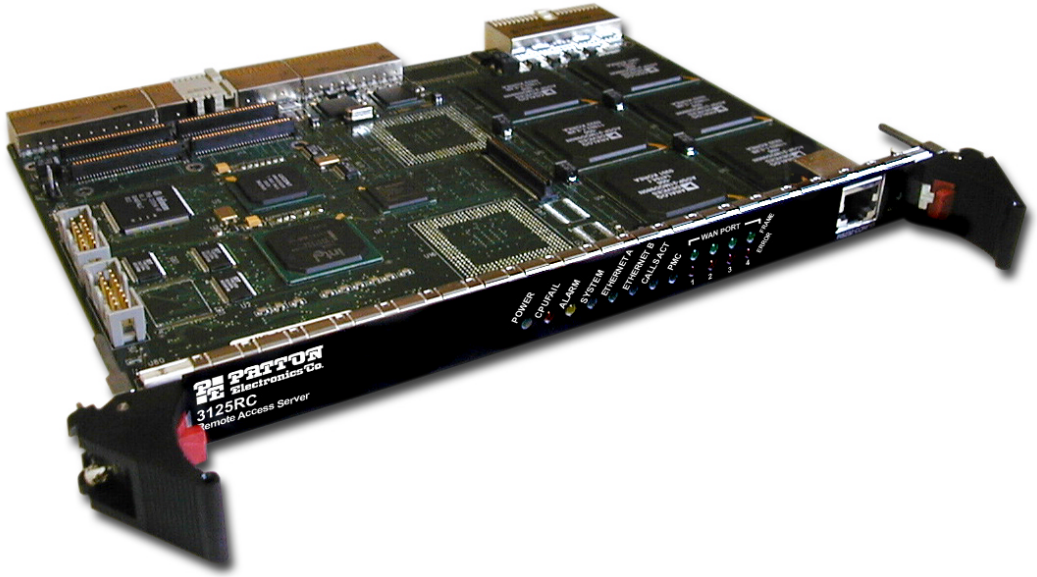
ForeFront™ Model 3125 Resource Card
Remote Access Server (RAS)

Getting Started Guide



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Contents

Compliance Information

Radio and TV Interference

The Model 3125 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 3125 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 3125 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, reorienting 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.

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 3125 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 3125. 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 3125 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 3125, please contact Patton Electronics Technical Support at +1 301-975-1000. The telephone company may ask you to disconnect the equipment from the telephone network until the problem has been corrected or until you are certain that the Model 3125 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.

Conformity documents of all Patton products can be viewed online at www.patton.com under the appropriate product page.

Service

All warranty and non-warranty repairs must be returned freight prepaid and insured to Patton Electronics. All returns must have a Return Materials Authorization number on the outside of the shipping container. This number may be obtained from Patton Electronics Technical Service at:

- Tel: **(301) 975-1007**
- E-mail: **support@patton.com**
- URL: **www.patton.com**

Note Packages received without an RMA number will not be accepted.

Patton Electronics' technical staff is also available to answer any questions that might arise concerning the installation or use of your Model 3125. Technical support is available from **8 AM** to **5 PM EST** (**8:00** to **17:00 UTC-5**), **Monday** through **Friday**.

About this guide

This guide describes installing and configuring a Patton Electronics Model 3125 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 5 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
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.
`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 3125 Remote Access Server overview

The Model 3125 (see figure 1) is a central-site remote-access server with integrated modems that terminate dial-up analog and digital users. The Model 3125RC RAS combines 96 or 120 ports, RAS software, a 10/100 Ethernet port, IP routing, Frame Relay/PPP forwarding, up to 52 T1/E1 WAN ports, and a centralized web-based management system. As shown in figure 1, the Model 3125RC comprises a front and rear blade that are inserted in an equipment rack with a cPCI-compliant mid-plane architecture (see figure 2 on page 17). The front blade feature LED indicators for *Power*, *CPU Fail*, *Alarm*, *System*, *Ethernet A*, *Ethernet B*, *Calls Act*, *PMC*, and *WAN Port* status. The rear blade contains the T1/E1/PRI WAN port connectors, dual 10/100 Ethernet ports, and an expansion (PMC) slot.

The 3125 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 96/120 (per resource card) analog modem or digital ISDN calls within a single chassis. The Model 3125 incorporates channel bank, terminal server, router and modem functionality in a self-contained, compact package.

Figure 1. Model 3125 Resource Card front blade and 3125 TransitionModule rear blade

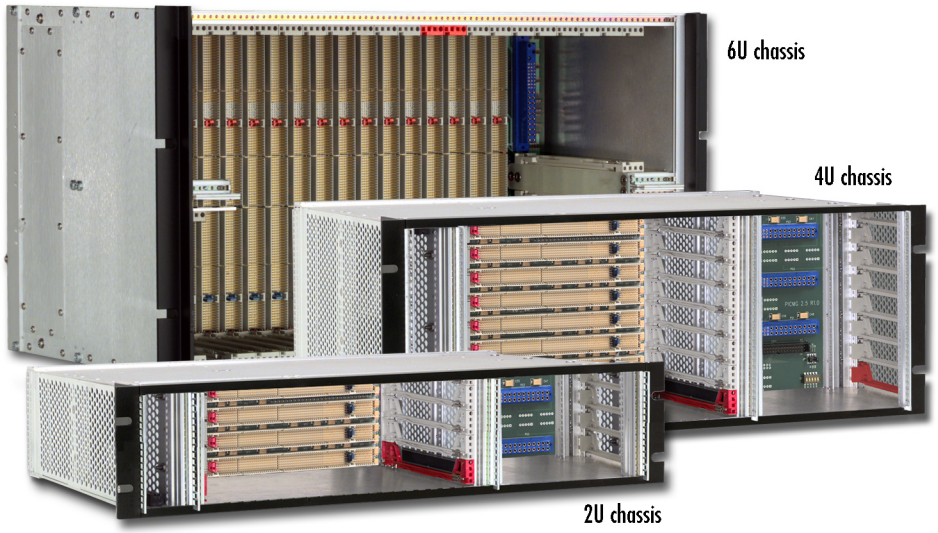

Figure 2. Patton 2U, 4U, and 6U cPCI platforms

Hardware overview

The Model 3125 RAS is a fully integrated remote access server for central site concentration of analog and digital modem calls. The 3125 Resource Card (see figure 3) is a 6U-sized CompactPCI circuit card that contains a full set of status LEDs and control port on the chassis front panel, while connections for WAN and LAN are located on the rear 3125 Transition Module.

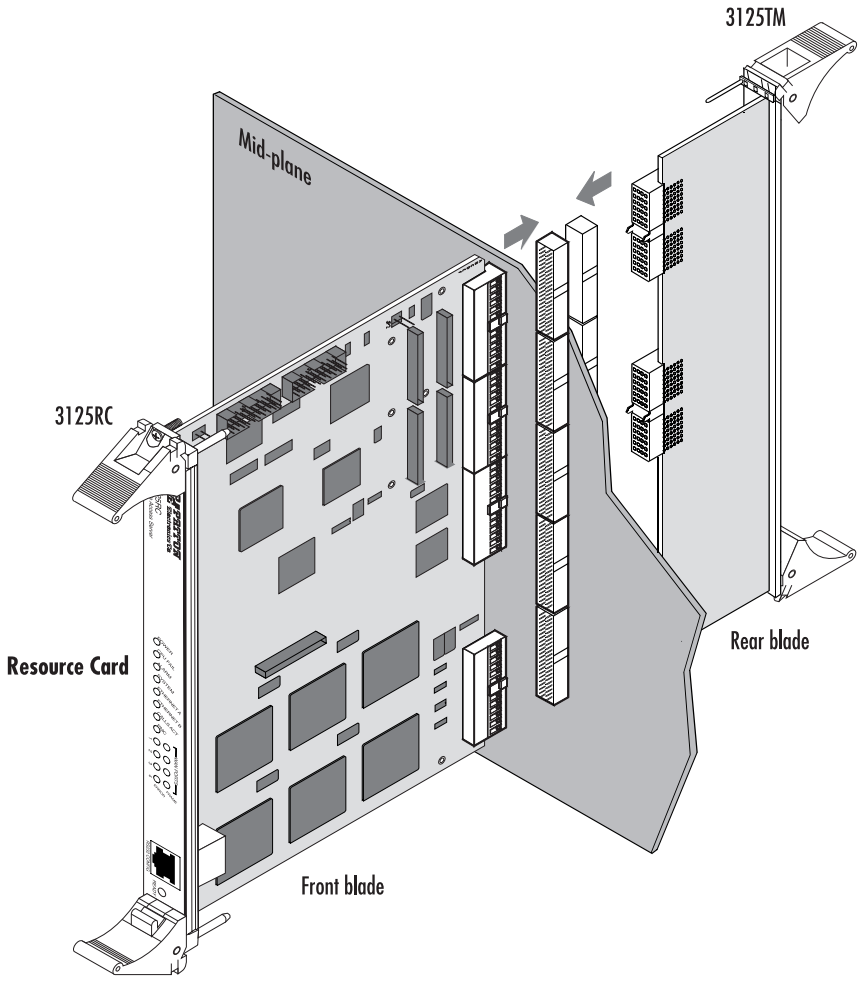

Figure 3. Model 3125 RAS features

WAN

The Model 3125 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 dual 10/100-Mbps Ethernet LAN ports are presented on an RJ-45 connector with an auto-sensing/full-duplex 10Base-T or 100Base-T interface. They also include:

- 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 96/120 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
The Model 3125 obtains power modular power supplies installed in the cPCI chassis via PCMG 2.11 47-pin power connectors (one for the front blade and one for the rear blade). Maximum power consumption is 43 watts.

Central processing unit
The 3125 uses 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 supports:

- 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

3125RC Resource Card

Weight: 0.8 lbs (0.35 kg)

Refer to figure 4 for height, width, and depth dimensions.

