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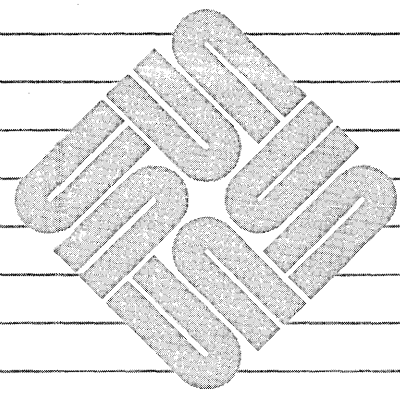
Sundiag User's Guide



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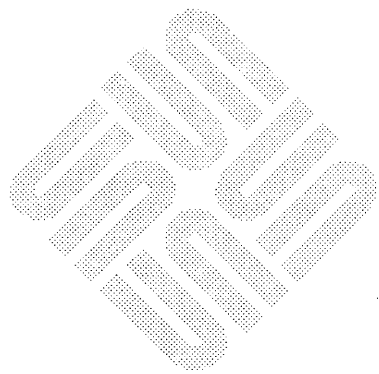

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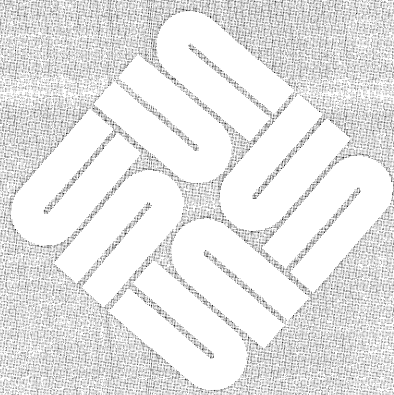

1

Introducing Sundiag

1.1. An Overview

The Sundiag On-line System Exerciser provides a SunView-based user interface for the tests formerly executed under the Sun System Diagnostic known as `sys-diag`, and for Sundiag tests written for new Sun products. The manual supports the version of Sundiag shipped with the SunOS version 4.0.3. The program may be found in the `/usr/diag/sundiag` directory if diagnostics were loaded during software installation.

With this new, easy to use System Exerciser, you can select tests and test options with a click of the mouse, and you can easily create your own test environment and save it for future use.

NOTE *We assume that you are familiar with the SunView window system. If you are not familiar with Sun's window system, please refer to the* ***SunView Beginner's Guide*** *before running Sundiag.*

Sundiag's `tty` interface makes it possible to use Sundiag from a terminal attached to a serial port, or from a modem. This feature requires that you type in commands instead of using the mouse, and displays one screen of information at a time. It is designed, however, to emulate the window system whenever possible; you still "toggle" various choices, entering a single letter instead of clicking the mouse. Chapter 3 describes the `tty` interface.

If you are remotely logging in to a Sun system from another Sun system, you may run Sundiag with the SunView interface. The "Setting Up" section explains how to set up your software for this feature.

Sundiag probes the system kernel for installed hardware devices, then automatically displays the devices it found on the control panel, with selected tests for each device on the test status panel. This feature provides a quick check of hardware/software setup. That is, if you know that a particular device — such as a disk drive or an optional PC board — is physically present in the system, yet Sundiag does not display the device on the control panel, it is likely that the kernel has not been configured to recognize that device.

Sundiag may be used to verify the configuration, functionality and reliability of most Sun hardware controllers and devices. To pinpoint specific hardware failures, use the SunDiagnostic Executive.

1.2. What This Manual Contains

This manual begins with general information about Sundiag and any special requirements for its use. Next, in Chapter 2, we describe start-up and exit procedures and the windows you can expect to see. Then the manual describes setting up test options, which will vary according to the hardware installed in the system under test, and explains how to customize your test sequence, and how to run a test.

Chapter 3 is devoted to the `tty` interface and tells you what to expect when you run Sundiag from a terminal or a remote log-in.

Chapter 4, a library of test descriptions, tells you what each test does, and includes test specific procedures. The Test Description section will change with each revision of this document, as new Sun products are introduced.

Finally, an appendix provides CPU board serial port loopback connector pin assignments.

1.3. Hardware and Software Requirements

Sundiag may be used on any Sun-2, Sun-3 or Sun-4 hardware configuration that has SunOS version 4.0 or later installed. The operating system kernel must be configured to support all peripherals that are to be tested. Some hardware may require a non-standard swap space (sd0b, xd0b, and so on) size. For minimum space requirements, refer to the software requirements shown in the hardware installation manual. An incorrect quantity of swap space may cause some Sundiag tests to fail.

Some of the tests that execute under Sundiag require loopback connectors. Contact Sun Customer Support for information on a loopback connector kit. Pin assignments for standard RS232 loopback connectors are shown in Appendix A.

For tape tests, you may need 1/2-inch or 1/4-inch scratch (write/read) tapes.

This diagnostic is designed to run in a SunView environment, but may be used from a terminal attached to a serial port. Chapter 3 describes the user interface when running in `tty` mode.

1.4. Setting Up

NOTE *In order for Sundiag's probe routine to function, you must boot* `vmunix` *(as opposed to any other renamed kernel, such as* `vmunix.patched`*).*

You will need to log in as super-user (root) in order to run Sundiag. Sundiag also needs to write the log and error files to the `/var/adm/sundiaglog` directory, which should be owned by root.

SunView-Based Remote Interface

If you want to run Sundiag from a remote log-in *with* the SunView interface, you must perform the steps described in the next few paragraphs.

1. Log in remotely (`rlogin`) to the *remotehost.*
2. Change to the Sundiag directory.

3. Become super-user (root) and start the Sundiag remote execution server:

```
myhost% su
password: enter super-user password
myhost# rlogin remotehost -l root
remotehost# cd /usr/diag/sundiag
remotehost# sd_rexd
```

4. Now you must mount the root directory of your system (*myhost*) on the remote system (*remotehost*):

```
remotehost# /etc/mount myhost:/ /mnt .
```

5. Now, back on your own system, set your path variable so that the *remotehost* `sundiag` directory is in your path:

```
myhost#  set path=($path /usr/diag/sundiag)
```

6. Finally, execute `sundiag` on the remote host from your system with the `-h` option:

```
myhost# sundiag -h remotehost
```

NOTE *When using the remote Sundiag interface, the color frame buffer tests are not fully functional.*

1.5. Starting and Exiting Sundiag

It is best to start Sundiag from a SunView window so that you are not left with a blank SunView canvas when you exit the diagnostic. If you are not running SunView when you start Sundiag, but you are logged in on the workstation under test, the SunView window system is automatically started and the Sundiag window is painted on the screen. However, when you exit Sundiag, the window disappears, but `sunview` is still running, meaning that you are left with a blank screen.

If you either log in remotely (`rlogin`) or log in from a serial port, Sundiag automatically runs in `tty` mode. Chapter 3 discusses the `tty` interface.

After reading the "Using Sundiag" chapter, from a SunView window, enter commands such as those shown below:

```
%su      enter password
#cd /usr/diag/sundiag
#sundiag [-a] [-C] [-o saved_options_file] [-t] [-m] [-p] [-v] [generic_tool_arguments]
```

To start Sundiag, you may simply enter `sundiag` and then Return, or you may add the arguments shown. You may also enter the complete path to the `sundiag` directory, rather than changing directories as shown above. For example, you could enter

```
%su      enter password
#/usr/diag/sundiag/sundiag
```

The optional arguments shown on the previous page in italics may be used as follows:

-a *hostname*
This argument tells Sundiag to run in automated test mode. This argument requires special Sun automated test equipment and is intended for use by Sun manufacturing.

-C This flag redirects the console output from any existing console window to the Sundiag console sub-window. *This option does not work when running Sundiag in tty mode.*

-o *saved_options_file*
This option directs Sundiag to use a specific "saved option" file. (Refer to "The **Optfiles** Button" for more information on this file.) If you do not use the `-o` argument, Sundiag uses the default option file `.sundiag`, if it exists.

-t This option instructs Sundiag to run in `tty` mode. Do not use the `-C` option with this option. For information on running Sundiag in this mode, refer to Chapter 3.

-m This option ensures that a device file is created on the workstation under test for all devices found during the kernel probe. When Sundiag creates the missing device files, it uses the major/minor device numbers and permissions that are already declared in `/dev/MAKEDEV`.

-p This argument tells Sundiag to ignore the kernel probe for devices. This argument is intended for use when running user-defined tests found in your `.usertest` file.

-v This argument suppresses the Sundiag start-up messages so that they do not interfere with the display when SunView windows are coming up. This argument may be used in your `.sunview` file.

-h *remote_host*
This command is used when you are set up to remotely test the system you name (shown above as *remote_host*) while using the SunView interface on your own system. Refer to "SunView Based Remote Interface" in the "Setting Up" section for information on setting up your software to implement this feature.

Generic Tool Arguments
Refer to `sunview(1)` in the *SunOS Reference Manual* for examples of generic tool arguments that may be used on the Sundiag command line when running in SunView mode.

Exiting Sundiag

To exit Sundiag from a SunView window, first click on the **Stop** button to stop any tests that are running, then click on the **Quit** button. After asking for verification, the Sundiag window will disappear.

You may also use the standard method of "quitting" a SunView window; that is, clicking RIGHT on the Sundiag window header and choosing **quit** from the pop-up menu.

If you want to continue testing and have your screen free for other uses, simply drag the mouse to **Close** from the window header menu and release the mouse button. A Sundiag icon (as shown in the left margin) will now appear on your screen, which you can monitor for test failures — if the icon has an X across it, a test has found an error.

To exit Sundiag from a terminal or remote log-in, type in **q** for "quit".

NOTE *While Sundiag is running, we recommend that you do not run any other programs or software that use the same hardware devices that Sundiag is testing. In particular, when the virtual memory test is running, there may not be enough free memory to run any other programs.*

