SunVTS™ 2.1.3 Test Reference

Solaris™ 2.6 Hardware: 5/98

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Preface

The Sun Validation and Test Suite (SunVTS™) product is a diagnostic tool that verifies the configuration, functionality, and reliability of hardware controllers and devices. SunVTS is primarily used from a graphical user interface (GUI), which may be either OPEN LOOK or Common Desktop Environment™ (CDE). This book describes SunVTS tests that run on machines with SPARC™ architectures. The descriptions include specific test options, procedures, and error messages.

This book is primarily written for hardware testing and verification purposes. Developers or experienced users who want to run SunVTS diagnostic applications in a test environment will also find it useful.

Before You Read This Book

In order to make full use of the information in this document, you may need access to the following documents:

- *SunVTS 2.1 User's Guide*
- *SunVTS 2.1 Quick Reference Card*

How This Book Is Organized

This book is organized as follows:

Chapter 1 “Introduction” describes SunVTS Hardware and Software Requirements, How to Access SunVTS, SunVTS System Interfaces, Standard Command Line Arguments, Test Modes, and How to Test Multiple Frame Buffers.

Chapters 2 through 46, describe the individual SunVTS tests, their options, command line syntax, other applicable test modes, and error messages.

Appendix A “Loopback Connectors” provides information about the serial and parallel port loopback connectors that are required by some of the SunVTS tests.

Using UNIX Commands

This document may 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:

- *Solaris 2.x Handbook for SMCC Peripherals*
- AnswerBook™ online documentation for the Solaris™ 2.x software environment
- Other software documentation that you received with your system

Typographic Conventions

TABLE P-1 Typographic Conventions

Typeface or Symbol	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. Command-line variable; replace with a real name or value.	Read Chapter 6 in the *User's Guide.* These are called *class* options. You *must* be `root` to do this. 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

This manual covers SunVTS revision 2.1.3 tests. It serves as an updated reference companion to the SunVTS 2.1 manuals listed below.

TABLE 0-1 Related Documentation

Title	Part Number
SunVTS 2.1 User's Guide	802-7299
SunVTS 2.1 Quick Reference Card	802-7301-10

Ordering Sun Documents

SunDocs[SM] is a distribution program for Sun Microsystems technical documentation. Contact SunExpress for easy ordering and quick delivery. You can find a listing of available Sun documentation on the World Wide Web.

TABLE P-3 SunExpress Contact Information

Country	Telephone	Fax
Belgium	02-720-09-09	02-725-88-50
Canada	1-800-873-7869	1-800-944-0661
France	0800-90-61-57	0800-90-61-58
Germany	01-30-81-61-91	01-30-81-61-92
Holland	06-022-34-45	06-022-34-46
Japan	0120-33-9096	0120-33-9097
Luxembourg	32-2-720-09-09	32-2-725-88-50
Sweden	020-79-57-26	020-79-57-27
Switzerland	0800-55-19-26	0800-55-19-27
United Kingdom	0800-89-88-88	0800-89-88-87
United States	1-800-873-7869	1-800-944-0661
World Wide Web: `http://www.sun.com/sunexpress/`		

Sun Documentation on the Web

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Sun Welcomes Your Comments

We are interested in improving our documentation and welcome your comments and suggestions. You can email your comments to us at `smcc-docs@sun.com`. Please include the part number of your document in the subject line of your email.

CHAPTER 1

Introduction

The Sun Validation and Test Suite (SunVTS) software runs multiple diagnostic hardware tests from a single user interface. SunVTS verifies the configuration, functionality, and reliability of most hardware controllers and devices.

SunVTS works from either the Common Desktop Environment (CDE) or the OPEN LOOK (OL)graphical user interface(GUI). The GUI lets you set test parameters quickly and easily while running the diagnostic tests. The sample screens and menus in this manual show SunVTS using the CDE user interface.

This manual describes SunVTS Version 2.1.3, which is on the *SMCC Supplement CD*. The default installation directory for SunVTS is `/opt/SUNWvts`. When you are installing SunVTS, you can specify a different directory to install the software.

This chapter describes hardware and software requirements, how to access the tests, how tests are grouped, and standard command line arguments.

Hardware and Software Requirements

The SunVTS Version 2.1.3 software runs on any system with the Solaris 2.5, 2.5.1, or 2.6 operating environment installed. The operating system kernel must be configured to support all peripherals that are to be tested.

Some SunVTS tests have additional requirements such as the connection of loopback connectors or the availability of disk space. For additional requirements see the specific test chapter in this book.

Software Requirements

General Package Requirement

To run SunVTS the SUNWvts package must be loaded on your system. To see if this package is loaded type the following:

```
% pkginfo SUNWvts
```

If your system responds with, "`system SUNWvts Online Validation Test Suite`" the package is present.

SunVTS with CDE

SunVTS is designed to run in the Common Desktop Environment (CDE). To run the CDE GUI you must have the CDE end-user software installed on your system, or at least the `SUNWdtbas` package from it. Perform this command to see if this package is installed on your system:

```
% pkginfo SUNWdtbas
```

If your system responds with, "`system SUNWdtbas CDE application basic runtime environment`" the package is present. If necessary, see your system administrator for assistance with installing the CDE software.

SunVTS with OPEN LOOK

You must meet the following requirements to run SunVTS with the OPEN LOOK GUI:

- Run Solaris operating system (Version 2.5 through 2.6)
- Run OPEN LOOK, Version 3.3

- Set the correct `openwin` path: Set the `OPENWINHOME` environment variable to point to the location where OPEN LOOK is installed on your system. You can ignore this requirement if you use the default location, `/usr/openwin`. Otherwise, use the following command and substitute the *pathname* variable for the actual path where OPEN LOOK is installed.

```
% setenv OPENWINHOME pathname
```

  Check the existing `OPENWINHOME` by typing **`env.`**

- Set the correct library path: Set the `LD_LIBRARY_PATH` environment variable to point to the location of the Windows library directory on your system. If you use the default location, `/usr/openwin/lib,` you can ignore this requirement. Otherwise, use the following command and substitute the *pathname* variable for the actual path where OPEN LOOK library is installed.

```
% setenv LD_LIBRARY_PATH pathname
```

  Check the existing `LD_LIBRARY_PATH` by typing **`env`**.

How to Access SunVTS

You can run SunVTS tests from various interfaces: The CDE and OL graphical user interfaces, or the TTY interface. SunVTS tests can also be run individually from a shell command line, using the command line syntax for each test. Table 1-1 describes the various SunVTS system interfaces.

TABLE 1-1 SunVTS System Interfaces

SunVTS System Interfaces	Description
Graphical User Interfaces (GUIs)	Users can select tests and test options by pointing and clicking with a mouse button in the CDE or OL interface.
TTY Interface	Users can run SunVTS from a terminal or modem attached to a serial port. This feature requires that you use the keyboard instead of the mouse, and it displays one screen of information at a time. However, it emulates the window system whenever possible.
Command Line Interface	Lets users run each of the SunVTS tests individually from a shell command line using the command line syntax. Each test description contains the corresponding command line syntax. For more information about running individual tests from the command line, refer to the specific test description in this manual.
Online Interface	Provides access to SunVTS testing through the SyMON monitoring tool.

Standard Command Line Arguments

Two types of command line arguments can be applied to a test: generic command arguments (common to all tests) and test-specific command line arguments. For test-specific command line arguments refer to the “Command Line Syntax” section found in each test chapter as well as TABLE 1-3 on page 6.

The standard syntax for all SunVTS tests is:

```
testname [-scruvdtelnf] [-p number][-i number] [-w number]
        [-o test specific arguments]
```

The following table defines the standard SunVTS command line arguments:

TABLE 1-2 Standard SunVTS Command Line Arguments

Argument	Definition
`-s`	Runs a test in SunVTS mode.
`-c`	Enables a core dump; the test creates a core file if a system crash occurs.
`-r`	Run-on-Error mode; if an error occurs, the test continues the next test sequence instead of exiting.
`-u`	Displays the Usage statement.
`-v`	Runs the test in Verbose mode; the test displays VERBOSE messages that tell more about the testing process.
`-d`	Runs the test in Debug mode; the test displays DEBUG messages to help programmers debug their test code.
`-t`	Runs the test in Trace mode; the test displays TRACE messages that track down function calls and sequences currently being used by the test code.
`-e`	Runs in Stress mode; the test runs under increased system load.
`-l`	Runs in Online mode.
`-n`	Runs in Connection test mode.
`-f`	Runs in Functional test mode.
`-i` *number*	Defines the number of instances for scalable tests.
`-p` *number*	Defines the number of passes.
`-w` *number*	For scalable tests, defines to which instance the test is assigned.

Test-Specific Arguments

There are test-specific arguments, as described in TABLE 1-3 Test-specific arguments should follow the format specified in the `getsubopt(3c)` man page. For information about test-specific arguments refer to the specific test chapter in this book.

TABLE 1-3 SunVTS Test-Specific Arguments

Argument	Definition
`-o`	Separate each test-specific argument by commas, with no space after the each comma. For example: `#./sample -v -o dev=/dev/audio,volume=78` The test option format is specified by the man page `getsubopt(3C)`.

Test Modes

SunVTS has three test modes:

- Connection test mode—a low stress, quick testing of the availability and connectivity of the tested device.
- Functional test mode—a more robust testing capability that uses whatever system resources are required to do thorough testing, and assumes that there are no other applications running.

Hardware Verification

The SunVTS kernel automatically probes the system kernel for installed hardware devices on your system or a remote system. Those devices are then displayed on the SunVTS control panel with the appropriate tests and test options. This provides a quick check of your hardware setup.

How to Test Multiple Frame Buffers

The following rules apply when you test multiple frame buffers (displays) simultaneously:

- You can test multiple frame buffers on a system at the same time, but only one frame buffer can run the window environment.
- To avoid incorrect test failures, for those frame buffer tests that have a window locking option, the frame buffer that runs the window environment, such as CDE or OPEN LOOK software, must have window locking enabled. Any other frame buffers must have window locking disabled.

Caution – If window locking is disabled (unlocked) on frame buffers that are running, the SunVTS tests can return false error messages if you move the mouse during testing. Even a slight mouse movement can cause a test to fail.

- By default, SunVTS enables window locking on the console monitor (frame buffers that are the `/dev/fb` named device).
- If you are running a frame buffer test from a command line, you can disable Window Locking by specifying a command line argument (see the test command line descriptions in this manual). For example, when running the generic frame buffer test (`fbtest`), use the `lock=e/d` option to enable or disable Window Locking. The example below shows the command that enables Window locking (frame buffer locking):

```
#./fbtest -o dev=cgthree0,lock=e
```

Remote Testing of Frame Buffers

The frame buffer locking option does not work when you start `sunvts` or `vtsk` remotely. In this case, disable the window locking option to `d`. Do not run any graphic programs (including `vtsui`) on that frame buffer during graphic testing.

CHAPTER

Advanced Frame Buffer Test (`afbtest`)

`afbtest` verifies the functionality of the Advanced Frame Buffer.

`afbtest` can detect and adapt to the various video modes of the advanced frame buffer (AFB). Instead of only running in one standard graphics mode, all tests can run in any mode. In stereo mode, all tests write into the right and left eyes unless you specify otherwise.

You can interrupt `afbtest` using Control-C. Turn off all other keyboard input if OPEN LOOK is running on the unit being tested.

Test accuracy is checked using a checksum algorithm. Possible locations of failing pixels are colored chartreuse to help visually identify their position.

Caution – Do not run any other application or screen saver program that uses the AFB accelerator port while running `afbtest`. This combination causes SunVTS to return incorrect errors.

Note – Disable all screen savers before testing any graphics device. Type **`xset s off`** at a UNIX prompt to disable the Solaris screen saver.

Note – DO NOT run Open Windows across multiple monitor while running `afbtest`, otherwise the test will return errors.

Note – `afbtest` requires approximately 29 Mbytes of disk space in the `/tmp` directory to extract its working files. If this space is not available, the diagnostic will fail and report warning and error messages, indicating a lack of disk space.

`afbtest` Options

By default, all `afbtest` options are enabled.

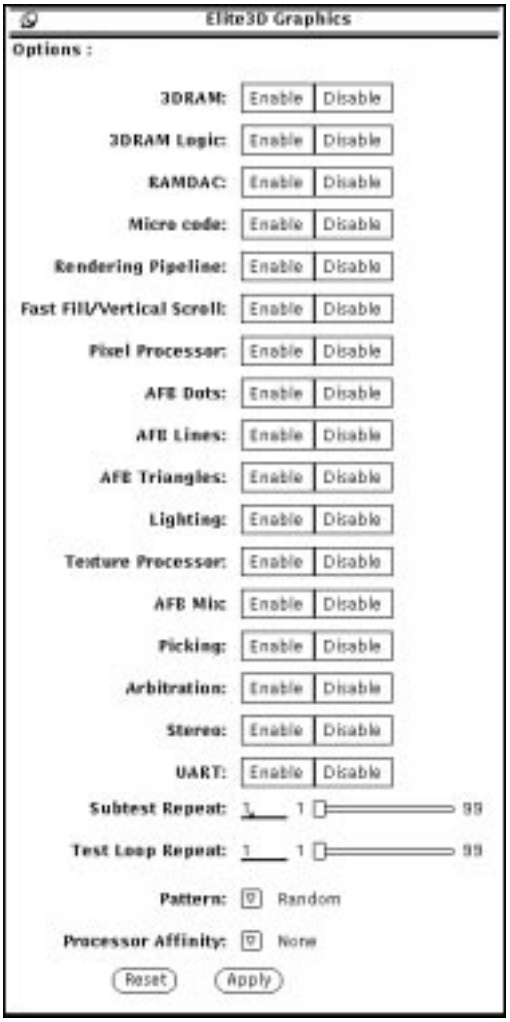

FIGURE 1-1 `afbtest` Option Menu

TABLE 1-4 `afbtest` Options

`afbtest` **Options**	**Description**
3DRAM Test	The 3DRAM test thoroughly tests the video memory in the AFB using 512-bit reads and writes. 3DRAM makes a full screen pass, consisting of a write and a read to each pixel location, for each access mode on the list below. The data used can be either random or specified by the user. A second pass is made with the one's complement of the data used in the first pass so that each memory location is tested with both a zero and a one. Errors in this subtest are attributes to the 3DRAM. A failing chip is indicated by (x, y) locations and device-specific "U" numbers. • DFB8R, DFB8G, DFB8B, DFB8X - Buffer A • DFB24 - Buffer A • DFB32 - Buffer A • SFB8R, SFB8G, SFB8B, SFB8X - Buffer A • SFB8R, SFB8G, SFB8B, SFB8X - Buffer B • SFB32 - Buffer A • SFB32 - Buffer B • SFB32 - Buffer C • SFB64 - Buffers A and C • SFB64 - Buffers B and C

TABLE 1-4 `afbtest` Options

`afbtest` **Options**	**Description**
3DRAM Logic Test	The 3DRAM Logic test provides logical functionality to the AFB. The following services are tested: • Compare Controls - Match AB • Compare Controls - Magnitude AB • Compare Controls - Match C • Compare Controls - Magnitude C • Match Mask - AB • Magnitude Mask - AB • Match Mask - C • Magnitude Mask - C • Raster Operations - RGB • Raster Operations - X • Raster Operations - YZ • Plane Mask - RGB • Plane Mask - X • Plane Mask - Y • Plane Mask - Z • Group Enable - R, G, B, X • Group Enable - Y, Z Each function is tested separately with a series of SFB64 writes. A total of 16 writes are made for each different test case with Y coordinate values varying from 0 to 30 in increments of 2 pixels. This dotted column organization provides page thrashing and block flashing in all screen resolutions. For each operation all possible combinations are tested. For example, in `ROP RGB` *new==old* there are three possible values: *new < old, new == old, and new > old.* Each of these cases are tested. Five passes of the functions are made. Each pass writes into a different AFB address space: SFB32-A, SFB32-B, SFB32-C, SFB64-AC, and SFB64-BC. Note that the passes that write into the SFB32 address spaces are writing two pixels at a time because the tests use SFB64 writes. Care is taken to ensure that all 3DRAM chips are tested. Errors in this subtest are attributed to the 3DRAM.

TABLE 1-4 `afbtest` Options

`afbtest` **Options**	**Description**
RAMDAC Test	RAMDAC registers are tested using simple read / write patterns to determine if there are any bad bits. This includes all LUTs (4 CLUTs, PWLUT and OWLUT). `afbtest` ensures that data is actually being read from the RAMDAC and not being supplied by the driver. RAMDAC on AFB can be in SEP8 or Combined mode. RAMDAC test detects the RAMDAC mode and tests the RAMDAC output for that mode. The RAMDAC Signature Register captures the pixels going to the screen. This test determines that all of the different data paths within the RAMDAC are functioning properly. The data pattern is designed so all the data paths are tested. i.e., All CLUTs, PWLUTs and OWLUTS. A cursor is also displayed on the screen. Errors in this test are attributed to the RAMDAC.
Microcode Test	Micro code test generates the checksum for the microcode of the each enabled float and compares all the check sums for equality. Errors in this test are attributed to the Microcode PROMS & SRAMS.
Rendering Pipeline Test	Rendering Pipeline uses the rendering pipeline tests developed for the FFB stand-alone diagnostics. Each FFB primitive is tested thoroughly with a variety of sources and configurations. • Dots • Anti-aliased dots • Lines using all four line drawing primitives • Triangles • Polygons • Rectangles • Fonts Errors in this test are attributed to the Draw Chips.
Fast Fill / Vertical Scroll Test	Fast Fill / Vertical Scroll primitives are separated from the Rendering Pipeline tests because of their dependence on screen type. There are three different tests, one for each screen type. Each test uses both block and page mode fast_fills. Errors in this test are attributed to the Draw Chips.

TABLE 1-4 `afbtest` Options

`afbtest` **Options**	**Description**
Pixel Process Test	The Pixel Processor test, a subtest, exercises the options selected by the AFB's Pixel Processor Control (PPC) register. • Auxiliary clipping (additive and subtractive) • Depth cueing • Alpha blend • Viewport clip (2D and 3D) • Area pattern (transparent and opaque) Errors in this test are attributed to the Draw Chips.
AFB Dots Test	This test uses the AFB primitive tests developed for the AFB stand-alone diagnostics. AFB Dots are tested thoroughly with a variety of sources and configurations. • Dots • Anti-aliased dots • Big dots Errors in this test are attributed to the Command & Draw Chips.
AFB Lines Test	This test uses the AFB primitive tests developed for the AFB stand alone diagnostics. AFB Lines are tested thoroughly with a variety of sources and configurations. • Jaggy lines • Anti-aliased lines • Lines with patterns • Bresenham Lines • Wide Lines drawn as lines and Triangles Errors in this test are attributed to the Command & Draw Chips.
AFB Triangles Test	This test uses the AFB primitive tests developed for the AFB stand alone diagnostics. AFB Triangles are tested thoroughly with a variety of sources and configurations. • Triangles drawn clock wise & counter clockwise • Triangles drawn as stripes • Independent Triangles • Triangles drawn as stars • Triangles with facet normals Errors in this test are attributed to the Command & Draw Chips.
Lighting Test	The Lighting test exercises AFB float and lighting microcode. This test lights an object with maximum number of lights (32) that AFB can handle in hardware. A check sum is generated for the rendered image and compared with the check sum generated for the same image on a known good system. Errors in this test are attributed to the Float & Microcode SRAMS.

TABLE 1-4 `afbtest` Options

`afbtest` **Options**	**Description**
Texture Processor Test	The Texture Processor test exercises the different options of the AFB's Texture Pixel Processor Control (TPPC) register. • Texture Minification • Texture Magnification • Blend • Decal • Modulation Errors in this test are attributed to the Draw Chips.
AFB Mix Test	The AFB Mix test draws different primitives with variety combinations of sources and configurations, exercising all the Draw, Float, Microcode and 3DRAM chips on AFB. This test is to stress the AFB. Errors in this test are attributed to Draw, Float, Microcode and/or 3DRAM Chips.
Picking Test	The Picking test exercises the pick detect login of the 3DRAM. We define a pick detect window and make sure that writes to the window are picked, and writes outside the window are not picked. The test is repeated once for each 3DRAM. Errors in this test are attributed to the 3DRAM.
Arbitration Test	The Arbitration test, a subtest, continuously renders an object into the accelerator port while doing reads and writes through the direct port. A picture is rendered into all 32 planes of the B buffer while the other process does 32-bit DFB reads and writes in the A plane. This subtest simulates conditions in the real world, where rendering processes and windows operations run concurrently. Errors in this test are attributed to the Context switching between DFB and SFB.

TABLE 1-4 `afbtest` Options

`afbtest` **Options**	**Description**
Stereo Test	Stereo test displays an object in stereo mode with different images for the right and left eye. The user can verify proper operation by looking at the screen with stereo glasses and following the instructions being displayed. If the monitor type is not 1280x1024 @ 76MHz, this test prints a warning message and does not execute. To prevent this message from being displayed or written to the SunVTS information log, disable the stereo test in the test option menu. Only Sony P4 and N2 monitors support stereo resolutions. This test temporarily switches the monitor into stereo mode, renders a stereo image, performs a signature analysis on the stereo image (using the RAMDAC signature capture register), and after displaying the image for five seconds, restores the monitor to its previous resolution. Errors in this test are attributed to the RAMDAC.
UART Test	The UART test tests both UART0 and UART1. First, UART memory is tested using simple read/write patterns to determine if there are any bad bits. Then data is written to UART 0/1 and the written data is read using the internal loopback in polling mode. The read data is verified with written data. Errors in this test are attributed to UART and its SRAM memory chip.

`afbtest` Test Modes

Due to the nature of graphic tests, reading data from, or writing data to the frame buffer during graphic tests will disturb user operation. For this reason, `afbtest` is only available in Functional mode.

afbtest Command Line Syntax

/opt/SUNWvts/bin/afbtest *standard_arguments* **-o dev=***device_name*,**S=***subtest_number*,**F=***#_of_subtest_loops*,**B=***#_of_test_loops*,**P=***test_pattern*

TABLE 1-5 afbtest Command Line Syntax

Argument	Explanation
dev=*device_name*	*device_name* is the relative path name of the device being tested with respect to /dev/fbs; The default is afb0.
S=*subtest_number*	*subtest_number* is the test number of the subtest to be run. Select from the subtests below. You can run multiple subtests by adding the subtest numbers together. For example, *n=0x3* runs both test 1 and test 2; *n=0x180* runs both test *0x080* and test *0x0100*. You do not need the leading zeros. *n* - 0x00001 3DRAM *n* - 0x00002 3DRAM Logic *n* - 0x00004 RAMDAC *n* - 0x00008 Micro code *n* - 0x00010 Rendering Pipeline *n* - 0x00020 FastFill/Vertical Scroll *n* - 0x00040 Pixel Processor *n* - 0x00080 AFB Dots *n* - 0x00100 AFB Lines *n* - 0x00200 AFB Triangles *n* - 0x00400 Lighting *n* - 0x00800 Texture Processor *n* - 0x02000 AFB Mix Test *n* - 0x04000 Picking *n* - 0x08000 Arbitration *n* - 0x10000 Stereo *n* – ox40000 UART
F=*#_of_subtest_loops*	The number of times to repeat each subtest; the default is 1.
B=*#_of_test_loops*	The number of times to repeat a test loop before passing; the default is 1.
P=*test_pattern*	The test pattern number. The default is r, for random patterns. You may also choose 0 for 0x0000000, 3 for 0x3333333, 5 for 0x5555555, or 9 for 0x9999999.

afbtest Error Messages

Errors returned by afbtest are nonspecific: It is not possible to determine which component caused a failure. In all error conditions, the field replaceable unit (FRU) is the entire AFB.

TABLE 1-6 afbtest Error Messages

	Error Message	Probable Cause(s)	Recommended Action
6000	*string* error: 3DRAM Memory error *string* Plane at *(data,data)* Expected = 0x*%02x*, actual = 0x*%02x*, xor = 0x*%02x*	Faulty frame buffer.	If the problem persists, contact your authorized Sun service provider.
6002	*string* error: 3DRAM Memory error *string* Plane at (*data*,*data*) Expected = 0x%06x, actual = 0x%06x, xor = 0x%06x		
6004	*string* error: 3DRAM Memory error *string* Plane at (*data,data*) Expected = 0x%08x, actual = 0x%08x, xor = 0x%08x		
6006	*string* error: 3DRAM Memory error *string* Mode, Plane A at (*data*,*data*) Expected = 0x%08x, actual = 0x%08x, xor = 0x%08x	Faulty frame buffer.	If the problem persists, contact your authorized Sun service provider.
6008	*string* error: 3DRAM Memory error *string* Mode, Plane B at (*data,data*) Expected = 0x%08x, actual = 0x%08x, xor = 0x%08x	Faulty frame buffer.	If the problem persists, contact your authorized Sun service provider.
6010	*string* error: 3DRAM Memory error *string* Mode, Plane C at (*data*,*data*) Expected = 0x%08x, actual = 0x%08x, xor = 0x%08x		

TABLE 1-6 `afbtest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
6012	`Misaligned raster`	Software error.	Reinstall software or contact your system administrator.

6013	`File Not Found`
	`Could not open file`
	`string`		

6014	`Could not open file` *`string`*`: `*`string`*		
6015	`Keyword not Found, line` *data*		
6016	`Miscompares, starting at` *`string`*	Faulty frame buffer.	Contact your authorized Sun service representative.

6017	`Picking test error.`
	`Got a pick hit with`
	`picking disabled`		

6018	`Picking test error.`
	`Got a pick hit outside`
	`the picking area`		

6019	`Picking test error.`
	`Should have detected a`
	`pick hit`		

6020	`Out of memory`	Software System Error.	Contact your system administrator.
6021	*`string`* `failed`	Software error.	Reinstall software or contact your system administrator. Check for existence and/or permissions on *`string`*. Also check for available space in `/tmp`.
6022	*`string`* `failed`	Software error.	Reinstall software or contact your system administrator. Check for existence and/or permissions on *`string`*.
6023	`fork1(2) failed`	`Software error.`	`Reinstall software or contact your system administrator.`
6024	`execl(2) failed`		
6025	`Unable to open` *`string`*	`Software error.`	`Reinstall software or contact your system administrator. Check device for existence and/or permissions on` *`string`*`.`

TABLE 1-6 `afbtest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
6026	ioctl(2) failed trying to read CLUT.	Possible hardware failure, more likely a software driver error.	Reinstall software first, if failure continues, see a System Administrator or your Sun Service provider.
6027	ioctl(2) failed trying to turn on AFB video.	Possible hardware failure, more likely a software driver error.	Reinstall software first, if failure continues, see a System Administrator or your authorized Sun service provider.
6028	ioctl(2) failed trying to post CLUT.		
6029	Miscompare found in Green channel of CLUT entry *data*. Expected = 0x%02x, Observed = 0x%02x, XOR = 0x%02x.	Faulty frame buffer.	If the problem persists, contact your authorized Sun service provider.
6030	Miscompare found in Green channel of CLUT entry *data*. Expected = 0x%02x, Observed = 0x%02x, XOR = 0x%02x.		
6031	Miscompare found in Blue channel of CLUT entry *data*. Expected = 0x%02x, Observed = 0x%02x, XOR = 0x%02x.		
6032	ioctl(2) failed trying to read WID LUT.	Possible hardware failure, more likely a software driver error.	Reinstall software first, if failure continues, see a System Administrator or your authorized Sun service provider.
6033	ioctl(2) failed trying to post WID LUT.		
6034	ioctl(2) failed trying to get RAMDAC signature analysis.		
6035	Miscompare found in WID LUT entry *data*. Expected = 0x%06x, Observed = 0x%06x, XOR = 0x%06x.	Faulty frame buffer.	If the problem persists, contact your authorized Sun service provider.
6036	RAMDAC test failed. The on-screen image is incorrect.		

TABLE 1-6 `afbtest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
6037	`sysinfo(2) failed getting hostname.`	Software error.	Must be superuser
6038	`can't acquire console semaphore`	Software error.	Reinstall software or contact your system administrator.
6039	`Cannot gain control of mouse: string`		
6040	`Cannot gain control of keyboard: string`		
6046	`ioctl(2) failed trying to get current video mode.`	Possible hardware failure, more likely a software driver error.	Reinstall software first, if failure continues, see a System Administrator or your authorized Sun service provider.
6047	`ioctl(2) failed trying to set current video mode.`		
6048	`ioctl(2) failed trying to get AFB system info.`		
6049	`ioctl(2) failed trying to go into Diagnostic mode.`		
6050	`mmap(2) failed: string.`	Software system error.	Reinstall software or contact your system administrator.
6051	`munmap(2) failed: string.`		
6052	`close(2) failed: string.`		
6053	`DGA error grabbing window on screen data.`		
6054	`DGA error getting window from token on screen data.`		
6055	`ioctl(2) failed trying to read Transparent Overlay registers.`	Possible hardware failure, more likely a software driver error.	Reinstall software first, if failure continues, see a System Administrator or your authorized Sun service provider.
6056	`ioctl(2) failed trying to post Transparent Overlay registers.`		
6057	`ioctl(2) failed trying to post cursor.`		
6058	`ioctl(2) failed trying to read cursor.`		
6059	`No AFB device found on display 0.`	The environmental variable DISPLAY is set wrong or the display being used is not using an AFB.	Set the variable to a display that has the AFB plugged into it.

TABLE 1-6 `afbtest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
6060	`There is an inconsistency with the version of the X Window System.`	Software error.	Contact your system administrator.
6061	`stat(2) failed trying to get info about Device Under Test.`	Software error.	Reinstall software or contact your system administrator.
6062	`stat(2) failed trying to get info about screen 0:`*`data`*`.`		
6063	`Can't access XWindows.`	Software error.	Try running xhost(1) or contact your system administrator.
6064	`wait(2) failed:` *`string`*	Software error.	Reinstall software or contact your system administrator.
6065	`signal(2) failed:` *`string`*		
6066	`thr_kill(2) failed`		
6067	`thr_join(2) failed:` *`string`*		
6071	`To get signatures, run afbtest from the command line.`		
6072	`Stereo image incorrect`	Faulty frame buffer.	If the problem persists, contact your Sun Service provider.
6075	`System LWP limit exceeded.`	Software error.	Reinstall software or contact your system administrator.
6076	`Error` *`data`* `creating thread.`		
6104	`Error in getting the length of the file.` *`string`*		
6105	`Stencil test failed` *`string`*	Faulty 3DRAM.	If the problem persists, contact your Sun Service provider.
6106	`Passin test failed` *`string`*		
6107	`Blend2 test failed` *string*		
6108	`Couldn’t create lock file` *string*	No permission or lack of space in `/tmp`.	Free some space in `/tmp` directory. Check permissions of `/tmp`.

TABLE 1-6 `afbtest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
6115	*string* error: GCopy error *string* at (*data*,*data*) Expected = 0x%02x, actual = 0x%02x, xor = 0x%02x.	Faulty frame buffer.	If the problem persists, contact your Sun Service provider.
6116	*string* error: GCopy AFB to Memory error *string* at (*data*,*data*) Expected = 0x%02x, actual = 0x%02x, xor = 0x%02x.		
6117	*string* error: GCopy Memory to AFB error *string* at (*data*,*data*) Expected = 0x%02x, actual = 0x%02x, xor = 0x%02x.		
6208	ioctl(2) failed trying to post Overlay WID LUT.	Possible hardware failure, more likely a software driver error.	Reinstall software first, if failure continues, see a System Administrator or your authorized Sun service provider.
6209	ioctl(2) failed trying to post Primary WID LUT.		
6210	Miscompare found in Overlay WID LUT entry *data*. Expected = 0x%06x, Observed = 0x%06x, XOR = 0x%06x.	Faulty frame buffer.	If the problem persists, contact your Sun Service provider.
6211	Miscompare found in Primary WID LUT entry *data*.		
6212	ioctl(2) failed trying to read CLUT # *data*.	Possible hardware failure, more likely a software driver error.	Reinstall software first, if failure continues, see a System Administrator or your authorized Sun service provider.
6213	ioctl(2) failed trying to post CLUT # *data*.		

TABLE 1-6 `afbtest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
6214	`Miscompare found in Red channel of CLUT # data in entry data. Expected = 0x%02x, Observed = 0x%02x, XOR = 0x%02x.`	Faulty frame buffer.	If the problem persists, contact your Sun Service provider.
6215	`Miscompare found in Green channel of CLUT # data in entry data. Expected = 0x%02x, Observed = 0x%02x, XOR = 0x%02x.`		
6216	`Miscompare found in Blue channel of CLUT # data in entry data. Expected = 0x%02x, Observed = 0x%02x, XOR = 0x%02x.`	Faulty frame buffer.	If the problem persists, contact your Sun Service provider.
6217	`RAMDAC test failed. The on-screen image in sep 4 mode is incorrect.`		
6218	`RAMDAC test failed. The on-screen image in sep 8 mode is incorrect.`		
6219	`RAMDAC test failed. The on-screen image in combined mode is incorrect.`		
6220	`ioctl(2) failed trying to read Overlay WID LUT.`	Possible hardware failure, more likely a software driver error.	Reinstall software first, if failure continues, see a System Administrator or your authorized Sun service provider.
6221	`ioctl(2) failed trying to read Primary WID LUT.`		
6222	`Couldn't bind afbtest and its threads to processor# data.`	User does not have permission or System error.	If the problem persists, contact you system administrator, or an authorized Sun service provider.

TABLE 1-6 `afbtest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
6230	`L-core checksum mismatch, L-core Checksum of Float #data = 0x`*value*	Possible hardware failure.	If the problem persists, contact your Sun Service provider
6231	`S-core checksum mismatch, S-core Checksum of Float #data = 0x`*value*		
6232	`F-core checksum mismatch, F-core Checksum of Float #data = 0x`*value*		
6233	`F-core SRAM error in Float #data, Failing address = 0x`*value*`, expected data = 0x`*value*`, actual data = 0x`*value*`, XOR of expected and actual data = 0x`*value*`, F-core checksum = 0x`*value*		
6234	`L-core SRAM error in Float #data, Failing address = 0x`*value*`, expected data = 0x`*value*`, actual data = 0x`*value*`, XOR of expected and actual data = 0x`*value*`, L-core checksum = 0x`*value*		
6235	`S-core SRAM error in Float #data, Failing address = 0x`*value* `expected data = 0x`*value*`, actual data = 0x`*value*`, XOR of expected and actual data = 0x`*value*`, S-core checksum = 0x`*value*		
6300	`Couldn't reset UART`*n*	`Faulty UART or Some other application/test is using the UART`*n*	Try stopping other applications / tests that use the UART. If the problem persists, contact your authorized Sun service provider.

TABLE 1-6 `afbtest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
6301	UART memory test failed. Error occurred in memory of UART*n*. data at location 0x*value* expected 0x*value* = *data* actual data = *data*	Faulty UART. Or some other application/test is using the UART.	Try stopping other applications / tests that use the UART. If the problem persists, contact your authorized Sun service provider.
6302	Couldn't baud rate of UART*n* *data* to *data*.		
6303	UART loopback test failed. Loopback cable is missing on UART n.		
6304	UART loopback test failed. Couldn't send data through UART*n*.		
6305	UART loopback test failed. TxRdy not ready. Timed out while polling UART*n*.		
6306	UART loopback test failed. Buffer pointer of UARTn data didn't advance.		
6307	UART loopback test failed. Couldn't read data from UART*n*.		
6308	UART Fill Buffer test for UART*n* failed. Transmitter not ready.		
6309	UART Fill Buffer test for UART*n* failed. Data mismatch at memory location ox%08*x*.		
8000	Real user ID of current instance of afbtest is not root.	Not logged in as root.	Log in as root. If the problem persists, contact your authorized Sun service provider.

CHAPTER 2

SunATM Adapter Test (atmtest)

atmtest checks the functionality of the SunATM-155 and SunATM-622 SBus and PCI bus adapters.

It runs only in loopback (external or internal) mode. The Asynchronous Transfer Mode (ATM) adapter, and ATM device driver must be present. To run the atmtest in external loopback mode, a loopback connector must be attached to the ATM adapter. The internal loopback mode does not require a loopback connector.

atmtest uses DLPI RAW mode to talk to the device driver. It establishes a virtual circuit (VC) to send a message, receive a message, and compare messages. If the message does not match, or the message is out of sequence, it displays an error message.

Using a random number generator, atmtest sends data into a data buffer and then sends each message from a different starting point. This assures that no two consecutive messages are the same.

atmtest can test more than one virtual circuit. The more virtual circuits used increases the stress level of the test. atmtest automatically selects the virtual circuit number which is unique to the test. atmtest is nonscalable as it provides for more than one virtual circuit to be tested for each instance, which is adequate for the purpose of a stress test.

atmtest can only be selected when the Intervention mode is enabled since it requires a loopback connector for external loopback testing. While Intervention mode is enabled, atmtest and nettest are both available as default selections, however, you must deselect nettest when testing the ATM device.

Note – Do not run nettest while running atmtest.

Note – Bring the ATM interface down to make sure that the interface is in offline mode before running atmtest.

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atmtest Options

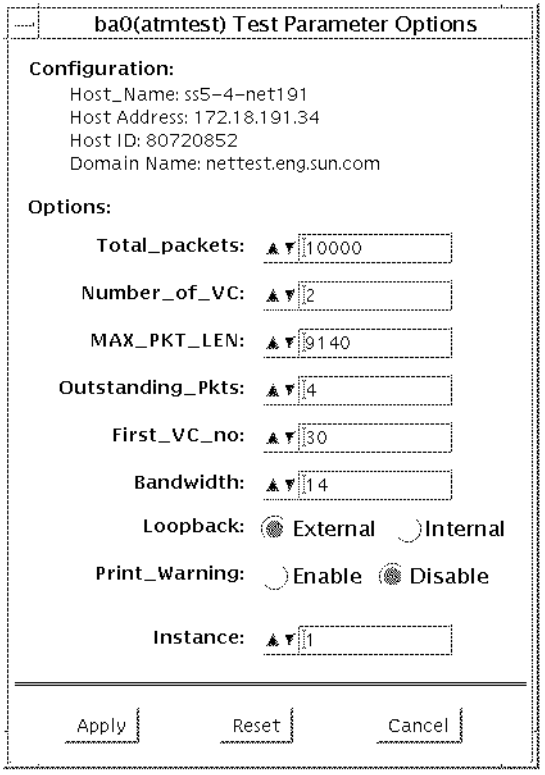


FIGURE 2-1 `atmtest` Option Menu

TABLE 2-1 `atmtest` Options

Options	Description
Configuration	The Post Address, Host ID, and Domain Name of the system being tested.
Total Packets	The total number of packets sent. The default number of packets sent is 10000.
Number of VC	The number of virtual circuits to be set up by one instance. The default number of virtual circuits is 2for each instance. The `atmtest` uses these two virtual circuits to send out messages simultaneously. The message is received in sending order.
Loopback	Enables the user to select either the external loopback field or internal loopback field. The default selection is the external loopback field. A loopback connector is only needed for external loopback testing.
MAX_PKG_LEN	The maximum packet length to be used by the test to send out the data. The default number is 9140.
Outstanding_pkts	Describes the maximum number of outstanding packets. `atmtest` stops sending messages when the outstanding packet count is more than the number of packets this field specifies.
First_VC_no	Enables the user to set up the starting virtual circuit number to be used for each `atmtest` instance. `atmtest` can automatically avoid virtual circuit numbers that have already been used.
Bandwidth	Enables the user to select different bandwidths to test. The default number is 14.

