

HPs Tape Library Remote Management Card (RMC)

Diane M. Miller

Hewlett-Packard Company
Storage System's Division
Greeley, Colorado

Phone: (970) 350-4088
FAX: (970) 350-4675
diane_m_miller@hp.com

HP Tape Library Remote Management Card

I. Abstract

The HP library built-in Remote Management Card (RMC) allows remote management and monitoring of your library through either a 10Base-T or a 100 Base-TX connection from your library to the network. This remote management functionality allows you to monitor your library from almost anywhere through comprehensive and user friendly web pages. It also provides a TapeAlert agent that can send TapeAlert events via SNMP to device management applications. Many instances of tape library fault situations can be detected and remedied from a single console in a remote location.

These libraries can be managed on the network - just like any other IP device when they are integrated into applications like OpenView Network Node Manager. Application plug-ins for some popular applications can be downloaded from www.automatedbackup.com.

II. Introduction

Today, where concise extensive backups are so essential to a business's profitability and viability IT Administrators literally can become "chained" to their computer rooms until correct backups are completed. Many times operators need to be physically available to run cleaning tapes on libraries, diagnose, fix, and physically "baby sit" their libraries while the backups are running.

Some of the above mentioned common tasks can be made easier and done from a remote console by using the Remote Management Card (RMC) included with the Hewlett-Packard libraries - SureStore 2/20, 4/40, 6/60, etc. These RMCs make many of the necessary library administration tasks easier, faster and best of all, available remotely - from anywhere you can get on the network and launch a web browser! And, there is no software to install and configure!

The Remote Management Card is a hardware-based solution that provides OS independence and zero software installation. This interface has been integrated with applications such as Network Node Manager and can be accessed from these applications. Since the RMC is truly integrated, applications like Network Node Manager can alert an operator when a library has a problem. The operator can go deeper into interface to diagnose and even fix some problems in the library configuration, right from the NNM console. Integration of the RMC web interface can be easily included in other applications that handle network management or backup operations.

This paper will discuss several topics that can make an administrator's life easier. First will be described the features of the RMC web interface, how to diagnose problems and

change configurations. The RMC features will be briefly discussed as well as some of the application integration information.

III. Overview of the RMC

Traditionally we have checked library status by either being notified that our backup has failed or by seeing some light or message appear on the library front panel. When a backup fails, that may mean several more hours in the computer room until the backup has been restarted and completes successfully. The second method of checking the library status, looking at the messages and/or lights on the front panel of the library, demands hands-on and physically viewing the backup device. Often, libraries are stacked in a computer room a great distance from the management console so this method can get a little tiresome and cumbersome. The RMC gives a third, easy-to-use method of checking a library's status and diagnosing problems from a single management console.

The web pages provide the following:

- Status information for drives, tapes, and the library
- Library configuration information and operations
- Logging of TapeAlert messages from the library and drive
- Error reporting and comprehensive error logs
- Firmware downloads
- Support information

What is a Remote Management Card?

The RMC is a built-in hardware feature of the Hewlett-Packard and other libraries that enable system administrators or backup operators who need worry free backup and restore operations to have a web based tool that allows management of their automated backup products from anywhere. It is OS independent and requires ZERO software installation. The RMC provides a powerful configuration and diagnostic tool that fits most environments.

Supported Configurations

RMC web access is supported from the following system configurations: MS Internet Explorer 4.01 or higher and Netscape Communicator 4.5 or higher on HP-UX, Solaris, and Windows NT/95/98.

