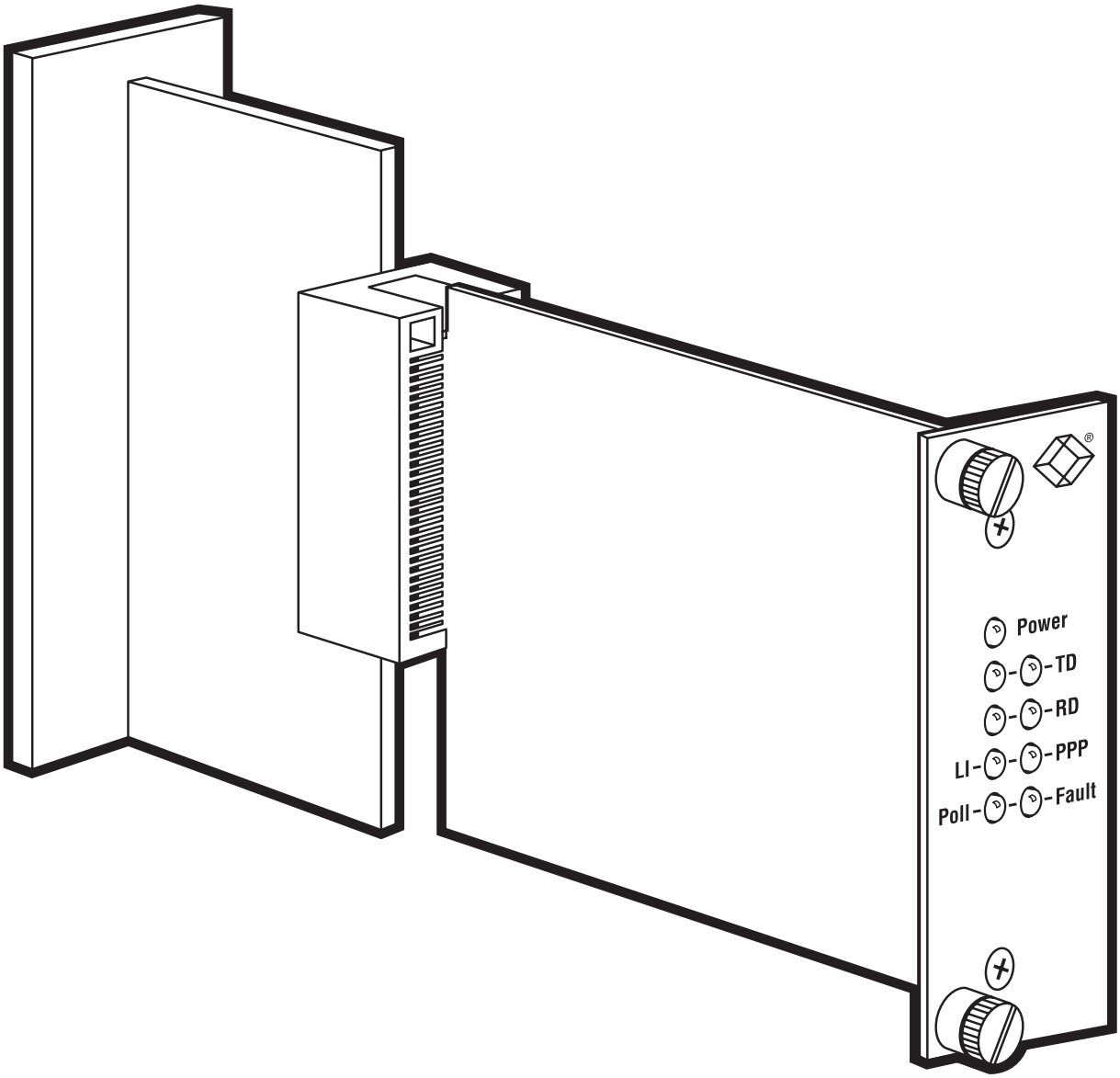
BLACK BOX®
NETWORK SERVICES

DECEMBER 2001
RM261C-SNMP

SNMP/HTTP Card for 16-Port Managed MicroRACK



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CE

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1. Todas las instrucciones de seguridad y operación deberán ser leídas antes de que el aparato eléctrico sea operado.
2. Las instrucciones de seguridad y operación deberán ser guardadas para referencia futura.
3. Todas las advertencias en el aparato eléctrico y en sus instrucciones de operación deben ser respetadas.
4. Todas las instrucciones de operación y uso deben ser seguidas.
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10. El equipo eléctrico deber ser situado fuera del alcance de fuentes de calor como radiadores, registros de calor, estufas u otros aparatos (incluyendo amplificadores) que producen calor.
11. El aparato eléctrico deberá ser connectado a una fuente de poder sólo del tipo descrito en el instructivo de operación, o como se indique en el aparato.
12. Precaución debe ser tomada de tal manera que la tierra fisica y la polarización del equipo no sea eliminada.
13. Los cables de la fuente de poder deben ser guiados de tal manera que no sean pisados ni pellizcados por objetos colocados sobre o contra ellos, poniendo particular atención a los contactos y receptáculos donde salen del aparato.
14. El equipo eléctrico debe ser limpiado únicamente de acuerdo a las recomendaciones del fabricante.
15. En caso de existir, una antena externa deberá ser localizada lejos de las lineas de energia.
16. El cable de corriente deberá ser desconectado del cuando el equipo no sea usado por un largo periodo de tiempo.
17. Cuidado debe ser tomado de tal manera que objectos liquidos no sean derramados sobre la cubierta u orificios de ventilación.
18. Servicio por personal calificado deberá ser provisto cuando:

    A: El cable de poder o el contacto ha sido dañado; u

    B: Objectos han caído o líquido ha sido derramado dentro del aparato; o

    C: El aparato ha sido expuesto a la lluvia; o

    D: El aparato parece no operar normalmente o muestra un cambio en su desempeño; o

    E: El aparato ha sido tirado o su cubierta ha sido dañada.

Contents

Chapter **Page**

Contents (continued)

Chapter **Page**

1. Specifications

Compliance:	CE; FCC Part 15 Subpart B Class A, IC Class/classe A
Standard:	IEEE 802.3 Ethernet v2
Interfaces:	10BASE-T; EIA/TIA RS-232, DTE; Proprietary MicroRACK power and data bus
Protocol:	RS-232: Asynchronous
Data Format:	RS-232: 8 data bit, no parity, 1 stop bit (fixed)
Data Rate:	10BASE-T: 10 Mbps; RS-232: 19,200 bps (fixed)
Flow Control:	RS-232: Responds to CTS (hardware) flow control only
Maximum Distance:	10BASE-T: 328 ft. (100 m) to next device; RS-232: 50 ft. (15.2 m) to next device
User Controls:	RS-232 terminal-session console (requires VT100 or compatible terminal emulation); Internal HTML management pages reachable through Ethernet network
Indicators:	(9) LEDs mounted on front panel of front card: (1) for power; (2) for transmit idle/activity; (2) for receive idle/activity; (1) for 10BASE-T link integrity; (1) for Ethernet heartbeat; (1) for PPP (not currently supported); (1) for hardware fault
Connectors:	(1) RJ-45 female for 10BASE-T; (1) DB25 female for RS-232; 50-pin card-edge on both front and rear cards for MicroRACK bus
Leads/Signals Supported:	RS-232: Pins 2, 3, 5, and 7 (TD, RD, CTS, and SGND respectively)
Maximum Altitude:	15,000 ft. (4572 m)
Temperature Tolerance:	32 to 122˚F (0 to 50˚C);
Humidity Tolerance:	Up to 95% noncondensing
Power:	From the midplane bus of the MicroRACK it's installed in

Size:	Rear card: 3.3"H x 1.5"W x 2.25"D (8.4 x 3.8 x 5.7 cm); Front card: 3.3"H x 1.5"W x 5"D (8.4 x 3.8 x 12.7 cm); screws protrude an additional 0.4" (1 cm) from the front panel
Weight:	Rear card (net): 1.9 oz. (54 g); Front card (net): 2.6 oz. (74 g); Total (shipping): Approx. 0.6 lb. (0.3 kg)

2. Introduction

2.1 Overview

The SNMP/HTTP Card for the Managed MicroRACK fits in the 16-Port Managed MicroRACK (RM260, shown in Figure 2-1). Once it's installed, you can use an SNMP workstation to configure and monitor a number of interconnected MicroRACKs, the cards installed in them, and any remote units linked to modem and line-driver cards. The SNMP/HTTP Card supports generic SNMP management software and MIB-walking tools. Alternatively, you can use a standard Web browser, such as Microsoft® Internet Explorer® or Netscape® Navigator®, to access the Card's embedded HTML management screens.

The SNMP/HTTP Card can be connected to an SNMP workstation through a 10BASE-T Ethernet. The modular RJ-45 10BASE-T port on the Card can also be used for flash upgrades by making an FTP connection to the Card.

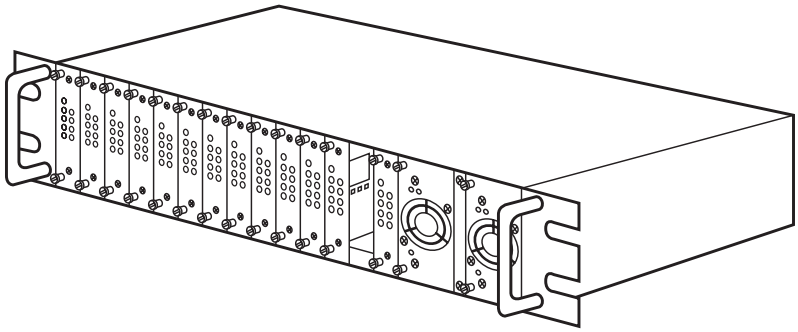


Figure 2-1. The MicroRACK chassis.

2.2 Features

Some of the SNMP/HTTP Card's features include:

- Fits in one slot of the 16-Port Managed MicroRACK.
- Allows one SNMP workstation to manage multiple MicroRACKs.
- Fully manageable using HTML management screens from any workstation using any standard Web browser.
- Supports generic network-management software and MIB-walking tools.
- Connects to an SNMP workstation using Ethernet LAN connection.
- Functions as an SNMP proxy agent for other MicroRACK cards and their remote standalone units.
- Hot-swappable.
- Flash-upgradable through FTP connection.
- User-selectable traps on a per-card basis.
- Front-panel LED indicators for power, TD, RD, LAN-link integrity, PPP, polling, and hardware fault.

2.3 The Complete Package

The only thing that comes with the SNMP/HTTP Card's front and rear cards is this manual.

2.4 System Requirements

Before you can fully install and configure your SNMP/HTTP Card, you'll need:

- A VT100™ terminal or a VT100 terminal emulator for connection to the Card's RS-232 configuration port.
- A null-modem cable to connect your VT100 terminal to the Card.
- A 10BASE-T connection from your local LAN to the Card's Ethernet port.
- A locally connected workstation (PC) that you can use to ping and HTTP into the Card.
- An IP address for the Card.
- The network's address space and netmask.
- The IP address for the default gateway of your LAN.

2.5 Additional References

For additional technical information that might prove useful with the SNMP/HTTP Card, you might want to use a Web browser to find online copies of these IETF "Request for Comment" standards (RFCs):

- RFC 1155, "Structure and Identification of Management Information for TCP/IP-based Internets."
- RFC 1213, "Management Information Base for Network Management of TCP/IP-based Internets: MIB-II."
- RFC 1389, "RIP Version 2 MIB Extension."
- RFC 1643, "Definitions of Managed Objects for the Ethernet-Like Interface Types."

2.6 The Card Illustrated

Figure 2-2 shows the front and rear panels of the SNMP/HTTP Card. Attaching equipment to the Card's rear-mounted connectors is discussed in **Sections 3.2** through **3.4**; interpreting the Card's front-mounted LEDs is discussed in **Section 4.1**.

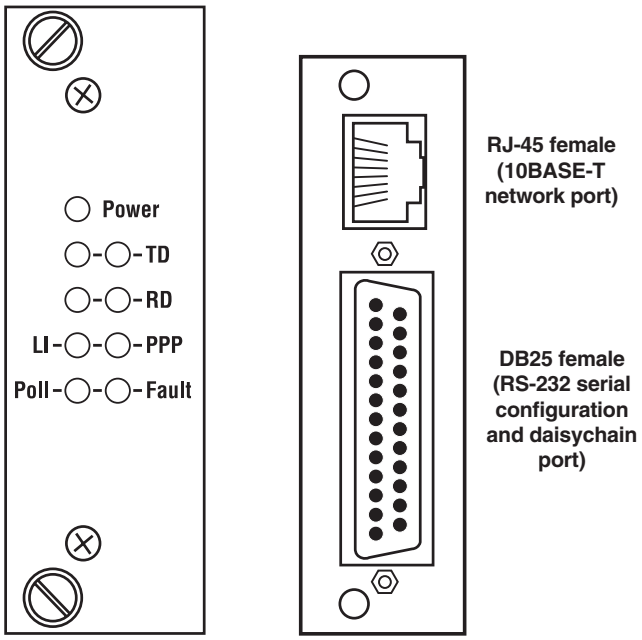


Figure 2-2. The front card (left) and rear card (right).

2.7 A Typical Application Illustrated

The SNMP/HTTP Card uses a 10BASE-T Ethernet port to connect to a local LAN or to anywhere in the world through the Internet. Management can be performed using any standard SNMP station or using a standard Web browser with the Card's internal HTML management screens. As shown in Figure 2-3, the Card can manage multiple MicroRACKs full of modems, line drivers, etc., using a simple daisychain connection and a Control Module (RM262C) in each managed rack.

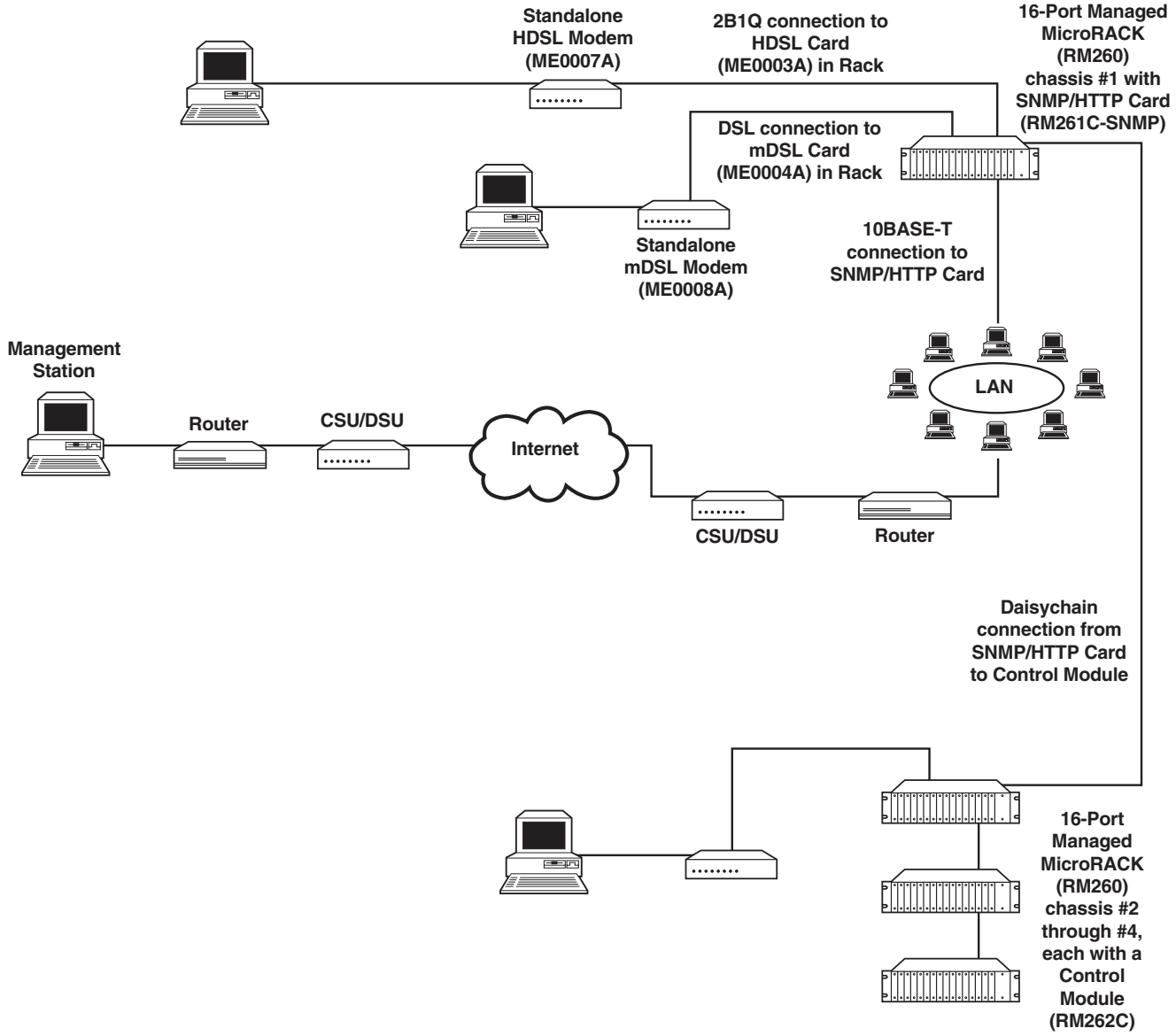


Figure 2-3. A MicroRACK installation managed through an SNMP/HTTP Card.

3. Installation

3.1 Installing the Card in a MicroRACK

The SNMP/HTTP Card, like the the 16-Port Managed MicroRACK's function cards, consists of a front card and a rear card that meet in the middle of the MicroRACK and plug into each other with mating 50-pin card-edge connectors. The MicroRACK has sixteen slots that can be used for the SNMP/HTTP Card if you use one power supply, or fourteen slots if you use two redundant power supplies; the Card takes up a single slot.

The Card takes up one slot in the chassis. Install the Card in slot 14. (This is the slot right next to slot 15, where a redundant power supply would be installed, and three slots away from slot 17 on the end, where the primary or single power supply must be installed.) The MicroRACK's bus bar has an extra connector at this slot which communicates information about the power supplies to the SNMP/HTTP Card. If the Card is not installed in this slot, it won't detect the power supplies and will continuously indicate that they have failed.

It doesn't matter whether or not a power supply is already installed and operating when you install the SNMP/HTTP Card; like the MicroRACK's function cards, the SNMP/HTTP Card is hot-swappable and won't be damaged by installing or removing it when the MicroRACK is powered. If the rack is powered, the Card's front and rear cards will start operating as soon as they touch the midplane of the rack.

To install the SNMP/HTTP Card in slot 14, take these steps:

1. Slide the rear card into the slot from the back of the rack chassis, along the metal rails.
2. Secure the rear card in place using the provided metal screws.
3. Slide the front card into the slot from the front of the chassis. It should meet the rear card when it's almost all the way into the chassis.
4. Push the front card gently into the rear card's card-edge receptacle. It should "click" into place.
5. Secure the front card in place using its captive thumbscrews.

3.2 Connecting the Card to Your LAN

The RJ-45 female Ethernet port on the rear panel of the SNMP/HTTP Card (shown in Figure 2-2 in **Section 2.6**) is designed to connect directly to a 10BASE-T network. Its pinout is shown in Figure 3-1. A 10BASE-T cable may run as far as 328 ft. (100 m) from the Card to the next device.

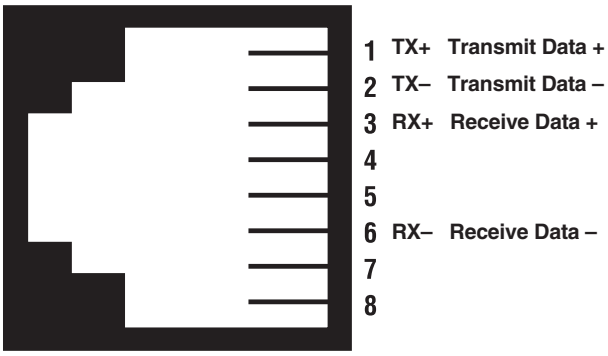


Figure 3-1. The pinout of the Card's Ethernet port.

You can connect the Card's Ethernet port to a 10BASE-T hub or repeater using a straight-through-pinned unshielded twisted-pair (UTP) cable with RJ-45 connectors, such as our product code EVMSL05. You can connect the Card's Ethernet port to the NIC card of a PC or workstation using a UTP cable with RJ-45 connectors that's cross pinned as shown here (such as product code EVCRB05):

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

3.3 Connecting the Card to a PC or Terminal for Initial Configuration

The DB25 female RS-232 port on the rear panel of the SNMP/HTTP Card (shown in Figure 2-2 in **Section 2.6**) is pinned as DTE. It can be connected directly to the serial port of another RS-232 DTE such as a terminal or a PC running terminal emulation in order to give the Card its IP address, its subnet mask, and the IP address of the attached LAN's default gateway, as described in **Section 4.2**. (If you have a daisychained system, once this initial configuration is done, you can swap in cabling that runs to your Control Modules in order to configure and manage all of the equipment in your system; see **Section 3.4**.) The pinout of this connector is shown in Figure 3-2 on the next page.

Connect the Card's RS-232 port to another DTE using a null-modem cable up to 50 ft. (15.2 m) long with a DB25 male connector at the Card end, such as product code EVMBPC if the other DTE is a PC with a DB9 male serial port, or product code EYN255C-MF if the other DTE is a terminal or a PC with a DB25 male serial port.

Keep in mind that any DTE connected to the Card needs to be, or to emulate, a VT100 or compatible terminal. The DTE must also be set to communicate at 19,200 bps using 8 data bits, no parity, and 1 stop bit.