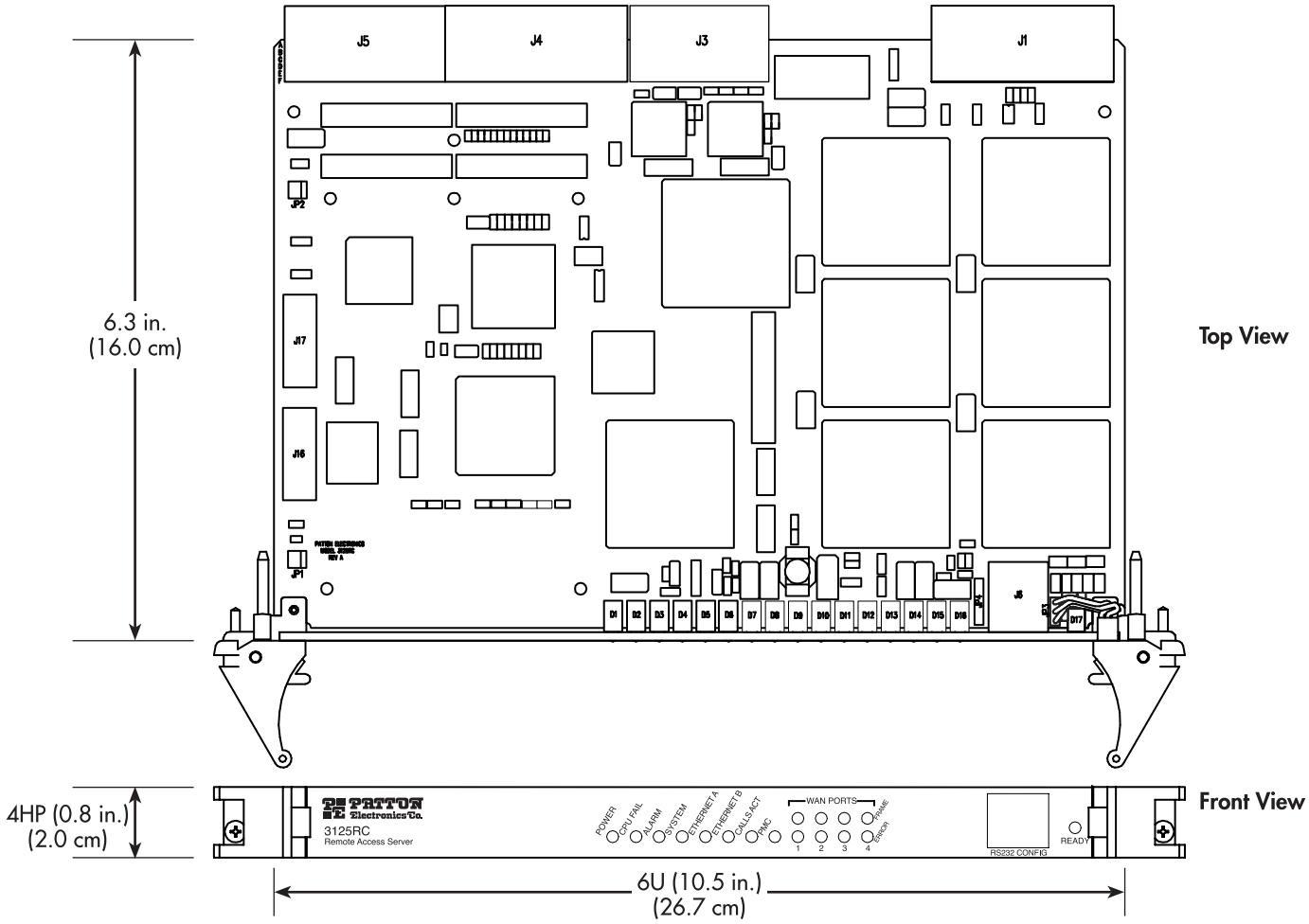

Figure 4. 3125RC physical dimensions

3125TM Transition Module
Weight: 0.45 lbs (0.2 kg)

Refer to figure 4 for height, width, and depth dimensions.

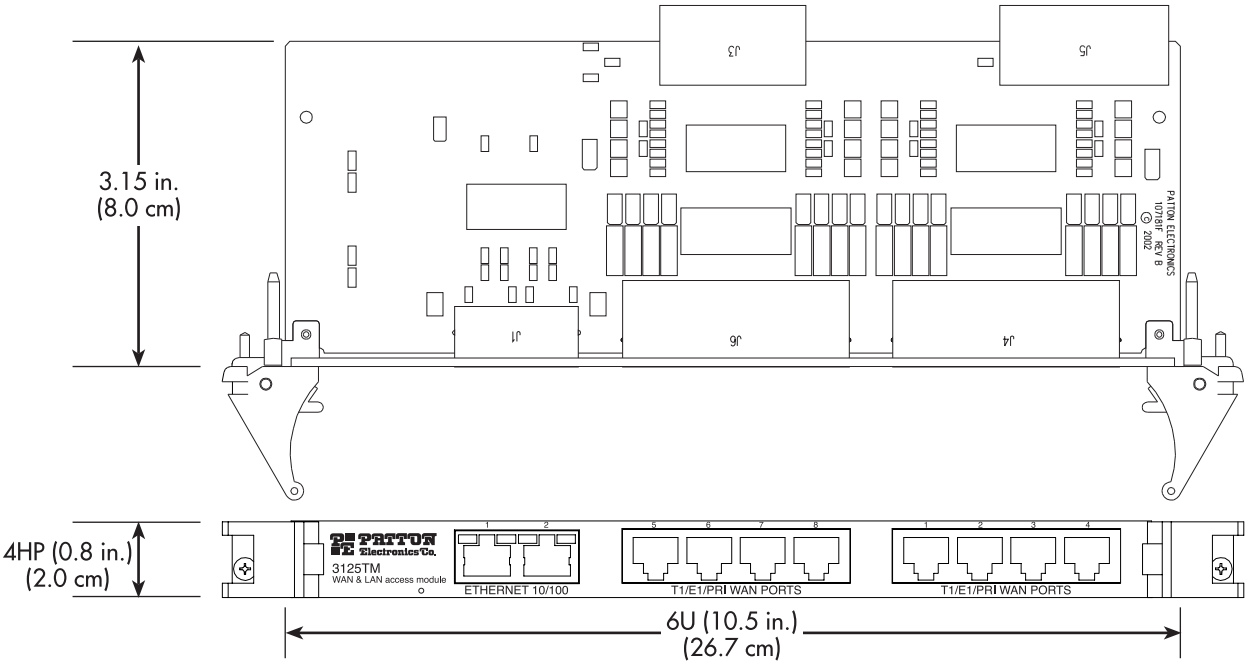

Figure 5. 3125TM physical dimensions

Security

- Internal database of 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

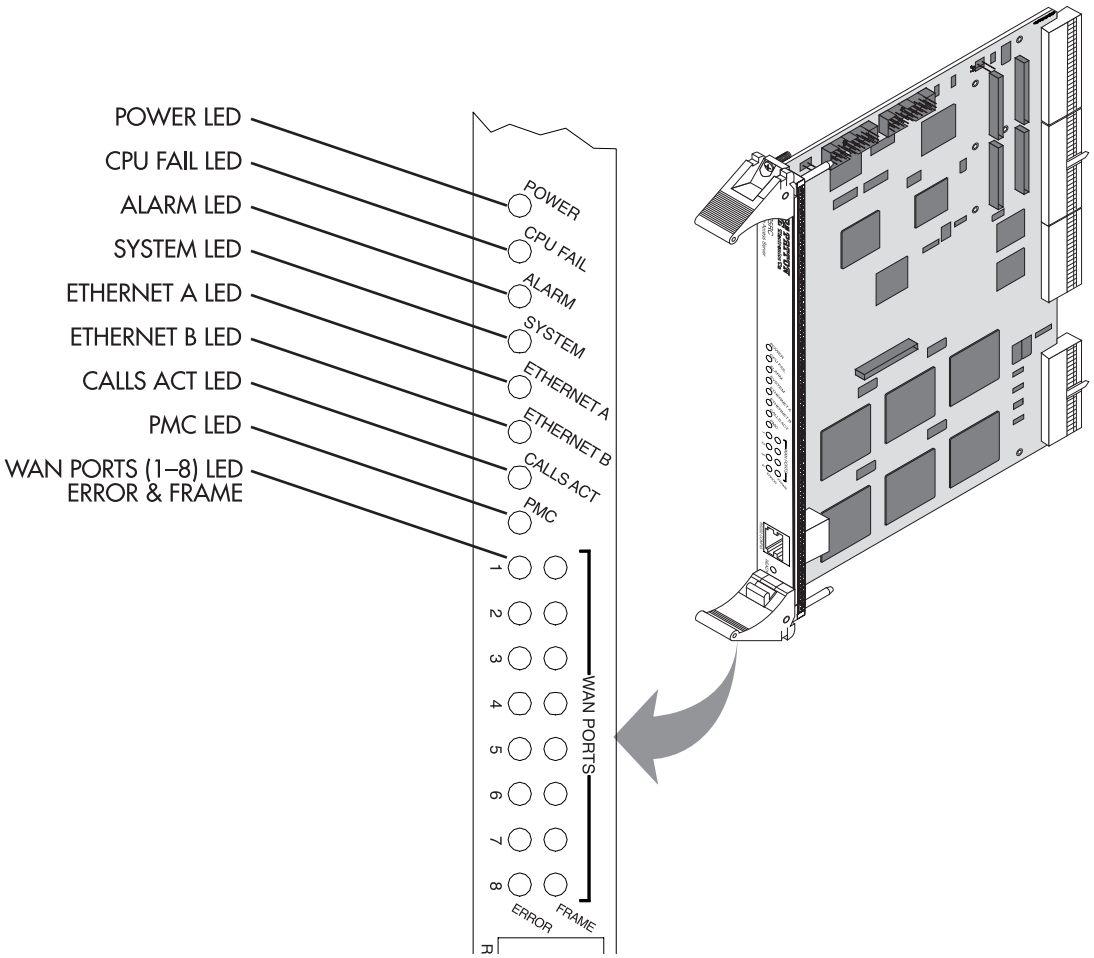

Figure 6. 3125RC status LEDs

LED display

The front panel (see figure 6) 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 3125 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 3125.

- WAN STATUS: Green indicates normal status at each of the four T1/E1/PRI links. Red indicates an error.

Approvals

The Model 3125 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 3125 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 3125 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 procedures • 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 • Congestion 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 software 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 3125 RAS:

- "Unpacking the Model 3125 RAS"—lists the contents of the RAS shipping container
- "Model 3125 installation" on page 27—describes installing the RAS in a cPCI rack.
- "Cable installation" on page 31—describes installing the network interface cables
- "Completing the hardware installation" on page 33—describes testing the RAS hardware to verify that it is ready for software configuration.

Unpacking the Model 3125 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 3125 RAS comes with the following items:

- The Model 3125 Series Remote Access Server (RAS) consisting of a 3125RC Resource Card and a 3125TM Transition Module
- A DB-9-to-RJ-45 (EIA-561) cable, 10 feet (3 meters) long
- Control port interface cable, 10 feett (3 meters) long, standard CAT-5 cable
- Two WAN connection cables, each 10 feet (3 meters) long
- CD-ROM containing product literature and the following documentation:
  - *Model 3125 RAS Administrator's Reference Guide*
  - *Model 3125 RAS Getting Started Guide*

Materials and Tools Required

This section provides information on the materials and tools required to perform installation. The minimum tools required to perform installation are:

- anti-static mat
- Phillips screwdrivers, #1, #2
- anti-static wrist strap
- ASCII Terminal (also called a *dumb terminal*)

Model 3125 installation

CAUTION

The resource and transition modules can easily be damaged by electrostatic discharge (ESD) resulting from the build-up of electrical potential on clothing and other materials.

To avid damaging the 3125 modules, perform the following safety and ESD preventive measures:

- Attach a ground strap to your wrist when connecting, disconnecting, or handling the modles. Connect the other end of the strap to a grounded surface.
- Keep the module in anti-static bags until they are needed.
- Remove a board from its anti-static bag only after you are correctly grounded by a ground strap.
- Place the modules only on an anti-static mat. Do not place boards on top of an anti-static bag unless the outside of the bag also provides anti-static protection.

CAUTION

Verify that the chassis rack is properly grounded before installing the Model3125. An adequate ground can be achieved by connecting a #10 AWG ground wire between the chassis rack ground stud and one of the following ground sources:

- The building ground rod (generally located at the site's main service entrance)
- A sprinkler pipe
- A cold water pipe
- Building structural steel

Installing the 3125TM Transition Module

1. If necessary, refer to the instructions in your chassis user manual to remove any outer covers so you can access the cPCI rack card cages.
2. If there is not a slot filler panel installed, go to step 3. Otherwise, remove the two screws (located at the top of the filler panel and at the bottom) that secure the panel to the card cage.
3. Remove the 3125TM Transition Module from its anti-static bag.