Connecting the RMC

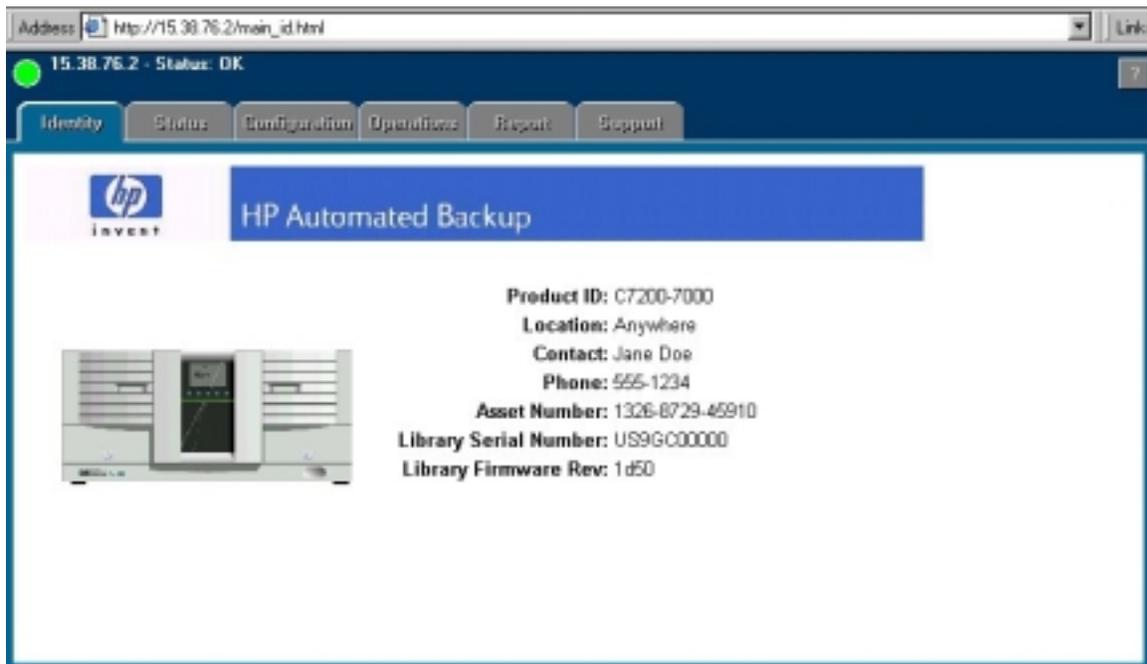
Connect the RMC to your network via either 10 BaseT or 100 BaseTX. Then set the IP address, subnet mask, and default gateway from the front panel of the library. Reboot the library. Once the library is on-line, from your Netscape or Internet Explorer browser on the supported management workstations, type in:

http://<IP Address of Library>
or
http://<Hostname of Library>

Then, the *Identity Page* will appear with the basic information about the library. The navigation tabs will help guide you to the information and operation areas you are seeking.

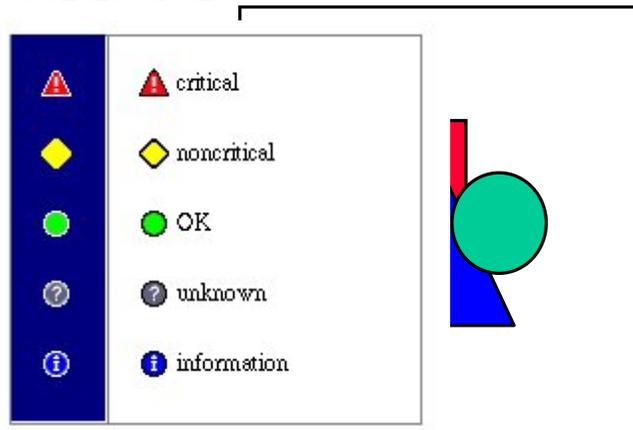
IV. Identity Page

When this page is accessed for the first time, the user-configurable information (Contact, Location, Phone and Asset Number) are *unset*. This information can be modified using the General page under the Configuration tab.