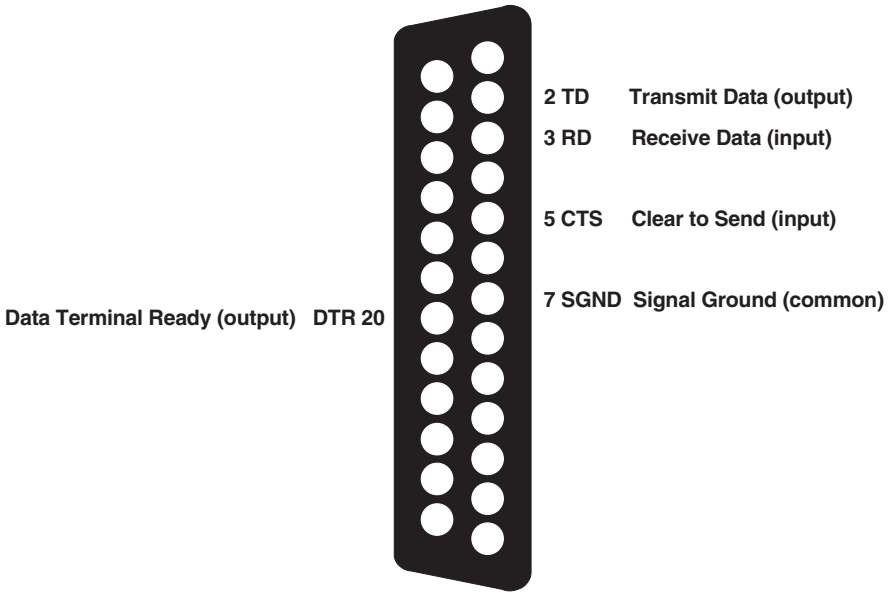


Figure 3-2. The pinout of the Card's RS-232 port.

3.4 Connecting the Card to Control Modules for Copying the Configuration (Daisychained Systems Only)

If the MicroRACK in which the SNMP/HTTP Card is installed is part of a daisychain, you can connect the Card to the daisychain's Control Modules (RM262C) so that you can manage the entire system through the Card's internal HTML management pages as described in **Chapter 5**. First, you need to have connected the Card to a DTE as described in **Section 3.3** and initially configured it as described in **Section 4.2**. If that's finished, take these steps, referring to Figure 3-3 on the next page:

1. Disconnect the RS-232 cable from the SNMP/HTTP Card's RS-232 port.

2. Attach a modular adapter to the Card's RS-232 port. This adapter should have a DB25 male connector to plug into the port and an RJ-45 female connector pinned according to TIA-561 on the other side. At the time of this writing, we don't stock such an adapter as a standard part, but you can order the FA025 adapter kit and assemble it yourself. Pin the adapter this way:

Standard RS-232 on DB25 Male		**TIA-561 on RJ-45 Female**	
Signal	Pin	Pin	Signal
TD	2	3	TD
RD	3	2	RD
RTS	4	7	RTS
CTS	5	8	CTS
DSR	6	6	DSR
SGND	7	5	SGND
CD	8	1	CD
DTR	20	4	DTR

3. Run straight-through-pinned 8-wire (4-pair) unshielded twisted-pair (UTP) cabling, such as product code EVMSL05, up to 50 ft. (15.2 m) from the adapter's RJ-45 connector to port A1 (a 10-pin RJ connector) on the Control Module installed in MicroRACK #2.

4. If you have additional MicroRACK chassis and the rest of your daisychain cabling isn't already in place, run the necessary cables, starting from port B1 of rack #2's Control Module, as described in the Control Module's manual.

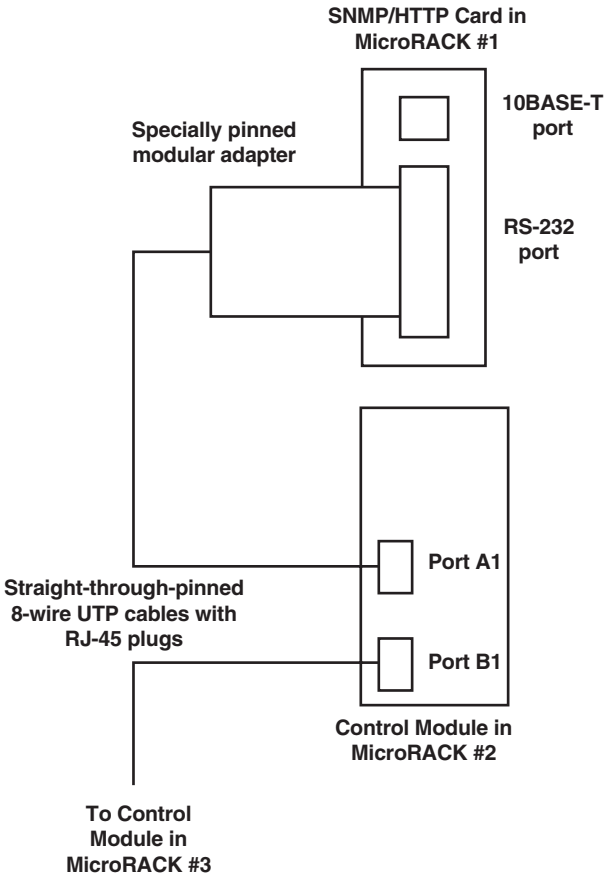


Figure 3-3. Connecting the Card to Control Modules in other daisychained MicroRACKs.

4. Initial Operation/Configuration and Terminal-Based Functions

4.1 The Card's LEDs

Once you've installed an SNMP/HTTP Card in a MicroRACK, it will begin operating immediately if the rack has a power supply installed and it's connected to a working power source. If not, the Card won't start operating until you apply power to the rack. The Card is hot-swappable; it won't be damaged by plugging it in or removing it while the rack is powered up.

Once you have your cables properly attached to the Card, check its front-panel LEDs (shown in Figure 2-2 in **Section 2.6**):

- Power (green): If this LED is lit, the Card is receiving enough power to operate. If this LED is dark, the rack is turned off or the Card is getting insufficient or no power for some reason.
- TD (Transmit Data, one yellow, one green): When the LAN link is idle, the yellow LED is steadily lit. When the Card is transmitting data on the LAN link, the yellow and green LEDs toggle back and forth (appear to flash).
- RD (Receive Data, one yellow, one green): When the LAN link is idle, the yellow LED is steadily lit. When the Card is receiving data on the LAN link, the yellow and green LEDs toggle back and forth (appear to flash).
- LI (green): If this LED is lit, the Card detects that it is attached to an active LAN. If this LED is dark, the Card can't detect an active LAN.
- PPP (green): At the time of this writing, this LED has no function because the Card doesn't support PPP yet. When PPP support is enabled in a future firmware release, the function of this LED will be explained.
- Poll (yellow): Flashes when the Card sends out a poll signal onto the MicroRACK's internal bus or out to any connected daisychain.
- Fault (red): Dark under normal conditions, lit if the Card has detected a fault in its own hardware.

4.2 "Booting" the Card (Performing Initial Configuration)

As soon as your SNMP/HTTP Card is installed, you need to give the Card its IP address, its subnet mask, and the IP address of the attached LAN's default gateway, so that its HTML management pages will function. To do so, take these steps:

1. If you haven't already done so, attach the Card to a VT100 or compatible terminal, or a PC emulating one, as described in **Section 3.3**. Make sure that the terminal or PC is set to communicate at 19,200 bps, 8 data bits, no parity, and 1 stop bit.

2. Power up the MicroRACK that the Card is installed in. The Card will begin running a series of diagnostic tests on its internal subsystems. Halt this power-up sequence by pressing lowercase "b" three times when you are prompted to do so:

```
DRAM: Configure Complete
FLASH: Configure Complete
Boot Version May 11 1999 14:44:24
Validating operation code
Valid operational code, Hit 'b' three times to stop operational boot
```

3. After you press "b" three times, the setup screen appears:

```
Timer Started May 11 1999 14:44:24
Timer installed
Clock installed
Trying the console

---Ethernet Hardware---
    Address: 00.a0.ba.00.01.71
---Current IP settings---
    IP:           192.168.200.1
    Mask:         255.255.255.0
    Gateway:      209.49.110.1
User set gateway: 2
Change IP settings (y/n)?
```

4. Press upper- or lowercase "Y" to change the IP address. The Card will now prompt you for a new IP address, subnet mask, and default gateway:

```
---Current IP settings---
    IP: 209.49.110.188
    Mask: 255.255.255.0
    Gateway: 209.49.110.1
Change IP settings (y/n)? y
User Set IP: 209.49.110.188
User Set Mask: 255.255.255.0
User Set Gateway: 209.49.110.1
---Settings to save---
    IP: 209.49.110.188
    Mask: 255.255.255.0
    Gateway: 209.49.110.1
Save these settings (y/n)?
```

5. Press upper- or lowercase "Y" to save the IP settings. The Card will now prompt you for changes to the hardware revision that your Card requires:

```
---Hardware Initialization---
    Current Hardware Revision B
    Change Hardware Revision (y/n)?
```

6. Unless you've just upgraded the Card's firmware (see **Section 4.4**), press"N" to keep the current revision. Cycle power to the MicroRACK to reboot the system with the new settings. After your system reboots, swap in the daisychain Control Module connection if you're using a daisychained system (see **Section 3.4**). Log into the Card using a standard Web browser from your network and fully configure the system as described in **Chapter 5** (or at least make sure the system's addressing is correct as described in **Section 4.3**).

4.3 Setting the Address Ranges for Your MicroRACK Function Cards

There is at least one more thing you need to do before your MicroRACK system is ready to run. Once it's fully booted, the SNMP/HTTP Card will begin polling the system looking for modems, line drivers, and other function cards. If the address of a function card is not configured or does not match the physical layout of the MicroRACK that it is installed in, the SNMP/HTTP Card might not find the function card. The address range that is polled is determined by the configuration of the system. So you must make sure that the software configuration within the SNMP/HTTP Card matches the hardware configuration of the system.

The SNMP/HTTP Card uses the number of power supplies in the system to determine what the address range of the individual racks will be. The number of power supplies installed in each MicroRACK needs to be entered on the Card's "Modem Information" page (see **Section 5.6**). If the system is set for two power supplies installed, the Card will automatically set the number of "Slots Available" (displayed on the Modem Information page) in the chassis to 13. If the system is set for a single power supply installed, the Card will automatically set the number of Slots Available in the chassis to 15.

Using this information, the SNMP/HTTP Card will poll the specified address range in each rack. Thus, in a single-power-supply system, the address range for MicroRACK #1 (the rack with the SNMP/HTTP Card installed in it) will be from address 1 to address 15. (Keep in mind that the SNMP/HTTP Card always occupies address 0 [zero].). The Card will then begin polling rack #2 through its daisychain port starting from address 16. In a redundant-power-supply system, the address range for rack #1 (the rack with the SNMP/HTTP Card installed in it) will be from address 1 to address 13. The Card will then begin polling rack #2 through its daisychain port starting from address 14.

The daisychained racks are set up in the same manner, with 13 addresses being available in a redundant system and 15 addresses being available in single-supply system. When you disable a rack, the addresses are still set aside for that rack space. If a power supply is removed, the addressing will not change unless you make the change through the SNMP/HTTP Card's Web pages. This means you can service the power supplies without having to worry about it causing problems with your system addressing.

One last note: In order for the SNMP/HTTP Card to communicate with your MicroRACK function cards through each rack chassis' internal bus, the function cards' rear cards should have Frame Ground connected to Signal Ground through a 100-ohm resistor. This can be done by setting a jumper on each function card's rear card; please refer to your function cards' manuals for more information.

4.4 Performing Terminal-Based Firmware Upgrades

At times, in order to fix bugs or to add new features, we might release upgraded firmware for the SNMP/HTTP Card or for the modem cards it can be used to manage. Black Box Technical Support might recommend that you install a new firmware revision; if so, they will tell you how to download the file(s) from our Web or FTP site onto your computer system. Once you have the upgraded firmware on a computer in your LAN, follow the procedure in this section to download it from that computer to an SNMP/HTTP Card or to an ME0003C/ME0007A or ME0004C/ME0008A modem pair in the same Managed MicroRACK system. (The firmware of the ME0001C/ME0009A IDSL modems can't be upgraded this way; if a tech-support technician tells you that you'll need to upgrade the firmware for one of these, he or she will tell you how to do so.)

When you have the correct firmware file in hand and it's been copied to a PC with an FTP utility installed on it, make sure that the PC and the SNMP/HTTP Card are both securely connected to the LAN, then take the following steps to load the new firmware (whatever type it is) into the SNMP/HTTP Card. (This procedure assumes that you're working with a DOS-based utility, but the principles are similar with FTP clients running on Windows®, Linux®, and other operating systems.)

1. At the DOS prompt on the PC ("C:\>", for example), type

   `ftp` *`IP_address`*

   where *`IP_address`* is the IP address of the SNMP/HTTP Card. The SNMP/HTTP Card should respond with these FTP messages:

   ```
   Connected to IP_address
   220 Code download service ready
   User ( IP_address (none)):
   ```

2. Enter a special case-sensitive username:

`KillImage`	if you're downloading code into the SNMP/HTTP Card;
`KillImage1094`	if you're downloading code to an ME0003C/ME0007A; or
`KillImage1095`	if you're downloading code to an ME0004C/ME0008A.

   The SNMP/HTTP Card should respond:

   ```
   331 User name okay, need password.
   Password:
   ```

3. Enter the superuser password for your 16-Port Managed MicroRACK system. (The default value for this password is "superuser", although you should have changed it as soon as you got the SNMP/HTTP Card—see **Section 5.2**.) The SNMP/HTTP Card should respond:

   ```
   230 User logged in, proceed.
   ```

4. Specify the type of file you're downloading by entering this at the FTP-utility prompt ("FTP>", for example):

   ```
   type image
   ```

   The SNMP/HTTP Card should respond:

   ```
   200 Command okay.
   ```

5. Send the file by entering this at the FTP prompt:

   ```
   send pathname
   ```

   where *pathname* is the full pathname of the firmware file you're downloading (for example, "c:\.temp\330230z.img"—tech support will tell you which filename to use). The SNMP/HTTP Card should respond:

   ```
   200 Command okay.
   150 File status okay; about to open data connection.
   226 Closing data connection.
   Connection closed by remote host.
   ```

   After the data connection is opened, there will be a delay of a few seconds while the file is being transferred to the SNMP/HTTP Card, and then the connection will be closed.

NOTE

If anything ever goes wrong during an FTP interaction with the SNMP/HTTP Card, enter "help" at the the FTP prompt for a list of the available FTP commands that could help you solve the problem. If a download is interrupted (because of an Internet connection failure, for example), the SNMP/HTTP Card will send you an error message and discard the partially downloaded code; you'll have to repeat the download. If the SNMP/HTTP finishes downloading firmware for itself, but a power failure or other problem interrupts the transfer of the new firmware from its RAM to its flash memory, when you reboot the Card its boot code will detect that the main program is bad and will refuse to run it; you will still be able to redownload the new firmware.

6. *If you've downloaded code for a modem card:* Transfer the new firmware from the SNMP/HTTP Card to the modem card as described in **Section 5.15**.

5. The Card's Management Pages

This chapter explains how to use the SNMP/HTTP Card's internal HTML management pages to manage your MicroRACK system as a whole. (Succeeding chapters describe how to manage specific function cards.) Note that the system can also be managed by using an SNMP network-management station using a standard SNMP software package or MIB-walking tool (a PC running HP® OpenView®, for example). To use the Card's HTML management pages, you must first define its IP address, subnet mask, and default gateway as described in **Section 4.2**.

5.1 Introduction to the Management Pages

5.1.1 Logging In

To log into the SNMP/HTTP Card's HTML Management pages, you must enter its "*xyz.abc.def.ghi.*" IP address (assigned in **Section 4.2**) into a Web browser as the URL (Universal Resource Locator) "http://*xyz.abc.def.ghi.jkl*". This will cause your Web browser to ask for a user name and password. There are two administration passwords associated with the operation of your Card. They are "superuser" and "monitor". The superuser password allows full permission to change and view any parameters in the Card. The monitor password allows full viewing of any non-password-oriented variables. Change these passwords immediately after initial configuration to avoid security breaches. Figure 5-1 shows the Card's login screen.

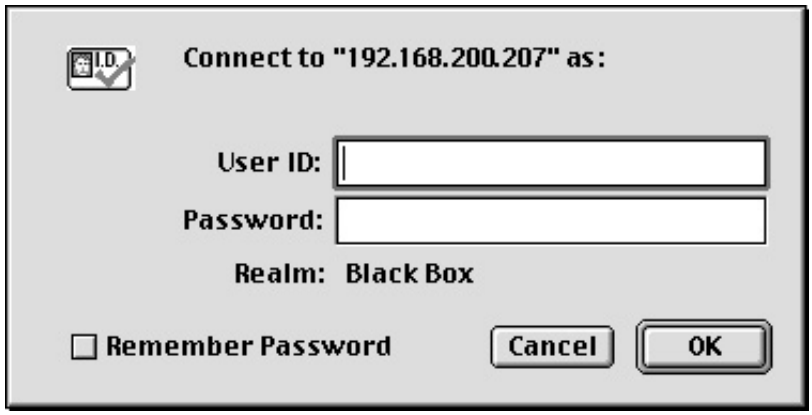


Figure 5-1. The Card's login screen.

NOTE

Figure 5-1 and the other figures in Chapters 5 **and** 6 **show the screens as they appear when viewed with an Apple Macintosh computer using Microsoft Internet Explorer 5.0. Their appearance might vary when viewed on a different type of computer or with a different type or version of Web browser.**

5.1.2 HTML AND SNMP OBJECT FORMAT

This chapter and the ones that follow describe variables that appear on each of the internal HTML pages. These descriptions are drawn from either the Card's proprietary MIB or the applicable SNMP MIB. The variable names and MIB object-designations will be presented this way: "Variable Name As It Appears to HTTP (variableMIBObject)". For example, the paragraph dealing with the "Total Active Calls" variable, a.k.a. the "diActive" MIB object, will begin with "Total Active Calls (diActive)".

5.1.3 SAVING HTML OBJECT CHANGES

After making changes to any Card-specific variables, you must save the changes in order to store them into the Card's flash memory. If the changes are not saved, they will be lost after the next power cycle.

NOTE

Changes you make to Card configuration parameters that deal with MicroRACK function cards will automatically be saved in the function cards' flash memory after the configurations are complete.

To make and save the changes, take these steps:

1. Make the change to the parameter.
2. Select "Submit."
3. Return to the HOME screen.
4. Select "Record Current Configuration."

5.1.4 HELP SCREENS

The Card's Web pages have built-in help screens which allow you to get information about the variables that are being described. Each Web page contains several headings that describe the section that is being defined. Some of the headings are hyperlinks to the help screen for that page. The new window will automatically scroll to the help area that was requested. You may also scroll through this page to view help information about other sections of the page. In some cases, the headings for tables will also be shown as hyperlinks. These hyperlinks work the same way, showing the help screen for that column of the table.

5.2 HTML Web-Page Navigation

This section describes how to navigate the SNMP/HTTP Card's internal HTML Web pages. Figure 5-2 shows how all of the Web pages are linked together. Following the diagram, there is a brief description of each page. Continuing on through this chapter gives a more detailed description of each Web page and the options that are available in that page.

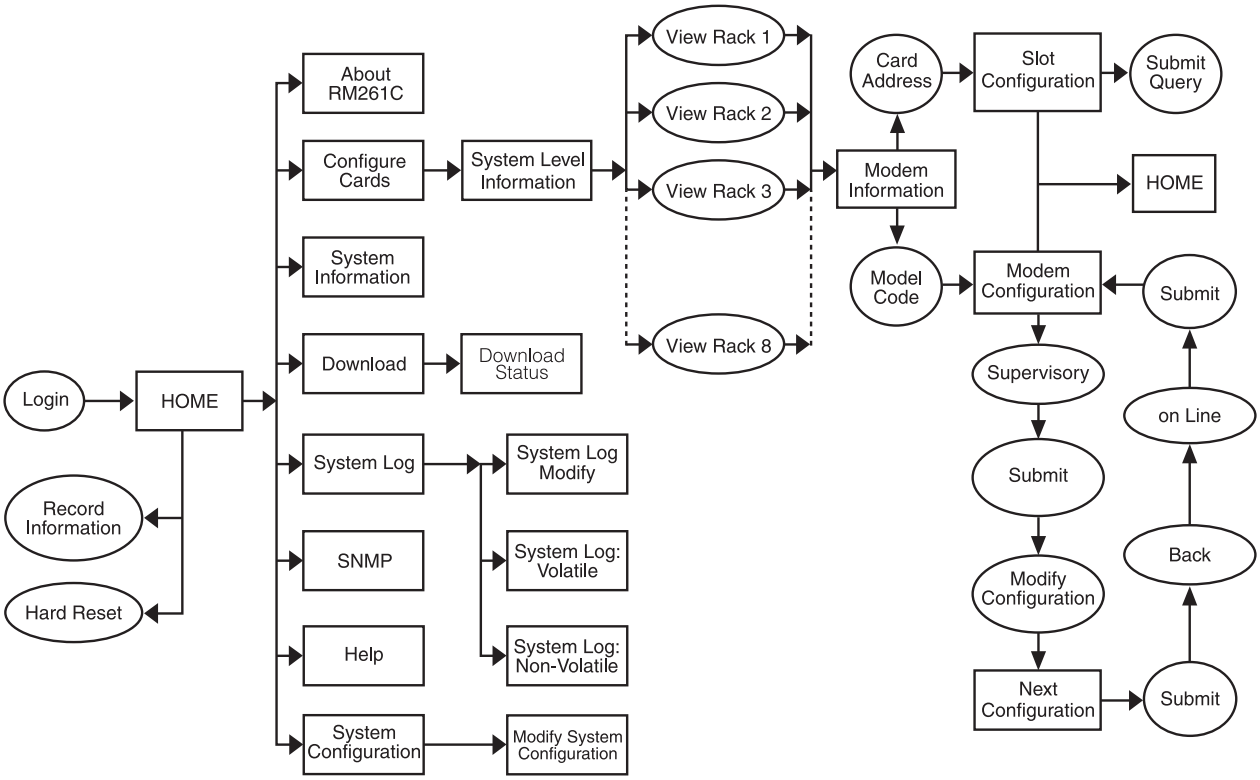


Figure 5-2. A map of the Card's internal pages.

