BLACK BOX®
NETWORK SERVICES

RMU9700-SNMP
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SNMP Management Module Access Rack

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About This Guide

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Audience

This Operations Manual is intended to be used by qualified systems administrators and network engineers to successfully configure and manage the Black Box SNMP Management Module and modems. Knowledge of basic networking concepts is assumed.

Preview of this Operations Manual

Chapter 1, "Introduction" provides a general description of the SNMP Management Module, including product features, terminology descriptions, product applications, connections, LED descriptions and product specifications.

Chapter 2, "Getting Started" provides a description of how the SNMP Management Module works, how to set and save initial operating parameters, as well as a general introduction to system management.

Chapter 3, "Using The Internal HTML Management Pages" provides a description of the SNMP Management Module's internal HTTP/HTML management pages.

Documentation Conventions

Table A-1. Documentation Conventions

Convention	Meaning
Bold Helvetica Text	Describes configuration commands or parameters that you may enter or change to configure the SNMP Management Module.
NOTE:	Denotes important additional information.
WARNING!	Means that a failure to take appropriate safety measures could result in physical injury.
Application Tips!	Denote helpful hints that could aid in SNMP Management Module operation or troubleshooting.
(snmpVariable)	Denote SNMP or Patton Enterprise MIB Variables

Compliance Information

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

Radio and TV Interference

The SNMP Management Module generates and uses radio frequency energy, and if not installed and used properly—that is, in strict accordance with the manufacturer's instructions—may cause interference to radio and television reception. The SNMP Management Module has been tested and found to comply with the limits for a Class A computing device in accordance with the specifications in Subpart J of Part 15 of FCC rules, which are designed to provide reasonable protection from such interference in a commercial installation. However, there is no guarantee that interference will not occur in a particular installation. If the SNMP Management Module does cause interference to radio or television reception, which can be determined by disconnecting the unit, try to correct the interference by one or more of the following measures: moving the computing equipment away from the receiver, re-orienting the receiving antenna and/or plugging the receiving equipment into a different AC outlet (such that the computing equipment and receiver are on different branches). In the event you detect intermittent or continuous product malfunction due to nearby high power transmitting radio frequency equipment, take the following steps: use only data cables with an external outer shield bonded to a metal or metalized connector; and, configure the rear card.

RFCs

You may use a World Wide Web browser to find online copies of the following Request for Comments (RFC).

RFC 1643, *Definitions of Managed Objects for the Ethernet-like Interface Types*
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*

Introduction

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Features

- Allows one SNMP workstation to manage multiple Black Box racks
- Fully manageable using HTTP/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 Black Box rack cards and their remote standalone units
- Hot Swappable installation–uses one slot on a Black Box Rack System
- FLASH upgradeable through ftp connection
- User selectable traps on a per-card basis

General Description

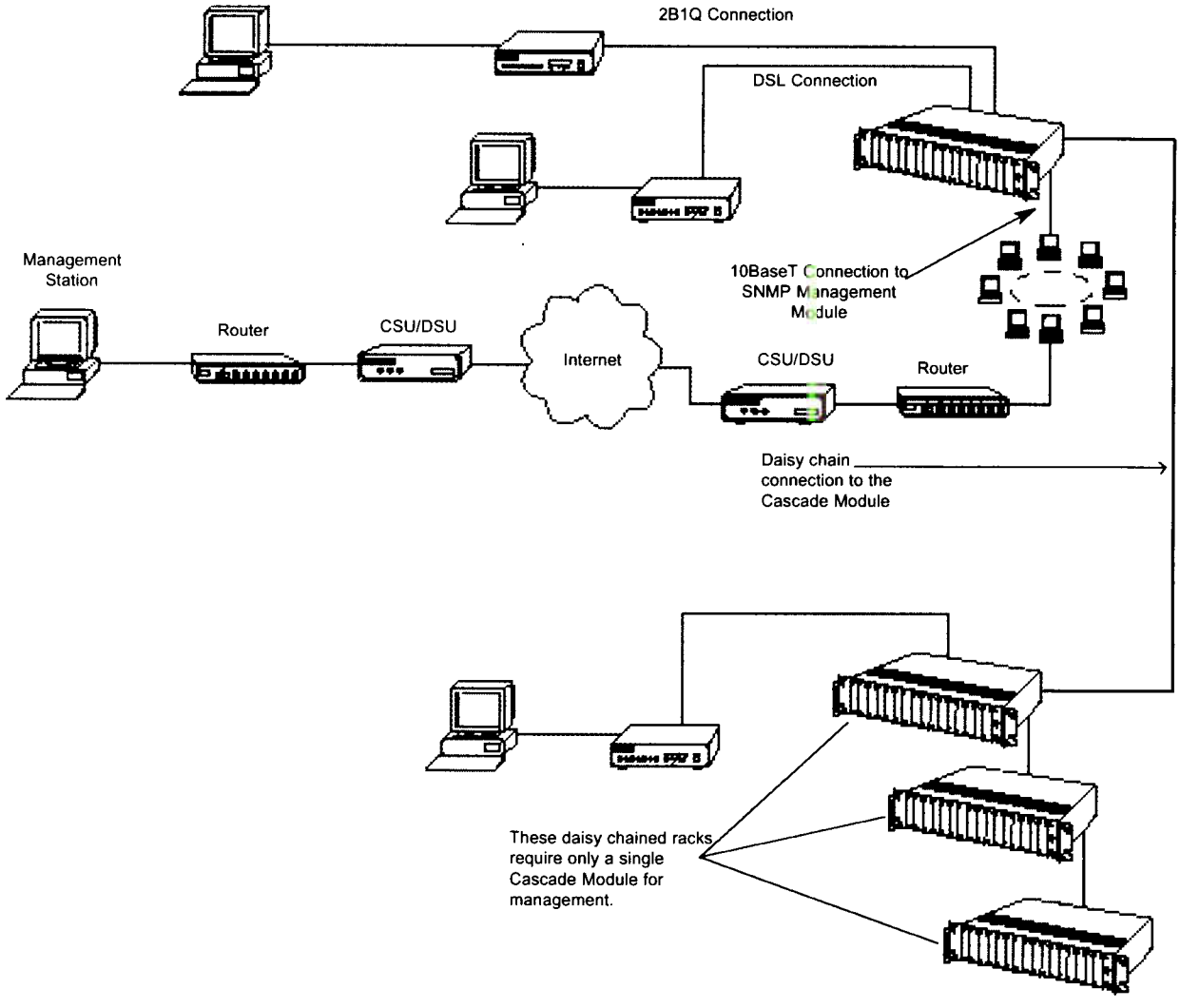
The **Black Box SNMP Management Module Network Management Card** allows an SNMP workstation to configure and monitor multiple Black Box racks full of cards, plus their connected standalone units! Designed to work with Black Box's rack cards, the Black Box SNMP Management Module supports generic SNMP management software and MIB walking tools. Or use a standard web browser (Internet Explorer™ or Netscape™) and the embedded HTTP/HTML management screens.

The Black Box SNMP Management Module connects to an SNMP workstation using an Ethernet (10BaseT) link. The Ethernet (modular RJ-45) port on the SNMP Management Module may also be used for FLASH software upgrades by making a ftp connection to the unit.

SNMP Management Module Management Solution

The SNMP Management Module uses a 10BaseT Ethernet port to connect to a local LAN or to anywhere in the world via the internet. Management can be performed using any standard SNMP station or using a standard web browser with the internal HTTP/HTML management screens. As shown in Figure 1-1 below, the SNMP Management Module can manage multiple racks of Black Box modems using a simple daisy chain connection and a Cascade Module in each additionally managed rack.

Figure 1-1. Network Management through a network using a 10BaseT Connection to SNMP Management Module



System Requirements

Before you can fully install and configure your SNMP Management Module please make sure you have these items available.

- A VT100 terminal or a VT100 terminal emulator for connection to the EIA-232 configuration port
- A Null modem or a Null modem cable to connect your VT100 terminal to the SNMP Management Module
- An Ethernet connection to your local LAN
- A locally connected workstation (e.g. PC) that you can use to PING and HTTP into the SNMP Management Module
- An IP address for the SNMP Management Module
- The network address space and netmask
- The IP address for the default gateway of your LAN

Checking the Contents

The following items are included at time of shipment. Please take a moment to account for the following items:

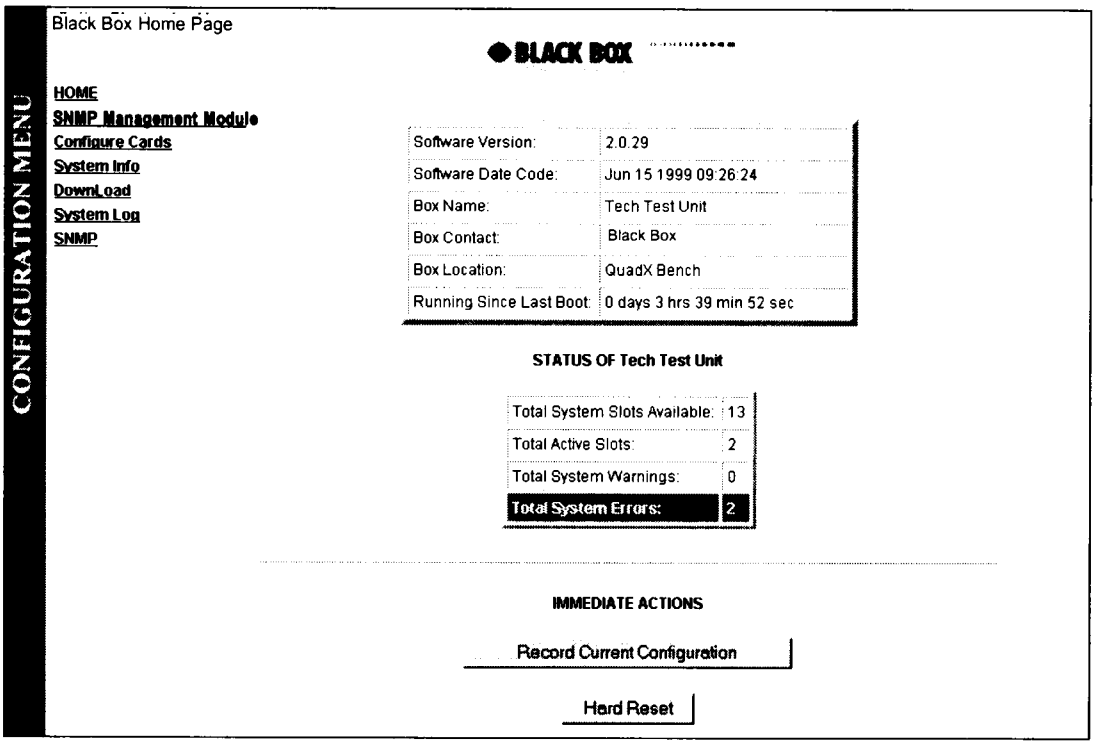
SNMP Management Module Contents

Quantity	Description
1	SNMP Management Module Front and Rear Card
1	Operations Manual

HOME

The HOME page is the first HTTP/HTML screen that you will reach after you log into the SNMP Management Module (See Figure 3-2, below). From the HOME page you may monitor the current system status, save any system changes or reset the system without powering off the rack system. Following Figure 3-2 is a description of each variable on the screen.

Figure 3-2. HOME Page



Making Connections

The SNMP Management Module fits into the Access Rack. The SNMP Management Module is designed to SNMP manage local Black Box rack cards and their remote counterparts. The Access Rack has fifteen short range modem card slots, plus its own power supply. Redundant power supplies are also available in the system. The SNMP Management Module can also manage up to seven more daisy chanined racks, and requires only a Cascade Module in each additional rack. Measuring only 3.5" high, Access Rack is designed to occupy only 2U in a 19" rack. Sturdy front handles allow the Access Rack to be extracted and transported conveniently.