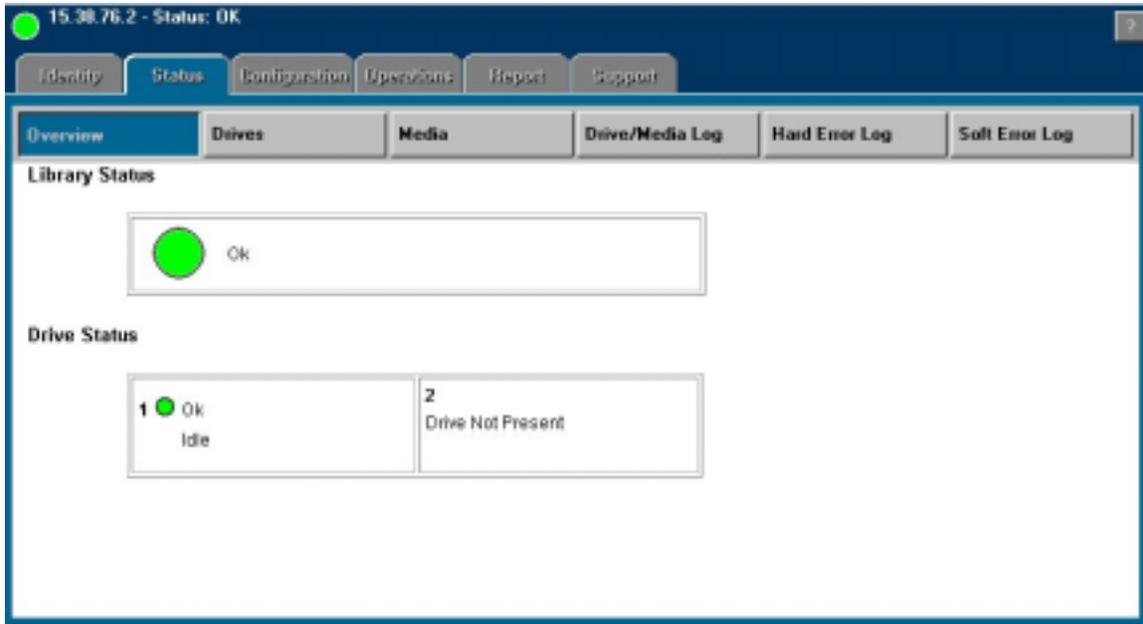


V. Library Status

In the upper left corner of all RMC screens, a general library status icon is present. It also includes a brief message about the status. The following legend outlines the meaning of the status icons displayed on the screen.



- Critical: You must deal with this problem quickly.
- Non-critical: Something to keep an eye on.
- OK: No problems seen.
- Unknown: Rarely encountered, might occur for a new component for which event messages are not yet implemented.
- Information: Usually used to inform you that a problem has been corrected, a new device has been added, etc.



More detailed information is accessible through the navigation tabs from this screen:

- Status for each drive on the library
- Media locations, barcodes and summary
- Drive and media log file
- Hard error log file
- Soft error log file

Some sample screens follow:

15.38.76.2 - Status: OK

Identity Status Configuration Operations Report Support

Overview Drives Media Drive/Media Log Hard Error Log Soft Error Log

Summary Number of Mailslots: 1 Slots in Use: 5
 Total Slots and Mailslots: 20 Slots Available: 14

Drawer 1		Drawer 2	
10	Tape in Drive 1	11	Empty
9	Empty	12	Empty
8	AF8398	13	Empty
7	Empty	14	CLN013
6	Empty	15	Empty
5	Empty	16	Empty
4	Empty	17	Empty
3	Empty	18	Empty
2	Empty	19	Full
1	Empty	M1	Full



15.38.76.2 - Status: OK

Identity Status Configuration Operations Report Support

Overview Drives Media Drive/Media Log Hard Error Log Soft Error Log



Drive 1
 Status: Full
 Activity: Idle
 Cleaning Status: Ok
 Type: DLT 7000
 Serial Number: C7843S0529
 SCSI ID: 1
 Firmware Revision: 00
 Number of Loads: 845
 Power-on Hours: 6266
 Power-Cycle Count: 4634
 Compression: Off