Login: After typing its IP address into your Web browser as the URL, the Card will present the "login" screen. The Card has two levels of password protection: superuser and monitor. The superuser password will allow you to view statistics and make configuration changes to the system. To log in as a superuser, type the word "superuser", all lowercase, as the login password. The monitor password allows you to view statistics, but it will not allow you to make any configuration changes. To log into the system at the monitor level, type "monitor", all lower case, as the password. The "superuser" and "monitor" passwords are set in the Card as the default passwords. During your initial setup, change the passwords. After logging into the Card, the system will display the HOME page.

HOME: The HOME page (see **Section 5.3**) displays a quick overview of the system, including error and warning indications, software information, chassis names, number of modems installed, etc. This page allows you to log into the Card, get a quick look at the system, and leave if there are no situations presented that require further attention.

On the left side of the HOME page is the "navigation view," a frame containing a set of hyperlinks that you can use to navigate to most of the Card's other pages. The navigation view will always be available to you so you can change from one page to the next.

Two additional pushbuttons are located on the bottom of the HOME page. The "Record Current Configuration" button allows you to store any configuration changes made to the MicroRACK chassis. (Keep in

mind that if configuration changes are not stored in memory, they will be lost if the Card is removed from the chassis or if the chassis is powered down or rebooted.) The "Hard Reset" button forces the Card to perform a reset. This will not reset the individual function cards in the rack, only the SNMP/HTTP Card. If you would like to perform a hardware reset on the individual function cards, please refer to the Slot Configuration page (discussed below, and see **Section 5.7**).

About RM261C-SNMP: The About RM261C-SNMP page (see **Section 5.4**) gives a second overview of the system. This page give a little more hardware information about the operation of the SNMP/HTTP Card. This page also contains contact information about Black Box.

Configure Cards (System Level Information): The Configure Cards hyperlink on the HOME page will bring you to the System Level Information page (see **Section 5.5**). This page is the starting point for the configuration and management of your MicroRACK function cards. This page allows you to quickly identify potential problems and view statistics on a per-rack basis. You can also disable racks from this level.

From this page, you can select a View Rack hyperlink that will bring up the Modem Information page (see **Section 5.6**) for the selected rack.

Modem Information: The Modem Information page (see **Section 5.6**) consists of a table that displays top-level information about the modems (function cards) installed in the selected MicroRACK. These items include product codes, user IDs, errors and warnings, and circuit IDs. This page also gives you information about the number of cards and power supplies in the rack.

From this page there are two hyperlinks that can be selected that will give you detailed information about a specific modem. These are the Slot Configuration hyperlink, embedded in the address of the card in the table, and the Modem Statistics hyperlink, embedded in the local modem's product code.

Slot Configuration: The Slot Configuration page (see **Section 5.7**) allows you to set up specific information about the selected modem. From this page, you can change the modem's user IDs, circuit IDs, and error and warning indications, and you can also clear errors and warnings or perform a hardware reset of the modem.

Modem Configuration Status: The Modem Configuration Status page (see **Section 6.4**) shows the current configuration and statistical state of the local and remote modems installed at the selected address. From this page, you can place the modem card into "supervisory mode." Once the card is in this mode, the Web page will display a hyperlink that will allow you to enter the Modem Configuration page.

Next Configuration or **Update Configuration:** The page called Next Configuration or Update Configuration (depending on what type of modem you're configuring; see **Section 6.5**) allows you to change the configuration of the local and remote modems installed at the selected address. (This page can also be used to place the cards in test modes.) Once the configuration has been set up, submit the changes, then go back to the Modem Configuration Status page and place the modem back into the online state. Keep in mind that the configuration changes won't be implemented in the modems until they are placed back in the online state.

System Information: You can navigate to the System Information page (see **Section 5.8**) by selecting the hyperlink along the left side of any page. The System Information page allows you to set up the IP information, chassis information, and password information for the system. It is recommended that you change your passwords immediately after installing your Card to ensure security for your network.

Download: The Download pages (see **Section 5.15**) allow you to perform firmware upgrades on the modems installed in your MicroRACK system. When new firmware for any of your modems becomes available, you can get it from Black Box and upload it into the SNMP/HTTP Card through an FTP link as described in **Section 4.4**. The software can then be sent from the SNMP/HTTP Card to the modems.

System Log: The System Log page (see **Section 5.9**) allows you to view the Syslog Messages. Syslog Messaging is a reporting tool used in the SNMP/HTTP Card to log run-time operations. There are several levels of messages and you can set the system to report only the messages above a certain level. From this page, you can reach one of three different Web pages: Modify, Volatile Memory, and Non-Volatile Memory.

System Log - Modify: The System Log - Modify (see **Section 5.10**) page allows you to set up the configuration for the Syslog messaging system. You can set variables such as the IP address of a Syslog Daemon and priority levels for each of the messaging facilities.

System Log - Volatile Memory: The System Log - Volatile Memory page (see **Section 5.11**) displays Syslog messages that have been sent to the Volatile Memory section of the messaging system. The messages stored here will be lost if the SNMP/HTTP Card is removed from the MicroRACK chassis or if the chassis is powered down or rebooted.

System Log - Non-Volatile Memory: The System Log - Non-Volatile Memory page (see **Section 5.12**) displays Syslog messages that have been sent to the Non-Volatile Memory section of the messaging system. The messages stored here will be stored in flash memory and will still be available even if the SNMP/HTTP Card is removed from the MicroRACK chassis or if the chassis is powered down or rebooted.

SNMP: The SNMP page consists of a set of hyperlinks that you can click on to download the proprietary MIBs for the SNMP/HTTP Card and your MicroRACK function cards. These MIBs will be required if you plan to manage the MicroRACK system using a network-management station instead of the Card's Web pages.

5.3 The HOME Page

The HOME page, shown in Figure 5-3, is the first HTML screen that you will reach after you log into the SNMP/HTTP Card. From the HOME page, you may monitor the current system status, save any system changes, or reset the system without powering off the system's MicroRACKs. The following subsections describe each variable on the screen.

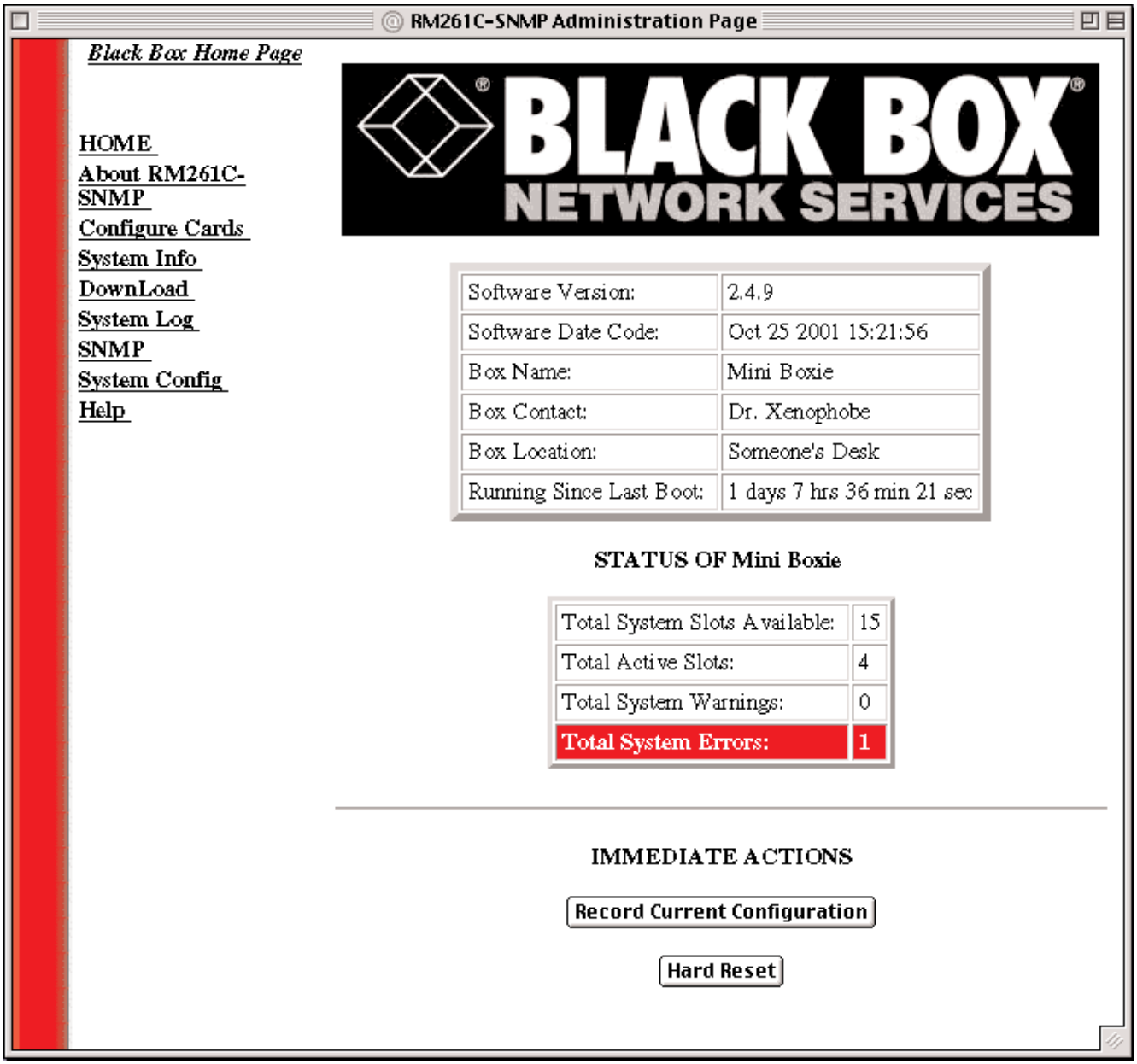
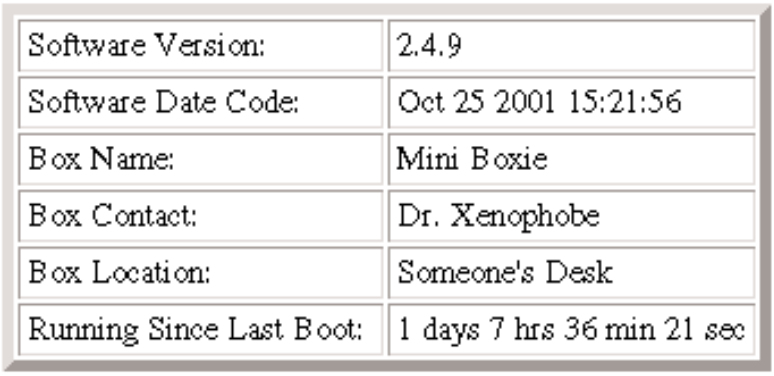


Figure 5-3. The Card's HOME page.

5.3.1 Card Status Variables

There are six system variables, shown in Figure 5-4, which apply to the SNMP/HTTP Card.



Software Version:	2.4.9
Software Date Code:	Oct 25 2001 15:21:56
Box Name:	Mini Boxie
Box Contact:	Dr. Xenophobe
Box Location:	Someone's Desk
Running Since Last Boot:	1 days 7 hrs 36 min 21 sec

Figure 5-4. The HOME page's Card-information box.

Software Version (boxSoftwareVersion): This variable displays the version of the firmware ("software") currently running in the SNMP/HTTP Card. The Card's firmware can be upgraded using an FTP download. For more information about upgrading the Card's firmware, see **Section 5.15**.

Software Date Code (boxDateCode): This variable displays the date and time the software was compiled.

Box Name (boxName): This variable displays a user-defined string that represents the name of the chassis. This variable can be changed by the user in the System Info page (see **Section 5.8**).

Box Contact (boxContact): This variable displays a user-defined string that represents the contact for the chassis. You can change this variable in the System Info Web page.

Box Location (boxLocation): This variable displays a user-defined string that represents the location of the chassis. You can change this variable in the System Info Web page.

Running Since Last Boot (boxUpTime): This variable tells you how long the Card has been running since it was last reset.

5.3.2 Operating-Status Variables

There are four system variables, shown in Figure 5-5, which describe the immediate operating status of the modems (function cards) installed in the MicroRACK system.

Figure 5-5. The HOME page's status box.

Total System Slots Available (totalConfigSlots): This read-only variable defines the largest address that the system will poll. (In other words, it will poll the addresses from 1 to totalConfigSlots.) Any modem with an address outside of this range will not be found by the SNMP/HTTP Card.

Total Active Slots (totalActiveSlots): This read-only variable defines the number of function cards currently installed in the MicroRACK system. As the Card brings the function cards online, this number is incremented. After a function card is removed from the system, this number is decremented.

Total System Warnings (boxWarningNumber): This variable defines the number of warnings that are currently outstanding in the system. This number includes warnings that have been generated from the modems as well as the SNMP/HTTP Card itself. If this number is greater than zero, this field will be highlighted in yellow to notify you that one or more warnings are outstanding. Warnings are cleared through the System Level Information page (see **Section 5.5**) for the system as a whole, or the Slot Configuration page (see **Section 5.7**) for the individual modems. You can view the System Log page (see **Section 5.9**) to examine the source of the warnings.

Total System Errors (boxErrorNumber): This variable defines the number of errors that are currently outstanding in the system. This number includes errors that have been generated from the modems as well as the SNMP/HTTP Card itself. If this number is greater than zero, this field will be highlighted in red to notify you that one or more errors are outstanding. Errors are cleared through the System Level Information page (see **Section 5.5**) for the system as a whole, or the Slot Configuration page (see **Section 5.7**) for the individual modems. You can view the System Log page (see **Section 5.9**) to examine the source of the errors.

5.3.3 Immediate Actions

There are two immediate actions shown in Figure 5-6 that can be executed on the SNMP/HTTP Card when you're logged in in superuser mode. Doing so will cause the Card to act according to the descriptions below.

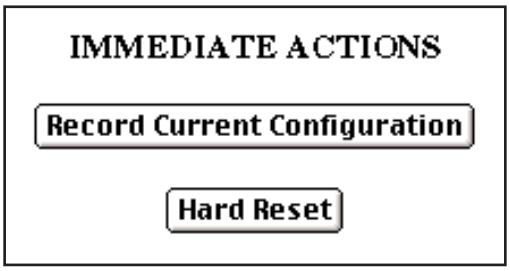
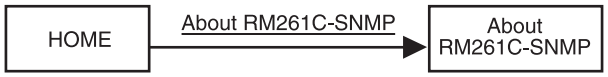


Figure 5-6. The HOME page's "immediate actions" area.

Record Current Configuration: Clicking on the "Record Current Configuration" button causes the current configuration to be stored in the Card's flash memory. Any changes made to the Card's configuration are stored in volatile RAM first. This allows you to set the Card up with a working configuration before making the configuration permanent. Changes become permanent when you select "Record Current Configuration." Unless you store them, you will lose all changes not stored to flash the next time the Card is removed from the MicroRACK chassis, or the next time the chassis is powered down or rebooted.

Hard Reset: Hard Reset causes the Card to restart. When you click on "Hard Reset," the Card confirms that you want to execute this command. Then the Card will reinitialize its LAN and RS-232 interfaces and reload configuration parameters from FLASH. Keep in mind that this action won't reset any of the modems installed in your MicroRACK system; that needs to be done from the Slot Configuration page (see **Section 5.7**) for that modem.

5.4 The About RM261C-SNMP Page



The About RM261C-SNMP page, shown in Figure 5-7, gives some additional information about the SNMP/HTTP Card, including a few read-only variables and Black Box contact information.

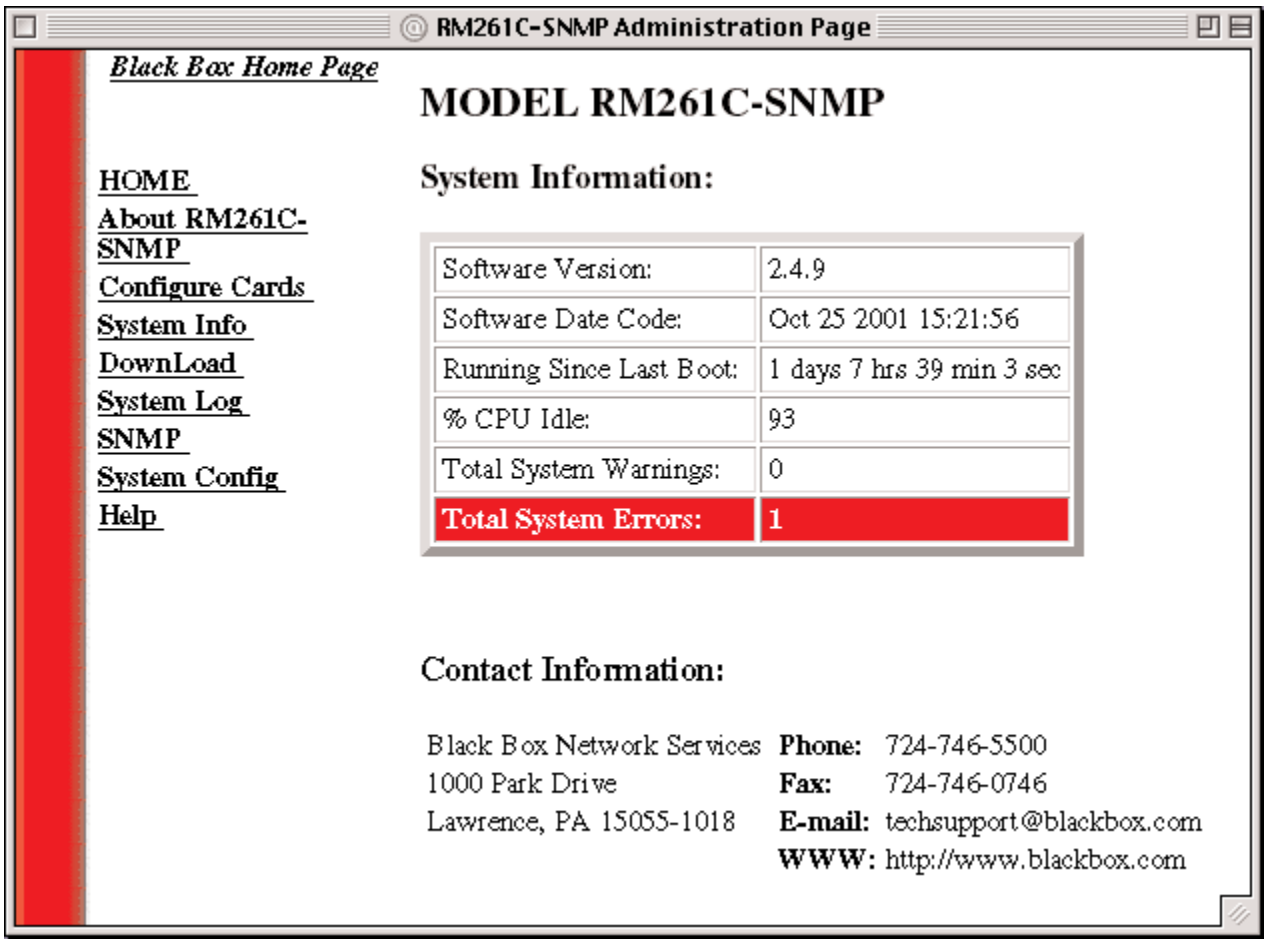


Figure 5-7. The About RM261C-SNMP page.

Software Version (boxSoftwareVersion): Displays the version of the firmware ("software") currently running in the SNMP/HTTP Card. The Card's firmware can be upgraded using an FTP download. For more information about upgrading the Card's firmware, see **Section 4.4**.

Software Date Code (boxDateCode): Displays the date and time associated with the installed firmware version.

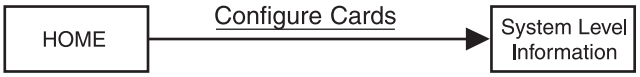
Running Since Last Boot (boxUpTime): Displays the amount of time that the SNMP/HTTP Card has been running since it was most recently powered up.

% CPU Idle (boxIdleTime): Displays what percentage of the Card's CPU clock cycles are not currently being utilized.

Total System Warnings (boxWarningNumber): Displays the amount of warnings that have been generated in the system since the warnings were last cleared.

Total System Errors (boxErrorNumber): Displays the amount of errors that have been generated in the system.

5.5 The System Level Information Page



The Configure Cards hyperlink from the HOME page will bring you to the System Level Information page. Figure 5-8 at the end of this section displays a portion of this Web page for the MicroRACK system being managed. The System Level Information page contains statistical information about the entire system and explains how that information is broken down among the racks. Each rack can be enabled or disabled from this level. When a rack is disabled, the Card stops polling the addresses contained in the specified rack. The Card's ability to stop polling is useful when you're installing fewer than eight racks or when you're taking function cards offline in order to perform servicing. (The modems installed in the system will continue to operate using the the most recently provided settings.) This page also allows you to clear alarms on a per-rack or system basis. Each rack view also contains a View Rack hyperlink to the Modem Information page (see **Section 5.6**).

Here are descriptions of some of the variables on the System Level Information page. The variables in the first table on the page apply to the entire Managed MicroRACK system:

Apply System Configuration (dslGlobalSubmitSystem): For Web-page use only. As described in **Section 5.14**, it's possible to define "global configurations" that can be applied simultaneously to multiple ME0004C and ME0008A mDSL modems installed in a Managed MicroRACK system. If you've defined such a configuration, you can apply it to all of the unprotected ME0004C and ME0008A modems in the entire MicroRACK system by selecting it in this menu and clicking on the "Apply Configuration" button.

