PATTON Electronics Co.

Model 2960/2996
Remote Access Server (RAS)

Getting Started Guide

Notice

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Contents

Compliance Information

Radio and TV Interference

The Model 2900 Series 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 Model 2900 Series 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 Model 2900 Series 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).

Industry Canada Notice

The Canadian Department of Communications label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational and safety requirements. The Department does not guarantee the equipment will operate to the user's satisfaction. Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. In some cases, the company's inside wiring associated with a single line individual service may be extended by means of a certified connector assembly (telephone extension cord). The customer should be aware that compliance with the above condition may not prevent degradation of service in some situations. Repairs to some certified equipment should be made by an authorized maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment. Users should ensure for their own protection that the ground connections of the power utility, telephone lines and internal metallic water pipe system, are connected together. This protection may be particularly important in rural areas.

> **CAUTION**
> Users should not attempt to establish or modify ground connections themselves, instead they should contact the appropriate electric inspection authority or electrician.

FCC Information

The Model 2900 Series has been tested with the specifications in Part 68 of the FCC rules. Your telephone company may make changes in its facilities, equipment, operations or procedures that could affect the proper operation of the Model 2900 Series. If this happens, the telephone company should give you advance notice to prevent the interruption of your service. The telephone company may decide to temporarily discontinue your service if they believe your Model 2900 Series may cause harm to the telephone network. Whenever possible, they will contact you in advance. If you elect to do so, you have the right to file a complaint with the FCC. If you have any trouble operating the Model 2900 Series, please contact Patton Electronics Technical Support at +1 301-975-1000. The telephone company may ask you to disconnect the equipment from the telephone net-

work until the problem has been corrected or until you are certain that the Model 2900 Series is not malfunctioning. In accordance with FCC rules and regulation CFR 47 68.218(b)(6), you must notify the telephone company prior to disconnection. The following information may be required when applying to your local telephone company for leased line facilities. The Universal Service Order Code (USOC) is RJ48. The Facility Interface Codes (FIC) are 04DU9-BN, 04DU9-DN, 04DU9-1KN, and 04DU9-1SN. The Service Order Code (SOC) is 6.0Y.

Service	Facility Interface Code	Service Code	Network Connection
1.544 Mbps SF format without line power	04DU9-BN	6.0Y	RJ-48C
1.544 Mbps SF and B8ZS without line power	04DU9-DN	6.0Y	RJ-48C
1.544 Mbps ANSI ESF without line power	04DU9-1KN	6.0Y	RJ-48C
1.544 Mbps ANSI ESF and B8ZS without line power	04DU9-1SN	6.0Y	RJ-48C

FCC Part 68 Compliance Statement

This equipment complies with Part 68 of the FCC rules and the requirements adopted by the ACTA. On the outside of this equipment is a label that contains, among other information, the product identifier US:3N8DFNAN004. If requested, this number must be provided to the telephone company. Please note the following:

1. You are required to request service from the telephone company before you connect the RAS to a network. When you request T1 Service, you must provide the telephone company with the Facility Interface Code. Provide the telephone company with both of the following codes: 04DU9-B (1.544 MB D4 framing format) and 04DU9-C (1.544 MB ESF format). The telephone company will select the code it has available. The Service Order Code(s) (SOC): 6.0Y. The required Universal Service Order Code (USOC) jack: RJ 48C. The make, model number, and FCC Registration number of the RAS.

2. Your telephone company may make changes to its facilities, equipment, operations, or procedures that could affect the proper functioning of your equipment. The telephone company will notify you in advance of such changes to give you and opportunity to maintain uninterrupted telephone service.

3. If your RAS causes harm to the telephone network, the telephone company may temporarily discontinue your service. If possible, they will notify you in advance, but if advance notice is not practical, you will be notified as soon as possible and will be informed of your right to file a complaint with the FCC.

4. If you experience trouble with the RAS, please contact Patton Electronics, Co. for service or repairs. Repairs should be performed only by Patton Electronics Co.

5. You are required to notify the telephone company when you disconnect the RAS from the network.

CE Notice

The CE symbol on your Patton Electronics equipment indicates that it is in compliance with the Electromagnetic Compatibility (EMC) directive and the Low Voltage Directive (LVD) of the European Union (EU). A Certificate of Compliance is available by contacting Technical Support.

About this guide

This guide describes installing and configuring a Patton Electronics Model 2960/2996 Remote Access Server (RAS). By the time you are finished with this guide, your RAS will be receiving calls and transferring data. The instructions in this guide are based on the following assumptions:

- The RAS will connect to a T1, E1, or PRI line
- Callers will dial-in and connect with a V.90/K56Flex/V.34 or ISDN modem using PPP
- There is a LAN connected to the Ethernet port of the RAS

Audience

This guide is intended for the following users:

- Operators
- Installers
- Maintenance technicians

Structure

This guide contains the following chapters and appendices:

- Chapter 1 describes the RAS
- Chapter 2 describes installing the RAS hardware
- Chapter 3 describes configuring the RAS for use
- Chapter 4 details how to power up and deactivate the RAS
- Chapter 5 contains troubleshooting and maintenance information
- Chapter 6 contains information on contacting Patton technical support for assistance

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

Precautions

Notes and cautions, which have the following meanings, are used throughout this guide to help you become aware of potential RAS problems:

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.

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	Indicates the names of menu bar options.
Italicized Futura type	Indicates the names of options on pull-down menus.
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.