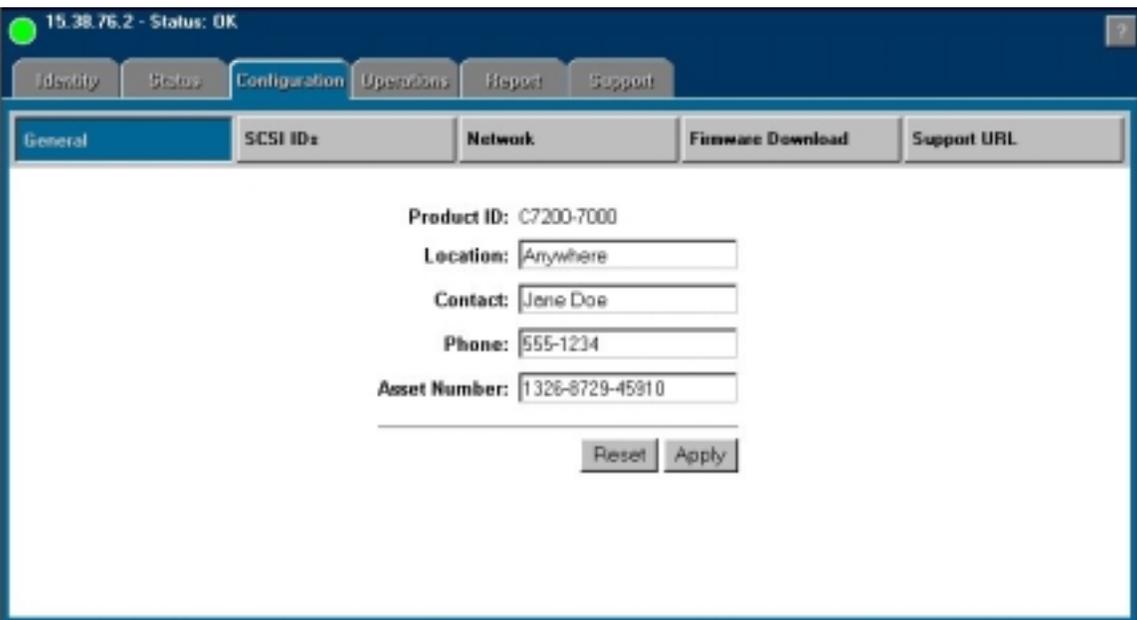
Media Type: Unknown format
 Barcode Label:

VI. Viewing and Changing Library Configuration

A great wealth of library information and configuration settings are available from the RMC web pages. The ability to change most of these configurations is possible from the web pages but, for security reasons an administrator password is required. If the library administrator password is not set, the user will not be allowed to change any configurations. In order to save or change configurations through the web interface, the user is required to set the library administrator password from the front panel of the library.

General Page

This page allows the user to configure the information shown on the Identity page. The fields that are configurable include the library location, contact name, phone number and asset number fields. To save the changes, click the "Apply" button at the bottom of the screen. These changes are reflected on the Identity page.



The screenshot displays the RMC web interface. At the top, a status bar shows "15.38.76.2 - Status: OK" and a help icon. Below this is a navigation menu with tabs for "Identity", "Status", "Configuration", "Operations", "Report", and "Support". The "Configuration" tab is active, and within it, the "General" sub-tab is selected. The main content area shows the following configuration fields:

- Product ID: C7200-7000
- Location:
- Contact:
- Phone:
- Asset Number:

At the bottom of the form, there are two buttons: "Reset" and "Apply".

SCSI INFORMATION

If there is a Fibre Channel interface present on the library, this page will not be displayed.

From this page, it is easy to see the current SCSI IDs for the library and the drives(s). New SCSI ID may be set by selecting new ones from the pull-down menus. To save these changes, use the "Apply" button at the bottom of the screen.

Fibre Channel

This page will not be displayed if your library does not have any Fibre Channel Card(s).

If this page is available, the current fibre channel loop status, card AL_PA, address type (hard or soft) and world wide name are displayed. Like the SCSI IDs, the fibre channel configurations may be modified using the pull-down menus to select new settings. Use "Apply" to save any changes.

Networking

The current network information including TCP/IP configurations and SNMP trap destinations for the selected library is displayed on this page.

The TCP/IP information may be set to configure automatically by selecting the "Obtain an IP address from a DHCP/BOOTP server" button, or manually by selecting the "Specify an IP Address" button. If the manual option is chosen, the user must enter the IP address, subnet mask and default gateway.

SNMP trap destinations are displayed under the SNMP trap destination category. When a TapeAlert event occurs, an SNMP trap is sent out to all the consoles displayed under the SNMP trap destination category. Up to five trap destinations can be configured. Any of the TCP/IP configurations and/or the SNMP trap destination information may be changed.