Apply System Test Mode (testModeSetSystem): For Web-page use only. The modems you can install in the Managed MicroRACK all support various firmware-mediated loopback and bit-error-rate tests. To simultaneously place all of the modems in the entire MicroRACK system into a given test mode (or back to normal operation), select the test mode in this menu and click on the "Apply Test Mode" button. For a list of the available test modes, see the description of the SW Test Mode variable in **Section 6.5**.

Total Slots Available (totalConfigSlots): Displays the number of configurable slots available in the system.

Total Cards Installed (totalActiveSlots): Displays the number of function cards the system has found.

Power Supplies Installed (boxPowerSupplies): Displays the number of power supplies installed in the system.

Total System Warnings (boxWarningNumber): Displays the amount of warnings that have been generated in the system since the warnings were last cleared.

Total System Errors (boxErrorNumber): Displays the amount of errors that have been generated in the system since the errors were last cleared.

Clear All System Alarms [clearAlarms clearAllAlarms(0)]: Can be used to clear alarms for the entire system.

The following variables apply separately to each MicroRACK in the system. Replace the "X" shown in the variable names with the appropriate rack number to derive the specific variable name (for example, "rack2Enable").

Rack X Enable/Disable (rackXEnable): Enables or disables the selected MicroRACK chassis for use by the system. There are two main uses for these variables. First, when your system configuration requires fewer than the maximum number of racks, all uninstalled racks should be disabled. The Card will not poll the address range for a rack that is disabled; this will decrease the polling time for the system. Second, you can disable a rack if you would like to remove cards from it without causing system alarms. Note that the modems in any "disabled" rack will continue to operate normally; they just won't be detected by, or manageable with, the SNMP/HTTP Card.

Address Range (rackXMinAddr, rackXMaxAddr): Specifies the minimum and maximum addresses that will be polled for the selected MicroRACK (based on the maximum address of the previous rack and the number of power supplies installed in this rack).

Total Slots Available (rackXSlotsAvailable): Displays the number of slots available for the selected MicroRACK (based on the number of power supplies installed in the rack).

Total Cards Installed (rackXCardsInstalled): Displays the number of function cards the system has found in this MicroRACK.

Power Supplies Installed (rackXPowerSupplies): Displays the number of power supplies installed in this MicroRACK (used to determine the addressing range for the rack).

Total Errors (rackXErrorNumber): Shows the number of errors that have been reported by the system for this MicroRACK.

Total Warnings (rackXWarningNumber): Shows the number of warnings that have been reported by the system for this MicroRACK.

Apply Rack Configuration (dslGlobalSubmitRackX): For Web-page use only; see *Apply System Configuration* on the previous page. To apply a defined global configuration to all of the unprotected ME0004C and ME0008A modems in this MicroRACK, select it in this menu and click on the "Apply Configuration" button.

Apply Test Mode (testModeSetRackX): For Web-page use only; see *Apply System Test Mode* on the previous page. To simultaneously place all of the modems in this MicroRACK into a given test mode (or back to normal operation), select the test mode in this menu and click on the "Apply Test Mode" button. For a list of the available test modes, see the description of the SW Test Mode variable in **Section 6.5**.

Rack Protection Mode (rackXProtected): As described in **Section 5.14**, ME0004C cards can be "protected" from being forced into global configurations if they require a different configuration. To protect all of the ME0004C cards in this MicroRACK from global configurations, set this variable to "protected(1)" rather than "normal(0)" and press the "Apply Protection" button.

Clear Alarms [clearAlarms clearAlarmsRackX(X)]: Read/write, can be used to clear alarms for the selected MicroRACK chassis.

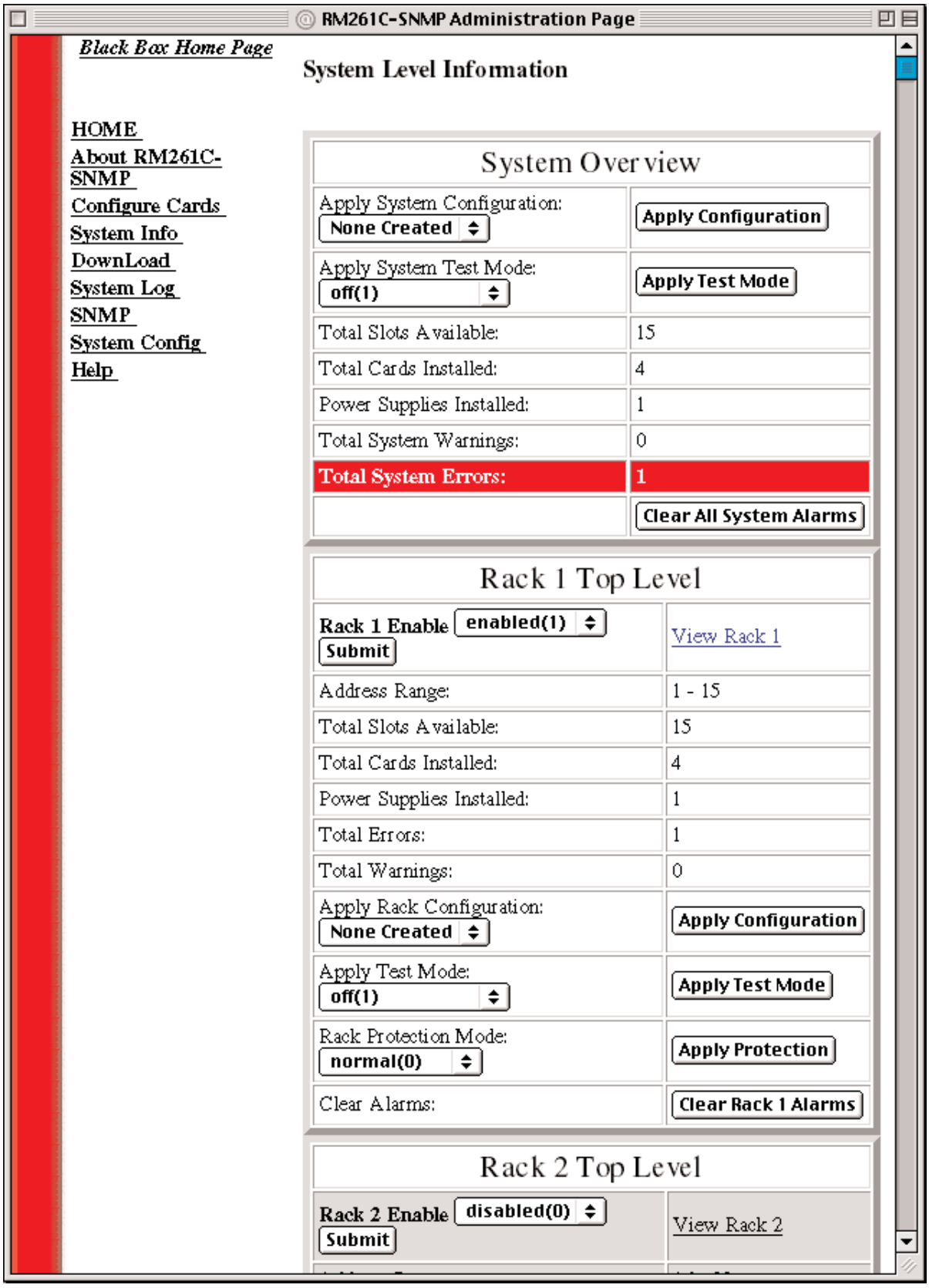
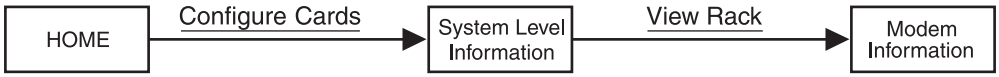


Figure 5-8. The System Level Information page.

5.6 The Modem Information Page



The Modem Information page, shown in Figure 5-9, displays an overview of a specific MicroRACK that is being managed. This page will display statistical information, such as errors and warnings on a per-card basis, and identification information, such as product codes and user IDs. A description of each variable follows Figure 5-9.

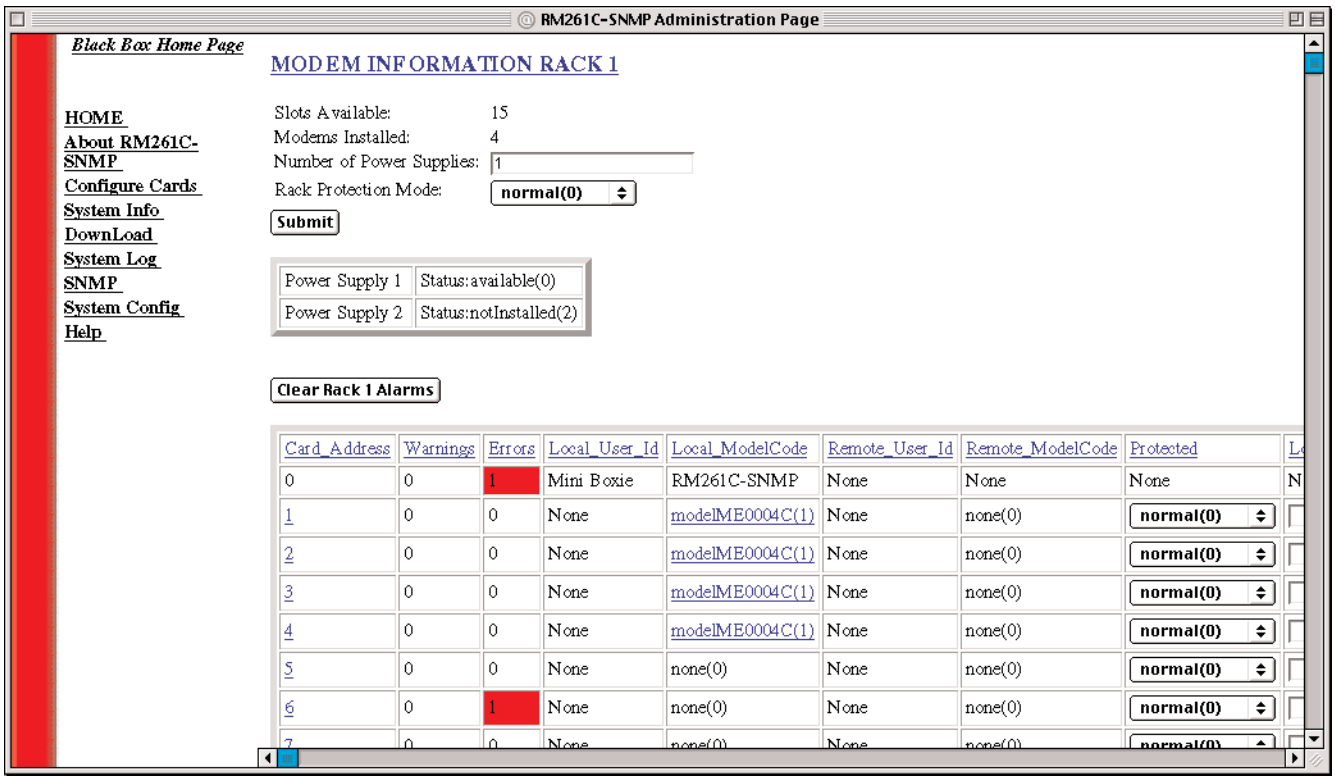


Figure 5-9. The Modem Information page.

Slots Available (rackXSlotsAvailable): Displays the number of slots available for the selected MicroRACK (based on the number of power supplies installed in the rack).

Modems Installed (rackXCardsInstalled): Displays the number of function cards the system has found in this MicroRACK.

Number of Power Supplies (boxPowerSupplies): Determines the number of power supplies that the Card will monitor for availability. If the selected MicroRACK chassis has a single power supply, you should set this variable to "1"; if it has redundant power supplies, you should set this variable to "2". A setting of "2" will inform the Card that there should be two power supplies in that chassis; if it doesn't detect that many, an error will be reported and the failed power supply will be highlighted in red.

Rack Protection Mode (rackXProtected): As described in **Section 5.14**, ME0004C cards can be "protected" from being forced into global configurations if they require a different configuration. To protect all of the ME0004C cards in the MicroRACK from global configurations, set this variable to "protected(1)" rather than "normal(0)" and press the "Apply Protection" button.

Submit button: Click on this button to have any changes you've made to the "Number of Power Supplies" and "Rack Protection Mode" settings take effect.

Power Supply 1 (boxPower1Down) and Power Supply 2 (boxPower2Down): Respectively define the status of power supply 1 (the one on slot 17—the right-hand one if you're looking at the front of the rack) and power supply 2 (the one on slot 15—the left-hand one if you're looking at the front of the rack). If the corresponding power supply fails, this field will be highlighted in red and generate a system error notifying you of the failure. Possible values are "available(0)", "down(1)", "notInstalled(2)", "testing(3)", and "rackDisabled(4)".

Clear Rack X Alarms [clearAlarms clearAlarmsRackX(X)]: Read/write, can be used to clear alarms for the selected MicroRACK chassis.

The following variables apply to the individual modems (function cards) installed in the selected MicroRACK chassis. Each variable heads one column of the "modem table" on this page. Note that each column heading contains an embedded hyperlink to a help page that contains information about the column.

Card_Address (nmsSlotID): Displays the address of the function card. The SNMP/HTTP Card will poll the function cards using the addresses listed in the "Card Address" column. If a modem is found at an address, its information will be displayed in the corresponding row of the table. The addresses of the function cards are set using DIP switches mounted on the cards; for more information, refer to your function cards' manuals.

The address contains an embedded hyperlink to the Slot Configuration page (see **Section 5.7**), which can be used to set slot-specific information about the function card.

Warnings (warningCount): Displays the warnings that are associated with each modem installed in the selected chassis. When warnings are present, this field will be highlighted in yellow and the number of warnings will be listed. For more information on the cause of the warning, you should view the System Log (see **Section 5.9**). Warnings will be highlighted in yellow in the log. The warnings for the slot can be erased in the Slot Configuration page (see **Section 5.7**). Note that the System Log will still display the warnings even after the warning-count number is cleared.

Errors (errorCount): Displays the errors that are associated with each modem installed in the selected chassis. When errors are present, this field will be highlighted in red and the number of errors will be listed. For more information on the cause of the error, you should view the System Log (see **Section 5.9**). Errors will be highlighted in red in the log. The errors for the slot can be erased in the Slot Configuration page (see **Section 5.7**). Note that the System Log will still display the errors even after the error-count number is cleared.

Local_User_Id (localUserID): User-supplied string that identifies this particular modem. The string is stored in the modem's nonvolatile flash memory. If the address of the modem is changed, the User ID will move to the new slot. The string can be up to 10 bytes long and can be changed or reset in the Slot Configuration page (see **Section 5.7**).

Local_ModelCode (localModelCodeBB): This column displays the function card's product code ("model code"). There is a hyperlink embedded in the code that points to the configuration page of the function card and its corresponding remote unit. Possible values for this variable are listed in **Section 6.4**.

Remote_User_Id (remoteUserID): User-supplied string that identifies the remote modem at the other end of the link from the selected function card. The string is stored in the remote modem's nonvolatile flash memory. If the remote modem is moved and placed opposite a different function card, its Remote User ID will move to the newt function card's slot. The string can be up to 10 bytes long and can be changed or reset in the Slot Configuration page (see **Section 5.7**).

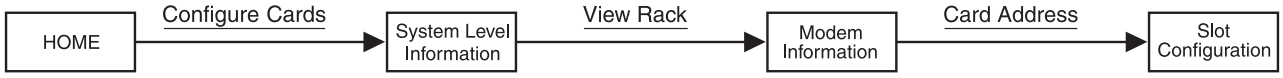
Remote_ModelCode (remoteModelCodeBB): The product code ("model code") of the remote modem linked to this function card. Possible values for this variable are listed in **Section 6.4**.

Protected (disableGlobalConfig): As described in **Section 5.14**, ME0004C cards can be "protected" from being forced into global configurations if they require a different configuration. To protect a particular ME0004C card from global configurations, set this variable to "protected(1)" rather than "normal(0)" for that card. This column will contain the string "None" for any card that isn't an ME0004C.

Local_Circuit_ID (localCircuitID): The local circuit ID is a 40-byte string identifying the local modem Card that is stored in the SNMP/HTTP Card's nonvolatile flash memory. This string can be changed in either the System Level Information page or the Slot Configuration page (see **Section 5.5** or **Section 5.7** respectively).

Remote_Circuit_ID (remoteCircuitID): The remote circuit ID is a 40-byte string identifying the remote modem that is stored in the SNMP/HTTP Card's nonvolatile flash memory. This string can be changed in either the System Level Information page or the Slot Configuration page (see **Section 5.5** or **Section 5.7** respectively).

5.7 The Slot Configuration Page



The Slot Configuration page (shown in Figure 5-10) allows you to make slot-specific configuration changes that are not product-specific. Following Figure 5-10 is a description of each of the page's variables.

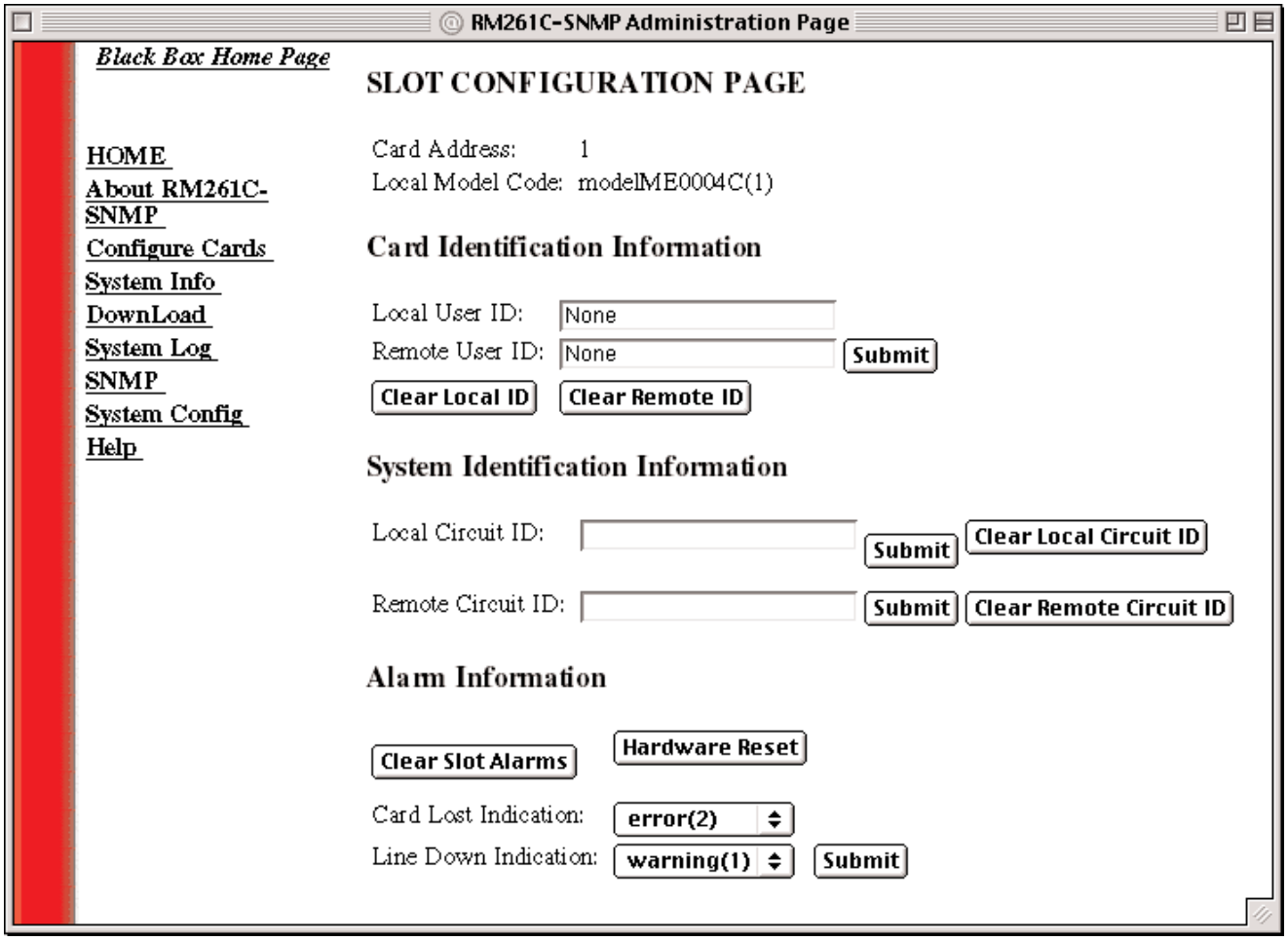


Figure 5-10. The Slot Configuration page.

These variables are at the top of the page:

Card Address (nmsSlotID): Displays the number assigned to this slot in the entire Managed MicroRACK system. Except for rack chassis #1, this address *won't* be the same as the chassis' slot number in a daisychained system.

Local Model Code (localModelCodeBB): Displays the product code of any function card installed in that slot. Possible values are "none(0)", "ME0004C(1)", "ME0001C(2)", and "ME0003C(3)".

These variables are included in the page's "Card Identification Information" section:

Local User ID (localUserID): 10-byte user-supplied string that identifies the local modem installed in the selected slot of the MicroRACK. The string is stored in the modem's nonvolatile flash memory. The best idea for this string is usually to use an abbreviation of the Local Circuit ID (see below).

Remote User ID (remoteUserID): 10-byte user-supplied string that identifies the remote modem connected to the local modem installed in the selected slot. The string is stored in the remote modem's nonvolatile flash memory. The best idea for this string is usually to use an abbreviation of the Remote Circuit ID (see below).