Figure 1-2. Access Rack with Power Supply

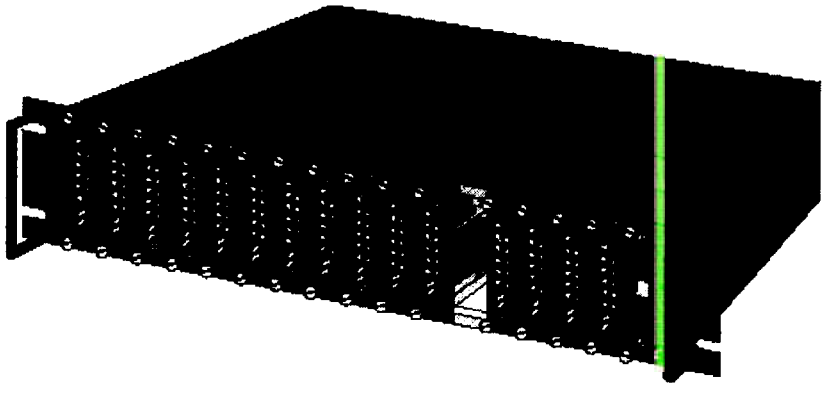
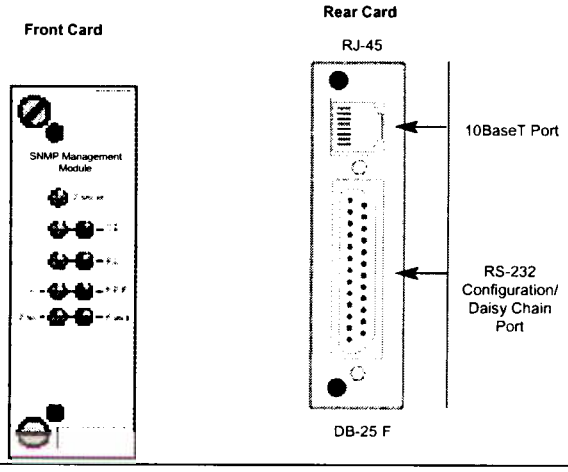


Figure 1-3, below, shows the SNMP Management Module front and rear panels. The following sections describe the rear card connections and front panel LED indicators.

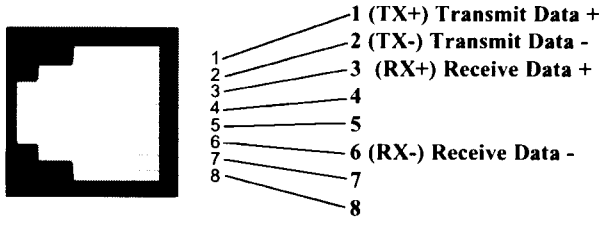
Figure 1-3. SNMP Management Module Front and Rear Panels



Connecting the 10BaseT Ethernet Port

The RJ-45 Ethernet port on the rear panel of the SNMP Management Module is designed to connect directly to a 10BaseT network. The diagram below shows the 10BaseT RJ-45 port pin description. Please refer to the instructions below when constructing cables to connect 10BaseT ports to the Black Box SNMP Management Module. You may make connections up to 330 feet using Type 4 or 5 cable.

Figure 1-4. SNMP Management Module 10BaseT Ethernet Port



Connecting a 10BaseT Hub to the SNMP Management Module

The Ethernet 10BaseT port on the rear of the SNMP Management Module is designed to connect directly to a 10BaseT hub or repeater using RJ-45 unshielded twisted pair cable that is wired *straight through* . Follow the diagram below to construct a *straight through* cable to connect a 10BaseT Hub to the SNMP Management Module's 10BaseT port.

10BaseT Hub 10BaseT Port RJ-45 Pin No.	**SNMP Management Module RJ-45 Pin No.**
3 (TX+)	3 (RX+)
6 (TX-)	6 (RX-)
1 (RX+)	1 (TX+)
2 (RX-)	2 (TX-)

Connecting a 10BaseT Workstation to the SNMP Management Module

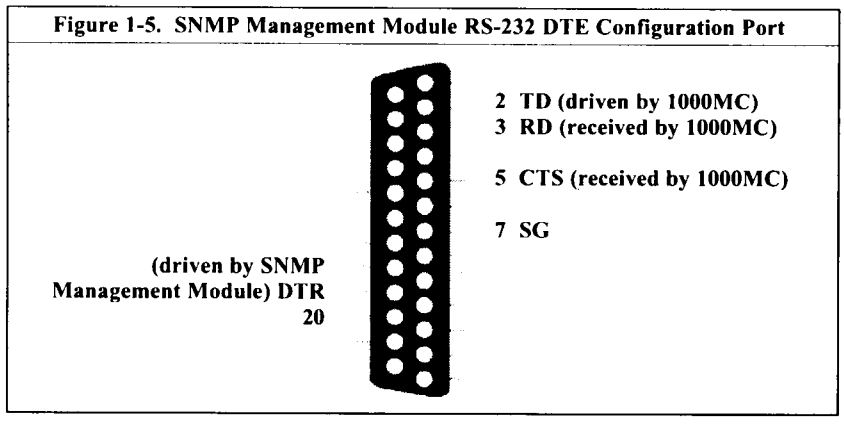
The 10BaseT port on the SNMP Management Module may also be connected directly to a 10BaseT workstation by means of a cross-connect cable. Follow the diagram below to build a cross-connect cable to connect the 10BaseT port on a workstations NIC to the SNMP Management Module 10BaseT port.

10BaseT WorkStation 10BaseT Port RJ-45 Pin No.	**SNMP Management Module RJ-45 Pin No.**
1 (TX+)	3 (RX+)
2 (TX-)	6 (RX-)
3 (RX+)	1 (TX+)
6 (RX-)	2 (TX-)

Connecting the RS-232 Configuration/Daisy Chain Port

Your SNMP Management Module is equipped with a DB-25 connector on the rear panel of the unit. This connector is a DTE configured RS-232 port that has two functions. When you first install your system, use this configuration port to setup your IP address, subnet mask, and default configuration. After the system is set up, the configuration port can be used to connect to a Cascade Module in a separate rack to allow daisy chain configuration of multiple racks.

Figure 1-5. SNMP Management Module RS-232 DTE Configuration Port



Note: The configuration port on your SNMP Management Module is a DTE, which requires a null modem or equivalent cable when connecting to a terminal.

Using personal computer communications software (Procomm, Windows Terminal, BitCom, PC Anywhere, etc.), set the configuration of your communications software to the following parameters:

Data Rate:=	19,200 bps
Async. Character Format:=	8 Data Bits, 1 Stop Bit, No Parity
Terminal Emulation:=	VT-100 (or similar) terminal emulation

Connecting the Power Supply

The power supply included in the Access Rack uses the same mid-plane architecture as the modem cards. The front card of the power supply slides in from the front, and the rear card slides in from the rear. They plug into one another in the middle of the rack. The front card is then secured by captive screws and the rear card by conventional metal screws.

Installing the SNMP Management Module into the Rack Chassis

Note: Install the SNMP Management Module in the Access Rack, next to the redundant power supplies. If you are using a single power supply, install the SNMP Management Module in slot 14 (two slots away from the single supply). The bus bar contained in the Access Rack has an extra connector at htis slot which communicates information about the power supplies to the SNMP Management Module. If the card is not installed in the correct slot, the SNMP Management Module will default to the failure mode for the power supplies.

The SNMP Management Module is comprised of a front card and a rear card. The two cards meet inside the rack chassis and plug into each other by way of mating 50 pin card edge connectors. Use the following steps as a guideline for installing each SNMP Management Module into the rack chassis:

1. Slide the rear card into the back of the chassis along the metal rails provided.
2. Secure the rear card using the metal screws provided.
3. Slide the front card into 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 card-edge receptacle of the rear card. It should "click" into place.
5. Secure the front card using the thumb screws.

Reading the LED Indicators

The SNMP Management Module front panel has numerous status LEDs to visually inform of the current operations status and health of the SNMP Management Module. Figure 1-3 shows the LEDs on the SNMP Management Module front panel.

TABLE 1-1. Ethernet LED Indicators

LED	Function/Color	Description
LI	Twisted Pair Link Indication Green	On = Connected to active LAN Off = Not connected to active LAN
TD	Transmit Data from SNMP Management Module to LAN	Yellow = Idle condition
RD	Yellow/Green Receive Data to SNMP	Green = Toggles Yellow/Green with Activity
	Management Module from LAN Yellow/Green	Yellow = Idle condition Green = Toggles Yellow/Green with Activity

Power LED Indicator

The power LED shows the power status of the SNMP Management Module

TABLE 1-2. Power LED Indicator		
LED	**Function/Color**	**Description**
Power	Power Green	On = Power is ON Off = Power is OFF

HeartBeat LED Indicator

TABLE 1-3. Poll LED Indicator		
LED	**Function/Color**	**Description**
Poll	Heartbeat Yellow	Toggles when packet TX is the on the Bus (backplane)

Fault LED Indicator

TABLE 1-4. Fault LED Indicator		
LED	**Function/Color**	**Description**
Fault	Fault Red	On = Signals hardware fault Off = No hardware fault

PPP LED Indicator

PPP will be included in future releases as a software upgrade to the SNMP Management Module.

Getting Started

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Booting the SNMP Management Module

NOTE: If you are starting the SNMP Management Module for the first time, you must log in via the rear panel RS-232 Configuration port and set the IP address, Subnet Mask, and Default Gateway. To complete this section you will need a VT-100 terminal or terminal emulator, a Null modem cable, an IP address for your box, a Subnet Mask for your box, and the IP address of the Default Gatway for your LAN.

NOTE: The configuration port on your SNMP Management Module is a DTE, which requires a null modem or equivalent cable when connecting to a terminal.

1. Using personal computer communications software (Procomm, Windows Terminal, BitCom, PC Anywhere, etc.), set the configuration of your communications software to the following parameters:

Data Rate:	19,200 bps
Async. Character Format:	8 Data Bits, 1 Stop Bit, No Parity
Terminal Emulation:	VT-100 (or similar) terminal emulation

2. Connect the RS-232/V.24 port of the terminal to the rear panel RS-232 configuration port of the SNMP Management Module through a null-modem. The RS-232 port is configured as Data Terminal Equipment (DTE).

3. Turn On the rack system or install your SNMP Management Module front card.

4. After the rack system is turned on, it will enter a series of diagnostic tests to exercise the internal sub-systems in the unit. Halt the power up sequence in order to enter a new IP address, mask, and default gateway into the box. Press 'b' three times when you see the following set of commands:

```
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
```

```
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
Change IP settings (y/n)?
```

5. After pressing 'b' three times the system will boot into the setup screen below.

```
---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)?  Y
```

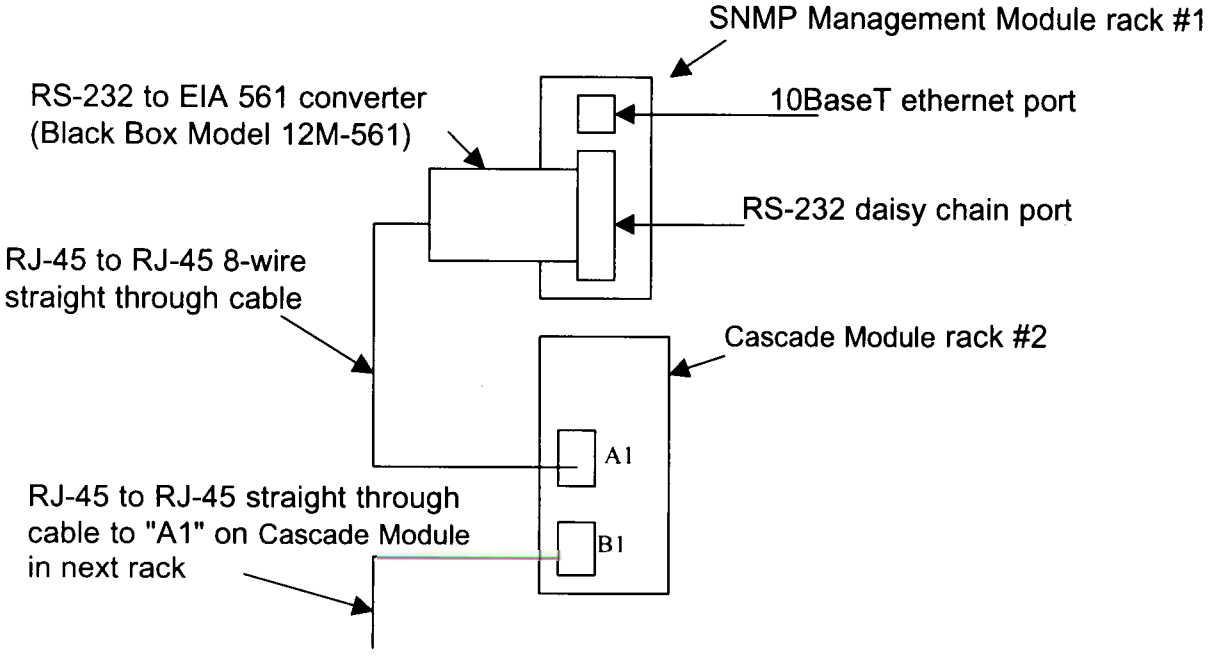
6. Type **Y** to change the IP address. The box will now prompt you for a new IP address, mask, and default gateway as shown in the following screen capture.