15.38.76.2 - Status: OK

Identity Status **Configuration** Operations Report Support

General SCSI IDs **Network** Firmware Download Support URL

TCP/IP

Obtain network parameters automatically from a DHCP/BOOTP server

Specify network parameters manually

IP Address:

Subnet Mask:

Default Gateway:

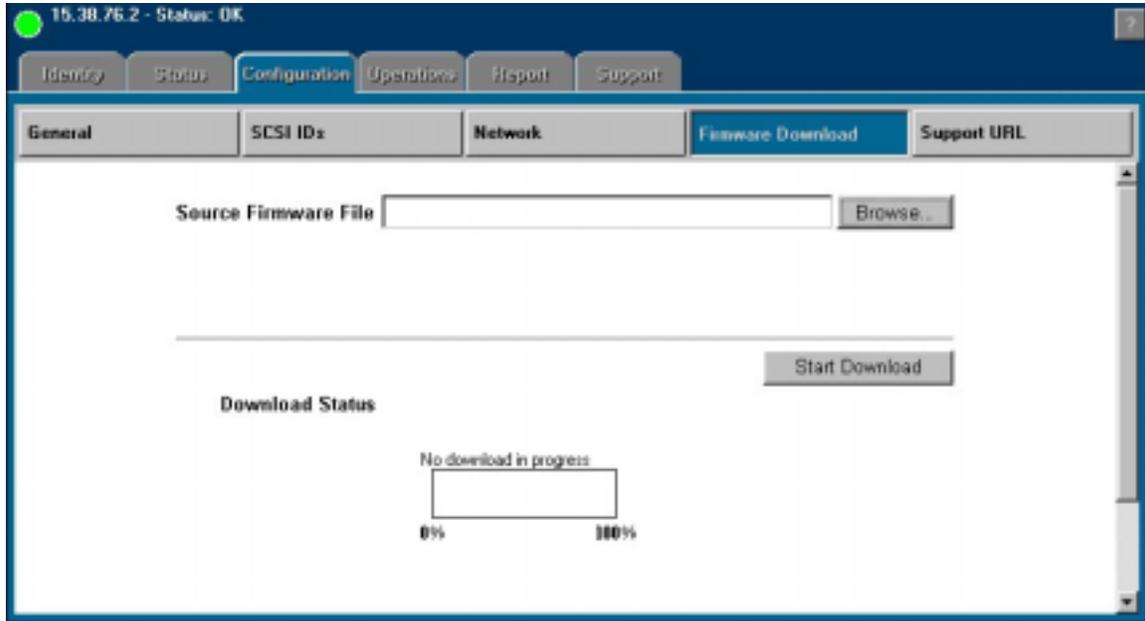
MAC Address: 00 10 83 65 03 c1

SNMP

Trap Destination IP address 1:

Library Firmware Download

Downloading library firmware is greatly simplified by using the RMC. First, download the new library firmware from www.autmatedbackup.com. Then, by either typing in the full pathname for the file or using the "Browse" button to locate the library "whole product" download file, you may download new firmware to the library. The "Start Firmware Download" button begins the actual process of downloading firmware for all library components except the drive(s). Once the download process starts, the progress and status of the download is displayed on the lower half of the screen as seen in the window below.