These variables are included in the page's "System Identification Information" section:

Local Circuit ID (localCircuitID): The circuit ID is a 40-byte string that identifies the local modem installed in the selected slot. This string is stored in the SNMP/HTTP Card's nonvolatile flash memory.

Remote Circuit ID (remoteCircuitID): The circuit ID is a 40-byte string that identifies the remote modem connected to the local modem installed in the selected slot. This string is stored in the SNMP/HTTP Card's nonvolatile flash memory.

These variables are included in the page's "Alarm Information" section:

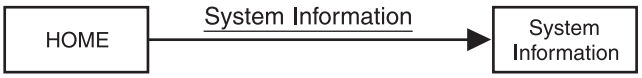
Clear Slot Alarms [resetStatus resetSlot(1)]: Clicking on this button erases the alarms (errors and warnings) associated with the selected slot. The errors and warnings will, however, still be listed in the System Log (see **Section 5.9**).

Hardware Reset [resetStatus resetModem(2)]: Clicking on this button will force the modem installed in the selected slot to perform a hardware reset.

Card Lost Indication (cardLostIndication): Determines what type of indication will be made if a modem is removed from the MicroRACK chassis. Three choices are currently available: "error(2)", "warning(1)", or "none(0)".

Line Down Indication (lineDownIndication): Determines what type of indication will be made if a modem reports a line down (lost link/carrier). Three choices are currently available: "error(2)", "warning(1)", or "none(0)".

5.8 The System Information Page



The System Information page, shown in Figure 5-11, displays the current settings of the SNMP/HTTP Card's main configuration variables—including the IP information and passwords—and allows you to change them. A description of each variable follows Figure 5-11.

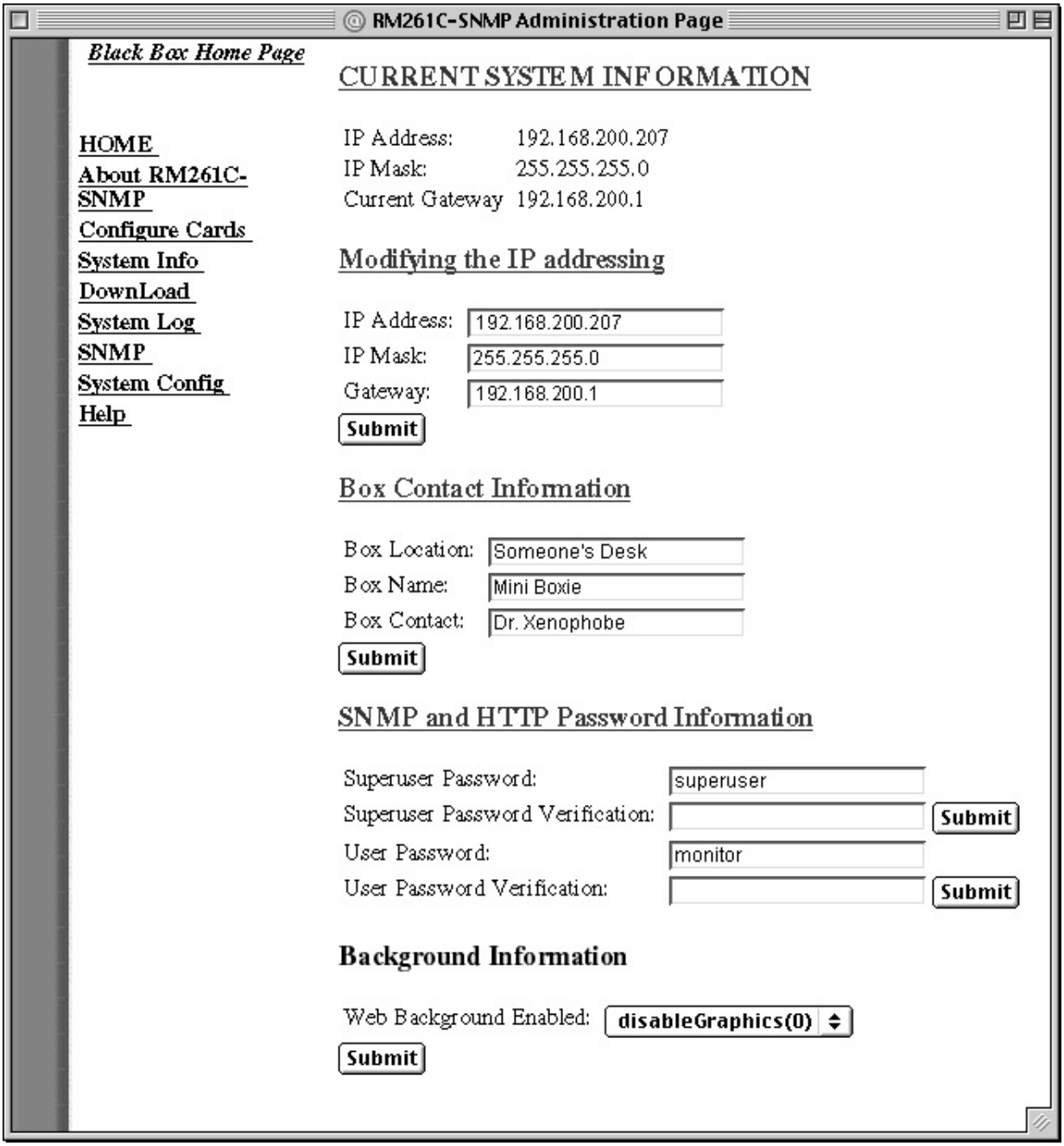


Figure 5-11. The System Information page.

Most of the headers on this page are hotlinks to an explanatory page. These variables are displayed (in read-only format) at the top of the page and can be changed in the page's "Modifying the IP addressing" section:

IP Address (boxIpAddress): Displays the IP address of the Card.

IP Mask (boxIpMask): Displays the IP mask of the Card.

Current Gateway (boxGateway): Displays the current gateway for the network.

These variables are included in the page's "Box Contact Information" section:

Box Location (boxLocation): User-defined string that represents the location of the chassis. This variable is displayed on the HOME page (see **Section 5.3**).

Box Name (boxName): User-defined string that represents the name of the chassis. This variable is displayed on the HOME page.

Box Contact (boxContact): User-defined string that represents the contact person or company for the chassis. This variable is displayed on the HOME page

These variables are included in the page's "SNMP and HTTP Password Information" section:

Superuser Password (boxSnmpMasterPassword): This password will allow full (read/write) access rights to your MicroRACK system. If you haven't already changed this password from its default value of "superuser," you should do so as soon as possible by typing the new password into both the Password and Verification fields and then selecting the "Submit" button. After entering the new password, you must store the changed configuration into permanent memory at the HOME page (see **Section 5.3**).

CAUTION!

Choose your passwords carefully and make a secure record of them. If you lose or forget your passwords, there's no way to recover or clear them at your location. The SNMP/HTTP Card will have to be returned to the factory.

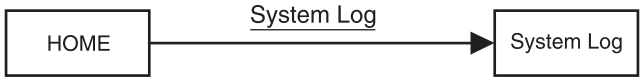
User Password (boxSnmpMonitorPassword): This password will allow monitor (read-only) access rights to your MicroRACK system. If you haven't already changed this password from its default value of "monitor," you should do so as soon as possible by typing the new password into both the Password and Verification fields and then selecting the "Submit" button. After entering the new password, you must store the changed configuration into permanent memory at the HOME page (see **Section 5.3**).

This variable is included in the page's "Background Information" section:

Web Background Enabled (boxBackgroundFlag): The SNMP/HTTP Card stores a background image that can be used while viewing its HTML management pages. This variable tells the system whether to display this background image ["enableGraphics(1)"] or not ["disableGraphics(0)"].

To make changes to any of these variables, click on the "Submit" button at the bottom of the section where they appear. Each "Submit" button affects only the variables in the corresponding section; if you make changes to variables in multiple sections, you need to click on each of those sections' "Submit" buttons.

5.9 The System Log Page



The System Log page, shown in Figure 5-12, gives an overview of the system-logging functions. The system log is a messaging system that stores information about the system as it is running. This page contains three hyperlinks to subsidiary pages (see **Sections 5.10** through **5.12**) where you can view and modify the system log messages.

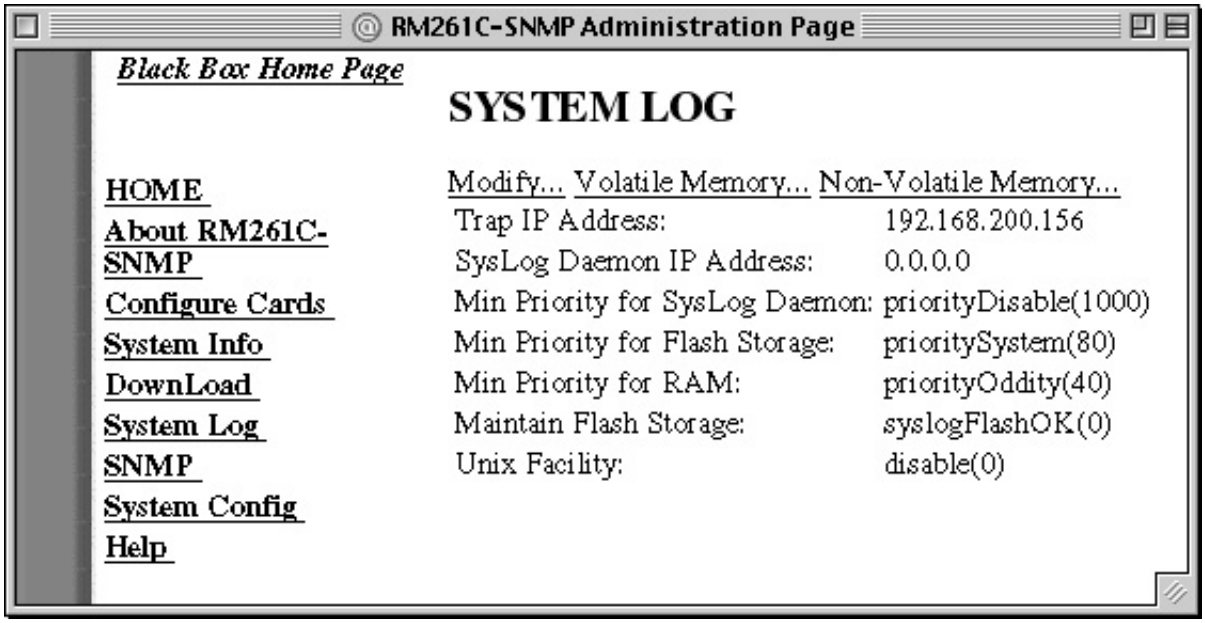
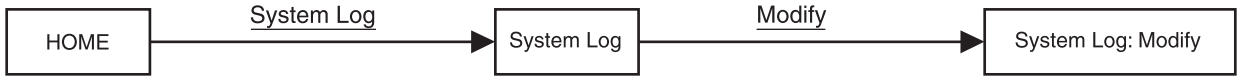


Figure 5-12. The System Log page.

5.10 The System Log: Modify Page



You can modify some system-log variables at the System Log: Modify page. The page is shown in Figure 5-13 and the variables are described afterwards. You can choose which messages will be sent to the available message-logging functions.

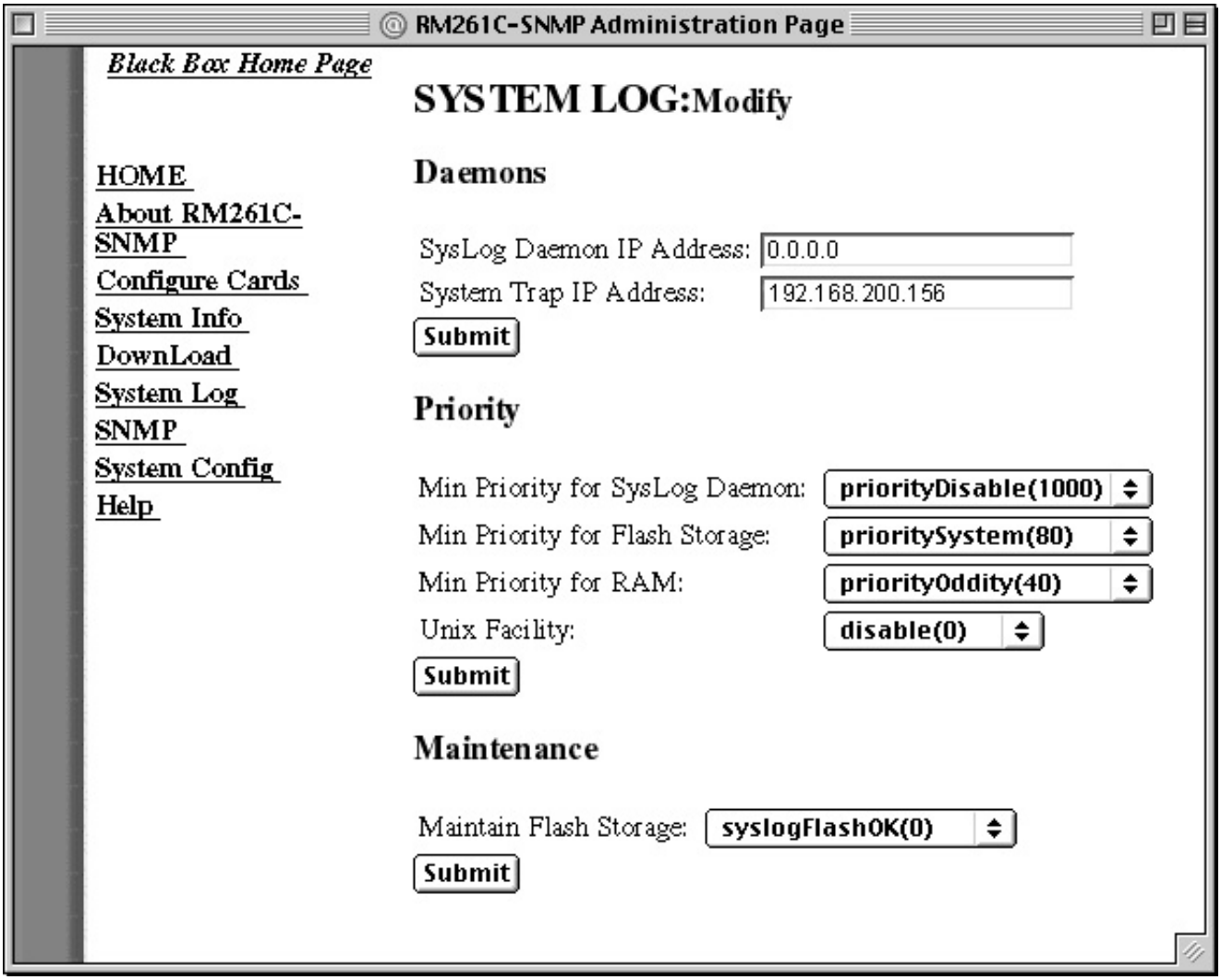


Figure 5-13. The System Log: Modify page.

This variable is included in the page's "Daemons" section:

SysLog Daemon IP Address (syslogDeamonIP): The SNMP/HTTP Card can send messages over a network to a Syslog Daemon. This variable specifies the IP address that will be running the Syslog Daemon.

System Trap IP Address (syslogTrapIP): The SNMP/HTTP Card can send SNMP traps over a network to a SNMP Trap Daemon running on a network-management system such as HP OpenView. This variable specifies the IP address that will be running the SNMP Trap Daemon.

These variables are included in the page's "Priority" section:

Min Priority for SysLog Daemon (syslogDeamonPriority), Min Priority for Flash Storage (syslogFlashPriority), and Min Priority for RAM (syslogTablePriority): These are three separate outputs that accept syslog messages. Specify the minimum priority for a message that will be sent to that output. For most situations, set the outputs that are being used to the maximum priority, prioritySystem(80). (Black Box technicians might ask you to set an output to a lower priority for the duration of a test.) For unused output mechanisms, set the priority to priorityDisable(1000) in order to disable sending messages to that output.

Unix Facility (syslogUnixFacility): If your network-management system is running on a variant of UNIX®, you need to tell UNIX which of its components will be processing syslog messages. There are several possible choices for this, but in most situations, a daemon will be handling the syslog messages, so this variable should be set to "daemon(3)". If there's any question about the method your UNIX system uses to process syslog messages, you should consult with the system administrator about how to set this variable.

This variable is included in the page's "Maintenance" section:

Maintain Flash Storage (syslogFlashClear): This variable is used to notify you about the status of the SNMP/HTTP Card's flash-storage area. If the area still has space remaining, it will read "syslogFlashOK(0)", but if the area is full, it will read "syslogFlashFull(1)". You can erase the data in the flash-storage area by setting this variable to "syslogFlashClear(2)" and clicking on the "Submit" button. As soon as the area has been purged, this variable will be set back to "syslogFlashOK(0)" again.

To make changes to any of these variables, click on the "Submit" button at the bottom of the section where they appear. Each "Submit" button affects only the variables in the corresponding section; if you make changes to variables in multiple sections, you need to click on each of those sections' "Submit" buttons.

5.11 The System Log: Volatile Memory Page

This page, shown in Figure 5-14, contains a log of messages that have been sent to the SNMP/HTTP Card's volatile RAM-storage area according the "Min Priority for RAM" variable in the Syslog: Modify page (see **Section 5.10**). Messages stored here will be lost if the SNMP/HTTP Card is removed from the MicroRACK chassis or if the chassis is powered down or rebooted.

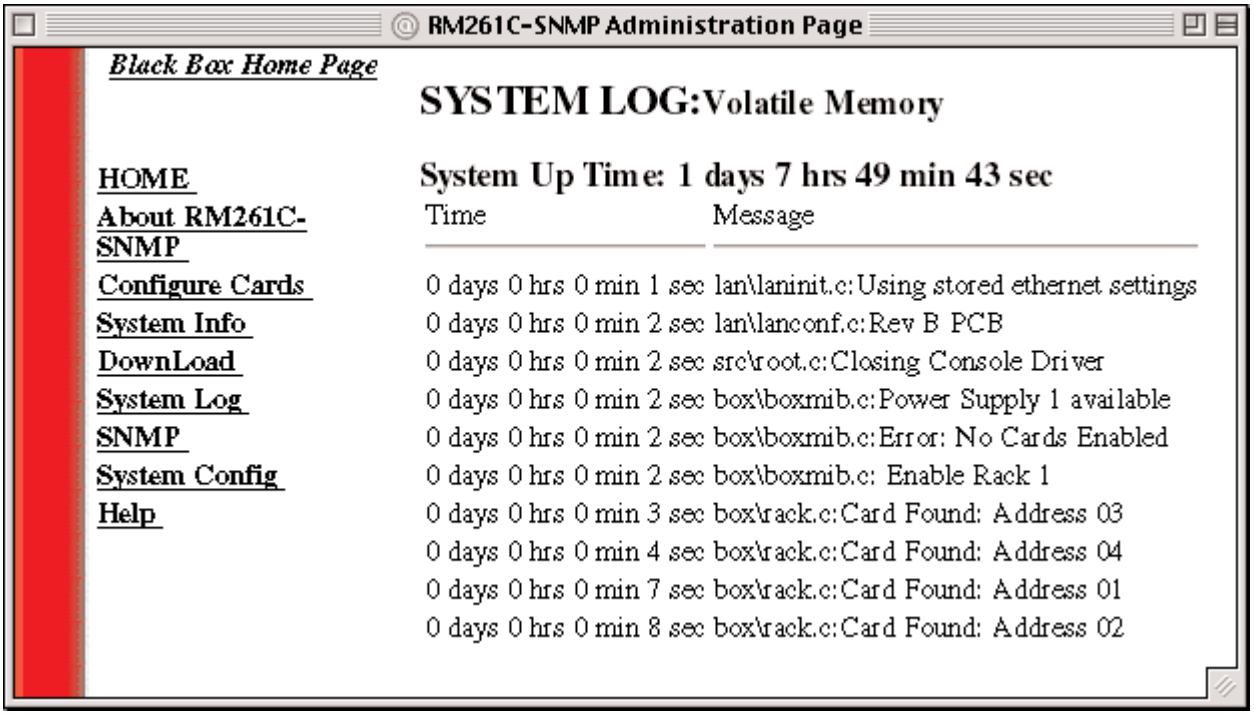
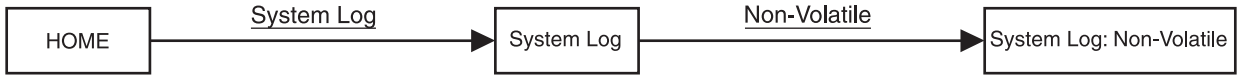


Figure 5-14. The System Log: Volatile Memory page.

5.12 The System Log: Non-Volatile Memory Page



This page, shown in Figure 5-15, contains a log of messages that have been sent to the SNMP/HTTP Card's nonvolatile flash-storage area according the "Min Priority for Flash Storage" variable in the System Log: Modify page (see **Section 5.10**). Messages stored here will be saved even if the SNMP/HTTP Card is removed from the MicroRACK chassis or if the chassis is powered down or rebooted. This page will show warnings highlighted in yellow and errors highlighted in red. When an error or warning is displayed somewhere in the Card's management pages, this page will give a description of the error/warning. All information on this page is read-only except for a single button at the top of the page:

Erase Flash Messages (syslogFlashClear): Click on this button to clear the messages listed on this page. This function can also be performed from the System Log: Modify page (see **Section 5.10**) and has been included here for ease of use. Keep in mind that once messages are erased, they cannot be recovered.