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Using Sundiag With SunView

2.1. The Sundiag Window

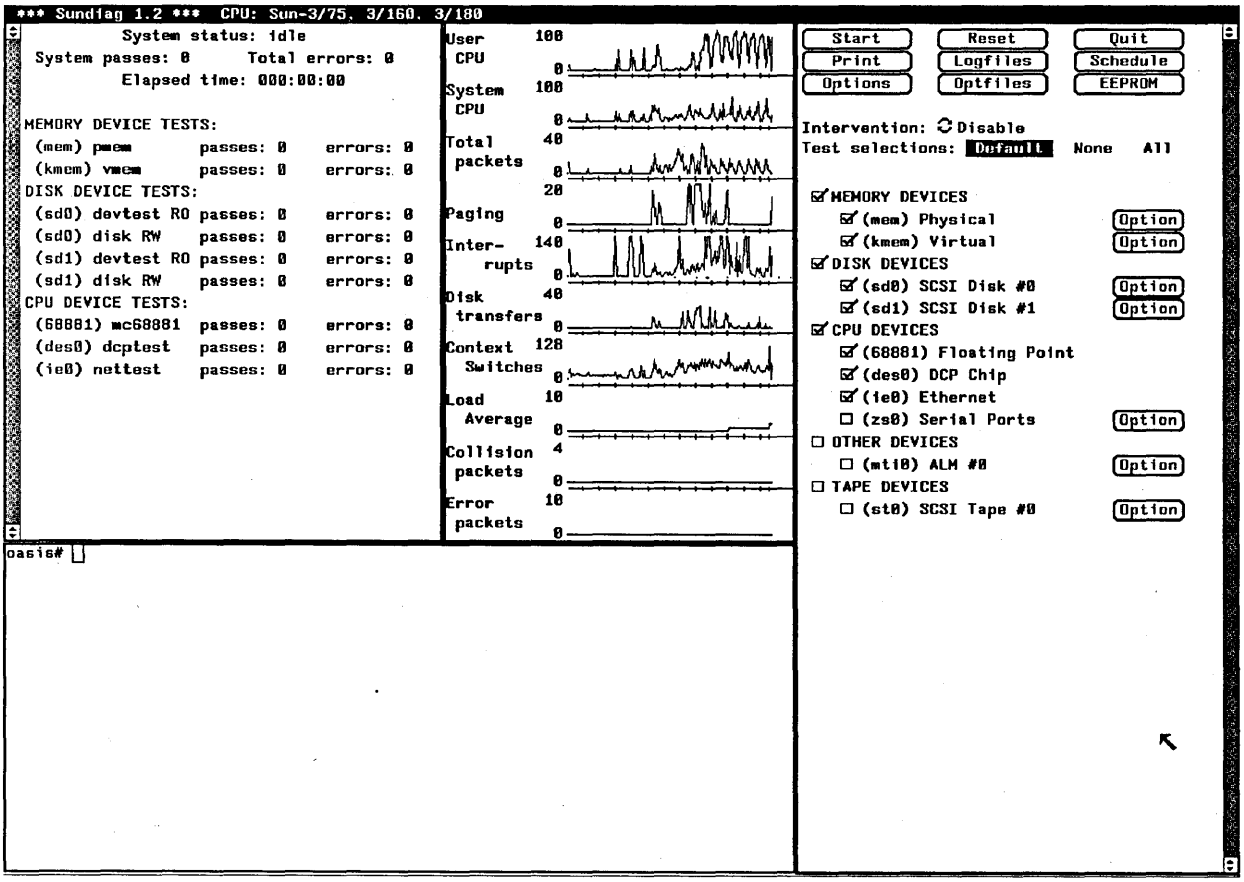
This chapter discusses using Sundiag from a SunView window. Refer to Chapter 3, "Using Sundiag with the TTY Interface" for information on using Sundiag from a terminal or from a modem. The "Setting Up" section in Chapter 1 explains how to perform a remote log-in over a network and run Sundiag with the SunView interface described here. When you start Sundiag, a SunView window appears on your screen, divided into four main windows. These "sub-windows" consist of:

- A control panel with buttons, cycle items and pop-up menus for manipulation of test parameters and options.
- A status window that lets you know how the tests are progressing.
- A console window that displays operating system messages and test messages and allows you, as super-user, to use SunOS commands.
- A performance monitor panel that displays the performance statistics for the system under test.
- Pop-up text sub-windows, available from the control panel for viewing Sundiag or operating system log files.

The Sundiag window looks something like this:

Figure 2-1 *Sundiag Window*

Status Window ↓ **Performance Meter** ↓ **Control Panel** ↓



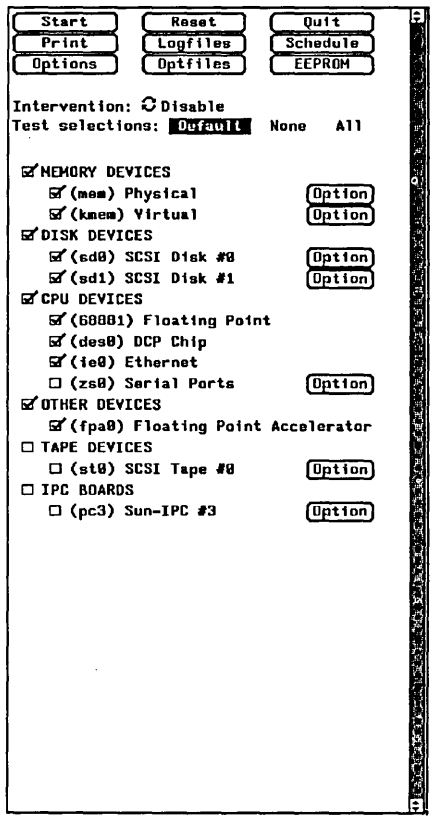
↑
Console Window

You can close the Sundiag window to an icon, as previously described. If one of the tests detects an error condition, an "X" appears over the icon.

The Control Panel

The contents of the lower part of the control panel are dependent on system configuration. Here is an example of the control panel part of the Sundiag window for a Sun-3 system that contains a floating point chip and a floating point accelerator board, as well as SCSI disks and tape, and a SunIPC™ board. The check marks mean that the device is enabled for testing.

Figure 2-2 *Control Panel*



The default condition of the control panel enables all the devices found during the kernel probe for all tests that do not require intervention or special manufacturing test equipment. Sundiag runs these tests if you choose the **Start** button.

Control Panel Buttons

Buttons such as **Options**, **Optfiles**, and **Schedule** become inoperative and appear shaded on the control panel after testing has started, meaning that the options they represent are valid only when tests are stopped. The following paragraphs describe the various buttons, cycle and text items that appear on the control panel.

Start/Stop

Start

When you push the **Start** button, Sundiag runs all currently enabled tests, and the wording on the button changes to **Stop**, so that you can click to stop the tests. System status on the Status Panel changes from **Idle** to **Testing**. When you click on the **Stop** button, all tests are stopped, the button changes back to **Start**, and the system status changes to **Stopping**, and then **Idle**.

When you press the **Start** button, the **Reset** button changes to **Suspend** so that you can suspend testing without actually stopping the test program.

Reset/Suspend/Resume

Reset

The reset button resets to zero the passes and error count for each test, in addition to resetting system passes and total errors. This is a valid option only while tests are stopped.

As previously explained, once tests are started, this option becomes **Suspend**. If you click on **Suspend**, test status in the status window changes to "suspended", and the **Suspend** button changes to **Resume**. When you are ready to resume testing, simply click on the **Resume** button. After you stop testing, the button will again read **Reset**.

The **Quit** Button

Quit

Click on the **Quit** button to exit Sundiag. All processes are stopped, and the diagnostic is exited.

The **Print** Button

Print

This button runs the SunView screen dump process, with the output directed to the printer you have selected using the **Options** button. This option may not function with a 24-bit frame buffer.

The **Logfiles** Button

Logfiles

Clicking LEFT on the **Logfiles** button brings up a window that displays the error log messages contained in the `sundiag.error` file. You may resize, move or quit this window in the standard SunView way.

When you click RIGHT on the **Logfiles** button and hold it down, you will see a menu of choices for viewing or deleting Sundiag and SunOS log files:

Figure 2-3 *Logfiles Menu*

```
display error log          remove error log
display info log           remove info log
display Unix log           remove Unix log
```

Slide the mouse to your choice and release the button. When you choose to display any of the logs, a text subwindow for viewing log files appears. This window has a scrollbar and all the features of a standard SunView text window.

The ASCII files you can view in this window are:

`/var/adm/sundiaglog/sundiag.info`	*the Sundiag status log file*
`/var/adm/sundiaglog/sundiag.err`	*the Sundiag status error file*
`/var/adm/messages`	*the SunOS (4.x) system error log*

If you choose to remove a log file, the program asks you for confirmation before truncating the file(s):

```
OK to remove Sundiag error log?

 Yes   No
```

The Status Log File, `sundiag.info` contains Sundiag messages about starting and stopping, and so on, in addition to Sundiag test messages. The Error Log File, `sundiag.err`, contains test messages classified as error messages as well as the test start/stop times. If a message line begins with a space, it is a continuation of the message that appeared on the previous line.

The format for test messages in either a status or error log file is:

date time device test [ERROR/FATAL/INFO/WARNING]: message

A typical message might look like this:

```
12/21/87 15:14:14 sd0 devtest ERROR:bad read
```

device is the device under test where the error occurred and *test* is the name of the test that reports the error. *date* and *time* tell you when the error occurred. The severity of the error is shown by the presence of one of these words:

```
ERROR
FATAL
INFO
WARNING
```

The *message* will vary, depending on the type of test in which the error occurred.

The format of Sundiag messages is:

date time hostname `sundiag [ERROR/FATAL/INFO/WARNING]:` *message*

When Sundiag probes for devices upon power-up, a message is displayed if any problems are found. Its format is:

date time hostname `probe [ERROR/FATAL/INFO/WARNING]`

The **Schedule** Button

Schedule

If you press this button, a pop-up window informs you that the Schedule feature is not yet implemented, and asks you to click on a square to continue.

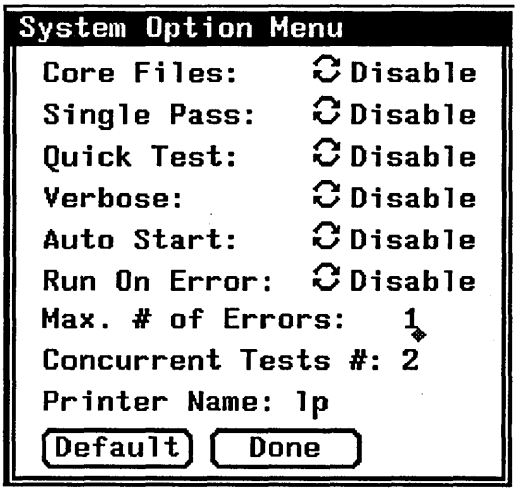
The **Options** Button

Options

This button sets various global test options, such as whether core files are enabled or disabled, and whether or not the tests should run on an error condition.

When you click on this button, a menu that looks like this appears:

Figure 2-4 *System Options Menu*



You may choose from this menu only while tests are stopped. Cycle the items (click LEFT on the circular arrows) to enable or disable each option. The System Option items are described below.

`Core files`
When you click on **`disable`** the tests will try to capture the signals that cause core dumps, meaning that you will receive informative messages instead of a `core` file.

`Single Pass`
If you enable this option, all Sundiag tests will execute one time only.

`Quick Test`
When you enable this option, a short version of the enabled tests is executed.

`Verbose`
When enabled, more diagnostic messages are printed in the console window while tests are running.

`Auto Start`
To eliminate the need to press the **`Start`** button to start Sundiag tests, do the following;

1. Enable the **`Auto Start`** option.
2. Save the global and test options (using the **`Optfiles`** facility, described in the next subsection)
3. Specify the saved option file (using the `-o` argument) when you type in the command line to invoke Sundiag.

`Run On Error`
If you enable this option, Sundiag will continue to execute the failed test until **`Max # of Errors:`** *some number* is reached. All tests will continue to execute until Sundiag encounters the number of errors you have

entered.

Concurrent Tests #:
Type in the number of tests you want to run concurrently in each device category after the

Concurrent Tests #:

text item. Point at the item and click LEFT to place the text caret after the colon.

Printer Name:
Type in the name of the printer you want to use when you click on the **Print** button. The name should match an entry in your `/etc/printcap` file, such as "lp1" or the name of the host to which the printer is attached. If you do not specify a printer, Sundiag will use the printer specified with the `PRINTER` environment variable. If there is no `PRINTER` variable (in `.login` for example), Sundiag will print on the printer specified by the `lp` entry in you `/etc/printcap` file. Any printer you specify must exist in the `printcap`file.