Note Be sure to wear the anti-static strap to prevent electrostatic damage to the module.

Note The module should be installed as close as possible to the termination jack provided by the Telco. The location should be well ventilated. Do not block the chassis rack cooling vents.

4. Press on the red tab on each injection/ejection handle to release the handle (see figure 7).

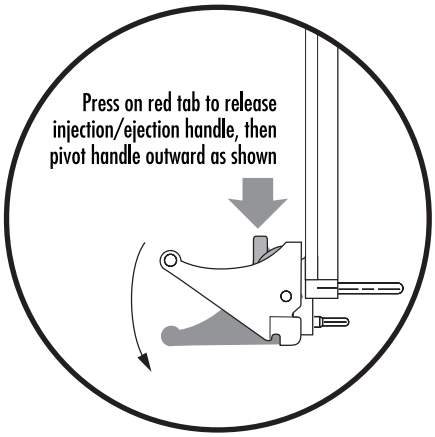

Figure 7. Releasing a injection/ejection handle

5. Locate the slot where the 3125TM will be installed. Insert the 3125TM so it enters the corresponding top and bottom slot guides as shown in figure 8.

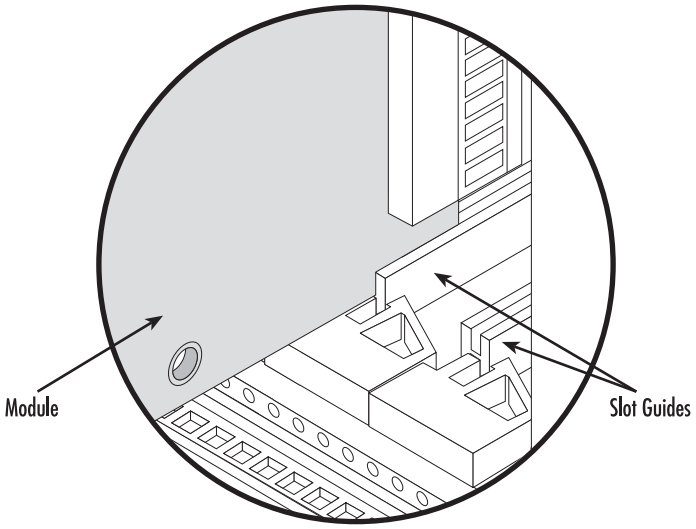

Figure 8. Inserting module into rack slot guides

6. Carefully slide the 3125TM into the chassis until it engages the mid-plane (see figure 9), when that happens, pivot the injection/ejection handles into locked position (see figure 10). Verify that the red tab in each handle *clicks* into place, indicating that the module is fully seated and locked.

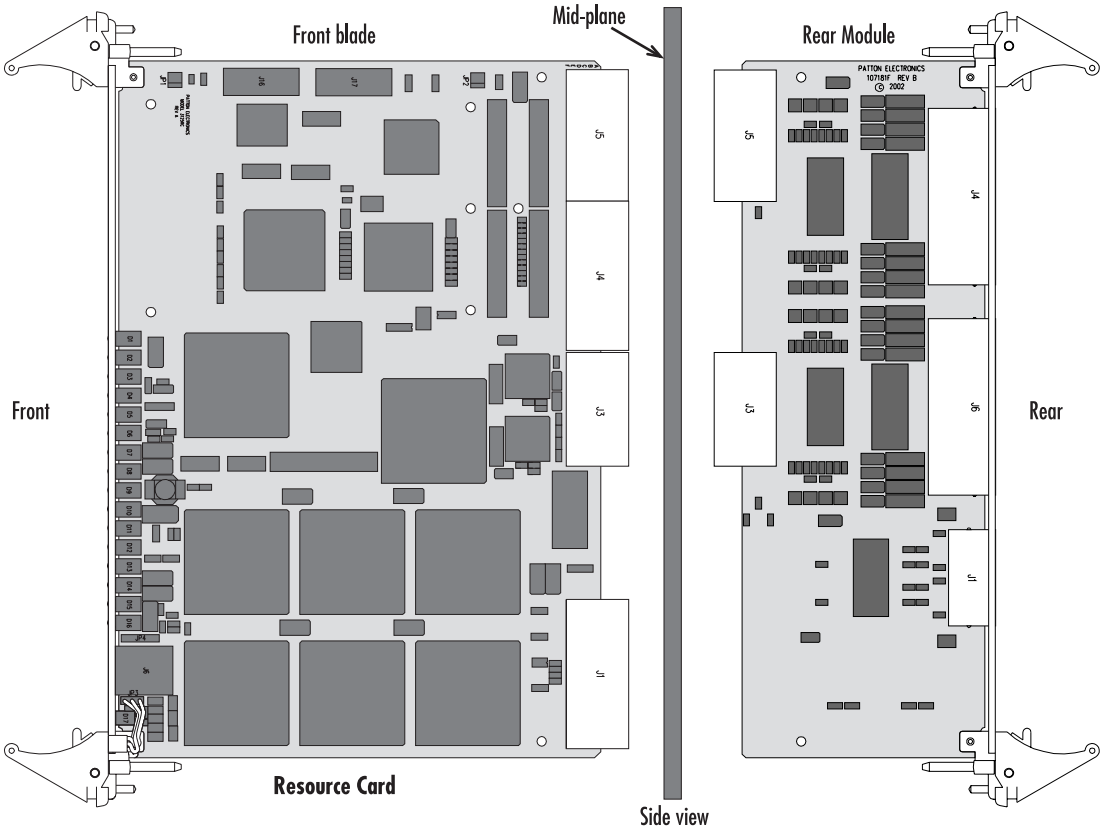

Figure 9. 3125RC and 3125TM installation diagram

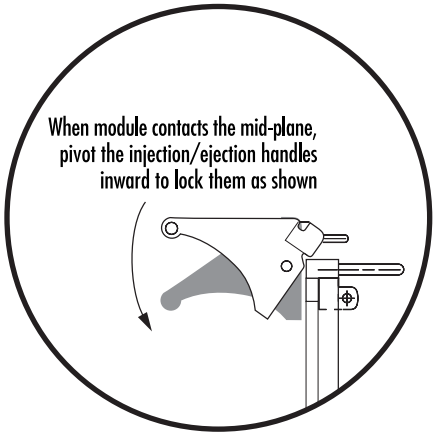

Figure 10. Locking an injection/ejection handle

7. Verify that the module is properly seated, then secure it to the chassis using the captive fasteners located adjacent to the injection/ejection handles (see figure 11).

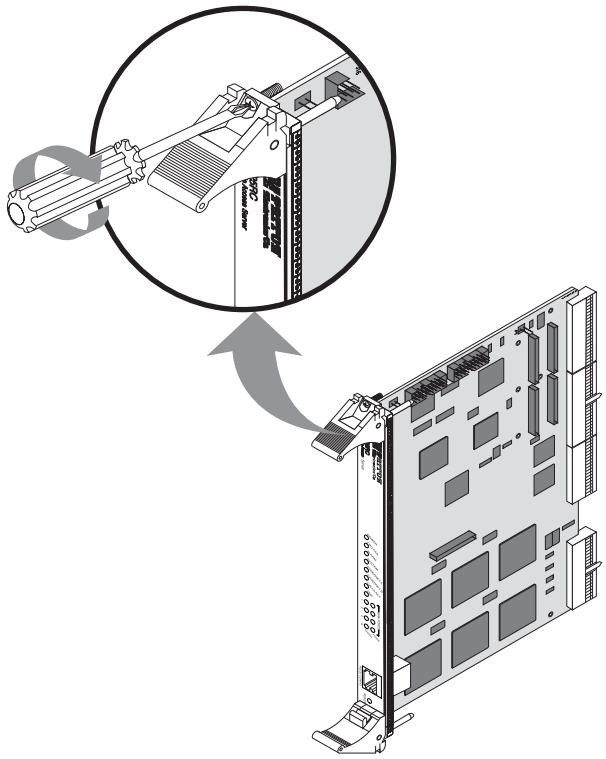

Figure 11. Securing the captive fasteners

Installing the 3125RC Resource Card

1. If there is not a slot filler panel installed, go to step 2. Otherwise, remove the two screws (located at the top of the filler panel and at the bottom) that secure the panel to the card cage.
2. Remove the 3125RC Resource Card from its anti-static bag.
3. Press on the red tab on each injection/ejection handle to release the handle (see figure 7 on page 28).
4. Locate the slot where the 3125RC will be installed. Insert the 3125RC so it enters the corresponding top and bottom slot guides as shown in figure 8 on page 28.
5. Carefully slide the 3125RC into the chassis until it engages the mid-plane (see figure 9 on page 29), when that happens, pivot the injection/ejection handles into locked position (see figure 10 on page 29).
6. Verify that the module is properly seated, then secure it to the chassis using the captive fasteners located adjacent to the injection/ejection handles (see figure 11).

Cable installation

This section describes installing the network interface cables.

Connecting the Ethernet ports

The 3125TM has a dual 10/100 Ethernet interface for connection to your LAN (see figure 12). 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.

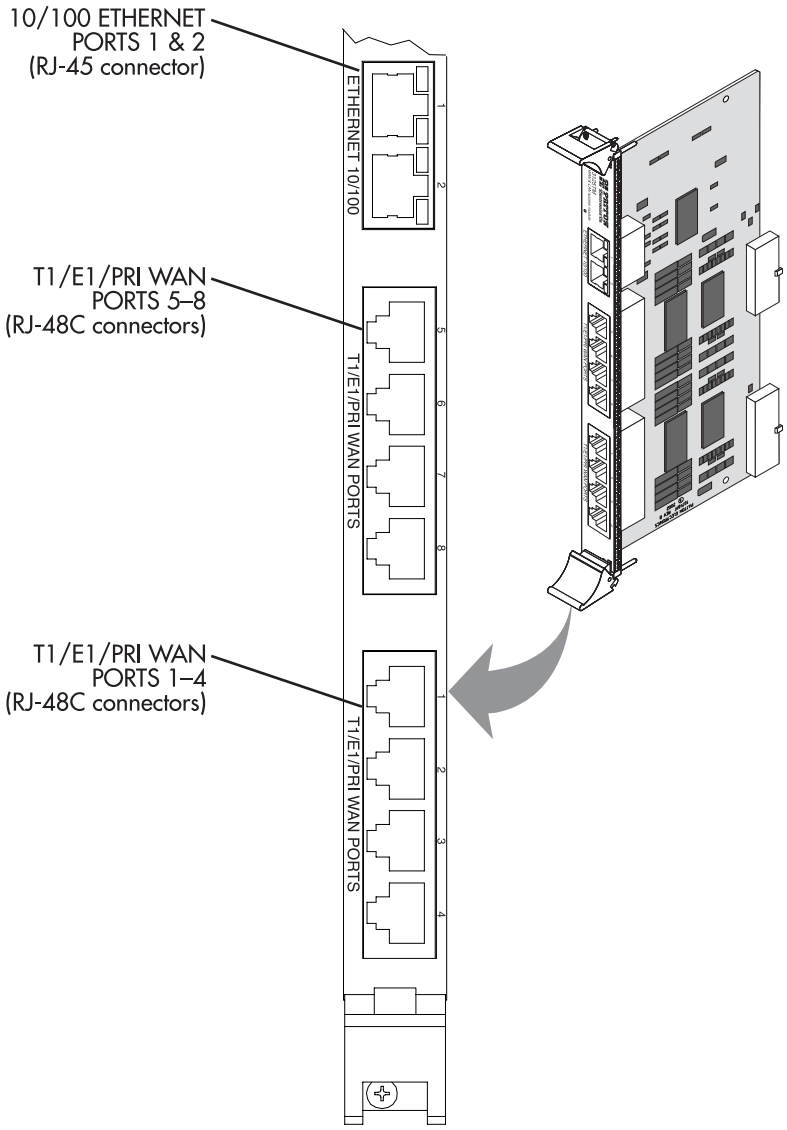

Figure 12. 3125TM network ports

Connecting the 10/100Base-T Ethernet port to an Ethernet switch or hub

The 10/100Base-T Ethernet port (see figure 12 on page 31) is designed to connect to an Ethernet switch or hub. Connect a straight-through CAT-5 cable (one wired as shown in figure 13) between the RAS and the hub/switch.