`atmtest` Test Modes

`atmtest` can only be run in Functional test mode.

atmtest Command Line Syntax

/opt/SUNWvts/bin/atmtest *standard_arguments* **-o dev=***device*,**tpkts=***n*,**nv=***n*,**ml=***n*,**bw=***n*,**opkts=***n*,*ld*,*sd*,*sl*,*nc*,*ns*,*vcf*

TABLE 2-2 atmtest Command Line Syntax

Argument	Explanation
dev=*device*	Specifies the device name to be tested, such as ba0.
tpkts=n	Specifies the number of packets to loopback [1.2147483647].
nv=num_vc	Specifies the number of simultaneous virtual circuits to be tested.
ml=max_len	Specifies the maximum length of the random packet.
bw=bandwidth	Specifies the bandwidth in MBits/s of a virtual circuit.
opkts=n	Specifies the number of packets for each virtual circuit that can be transmitted without receiving a corresponding packet.
lb	The internal loopback mode is selected.
sd	Changes the payload data to static instead of random.
sl	Changes all packets to their maximum length.
nc	Instructs the test not to check the receive payload (Improves throughput).
ns	Instructs the test not to exit on a packet reception failure.
vcf=n	Specifies the first virtual circuit number used.

atmtest Error Messages

The atmtest error messages are listed below with explanations or probable causes:

TABLE 2-3 atmtest Error Messages

	Error Message	Probable Cause(s)	Recommended Action
6000	putmsg failed, errmsg=*data*		
6001	getmsg failed, errmsg=*data*		

TABLE 2-3 `atmtest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
6002	`wrong vc: exp:` *number*, `obs:` *number*		
6003	`VC` *number* `bogus pkt, seq: exp=`*number*`, obs=`*number*`; len: exp=`*number*`, obs=`*number*		
6004	`VC` *number* `bad pkt len, EXP:` *number*`, OBS:` *number*`, seq=`*number*		
6005	`VC number memcmp error`		
6006	`VC number failed to rcv a packet`		
6007	`Complete Usage:` *string* `u`		
6008	*string*`: alarm`		
6009	*string*`: getmsg`		
6010	`receive` *string* `for` *string* `with` *string* `error`		
6011	`DL_OK_ACK was not M_PCPROTO`		
6012	`short response ctl.len:` *number*		
6013	`ctl.len sizeof (dl_ok_ack_t):` *number*		
6014	`receive` *string* `for string with` *string* `error`		
6015	`DL_BIND_ACK was not M_PCPROTO`		
6016	`ioctl DLIOCRAW failed, errmsg` *string*		
6017	`ioctl DL_IOC_HDR_INFO failed, errmsg` *string*		
6018	`len=`*number* `hdrmax=`*number*		
6019	`ioctl ADDVC failed, errmsg` *string*		
6020	`ioctl ALLOCBW failed, errmsg` *string*		
8000	`open device failed, errmsg=`*string*		

TABLE 2-3 `atmtest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
8001	`sa_add_vpci failed, errmsg=`*string*		
8002	`sa_allocatebw failed, errmsg=`*string*		
8003	`atm_attach failed, errmsg=`*string*		

CHAPTER 3

Audio Test (audio)

The audio test verifies the hardware and software components of the audio subsystem. This test supports all Sun audio implementations.

The audio device is an *exclusive use device*. Only one process or application can interface with it at a time. This test is not scalable.

The availability of the following subtests depends on the particular audio implementation being tested.

audio Subtests

TABLE 3-1 audio Subtests

Subtest	Description
Record / Play Test	This test plays and records one second of data. It does not check data. This test is run on all audio implementations.
Crystal Test	The crystal test measures the accuracy of the crystal that generates the sample rate clock. It does this by playing a one-second signal and then measuring the actual time required to play the signal. This measurement is performed for each of the eight standard sample rates. This test is available for dbri(7) and audiocs(7) audio implementations
Loopback Tests	This test verifies the functionality and signal quality of the audio ports. The test simultaneously plays and records a known signal. The recorded signal is analyzed for loop gain and signal-to-noise ratio plus distortion. This is repeated at various sample rates, encodings, precisions and channels. The audio ports that are supported depend on the audio implementation under test. The audiocs(7) implementation supports loopbacks from / to headphone, line-out, microphone, and line-in ports. The dbri(7) / speakerbox implementation supports fewer ports. The audioamd(7) implementation does not support loopback tests. Most tests require a stereo loopback cable. NOTE: The microphone loopback tests require special hardware and are used by manufacturing centers and special test facilities. Do not invoke the microphone loopback tests unless you have the required hardware.
Controls Test	This test verifies the three control buttons on the Sun Speakerbox. The Controls test plays music while the user is prompted to press the Volume Down, Volume Up, and Mute buttons in a specific order. If no button is pressed, the music plays for about 30 seconds, then stops, and returns an error. This test is only supported on the dbri(7) / speakerbox implementation.
Audio Test	This test plays a 30-second music file out of the speaker or headphone. The user must decide if the test passes or fails. Badly distorted audio, or no audible music indicates a problem. This test is supported on all audio implementations.

audio Options

Upon start-up, the SunVTS probe utility determines which audio implementation is present and adjusts the audio option menu appropriately. The possible option menus are as follows:

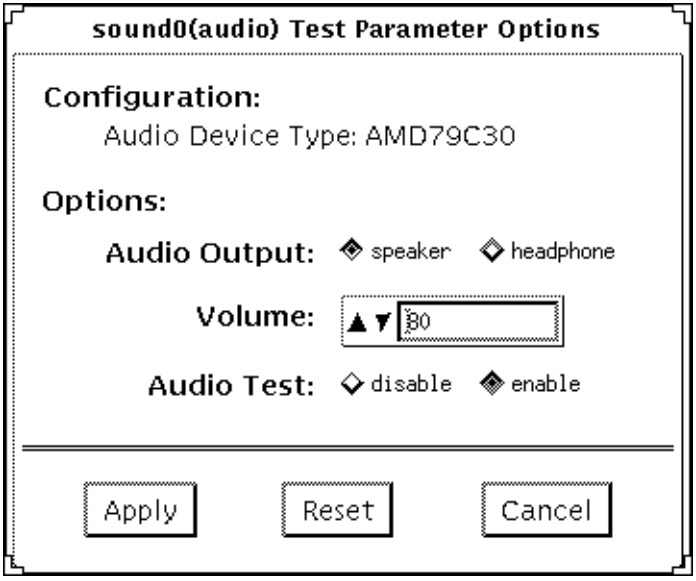


FIGURE 3-1 audio Test Option Menu for audioamd(7)

The audioamd(7) is an 8-bit mono, telephone-quality, audio device.

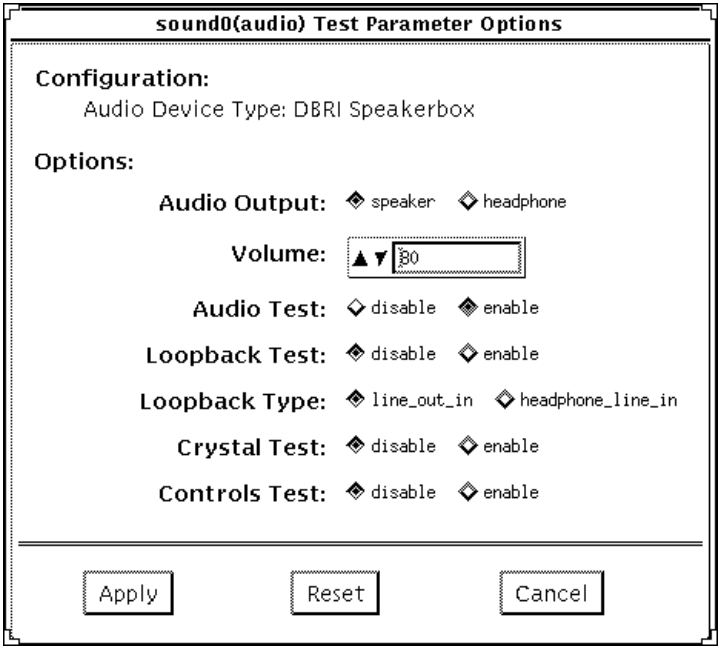


FIGURE 3-2 `audio` Test Option Menu for Speakerbox `dbri(7)` `audio`

The speakerbox `dbri` is a high-quality 16-bit stereo multimedia (coder / decoder (codec).

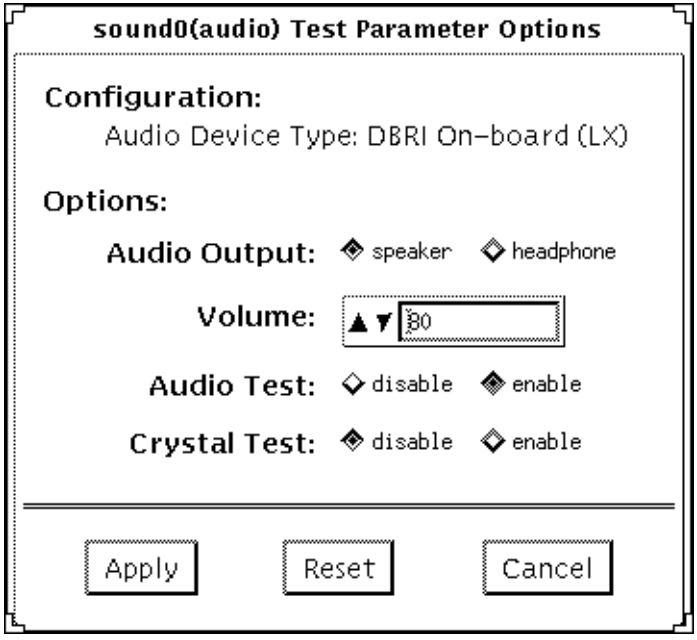


FIGURE 3-3 `audio` Test Option Menu for SPARCstation LX `dbri(7)` without a Speakerbox attached

The on-board DBRI interface is a high-quality, 16-bit stereo multimedia codec.

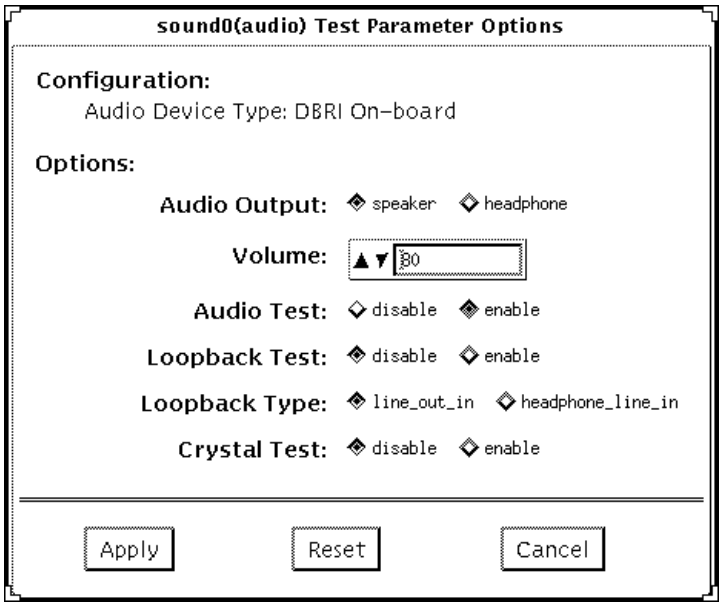


FIGURE 3-4 `audio` Test Option Menu for on-board `dbri(7)` for SPARCstation 20 and S240

The SPARCstation 20 On-board dbri is a high-quality 16-bit stereo multimedia codec.

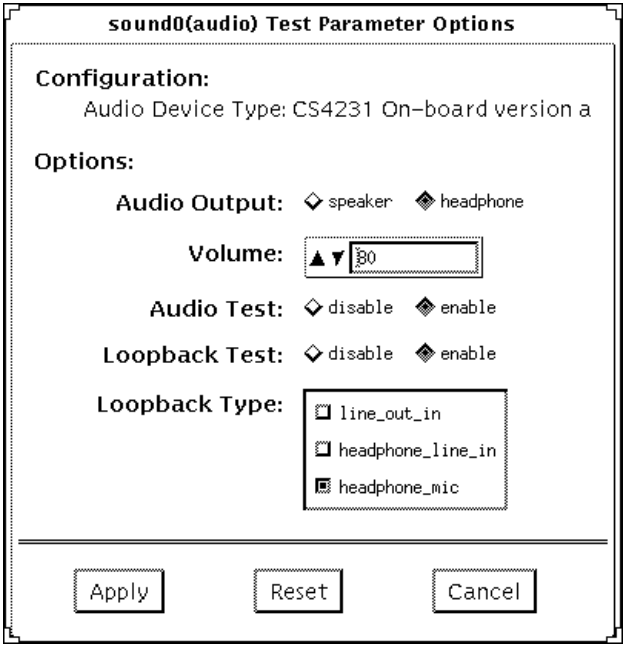


FIGURE 3-5 `audio` Test Option Menu for `audiocs(7)`

The `audiocs(7)`is an on-board, high-quality 16-bit stereo multimedia codec.

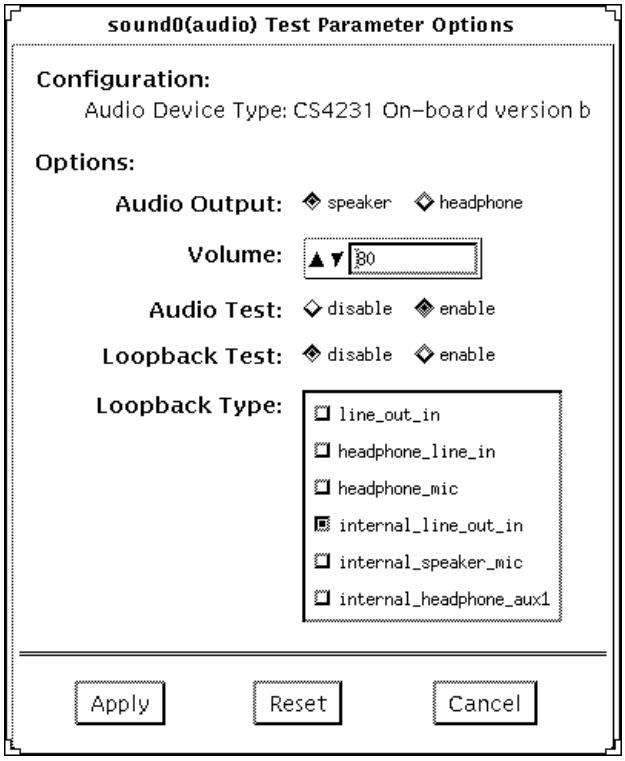


FIGURE 3-6 `audio` Test Option Menu for `audiocs`(7) with Internal Loopbacks

The `audiocs`(7) is an on-board, high-quality 16-bit stereo multimedia codec.

Note – The internal loopbacks are only active if the audio jacks are unused (nothing connected).

Some options can only be selected through the command line. See the command line option descriptions in “audio Command Line Syntax” on page 42.

TABLE 3-2 `audio` Options

Option	Description
Audio Test	Enables or disables the music play test. This test is enabled by default.
Audio Output	Selects the output port for the music play test.
Volume	Sets the volume for the music play test.

TABLE 3-2 `audio` Options *(Continued)*

Option	Description
Loopback Test	Enables or disables the loopback test. A loopback cable must be installed between the selected ports to run this test. This test is disabled by default.
Loopback type	Selects the type of loopback test to run.
Crystal Test	Enables or disables the crystal test. This test is disabled by default.
Controls Test	Enables or disables the speakerbox Controls test. This is an interactive test and the user is prompted to press the control buttons on the speakerbox. This test is disabled by default.

Note – Do not run the crystal test while running other SunVTS tests. The crystal test is timing-dependent. If the system is too busy, it fails due to time-out errors.

`audio` Test Modes

TABLE 3-3 `audio` Test Modes

Test Mode	Description
Connection Test	A simple open and close is performed. No data is transferred. The test returns a pass if the device can be opened and closed successfully. If the device cannot be opened because it is busy, then it is assumed that the device is successfully connected to another process and the test passes.
Functional Test	The record / play test is run and you can choose to run any of the tests described earlier. In this mode, the test will fail if the device is busy. If you invoke SunVTS through SyMON, the following Functional Test description applies: The record / play test is run. If the device cannot be opened because it is busy, then it is assumed that the device is successfully connected to another process and the test passes.

audio Command Line Syntax

/opt/SUNWvts/bin/audio *standard_arguments* **-o dev=/dev/sound/***unit_no***,I=/dev** *ioctl_device***, M, L, Q, S,**
T=*loopback_test_type***,X,E,LE,CD,CDD=***CD_device_name***,**
CDT=*track_number***,CDG=***play_gain***,CDL=***play_time***,W,**
MF=*filename***,TF=***filename*

TABLE 3-4 audio Command Line Syntax

Argument	Explanation
dev=/dev/audio_device	Specifies the audio device to be tested. The default is dev=/dev/audio
I=/dev/ioctl_device	Specifies the audio ioctl device to be tested; the default is /dev/audioctl.
M	Enables the music play test.
L	Enables the loopback test.
Q	Enables the quality test. This option does the same thing as L option except that it prints an extra status message upon completion.
S	Enables the speakerbox controls test.
T=loopback_test_type	Specifies the type of loopback test. The default is 1; the choices are listed below. 0 Speaker / Microphone 1 Line-in / Line-out 2 Headphone / Line-in 3 Headphone / Microphone 4 Speaker / CD-input I1 Internal Line-in / Line-out I2 Internal Spk / Mic I3 Internal Headphone / Aux1 Note: Test types 0, 3, an 4 require special hardware, and are used by manufacturing centers and special test facilities. Do not invoke these tests unless you have the required hardware.
X	Enables the Audio Crystal test.
E	Continues testing if an error occurs.
LE	Loops on Error. This plays the signal data in a continuous loop.

TABLE 3-4 audio Command Line Syntax *(Continued)*

Argument	Explanation *(Continued)*
CD	Enables the cdtest. This is for systems with an internal CD-ROM drive. A CD disc with music tracks must be loaded prior to running this test.
CDD=CD_device_name	Specifies the raw device name for the CD-ROM drive. The default is CDD=/dev/rdsk/c0t6d0s0.
CDT=number	Specifies the track number of CD-ROM to play. The default is to play the first track on the disc.
CDG=play_gain	Specifies the play gain of the CD Play test (0 to 255). The default is 120.
CDL=play_time	Specifies the number of seconds to run the CD Play test. The default is 30 seconds.
W	Shows warning messages during the loopback test.
MF=filename	Selects an optional music file.
TF=filename	Specifies an optional tolerance file. Note: The tolerance file is used by manufacturing centers and special test facilities. Do not use this option unless you are familiar with the tolerance file format.

audio Error Messages

TABLE 3-5 audio Error Messages

	Error Message	Probable Cause(s)	Suggested Action (if applicable)
6000	Signal To Noise ratio too low (*name*) on *name*, SNR =*number* db, Min SNR =*number* db (*text*)	Loopback cable is missing or faulty. Audio hardware (usually consistent failures). System software problem (usually intermittent failures).	
6001	Channel Separation too low (*name*), SEP =*number* db, Min SEP =*number* db (*text*)	Loopback cable is faulty. Audio hardware is faulty (usually consistent failures). System software problem (usually intermittent failures).	

TABLE 3-5 audio Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Suggested Action (if applicable)
6002	Loop gain is out of range (*name*), *name* GAIN =*number* db, Min =*number* Max =*number* db (*text*)	Loopback cable is missing or faulty. Audio hardware is faulty (usually consistent failures). System software problem (usually intermittent failures).	
8000	Must be super user (*root*) to execute	The user does not have root privileges.	
8012	Invalid audio device (*device_name*) for Crystal test	The crystal test is not supported on the system audio device.	
8013	Invalid audio device (*device_name*) for Controls test	The system audio device does not support a speakerbox.	
8014	Invalid audio device (*device_name*) for Loopback Quality test	No loopback tests are supported on the system audio device.	
8015	Invalid audio device (*device_name*) for Loopback Quality test (T=*number*)	The specified loopback test is not supported on the system audio device. The specified loopback type is not supported on this audio device.	
8020	Incomplete button press sequence	The required button presses were not detected in the time allowed.	
8023	Underrun/Overrun error failure	The audio driver detected underrun or overrun errors while transferring data to the audio device. These errors usually happen when the loopback test is run while during heavy system activity.	
8027	*name*: '*name*(*name*=*number*, *name*=*number*, *name*=*number*)' system call timeout. No response after *number* seconds. Device = *device_name*	The system call is hanging. Audio hardware (usually consistent failures). System software problem (usually intermittent failures).	

TABLE 3-5 audio Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Suggested Action (if applicable)
8028	Audio crystal test did not complete in the expected time, rate = *number* Hz, time = *number* usecs, min = *number*, max = number	Excessive loading on the system.	Disable all other tests and try again.
8029	Speaker is an invalid output port for device	The system does not have an on-board speaker.	
8032	Failed ioctl name (*error_message*)	The ioctl( ) system call failed.	See the appended error message.
8033	Failed mmap (*error_message*)	The mmap( ) system call failed.	See the appended error message.
8034	Failed fstat (*error_message*)	The fstat( ) system call failed.	See the appended error message.
8035	Failed ftruncate (*error_message*)	The ftruncate( ) system call failed.	See the appended error message.
8036	Write to audio device returned error condition (*error_message*)	The write( ) system call failed.	See the appended error message.
8037	Read from audio device returned error condition (*error_message*)	The read( ) system call failed.	See the appended error message.
8038	Failed to allocate number bytes of memory (*error_message*)	The memory allocation system call failed, most likely due to a lack of system memory resource.	See the appended error message.
8051	Unknown audio device (*name*=*device_name*, config=*name*)		
8052	Unable to get platform name		
8053	Unknown architecture/audio = *name* / *device_name*		
8055	Could not open *device_name*: *error_message*	The open( ) system call failed Examine system message files (/var/adm/messages) for other information. Device does not respond. No mmcodec device found. Unable to communicate with speakerbox.	

TABLE 3-5 `audio` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Suggested Action (if applicable)
8075	`Invalid audio file format`	Specified audio file is not in expected format.	
8077	`Invalid audio encoding`	An unknown audio encoding type was specified.	
8090	`Only one` *name* `loopback can be selected at a time`	The user specified more than one loopback test on the same port.	
8091	`Cannot enable loopback testing without selecting a loopback type`	The user enabled loopback testing but did not specify a loopback type.	

CHAPTER 4

Bidirectional Parallel Port Printer Test (bpptest)

bpptest verifies the functionality of the bidirectional parallel port. SBus printer cards have two printer ports: one for SPARCprinters™, and one for a parallel port printer. Use the lpvitest to verify SPARCprinter functionality.

The bpptest verifies that your SBus card and its parallel port are working properly by attempting to transfer a data pattern from the SBus card to the printer.

Two indications show that the card and printer are functioning properly: First, you can see from the SunVTS Status window that bpptest made a successful pass, and second, that the pattern transmitted to the printer printed correctly.

If the bpptest passes successfully, you know that the SBus DMA circuitry, the printer, and the device driver are functioning properly.

Note – Large Postscript files or raster files may require that the printer has 2 Mbytes or more of memory. Otherwise, the printout may appear on two different sheets of paper.

Printer Test Hardware and Software Requirements

The SBus printer card and device drivers must be installed to run lpvitest or bpptest. A printer must be connected to the SPARCprinter or bidirectional parallel port, and be powered-up. If both a SPARCprinter and a parallel port printer are connected to the SBus card, you can test both devices at the same time.

Note – For a SPARCstation 10, SPARCstation LX, or SPARCclassic system, you can connect a printer directly to the onboard parallel port to run `bpptest`.

If you are testing the SPARCprinter port, be sure the magnets on the SPARCprinter paper tray are set to the correct paper size. For more information, see the *SPARCprinter Installation and User's Guide* and the label on the paper tray.

`bpptest` Options

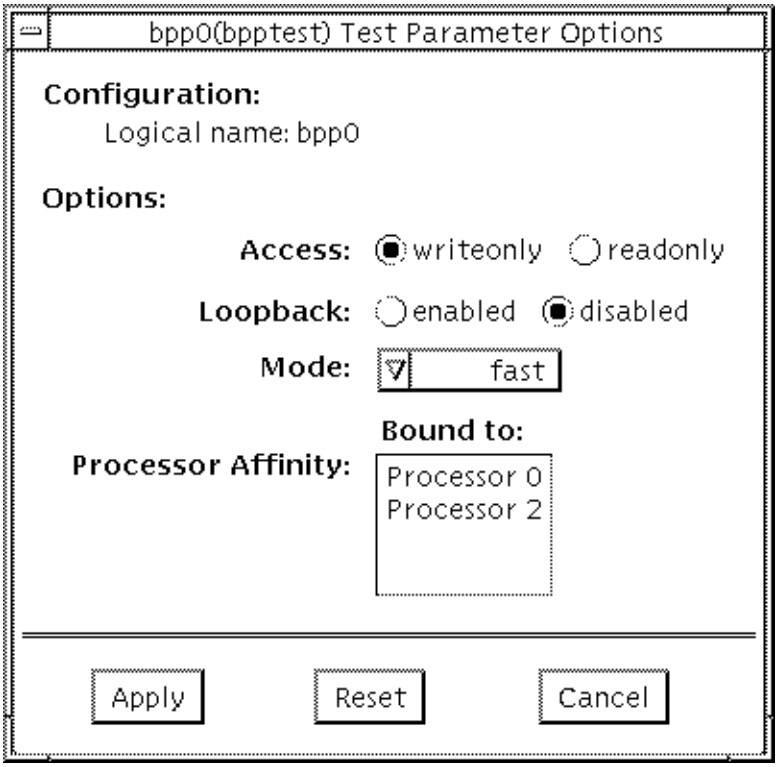


FIGURE 4-1 `bpptest` Option Menu

TABLE 4-1 `bpptest` Options

Options	Description
Access	Determines the direction of data transfer; this field is informational only. Writeonly is the only option currently available. Data is transferred only from the SBus printer card to the printer.
Mode	Sets the print intervals. This option lets you select the intervals at which the test image is printed. The default setting is Fast. In the online and Functional tests this option is set to medium. In the Functional test, the choices are: Fast: Prints an image every 10 seconds. Medium: Prints an image every 12 minutes. Extended: Prints an image every 30 minutes.

`bpptest` Test Modes

This test supports Connection and Functional test modes.

TABLE 4-2 `bpptest` Test Modes

Test Mode	Description
Connection Test	In his mod, `bpptest` verifies that a bidirectional parallel port is configured on the system. The success of the `bpptest` in this mode indicates that the system has the bidirectional parallel port hardware and the software driver is installed.
Functional Test	The testing done in this mode is the same as in the online mode, except that the test registers a failure if the port is found busy. This is because SunVTS tests make the assumption that all the resources will be available for testing in the Functional test and therefore the unavailability of the device is interpreted as an indication of a fault condition. If you invoke SunVTS through SyMON, the following Functional test description applies: the test attempts to verify the functionality of the parallel port and the path between the parallel port and the host memory. An internal loopback test is performed and if a printer is attached to the port, a data pattern is transferred to the printer.

bpptest Command Line Syntax

/opt/SUNWvts/bin/bpptest *standard_arguments* **-o dev=***device_name***,access=***writeonly* | *readonly***,mode=***mode***,loop=***disable* | *enable*

TABLE 4-3 bpptest Command Line Syntax

Argument	Explanation
dev=*device_name*	Specifies the name of the device. This should be of the form /dev/bpp#, where # is the minor number of the device.
access=*writeonly* | *readonly*	Determines test mode: writeonly or readonly. Note: This flag is mandatory.
mode=*mode*	Sets the test image print rate. The test image is a continuous printout of the ASCII character set. Possible rates are: Fast: Prints the test image at 10-second intervals. Medium: Prints the test image at 12-minute intervals. Extended: Prints the test image at 30-minute intervals.

bpptest Error Messages

TABLE 4-4 bpptest Error Messages

	Error Message	Probable Cause(s)	Suggested Action (if applicable)
6000	Read compare failed, expected:*value*, observed:*value*	Suspect DMA circuitry or FIFO associated with bpp.	
6001	Error occurred while accessing *device_name*; Time out Error: *value*; Bus Error: *value*; Pin Status: value	System error message.	
8000	could not open *device_name*	System error message.	
		Device does not exist.	
		Device not configured correctly.	

TABLE 4-4 `bpptest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Suggested Action (if applicable)
8001	`Encountered error while writing to` *device_name*`; Requested bytes to write:` *value*`; Bytes successfully written: value`	Device not configured correctly or does not exist.	
		Too many print requests queued up.	
		Printer out of paper.	
8002	`Failed to obtain memory from malloc() system call`	System heavily loaded.	
8003	`Error occurred while attempting to fork a child process`	System error message.	
8004	`ioctl fail on` *device_name*	System error message.	
8005	`error=`*number*	System error message.	
8006	`Device` *device_name* `unavailable for testing`	Device is busy.	Retry later.

CHAPTER 5

Compact Disc Test (`cdtest`)

`cdtest` checks the CD-ROM unit by reading the CD. `cdtest` is not a scalable test. Each track is classified as follows:

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

Note – Load a compact disc into the drive before starting the test. See the explanation for CD Type in TABLE 5-2 in the chart in "`cdtest` Test Modes," later in this chapter.

Volume Management and Compact Discs

`cdtest` tests the CD-ROM drive(s) even if the Volume Manager is not running. If the Volume Manager is running and no media is installed in the CD-ROM drive(s), SunVTS prompts you to install media in the drive before selecting the test.

The test fails if you try to run it without a CD in the drive.

cdtest Options

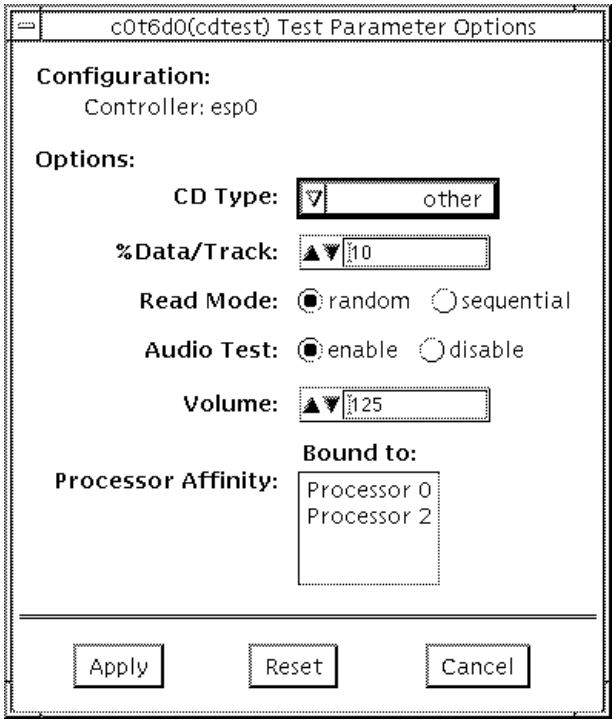


FIGURE 5-1 `cdtest` Option Menu

TABLE 5-1 `cdtest` Options

Options	Description
CD Type	The types of compact discs that can be tested are listed in the CD Type menu. The choices are: `pdo`, `multi-session`, or `other` (the default CD type is `other`).In the Connection test, this option has a default value of other. NOTE: Your choice must correspond with the disc used for testing.
% Data / Track	Tests a percentage of data on each track; type a value between 0 and 100 in this field to indicate the percentage. In the online and connection tests this option has a canned value of 2%.
Read Mode	`cdtest` reads the CD either in Random or Sequential mode. In Random mode, data blocks are read from random track positions; in Sequential mode, data blocks are read in sequence. For both modes, the total number of blocks read is determined by the `%_of_data` option. In the online and Connection tests this option has a canned value of random.
Audio Test	Enables or disables the audio test. You must connect headphones or a speaker to the audio jack on the CD player to hear audio output. In the Connection test, this option has a default value of disable.
Volume	Adjusts the volume; type a value between 0 and 255 in this field. In the online and connection tests this option has a default value of 125.

cdtest Test Modes

This test supports Connection and Functional tests.

TABLE 5-2 cdtest Test Modes

Test Mode	Description
Connection Test	In this mode, cdtest verifies that a CD-ROM drive is connected to and configured in the system.
Functional Test	This mode is similar to Online mode except that the test registers a failure if the device is found to be busy. This is because SunVTS tests make the assumption that all the resources will be available for testing in the Functional test and the unavailability of a device is interpreted as an indication of a fault condition. If you invoke SunVTS through SyMON, the following Functional Test description applies: This mode attempts to verify 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, cdtest tries to play it. Only a small percentage of the media is read, as this is sufficient to verify the functionality of the drive and keeps the test runtime from being unnecessarily extended. If the device is found to be busy at the time of testing, the test exits after printing a message indicating that the device is unavailable for testing. The pass and error counts are unaffected.

cdtest Command Line Syntax

/opt/SUNWvts/bin/cdtest *standard_arguments* **-o dev=***raw_device_name*, **mode=***mode*,**read=***random* | *sequential*,**data=***%_of_data*,**vol=***volume*, **audio=***enable* | *disable*,**type=***CD_type*

TABLE 5-3 cdtest Command Line Syntax

Argument	Explanation
dev=*raw_device_name*	Specifies the name of the raw device to be tested.
read=*random* | *sequential*	Indicates random or sequential read access.
data=*%_of_data*	Sets the percentage of data to be tested; you can specify 0 to 100 percent.
vol=*volume*	Controls the audio volume; you can specify 0 through 255; the default is 255.
audio=*enable* | *disable*	Enables or disables the audio test; you must connect headphones or a speaker to the audio jack on the CD player to hear audio output.
type=*CD_type*	Specifies the type of CD used for the test; the choices are: pdo, multi-session, sunos and other; the default is other.

cdtest Error Messages

TABLE 5-4 cdtest Error Messages

	Error Message	Probable Cause(s)	Suggested Action (if applicable)
6000	Fail to seek at block *value*	System error message.	Retry with a different CD-ROM.
		Bad media.	
6001	Fail to read *number* bytes at block *number*	System error message.	
		Bad media	
		Incorrect CD-ROM type passed to cdtest.	
6002	Data mode *value* not supported	Datamode has a value other than CD_DATAMODE1 or CD_DATAMODE2 (see cdio(7)).	
6003	Error occurred while playing audio track *number*		
6004	Failed to obtain memory from malloc() system call	Audio stop before complete at track *number.*	
6005	Unexpected audio status *value* received at track *number*	System error message	
6006	Fail in reading offset of the multi-session, offset = *value*	An incorrect value for cdtype has been passed to the cdtest.	
		Bad media.	
6007	This is not a CD ROM Multi-Session disc!	An incorrect value for cdtype was passed to the cdtest.	
8000	Fail to open device *device_name*	System error message.	
8001	Fail ioctl *name*	System error message.	
8002	Fail ioctl *name*	System error message.	
		No partitions on the disc	
8003	Fail to allocate *number* bytes of memory		

TABLE 5-4 `cdtest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Suggested Action (if applicable)
8004	`Error occurred while reading TOC header`	Track numbers out of range; First track: *value*, Last track: *value*.	
8005	`Data miscompare while reading number bytes starting from block` *number*	An incorrect value for cdtype has been passed to `cdtest`.	
		Bad media.	
8006	`ioctl CDROMSTART failure (number of retries:` *value*`)`		

CHAPTER 6

Color Graphics Frame Buffer Test (cg14test)

cg14test checks the cg14 frame buffer card. cg14test is specific to the VSIMM (Video SIMM) devices in the SPARCstation 10 SX and the SPARCstation 20 SX.

Caution – Due to possible conflicts between SunVTS cg14 frame buffer tests and OPEN LOOK applications that use the cg14 frame buffer, the following restrictions apply when running cg14test:

Do not run graphic applications other than OPEN LOOK while SunVTS is running frame buffer tests.

Do not run OPEN LOOK programs that generate video updates outside or on top of the SunVTS window.

Do not close the SunVTS window to an icon while it is running frame buffer tests.

Ensure that the frame buffer locking option is enabled from the Options window (see the section about testing frame buffers in *SunVTS 2.1 User's Guide* for details).

cg14test Groups

There are nine test groups in cg14test:

1. MDI and VBC Chip Control Registers
2. Memory Chips
3. MDI Chip Cursor Registers
4. MDI Chip CLUT Registers
5. DAC Chip Registers
6. MDI Chip XLU Registers
7. CG14 Display (visual only)
8. MDI Chip Testmode Readback in 8-bit mode
9. Driver IOCTLs

TABLE 6-1 cg14 Test Groups

Test Groups	Description
Hardware (Groups 1-6)	These test groups are tested by opening /dev/fbs/cgfourteenX, mapping the MDI Control Address Space, modifying the target test location (using direct writes to the mapped address space), reading from the mmapped address space for verification, and closing the device.
Visual Pattern (Group 7)	This subtest loads a visual pattern of 256 colors, then rotates the pattern around. You verify this test by seeing it display.
Data Propagation (Group 8)	This test group is tested by loading the frame buffer (FB) memory with four neutral data patterns, then setting a target FB pixel with data that triggers the test mode readback latch. The result is read from the readback register after vertical blanking occurs. Two different trigger patterns are used at each FB pixel. All four MDI pixel paths (A - D) are used, and the pixel locations for each trigger are designed to detect gross MDI input data opens or short, VRAM SAM addressing, and VRAM-to-SAM transfer addressing. The screen shows four horizontal bars, which are either greyscale or colored. These bars change each time the trigger data is inverted, and as it completes the testing of a raster pattern. **NOTE —** If the resolution and VRAM size permits, 8-bits per pixel mode are tested.

