equipment into a different AC outlet (such that the computing equipment and receiver are on different branches).

ISDN Connection

The device identified in this document is not intended nor approved for connection to the public ISDN telecommunication network.

EC Declaration of Conformity

(See section for German version.)

Product Description: Smart-DTA

The products described above in the form as delivered are in conformity with the provisions of the following European Directive:

R&TTE Directive 1999/5/EC

Guidelines of the European Parliament and the Committee for the Harmonization of the Legal Regulations of the Member States concerning radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity.

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

The signed Declaration of Conformity can be downloaded from **www.patton.com/certifications/.**

EG-Konformitätserklärung

(see section "EC Declaration of Conformity" on page 39 for English version)

Produktbezeichnung: Smart-DTA

Die bezeichneten Produkte stimmen in der von uns in Verkehr gebrachten Ausführung mit den Vorschriften folgender Richtlinie überein:

R&TTE 1999/5/EG

Richtlinie des europäischen Parlaments und des Rates zur Angleichung der Rechtsvorschriften der Mitgliedstaaten über Funkanlagen und Telekommunikations-Endeinrichtungen und die gegenseitige Anerkennung ihrer Konformität.

$C\epsilon$ Die Sicherheitshinweise in der mitgelieferten Produktdokumentation sind zu beachten. Die Konformität mit der oben erwähnten Richtlinie wird durch das CE-Zeichen auf dem Gerät bestätigt.

Die unterzeichnete Konformitätserklärung kann heruntergeladen werden von: **www.patton.com/certifications/.**

Authorized European Representative

D R M Green

European Compliance Services Limited.

Oakdene House, Oak Road

Watchfield,

Swindon, Wilts SN6 8TD, UK

Appendix B **Specifications**

Chapter contents

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

DSP

One 2-channel DSP

Voice connectivity

Single ISDN BRI So (NT), 4-wire RJ45 port labeled *BRI*

Point-to-point, point-to-multipoint configurable

BRI port provides ISDN line power to connected terminals

Data connectivity

10/100Base-TX Ethernet WAN port

Full duplex, autosensing, auto-MDX

Voice processing (signalling dependent)

2 full-duplex channels of Voice CODECS:

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

G.168 echo cancellation

DTMF detection and generation

Carrier tone detection and generation

Silence suppression and comfort noise

Configurable dejitter buffer

Configurable tones (dial, ringing, busy)

Configurable transmit packet length

RTP/RTCP (RFC 1889)

Fax and modem support

Automatic fax and modem detection

Codec fallback for modem-bypass

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

G.711 Fax-Bypass

Voice signalling

SIPv2

H.323v4

SIP call transfer, redirect

Overlap or en-bloc dialing

DTMF in-band, out-of-band

Configurable progress tones

Voice routing—session router

Local switching

Interface huntgroups

Call-Distribution groups

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

Number manipulation functions:

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

IP services

DiffServe/ToS set or queue per header bits

802.1p VLAN tagging

IPSEC AH & ESP Modes

Manual Key; IKE optional

AES/DES/3DES Encryption

Note To use the IPSec VPN capabilities including AES/DES/3DES encryption with the Smart-DTA, you may need to purchase additional license keys.

Management

Industry standard CLI with remote Telnet access

HTTP web management and firmware loading

TFTP configuration & firmware loading

SNMP v1 agent (MIB II and private MIB)

Built-in diagnostic tools (trace, debug)

Operating environment

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

Operating humidity
5–80% (non condensing)

System

CPU Motorola MC870 operating at 66 MHz

Memory:

- 16 Mbytes SDRAM
- 4 Mbytes Flash

Dimensions

4.2W x 1.5H x 5.00D in. (3.9H x 10.6W x 12.70D cm)

Weight and power dissipation

See table 4.

Table 4. SmartNode weight and maximum power specifications

SmartNode model	Weight	Maximum power dissipation
Smart-DTA	<15.9 oz./450 g	4W

Identification of the SmartNode devices via SNMP

All SmartNode devices have assigned sysObjectID (.iso.org.dod.internet.mgmt.mib-2.system.sysObjectID) numbers (see table 5).