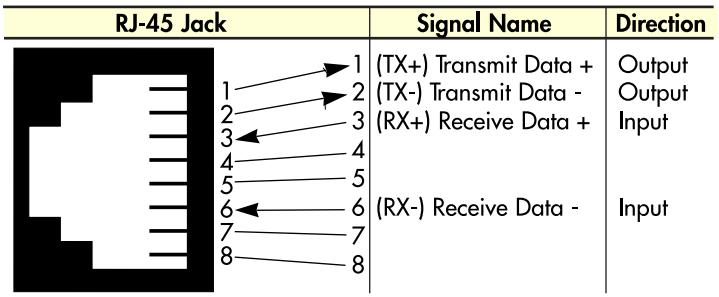

Figure 13. Straight-through RJ-45-to-RJ-45 Ethernet cable diagram

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 14 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.

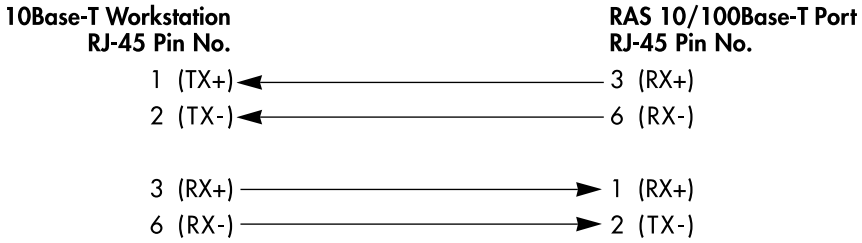

Figure 14. Cross-over RJ-45-to-RJ-45 Ethernet cable diagram

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 12 on page 31) and an open serial port on your computer. If you need to assemble your own cable, refer to the pinout diagram in figure 15.

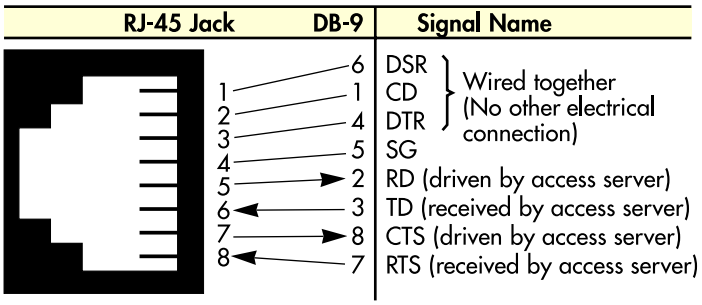

Figure 15. DB-9-to-RJ-45 cable diagram

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 from the digital services termination.

1. Refer to figure 16 for the T1/E1/PRI RJ-48C pinout diagram.

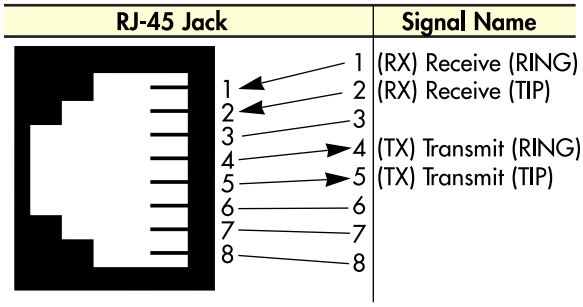

Figure 16. T1/E1/PRI RJ-48C pinout diagram

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 Model 3125 RAS hardware is operational to the point where you can begin configuring the software settings.

Power to the modules is delivered from the cPCI chassis backplane through the 47-pin PICMG 2.11 power connectors on the 3125RC. Upon insertion in the cPCI chassis, the Model 3125 immediately powers up and begins its boot cycle. During the boot cycle, the following occurs:

1. The *POWER* LED illuminates, indicating normal power is being applied to the Model 3125.
2. The *SYSTEM* LED begins flashing, indicating the Model 3125 is operating normally.

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 3125 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 40—describes installing the power and network interface cables
- "Saving your configuration" on page 55—tells you how to save the configuration settings.
- "Completing the installation" on page 57—describes testing the RAS to verify that it is fully operational

Configuration prerequisites

You will need the following to configure the Model 3125 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 Model 3125 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 12 on page 31) 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 17).

Figure 17. Hyperterminal properties

– Configure the COM port settings as shown in figure 18.

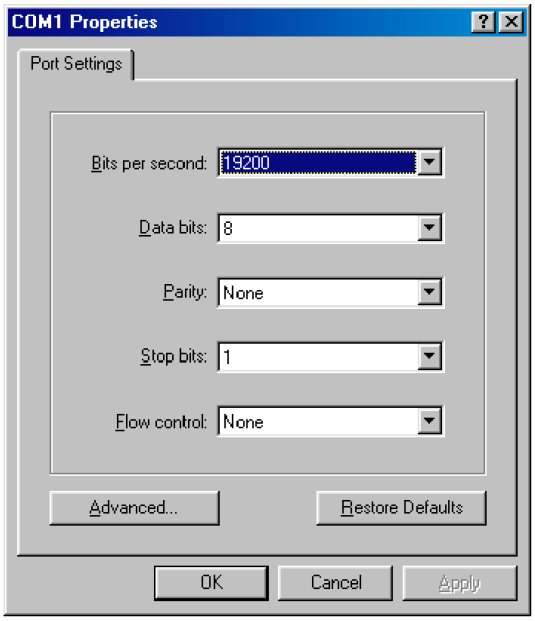

Figure 18. COM properties

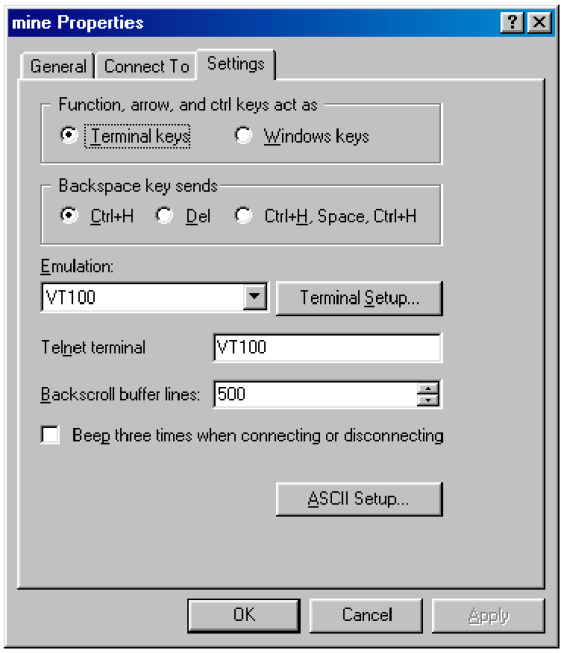

Figure 19. Terminal keys configuration

– Configure the Settings for *Function, arrow and ctrl keys act as* to *Terminal keys* as shown in figure 19.

4. Press <RETURN> to display the login window, which will resemble that shown in figure 20.

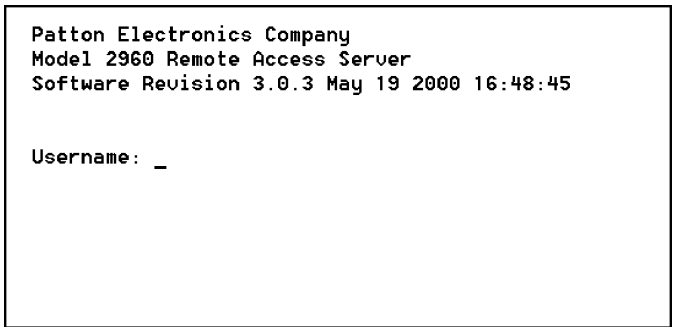

Figure 20. Login window

5. Type **superuser** as the default username and password, then press <RETURN>. The *Top Level Management* window displays (see figure 21).

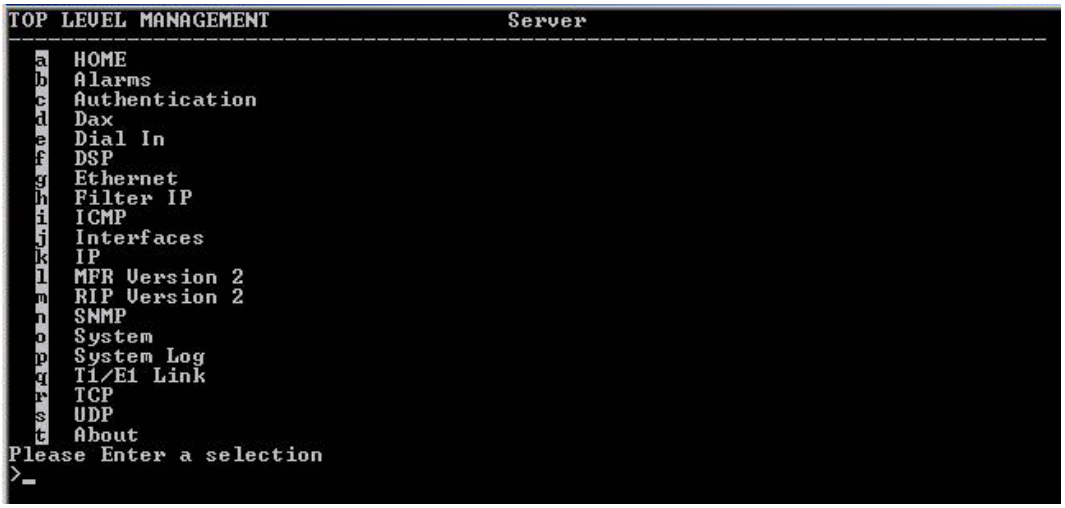

Figure 21. VT-100 Top Level Management window

6. Select option ***g*** *Ethernet.*
7. Select ***a*** *PrimaryIpAddress* to set the Ethernet A 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 A IP subnet mask.
11. Type the IP netmask at the > prompt, then press <RETURN>.
12. Select ***d*** *PrimaryIpAddress* to set the Ethernet B IP address.
13. Type the IP address at the > prompt, then press <RETURN>.
14. Use the left arrow key to return to the previous menu.
15. Select ***e*** *PrimaryIpMask* to set the Ethernet B IP subnet mask.