TABLE 6-1 cg14 Test Groups *(Continued)*

Test Groups	Description
Driver (Group 9)	Test all IOCTL calls that have not yet been used to verify proper driver communication to the hardware. Call the driver to perform a hardware update, and then confirm that the update was successful by using the complementary driver read, or reading the mmap'ed address space and comparing it against the stimulus. `cg14test` performs the appropriate steps before and after each test (if possible) to maintain context and prevent visual confusion by saving the register data before it is overwritten, disabling video (if possible), performing the specific test, and restoring the saved register data information. The data used for register testing is optimized to include all 0's, all 1's, and walking a 1 through each bit being tested.
MDI and VBC Chip Control Registers (Group 1)	Master Control Register bits 7-0 write / read verify Packed Pixel Register bits 3-0 write / read verify Master Status Register bits 7-4 read-only verify 0x00 and 0x30 occur Horizontal Blank Start Register bits 9-0 write / read verify Horizontal Blank Clear Register bits 9-0 write / read verify Horizontal Sync Set Register bits 9-0 write / read verify Horizontal Sync Clear Register bits 9-0 write / read verify Composite Sync Clear Register bits 9-0 write / read verify Vertical Blank Start Register bits 11-0 write / read verify Vertical Blank Clear Register bits 11-0 write / read verify Vertical Sync Set Register bits 11-0 write / read verify Vertical Sync Clear Register bits 11-0 write / read verify Transfer Cycle Set Register bits 9-0 write / read verify (MDI revision 0 only) Transfer Cycle Clear Register bits 9-0 write / read verify (MDI revision 0 only) Fault Status Address Register bits 15-0 write / read verify Auto-increment Address Space Register bits 7-0 write / read verify Video Base Register bits 23-12 write / read verify
Memory Chips (Group 2)	The Memory Chips test group includes VRAM Testing, Memory Retention, and Test Write Recovery. *VRAM Testing* The Data Bus Test uses 18 NTA patterns (Nair, Thatte, and Abraham's testing procedure for RAM) to check for data and address faults. This test is performed in `MDI_CHUNKY_XBGR_MAP` access mode only. See **Table 7-2**.

TABLE 6-1 cg14 Test Groups *(Continued)*

Test Groups	Description

Memory Chips (Group 2) Continued	*VRAM Testing (Continued)*
	The test ascends through the Frame buffer memory, clearing it to 0's. The NTA pattern test number *x* reads a location to make sure test data *y* is present. It then writes new data *z* to that location. The location ascends through the FB sequentially. See Table 7-2.
	
	Memory Retention
	VRAM Data Retention checks for gross problems with the VRAM refresh. Since refresh is active during this test, no retention problems should occur unless the refresh is defective.
	
	This test turns off the video, writes 0's to all the VRAM, waits the specified `memory_hold` time (the default is five seconds), then reads and compares all VRAM data. This process is repeated with data of f's, then the video is restored and the test is complete.
	
	There are two new command line parameters related to this test: `R=`*number* and `H=`*number*. `R=` lets the user specify the refresh interval from 128-1023. The time between refresh cycles and the system default is 123. `H=` lets the user specify the retention test hold time in seconds.
	
	Test Write Recovery
	A write recovery test is used in all the EMC mapping modes to write data to 0's followed by immediately reading that data location to see if the VRAM can recover from a write correctly. This is done to all sequential ascending locations. Next, a second independent pass of memory is made with the complementary data of `0xffffffff` written to descending locations of the FB memory buffer.
	
	The EMC mapping access modes are:
	`MDI_CHUNKY_XGBR_MAP`
	`MDI_CHUNKY_BGR_MAP`
	`MDI_PLANAR_X16_MAP`
	`MDI_PLANAR_C16_MAP`
	`MDI_PLANAR_X32_MAP`
	`MDI_PLANAR_B32_MAP`
	`MDI_PLANAR_G32_MAP`
	`MDI_PLANAR_R32_MAP`

TABLE 6-1 cg14 Test Groups *(Continued)*

Test Groups	Description
MDI Chip Cursor Registers (Group 3)	The MDI Chip Cursor Registers are: Cursor Plane 0 Register bits 31-0 write/read verify Cursor Plane 1 Register bits 31-0 write/read verify Cursor Plane 0 Register bits 31-0 write/read verify (with auto increment) Cursor Plane 1 Register bits 31-0 write/read verify (with auto increment Cursor Control Register bits 2-0 write/read verify Cursor Color Register 1 bits 28-0 write/read verify Cursor Color Register 2 bits 28-0 write/read verify X-Cursor Location Register bits 11-0 write/read verify Y-Cursor Location Register bits 11-0 write/read verify Cursor Plane 0 Non-Auto Registers test Cursor Plane 0 Auto Registers test Cursor Plane 1 Non-Auto Registers test Cursor Plane 1 Auto Registers test Cursor Planes Retry A test Cursor Planes Retry B test
MDI Chip CLUT Registers (Group 4)	The MDI Chip CLUT Registers are: LUT1 Registers 0-255 bits 31-27 & 23-0 write/read verify LUT1 Registers 0-255 bits 31-27 & 23-0 write/read verify (with auto increment) LUT1D Registers 0-255 bits 31-27 & 23-0 write/read verify LUT1D Registers 0-255 bits 31-27 & 23-0 write/read verify (with auto increment) LUT2 Registers 0-255 bits 31-27 & 23-0 write/read verify LUT2 Registers 0-255 bits 31-27 & 23-0 write/read verify (with auto increment) LUT2D Registers 0-255 bits 31-27 & 23-0 write/read verify LUT2D Registers 0-255 bits 31-27 & 23-0 write/read verify (with auto increment) LUT3 Registers 0-255 bits 31-27 & 23-0 write/read verify LUT3 Registers 0-255 bits 31-27 & 23-0 write/read verify (with auto increment) LUT3D Registers 0-255 bits 31-27 & 23-0 write/read verify LUT3D Registers 0-255 bits 31-27 & 23-0 write/read verify (with auto increment)

TABLE 6-1 cg14 Test Groups *(Continued)*

Test Groups	Description
DAC Chip Registers (Group 5)	The DAC Chip Registers test group includes the RAMDAC registers and control registers. *RAMDAC Registers* Address Register bits 7-0 (0x7 maximum) write/read verify Mode Register bits 7-0 (skip bit 5) bits write/read verify *Control Registers* ID Register bits 7-0 r/o verify data is 0x8C Pixel-Mask Register bits 7-0 write/read verify (skipped if dac rev = 2) Command2 Register bits 7-0 write/read verify (skipped if dac rev = 2) Command3 Register bits 7-0 write/read verify (skipped if dac rev = 2)
MDI Chip XLUT Registers (Group 6)	The MDI Chip XLUT Registers are: XLUT Registers 0-255 bits 7-0 write/read verify XLUT Registers 0-255 bits 7-0 write/read verify (with auto increment) XLUTD Registers 0-255 bits 7-0 write/read verify XLUTD Registers 0-255 bits 7-0 write/read verify (with auto increment)
CG14 Display (visual only) Group 7)	This test visually displays 256 boxes on the screen (each in a different color), and then shifts the CLUT1 entries giving the visual impression of the pattern mirroring itself from left to right horizontally. The pattern then rotates up, down, followed by mirroring itself horizontally left to right.
MDI Chip Test Mode Readback Register (Group 8)	This Test Mode reads back register bits 23-0 in read-only and verify modes.

TABLE 6-1 cg14 Test Groups *(Continued)*

Test Groups	Description
Driver IOCTLs (Group 9)	MDI_GET_CFGINFO check # of CLUT's, pixel height, pixel width, and pixel mode against hardware FBIOGATTR check real_type, fb_height, fb_width, fb_depth, fb_cmsize, and fb_size against cfginfo values FBIOGTYPE check fb_type, fb_height, fb_width, fb_depth,fb_size, and fb_cmsize against driver defines or cfginfo values FBIOGVIDEO check status returned against hardware FBIOSVIDEO set off, off, on, on, off verifying against hardware FBIOVERTICAL (imbedded in FBIOSVIDEO) MDI_VRT_CNTL turn off, off, on, on, off the video interrupt enable and verify the hardware agreesMDI_SET_PIXELMODE set different modes and verify against the hardware MDI_SET_PPR set the different modes and verify against the hardware MDI_SET_COUNTERS set HSS, HSC, XCC, HBC, XCS, HBS, CSC, VSS, VSC, VBC, VBS, HCT, and VCT then verify against hardware MDI_SET_XLUT set xlut and verify against hardware MDI_GET_XLUT get xlut and verify against hardware MDI_SET_CLUT set clut (1-3 as applicable) and verify against hardware MDI_GET_CLUT get clut (1-3 as applicable) and verify against hardware FBIOPUTCMAP set and verify clut1 matches FBIOGETCMAP verify clut1 matches get FBIOSATTR set emu_type to FBTYPE_MDICOLOR and verify FBIOGATTR check FBIOGCURMAX verify x and y size match driver defines FBIOSCURSOR verify set at 3 locations matches hardware FBIOGCURSOR verify driver knows what set(s) just did FBIOSCURPOS verify set at three locations matches hardware FBIOGCURPOS verify driver knows what set(s) just did MDI_SET_CURSOR set then check CCR, XCU, and YCU cursor hardware registers

TABLE 6-2 cg14test NTA Testing Patterns

NTA Test Pattern Number = *x*	*Test Data = y*	*New Data = z*
1.0	0x00000000	0x01010101
1.5	0x01010101	0xffffffff
2.1	0xffffffff	0xf1f1f1f1
2.2	0xf1f1f1f1	0x33333333
3.1	0x33333333	0xf0f0f0f0

TABLE 6-2 `cg14test` NTA Testing Patterns *(Continued)*

NTA Test Pattern Number = *x*	*Test Data = y*	*New Data = z*
3.2	0xf0f0f0f0	0x0f0f0f0f
4.1	0x0f0f0f0f	0x55555555
4.2	0x55555555	0xaaaaaaaa
5.1	0xaaaaaaaa	0x05050505 (1x) 0x88888888 (2x)
5.2	0x88888888	0xf5f5f5f5
6.1	0xf5f5f5f5	0x00000000 (1x) 0x5f5f5f5f (2x)
6.2	0x5f5f5f5f	0x11111111
7.1	0x11111111	0x00000000 (1x) 0xcccccccc (2x)
7.2	0xcccccccc	0xdbdbdbdb
8.1	0xdbdbdbdb	0x6d6d6d6d
8.2	0x6d6d6d6d	0x6b6b6b6b
9.1	0x6b6b6b6b	0x0000000
9.2	0x00000000	-

cg14test Options

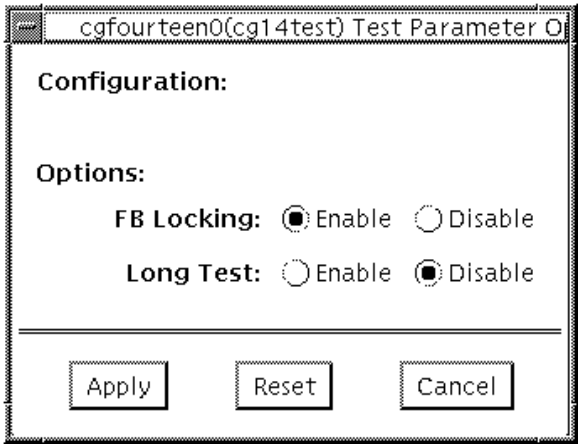


FIGURE 6-1 cg14test Option Menu

TABLE 6-3 cg14test Options

Options	Description
FB Locking	See the section about Testing Multiple Frame Buffers in the *SunVTS 2.1 User's Guide* for details.
Long Test	When enabled, the color bar screen(s) in the MDI Testmode Readback test checks all SAM transfers in clock=0 mode and clock=1 mode. If Long test is disabled, clock=1 runs checks on the first eight addresses and the first SAM transfer only.
Processor Affinity	For multiprocessor systems, indicates the processor to be tested.

cg14test Command Line Syntax

/opt/SUNWvts/bin/cg14test *standard_arguments* **-o dev=***device_name*, l**ock=***E(nable)/D(isable)*,L,I

TABLE 6-4 cg14test Command Line Syntax

Argument	Explanation
dev=*device_name*	Specifies the path of the cg14 device file to be tested; for example: /dev/fbs/*device_name.*
lock=*E(nable)/ D(isable)*	Enables and disables the window system locking option. See the Testing Multiple Frame Buffers sections in the *SunVTS 2.1 User's Guide* for details. Do not use when your device is the window system display.
L	Enables the long TMRB test.
I	Enables optional driver ioctl tests for cursor. Note- Do not move the mouse during the cg14test when you run this option.

cg14test Test Modes

Due to the nature of graphic tests, reading from or writing to the frame buffer during graphic tests will disturb user operation. This test is only available in Functional test mode.

The Functional test uses all subtests to test the cg14 frame buffer. The user can select the long mode for TRMB subtest.

cg14test Error Messages

TABLE 6-5 cg14test Error Messages

	Error Message	Probable Cause(s)	Suggested Action (if applicable)
6002	MDI *name* register = *number*	CG14 video board	
6004	MDI Cursor planes retry test maximum retry limit exceeded	CG14 video board	
6006	*name* error message	CG14 video boar	
6008	Failed open of file *name*, errno=*number*	Disk	
		CPU board	
6010	Failed write to file *name*, errno=*number*	CG14 video board	
		CPU board	
		Disk	
6012	Failed close of file *name*, errno=*number*	Disk	
		CPU board	
6014	MDI chip TestMode Readback, *number*-bit *name* mode, offset= *number* pixelpipe=*name* clock=*number* exp=*number* obs=*number*		
6016	MEM (*name*), Data Retention offset= *number* exp=*number* obs=number	CG14 video board	
		CPU board	
6018	MEM (*name*), NTA *name* offset= *number* exp=*number* obs=*number*	CG14 video board	
		CPU board	
6020	MEM (*name*), WRRD *name* offset= *number* exp=*number* obs=*number*	CG14 video board	
		CPU board	
6022	failed, mapping *name* space, errno = *number*	CG14 device file	
		SunOS	
		CG14 video board	
		CPU board	

TABLE 6-5 `cg14test` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Suggested Action (if applicable)
6024	`MEM (`*name*`), WRRD` *name* `offset=` *number* `exp=`*number* `obs=`*number*	SunOS	
		CG14 video board	
		CPU board	
6026	`VBC Control Register exp=`*number* `obs=`*number*	CG14 video board	
		CPU board	
8002	*name* `is an invalid parameter for` *name*`!`	Operator error	
8004	`unable to close device` *name*	CG14 device file	
		SunOS	
		CG14 video board	
8006	`invalid CG14 device type from` *name*	CG14 device file	
		SunOS	
		CG14 video board	
8008	`IOCTL Error:` *name*	CPU board	
		CG14 video board	
8008	`IOCTL(`*name*`)` *name*	CPU board	
		CG14 video board	
8010	`unable to unlock OL windows`	SunOS	
		Operator error	
8012	`IOCTL(`*name*`,CLUT`*number*`)` *name*	CG14 device file	
		SunOS	
		CG14 video board	
8014	`unable to open CG14 device` *name*	Incorrect device name	
		No existing device	
		CG14 video board	

CHAPTER 7

Frame Buffer, GX, GX+ and TGX Options Test (cg6)

The cg6 test verifies the cgsix frame buffer and the graphics options offered with most SPARC based workstations and servers. This test stresses the frame buffer with the subtests described below.

Note – Disable all screen savers before testing any graphics device. Type **xset s off** at the prompt to disable the Solaris screen saver.

To start SunVTS with vtsui, but without vtsk, add the host name to xhost as: xhost + *hostname.*

cg6 Subtests

TABLE 7-1 cg6 Subtests

Subtests	Description
Cursor Test	cg6 visually checks the overlay registers of the RAMDAC. A pointer is drawn on the screen and moved to predetermined locations. There is a problem if the pointer disappears. This visual test ensures that the overlay is working properly
Fast Copy in Double Buffer Test Mode	Creates two full-size screen raster images in double buffer mode, writing different patterns to each. The hidden buffer is copied to the visible buffer, and the data is compared. An error message is returned if there are inconsistencies. Then the buffer is flipped and the process is repeated. Note: This test only applies to Sun Microsystems GX+ graphic accelerators with double-buffering capacity.
TEC Test	Verifies that the Transformation Engine and Cursor control logic are accessible to confirm that further TEC access is performed correctly.
FBC Test	Verifies that the Frame Buffer Controller logic is accessible to confirm that further FBC access is performed correctly.
Frame Buffer Test	Verifies that the frame buffer memory is working. A “walking ones” pattern is written to memory, with a specific color signifying one of eight bits. The screen is divided into eight equally wide vertical stripes. A “walking one” is written to each stripe, causing eight iterations of these stripes. The value written is read back and checked. If the values do not match, an error is reported.
Screen Test Using Blits	Draws blocks of color and performs blit transfers to other portions of the screen. First, the entire screen is drawn with cyan, then a black block is placed in the upper-left corner. This subtest blits this block on the upper-right, lower-right, and lower-left corners, then “or’s” the whole image.
Blit Test	Draws a block of data and blit into a location at the bottom-right rectangle.

TABLE 7-1 cg6 Subtests

Subtests	Description
Line Test	Draws lines on the screen in different colors with different data values. The data is read back and compared with the expected values. An error is returned in the case of a mismatch.
Polygon Test	Draws hourglass-shaped polygons on the screen, using the four vertices. After all the polygons are rendered in the video memory, they are read back and the data compared with expected values. If there is a mismatch, an error is displayed.
Colormap Test	Loads all 256 locations in the color map with a greyscale, both backward and forward. This means decreasing values are loaded to all R, G, and B values. Note: If the system being tested has a monochrome or greyscale monitor, visual color problems are undetectable.

cg6 Options

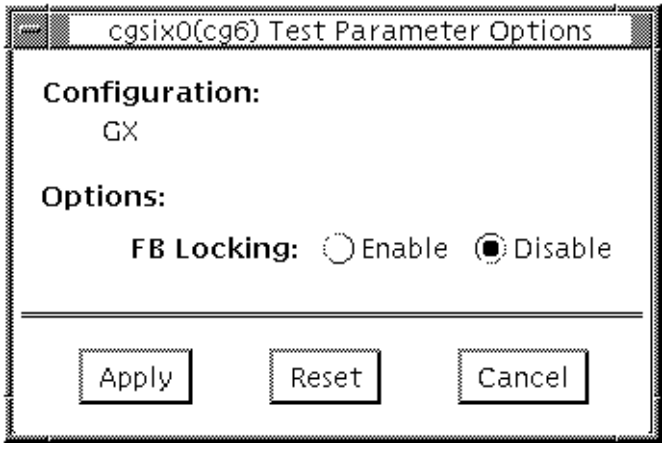


FIGURE 7-1 cg6 Options Menu

FB Locking

See the section about Testing Frame Buffers in the *SunVTS 2.1 User's Guide* for details about frame buffer locking.

cg6 Test Modes

Due to the nature of graphic tests, reading from or writing to the frame buffer during graphic tests will disturb user operation. This test is only available in Functional test.

cg6 Command Line Syntax

/opt/SUNWvts/bin/cg14test *standard_arguments* **-o dev=***device_name*,**lock=***E(nable)/D(isable)*,L,**Passes=***number*,I

TABLE 7-2 cg6 Command Line Syntax

Argument	Explanation
dev=*device_name*	Specifies the path of the cg14 device file to be tested; for example: /dev/fbs/*device_name.*
lock=*E(nable)/D(isable)*	Enables / disables the window system locking option. See the section about Testing Multiple Frame Buffers in the *SunVTS 2.1 User's Guide* for details. Do not use when device is the window system display.
L	Enables the long TMRB test.
Passes=*number*	The number of passes to run; the default is 1.
I	Enables optional driver ioctl tests for cursor. Note: Do not move the mouse during the cg14test when you run this option.

Note – Extra swap space of 5 MBytes is required.

cg6 Error Messages

TABLE 7-3 cg6 Error Messages

	Error Message	Probable Cause(s)	Recommended Action(s)
6000	`Resolution not supported for double buffering`	Unsupported resolution.	Change to other resolutions.
6002	`data error: x_pos:` *number*`, y_pos:` *number*`. *mobs:` *number*`, *mexp:` *number*	Faulty frame buffer.	If the problem persists, call your authorized Sun service provider.
6004	`FB Screen Test data error: xpos=`*number*`, ypos=`*number*`, exp(`*number*`), obs(`*number*`)`	Faulty frame buffer.	If the problem persists, call your authorized Sun service provider.
6006	`Data Error: Screen location x:` *number*`, y: number, Obs:` *number*`, Exp:` *number*	Faulty frame buffer.	If the problem persists, call your authorized Sun service provider.
6007	`Multibuffering extension does not exists`	Faulty frame buffer.	If the problem persists, call your authorized Sun service provider.
6008	`Cannot create CMAP`	System error. Faulty frame buffer.	If the problem persists, call your authorized Sun service provider.
6009	`name off(`*number*`)exp(`*number*`), obs(`*number*`), xor(`*number*`)`	Faulty frame buffer.	If the problem persists, call your authorized Sun service provider.
6010	`Could not get color`	System error. Faulty frame buffer.	If the problem persists, call your authorized Sun service provider.
6011	*name* `off(`*number*`)exp(`*number*`), obs(`*number*`), xor(`*number*`)` *name*	Faulty frame buffer.	If the problem persists, call your authorized Sun service provider.
6012	`Checksum test failed for PROM. Observed:` *number*`, Expected:` *number*	Faulty frame buffer.	If the problem persists, call your authorized Sun service provider.
6014	`Unable to lock frame buffer`	FB lock was enabled while window system was not running.	Disable the FB lock.
6016	`Found error in sine test`	Faulty frame buffer.	If the problem persists, call your authorized Sun service provider.

TABLE 7-3 cg6 Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action(s)
6018	`Found error in cursor test`	Faulty frame buffer.	If the problem persists, call your authorized Sun service provider.
6020	`Found error in fb test`	Faulty frame buffer.	If the problem persists, call your authorized Sun service provider.
6022	`Found error in polygon test`	Faulty frame buffer.	If the problem persists, call your authorized Sun service provider.
6024	`Found error in cmap test`	Faulty frame buffer.	If the problem persists, call your authorized Sun service provider.
6026	`Found error in db test`	Faulty frame buffer.	If the problem persists, call your authorized Sun service provider.
6028	`Found error in line test`	Faulty frame buffer.	If the problem persists, call your authorized Sun service provider.
6030	`Found error in dac test`	Faulty frame buffer.	If the problem persists, call your authorized Sun service provider.
8000	*name* `not mapped`	System error.	If the problem persists, call your authorized Sun service provider.
8002	`can't acquire console semaphore`	System error.	If the problem persists, call your authorized Sun service provider.
8004	`XCreateSimpleWindow failed`	System error.	If the problem persists, call your authorized Sun service provider.
8008	`Couldn't create enough buffers`	Not enough memory available.	Reduce the system load.
		System error.	If the problem persists, call your authorized Sun service provider.
8010	`grab of pointer unsuccessful`	Not enough memory available.	Reduce the system load.
		System error.	If the problem persists, call your authorized Sun service provider.

TABLE 7-3 cg6 Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action(s)
8012	`cmap mapping failed`	Not enough memory available.	Reduce the system load.
		System error.	If the problem persists, call your authorized Sun service provider.
8014	`Blit status. Could not launch draw`	Faulty frame buffer.	If the problem persists, call your authorized Sun service provider.
8016	`Draw Wait FBC_DRAW status=`*number*	Faulty frame buffer.	If the problem persists, call your authorized Sun service provider.
8018	`Could not get cmap`	Faulty frame buffer.	If the problem persists, call your authorized Sun service provider.
8020	`Could not get color`	Faulty frame buffer.	If the problem persists, call your authorized Sun service provider.
8022	`Could not create child raster`	Incorrect device name.	Re-enter the correct name.
		Not enough memory available.	Reduce the system load.
8024	`Failed to get malloc`	Not enough memory available.	Reduce the system load.
		System error.	
8026	`Cannot create CMAP`	System error.	If the problem persists, call your authorized Sun service provider.
		Faulty frame buffer.	
8028	`Couldn't get hostname of machine under test`	System error.	If the problem persists, call your authorized Sun service provider.
8030	`Failed in opening device` *name*	Incorrect device name.	Re-enter the correct name.
		Faulty frame buffer.	If the problem persists, call your authorized Sun service provider.
8032	`Failed to create raster`	Incorrect device name.	Re-enter the correct name.
		Not enough memory available.	Reduce the system load.

TABLE 7-3 cg6 Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action(s)
8034	`Failed to create context`	Not enough memory available.	Reduce the system load.
		System error.	If the problem persists, call your authorized Sun service provider.
8036	`fbs/cgsix0 FATAL: “mmap() failed`	Overloaded system.	Reduce the system load.
		System error.	Check OS release number.

CHAPTER 8

Disk and Floppy Drives Test (disktest)

disktest verifies the functionality of hard disk drives and floppy drives using three subtests (see TABLE 8-1): Media, File System, and Asynchronous I/O. disktest test performs a random seek check followed by a read test or a read-after-write test on the disk. Most disk drives, such as SCSI disks, native or SCSI floppy disks, IPI, and so on, are supported. The type of drive being tested is displayed at the top of the option menu.

Initially, disktest probes the disks under /dev/rdsk. It checks all of the partitions of each disk in the Functional test mode. If any partition has a file system that is not yet mounted, disktest pre-mounts these partitions for the File System subtest. The pre-mount point bears the name of the disk partition appended with a system-wide unique number. For example, if the disk name is /dev/dsk/c0t3d0, disktest mounts it as superuser under the name /disktest_c0t3d0. The disktest option menu shows all partitions (except the swap partition) that are available for testing. The File System subtest can only be run if the selected partition *is* mounted. The Write option of the Media subtest is allowed only if a selected partition is *not* mounted.

disktest tests the floppy drive regardless of whether the Volume Management software is running.

- If the Volume Management software is running, disktest tests the disk drive with the mount point name in the /etc/mnttab file.

Caution – If a power failure occurs while the Media subtest is being run in write mode, disk data will be destroyed.

- If the Volume Management software is *not* running, disktest tests the disk drive with the device name dev=/dev/diskette. Do not edit the /etc/vold.conf file to change the floppy drives. Currently, the SunVTS software is hard-coded to use these path names as the default logic name.

Table 2-1 describes the `disktest` subtests.

TABLE 8-1 `disktest` Subtests

Subtest	Description
Media Subtest	Verifies disk media by writing data to and reading data from the disk. The Media subtest treats a disk as one large chunk of contiguous data. This is a scalable test that can run multiple copies in read/write mode on the same disk partition. To avoid data corruption, all simultaneous instances of `disktest` communicate through a shared memory service. This ensures that different copies of the media subtest do not overlay the same disk block at the same time.
File System Subtest	Verifies the disk system's integrity. The file system subtest exercises the partition being tested to determine if it is mounted. If the partition is not already mounted or pre-mounted, then the test is blocked. The test opens two temporary files (of the size specified on `File System File Size`) and performs a Read/Write test.
Asynchronous I/O Subtest	Uses the asynchronous read/write feature of the Solaris disk driver to exercise the disk. In read-only mode, the test sends a maximum of four asynchronous read packets, each with a random size and a random offset into the selected partition. The test then waits for all outstanding I/O activity to complete before issuing another round of packets. This process continues until the whole area is tested. In read-write mode, one write packet is issued in every four read packets as a spot check of the write operation. Before data is written to a particular location, data is backed up, write-verified, and restored to its original state.

disktest Test Options

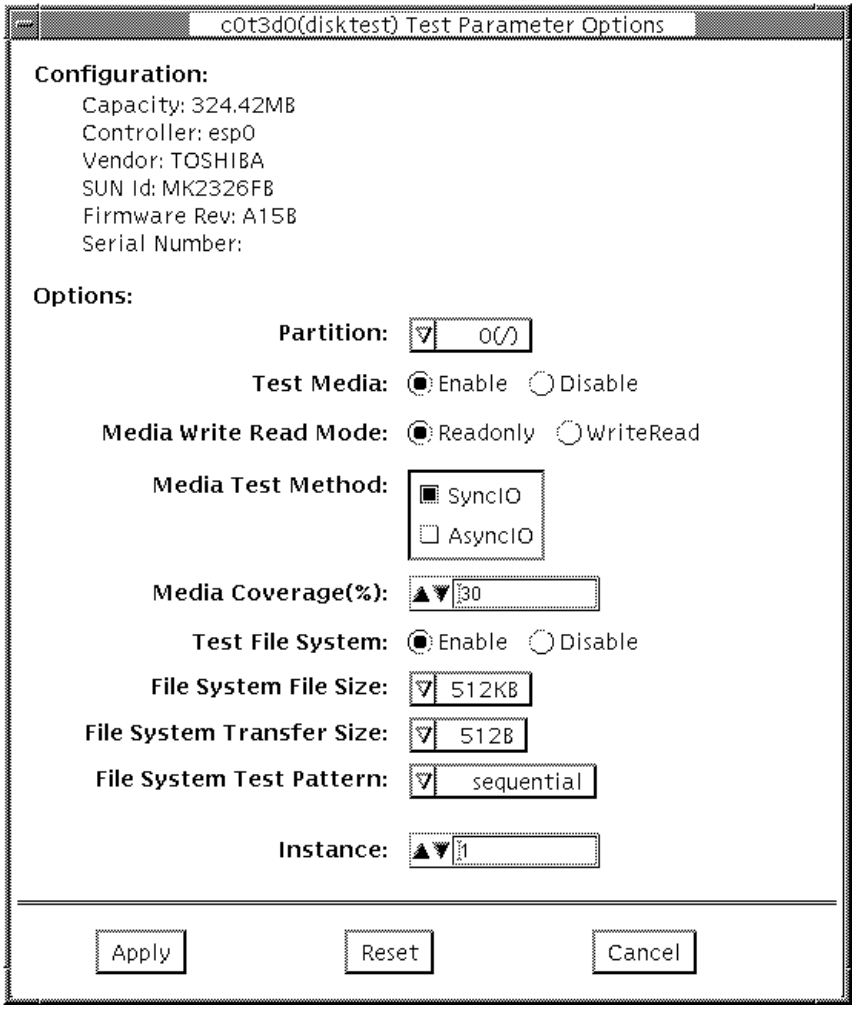


FIGURE 8-1 disktest Configuration and Options Menu

The disktest test (see FIGURE 8-1 and TABLE 8-2) has different option menus for different test modes.

TABLE 8-2 `disktest` Configurations and Options

`disktest` **Options**	**Description**
Partition	Displays the partition for the Media subtest. If a partition is mounted, its mount point is appended after the partition number, such as `1(/usr)`, where `1` is the partition number, and `/usr` is the mount point.
Test Media	Enables or disables the Media subtest.
Media Write Read Mode	Enables Read-Only or Read mode after write, with or without backup.
Media Coverage (%)	Enables users to test all or part of a partition (in percentages).
Test File System	Enables or disables the File System subtest; File System File Size: creates a file system file size twice the size as what is specified.
File System Transfer Size	Displays the transfer size of the File System subtest. File System Test Pattern: Test pattern of File System subtest.
Connection Test for Hard Disk	Option Menu for hard disk partition: 0 - 7 [default] Test Media: [Enable~](fixed to Enable) Test Mode: [Read Only~](fixed to Read Only) Media Coverage(%): [1](default - can be changed) Media Transfer Size: [2KB] Test File System: [Disable~](fixed to Disable)

TABLE 8-2 `disktest` Configurations and Options *(Continued)*

`disktest` **Options**	**Description**
Online Mode for Hard Disk	Online Mode for hard disk partition: 0 - 7 [default] Test Media: [Enable]- [Disable] Test Mode: [Read-only~](fixed to Read-only) Media Coverage(%): [10] Media Transfer Size: [2KB] [10KB] [20KB] - [40KB] [60KB] Test File System: [Disable~](fixed to Disable)
Functional Test for Hard Disk	(under SCSI-devices group): partition: 0 - 7 [default] Test Media: [Enable]- [Disable] Mode: [Read-only]- [BackupWriteRead] [NoBackupWriteRead] Media Coverage(%): [30] Media Transfer Size: [2KB] [10KB] [20KB] - [40KB] [60KB] Test File System: [Enable] [Disable] - File System File Size:[512KB]-[2MB][8MB][20MB] [100MB] [200MB] File System Transfer Size:[512B]- [1024B][10KB][40KB] [100KB] File System Test Pattern:[sequential] [0x00000000] [0xffffffff] [0x5aa55aa5] [0xdb6db6db] [random]
Functional Test for Floppy Disk	(under Other-Devices group): partition: 0 - 7 [default] Test Media: [Enable]- [Disable] Mode: [Read-only]- [BackupWriteRead] [NoBackupWriteRead] Media Coverage(%): [30] Media Transfer Size: [2KB]- [10KB] [20KB] Test File System: [Enable] [Disable] - File System File Size:[512KB]- [2MB] [8MB] [20MB] [100MB] [200MB] File System Transfer Size:[512B]- [1024B] [10KB] File System Test Pattern:[sequential] [0x00000000] [0xffffffff] [0x5aa55aa5] [0xdb6db6db] [random] **NOTE**: The floppy `disktest` can only be run in Functional test mode.

disktest Test Modes.

TABLE 8-3 disktest Test Modes

Test Mode	Description
Connection Test	This mode is only available for the hard disk test. There is no Connection test for the floppy driver test. Only one instance of disktest (which monitors UNIX error messages) is allowed for each disk device. disktest displays messages and reports errors. The test also opens the hard disk, checks the disk configuration, reads a few blocks, and then closes the hard disk. No File System subtest is run. No Write option is available in Connection test.
Functional Test	This mode does not allow disktest to monitor UNIX error messages. More than one instance of disktest is allowed for one disk device. Both the File System and Media subtests can be run in Functional test.The floppy test can also be run in Functional test mode. If you invoke SunVTS through SyMON, the following Functional Test description applies: This mode is only available for the hard disk test. There is no Online mode for the floppy driver test. Only one instance of disktest is allowed for each disk device, which monitors UNIX error messages. disktest displays messages and reports errors. In this mode, disktest also opens the hard disk, checks the disk configuration, and executes the Media subtest. Next, disktest performs random seek checks. Only Read Only mode is allowed. The default coverage is 30percent. No File System subtest is run. When the test finishes, disktest closes the disk device being tested. No Write option is available in Online mode.

disktest Command Line Syntax

/opt/SUNWvts/bin/disktest *standard_arguments* **-o p=***n*,**-i=***n*, **-w=***n*,**dev=***device_name*,**partition=***0-7*,**rawsub=***E/D*,**rawrw=**,

rawcover=, rawiosize=, fssub=, fssize=, fsiosize=, fspattern=

TABLE 8-4 `disktest` Command Line Syntax

Argument	Explanation
`p=number`	Sets the number of passes for the test to run; default is 1.
`i=number`	Sets the number of total instances for the test; default is 1.
`w=number`	Determines which instance this test is assigned; default is 0.
`dev=`*device_name*	Specifies the name of the disk to be tested, such as c0t3d0.
`partition=`*0-7*	Specifies the partition number to test as `partition`=6(/export/s6) if mounted on partition 6.
`rawsub=Enable/Disable`	Enables or disables the media subtest.

`rawrw=`
`Readonly`
`BackupWriteRead`
`NoBackupWriteRead`
	Specifies the Media subtest Read and Write mode:
	-Read Only
	-Write, read then backup
	-Write, read without backup

`rawcover=`	Specifies media coverage from 0-100% of the partition, such as 70526f.
`rawiosize=`*2KB,10KB 20KB,40KB,60KB*	Specifies the media size to transfer.
`fssub=Enable/Disable`	Enables or disables the file system subtest.
`fspattern=`*data pattern*	Specifies the file system data pattern as sequential or random. {seq(uential)/0x0(0000000)/0xf(fffffff)/0xa (5a5a5a5)/0x5(a5a5a5a)/ran(dom)/0xd(b6db6db)}
`fssize=`*file system size*	Indicates the file system subtest size in kilobytes or megabytes: K/k/KB/kb:kilobytes, M/m/MB/mb: megabytes.
`fsiosize=`*file system I/O transfer size*	Indicates the size of the file system subtest I/O transfer in bytes or kilobytes: {512B/1024B/10KB/40KB/100KB}

disktest Error Messages

TABLE 8-5 disktest Error Messages

Error Message	Probable Cause(s)	Recommended Action
6000 Re-reading and recomparing block *number* on name	Media error.	If the problem persists, call your authorized Sun service provider.
	Faulty cable, disk, or controller.	
6002 Error on recomparing block *number* on *name*	Media error.	If the problem persists, call your authorized Sun service provider.
	Faulty cable, disk, or controller.	
6004 *name* failed on *name*, blk *number*: *error_message*	Faulty cable, disk, or controller.	If the problem persists, call your authorized Sun service provider.
6006 Compare error on *name*, block *number*, offset *number*	Faulty cable, disk, or controller.	If the problem persists, call your authorized Sun service provider.
6008 Compare error: Block *number* on *name* was written with a repeating hex pattern of *number*	Media error.	If the problem persists, call your authorized Sun service provider.
	Faulty cable, disk, or controller.	
6010 TIME OUT!	System too busy.	Reduce the system load.
	Faulty cable, disk, or controller.	If the problem persists, call your authorized Sun service provider.
6012 Couldn't close *name*	System error.	
6014 *name* read failed on disk, in-between blocks *number* and *number*: *name*	Media error.	If the problem persists, call your authorized Sun service provider.
	Faulty cable, disk, or controller.	
6016 *name* read failed due to unexpected end of media		
6018 *name* write failed on disk, in-between blocks *number* and *number*: *name*	Media error.	If the problem persists, call your authorized Sun service provider.
	Faulty disk or controller.	
6020 *name* write failed due to unexpected end of media:		

TABLE 8-5 `disktest` Error Messages *(Continued)*

Error Message		Probable Cause(s)	Recommended Action
6022	*name* `compare failed on` *name*, `block` *number*, `offset` *number*	Media error.	If the problem persists, call your authorized Sun service provider.
		Faulty disk or controller.	
6024	`Couldn't close name`	Faulty disk or controller.	If the problem persists, call your authorized Sun service provider.
		System error.	
6026	`failed automount` *name* `onto` *name*:*error_message*	Un-supported file system.	Disable the file system subtest.
		System error.	Disable the file system subtest.
			If the problem persists, call your authorized Sun service provider.
6028	*error_message*		
8000	`File system subtest only allow to run on off-line mode`	Parameter error.	Re-enter the command line correctly.
8002	`malloc() failed`	System load too heavy.	
		System error.	
8006	`File operation error: Couldn't` *name* `file` *name* `on` *name*: *error_message*	Lack of system resource.	Reduce the system load.
		Permission error.	Check directory or file permission.
		System error.	If the problem persists, call your authorized Sun service provider.
8008	`Not enough free blocks on` *name* `(partition` *number*`)`		Try another partition or delete files.
8010	`No writable partition on` *name*		Try another partition.
8012	`No file system on device:` *name*		Use `newfs` to create the file system.
			Disable the file system subtest.

