Sun™ Management Center Hardware Diagnostic Suite 1.1 User's Guide

THE NETWORK IS THE COMPUTER™

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Preface

The *Sun™ Management Center Hardware Diagnostic Suite 1.1 User's Guide* provides instructions on how to use the Hardware Diagnostic Suite 1.1 software through the Sun Management Center 3.0 application.

Note – The Sun™ Management Center Hardware Diagnostic Suite 1.1 is referred to as the Hardware Diagnostic Suite throughout this document.

Note – The Sun™ Management Center software version 3.0 is referred to as Sun Management Center throughout this document.

Before You Read This Book

In order to fully use the information in this document, you must have knowledge of the topics discussed in the *Sun Management Center 3.0 Software User's Guide*.

How This Book Is Organized

Chapter 1 provides an overview of the Sun Hardware Diagnostic Suite application.

Chapter 2 describes how to access the Sun Hardware Diagnostic Suite application.

Chapter 3 describes how to configure, run, schedule, and review a Sun Hardware diagnostic Suite test session.

Chapter 4 describes how to view and customize the Sun Management Center alarms for use with the Sun Hardware Diagnostic Suite.

Appendix A contains descriptions of the Sun Hardware Diagnostic Suite tests.

Appendix B describes the Hardware Diagnostic Suite console panels, buttons and menus.

Using UNIX Commands

This document does not contain information on basic UNIX® commands and procedures such as shutting down the system, booting the system, and configuring devices.

See one or more of the following for this information:

- AnswerBook2™ online documentation for the Solaris™ software environment
- Other software documentation that you received with your system

Typographic Conventions

TABLE P-1 Typographic Conventions

Typeface	Meaning	Examples
`AaBbCc123`	The names of commands, files, and directories; on-screen computer output	Edit your `.login` file. Use `ls -a` to list all files. `% You have mail.`
`AaBbCc123`	What you type, when contrasted with on-screen computer output	`% su` `Password:`
AaBbCc123	Book titles, new words or terms, words to be emphasized	Read Chapter 6 in the *User's Guide.* These are called *class* options. You *must* be superuser to do this.
	Command-line variable; replace with a real name or value	To delete a file, type `rm` *filename.*

Shell Prompts

TABLE P-2 Shell Prompts

Shell	Prompt
C shell	*machine_name*%
C shell superuser	*machine_name*#
Bourne shell and Korn shell	$
Bourne shell and Korn shell superuser	#

Related Documentation

TABLE P-3 Related Documentation

Title	Part Number
Sun Management Center 3.0 Software Installation Guide	806-5943-10
Sun Management Center 3.0 Software User's Guide	806-5942-10
Sun Management Center 3.0 Software Release Notes	806-5944-10

Additional information about Sun Management Center software is available from:

`http://www.sun.com/sunmanagementcenter`

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CHAPTER 1

Hardware Diagnostic Suite Overview

This chapter covers the following topics:

- "What is the Hardware Diagnostic Suite?" on page 2
- "Hardware Diagnostic Suite Architecture" on page 3
- "Installing and Uninstalling the Hardware Diagnostic Suite Software" on page 7

What is the Hardware Diagnostic Suite?

The Hardware Diagnostic Suite 1.1 application is a Sun Management Center 3.0 software solution that tests and validates Sun SPARC hardware in an enterprise environment.

The Hardware Diagnostic Suite enhances system availability by stimulating and detecting hardware faults, and warning you of latent problems before they cause system downtime.

Features

- Provides tests that stimulate, detect, and report failing field replaceable units (FRUs) with suggested steps for problem resolution, enhancing system availability.
- Performs testing that is data-safe, not resource intensive, and can run concurrently with day-to-day applications.
- Supports networked systems, enabling administrators to monitor and manage multiple test sessions on Sun systems remotely.
- Provides the ability to schedule test sessions to run automatically one time, or periodically, for routine system validation.
- Provides the ability to alert the system administrator to important Hardware Diagnostic Suite events through the Sun Management Center alarm management features.
- Logs all test session details in easily accessible log files.
- Takes advantage of the Sun Management Center enterprise-wide security measures to authorize or limit user access.

Note – The Hardware Diagnostic Suite is not intended for stressful or data destructive off-line testing, testing when no operating system is running, or analyzing data for failure prediction.

Hardware Diagnostic Suite Architecture

The Hardware Diagnostic Suite is composed of three components:

- Hardware Diagnostic Suite (HDS) agent and tests
- Hardware Diagnostic Suite (HDS) server
- Hardware Diagnostic Suite (HDS) console

Each Hardware Diagnostic Suite component is installed with the corresponding Sun Management Center (SunMC) component during the Sun Management Center installation.

The communication between these components is shown in FIGURE 1-1 and described in the following
sections.

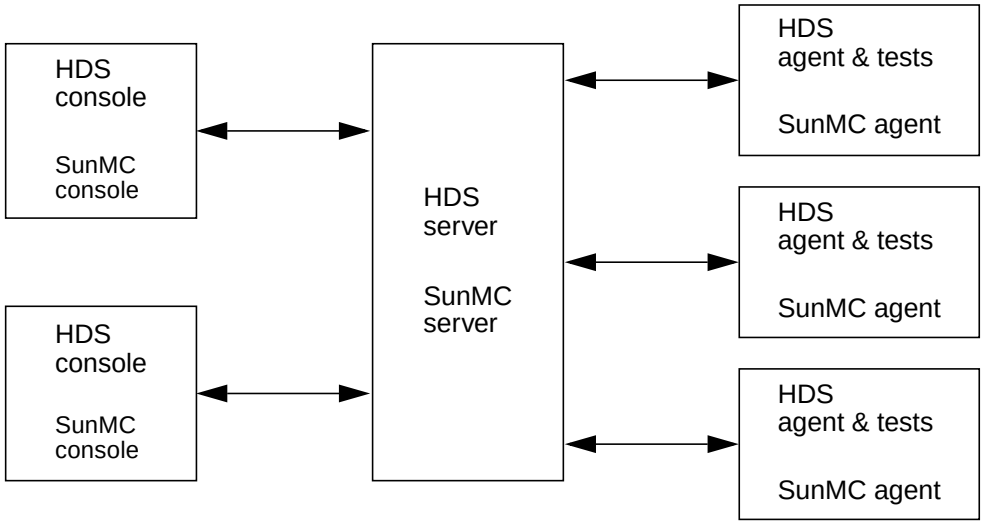

FIGURE 1-1 Communication Between Hardware Diagnostic Suite Components

Hardware Diagnostic Suite Agent and Tests

Agent

The Hardware Diagnostic Suite agent component manages the test session on a given host. The agent interacts with the Hardware Diagnostic Suite server to pass test information to the appropriate Hardware Diagnostic Suite console. The agent performs the following activities:

- Probing of the host's configuration
- Test session execution
- Test session monitoring
- Notification and logging of test error messages

The Hardware Diagnostic Suite agent is installed on the host where diagnostic testing is to be performed and where the Sun Management Center agent is installed.

Tests

The collection of tests in the Hardware Diagnostic Suite application includes tests for communication, memory, network, peripherals, processor, and storage enclosure hardware. These tests support device testing in a 32-bit and a 64-bit Solaris operating environment.

You can select any number of tests for a given test session. Each test runs non-intrusively, and non-destructively, so each Hardware Diagnostic Suite test session is safe to run on a system that is running other applications.

The tests are installed on the host where diagnostic testing is to be performed and where the Sun Management Center agent is installed.

Hardware Diagnostic Suite Server

The Hardware Diagnostic Suite server component accepts requests from the console and passes these requests to the appropriate Hardware Diagnostic Suite agent. It then relays the response from the agents back to the console.

The multithreaded server is based on Java™ technology and handles multiple data requests from various Hardware Diagnostic Suite agents and users.

The Hardware Diagnostic Suite server is installed with the Sun Management Center server. The server components only need to be installed on a single host in the enterprise network in order to communicate with other agents and consoles, but that host must also have the Sun Management Center server installed.

Hardware Diagnostic Suite Console

The Hardware Diagnostic Suite console (FIGURE 1-2) is the graphical user interface between you and the Hardware Diagnostic Suite server. It enables you to do the following:

- Select devices to test
- Initiate testing
- Monitor a test session
- Access log information
- Schedule testing

The Hardware Diagnostic Suite console runs in the Sun Management Center console details window.

Appendix B describes each Hardware Diagnostic Suite console window panel, dialog box, and control button.

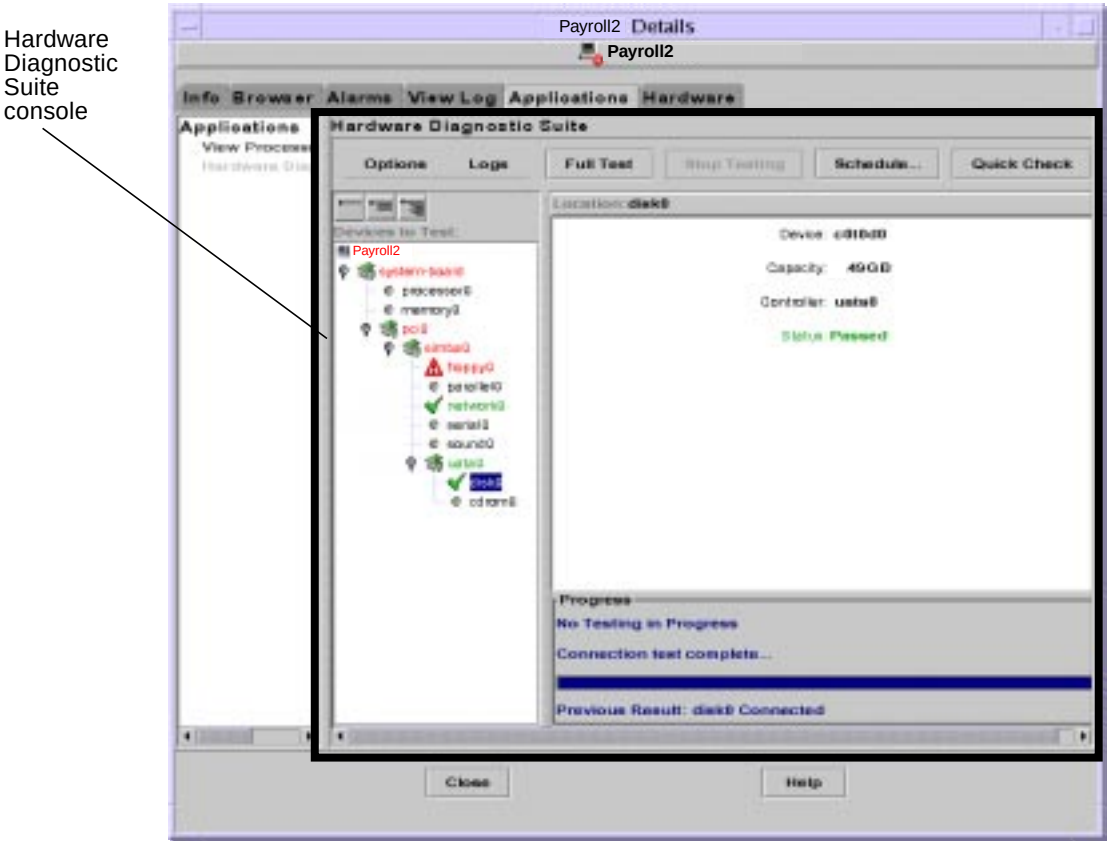

FIGURE 1-2 Hardware Diagnostic Suite Console

Installing and Uninstalling the Hardware Diagnostic Suite Software

The Hardware Diagnostic Suite software is automatically installed when you install the Sun Management Center software with the `es-inst` script, and uninstalled with the Sun Management Center `es-uninst` script.

Refer to the Sun *Management Center 3.0 Installation Manual* for:

- System requirements
- Supported systems
- Pre-installation information
- Installation and uninstallation instructions

Note – Refer to the *Hardware Diagnostic Suite 1.1 Release Notes* for information on configd dependencies.

Hardware Diagnostic Suite Packages

The installation of Hardware Diagnostic Suite is performed through the Sun Management Center software installation script, never by installing individual packages. However, for general information, the following table lists the packages that make up Hardware Diagnostic Suite.

TABLE 1-1 Hardware Diagnostic Suite Packages

Package Name	Description
`SUNWed`	Hardware Diagnostic Suite server and console package
`SUNWedag`	Hardware Diagnostic Suite agent and tests package
`SUNWedagx`	Hardware Diagnostic Suite 64-bit agent and tests package
`SUNWedss`	Hardware Diagnostic Suite server system files
`SUNWedcom`	Hardware Diagnostic Suite common components
`SUNWedh`	Hardware Diagnostic Suite help package

Note – For the names of the localized packages refer to the release notes.

CHAPTER 2

Accessing Hardware Diagnostic Suite Software

This chapter describes “Accessing Hardware Diagnostic Suite Through Sun Management Center” on page 9.

Note – The Hardware Diagnostic Suite software is automatically installed when you install the Sun Management Center software. Refer to the Sun *Management Center 3.0 Installation Manual* for details.

Accessing Hardware Diagnostic Suite Through Sun Management Center

Below is an outline of the procedures that you perform to access the Hardware Diagnostic Suite software through Sun Management Center. It is important to perform these procedures in the order listed. Detailed, step-by-step instructions follow.

1. Start the Sun Management Center server and agent (refer to the *Sun Management Center 3.0 Software User’s Guide* for details). These Sun Management layers are usually automatically running on the systems for which they are installed.
2. Start the Sun Management Center console (page 10).
3. Access the Hardware Diagnostic Suite console through Sun Management Center console (page 12).

▼ To Start the Sun Management Center Console

Note – The following procedure assumes that the Sun Management Center application (the Sun Management Center server and agent) is already running in your enterprise network. For information on starting the Sun Management Center application, refer to the *Sun Management Center 3.0 Software User's Guide*.

---

1. **Start the Sun Management Center console:**

```
# /opt/SUNWsymon/sbin/es-start -c &
```

Note – You do not have to be superuser to start the Sun Management Center console.

The Sun Management Center Login dialog box is displayed (FIGURE 2-1).

2. **Log in to Sun Management Center.**

You must supply the following information:

- Login ID—A valid Solaris user account. This account must also be listed in the `/var/opt/SUNWsymon/cfg/esuers` file on the Sun Management Center server machine.
- Password—The valid Solaris password for the login account
- Server Host—The hostname of the Sun Management Center server.

FIGURE 2-1 Sun Management Center Login Dialog Box

3. **Click the Login button.**

The Sun Management Center main console window is displayed (FIGURE 2-2)

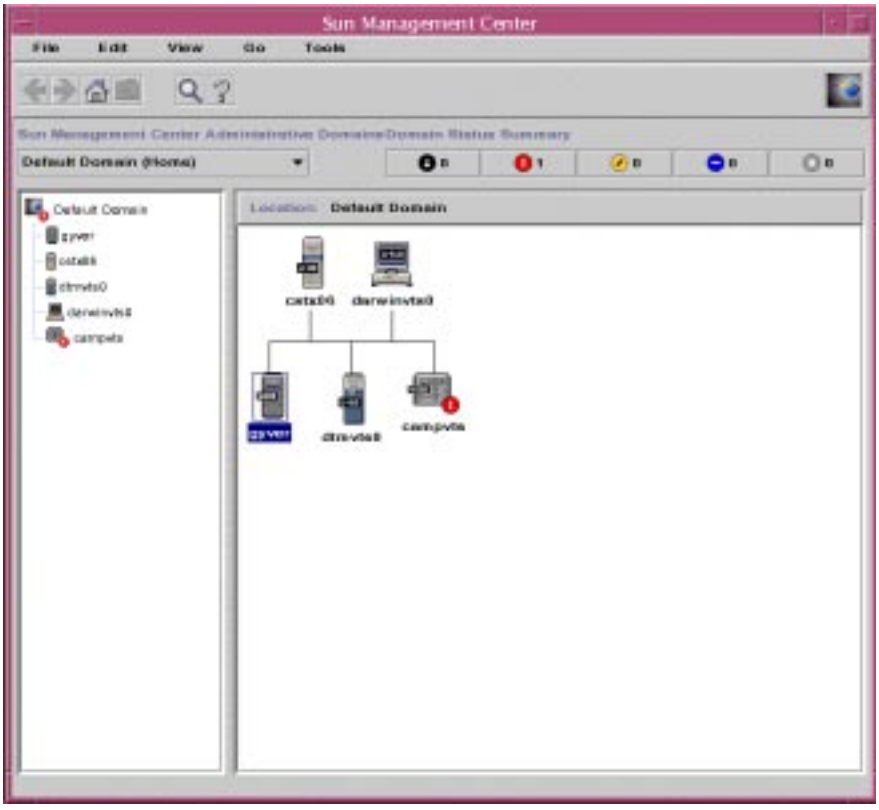

FIGURE 2-2 Sun Management Center Main Console Window

▼ To Access Hardware Diagnostic Suite Console Through Sun Management Center

1. **Locate the host you want to test in the Sun Management Center main window (**FIGURE 2-3**).**

Note – If you cannot locate the host, consider the following:

- Make sure you have the correct Sun Management Center domain.
- See if the host is configured as an object in Sun Management Center.
- Use the Sun Management Center topology search feature by selecting Go➤Search to search for the desired host.