Table 1. General conventions (Continued)

Convention	Meaning
`Are you ready?`	All system messages and prompts appear in the `Courier` font as the system would display them.
`% dir *.*`	Bold Courier font indicates where the operator must type a response or command

Mouse conventions

The following conventions are used when describing mouse actions:

Table 2. Mouse conventions

Convention	Meaning
Left mouse button	This button refers to the primary or leftmost mouse button (unless you have changed the default configuration).
Right mouse button	This button refers the secondary or rightmost mouse button (unless you have changed the default configuration).
Point	This word means to move the mouse in such a way that the tip of the pointing arrow on the screen ends up resting at the desired location.
Click	Means to quickly press and release the left or right mouse button (as instructed in the procedure). Make sure you do not move the mouse pointer while clicking a mouse button.
Double-click	Means to press and release the same mouse button two times quickly
Drag	This word means to point the arrow and then hold down the left or right mouse button (as instructed in the procedure) as you move the mouse to a new location. When you have moved the mouse pointer to the desired location, you can release the mouse button.

Chapter 1 Introduction

Chapter contents

Model 2960/2996 Remote Access Server overview

The Model 2960/2996 is a central site remote access server with integrated modems which terminate dial-up analog and digital users. The Model 2960 RAS combines 16, 24, 30, 48, 60 or 72 ports—the 2996 RAS combines 96 or 120—analog and digital modems, RAS software, a 10/100 Ethernet port, IP Routing, Frame Relay/PPP forwarding, and four T1/E1 WAN ports.

The 2960/2996 RAS simultaneously consolidates analog modem and digital ISDN remote access connections (over PSTN digital trunks) using a completely digital approach. Up to four T1/E1/PRI ports provide PSTN and/or PABX connectivity and terminate up to 48/60 (Model 2960) or 96/120 (Model 2996) analog modem or digital ISDN calls within a single chassis. The Model 2960/2996 incorporates channel bank, terminal server, router and modem functionality in a self-contained, compact package.

Figure 1. Model 2960/2996 RAS (*Ultra Red* version shown)

Hardware overview

The Model 2960/2996 RAS is a fully integrated remote access server for central site concentration of analog and digital modem calls. The RAS (see figure 2) comprises a 1U-high 17-inch wide chassis that contains a motherboard and two dual-redundant power supplies. A full set of LEDs are present on the chassis front panel, while connections for WAN, LAN, and control ports are present on the rear of the chassis. Two IEC-320 receptacles provide for AC power input. Optional DC power supplies with 32 to 72 VDC are available.
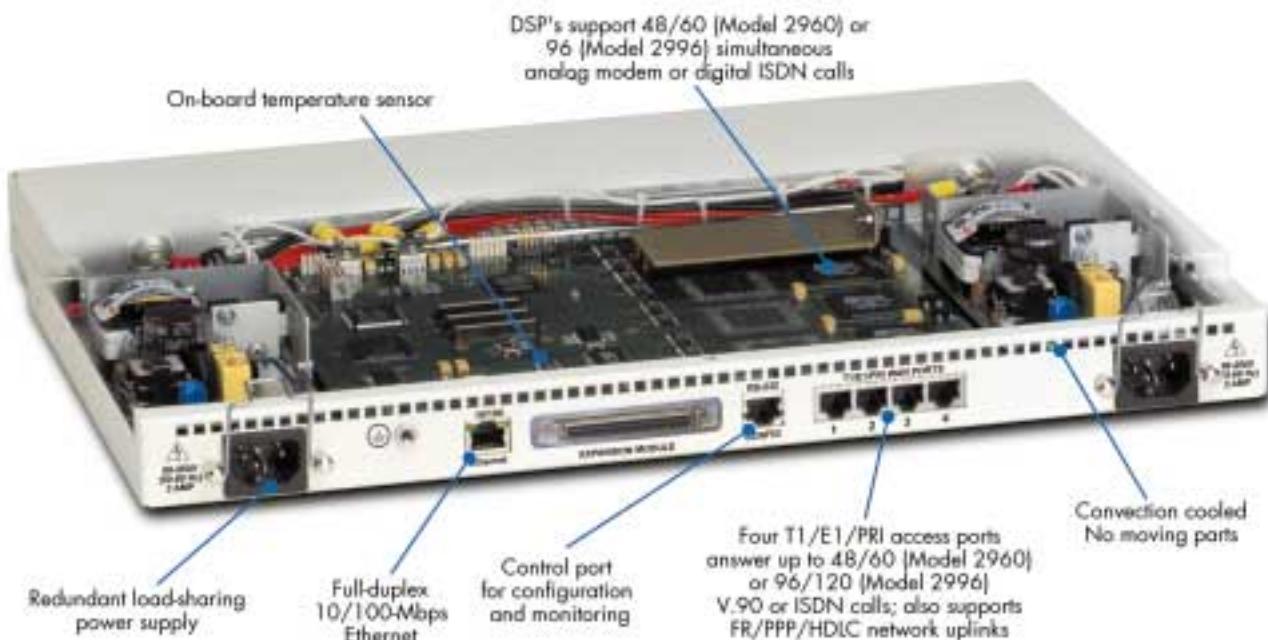
Figure 2. Model 2960/2996 RAS features (*Cool White* version shown)

WAN

The RAS includes four WAN ports, each of which is software-selectable for T1, E1 or PRI operation. These WAN ports are provided via balanced RJ-48C interfaces. They also include:

* Built-in T1/E1 CSU/DSU
* T1 1.544 Mbps with: D4 or ESF framing, AMI or B8ZS, FCC part 68 compliant
* E1 2.048 Mbps with: Double frame or CRC4 framing, AMI/HDB3, CTR-4, and CTR-12 compliant

LAN

The 10/100-Mbps Ethernet LAN port is presented on an RJ-45 connector with an auto-sensing/full-duplex 10Base-T or 100Base-T interface. It also includes:

* 100Base-TX half-/full-duplex operation (100 + 100)
* 10Base-T half-/full-duplex operation (10 + 10)
* Auto detection and fallback
* 10/100 Mbps link and status indicators

Signaling
Robbed-bit, R1, R2, Q.921/Q.931

Modems
Up to 48/60 (Model 2960) or 96/120 (Model 2996) V.92, V.90, K56Flex, V.34+, ISDN B-channel digital calls (additional ports/functionality can be added by installing optional PMC expansion modules), or 64 kbps and 56 kbps DOVBS (*data over voice bearer services*).