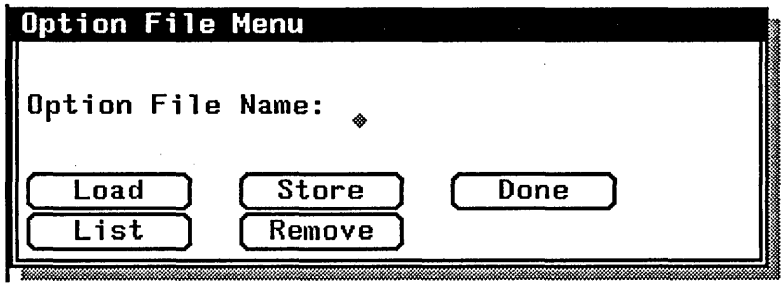
The **Optfiles** Button

Optfiles

Clicking LEFT on the **Optfiles** button brings up a menu of actions you may perform on the option files that exist in the `/var/adm/sundiaglog/options` directory. The options stored in these files are those you have chosen from the System Options Menu and those chosen from the control panel for specific tests. The **Optfiles** button works only when tests are stopped.

The menu looks something like this:

Figure 2-5 *Optfiles Menu*



Click RIGHT on **List** and hold the button down to view a list of the existing option files. The options that are saved in these files are those you set with the **Options** button, as well as the individual options chosen for each test.

If you choose **Store** from the menu, and then **Load**, the next time you **Start** the tests, the options you saved will be used, and the Control Panel will reflect those choices.

Choose **Remove** to remove the named option file. A pop-up menu will ask you if you are sure you want to remove the file.

You may type in the name of the file you want to create or load after the **Option File Name:** text item. `.sundiag` is the name of the default option file. If you invoke Sundiag without the `-o` option, the `.sundiag` file is used, if it exists.

When you are finished, click on **Done** and the Option File Menu will disappear.

The **EEPROM** Button

This feature is not implemented at this time.

This button starts a process that reads the contents of the EEPROM on the CPU board and sends that information to Sundiag. The diagnostic then compares the EEPROM hardware configuration information to the hardware configuration of the system as understood by the operating system, and any differences are flagged as errors. This information is displayed in a pop-up. The EEPROM information is logged into the Sundiag log file(s) only at your request.

Intervention Mode

This cycle item disables/enables all the tests that require user intervention or special test equipment. The intervention mode assumes that all tests are executed with standard cables and other equipment available in the field.

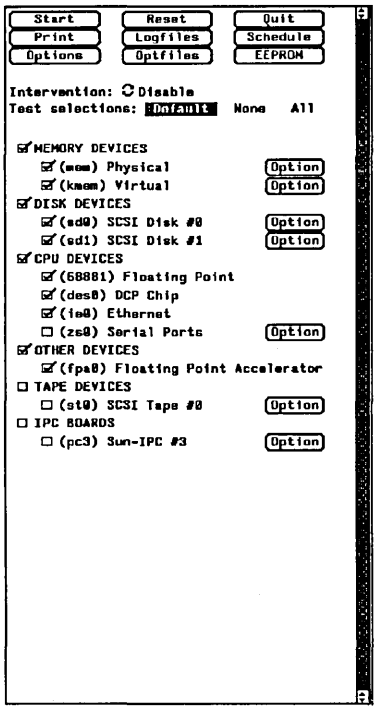
Default, All or **None**

Initially, the control panel highlights **Default** mode, meaning that all the devices that do not require intervention are enabled for testing.

Clicking on **All** enables testing of all the devices installed in the system *if* intervention mode is chosen. In this case, you must provide the necessary test equipment for the devices you want to test.

If you click on **None**, All the devices enabled by default are "disabled" and the program waits for you to select the devices you want to test. If you choose **None** and then click on the **Start** button, the Test Status window will show "0" test results.

Devices Section of Control Panel

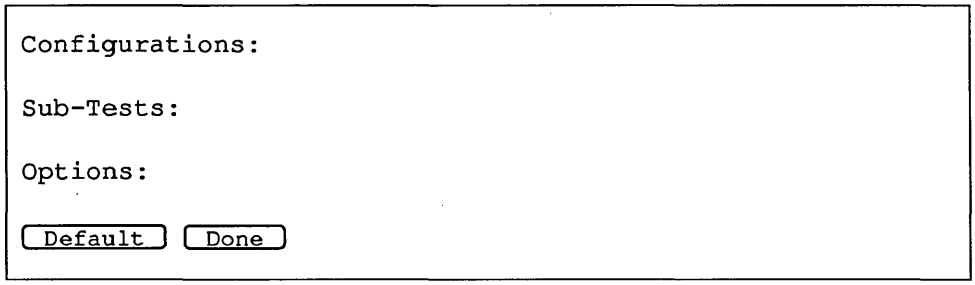


This part of the control panel is generally divided into categories such as MEMORY DEVICES, DISK DEVICES, CPU DEVICES, OTHER DEVICES, TAPE DEVICES, and special boards. The options shown are the result of the kernel probe that is done before your Sundiag window comes up, and the items shown will vary with each system configuration. Each device found has a check mark when enabled for testing (as shown to the left of this text). The device is enabled or disabled when you point at the toggle area and click LEFT.

If a device is enabled during testing, the test(s) are started as soon as possible. If an enabled device is disabled during testing, the test(s) stop immediately.

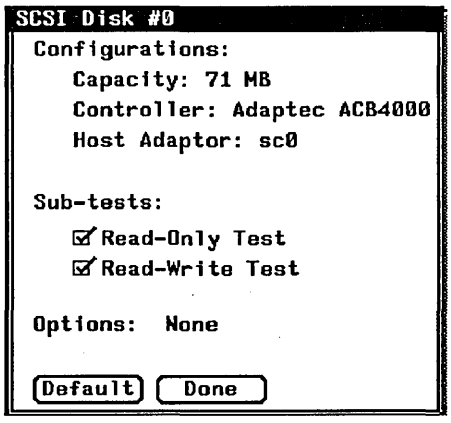
Test Option Buttons

Each device with configuration options has an **Option** button to the right of its name. When you click RIGHT on that button, a small option menu pops up. All option menus share these fields:



If you click on **Default**, check marks will appear in front of the standard default tests, as shown above, and when you start testing, the options that are checked will be used. In Figure 2-6 , the menu shows that SCSI disk #0 has a 71MB capacity and that its controller ID is sc0 (the first controller board). This information comes from the operating system kernel. This test offers read-only and read/write testing. In this case, both types of testing are enabled, as signified by the check marks.

Figure 2-6 *Example Option Menu*

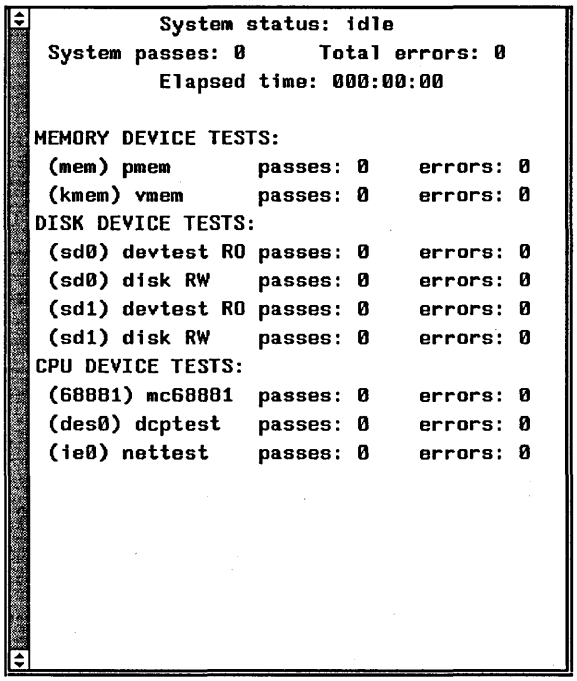


Refer to the "Test Description" section for test specific option menu choices. When you are ready to view another option menu, click on **Done** and the option menu will disappear. You may view only one option menu at a time.

The Test Status Panel

This panel shows the SunOS device name and the test name for each device under test, along with a running total of test passes and errors. The tests are grouped by device type, and an actively running test is marked with an asterisk. The test status panel looks something like this:

Figure 2-7 *Test Status Panel*



The results displayed in this window are stored in special log files, discussed under "The Log File Button".

The message following `System status:` at the top of the display changes as described previously under "Start/Stop" and "Reset/Suspend/Resume".

`System passes:` always shows the least number of passes that any test has completed. In other words, if the `pmem` test has completed two passes while all other tests have completed four passes, the status panel will show

```
System passes: 2
```

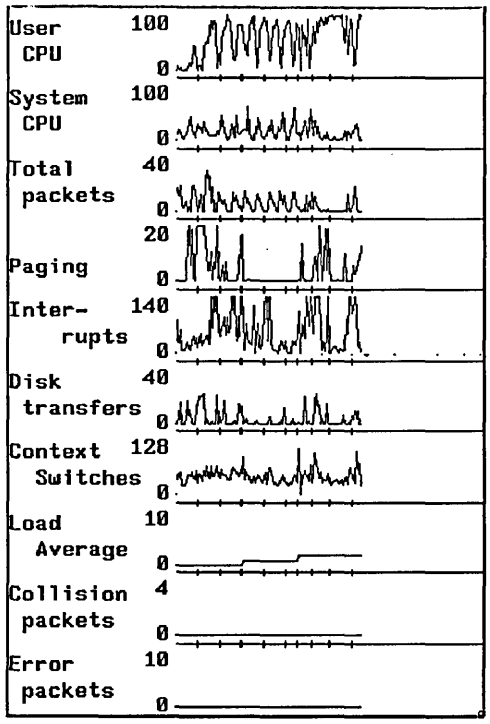
The Console Window

The Console Window appears in the lower left corner of the Sundiag window. You may enter SunOS commands from this window, and if you use the `-C` option when you bring up Sundiag, all the SunOS messages that would normally appear in your system console window will appear in the Sundiag Console Window.

The Performance Monitor

The performance monitor is the same as that provided by the SunOS `perfmeter` utility, and provides a graphic display of system performance statistics. The `perfmeter` looks something like this:

Figure 2-8 *Performance Monitor*



2.2. Running Sundiag Tests

You have logged into the system under test as superuser (root) and entered the appropriate command line (as described in Chapter 1, Section 1.5). You have brought up the Sundiag window and checked the devices shown in the control panel against the devices you know to be physically present in the system. If there were any discrepancies, you should check the boot-up information in the `/var/adm/messages` file to make sure that SunOS sees all of your hardware devices. (The on-board MC68881 (Sun-3) and FPU (Sun-4) floating point devices do not show up in the SunOS boot messages.) If the SunOS does not recognize your hardware device, you need to check the hardware and the SunOS kernel configuration. If you use the `-m` option when entering the command line, Sundiag will make the appropriate device files if they are missing.

You have chosen from the system and test options offered, and perhaps even created a special global Options file that you may **`Load`** before you begin testing, or specify with the `-o` option when you first invoke Sundiag.

When you are satisfied that the software configuration agrees with the hardware configuration, and that a check mark appears beside every device you want to test, simply click on the **`Start`** button. Or, if you have enabled the **`Auto Start`** option from the System Option menu and saved an options file, simply type **`sundiag -o`** *options_filename* from a SunView window.

3

Using Sundiag With the TTY Interface

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3

Using Sundiag With the TTY Interface

This chapter describes the interface available when you execute Sundiag from a or from a terminal attached to a serial port or from a modem. All the buttons displayed on the SunView version of Sundiag have command equivalents in `tty` mode. For more information on a particular command, please refer back to Chapter 2. Note that, if you are logging in remotely over the Ethernet from a Sun system, you may run Sundiag with the SunView interface. Refer to the "Setting Up" section in Chapter 1 for more information.