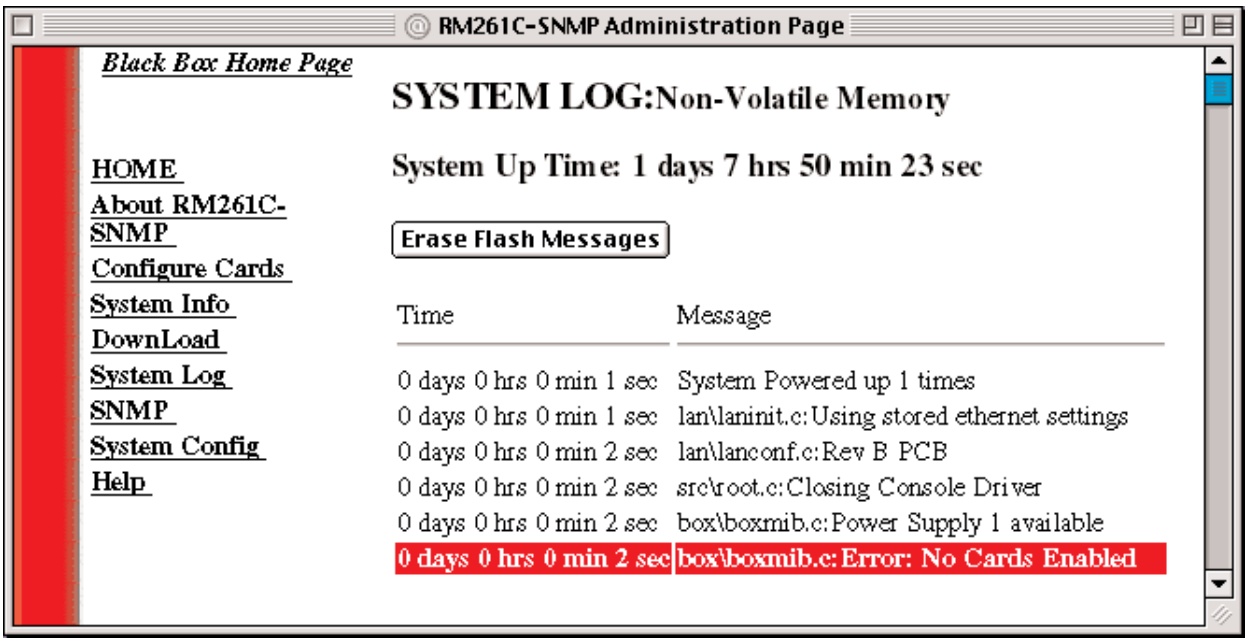
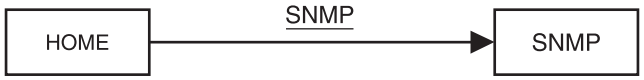


Figure 5-15. The System Log: Non-Volatile Memory page.

5.13 The SNMP Page



This page, shown in Figure 5-16, contains hyperlinks that you can click on to download the proprietary MIBs for the SNMP/HTTP Card and your MicroRACK function cards. You'll need these MIBs if you plan to manage the MicroRACK system using a network-management station instead of the Card's Web pages.

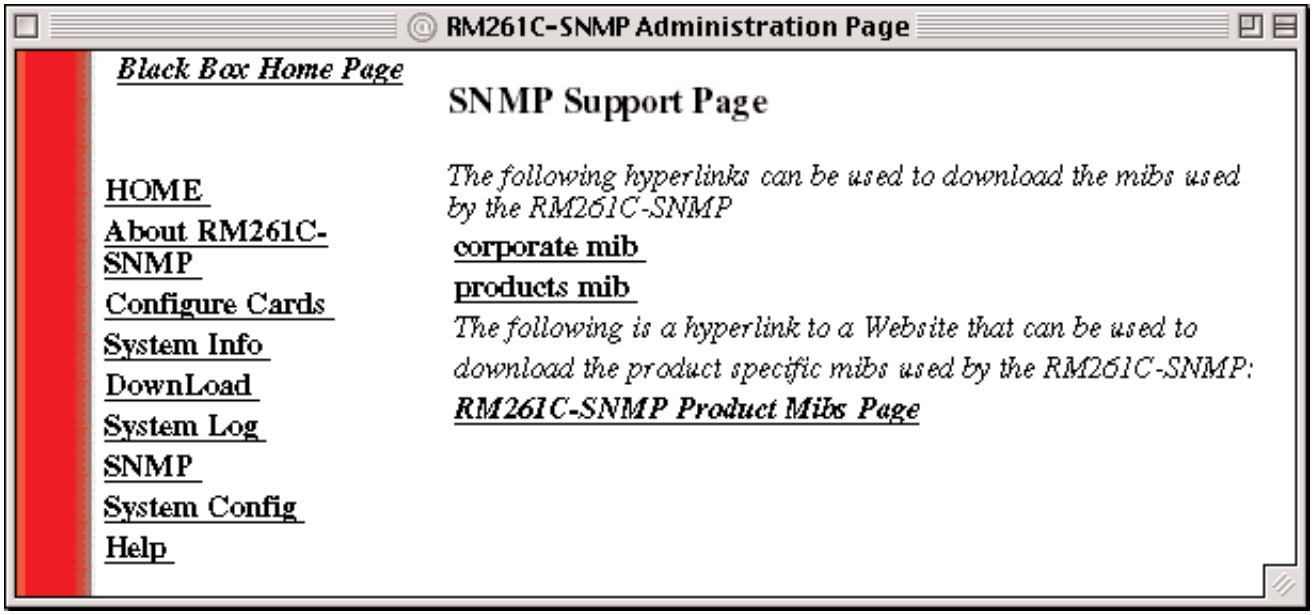


Figure 5-16. The SNMP page.

5.14 The Global Configuration Pages (Systems with mDSL Cards Only)

From the HOME page, click on "System Config" to reach the Global Configuration page, shown in Figure 5-17. Here you can administer global configurations that can be applied simultaneously to multiple ME0004C mDSL cards installed in the MicroRACK system by using the "Apply System Configuration" and "Apply Rack Configuration" buttons on the System Level Information page (see **Section 5.5**). (You can turn on "protected mode" for a given card or rack if you want that card or rack to remain unaffected by global-configuration applications.)

Note that these pages' MIB variables are designed for Web-page use only. They wouldn't normally be viewed or set with a network-management station, and are listed only for informational purposes.

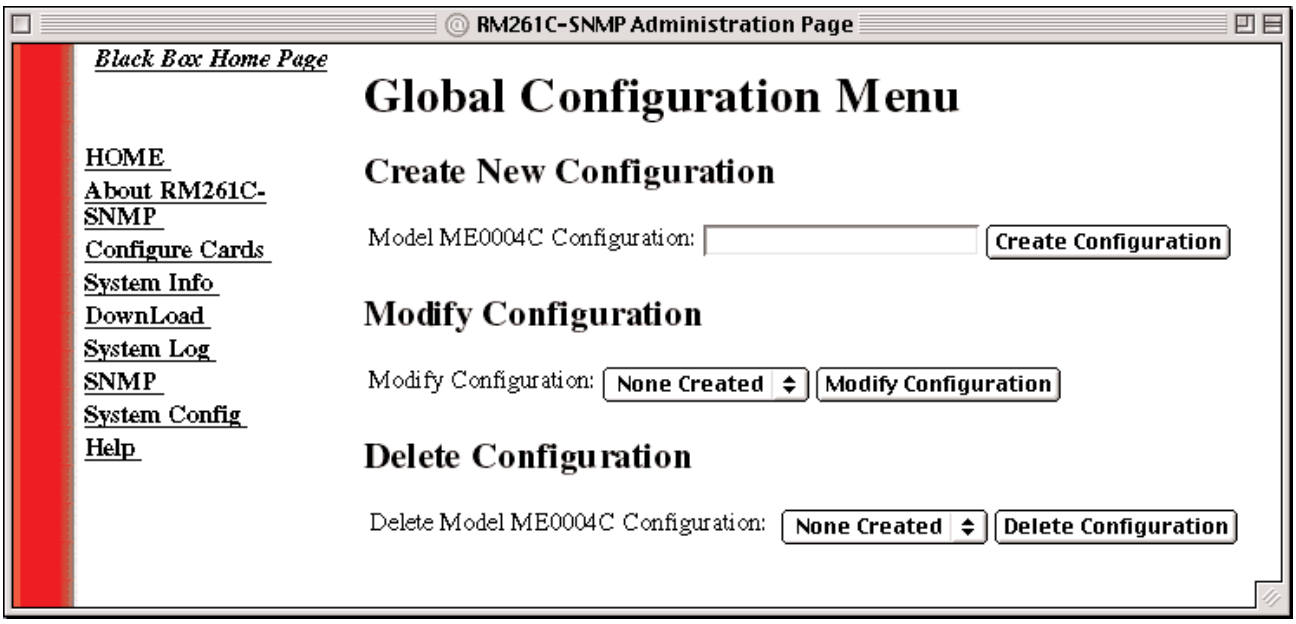


Figure 5-17. The Global Configuration page.

In the "Create New Configuration" section, you can start the process of creating a new global configuration for your system's ME0004C cards. (There can be as many as five global configurations defined at any one time.) Give your configuration a name up to 20 printable characters long—which will be stored in the MIB variable dslGlobalName—and click on the "Create Configuration" button. The SNMP/HTTP Card will automatically append the numeric value of the first available configuration slot to the configuration name—for example, if "TEST_CONFIG" is the first global configuration you create, it will become "TEST_CONFIG(0)"—and it will substitute this name for one of the "placeholder values" of the MIB variable dslGlobalModify (from "xtmp NameA(0)" to "xtmp NameE(4)"). The SNMP/HTTP Card will then bring up the Modify Global Configuration page shown in Figure 5-18 on the next page, where you can enter the settings that will characterize the new configuration.

In the "Modify Configuration" section, you can select an existing ME0004C global configuration, then click on the "Modify Configuration" button to bring up the Modify Global Configuration page shown in Figure 5-18 on the next page, where you can change any desired settings. If there are no configurations defined, the menu bar will say only "None Created".

In the "Delete Configuration" section, you can you can select an existing ME0004C global configuration, then click on the "Delete Configuration" button to delete that configuration. (This will not change the configuration settings of any function card to which that configuration had been applied.) That global configuration's numbered slot will become vacant, and can be used for future configurations you might define. If there are no configurations defined, the menu bar will say only "None Created".

In the Modify Global Configuration page, you'll be able to set global values for various ME0004C configuration variables (see **Sections 6.4** and **6.5** for variable descriptions). To rename a global configuration, type the new name into the "Modify Configuration Name" field—representing the dslGlobalNameModify variable—and click on the adjacent "Submit" button to copy this value to dslGlobalName.

To change a global configuration's settings, select the values you want and click on the "Submit" button below the table. If the new settings are valid, they will be accepted; the page will be reloaded and its table will continue to be headed with "Valid Configuration". If the new settings are invalid, they will be rejected (the settings will be returned to their factory-default values); the page will be reloaded and its table will be headed with "Illegal Configuration". (Either way, the configuration will be flagged as valid or invalid in the dslGlobalNameList variable.) The selected global configuration will contain the factory-default values until you submit valid settings. Even after a global configuration is defined or altered, the new or changed configuration is not applied to any of your ME0004C cards until you go to the System Level Information page (see **Section 5.5**) and click on the the "Apply System Configuration" button, or on the "Apply Rack Configuration" button for that card's rack chassis.

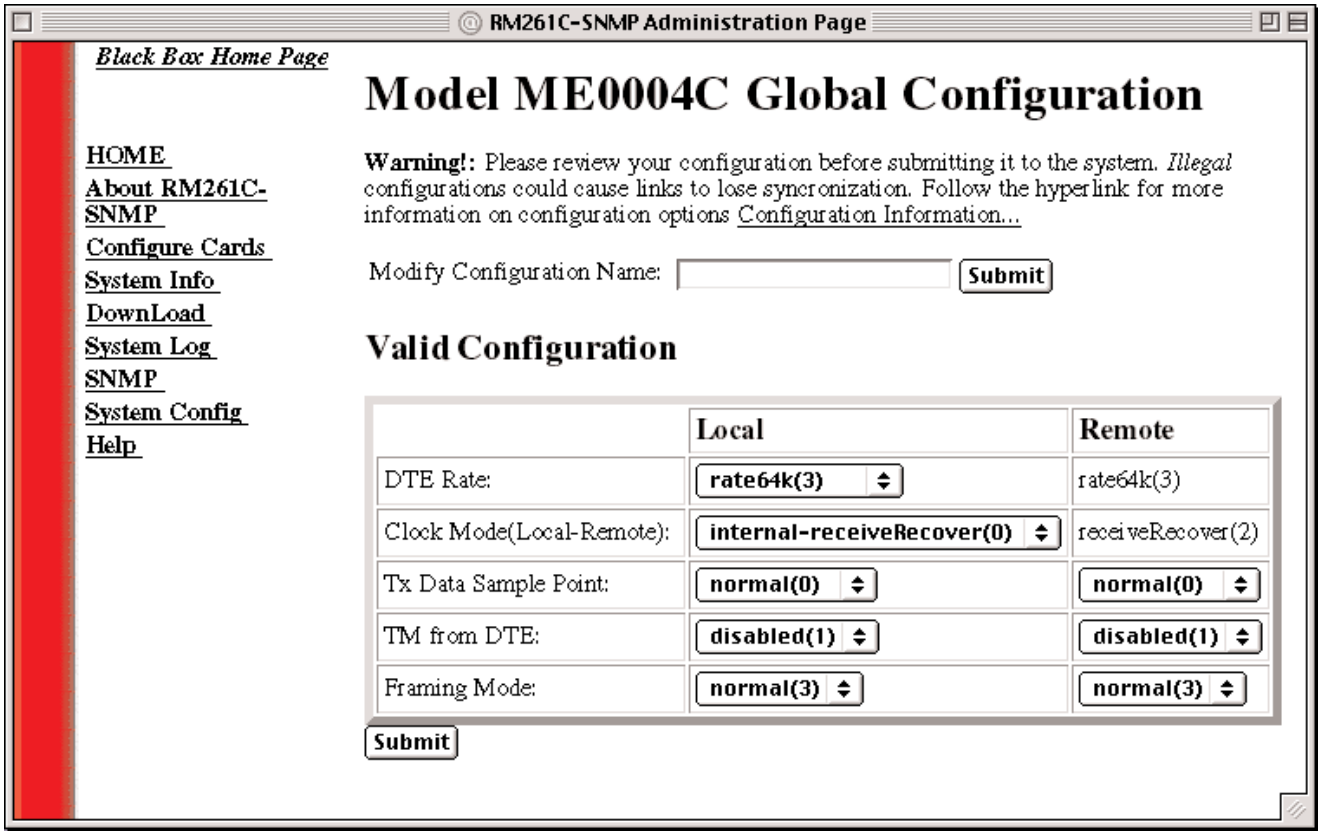


Figure 5-18. The Modify Global Configuration page.

5.15 The Download Pages: Firmware Upgrades for Your HDSL or mDSL Modems

The SNMP/HTTP Card can be used to download new firmware into the HDSL (ME0003C) and mDSL (ME0004C) modems installed in your MicroRACK. To upgrade the firmware of one of these modems (and only one modem at a time can be upgraded this way), first download the new code into the SNMP/HTTP Card as described in **Section 4.4**, then follow the instructions that appear on the Download page (shown in Figure 5-19) to download the firmware from the SNMP/HTTP Card to the modem.

Under the "Current Software Available" heading, you'll see some combination of "Model ME0004C", "Model ME0003C", and "ME0004C Key". These phrases are followed by the version number of the corresponding firmware; this version number is stored in the MIB variables model1095Soft for the ME0004C main firmware, model1094ASoft for the ME0003C main firmware, and model1095RCkey for the ME0004C firmware key.

To send one of these firmware files to the modem card prepared to receive it, click on the corresponding button: Download ME0004C Software, Download ME0003C Software, or Download ME0004C Key. (Don't download the ME0004C key unless a technical support technician tells you to do so.) When you click on this button, the softwareDownload variable will be set from "none(0)" to the type of firmware file you're downloading—"model1095RC(1)" for the ME0004C main firmware, "model1094ARC(2)" for the ME0003C main firmware, or "model1095RCKey(3)" for the ME0004C firmware key—and the download will begin.

Press the Cancel Download button here or on the Download Info page to set softwareDownload to "cancelDownload(4)" and abort any download in progress. If a download is canceled and the DIP switches on the modems being upgraded are returned to their normal positions, the modems will continue operating using the previous version of their firmware.

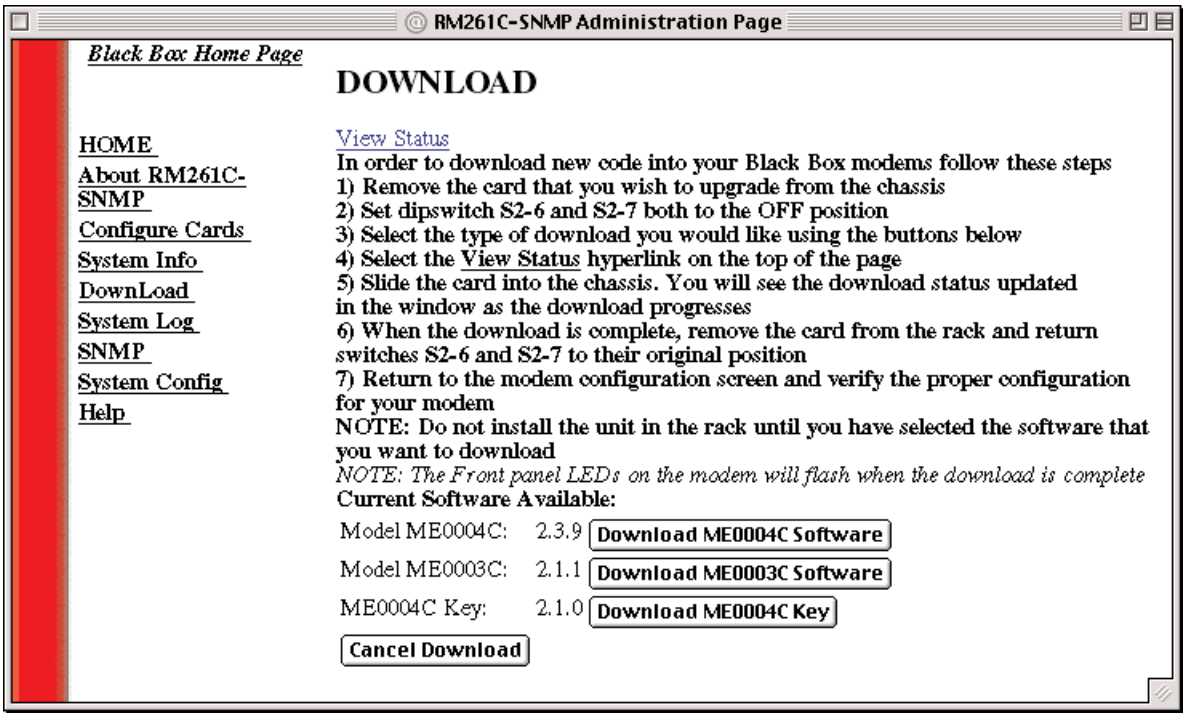


Figure 5-19. The Download page.

After you begin downloading the new firmware, click on the "View Status" hyperlink to bring up the Download Info page, shown in Figure 5-20. Download Info will show you the progress of the download. Here are the components on this page:

Download Size (downloadSize): The size of the firmware file in bytes.

Bytes Sent (downloadBytes): The number of bytes of the firmware file that have been sent up to the current point in the download.

Download Status (downloadStatus): Whether the download hasn't started [noDownload(0)], is waiting for a response [waitingForCard(1)], is in progress [downloadInProcess(2)], has finished [downloadComplete(3)], or has been canceled [downloadCanceled(4)].

The **percentage indicators**—controlled by a ten-bit downloadProcess variable—turn blue to show you how much of the firmware file, in percentage terms, has been downloaded so far.

Cancel Download: Click on this button to set softwareDownload to "cancelDownload(4)" and abort any firmware download in progress. The modem card that was receiving the canceled upgrade will continue to use the same firmware it was using before; the incomplete file will be discarded.

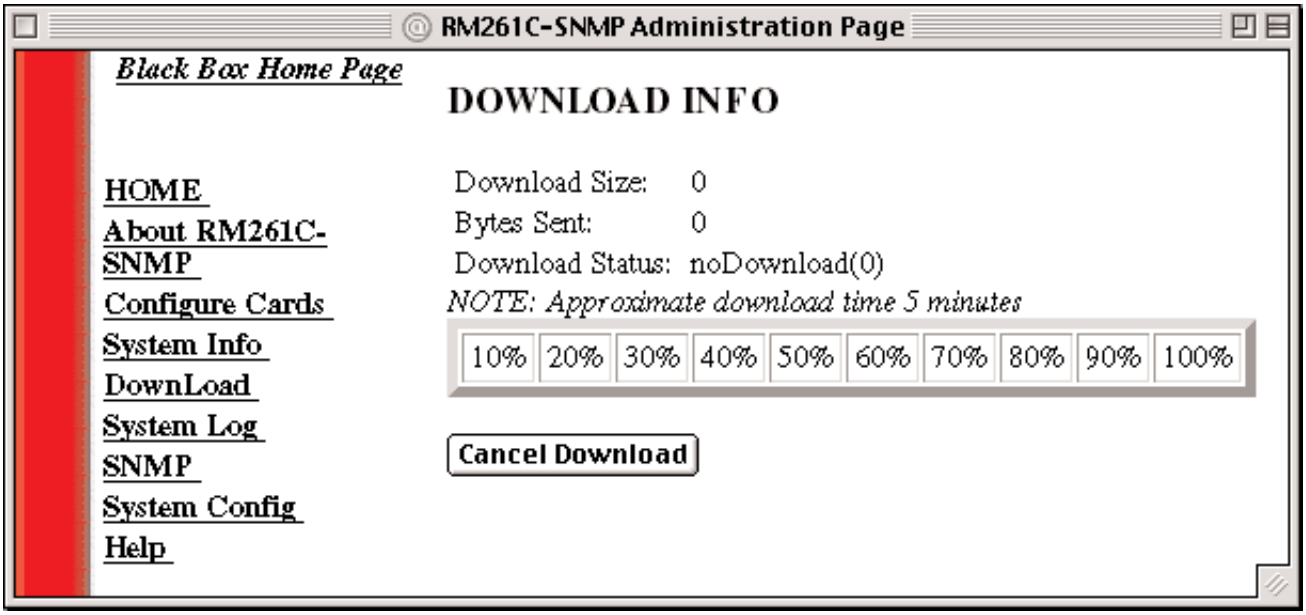


Figure 5-20. The Download Info page.