RS-232 control port
An RS-232 port provides for initial configuration of the RAS. The RS-232 port also supports:

- Asynchronous data at 19.2 kbps

- An RJ-45 connector with EIA-561 pinout

- A VT-100 console management interface

- Hardware CD and DTR signals for external modem support

Power system
- Fixed internal dual-redundant, load-sharing power supplies

- Universal-input voltage range, 90 to 260 VAC, 50/60 Hz

- Optional DC power supply with 36 to 72 VDC

- Power consumption: less than 35 watts.

Central processing unit
The 2960/2996 is powered by a RISC-based Intel model i80960VH processor operating at 100 MHz. The CPU executes the LAN protocol, IP routing, WAN protocol, management and authentication software. It also sup-ports:

- 4 Mbytes of FLASH memory

- 32 Mbytes of EDO DRAM

Temperature
Operating range: 32 to 104 °F (0 to +40 °C)

Altitude
Maximum operating altitude: 15,000 feet (4,752 meters)

Humidity
5 to 95% relative humidity (RH) at 122 °F (50 °C)

Physical dimensions

Weight: 8.94 lbs (20.12 kg)

Refer to figure 3 for height, width, and depth dimensions.
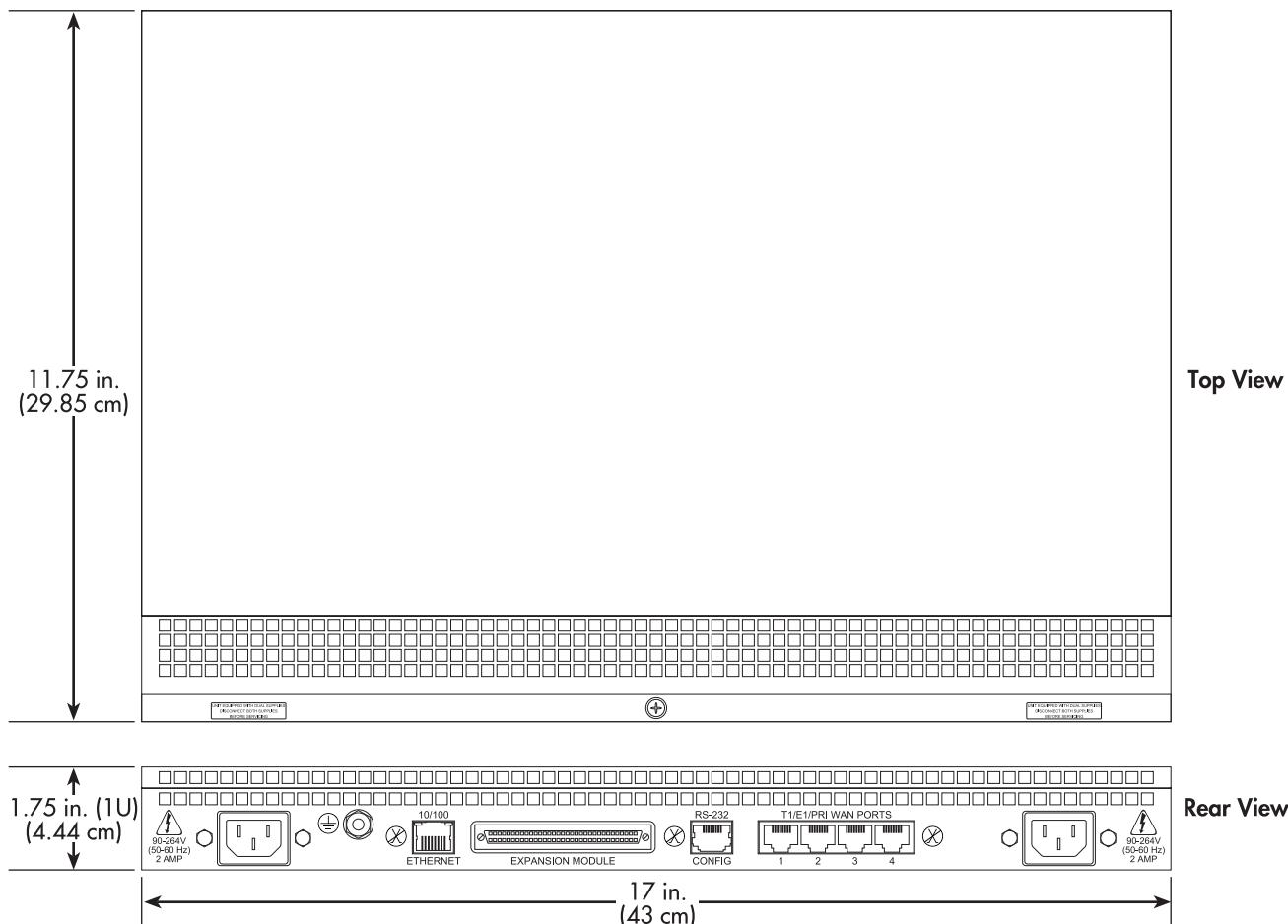
Figure 3. Model 2960/2996 RAS chassis physical dimensions

Security

- Internal database of over 111 static users
- RADIUS Client supporting dual Authorization and Accounting servers
- Framed connections: PPP PAP & CHAP
- Unframed connections: User name login and password
- Dual SNMP/HTTP passwords for monitor and superuser access levels
- Packet filtering on dial-in user traffic and Ethernet port

Management services

- Out-of-Band RS-232 configuration port for management and control
- Remote software upgrade via FTP to internal FLASH memory