TABLE 8-5 `disktest` Error Messages *(Continued)*

Error Message	Probable Cause(s)	Recommended Action
8014 `Couldn't run fstest on any partition of device:` *name*`(except 2)`	File system not supported.	Disable the file system subtest.
	System error.	If the problem persists, call your authorized Sun service provider.
8016 `Cannot open device:` *name*	Parameter error.	Enter the correct name of disk as `dev=c0t3d0`.
	System error.	If the problem persists, call your authorized Sun service provider.
8018 `Couldn't mount /dev/dsk/` *name*	Parameter error.	Enter the correct name of disk as `dev=c0t3d0.`
	System error.	If the problem persists, call your authorized Sun service provider.
8020 `Couldn't remove temporary dir` *name*`:` *error_message*	System error.	If the problem persists, call your authorized Sun service provider.
8022 `fail get semaphore:` *error_message*	Lack of system resource.	Reduce the system load.
	System error.	If the problem persists, call your authorized Sun service provider.
8024 `failed lock mtab semaphore: "semap" system call failure, errmsg` *error_message*	`disktest` instances exceed system semaphore operation limitation (default system limit for seminfo_semmnu=30)system software error.	Add the line "set semsys: seminfo_semmnu=0x100" to your `/etc/system` file and reboot the machine. If the problem persists, call your authorized Sun service provider.
8026 `fail unlock mtab semaphore:` *error_message*	System error.	If the problem persists, call your authorized Sun service provider.
8028 `failed get_volmgr_name()`		
8030 `Couldn't open` *name*`:` *error_message*	Cable loose or disconnected.	Check the cable.
	Device off line or missing.	Check the device on line.
	Device not configured.	Configure the device.
8032 `Get file state` *name* `failed:` *error_message*	System error.	If the problem persists, call your authorized Sun service provider.

TABLE 8-5 `disktest` Error Messages *(Continued)*

Error Message	Probable Cause(s)	Recommended Action
8034 `Couldn't open` *name*	Permission error.	Check the permissions.
	System error.	If the problem persists, call your authorized Sun service provider.
8036 `failed putmntent():` *error_message*	System error.	If the problem persists, call your authorized Sun service provider.
8038 `fail rename file`	Permission error.	Check permission.
	System error.	If the problem persists, call your authorized Sun service provider.
8040 `Couldn't get mount table entry for` *name*		
8042 `Invalid device name in` *name*	Parameter error.	Enter the correct name of disk as `dev=c0t3d0`.
8044 `Message table overflow on device` *name*	Parameter error.	Enter the correct name of disk as `dev=c0t3d0`.
	System error.	If the problem persists, call your authorized Sun service provider.
	Program error.	
8046 `Invalid controller id` *name* `for` *name*	Parameter error.	Re-enter the command line correctly.
8048 *name*`, disk DKIOCINFO ioctl:` *name*	Controller is not supported.	Disable the file system subtest.
	System error.	If the problem persists, call your authorized Sun service provider.
8050 `failed getting shared memory for monitor` *number*`:` *error_message*`:`	Lack of system resource.	Reduce the system load.
	System error.	If the problem persists, call your authorized Sun service provider.
8052 `failed attaching monitor shared memory:`*error_message*	Lack of system resource.	Reduce the system load.
	System error.	If the problem persists, call your authorized Sun service provider.

TABLE 8-5 `disktest` Error Messages *(Continued)*

Error Message	Probable Cause(s)	Recommended Action
8053 `failed create monitor shared memory` *number*:	Lack of system resource.	Reduce the system load.
	System error.	If the problem persists, call your authorized Sun service provider.
8054 `Shm remove error:` *error_message*	System error.	If the problem persists, call your authorized Sun service provider.
8056 `New error messages in system log. Extracted below:` *error_message*	Faulty cable / disk / controller.	See `/var/adm/messages` for more information.
		If the problem persists, consult your authorized Sun service provider.
8060 `fails to open any partition of` *name*	File system not mounted.	Mount the file system then run the test.
		Disable the file system subtest.
		If the problem persists, call your authorized Sun service provider.
8060 `failed getting semaphore:` *error_message*	System error.	If the problem persists, call your authorized Sun service provider.
8062 `failed getting shared memory:` *error_message*	System error.	If the problem persists, call your authorized Sun service provider.
8064 `failed attaching shared memory:` *error_message*	System error.	If the problem persists, call your authorized Sun service provider.
8068 `failed unlocking semaphore:` *error_message*	System error.	If the problem persists, call your authorized Sun service provider.
8070 `fail open floppy disk`	No floppy disk in drive.	Check the floppy disk.
8072 `failed FDIOGCHAR on floppy ioctl`	System error.	If the problem persists, call your authorized Sun service provider.
8074 `ioctl DKIOCGGEOM failed`	File system not supported.	If the problem persists, call your authorized Sun service provider.
	System error.	

TABLE 8-5 `disktest` Error Messages *(Continued)*

Error Message	Probable Cause(s)	Recommended Action
8074 `ioctl DKIOCGAPART failed`	System error.	If the problem persists, call your authorized Sun service provider.
8076 `fail initialize shared memory`	System error.	If the problem persists, call your authorized Sun service provider.
8078 `Illegal parameters on Online Mode`	Parameter error.	Enter the correct option.
8080 `Illegal parameters on Conn. Mode`	Parameter error.	Enter the correct option.
8082 `failed get_volmgr_name()`	No floppy disk in drive.	Check the floppy disk.
8084 `Mounted file system on device!`	Not enough disk space.	Reduce the system load.
	Permission error.	Check directory or file permissions.
	System error.	If the problem persists, call your authorized Sun service provider.
8086 `Invalid controller id` *number* `from` *name*	Parameter error.	Enter the correct name of disk as `dev=c0t3d0`.
8088 `Couldn't get file system information on` *name* `errno=`*number*	System error.	If the problem persists, call your authorized Sun service provider.
8090 `ioctl() failed on` *name*`:` *name*	System error.	If the problem persists, call your authorized Sun service provider.
8092 `Fail to get disk information`	No supported disk.	No UNIX message monitor feature in this disk(2).
	System load is too heavy.	Reduce the system load
8094 `Failed to create a message base for controller` *number*	No disk under this controller.	Connect the disk driver then run the test again.
8096 `fail to make directory` *name*	Lack of system resource.	Reduce the system load.
	Permission error.	Check directory or file permissions.
	System error.	If the problem persists, call your authorized Sun service provider.
8098 `Failed to mount partition`	Does this disk only have partition 2.	Partition 2 must be manually mounted.

TABLE 8-5 `disktest` Error Messages *(Continued)*

Error Message		Probable Cause(s)	Recommended Action
8010	`r/w is on /dev/r`*name*	System error.	If the problem persists, call your authorized Sun service provider.
8102	write / read count error	Out of disk space.	Try another partition or delete some files.
8104	failed to create buffer	Not enough memory.	Reduce the system load. If the problem persists, call your authorized Sun service provider.
8106	`failed aioread() :` *offset error number error* `string`	Faulty cable, disk, or controller.	If the problem persists, call your authorized Sun service provider.
8108	`failed aiowrite() :` *offset error number error string*	Faulty cable, disk, or controller.	If the problem persists, call your authorized Sun service provider.
8110	`failed aiooperation() :` *number text*	Faulty cable, disk, or controller.	If the problem persists, call your authorized Sun service provider.

CHAPTER 9

ECP 1284 Parallel Port Printer Test (ecpptest)

The ecpptest verifies the functionality of the ecpp(7) IEEE 1284 parallel printer port device.

The ecpp(7) device is an *exclusive use device*. Only one application can interface with it at a time. This test is not scalable.

Printer Test Hardware and Software Requirements

The ecpp(7) driver is installed with the OS if the system being tested supports the ecpp(7) device. To run the optional printer subtest, a Centronics or ECP-mode printer must be attached to the printer port. To run the optional external loopback test, a passive loopback connector must be installed on the printer port.

Note – The external loopback test is intended for Sun internal manufacturing use only. It requires a custom loopback connector not available to an external customer.

ecpptest Subtests

TABLE 9-1 ecpptest Subtests

Subtest	Description
Internal Test FIFO Loopback	Verifies DMA and PIO accesses to the ecpp device. It uses an internal test fifo on the ecpp device. There are no printer or loopback connectors required. This test is always executed.
External Passive Loopback	This verifies the parallel port I/O connections to the back panel connector. This test requires a passive loopback connector (Sun part no. 270-2965-01). This test is disabled by default and must be manually enabled by the user. Note: The external loopback test is intended for Sun internal manufacturing use only. It requires a custom loopback connector that is not available to an external customer.
Printer Test	This verifies the parallel port printer operation. It will output a half page of ASCII character data. The output mode (for example, ECP and Centronics) is determined by whatever mode the printer and ecpp driver automatically negotiate. It will not change the current mode. The user must verify that data printed properly. This test is disabled by default and must be manually enabled by the user. If this test passes successfully, you know that the SBus DMA circuitry, the printer, and the device driver are functioning properly.

ecpptest Options

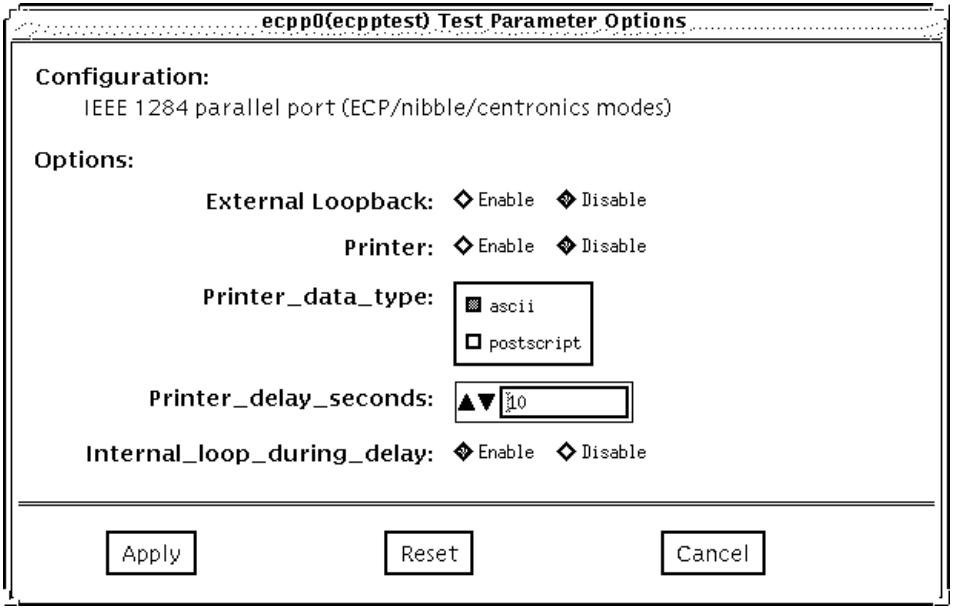


FIGURE 9-1 ecpptest Option Menu

TABLE 9-2 ecpptest Options

ecpptest **Options**	**Description**
External Loopback	Enables or disables the external loopback test. This test requires a special loopback plug
Printer	Enables or disables the printer test; this test requires a printer to be attached to the parallel port

ecpptest Test Modes

TABLE 9-3 ecpptest Test Modes

Test Mode	Description
Connection Test	Opens and closes the ecpp(7) device. No data is transferred. The test passes if the device can be open and closed successfully. The test also passes if the device cannot be opened because the device is busy with another process
Functional Test	Runs the internal loopback test and the user can optionally run the External loopback test and Printer test. The test will fail if the device is busy If you invoke SunVTS through SyMON, the following Functional Test description applies: Runs the internal loopback test. If the device cannot be opened because it is busy, then it is assumed that the device is successfully connected to another process

ecpptest Command Line Syntax

/opt/SUNWvts/bin/ecpptest *standard_arguments* **-o** [**dev=***device_name*] [**ext_loop=***Enable* | *Disable*][**printer=***Enable* | *Disable*]

TABLE 9-4 ecpptest Command Line Syntax

Argument	Explanation
dev=*device_name*	Specifies the name of the device. This should be of the form /dev/ecpp#, where # is the minor number of the device. The default device is /dec/ecpp0.
ext_loop=*enable* | *disable*	If enabled, the external loopback test is run. The External loopback plug must be attached to the printer port.
printer=*enable* | *disable*	If enabled, the printer test is run. A Centronics or ECP mode parallel port printer must be attached

ecpptest Error Messages

TABLE 9-5 ecpptest Error Messages

	Error Message	Probable Cause(s)	Recommended Action
8000	External loop test and printer test cannot be enabled at the same time	Operator error.	Examine system message files (/var/adm/messages) for other information.
8001	*device_name*: Device does not exist or is otherwise inaccessible	Correct ecpp driver not installed.	Examine system message files (/var/adm/messages) for other information.
		Faulty ecpp device or motherboard hardware.	
		System software problem.	
8002	Must be super user (*root*) to execute	Operator error.	Examine system message files (/var/adm/messages) for other information.
8003	Failed to open *device_name* (*error_message*)	Correct ecpp driver not installed.	Examine system message files (/var/adm/messages) for other information.
		Faulty ecpp device or motherboard hardware.	
		System software problem.	
8004	Failed ioctl *name*, device = *device_name*, error = *error_message*	Correct ecpp driver is not installed.	Examine system message files (/var/adm/messages) for other information.
		Faulty ecpp device or motherboard hardware.	
		System software problem.	
8005	Device not in correct mode, device = *device_name*, expected mode = *number*, observed mode = *number*	Correct ecpp driver is not installed.	Examine system message files (/var/adm/messages) for other information.
		Faulty ecpp device or motherboard hardware.	
		System software problem.	

TABLE 9-5 ecpptest Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
8006	*device_name*: Status line miscompare, expected = *number*, observed = *number*, xor = *number*	Faulty or missing external loopback connector.	Examine system message files (/var/adm/messages) for other information.
		Correct ecpp driver is not installed.	
		Faulty ecpp device or motherboard hardware.	
		System software problem.	
8007	ECPP_nACK in wrong state, expected = *number*, observed = *number*, xor = *number*	Faulty or missing external loopback connector.	Examine system message files (/var/adm/messages) for other information.
		Correct ecpp driver not installed.	
		Faulty ecpp device or motherboard hardware.	
		System software problem.	
8008	*subtest_name*: Data miscompare, expected = *number*, observed = *number*, xor = *number*	Faulty or missing external loopback connector.	Examine system message files (/var/adm/messages) for other information.
		Correct ecpp driver not installed.	
		Faulty ecpp device or motherboard hardware.	
		System software problem.	
8009	Could not set correct port type, expected = *number* (*device_name*), observed = *number*, device = *device_name*	Correct ecpp driver not installed.	Examine system message files (/var/adm/messages) for other information.
		System software problem.	
		Faulty ecpp device or motherboard hardware.	

TABLE 9-5 ecpptest Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
8010	*subtest_name*: Failed to allocate *number* bytes of memory, error = *error_message*	System resources temporarily not available, try again.	Examine system message files (/var/adm/messages) for other information.
		Correct ecpp driver not installed.	
		Faulty ecpp device or motherboard hardware.	
		System software problem.	
8011	*subtest_name*: Write() failed, device = *device_name*, error = *error_message*	Correct ecpp driver not installed.	Examine system message files (/var/adm/messages) for other information.
		Faulty ecpp device or motherboard hardware.	
		System software problem.	
8012	*subtest_name*: Write count is wrong, expected = *number*, observed = *number*	Correct ecpp driver is not installed.	Examine system message files (/var/adm/messages) for other information.
		Faulty ecpp device or motherboard hardware.	
		System software problem.	
8013	*subtest_name*: Data miscompare, expected = *number*, observed = *number*, xor = *number*, offset = *number*	Correct ecpp driver not installed	Examine system message files (/var/adm/messages) for other information.
		Faulty ecpp device or motherboard hardware.	
		System software problem.	
8014	*device_name*: Device busy	Another process is using the device.	Make sure no other process is using the device.
		Someone is printing with the device.	Make sure no one is printing to the device.
		Faulty ecpp device or motherboard hardware.	Examine system message files (/var/adm/messages) for other information.
		System software problem.	
8015	Bad state for device *name*, expected mode = *number*, observed mode = *number*		

TABLE 9-5 ecpptest Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
8016	ecpp device busy: device *name*, expected mode = *number*, observed mode = *number*		
8017	Paper out: device *name*, expected mode = *number*, observed mode = *number*		
8018	Printer offline: device *name*, expected mode = *number*, observed mode = *number*		
8019	Printer error: device *name*, expected mode = number, observed mode = *number*		
8020	Printer unplugged: device *name*, expected mode = *number*, observed mode = *number*		
8021	Unrecognized printer error: device *name*, expected mode = *number*, observed mode = *number*		

CHAPTER 10

Sun Enterprise Network Array Test(enatest)

enatest is used to provide configuration verification, fault isolation, and repair validation of the Sun Enterprise Network Array.

The Sun Enterprise Network Array is a high availability mass storage subsystem consisting of:

- SCSI fibre channel protocol host adapters with dual 100-Megabyte FC-AL ports.
- A disk enclosure.
- A Front panel display for configuration information.
- Up to two interface boards in the enclosure, which provide FC-AL connections to the enclosure and also provide status information and control of the conditions within the enclosure.
- Other field-replaceable units (FRUs) within the enclosure include power supply units, fan trays and backplane.

enatest can be used for validation, configuration verification, repair verification and fault isolation.

`enatest` detects all Sun Enterprise Network Array enclosures connected to the host and collects relevant configuration information. FIGURE 10-1 shows the Options menu which contains a sample configuration listing and test parameters. TABLE 10-1 describes the extent of the test coverage and provides samples of the configuration information that is displayed.

TABLE 10-1 `enatest` Coverage

Test Coverage	Description
Host Connections	`enatest` searches for all the active and inactive connections between the host and the enclosure and reports the number of existing active connections. If the VERBOSE mode is enabled, the socal port on the host side and the GBIC port on the enclosure side is reported for each active connection. The test also diagnoses any inactive connection(s) and reports the possible causes for the failure. The test will fail if there are one or more inactive connections. See the section on "Fault Isolation Capability" on page 108" for more information.
Disk Access	During the testing, each disk is accessed through each active connection leading to that disk. The `enatest` opens partition 2 on the disk and reads 512 bytes of raw data. If there are any failures, the test tries to isolate the fault to either an enclosure element, the cable, the host adapter card or the OE module on the host adapter. See the section on "Fault Isolation Capability" on page 108"for more information.

Sample Output:

```
SUNWvts.enatest.1010 06/05/97 13:48:53 enatest ses0 VERBOSE:
"MYBOX: Lower-Right GBIC connected to host via /devices/sbus@1f,0/
SUNW,socal@0,0:1"
SUNWvts.enatest.1006 06/05/97 13:48:53 enatest ses0 VERBOSE:
"MYBOX: Interface Board (Bottom one in the enclosure) detected to be
installed
and OK"
SUNWvts.enatest.6023 06/05/97 13:48:53 enatest ses0
ERROR: "MYBOX: Cannot communicate with the enclosure via
/devices/sbus@1f,0/SUNW,socal@0,0:0; possibly connected to Lower-Left
GBIC in the enclosure"
Probable_Cause(s):
     (1)Signal too low at the GBIC module in the enclosure
     (2)Faulty cable or cable disconnected
     (3)Faulty GBIC module on the host side
Recommended_Action(s):
     (1)Ensure the cables are properly connected
     (2)Please contact your service representative

SUNWvts.enatest.2006 06/05/97 13:48:53 enatest ses0 INFO:
"MYBOX: Number of connections to the host: 1"
```

TABLE 10-1 `enatest` Coverage

Test Coverage	Description
Enclosure Status	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. TABLE 10-2 shows how the status information is reported.

TABLE 10-2 Element Enclosure Status

Enclosure Element	Information
Disk	Fault Sensed: Yes / No Status of ports A and B: Connected or Bypassed
Power Supply	Status: ON / OFF Temperature: OK / Critical Overtemp / Abnormal AC Input: OK / Not OK DC Output: OK / Not OK
Fan	Status: On / Off Speed: High / Low / Stopped
Backplane	Status: OK / Failed Status of ports A and B: Connected / Bypassed
Interface Board	Temperature: OK / Critical Overtemp Loop A status: OK / Failed Loop B status: OK / Failed
GBIC	Status: Disabled / Enabled Signal Level: OK / Too low Transmitter: OK / Failed

enatest Options

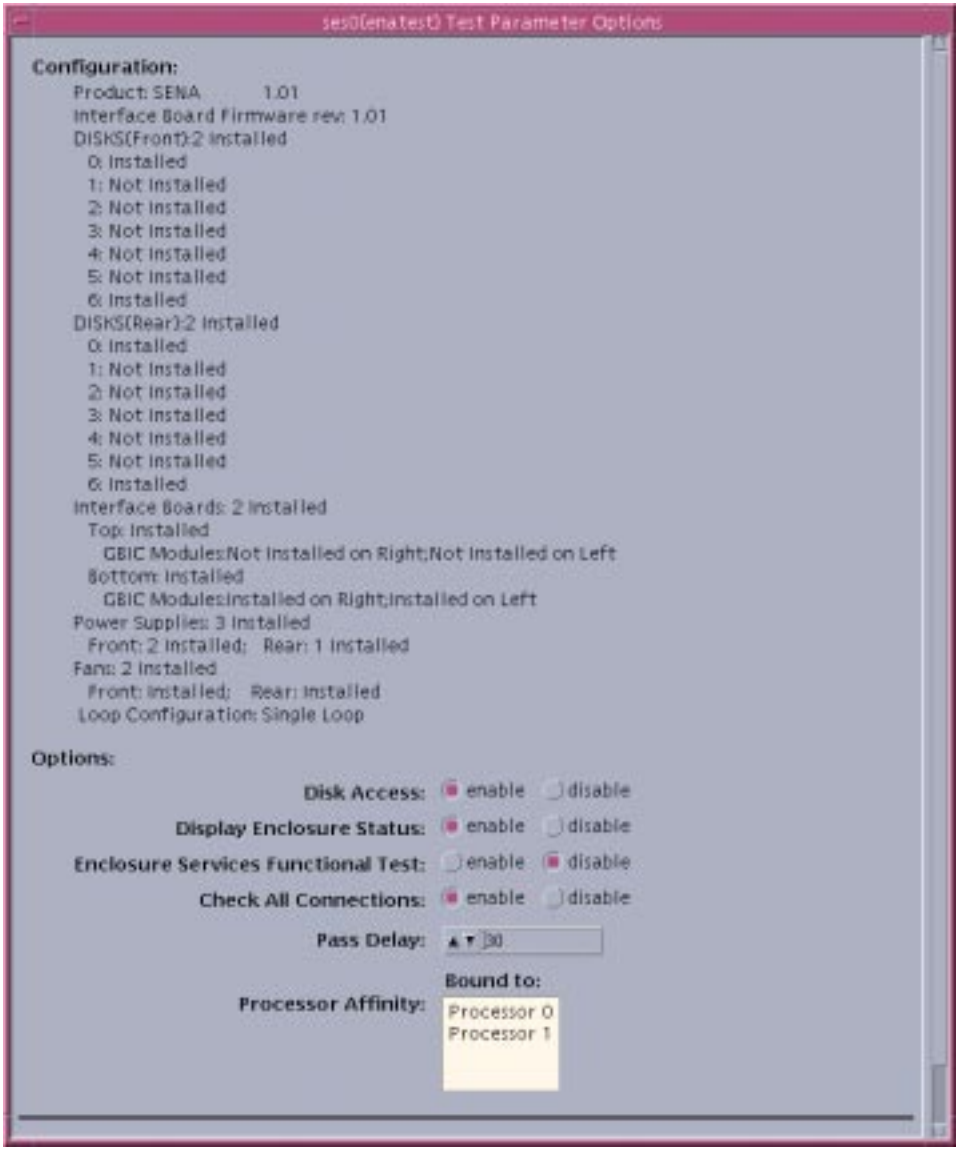


FIGURE 10-1 `enatest` Options

TABLE 10-3 `enatest` Options

`enatest` **Options**	**Description**
Enclosure Services Functional Test (General Description)	Certain control operations are performed on devices in the enclosure through the SES device and verified that the operation was performed successful. This functional test involves the following steps: **(a)** Perform control operation. **(b)** Verify control operation was successful. **(c)** Restore state to what it was before (a). **(d)** Verify restore operation was successful. The test will fail if any one of the above steps fails. This test targets the Disks and the Fans in the enclosure.
Enclosure Services Functional Test (Detailed disk test description)	**(a)** Control Operation: Each port of the disk is toggled from its original state: a port that was originally connected will be bypassed and vice-versa. **(b)** Verify Control Operation: This is done in two ways. First, the new status of the disk ports is verified by reading the status through the SES device. The test will fail if the status read back does not reflect the change. Next, disk access is attempted through the port that was originally connected but has now been bypassed. The test will fail if the access attempt is successful. **(c)** Restore State: The port states are restored to what they were before the Control Operation. **(d)** Verify Restore Operation: This is done in two ways. First the status of the disk ports is verified by reading the status through the SES device. The test will fail if the status read back does not reflect the change. Next, disk access is attempted through the port that have been reconnected. The test will fail if the access attempt is unsuccessful.

TABLE 10-3 `enatest` Options

`enatest` **Options**	**Description**
Enclosure Services Functional Test (Detailed Fan test description)	**(a)** Control Operation: The speed of each fan is toggled. Possible speeds are HIGH and LOW. **(b)** Verify Control Operation: The status is read back through the SES device and the speeds are compared. Failure to vary the speed in this case will result in an INFO message indicating that the fan speed could not be changed but does not result in a test failure. This is because SES can ignore fan speed change requests if required because of existing ambient temperature conditions. **(c)** Restore State: Restore the fan speed to the original speed. **(d)** Verify Restore Operation: This is similar to the Verify Control Operation step above.

Fault Isolation Capability

In the case of a failure, the test aids in fault isolation by reporting the possible cause(s) of failure. The fault isolation capability varies depending on the nature of the fault and the system configuration. `enatest` can detect and isolate hard faults. The following table shows the fault isolation capability for different configurations. A `Yes` indicates that fault isolation capability is available for that component in that configuration and a `No` indicates lack of fault isolation capability for that component in that configuration.

TABLE 10-4 `enatest` Fault Isolation Configurations

				Enclosure Elements			
Connections to Enclosure	**System Architecture**	**SOC+ Host Adapter**	**Host Side GBIC or Cable**	**Disk**	**Backplane**	**IB**	**GBIC**
Multiple	sun4u	Yes	Yes	Yes	Yes	Yes	Yes
Multiple	sun4d	Yes	No	Yes	Yes	No	No
Single	sun4u	Yes	No	No	No	No	No
Single	sun4d	Yes	No	No	No	No	No

enatest Test Modes

TABLE 10-5 enatest Test Modes

Test Mode	Description
Connection Test	In this mode, 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. Non-critical conditions result in a warning. A sample of the output follows.

```
Connection test starting....

     ses0
          Status: Connected
          Enclosure:
              Product Anemones Enterprise Network Array,
              Enclosure Name=MYBOX,
          Host Connections:
              Number of Active Connections=2,
          Enclosure State:
              Critical Conditions=None, Non-Critical Conditions=None

Connection test complete
```

Functional	When invoked through SyMON, The Enclosure Services Functional Test is not allowed and the Disk Access option is disabled by default. When the test is invoked through regular SunVTS GUI, all the options are allowed in this mode.

enatest Command Line Syntax

/opt/SUNWvts/bin/enatest *standard_arguments* **-o dev=***device_name,* **disk_access=***enable | disable,* **disks=***disk1:disk2:disk3:...diskn* **disp=***enable | disable,* e**sfunc=***enable | disable*

TABLE 10-6 enatest Command Line Syntax

Argument	Explanation
dev	The name of a ses device in the enclosure.
disk	The disks will be accessed only if this option is enabled.
disks	This argument consists of a ":" separated list of disks contained within this enclosure, that the test will attempt to access if the disks_access option is enabled. If this option is absent the test will access all the disks that it can find in the enclosure.
disp	Detailed status information regarding the enclosure elements will be displayed only if this option is enabled.
esfunc	The Enclosure Services Functional Test will be performed only if this option is enabled.

enatest Error Messages

TABLE 10-7 describes the enatest error messages, probable causes, and recommended actions.

TABLE 10-7 enatest Error Messages

	Error Message	Probable Cause(s)	Recommended Action
6000	*enclosure_name*: Unable to access disk *diskname* (*enclosure name*, *Front | Rear*, Slot)	Bad disk.	Contact your authorized Sun service representative.
6001	Unable to access any disk through host adapter: *host adapter device*	Bad host adapter.	Run SunVTS socaltest on the host adapter.

TABLE 10-7 `enatest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
6003	*enclosure_name*: Unable to access disk *diskname* (*enclosure_name*, *Front*|*Rear*, Slot) through *Host adapter device name*. This disk is still accessible through other path(s)	Port A or B of the disk is faulty.	Contact your authorized Sun service representative.
6004	*enclosure_name*: Failed to determine the location of disk *diskname*	Invalid device name.	Contact your authorized Sun service representative.
6005	*enclosure_name*: Could not access *diskname* (*enclosure_name*, *Front*|*Rear*, Slot) through *Host adapter device name*	Host adapter is faulty.	Contact your authorized Sun service representative.
6006	*enclosure_name*: Disk *diskname* cannot be accessed through *Host adapter device name*	Critical failure in the Interface Board (in the enclosure) through which this disk is accessed.	Contact your authorized Sun service representative.
6007	*enclosure_name*: Disk *diskname* cannot be accessed through *Host adapter device name*	Interface Board (in the enclosure) through which this disk is accessed is not installed.	
6008	*enclosure_name*: Disk *diskname* cannot be accessed through *Host adapter device name*	Critical failure (transmitter fault) in the GBIC module (in the enclosure) through which this disk is accessed.	Contact your authorized Sun service representative.
6009	*enclosure_name*: Disk *diskname* cannot be accessed through *Host adapter device name*	Loss of light at the GBIC module (in the enclosure) through which this disk is accessed. Faulty cable. Faulty GBIC module on the host side.	Contact your authorized Sun service representative.
6013	*enclosure_name*: Could not access *diskname* (*enclosure name*, F*ront*|*Rear*, Slot) through *Host adapter device* name	Faulty GBIC module on host side. Bad cable connection.	
6014	*enclosure_name*: Could not access *diskname* (*enclosure name*, Front|Rear, Slot) through *Host adapter* device name	Faulty Host Adapter. Faulty GBIC on host side. Faulty cable.	

TABLE 10-7 `enatest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
6015	*enclosure_name*: Could not access *diskname* through *Host adapter device name*	Disk is not installed.	
6016	*enclosure_name*: Could not access *diskname* through *Host adapter device name*	Disk detected to be installed, but may be bypassed or powered off.	
6017	*enclosure_name*: Disk *diskname* cannot be accessed through *Host adapter device name*	Critical failure in the enclosure backplane through which this disk is accessed.	Contact your authorized Sun service representative.
6018	*enclosure_name*: Disk *diskname* cannot be accessed through *Host adapter device name*	Enclosure backplane through which this disk is accessed is not installed.	
6019	*enclosure_name*: Disk *diskname* cannot be accessed through *Host adapter device name*	GBIC module (in the enclosure) through which this disk is accessed is not installed.	
6020	*enclosure_name*: Cannot communicate with the enclosure via *Host adapter device name*	Critical failure in the Interface Board (top / bottom one in enclosure).	Contact your authorized Sun service representative.
6021	*enclosure_name*: Cannot communicate with the enclosure via *Host adapter device name*	Interface board (top or bottom) is not installed in the enclosure.	
6022	*enclosure_name*: Cannot communicate with the enclosure via *Host adapter device name*; possibly connected to *location* GBIC in the enclosure	Critical failure (transmitter fault in the GBIC module in the enclosure).	Contact your authorized Sun service representative.
6023	*enclosure_name*: Cannot communicate with the enclosure via H*ost adapter device name*; possibly connected to *location* GBIC in the enclosure	Signal level too low at the GBIC module in the enclosure. Faulty cable or cable disconnected. Faulty GBIC module on the host side.	Ensure the cables are properly connected. Contact your authorized Sun service representative.
6024	*enclosure_name*: Cannot communicate with the enclosure via *Host adapter device name*	GBIC module (*location*) is not installed in the enclosure.	

TABLE 10-7 `enatest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
6026	*enclosure_name*: Failed to *Restore*|*Toggle* disk (*Front*|*Rear*, slot *slot_number*) state. Expected: Port A: *Bypassed*|*Connected*; Port B: *Bypassed*|*Connected*; Observed: Port A: *Bypassed*|*Connected*; Port B: *Bypassed*|*Connected*	Error in Enclosure Services or Enclosure Element.	Contact your authorized Sun service representative.
6027	*enclosure_name*: Unable to access disk *diskname* (*Front*|*Rear* slot *slot_number*) through port *A*|*B* even after bringing the port online	Error in Enclosure Services or Enclosure Element.	Contact your authorized Sun service representative.
6028	*enclosure_name*: Disk access succeeded for *diskname* (*Front*|*Rear* slot *slot_number*) through port *A*|*B* even after requesting that the port be bypassed	Error in Enclosure Services or Enclosure Element.	Contact your authorized Sun service representative.
6035	*enclosure_name*: Cannot access enclosure through *Host adapter device name*	Critical GBIC failure in the enclosure; location GBIC: disabled|enabled Signal: *signal_level*; Transmitter: *Failed*|*OK*; *location* GBIC: *disabled*|*enabled* Signal: *signal_level*; Transmitter: *Failed*|*OK*	Contact your authorized Sun service representative.
6036	*enclosure_name*: Critical condition detected in enclosure!		Run this test in 'Functional' mode for more information. Contact your authorized Sun service representative.
8001	Could'nt determine the host adapter through which diskname being accessed	Software error.	Contact your authorized Sun service representative.
8003	Internal error	Software error in test. system error message.	Contact your authorized Sun service representative

TABLE 10-7 `enatest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
8004	*enclosure_name*: `Could not communicate with enclosure via` *Host adapter device name*	Bad connection.	Ensure the cables are properly connected. Contact your authorized Sun service representative.
8005	`Could not communicate with the enclosure`	Faulty connection.	Ensure the cables are properly connected. Run SunVTS `socaltest` to verify the host adapter. Contact your authorized Sun service representative.

CHAPTER 11

StorEdge 1000 Enclosure Test (enctest)

enctest tests the StorEdge 1000 enclosures. The enclosure can support either 12 1" 4GB drives or 8 1.6" 9GB drives and have redundant power and cooling. Two enclosure models are available:

- StorEdge A1000 – Disk Tray with the hardware RAID controller
- StorEdge D1000 – Disk Tray without the hardware RAID controller.

enctest can be used for validation, configuration verification, repair verification, and fault isolation of both models.

The enctest probe detects all the connected StorEdge enclosures and displays the status of the various elements in the enclosure.

enctest sets the StorEdge D1000 LEDs as follows:

TABLE 11-1 enctest Status LEDs

LED State	Indicated Condition
On	Unrecoverable or critical condition
Blinking	Non-critical condition
Off	Informational or no condition to report

Note – NOTE: The ses driver must be present on the system with the StorEdge enclosure(s). If the ses driver is not present, SunVTS will not detect the StorEdge hardware. Use the following command to see if the ses driver is present:
pkginfo SUNWses
Install the package if necessary.

`enctest` reports the status of the various elements in the enclosure. An error is registered if an unrecoverable or critical condition is detected. Non-critical conditions are reported through warning messages. TABLE 11-2 describes the information that is reported for each enclosure element.

TABLE 11-2 `enctest` Enclosure Status Report

Enclosure Element	Information reported (per device slot)
Disk	Present / Not Present Failed / OK
Power supply	Present / Not Present Failed / OK
Fan	Present / Not Present Failed / OK
Temperature	OK / Over temperature
RPA cache Battery (StorEdge A1000 only)	OK / Low Charge

enctest Options

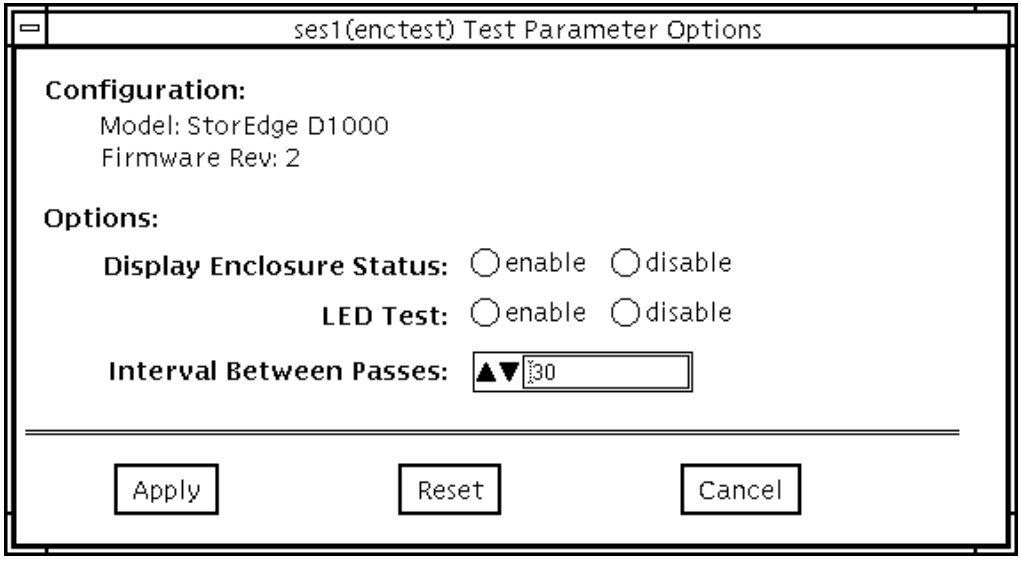


FIGURE 11-1 enctest Options

TABLE 11-3 enctest Options

enctest **Options**	**Description**
Display Enclosure Status	When enabled, the status of the enclosure elements are displayed as messages in the SunVTS console. These messages are also logged in the SunVTS info log file.
LED Test	When enabled, the LEDs associated with the disks are flashed for a short period of time.
Interval Between Passes	Sets the minimum delay between successive invocations of the test.

enctest Test Modes

TABLE 11-4 enctest Test Modes

Test Mode	Description
Connectivity Mode	The enclosure status summary bits are read. Detailed information is reported only if an unrecoverable or critical condition is detected.
Functional Mode	When started through Symon, the LED test is not allowed and the "Display Enclosure Status" option is disabled by default. When started through the regular SunVTS GUI, all options are allowed.

enctest Command Line Syntax

/opt/SUNWvts/bin/enctest *standard_arguments* **-o dev=***device_name,*
disp=*enable* | *disable,* **led=***enable* | *disable,* **delay=***delay_in_seconds*

TABLE 11-5 enctest Command Line Syntax

Argument	Explanation
dev	This is the name of a ses device in the enclosure.
disp	Detailed status information regarding the enclosure elements will be displayed if enabled
l*ed*	Option to enable or disable the LED test.
delay	Minimum delay between successive invocations of the test.

enctest Error Messages

TABLE 11-6 describes the enctest error messages, probable causes, and recommended actions.