Refer to the *Sun Management Center 3.0 Software User's Guide* for more details.

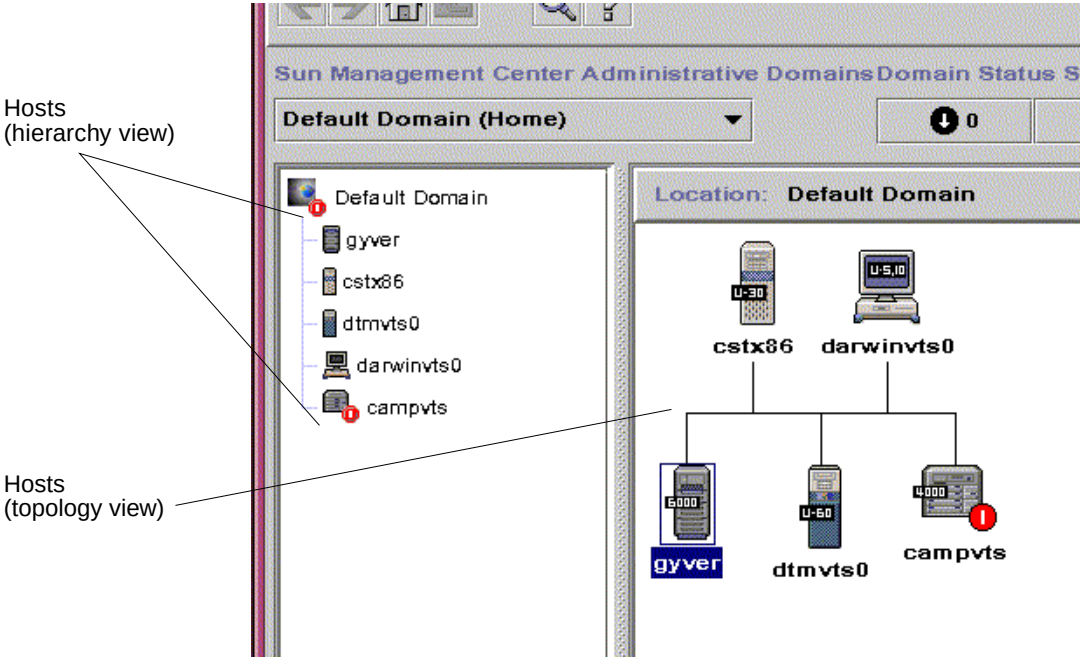

FIGURE 2-3 Hosts in the Sun Management Center Main Window

2. **Select the host for testing in one of the following ways:**
   - With your left mouse button, double-click the selected host icon in the hierarchy view or the topology view.
   - Click the right mouse button on the desired host and highlight Details from the pop-up menu in the hierarchy or topology view.
   - With your left mouse button, click the selected host icon in the hierarchy view or the topology view, then select Tools➤Details.

The Details window for the selected host is displayed (FIGURE 2-4).

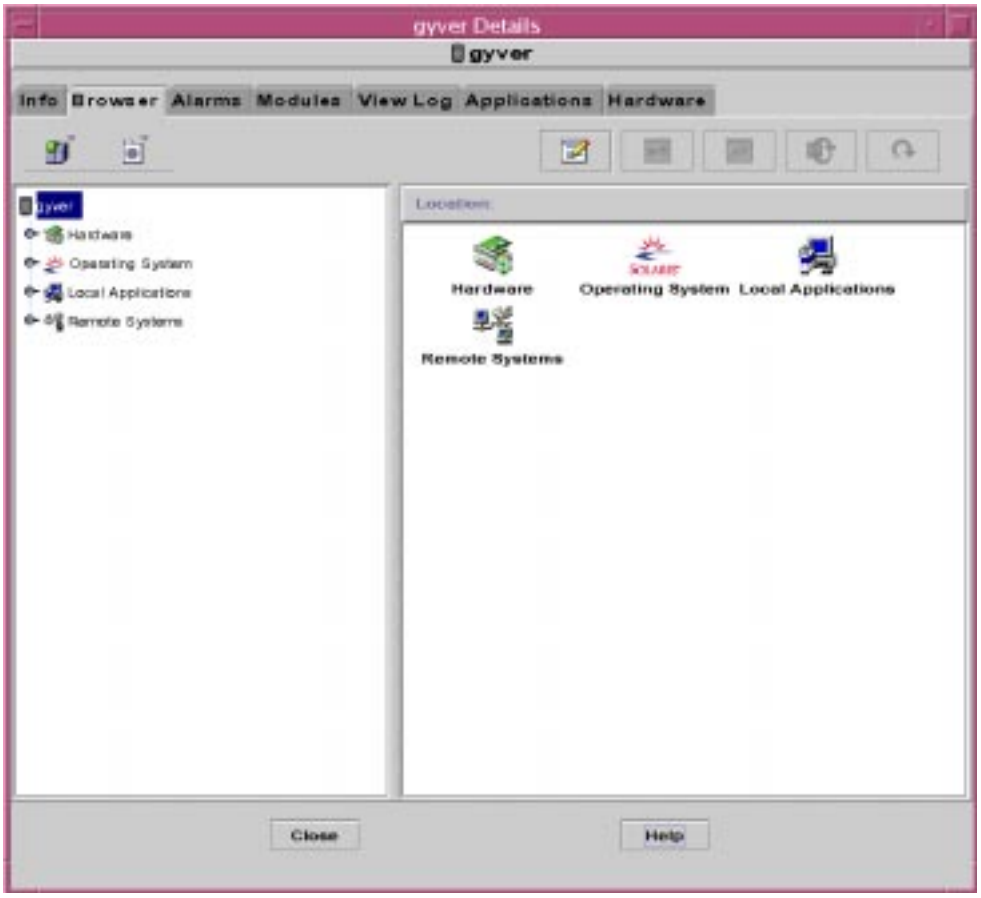

FIGURE 2-4 Sun Management Center Details Window

3. **Click on the Applications tab (**FIGURE 2-5**) to access the Sun Management Center add-on products**

.

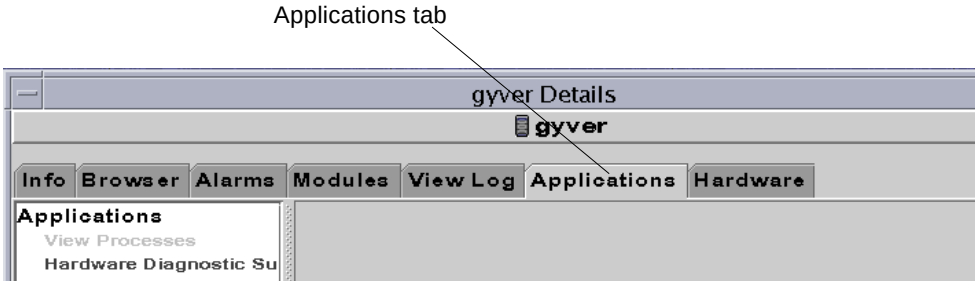

FIGURE 2-5 Applications Tab

4. **Click on Hardware Diagnostic Suite from the list of Applications(**FIGURE 2-6**).**

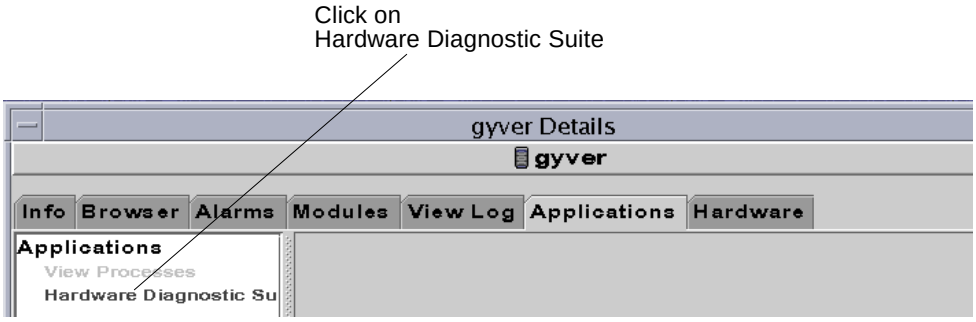

FIGURE 2-6 Accessing Hardware Diagnostic Suite Through the Applications List

The Hardware Diagnostic Suite console window is displayed (FIGURE 2-7).

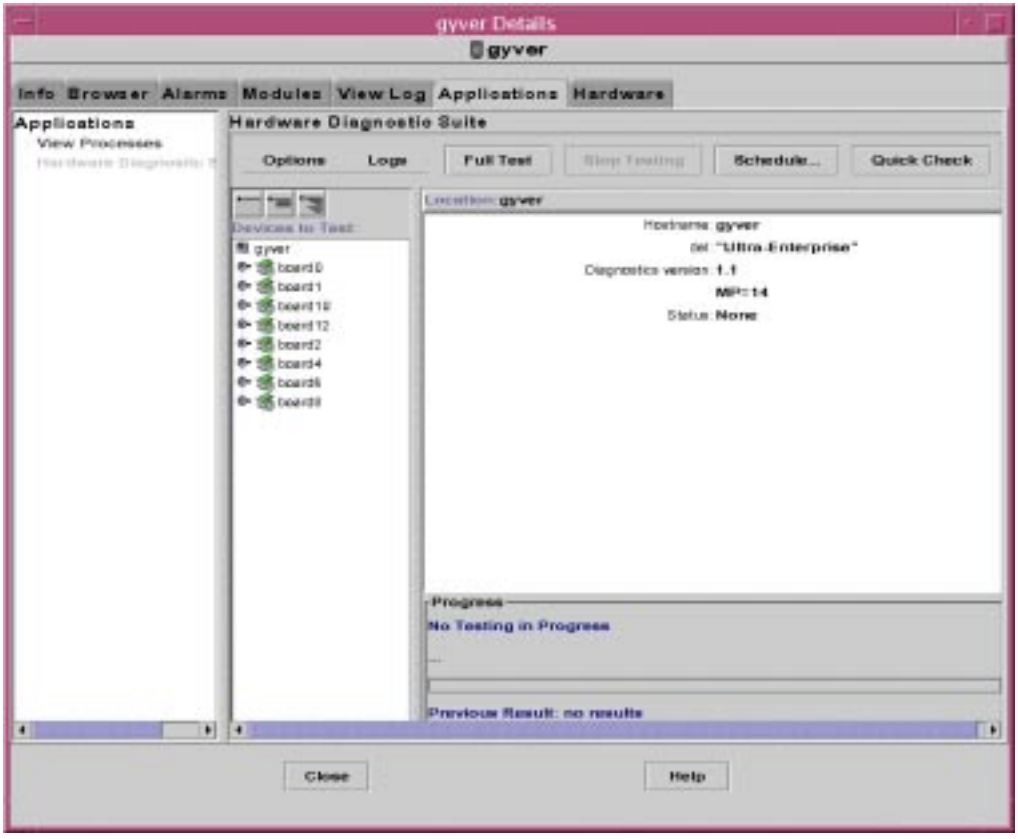

FIGURE 2-7 Hardware Diagnostic Suite Console Window

Note – The Hardware Diagnostic Suite agent starts automatically when you select the Applications tab as described in Step 3 in the previous procedure on page 14.

CHAPTER 3

Running a Hardware Diagnostic Suite Test Session

This chapter describes how to configure, run, schedule, and review a Hardware Diagnostic Suite test session. The main topics are:

- "Test Session Overview" on page 18
- "Preparing Devices for a Test Session" on page 19
- "Selecting Devices for a Test Session" on page 19
- "Starting a Test Session" on page 23
- "Monitoring a Test Session" on page 24
- "Suspending, Resuming, and Stopping a Test Session" on page 28
- "Resetting the Hardware Diagnostic Suite Console" on page 31
- "Scheduling a Test Session" on page 31

The procedures in this chapter assume that the Hardware Diagnostic Suite is already running as described in Chapter 2.

Appendix B describes of all the Hardware Diagnostic Suite console panels, buttons, and menus.

Test Session Overview

The list below is an overview of the steps that you perform when running a Hardware Diagnostic Suite test session.

1. Prepare devices for testing (page 19).
2. Select devices to test (page 19).
3. Start the test session now (page 23) or through a schedule (page 31).
4. Monitor tests in progress (page 24).
5. Review test results (page 29).
6. Reset the Hardware Diagnostic Suite console (page 31).

Sometimes you may need to suspend and resume (page 28), or stop (page 28) a test session. All of these topics are covered in this chapter.

Preparing Devices for a Test Session

The following tests require media to be installed before the test is run:

- “CDROM Test” on page 60
- “Floppy Test” on page 62

See the appropriate test description for details, and install the necessary media before starting the test.

Selecting Devices for a Test Session

When the Hardware Diagnostic Suite window is displayed for a host, the system configuration is probed to display devices that can be tested. You select the device that you want to test in the hierarchy view. These devices may be collapsed in the hierarchy view, requiring you to expand the view.

▼ To Select a Device to Test

1. **If necessary, expand the hierarchy view to show the devices on the host by clicking on one of the hierarchy view buttons (**FIGURE 3-1**).**

Note – For more details about the Collapse/Expand Hierarchical View panel buttons, refer to “Hierarchical View Panel Buttons” on page 77.

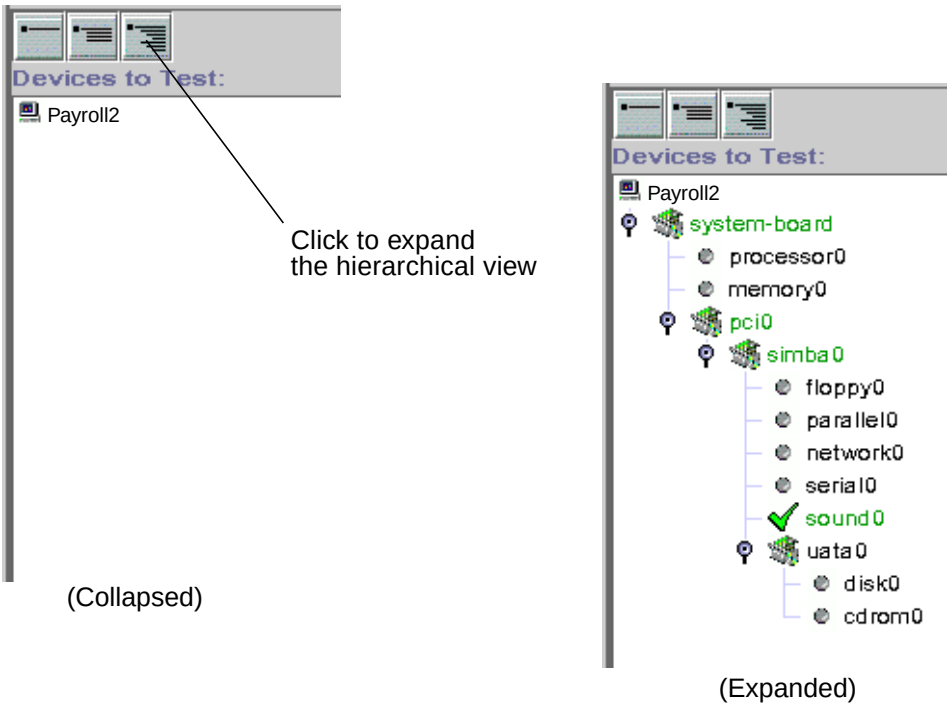

FIGURE 3-1 Expanding the Hierarchical View

2. **Click on the device (or device group) that you want to test (**FIGURE 3-2**).**

   The device is highlighted as shown in FIGURE 3-2.

   By default, if you select another device, the previous device is no longer selected. To select more than one device, see “To Select Multiple Devices” on page 21.

   You can select individual devices, entire groups of devices, or the top level device (host) for testing by a single click at the appropriate level (FIGURE 3-2).

   If you double-click on a device the Device Display panel shows additional information about the device.

Note – To deselect a device, click on it.