- SNMP version 1 configuration management
- Support for MIB-II (RFC-1213), DS1 MIB (RFC-1406), RIPv2 MIB (RFC 1389), Ethernet MIB (RFC-1643), Frame Relay DTE MIB (RFC-1315) and Patton's enterprise MIB (1768)
- System logging to configuration port, non-volatile FLASH, volatile RAM, SYSLOG Daemon, and SNMP trap
- RADIUS Accounting
- Dial-in dynamic IP address pool management
- User configurable login prompts and banners
- Status reporting of all access server parameters
- Built in HTTP server for complete configuration and control using a standard Web browser
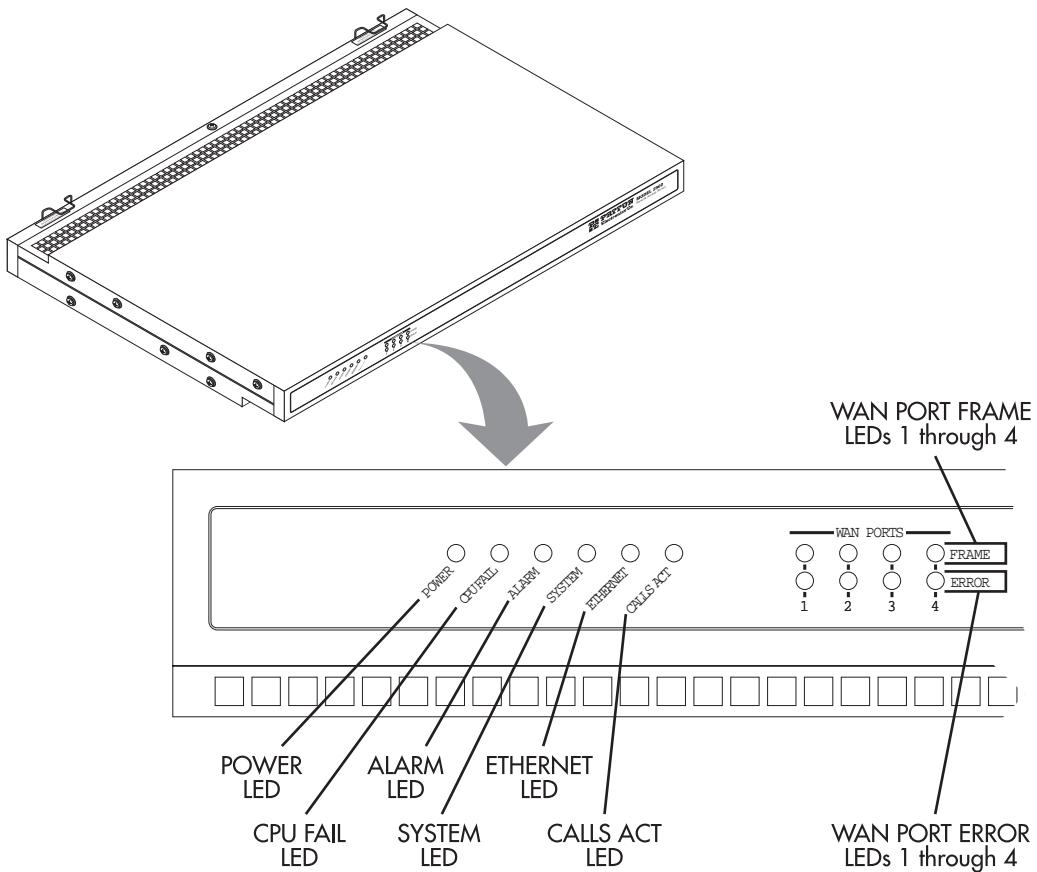
Figure 4. Model 2960/2996 front panel LEDs

LED display

The front panel (see figure 4) includes LEDs for:

- POWER: Green if power is being applied. Flashing if a power supply has failed.
- CPU FAIL: Red if the CPU has failed.
- ALARM: Red if the Model 2960/2996 is in an alarm state.

- SYSTEM: Green if the RAS is operating normally.
- ETHERNET: Green if link status is nominal for the Ethernet port.
- CALLS ACT: Green to indicate call activity on the Model 2960/2996.
- WAN STATUS: Green indicates normal status at each of the four T1/E1/PRI links. Red indicates an error.

Approvals

The Model 2960/2996 RAS has achieved the following approvals:

- FCC Part 15, Class A
- FCC Part 15, Class B
- FCC Part 68
- Complies with UL1950 (MET)
- Canadian cMET
- Canadian CS-03
- EMC Directive 89/336/EEC
- Low Voltage Directive 73/23/EEC (EN60950)
- ITU-T CTR-4 and CTR-12

Software overview

The Patton Model 2960/2996 supports all common remote access services as well as integrated routing and forwarding (see table 3). Authentication and network management offer control and detailed monitoring from any web browser. From the PSTN, the Model 2960/2996 RAS will accept either T1/E1 or PRI connections, with support for both channel associated or common channel signaling.