Table 5. SmartNode Models and their Unique sysObjectID

SmartNode Model	SysObjectID
Smart-DTA	.iso.org.dod.internet.private.enterprises.patton.products.sn455x.3 1.3.6.1.4.1.1768.100.4.6.3

According to table 5, an SNMP get request to *.iso.org.dod.internet.mgmt.mib-2.system.sysObjectID* of a Smart-Node 4552 device reads out a numeric OID of *1.3.6.1.4.1.1768.2.4.6.1*, which represents a SmartNode 4552 device. The mapping of the sysObjectID to each of the SmartNode model is realized with the Smart-Node product identification MIB.

The SNMP agent running in SmartWare is SNMP version 1 (SNMPv1) compliant. SNMP version 2 (SNMPv2) and SNMP version 3 (SNMPv3) are not currently supported.

IMPORTANT

Appendix C **Cabling**

Chapter contents

Introduction

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

Ethernet

Ethernet devices (10Base-T/100Base-T) are connected to the Smart-DTA over a cable with RJ-45 plugs. All Ethernet ports on the S-DTA are Auto-MDX and use any straight or crossover cable to connect to hubs, switches, PCs or other devices.
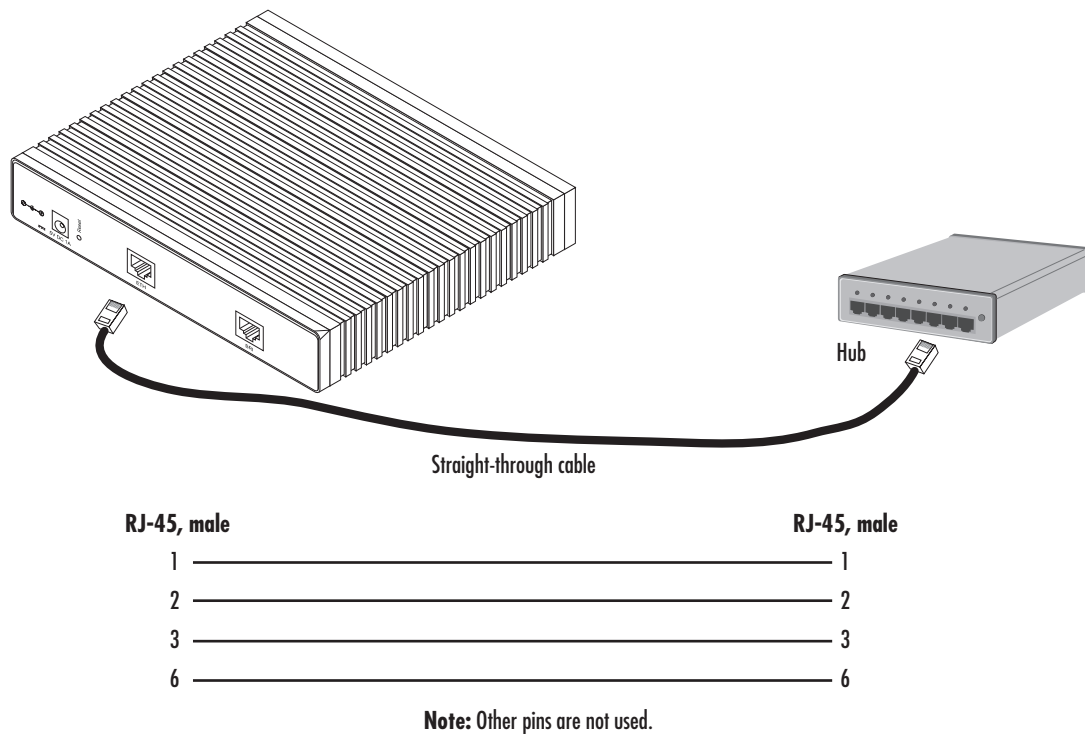
Figure 13. Typical Ethernet straight-through cable diagram

ISDN BRI

The ISDN port connects to ISDN terminals (phones, PBXs) or an ISDN S-BUS using cables terminated with RJ-45 connectors. Use straight-though cables to connect to the TE port of your phone, PBX, or residential S-BUS.