3.1. Starting Sundiag From a Terminal

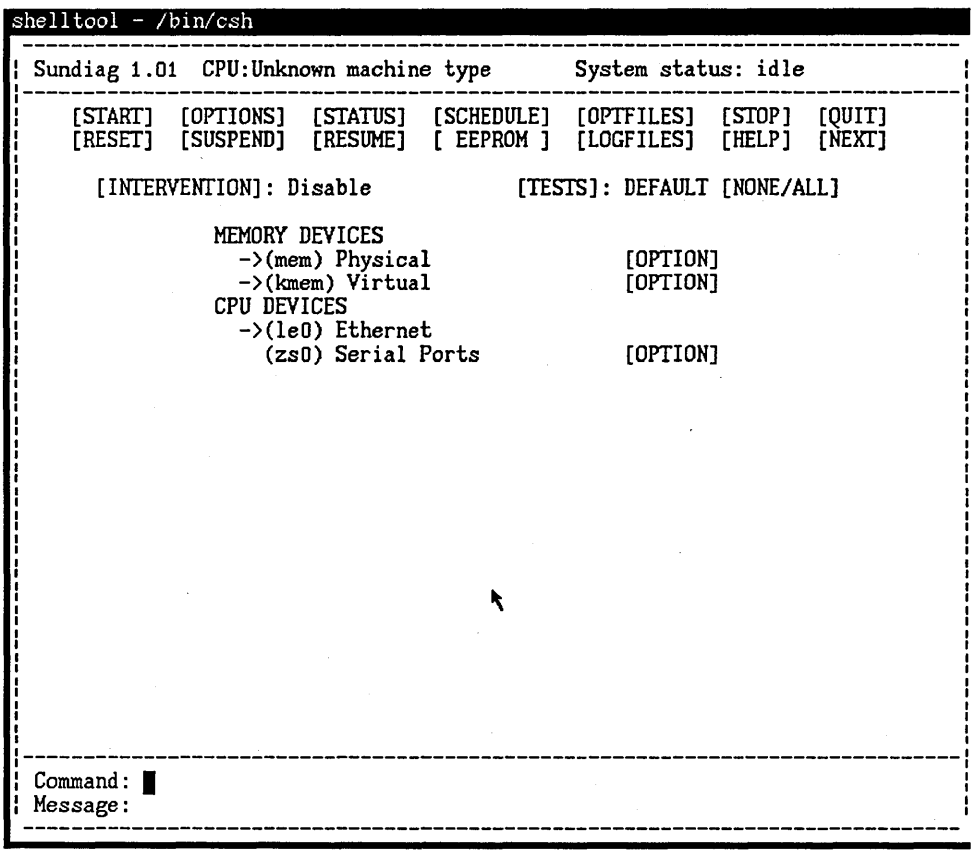
Whether you are remotely logged-into a workstation that contains the `sundiag` directory, or whether you are running Sundiag from a terminal attached to such a workstation, you type in the command line described under "Starting and Exiting Sundiag" at the beginning of this manual. The `-C` option is the only option NOT AVAILABLE when using the Sundiag `tty` interface.

After changing to the `sundiag` directory, you may simply enter **`sundiag`**. The program will sense that you are logging in from a terminal interface and will automatically bring up the `tty` version of the control panel. You will see this brief message

```
Starting probing routine....please wait
```

and then a display that looks something like the example on the following page.

Figure 3-1 *Main Display on a Terminal*



All of the commands shown in brackets at the top of the display may be entered after the blinking cursor at the bottom of the display. You may enter the entire command in upper or lower case, or you may use the single letter that corresponds to each command, as shown on the table that follows:

Table 3-1 *TTY Command Characters*

Command	*Character to Enter*
`start`	`s`
`options`	`o`
`logfile`	`l`
`status`	`a`
`optfiles`	`f`
`stop`	`t`
`quit`	`q`
`reset`	`r`
`suspend`	`p`
`resume`	`u`
`eeprom`	`e`
`schedule`	`m`
`intervention`	`i`
`next`	`n`
`tests`	`c`

Scrolling

All the commands function as described for the SunView buttons. The `next` command provides a means of viewing a display that is too long to fit on one terminal screen. When you have reached the end of the display, the `next` command takes you back to the beginning of the display. Simply enter a new command to exit from the loop.

When you enter the first character of a command, the screen is cleared of any messages at the bottom of the screen.

Re-drawing the Screen

If you want to redraw the screen, enter Control-L.

Some of the command choices cause a visible change to the display. For example, if intervention mode showed on the screen as "disabled", when you enter **`i`**, or **`intervention`**, the display changes to `enable`, and tests started now would run in intervention mode.

When tests are actively running, an asterisk appears before the test name, as it does when in SunView mode.

Some commands bring up a secondary display that replace the existing one. You may type **`d`** for `Done` from most of these displays and thereby return to the "control panel" display, as we shall call the display you see when you start Sundiag.

The Sundiag `tty` interface attempts to simulate all the windows you see when you use the SunView interface, one at a time. In some cases, features are combined for your convenience. For example, the "control panel" display also shows whether or not a test is in progress, and whether or not a test has failed. A secondary display either shows all available control panel commands in addition to those available from the level you are on, or provides a `Done` command to return you to the original display. One exception is that, when you choose to `Display`

a log file, the Sundiag `tty` interface uses `vi` to display the file. You must then use the `ex` command

```
:q
```

to exit from that display.

Backgrounding Sundiag

After you have brought Sundiag up, using the `tty` interface, you can enter Control-x (hold down the Control key while pressing **x**) and Sundiag will continue to run in the background, freeing your screen for other functions. You may also log out of the remote system after placing Sundiag in background mode.

To bring Sundiag back into view, simply log back into the remote system, if necessary, and enter **`sundiagup`**. You should see a pass and error count, followed by the Sundiag display.

3.2. Control Panel Commands

NOTE *After you type in any of these commands, enter a carriage return.*

This section gives a brief description of what to expect when you enter each of the commands shown in brackets at the top of the screen. The commands are presented as they appear on the screen, from left to right.

[START]

This command may be typed in as `start` or, simply `s`. After you have selected the tests and entered the system level and test level options of your choice, you must enter "start" to begin testing. Tests begin immediately, and the `Status` at the top of the screen changes to `testing`.

[OPTIONS]

Entering `options` or just `o` from the main "control panel" display brings up a menu of global, system level options that affect every test. Refer to "The Option Menu" for an example of the display and a description of each choice.

[STATUS]

Entering `status` or simply `a` brings up an informative display about the tests in progress, and so on. Refer to "The Status Display" for an example.

[SCHEDULE]

This option is not implemented at this time. Entering `schedule` or `m` displays a message to that effect.

[OPTFILES]

Entering either `optfiles` or `f` from the main, "control panel" display brings up a display from which you may save global options chosen with the `Options` command. Refer to "The Optfiles Menu" for an example of this display.

[STOP]

Entering either `stop` or the character `t` stops all testing. While Sundiag is stopping the tests in progress, the top right of the screen reads:

```
System status: stopping
```

When all tests are stopped, the System status is `idle`.

If you want to stop an individual test, you simply type in the test name:

```
Command: mem
Message:
```

If a test is already stopped, typing in its name starts the test and typing the test name again stops the test once more.

[QUIT]

Entering `quit` or just the character `q` exits the Sundiag `tty` interface. If you have remotely logged in, you must also change directories to your remote entry point and exit the remote log-in.

[RESET]

Entering `reset` or just the character `r` resets to zero the passes and error count for each test, in addition to resetting system passes and total errors. This is a valid option only while tests are stopped.

[SUSPEND]

Entering `suspend` or just the character `p` suspends all testing until you enter `resume` or the character `u`. When you enter this command, the System status at the top of the screen changes to `suspended`.

[RESUME]

Enter `resume` or the character `u` to resume testing after you entered the `suspend` command. The System status display will then change to `testing`.

[EEPROM]

This option is not available at this time.

[LOGFILES]

Entering `logfiles` or just the character `l` brings up a display of operations you can perform on the log files Sundiag has stored in the `/usr/adm/sundiaglog` directory. Refer to "The Logfiles Menu" for an example of the display and a description of the options.

[NEXT]

Entering `next` or just the character `n` displays the next screen of information when a second screen is needed. When you reach the end of the display, enter `n` again to page back to the beginning of the display, or enter a new command from those in brackets at the top of the screen.

[INTERVENTION]

When you enter **`intervention`** or **`i`** from the "control panel" display, the `[INTERVENTION]:` text item toggles from `Disable` to `Enable` or from `Enable` to `Disable`. When you enable intervention mode you may choose tests that require special loopback connectors. If the mode is not enabled and you try to enable a test that requires it, a message at the bottom of the screen will

tell you to enable intervention mode.

[TESTS]

When you enter

tests default

or

c d

a -> symbol appears before each default test, meaning that those tests will run when you enter `start`.

If you enter

tests none

or

tests n

no tests are enabled, and all the -> symbols disappear from the test names.

If you enter

tests all

or

tests: a

and `[INTERVENTION]` is disabled, all tests that do not require user intervention are enabled; an arrow appears before each. If intervention mode was enabled before you entered `all`, all tests displayed are enabled.

3.3. To Enable/Disable Individual Tests

If you do not want to run the pre-selected default tests, or all the tests, you may enable or disable any of the tests listed, simply by entering the test name as shown in parentheses. For example, if there is no -> symbol in front of the display:

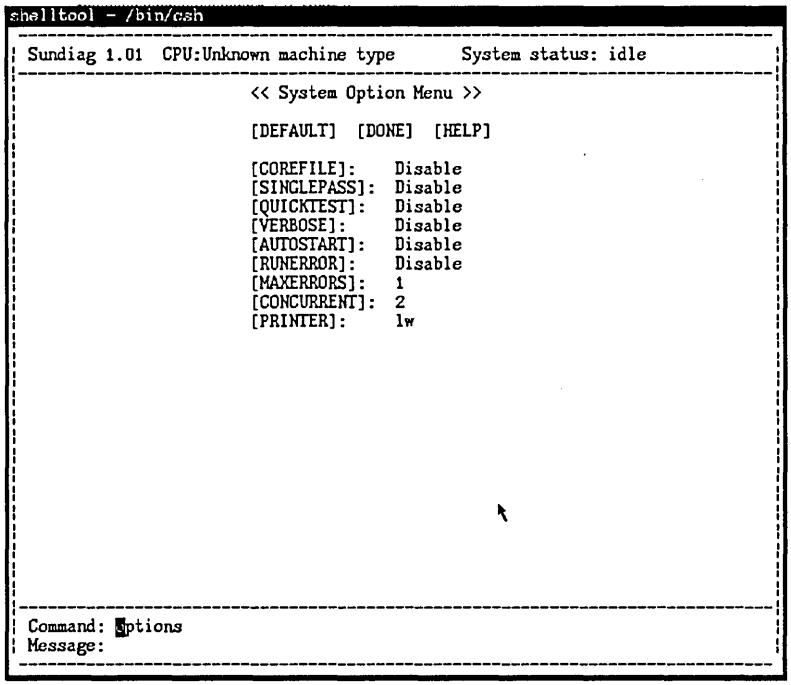
```
(mem) Physical              [OPTION]
```

You may enter **mem** to enable the Physical Memory test. An arrow will immediately appear before the test name. Entering **mem** again disables the test and removes the arrow. Tests that do not have an arrow in front of the test name will not run when you enter **start**. As mentioned earlier in this text, you can also enter a test's name to stop an individual test in progress, or start a new test.