Table 3. Software overview

Parameter	Modem Support
WAN Protocols	V.92 (28,000–56,000) • V.90 (28,000–56,000) • K56 Flex (32,000–56,000) • V.34 Annex 12 (2,400–33,600) • V.34 (2,400–28,800) • V.8bis (capabilities negotiations) • V.32bis (7,200–14,400 with trellis encoding) • V.32 (4,800 & 9,600) • V.22 (600, 1,200, & 2,400) • V.22bis (600, 1,200, & 2,400) • V.21 (300 bps) • Bell 212A (1,200 bps) • Bell 103 (300 bps) • Bell 202 (75/1,200 bps) • EIA PN-2330 and low-speed data modem automode proce-dures • Modulation supervision for automatic rate selection • Bit error performance monitoring for automatic fallback and fall-forward • V.14 synch to async con-version (buffered/direct) • V.42 sync to async conversion with error correction • V.42bis compression • 64 kbps and 56 kbps Digital ISDN • V.110 • DOVBS • User-selectable modulation and speeds • Quick Connect • Modem on hold
LAN Protocols	SLIP • Sync/Async PPP with dial-up auto-detection • Multilink PPP & Multichassis MultiLink with L2TP tunneling • LCP • IPCP with MS extensions • Frame Relay RFC 1490 IP Encapsulation • User configurable PVCs • User-selectable 2-, 3-, or 4-byte DLCI address field formats • Conges-tion recognition and management • Individual DLCI statistics • Current throughput indication (10-second average) • Online help • 802.3 Ethernet, ARP, RARP, IP over Ethernet • Proxy ARP for dial-up IP addresses
PSTN Connectivity	T1/CT1 • Robbed Bit with Ground Start, Loop Start, E&M Wink, E&M Immediate, Taiwan R1 • Office Side Robbed Bit • PRI/Q.931 Switch Support: NI1, AT&T/Lucent, DMS •T1/E1 Near- and Far-end Statistics • User Selectable Time Slot allocation • E1/CE1 with MFR2 with user configurable inter-register codes • PRI Switch Support: NET5/CTR-4, TS014, INS1500 • Drop & Insert with signaling conversion • Digital Cross Connect with multiple clock source fail-over protection
IP Services	TCP/IP suite with extensive protocol statistics • ICMP with redirect enable/disable • TFTP • FTP • RLOGIN • TELNET • Proxy ARP • IP over Point-to-Point Protocol • IP over Ethernet • Van Jacobson TCP Header Compression • PPP address and protocol compression • RIP and RIPv2 dynamic route distribution with support for Multiple RIP interfaces • User configurable static routes with gateway/host/interface routes • TCP clear connection (TCPRAW) • Dial-in NetBIOS UDP broadcast enable/disable • IP Encapsulation within IP (RFC 2003)
Management	HTTP • SNMPv2 with MIB II • TELNET • RS232 Console port • SYSLOG client • Remote soft-ware upgrade via FTP • Complete dial-in statistics including the viewing of active calls, previous 15 dead calls, administrative call termination • Selectable login time limit • Selectable idle time limit • Selectable session total time limit • Dial-in dynamic IP address pool management using DNIS • Dial-out via Telnet with user configurable port numbers • Layer 3 & Layer 4 IP Filters with auto-default for dial-in users and Ethernet
Authentication	RFC 2138 & RFC 2139 RADIUS client with packet format selection and authentication statistics with user configurable timeout/retry parameters • PAP & CHAP • CLID/ANI/DNIS • ASCII Username & Password • Internal Static Users Database (111 entries)

Chapter 2 Hardware installation

Chapter contents

Introduction

This chapter contains the following procedures for installing the Model 2960/2996 RAS:

- "Unpacking the Model 2960/2996 RAS"—lists the contents of the RAS shipping container
- "RAS chassis installation"—describes installing the RAS on a flat surface or in a standard 19–inch rack.
- "Cable installation" on page 23—describes installing the power and network interface cables
- "Completing the hardware installation" on page 26—describes testing the RAS hardware to verify that it is ready for software configuration.

Unpacking the Model 2960/2996 RAS

Inspect the shipping carton for external damage. Note any damage before removing the container contents. Report equipment damage to the shipping carrier immediately for claim purposes. Save all packing materials in case you need to return an item to the factory for servicing.

The RAS comes with the following items:

- The 2960/2996 Series Remote Access Server (RAS)
- A DB-9-to-RJ-45 (EIA-561) cable, 10 foot (3 meters)
- Control port interface cable, 10 foot (3 meters), standard CAT-5 cable
- Two WAN connection cables, 10 foot (3 meters) each
- Rack mounting kit with rack ears and mounting hardware
- CD-ROM containing product literature and the following documentation:
  - *Access Server Administrator's Reference Guide*
  - *Model 2960/2996 RAS Getting Started Guide*

> **Note** Power cables are shipped separately from the Model 2960/2996 RAS.

RAS chassis installation

Do the following:

1. If you have not done so already, remove the RAS from its shipping container.

   > **Note** The RAS should be placed as close as possible to the termination jack provided by the Telco. Avoid installing the RAS in a location where the power cords or network interface cables could be accidentally disconnected. The location should be well ventilated. Do not block the RAS's cooling vents.

2. If you are installing the RAS in a 19-inch rack, go to step 3. Otherwise, place the RAS at the desired location, then go to "Cable installation" on page 23.

3. Install the rack mounting ears onto the RAS using the mounting hardware provided.

4. Place the RAS at the desired position in the rack.

5. Secure the RAS in position with the mounting screws.

Cable installation

This section describes installing the power, ground, and network interface cables.

Installing the power cables

This section describes installing the female end of the power cables into the IEC-320 connectors on the RAS. *Do not connect the male end of the power cables to the power outlet at this time*. Do the following:

1. Install a power cable into an IEC-320 connector (see figure 5).
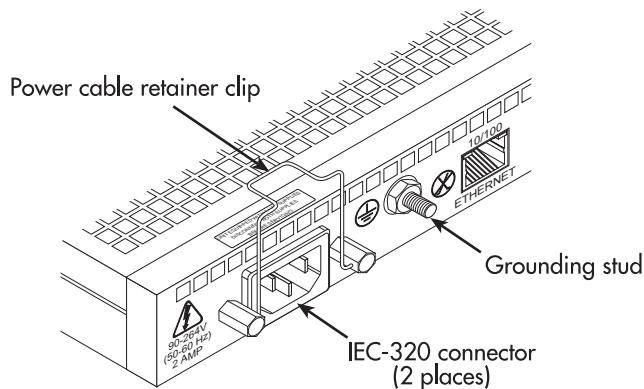

Figure 5. IEC-320 connector and grounding stud locations

> ⚠ **WARNING**
>
> **To avoid the risk of injury from electric shock, the power cords connected to the IEC-320 connectors must be grounded power cords.**