RJ-45, male   **RJ-45, male**

3 ————————————————————— 3
4 ————————————————————— 4
5 ————————————————————— 5
6 ————————————————————— 6

Note: Other pins are not used.
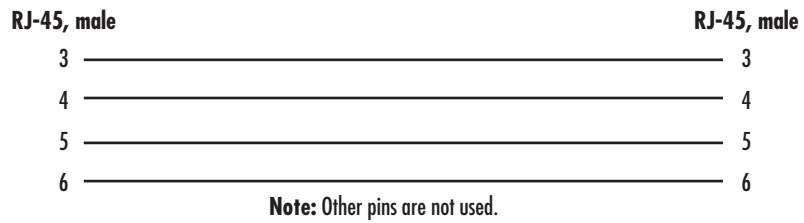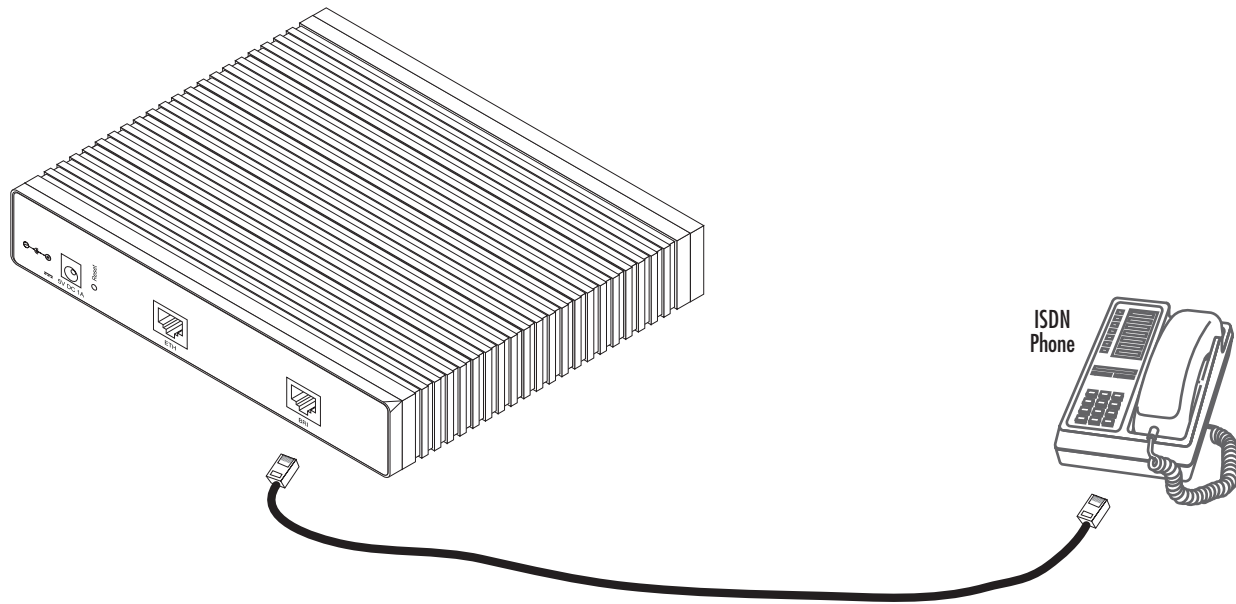
Figure 14. Connecting an ISDN device

Appendix D **Port pin-outs**

Chapter contents

Introduction

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

Ethernet

Table 6. RJ-45 Ethernet socket

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

Note   Pins not listed are not used.

ISDN BRI Terminal (NT/Net) port

The BRI terminal port uses an 8-pin RJ-45 connector (the pinout is shown in table 7).

Table 7. RJ-45 BRI (NT/Net) socket

Pin	Signal
3	Rx+
4	Tx+
5	Tx-
6	Rx-

Note   Pins not listed are not used.