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

7. After entering the information, the system will prompt you to save the IP settings. Type **Y** to save these settings.

8. Next, the SNMP Management Module will prompt you (see below) for changes to the hardware revision that your unit requires. In most cases you should select 'N' to keep the current revision. The hardwared revision should only be changed if you are upgrading to the latest firmware release.

9.



The power will need to be recycled to reboot the system with the new settings. After your system reboots, log into the box using a standard web browser from your network.

Installing the SNMP Management Module RS-232 Daisy Chain Port

Using the SNMP Management Module RS-232 Daisy Chain Port and an EIA-510 cable, your SNMP Management Module can manage up to seven additional racks. Each daisy chained rack requires

Setting the Address Range for Your Modems

The SNMP Management Module POLLs the system looking for Modems. If the address of the modem is not configured or does not match the rack that it is installed in, the SNMP Management Module may not find the card. The address range that is POLLed is determined by the configuration of the system. The system administrator must make sure that the software configuration within the SNMP Management Module matches the hardware configuration of the system.

The SNMP Management Module 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 rack is entered on the Modem Information page. If the system is set for two power supplies installed, the SNMP Management Module 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 SNMP Management Module will automatically set the number of Slots Available in the chassis to 15.

Using this information, the SNMP Management Module will POLL the specified address range in each rack. Thus, in a single power supply system, the address range for Rack #1 (the rack with the SNMP Management Module installed) will be from address 1 to address 15 (NOTE: the SNMP Management Module is always address 0). The SNMP Management Module will then begin POLLing Rack #2 on the daisy chain port starting from address 16. In a redundant power supply system, the address range for Rack #1 (the rack with the SNMP Management Module installed) will be from address 1 to address 13. The SNMP Management Module will then begin POLLing Rack #2 on the daisy chain port starting from address 14.

The daisy chained racks are setup 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 Management Module web pages. This allows easy service of the power supplies.

Configuring Your Modems for Installation

The SNMP Management Module uses an internal bus to communicate with the modems installed in your system. It is required that the modem rear card should have Fame GND connected to Signal GND through a 100 Ohm resistor. This is done by setting a jumper on the rear card of your modem. Please refer to the manual that was shipped with your unit for more information on this jumper setting.

Using the Internal HTTP/HTML Management Pages

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Introduction to the Internal HTTP/HTML Management Pages

This chapter explains how to use the internal HTTP/HTML management pages to manage your Black Box System. The system can also be managed by using an SNMP Network Management Station using a standard SNMP software package or MIB walking tool. To use the SNMP Management Module HTTP/HTML management pages, you must first define the LAN IP Address, and LAN Subnet Mask for the SNMP Management Module. If you have not done so, please return to Chapter 2. Getting Started, to do so.

Logging Into the HTTP/HTML Pages

To log into the HTTP/HTML Management pages, you must enter the IP address as the URL (Universal Resource Locator) into a World Wide Web Browser. This address is the same address that you entered in **Chapter 2. Getting Started.**

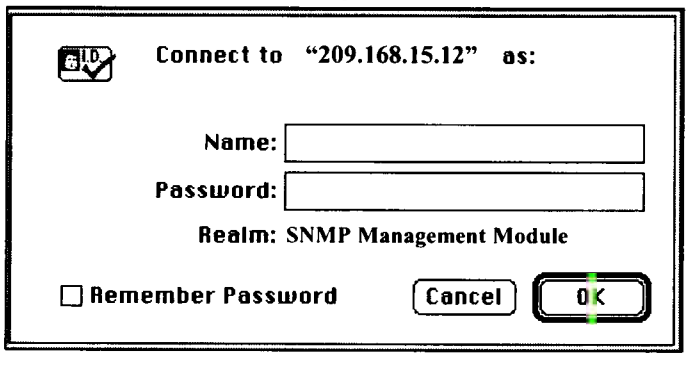
http://abc.def.ghi.jkl

This will cause your web browser to ask for user name and password. There are two administration passwords associated with the operation of your SNMP Management Module. They are:

1. **superuser**
2. **monitor**

The **superuser** password allows full permission to change and view any parameters in the SNMP Management Module. The **monitor** password allows full viewing of any non-password oriented variables. Change these passwords immediately after initial configuration to avoid security breaches. Figure 3-1 shows the SNMP Management Module's login screen.

Figure 3-1. SNMP Management Module Login Screen



HTTP/HTML and SNMP Object Format

In Chapter 3, we shall describe variables on each of the internal HTTP/HTML pages. These variables will include brief descriptions of either the Black Box Enterprise MIB or the applicable SNMP MIB. The format of the varibles will look like this:

Saving HTTP/HTML Object Changes

After making changes to any SNMP Management Module specific variables, you must save the changes in order to store them into flash. If the changes are not saved, they will be lost after the next power cycle.
NOTE: Changes you make to the SNMP Management Module configuration parameters that deal with the function cards will automatically be saved in the function card flash memory after the configurations are complete.

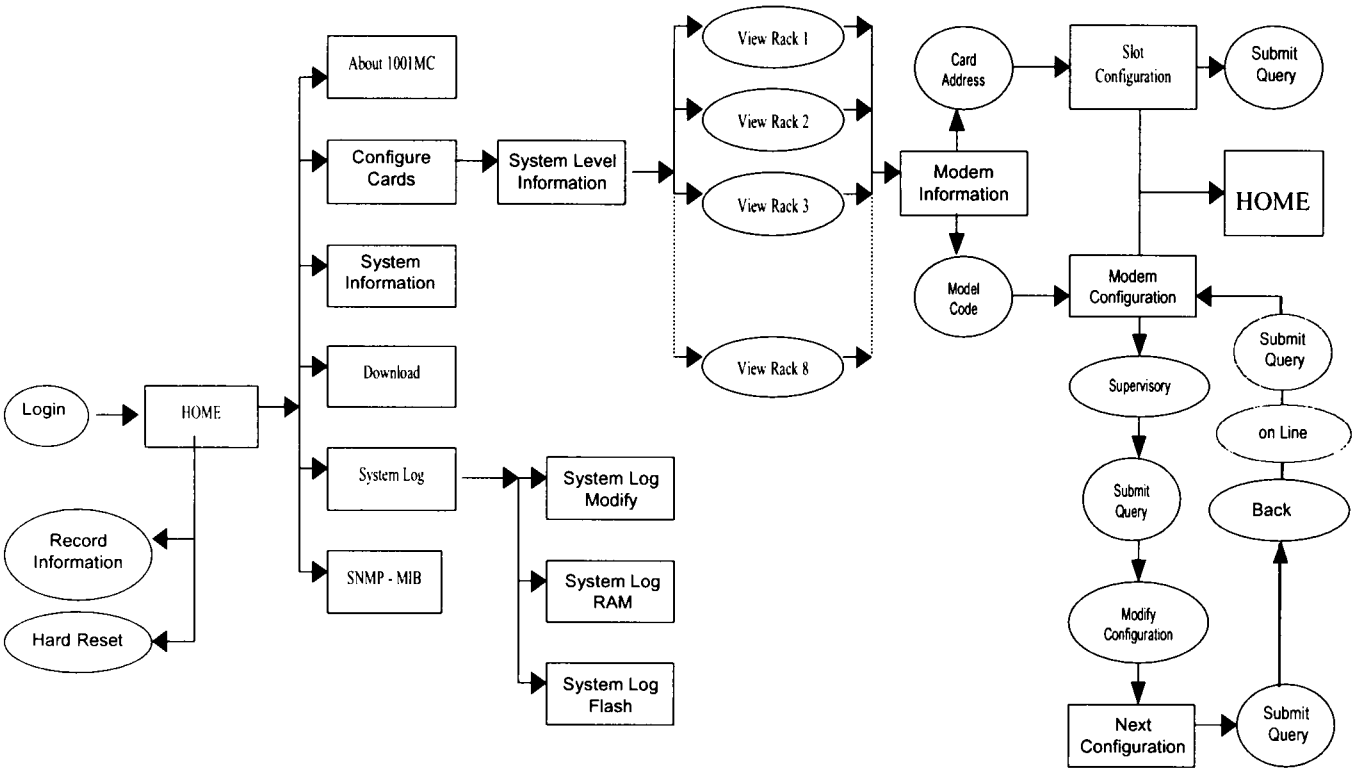
1. Make the change to the parameter
2. Select Submit
3. Return to the HOME screen
4. Select Record Current Configuration

Help Screens

The SNMP Management Module 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 the tables will be shown as hyperlinks, these hyperlinks, work the same as was previously discussed, showing the help screen for that column of the table.

HTTP/HTML Web Page Navigation

This section describes how to navigate the internal HTTP/HTML web pages on the SNMP Management Module. The diagram below 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.



Login: After typing the IP address into your web browser as the URL, the SNMP Management Module will present the "login" screen. The SNMP Management Module has two levels of password protection, superuser and monitor. The superuser password level will allow you to view statistics and make configuration changes to the system. To log in as a superuser, type the word "superuser", all lower case, as the password to the login. The monitor level 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 unit as the default passwords. During your initial setup, change the passwords. After logging into the box, the system will display the HOME page.

Home: The HOME page displays a quick overview of the system including; error and warning indications, software information, box names, number of modems installed, etc. This page allows you to log into the box, 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. The list on the left side of the screen allows you to navigate to any page from this point. The navigation page will always be available to you so you can change from one page to the next.

Two additional push buttons are located on the bottom of the HOME page. The "Record Current Configuration" button allows you to store and configuration changes made to the box. NOTE: If configuration changes are not stored into memory, they will be lost if the unit is powered down. The "Hard Reset" button forces the SNMP Management Module to perform a reset. This will not reset the individual cards in the rack only the SNMP Management Module. If you would like to perform a hardware reset on the individual cards please refer to the Slot Configuration page.

About SNMP Management Module: The About SNMP Management Module page gives a second overview of the system. This page give a little more hardware information about the operation of the unit. This page also contains contact information about Black Box.

Configure Cards: The Configure Cards hyperlink will bring you to the System Level Information page. This page is the starting point for the configuration and management of your Black Box Modems. 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 hyperlinks that will bring up the Modem Information Page for the selected Rack.

Modem Information Page: The Modem Information Page consists of a table that displays top level information about the cards installed in the selected rack. These items include; model codes, user ids, errors and warning, and circuit ids. This page also allows you to gain 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, shown as the address of the card in the table, and the Modem Statistics hyperlink, shown as the local model code.

Slot Configuration: The slot configuration page allows you to setup specific information about the modem installed. From the page, you can change the User Ids, Circuit Ids, and the Error and Warning Indications. From this page, you can also clear errors and warning and perform a hardware reset on the modem installed in the rack.

Modem Configuration: The Modem Statistics page shows the current configuration and statistical state of the local and remote modem installed at the selected address. From this page, you can place the card into the superVisoryMode. Once the card is in this mode, the web page will display a hyperlink that will allow you to enter the Modem Configuration Page.

Modem Configuration Page: The Modem Configuration page 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 into test modes. Once the configuration has been setup, submit the changes, and then place the

modem back into the onLine state. This is done in the Modem Statistics page discussed earlier. NOTE: The configuration changes that are made will not be implemented in the cards until the unit is placed back into the onLine state.

System Information: You can navigate to the System Information page by selecting the hyperlink along the left side of any page. The System Information page allows you to setup the IP information, box information, and password information for the system. It is recommended that you change your passwords immediately after installing your SNMP Management Module to insure security for your network.

Download: The DownLoad page allows you to perform software upgrades on the Rack Card Modems installed in the system. New software for the modems can be obtained from Black Box and uploaded into the SNMP Management Module system through an ftp. The software can then be sent from the SNMP Management Module to the cards installed.

System Log: The System Log page allows you to view the Syslog Messages. Syslog Messaging is a reporting tools used in the SNMP Management Module 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.

Syslog - Modify: The Syslog-Modify web page allows you to setup 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.

Syslog - Volatile Memory: The Syslog-Volatile Memory page 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 system is re-booted.