TABLE 11-6 enctest Error Messages

	Error Message	Probable Cause(s)	Recommended Action
8000	Failed to open device.	System error. Cable loose or disconnected or device not configured.	Verify the cable is properly connected and the device configured.Contact your authorized Sun service representative.
8001	Failed to communicate with the enclosure	System error. Cable loose or disconnected or device not configured.	Verify the cable is properly connected and the device configured.Contact your authorized Sun service representative.
8002	Cannot proceed further due to lack of memory	Heavy system load.	Please try later.
8003	*unrecoverable* | *critical* | *non-critical* informational condition detected in the enclosure		

TABLE 11-6 `enctest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
8004	`Failed to obtain list of enclosure elements`	System error	Contact your authorized Sun service representative.
8005	`Failed to obtain status of an enclosure element`	System error	Contact your authorized Sun service representative.
8006	`Failed to set the status of an enclosure element`	System error	Contact your authorized Sun service representative.

CHAPTER 12

Environmental Test (envtest)

envtest exercises the I2C bus on the Sun Enterprise 450 product line. envtest contains five subtests to test and report on the power supply status, system temperature status, fan speed, disk LEDs, and front panel and keyswitch. envtest is not scalable.

envtest Options

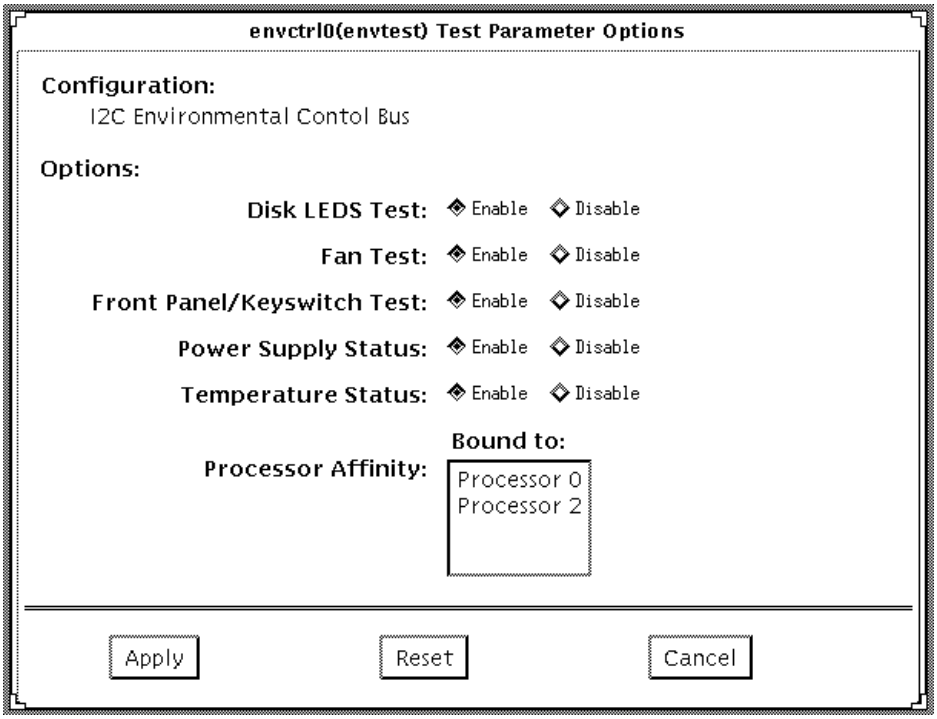


FIGURE 12-1 `envtest` Options Menu

TABLE 12-1 `envtest` Options

`envtest` **Options**	**Description**
Disk LEDs Test	Illuminates each LED on the disk backplane(s) to green, then amber, and then back to its original state. The test then illuminates *all* disk LEDs to green, then amber, and then back to their original state. This test is only enabled in Functional test mode.
Fan Test	Cycles each fanbank speed to low, medium, and high, then verifies the correct speed. Next, each fanbank is stopped, one at a time. The test then verifies that a fan fault has occurred. Next, the watchdog timer is invoked to simulate a catastrophic failure. The test verifies that the system set all fanbanks to high and then resets the fan speed to normal. This test is only enabled in Functional test.

TABLE 12-1 `envtest` Options

`envtest` **Options**	**Description**
Front Panel and Keyswitch Test	Flashes each individual LED on the front panel to ON (green or amber), then OFF, and then back to its original state. The test then illuminates all front panel LEDs then sets them back to their original state. The power on LED is Read Only and will not be cycled. The test then displays the current keyswitch position. This test is only enabled in Functional test mode.
Power Supply Status	Identifies the number of power supplies that are in the system, and the state of each power supply, and verifies that the power supply temperatures are within normal operating parameters. This test is enabled in all modes.
Temperature Status	Identifies the current temperature of each CPU in the system, and the ambient temperature of the system, and `envtest` verifies that all temperatures are within normal operating parameters. This test is enabled in all modes.

`envtest` Test Modes

`envtest` supports Connection and Functional tests.

TABLE 12-2 `envtest` Test Modes

Test Mode	**Description**
Connection Test	Reports the status of the power supplies, the temperature sensors within the system, and verifies normal operating parameters.
Functional Test	Tests the disk back panel, front panel LEDs, and fan control circuitry. Also uses the same functionality as Online mode and connection test If you invoke SunVTS through SyMON, the following Functional Test description applies: `envtest` runs in Connection Test mode (see description above).

envtest Command Line Syntax

/opt/SUNWvts/bin/envtest [*standard arguments*]
-o dev=*raw_device_name*,**diskleds=***E/D*,**fans**=*E/D*,**fpanel**=*E/D*,
psupply=*E/D*,**temp**=*E/D*

TABLE 12-3 envtest Command Line Syntax

Argument	Explanation
dev=*raw_device_name*	Specifies the name of the raw device to test.
diskleds=*enable*|*disable*	Enables or disables the diskleds test.
fans=*enable*|*disable*	Enables or disables the fans test.
fpanel=*enable*|*disable*	Enables or disables the front panel test.
psupply=*enable*|*disable*	Enables or disables the power supply test
temp=*enable*|*disable*	Enables or disables the temperature test.

envtest Error Messages

Table 12-4 envtest Error Messages

Error Message		Probable Cause(s)	Recommended Action
8000	Unable to open driver *driver_name*: *sys error msg*	Device name is wrong or driver is not loaded.	Check the device name (if entered) or load driver.
		Device busy.	Kill all other processes accessing driver.
8001	kstat_open failed	No kernel resource available.	Consult /var/adm/messages file for more information.
		System software error	

Table 12-4 `envtest` Error Messages

Error Message		Probable Cause(s)	Recommended Action
8002	`kstat_lookup failed for envtest` *structure* `in` *kstat module*	`envtest` module not found.	Check revision and reload `envctrl` driver.
		No kernel resource available.	Consult `/var/adm/messages` file for more information.
		System software error.	
8003	`kstat_read failed envtest` *structure* `in` *kstat module*	`envtest` module not found.	Check revision / reload `envctrl` driver.
		No kernel resource available.	Consult the `/var/adm/messages` file for more information.
		System software error.	
8004	`Unable to close kstat`	No kernel resource available.	Consult the `/var/adm/messages` file for more information.
		System software error	
8005	`Unable to set mode to DIAG using ioctl.:` *sys error msg*	System software error	Consult the `/var/adm/messages` file for more information.
8006	`Unable to set disk LEDs:` *sys error msg*	System software error	Consult the `/var/adm/messages` file for more information.
8007	`Unable to get disk LEDs:` *sys error msg*	System software error.	Consult the `/var/adm/messages` file for more information.
8008	`Unable to set` *fan type* `fan speed to` *speed*`:` *sys error msg*	Fan hardware failure.	Manually check the fan speed and replace the fan.
		System software error.	Consult the `/var/adm/messages` file for more information.
8009	`Unable to get` *fan type* `fan speed:` *sys error msg*	System software error.	Consult the `/var/adm/messages` file for more information.
8010	*fan type* `fan speed:` *speed* `out of range`	Fan hardware failure.	Manually check the fan speed and replace the fan.
		System software error.	Consult the `/var/adm/messages` file for more information.
8011	`Forced fan fault did not occur for` *fan type* `fanbank`	Hardware failure.	Replace the hardware.
		System software error.	Consult the `/var/adm/messages` file for more information.

Table 12-4 `envtest` Error Messages

Error Message	Probable Cause(s)	Recommended Action
8012 `Forced fan fault did not clear for` *fan type* `fanbank`	Hardware failure.	Replace the hardware.
	System over temperature.	Consult the `/var/adm/messages` file for more information.
	System software error.	
8013 `Unable to set watchdog timer`	Hardware failure.	Replace the hardware.
	System software error.	Consult the `/var/adm/messages` file for more information.
8014 `Unable to set temperature to` *temperature*	System software error.	Consult the `/var/adm/messages` file for more information.
8015 `Power Supply` *supply* `has failed: Limit` *0=PASS | 1=FAIL* `Current Share` *0=PASS | 1=FAIL* `Temperature` *temperature*	Power supply hardware failure.	Replace the power supply.
8016 `Unable to allocate memory using malloc. :` *sys error msg*	System software error.	Consult the `/var/adm/messages` file for more information.
8017 `Unable to set mode to NORMAL using ioctl. :` *sys error msg*	System software error.	Consult the `/var/adm/messages` file for more information.
8018 `Error encountered during call to` *function name*		
8019 `Unable to set front panel LEDs using ioctl.:` *sys error msg*	System software error.	Consult the `/var/adm/messages` file for more information.
8020 `Unable to reset front panel LEDs to original state`	System software error.	Consult the `/var/adm/messages` file for more information.
8021 `Unable to set front panel LEDs to` *led mask*	System software error	Consult the `/var/adm/messages` file for more information.
8022 `Ambient temperature:` *temperature* `Celsius out of range`	`envctrl` hardware error.	
8023 `CPU CPU # temperature:` *temperature* `Celsius out of range`	`envctrl` hardware error.	

Table 12-4 `envtest` Error Messages

Error Message	Probable Cause(s)	Recommended Action
8024 `Data Miscompare: ioctl diskled mask =` *diskled mask* `kstat diskled mask =` *diskled mask*	`envctrl` hardware error	
	System software error.	Consult the `/var/adm/messages` file for more information.
8025 `Illegal options passed to envtest` *option*	User error.	Check usage by typing `envtest -u`.
8026 `Unable to retrieve power supply information.`	I2C hardware failure	Replace power supply.
	I2C bus wedged	Check for other I2C devices that may be corrupting the I2C bus.
8027 `Power Supply Over Temperature: PS Slot` *slot* `PS Temperature` *temperature*`.`	Bad Power Supply.	Replace Power Supply.

CHAPTER 13

Environmental Test (env2test)

env2test exercises and validates the I2C bus on systems that support the envctrltwo driver.

Five subtests are in env2test to test and report the status of the power supply, system temperature, fan speed, disk LEDs, front panel, and keyswitch.

env2test is not scalable.

env2test Options

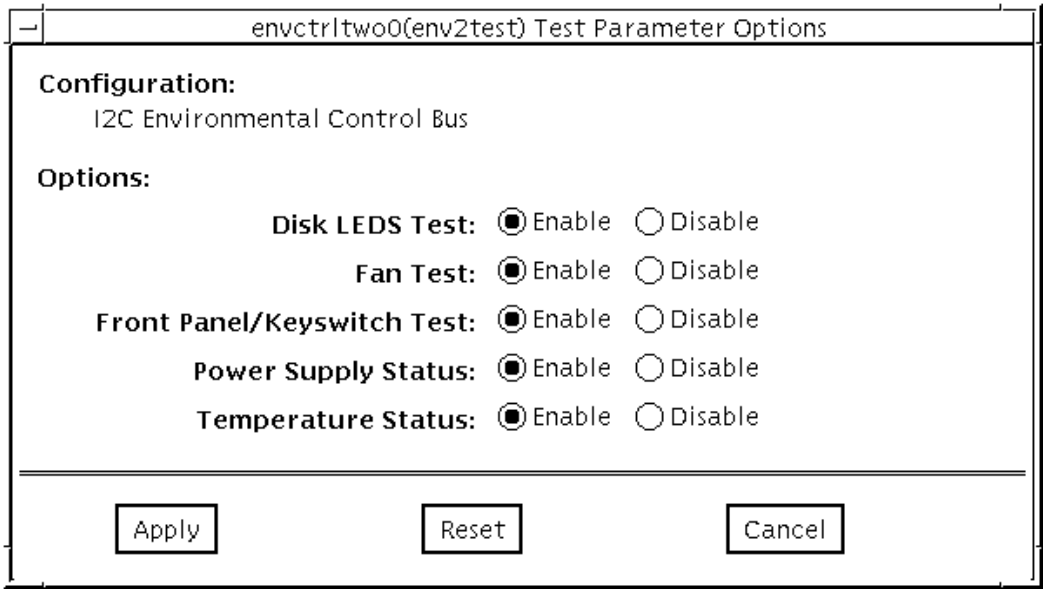


FIGURE 13-1 env2test Options Menu

TABLE 13-1 env2test Options

env2test **Options**	**Description**
Disk LEDs Test	Determines the number of disks that are present and the state of each disk. Illuminates each LED on the disk backplane to amber, and then back to its original state. The test then illuminates *all* disk LEDs to amber, and then back to their original state. This test is only enabled in Functional test.
Fan Test	Sets the fanbank speed to halfway between the current speed and max speed, then verifies the correct speed. Next, the fanbank speed is set to max speed, and the speed is verified. The fanbank speeds are then returned to normal, and then verified. This test is only enabled in Functional test.

TABLE 13-1 `env2test` Options

`env2test` **Options**	**Description**
Front Panel and Keyswitch Test	Flashes each individual LED on the front panel to ON (green or amber), then OFF, and then back to its original state. The test then illuminates all front panel LEDs then sets them back to their original state. The power on LED is read-only and will not be cycled. The test then displays the current keyswitch position. This test is only enabled in Functional test.
Power Supply Status	Identifies the number of power supplies that are in the system and the state of each power supply. This test is enabled in all modes.
Temperature Status	Identifies the current temperature of each CPU in the system, the ambient temperatures of the system, the temperature on the SCSI and power distribution boards, and verifies that all temperatures are within normal operating parameters. This test is enabled in all modes.

`env2test` Test Modes

env2test supports Connection and Functional tests as descripbed in the table below.

TABLE 13-2 `env2test` Test Modes

Test Mode	**Description**
Connection Test	Reports the status of the power supplies, the temperature sensors within the system, and verifies normal operating parameters
Functional Test	Tests the disk back panel, front panel LEDs, and fan control circuitry. Also uses the same functionality as Online mode and connection test If you invoke SunVTS through SyMON, the following Functional Test description applies: Uses the same functionality as connection test (above)

env2test Command Line Syntax

/opt/SUNWvts/bin/env2test [*standard arguments*]
-o dev=*device=name*,**diskleds=***E/D*,**env_mon=***poll_interval*,**fans**=*E/D*,**fpanel=***E/D*,**psupply=***E/D*,**temp=***E/D*

TABLE 13-3 env2test Command Line Syntax

Argument	Explanation
dev=raw_device_name	Specifies the name of the raw device to test
diskleds=enable|disable	Enables or disables diskleds test
env_mon=poll_interval	Displays all system environmental statics every "poll_interval" seconds. (Display ONLY, Does not test.)
fans=enable|disable	Enables or disables fans test
fpanel=enable|disable	Enables or disables front panel test
psupply=enable|disable	Enables or disables power supply test
temp=enable|disable	Enables or disables temperature test

env2test Error Messages

Table 13-4 env2test Error Messages

Error Message		Probable Cause(s)	Recommended Action
8000	Unable to open driver *driver name*: *sys error msg*	Device name is wrong or driver is not loaded.	Check the device name (if entered) or load driver.
		Device busy.	Kill all other processes accessing driver.
8001	kstat_open failed	No kernel resource available.	Consult /var/adm/messages file for more information.
		System software error	

Table 13-4 `env2test` Error Messages

Error Message	Probable Cause(s)	Recommended Action
8002 `kstat_lookup failed for env2test` *structure* `in` *kstat module*	`env2test` module not found.	Check revision and reload `envctrl` driver.
	No kernel resource available	Consult `/var/adm/messages` file for more information.
	System software error.	
8003 `kstat_read failed env2test` *structure* `in` *kstat module*	`env2test` module not found.	Check revision / reload `envctrl` driver.
	No kernel resource available.	Consult the `/var/adm/messages` file for more information.
	System software error.	
8004 `Unable to close kstat`	No kernel resource available.	Consult the `/var/adm/messages` file for more information.
	System software error.	
8005 `Unable to set mode to DIAG using ioctl.: sys error msg`	System software error	Consult the `/var/adm/messages` file for more information.
8006 `Unable to set disk LEDs:` *sys error msg*	System software error	Consult the `/var/adm/messages` file for more information.
8007 `Unable to get disk LEDs:` *sys error msg*	System software error.	Consult the `/var/adm/messages` file for more information.
8008 `Unable to set fan speed to` *speed*`:` *sys error msg*	Fan hardware failure	Manually check the fan speed and replace the fan.
	System software error.	Consult the `/var/adm/messages` file for more information.
8009 `Unable to get fan speed:` *sys error msg*	System software error	Consult the `/var/adm/messages` file for more information.
8010 `Fan speed` *speed* `out of range: MIN` *speed* `MAX` *speed*	Fan hardware failure.	Manually check the fan speed and replace the fan.
	System software error.	Consult the `/var/adm/messages` file for more information.
8011 `Forced fan fault did not occur for` *fan type* `fanbank`	Hardware failure.	Replace the hardware.
	System software error.	Consult the `/var/adm/messages` file for more information.
8015 `Power Supply` *supply* `has failed: State` *state*	Power supply hardware failure.	Replace the power supply.

Table 13-4 `env2test` Error Messages

Error Message	Probable Cause(s)	Recommended Action
8016 `Unable to allocate memory using malloc. :` *sys error msg*	System software error.	Consult the `/var/adm/messages` file for more information.
8017 `Unable to set mode to NORMAL using ioctl. :` *sys error msg*	System software error.	Consult the `/var/adm/messages` file for more information.
8018 `Error encountered during call to` *function name*		
8019 `Unable to set front panel LEDs using ioctl.:` *sys error msg*	System software error.	Consult the `/var/adm/messages` file for more information.
8020 `Unable to reset front panel LEDs to original state`	System software error.	Consult the `/var/adm/messages` file for more information.
8021 `Unable to get front panel LEDs.`	System software error.	Consult the `/var/adm/messages` file for more information.
8022 `Ambient temperature` *temperature* `Celsius out of range`	`envctrl` hardware error.	
8023 `CPU CPU # temperature` *temperature* `Celsius out of range`	`envctrl` hardware error.	
8024 `Data Miscompare: ioctl diskled mask =` *diskled mask* `kstat diskled mask =` *diskled mask*	hardware error	
	System software error.	Consult the `/var/adm/messages` file for more information.
8025 `Illegal options passed to env2test` *option*	User error.	Check usage by typing **`env2test -u.`**
8026 `Unable to retrieve power supply information.`	I2C hardware failure.	Replace power supply.
	I2C bus wedged.	Check for other I2C devices that may be corrupting the I2C bus.
8033 `Temperature` *temperature* `celsius out of range.`	Hardware error.	Check all thermistors.

CHAPTER 14

Frame Buffer Test (`fbtest`)

`fbtest` is a generic test for all dumb frame buffers used with the Solaris 2.x software.

The `fbtest` checks the frame buffer by sequentially writing, reading, and verifying small blocks of random patterns across the entire video RAM. The block size is 64 x 64 pixels. If a miscompare occurs, the test stops with an error message that indicates the location of the error.

If a generic frame buffer device name (`dvc/fb`) is specified, `fbtest` automatically detects the depth of the frame buffer, and adjusts testing to the frame buffer size.

`fbtest` Options

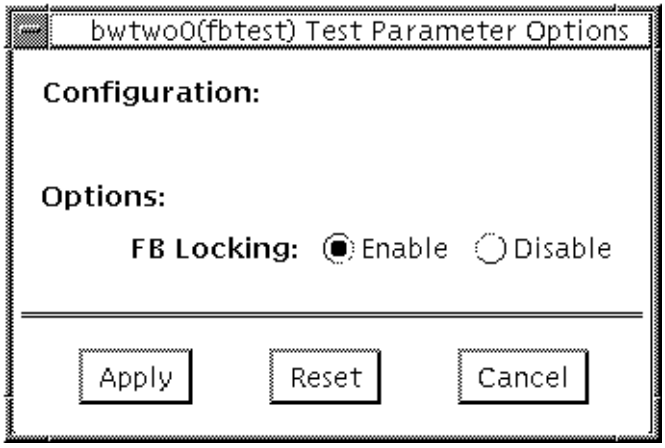


FIGURE 14-1 `fbtest` Option Menu

Note – To start SunVTS with `vtsui`, but without `vtsk`, you must add the host name to `xhost` as: `xhost +` *hostname.*

`fbtest` Command Line Syntax

`/opt/SUNWvts/bin/fbtest` *standard_arguments* **`-o dev=`***device_name* **`lock=`***E(nable)/D(isable)*

TABLE 14-1 `fbtest` Command Line Syntax

Argument	Explanation
`dev`=*device_name*	Specifies which frame buffer to be test.
lock=*E(nable)/ D(isable)*	Enables or disables the window system locking option. See the section about Testing Multiple Frame Buffers in the *SunVTS 2.1 User's Guide* for details. Frame buffer locking is enabled by default on the window server running the Open Windows software.

`fbtest` Test Modes

Due to the nature of graphic tests, reading from or writing to the frame buffer during graphic tests disturbs user operation. This test is only available in Functional test.

fbtest Error Messages

TABLE 14-2 fbtest Error Messages

	Error Message	Probable Cause(s)	Recommended Action
6000	Data compare error	FB lock is disabled.	Enable FB lock.
		Bad frame buffer.	If the problem persists, call your authorized Sun service provider.
6001	Video memory error at *address*, expected: *number*, observed: *number*	FB lock is disabled.	Enable FB lock.
		Bad frame buffer.	If the problem persists, call your authorized Sun service provider.
6002	Unable to lock frame buffer	FB lock was enabled while the window system was not running.	
8000	can't acquire console semaphore	System load is too heavy.	Reduce the system load.
		System error.	If the problem persists, contact your Sun service provider.
8001	Parameter error - Improper test parameters supplied	fbtest can only run in Functional test.	
8002	Device name missing!	Parameter error.	Must provide device name
8003	Create_Raster() failed for *name*	Parameter error.	
		No such device.	
8004	Create_Raster() failed for type RAS_CHILD	Operator error.	Check test options, mode and retry, if appropriate.
		Software error.	Contact your Sun service provider.
8005	Malloc failed	System load too heavy.	Reduce the system load
		System error	If the problem persists, call your authorized Sun service provider.

CHAPTER 15

Fast Frame Buffer Test (`ffbtest`)

`ffbtest` verifies the functionality of the Fast Frame Buffer.

`ffbtest` can detect and adapt to the video modes of single- and double-buffer versions of the fast frame buffer (FFB). All `ffbtest` tests can run in several screen resolutions such as standard, stereo, and high resolution. In stereo mode, all tests write into the right and left eyes unless you specify otherwise. This test also supports FFB, FFB2, and FFB2+ fast frame buffer configurations. Use the `ffbconfig -prconf` command to display the configuration of the frame buffer you want to test.

You can interrupt `ffbtest` using Control-C. Turn off all other keyboard input if OPEN LOOK is running on the unit being tested.

Test accuracy is checked using a checksum algorithm. Possible locations of failing pixels are identified, as well as the likely failing FRU.

Caution – DO NOT run any other application or screen saver program that uses the FFB accelerator port while running `ffbtest`. Do not run power management software. These programs causes SunVTS to return incorrect errors.

Note – Disable all screen savers before testing any graphics device. Type **`xset s off`** at a UNIX prompt to disable the Solaris screen saver. Disable power management software if it is running.

Note – DO NOT run Open Windows across multiple monitors.

Note – `ffbtest` requires approximately 7 Mbytes of disk space in the `/tmp` directory to extract its working files. If this space is not available, the diagnostic will fail and report warning and error messages, indicating a lack of disk space.

Note – To start SunVTS with `vtsui`, but without `vtsk`, you must add the host name to `xhost` as: `xhost +` <*hostname*>.

`ffbtest` Options

By default, all tests are enabled except the stereo test.

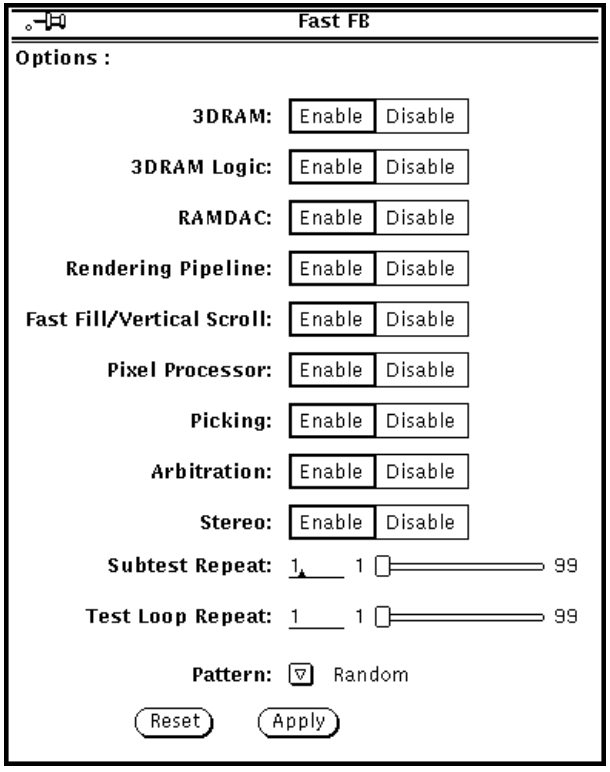


FIGURE 15-1 `ffbtest` Option Menu

TABLE 15-1 `ffbtest` Options

`ffbtest` **Options**	**Description**
3DRAM Test	The 3DRAM Test thoroughly tests the video memory in the FFB using 512-bit reads and writes. 3DRAM makes a full screen pass, consisting of a write and a read to each pixel location, for each access mode on the list below. You can use either random data or specify data at the command line. A second pass is made with the one's complement of the data used in the first pass so that each memory location is tested with both a zero and a one. Notice that some passes are skipped on the single-buffered FFB. Errors in this subtest are attributes to the 3DRAM. A failing chip is indicated by (x, y) locations and device-specific "U" numbers. DFB8R, DFB8G, DFB8B, DFB8X - Buffer A DFB24 - Buffer A DFB32 - Buffer A SFB8R, SFB8G, SFB8B, SFB8X - Buffer A SFB8R, SFB8G, SFB8B, SFB8X - Buffer B (double buffer only) SFB32 - Buffer A SFB32 - Buffer B (double buffer only) SFB32 - Buffer C (double buffer only) SFB64 - Buffers A and C (double buffer only) SFB64 - Buffers B and C (double buffer only)
3DRAM Logic Test	3DRAM Logic provides logical functionality to the FFB. The following services are tested: Compare Controls - Match AB Compare Controls - Magnitude AB Compare Controls - Match C (double buffer only) Compare Controls - Magnitude C (double buffer only) Match Mask - AB Magnitude Mask - AB Match Mask - C (double buffer only) Magnitude Mask - C (double buffer only) Raster Operations - RGB Raster Operations - X Raster Operations - YZ (double buffer only) Plane Mask - RGB Plane Mask - X Plane Mask - Y Plane Mask - Z Group Enable - R, G, B, X Group Enable - Y, Z (double buffer only)

TABLE 15-1 `ffbtest` Options *(Continued)*

`ffbtest` **Options**	**Description**
3DRAM Logic Test (Continued)	`ffbtest` tests each function separately with a series of SFB64 writes. A total of 16 writes are made for each different test case with Y coordinate values varying from 0 to 30 in increments of 2 pixels. This dotted column organization provides page thrashing and block flashing in all screen resolutions. For each operation, all possible combinations are tested. For example, `ROP RGB new==old` has three possible values are: `new < old`, `new == old`, *and* `new > old`. `ffbtest` tests each of these cases. Five passes of the functions are made. Each pass writes into a different FFB address space: SFB32-A, SFB32-B, SFB32-C, SFB64-AC, and SFB64-BC. Note that the passes that write into the SFB32 address spaces are writing two pixels at a time because the tests use SFB64 writes. For FFB2+ boards, additional testing is performed on the new stencil and passin capabilities if the board is DBZ. Care is taken to ensure that all 3DRAM chips are tested. Errors in this subtest are attributed to the 3DRAM.
RAMDAC Test	RAMDAC registers are tested using simple read/write patterns to determine if there are any bad bits. This includes all LUTs. `ffbtest` ensures that data is actually being read from the RAMDAC and not being supplied by the driver. Next, the RAMDAC Signature Register captures the pixels going to the screen. This test determines that all of the different data paths within the RAMDAC are functioning properly. The following modes are tested: 24-bit true color from A 24-bit true linear color from A 24-bit direct color from A 24-bit true color from B (double buffer only) 24-bit true linear color from B 24-bit direct color from B (double buffer only) 8-bit pseudo color (from each plane in RGB) from A 8-bit pseudo color (from each plane in RGB) from B (double buffer only) 8-bit non-linear grayscale (from each plane in RGB) from A 8-bit non-linear grayscale (from each plane in RGB) from B (double buffer only) 8-bit linear grayscale (from each plane in XRGB) from A 8-bit linear grayscale (from each plane in XRGB) from B (double buffer only) 8-bit overlay pseudo color (from buffer A, X plane)

TABLE 15-1 `ffbtest` Options *(Continued)*

`ffbtest` **Options**	**Description**
RAMDAC Test (Continued)	This test displays a total of 11 different types of windows on the screen for the single-buffered configuration; 22 for double-buffered. A cursor is also displayed on the screen. RAMDAC on FFB2+ board supports three modes (SEP8, SEP4 and Combined). This test detects the RAMDAC type and tests the original and additional features like increased number of CLUTs, increased WLUT size, additional overlay WLUT. Errors in this test are attributed to the RAMDAC.
Rendering Pipeline Test	Rendering Pipeline uses the rendering pipeline tests developed for the FFB stand-alone diagnostics. Each primitive is tested thoroughly with the following sources and configurations: • Dots • Anti-aliased dots • Lines using all four line drawing primitives • Triangles • Polygons • Rectangles • Fonts Errors in this test are attributed to the FBC.
Fast Fill / Vertical Scroll Test	The Fast Fill / Vertical Scrol*l* primitives are separated from the Rendering Pipeline tests because of their dependence on screen type. There are three different tests, one for each screen type. Each test uses both block and page mode fistfuls. Errors in this test are attributed to the FBC.
Pixel Process Test	Pixel Processor, a subtest, exercises the following options selected by the FFB's Pixel Processor Control (PPC) register. • Auxiliary clipping (additive and subtractive) • Depth cueing • Alpha blend • Viewport clip (2D and 3D) • Area pattern (transparent and opaque) Errors in this test are attributed to the FBC.

TABLE 15-1 `ffbtest` Options *(Continued)*

`ffbtest` **Options**	**Description**
Picking Test	The Picking test exercises the pick detect login of the 3DRAM. `ffbtest` defines a pick detect window and checks that writes to the window are picked, and writes outside the window are not picked. The test is repeated once for each 3DRAM. Errors in this test are attributed to the 3DRAM.
Arbitration Test	Arbitration, a subtest, continuously renders an object into the accelerator port while performing reads and writes through the direct port. For single-buffered configuration, a picture is rendered into the RGB planes while another process does DFB reads and writes in the X plane. For doubled buffered configuration, a picture is rendered into all 32 planes of the B buffer while the other does 32-bit DFB reads and writes in the A plane. This subtest simulates conditions in the read world, where rendering processes and windows operations run concurrently. Errors in this test are attributed to the FBC.

TABLE 15-1 `ffbtest` Options *(Continued)*

`ffbtest` **Options**	**Description**
Stereo Test	The Stereo test displays an object in stereo mode with different images for the right and left eye. The user can verify proper operation by looking at the screen with stereo glasses and following the displayed instructions. If the monitor type is not 1280x1024 @ 76MHz, this test prints a warning message and does not run. To prevent this message from being displayed or written to the SunVTS information log, disable the stereo test in the test option menu. Only Sony P4 and N2 monitors support stereo resolutions. This test temporarily switches the monitor into stereo mode, renders a stereo image, performs a signature analysis on the stereo image (using the RAMDAC signature capture register), and after displaying the image for five seconds, restores the monitor to its previous resolution. Errors in this test are attributed to the RAMDAC. **NOTE** — If vertical lines are displayed on the console when running SunVTS, this could be caused by the `ffbtest` stereo test. There is a time-critical period in the FFB hardware when trying to change the screen resolution from standard to stereo and back to standard. When the system is heavily loaded or running all of the SunVTS tests, the FFB device driver may get interrupted while changing screen resolution. If this occurs, FB ASIC and RAMDAC get out of synchronization, resulting in an unusual display on the FFB screen. This problem could also cause a system hang condition. This test is disabled by default because it is only needed when a stereo monitor and stereo glasses are present. To avoid this type of display problem, disable the `ffbtest` stereo test when other SunVTS tests are enabled.

ffbtest Test Modes

Due to the nature of graphic tests, reading from or writing to the frame buffer during graphic tests will disturb user operation. This test is only available in Functional Test and Stress Mode.

TABLE 15-2 ffbtest Test Modes

Test Mode	Description
Functional Test	The ffbtest verifies both the single- (SFB) and double-buffered (DBZ) fast frame buffer boards.
Stress Mode	Stress mode exercises the frame buffer as much as possible. The Random Test generator, constructed as part of the verification effort, is used. Starting from a known seed, random primitives with random attributes are generated. The primitives are checked to ensure that they were rendered in the same way as on a known good system. The test is repeated ten times, with each random picture overlaying the previous one. Stress is mode is not available on FFB2+ boards.

ffbtest Command Line Syntax

/opt/SUNWvts/bin/ffbtest *standard_arguments* **-o dev=***device_name*, **S=***subtest_number*,**F=***#_of_subtest_loops*,**B=***#_of_test_loops*,**P=***test_pattern*

TABLE 15-3 ffbtest Command Line Syntax

Argument	Explanation
dev=*device_name*	*device_name* is the relative path name of the device being tested with respect to /dev/fbs; The default is ffb0.

TABLE 15-3 `ffbtest` Command Line Syntax

Argument	Explanation *(Continued)*

S=*subtest_number*	*subtest_number* is the test number of the subtest to be run. Select from the subtests below. You can run multiple subtests by adding the subtest numbers. For example, n=0x3 runs both test 1 and test 2; n=0x180 runs both test 0x080 and test 0x0100. Note that you do not need the leading zeros.
	`n - 0x00001 3DRAM`
	`n - 0x00002 3DRAM Logic`
	`n - 0x00004 RAMDAC`
	`n - 0x00008 Rendering Pipeline`
	`n - 0x00010 FastFill/Vertical Scroll`
	`n - 0x00020 Pixel Processor`
	`n - 0x00040 Picking`
	`n - 0x00080 Arbitration`
	`n - 0x00100 Stereo`
	More than one test can be selected by ORing subtest numbers. For example: n = 0x00009 selects 3DRAM and Rendering Pipeline tests. A hex number must be preceded by `0x`, decimal numbers are also acceptable.

F=*#_of_subtest_loops*	Specifies the number of times to repeat each subtest; the default is 1.
B=*#_of_test_loops*	Specifies the number of times to repeat a test loop before passing; the default is 1.
P=*test_pattern*	Specifies the test pattern number. The default is `r`, for random patterns. You may also choose `0 for 0x0000000`, `3 for 0x3333333`, `5 for 0x5555555`, or `9 for 0x9999999`.

`ffbtest` Error Messages

Errors returned by `ffbtest` are nonspecific. It is not possible to determine which component caused a failure. In all error conditions, the field replaceable unit (FRU) is the entire FFB.

TABLE 15-4 `ffbtest` Error Messages

	Error Message	Probable Cause(s)	Recommended Action
6000	`3DRAM Memory error in` *string* `Plane`	Faulty 3DRAM, or possibly host memory error during gcopy operation.	If the problem persists, contact your authorized Sun service provider.
6002	`3DRAM Memory error in` *string* `Plane`	Faulty 3DRAM, or possibly host memory error during gcopy operation.	If the problem persists, contact your authorized Sun service provider.
6004	`3DRAM Memory error in` *string* `Plane`	Faulty 3DRAM, or possibly host memory error during gcopy operation.	If the problem persists, contact your authorized Sun service provider.
6006	`3DRAM Memory error in Buffer A`	Faulty 3DRAM, or possibly host memory error during gcopy operation.	If the problem persists, contact your authorized Sun service provider.
6008	`3DRAM Memory error in Buffer B`	Faulty 3DRAM, or possibly host memory error during gcopy operation.	If the problem persists, contact your authorized Sun service provider.
6010	`3DRAM Memory error in Buffer C`	3DRAM Memory error in Buffer C.	If the problem persists, contact your authorized Sun service provider.
6012	`Misaligned raster.`	Software error.	Reinstall software. If the problem persists, contact your authorized Sun service provider.
6013	`File Not Found. Could not open file` *string*`.`	Software error	Reinstall software. If the problem persists, contact your authorized Sun service provider.
6014	`Could not open file` *string*`:` *string*`.`	Software error.	Reinstall software. If the problem persists, contact your authorized Sun service provider.

TABLE 15-4 `ffbtest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
6015	`Keyword not Found, line` *data*	Software error, Suspect data file corruption.	Reinstall software. If the problem persists, contact your authorized Sun service provider.
6016	*string* `error. Miscompares, starting at` *string*`.`	Faulty frame buffer.	If the problem persists, contact your authorized Sun service provider.
6017	`Picking test error. Got a pick hit with picking disabled.`	Faulty frame buffer.	If the problem persists, contact your authorized Sun service provider.
6018	`Picking test error. Got a pick hit outside the picking area.`	Faulty frame buffer.	If the problem persists, contact your authorized Sun service provider.
6019	`Picking test error. Should have detected a pick hit.`	Faulty frame buffer.	If the problem persists, contact your authorized Sun service provider.
6020	`Out of memory`	Software System Error.	Contact system administrator
6021	*string* `failed`	Software error.	Check for existence and/or permissions on *string.* Also check for available space in tmp. Reinstall software or contact your system administrator.
6022	*string* `failed`	Software error.	Check for existence and/or permissions on *string.*
6023	`fork1(2) failed`	Software error.	Reinstall software or contact your system administrator.
6024	`execl(2) failed`	Software error.	Reinstall software or contact your system administrator.
6025	`Unable to open` *string*`.`	Software error.	Check device for existence and/or permissions on *string.* Reinstall software or contact your system administrator.
6026	`ioctl(2) failed trying to read CLUT.`	hardware failure or software driver error.	Reinstall software first, if failure continues, see a system administrator or your authorized Sun service provider.