16. Use the left arrow key to return to the top level management page.
17. Select *a Home*.
18. Select *1 StoreConfig* to save your IP address and netmask.

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

Note The default gateway has not been configured at this time. You can access the web pages with a PC located on the same network as the RAS or you must configure the default gateway using HyperTerminal. Select ***i*** *IP* then ***2*** *Default Gateway*.

Configuring the RAS with a Web browser

This section describes configuring the following:

- User authentication
- Dial-in user configuration
- Default gateway

Opening the RAS Web Administration Pages

Do the following:

1. Connect the RAS to the LAN.
2. Start a Web browser session and go to the URL:

   `http://<the.ras.ip.address>`

   where the *<the.ras.ip.address>* is the IP address of the RAS entered in Step 8.
3. When the username and password window displays, type **`superuser`** as the username and password, then press <RETURN>. The Administration Pages Home window appears (see figure 22).

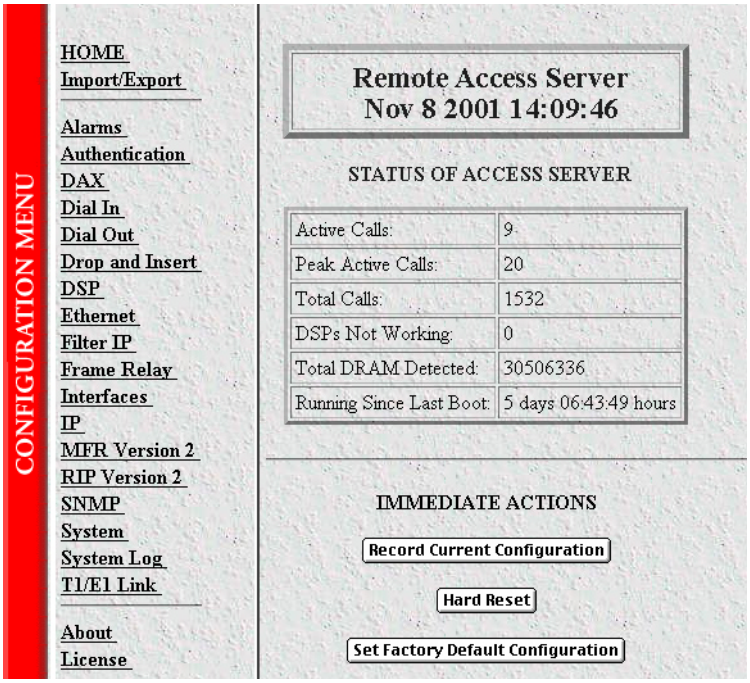

Figure 22. Home page

Home page overview

The HOME window is divided into two *panes*: the Configuration Menu pane and the configuration/information pane (see figure 23). The Configuration Menu contains the links to the various RAS subsystems, while the configuration/information pane is where you can view status and other information, or make changes to the system configuration. Unlike the Configuration Menu pane, which looks the same no matter which subsystem page you may move to, the configuration/information pane contents will change as you move from one subsystem page to another.

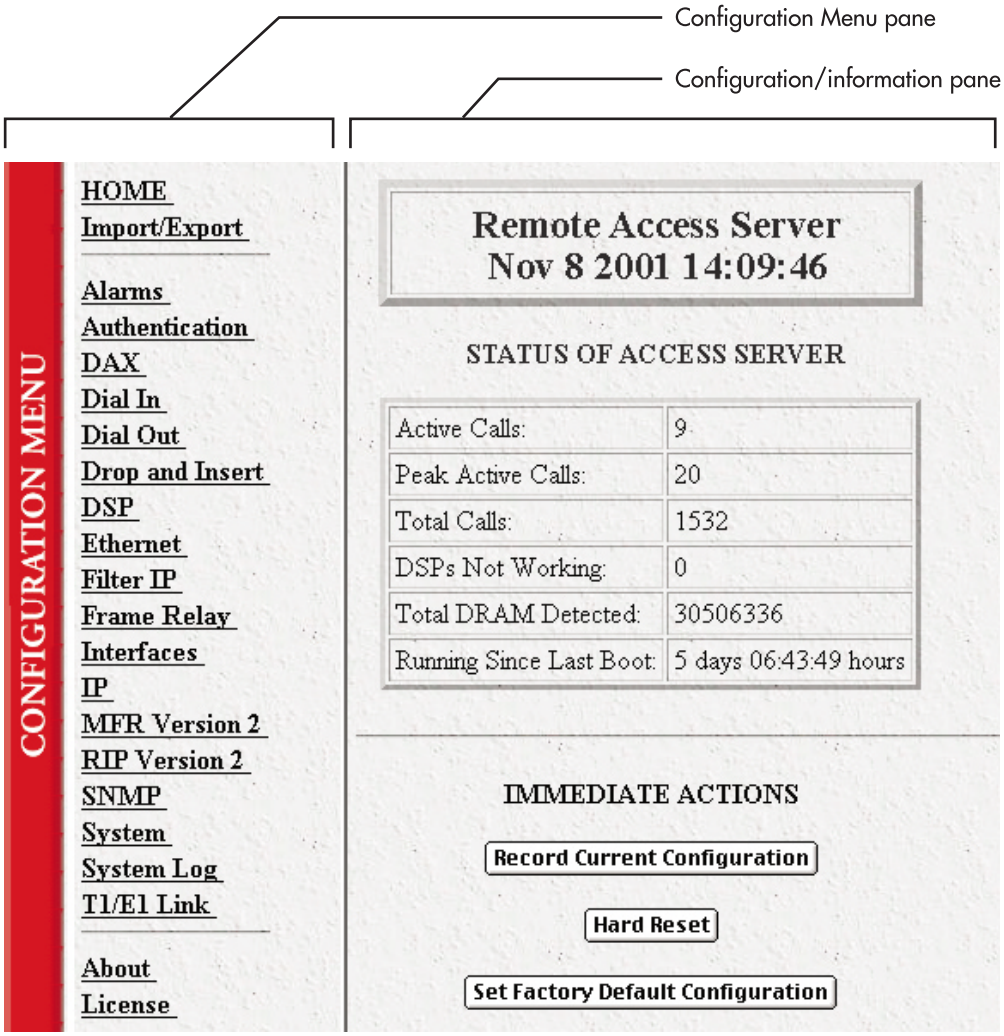

Figure 23. HOME page window panes

From the Home page, the following actions can be performed:

- **Record Current Configuration**—clicking on this button (figure 24) causes the current configuration to be stored in FLASH memory. Any changes made to the RAS configuration are stored in non-volatile RAM first. This allows the user to set the box up with a working configuration before committing it to FLASH. Configuration changes become permanent when you select **Record Current Configuration**. You will *lose* all changes *not* stored to FLASH the next time the RAS is re-booted.

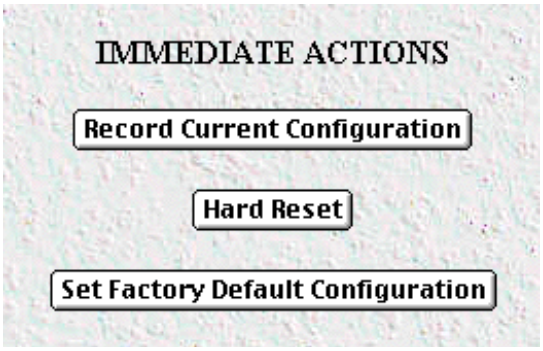

Figure 24. Immediate Actions buttons

- **Hard Reset**—this button (figure 24) causes the RAS to perform a cold restart. When you select **Hard Reset**, the RAS confirms that you want to execute this command. Then, the RAS will disconnect all current sessions, re-initialize the interfaces, and re-load configuration parameters from FLASH.
- **Set Factory Default Configuration**—this button (figure 24) clears out the configuration in FLASH and loads the factory default parameters into FLASH memory. The factory default settings *will not* execute on the RAS until it is re-booted.

> **Note** **Set Factory Default Configuration** (figure 24) will delete any routing information, the RAS's Ethernet IP address, and any other site specific settings made for your particular installation. You will have to re-enter the RAS's Ethernet IP address and netmask using the front panel control port in order to use the HTTP/HTML Management pages.

Configuring simple authentication

The following sections describe two methods for configuring simple authentication to test the setup.

No Validation

A *No Validation* authentication setting means that the user will be able to log in without requiring a username or password.

1. Select Authentication on the Configuration Menu. The Authentication window displays (see figure 25).

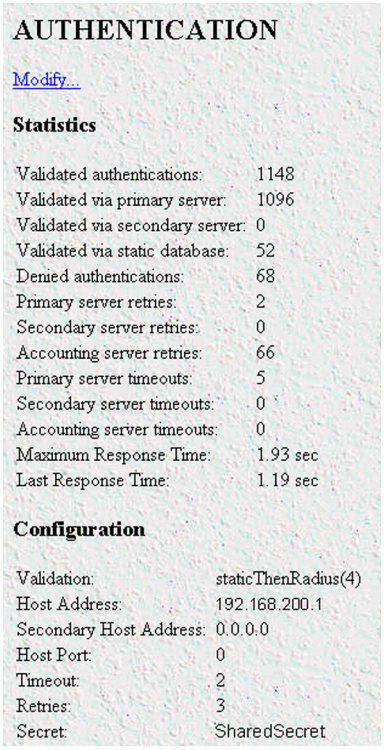

Figure 25. Authentication main window

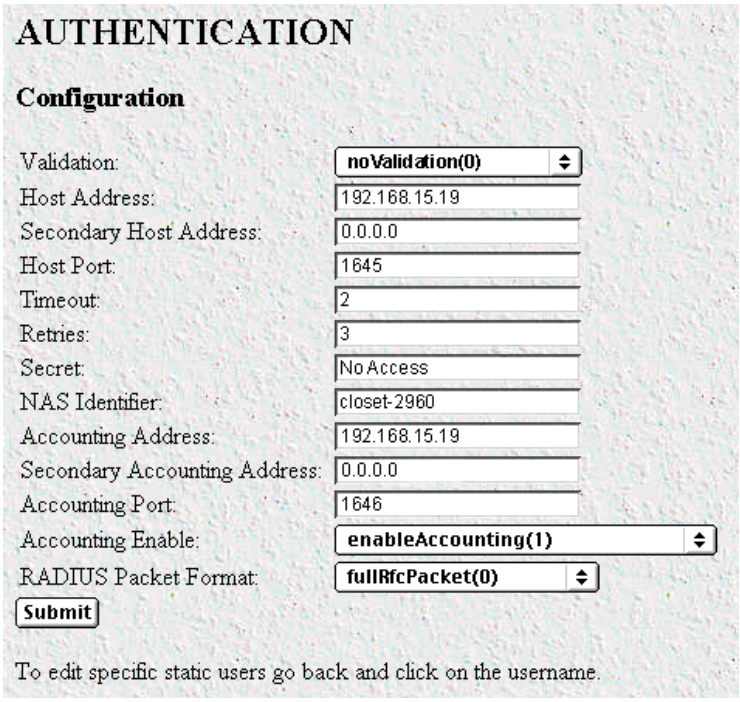

Figure 26. Authentication Configuration window

2. Click on Modify. The Authentication Configuration window appears (see figure 26).
3. Change *Validation* to *noValidation(0)*.
4. Click on the **Submit Query** button.