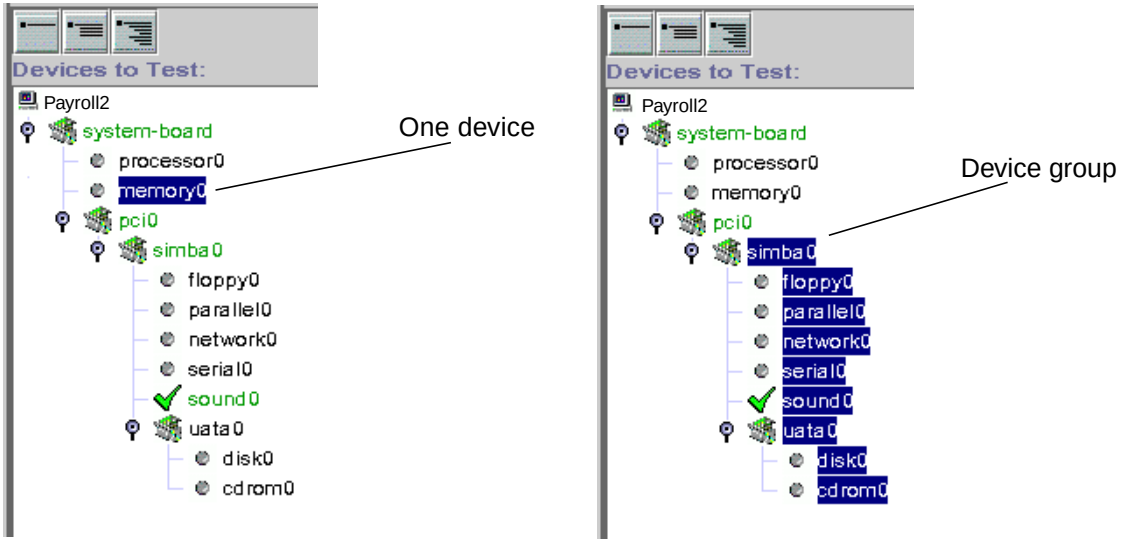

FIGURE 3-2 Selecting a Device or a Device Group

▼ To Select Multiple Devices

1. **Hold down the Shift key while clicking on additional devices (**FIGURE 3-3**).**

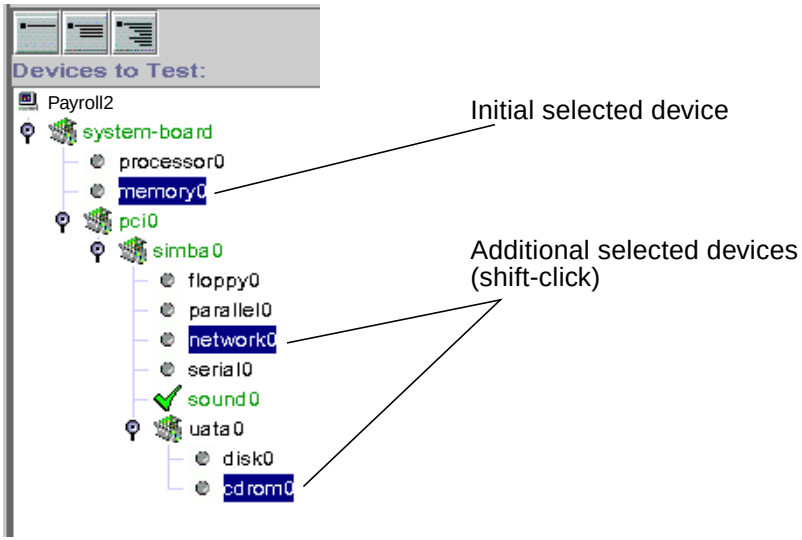

FIGURE 3-3 Selecting Multiple Devices

▼ To Reprobe the System for Devices

The Hierarchical View panel only displays devices recognized by the Hardware Diagnostic Suite agent when the application is first started. If, for example, you add hot-pluggable devices or perform a dynamic reconfiguration after starting Hardware Diagnostic Suite, you can use the Reprobe function to check the system and get an updated list of testable devices.

Note – When you add a device to your system, you must first perform the appropriate task (such as a reconfiguration boot) to enable the Solaris kernel to recognize the device. Once the device is recognized by the Solaris operating environment, use the Reprobe command.

---

1. **Click on the Options button to access the Options menu.**

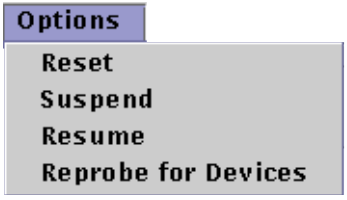

FIGURE 3-4 Accessing the Reprobe Function

2. **Click on Reprobe for Devices.**

   The Hardware Diagnostic Suite agent rechecks the system for all testable devices and displays them in the Hierarchical View panel.

Starting a Test Session

Before you start a test session, make the following decisions:

- Choose to run a Full Test session or to run a Quick Check as described in TABLE 3-1.
- Choose to run the tests now, or schedule the session to run at a future date and time (“Scheduling a Test Session” on page 31).

TABLE 3-1 Test Modes

Mode	Description
Full Test	Performs functional, data-safe, non-resource-intensive tests that exercise the various subsystems of the devices that are selected in the Hierarchical View panel.
Quick Check	Runs a brief test on all selected devices. The Quick Check tests make an attempt to communicate with each selected device to confirm connectivity. No functional device testing occurs.

Note – All tests are designed so they will not interfere with the applications that are currently running on a system.

▼ To Run a Full Test Session Now

1. **After selecting devices to test, click the Full Test button.**

   Functional tests for each selected device are run sequentially until all tests complete.

   For information about viewing the progress of the test session refer to “Monitoring a Test Session” on page 24.

▼ To Run a Quick Check Test Now

1. **After selecting devices to test, click the Quick Check button.**

   Quick connectivity tests for each selected device are run sequentially until all tests complete.

   For information about viewing the progress of the test session refer to “Monitoring a Test Session” on page 24.

Monitoring a Test Session

The Hardware Diagnostic Suite console displays information about each device and each test as it runs and displays the results of each test.

▼ To Monitor the Tests in Progress

1. **View the progress of each test as it runs (**FIGURE 3-5**).**

   As each device is tested, device information is shown in the Device Description panel, and test information is displayed in the Progress panel.

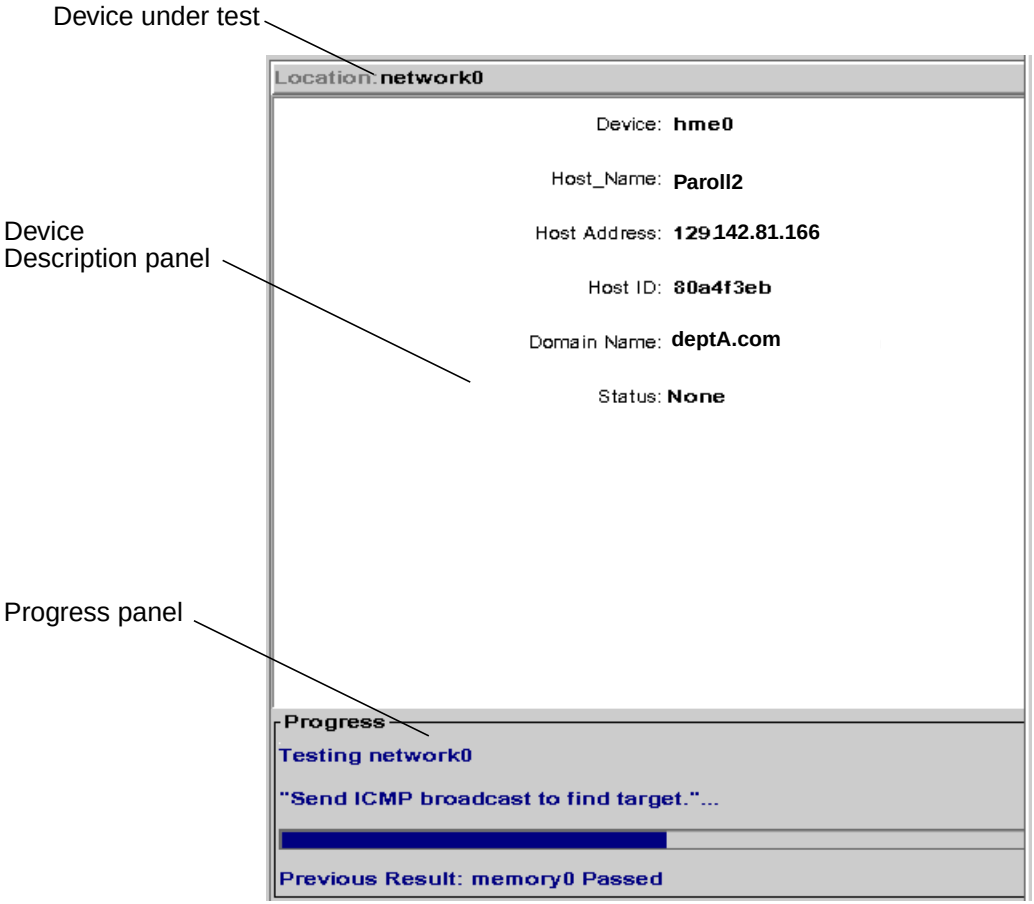

FIGURE 3-5 Device Description Panel and Progress Panel

The Progress panel (FIGURE 3-6) displays the following information:

- The device under test, the subtest that is currently running, and test messages
- A bar that represents the progress of the current test; for example, when the bar is half filled the test on the current device is half finished
- The status (pass/fail) of the previous test

FIGURE 3-6 Progress Panel

2. View the status of all tested devices in the Hierarchy View.

When a Hardware Diagnostic Suite test detects a successful or failing test on a device, the pass or fail condition is immediately displayed in the Hierarchical View panel (FIGURE 3-7). TABLE 3-2 describes the test indicators.

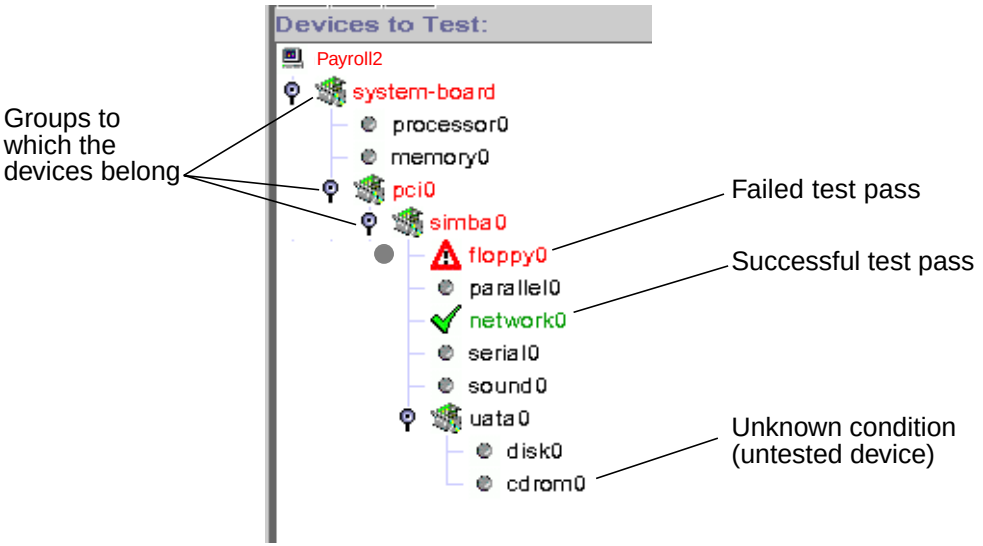

FIGURE 3-7 Pass and Fail Conditions in the Hierarchy View

TABLE 3-2 Hierarchical View Panel Indicators

Indicator	Condition	Description
	Unknown	The device is in an unknown state, usually because it has not been tested or the test has not competed. The device name is displayed in black text.
	Successful test pass	When a test completes with no failures detected, the device is marked with a green checkmark in the Hierarchical View panel. The device name is displayed in green text.
	Failed test pass	As soon as a failure is detected, the device is marked with this indicator. The device name and the group(s) that the failing device belongs to are displayed in red text. The red text highlights the hierarchy of devices involved in the detected failure. The information and error log files are updated with the error condition information. In addition, if you double-click on the device, a pop-up window displays the error message.

3. **To view additional information about a device, double-click on the device name in the hierarchy view.**

   If the device is in an unknown (untested) state or has a successful test pass indicator, you see additional information about that device in the Device Description panel.

   If the device shows a failing test indicator, a pop-up window displays more information about the failure (FIGURE 3-8).

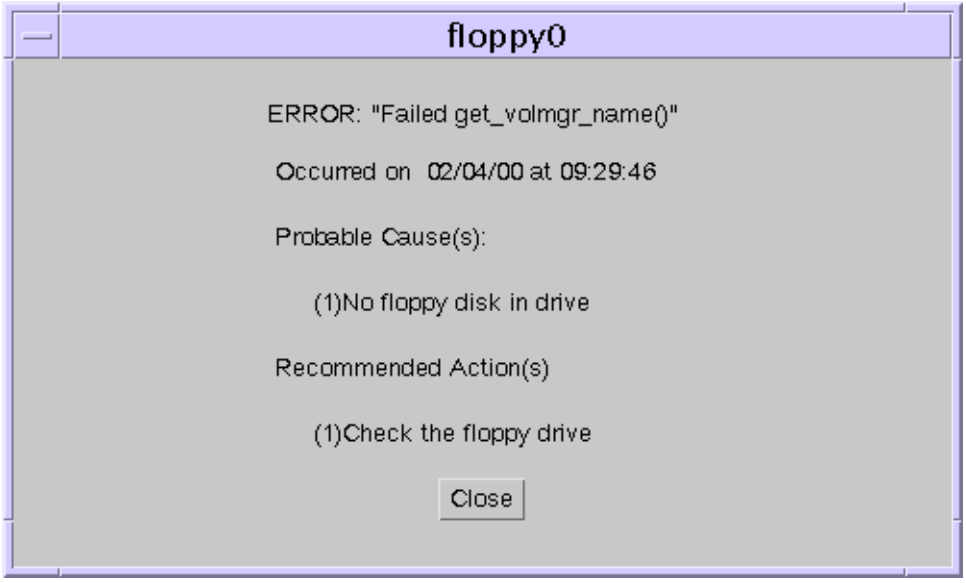

FIGURE 3-8 Error Message Pop-up

Suspending, Resuming, and Stopping a Test Session

You can suspend a Hardware Diagnostic Suite test session and resume it as described in the following procedures.

▼ To Suspend a Test Session

1. **While a test session is running, select the Options button to access the Options menu (**FIGURE 3-9**).**

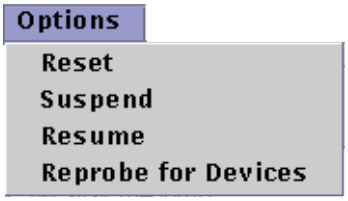

FIGURE 3-9 Options Menu

2. **Select Suspend.**

   The Hardware Diagnostic Suite test session is suspended until you resume it.

▼ To Resume a Test Session

1. **While a test session is suspended, select the Options button to access the Options menu (**FIGURE 3-9**).**
2. **Select Resume.**

   The Hardware Diagnostic Suite test session that was suspended starts to run again.

▼ To Stop a Test Session

- **While a test session is running, click on the Stop Testing button.**

  All testing stops.

Reviewing Test Results

In addition to the test results displayed in the Hierarchical View panel, there are two log files that contain information about every Hardware Diagnostic Suite test session:

- Information Log—Contains informative messages, such as start and stop times and pass and failure information. The information messages are recorded in the `/var/opt/SUNWhwdiag/logs/hwdiag.info` file.
- Error Log—Contains all Hardware Diagnostic Suite error messages that have occurred during the test sessions. The error messages are recorded in the `/var/opt/SUNWhwdiag/logs/hwdiag.err` file.

▼ To View the Hardware Diagnostic Suite Log files

1. **Select the Logs button to access the Logs menu (**FIGURE 3-10**).**

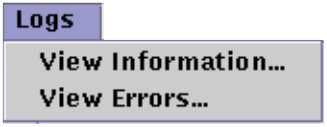

FIGURE 3-10 Logs Menu

2. **Select the log (Information or Errors) that you want to view.**

   A window that contains the Hardware Diagnostic Suite messages is displayed.

   TABLE 3-3 describes the types of error messages.

TABLE 3-3 Error Message Categories

Message Category	Description
FATAL	Fatal messages are severe errors that indicate a serious hardware failure was detected while testing the device. The problem may be so severe that the test was unable to communicate with the device in any way. The Hardware Diagnostic Suite test might have detected a data compare or a hardware error. These errors are recorded in the Error log file.
ERROR	Error messages indicate that some sort of hardware error was detected, such as missing media, a loose cable, or a disconnection. This type of error is usually less severe than a fatal error. These errors are recorded in the Error log file.
WARNING	Warning messages warn the tester of some occurrence that is not a hardware error. These messages are recorded in the Information log file.
INFO	Info messages are informative, non-error type events such as start and stop times. These messages are recorded in the Information log file.

Resetting the Hardware Diagnostic Suite Console

If you want to clear the Hardware Diagnostic Suite console of previous test information, perform a reset as described below.

▼ To Reset the Console

1. **Select the Options button to access the Options menu (**FIGURE 3-11**).**

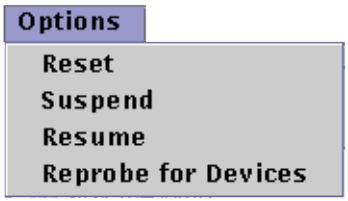

FIGURE 3-11 Options Menu

2. **Select the Reset button.**

   All previous test results are cleared from the console.

Note – The Hardware Diagnostic Suite log files are *not* cleared.

Scheduling a Test Session

The Hardware Diagnostic Suite scheduling function creates entries in root's `crontab` file. When the start date and time criteria are met, the test session, as configured in the Scheduler, starts automatically. You do not need to start Sun Management Center software to run a scheduled test session.

To check the results of any prior test session, view the Hardware Diagnostic Suite log files as described in "To View the Hardware Diagnostic Suite Log files" on page 30.

▼ To Schedule a Test Session

1. **In the Hardware Diagnostic Suite console, click on the Schedule button.**
   The Schedule panel with scheduling instructions is displayed (FIGURE 3-12).