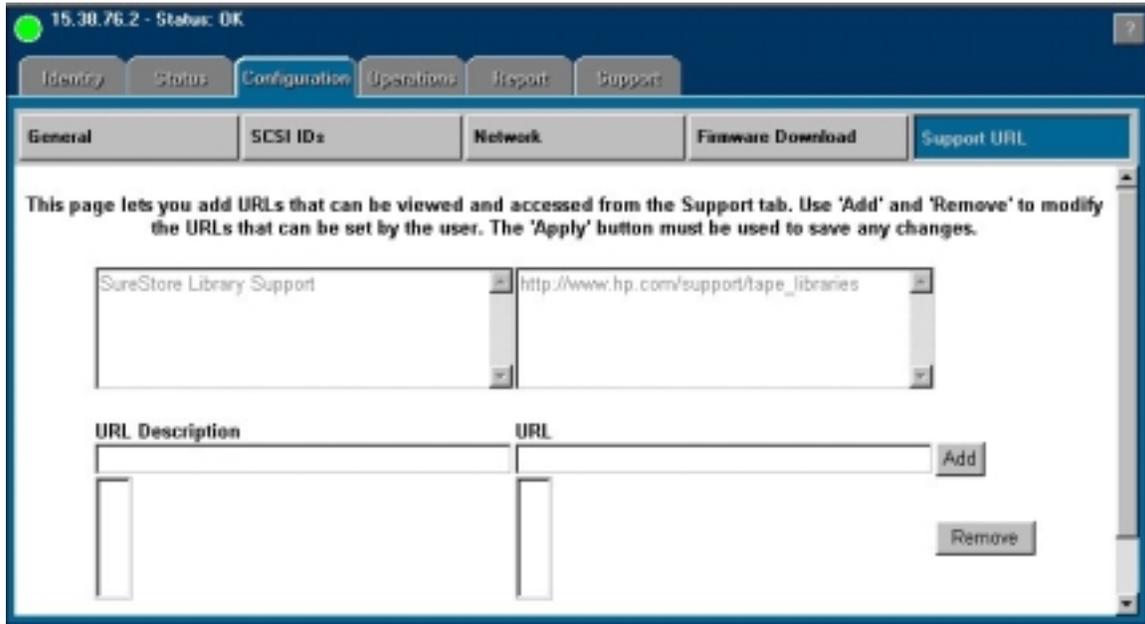


The library administrator password **is** required to download firmware.

It is recommended that you use the Firmware Download page to upgrade your library's firmware. But, if for some reason you cannot access the web pages, there is an alternate method to do the firmware upgrade using FTP that is explained in the on-line documentation. To get this documentation screen, click on the button with the "?" from this firmware download page and the explanation will appear in a window.

Support URLs

This page displays the static (default) and dynamic (configurable) URLs for customer support. The static URLs cannot be modified. You can add your own URLs to the "dynamic" list by using the "Add" or "Delete" buttons. To save any changes you have made, use the "Apply" button at the bottom of the screen. The changes made to the information on this page will be reflected on the Support page.



VII. Operations

The Operations page has six sub-pages. The Operations sub-pages allow specific library operations (listed below) to be performed via the RMC. You may perform these operations if you have administrative privileges. You will be asked to enter the Administrator password (same as the library administration password) when attempting to use any of the library operations. If the password is validated, you are given administrative privileges and the operations will be executed on the library.

If the library administrator password is not set, you will not be allowed to use the operations. In order to use the operations through the web interface, the library administrator password must be set from the front panel of the library.

After performing these operations you may need to reconfigure or notify your backup software application so it can accommodate these changes.

Unload Media

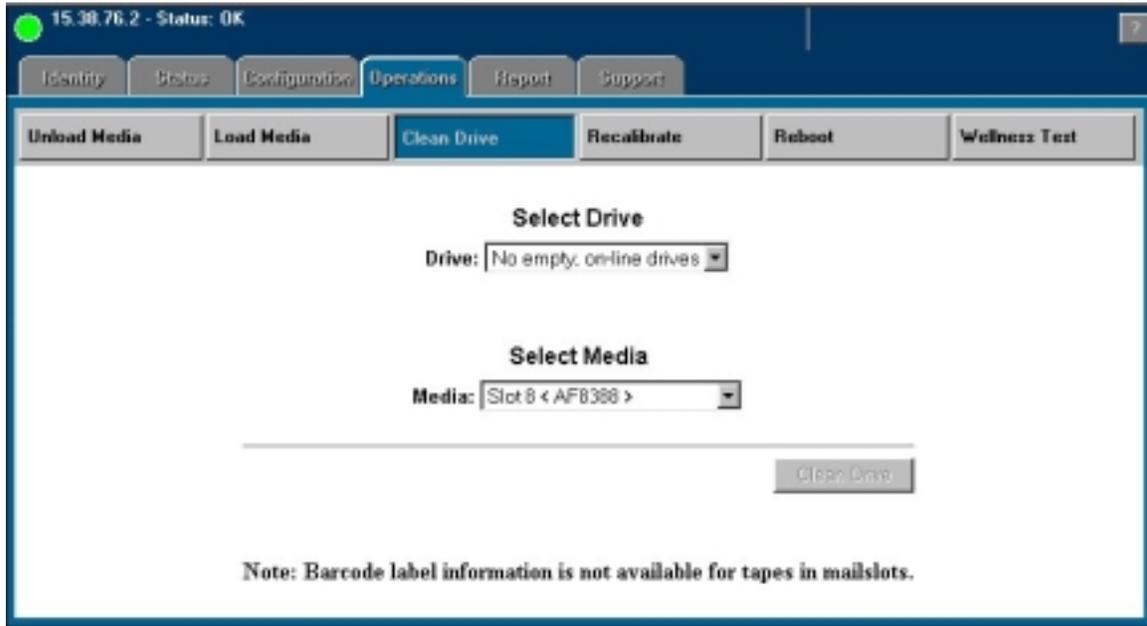
Any on-line and full drive to be unloaded from this page. The media is returned to the location from which it was originated (its starting slot location before being loaded into the drive).