2. Rotate the power cable retainer clip so it secures the power cable plug in the IEC-320 connector as shown in figure 6.
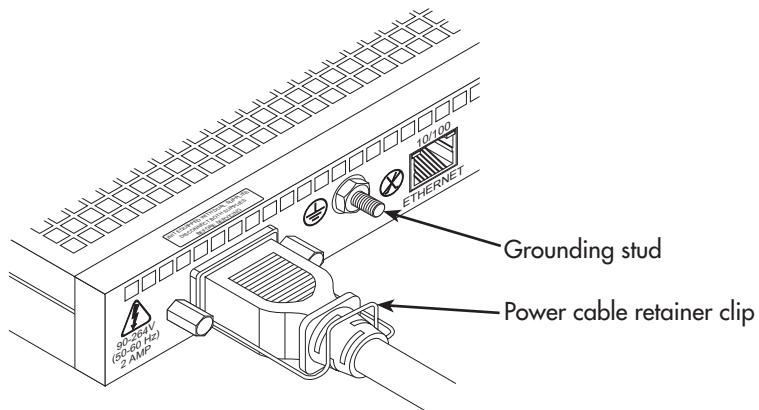

Figure 6. Power cable retainer clip

3. Repeat steps 1 and 2 to install the remaining power cable.

Grounding the Model 2960/2996

Do the following:

1. Assemble a ground wire using #10 AWG wire with green-colored insulation and two ring terminals. Make the wire long enough to reach one of the following ground sources:

– The building ground rod (generally located at the site's main service entrance)

– A sprinkler system pipe

– A cold-water pipe

– Building structural steel

> ⚠️ **WARNING**
>
> **To avoid the risk of personal injury, the distance between ground and the equipment rack must not exceed the distance specified in either local electrical codes or the National Electrical Code.**

2. Install the ground wire between the grounding stud (see figure 6) and the grounding source.

Connecting the Ethernet ports

The RAS has a single 10/100 Ethernet interface for connection to your LAN (see figure 7). The Ethernet port will autosense the correct speed of the local LAN and automatically negotiate half- or full-duplex operation. This section describes connecting the RAS to the Ethernet LAN via an Ethernet hub, switch, or workstation.
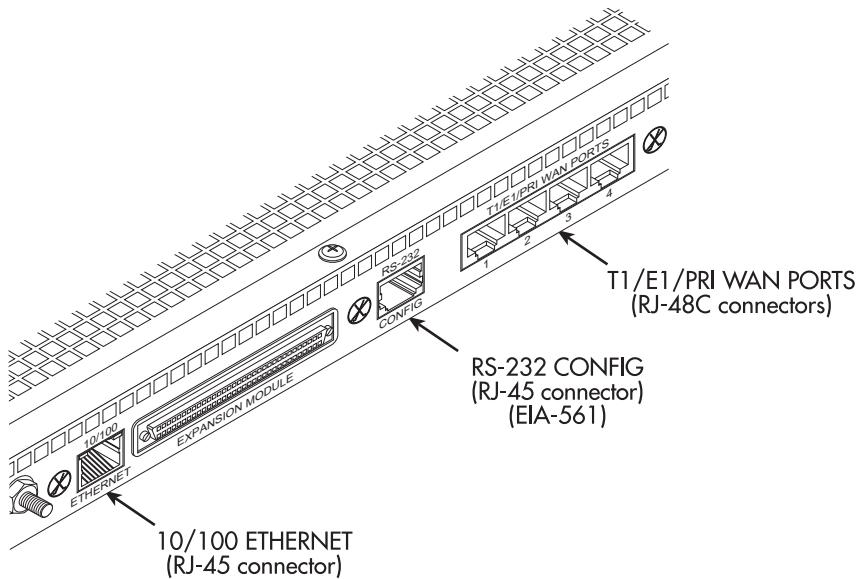

Figure 7. Model 2960/2996 network and configuration ports

Connecting the 10/100Base-T Ethernet port to an Ethernet switch or hub
The 10/100Base-T Ethernet port (see figure 7 on page 24) is designed to connect to an Ethernet switch or hub. Connect a straight-through CAT-5 cable (one wired as shown in figure 8) between the RAS and the hub/switch.

RJ-45 Jack	Signal Name	Direction
1	(TX+) Transmit Data +	Output
2	(TX-) Transmit Data -	Output
3	(RX+) Receive Data +	Input
4		
5		
6	(RX-) Receive Data -	Input
7		
8		
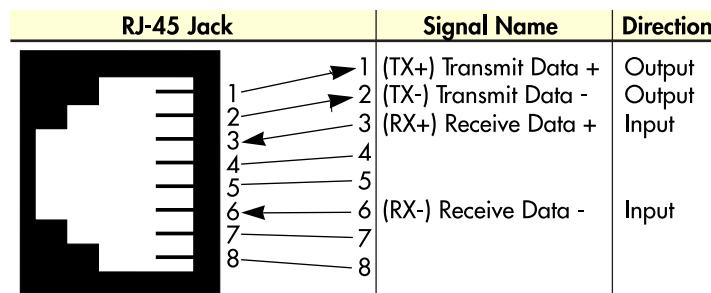
Figure 8. Straight-through RJ-45-to-RJ-45 Ethernet cable diagram

Connecting the 10/100Base-T Ethernet port to an Ethernet-capable workstation
The 10/100Base-T Ethernet port can connect to a single Ethernet-capable workstation by means of a cross-over cable. Refer to figure 9 to assemble a cross-connect cable that will connect between the NIC Ethernet port in the workstation and the RAS 10/100Base-T Ethernet port.

10Base-T Workstation
RJ-45 Pin No.   **RAS 10/100Base-T Port**
                                            RJ-45 Pin No.