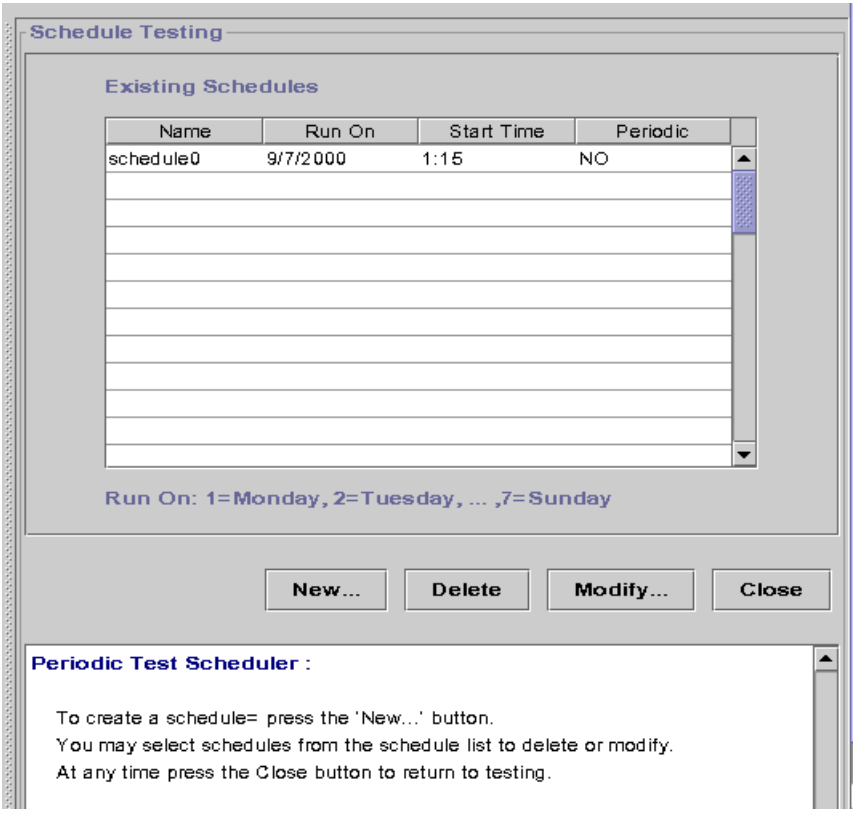

FIGURE 3-12 Schedule Panel

Note – A scheduled tests session will not start if Hardware Diagnostic Suite is running a test session.

---

2. **Select the New button.**

The Schedule Form is displayed (FIGURE 3-13).

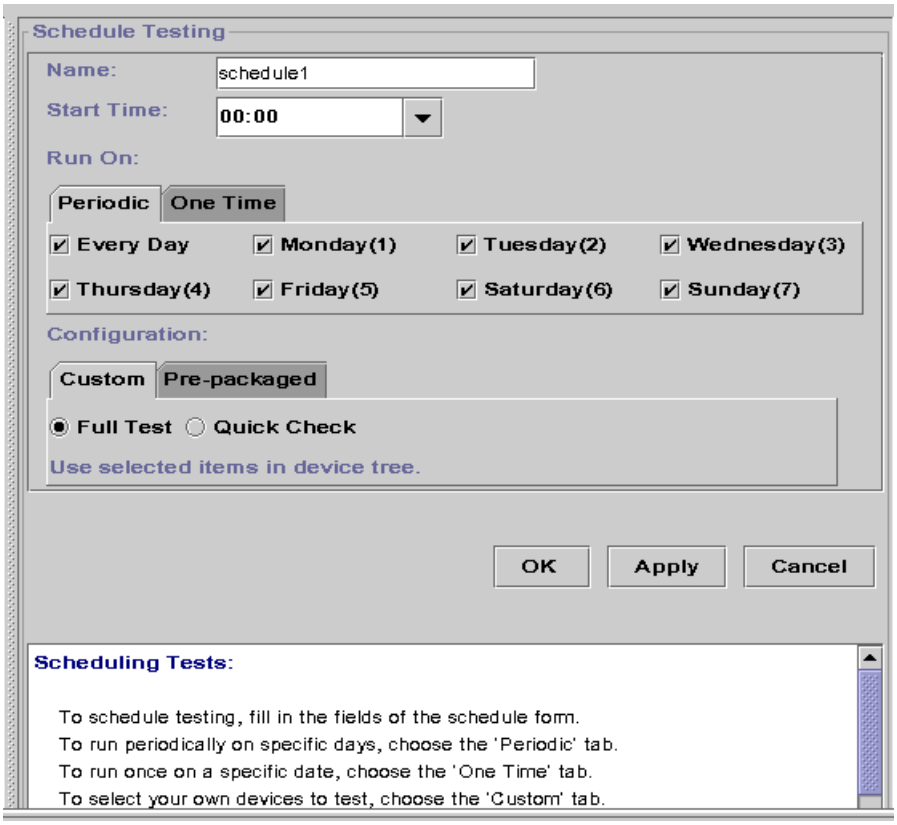

FIGURE 3-13 Schedule Form

3. **Enter a schedule name in the Name field.**

You can use the name that is shown in the Name field (the Hardware Diagnostic Suite displays a unique name each time a schedule is created), or specify a different name. The following naming rules apply:

- The name must be a unique schedule name.
- The name should be between 1 to 20 alpha-numeric characters.
- The only non-alpha-numeric character that is permitted is the _ (underscore).

4. **Enter the start time for the test session that you are scheduling.**

   You can use the 24-hour clock settings in 15-minute intervals that are located in the pull-down list (FIGURE 3-14), or type in your own start time in the Start Time field.

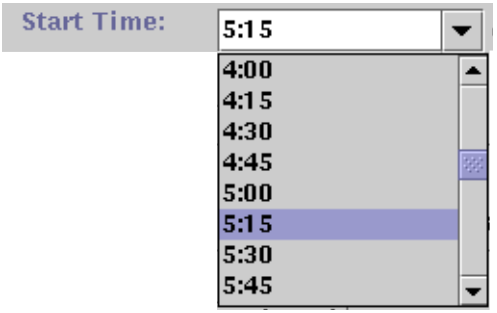

FIGURE 3-14 Scheduling Start Times

5. **Enter the date for the test session in the Run On field.**

   - Choose the Periodic tab **(**FIGURE 3-15**)** to create a schedule that runs the Hardware Diagnostic Suite test session at regular intervals. Select the days that you want testing to occur. This schedule remains in effect until you delete or modify it.
   - Choose the One Time tab **(**FIGURE 3-16) to create a schedule that will only run one time. Specify the date using the *mm/dd/yyyy* format. This schedule will only run one time, but remains in the list of schedules so that you can modify it if you want it to run again. You must delete the schedule to remove it from the list.

FIGURE 3-15 Run On Field (Periodic Schedule)

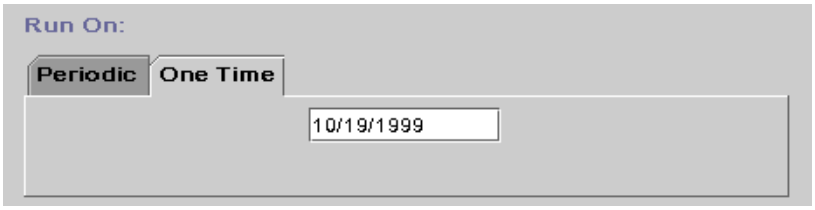

FIGURE 3-16 Run On Field (One Time)

6. **Configure the test mode and the devices to test in the Configuration field.**

   There are two methods to do this:

   - Choose the Custom tab to create a schedule that runs tests on devices that you select in the Hierarchical View panel:

     i. Select either Full Test or Quick Check for the test mode (see TABLE 3-1**).**

     ii. Select the devices to test in the Hierarchical View panel.

   - Choose the Pre-packaged tab to create a schedule that runs a predefined Hardware Diagnostic Suite test session and select one of the predefined tests as described in TABLE 3-4.

TABLE 3-4 Predefined Tests

Test Name	Description
Connection Check	Sets up a schedule to run Quick Check tests on all available devices.
Functional Check	Sets up a schedule to run Full Tests on all available devices.
Processor(s) Check	Sets up a schedule that runs the Processor test (in Full Test mode) on all the processors in the system.
Hard Disk Check	Sets up a schedule that runs the Disk test (in Full Test mode) on all the disks in the system.
Odd Disk Testing	Sets up a schedule that runs the Disk test (in Full Test mode) on every other disk in the system, beginning with the first disk (as seen in the Hierarchical View panel). This test is useful when there are many disks in the system.
Even Disk Testing	Sets up a schedule that runs the Disk test (in Full Test mode) on every other disk in the system beginning with the second disk (as see in the Hierarchical View panel). This test is useful when there are many disks in the system.

7. **Apply your test session schedule information by clicking the OK button.**

   Your schedule information is applied, the Schedule Form is closed, and the Schedule panel is displayed. Your new Hardware Diagnostic Suite test session schedule is listed in the Existing Schedules list (FIGURE 3-17).

Note – For descriptions of all Scheduling buttons refer to “Schedule Form Buttons” on page 88.

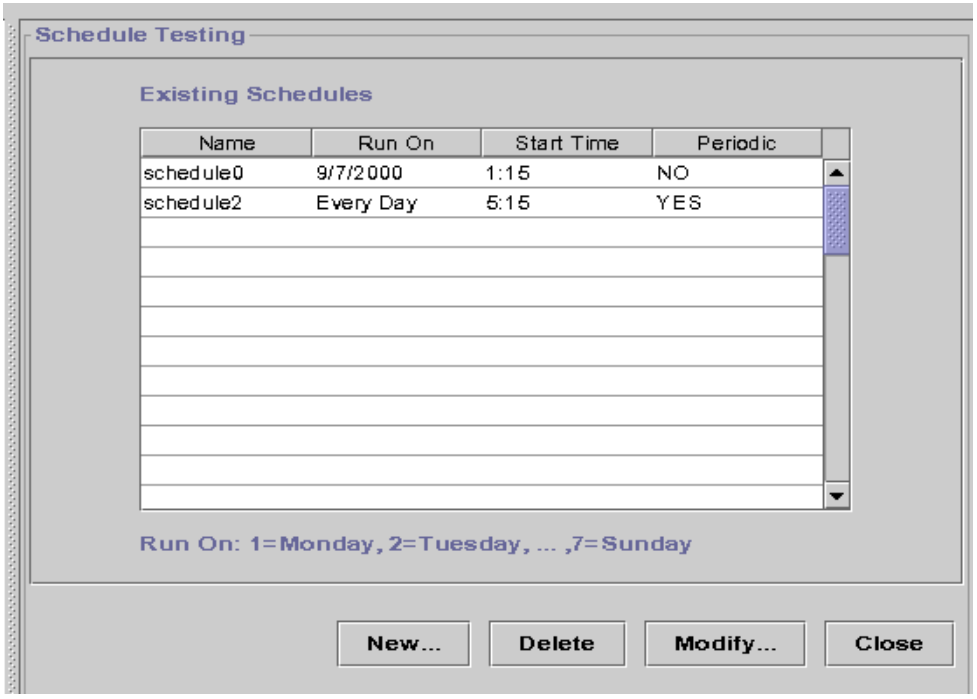

FIGURE 3-17 Existing Schedules List

8. **Exit the scheduling function by clicking the Close button.**
   The Schedule panel is closed.

▼ To Modify a Schedule

1. **Select the Schedule button.**
   The Hardware Diagnostic Suite displays the Schedule panel with the list of schedules.
2. **Select the schedule that you want to modify.**
   The schedule is highlighted.
3. **Select the Modify button.**
   The Schedule Form is displayed (FIGURE 3-13).

4. **Change the schedule entries as needed.**

Note – If you change the name of the schedule, the Hardware Diagnostic Suite creates another schedule with the newly specified name. It does not modify the name of the original schedule.

---

5. **Click the OK button to apply your changes (or click the Apply button and skip Step 6).**
6. **Click the Close button to close the Schedule panel.**

▼ To Delete a Schedule

1. **Select the Schedule button.**

   The Schedule panel with the list of schedules is displayed.

2. **Click on the schedule that you want to delete.**

   The schedule is highlighted.

3. **Select the Delete button.**

   The selected schedule is deleted and removed from the list.

4. **Select the Close button to close the Schedule panel.**

CHAPTER 4

Using Hardware Diagnostic Suite With Sun Management Center Alarms

This chapter describes how to view and customize Sun Management Center alarms for use with the Hardware Diagnostic Suite:

- "Sun Management Center Alarms Overview" on page 40
- "To View and Acknowledge an Alarm" on page 42
- "To Edit the Alarm Thresholds for Hardware Diagnostic Suite" on page 45
- "To Create Your Own Alarm Trigger" on page 51
- "To Create an Alarm Action" on page 53

Note – The procedures in this chapter assume that the Hardware Diagnostic Suite is already running as described in Chapter 2.

For additional information about Sun Management Center alarms, refer to the *Sun Management Center 3.0 Software User's Guide.*

Sun Management Center Alarms Overview

The Sun Management Center software monitors your system and notifies you, through alarms, when abnormal conditions occur. These alarms are triggered by conditions falling outside the predetermined ranges.

The Hardware Diagnostic Suite uses the Sun Management Center file scanning feature to trigger and display alarm conditions for the host you are testing. By default, any Hardware Diagnostic Suite test session error message that occurs triggers a Sun Management Center critical alarm and the alarm is displayed in the Sun Management Center console. Additionally, you can set the Sun Management Center alarms so they are triggered by Hardware Diagnostic events defined by you, and define the actions that take place when an alarm occurs.

Sun Management Center can be configured to send email when certain alarms are triggered, and to execute scripts that perform an action on the system. For example, if the Hardware Diagnostic Suite detects an error on one FPU of a multiprocessor system, the event can raise an alarm that automatically triggers the execution of a script that takes the suspect CPU offline. In the meantime, an email notification is immediately sent to the system administrator. See FIGURE 4-12 for more details.

Sun Management Center uses alarm indicators (TABLE 4-1) to alert you that an alarm condition occurred.

TABLE 4-1 Alarm Indicators

Indicator	Severity	Description
 (black)	1 Down	Indicates that a service-affecting condition has occurred and an *immediate* corrective action is required. An example of this condition is when a Sun Management Center managed object has gone out of service and that resource is required.
 (red)	2 Critical	Indicates that a service-affecting condition has developed and corrective action is required. This type of error is generated when a hardware failure is detected by a Hardware Diagnostic Suite test session.
 (yellow)	3 Alert	Indicates that a non-service-affecting condition has developed and corrective action should be taken in order to prevent a more serious fault.
 (blue)	4 Caution	Indicates the detection of a potential or an impending service-affecting fault, before any significant effects have occurred.
 (gray)	5 Disabled	Indicates that a resource has been disabled.

TABLE 4-2 describes the Sun Management Center window in which the alarm indicators are displayed.

TABLE 4-2 Locations of Alarm Indicators

Alarm Indicator Location	Description
Sun Management Center Main Window	Colored alarm indicators appear next to the host in the hierarchy and topology views. Also, the number of alarms for different categories is displayed in the Domain Status Summary (the group of circular colored alarm indicators in the upper right portion of the window).
Details Window (Browser tab)	Colored alarm indicators appear next to the Sun Management Center module that generated the alarm. Hardware Diagnostic Suite generated alarms appear next to the Local Applications indicator in the hierarchy and topology views.
Details Window (Alarms tab)	All alarm indications (unacknowledged and acknowledged) are listed in a table.
Details Window (Diagnostics tab)	A small colored alarm indicator appears next to the hostname at the very top of the Diagnostics window.

▼ To View and Acknowledge an Alarm

1. **In the Sun Management Center main window, look at the host in the hierarchy view or the topology view.**

   If an alarm indicator (TABLE 4-1) is displayed, there is an unacknowledged alarm condition that warrants further investigation.

   Only one alarm indicator can be displayed for a host at a given time. If there are two or more types of alarms for the host, the more severe unacknowledged alarm takes precedence and is propagated up the tree. All alarms are listed in the Sun Management Center alarms window.

Note – Sun Management Center displays alarms for many kinds of events. Therefore, all the displayed alarms may not be generated by a Hardware Diagnostic Suite test session.

Note – The Sun Management Center agent is configured so that only one server receives alarm information from that agent.

---

2. **If an alarm exists, follow these steps to view and acknowledge the alarm condition:**

   a. **Double-click on the host in the main Sun Management Center window to open the Details window.**

   b. **Select the Alarms tab.**

      The Alarms Details window is displayed (FIGURE 4-1). All alarms for this host are displayed.