Load Media

From this page any on-line and empty drive can be loaded with any available media.

Drive Cleaning

Any on-line and empty drive can be cleaned when a cleaning cartridge is put in the drive from this page though you must know which available media is a cleaning cartridge. Loading of a non-cleaning cartridge will cause this operation to fail.



The screenshot shows a web interface for a library management system. At the top, the IP address is 15.38.76.2 and the status is OK. The main navigation bar includes tabs for Identity, Status, Configuration, Operations, Report, and Support. Below this, a secondary navigation bar has buttons for Unload Media, Load Media, Clean Drive (which is highlighted), Recalibrate, Reboot, and Wellness Test. The main content area is titled 'Select Drive' and shows a dropdown menu for 'Drive' with the text 'No empty, on-line drives'. Below that is a 'Select Media' section with a dropdown menu for 'Media' showing 'Slot 8 < AF8388 >'. A 'Clean Drive' button is located at the bottom right of the form area. A note at the bottom of the page states: 'Note: Barcode label information is not available for tapes in mailslots.'

Recalibrate System

From this page the power-up self-tests can be performed. Each test will be run once. This operation also recalibrates the mechanics and clears any hard error.

Reboot System

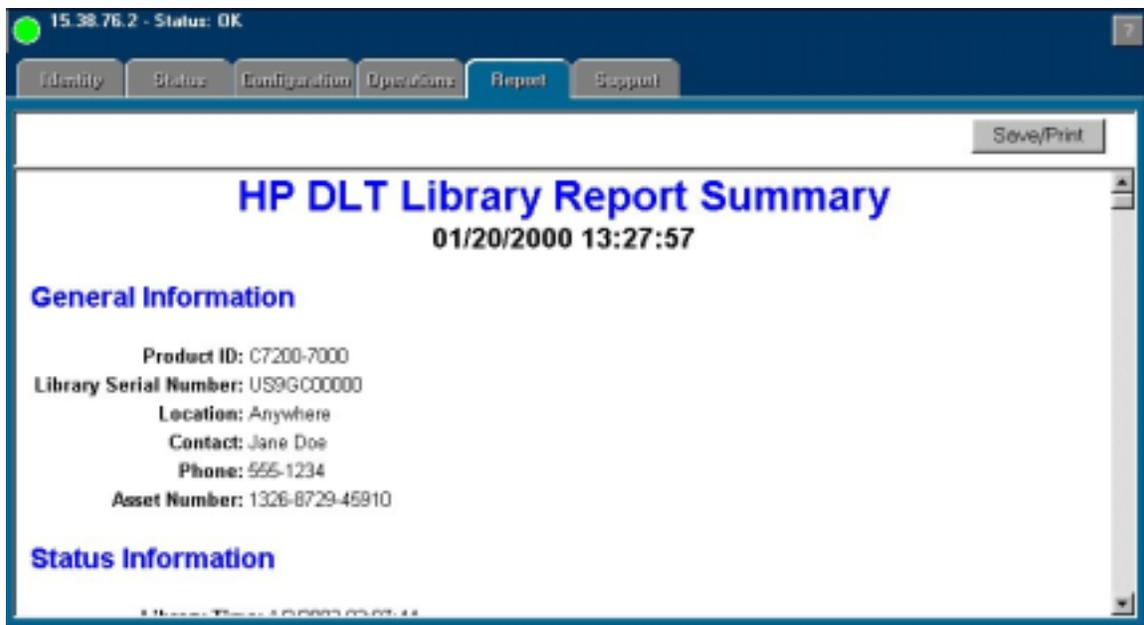
The library can be rebooted from this page. Rebooting the library is equivalent to powering off the device. Network operation will be interrupted while the device is performing its self-test and initialization tasks. The web browser will try to close. You will have to restart your browser to this site after this operation is complete.

Perform System Wellness Test

When you start a wellness test from this page, it causes the library to move a tape from a random slot to an empty drive, repeats the process until all drives are full and returns all tapes to their original slots. Make sure you have at least one tape and one open slot available.