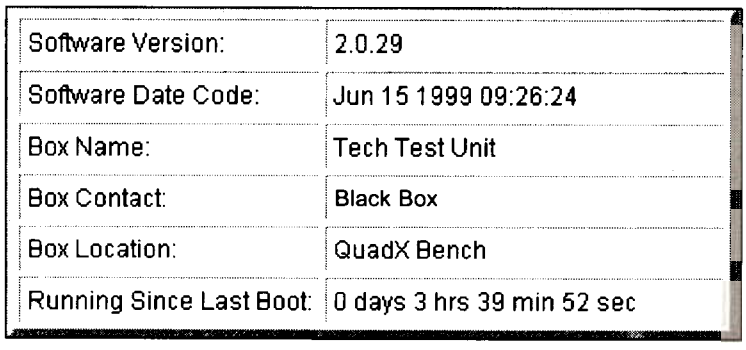
Syslog - Non-Volatile Memory: The Syslog-Non-Volatile Memory page displays Syslog messages that have been sent to the Non-Volatile Memory section of the messaging system. The messages stored here will be stored in Flash Memory and will be available if the system is re-booted or power is lost.

SNMP: The SNMP web page has been made available to allow you to download the Black Box Enterprise MIBs for the SNMP Management Module. These MIBs will be required if you plan to manage the system using a NMS system instead of the web page manager.

Box Information

There are six system varilables which describe information about the SNMP Management Module. These variables are shown in 3-3, and are described in the section below.

Figure 3-3. Box Information



Software Version (boxSoftwareVersion) This variable defines the version of the software currently running in the SNMP Management Module. The SNMP Management Module can be software upgraded using an ftp download. More information about the software download can be found in Chapter 2 Getting Started.

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

Box Name (boxName) This variable displays a user defined string that represents the name of the box. This variable can be changed by the user in the System Info web page.

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

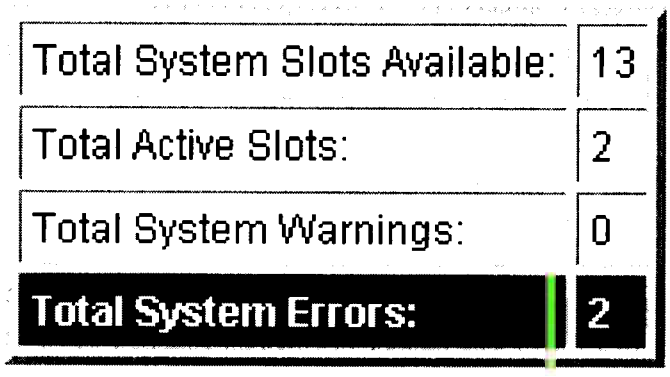
Box Location (boxLocation) This variable displays a user defined string that represents the location of the box. You can change this variable in the System Info web page.

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

Operating Status Variables

There are four system variables which describe the immediate operating status of the modems installed in the rack. These variables are shown in 3-4 below, and are described in the section below.

Figure 3-4. Operating Status Variables



Total System Slots Available(totalConfigSlots) This read-only variable defines the largest address that the system will POLL (address 1 to totalConfigSlots). Any modem with an address outside of this range will not be found by the SNMP Management Module.

Total Active Slots (totalActiveSlots) This read-only variable defines the number of modems currently installed in the system. As the SNMP Management Module brings the modems online this number is incremented. After a card is removed from the system, this number is decrement.

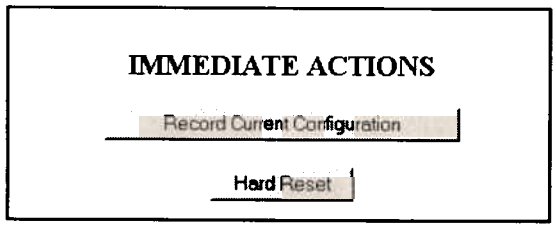
Total System Warnings (boxWarningNumber) This variable defines the number of warnings that are currently outstanding in the system. This number includes warnings that have been generated from the modems as well as the SNMP Management Module itself. If this number is greater than zero, this field will be highlighted in yellow to notify you that the warning exists. Warnings are cleared through the Configure Cards web page for the system, or the Slot Configuration page for the individual modems. You can view the System Log page 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 Management Module itself. If this number is greater than zero, this field will be highlighted in red to notify you that the errors exists. Errors are cleared through the Configure Cards web page for the system, or the Slot Configuration page for the individual modems. You can view the System Log page to examine the source of the warnings.

Immediate Actions

There are several immediate actions which can be executed on the SNMP Management Module, when in superuser mode (refer to Figure 3-5, below), which will cause the box to act according to the descriptions below.

Figure 3-5. Immediate Actions

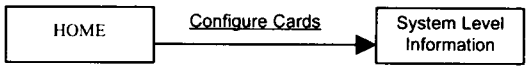


Record Current Configuration SELECTING the RECORD CURRENT CONFIGURATION button causes the current configuration to be stored in FLASH memory. Any changes made to the SNMP Management Module configuration are stored in non-volatile RAM first. This allows you to set the box up with a working configuration before making the configuration permanent. Changes become permanent when you select RECORD CURRENT CONFIGURATION. You will lose all changes not stored to FLASH the next time the SNMP Management Module is re-booted unless you store them.

Hard Reset HARD RESET causes the SNMP Management Module to restart. When you select HARD RESET, the SNMP Management Module confirms that you want to execute this command. Then, the SNMP Management Module will re-initialize the interfaces, and re-load configuration parameters from FLASH.

NOTE: The Hard Reset will not perform a hardware reset on the modem in the system. This can be done in the slot configuration web page for the individual cards.

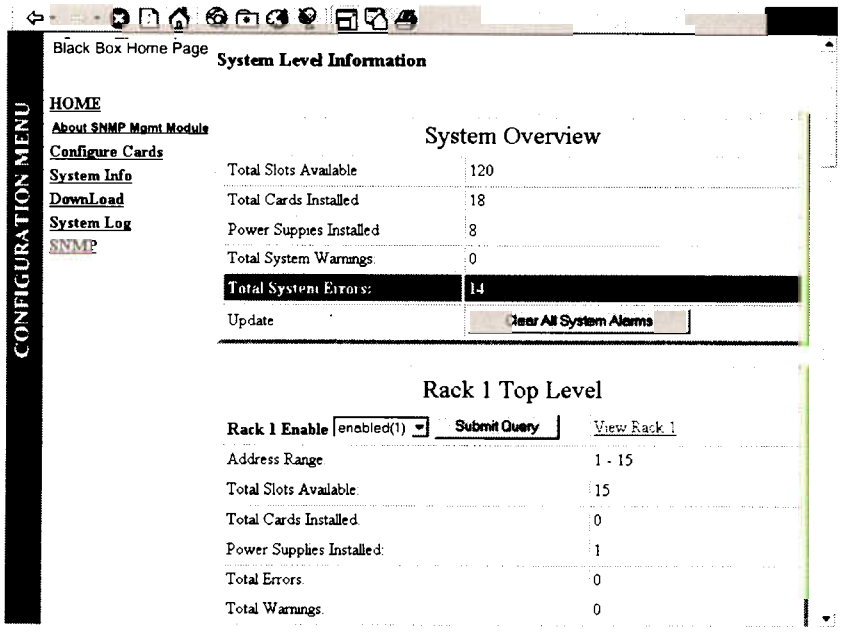
System Level Information



The Configure Cards hyperlink from the HOME page will bring you to the System Level Information page. Figure 3-2 displays a portion of the information page for the 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 SNMP Management Module stops POLLing the addresses contained in the specified rack. The SNMP Management Module's ability to stop POLLing is useful when installating less than eight racks or when taking cards OffLine in order to perform servicing. The modems installed in the system will continue to operate at the last setting provided. 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.

Below is a representation of the System Level Information page (Fig. 3-2). Following Fig. 3-2 is a description of the variables contained within the System Level Information page.

Figure 3-2. System Level Information Page



Total Configurable Slots (totalConfigSlots): Read only, defines the amount of configurable slots available in the system.

Total Cards Installed (totalActiveSlots): Read only, defines the amount of cards the system has found.

Total Power Supplies Installed (boxPowerSupplies): Read only, defines the amount of power supplies installed in the system.

Total Number of Warnings in the System (boxWarningNumber): Read only, defines the amount of warnings that have been generated in the system.

Total Number of Errors in the System (boxErrorNumber): Read only, defines the amount of errors that have been generated in the system.

The following variables are used by each rack in the system. Replace the "X" shown in the variable name with the appropriate rack number to label the specific variable name (i.e. rack2Enable).

Enable Disable Rack (rackXEnable): Read/write, enables or disables a rack for use by the system. There are two main uses for these variables. When your system configuration requires less than the maximum number of racks, all un-installed racks should be disabled. The SNMP Management Module will not POLL the address range for a rack that is disabled, this will decrease the POLLing time for the system. If you would like to remove cards from the rack without the alarm notification you can disable the rack.

Rack Minimum Address (rackXMinAddr): Specifies the minimum address that will be polled for the defined rack (based on the maximum address of the previous rack).

Rack Maximum Address (rack1MaxAddr): Specifies the maximum address that will be polled for the defined rack (based on the minimum address of the rack and the number of power supplies installed).

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

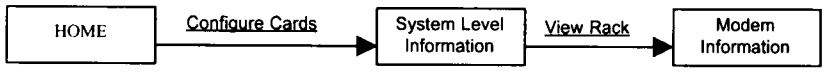
Number of Cards Installed (rackXCardsInstalled): Displays the number of cards that the system has found.

Number of Power Supplies (rackXPowerSupplies): Sets the number of power supplies installed in the rack (used to determine the addressing range for the rack).

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

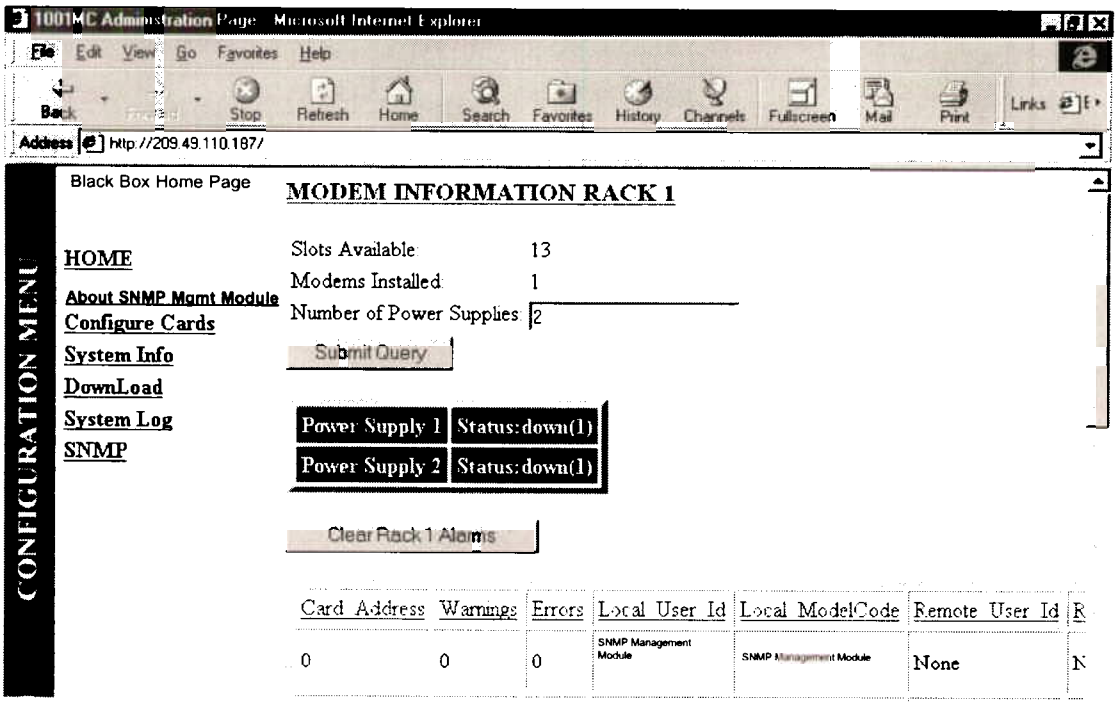
Number of Warnings (rackXWarningNumber): Shows the number of warnings that have been reported by the system for this rack.