3.4. The Options Menu

Entering **options** from the main display brings up a display that looks something like this:

Figure 3-2 *System Options Display*



The commands shown on this display may be entered either as complete words, or with the following characters:

Command	*Character to Enter*
default	f
done	d
corefile	o
singlepass	s
quicktest	q
verbose	v
autostart	a
runerror	r
maxerrors	m
concurrent	c
printer	p

These commands correspond to the **Options** button menu choices described in the SunView "Control Panel" section of this manual. For descriptions of the system options, please read that section.

When you enter **default** or **f**, the pre-selected, default system options are enabled. The display should show `enabled` after each default option.

To exit from this display, enter **done** or simply **d**.

The corefile (o), single pass (s), quick test (q), verbose (v), auto start (a) and run on error (r) options toggle from `disable` to `enable` when you enter the command. For example, if the display shows

```
[COREFILE]  disable
```

and you enter `corefile` or `o`, the option of having a core dump saved in a file is enabled, and the display changes to `enable`. When you enter the command again, the display changes back to `disable`, and the tests will attempt to capture the signals that cause core dumps. You will receive informative messages instead of a `core` file.

In order to change the maximum number of errors Sundiag will allow before stopping tests, you must enter

maxerrors *some_number*

or simply

m *some_number*

When you press Return the number you have entered will appear after `[MAXERRORS]:`.

In order to specify the maximum number of tests you want Sundiag to execute concurrently, you must enter

concurrent *some_number*

or

c *some_number*

In order to specify where you want your screendumps printed when you enter the `Print` command in Sundiag's SunView mode, you must enter the printer name, as it appears in your `/etc/printcap` file. For example:

```
printer lp1
```

You may also simply enter

p *printer_name*

It is not possible to print a screen dump from `tty` mode.

3.5. The Status Display

When you enter `status` or `a` from the "control panel" display, this sort of display appears:

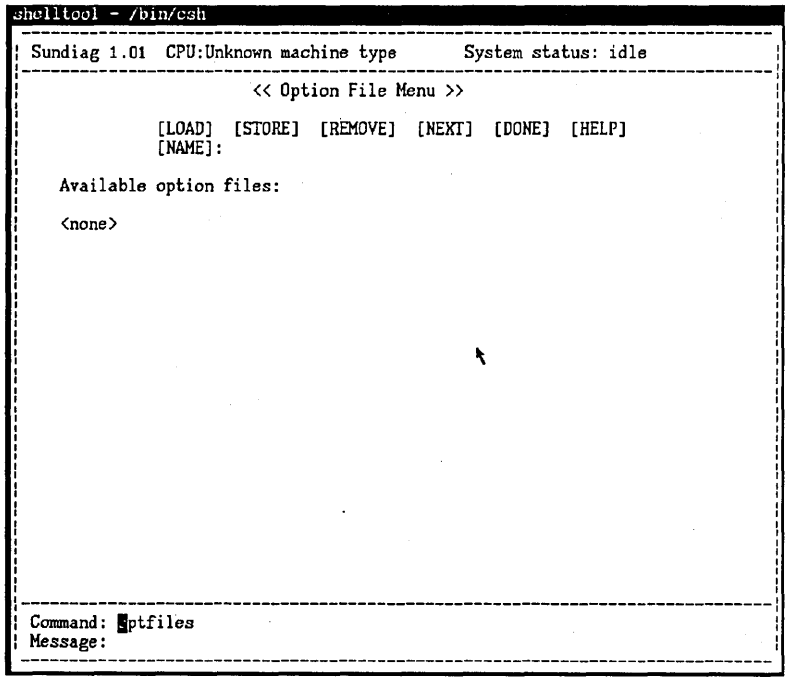
Figure 3-3 *Status Display*

```
shelltool - /bin/csh
-------------------------------------------------------------------------------
| Sundiag 1.01  CPU:Unknown machine type       System status: idle              |
-------------------------------------------------------------------------------
|    [NEXT]  [DONE]  [HELP]                                                     |
|    System passes: 0      Total errors: 0       Elapsed time: 000:00:00        |
|                                                                               |
|              MEMORY DEVICE TESTS:                                             |
|                 (mem) pmem        passes: 0    errors: 0                      |
|                 (kmem) vmem       passes: 0    errors: 0                      |
|              CPU DEVICE TESTS:                                                |
|                 (le0) nettest     passes: 0    errors: 0                      |
|                                                                               |
|                                                                               |
|                                                                               
```

3.6. The Option Files Menu

When you enter **optfiles** or **f** from the "control panel" display, this sort of menu is offered:

Figure 3-4 *Option Files Menu*



This menu provides the opportunity to load and store the global system options and the individual test options you have selected. The default option file is `.sundiag`. You may create option files with different names, and use the `-o` option when you invoke Sundiag, in order to use the options specified in the named file. Any command you enter will apply to the file named after

`[NAME]:`

In other words, if you want the presently selected options to be stored in the `sundiag` file, listed after `[NAME]:`, enter `store` or `s`. If you want to remove the `.sundiag` file, enter `remove` or `r`. If you want to use the options stored in the named file the next time you run Sundiag tests, enter `load` or `l`.

If you want to create a new option file, simply enter

name *newfilename*

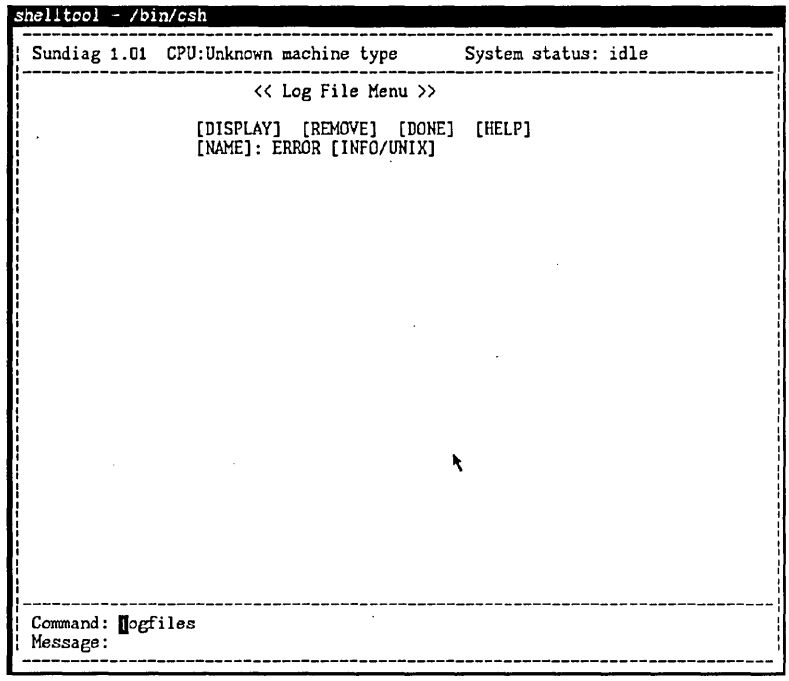
and the name you enter will be echoed after `[NAME]:`. To save the new file, enter `store`.

The option files named in this display are stored in the `/var/adm/sundiaglog/options` directory. If there are more files than the screen is able to display at one time, enter `next` or `n` to page forward. When you want to return to the previous display, enter `done` or `d`.

3.7. The Log Files Menu

When you enter `logfiles` or `l` from the "control panel" display, a menu such as this comes up:

Figure 3-5 *Log Files Menu*



When you type in **`error`**, **`info`**, or **`unix`** after typing **`name`**, you have selected the type of file you wish to view and possibly edit. When you enter **`error`** and then **`display`**, for example, the `/var/adm/sundiaglog/sundiag.err` file is displayed in the `vi` editor format. You may use `vi` commands such as Control-f or Control-b to page forward and backward through the file. In order to return to the Log File Menu, you must use the command:

`:q`

If you have edited the file, and you want to save the changes, enter

`:wq` *or* **`zz`**

Here is an example of an error file:

Figure 3-6 *TTY Error Log*

```
08/23/88 15:45:16 oasis sundiag INFO: *** Reset pass/error counts ***
08/23/88 15:45:27 oasis sundiag INFO: *** Start all tests ***
08/23/88 15:45:29 oasis sundiag ERROR: Failed forking nettest for device (ie0)
08/23/88 15:45:29 oasis sundiag INFO: *** Stop all tests ***
08/23/88 15:46:08 oasis sundiag INFO: *** Start all tests ***
08/23/88 15:46:47 ttya sptest FATAL: Device '/dev/ttya' does not respond. Check
loopback connector, errors 0.
08/23/88 15:46:48 oasis sundiag INFO: *** Failed test ***
 (zs0) sptest     passes: 0    errors: 1
08/23/88 15:46:48 oasis sundiag INFO: *** Stop all tests ***
08/23/88 15:49:04 oasis sundiag INFO: *** Quit sundiag ***


08/23/88 15:49:16 oasis sundiag INFO: *** Start sundiag ***
08/23/88 15:50:20 oasis sundiag INFO: *** Start all tests ***
08/23/88 15:50:46 oasis sundiag INFO: *** Quit sundiag ***


08/24/88 09:41:14 oasis sundiag INFO: *** Start sundiag ***
08/24/88 09:43:15 oasis sundiag INFO: *** Quit sundiag(abnormally) ***


08/24/88 14:37:18 oasis sundiag INFO: *** Start sundiag ***
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
"/usr/adm/sundiaglog/sundiag.err" 22 lines, 1042 characters
```

If you have entered `name info` or `i`, and then `display` or `l`, this sort of display is presented in `vi` format:

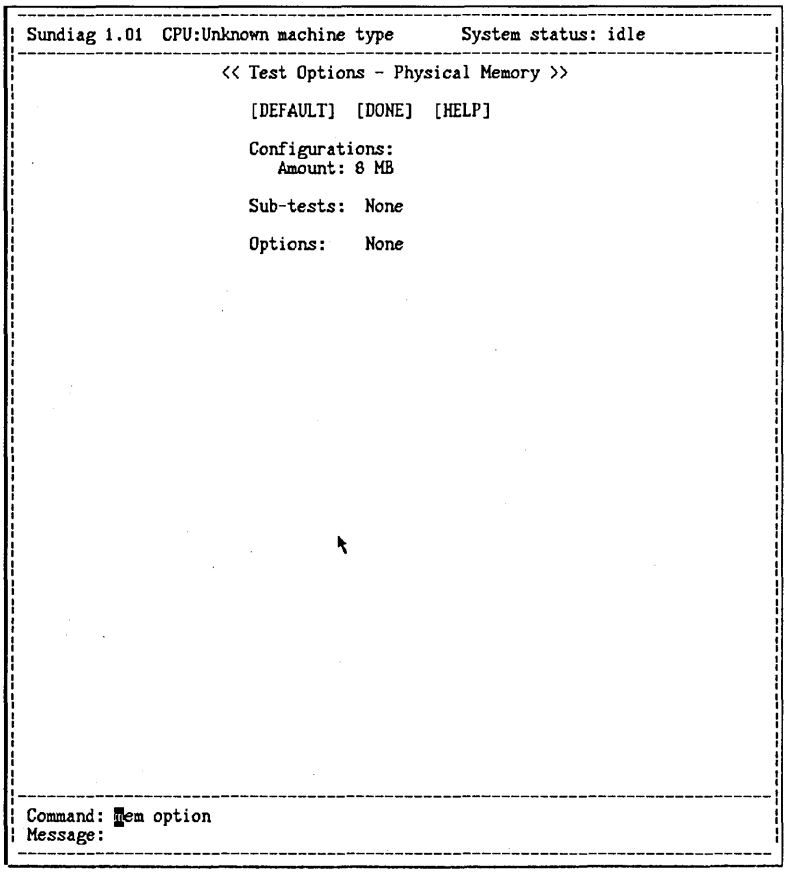
Figure 3-7 *TTY Info Log*

```
08/09/88 18:51:30 oasis sundiag INFO: *** Start Sundiag ***
08/09/88 18:51:36 oasis probe WARNING: /dev/ttyb: wrong permissions, expected 06
66
08/09/88 21:27:31 oasis sundiag INFO: *** Start Sundiag ***
08/09/88 21:27:37 oasis probe WARNING: /dev/ttyb: wrong permissions, expected 06
66
~
~
~
```

The character in brackets to the left of the sub-test or option may be entered to toggle the option or subtest from `enable` to `disable`. Entering the character again toggles the option or sub-test back from disable to enable.