6. Using the Card to Manage MicroRACK-Compatible DSL Modems

This chapter describes how to use the SNMP/HTTP Card to manage a local DSL card installed in the 16-Port Managed MicroRACK and its corresponding remote DSL card or standalone DSL modem. At the time of this writing, there are three main varieties of DSL cards and matching standalone modems that can be managed this way:

- The IDSL cards (ME0001C product codes) and standalones (ME0002A and ME0009A product codes).
- The HDSL cards (ME0003C product codes) and standalones (ME0006A and ME0007A product codes).
- The mDSL cards (ME0004C product codes) and standalones (ME0005A and ME0008A product codes).

This information supplements the information in the manual for your DSL card or modem. With the SNMP/HTTP Card, you can manage this DSL equipment using their proprietary MIBs, the SNMP/HTTP Card's HTML management pages, or (with mDSL remote modems only) automatic remote management.

6.1 Introduction to the DSL Cards/Modems

6.1.1 Features

Here are some important features of the MicroRACK-compatible DSL cards and standalone modems:

- Manageable through the SNMP/HTTP Card, like other function cards, with either SNMP software or the SNMP/HTTP Card's HTML management pages and a standard Web browser.
- Support firmware upgrades through the SNMP/HTTP Card's download function.
- The mDSL cards and modems also support automatic remote management for easy startup of remote modems.
- DSL distances on just two wires.
- A full range of DTE speeds:
  - IDSL models: 19.2, 32, 56, 64, or 128 kbps. (The IDSL models need to use their default DTE rate of 64 kbps for initial configuration.)
  - HDSL models: Multiples of 64 kbps up to 1.152 Mbps.
  - mDSL models: Multiples of 64 kbps up to 2.3 Mbps.
- Internal, external, or receive-recover clocking.

6.1.2 Description

The DSL cards and standalone modems were developed to meet the needs of Internet service providers (ISPs), Incumbent Local Exchange Carriers (ILECs), Inter-Exchange Carriers (IXCs), and post/telephone/telegraph companies (PTTs) that must achieve affordable broadband transmission over the existing copper infrastructure. As symmetric DSL modems, all of the MicroRACK-compatible DSL cards and standalones offer the same data rates in both directions over a single pair of regular telephone lines using Carrierless Amplitude and Phase (CAP) modulation. They're available for a huge range of site-equipment interfaces, including Ethernet, V.24/RS-232, V.35, RS-422/530, G.703, and X.21. Line connection is made through an RJ-45 jack.

When a standalone DSL modem of one of these models is coupled with a matching DSL card installed in a 16-Port Managed MicroRACK, both the DSL card and the standalone are fully SNMP manageable. SNMP management can be performed on both the local and remote modems using a standard SNMP network-management station (NMS) or by using a standard Web browser and the SNMP/HTTP Card's built-in Web server. You can view and change configuration variables, view statistical variables, and view error and warning indications in the pages described for those functions in **Chapter 5**. With the mDSL models, you can also take advantage of automatic remote management; see **Section 6.2.3**.

6.1.3 Configuration and Management

The only hardware setting that *has* to be done on your DSL modems is their initial MicroRACK system address, which is handled through an 8-position DIP switch on the local DSL card as described in **Section 6.2**. (We also recommend that you set your DSL cards, and all of your other function cards, to connect frame ground and signal ground, as the Note at the beginning of **Section 6.2** says.) Beyond that, the remainder of this chapter describes how to configure and manage MicroRACK-compatible DSL modems using the HTML management pages in your SNMP/HTTP Card's internal Web server. If you plan to manage your modems using a standard network-management station (NMS), you can download the necessary proprietary MIBs by following the appropriate links on the SNMP/HTTP Card's internal SNMP page.

You can set communication parameters for your DSL modems using either the SNMP/HTTP Card or the modems' other DIP switches. (The mDSL modems also support automatic remote management, which is described in more detail in **Section 6.2.3**.) Communication setup using the modems' DIP switches is not described in this manual; please refer to your modems' manuals for information about it.

NOTE

Some examples of configuration settings in the following sections assume a "central office to customer premises" application in which a DSL card installed in the MicroRACK (set for internal or external clock) is communicating with a standalone modem (set for receive-recover clock). If your application is different, additional information might be needed to complete your setup; call Black Box Technical Support if this turns out to be the case.

6.2 Hardware-Based Configuration: Setting the Address Switch

NOTE

The SNMP/HTTP Card uses the MicroRACK's internal bus to communicate with your modems. To ensure a reliable connection between the SNMP/HTTP Card and your DSL cards (and other function cards), we strongly recommend that you set the rear cards of all of your function cards so that frame ground (FGND) is connected to signal ground (SGND) through a 100-ohm resistor. Refer to your function cards' manuals for information about how to do this.

An 8-position DIP switch (the "address switch," labeled "S1" on your mDSL or HDSL cards or "S2" on your IDSL cards) is used to set the address of each modem pair in the MicroRACK system. You need to make sure that each of the modem pairs connected to a particular MicroRACK chassis has a unique shared address by setting this switch carefully on the local DSL card; this address will automatically be passed to the remote modem that the DSL card is communicating with, so that the pair of modems will share the address. The SNMP/HTTP Card will then use this address as the basis for polling the MicroRACK system, as described in **Section 6.2.1**. Assign a pair of modems a specific address by manually setting the address switch on the local card as detailed in **Section 6.2.2**. Remote standalone modems normally ignore the setting of this switch, except that on the remote mDSL modems, you can set all of the address-switch positions to ON in order to have it self-configure using automatic remote management, as described in **Section 6.2.3**.

6.2.1 Polling and the Address Range

The SNMP/HTTP Card sends "poll" messages along the internal bus looking for function cards installed in the system. Once a card is found it is "brought online," so that communication with the management station can begin. If the address of a modem card is not configured or does not match the address range of the rack that it is installed in, the SNMP/HTTP Card might not recognize the modem card. The address range that is polled is determined by the configuration of the system; it will start with address #1 and continue up to the value of the Total System Slots Available (totalConfigSlots) variable. (This variable appears on the SNMP/HTTP Card's HOME page; see **Section 5.3**.)

If a function card's address is set outside the range of this polling area, the Card will never send the card a poll command and the card will never come online. As in most networking environments, if two cards are both given the same address, they will both respond to the same command, causing conflicts on the MicroRACK's internal bus. If two cards are set to the same address, an error will be displayed on the Card's System Log (Syslog) page (see **Section 5.9**) reading "Possible Address Conflict: Slot xx". (Note that this is not the only cause for this type of error.) In general, the system administrator must make sure that the software configuration within the SNMP/HTTP Card matches the actual hardware configuration of the system.

Here's how this automatic polling works: The SNMP/HTTP Card uses the number of power supplies in the system to determine what the address range of the individual MicroRACKs will be. The number of power supplies installed in each rack is entered on the Card's Modem Information page (see **Section 5.6**). If a rack chassis is identified as having two power supplies installed, the Card will automatically set the chassis' number of Slots Available (also displayed on the Modem Information page) to 13. If a rack chassis is identified as having a single power supply installed, the Card will automatically set the number of Slots Available in the chassis to 15.

Using this information, the SNMP/HTTP Card will poll the specified address range in each rack. Thus, if rack #1 in your system (the one that the SNMP/HTTP Card is installed in) is using a single power supply, its address range will be from 1 to 15. (Keep in mind that SNMP/HTTP Cards are always address 0 [zero], and Control Modules [RM262C] don't need an address at all.) In a daisychained system, after deriving these address numbers for rack #1, the Card will then begin polling rack #2 through its RS-232 daisychain port,

numbering rack #2's slots starting with address 16, and so on. Similarly, if rack #1 has redundant power supplies, its address range will be from address 1 to 13, and in a daisychain the Card will start numbering rack #2's slots starting with address 14.

In a daisychain, when you disable a daisychained MicroRACK, its addresses will be skipped when the SNMP/HTTP Card polls the system. If a power supply is removed from or added to a rack chassis, the addressing for that chassis will not change unless you make the change through the SNMP/HTTP Card's Web pages. This allows easy service of the power supplies.

If all of the bits of the address switch are set to the "ON" position on a local DSL card, the DSL card will run completely from its DIP-switch configuration, ignoring the presence of any control cards. This can be useful for testing DSL circuits independently of the management system. If a specific address is set on this switch instead, the DSL card will boot from its stored flash configuration and begin looking for poll commands from the SNMP/HTTP Card.

6.2.2 Setting the Address Switch for a Specific Address

The address switch allows an 8-bit address to be assigned to a link. The following rules apply to setting the address. Bit 8 is the least significant bit. A bit set to "ON" is considered a "0". A bit set to "OFF" is considered a "1". We suggest that you set addresses this way: Starting by assigning address #1 to the card in slot #1 at the far left of your rack chassis (farthest away from the power supplies) and increment the address numbers by one as you go from left to right, so that the cards in slots #1 through 13 have addresses 1 through 13 respectively. The SNMP Card in slot #14 will have address 0 (zero). Any cards in slots 15 and 16 should be assigned addresses 14 and 15. (Power supplies and Control Modules [RM262C] don't have addresses.) Setting the addresses this way will make configuration easier as you start using the SNMP/HTTP Card's HTML management pages. Table 6-1, below and on the next page, shows how to set the address switch; Table 6-2 on the next page shows some sample addresses. The maximum address that can be assigned to any slot is 128 decimal (80 hex); address settings higher than this will cause the modem card never to be polled by the system. The 255 decimal/FF hex setting (all positions ON) is reserved for other purposes (see **Sections 6.2.1** and **6.2.3**).

Table 6-1. Setting the address switch.

Upper nybble of address:	Position 1	Position 2	Position 3	Position 4
Lower nybble of address:	**Position 5**	**Position 6**	**Position 7**	**Position 8**
0 decimal/hex	ON	ON	ON	ON
1 decimal/hex	ON	ON	ON	OFF
2 decimal/hex	ON	ON	OFF	ON
3 decimal/hex	ON	ON	OFF	OFF
4 decimal/hex	ON	OFF	ON	ON
5 decimal/hex	ON	OFF	ON	OFF
6 decimal/hex	ON	OFF	OFF	ON
7 decimal/hex	ON	OFF	OFF	OFF
8 decimal/hex	OFF	ON	ON	ON
9 decimal/hex	OFF	ON	ON	OFF
10 decimal/A hex	OFF	ON	OFF	ON

Table 6-1. Setting the address switch (continued).

Upper nybble of address:	Position 1	Position 2	Position 3	Position 4
Lower nybble of address:	**Position 5**	**Position 6**	**Position 7**	**Position 8**
11 decimal/B hex	OFF	ON	OFF	OFF
12 decimal/C hex	OFF	OFF	ON	ON
13 decimal/D hex	OFF	OFF	ON	OFF
14 decimal/E hex	ON	OFF	OFF	ON
15 decimal/F hex	ON	OFF	OFF	OFF

Table 6-2. Sample address settings.

Address:	Pos. 1	Pos. 2	Pos. 3	Pos. 4	Pos. 5	Pos. 6	Pos. 7	Pos. 8
1 decimal/hex	ON	ON	ON	ON	ON	ON	ON	OFF
2 decimal/hex	ON	ON	ON	ON	ON	ON	OFF	ON
16 decimal/10 hex	ON	ON	ON	OFF	ON	ON	ON	ON
35 decimal/23 hex	ON	ON	OFF	ON	ON	ON	OFF	OFF
181 decimal/B5 hex	OFF	ON	OFF	OFF	ON	OFF	ON	OFF

6.2.3 Setting the Address Switch for Automatic Remote Management (mDSL Modems Only)

If you set up mDSL modems (ME0004C and ME0008A) to take advantage of automatic remote management, you can forgo configuring the standalone remote modem until after it's installed. If you are an ISP or other company who is providing standalone DSL equipment to your customers, this means that there is *no configuration required* before you ship a standalone remote modem to a customer, except to set all of the positions of its address switch to "ON." This will allow the remote standalone modem to link up with the local mDSL card using its default communication settings. Once this is done, the remote modem will automatically copy its entire configuration from the local mDSL card, which you would have previously configured through the SNMP/HTTP Card or your network-management station.

When the remote modem is set for automatic remote management, it will power up and default to the receive-recover clocking mode. As it is handshaking with the local mDSL card, the local card will pass the DTE rate across the link to the remote modem. Then the modems will link at that DTE rate. (Before the link is made, you can use the SNMP/HTTP Card or your network-management station to set up the communication parameters that the modem pair will be using for that link, with the restriction that the local mDSL card *must* be set for either internal or external clocking. This is because the remote modem will default to the receive-recovered clocking mode, and the link won't function if the local mDSL card is also set for receive-recovered clocking.) After the link is made, the remote modem will copy its remaining (non-link-related) configuration parameters (those that aren't related to its link with the local mDSL card) from the local card.

6.3 Firmware-Based Configuration Using the SNMP/HTTP Card's Management Pages

Most of the configuration for your local DSL cards and the corresponding remote modems will be done through the SNMP/HTTP Card's internal HTML management pages. In particular, you'll be making use of the Modem Configuration Status page (see **Section 6.4**) and the Next Configuration page (see **Section 6.5**). Referring to Figure 6-1, take these steps to navigate through the management pages to reach the Modem Configuration Status page:

1. Log into the Card. The HOME page will be displayed (see **Section 5.3**).
2. Click on "Configure Cards." The System Level Information page will be displayed (see **Section 5.5**).
3. Click on "View Rack *n*," where *n* is the number of the MicroRACK where the DSL card of the modem pair you want to configure is installed. The Modem Information page will be displayed (see **Section 5.6**).
4. Click on the "Model Code" field of the entry for the DSL card you're interested in. The Modem Configuration Status page will be displayed. As soon as you access this page, the selected modem pair is set to the online state and their current configuration is displayed.

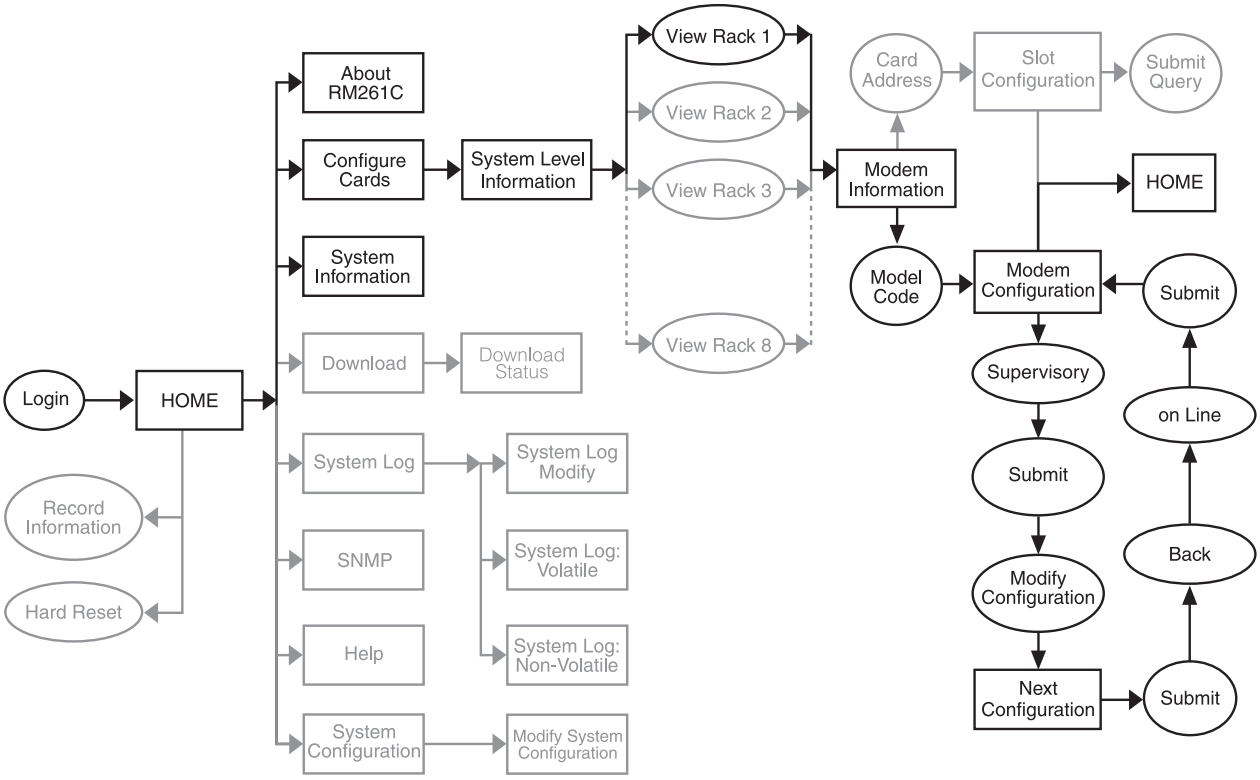


Figure 6-1. Navigation map for reaching the modem-configuration pages.

Once you have reached the Modem Configuration Status page, use the following steps to make configuration changes to the selected modems:

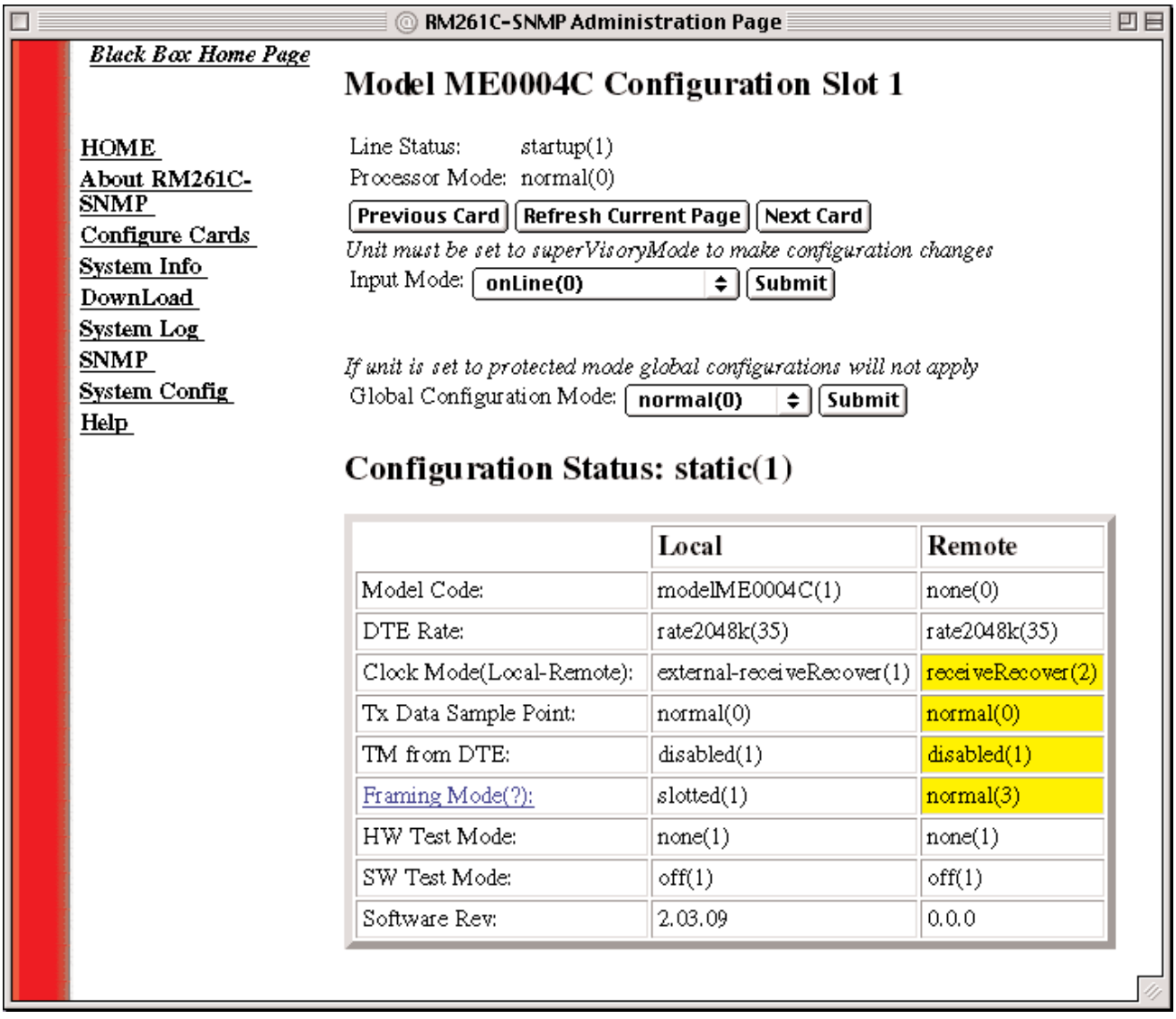
1. Change the Input Mode to "superVisoryMode". The "Modify Configuration" hyperlink will appear.
2. Click on "Modify Configuration." This hyperlink will take you to the Next Configuration or Update Configuration page.
3. Make your configuration changes or click on the "Set Default Configuration" button.
4. Click on the "Submit" button to place the changes into the SNMP/HTTP Card's temporary memory. If you decide that you do not want your changes implemented, you can select the "Clear Changes" button.
5. Click on the "Back…" hyperlink to return to the Modem Configuration Status page.
6. Change the Input Mode back to "onLine" (online) and click on the "Submit" button. Once the modem is set back to the online state, the DSL card will start the implementation of the configuration changes. Note that the variables that you changed are now highlighted in yellow. Once the DSL card "gets" the new information, the highlight is removed. After all of the configuration information has been obtained, the implementation will be completed by the modem pair.