TABLE 15-4 `ffbtest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
6027	`ioctl(2) failed trying to turn on FFB video.`	hardware failure or software driver error.	Reinstall software first, if failure continues, see a system administrator or your authorized Sun service provider.
6028	`failed trying to post CLUT.`	hardware failure or software driver error.	Reinstall software first, if failure continues, see a system administrator or your authorized Sun service provider.
6029	`Miscompare found in Red channel of CLUT entry` *data*`.`	Faulty frame buffer.	If the problem persists, contact your authorized Sun service provider.
6030	`Miscompare found in Green channel of CLUT entry` *data*	Faulty frame buffer.	If the problem persists, contact your authorized Sun service provider.
6031	`Miscompare found in Blue channel of CLUT entry` *data*	Faulty frame buffer.	If the problem persists, contact your authorized Sun service provider.
6032	`ioctl(2) failed trying to read WID LUT.`	hardware failure or software driver error.	Reinstall software first, if failure continues, see a system administrator or your authorized Sun service provider.
6033	`ioctl(2) failed trying to post WID LUT`	hardware failure or software driver error.	Reinstall software first, if failure continues, see a system administrator or your authorized Sun service provider.
6034	`failed trying to get RAMDAC signature analysis.`	hardware failure or software driver error.	Reinstall software first, if failure continues, see a system administrator or your authorized Sun service provider.
6035	`Miscompare found in WID LUT entry` *data*	Faulty frame buffer	If the problem persists, contact your authorized Sun service provider.
6036	`RAMDAC test failed. The on-screen image is incorrect`	Faulty frame buffer.	If the problem persists, contact your authorized Sun service provider.
6037	`sysinfo(2) failed getting hostname`	Software error.	Make sure you are superuser.

TABLE 15-4 `ffbtest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
6038	`can't acquire console semaphore`	Software error.	Reinstall software or contact your system administrator.
6039	`Cannot gain control of mouse:` *string*	Software error.	Reinstall software or contact your system administrator.
6040	`Cannot gain control of keyboard:` *string*	Software error	Reinstall software or contact your system administrator.
6046	`ioctl(2) failed trying to get current video mode.`	Possibly hardware failure, likely software driver error.	Reinstall software first, if failure continues, see a system administrator or your authorized Sun service provider.
6047	`ioctl(2) failed trying to set current video mode`	Possibly hardware failure, likely software driver error.	Reinstall software first, if failure continues, see a system administrator or your authorized Sun service provider.
6048	`ioctl(2) failed trying to get FFB system info`	Possibly hardware failure, likely software driver error.	Reinstall software first, if failure continues, see a system administrator or your authorized Sun service provider.
6049	`ioctl(2) failed trying to go into Diagnostic mode`	Possibly hardware failure, likely software driver error.	Reinstall software first, if failure continues, see a system administrator or your authorized Sun service provider.
6050	`mmap(2) failed:` *string*	Software system error.	Reinstall software or contact your system administrator.
6051	`munmap(2) failed:` *string*	Software system error.	Reinstall software or contact your system administrator.
6052	`close(2) failed:` *string*	Software system error.	Reinstall software or contact your system administrator.
6053	`DGA error grabbing window on screen` *data*	Software error.	Reinstall software or contact your system administrator.
6054	`DGA error getting window from token on screen` *data*	Software error.	Reinstall software or contact your system administrator.
6055	`failed trying to read Transparent Overlay registers`	Possibly hardware failure, likely software driver error.	Reinstall software first, if failure continues, see a system administrator or your authorized Sun service provider.

TABLE 15-4 `ffbtest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
6056	`ioctl(2) failed trying to post Transparent Overlay registers`	Possibly hardware failure, likely software driver error.	Reinstall software first, if failure continues, see a system administrator or your authorized Sun service provider.
6057	`failed trying to post cursor`	Possibly hardware failure, likely software driver error.	Reinstall software first, if failure continues, see a system administrator or your authorized Sun service provider.
6058	`ioctl(2) failed trying to read cursor`	Possibly hardware failure, likely software driver error.	Reinstall software first, if failure continues, see a system administrator or your authorized Sun service provider.
6059	`No FFB device found on display 0`	The environmental variable DISPLAY is set wrong or the display being used is not using an FFB.	Set the variable to a display that has the FFB plugged into it.
6060	`There is an inconsistency with the version of the X Window System`	Software error.	Contact your system administrator
6061	`stat(2) failed trying to get info about Device Under Test`	Software error.	Reinstall software or contact your system administrator.
6062	`stat(2) failed trying to get info about screen 0:`*data*	Software error.	Reinstall software or contact your system administrator.
6063	`Can not access X Windows`	Software error.	Try running `xhost(1)` or contact your system administrator.
6064	`wait(2) failed:` *string*	Software error.	Reinstall software or contact your system administrator.
6065	`signal(2) failed:` *string*	Reinstall software or contact your system administrator.	Reinstall software or contact your system administrator.
6066	`thr_kill(2) failed`	Software error.	Reinstall software or contact your system administrator.
6067	`thr_join(2) failed:` *string*	Software error.	Reinstall software or contact your system administrator.

TABLE 15-4 `ffbtest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
6071	`get signatures`	operator error.	To get signatures, run `ffbtest` from the command line
6072	`Stereo image incorrect`	Stereo image incorrect.	If the problem persists, contact your authorized Sun service provider.
6075	`System LWP limit exceeded`	Software error.	Reinstall software or contact your system administrator.
6076	`Error` *data* `creating thread`	Software error.	Reinstall software or contact your system administrator.
6104	`Error in getting the length of the file.` *string*	Software error.	If the problem persists, contact your authorized Sun service provider.
6105	`Stencil test failed` *string*	Faulty 3DRAM.	If the problem persists, contact your authorized Sun service provider.
6106	`Passin test failed` *string*	Faulty 3DRAM.	If the problem persists, contact your authorized Sun service provider.
6107	`Blend2 test failed` *string*	Faulty 3DRAM.	If the problem persists, contact your authorized Sun service provider.
6115	`3DRAM Memory error testing` *string*	Faulty 3DRAM, or possibly GCopy error.	If the problem persists, contact your authorized Sun service provider.
6116	*string* `error: 3DRAM Memory error testing` *string*	Faulty 3DRAM, or possibly GCopy FFB to Memory error.	If the problem persists, contact your authorized Sun service provider.
6117	*string* `error: 3DRAM Memory error testing` *string*	Faulty 3DRAM, or possibly GCopy Memory to FFB error.	If the problem persists, contact your authorized Sun service provider.
6208	`ioctl(2) failed trying to post Overlay WID LUT.`	Possibly hardware failure, likely software driver error.	Reinstall software first, if failure continues, see a system administrator or your authorized Sun service provider.
6209	`ioctl(2) failed trying to post Primary WID LUT`	Possibly hardware failure, likely software driver error.	Reinstall software first, if failure continues, see a system administrator or your authorized Sun service provider.

TABLE 15-4 `ffbtest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
6210	`Miscompare found in Overlay WID LUT entry` *data*	Faulty frame buffer.	If the problem persists, contact your authorized Sun service provider.
6211	`Miscompare found in Primary WID LUT entry` *data*	Faulty frame buffer.	If the problem persists, contact your authorized Sun service provider.
6212	`ioctl(2) failed trying to read CLUT #` *data*	Possibly hardware failure, likely software driver error.	Reinstall software first, if failure continues, see a system administrator or your authorized Sun service provider.
6213	`ioctl(2) failed trying to post CLUT #` *data*	Possibly hardware failure, likely software driver error.	Reinstall software first, if failure continues, see a system administrator or your authorized Sun service provider.
6214	`Miscompare found in Red channel of CLUT #` *data* `in entry` *data*	Faulty frame buffer.	If the problem persists, contact your authorized Sun service provider.
6215	`Miscompare found in Green channel of CLUT #` *data* `in entry` *data*	Faulty frame buffer.	If the problem persists, contact your authorized Sun service provider.
6216	`Miscompare found in Blue channel of CLUT #` *data* `in entry` *data*	Faulty frame buffer.	If the problem persists, contact your authorized Sun service provider.
6217	`RAMDAC test failed. The on-screen image in sep 4 mode is incorrect.`	Faulty frame buffer.	If the problem persists, contact your authorized Sun service provider.
6218	`RAMDAC test failed. The on-screen image in sep 8 mode is incorrect.`	Faulty frame buffer.	If the problem persists, contact your authorized Sun service provider.
6219	`RAMDAC test failed. The on-screen image in combined mode is incorrect.`	Faulty frame buffer.	If the problem persists, contact your authorized Sun service provider.
6220	`ioctl(2) failed trying to read Overlay WID LUT`	Possibly hardware failure, likely software driver error.	Reinstall software first, if failure continues, see a system administrator or your authorized Sun service provider.

TABLE 15-4 `ffbtest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
6221	`ioctl(2) failed trying to read Primary WID LUT`	Possibly hardware failure, likely software driver error.	Reinstall software first, if failure continues, see a system administrator or your authorized Sun service provider.

CHAPTER 16

Floating Point Unit Test (`fputest`)

`fputest` checks the floating point unit on machines with the SPARC-based architecture. `fputest` performs the following subtests:

Instruction tests:

- 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, Square-root, 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

Benchmark tests:

- Linpack test
- Cparanoia test
- Cora test
- Kcsqrt test
- Kcdiv test
- Clorenz test
- Cvector test

`fputest` Options

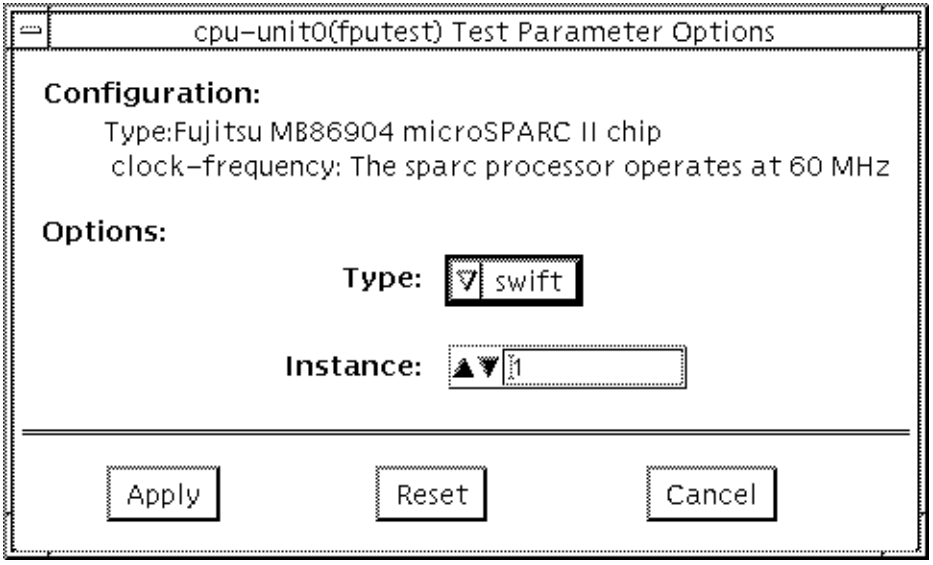


FIGURE 16-1 `fputest` Option Menu

fputest Test Modes

TABLE 16-1 fputest Test Modes

Test Mode	Description
Connection Test Mode	In this mode, fputest includes all the instruction tests.
Functional Test Mode	Functional test includes all the Instruction Tests and all the benchmark tests.
Online Mode	Provides a means to run fputest through SyMON. In Online mode, the following Functional Test description applies: fputest includes Linpack test and all the instruction tests.
Stress Mode	When stress mode is selected, several fpu benchmark tests are run.

fputest Command Line Syntax

/opt/SUNWvts/bin/fputest *standard_arguments*

fputest Error Messages

TABLE 16-2 fputest Error Messages

	Error Message	Probable Cause(s)	Recommended Action
6012	Precision worse than 5 decimal figures	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6013	Radix is too big: roundoff problems	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6014	Radix is not as good as 2 or 10	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6015	(1-U1)-1/2 < 1/2 is FALSE, prog. fails?	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.

TABLE 16-2 `fputest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
6016	`X=1 but X-1/2-1/2!= 0`	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6017	`Subtraction is not normalized X=Y,X+Z != Y+Z!`	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6018	`Multiplication lacks a Guard Digit, so 1*X != X`	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6019	`Multiplication gets too many final digits wrong`	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6020	`Division lacks a Guard Digit`	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6021	`Division lacks a Guard Digit, so X/1 != X`	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6022	`Computed value of 1/1.000.1 >= 1`	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6023	`Multiplication and/or Division gets too many last digits wrong`	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6024	`Subtraction lacks Guard Digit, so cancellation is obscured`	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6025	`X * (1/X) differs from 1`	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6026	`Radix * ( 1 / Radix ) differs from 1`	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6027	`Incomplete carry-propagation in Addition`	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6028	`Square root of 0.0, -0.0 or 1.0 wrong`	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6029	`sqrt gets too many last digits wrong`	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6030	`Square root is neither chopped nor correctly rounded`	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6031	`PseudoZero prints out as:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6032	`PseudoZero prints out as:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.

TABLE 16-2 `fputest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
6033	`Underflow prints out as:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6034	`Accuracy deteriorates as numbers approach a threshold =` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6035	`Underflow confuses Comparison`	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6036	`X =` *value* `is not equal to Z =` *value* `yet X - Z yields` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6037	`X =` *value* `is not equal to Z =` *value* `yet X - Z yields` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6038	`Calculation yields:` *value* `:This is not between 0 and underflow threshold =` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6039	`Calculation yields:` *value* `:This is not between 0 and underflow threshold =` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6040	`Calculated` *value* `for (1 +` (*value*) `^` (*value*)`; differs from correct value by` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6041	`Calculated` *value* `for (1 +` (*value*) `^` (*value*)`; differs from correct value by` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6042	`Overflow(```Z = -Y') test on Y =` *value* `finds that -(-Y) differs from Y`	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6043	`Overflow(```Z = -Y') test on Y =` *value* `finds that -(-Y) differs from Y`	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6044	`Overflow past` *value* `shrinks to` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6045	`Overflow past` *value* `shrinks to` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6046	`Comparisons involving +-` *value*`, +-` *value* `and +-` *value* `are confused by Overflow`	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6047	`Comparisons involving +-` *value*`, +-` *value* `and +-` *value* `are confused by Overflow`	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.

TABLE 16-2 `fputest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
6048	`A total of` *value* `floating point exceptions were registered`	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6049	`(`*value*`) ^ (`*value*`) yielded` *value*`; which compared unequal to correct` *value*`; they differ by` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6050	`(`*value*`) ^ (`*value*`) yielded` *value*`; which compared unequal to correct` *value*`; they differ by` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6051	`What prints as Z =` *value* `compares different from Z * 1 =` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6052	`What prints as Z =` *value* `compares different from 1 * Z ==` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6053	`What prints as Z =` *value* `compares different from Z / 1 =` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6054	`What prints as Z =` *value* `compares different from Z * 1 =` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6055	`What prints as Z =` *value* `compares different from 1 * Z ==` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6056	`What prints as Z =` *value* `compares different from Z / 1 =` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6057	`Multiplication does not commute:Comparison alleges that 1 * Z =` *value* `differs from Z * 1 =` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6058	`Multiplication does not commute:Comparison alleges that 1 * Z =` *value* `differs from Z * 1 =` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6059	*subtest_name* `test appears to be inconsistent.`	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6060	`Comparison alleges that -0.0 is Non-zero!`	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.

TABLE 16-2 `fputest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
6061	`Disagreements among the values X1, Y1, Z1 respectively` *value value value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6062	`Disagreements among the values X1, Y1, Z1 respectively` *value*, *value*, *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6063	`Comparison alleges (1-U1) < 1 although subtraction yields (1-U1) - 1 = 0`	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6064	`Multiplication appears to chop`	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6065	`Multiplication is neither chopped nor correctly rounded`	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6066	`Division appears to chop`	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6067	`Division is neither chopped nor correctly rounded`	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6068	`Addition/Subtraction appears to be chopped`	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6069	`Addition/Subtraction neither rounds nor chops`	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6070	`(X - Y) + (Y - X) is non zero`	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6071	`Sticky bit used incorrectly or not at all`	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6072	`X * Y == Y * X trial fails`	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6073	`Sqrt(X) is non-monotonic for X near` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6074	`Sqrt(X) is non-monotonic for X near` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6075	`Anomalous arithmetic with Integer Radix-Precision =` *value* `fails test whether sqrt rounds or chops`	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.

TABLE 16-2 `fputest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
6076	`Anomalous arithmetic with Integer Radix-Precision =` *value* `fails test whether sqrt rounds or chops`	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6077	`Square root appears to be chopped`	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6078	`Comparison alleges that Z =` *value* `is too far from sqrt(Z) ^ 2 (`*value*`)`	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6079	`Comparison alleges that Z =` *value* `is too far from sqrt(Z) ^ 2 (`*value*`)`	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6080	`Unbalanced range; UfThold * V =` *value* `is too far from 1`	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6081	`Unbalanced range; UfThold * V =` *value* `is too far from 1`	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6082	`Sqrt(` *value*`) -` *value* `=` *value* `instead of correct value 0`	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6083	`Sqrt(` *value*`) -` *value* `=` *value* `instead of correct value 0`	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6084	`Similar discrepancies have occurred` *value* `times`	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6085	`X / X traps when X =` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6086	`X / X traps when X =` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6087	`X / X differs from 1 when X =` *value* `instead, X / X - 1/2 - 1/2 =` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6088	`X / X differs from 1 when X =` *value* `instead, X / X - 1/2 - 1/2 =` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6089	`Computed:`*character* `Expected:`*character*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6090	`Failed Vector test`	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6091	`Error: Invalid operator (`*character*`)`	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.

TABLE 16-2 `fputest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
6092	`Error: Invalid version` (*character*)	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6093	`Error: Invalid precision` (*character*)	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6094	`Error: Illegal input` (*character*)	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6095	`Failed Vector` *subtest_name* `sub-test[`*text*`],` `Operand 1` *text value value*`,` `Operand 2` *text value value*`,` *charactercharactercharacter* `Correct` *text value value* (*text*)`,` `Computed` *text value value* (*text*)	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6096	`Failed Vector` *subtest_name* `sub-test[`*text*`],` `Operand 1` *text value value*`,` `Operand 2` *text value value value*`,` *charactercharactercharacter* `Correct` *text value value value* (*text*)`,` `Computed` *text value value value* (*text*)	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6097	`Failed Vector` *subtest_name* `sub-test[`*text*`],` `Operand 1` *text value value value value*`,` `Operand 2` *text value value value value*`,` *charactercharactercharacter* `Correct` *text value value value value* (*text*)`,` `Computed` *text value value value value* (*text*)	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6098	`Failed Vector` *subtest_name* `sub-test[`*text*`]` `Operand 1` *text* `value` *value* `Operand 2` *text value value value* *charactercharactercharacter* `Correct` *text value value value* (*text*) `Computed` *text value value value* (*text*)	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.

TABLE 16-2 `fputest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
6099	*charactercharactercharacter value* (*text*) *character value* (*text*) <computed *character*>	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6100	*charactercharactercharacter* Op1 (*text*) *character* Op2 (*text*) <computed *character*>	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6101	Flags: Correct (*text*) Computed (*text*)	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6102	FPU initialization failure	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6103	Multiplication failed, result was (*value*), expected (*value*)	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6104	Failed Single-Precision FPA math test	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6105	Failed Double-Precision FPA math test	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6106	Failed linpack test	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6107	Failed cparanoia test	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6108	Failed cora test	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6109	Failed clorenz test	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6110	Failed kcsqrt test	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6111	Failed kcdiv test	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6112	Error: a + b, Expected: 2.2221000 Actual: *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6113	Error a - b,, Expected: 0.2469000 Actual: *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6114	Error a * b, Expected: 1.2191922 Actual: *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6115	Error a / b, Expected: 1.2500000 Actual: *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.

TABLE 16-2 `fputest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
6116	`Error: a + (a + b),` `Expected: 1.4814000` `Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6117	`Error: a - (a + b),` `Expected: -0.9876000` `Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6118	`Error: a + (a * b),` `Expected: 2.4536924` `Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6119	`Error: a - (a * b),` `Expected: 0.0153078` `Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6120	`a + (a / b), Expected:` `2.4845002 Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6121	`Error: a - (a / b),` `Expected: -0.0155000` `Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6122	`Error: a * (a + b),` `Expected: 2.7431825` `Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6123	`Error: a * ( a - b),` `Expected: 0.3047980` `Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6124	`Error: a / ( a - b),` `Expected: 0.5555550` `Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6125	`Error: a / ( a - b),` `Expected: 5.0000000` `Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6126	`Error: a * ( a / b),` `Expected: 1.5431250` `Actual:` *value*`)`	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6127	`Error: a / ( a * b),` `Expected: 1.0125557` `Actual:` *value*`)`	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6128	`Error: a + b, Expected:` `2.222100000000000` `Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.

TABLE 16-2 `fputest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
6129	`Error: a - b, Expected: 0.246899999999999` `Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6130	`Error: a * b, Expected: 1.219192199999999` `Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6131	`Error: a / b, Expected: 1.249999999999999` `Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6132	`Error: a + (a - b), Expected: 1.481399999999999` `Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6133	`Error: a - (a + b), Expected: -0.987600000000000` `Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6134	`Error: a + (a * b), Expected: 2.453692200000000` `Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6135	`Error: a - (a * b), Expected: 0.015307800000000` `Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6136	`Error: a + (a / b), Expected: 2.484500000000000` `Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6137	`Error: a - (a / b), Expected: -0.015499999999999` `Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6138	`Error: a * (a + b), Expected: 2.743182449999999` `Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6139	`Error: a * (a - b), Expected: 0.304798049999999` `Actual:` *value*	FFaulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6140	`Error: a / (a + b), Expected: 0.555555555555555` `Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6141	`Error: a / (a - b), Expected: 5.000000000000002` `Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.

TABLE 16-2 `fputest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
6142	`Error: a * (a / b), Expected: 1.543124999999999 Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6143	`Error: a / (a * b), Expected: 1.0125555690562980 Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6144	`Error: sin(-2pi), Expected: -0.000000000820413 Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6145	`Error: sin(-3pi 2), Expected: 1.0000000000000000 Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6146	`Error: sin(-3pi/2), Expected: 1.0000000000000000 Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6147	`Error: sin(-pi), Expected: 0.000000000410206 Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6148	`Error: sin(-pi/2), Expected: -1.0000000000000000 Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6149	`Error: sin(0), Expected: 0.0000000000000000 Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6150	`Error: sin(pi/2), Expected: 1.0000000000000000 Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6151	`Error: sin(pi), Expected: -0.000000000410206 Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6152	`Error: sin(3pi/2), Expected: -1.0000000000000000 Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6153	`Error: sin(2pi), Expected: 0.000000000820143 Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.

TABLE 16-2 `fputest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
6154	`Error: cos(-2pi), Expected: 1.0000000000000000 Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6155	`Error: cos(-3pi/2), Expected: 0.000000000615310 Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6156	`Error: cos(-pi), Expected: -1.0000000000000000 Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6157	`Error: cos(-pi/2), Expected: -0.000000000205103 Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6158	`Error: cos(0), Expected: 1.0000000000000000 Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6159	`Error: cos(pi/2), Expected: -0.000000000205103 Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6160	`Error: cos(pi), Expected: -1.0000000000000000 Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6161	`Error: cos(3pi/2), Expected: 0.000000000615310 Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6162	`Error: cos(pi/2), Expected: 1.0000000000000000 Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6163	`Error: sin(pi/4), Expected: 0.707106781259062 Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6164	`Error: sin(3pi/4), Expected: 0.707106780969002 Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6165	`Error: sin(5pi/4), Expected: -0.707106781549122 Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.

TABLE 16-2 `fputest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
6166	`Error: sin(7pi/4), Expected: -0.707106780678942 Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6167	`Error: cos(pi/4), Expected: 0.707106781114032 Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6168	`Error: cos(3pi/4), Expected: -0.707106781404092 Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6169	`Error: cos(5pi/4), Expected: -0.707106780823972 Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6170	`Error: cos(7pi/4), Expected: 0.707106781694152 Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6171	`Error: exp(0), Expected: 1.0000000000000000 Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6172	`Error: exp(1), Expected: 2.718281828459045 Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6173	`Error: exp(2), Expected: 7.389056098930650 Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6174	`Error: exp(5), Expected: 148.413159102576600 Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6175	`Error: exp(10), Expected: 22026.465794806718000 Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6176	`Error: exp(-1), Expected: 0.367879441171442 Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6177	`Error: exp(-2), Expected: 0.135335283236612 Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.

TABLE 16-2 `fputest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
6178	`Error: exp(-5), Expected: 0.006737946999085 Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6179	`Error: exp(-10), Expected: 0.000045399929762 Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6180	`Error: exp(log(1), Expected: 1.0000000000000000 Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6181	`Error: exp(log(10), Expected 10.000000000000002 Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6182	`Error: log(1), Expected: 0.0000000000000000 Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6183	`Error: log(2), Expected: 0.693147180559945 Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6184	`Error: log(10), Expected: 2.302585092994045 Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6185	`Error: log(100), Expected: 4.605170185988091 Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6186	`Error: log(exp(0)), Expected: 0.0000000000000000 Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6187	`Error: log(exp(1)), Expected: 1.0000000000000000 Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6188	`Error: log(exp(10)), Expected: 10.0000000000000000 Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6189	`Error: tan(-2pi), Expected: -0.0000000000820414 Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.

TABLE 16-2 `fputest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
6190	`Error: tan(-7pi/4), Expected: 0.999999998564275 Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6191	`Error: tan(-5pi/4), Expected: -1.000000001025517 Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6192	`Error: tan(-pi, Expected: 0.000000000410207 Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6193	`Error: tan(-3pi/4), Expected: 0.999999999384690 Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6194	`Error: tan(-pi/4), Expected: -1.000000000205103 Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6195	`Error: tan(0.0), Expected: 0.000000000000000 Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6196	`Error: tan(pi / 4), Expected: 1.000000000205103 Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6197	`Error: tan(3pi/4), Expected: -0.999999999384690 Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6198	`Error: tan(pi), Expected: 0.000000000410207 Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6199	`Error: tan(5pi/4), Expected: 1.000000001025517 Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6200	`Error: tan(7pi/4), Expected: -0.999999998564275 Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6201	`Error: tan(2pi), Expected: 0.000000000820414 Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.

TABLE 16-2 `fputest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
6202	`Error: sqrt(0), Expected: 0.0000000000000000 Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6203	`Error: sqrt(1), Expected: 1.0000000000000000 Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6204	`Error: sqrt(4), Expected: 2.0000000000000000 Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6205	`Error: sqrt(9), Expected: 3.0000000000000000 Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6206	`Error: sqrt(16), Expected: 4.0000000000000000 Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6207	`Error: sqrt(25), Expected: 5.0000000000000000 Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6208	`Error: sqrt(36), Expected: 6.0000000000000000 Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6209	`Error: sqrt(49), Expected: 7.0000000000000000 Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6210	`Error: sqrt(64), Expected: 8.0000000000000000 Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6211	`Error: sqrt(81), Expected: 9.0000000000000000 Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6212	`Error: sqrt(100), Expected: 10.0000000000000000 Actual:` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6213	`log-test failed: int =` *value*`, expected / observed =` *value* `/` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6214	`kvm_read(mem,nl[0].n_value, ..) failed`	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6215	`kvm_open() failed:<error_message>`	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.

TABLE 16-2 `fputest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
6216	`kvm_nlist() failed:<error_message>`	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6217	`Add SP failed: expected / read =` *value* `/` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6218	`Multiply SP failed:expected / read =` *value* `/` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6219	`Add DP failed: msw : expected / read =` *value* `/` *value*`, lsw : expected / read =` *value* `/` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6220	`Multiply DP failed: msw : expected / read =` *value* `/` *value*`, lsw : expected / read =` *value* `/` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6221	`Single-Precision: add, expected / observed = 0x41200000 / 0x`*value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6222	`Single-Precision: Multiply, expected / observed = 0x43470000 / 0x`*value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6223	`Double-Precision: Add, MSW : expcected / observed = 0x40240000 / 0x`*value*`, LSW : expected / observed = 0x0 / 0x`*value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6224	`Double-Precision: Multiply, MSW : expected / observed = 0x4034000 / 0x`*value*`, LSW : expected / observed = 0x0 / 0x`*value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6225	`Error: expected / observed =` *value* `/ 0x`*value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6226	`Error: expected / observed =` *value* `/ 0x`*value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6227	`fitos failed: int =` *value*`, expected / observed =` *value* `/` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6228	`fitod failed: int =` *value*`, expected / observed =` *value* `/` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.

TABLE 16-2 `fputest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
6229	`fstoi failed: int =` *value*`, expected / observed =` *value* `/` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6230	`fdtoi failed: int =` *value*`, expected / observed =` *value* `/` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6231	`fstod failed: int =` *value*`, expected / observed =` *value* `/` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6232	`fdtos failed: int =` *value*`, expected / observed =` *value* `/` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6233	`fmovs failed : written` *value* `to f0, read from f31 =` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6234	`fnegs failed(from pos to neg): int =` *value*`, expected / observed =` *value* `/` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6235	`fnegs failed (from neg. to pos): int =` *value*`, expected / observed =` *value* `/` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6236	`fabs failed: int =` *value*`, expected / observed =` *value* `/` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6237	`fadds failed: int =` *value*`, f0 =` *value*`, f2 =` *value*`, f0+f2 = f4 =` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6238	`faddd failed: int =` *value*`, f0 =` *value*`, f2 =` *value*`, f0+f2 = f4 =` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6239	`fsubs failed:int =` *value*`, f0 =` *value*`, f2 =` *value*`, f0-f2 = f4 =` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6240	`fsubd failed: int =` *value*`, f0 =` *value*`, f2 =` *value*`, f0-f2 = f4 =` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6241	`fsqrt(single) failed: written / read =` *value* `/` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6242	`fsqrt(double) failed: written / read =` *value* `/` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.

TABLE 16-2 `fputest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
6243	`fdivs failed: int =` *value*`, f0 =` *value*`, f2 =` *value*`, f0 / f2 = f4 =` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6244	`fdivd failed: int =` *value*`, f0 =` *value*`, f2 =` *value*`, f0 / f2 = f4 =` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6245	`fmuls failed: int =` *value*`, f0 =` *value*`, f2 =` *value*`, f0 / f2 = f4 =` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6246	`fmuld failed: int =` *value*`, f0 =` *value*`, f2 =` *value*`, f0 / f2 = f4 =` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6247	`fcmps failed: f0 =` *value*`, f2 =` *value* `: expected / observed = 0 /` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6248	`fcmps failed: f0 =` *value*`, f2 =` *value* `: expected / observed = 1 /`*value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6249	`fcmps failed: f0 =` *value*`, f2 =` *value* `: expected / observed = 2 /`*value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6250	`fcmps failed: f0 =` *value*`, f2 = NaN : expected / observed = 3 /`*value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6251	`fcmpd failed: f0 =` *value*`, f2 =` *value* `: expected / observed = 0 /` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6252	`fcmpd failed: f0 =` *value*`, f2 =` *value* `: expected / observed = 1 /`*value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6253	`fcmpd failed: f0 =` *value*`, f2 =` *value* `: expected / observed = 2 /`*value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6254	`fcmpd failed: f0 =` *value*`, f2 = NaN : expected / observed = 3 /`*value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6255	`FBU failed. result =` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6256	`FBG failed: f0 =` *value*`, f2 =` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.

TABLE 16-2 `fputest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
6257	`FBUG (unordered) failed`	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6258	`FBUG (greater) failed: f0 =` *value*`, f2 =` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6259	`FBL failed: f0 =` *value*`, f2 =` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6260	`FBUL (unordered) failed`	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6261	`FBUL (Less) failed: f0 =` *value*`, f2 =` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6262	`FBLG (Less) failed: f0 =` *value*`, f2 =` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6263	`FBLG (Greater) failed: f0 =` *value*`, f2 =` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6264	`FBNE failed: f0 =` *value*`, f2 =` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6265	`FBE failed : f0 =` *value*`, f2 =` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6266	`FBUE (unordered) failed`	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6267	`FBUE (equal) failed : f0 =` *value*`, f2 =` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6268	`FBGE (equal) failed : f0 =` *value*`, f2 =` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6269	`FBGE (greater) failed: f0 =` *value*`, f2 =` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6270	`FBUGE (unordered) failed`	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6271	`FBUGE (equal) failed : f0 =` *value*`, f2 =` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6272	`FBUGE (greater) failed: f0 =` *value*`, f2 =` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6273	`FBLE (Less) failed: f0 =` *value*`, f2 =` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6274	`FBLE (equal) failed : f0 =` *value*`, f2 =` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.

TABLE 16-2 `fputest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
6275	`FBULE (unordered) failed`	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6276	`FBULE (Less) failed: f0 =` *value*`, f2 =` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6277	`FBULE (equal) failed : f0 =` *value*`, f2 =` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6278	`FBO failed: f0 =` *value*`, f2 =` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6279	`FBA failed: f0 =` *value*`, f2 =` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6280	`FBN failed: f0 =` *value*`, f2 =` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6281	`FBU failed`	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6282	`FBG failed: f0 =` *value*`, f2 =` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6283	`FBUG failed: f0 =` *value*`, f2 =` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6284	`FBLfailed: f0 =` *value*`, f2 =` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6285	`FBUL failed: f0 =` *value*`, f2 =` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6286	`FBLG failed: f0 =` *value*`, f2 =` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6287	`FBNE failed: f0 =` *value*`, f2 =` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6288	`FBE failed: f0 =` *value*`, f2 =` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6289	`FBUE failed: f0 =` *value*`, f2 =` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6290	`FBGE failed: f0 =` *value*`, f2 =` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6291	`FBUGE failed: f0 =` *value*`, f2 =` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6292	`FBLE failed: f0 =` *value*`, f2 =` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.

TABLE 16-2 `fputest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
6293	`FBULE failed: f0 =` *value*`, f2 =` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6294	`FBO failed`	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6295	`fcmpxs failed: Exception did not occur. fsr =` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6296	`fcmpxd failed: Exception did not occur. fsr =` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6297	`Error: Bus error occured. ftt =` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6298	`Error: Bus error did not occur(IEEE exception). ftt =` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6299	`Error: Bus error did not occur(Unfinished exception). ftt =` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6300	`register read/write failed : reg =` *value*`, expected / observed =` *value* `/` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6301	`register test-2 read/write failed : reg =` *value*`, expected / observed =` *value* `/` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6302	`register read/write failed : reg =` *value*`, expected / observed =` *value* `/` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6303	`FSR Error: expected / observed =` *value* `/` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6304	`Wrong code is given`	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6305	`FPU Trap did not occur , i =` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6306	`FPU Trap Should not occur but occured`	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6307	`Bus Error did not occur`	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.

TABLE 16-2 `fputest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
6308	`Did not create correct IEEE exception (Inexact): expected = 1, observed =` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6309	`Did not create correct IEEE exception (Divide By zero) : expected = 2, observed =` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6310	`Did not create correct IEEE exception (Overflow) : expected = 8, observed =` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6311	`Did not create correct IEEE exception (Invalid) : expected = 10, observed =` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6312	`Sun FPU Reliability Test Failed due to segment violation error`	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6313	`Sun FPU Reliability Test Failed due to fpu bus error`	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6314	`Number of failures (out of` *value* `cases) =` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6315	`malloc(0x`*value*`) failed :<error_message>`	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6316	`Failed` *value* `precision linpack test`	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6317	`DIVTEST` *value*`: Number of failures (out of` *value* `cases) =` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6318	`,  expected t` *value*`, observed`*value*`, expected x` *value*`,observed`*value*`, expected y` *value*`, observed` *value*`, expected z` *value*`, observed` *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.

TABLE 16-2 `fputest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
6319	, expected t *value*, observed *value* /n expected x *value*, observed *value* , expected y *value*, observed *value* , expected z *value*, observed *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6320	Failed *value* precision Cora test:Check Sum = *value* Expected *value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6321	*value*	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6322	Sun FPU Reliability Test Failed due to floating point exception error	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
6323	Sun FPU Reliability Test Failed due to illegal instruction error	Faulty CPU module.	Retry test. If the problem persists, contact your Sun service provider.
8000	Failed systest for FPU		
8001	Floating point exception interrupt		

CHAPTER 17

Intelligent Fibre Channel Processor Test (`ifptest`)

`ifptest` tests the functionality of the PCI FC_AL card when there are no devices attached to the loop. The driver checks for devices on the fibre loop. If devices are detected it blocks any diagnostic commands.

Note – When devices are attached to the loop, do not run `ifptest`. Instead, run tests against the individual devices. This will test the whole subsystem including the FC_AL controller.

Note – The driver checks for devices on the fibre loop, and will block any diagnostic command if it finds attached devices.

`ifptest` uses the “mailbox” interface to the card. This interface allows certain firmware operations to be performed that normally would not be available to the application layer.

There are four subtests that are run in online and functional modes:

- Mailbox loopback Test

  Loads a series of registers into the input mailboxes on the card and then reads the output mailboxes and compares results. This verifies that the system side of the card is operating correctly, and that the internal data paths are ok.

- Firmware revision check

  Reads the firmware revision from the firmware and compares it against a revision loaded by the driver.

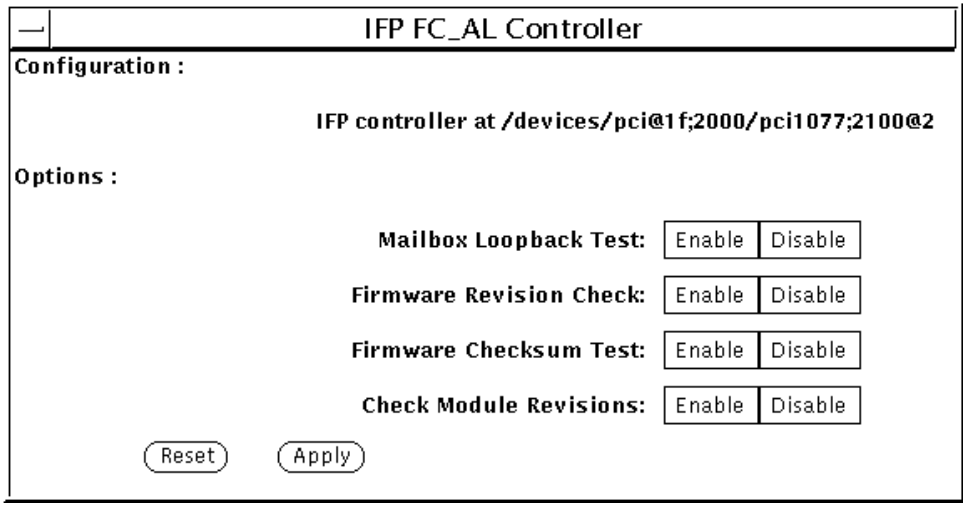
- Checksum firmware test

  Runs an internal checksum test on the installed firmware. This verifies that the risc ram on the card is fully functional and that the installed firmware is still intact. This test also serves as a quick ram check of the risc ram.