Modem Information



The Modem Information screen displays an overview of the rack 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 model codes and user IDs. Figure 3-6, below, shows the Modem Information page, a description of each variable follows.

Figure 3-6. Modem Information



Card Display Type (listType) Defines how the current web page will be displayed. You can choose to display all of the slots that are available to the SNMP Management Module, or he can choose to display only the slots that are currently populated with modems.

Number of Power Supplies (boxPowerSupplies) Defines the number of power supplies that the SNMP Management Module will monitor for availability. In the case of a redundant power supply system, you should set this variable to 2, this will inform the SNMP Management Module that there should be 2 power supplies in the system, if it finds any less than that an error will be reported and the failed power supply will be highlighted in red.

Power Supply 1 (boxPower1Down) Defines the status of the Power Supply 1. If Power Supply 1 fails, this field will be highlighted in red and generate a system error notifying you of the failure. When looking at the front of your rack, Power Supply 1 is on the right side

Power Supply 2 (boxPower2Down) Defines the status of the Power Supply 2. If power supply 2 fails, this field will be highlighted in red and generate a system error notifying you of the failure.

The following information describes each column of the modem table. Note: each table heading is a hyperlink to a help page that contains information about the column.

Card Address (nmsSlotID) Defines the address of the card. The SNMP Management Module will POLL the cards using the addresses listed in the "Card Address" column. If a modem is found with the same address, it will be displayed in that row. The address of the card is setup using the dip-switches on the card. For more information about setting the address of a card, please refer to the appropriate NMS version of the manual for the specific modem. The address is also a hyperlink to the Slot Configuration page. This page can be used to set slot specific information about the card.

Warnings (warningCount) Displays the warnings that are associated with each modem installed in the system. 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. Warnings will be highlighted in yellow in the log. The warnings for the slot can be erased in the Slot Configuration page. Note, the System Log will still display the warnings even after the number is cleared.

Errors (errorCount) Displays the errors that are associated with each modem installed in the system. 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. Errors will be highlighted in red in the log. The errors for the slot can be erased in the Slot Configuration page. Note, the System Log will still display the errors even after the number is cleared.

Local User Id (localUserID) User supplied string that defines the modem installed in the rack. The string is stored in non-volatile flash within the modem. 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 within the Slot Configuration page.

Local Model Code (localModelCode) This column displays the model code of the modem installed at the specified address. The Model Code is also a hyperlink into the configuration of the modem and its remote unit.

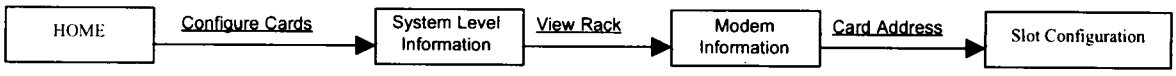
Remote User Id (remoteUserID) User supplied string that defines the unit at the end of the link. The string is stored in non-volatile flash within the unit. If the unit is moved, the User ID will move to the new slot. The string can be up to 10 bytes long and can be changed or reset within the Slot Configuration page.

Remote Model Code (remoteModelCode) This column displays the model code of the modem at the far end of the link.

Local Circuit ID (localCircuitID) The circuit ID is a 40 byte string that is stored in non-volatile flash within the SNMP Management Module. This string can be changed from the Configure Cards web page or from the Slot Configuration web page.

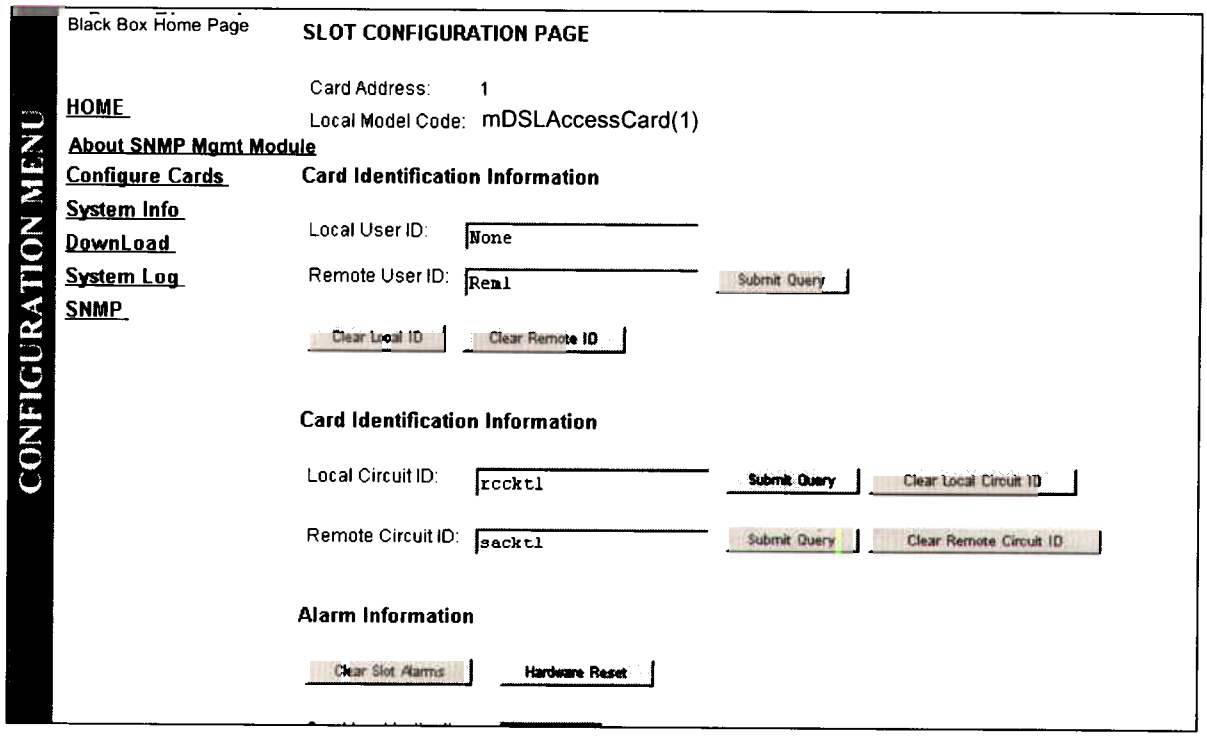
Remote Circuit ID (remoteCircuitID) The circuit ID is a 40 byte string that is stored in non-volatile flash within the SNMP Management Module. This string can be changed from the Configure Cards web page or from the Slot Configuration web page.

Slot Configuration



The Slot Configuration page (Figure 3-7) allows you to make slot specific configuration changes that are not product specific. Following Fig. 3-7 is a description of each variable.

Figure 3-7. Slot Configuration Page



Card Identification Information:

Local User Id (localUserID) 10 byte user supplied string that defines the modem installed in the rack. The string is stored in non-volatile flash within the modem.

Remote User Id (remoteUserID) 10 byte user supplied string that defines the remotely connected modem. The string is stored in non-volatile flash within the modem.

Local Circuit ID (localCircuitID) The circuit ID is a 40 byte string that is stored in non-volatile flash within the SNMP Management Module.

Remote Circuit ID (remoteCircuitID) The circuit ID is a 40 byte string that is stored in non-volatile flash within the SNMP Management Module.

Alarm Information:

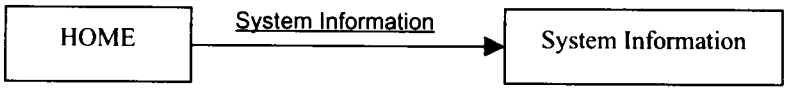
Clear Slot Alarms (resetStatus) Selecting this push button erases the alarms (errors and warnings) associated with the specified slot. Note: The errors and warning will still be listed in the System Log.

Hardware Reset (resetStatus) Selecting this push button will force the associated modem to perform a hardware reset.

Card Lost Indication (cardLostIndication) This variable allows you to choose what type of indication will be made if a modem is removed from the management system. Three choices are currently available: error, warning, and none.

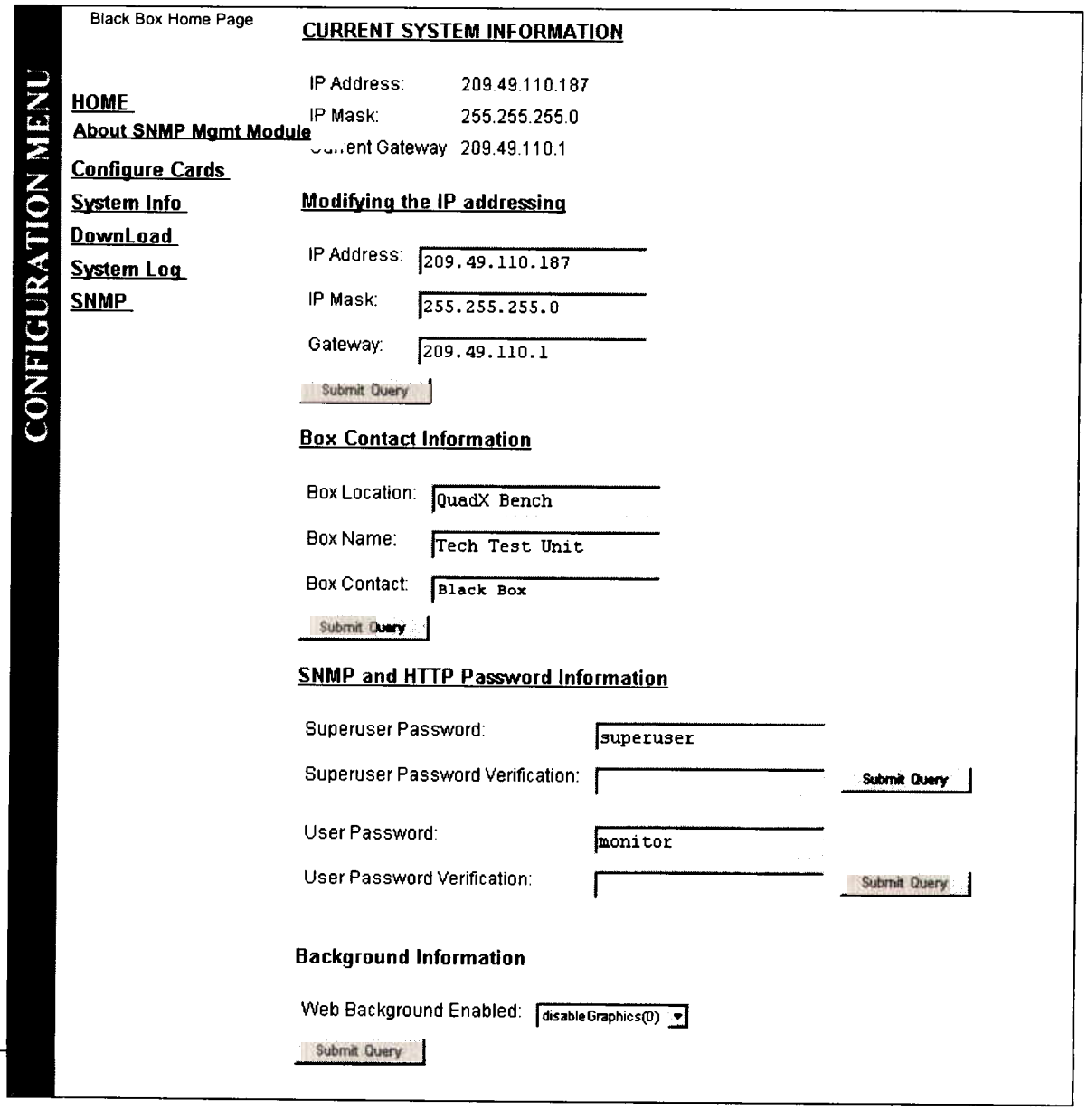
Line Down Indication (lineDownIndication) This variable allows you to choose what type of indication will be made if a modem reports a line down scenario. Three choices are currently available: error, warning, and none.

System Information



The System Information page displays the current setting for the system. This page allows you to setup parameters defining password protection and the network address. The page is shown below, a description of each variable follows.

Figure 3-8. System Information



IP Address (boxIpAddress) This parameter defines the IP address of the box

IP Mask (boxIpMask) This parameter defines the IP mask of the box

Current Gateway (boxGateway) This parameter defines the current gateway for the network.

Box Location (boxLocation) User defined string that represents the location of the box. This variable is displayed on the HOME page..