Here is a sample option menu:

Figure 3-8 *TTY Test Options Menu*



4

Test Descriptions

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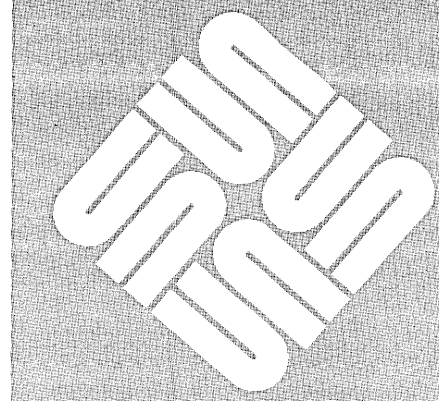


4

Test Descriptions

This chapter of the manual will expand as new tests are added. At the present time, all the tests that function under `sysdiag` also work with Sundiag. Here is a brief description of the function of the present Sundiag tests, organized similarly to the Control Panel options.

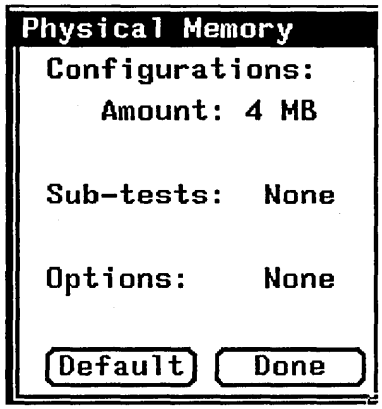
4.1. Memory Options

These tests are shown on the control panel under MEMORY DEVICES.

Physical (*pmem*)

This test locates parity errors, hard and soft ECC errors, memory read errors, and addressing problems. Through the memory device, it maps, then reads a page repeatedly throughout memory. If you click on the **`Option`** button for **`Physical (mem)`**, this menu comes up:

Figure 4-1 *Physical Memory Option Menu*



Virtual (*vmem*)

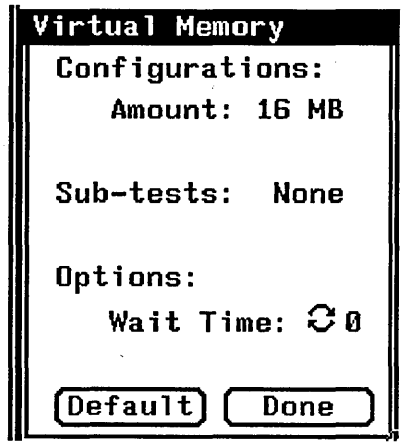
This test checks virtual memory, that is, the combination of physical memory and the swap partition(s) of the disk(s), by allocating, writing and then reading as much virtual memory as feasible. It uses the SunOS `malloc` (memory allocator) system call. This test also detects parity errors, memory read errors and addressing problems. Because this test puts a significant burden on the operating system while it is running, there is a configurable "wait time" option, so that you may control the time interval between vmem sessions.

You may cycle

Wait Time: ↻ **0**

from zero to 30, 60 or 90 seconds. Here is an example of the Virtual Memory Option menu:

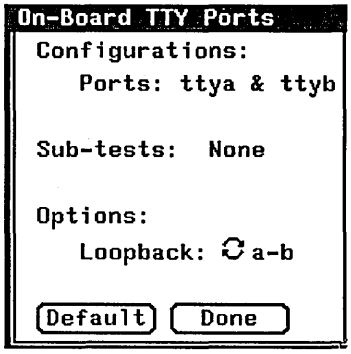
Figure 4-2 *Virtual Memory Option Menu*



4.2. CPU Options

Tests such as *dcp, Ethernet, devtest, fputest*, and *MC68881* show up on the control panel under CPU DEVICES. Before you click on the **Options** button opposite **Serial Ports (zs0)** , you must enable **Intervention Mode**. The option menu for the CPU board serial ports looks something like this:

Figure 4-3 *CPU Serial Port Test Options*



The loopback choices refer to serial port testing. You must use loopback connectors (described in Appendix A) to connect the CPU board ports you choose. The default is to link ports A and B with a loopback cable, as indicated by `a-b`.

If you choose **a** only or **b** only, Sundiag tests just that port, and expects a loopback connector on that port.

If you choose **a b**, Sundiag tests ports A and B separately, and expects a loopback connector on each port.

dcptest

This test checks the functionality of the Data Ciphering Processor when it is present on the CPU board. There are no test options associated with this device.

The DCP test uses DES (Data Encryption Standard) hardware (AM9568) to implement the NBS Data Encryption Standard. It encrypts in Electronic Code Book (ECB) mode, which encrypts blocks of data independently. It also uses Cipher Block Chaining (CBC) mode, which chains together successive blocks and protects against insertions, deletions and substitutions of blocks, as well as regularities in the cipher text.

The test checks both CBC and ECB modes, with high bit and low bit parity for the encryption key, with two sets of data: a table with zero to all bits turned on, as well as some standard ASCII data. *dcp* also checks the encryption of the maximum number of bytes in one call, and the "quick" mode.

pptest

This test checks the parallel port interface for the Sun-3/80.

nettest

This test checks the functionality of the Ethernet (Sun3 — ie0 le0) hardware on the system CPU board, as well as the functionality of separate Ethernet boards (Sun2 — ie0, Sun-2/Sun-3 — ie1). The Sun workstation under test must be attached to an Ethernet with at least one other system on the network in order for this test to be meaningful. This test appears as **Ethernet** on the control panel, under **CPU DEVICES**. There are no test options associated with this test.

The *nettest* test uses a raw socket with the ICMP protocol (Interface Control Message Protocol), specifically with ICMP_ECHO and ICMP_ECHOREPLY message types. The test sends out an ICMP_ECHO message on a valid network interface and expects to hear a reply from some other host besides itself (localhost loopback). Due to the low-level of ICMP protocol, only one Ethernet test can execute on a system at one time.

The test assumes a broadcast network, as opposed to a point-to-point network. It obtains the network interface configuration, retrieves the interface flags to see if the network is "up" or "down", and it obtains the broadcast address. The test ignores the "me0" network if it exists for one or more IPC boards.

nettest waits for replies for a given period of time, counts the replies and checks to make sure that they have the same data as that sent. If no replies come from hosts other than the test host, an error condition is recorded.

fputest

This test checks the floating point unit on Sun-4 systems. It performs the following:

- FSR Register Test
- Registers Test
- NACK Test
- Move Registers Test
- Positive to Negative Test
- Negative to Positive Test
- Absolute Test
- Single Precision Integer to Floating Point Test
- Double Precision Integer to Floating Point Test
- Single Precision Floating Point to Integer Test
- Double Precision Floating Point to Integer Test
- Single Precision Round Toward Zero Test
- Double Precision Round Toward Zero Test
- Single to Double Precision Format Conversion Test
- Double to Single Precision Format Conversion Test
- Single and Double Precision Addition, Subtraction, Multiplication, Division and Compare Tests
- Single and Double Precision Compare and Exception if Unordered Tests
- Branching and no Branching on Condition Instructions Tests
- Single and Double Precision Chaining Tests
- Weitek Status Tests
- Lock Test
- Single and Double Precision Datapath Tests
- Timing (load) Test
- Linpack Test

Floating Point

This test checks the floating point coprocessor (on Sun-3 systems only). It is listed on the control panel as **`68881(2) Floating Point`**. The test verifies that the device exists, checks the EEPROM, then performs a short series of single and double precision calculations, checking the answer after each computation. There are no test options associated with this device.

4.3. Disk Options

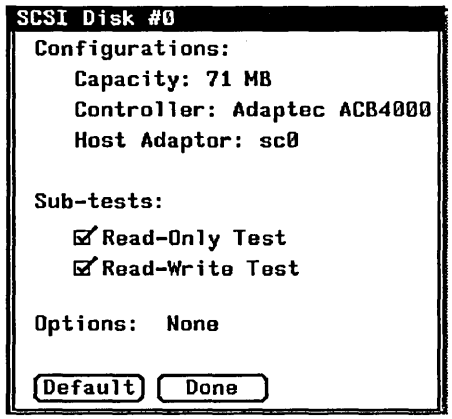
devtest

This test performs read-only tests on local disks, using generic SunOS routines.

This test appears on the control panel as **`DISK DEVICES`**.

This test supports all types of Sun disk drives, such as native or SCSI floppy, Xylogics 7053, and so on. The type of drive under test is named at the top of the option menu. For example, when an Intelligent Peripheral Interface is installed on the system under test, the Disk Option Menu header will name the IPI. If you click on a control panel disk **`Option`** button, this sort of menu comes up:

Figure 4-4 *Disk Option Menu Example*



You may choose read-only testing, read-write testing, or both. If you choose read-only testing, `devtest` ist executed. If you choose read-write testing, `disk` test is executed.

disk

This test exercises the disk controller and drive. It writes two .5 MB files with random data in `/tmp`, then reads and compares them. If the system has no `/tmp` directory, Sundiag creates a `/tmp-disktop-sd` directory to fill with random data, and removes it when you exit. `Sundiag` selects the drive by issuing the SunOS command `df` and uses each local drive listed; therefore the disks to be tested must be mounted and contain valid file systems.

4.4. Tape Tests

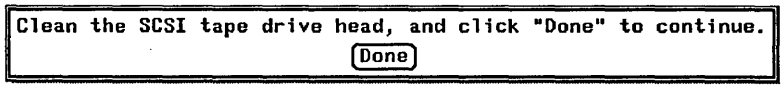
Use a standard scratch tape for this test.

tapetest

The *tapetest* rewinds the tape, erases it, writes a pattern to a specified number of blocks (or, for a SCSI tape, writes to the end of the tape). It then rewinds the tape and reads/compares the information just written. The test expects a device name and number of sectors as input parameters, and first writes to the device from a 126x512 byte buffer, then from a 512-byte buffer for any "left-overs".

During `tapetest`, at eight-hour intervals, a pop-up (as shown below) tells you to clean the tape head and then to click on the square when you are finished. If you do not click on the square, the tape test will stop.