- Dump revision levels

  Extracts the hardware and firmware revision levels of different sub modules on the card.

ifptest Options



ifptest Option Menu

Table 0-1 ifptest Options

ifptest **Options**	**Description**
Mailbox Loopback Test	Enable|Disable the mailbox loopback command. This test writes data patterns into the mailboxes and then reads them back from the output mailboxes and verifies the data is correct.
Firmware Revision Check	Enable|Disable the firmware revision check command. This test extracts the firmware revision from the RISC firmware code and verifies against expected values.
Firmware Checksum Test	Enable|Disable the firmware checksum command. This command instructs the interface's risc processor to calculate the checksum on the current microcode and then compare it against the checksum that was loaded in with the microcode.
Check Module Revisions	Enable|Disable the firmware checksum command. This command returns the revision level of several sub-modules on the interface card. Although this test is executed when enabled, the module revision levels are only printed out in VERBOSE mode.

ifptest Command Line Syntax

/opt/SUNWvts/bin/ifptest *standard_arguments* [**-p** *n*] [**-i** *n*] [**-w** *n*] **-o** [**dev=***device name*] [**mbox=***Enable*|*Disable*] [**fwrevcheck=***Enable*|*Disable*] [**checksum=***Enable*|*Disable*] [**modrevcheck=***Enable*|*Disable*]

TABLE 17-1 ifptest Command Line Syntax

Argument	Explanation
dev	The name of the device to test.
mbox	*Enable*|*Disable* the mailbox loopback command. This test writes data patterns into the mailboxes and then reads them back from the output mailboxes and verifies the data is correct.
fwrevcheck	*Enable*|*Disable* the firmware revision check command. This test extracts the firmware revision from the RISC firmware code and verifies against expected values.
checksum	*Enable*|*Disable* the firmware checksum command. This command instructs the interface's risc processor to calculate the checksum on the current microcode and then compare it against the checksum that was loaded in with the microcode.
modrevcheck	*Enable*|*Disable* the firmware checksum command. This command returns the revision level of several sub-modules on the interface card. Although this test is executed when enabled, the module revision levels are only printed out in VERBOSE mode.

ifptest Test Modes

ifptest runs in three modes.

TABLE 17-2 ifptest Test Modes

Test Mode	Description
Functional mode	ifptest runs the full set of mailbox tests
Online mode	ifptest runs the full set of mailbox tests
Connectivity	ifptest only performs an open/close

Note – Connectivity mode will only open the controller to verify that the path is still viable.

ifptest Error Messages

TABLE 17-3 ifptest Error Messages

	Error Message	Probable Cause(s)	Recommended Action
6000	Mailbox loopback failed	FC_AL board, System software.	Replace FC_AL board. If the problem persists, contact your authorized Sun service provider.
6001	Error: No device specified to test.		
6002	Can not associate device with *string*.	New hardware added since VTS probe or system software.	Stop all testing and re-probe. If the problem persists, contact your authorized Sun service provider.
6003	FW Stop command returned *data*, expected 0.	IFP Firmware or a system software.	Reload IFP firmware. If the problem persists, contact your authorized Sun service provider.
6004	Command #*data* (cmd=value) did not successfully complete, status: Obs 0x*value*, Exp 0x*value*	IFP Firmware or a system software.	Reload IFP firmware. If the problem persists, contact your authorized Sun service provider.

TABLE 17-3 `ifptest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
6005	`Chained command number` *data* `failed to complete.`	IFP Firmware or a system software.	Reload IFP firmware. If the problem persists, contact your authorized Sun service provider.
6006	*data* `errors were observed during this cycle.`		
6007	`Command chain aborted:` *data* `commands queued,` *data* `commands run`		
6008	`Command Issued:` `mbox[0]=0x`*value*`,` `mbox[1]=0x`*value*`,` `mbox[2]=0x`*value*`,` `mbox[3]=0x`*value*`,` `mbox[4]=0x`*value*`,` `mbox[5]=0x`*value*`,` `mbox[6]=0x`*value*`,` `mbox[7]=0x`*value*		
6009	`Result Mboxes:` `mbox[0]=0x`*value*`,` `mbox[1]=0x`*value*`,` `mbox[2]=0x`*value*`,` `mbox[3]=0x`*value*`,` `mbox[4]=0x`*value*`,` `mbox[5]=0x`*value*`,` `mbox[6]=0x`*value*`,` `mbox[7]=0x`*value*		
6010	`HCCR=0x`*value*`,` `BUS_SEMA=0x`*value*`,` `ISR=0x`*value*`, ICR=0x`*value*`,` `CDMA_COUNT=0x`*value*`,` `CDMA_ADDR=0x`*value*		
6011	`CDMA_STATUS=0x`*value*`,` `CDMA_CONTROL=0x`*value*`,` `RDMA_COUNT=0x`*value*`,` `RDMA_ADDR=0x`*value*`,` `RDMA_STATUS=0x`*value*`,` `RDMA_CONTROL=0x`*value*		
6012	`TDMA_COUNT=0x`*value*`,` `TDMA_ADDR=0x`*value*`,` `TDMA_STATUS=0x`*value*`,` `TDMA_CONTROL=0x`*value*`,` `RISC_PSR=0x`*value*`,` `RISC_IVR=0x`*value*		

TABLE 17-3 `ifptest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
6013	`RISC_REGS: RR0=0x`*value*`, RR1=0x`*value*`, RR2=0x`*value*`, RR3=0x`*value*`, RR4=0x`*value*`, RR5=0x`*value*`, RR6=0x`*value*`, RR7=0x`*value*		
6014	`RISC_REGS: RR8=0x`*value*`, RR9=0x`*value*`, RR10=0x`*value*`, RR11=0x`*value*`, RR12=0x`*value*`, RR13=0x`*value*`, RR14=0x`*value*`, RR15=0x`*value*		
6015	`RISC_PCR=0x`*value*`, RISC_RAR0=0x`*value*`, RISC_RAR1=0x`*value*`, RISC_LCR=0x`*value*`, RISC_PC=0x`*value*`, RISC_SP=0x`*value*		
6016	`REQUEST_IN=0x`*value*`, REQUEST_OUT=0x`*value*`, RESPONSE_IN=0x`*value*`, RESPONSE_OUT=0x`*value*		
6017	`CURRENT_REQ_PTR=0x`*value*`, BASE_REQ_PTR=0x`*value*`, CURRENT_RESP_PTR=0x`*value*`, BASE_RESP_PTR=0x`*value*		
8000	*string*`: invalid file descriptor` *data* `passed in.`	Programming error or system software.	If the problem persists, contact your authorized Sun service provider.
8001	*string*`: IOCTL call failed:` *string*`.`	wrong / missing IFP driver.	Contact your system administrator to load correct driver. If the problem persists, contact your authorized Sun service provider.
8002	*string*`: Firmware checksum failed, Rec:` *value*`, Exp: 0x0`	Unsupported or bad firmware loaded or bad ifp controller.	Load the correct ifp driver. If the problem persists, contact your authorized Sun service provider.
8003	*string*`: Get Revision command failed, return code 0x`*value*`.`	Incorrect ifp firmware loaded or a system software problem.	Load the correct ifp driver. If the problem persists, contact your authorized Sun service provider.
8004	*string*`: Phase 1 Revision check failed, Act: 0x`*value*`, Exp: 0x`*value*	System software problem.	Contact your system administrator. If the problem persists, contact your authorized Sun service provider.
8005	*string*`: Firmware restart failed, Counter: 0x`*value*`, Status: 0x`*value*	System software problem. Possible defective IFP card.	Contact your system administrator. If the problem persists, contact your authorized Sun service provider.

TABLE 17-3 `ifptest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
8006	`Unknown option passed in:` *string*	Program error or system software problem.	Contact your system administrator. If the problem persists, contact your authorized Sun service provider.
8007	`Bad option string passed to test:` *string*	Program error or system software problem.	Contact your system administrator. If the problem persists, contact your authorized Sun service provider.
8008	`Open of IFP device failed;` *string*	System software problem.	Contact your system administrator. If the problem persists, contact your authorized Sun service provider.

CHAPTER 18

Dual Basic Rate ISDN (DBRI) Chip (`isdntest`)

`isdntest` verifies the functionality of the ISDN portion of the Dual Basic Rate ISDN (DBRI) chip.

`isdntest` is actually a set of several subtests. Three main channels exist within an ISDN: D, B1 and B2. In each of the following subtests, unless otherwise indicated, the D channels are in Basic Rate HDLC data mode, the B1 channels are in 56 kbps HDLC data mode, and the B2 channels are in 64-kbps HDLC data mode. The D channel packet size is 256 bytes, and the B channel packet size is 1024 bytes. The packet count is 10 packets. Each channel runs as an independent thread.

TABLE 18-1 `isdntest` Subtests

`isdntest` **Subtests**	**Description**
Local Loopback Test	The local loopback test checks the initial activation state of the Network Termination (NT) and Terminal Equipment (TE) interfaces to make sure they are deactivated. Then it activates each interface using the “force activation” capability of DBRI. Each interface is put into local loopback mode (See FIGURE 18-1). Data residing in host memory is written to each interface, which loops the data back to itself. The data is then read back into host memory and verified. Each channel, D, B1 and B2 is tested (with the exception of the TE D channel, which cannot be tested in local loopback mode). The local loopback test runs internal to the DBRI chip and does *not* require an NT-to-TE external loopback connector.
Activation / Deactivation Test	The activation / deactivation test runs through the activation / deactivation sequence for the NT and then the activation sequence for the TE. The T101 and T103 timers are set to five seconds. This subtest requires an NT-to-TE external loopback connector.

TABLE 18-1 `isdntest` Subtests *(Continued)*

`isdntest` **Subtests**	**Description**
Remote Loopback Test	The remote loopback capability is tested next. The TE interface is put into remote loopback mode, and the NT transmits data to the TE on all three channels, D, B1 and B2 (See FIGURE 18-2). The TE loops all data back to the NT and reads a copy of it. Data is then verified. Next, the whole process is repeated with the TE transmitting to the NT, which is placed in remote loopback mode. This subtest requires an NT-to-TE external loopback connector.
Read / Write Test	Next, a read / write test is performed on all six ISDN channels: TE D, TE B1, TE B2, NT D, NT B1 and NT B2. The external loopback connector connects each channel on the TE interface to its corresponding channel on the NT (See FIGURE 18-3). A unique data pattern is used for each path. Packets read are compared against packets written. The test is repeated with the B1 channels placed in 64-kbps HDLC data mode and the B2 channels in 56-kbps HDLC data mode. This subtest requires an NT-to-TE external loopback connector.
Packet Size Test	The next subtest is a packet size test. A read / write test, similar to the previous one, is performed with a packet count of 100. Each packet transmitted and received is a unique size, computed randomly. This subtest requires an NT-to-TE external loopback connector.
Data Path Test	The last subtest is a data path test. Using the ISDN_SET_CHANNEL `ioctl`, data is routed through a series of short pipe interconnects within DBRI (See FIGURE 18-4). This subtest requires an NT-to-TE external loopback connector.

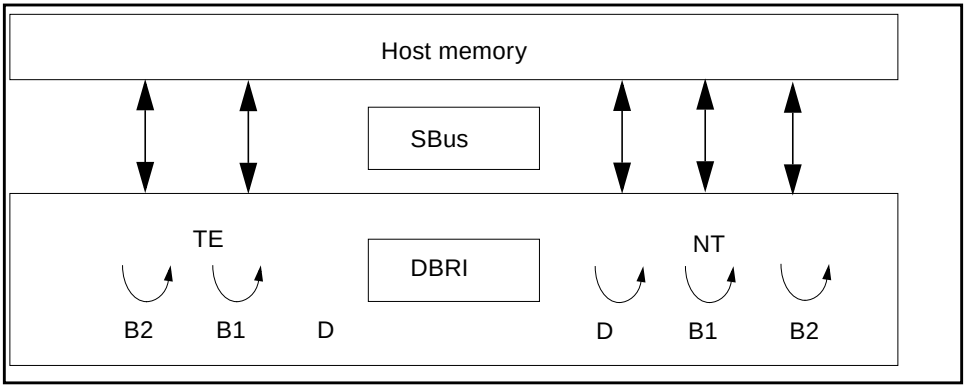


FIGURE 18-1 `isdntest` Local Loopback Subtest

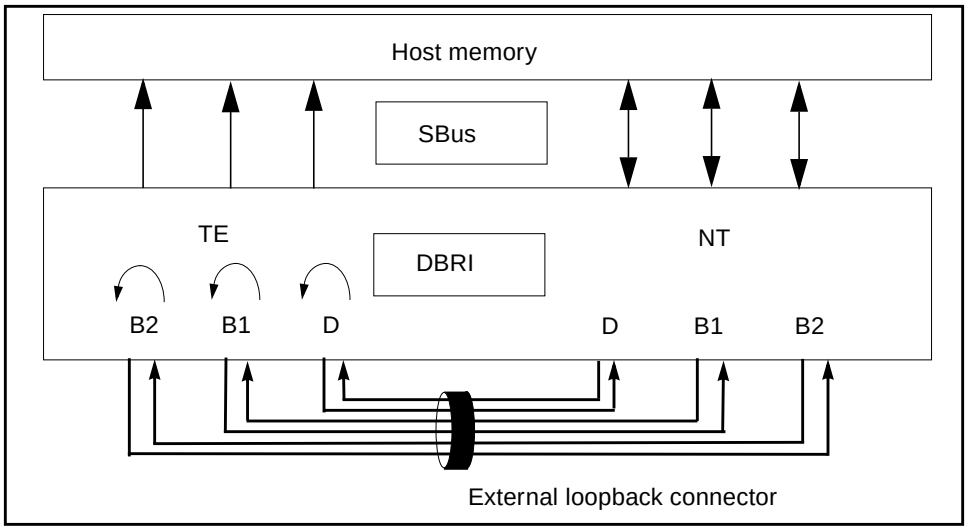


FIGURE 18-2 `isdntest` Remote Loopback Subtest

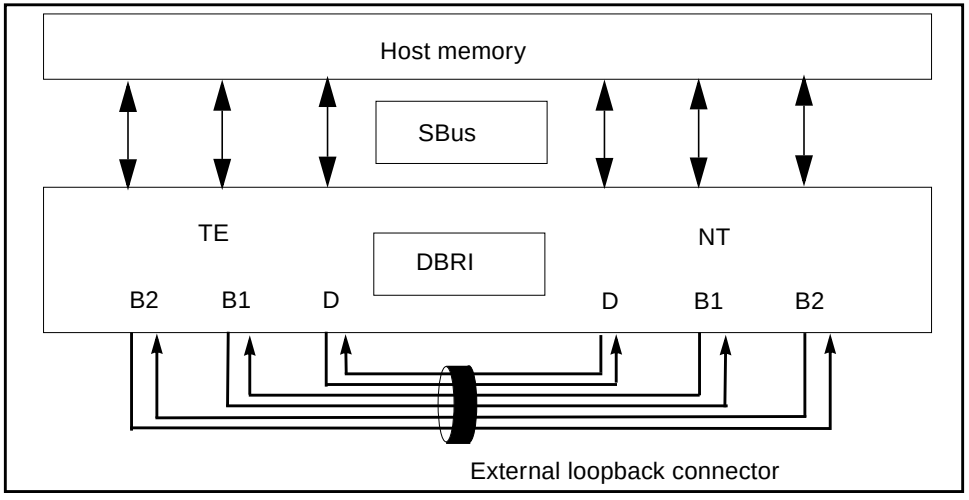


FIGURE 18-3 `isdntest` Read / Write Subtest

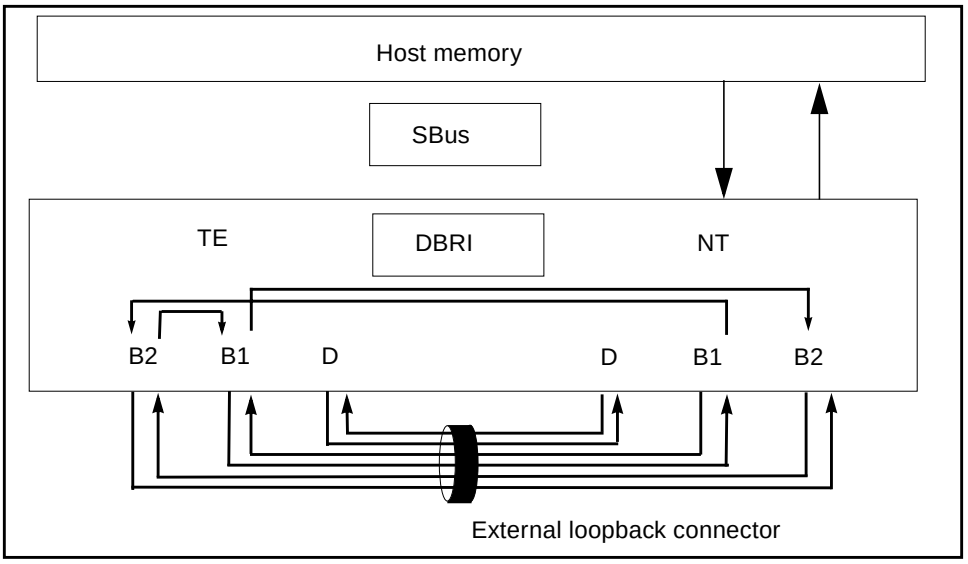


FIGURE 18-4 `isdntest` Data Path Subtest

`isdntest` Options

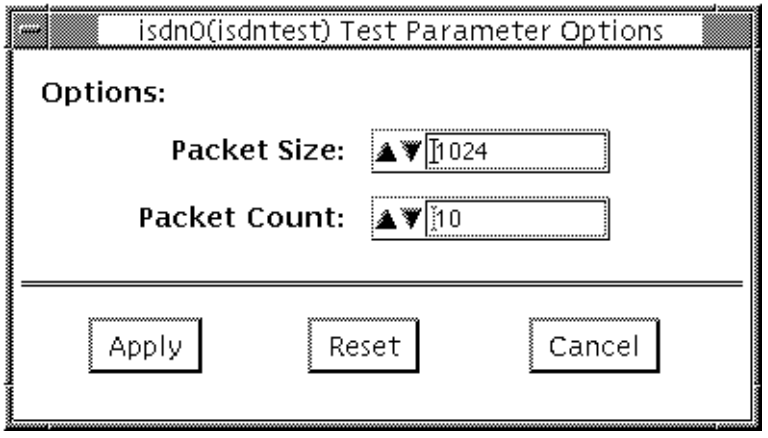


FIGURE 18-5 `isdntest` Options Menu

TABLE 18-2 `isdntest` Options

`isdntest` **Options**	**Description**
Packet Size	The byte size of the B channel packets. The default size is 1024 bytes for the B channels and 256 for the D channels. The maximum packet size is 8186 bytes for the B channels, and the minimum packet size is 1 byte. The D channel packet size is set to 256, except during the packet size test, when it is set to random values between 1 and 256
Packet Count	How many packets are to be transmitted and received for all channels. The default packet count is 10 packets. The maximum packet count is 100 packets

`isdntest` Test Modes

This test only supports Functional Test mode.

`isdntest` Command Line Syntax

`/opt/SUNWvts/bin/isdntest` *standard_arguments* **`-o size=`***packet_size*`,` **`count=`***packet_count*

TABLE 18-3 `isdntest` Command Line Syntax

Argument	**Explanation**
`size=`*packet_size*	The byte size of the B channel packets. The B channel default size is `1024` bytes. The D channel default size is 256 bytes. The B channel maximum packet size is 8186 packets. The B channel minimum packet size is 1 packet. The D channel packet size is 256 (except during the packet size test, when it is set to random values between 1 and 256).
`count=`*packet_count*	How many packets are to be transmitted and received for all channels The default count is 10 packets. The Maximum packet count is 100 packets.

isdntest Error Messages

TABLE 18-4 isdntest Error Messages

	Error Message	Probable Cause(s)	Recommended Action
6000	ISDN_PARAM_SET ioctl failed for *device_name*. (*error_message*)		
6001	ISDN_SET_LOOPBACK ioctl failed for *device_name*. (*error_message*)		
6002	ISDN_RESET_LOOPBACK ioctl failed for *device_name*. (*error_message*)		
6003	ISDN_SET_CHANNEL ioctl() failed for *device_name*. (*error_message*)		
6004	Unable to open *device_name*. (*error_message*)		
6005	poll() failed. (*error_message*)		
6006	Invalid packet size: S=*number*. Max is *number*		
6007	Invalid packet count: C=*number*. Max is *number*		
6008	ISDN_SET_FORMAT, ioctl() failed for ISDN_CHAN_TE_D during *device_name*. (*error_message*)		
6009	ISDN_SET_FORMAT, ioctl() failed for ISDN_CHAN_NT_D during *device_name*. (*error_message*)		
6010	ISDN_SET_FORMAT, ioctl() failed for ISDN_CHAN_TE_B1 during *device_name*. (*error_message*)		
6011	ISDN_SET_FORMAT, ioctl() failed for ISDN_CHAN_NT_B1 during *device_name*. (*error_message*)		

TABLE 18-4 `isdntest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
6012	Mode is unknown: *number*		
6013	ISDN_SET_FORMAT, ioctl() failed for ISDN_CHAN_TE_B2 during *device_name*. (*error_message*)		
6014	ISDN_SET_FORMAT, ioctl() failed for ISDN_CHAN_NT_B2 during *device_name*. (*error_message*)		
6015	Unable to open *device_name* during *device_state*. (*error_message*)		
6016	Unable to close *device_name* during *device_state*. File descriptor = *number* (*error_message*)		
6017	Initial state of *string* is ISDN_ACTIVATED		
6018	Initial state of *string* is unknown: *number*		
6019	ISDN_PARAM_SET ioctl() *parameter* failed for *device_name*. (*error_message*)		
6020	ISDN_ACTIVATION_STATUS ioctl() failed for *device_name*. (*error_message*)		
6021	getmsg() failed. (*error_message*)		
6022	Invalid message returned from getmsg()		
6023	*string* ioctl() failed for *device_name*. (*error_message*)		
6024	\n*device_name*.\nTE state = *string*\tNT state = *string*		
6025	shmget() failed.(*error_message*)		
6026	Initial state unknown: *number*		
6027	*string*		

CHAPTER 19

ZX and TZX Graphics Accelerator Test (leotest)

leotest verifies the Sun Microsystems ZX and TZX graphics accelerators with a sequence of subtests. All tests are nondestructive and maintain the system integrity during and after the tests are run.

Caution – Do not run any other application that uses the ZX or TZX accelerator port while running leotest. This combination causes SunVTS to return incorrect errors.

Note – Disable all screen savers before testing any graphics device. Type **xset s off** at a UNIX prompt to disable the Solaris screen saver.

To start SunVTS with vtsui, but without vtsk, you must add the host name to xhost as: xhost + *hostname*

leotest requires approximately 2 Mbytes of disk space in the /tmp directory to extract its working files. If this space is not available, the diagnostic will fail and report warning and error messages, indicating a lack of disk space.

This test cannot be run on UltraSPARC systems.

leotest Options

By default, SunVTS runs all of the available tests described in the next section,“leotest Subtests” on page 201, except the Stereo test. To avoid excessive test cycle times when testing the ZX or TZX Graphics Accelerators, follow these instructions to ensure that `leotest` runs once, reports the status as each test routine, and then exits:

1. Select Single Pass in the SunVTS Options menu.
2. Select Verbose in the SunVTS Options menu.
3. Do not select any other diagnostic tests.

Note – Disable all screen savers before testing any graphics device. Type **`xset s off`** at a UNIX prompt to disable the Solaris screen saver.

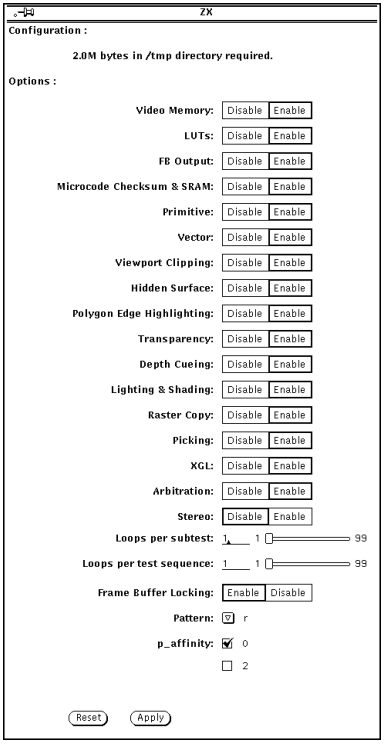


FIGURE 19-1 `leotest` Option Menu

leotest Subtests

leotest is divided into two subtest categories:

- **Direct Port tests**

The direct port tests check the non-accelerated portion of the ZX using various subtests (refer to TABLE 19-1).

- **Accelerator Port tests**

The accelerator port test consists of a sequence of subtests that are designed to ensure the ZX Graphics Accelerator integrity at the system level (refer to TABLE 19-1). They take accelerator port transaction files as input. These files contain graphic data that is passed to the ZX Accelerator port in groups of 32-bit words called packets. These packets contain dots, vectors, triangles, and pass-through commands, and are generated in either immediate (programmed I/O) or DMA mode. The ZX SunVTS queries the system software for DMA capability, and if applicable, renders objects in DMA mode for some subtests. For more information on ZX hardware, refer to the *Leo Hardware Reference Manual*.

For verification, after the image is rendered to the frame buffer, each subtest reads the RGB image data from the frame buffer and compares the data against known good images. To save disk space, the good image data is stored in a reduced size (64 times smaller that the normal size), and is stored in the Sun raster file format. The files are stored in the `leotest.data` file in the `/opt/SUNWvts/bin` directory.

Note – The `leotest` subtests verify a frame buffer region of 1152 by 900 pixels, regardless of monitor size.

TABLE 19-1 `leotest` Subtests

`leotest` **Subtests**	**Description**
Direct Port Tests	
Video Memory	The video memory array subtest selects and tests 64 x 64 pixel regions covering all video memory planes, including the 24-bit double-buffered image plane, 8-bit overlay plane, 24-bit depth (Z buffer) plane, and 10-bit window identification (WID) plane. If the subtest detects an error, SunVTS reports the defective plane and location.
LUTs	This subtest performs a nondestructive read-write test on the frame buffer color look-up tables and the WID look-up tables. After the test is complete, the table contents are restored. If this subtest detects a failure, SunVTS reports the location of the failure. At the beginning of this subtest, red, green, and blue stripes are displayed for visual verification of the digital-to-analog converters (DACs).
Frame Buffer Output	The Frame Buffer Output subtest creates various windows in the Window ID plane, then sets up the look-up tables (LUTs) associated with these windows. This subtest then writes random values to the video memory of these windows. Next, the test verifies the RGB image data of each pixel by triggering the trap registers, reading and generating RGB checksums from these values, and comparing these checksums with known values. This is also a visual cursor test as the cursor is being displayed for each pixel that is being tested. Note: Moving the mouse cursor during the test can prolong the test and cause failures. For best results, remove the mouse from the mouse pad during this test.
Accelerator Port Tests	
Microcode SRAM Checksum and Read / Write Selftest	This subtest sends a diagnostic package to the microcode of the floating point transform engine with instructions to reset the accelerator port, run the SRAM selftest, and restart the engine. Then the test verifies each SRAM of all four Leo float chips in the floating point transform engine to make sure they have the same checksum. If not, the test reports an error, based on the information it receives from the microcode. Nondestructive read / write tests are also performed on each SRAM.
Primitive	This subtest renders primitives such as dots and lines, as well as triangle, with different color and shading at each vertex.
Vector	This subtest renders fairly large vector objects with aliased and anti-aliased vectors. This subtest is rendered in DMA mode, when applicable.

TABLE 19-1 `leotest` Subtests *(Continued)*

`leotest` **Subtests**	**Description**
Viewpoint Clipping	This subtest renders and clips an object around and in front of the screen.
Hidden Surface	This subtest renders objects with the Z-buffer-compare attribute turned on.
Polygon edge Highlighting	This subtest renders an object with the polygon edge attribute turned on. This subtest is rendered in DMA mode, when applicable.
Transparency	This subtest renders a scene with two transparency modes (standalone and alpha blend) in various degrees. This results in a two-pass transparency of the objects in the scene. This subtest is rendered in DMA mode, when applicable.
Depth-Cueing	This subtest renders an object with the depth-cueing attribute turned on.
Lighting and Shading	This subtest renders an object with multiple light sources and Gouraud shading for front and back surfaces. This subtest is rendered in DMA mode, when applicable.
Raster Copy	This subtest renders 32-bit image and various subregions of it, and zooms in on a subregion, using the microcode raster data copy command.
Picking	This subtest has two parts: a Pick Detect test and a Pick Echo test.
XGL	The transaction file for this subtest was generated from an XGL program to ensure that the XGL registers are exercised.
Arbitration	This subtest continually renders an object into the accelerator port while a second process performs a read/write test to the WID planes from the direct port on the frame buffer. This subtest simulates conditions where rendering processes and windows operation run concurrently. This subtest is rendered in DMA mode, when applicable.
Stereo (Interactive)	This subtest displays text information in stereo mode. The user verifies proper operation by looking at the screen with stereo glasses and following the instructions displayed.
Loops per subtest	Type the number of times each test should be run before going on to the next test. The default is one loop.

TABLE 19-1 `leotest` Subtests *(Continued)*

`leotest` **Subtests**	**Description**
Loops per test sequence	Type the number of times the entire test sequence should be run. Each sequence pass registers one in the SunVTS Pass Count window. The default is one loop.
FB Locking	See the section "Testing Multiple Frame Buffers" in Chapter 3 of the *SunVTS 2.1 User's Guide* for details.
Pattern	Press MENU to select a data pattern for the direct port tests. The default is `r` for random patterns. You may select a pattern of 0s, 3s, 5s, or 9s. For example, if you choose a pattern of 3s, the value 0x33333333 is written to and read from the frame buffer.

`leotest` Test Modes

Due to the nature of graphic tests, reading from or writing to the frame buffer during graphic tests will disturb user operation. This test is only available in Functional test.

In Functional test, `leotest` verifies the ZX and TZX graphics accelerators by running direct port tests and accelerator port tests.

leotest Command Line Syntax

/opt/SUNWvts/bin/leotest *standard_arguments* **-o dev=**device_name**,S=***subtest_number***,F=***#_of_subtest_loops***,B=***#_of_test_loops***,lock=***E(nable)/D(isable)***,P=***pattern*

TABLE 19-2 leotest Command Line Syntax

Argument	Explanation
dev=*device_name*	*device_name* is the full path name of the device being tested; the default is /dev/fbs/leo0.
S=*subtest_number*	*subtest_number* is the test number of the subtest to be run. Select from the subtests below. You can run multiple subtests by adding the subtest numbers. For example, n=0x3 runs both test 1 and test 2; n=0x180 runs both test 0x080 and test 0x0100. Note that you do not need the leading zeros. To run all tests, enter n=0xFFFF. 0x 000 001Direct port—video memory 0x 000 002Direct port—CLUTs and WID LUTs 0x 000 004Direct port—Frame buffer output section 0x 000 008Direct port—SRAM checksum and read/write 0x 000 010Accelerator port—primitives 0x 000 020Accelerator port—vectors 0x 000 040Accelerator port—clipping 0x 000 080Accelerator port—z-buffer 0x 000 100Accelerator port—polygon edge 0x 000 200Accelerator port—transparency 0x 000 400Accelerator port—depth cueing 0x 000 800Accelerator port—lighting & shading 0x 001 000Accelerator port—raster copy 0x 002 000Accelerator port—picking 0x 004 000Accelerator port—XGL 0x 008 000Accelerator port—arbitration 0x 010 000Accelerator port—stereo (interactive)
F=*#_of_subtest_loops*	*#_of_subtest_loops* is the number of loops for each subtest; the default is 1.

TABLE 19-2 `leotest` Command Line Syntax *(Continued)*

Argument	Explanation *(Continued)*
B=*#_of_test_loops*	*#_of_test_loops* is the number of loops of each test sequence. The default is 1.
`lock`=*E(nable)/ D(isable)*	Enables or disables frame buffer locking. See the section "Testing Multiple Frame Buffers" in Chapter 3 of the *SunVTS 2.1 User's Guide* for details.
P=*pattern_number*	Selects a pattern number to be used with the direct ports tests; the default is `r`, for random patterns. You may also choose `0`, `3`, `5`, or `9`.

`leotest` Command Line Examples

The following three examples illustrate how to run `leotest` from a command line. Make sure to change the directory to `/opt/SUNWvts/bin` before running `leotest` from the command line. `leotest` is hard-wired to look for its data file, `leotest.data` in `/opt/SUNWvts/bin`.

- To test the simple accelerator port with a primitive single pass:

```
machine# cd /opt/SUNWvts/bin
machine# leotest -o S=0x10
```

- To test all direct port with five loops of sequence:

```
machine# cd /opt/SUNWvts/bin
machine# leotest -o S=0x7,B=0x5
```

- To test all subtests (except the interactive tests) with two loops of each subtest and four loops of each test sequence:

```
machine# cd /opt/SUNWvts/bin
machine# leotest -o S=0xFFFF,F=2,B=4
```

leotest Error Messages

In all error conditions, the field replaceable unit (FRU) is the entire FFB.

TABLE 19-3 leotest Error Messages

	Error Message	Probable Cause(s)	Recommended Action
1	Arbitration test failed	The arbitration test fails, and the cause is given in the message that follows.	
2	Background process wouldn't die. System error	A software error.	Reboot the SPARCstation.
3	Busy wait exceeded *number* loops. Error in the Floating Point Transform section. Rerun Leoconfig	A timeout error.	There is a possible problem with the floating point transform section. Execute the leoconfig software (located in /etc/opt/SUNWleo/bin/leoconfig) again. Check the leoconfig man pages for more details.
4	[Plane group name] Byte Access Mode error at x=*number* y=*number*, bank=*number*, expected=*number*, observed=*number*, XOR=*number*	The direct port video memory test found an error at pixel (x,y) in the named plane group. The bank # refers to the corresponding VRAM bank number. Byte/Stencil Access Mode applies to all plane groups that access 8 bits of the frame buffer memory (in other words, the 8-bit image and overlay planes). The test expected to find exp but observed obs, yielding xor when the two values are exclusive or'd with each other.	
5	Cannot read Window ID look up table from device *device_name*	Software error.	Check device for existence or permissions.
6	Cannot write Window ID look up table to device *device_name*	Software error.	Check device for existence or permissions.
7	Cannot post Color LUTs to device *device_name*	Software error	Check device for existence or permissions.

TABLE 19-3 `leotest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
8	`Cannot get monitor mode from device` *device_name*	Software error.	Check device for existence or permissions.
9	`Cannot set diagnostic mode from device` *device_name*		Check device for existence or permissions.
10	`Cannot set monitor mode from device` *device_name*		Check device for existence or permissions.
11	`Cannot create raster for device` *device_name*		Check device for existence or permissions.
12	`Cannot create color map for device` *device_name*		Check device for existence or permissions.
13	`Cannot create context for device` *device_name*		Check device for existence or permissions.
14	`Cannot create color translation object for device` *device_name*		Check device for existence or permissions.
15	`Cannot create path object for device` *device_name*		Check device for existence or permissions.
16	`Cannot create child raster for device` *device_name*		Check device for existence or permissions.
17	`Cannot create multiple plane group information for device` *device_name*	Software error. The device that you specified (the default is `/dev/fbs/leo0`) may not be available to the test, therefore the above operation cannot be performed on this device.	Check device for existence or permissions. Make sure that you are executing the test on a machine with a ZX, and that you have permission to access it, and that the device is not being used by another application.
18	`Cannot start another process. Software error`	Software error. The process table may be full.	Reboot.

TABLE 19-3 `leotest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
19	`Cannot grab mouse or keyboard because` *message*	Software error. When the FB locking option is selected, `leotest` tries to lock the mouse and keyboard but was not successful. The reason can be one of the following, according the window system software: • Mouse/keyboard is frozen • Grab window is not viewable • Grabbed at an invalid time • Another client grabbed it	Bring down other graphic software that is currently running the same window server.
20	`CLUT` *number*`, index` *number*`, color` *name*`, expected` *number*`, observed` *number*`, XOR=`*number*	An error was found in one of the three color look-up tables tested by SunVTS. The error was found in the *n*th CLUT. The index is out of 256 entries in each CLUT. Each CLUT has an 8-bit value for RED, GREEN, and BLUE. The color indicates the 8-bit set in which the error was found. The test expected to find `expected` but received `observed`, yielding *XOR* when the two values are exclusive `or'd` with each other	
21	`Data file` *file_name* `missing in the current test directory`	Software error. ZX SunVTS can't find the data file (`leotest.data`) in the current `/opt/SUNWvts/bin` directory	Reinstall the `SUNWvts` package in the specified directory.
22	`Error in` *subtest_name* `test`	The subtest fails and the cause is given in the message that follows.	
23	`Error in verifying the` *red/green/blue* `plane at x=`*number*`, y=`*number*`, bank=`*number*`, expected=`*number*`,observed=`*number*`, XOR=`*number*	Failed accelerator port test. The error is in either the RED, GREEN, or BLUE image plane. The `x-y` coordinate of the pixel should contain the `expected` value but instead received the `observed` value. This yields XOR value, or the bits in error, when the two values are exclusive `or'd` with each other.	

TABLE 19-3 `leotest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
24	`Failed to open data file` *file_name*`. Suspect incomplete or incorrect hardware installation. Files may also have been corrupted`	Software initialization problem. *file_name* is the data file that SunVTS can't open.	
25	`Failed to read data file` *file_name*`. Suspect incomplete or incorrect hardware installation. Files may also have been corrupted`	Indicates a software initialization problem where *file_name* is the data file that SunVTS can't read.	
26	`Illegal SBus DVMA code =` *number* `addr = 0x%x data=` *number*	Data file may be corrupt.	
27	`Illegal SBus packet, code =` *number* `addr =` *number* `data =` *number*`. Maybe data file is corrupted`	This error occurs while the subtest is reading the transaction file. It is likely that the data file is corrupt.	The `SUNWvts` package may need to be reinstalled.
28	`Out of Memory`	No memory available.	Increase swap space or kill other processes.
29	`Pick Detect misses:`*number* `lines and/or triangles inside the pickbox and/or` *number* `lines and triangles outside the pickbox`	Failed the Picking accelerator port test. Only the failing component *Red, Green,* or *Blue* appears in the message.	
30	`Pick Echo failed: *** Error(s) found in` *Red, Green,* or *Blue* `components`	Failed the Picking accelerator port test. Only the failing component *Red, Green,* or *Blue* appears in the message.	
31	`Picking: *** Error(s) found in` *Red, Green,* or *Blue* `components`	Failed the picking accelerator port test. Only the failing component *Red, Green,* or *Blue* appears in the message.	