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

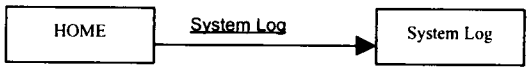
Box Contact (boxContact) User defined string that represents the contact for the box. This variable is displayed on the HOME page

Superuser Password (boxSnmpMasterPassword) This password will allow full access rights to the box (read-write). You should change this password by typing the new password into both the Password and Verification field and then selecting the "Submit" button. After entering the new password, you must store the configuration into memory from the HOME page.

User Password (boxSnmpMonitorPassword) This password will allow monitor access rights to the box (read-only). You should change this password by typing the new password into both the Password and Verification field and then selecting the "Submit" button. After entering the new password, you must store the configuration into memory from the HOME page.

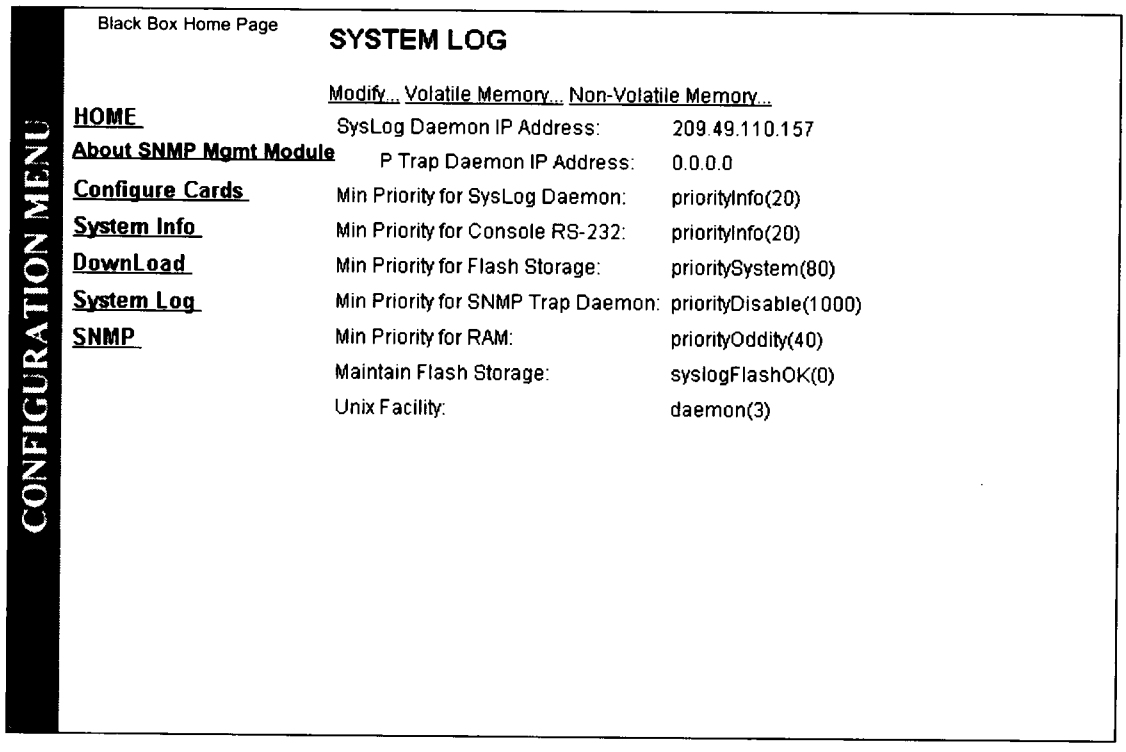
Web Background Enable (boxBackgroundFlag) The SNMP Management Module contains a background image that can be used while viewing the web pages. This variable tells the system wether to display the background information or not.

System Log

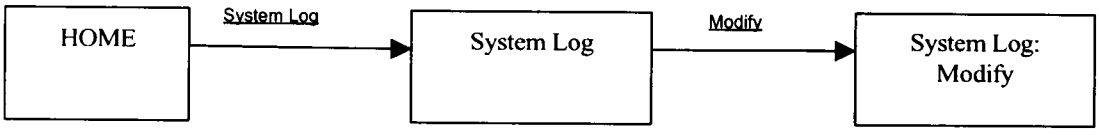


The System Log page gives an overview of the system logging functions. The system log is a messaging system that stores information about the system as it is running. This pages contains three hyperlinks which allow modification and viewing of the system log messages. The variables associated with the system log will be defines within the context of these web pages.

Figure 3-9. System Log

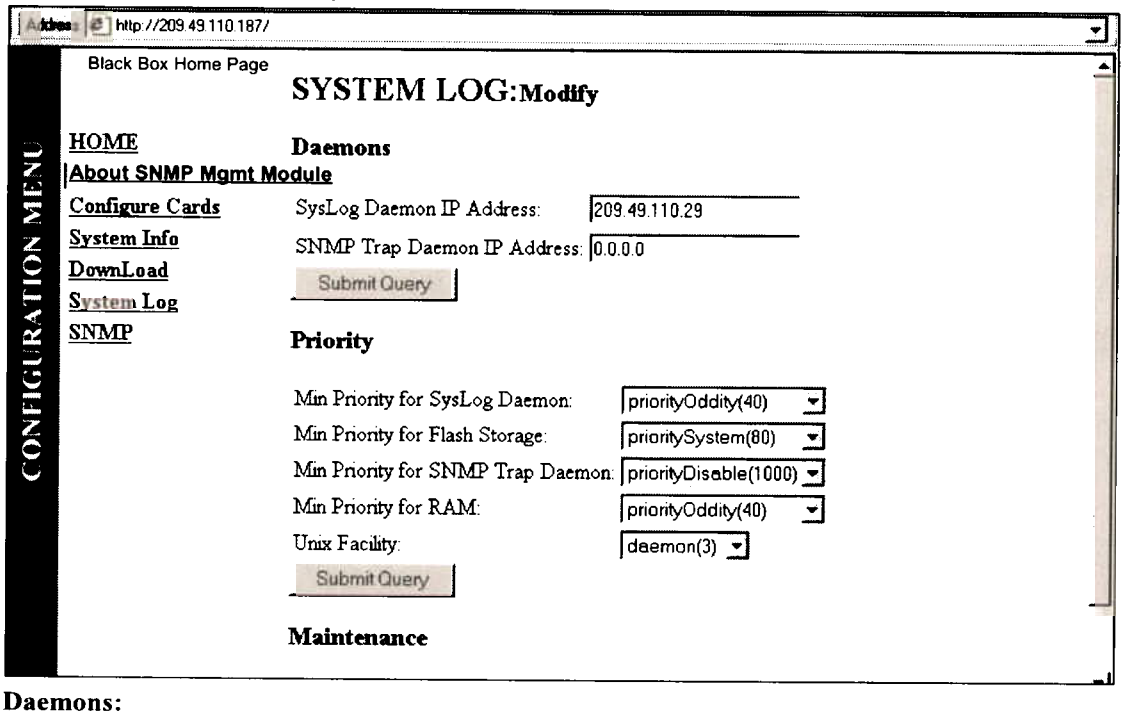


System Log Modify



The System Log Modify page allows you to modify the system log parameters. You can choose which messages will be sent to the available message logging functions.

Figure 3-10. System Log Modify



Daemons:

Syslog Deamon IP Address (syslogDeamonIP) The SNMP Management Module can send messages over a network to a Syslog Daemon. This variable specifies the IP address that will be running the Syslog Daemon.

SNMP Trap Daemon IP Address (syslogTrapIP) NOT SUPPORTED AT THIS TIME. This variable is not supported in the present software version. Please check the Black Box web site for software upgrades that will support this feature.

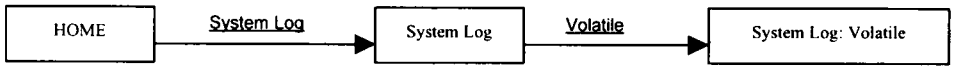
Priority:

There are four 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 prioritySystem(80). For unused output mechanisms, set the priority to priorityDisable(100).

Maintenance:

Maintain Flash Storage (syslogFlashClear) This variable is used to notify you about the status of the flash storage area. If the flash storage area is full this variable will read "syslogFlashFull". The flash storage area can be erased by setting this variable to "syslogFlashClear" and selecting the "Submit Query" button.

SYSTEM LOG: Volatile Memory



This page contains a log of messages that have been sent to the RAM storage area using the **Min Priority for RAM** variable in the Syslog Modify page. Messages stored here will be lost if the box reboots.

Figure 3-11. System Log Volatile Modify

CONFIGURATION MENU

Black Box Home Page

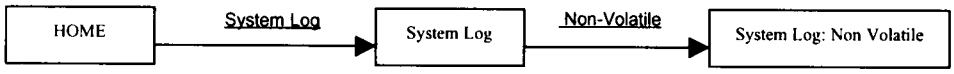
HOME
About SNMP Mgmt Module
Configure Cards
System Info
DownLoad
System Log
SNMP

SYSTEM LOG:Volatile Memory

System Up Time: 1 days 7 hrs 10 min 24 sec

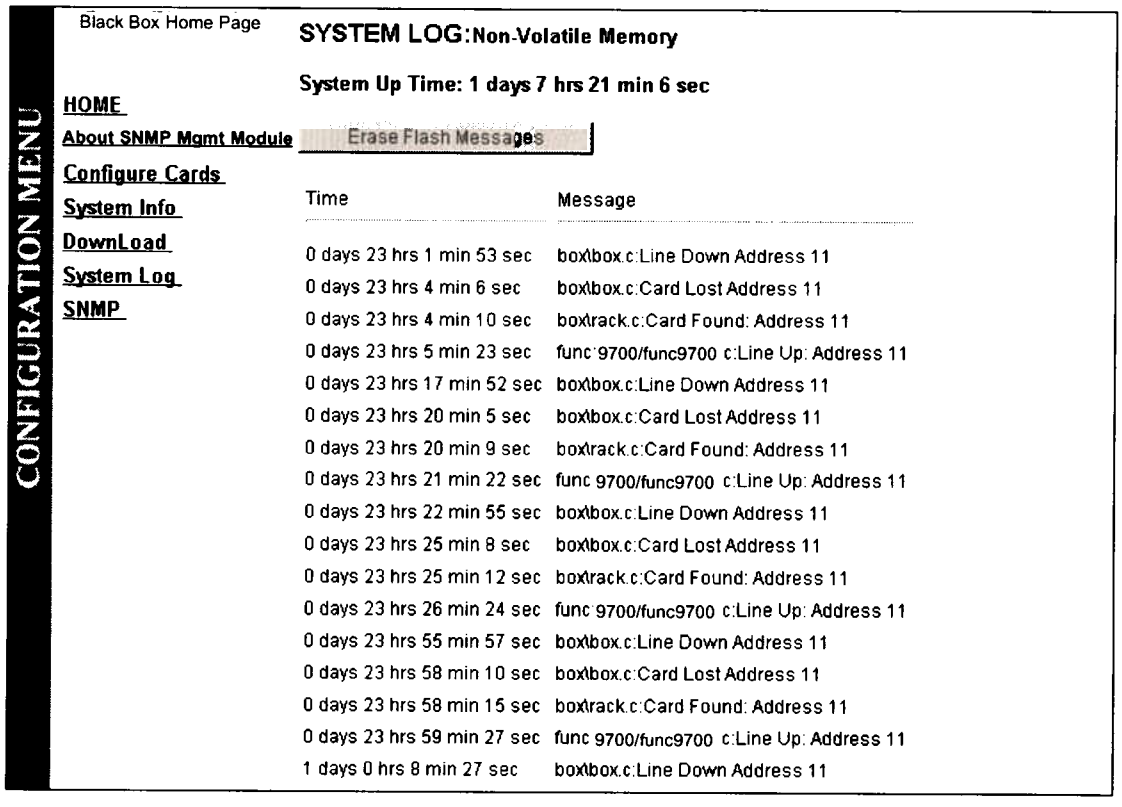
Time	Message
0 days 23 hrs 1 min 53 sec	box\box.c:Line Down Address 11
0 days 23 hrs 4 min 6 sec	box\box.c:Card Lost Address 11
0 days 23 hrs 4 min 10 sec	box\rack.c:Card Found: Address 11
0 days 23 hrs 5 min 23 sec	func 9700/func9700 c:Line Up: Address 11
0 days 23 hrs 17 min 52 sec	box\box.c:Line Down Address 11
0 days 23 hrs 20 min 5 sec	box\box.c:Card Lost Address 11
0 days 23 hrs 20 min 9 sec	box\rack.c:Card Found: Address 11
0 days 23 hrs 21 min 22 sec	func 9700/func9700 c:Line Up: Address 11
0 days 23 hrs 22 min 55 sec	box\box.c:Line Down Address 11
0 days 23 hrs 25 min 8 sec	box\box.c:Card Lost Address 11
0 days 23 hrs 25 min 12 sec	box\rack.c:Card Found: Address 11
0 days 23 hrs 26 min 24 sec	func19700/func9700 c:Line Up: Address 11
0 days 23 hrs 55 min 57 sec	box\box.c:Line Down Address 11
0 days 23 hrs 58 min 10 sec	box\box.c:Card Lost Address 11
0 days 23 hrs 58 min 15 sec	box\rack.c:Card Found: Address 11
0 days 23 hrs 59 min 27 sec	func 9700/func9700 c:Line Up: Address 11
1 days 0 hrs 8 min 27 sec	box\box.c:Line Down Address 11

SYSTEM LOG: Non-Volatile Memory



This page contains a log of messages that have been sent to the flash storage are using the **Min Priority for Flash Storage** variable in the Syslog Modify page. Messages stored here will be saved even if the box reboots. This page will show Warnings highlighted in yellow and Errors highlighted in red. When an error or warning is displayed somewhere in the web pages, this page will give a description of the error/warning. All information on this page is read-only except a single push button at the top of the page which is described in more detail below.