VIII. Report Generation

From the *Report* tab of the main web page, a full report of all the library and drive information can be seen and printed. This report includes: status of the drives, library media inventory, physical library information, drive information, bus addresses, and log files. This report is a collection of information from the Identity, Status, and Configuration pages. To save or print the Report page, click on the "Save/Print" button. This will bring up the Report page in a separate browser window. Use the browser's "Save As" or "Print" options to save or print the Report page. You can either fax the printed report or attach the saved file to an email and send it out to the appropriate support team for troubleshooting.



IX. Integration of RMC with Applications

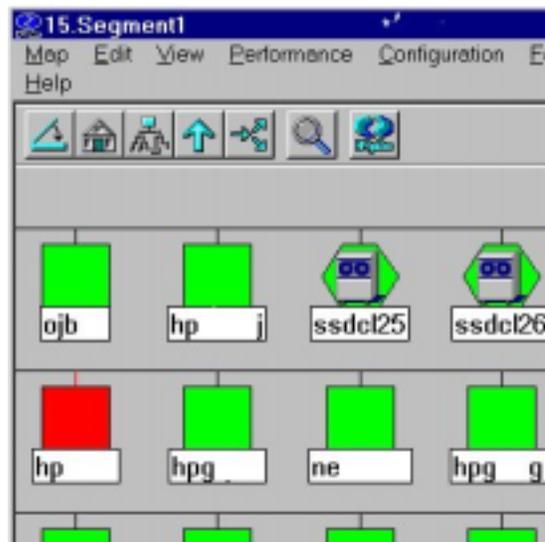
The growing list of applications that have been integrated with the RMC web pages can be found on the web site: www.automatedbackup.com. Several of the software plug-ins that are necessary to run in that integrated environment are available and can be downloaded from that site.

In many cases, the applications, such as backup applications, simply supply an access button on their current interface that will start a browser at the indicated library IP Address. Other application plug-ins, such as the Tape Alert plug-in for Network Node Manager (NNM), get a little more complex. The Tape Alert Plug-in for Network Node

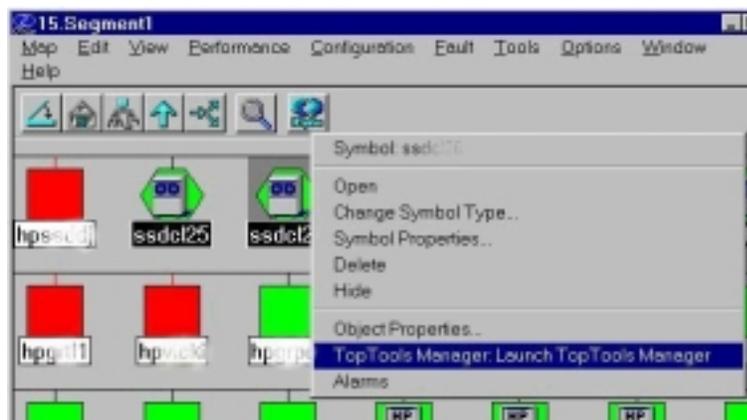
Manager plug-in extends the functionality of Network Node Manager so that it will discover and manage tape and tape library devices associated with Tape Alert agents. It supports Tape Alert agents that are embedded in HP DLT Libraries as well as Tape Alert agents in backup applications.

Discovery

Since the RMC has a Tape Alert Agent as well as an on-board SNMP agent, and its own IP Address, NNM can discover the library, interrogate its status, and notify the operator, using normal NNM status colors.



Once the libraries are on the object map, the symbol for the library can be highlighted, the object pull-down menu accessed and Top Tools manager can be launched.



From this Manager, Tape Alert events can be viewed, special situations monitored with even a special category of events for the tape library events.

The plug-ins create a seamless work console for managing backups, device management, and the tape libraries that is even easier to monitor and manage from any console on your network.

X. Conclusion

The HP library built-in Remote Management Card with or without plug-ins can make an administrator's job easier. This hardware -based solution allows remote management and monitoring of your library through either a 10Base-T or a 100 Base-TX connection from your library to the network. Many instances of tape library fault situations can be detected and remedied from a single console in a remote location. Life for the system administrator just got a little bit easier!