Figure 4-5 *Head Cleaning Warning*



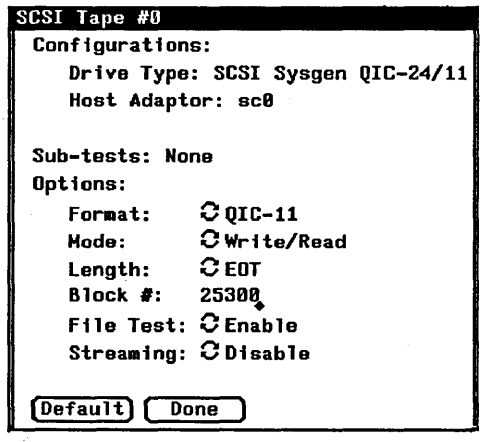
When no one is available to clean the tape head and restart the test, you may wish to run the tape test without the head cleaning reminder. To do so, you must use the SunOS `setenv` command before starting Sundiag.

On a system that is running SunView, enter:

```
% setenv NO_CLEAN_HEAD
```

If you click on the SCSI tape **Option** button, this sort of menu comes up:

Figure 4-6 *SCSI Tape Option Menu*



Format:

QIC-11 and QIC-24 are tape formats that this test uses when it writes to the scratch tape you have inserted. QIC-11 uses a 1-byte block ID, while QIC-24 uses 4 bytes, meaning that each block on a QIC-24 tape is uniquely identifiable.

Use a standard scratch tape for this test.

QIC-11 format is the default testing format. If you cycle through the options, you may choose QIC-24 only, or both of QIC-11 and QIC-24 formats. If you choose both, the test will first write one pass to the tape in QIC-11 format, and then write a second pass over it in QIC-24 format.

Mode:

If you toggle to `Write/Read`, the test first writes the to tape and then reads it back to compare.

If you toggle to ,`ReadOnly` the test assumes the tape has been properly written and merely reads and compares, which is useful to check head alignment.

Length:

If you choose the `Long` testing length, the SCSI tape test nearly checks the entire tape length. If you choose `Short`, only the first 1000 blocks are tested. If you choose EOT, the entire tape length is tested.

Block #:

If you have specified the `Length` option, you must enter the number of blocks you wish to test.

File Test:

The *tape file* test writes three files, rewinds and then reads part of the first file and forward spaces to the start of the second file, reads the second file, forward spaces to the start of the third file, and tries to read to the end of that

file. For SCSI tapes only, the test then tries to back space to the start of the second file and read it.

`Streaming:`
When streaming is enabled, the test performs the Write/Read at top speed to "stream" to tape.

`Reconnect:`
When you enable **`Reconnect:`** from the option menu, Sundiag attempts to check whether or not disconnect/reconnect is working, on a Sun-3/50 or on a system with a SCSI3 board and both SCSI disk and tape devices. The test forks a child process to test the SCSI disk, which sets up a signal handler to catch a signal from the parent process. It then sleeps for three seconds, reads in two blocks from the disk, sleeps again, and expects to have received a signal from the parent process in the interim. The parent process retensions the tape and then notifies the child.

4.5. Other Options

Other boards, when installed in the system, will be listed on the control panel under the board name. The option buttons will vary. The following paragraphs provide a few examples of the tests for optional boards.

color
This test checks the CG2 and CG4 frame buffer and color map on the system's color board (if it is installed). The test sets up the window system so that the background windows remain intact, then sets up the color map so all color permutations are displayed. It writes a pixrect of a certain color and dimension to the screen and verifies that the locations in the frame buffer are the same read as written. The test then zooms forward and backward through the color map, twenty colors at a time, checking after each change to the color map, and finally restoring the input characteristics and the screen.

NOTE *In order to exit prematurely from the color test, enter [Control-C] on the keyboard. The test that is running will be killed, and the Sundiag screen will be redisplayed. To disable the entire test sequence, click on the box in front of the color test.*

c24
The *c24* test checks the CG8 24-bit, P4-bus frame buffer. To verify that the CG8 board is working properly, the test executes several pixrect calls on the frame buffer and compares the result against a memory pixrect. CG8 roping, vector drawing, puts and gets, look up table writing and reading, regions, and memory testing are all tested. There is no option menu for this test.

fpatest
This test checks the floating point accelerator board (on Sun-3 systems only). It performs the following tests:

- Immediate Errors Register Test
- Inexact Error Mask Register Test
- Load Pointer Register Test
- Mapping RAM Test

- Microstore RAM Test
- Upper and lower halves of Register RAM tests
- Simple Instruction Test
- Test for Shadow RAM present context
- Pointer Test
- Pointer Increment and Decrement Test
- Lock Test
- NACK Test
- F+ Test
- Micro-store Register Test
- Wstatus Register Test
- Weitek Data Path Test
- Weitek Operation Test
- Weitek Status Test
- Jump Conditions Test
- Timing (load) Test
- Linpack Test

gpmtest

This test checks the GP1 (gpone0a) board, with or without a graphics buffer board, if they are installed.

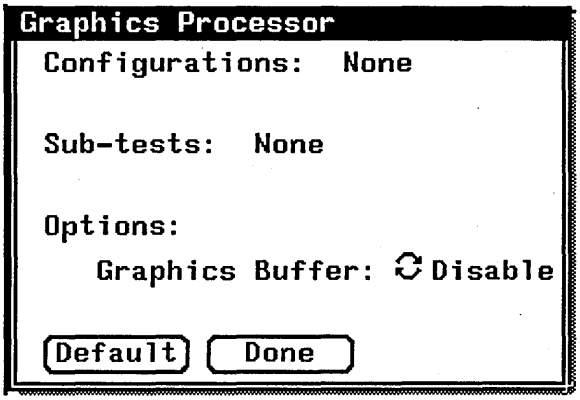
NOTE *This test can be executed ONLY when* `gpconfig` *HAS NOT been initialized from the* `rc.local` *file, due to limitations with the test's microcode.*

If the test is to be restarted after a reboot, remove the `*gp*` *device in* `/dev`*. After the reboot, recreate the device.*

The test first opens the `/dev/vme24` device, allocates some space, maps in the graphics processor, and initializes it. It then runs a series of tests for each part of the Graphics Processor and Graphics Buffer. It tests the Viewing Processor first, followed by the Painting Processor and the Graphics Buffer.

The graphics option menu looks something like this:

Figure 4-7 *Graphics Option Menu*



gp2test

NOTE *This test can be executed ONLY when* `gpconfig` *HAS been initialized from the* `rc.local` *file.*

The test first opens the `/dev/vme24d32` device, allocates some space, maps in the graphics processor and tries to write to it, to verify that a Graphics Processor2 (GP2) is installed. The test then probes to determine if it is running on a single or double monitor system, and sets up the SunView desktop appropriately. *gp2test* is a series of tests for different parts of the GP2 board. It first utilizes diagnostics that are present in the board's microcode to test the hardware. Then it tests the GPCI matrix duplication commands, multiplying two matrices together, testing rotation around the X, Y and Z axis, multiplying the depth, and finally checking all results. It then tests the GPCI commands `GP1_MUL_POINT_FLT_3D` and `GP1_MUL_POINT_INT_3D`, transforming some 3D points in a matrix and checking the results. It tests the `GP1_PROC_LINE` command, instructing the GP2 to take some 3D coordinates and clip them to the view port, and then checks the result. Finally, *gp2test* calls the functions that display polygons on the screen.

TAAC Test

The TAAC-1 is a high performance graphics accelerator card. Its applications range from mathematical modeling to image processing. The on-line diagnostic for the TAAC-1 attempts to test all the functional blocks. These include the floating point circuitry, video RAMDAC, RAM, and so on. The TAAC diagnostic under Sundiag automatically tests the various functional blocks and logs the errors accordingly. It does not test the video analog circuitry, which requires visual verification. There is no option menu for this test.

Unbundled Product Tests

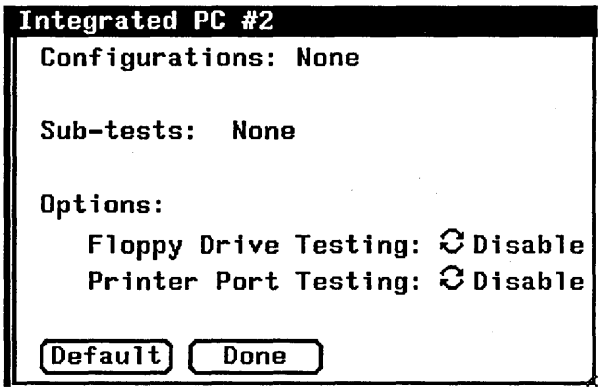
ipctest

This test checks the SunIPC floppy drives, printer ports, and the general functionality of the SunIPC coprocessor board(s) (Sun-2/Sun-3 only: pc0, pc1, pc2, pc3). It attempts to start `pctool` for the specified SunIPC device.

The printer portion of the test requires installation of loopback connectors.

Clicking on the IPC BOARDS **`Option`** button brings up this menu:

Figure 4-8 *SunIPC Option Menu*



CAUTION **Under Floppy Drive Testing, only Drive "B" is tested. Do not insert a diskette in Drive "A"; doing so causes this test to fail.**

sundials

This test checks SunDials (an input device consisting of 8 knobs) `sundials` verifies the connection between the dialbox and serial port.

NOTE *The presence of SunDials hardware is not detected during the device probe upon Sundiag startup; therefore* `sundials` *does not automatically appear on the control or status panels, even though the test is included in the* `sundiag` *directory.*

Refer to the "Adding Your Own Tests" section and create a `usertest` file for `sundials` before you attempt to execute the test. Here is an example of a `.usertest` entry for `sundials`:

```
Sundials,sundials,sd
```

`sundials` also has an interactive mode that places eight knobs in a SunView window to track the movement of the individual knobs. The interactive mode is executed with the following command

```
% sundials diag
```

This test will not pass unless you install the correct loopback connectors or port to port cables on the ports you are testing. Connect the ports you specify from the option menu.

sunlink

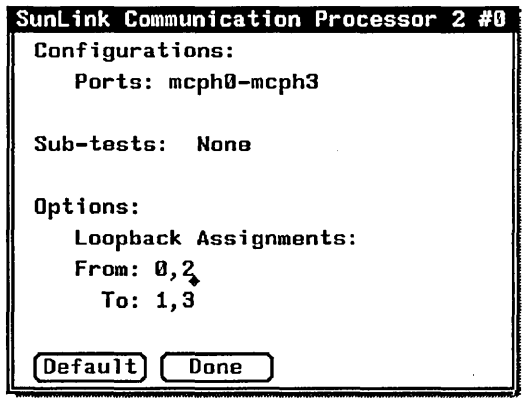
For more information on installing the HSI board, installing loopback connectors, and connecting V.35 devices, refer to *Installation, User Diagnostics, and Servicing for the SunLink High-speed Serial Interface Board* and *Configuration Procedures for the SunLink High-speed Serial Interface Board.*

This test checks the SCP and SCP2 board(s) (dcp0, dcp1, dcp2, dcp3), the SunLink MCP board(s) (mcp0, mcp1, mcp2, mcp3), and the High Speed Serial Interface (hs0, hs1). It tests the SDLC protocol on these boards. To do this, the test down-loads the DCP microcode, initializes the selected channel and then configures the selected channel to the SDLC protocol. Next, the test opens a datagram socket and tries to change the socket so that it will

receive sync mode information from it. It then opens the ports, transmits a buffer of special data, receives the data back and checks it, and finally, gathers statistics from the socket.