Figure 3-12. System Log Non-Volatile Memory



Erase Flash Messages (syslogFlashClear) This push button will clear the messages listed on this page. This function can also be performed from the Syslog Modify page and has been added here for ease of use. Note, once message are erased they can not be recovered.

Software Upgrades for your Modems

The SNMP Management Module has the facilities to download new software into your modems although not all of the modems are flash upgradeable. Please refer to the appendix of this manual that deals with your modem to see if software upgrades are supported.

In order to perform a software upgrade on your modem, please refer to the instructions on the Download web page.

Appendix A - mDSL Network Management System

This document describes the management of an mDSL Network Management System- DSL modem. This document is intended to be used in addition to the manual that you received with your unit. This document describes how to manage your mDSL Network Management System using the SNMP Management Module's internal HTTP/HTML web engine and a standard web browser, the Black Box Enterprise MIB that is associated with the mDSL Network Management System, and Plug-and-Play features that can be used with your modems.

Features

- Fully SNMP manageable local and remote units using the Black Box SNMP Management Module
- HTTP/HTML manageable local and remote units using the Black Box Model SNMP Management Module and a standard web browser
- Plug-And-Play allows easy startup of CPE units
- Software upgrades available
- DTE speeds nx64 to 2.3 Mbps
- DSL Distances on just two wires using mDSL technology
- 2-wire operation
- Standalone (QuikConnect), Rackmount, and Fixed Interface (MDU9705A) versions available
- Internal, external, and receive recover clocking options

mDSL Network Management System Description

The mDSL mDSL Network Management System was developed to meet the needs of Internet Service Providers (ISPs), Incumbent Local Exchange Carriers (ILECs), Inter-Exchange Carriers (IXC), and PTTs that must achieve affordable broadband transmission over the existing copper infrastructure. As a symmetric DSL modem, the mDSL offers the same data rates in both directions over a single pair of regular telephone lines using Carrierless Amplitude and Phase (CAP) modulation. Featuring replaceable DCE-DTE interface modules and rear cards, the mDSL can be configured for a huge range interfaces including: Ethernet, Data and Voice, V.24/RS-232, V.35, RS-422/530, G.703, and X.21 applications. Line connection is made by an RJ-45 jack.

Specifically designed for use in the Black Box system, when the mDSL is coupled with the SNMP Management Module () and the Black Box Access Rack, the modems are fully SNMP manageable. SNMP management can be performed on both the local and remote units using a standard SNMP Network Management Station or by using a standard web browser and the SNMP Management Module's built in web server. You can view and change configuration variables, view statistical variables, and view error and warning indications. Using the system, you can also take advantage of the Plug-And-Play feature that is available in the mDSL modems. For more information on the Plug-And-Play, please refer to that section of this manual.

Configuration and Management

This section describes the configuration and management of your mDSL modems using a SNMP Management Module management card with built in HTTP/HTML web server. If you plan to manage your units using a standard Network Management Station you can download the Black Box Enterprise MIBs either through the SNMP web page on the SNMP Management Module or visit the Black Box web site.

There are three separate ways to setup your modems for communication: dip-switch controlled, dip-switch Plug-And-Play CP, and Plug-And-Play CP. The Plug Plug-and-Play setup is described in more detail on the following page. The dip-switched controlled setups are not described in this manual. Please refer to the manual that was shipped with your unit for more information on the dip-switch operation of your units or contact Black Box technical support for further help.

NOTE: The applications described in the following sections are designed for a mDSL rack card modem (CO configuration - Internal/External Clock) in a chassis with a SNMP Management Module. At the remote end, a mDSL stand alone unit (CP configuration - Receive Recover Clock) is connected as a Plug-And-Play CP. If your setup differs from this application, additional information may be needed to complete your setup.

Hardware Setup of your mDSL Rack Card:

The SNMP Management Module uses the internal bus bar connection to communicates with your modems. To ensure a reliable connection between the SNMP Management Module and the mDSL Network Management SystemC, set the rear cards on all modems to have Frame GND connected to Signal GND through a 100 Ohm resistor. For more information on making this connection, please refer to the MDU9700C manual that was shipped with your unit.

The manual that was shipped with your mDSL unit specifies switch S1 as "Reserved". This switch is actually used to set the address of the modem in the system. Each card in the chassis is given a unique address through the setting of switch S1. Note, the stand alone units are not given an address through the setting of a dip-switch, they will use the address of the rack card that they are connected to. The SNMP Management Module sends "POLL" messages along the internal bus looking for cards installed in the system. Once a card is found it is placed "on-line" and communication with the management station can begin.

If the address of the modem is not configured or does not match the address range of the rack that it is installed in, the SNMP Management Module may not recognize the card. The address range that is POLLed is determined by the configuration of the system. The system administrator must make sure that the software configuration within the SNMP Management Module matches the hardware configuration of the system.

The SNMP Management Module 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 rack is entered on the Modem Information page. If the system is set for two power supplies installed, the SNMP Management Module 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 SNMP Management Module will automatically set the number of Slots Available in the chassis to 15.

Using this information, the SNMP Management Module will POLL the specified address range in each rack. Thus, in a single power supply system, the address range for Rack #1 (the rack with the SNMP Management Module installed) will be from address 1 to address 15 (NOTE: the SNMP Management Module is always address 0). The SNMP Management Module will then begin POLLing Rack #2 on the daisy chain port starting from address 16. In a redundant power supply system, the address range for Rack #1 (the rack with the SNMP Management Module installed) will be from address 1 to address 13. The SNMP Management Module will then begin POLLing Rack #2 on the daisy chain port starting from address 14.

The daisy chained racks are setup 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 Management Module web pages. This allows easy service of the power supplies.

If all of the bits of switch S1 are set to the "ON" position, then the unit will run completely from its' dip-switch configuration. This can be useful for testing circuits independently of the management system. If an address is placed on the switch, the unit will boot from its stored flash configuration and begin looking for POLL commands from the SNMP Management Module.

Switch S1 allows an 8 bit address to be assigned to a link. The following rules apply to setting the address. Bit S1-8 is the least significant bit. A bit set to "ON" is considered a "0". A bit set to "OFF" is considered a "1". Black box suggests that you set your addresses starting with address 1 at the far left of your rack (farthest away from the power supplies) and increment the numbers by one as you go from left to right. Setting the addresses in this manner will make configuration easier as you start using the web page management. An example of this is shown in table A-1.

Table A-1. Starting Address Setting

1 - 2 - 3 - 4 - 5 - 6 - 7 - 8 - 9 - 10 - 11 - 12 - 13 - PS2 - PS1

The following table A-2 shows the bit setting to configure the address.

TABLE A-2. Bit Setting to Configure the Address

Upper (Lower) Nibble	S1-1 (S1-5)	S1-2 (S1-6)	S1-3 (S1-7)	S1-4 (S1-8)
0	ON	ON	ON	ON
1	ON	ON	ON	OFF
2	ON	ON	OFF	ON
3	ON	ON	OFF	OFF
4	ON	OFF	ON	ON
5	ON	OFF	ON	OFF
6	ON	OFF	OFF	ON
7	ON	OFF	OFF	ON
8	OFF	ON	ON	ON
9	OFF	ON	ON	OFF
A	OFF	ON	OFF	ON
B	OFF	ON	OFF	OFF
C	OFF	OFF	ON	ON
D	OFF	OFF	ON	OFF
E	OFF	OFF	OFF	ON
F	OFF	OFF	OFF	OFF

TABLE A-3. Examples of the Address Settings

Address (Dec.)	S1-1	S1-2	S1-3	S1-4	S1-5	S1-6	S1-7	S1-8
0x01 (1)	ON	ON	ON	ON	ON	ON	ON	OFF
0x02 (2)	ON	ON	ON	ON	ON	ON	OFF	ON
0x10(16)	ON	ON	ON	OFF	ON	ON	ON	ON
0xB5(181)	OFF	ON	OFF	OFF	ON	OFF	ON	OFF

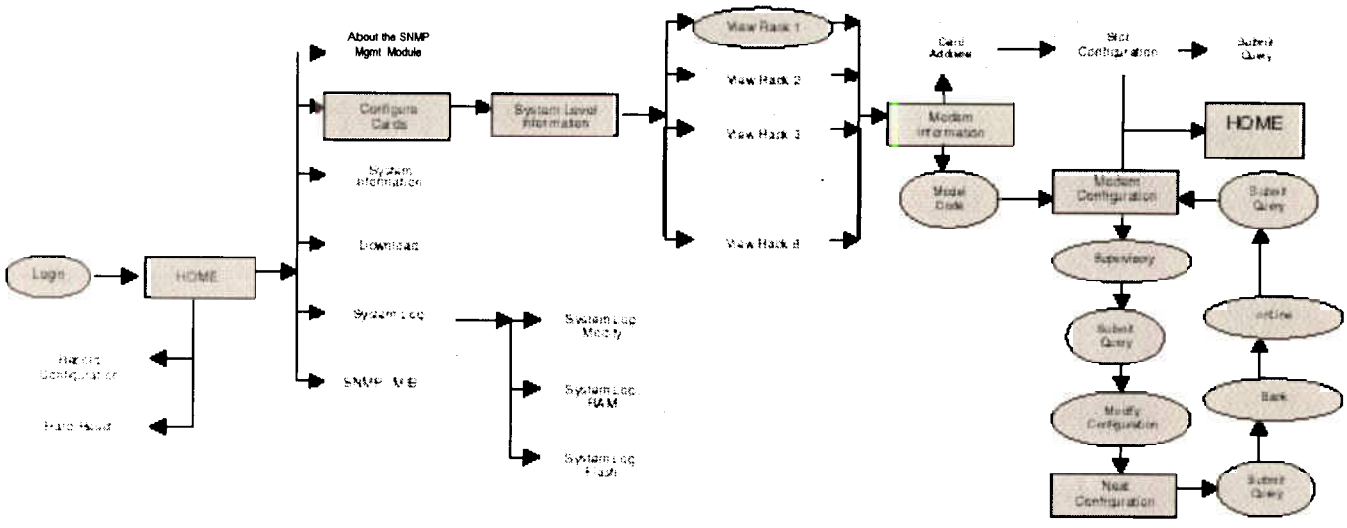
Plug-And-Play CP Setup

The **Plug-And-Play** setup allows you to forgo setting the Customer Premise box until after the management station has been installed. This means that there are NO-SETTINGS-NEEDED before the box is shipped to the end customer. The only configuration needed is to set all dip-switches to the "ON" position. This will allow the remote stand alone unit to link up with the local rack card unit. Once this is done all configuration for the local and remote unit can be done through the management station.