Appendix E **Smart-DTA factory configuration**

Chapter contents

Introduction

The factory configuration settings for the Smart-DTA are shown below.

```
#----------------------------------------------------------------#
#                                                                #
# S-DTA Series                                                   #
# R3.xx BUILDxxxxx SIP                                           #
# 2005-08-25T00:00:00                                            #
# Factory configuration file                                    #
#                                                                #
#----------------------------------------------------------------#

gui type basic
webserver port 80 language en

profile acl ACL_WAN_PERMIT_ALL_MGMT
  permit 1 ip any any

profile acl ACL_WAN_PERMIT_SEL_MGMT
  deny 1 tcp any any eq 23
  deny 2 tcp any any eq 80
  deny 3 udp any any eq 161
  permit 4 ip any any

profile acl ACL_WAN_BLOCK_ALL_MGMT
  deny 1 tcp any any eq 23
  deny 2 tcp any any eq 80
  deny 3 udp any any eq 161
  permit 4 ip any any


profile call-progress-tone US_DIAL_TONE
  play 1 0 350 -13 440 -13

profile call-progress-tone US_RB_TONE
  play 1 2000 440 -19 480 -19
  pause 2 4000

profile call-progress-tone US_BUSY_TONE
  play 1 500 480 -24 620 -24
  pause 2 500

profile call-progress-tone US_CONGESTION_TONE
  play 1 250 480 -24 620 -24
  pause 2 250

profile tone-set Europe

profile tone-set UnitedStates
  map call-progress-tone dial-tone US_DIAL_TONE
  map call-progress-tone ringback-tone US_RB_TONE
  map call-progress-tone busy-tone US_BUSY_TONE
  map call-progress-tone release-tone US_BUSY_TONE
  map call-progress-tone congestion-tone US_CONGESTION_TONE
```

```
profile voip VOIP
  codec 1 g729 rx-length 20 tx-length 20
  codec 2 g711alaw64k rx-length 20 tx-length 20
  codec 3 g711ulaw64k rx-length 20 tx-length 20
  dejitter-mode static
  dejitter-max-delay 120

context ip router

  interface IF_IP_WAN
    ipaddress dhcp
    use profile acl ACL_WAN_PERMIT_ALL_MGMT in

context ip router

subscriber ppp SUB_PPPOE
  dial out
  authentication chap
  authentication pap
  bind interface IF_IP_WAN router

context cs switch

  routing-table called-e164 RT_SPEED_DIAL
    route T dest-table RT_NR_BLOCKING MT_SPEED_DIAL

  routing-table called-e164 RT_NR_BLOCKING
    route default dest-table RT_CALL_ROUTING MT_SET_CNPN

  routing-table called-e164 RT_CALL_ROUTING
    route default dest-interface IF_SIP_SERVICE

  routing-table called-e164 RT_INCOMING
    route default dest-interface IF_S0_00 MT_NR_TRANSLATION

  mapping-table called-e164 to called-e164 MT_SPEED_DIAL

  mapping-table calling-e164 to calling-e164 MT_SET_CNPN

  mapping-table called-e164 to called-e164 MT_NR_TRANSLATION


  interface isdn IF_S0_00
    route call dest-table RT_SPEED_DIAL
    use profile tone-set Europe
    isdn-date-time

  interface isdn IF_DEV0

  interface sip IF_SIP_SERVICE
    bind gateway GW_SIP
    service default
    route call dest-table RT_INCOMING
    use profile voip VOIP
```

```
context cs switch
  no shutdown

gateway sip GW_SIP
  bind interface IF_IP_WAN router

  service default

gateway sip GW_SIP
  no shutdown

port ethernet 0 0
  bind interface IF_IP_WAN router
  medium auto

  pppoe

    session SES_PPPOE
      bind subscriber SUB_PPPOE
      shutdown

port ethernet 0 0
  no shutdown

port bri 0 0
  clock auto
  encapsulation q921

  q921
    protocol pmp
    uni-side auto
    encapsulation q931

    q931
      protocol dss1
      uni-side net
      encapsulation cc-isdn
      bind interface IF_S0_00 switch

port bri 0 0
  no shutdown
```

Appendix F **End user license agreement**

Chapter contents

End User License Agreement

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

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 Patton Electronics Company.

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.

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 57.

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 56.

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. 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:

• A routing license is included at no charge.

• MGCP and VPN capabilities will require the purchase of an additional license.

• 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 (**http://ecos.sourceware.org/license-overview.html**) and GNU General Public License (GPL) terms (**http://www.gnu.org/copyleft/gpl.html**). Source code is available upon request.