6.4 The Modem Configuration Status Page

Figure 6-2 shows the Modem Configuration Status page. A description of each of the page's variables and controls follows.

NOTE

The names of many of the variables on this Web page and the Next Configuration or Update Configuration page will vary depending on which model of DSL modem you've selected. In this section and Section 6.5, "ME000*x*C" and "109*x*" will appear as "ME0001C" and "1092" for IDSL modems (ME0001C/ME0009A), "ME0003C" and "1094" for HDSL modems (ME0003C/ME0007A), or "ME0004C" and "1095" for mDSL modems (ME0004C/ME0008A).



	Local	Remote
Model Code:	modelME0004C(1)	none(0)
DTE Rate:	rate2048k(35)	rate2048k(35)
Clock Mode(Local-Remote):	external-receiveRecover(1)	receiveRecover(2)
Tx Data Sample Point:	normal(0)	normal(0)
TM from DTE:	disabled(1)	disabled(1)
Framing Mode(?):	slotted(1)	normal(3)
HW Test Mode:	none(1)	none(1)
SW Test Mode:	off(1)	off(1)
Software Rev:	2.03.09	0.0.0

Figure 6-2. The Modem Configuration Status page.

Model ME000*x*C Configuration Slot (nmsSlotID): The header of the page displays the address of the selected DSL card, as defined by the setting of the card's address switch (see **Section 6.2**). The remote standalone modem has no address specified, but uses the address of the rack card that it is connected to.

Line Status (lineStatus109*x*): Displays the status of the line between the local and remote modems. There are three possible values that can be displayed: "startup(1)", "dataMode(2)", or "testMode(3)". When the Line Status is dataMode(2), the modems are "linked up" and ready to send data.

Processor Mode (processorMode109*x*): Displays the status of the DSL card's processor. There are four values that are significant to you: "normal(0)", "internalProcessing(1)", "negotiating(2)", and "lineDown(3)". When the processor is in normal(0) mode, the DSL card is monitoring itself and sending the status information to the SNMP/HTTP Card. When the processor is in the internalProcessing(1) mode, it is either busy downloading code to the internal DSP or setting the data pump. When the processor is in the negotiating(2) mode, the card was just "brought online" and the DSL card is setting up the configuration parameters in the SNMP/HTTP Card. At startup, all of the fields will be highlighted in yellow, signifying that they are *not* verified parameters. As the DSL card sets up the parameters, the fields are changed to a white background to signify that the display matches the actual setting of the card.

Previous Card: Click this button to view the configuration of the card with the previous address in numeric sequence.

Refresh Current Page: Click this button to refresh this page if you've changed the configuration of this modem.

Next Card: Click this button to view the configuration of the card with the next address in numeric sequence.

Input Mode (mode109*x*): To make configuration changes to the DSL modems, you must first set this bit to "superVisoryMode(1)". When the Input Mode is set to superVisoryMode(1), a "Modify Configuration" hyperlink will appear on this page directly beneath the Input Mode line. When you click on the "Modify Configuration" hyperlink, the "Next Configuration" or "Update Configuration" page (see **Section 6.5**) will appear. After making your desired configuration changes on the Next/Update Configuration page, return to this page and set the Input Mode variable back to "onLine(0)". This will notify the SNMP/HTTP Card that the configuration has been completed, and will force it to copy the new configuration from your local "scratch memory" into the DSL modems' configuration space in the SNMP/HTTP Card's volatile memory. If this is not done, the configuration of the DSL modems will never actually be updated.

ME0004C cards only: **Global Configuration Mode (disableGlobalConfig):** As described in **Section 5.14**, ME0004C cards can be "protected" from being forced into global configurations if they require a different configuration. To protect a particular ME0004C card from global configurations, set this variable to "protected(1)" rather than "normal(0)" for that card.

The Configuration Status table shows the full communication configuration for the selected pair of modems. There is a column for both the local and remote modems. If a field is highlighted in yellow, this signifies one of two possible unknowns:

- At startup, the SNMP/HTTP Card will display a default configuration for the DSL card and all fields will be highlighted in yellow, notifying you that the information has not been verified. During the negotiation phase, the DSL card will update the configuration in the SNMP/HTTP Card with its most recent set of stored parameters. As these fields are updated in the SNMP/HTTP Card, the field background will change from yellow to white, signifying that the information has been updated.

- After the local and remote modems are linked, the modems will begin updating the remote information in the table, setting Line Status to "data-mode(2)". If a function card is installed in the rack without a corresponding remote modem being connected, the remote information will be left as either none or highlighted in yellow, notifying you that the information has not been verified.

Here's a list of the variables that are shown in the Configuration Status table. The MIB variable names are shown in parentheses with the local modem's MIB variable first, then a slash, then the remote modem's MIB variable. For example, "Parameter (localParameter/remoteParameter)".

Model Code [localModelCodeBB/remoteModelCodeBB]: These variables display the product codes ("model codes") of the local and remote modems at the specified address. Possible values for the local modem card are:

- "none(0)",
- "modelME0004C(1)",
- "modelME0001C(2)", and
- "modelME0003C(3)".

Possible values for the remote standalone modem or modem card are:

- "none(0)",
- "modelME0004C(1)",
- "modelME0008A-MCAMP(2)",
- "modelME0008A-ME1(3)",
- "modelME0008A-MT1(4)",
- "modelME0003C(7)",
- "modelME0007A(8)",
- "modelME0005A-10BT(9)",
- "modelME0005A-G703(10)",
- "modelME0005A-V35(11)",
- "modelME0005A-X21(12)",
- "modelME0006A-10BT(13)",
- "modelME0006A-G703(14)",
- "modelME0006A-V35(15)",
- "modelME0006A-X21(16)",
- "modelME0009A(19)",
- "modelME0001C(20)",
- "modelME0002A-10BT(21)",
- "modelME0002A-V35(22)", and
- "modelME0002A-X21(23)".

DTE Rate [dteRate109*x*]: This variable displays the DTE rate for the link. Because these DSL modems are symmetrical (same rate in both directions), there is only one MIB variable that defines the DTE rate. The possible values for this variable are described in **Section 6.5**.

Clock Mode (Local-Remote) [clockMode109*x*/remoteclockMode109*x* or (on ME0001C and ME0009A) clockModeIDSL/remoteclockModeIDSL]: This variable displays the clock source ("clock mode") for the local DSL card paired with that of the remote modem (for example, "internal-receiveRecover(0)") in the Local column, followed by the clock source of the remote modem only in the Remote column. The reason for this (and the possible values for this variable) are discussed in **Section 6.5**.

mDSL and HDSL models only: **Tx Data Sample Point [txdEdge109*x*/remotetxdEdge109*x*]:** These variables determine the sampling point that is used by the mDSL and HDSL modems to read data from the DTE. In most situations these should always be set to "normal(0)". In high-speed applications, some equipment that handles clocking in nonstandard ways will require an "inverted(1)" sampling point.

TM From DTE [dteTM109*x*/remotedteTM109*x*]: These variables determine whether the modems will accept test-mode requests from the DTE that's connected to the remote modem.When you're using modem cards whose rear cards have Ethernet interfaces that can't establish data loopbacks with the DTE, such as the ME0003C-10BT, ME0004C-10BT, etc., this variable must be set to "disable(1)". It should also be set to "disable(1)" for other models in normal applications. In most situations, if a DTE test mode is required, it should be enabled only during the time that the test is needed.

Framing Mode [framingMode/remoteFramingMode]: These variables tell the modems what type of framing they should use. In most situations, they should both be set to "normal(3)", but if either modem in a link is a G.703 E1 model, the variable for that modem should be set to "slotted(1)". Refer to the entry for this variable in **Section 6.5**.

HW Test Mode [testModeInd109*x*/remoteTestModeInd109*x*]: These read-only variables notify you whether the selected modem has been placed into a test mode through a hardware mechanism (either by the modems' front-panel switches, by a test-mode request from the modem at the other end of the link, or, if the feature is enabled, by test-mode requests sent from the DTE). When a test mode is displayed, the field will be highlighted in blue to give you quick notification. Possible settings you might see include:

- "none(1)"—no hardware test in progress;
- "lalFromDTE(2)"—local analog loopback triggered by the local DTE;
- "lalSwitch(3)"—local analog loopback triggered with the front-panel switch;
- "lal511Switch(4)"—local analog loopback with 511-bit BERT triggered with the front-panel switch;
- "rdlFromDTE(5)"—remote digital loopback triggered by the local DTE;
- "rdlSwitch(6)"—remote digital loopback triggered with the front-panel switch;
- "rdl511Switch(7)"—remote digital loopback with 511-bit BERT triggered with the front-panel switch;
- "rdl511ERSwitch(8)"—remote digital loopback with errored 511-bit BERT triggered with the front-panel switch;
- "rdlRemote(9)"—remote digital loopback triggered by the remote modem (the one at the other end of the link);
- "lal511ERswitch(10)"—local analog loopback with errored 511-bit BERT triggered with the front-panel switch;
- "switch511(11)"—511-bit BERT triggered with the front-panel switch; and
- "switchER511(12)"—errored 511-bit BERT triggered with the front-panel switch.

SW Test Mode [testModeSet109*x*/remoteTestModeSet109*x*]: These variables notify you whether the selected modem has been placed into a test mode through a "software" mechanism (that is, through the SNMP/HTTP Card). You can place a modem into a test mode at the Next/Update Configuration page (see **Section 6.5**).

Software Rev [softVersion109*x*/remoteSoftVersion109*x*]: These read-only variables display the current version of code that is running in the selected DSL modems. At anytime, you can check the SNMP/HTTP Card's Download page (see **Section 5.15**) to see if there's a newer version of code available for downloading. Through the Download page, you can update the software that is running in the local DSL card. You can also update the software in the corresponding remote standalone modem through the modem's front-panel control port; this can't be done across the link through the DSL card, however.

6.5 The Next Configuration or Update Configuration Page

The Web page shown in Figure 6-3 on the next page, titled "Update Configuration" for the HDSL modems or "Next Configuration" for the other models, allows you to update the configuration of the DSL modems that are installed in the MicroRACK system. The configuration displayed on this page is initially the same active configuration as the one displayed on the Modem Configuration Status page (see **Section 6.4**). After making changes to the configuration on this page, click on "Back..." to return to the Modem Configuration Status page, then change the Line Status to "onLine", and finally, click on "Submit". This will send the new information from the "scratch memory" on the computer where you're viewing this Web page to the SNMP/HTTP Card over the network.

NOTE

If the DSL modems are not connected to each other at the time of the configuration changes, any changes made to the remote modem's configuration will be lost after the modems link up. All parameters in the Local column can be changed at any time and will take effect in the local DSL card immediately.

The variables on this page are all of the user-settable ones from the Modem Configuration Status page, but we will list the ones from the Configuration Status table (headed "Next Configuration" on this Web page) again following Figure 6-3, with added emphasis on changing their settings.

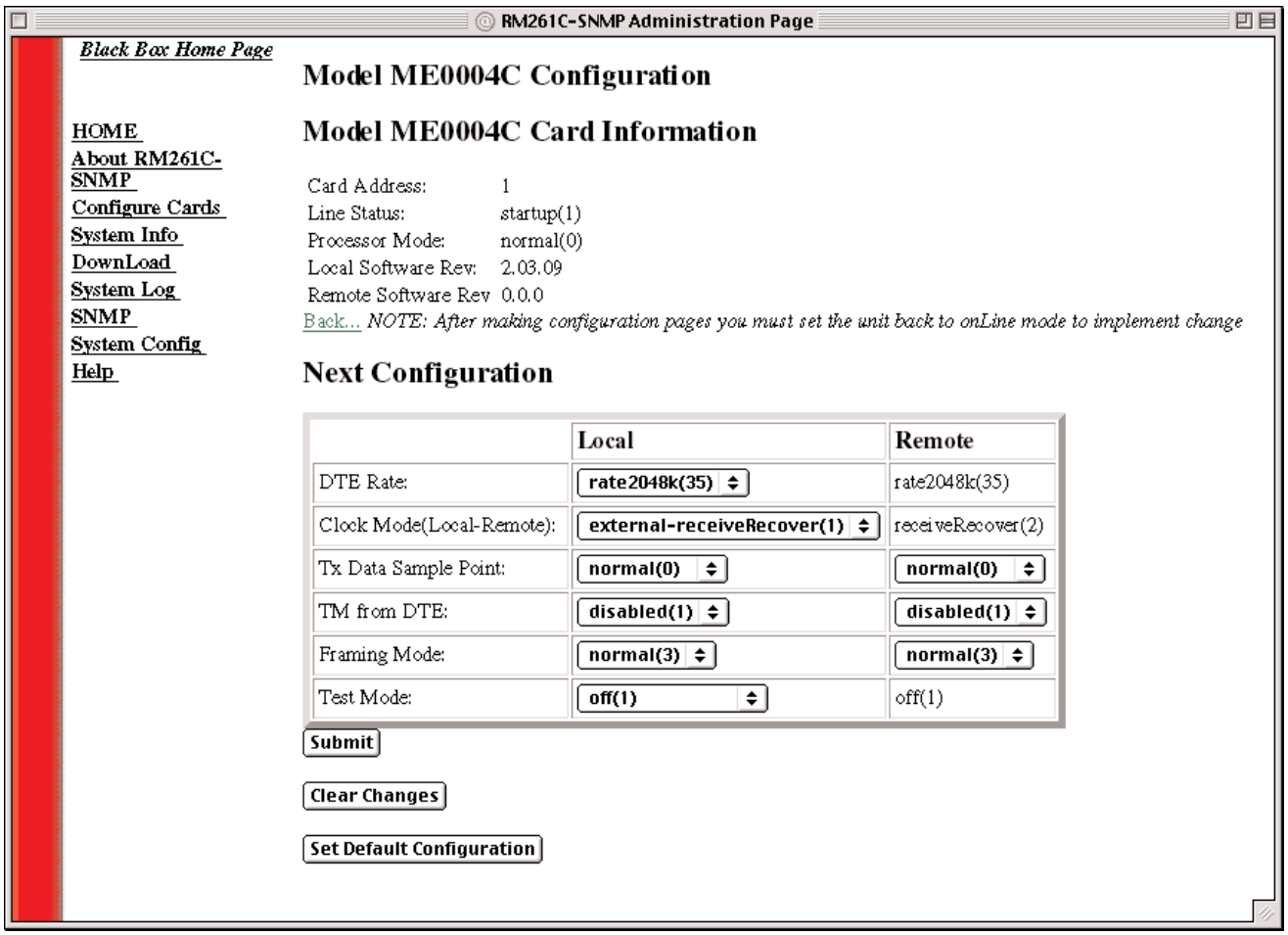


Figure 6-3. The Next Configuration page.

The Next Configuration table shows the configurable variables for the selected pair of DSL modems. There is a column for both the local and remote modems. Sometimes a single variable applies to both the local and remote modems, in which case there's a single configuration field in the Local column and the Remote column is a read-only field. After you finish making your changes, click on the "Submit" button at the bottom of the table and then set the Input Mode back to "onLine(0)" in the Modem Configuration Status page. Here are the variables that appear in this table:

DTE Rate [dteRate109x]: This variable displays the DTE rate for the link between the local and remote modems. Because the DSL modems are symmetrical (same rate in both directions), there is only one MIB variable that defines the DTE rate. The remote modem will automatically update its configuration to the DTE rate that is set here. The possible values are multiples of 64 kbps and range from "64k(3)" to "2304k(39)". (Index number "(27)" is skipped; "1536(26)" is followed by "1600"(28)".)

mDSL models: When you're using automatic remote management (see **Section 6.2.3**), this variable can be changed at any time, even before the modems are linked up.

HDSL models: Both modems must be set to the same data rate, or they won't be able to link up. In particular, at initial bootup, the local card should be left set to its default DTE rate of 64 kbps, which is what the remote modem will default to; later you can set both the local and remote modems to a different rate.

Clock Mode (Local-Remote) [clockMode109*x*/remoteclockMode109*x* or (on ME0001C and ME0009A) clockModeIDSL/remoteclockModeIDSL]: This variable determines the clock source ("clock mode") for the local DSL card followed by that of the remote modem. Local/remote clock-source pairs (for example, "internal/receive-recovered" or "external/receive-recovered") are displayed as a single variable in the Local column; the Remote column displays a read-only field showing the remote modem's clock source. This was done to prevent the modems from being configured with clock-source pairings such as "internal/internal" that don't work. Valid settings for clockMode (the local/remote pair) include:

- "internal-receiveRecover(0)"—local uses internal clock, remote uses receive-recovered clock;
- "external-receiveRecover(1)"—local uses external clock, remote uses receive-recovered clock;
- "receiveRecover-internal(2)"—local uses receive-recovered clock, remote uses internal clock; and
- "receiveRecover-external(3)"—local uses receive-recovered clock, remote uses external clock.
- "external-external(4)"—both use external clock; valid only when both modems have G.703/704 E1 interfaces (for example, if you have a local ME0004C-G703 and a remote ME0005A-G703).

The settings you'll see for remoteclockMode (just the remote clock) are "internal(0)", "external(1)", and "receiveRecover(2)".

NOTE

***mDSL modems only:* The mDSL modems are ideal for a standard central-office/customer-premise application. This application requires that the local mDSL card be configured for either internal or external clocking. When the corresponding remote standalone modem is set to use automatic remote management (see** Section 6.2.3**), at bootup it will default to using receive-recover clocking and to communicating at the DTE rate specified by the local DSL card. When this clocking configuration is followed, the DTE rate can be changed on the DSL card regardless of whether or not the remote modem is linked to it at the time of the change.**

mDSL and HDSL models only: **Tx Data Sample Point [txdEdge109*x*/remotetxdEdge109*x*]:** These variables determine the sampling point used by the mDSL and HDSL modems to read data from the DTE. In most situations these should always be set to normal(0). In high-speed applications, some equipment that handles clocking in nonstandard ways will require an inverted(1) sampling point.

TM From DTE [dteTM109*x*/remotedteTM109*x*]: These variables determine whether the modems will accept test-mode requests from the DTE that's connected to the remote modem. When you're using modem cards whose rear cards have Ethernet interfaces that can't establish data loopbacks with the DTE, such as the ME0003C-10BT, ME0004C-10BT, etc., this variable must be set to "disable(1)". It should also be set to "disable(1)" for other models in normal applications. In most situations, if a DTE test mode is required, it should be enabled only during the time that the test is needed.

Framing Mode [framingMode/remoteFramingMode]: These variables tell the modems what type of framing they should use. For most models, the framing mode should be set to "normal(3)" at both ends. But because the G.703 E1 interface is "timeslot-aware," if you have a local ME0004C-G703 card, you need to set the local framing mode to "slotted(1)" (and make sure the clock mode, described above, is set to either "external-receiveRecover(1)" or "external-external(4)"). You should set the remote framing mode to "slotted(1)" (and the clock mode to "receiveRecover-external(3)" or "external-external(4)") if you have a remote ME0004C-G.703 or ME005A-G703.

Test Mode [testModeSet109*x*/remotetestModeSet109*x*]: These variables allow you to place the selected modem into and out of any of several software-mediated test modes:

- "off(1)"—end any software-mediated test in progress and return the modem to normal operation;
- "five11(2)"—begin a V.52-compliant 511-bit BERT;
- "five11er(3)"—begin a V.52-compliant errored 511-bit BERT;
- "lal(4)"—begin a V.54-compliant local analog loopback test;
- "lalwith511(5)"—begin a local analog loopback test with 511-bit BERT;
- "lalwith511er(6)"—begin a local analog loopback test with errored 511-bit BERT;
- "rdl(7)"—begin a V.54-compliant remote digital loopback;
- "rdlwith511(8)"—begin a remote digital loopback with 511-bit BERT; and
- "rdlwith511er(9)"—begin a remote digital loopback with errored 511-bit BERT.

The BERT tests are V.52-compliant and the loopback tests are V.54-compliant. For more information on these test modes, please see the corresponding sections of the manual for the selected modem.

Submit: After you finish making your configuration changes, click on the "Submit" button at the bottom of the table. This will submit all the configuration information to the SNMP/HTTP Card for storage in the Card's volatile RAM. Then click on "Back..." to return to the Modem Configuration Status page, set the Input Mode back to "onLine(0)", and click on "Submit" there. This will tell the SNMP/HTTP Card to copy all of the configuration information from "scratch memory" on the computer where you're viewing this Web page into the DSL configuration space in the SNMP/HTTP Card's memory.

Clear Changes: If you decide not to implement a set of configuration changes after you've already made them and clicked on the "Submit" button, click on the "Clear Changes" button. This will set the configuration back to the settings that were in effect when this page was accessed.

Set Default Configuration: Clicking on this button will restore the factory-default configuration to the Next Configuration table. You must then follow the same sequence to submit and store the default configuration as if you had manually set up the configuration yourself.

7. Troubleshooting

7.1 Calling Black Box

If you determine that your SNMP/HTTP Card is malfunctioning, *do not attempt to alter or repair it.* It has no user-serviceable parts. Contact Black Box Technical Support at 724-746-5500.

Before you do, make a record of the history of the problem. We will be able to provide more efficient and accurate assistance if you have a complete description, including:

- the nature and duration of the problem;
- when the problem occurs;
- the components involved in the problem;
- any particular application that, when used, appears to create the problem or make it worse; and
- the results of any testing you've already done.

7.2 Shipping and Packaging

If you need to transport or ship your SNMP/HTTP Card:

- Package it carefully. We recommend that you use the original container.
- Before you ship the unit back to Black Box for repair or return, contact us to get a Return Authorization (RA) number.

NOTES

NOTES

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