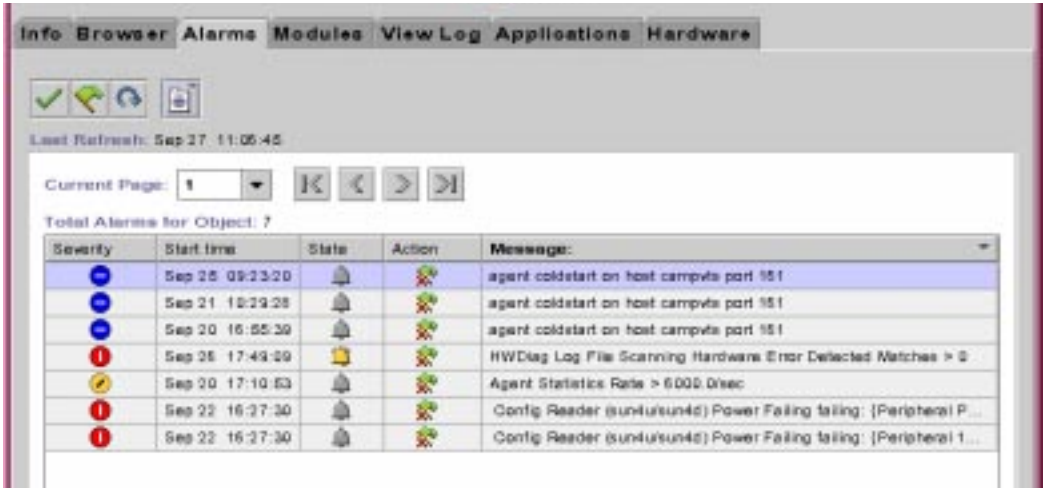

FIGURE 4-1 Alarms Tab

Alarm Information

The Alarms tab displays the host alarms with the following information:

TABLE 4-3 Alarm Table Description

Category	Description
Severity	Graphic indicator whose color indicates the severity of the alarm as described in TABLE 4-1. A green check next to the indicator means that the alarm is acknowledged. If no check is present, the alarm is unacknowledged.
Start time	Indicates the time the alarm first occurred.
State	A “ringing” open indicator means the condition that caused the alarm still exists. A “silent” closed indicator means the condition no longer exists.
Action	Indicates the action assigned to the alarm.
Message	Abbreviated message that indicates the type of alarm.

3. **To acknowledge an alarm, select the alarm, then click the checkmark button**  **.**

   The alarm is marked *acknowledged* in the Alarms tab list. Acknowledged alarms are not displayed in other Sun Management Center windows.

Note – Additional information about Sun Management Center alarms can be found in the *Sun Management Center 3.0 Software User’s Guide*.

▼ To Edit the Alarm Thresholds for Hardware Diagnostic Suite

By default, the Hardware Diagnostic Suite error and information log files are scanned by Sun Management Center for any occurrence of the ERROR or FATAL text pattern. If the pattern is detected, an alarm is generated. You can modify the error condition criteria or create your own pattern, which when logged, will generate an alarm.

1. **In the Sun Management Center main window, open the Details window for the host for which you plan to set or modify an alarm condition.**
2. **Select the details window Browser tab, if it is not already selected.**
3. **Double-click on Local Applications in the topology view (**FIGURE 4-2**).**

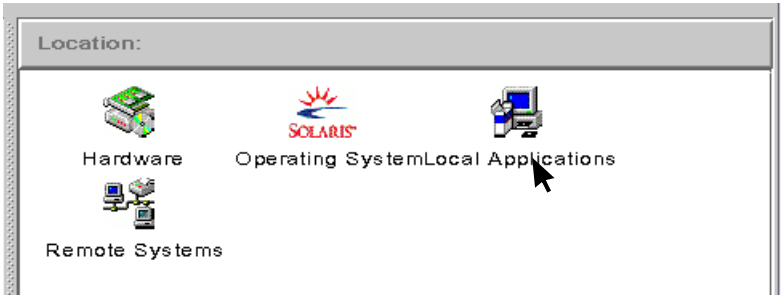

FIGURE 4-2 Details Window (Browser View), Selecting Local Applications

4. **Double-click on File Scanning [HwDiag Log] in the topology view (**FIGURE 4-3**).**

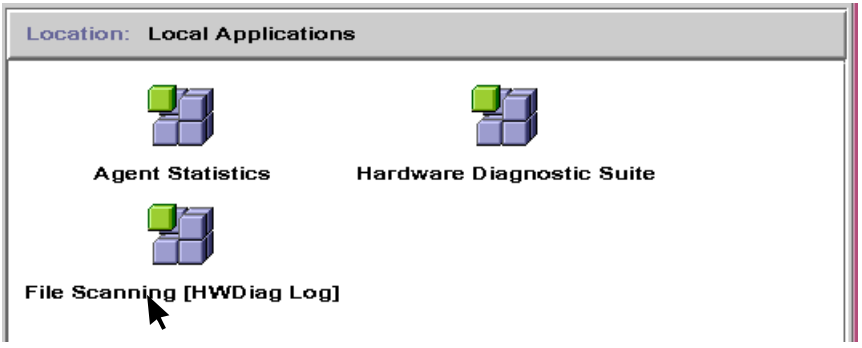

FIGURE 4-3 Details Window (Browser View), Selecting File Scanning

5. **Double-click on the File Scan folder in the topology view.**

The Hardware Diagnostic Suite file scanning properties are displayed (FIGURE 4-4). TABLE 4-4 describes these properties.

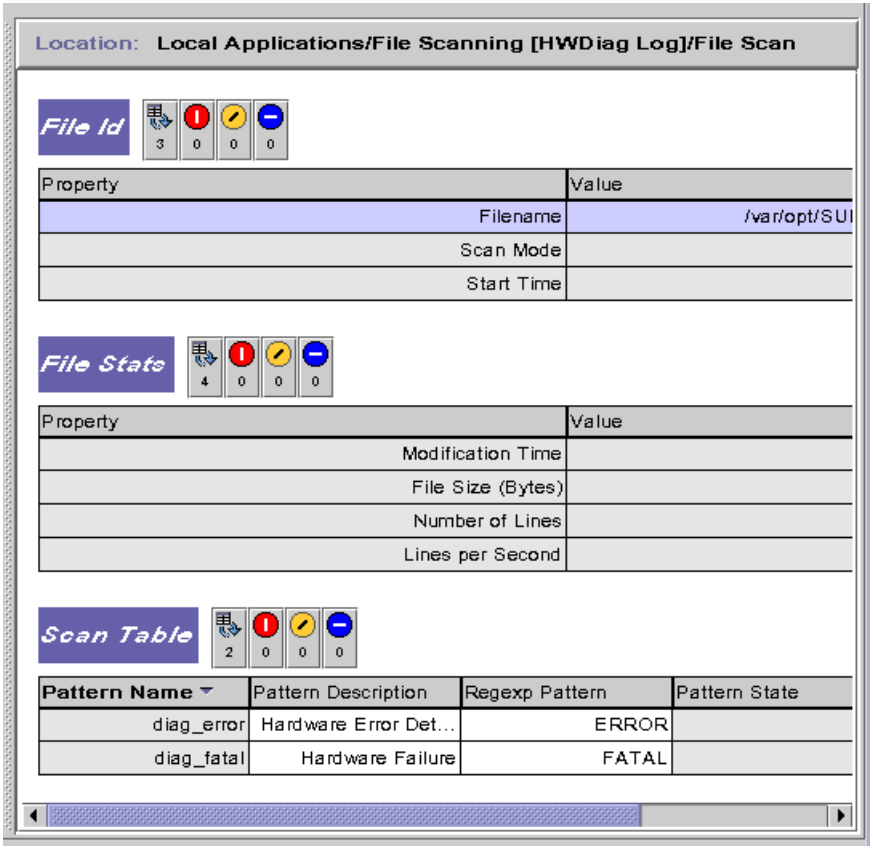

FIGURE 4-4 Hardware Diagnostic Suite File Scanning Properties

TABLE 4-4 File Scanning Properties

Table Name	Row/Column	Description
File ID	Filename	Specifies the file to scan. The Hardware Diagnostic Suite file is: `/var/opt/SUNWhwdiag/logs/hwdiag.err`
	Scan Mode	Specifies the mode used to scan the file. Hardware Diagnostic Suite uses the tail mode, which only scans lines as they are added to the file.
	Start Time	Specifies the time when scanning of the file first began.
File State	Modification Time	Specifies the time the file was last modified.
	File Size	Specifies the size of the file in bytes.
	Number of Lines	Specifies the number of lines in the file.
	Lines per Second	Specifies the rate at which the file is growing.
Scan Table	Pattern Name	Specifies the name of this file scanning property. Default Hardware Diagnostic Suite file scanning names are: • `diag_error`–The name of the pattern that scans for Hardware Diagnostic Suite test session error messages. • `diag_fatal`–The name of the pattern that scans for Hardware Diagnostic Suite test session fatal error messages.

	Pattern Description	Specifies a description of the file scanning property. Hardware Diagnostic Suite descriptions are:
		`Hardware Error Detected`
		`Hardware Failure`

TABLE 4-4 File Scanning Properties

Table Name	Row/Column	Description
	Regexp Pattern	Defines the pattern that generates the alarm. The default Hardware Diagnostic Suite patterns are: ERROR–When this pattern occurs in the Hardware Diagnostic Suite log file, this indicates that a hardware error that requires intervention occurred. It might be due to missing media, a loose cable, or a disconnection. FATAL–When this pattern occurs, it is an indication that the hardware failure was unrecoverable. The Hardware Diagnostic Suite test might have detected a data miscompare or a hardware error. See TABLE 3-3 for descriptions of Hardware Diagnostic Suite types of errors.
	Pattern State	On—Turns on file scanning for this pattern. Off—Turns off file scanning for this pattern.
	Matches	Displays the number of pattern matches that have occurred. When this number matches the alarm threshold, an alarm is triggered. This table cell is also used to define the alarm thresholds as described in Step 7 through Step 10.

6. **Use the lower scroll-bar to move the topology view to the left.**

   The Matches column becomes visible (FIGURE 4-5). You will modify the alarm threshold values here.

7. **Select either the ERROR or FATAL data property by clicking on the Matches table cell (**FIGURE 4-5**).** See TABLE 3-1 for error type descriptions.

   The border of the cell darkens and the line highlights indicating that it is selected.

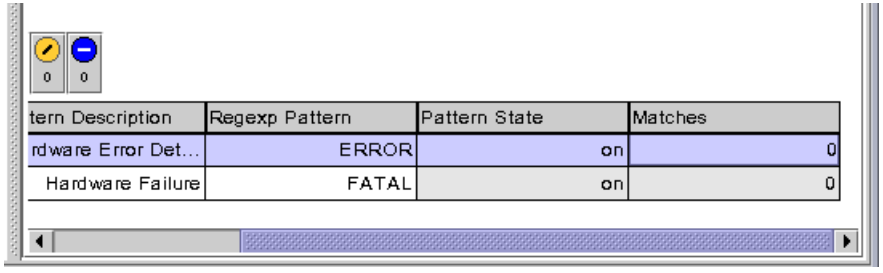

FIGURE 4-5 Scan Table Matches Table Cell

8. **Open the Attribute Editor by doing one of the following:**

   - Click the right mouse button in the Matches table cell and select Attribute Editor from the pop-up menu.
   - Click the Attributes button at the top of the Details window  .

   The initial Attribute Editor panel shows information about the attribute. You cannot edit the properties for alarms in this panel.

9. **Select the Alarms tab in the Attribute Editor.**

   The alarms panel is displayed (FIGURE 4-6). This panel enables you to set alarm thresholds.

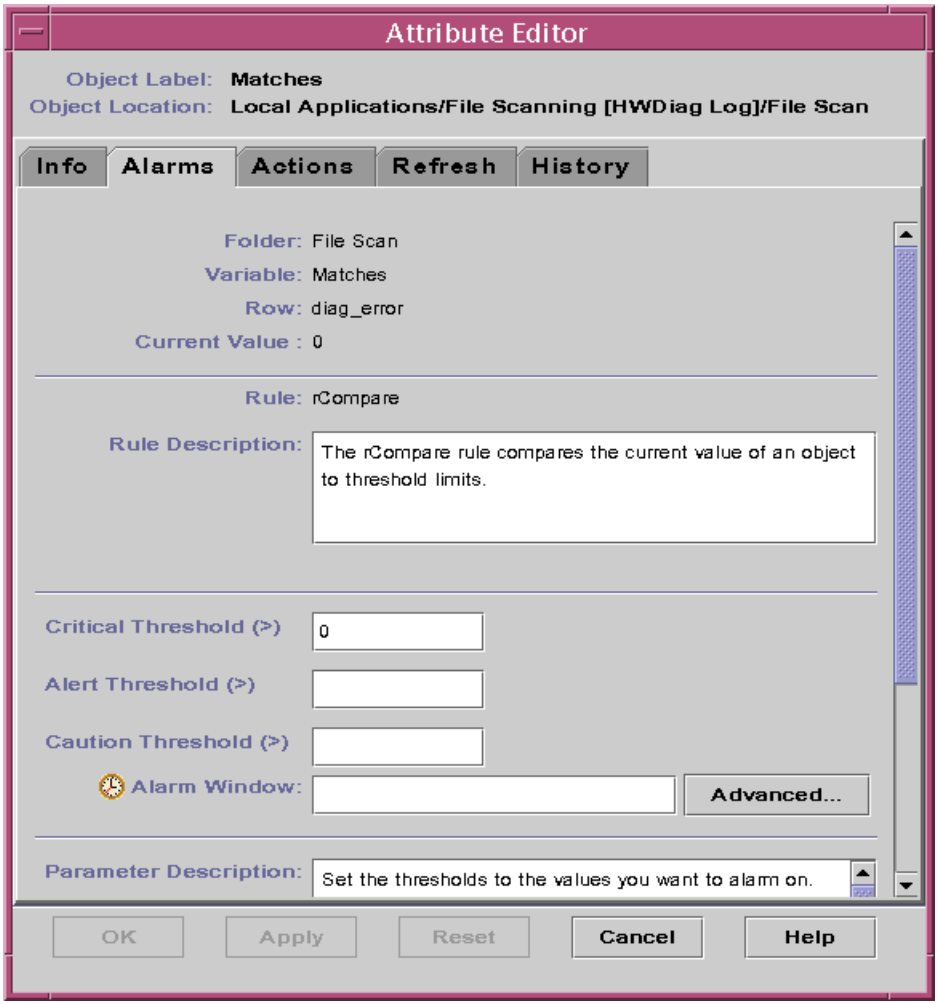

FIGURE 4-6 Attribute Editor, Alarms Panel

10. **Define the desired alarm thresholds by entering the appropriate numbers in the alarm threshold fields (**FIGURE 4-7**).**

The alarm threshold determines the type of alarm to generate based on the number of pattern matches that occur (TABLE 4-5).

TABLE 4-5 Alarm Thresholds

Fields for New Values	Description
Critical Thresholds>	Specify an integer value. If the pattern occurs more times than this value, a Critical (red) alarm is generated.
Alert Thresholds>	Specify an integer value. If the pattern occurs more times than this value, an Alert (yellow) alarm is generated.
Caution Thresholds>	Specify an integer value. If the pattern occurs more times than this value, a Caution (blue) alarm is generated.
Alarm Window	Alarm occurs only during this time period. For example, if you type `day_of_week=fri`, an alarm occurs only if the alarm condition exists on a Friday. If an alarm condition exists on Tuesday, no alarm is registered.

For example, if you selected the attribute editor for the FATAL pattern Matches column and entered the following:

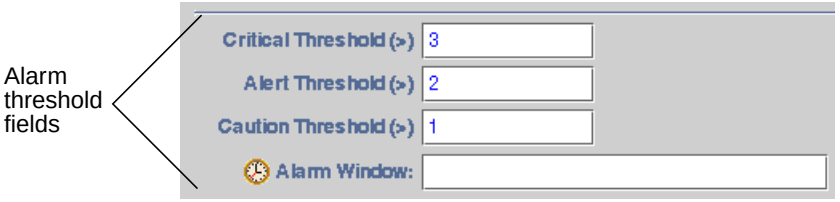

FIGURE 4-7 Alarms Panel with New Thresholds

Different alarms would be displayed when a Hardware Diagnostic Suite test session logged fatal errors. The type of alarm displayed would be:

- No alarm generated if the fatal error occurred only one time.
- A blue Caution alarm when two fatal errors were logged.
- A yellow Alert alarm when three fatal errors were logged.
- A red Critical alarm when four or more fatal errors were logged.

The default threshold for both `diag_error` and `diag_fatal` patterns is Critical Threshold (>) 0.

If you want to reset the thresholds to Hardware Diagnostic Suite default values, enter blanks in the fields.

▼ To Create Your Own Alarm Trigger

The Sun Management Center file scanning feature enables you to create your own pattern that will trigger an alarm when the defined pattern appears in the Hardware Diagnostic Suite error log file.

1. **Open the File Scanning [HwDiag] folder.**

   For instructions on how to do this, see “To Edit the Alarm Thresholds for Hardware Diagnostic Suite” on page 45, Step 1 through Step 5.

2. **To add a new Hardware Diagnostic Suite log file pattern that will generate an alarm condition, perform the following:**

   a. **From the Options pull-down menu**  **, select Add Row.**

      The Row Adder dialog box appears (FIGURE 4-8).