1 (TX+) ◄──────────────── 3 (RX+)
2 (TX-) ◄──────────────── 6 (RX-)

3 (RX+) ────────────────► 1 (RX+)
6 (RX-) ────────────────► 2 (TX-)
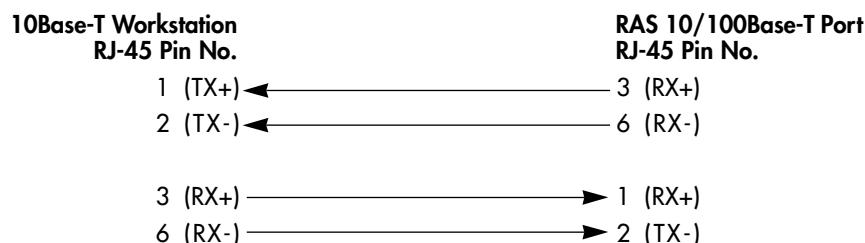
Figure 9. Cross-over RJ-45-to-RJ-45 Ethernet cable diagram

Connecting the EIA-561 RS-232 configuration port
Install the supplied DB-9-to-RJ-45 cable between the RAS RS-232 port (see figure 7 on page 24) and an open serial port on your computer. If you need to assemble your own cable, refer to the pinout diagram in figure 10.

RJ-45 Jack	DB-9	Signal Name
	6	DSR ⎫
1	1	CD ⎬ Wired together
2	4	DTR ⎭ (No other electrical
3	5	SG connection)
4	2	RD (driven by access server)
5	3	TD (received by access server)
6	8	CTS (driven by access server)
7	7	RTS (received by access server)
8		
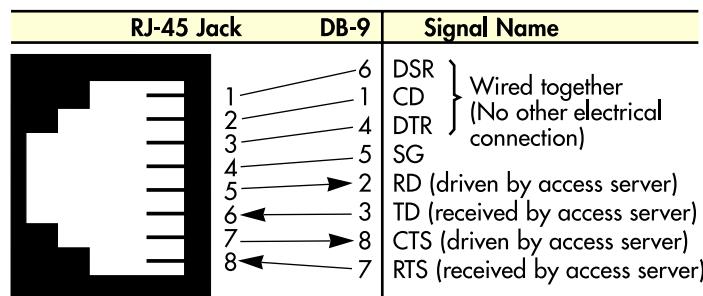
Figure 10. DB-9-to-RJ-45 cable diagram

Connecting to the T1/E1/PRI WAN ports

An active T1/E1/PRI is not necessary to configure the RAS. However, an active T1/E1/PRI connection is required to receive or make calls. The factory-set default configuration of the access server has the T1/E1 ports disabled.

> **Note**   The cable connecting the T1/E1/PRI WAN ports to the RJ-48C termination jack should be CAT-3 or higher and extend no farther than 1 mile (1.6 km) from the digital services termination.

1.   Refer to figure 11 for the T1/E1/PRI RJ-48C pinout diagram.

| RJ-45 Jack	Signal Name
1	(RX) Receive (RING)
2	(RX) Receive (TIP)
3	
4	(TX) Transmit (RING)
5	(TX) Transmit (TIP)
6	
7	
8	
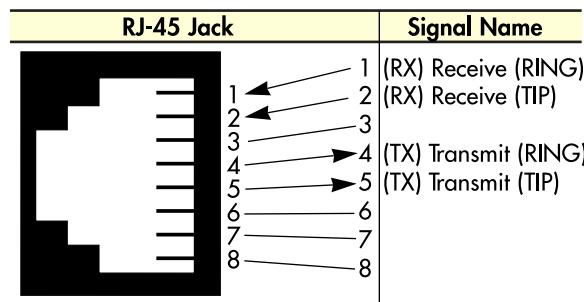
Figure 11. T1/E1/PRI RJ-48C pinout diagram

2.   Attach the network cable from the telephone network demarc to the Primary T1/E1/PRI port (RJ-48C) on the RAS.

> **Note**   For 75-ohm twin-coax E1 connections, use the Patton Model 460 E1 120-ohm/75-ohm adapter to convert from a 75-ohm dual-coax to the 120-ohm twisted-pair interface the RAS uses.

Completing the hardware installation

This section verifies that the RAS hardware is operational to the point where you can begin configuring the software settings.

> **⚠ CAUTION**   The RAS power supply automatically adjusts to accept an input voltage of from 90 to 260 VAC (50 to 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.   Verify that the AC power cord included with your RAS is compatible with local standards. If it is not, refer to Chapter 6, "Contacting Patton for assistance" to find out how to replace it with a compatible power cord.

2.   Connect the male end of the power cord to an appropriate power outlet.

3.   Verify that the green *POWER* LED is lit. If the *POWER* LED is flashing green, refer to Chapter 5, "Troubleshooting and maintenance".

Hardware installation is complete. Refer to Chapter 3, "Configuring the RAS for operation".

Chapter 3 Configuring the RAS for operation

Chapter contents

Introduction

This chapter contains the following procedures for configuring the Model 2960/2996 Remote Access Server for operation:

- "Configuration prerequisites"—lists the items you need to have on hand before configuring the RAS.

- "Preparing the RAS for configuration"—describes setting up the RAS IP address and netmask parameters.

- "Configuring the RAS with a Web browser" on page 32—describes installing the power and network interface cables

- "Saving your configuration" on page 46—tells you how to save the configuration settings.

- "Completing the installation" on page 48—describes testing the RAS to verify that it is fully operational

Configuration prerequisites

You will need the following to configure the RAS:

- A PC with a serial port and a VT-100 terminal program

- A PC with an Ethernet port and a WWW browser (Microsoft Internet Explorer or Netscape Communicator) connected to the remote access server's local LAN

- The IP address and subnet mask for the RAS's Ethernet port

- A range of IP addresses to be assigned to the dial-in users (IP pool)

- The IP addresses of the domain name servers (DNS)

- The IP address of the default gateway

> **Note** Before installing the RAS, you will need the following information from your local telephone company (telco):
>
> - The line type and encoding of the T1/E1 line
>
> - The signalling of the E1 (ISDN or MFCR2) line or the signalling of the T1 line. If the signalling for E1 is MFCR2, you will need the number of digits the telco will send over the line for the called number and the calling number
>
> - The voice channels that are active on the T1/E1 line

Preparing the RAS for configuration

Before the RAS can be configured the IP address and the netmask needs to be set up. This setup is done through the RS-232 CONFIG port on the RAS.