When you click on the SCP option button, this sort of menu pops up:

Figure 4-9 *SunLink Communication Processor 2 Option Menu*

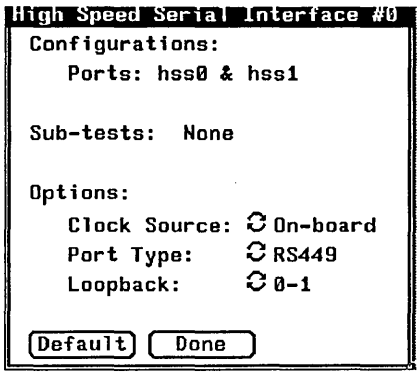


When selecting the SCP2 loopback assignments, the "To" port number is connected to the "From" port shown directly above it. For example, in the option menu shown above, ports 0 and 1 are looped, and ports 2 and 3 are looped. If port 3 were not specified, ports 0 and 1 would be linked and port 2 would be looped to itself:

```
From: 0, 2
  To: 1
```

When you click on the **Options** button for the HSI board, this sort of pop-up menu is displayed:

Figure 4-10 *High Speed Serial Interface Option Menu*



Refer to the High Speed Serial Interface hardware manuals for information on loopback connectors.

Multiple Terminal Interface Tests

printer

The printer test checks the printer ports on the MCP(ALM2) board(s) (mcpp0, mcpp1, mcpp2, mcpp3). For each port, the test opens the `/dev/mcpp[0-3]` device, puts it in raw and self-test loopback modes, asserts all ones on the data lines, and looks for the PE status signal. It then walks a zero through the odd data lines (Bits 1,3,5 and 7), and checks the PE status for each. Finally it re-asserts all ones again, and walks a zero through the even data lines (bits 2,4,6,8).

sptest

This test checks the system's on-board serial ports (zs0, zs1), as well as any Multi-Terminal Interface (MTI/ALM1) boards (mti0, mti1, mti2, mti3), or MCP(ALM2) boards (mcp0, mcp1, mcp2, mcp3). It writes data to the source device and then reads it back from the receiver device, verifying the data after each byte sent.

4.6. Adding Your Own Tests

If you have created a test to run under Sundiag, you must create the file `.user-test` in the `/usr/diag/sundiag` directory and place the following information in it:

```
device_name_label, testname, command-line arguments
```

Replace *device_name_label* with whatever "user-friendly" device name you want to be displayed on the control panel for your test. Sundiag will place the SunOS device name in parentheses next to the name you have chosen.

Replace *testname* with the actual name of the file that contains your test. It will be used as the test name on the status panel.

Replace *command-line arguments* with whatever command-line arguments you would like Sundiag to fork and use to execute your test.

A

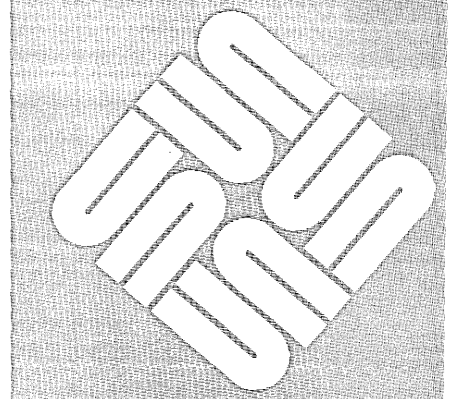
Loopback Connectors

Loopback Connectors 55

Serial Port Loopback Connectors 55

Serial Port Loopback Connector 55

RS-232 Loopback Cable 56



A

Loopback Connectors

Serial Port Loopback Connectors

The Serial Port Loopback connectors are designed to connect serial port A to serial port B of a Sun CPU board for testing purposes. The Transmit/Receive, RTS/CTS, and DTR/DCD signal lines are cross connected between the two ports.

The RS-232 Loopback cable is used to test the serial ports of assembled systems. This appendix contains pin designations for these connectors. To obtain a loopback connector kit, contact Sun Customer Support.

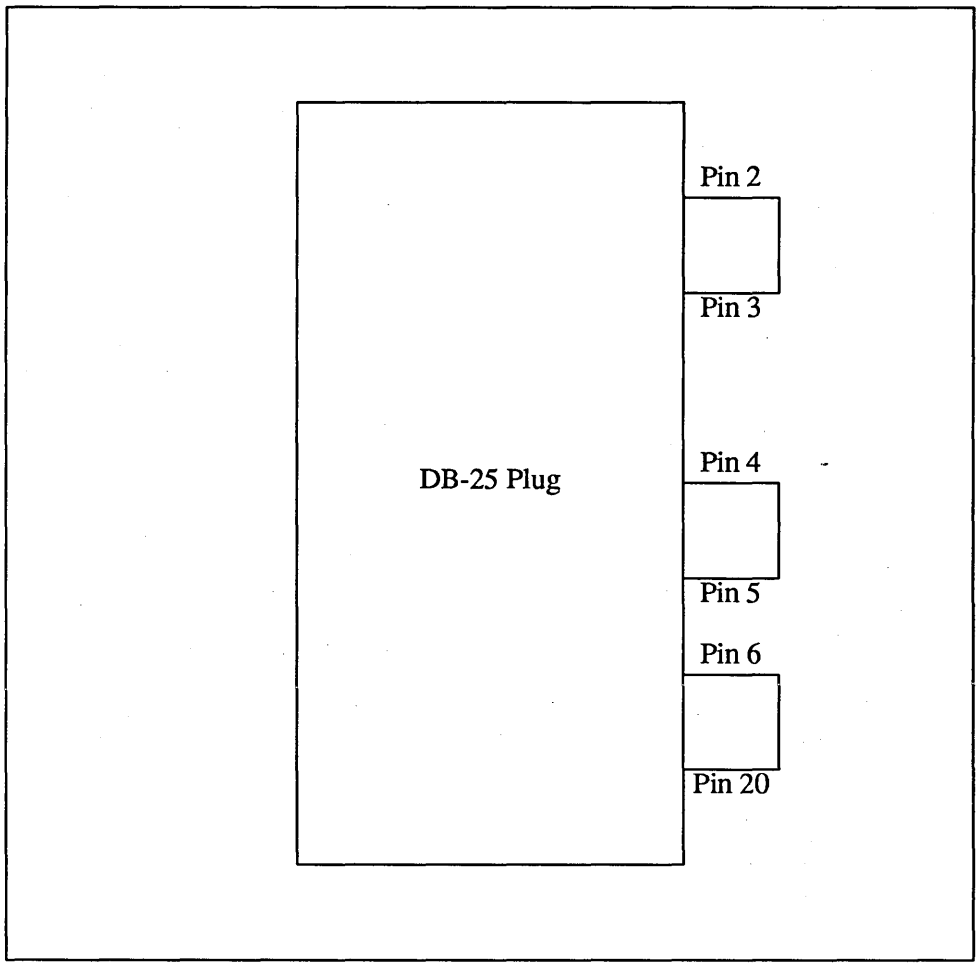
Serial Port Loopback Connector

The RS-232 Loopback Connector is a specially wired male DB-25 connector. It is plugged in to a serial port in the back of a system under test. It is wired as follows:

Connect pin2 to pin3
Connect pin4 to pin5
Connect pin6 to pin20

See the following figure:

Figure A-1 *RS-232 Loopback Connector*



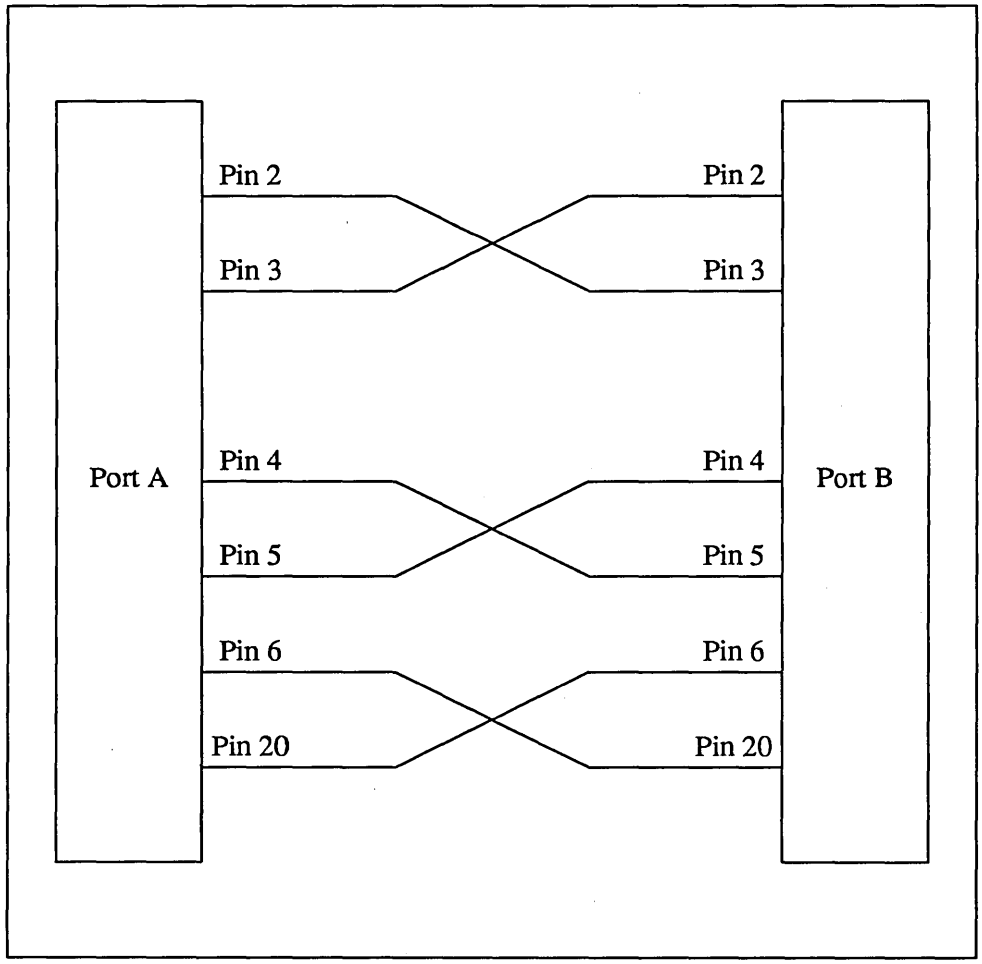
RS-232 Loopback Cable

The RS-232 Loopback Cable is a specially wired cable with two male DB-25 connectors at each end. It is plugged into a pair of serial ports in the back of the system under test. The cable is wired as follows:

Connect pin2 to pin3
Connect pin3 to pin2
Connect pin4 to pin5
Connect pin5 to pin4
Connect pin6 to pin20
Connect pin20 to pin6

See the following figure:

Figure A-2 *RS-232 Loopback Cable*



NOTE *Loopback connectors must be wired properly and connected firmly for the Serial Port Tests to work correctly. Miswired, poorly soldered, or missing loopback connectors can lead to erroneous diagnostic error messages when diagnostics are executed.*

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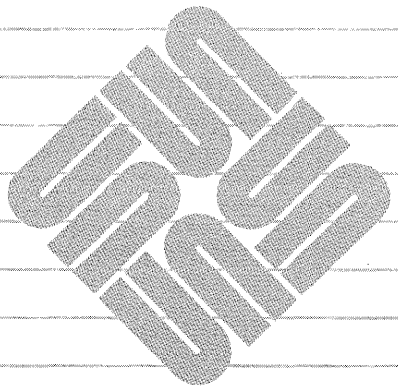
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