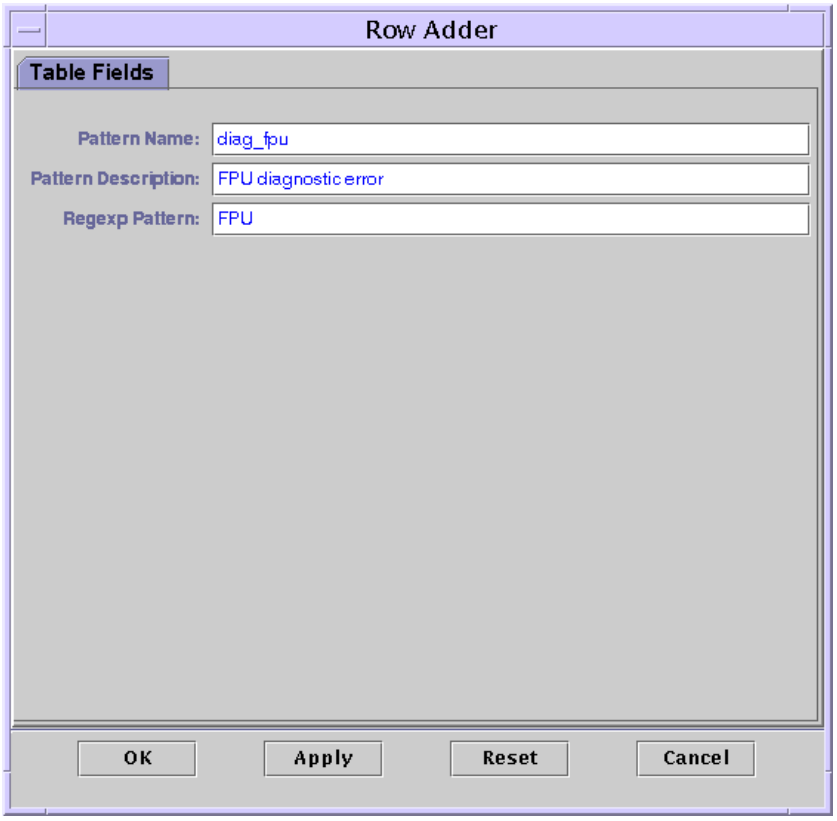

FIGURE 4-8 Sun Management Center Row Adder Dialog Box

b. Enter information in the fields using the descriptions in TABLE 4-6**.**

TABLE 4-6 Row Adder Dialog Box Field Descriptions

Field Name	Description
Pattern Name	Specifies the name of the alarm condition that you are creating.
Pattern Description	Specifies a description of the pattern that Sun Management Center looks for.
Regexp Pattern	Specifies the regular expression (pattern) that generates the alarm condition.

c. Complete one of the following actions:

- Click OK to apply the changes and close this window.
- Click Apply to apply the changes without closing this window.
- Click Reset to clear all the field entries without closing this window.
- Click Close to clear all the field entries and to close this window.

d. Create the alarm thresholds that define the type of alarm that is triggered.

For instructions on how to do this, see "To Edit the Alarm Thresholds for Hardware Diagnostic Suite" on page 45.

Once you apply your changes, the new row is inserted in the table. If a Hardware Diagnostic Suite test session logs a message that contains the pattern that you specified, an alarm is generated for that host.

▼ To Create an Alarm Action

By default, the Hardware Diagnostic Suite performs the action of sending email to root when an Error or Fatal error is detected. You can customize the action. For example, you can set an action that runs a script.

Note – These scripts execute with root permissions.

---

1. Open the File Scanning [HwDiag] folder.

For instructions on how to do this, see "To Edit the Alarm Thresholds for Hardware Diagnostic Suite" on page 45, Step 1 through Step 5.

2. Open the Attribute editor for the Matches table cell in the Scan Table.

For instructions on how to do this, see "To Edit the Alarm Thresholds for Hardware Diagnostic Suite" on page 45, Step 6 through Step 8.

3. **Select the Actions Tab in the Attribute Editor.**

The Actions menu is displayed as shown in FIGURE 4-9. TABLE 4-7 describes the fields.

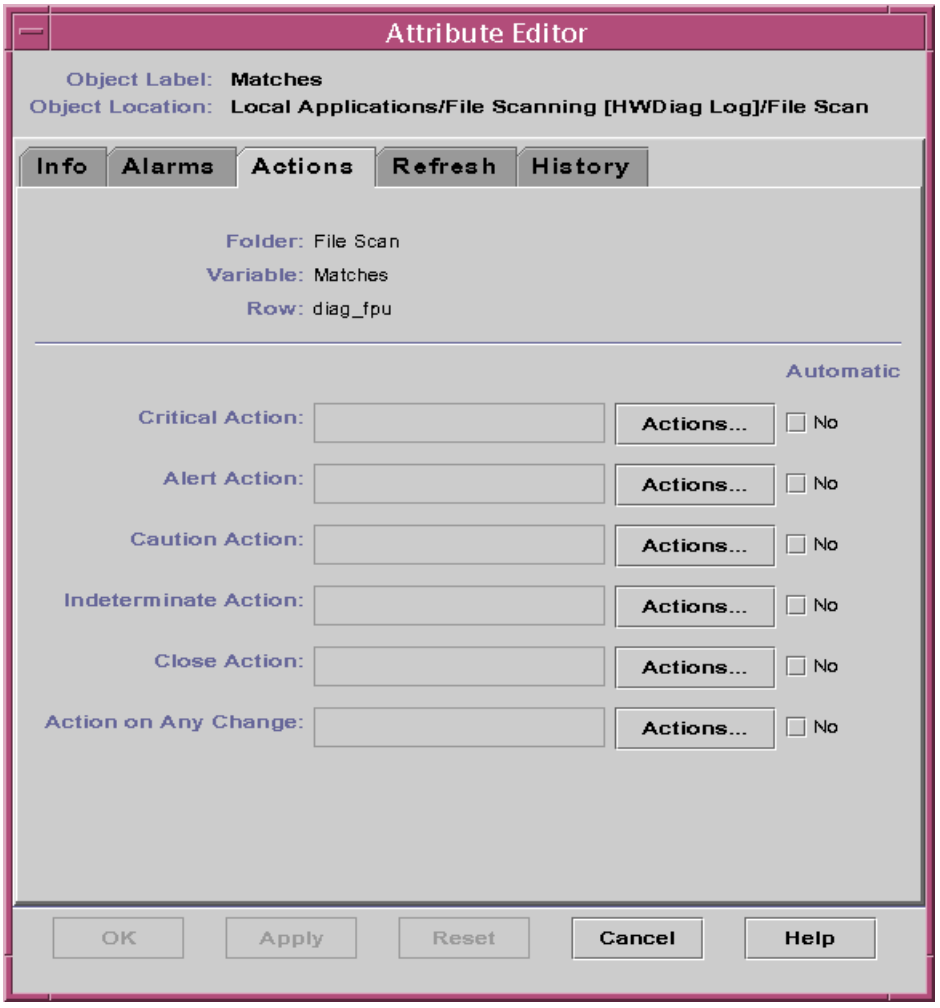

FIGURE 4-9 Attribute Editor, Actions Tab

TABLE 4-7 Actions Tab Field Descriptions

Field	Description
Critical Action	Specifies the action to take when a critical (red) alarm is generated.
Alert Action	Specifies the action to take when a critical (yellow) alarm is generated.
Caution Action	Specifies the action to take when a critical (blue) alarm is generated.
Close Action	Specifies the action when the alarm is closed.
Action on Any Change	Specifies the action that runs when any variable change occurs, whether or not an alarm is generated.

4. Add an action to the action fields.

Note – The action to email root for any Hardware Diagnostic Suite critical alarm is the default configuration. You only need to add an action to an action field if you want to modify or create additional actions.

You can only specify one action in an action field. To have more than one action (to send email *and* run a script, for example, you must specify the actions in separate fields. The following example describes how to do this.

a. Click the Actions button next to the level (Critical, Alert, and so on) of your choice.

The Action Selection window is displayed **(**FIGURE 4-10**)**.

b. Specify the email recipient.

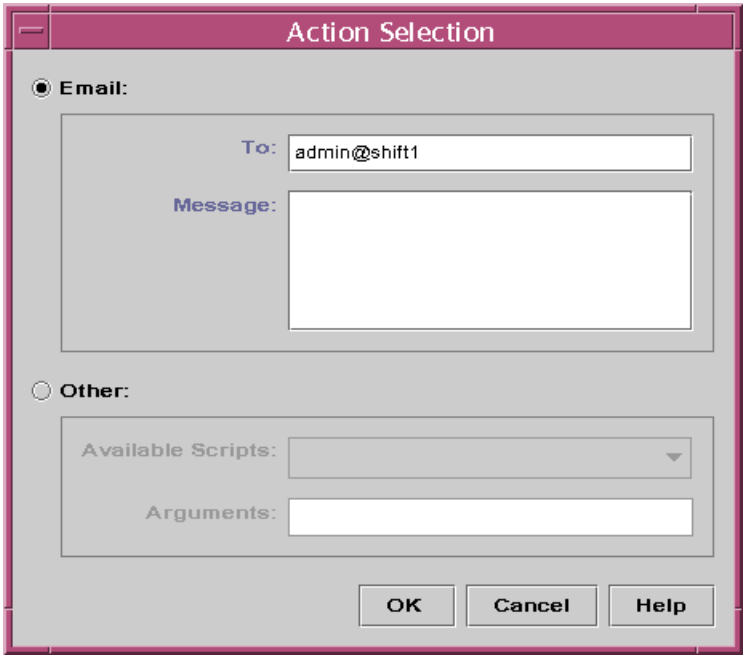

FIGURE 4-10 Action Field Specifying an Email Address

An email recipient (in this case `admin@shift1`) is added to the Alert Action field.

In this example, the `Critical Action: email root` entry is the factory default action. In a subsequent step, the critical action will be redefined to run a script. By adding an email recipient to the Alert Action field, an alarm will generate an email and run the script.

The Hardware Diagnostic Suite does not generate “Alert“ alarms by default. For this example to work, you must also set up an alarm threshold for the Alert condition. See “To Edit the Alarm Thresholds for Hardware Diagnostic Suite” on page 45.

In the this example, the following email is sent to the addressee whenever an alert alarm occurs for any fatal error:

```
Date: Tue, 12 Oct 1999 15:25:39 -0800
From: root@Payrool2 (0000-Admin(0000))
Mime-Version:1.0

Sun Management Center alarm action notification ... {Alert:
Payroll2 File Scanning Hardware Error Detected Matches > 1}
```

c. To create an action that runs a script when a critical Hardware Diagnostic Suite alarm is raised, perform the following:

i. Place the script in the /var/opt/SUNWsymon/bin directory making sure that execute permissions are set.

The script will be run with superuser privileges.

Note – The script must reside in the `/var/opt/SUNWsymon/bin` directory before you can select it from the Action Selection pull-down menu, and it will run with superuser privileges.

---

ii. Select the script from the Available Scripts pull-down menu (FIGURE 4-11**).**

iii. Click OK in the menu.

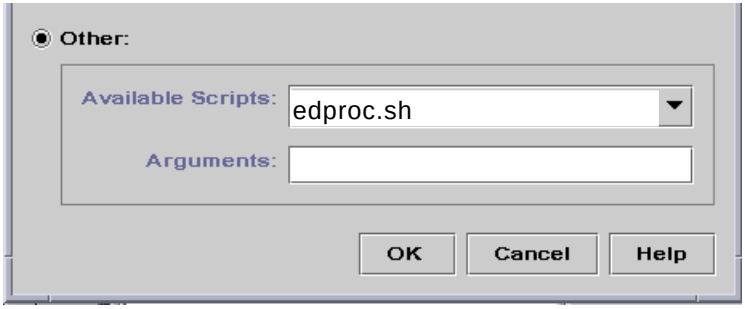

FIGURE 4-11 Critical Action Field Specifying a Script

In this example, the administrator wrote a script (`/var/opt/SUNWsymon/bin/edproc.sh`) that runs a program using the `p_online()` system call to disable one processor on a multiprocessor system. The administrator also created a new alarm trigger that generates an alarm when a fatal FPU error is detected during a Hardware Diagnostic Suite test session.

Together, these custom alarm settings will have the following result:

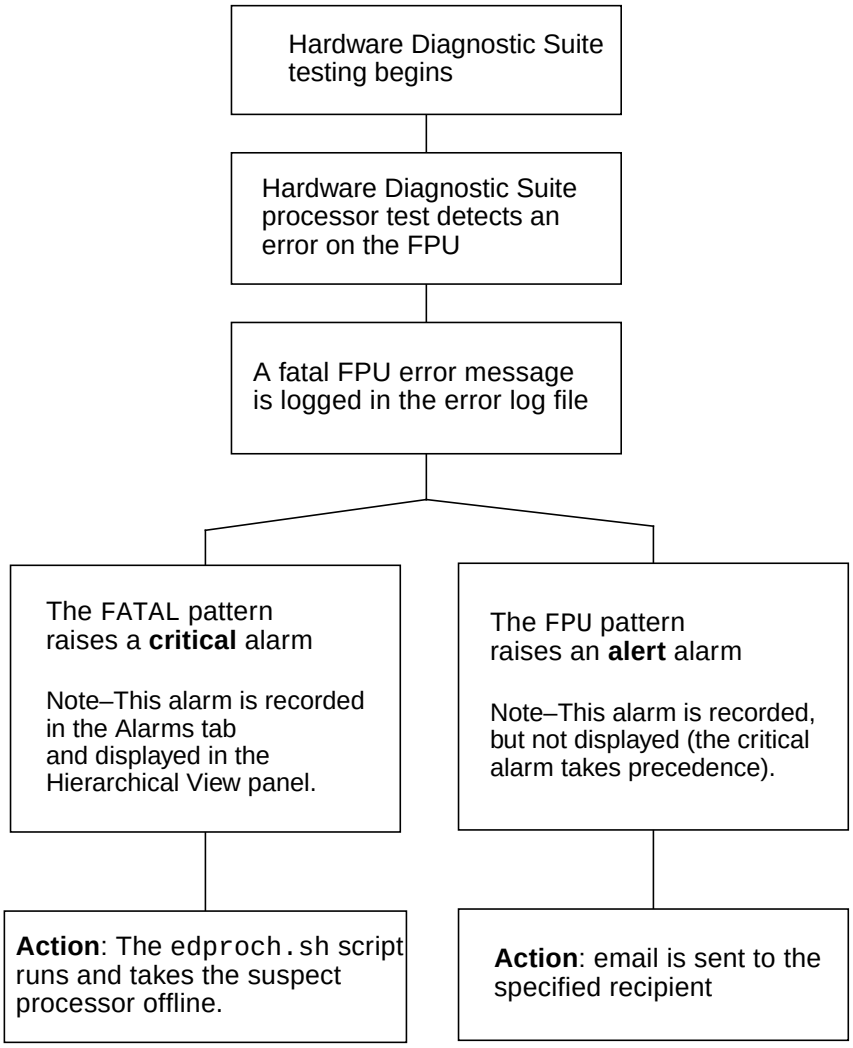

FIGURE 4-12 Alarm Action Flow Chart

5. **Complete this procedure with one of the following actions:**
   - Click OK to accept the changes you have made and close this window.
   - Click Apply to apply your changes without closing this window.
   - Click Reset to reset the Attribute Editor to the default parameters.
   - Click Cancel to cancel your request.

APPENDIX **A**

Hardware Diagnostic Suite Test Reference

This appendix contains descriptions of the following Hardware Diagnostic Suite tests and lists all test requirements:

- "CDROM Test" on page 60
- "Disk Test" on page 61
- "Floppy Test" on page 62
- "Memory Test" on page 63
- "Network Test" on page 64
- "Parallel Port Test" on page 65
- "Processor Test" on page 66
- "Serial Port Test" on page 67
- "Sun StorEdge A5x00 Enclosure Test" on page 68
- "Sun StorEdge A/D 1000 Enclosure Test" on page 69
- "SPARCstorage Array Controller Test" on page 70
- "Tape Test" on page 71

CDROM Test

The CDROM test checks the CD-ROM drive.

Each track is classified as follows:

- Mode 1 uses error detection/correction code (288 bytes).
- Mode 2 uses auxiliary data space or an audio track.

TABLE A-1 CDROM Test Descriptions and Requirements

Test Mode	Description	Requirements
Quick Check	Verifies that a CD-ROM drive is connected to the system.	None
Full Test	Verifies the functionality of the drive by accessing and reading the media in the drive. If the media contains audio and the audio test is enabled, the test tries to play it. Only a small percentage of the media is read, as this is sufficient to verify the functionality of the drive. It also keeps the test runtime from being unnecessarily extended. If the device is busy at the time of testing, the test exits after printing a message indicating that the device is unavailable for testing.	Load a CD-ROM (data or audio) into the drive before starting this test.

Disk Test

The Disk test verifies the functionality of hard drives.

TABLE A-2 Disk Test Descriptions and Requirements

Test Mode	Description	Requirements
Quick Check	Opens the drive, checks the drive configuration, reads a few blocks, and then closes the drive. All UNIX drive error messages are monitored and displayed. No hard drive data is written and no file system test is performed.	None
Full Test	Opens the drive, checks the drive configuration, performs a read-only test on the drive under test, and performs random seek checks. No file system test is run. When the test is done, the test closes the drive. All UNIX hard drive error messages are monitored and displayed.	None

Floppy Test

The Floppy test checks the diskette drive.