A Static User

The *Static User* authentication setting means that the user will have to use the static username and password you create to log in.

1. Select Authentication on the Configuration Menu. The Authentication window displays (see figure 25 on page 44).

2. To add an entry in the static user database (see figure 27), fill in the ID with a number not currently in use.

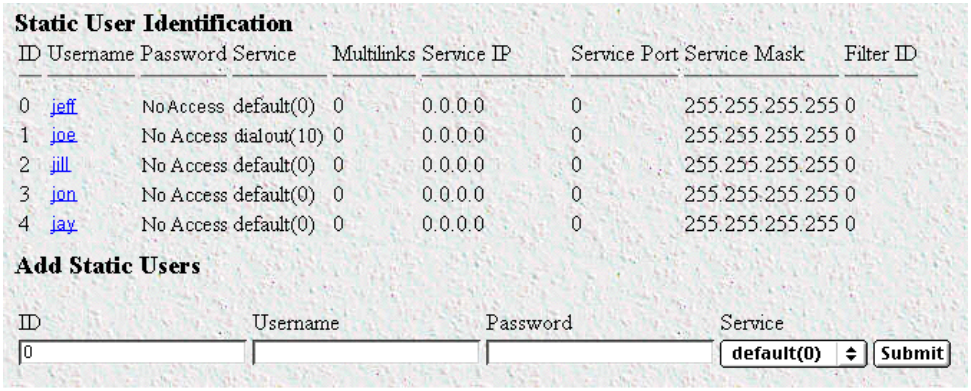

Figure 27. Static User Identification window

3. Add the desired username and password.
4. Click on the **Submit Query** button.
5. Click on Modify. The Authentication Configuration window appears (see figure 26 on page 45).
6. Change *Validation* to *StaticUsers(1)*.
7. Click on the **Submit Query** button.

> **Note** Static Users or RADIUS are not used if validation is set to *noValidation(0)*.

Configuring dial-in user information

1. Click on Dial-in in the Configuration Menu. The Dial-In main window appears (see figure 28).

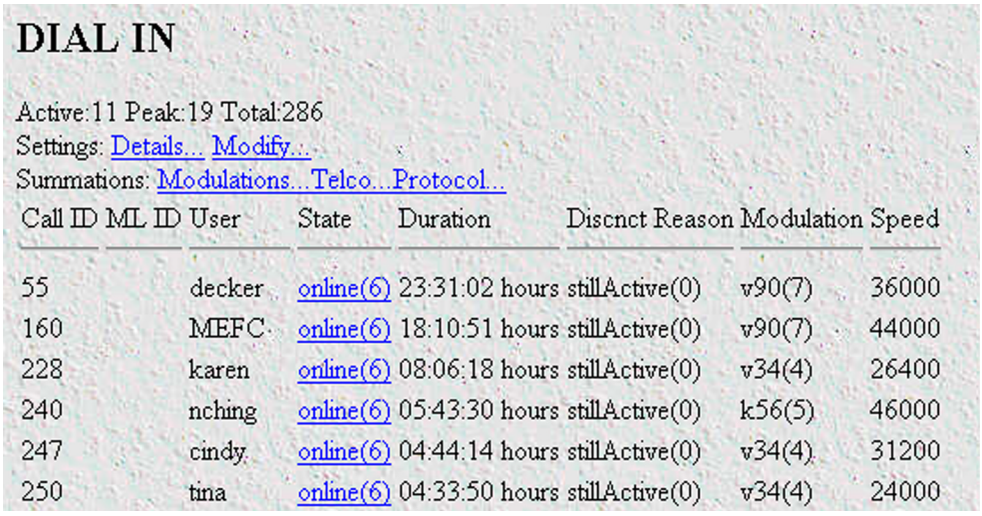

Figure 28. Dial-in main window

2. Click on Modify. The Modify Dial-In window appears (see figure 29).

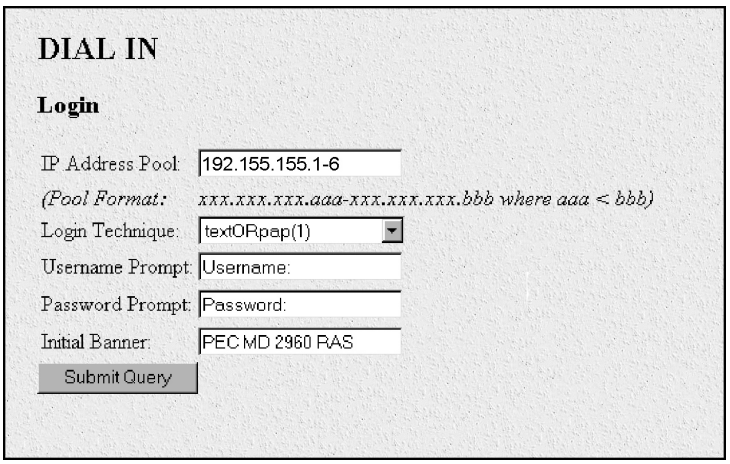

Figure 29. Modify Dial-In window, Login section

3. The IP address pool contains the IP addresses that are assigned dynamically to the dial-in connections. Type the IP address pool in the space provided. The IP addresses can be non-contiguous addresses configured as follows:

   – Blocks of IP addresses are designated with a dash (-) separating the first and last host in the block (for example, *192.49.110.151-155*)

   – The addresses can be from a subnet other than the local network the RAS is on

   – The IP address pool can have IP addresses from multiple subnets. The subnets must be separated by a semi-colon (for example, *192.155.155.1-6; 192.155.160.41-46*)

   Note The IP address pool is limited to 39 characters.

4. Click the **Submit Query** button under the section.

   Note Each section in the Modify Dial-In window has its own **Submit Query** button. In order for a change in a particular section to take place, that section's submit query button must be selected before making changes elsewhere.

5. Scroll down to the Domain Name Server section of the Modify Dial-In window (see figure 30).

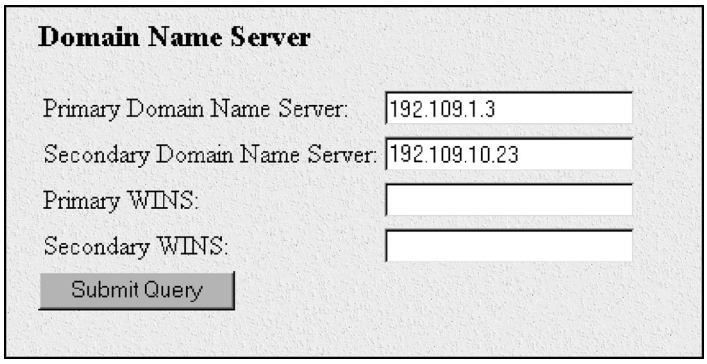

Figure 30. Modify Dial-In window, Domain Name Server section

6. Enter in the IP Address of the primary and secondary domain name servers (DNS). The DNS enables users to find locations on the Internet.
7. Click on **Submit Query**.

Configuring the default gateway

Do the following to add the default gateway (if it was not already configured through HyperTerminal):

1. Select IP on the Configuration Menu, then click on Routing Info…(see figure 31).

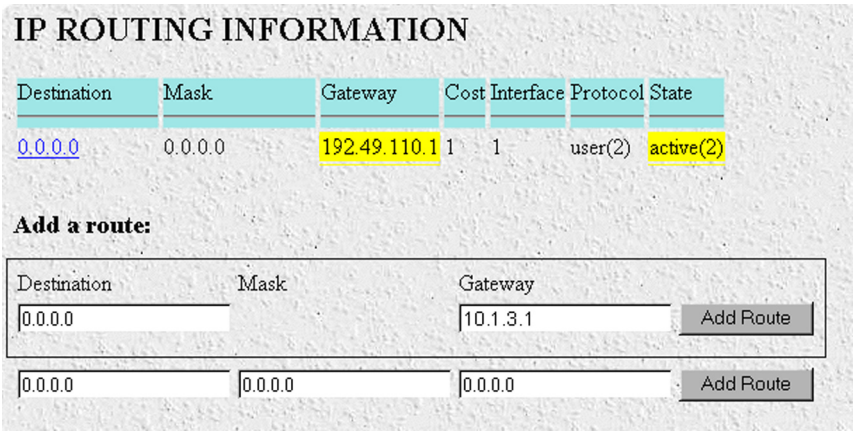

Figure 31. IP Routing Information window

2. Type the IP address of the router forwarding packets to the Internet in the Gateway box. This is the default gateway.
3. Click on the **Add Route** button.

Configuring line settings and signaling for E1

1. Select T1/E1 Link on the Configuration Menu. The T1/E1 Link Activity window appears (see figure 32).

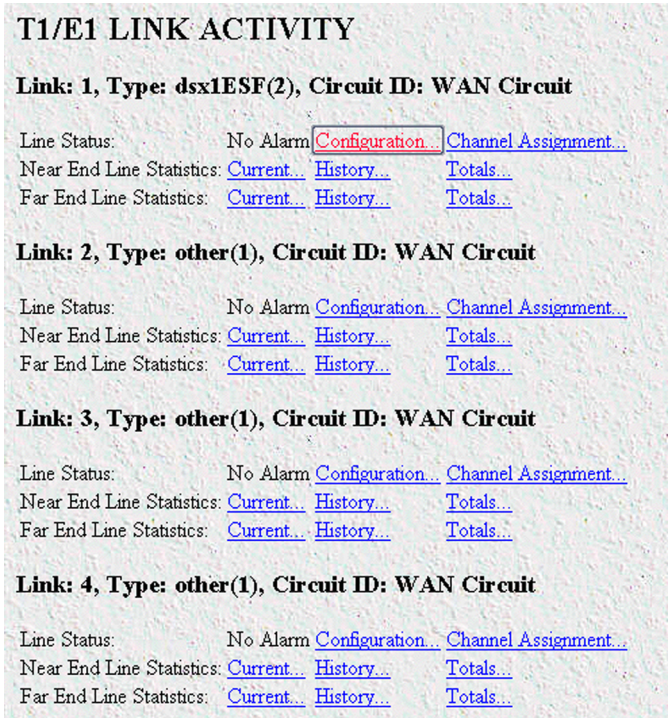

Figure 32. T1/E1 Link Activity window

2. Link: 1 corresponds to Line 1 on the RAS. This is the primary link for dial-in callers. Under Link 1, Click on Configuration then Modify. The Line Interface Settings section of the WAN Circuit Configuration window appears (see figure 33).