1. If you have not done so already, install the supplied DB-9-to-RJ-45 cable between the RAS RS-232 port (see figure 7 on page 24) and an open serial port on your computer.

2. Start a new VT-100 terminal session configured with the following characteristics:

   – Direct connection to COM port

   – 19.2 kbps

  – 8 bits

  – No Parity

  – 1 Stop bit

  – No flow control

3. Set up HyperTerminal™ as follows:

  – Open a HyperTerminal session.

  – Enter a name for this connection.

  – Click on the *Connect using:* pop-up menu and choose the *Direct to Com*X option (where *X* is the number of the COM port onto which you connected the cable in step 1) (see figure 12).

Figure 12. Hyperterminal properties

  – Configure the COM port settings as shown in figure 13.

Figure 13. COM properties
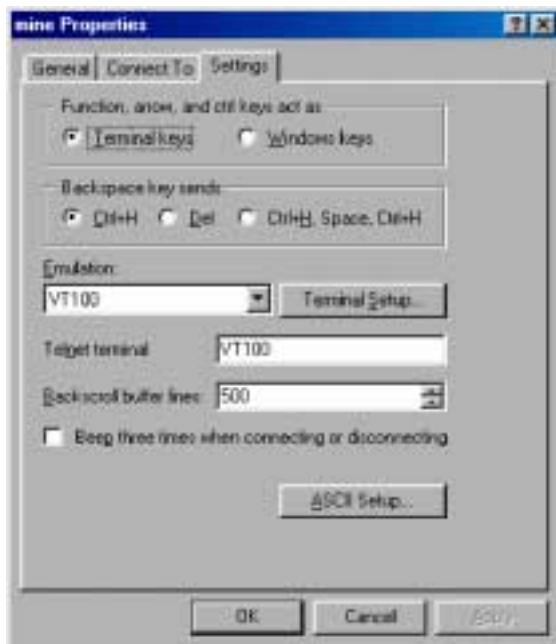
Figure 14. Terminal keys configuration

– Configure the Settings for *Function, arrow and ctrl keys act as* to *Terminal keys* as shown in figure 14.

**4.** Press <RETURN> to display the login window, which will resemble that shown in figure 15.
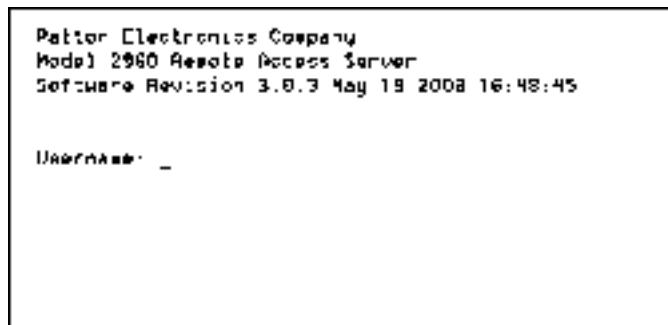
Figure 15. Login window

5. Type **superuser** as the default username and password, then press <RETURN>. The *Top Level Management* window displays (see figure 16).
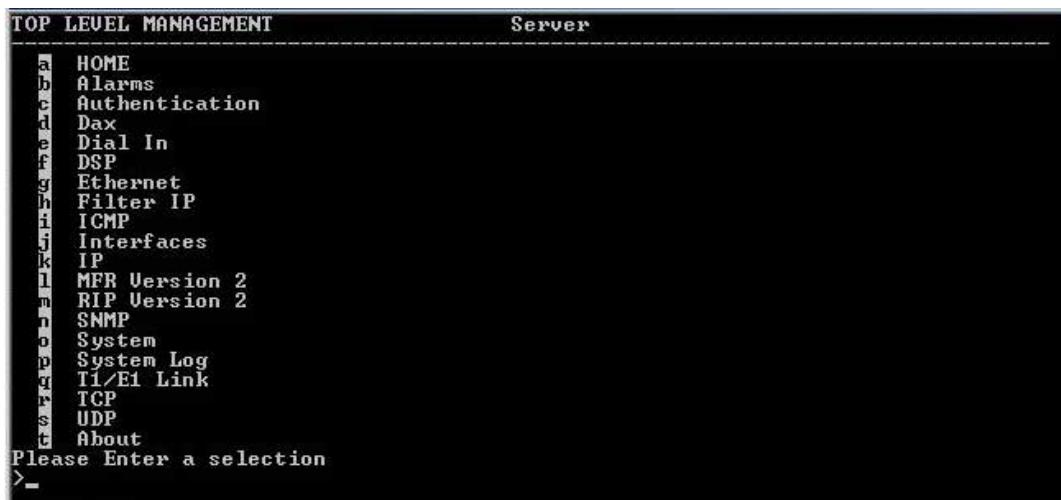
Figure 16. VT-100 Top Level Management window

6. Select option *g Ethernet.*

7. Select *a PrimaryIpAddress* to set the Ethernet IP address.

8. Type the IP address at the > prompt, then press <RETURN>.

9. Use the left arrow key to return to the previous menu.

10. Select *b PrimaryIpMask* to set the Ethernet IP subnet mask.

11. Type the IP netmask at the > prompt, then press <RETURN>.

12. Use the left arrow key to return to the top level management page.

13. Select *a Home*.

14. Select *1 StoreConfig* to save your IP address and netmask.

The RAS is now prepared for configuration using a Web browser.