TABLE A-3 Floppy Test Descriptions and Requirements

Test Mode	Description	Requirements
Quick Check	Opens the diskette drive. All UNIX diskette drive error messages are monitored and displayed. No data is written and no file system test is performed.	Load a UNIX formatted diskette into the drive.
Full Test	Opens the diskette drive, checks the configuration, performs a read-only test on the diskette. No file system test is run. When the test is complete, the test closes the diskette drive. All UNIX diskette error messages are monitored and displayed.	Load a UNIX formatted diskette into the drive.

Memory Test

The Memory test checks the physical memory of the system. The test locates parity errors, hard and soft error correction code (ECC) errors, memory read errors, and addressing problems. The pseudo driver `mem(7)` is used to read the physical memory.

This test reads through all available physical memory. It does not write to any physical memory locations.

TABLE A-4 Memory Test Descriptions and Requirements

Test Mode	Description	Requirements
Quick Check	One percent of the memory is read. The test also displays how much physical memory is available. For systems that use ECC memory error handling, the test reports the ECC errors that have occurred since it was last invoked. The test reports ECC errors for a particular CPU, memory board, or SIMM.	None
Full Test	Performs the same test as for the Quick Check mode, except that more of the memory is read.	None

Network Test

The Network test checks all the networking hardware on the system CPU board and separate networking controllers (for example, a second SBus Ethernet controller). Such network devices include:

- Ethernet (`ie` and `le`)
- 100-Mbits per second Ethernet (`be` and `hme`)
- Token ring (`tr` and `trp`)
- Quad Ethernet (`QED`)
- Fiber optic (`fddi`, `nf`, `bf`, and `pf`)
- SPARCcluster™ System (`em`)
- ATM (`sa` and `ba`)
- HiPPI

For the test to be meaningful, the machine under test must be attached to a network with at least one other system on the network. This test mainly uses the Internet Control Message Protocol (ICMP), and requires at least two machines on a network—the machine under test and another machine reliable enough to be a test target. Both machines must support Transport Control Protocol/Internet Protocol (TCP/IP). The target machine must either be configured to respond to ICMP broadcast or to RPC broadcast.

First, the Network test determines the target machines to test. It sends an ICMP broadcast to find them. If it fails to find a necessary target, it tries an RPC broadcast to the RPC port mapper daemon. After finding the target, this test performs a random test in which it sends out 256 packets with random data length and random data.

The Receive Timeout is set to 120 seconds. The number of retries before an error is flagged is set to three.

TABLE A-5 Network Test Descriptions and Requirements

Test Mode	Description	Requirements
Quick Check	Checks whether the device is connected. It searches through all the network interfaces for a specified device name. If the network test does not find the device connected, the test fails, otherwise it passes.	System must be connected and configured for network communications through the network interface that is tested.
Full Test	Performs as described in the general description of the test.	System must be connected and configured for network communications through the network interface that is tested.

Parallel Port Test

The Parallel test verifies the functionality of the IEEE 1248 Centronics-compatible parallel port (ECP mode capable).

If the Parallel test completes successfully, you know that the DMA circuitry, and the device driver are functioning properly.

TABLE A-6 Parallel Test Descriptions and Requirements

Test Mode	Description	Requirements
Quick Check	Verifies that a bidirectional parallel port is configured on the system. The success of the test in this mode indicates that the system has the bidirectional parallel port hardware and the software driver installed.	None
Full Test	The test checks the functionality of the device by performing an internal loopback test on the device, using the internal fifo loopback test ioctl. The Algorithm used: set TFIFO mode pio write/read/compare on fifo contents dma write to fifo and pio read/compare	None

Processor Test

The Processor test checks the floating point unit on machines with the SPARC-based architecture. It runs a series of tests that check the registers, single- and double-precision floating point to integer conversions, addition, subtraction, multiplication, division, lock check, timing, and branching and non-branching condition instructions.

TABLE A-7 Processor Test Descriptions and Requirements

Test Mode	Description	Requirements
Quick Check	Checks the characteristics of the CPU.	None
Full Test	Exercises the functionality of the floating point unit.	None

Serial Port Test

The Serial test checks the on-board serial ports (`zs`[`0`,`1`], `zsh`[`0`,`1`]), `se`[`0`,`1`], `se_hdlc`[`0`,`1`]).

An asynchronous and synchronous test is run in Full Test mode. They are described below:

- Asynchronous test—Uses the asynchronous communication protocol as described in the `zs(7D)`and `se(7D)` man pages. The `termio(7I)`interface is used for configuring port characteristics. The test writes and reads data through the loopback path and compares the data to the original data. The test first sends a single character. If no errors or timeouts are detected, the rest of the data is simultaneously written and read, then compared.
- Synchronous test—Uses the synchronous HDLC-framing interface as described in the `zsh(7D)` and `se_hdlc(7D)` man pages. Data is written and read in checksum-protected packets.The synchronous test runs in three phases:
  - The first phase looks for activity on the port. If no activity is detected for at least four seconds, the test proceeds to the next phase. If activity is detected, the serial test exits with an error.
  - The second phase attempts to send and receive one packet. If no packets are detected after five attempts, the test exits with an error. If a packet is returned, the result is compared to the original. If the length and content of the packets do not match exactly, the test exits with an error.
  - The third phase attempts to send many packets through the loop. Some packet drops are to be expected, especially on a heavily-loaded system. Each packet is compared with its original for length and content. If a mismatch is detected, the test exits with an error.

TABLE A-8 Serial Test Descriptions and Requirements

Test Mode	Description	Requirements
Quick Check	Opens the port to determine if the device is connected. If the open operation fails and the port is not busy, the test exits with an error. If the open operation is successful or fails with a busy or exclusive use error, then the port is considered connected, and the test passes.	None
Full Test	Performs synchronous and asynchronous testing. If the device supports an internal loopback, then the Full Test is run using the internal loopback. The `zs(7D)` device supports an internal synchronous loopback and the `se(7d)` device supports an internal asynchronous loopback.	None

Sun StorEdge A5x00 Enclosure Test

The Sun StorEdge A5x00 Enclosure test is used to verify the functionality of the Sun StorEdge™ A5*x*00 subsystems.

The Sun StorEdge A5x00 enclosure test detects all Sun StorEdge A5x00 enclosures connected to the host and collects relevant configuration information.

TABLE A-9 Sun StorEdge A5x00 Enclosure Test Descriptions and Requirements

Test Mode	Description	Requirements
Quick Check	The host connections and the status of the enclosure are checked. The test fails if there are any broken connections or if a critical enclosure condition is detected.	None
Full Test	Searches for all the active and inactive connections between the host and the enclosure and reports the number of existing active connections. The test diagnoses any inactive connections and reports the possible causes for the failure. The status of the enclosure is obtained by querying the SCSI Enclosure Services (SES) device in the enclosure. Detailed information regarding the status of the elements within the enclosure is reported. The test fails if a critical condition is detected in the enclosure.	None

Sun StorEdge A / D 1000 Enclosure Test

The Sun StorEdge A / D 1000 Enclosure test is used to verify the functionality of the Sun StorEdge 1000 enclosure.

The A / D 1000 Enclosure test detects all the connected Sun StorEdge enclosures and displays the status of the various elements in the enclosure.

TABLE A-10 Sun StorEdge A / D 1000 Enclosure Test Descriptions and Requirements

Test Mode	Description	Requirements
Quick Check	The enclosure status summary bits are read. Detailed information is reported only if an unrecoverable or critical condition is detected.	None
Full Test	Checks and reports the status of the following elements in the enclosure: • Disk • Power supply • Fan • Temperature • RPA cache Battery (StorEdge A1000 only) An error is registered if an unrecoverable or critical condition is detected. Non-critical conditions are reported through warning messages.	None

SPARCstorage Array Controller Test

The SPARCstorage Array Controller test checks the functionality of the controller board on the SPARCstorage™ Array (SSA). The SPARCstorage Array Controller test isolates failures on the SSA disk drives from failures on the SSA controller board.

TABLE A-11 SPARCstorage Array Controller Test Descriptions and Requirements

Test Mode	Description	Requirements
Quick Check	Checks the state of the battery module and the fan module of the SPARCstorage Array.	None
Full Test	Exercises the hardware and software by invoking SCSI read buffer commands of various sizes to the NVRAM. These operations exercise all components except the SCSI devices: the host Fibre Channel hardware, the SSA Fibre Channel hardware, the SSA resident management software, and the hardware component interaction on the SSA controller card. Note—To test the hard drives, use the Disk test. This test also reports failure of the fan module and the NVRAM battery module of the SPARCstorage Array.	None

Tape Test

The Tape test verifies the presence or operation of various kinds of tape drives. It supports 4-mm, 8-mm, DLT, 1/4-inch cartridge, and 1/2-inch front-load tape drives.

TABLE A-12 Tape Test Descriptions and Requirements

Test Mode	Description	Requirements
Quick Check	Verifies that the drive can be opened and that the drive type can be determined. If both checks are successful, or if the drive is currently busy, then the test passes. The tape test fails if the open operation is unsuccessful for any reason other than that the drive is busy.	None
Full Test	Verifies that the drive can be opened and that the drive type can be determined. If both checks are successful, or if the drive is currently busy, then the test passes. The tape test fails if the open operation is unsuccessful for any reason other than that the drive is busy.	None

APPENDIX **B**

Hardware Diagnostic Suite Console Reference

This appendix contains descriptions of the Hardware Diagnostic Suite console panels and controls.

- "Hierarchical View Panel" on page 74
- "Hierarchical View Panel Buttons" on page 77
- "Device Description Panel" on page 77
- "Progress Panel" on page 78
- "Test Control Buttons" on page 78
- "Options and Logs Menus" on page 80
- "Sun Management Center Tab Selectors" on page 82
- "Lower Controls" on page 82
- "Schedule Panel" on page 83
- "Schedule Form" on page 85

Note – For step-by-step instructions on how to start and run the Hardware Diagnostic Suite refer to Chapter 2, "Accessing Hardware Diagnostic Suite Through Sun Management Center" on page 9, and Chapter 3, "Running a Hardware Diagnostic Suite Test Session" on page 17.

The Hardware Diagnostic Suite Console

You control the Hardware Diagnostic Suite application through the Hardware Diagnostic Suite console in the Sun Management Center Details window (FIGURE B-1). Each console panel button and control is described in the following section.

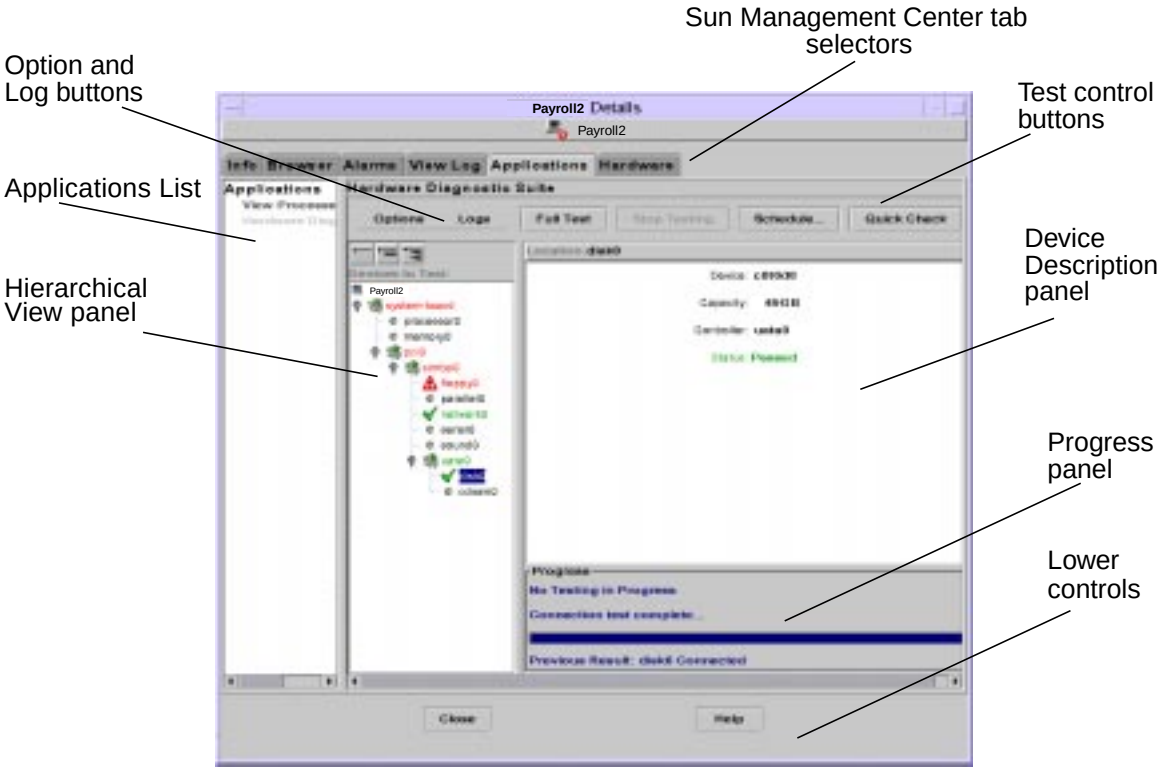

FIGURE B-1 Hardware Diagnostic Suite Console

Hierarchical View Panel

The Hierarchical View panel (FIGURE B-2) displays the host and the devices connected to the host. In this panel you select devices for testing and view test results. The Hierarchical View panel only displays devices that are testable with the Hardware Diagnostic Suite application. Devices that are not testable, or for which there is no Hardware Diagnostic Suite test, are not displayed.

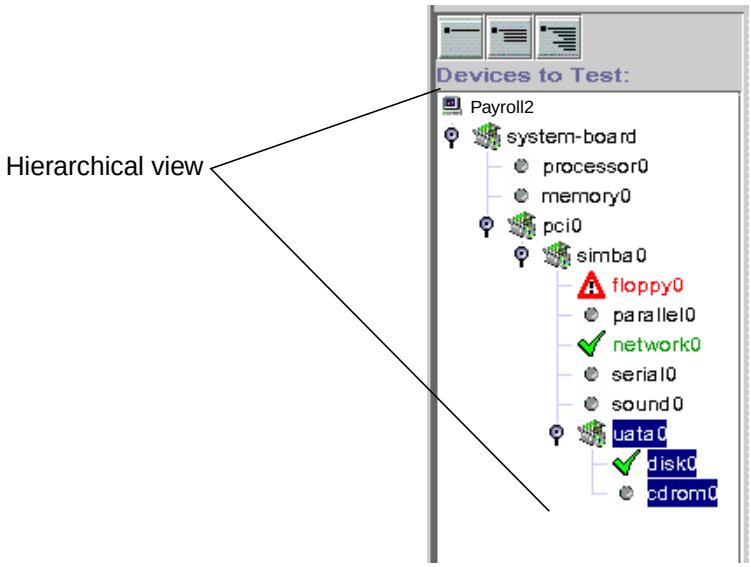

FIGURE B-2 Hierarchical View (Expanded View)

Devices in the Hierarchical View Panel

The Hierarchical View panel (FIGURE B-2 and FIGURE B-3) displays a graphical representation of the testable devices for host. The devices are displayed in groups according to their physical relationship to each other. For example, in FIGURE B-2 the floppy drive, parallel port, and so on are found in a group called simba0 because that is the interface to which they are attached. The topmost group, the host, represents the whole system.

The Hierarchical View can be expanded and collapsed with the View buttons at the top of the Hierarchical View panel.

Device Selection

In the Hierarchical View panel you select (for testing) individual devices, entire device groups, or the entire host, by clicking on the name of the item. Multiple devices in different groups can be selected by holding the Shift key while clicking on additional devices. When a device (or group) is selected, it is highlighted with a dark rectangle (FIGURE B-3).

Click again on a selected device to deselect it.

If you double-click on the device, information about that device is displayed in the Device Description panel.

Hierarchical View Indicators

As soon as the Hardware Diagnostic Suite test detects a successful or failing test on a device, the pass and fail condition is displayed in the Hierarchical View (FIGURE B-3). A condition indicator is displayed for each tested device (TABLE B-1).

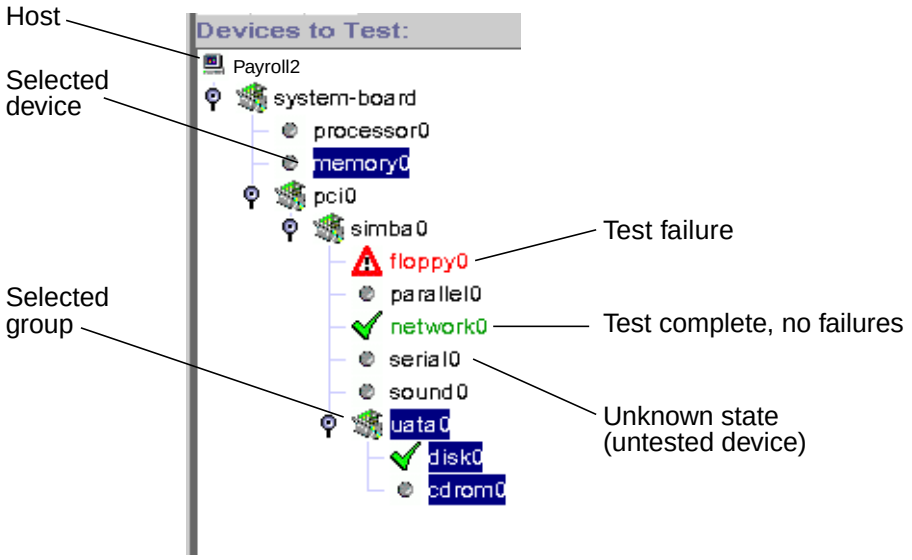

FIGURE B-3 Hierarchical View Panel Indicators

TABLE B-1 Hierarchical View Panel Indicators

Indicator	Name	Description
	Host	Represents all testable devices on the system.
	Board	Indicates a device group (a node that has other testable devices connected to it).
	Node	Indicates if a particular node has hidden sub-nodes (horizontal bar), or if the sub-nodes are displayed (vertical bar).