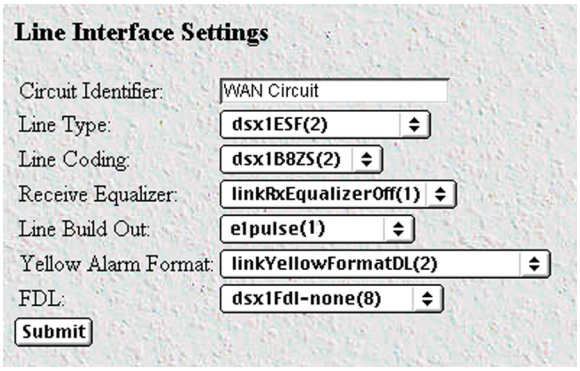

Figure 33. WAN Circuit Configuration window, Line Interface Settings section

Configuring the line settings

1. Click on the Line Type pop-up menu (see figure 33 on page 49) and choose from the following options:
   - For an E1/PRI line your options will be either dsx1E1(4) or dsx1E1-CRC(5)
   - For an E1/R2 line your options will be either dsx1E1-MF(6) or dsx1E1-CRC-MF(7)
2. Click on the Line Coding pop-up menu (see figure 33 on page 49) and choose either dsx1AMI(5) or dsxHDB3(3). Most installations will use HDB3.
3. Click on the Line Build Out pop-up menu (see figure 33 on page 49) and select e1pulse(1).
4. Click on Yellow Alarm Format pop-up menu (see figure 33 on page 49) and choose from the following options:
   - For an E1/PRI line choose linkYellowFormatDL(2)
   - For an E1/R2 line choose linkYellowAlarmFormatBit2(1)
5. Click on **Submit Query**.

At this point, the WAN front panel LEDs will become active. A solid green *FRAME* light indicator means that the RAS has synchronized with the E1 line.

Note If you suspect that there is a physical malfunction in the WAN ports, you can assemble a loopback connector to test the port (see figure 34).

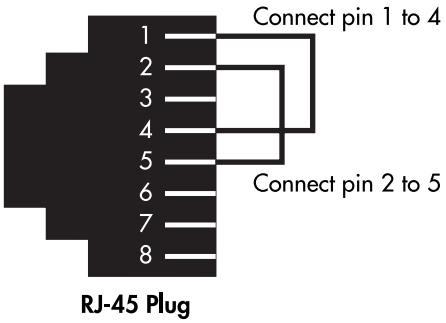

Figure 34. Pinout for loopback to test WAN port

If you have an E1/PRI (ISDN) line, refer to “Setting the line signaling for an E1/PRI (ISDN) line”. Otherwise, refer to “Setting the line signaling for an E1/R2 line”.

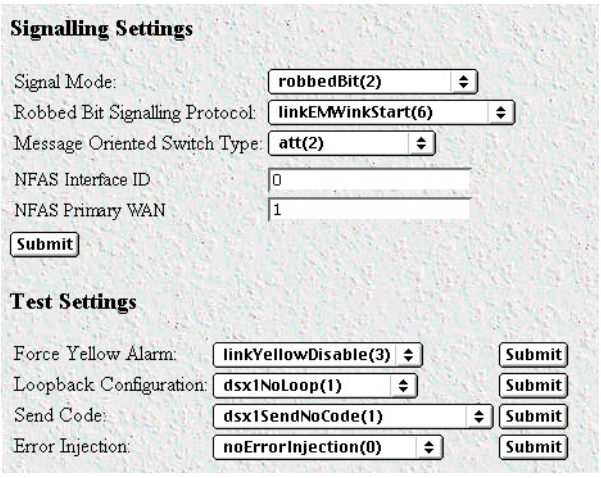

Figure 35. WAN Circuit Configuration window, signaling Settings section

Setting the line signaling for an E1/PRI (ISDN) line

Do the following:

1. Scroll down the WAN Circuit Configuration window, until the Signaling Settings section appears (see figure 35).
2. Click on the Signal Mode pop-up menu and choose messageOriented(4).
3. Click on the Message Oriented Switch Type pop-up menu (see figure 35) and choose CTR4(3).
4. Click on **Submit Query**.

Signaling is now configured for E1/PRI.

Setting the line signaling for an E1/R2 line

Do the following:

1. Scroll down the WAN Circuit Configuration window, until the Signaling Settings section appears (see figure 35).
2. Click on the Signal Mode pop-up menu and choose bitOriented(3).
3. Click on **Submit Query**.
4. Select MFR Version 2 on the Configuration Menu, then click on Modify. The MFR Version 2 Modify window appears (see figure 36).

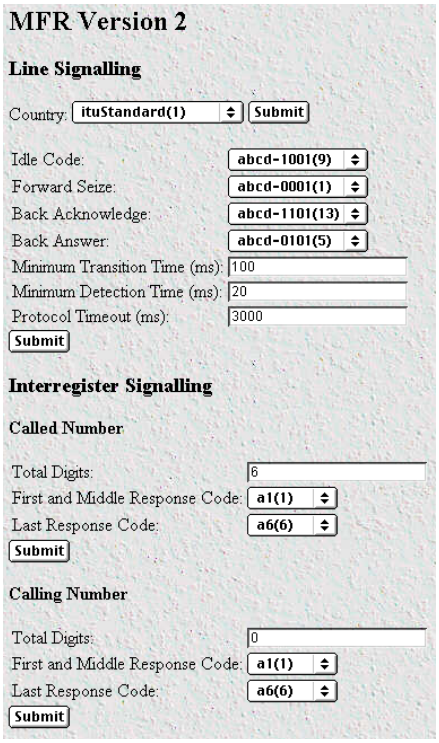

Figure 36. MFR Version 2 Modify window

5. Click on the Country pop-up menu. If your country is not available, select ituStandard(1).
6. Click on **Submit**.
7. Scroll down to the Interregister signaling section.
8. Type the Called Number Total Digits in the box provided. This setting tells the RAS how many digits to expect from the phone company. The called Number is the number a user dials to call into the RAS.
9. Set the First/Middle and Last Response Codes. These are the codes the switch expects after each digit sent by the switch.
10. Click on **Submit**.
11. Type the Calling Number Total Digits in the box provided. This setting tells the RAS how many digits to expect from the phone company. This number is the calling party's phone number or Caller-ID information.
12. Set the First/Middle and Last Response Codes. These are the codes the switch expects after each digit sent by the switch.
13. Click on **Submit**.

signaling is now configured for MFC-R2.

Note The information entered into the Interregister Signaling section must match the information the telco provided. If the information entered is not the same, the RAS may not answer calls. In some installations, the phone company will send a special tone to alert that it is done sending the Calling Number. In this case, the value in the Total Digits box does not have to match the telephone company's exactly.

Channel assignment

This section describes configuring the RAS so it will know which channels are active. Do the following:

1. Select T1/E1 Link on the Configuration Menu. The T1/E1 Link Activity window appears (see figure 32 on page 49).
2. Click on Channel Assignment. The WAN Circuit Channel Assignment window appears (see figure 37).

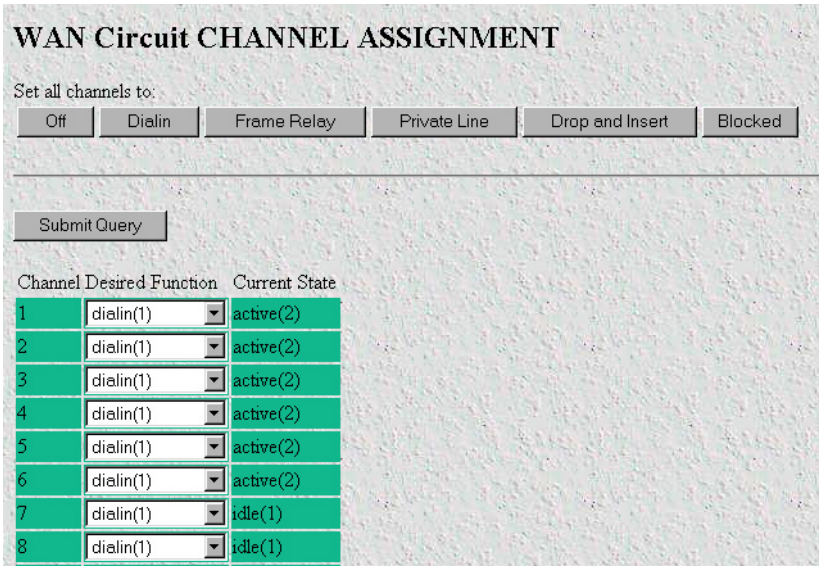

Figure 37. WAN Circuit Channel Assignment window

3. Click on the **Dialin** button located under Set all channels to:.
4. Click on **Submit Query**.

Configuring line settings and signaling for T1

1. Select T1/E1 Link on the Configuration Menu. The T1/E1 Link Activity window appears (see figure 32 on page 49).
2. Link: 1 corresponds to Line 1 on the RAS. This is the primary link for dial-in callers. Under Link 1, Click on Configuration then Modify. The Line Interface Settings section of the WAN Circuit Configuration window appears (see figure 33 on page 49).

Configuring the line settings

1. Click on the Line Type pop-up menu (see figure 33 on page 49) and choose from the following options:

   – dsx1ESF Extended SuperFrame DS1

– dsx1D4 AT&T D4 format DS1

– For ISDN PRI service, set the line type to dsx1ESF

2. Click on the Line Coding pop-up menu (see figure 33 on page 49). The most common options are: dsx1B8ZS and dsx1AMI. For ISDN PRI service, set the line coding to dsx1B8ZS.
3. Click on the Line Build Out pop-up menu (see figure 33 on page 49) and select t1pulse0dB(1).
4. Click on the Yellow Alarm Format pop-up menu and choose linkYellowFormatBit2(1).
5. Click on **Submit Query**.

At this point, the WAN front panel LEDs will become active. A solid green *FRAME* light indicator means that the RAS has synchronized with the T1 line.

> **Note** If you suspect that there is a physical malfunction in the WAN ports, you can assemble a loopback connector to test the port (see figure 34 on page 50).

If you have an T1/PRI (ISDN) line, refer to "Setting the line signaling for an ISDN/PRI line". Otherwise, refer to "Setting the line signaling for a robbed-bit T1 line".

Setting the line signaling for an ISDN/PRI line

Do the following:

1. Scroll down the WAN Circuit Configuration window, until the signaling Settings section appears (see figure 35 on page 51).
2. Click on the Signal Mode pop-up menu and choose messageOriented(4).
3. Click on the Message Oriented Switch Type pop-up menu (see figure 35 on page 51) and choose either ni1(National ISDN 1), dms(Nortel Switch) or att(AT&T Customer).
4. Click on **Submit Query**.

Signaling is now configured for ISDN/PRI.

Setting the line signaling for a robbed-bit T1 line

Do the following:

1. Scroll down the WAN Circuit Configuration window, until the signaling Settings section appears (see figure 35 on page 51).
2. Click on the Signal Mode pop-up menu and choose robbedBit(3).
3. Click on **Submit Query**.
4. Click on the Robbed-Bit signaling Protocol pop-up menu and choose LinkGroundStart, LinkLoopStart, or LinkEMWinkStart.
5. Click on **Submit Query**.
6. Click on the Yellow Alarm Format pop-up menu and choose one of the following options:

   – For T1 lines with D4/AMI settings, this should be set to linkYellowFormatBit(1).

– For T1 lines with ESF/B8ZS this should be set to linkYellowFormatDL(2).

7. Click on **Submit Query**.

Channel assignment

This section describes configuring the RAS so it will know which channels are active. Do the following:

1. Select T1/E1 Link on the Configuration Menu. The T1/E1 Link Activity window appears (see figure 32 on page 49).
2. Click on Channel Assignment. The WAN Circuit Channel Assignment window appears (see figure 37 on page 53).
3. Click on the **Dialin** button under the Set all channels to: section. Channels 25 through 30 are ignored for T1/PRI lines.
4. Click on **Submit Query**.

Saving your configuration

The basic configuration for the RAS is now finished. Do the following to save your configuration settings:

1. Select Home on the Configuration Menu. The Home window appears (see figure 22 on page 41).
2. Click on the **Record Current Configuration** button (see figure 24 on page 43).