NOTE: When the **Plug-And-Play** is activated on the Customer Premise box, the unit will power up and default to the Receive Recover clocking mode. As the handshaking is taking place, the rack card will pass the DTE rate across the link to the remote unit. Then the units will link at that DTE/line rate. You is allowed to setup the link through the management station prior to the installation of the link with the restriction that the mDSL rack card **MUST** be either set for Internal or External clocking. This restriction is in place because the mDSL stand alone unit at the far end will default to the Receive Recovered clocking mode.

mDSL Network Management System Configuration Slot

The mDSL Network Management System Configuration Slot web page, (Figure A-1), gives you the ability to make configuration changes to the mDSL Network Management System and the remote CPE box. When you first enter the page, the unit is set to the onLine state and the current configuration is displayed. The following diagram shows the web page navigation required to get to this area of the system. This section provides a step by step example of how to make configuration changes. The end of this document shows the two main web pages that pertain to the mDSL Network Management System mDSL modems. After each web page is a description of the MIB variables that are available from the web page.

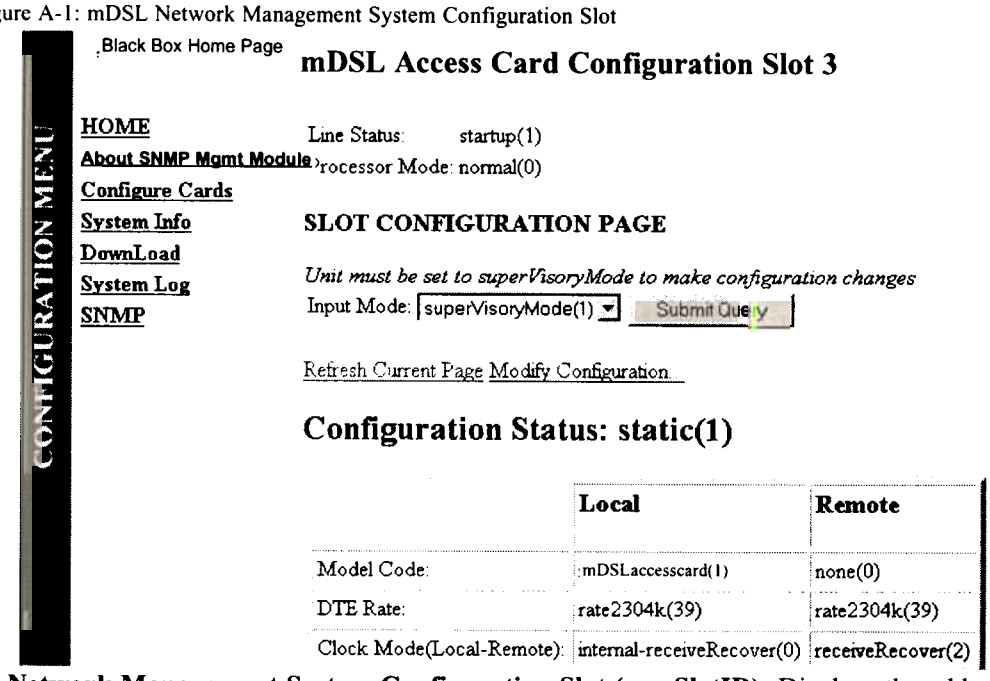


Making Configuration Changes to your Modems

Once you have reached the Modem Configuration web page, use the following steps to make configuration changes to your modems.

1) Change the Input Mode to "superVisoryMode". The Modify Configuration hyperlink will appear.
2) Select the Modify Configuration hyperlink. This hyperlink will take you to the mDSL Network Management System Next Configuration web page.
3) Make your configuration changes or select the "Set Default Configuration" button.
4) Select the "Submit Query" button to place the changes into the SNMP Management Module temporary memory. If you decide that you do not want your changes implemented, you can select the "Clear Changes" button.
5) Select the Back... hyperlink to return to the Configuration Slot web page.
6) Change the Input Mode back to "onLine" and select the "Submit Query" button. Once the unit is set back to the onLine state, the MDU9700C will start the implementation of the configuration changes. Note that the variables that you changed are now highlighted in yellow. Once the MDU9700C "gets" the new information, the highlight is removed. After all of the configuration information has been obtained, the implementation will be completed by the modems.

Figure A-1: mDSL Network Management System Configuration Slot



mDSL Network Management System Configuration Slot (nmsSlotID): Displays the address of the mDSL modem. The address is defined by the dip-switch setting of S1 on the rack card. The remote stand alone unit has no address specified, but uses that address of the rack card that it is connected to.

Line Status (lineStatusmDSL Network Management System): Displays the status of the line. There are three possible values that can be displayed: startup(1), dataMode(2), or testMode(3). When the line status is dataMode(2), the units are "linked-up" and ready to send data.

Processor Mode (processorModemDSL Network Management System) Displays the status of the processor running on the mDSL. 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 mDSL modem is monitoring itself and sending the status information to the SNMP Management Module. 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 "on-line" and the mDSL is setting up the configuratin parameters within the SNMP Management Module. At startup, all of the fields will be highlighted in yellow, signifying that they are NOT verified parameters. As the mDSL sets up the parameters, the fields are changed to a white background to signify that the display matches the setting of the card.

Input Mode (modemDSL Network Management System) To make configuration changes to the mDSL modems, you must first set this bit to superVisoryMode(1). When the Input Mode is set to superVisoryMode(1), the Modify Configuration hyperlink will appear on the web page next to the Refresh Current Page hyperlink. Select the Modify Configuration hyperlink. The mDSL Network Management System Update Configuration web page will appear. This page will be discussed in more detail in the following section. After making configuration changes to the mDSL modems in the mDSL Network Management System Update Configuration web page, return to this page and place the Input Mode variable back to onLine(0). This will notify the SNMP Management Module that the configuration has completed and will force it to copy the new configuration into the mDSL configuration space. If this is not done, the mDSL will never see the configuration changes that were made.

Configuration Status

This table shows the configuration for the set of units. There is a column for both the local and remote units. If a field is highlighted in yellow, this signifies one of two possible unknowns. At start up, the SNMP Management Module will display a default configuration for the card and all fields will be highlighted in yellow, notifying you that the information has not been verified. During the negotiation phase, the mDSL modem will update the configuration in the SNMP Management Module with its last set of stored parameters. As these fields are updated in the SNMP Management Module, the field background will change from yellow to white, signifying that the information has been updated. After the local and remote units are linked, the units will begin updating the remote information in the table, and Line Status set to datamode(2). If a rack card is installed in the rack without a customer premise unit connected, the remote information will be left as either none or highlighted in yellow, notifying you that the information has not been verified.

The following list explains the MIB variables that are shown in the **Configuration Status**. The MIB variable names are shown in the brackets with the local MIB variable first (local/remote).

Model Code (localModelCode/ remoteModelCode) These variables display the local and remote models codes for the units that were found in the specified address.

DTE rate (dteRatemDSL Network Management System) This variable displays the DTE rate for the link. Because the mDSL modems are symmetrical (same rate in both direction), there is only one MIB variable that defines the DTE rate.

Clock Mode (Local-Remote) This variable defines the clock mode for the modems. The display shows the Local clock mode (rack card) and then the remote clock mode.

Tx Data Sample Point (txdEdgemDSL Network Management System/ remotetxdEdgemDSL Network Management System) These variables define the sampling point that is used by the mDSL modems to read data from the DTE. In most situations these should always be set to normal(0). In high speed applications, there are situations that would require an inverted(1) sampling point.

TM From DTE (dteTMmDSL Network Management System/ remotedteTMmDSL Network Management System) These MIB variables define whether you would like the modems to accept test mode requests from the DTE that is connected. In normal applications this should be set to disable(1). When the application is using rear cards or interface modules that do not have loop back ability from the DTE, such as the IM2RC/IA Ethernet rear card, this variable must be set to disable(1). In most situations, if a DTE test mode is required, it should be enable only during the time that the test is needed.

HW Test Mode (testModeIndmDSL Network Management System/ remotetestModeIndmDSL Network Management System) These read-only variables notify you that the specified unit has been placed into a test mode through the hardware. This could have been done either through the front panel switches or from the DTE (if the TM from DTE is enabled). When a test mode is displayed, the field will be highlighted in blue to give you quick notification.

SW Test Mode (testModeSetmDSL Network Management System/ remotetestModeSetmDSL Network Management System) These variables notify you that the specified unit has been placed into a test mode through the management station. The management can place a unit into a test mode within the mDSL Network Management System Update Configuration page explained in more detail below.

Software Rev (softVersionmDSL Network Management System/ remotesoftversionmDSL Network Management System) These read-only MIB variables display the current version of code that is running in the mDSL modems. Check the download web page to see if the SNMP Management Module has a newer version of code available for downloading. Through the download web page, you can update the software that is running in the mDSL rack card. You can also update the software in the stand alone unit through the front panel control port on the unit.

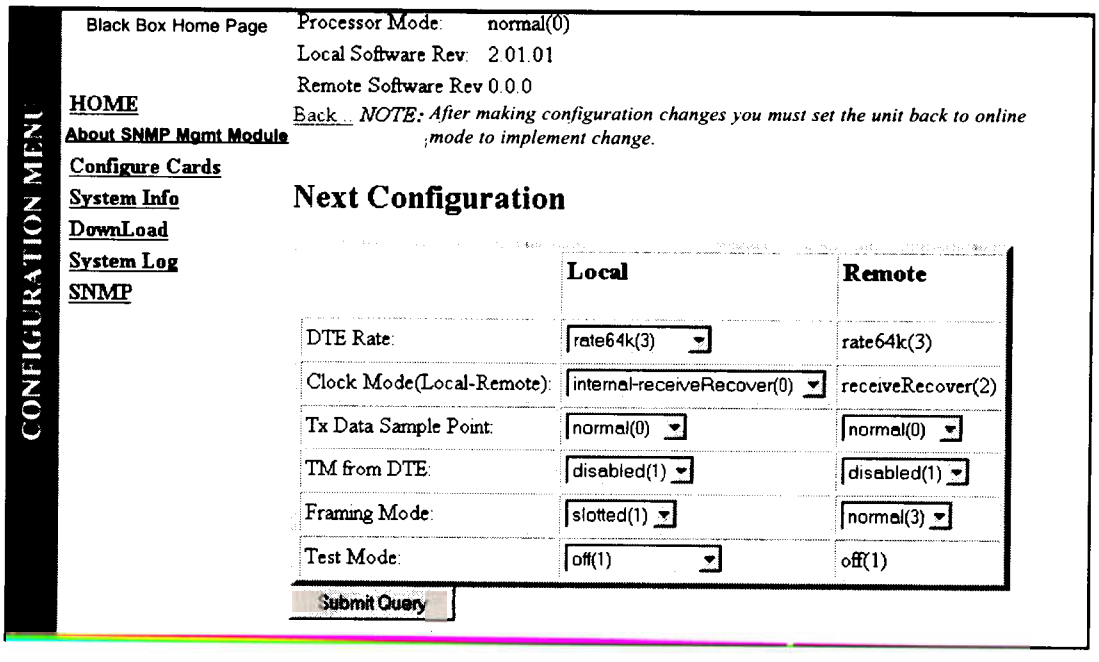
mDSL Network Management System Next Configuration

This web page allows you to update the configuration of the mDSL modems that are installed in the system. The configuration displayed on this page will be the active configuration that was displayed on the mDSL Network Management System Configuration web page discussed in the previous section. After making changes to the configuration on this page, select "Back" (to Configuration Status), then select "on Line", and finally, select "Submit Query". This will send the new information to the SNMP Management Module over the network.

NOTE: If the mDSL modems are not connected, and changes made to the remote configuration will be lost after the units link-up. All parameters in the Local column can be changed at any time.

Following the picture of the web page below, a description of each variable is given. Note that much of the information given here is also described in the previous section. In this section more detail is given regarding making changes to the variables. The same descriptions are given for ease of use.

FIGURE A-2. MDSL Network Management System Configuration



Test Mode (testModeSetmDSL Network Management System/ remotetestModeSetmDSL Network Management System) These variables allow you to place the mDSL rack card into test modes. For more information on the test modes, please see the - mDSL Test Modes section below.

Submit Query Button After making configuration changes, select "Back" (to Configuration Status), then select "on Line", and finally, select "Submit Query". This will submit all the configuration information to the SNMP Management Module. After this, the information is stored in volatile RAM until you place the Input Mode to onLine(0). This will tell the SNMP Management Module to copy all of the configuration information into the mDSL configuration space.

Clear Changes Once configuration changes have been made and you have selected the "Submit Query" button, if you decide not to implement these changes, select the "Clear Changes" button. This will set the configuration back to the settings that were there when this page was entered.

Set Default Configuration: Selecting this button will place the default configuration into the **Next Configuration Table**. You must then follow the same sequence to submit the configuration as if he had manually setup the configuration.