TABLE B-1 Hierarchical View Panel Indicators

Indicator	Name	Description
	Device	Indicates an individual device node that is in an unknown state, usually because it has not been tested yet.
	Test Pass	Indicates that at least one successful test pass was made.
	Test Failure	Indicates that a test failure was detected.

Hierarchical View Panel Buttons

Collapsed View Button

Press the Collapse View button to hide all the device groups under the host indicator.

Board-Level View Button

Press the Board-Level View button to collapse the view to show only the second level of devices under the host (the board level). Devices below the second level are hidden from view.

Expanded View Button

Press the Expanded View button to completely expand the list of devices in the Hierarchical View panel.

Device Description Panel

The Device Description panel displays information about each device as it is *visited* (double-click on a device to visit it) in the Hierarchical View panel and tested while the Hardware Diagnostic Suite is runnig.

FIGURE B-4 Device Description Panel

Progress Panel

The Progress panel displays the following information:

- Current test information—Indicates which device is under test, which subtest is currently running, and displays test messages.
- Progress bar—Displays a graphical representation of the progress of the current test. For example, when the bar is half filled, the current test is half finished.
- Previous test results—Indicates whether the previous test passed or failed.

FIGURE B-5 Progress Panel

Test Control Buttons

The Hardware Diagnostic Suite test control buttons are used to start, stop, and schedule test sessions as described below.

Full Test Button

Press the Full Test button to begin a test session. The tests that run are based on the selections made in the Hierarchical View. When testing begins, the Full Test button dims and the test session information is displayed in the Progress panel.

Stop Testing Button

Press the Stop Testing button to stop the test session. The most recent test name and test results are displayed in the Progress panel.

Schedule Button

Press the Schedule button to create, edit, or delete a scheduled test session. Instructions are displayed in the Device Description panel and scheduling controls are displayed in the Progress panel.

Quick Check Button

Press the Quick Check button to start a test session that runs a brief test on all selected devices. The Quick Check tests attempt to communicate with each selected device to confirm connectivity. No functional device testing occurs.

Options and Logs Menus

The Options and Logs menus provide access to the Hardware Diagnostic Suite test controls and log files.

Options Menu

The Options menu (FIGURE B-6) provides access to the following controls:

- Reset—Clears previous test results from the Hardware Diagnostic Suite display.
- Suspend—Interrupts the current test session.
- Resume—Resumes a test session that has been suspended.
- Reprobe for Devices—Causes the Hardware Diagnostic Suite agent to interrogate the system for testable devices. All testable devices are displayed in the Hierarchical View.

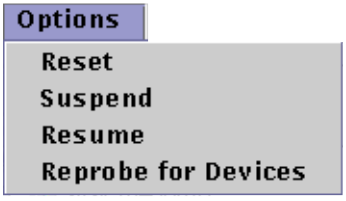

FIGURE B-6 Options Menu

Logs Menu

The Logs menu (FIGURE B-7) provides access to the following Hardware Diagnostic Suite log files:

- View Information—Opens a window that displays the Hardware Diagnostic Suite information log. The information log contains informative messages about each Hardware Diagnostic Suite test session, such as start and stop times and pass and failure information.
- View Errors—Opens a window that displays the Hardware Diagnostic Suite error log. The error log is a collection of date- and time-stamped error messages that occurred during previous Hardware Diagnostic Suite test sessions.

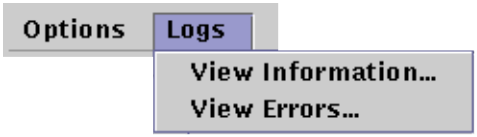

FIGURE B-7 Logs Menu

Sun Management Center Tab Selectors

The Sun Management Center tab selectors can be used to access Sun Management Center features. Three of these tabs are relevant to Hardware Diagnostic Suite:

- Browser—Use to access the Sun Management Center file scanning modules to set up alarm conditions for the Hardware Diagnostic Suite. Refer to Chapter 5, “Using Hardware Diagnostic Suite With Sun Management Center Alarms” on page 39.
- Alarms—Use to access the Sun Management Center alarm information. The Hardware Diagnostic Suite sets certain alarm conditions based on test results. Refer to Chapter 5, “Using Hardware Diagnostic Suite With Sun Management Center Alarms” on page 39.
- Applications—Use to access the Hardware Diagnostic Suite application through the Sun Management Center console.

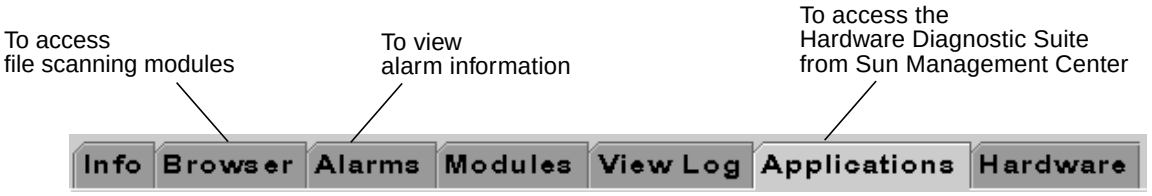

FIGURE B-8 Sun Management Center Tab Selectors

Lower Controls

The two buttons in the lower portion of the Hardware Diagnostic Suite console are described below.

Close Button

Press the Close button to close the Details window where the Hardware Diagnostic Suite is running.

Help Button

Press the Help button to access online help.

Schedule Panel

Access the Schedule panel (FIGURE B-9) by clicking on the Schedule button. In this panel you create, delete, and modify Hardware Diagnostic Suite test schedules. The functions of the Schedule panel are described in the following sections and step-by-step scheduling instructions are described in “Scheduling a Test Session” on page 31.

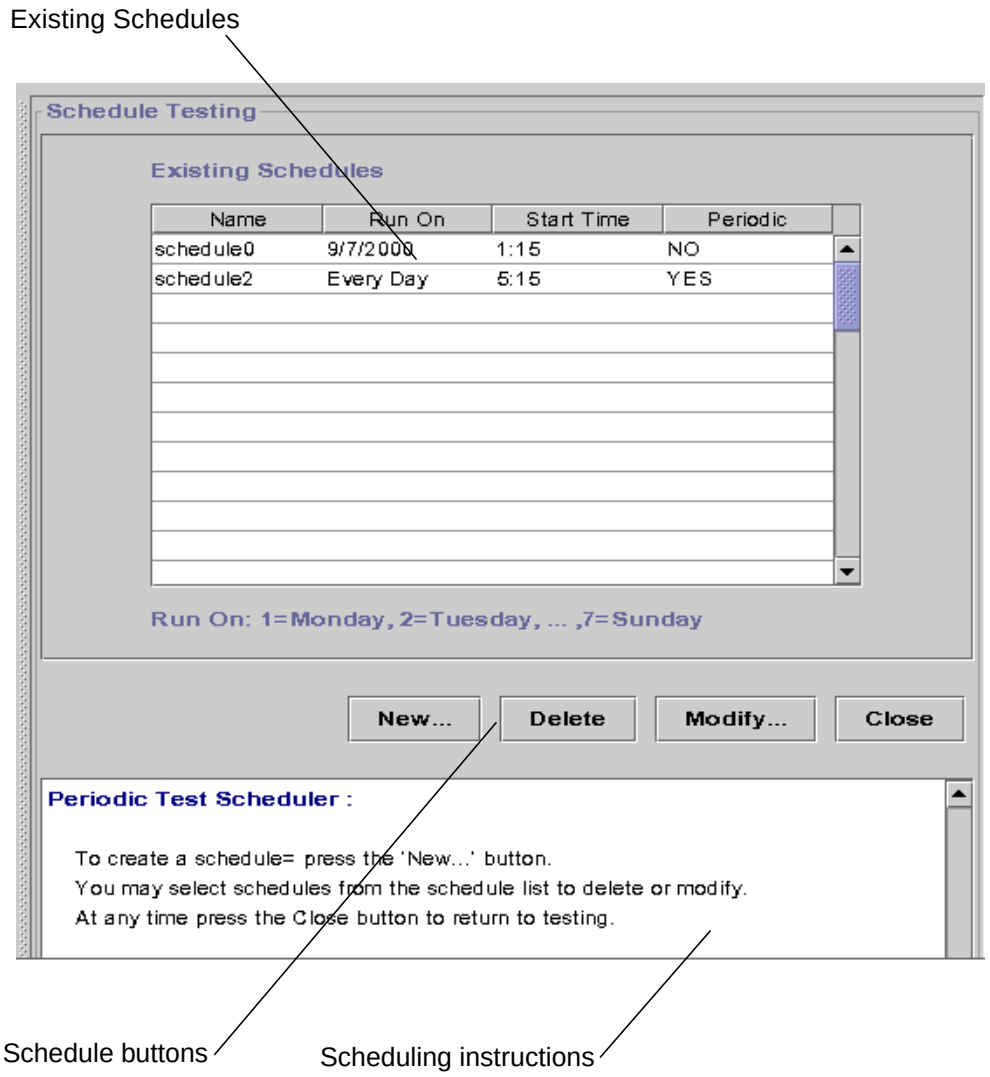

FIGURE B-9 Hardware Diagnostic Suite Schedule Panel

Existing Schedules List

The Existing Schedules (FIGURE B-9) list displays a list of current schedules for this host. If nothing is shown in the list, there are no current Hardware Diagnostic Suite schedules.

The Existing Schedules list describes the schedules as follows:

- Name—The name of the schedule.
- Run On—Indicates the days to run the scheduled test session.
- Start Time—Indicates the time of day that the test session is scheduled to start.
- Periodic—Indicates if the schedule is set up to run at regular intervals (Periodic=Yes), or if the schedule is set up to run one time (Periodic=No).

Schedule Panel Buttons

New Button

Press the New button to display the Schedule Form.

Delete Button

Press the Delete button to delete the selected schedule.

Modify Button

Press the Modify button to display the Schedule Form for modifications.

Close Button

Press the Close button to close the Schedule panel.

Schedule Form

Use the Schedule Form (FIGURE B-10) to create new Hardware Diagnostic Suite test session schedules and to modify existing Hardware Diagnostic Suite test session schedules. This form is displayed when the New or Modify buttons in the Schedule panel are selected. Each field of this form is described below.

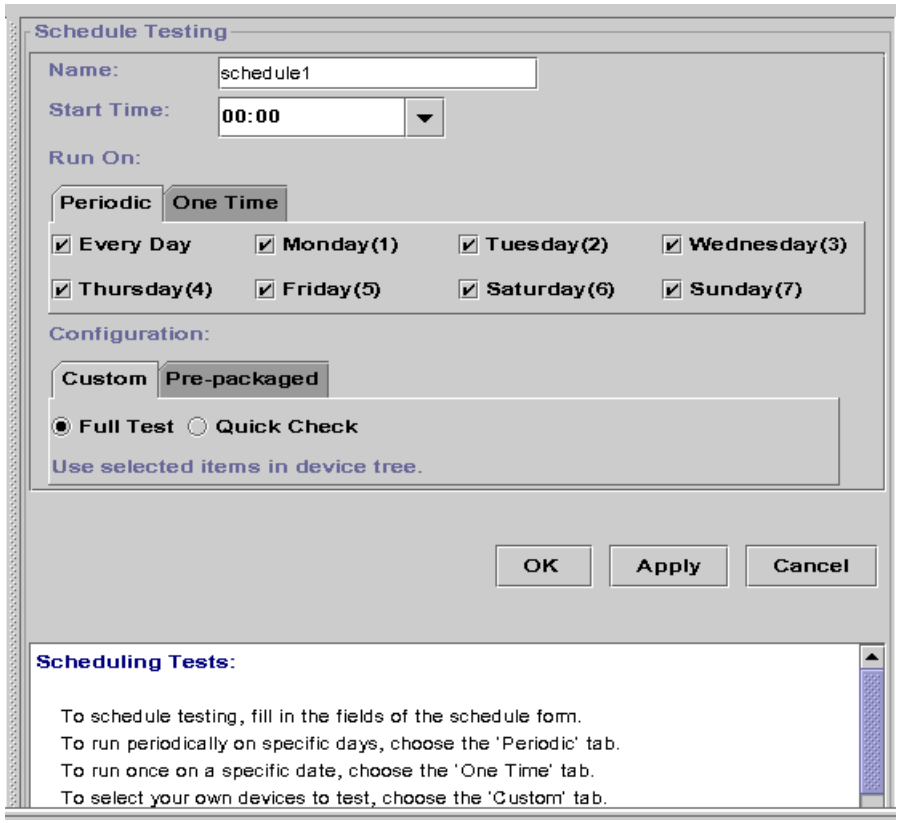

FIGURE B-10 Schedule Form

Name Field

The Name field specifies the name of the schedule that is being created or modified. Each Hardware Diagnostic Suite test session schedule name must be unique. A valid schedule name should be between one to 20 alpha-numeric characters. The name can contain the same special characters that are valid in Solaris file naming conventions.

Start Time

The Start Time field specifies the time when the scheduled test session begins.

Use the Menu mouse-button to select predefined start times that are available in 15-minute intervals, or type the specific time (based on a 12-hour clock) in the Start Time field. Select the appropriate AM or PM designation with the buttons provided.

Run On Field

The Run On field specifies the date for the scheduled test session. You can specify a date in two ways:

- Periodic—As seen in FIGURE B-10, is used when a scheduled test session runs periodically on specified days. A Periodic schedule remains in effect until it is modified or deleted.
- One Time—As seen in FIGURE B-11, is used when a scheduled test session runs one time. The date is specified using a *mm*/*dd*/*yyyy* format.

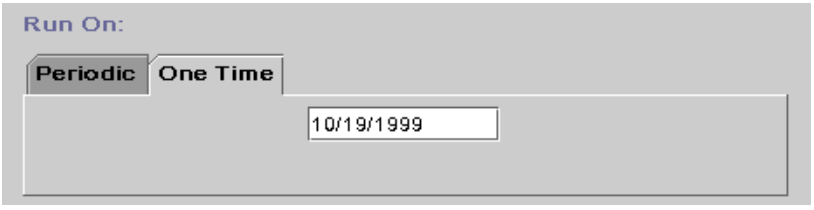

FIGURE B-11 Run On Field, One Time Date Specification

Configuration Field

The Configuration field specifies the test mode and the devices to test. Two methods are used to specify the test configuration information:

- Custom—(FIGURE B-10) Provides buttons to select Full Test or Quick Check test modes. You must further define the schedule by selecting the devices to test in the Hierarchical View.
- Pre-Packaged—(FIGURE B-12) Provides buttons to select pre-packaged test session schedules. These schedules are explained in TABLE B-2.

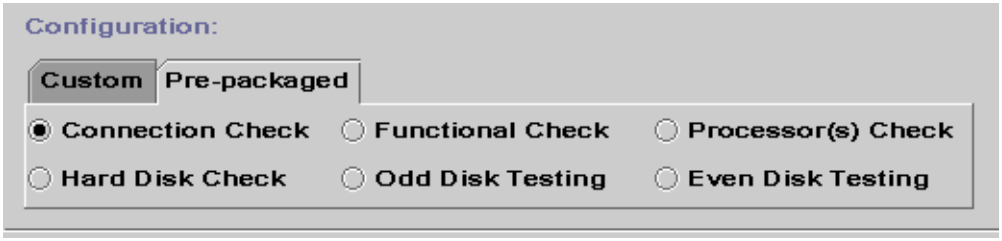

FIGURE B-12 Configuration Field, Pre-Packaged Schedules

TABLE B-2 Pre-Packaged Schedule Configurations

Name	Description
Connection Check	Sets up a schedule to run Quick Check tests on all available devices.
Functional Check	Sets up a schedule to run Full tests on all available devices.
Processor(s) Check	Sets up a schedule that runs the Processor test (in Full Test mode) on all the processors in the system.
Hard Disk Check	Sets up a schedule that runs the Disk test (in Full Test mode) on all the disks in the system.
Odd Disk Testing	Sets up a schedule that runs the Disk test (in Full Test mode) on every other disk in the system, beginning with the first disk (as seen in the Hierarchical View). This test is useful when there are many disks in the system.
Even Disk Testing	Sets up a schedule that runs the Disk test (in Full test mode) on every other disk in the system beginning with the second disk (as see in the Hierarchical View). This test is useful when there are many disks in the system.

Schedule Form Buttons

OK Button

Press the OK button to apply all the schedule information and to close the Schedule Form.

Apply Button

Press the Apply button to apply all the schedule information without closing the Schedule Form.

Cancel Button

Press the Cancel button to cancel any changed schedule information and to close the Schedule Form.

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