> **Note** Failing to click on the **Record Current Configuration** button before you power down or reset the RAS will cause your changes to be lost.

3. The Import/Export function enables you to make a backup (or *export*) copy of your access server's configuration parameters. By exporting the configurations, the saved files can quickly be loaded (or *imported*) into a replacement access server—greatly speeding up the installation process should an access server need replacing.

> **Note** All actions for Import/Export require superuser access privileges.

4. To import or export a configuration, click on Import/Export under the Configuration Menu to display the Import/Export main window (see figure 38).

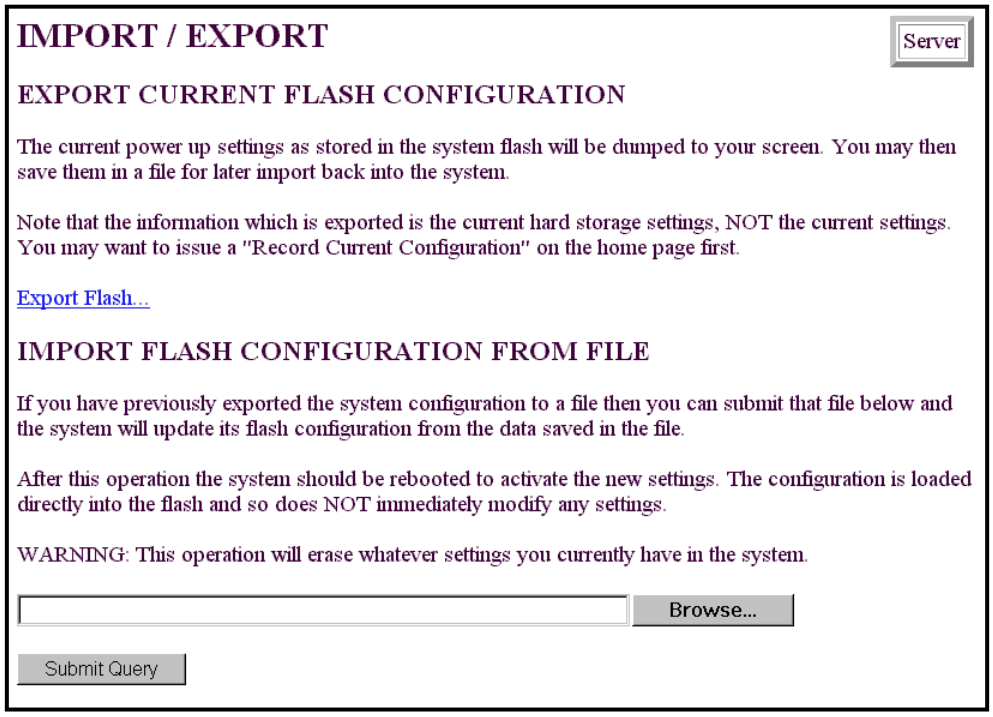

Figure 38. Import/Export main window

5. To export the flash configuration, click on the Export Flash link on the Import/Export main page. The access server will display text configuration information resembling that shown in figure 39.

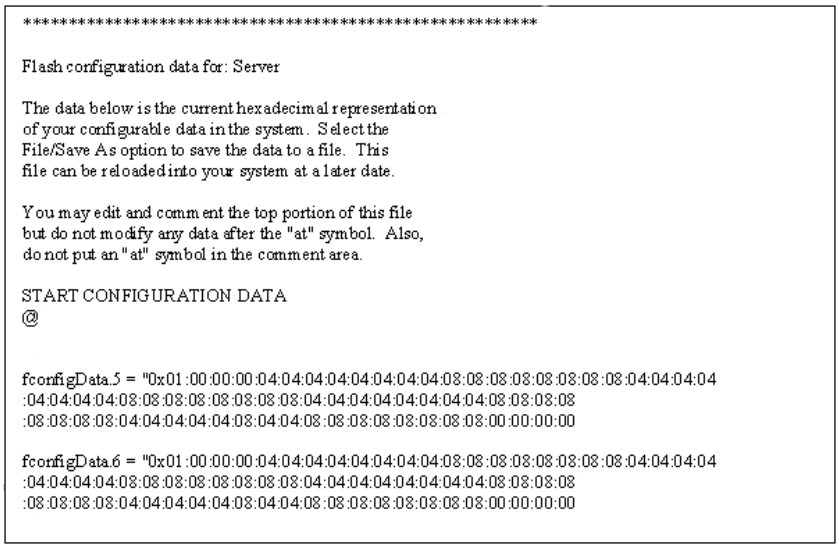

Figure 39. Typical access server flash memory configuration data

To save the displayed data as a text file, select the **Save** option on your browser (see figure 40). For example, under Netscape, select **File** > **Save As**. A dialog box will display enabling you to save the contents of the export parameters to a text file. Select the location where you want the file stored, type a file name, and click **Save**.

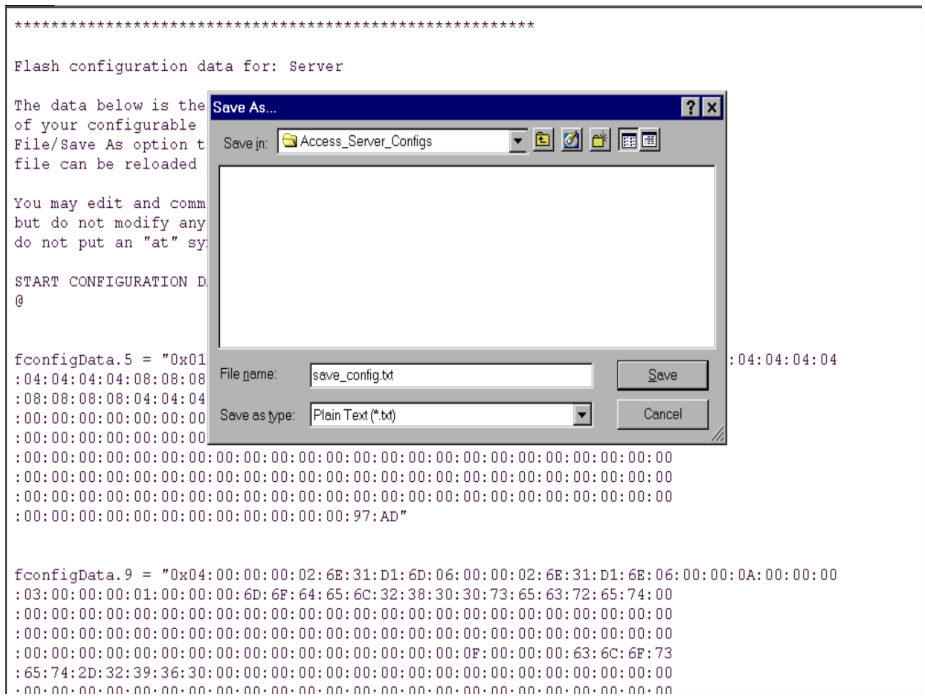

Figure 40. Saving the access server flash memory configuration data as a text file

Completing the installation

This section verifies that the RAS is fully operational.

1. Temporarily disconnect the male ends of both power cords from the power outlet. Wait 30 seconds, then plug the power cords in again.
2. Verify that the green *POWER* LED is lit. If the *POWER* LED is flashing green, refer to Chapter 5, "Troubleshooting and maintenance".
3. Verify that the *Link 1 Frame* LED illuminates, indicating that the RAS is synchronizing with the T1/E1/PRI signal.
4. Verify that after 5 seconds, the *Link A Error* LED begins flashing, indicating that the RAS is satisfied with the quality of the T1/E1/PRI signal.
5. Verify that after 10 seconds, the *Link A Error* LED extinguishes, indicating that the RAS is satisfied with the network signal and that the link is ready for use.

Note If the RAS does not respond as described, the most likely cause is that the RAS default settings are not compatible with the T1/E1 line. If this is the case, use the RS-232 CONFIG port to correct the RAS settings. You will have to examine the T1/E1 Link section in the configuration pages in the RAS.

6. There are two LEDs on the RAS 10/100 Ethernet port: a green LED that indicates line speed, and a yellow LED that indicates link status and activity.

Verify that the yellow LED is either flashing yellow (meaning that packets are being received at the Ethernet port) or solid yellow (meaning that the link is valid but no packets are being received).

Congratulations! Your RAS is now installed. For more in-depth information about configuring your RAS settings, refer to the *Model 3125 Administrator's Reference Guide* included on your RAS CD-ROM. Otherwise, refer to Chapter 4, "Operation and shutdown" for information on activating and de-activating your remote access server.

Chapter 4 Operation and shutdown

Chapter contents

Introduction

This chapter describes how to start or power-down the RAS.

Activating the RAS

Power to the modules is delivered from the cPCI chassis backplane through the 47-pin PICMG 2.11 power connectors on the 3125RC. Upon insertion in the cPCI chassis, the Model 3125 immediately powers up and begins its boot cycle. During the boot cycle, the following occurs on the 3125RC Resource Card:

1. The *POWER* LED illuminates, indicating normal power is being applied to the Model 3125.
2. The *SYSTEM* LED begins flashing, indicating the Model 3125 is operating normally.

On the 3125TM Transition Module, the following occurs after power is applied:

1. The *Link 1 Frame* LED illuminates, indicating that the RAS is synchronizing with the T1/E1/PRI signal.
2. After 5 seconds, the *Link A Error* LED flashes, indicating that the RAS is satisfied with the quality of the T1/E1/PRI signal.
3. After 10 seconds, the *Link A Error* LED extinguishes, indicating that the RAS is satisfied with the network signal and that the link is ready for use.
4. There are two LEDs on the RAS 10/100 Ethernet port: a green LED that indicates line speed, and a yellow LED that indicates link status and activity.

   The yellow LED is either flashing yellow (meaning that packets are being received at the Ethernet port) or solid yellow (meaning that the link is valid but no packets are being received).

   The green LED is either lit (indicating 100 Mbps operation) or off (indicating 10 Mbps operation).

   Note The green LED reflects the speed of the last valid Ethernet connection.

The Model 3125 RAS is operational.

De-activating the RAS

To power-down the 3125 RAS, either remove power from the cPCI rack in which the RAS is installed, or do the following to remove the 3125RC Resource Card and/or 3125TM Transition Module from the cPCI rack:

Note Be sure to wear the anti-static strap to prevent electrostatic damage to the module.

1. Use a Phillips screwdriver to loosen the captive fasteners on the 3125RC (see figure 11 on page 30) until the fasteners no longer attach the module to the rack.
2. Press the red tab on each injection/ejection handle to release the handles (see figure 7 on page 28).
3. Slide the module from the rack and place it in an anti-static bag.
4. At the 3125TM Transition Module, disconnect and label the network cables from the module.

5. Use a Phillips screwdriver to loosen the captive fasteners on the 3125TM (see figure 11 on page 30) until the fasteners no longer attach the module to the rack.
6. Press the red tab on each injection/ejection handle to release the handles (see figure 7 on page 28).
7. Slide the module from the rack and place it in an anti-static bag.

The RAS has been de-activated.

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.

- 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 5 days a week, from 8:00am to 5:00pm EST by calling **+1 (301) 975-1007**

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) 975-1000** 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.