TABLE 19-3 `leotest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
32	*Plane group name* `Pixel Access Mode error at x=`*number* `y=`*number*`, bank=`*number*`, expected=`*number*`,observed=` *number*`, XOR=`*number*	The direct port video memory test found an error at pixel (`x,y`) in the named plane group. Pixel Access Mode applies to all plane groups that access the frame buffer memory 4-bytes at a time. (In other words, all planes except 8-bit planes). The memory for the pixel resides in the given VRAM bank. The test expected to find *expected* but found *observed*, yielding *XOR* when the two values are exclusive or'd with each other.	
33	`SRAM checksum mismatch. Float #1 =` *number*`, Float #2 =` *number*`, Float #3 =` *number*`, Float #4 =` *number*	All four checksums of the SRAMs in the floating point transform section are not identical. The subtest displays the mismatched checksum from each SRAM of each LeoFloat chip.	
34	`SRAM of the LeoFloat [0/1/2/3], number of failures =` *number*`, first SRAM location =` *number*`, expected =` *number*`, observed =` *number*`, XOR =` *number*	An error is found in the SRAM test of the LeoFloat chip number 0, 1, 2, or 3. If the number of failures is more than one, the subtest displays the first SRAM location that fails, the expected and observed values in this location, and the bits in error (values of expected and observed are `xor'd` together).	
35	`tar never finished. System software problem`	Software error.	Make sure that the `tar` program is installed correctly on your system. Also, use `df` to see if you have enough disk space left in your `/tmp` directory.
36	`tar` *error*	Software error. The `tar` program cannot unpack data file to the `/tmp` directory due to limited disk space. A space of approximately 2MB in `/tmp` is required for the test to run correctly.	Make sure that the `tar` program is installed correctly on your system. Also, use `df` to see if you have enough disk space left in your `/tmp` directory.

TABLE 19-3 `leotest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
37	`The checksums for` *red/green/blue* `image data of all pixels don't match, expected =` *number*`, observed =` *number*`, XOR =` *number*	The FB output section subtest prints this message when the checksums of either RED, GREEN, or BLUE image data *observed* from the trap registers in the Video Output test are not the same as the *exp*ected values. It also prints the error messages below if the upper four bits in the trap registers are not set or reset as expected.	
38	`The Even Field bit expected to be 0, observed 1`		
39	`The Composite Sync bit expected to be 1, observed 0`		
40	`The Composite Blank field expected to be 1, observed 0`		
41	`The Stereo bit expected to be 1, observed 0`		
42	`The Stereo bit expected to be 1, observed 0`	These bits are either not set correctly, or the read is from the wrong location, which indicates there is an error in the Video Output section.	
43	`Unable to map` *device_name*`. Not enough memory`	Software error. There is not enough memory to map the addresses for the ZX device; the default is `/dev/fbs/leo0.`	You may have to increase swap space or add more memory.
44	`Unable to open device` *device_name*`. Check device for existence and/or permission`	Software error. SunVTS is unable to open the ZX device.	Make sure that `/dev/fbs/leo0` exists and that the permissions are correct. There may be a software installation problem in which the ZX software packages need to be reinstalled.

TABLE 19-3 `leotest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
45	`Uncompression of data file failed. Note: A space of approximately 2MB in /tmp is required for the test to run correctly`	Software error. There is not enough disk space in `/tmp`; about 2 Mbytes is required to uncompress the data file.	You may have to remove unneeded files or link `/tmp` to a larger disk partition.
46	`Unknown data file magic number =` *number*	Software error. The data file was generated by an older version of software tools.	Report this error by filing a bug report or contacting your Sun Service representative.
47	`Unsupported 24-bit data length. Maybe data file is corrupted`	This error occurs while the subtest is reading the transaction file. Data may be corrupt.	Reinstall the `SUNWvts` package.
48	`Unable to open display. Window server not running`	Warning message only. This message is displayed when the ZX SunVTS is executed from the command line remotely or if SunVTS is run in TTY mode.	
49	`vfork:`*error*	Software error. An error occurred while trying to fork a child process.	Increase swap space, or close other processes.
50	`[PWID/QWID] WLUT: Look up table error at index` *number*`, expected` *number*`, observed` *number*`, XOR` *number*	An error was found in either the PWID (Hardware Window ID) or the QWID (Software Window ID) look-up tables. The error was found in the *n*th WLUT. The index is out of 64 entries for PWID or 15 for QWID. The test expected to find *expected* but received *observed*, yielding *XOR* when the two values are exclusive `or'd` with each other, which indicates the bits in error. This error message indicates there is an error in the Video Output section.	

CHAPTER 20

SPARCprinter Port Test (`lpvitest`)

`lpvitest` verifies the functionality of SPARCprinter ports, and `bpptest` verifies the functionality of bidirectional parallel ports. SBus printer cards have two printer ports: one for SPARCprinters, and one for any parallel port printer.

Printer Test Hardware and Software Requirements

The SBus printer card and device drivers must be installed to run `lpvitest` or `bpptest`. A printer must be connected to the SPARCprinter or bidirectional parallel port, and powered-up. If both a SPARCprinter and a parallel port printer connected to the SBus card, you can test both ports simultaneously.

If you are testing the SPARCprinter port, be sure the magnets on the SPARCprinter paper tray are set to the correct paper size. For more information, see the *SPARCprinter Installation and User's Guide* and the label on the printer tray.

The `lpvitest` verifies that your SBus card and SPARCprinter are working properly by attempting to transfer a data pattern from the SBus card to the SPARCprinter and printing the pattern.

If the SBus card and printer are functioning properly, you can see in the SunVTS Status window that `lpvitest` made a successful pass, and the pattern transmitted to the printer printed correctly.

If this test passes successfully, the SBus DMA circuitry, the SPARCprinter, and the device driver are functioning properly.

lpvitest Options

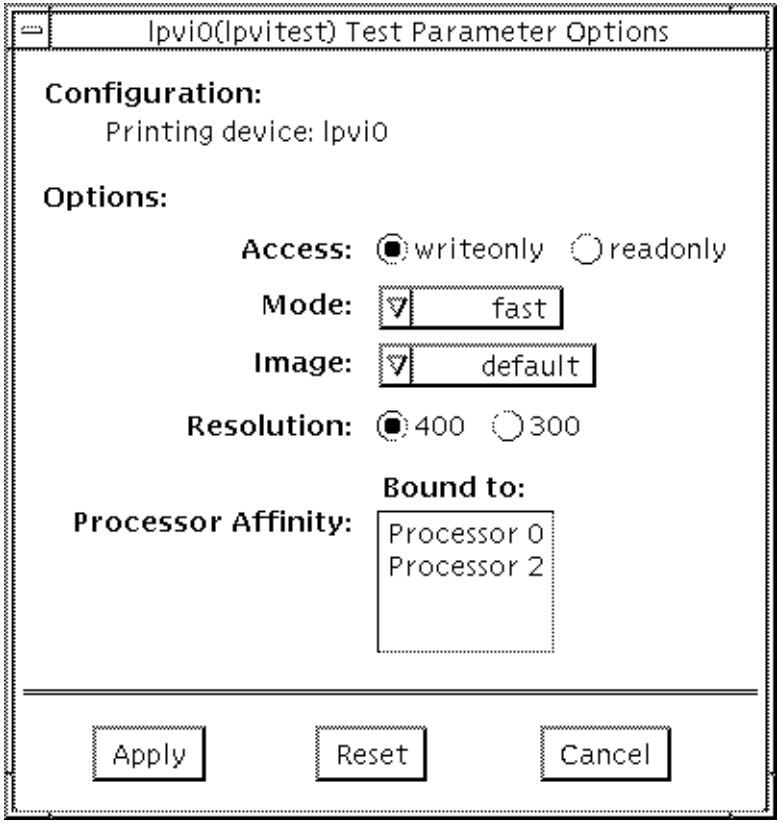


FIGURE 20-1 lpvitest Option Menu

TABLE 20-1 `lpvitest` Options

`lpvitest` **Options**	**Description**
Access	This field is informational only. Writeonly is the only option currently available. This indicates that the only data being transferred is going from the SBus printer card to the SPARCprinter.
Mode	Use this option to select how often to print the test image. The default setting is Fast; the available settings are: Fast: Prints an image every 1 minute. Medium: Prints an image every 12 minutes. Extended: Prints an image every 30 minutes.
Image	This option lets you choose which test image to print. The settings are: Default: A pattern of vertical lines on one page and a checkerboard pattern on another. 57fonts: An image of the 57 different fonts that the printer supports. User defined: You can use any raster file as a test image. Just place the file in the `/opt/SUNWvts/bin` directory and save it as the file name `u_image`.
Resolution	This setting defines the printer resolution of the printed test pattern. The choices are 300 or 400 dots per inch. Note: Patterns such as the default test pattern are printed at different sizes and at different dpi resolutions. The text in the 57 fonts pattern prints in the same size, using the two different resolutions.

`lpvitest` Test Mode

This test only supports the Functional test.

lpvitest Command Line Syntax

/opt/SUNWvts/bin/lpvitest *standard_arguments* **-o dev=***device_name***,access=***writeonly*|*readonly***,image=***filename***,reso=***resolution***, mode=***mode*

TABLE 20-2 lpvitest Command Line Syntax

Argument	Explanation
dev=*device_name*	Specifies the name of the device. This should be of the form /dev/lpvi#, where # is the number of the device.
access=	Choices are write-only or read-only, but write-only is the only option supported at this time. See the Access description in TABLE 20-1 on page 217.
image=*filename*	The name of the file containing the test image. Possible values are: *imagefile:* Any file containing user-defined images. Before running SunVTS, copy the raster image file to the /opt/SUNWvts/bin directory and save it with the filename u_image. The size of the image is adjusted based on the resolution 57fonts: Contains an image of 57 fonts. The size of the image is adjusted, based on the resolution default: The default images print on two pages, one image is a pattern of vertical lines and the other is a checkerboard
reso=*resolution*	*resolution* is the resolution of the output in dots per inch (DPI). Possible values are 300 and 400.
mode=*mode*	*mode* is the print speed mode. This is the rate at which the test image is printed. Possible values are: fast: Prints the test image at 1-minute intervals. medium: Prints the test image at 12-minute intervals. extended: Prints the test image at 30-minute intervals.

lpvitest Error Messages

TABLE 20-3 lpvitest Error Messages

	Error Message	Probable Cause(s)	Recommended Action
6000	Error occurred while attempting to obtain paper size	System error message.	
		No tray installed.	
		Printer out of paper.	
6001	Error occurred while attempting to fork a child process	System error message.	
6002	image in *name* raster file too big		
6003	error=*number*	System error message.	
8000	couldn't open *device_name*	Device does not exist.	
		Device not configured correctly.	
8001	ioctl fail on *device_name*	System error message.	
8002	Failed to obtain memory from malloc() system call	System is heavily loaded.	
8003	Couldn't open *file_name*		
8004	Error occurred while reading raster file header *value* for *device_name*	Specified image raster file does not have the proper format.	
8005	Error occurred while loading image file *value* for *device_name*	Specified image raster file does not have the proper format.	
8006	Error occurred while writing to printer device	System error message.	
8007	Error encountered while accessing printer device *device_name*; Paper size: *value*,Counters: *value*, Print Engine: *value*		

TABLE 20-3 `lpvitest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
8008	`Error encountered while accessing printer device` *device_name*`; Error code:` *value*	Error in main motor.	
8009	`Error encountered while accessing printer device` *device_name*`; Error code:` *value*	ROS out of order.	
8010	`Error encountered while accessing printer device` *device_name*`; Error code:` *value*	FUSER out of order.	
8011	`Error encountered while accessing printer device` *device_name*`; Error code:` *value*	XERO failure.	
8012	`Error encountered while accessing printer device` *device_name*`; Error code:` *value*	Interlock open	
8013	`Error encountered while accessing printer device` *device_name*`; Error code:` *value*	No tray installed.	
8014	`Error encountered while accessing printer device` *device_name*`; Error code:` *value*	No paper exists in selected tray	
8015	`Error encountered while accessing printer device` *device_name*`; Error code:` *value*	Exit JAM.	
8016	`Error encountered while accessing printer device` *device_name*`; Error code:` *value*	Misfeed JAM.	
8017	`Error encountered while accessing printer device` *device_name*`; Error code:` *value*	Drum cartridge is nearly exhausted.	

TABLE 20-3 `lpvitest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
8018	`Error encountered while accessing printer device` *device_name*`; Error code:` *value*	Deve module is nearly exhausted.	
8019	`Error encountered while accessing printer device` *device_name*`; Error code:` *value*	No drum cartridge.	
8020	`Error encountered while accessing printer device` *device_name*`; Error code:` *value*	No deve cartridge.	
8021	`Error encountered while accessing printer device` *device_name*`; Error code:` *value*	Drum cartridge exhausted.	
8022	`Error encountered while accessing printer device` *device_name*`; Error code:` *value*	Deve cartridge exhausted.	
8023	`Timed out while accessing printer device` *device_name*		
8024	`EIO error`		

CHAPTER 21

M64 Video Board Test (`m64test`)

`m64test` tests the PCI-based M64 video board by performing the following subtests:

- Video Memory test
- RAMDAC test
- Accelerator Port test

Caution – DO NOT run any other application or screen saver program that uses the Pineapple accelerator port while running `m64test`. Do not run power management software. These programs cause SunVTS to return incorrect errors.

Note – Disable all screen savers before testing any graphics device. Type **`xset s off`** at a UNIX prompt to disable the Solaris screen saver. Disable power management software if it is running.

Note – DO NOT run Open Windows across multiple monitors.

Note – To start SunVTS with `vtsui`, but without `vtsk`, you must add the host name to `xhost` as: `xhost +` *hostname*.

m64test Options

By default, all options are enabled except frame buffer locking.

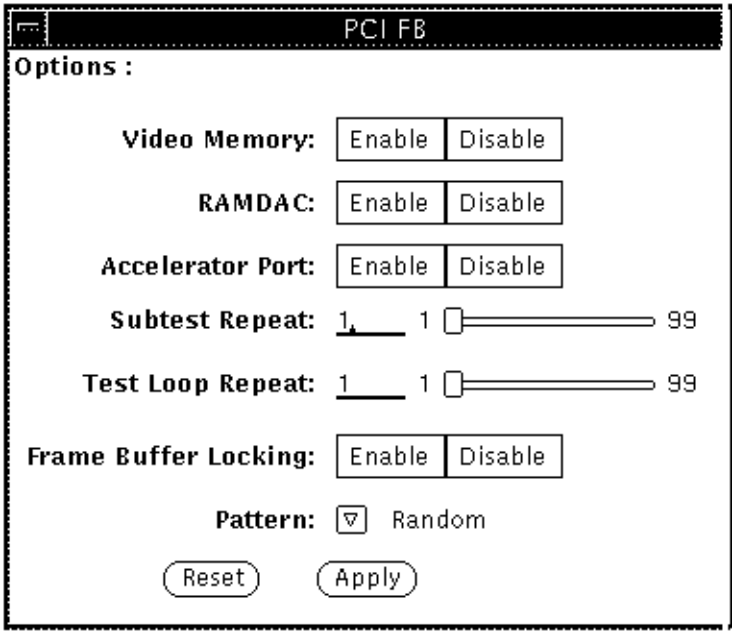


FIGURE 21-1 `m64test` Option Menu

TABLE 21-1 `m64test` Options

`m64test` **Options**	**Description**
Video Memory Test	Thoroughly tests the on-screen video memory (the memory part that is mapped on to the monitor) of the M64 video board in 8-bit, 16-bit, 32-bit, 64-bit, and 64 byte (block) modes. Entire on screen video memory is tested by testing 512 bit blocks at a time (8x8 pixel block). Each block is tested in two passes. Each pass consists of a data write and read. In the first pass user specified data or random data is used and in the second pass one's complement of the data used in the first pass is used so that each on-screen video memory location (bit) is tested with a zero (electrical low state) and one (electrical high state).

TABLE 21-1 `m64test` Options

`m64test` **Options**	**Description**
RAMDAC Test	Tests the RAMDAC in three phases. In the first phase the RAMDAC CLUT (Color LookUp Table) is tested using simple write/read patterns to determine if there are any bad bits in CLUT. The data patterns used are: • Random data • Complement of the random data (used as first data pattern) • The data pattern 0101 • The data pattern 10101 In the second phase four different patterns are drawn on the screen. Each pattern stays on the screen for approximately three seconds. The four patterns that are drawn are listed below. For each pattern signature is captured and compared with the signature obtained for the same pattern on a known good board. This test verifies that all the different data paths within the RAMDAC are functioning properly. Patterns drawn on screen: • Red ramp with cursor at top-left corner of the screen • Blue ramp with cursor at top-right corner of the screen • Green ramp with cursor at bottom-left of the screen • Grey ramp with cursor at bottom-right of the screen In the last (third) phase of the RAMDAC test the Vertical Retrace Interrupt is tested for 300 interrupts.
Accelerator Port Test	Tests all the data paths (sources: fixed color, host data, blit, fixed pattern), arithmetic and logic unit (ALU), color comparator, primitives (destinations: line, rectangle), and mono to color expansion logic. Primitives are drawn using a combination of different data paths (allowed), ALU functions, and color comparator functions. A checksum is generated for each data combination and is compared with the checksum generated for the same data combination on a known good board.
Frame Buffer Locking	This option is set to *disable* if the M64 is not the console device. When Sunvts GUI is brought up FB Locking is enabled by default if M64 is console device. If M64 is not console device, FB Locking is disabled by default.

m64test Test Modes

Due to the nature of graphic tests, reading from or writing to the frame buffer during graphic tests will disturb user operation. This test is only available in the Functional Test mode.

TABLE 21-2 m64test Test Mode

Test Mode	Description
Functional Test	The m64test verifies the M64 video board.

m64test Command Line Syntax

/opt/SUNWvts/bin/m64test *standard_arguments* **-o dev=***device_name*, **S=s***ubtest_number*,**F=***#_of_subtest_loops*,**B=***#_of_test_loops*,**L=**disable,**P=***test_pattern*

TABLE 21-3 m64test Command Line Syntax

Argument	Explanation
dev=*device_name*	*device_name* is the relative path name of the device being tested with respect to /dev/fbs; The default is m640.
S=*subtest_number*	*subtest_number* is the test number of the subtest to be run. Select from the subtests below. You can run multiple subtests by adding the subtest numbers. For example, n=0x00003 runs both test 00001 and test 00002; n=0x00005 runs both test 0x00001 and test 0x00004. Note that you do not need the leading zeros. n - 0x00001 VRAM n - 0x00002 RAMDAC n - 0x00004 Accelerator port test (Rendering Pipeline) More than one test can be selected by ORing subtest numbers. For example: n = 0x00005 means VRAM and Rendering Pipeline tests. A hex number must be preceded by 0x, decimal numbers are also acceptable.
F=*#_of_subtest_loops*	Specifies the number of times to repeat each subtest; the default is 1.

TABLE 21-3 `m64test` Command Line Syntax

Argument	Explanation *(Continued)*
B=*#_of_test_loops*	Specifies the number of times to repeat a test loop before passing; default is 1.
L=`disable`	*Disables the frame buffer lock.*Disable the lock when the m64 is not the console or when the server is not running on the m64 under test.
P=*test_pattern*	Specifies the test pattern number. The default is `r`, for random patterns. You may also choose `0 for 0x0000000`, `3 for 0x3333333`, `5 for 0x5555555`, or `9 for 0x9999999`.

`m64test` Error Messages

Errors returned by `m64test` are nonspecific. It is not possible to determine which component caused a failure. In all error conditions, the field replaceable unit (FRU) is the entire M64 video board. The errors messages are listed below, along with probable causes and recommended actions.

TABLE 21-4 `m64test` Error Messages

	Error Message	Probable Cause(s)	Recommended Action
6000	`Out of memory`	System error.	If problem persists, call your authorized Sun service provider.
6002	*string* `error: Misaligned raster.`	Software error.	If problem persists, call your authorized Sun service provider.
6003	`Unable to open` *string*`.`	`Device not present.`	Check for device presence.
		Device failure.	Replace device.
		Permission restrictions.	Check device permissions.
6004	`ioctl(2) Error in loading the Frame Buffer structure fbtype.`	IOCTL call to driver failure.	Try replacing device.
		Device failure.	Call your authorized Sun service provider.
6005	`ioctl(2) Error in loading the Original Color Map Values.`	IOCTL call to driver failure.	Try replacing device.
		Device failure.	Call your authorized Sun service provider.

TABLE 21-4 `m64test` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
6006	`ioctl(2) Error in Setting the Cursor Values.`	IOCTL call to driver failure. Device failure.	Try replacing device. Call your authorized Sun service provider.
6007	`ioctl(2) Error in loading the GXInfo Structure fbtype.`	IOCTL call to driver failure. Device failure.	Try replacing device. Call your authorized Sun service provider.
6008	*string* `(1-byte access) error: x/y (`*data*`) Expected 0x%02x, Actual 0x%0 2x, Xor 0x%02x.`	Device failure.	Replace device. Call your authorized Sun service provider.
6009	*string* `(2-byte access) error: x/y (`*data*`,`*data*`) Expected 0x%04x, Actual 0x%0 4x, Xor 0x%04x.`	Device failure.	Replace device. Call your authorized Sun service provider
6010	*string* `(4-byte access) error: x/y (`*data*`,`*data*`) Expected 0x%08x, Actual 0x%0 8x, Xor 0x%08x.`	Device failure	Replace device. Call your authorized Sun service provider.
6011	*string* `(8-byte access) error: x/y (`*data*`,`*data*`) Expected 0x%08x, Actual 0x%0 8x, Xor 0x%08x.`	Device failure	Replace device. Call your authorized Sun service provider.
6012	*string* `(64-byte access) error: x/y (`*data*`,`*data*`) Expected 0x%08x, Actual 0x% 08x, Xor 0x%08x.`	Device failure.	Replace device. Call your authorized Sun service provider.
6013	`Error in Allocating Memory mmap call Failure.`	System error.	If problem persists, call your authorized Sun service provider.
6014	`Error in DeAllocating Memory unmap call Failure.`	System error.	If problem persists, call your authorized Sun service provider.

TABLE 21-4 `m64test` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
6015	`ioctl(2) failed trying to turn on M64 video.`	IOCTL call to driver failure. Device failure.	Replace device. Call your authorized Sun service provider.
6016	`ioctl(2) failed trying to post CLUT.`	IOCTL call to driver failure. Device failure.	Replace device. Call your authorized Sun service provider.
6017	`ioctl(2) failed trying to read CLUT.`	IOCTL call to driver failure. Device failure.	Replace device. Call your authorized Sun service provider.
6018	`Miscompare found in Red channel of CLUT entry` *data*`. Expected 0x%02x, Ob served 0x%02x, XOR 0x%02x.`	RAMDAC failure. Device failure.	Replace device. Call your authorized Sun service provider.
6019	`Miscompare found in Green channel of CLUT entry` *data*`. Expected 0x%02x, Observed 0x%02x, XOR 0x%02x.`	RAMDAC failure Device failure	Replace device. Call your authorized Sun service provider.
6020	`Miscompare found in Blue channel of CLUT entry` *data*`. Expected 0x%02x, O served 0x%02x, XOR 0x%02x.`	RAMDAC failure. Device failure	Replace device. Call your authorized Sun service provider.
6021	`RAMDAC test screen CRC signature error message. Monitor type` *data*`, Cursor Position` *data*`, Expected Signature 0x`*value*`, Actual Signature 0x`*value*	Device failure.	Call your authorized Sun service provider.
6022	`sysinfo(2) failed getting hostname.`	No system permissions.	Become superuser. If problem persists, call your authorized Sun service provider.
6023	`Can't acquire console semaphore`	System error.	If problem persists, call your authorized Sun service provider.

TABLE 21-4 `m64test` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
6024	`Cannot gain control of mouse:`*string*	System error.	If problem persists, call your authorized Sun service provider.
6025	`Cannot gain control of keyboard:`*string*	System error.	If problem persists, call your authorized Sun service provider.
6026	`Already grabbed by another client`		Try stopping other similar actions. If problem persists, call your authorized Sun service provider.
6027	`grabbed at invalid time`	System error.	If problem persists, call your authorized Sun service provider.
6028	`grab window is not viewable`		If problem persists, call your authorized Sun service provider.
6029	`pointer/keyboard is frozen`		If problem persists, call your authorized Sun service provider.
6030	`Unknown cause`		If problem persists, all your authorized Sun service provider.
6031	`ioctl(2) failed trying to get current video mode.`	IOCTL call to driver failure Device failure.	Replace device. Call your authorized Sun service provider.
6032	`ioctl(2) failed trying to set current video mode.`	IOCTL call to driver failure. Device failure.	Replace device. Call your authorized Sun service provider.
6033	`ioctl(2) failed trying to get M64 system info.`	IOCTL call to driver failure. Device failure.	Replace device. Call your authorized Sun service provider.
6034	`mmap(2) failed:`*string*`.`	System error.	If problem persists, all your authorized Sun service provider.
6035	`munmap(2) failed:`*string*`.`	System error	If problem persists, all your authorized Sun service provider.

TABLE 21-4 `m64test` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
6036	`close(2) failed:`*string*`.`	System error.	If problem persists, all your authorized Sun service provider.
6045	`Can't access X Windows`	Permission denial from Host. System error. X Server is not running.	Run `xhost`(1). If X server is not running, run X server. If problem persists, all your authorized Sun service provider.
6046	`wait(2) failed:`*string*	System error.	If problem persists, all your authorized Sun service provider.
6047	`signal(2) failed:`*string*	System error.	If problem persists, all your authorized Sun service provider.
6048	`ioctl(2) Error in vertical retrace test.`	IOCTL call to driver failure. Device failure.	Replace device. Call your authorized Sun service provider.
6049	`Can't open display`	Permission denial from Host. System error. X Server is not running.	Run `xhost`(1). If X server is not running, run X server. If problem persists, call your authorized Sun service provider.
6050	`m64 open file failed Could not open the signature file` *string*`:` *string*	No file permission or file does not exist.	Check the file permissions. If problem persists, call your authorized Sun service provider.
6051	`m64 FTRUNCATE failed in checker. Accelerator could not extend or truncate the signature file.`	Insufficient disk space.	Create more space by deleting unnecessary files. If problem persists, call your authorized Sun service provider.

TABLE 21-4 `m64test` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
6052	`m64 close failed in checker. Accelerator could not close signature file.`	System error.	If problem persists, call your authorized Sun service provider.
6053	`m64 check error in checker`	Device failure.	Replace device. If problem persists, call your authorized Sun service provider.
6054	`m64 ROP test failed`	Device failure.	Replace device. If problem persists, call your authorized Sun service provider.
6055	`m64 IOCTL fails FBIOPUTCMAP Error while putting color map.`	Device failure.	Check software installation. Replace device. If problem persists, call your authorized Sun service provider.
6056	`m64 IOCTL fail FBIOGETCMAP. Error while getting color map. IOCTL call to deriver failure`	Device failure.	Check software installation. Replace device. If problem persists, call your authorized Sun service provider.
6057	`Internal error Mon XLATOR Internal error occurred while translating monitor type to index into signature file`	Monitor types are modified.	If problem persists, call your authorized Sun service provider.

CHAPTER 22

Multiprocessor Test (`mptest`)

`mptest` verifies the functionality of multiprocessing hardware. This test allocates a page of virtual memory for the test, declaring the page shared, locks the page against swapping, and creates threads to each of the processors being tested. Up to 64 processors can be tested by `mptest` in a CPU.

The processor mask argument can be sent to `mptest` during test probing. The `mptest` verifies that the current processor mask matches the argument you entered in the command line or from the GUI/TTYUI.

mptest Options

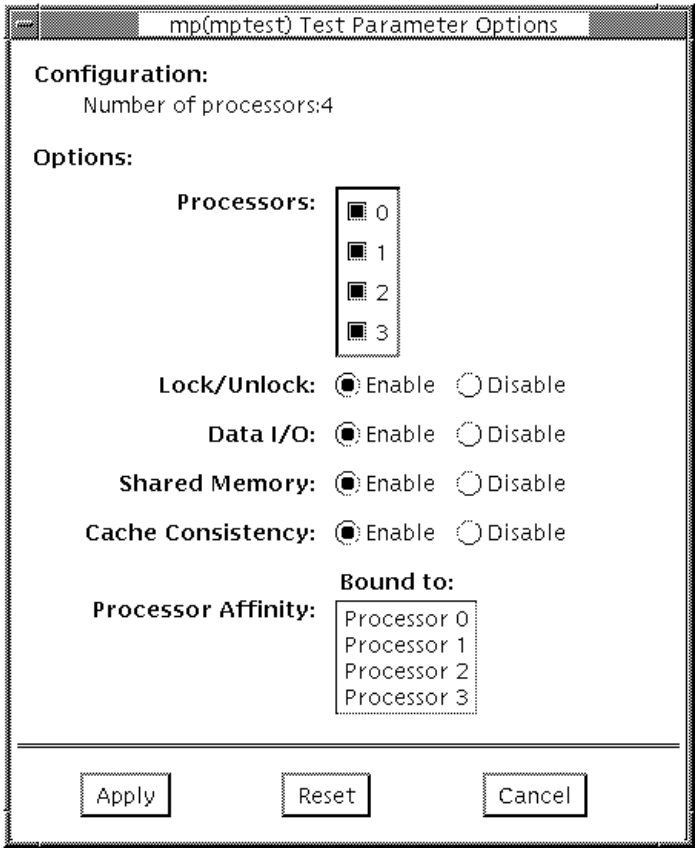


FIGURE 22-1 `mptest` Option Menu

The processors that can be tested are listed in the Configuration area of the menu. The multiprocessing test can be enabled or disabled for individual processors on this menu.

The options listed in Table 17-1 can be run alone or concurrently with other options.

TABLE 22-1 `mptest` Options

mptest Options	Description
Processors	You can test specific processors by clicking SELECT on the check boxes to enable or disable each processor. A check mark means the processor is enabled for testing; the default setting is all processors enabled. Note that `mptest` requires at least two enabled processors to test multiprocessing systems.
Lock / Unlock	Tests the lock / unlock mechanism that guarantees exclusive access to a physical page to one processor. A thread is created at each of the processors. Each processor uses the SPARC atomic instruction `ldstub` to write to the same shared physical memory page. While one processor is attempting the write, the other processors should be free spinning for their turn. As each processor acquires the lock, it writes an ordinal number to a shared trace buffer using a shared write pointer. After the test cycle is complete, the trace buffer is dumped for analysis. This test fails and returns an error message if the trace buffer does not contain an equal number of ordinal numbers for each processor. For example, if the specified loop count is 5, the trace buffer should contain five 0s, five negative 1s, five 2s, and so on.
Data I / O	Requires two or more threads, each of which locks onto one of the processors. Each processor, in turn, writes data to a temporary file that has been mapped to the physical address. The modified data is immediately read by other processors being tested. This test hangs and fails if the processors do not recognize the expected data.
Shared Memory	A shared memory buffer is divided into a number of contiguous chunks, one for each of the CPUs participating in the test. Each CPU is assigned a unique chunk based upon its ID (1-N). This subtest has two parts. First, each CPU locks and writes data to its data chunk. Identical data is written for each CPU. Then each CPU reads and compares the information on its data chunk with that of another CPU. If two CPUs do not confirm consistent data, the test fails and returns an error message. If that happens, testing stops and this test is run again in verbose mode to return more detailed information.
Cache Consistency	Requires two or more processors to access and write to the same physical address. This test verifies that a change in physical address by one processor is confirmed by another. If two processors do not confirm consistent data, the test continues to run, but the Pass Count in the SunVTS status window stops incrementing. If this happens, stop testing and run the test again in verbose mode for a more detailed picture of the problem.

mptest Test Modes

TABLE 22-2 mptest Test Modes

Test Mode	Description
Connection Test	The Connection test checks the current processors on the system with the original processor mask. An error is reported if they do not match. The original processor mask is set during probing, which shows the processors on system during the probe. The status of each selected processor is checked by procsesor_bind.
Functional Test	This test mode verifies that the current processor mask is the same as that from the command line, or the same as that from the GUI/ TTYUI
Online Mode	Provides a means to run mptest through SyMON. In Online mode, the following Functional Test description applies: This test mode verifies that the current processor mask is the same as that from the command line, or the same as that from the GUI/ TTYUI

mptest Command Line Syntax

/opt/SUNWvts/bin/mptest *standard_arguments* **-o M=**0+1+2+3...,NL,ND,NS,NC

TABLE 22-3 mptest Command Line Syntax

Arguments	Explanation
NL	Disable the Lock/Unlock subtest.
ND	Disable the Data I/O subtest.
NS	Disable the Shared Memory subtest.
NC	Disable Cache Consistency subtest
M=*processors to be enabled*	Where 0, 1, 2 are processors.
omask=*original mask of processors>*	

mptest Error Messages

TABLE 22-4 mptest Error Messages

	Error Message	Probable Cause(s)	Recommended Action
6000	mp lock failed	Faulty processor.	If the problem persists, call your authorized Sun service provider.
6001	All subtests are disabled	Parameter error.	Enable at least one subtest.
6002	thr_setconcurrency error	System load is too heavy.	Reduce the system load.
		System error.	If the problem persists, call your authorized Sun service provider.
6003	Error in creating threads: *name*	System load is too heavy.	Reduce the system load.
		System error.	If the problem persists, call your authorized Sun service provider.
6004	thr_join() thread *number* error status: *number*	System load is too heavy.	Reduce the system load.
		System error	If the problem persists, call your authorized Sun service provider.
6005	Processor Mask Error: Expect *number* Was *number*	Some processors are disappeared from processor mask.	If the problem persists, call your authorized Sun service provider.
6006	Failed in system call uadmin, errno = *number*, sys_errlist = *name*	System load is too heavy.	Reduce the system load.
		System error.	If the problem persists, call your authorized Sun service provider.
6007	Failed in function getnextbitmsk!	System error.	If the problem persists, call your authorized Sun service provider.
6008	Processor Mask Error: check mask *number* cpu mask *number*	Some processors disappeared from the processor mask.	If the problem persists, call your authorized Sun service provider.
6009	Failed to get shared memory, err = *name*	System load is too heavy.	Reduce the system load.
		System error.	If the problem persists, call your authorized Sun service provider.
6010	Failed to create shared memory, err = *name*	System load is too heavy.	Reduce the system load.
		System error	If the problem persists, call your authorized Sun service provider.

TABLE 22-4 `mptest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
6011	`Shared Memory Subtest: Process` *number*`, Processor` *number*`, *curr_add` *number* `curr_addr` *number*`, cpu_mask` *number* `failed`	System load too heavy.	Reduce the system load.
		System error.	If the problem persists, call your authorized Sun service provider.
6014	`Failed on read & compare: Processor` *number*`, read=`*number*`, exp=`*number*		
6016	`Not a MP system!`	Faulty Processor.	
		Do not run `mptest` on this system.	
8000	`Failed to open` *name*	Not enough disk space.	Allocate disk space.
		Permission error.	Check directory / file permissions.
		System error.	If the problem persists, call your authorized Sun service provider.
8001	`Failed to create a page`	System load too heavy.	Reduce the system load.
		System error.	If the problem persists, call your authorized Sun service provider.
8002	`mmap address space to device`	System load too heavy.	Reduce the system load.
		System error.	If the problem persists, call your authorized Sun service provider.
8003	`mlock error.` *name*	Processor error.	Isolate the bad processor.
8005	`All subtests are disabled`	Parameter error: None subtest is selected.	Re-enter command line correctly: Select at least one subtest.
8006	`Can not run mptest! You need to enable at least two processors`	Parameter error You have selected less than two processors for testing.	Re-enter command line correctly; Select at least two processors.

CHAPTER 23

Network Hardware Test (nettest)

nettest checks all the networking hardware on the system CPU board and separate networking controllers (for example, a second SBus Ethernet controller). For this test to be meaningful, the machine under test must be attached to a network with at least one other system on the network.

Note – This version of nettest is used for *all* networking devices, including Ethernet (ie and le), token ring (tr, trp), quad Ethernet (QED), fiber optic (fddi, nf, bf, pf), SPARCcluster™ 1 System (em), ATM (sa, ba), and 100-Mbits per second Ethernet (be,hme) devices.

The nettest 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 the transport control protocol/interface program (TCP/IP) (ICMP is part of TCP/IP). The target machine must either be configured to respond to ICMP broadcast or to RPC broadcast.

First nettest determines the target machine(s) to test against. If no targets are specified, it sends an ICMP broadcast to find them. If it fails to find all necessary targets, it tries RPC broadcast to the RPC port mapper daemon. If you specify the targets, nettest uses the specified target(s) instead.

After finding the necessary targets, nettest performs the following tests:

- **Random test** sends out 256 packets with random data length and random data.
- **Incremental test** sends out packets with length from minimum to maximum packet size using incremental data. (Minimum and maximum values differ for each device.)
- **Pattern test** sends 256 packets of maximum length, where each packet contains one test pattern, and all byte patterns (0 to 0xFF hex) are used. That is, the first packet contains pattern 0, the second packet contains pattern 1, and so on, until the last packet pattern of 0xFF.

Note – `nettest` is a scalable test. However, the maximum number of networked devices allowed on a system is 255, and the number of instances for each device is limited to 200. So, if you start the SunVTS exerciser using the `-i` option to specify a default number of instances for all tests, `nettest` cannot assign more than 200 instances per each networked device.

`nettest` Options

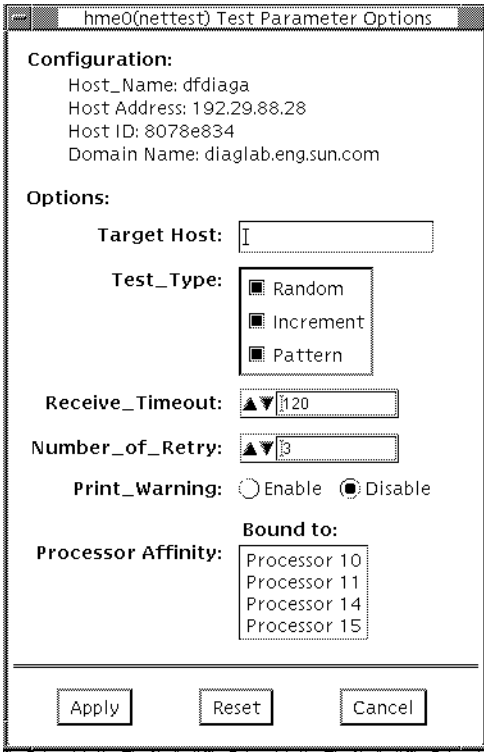


FIGURE 23-1 `nettest` Option Menu

The Configuration section specifies the host name, host ID, host address, and domain name of the system being tested.

TABLE 23-1 `nettest` Options

`nettest` **Options**	**Description**
Target Host	Specifies one or more targets to be tested against. Target host entries can be either a host name or an Internet address. When no target host is specified, the test finds necessary targets through broadcasting. The default setting leaves this field empty.
Receive Timeout field	The default is 120 seconds, but can be changed. Use a range between 0 - 600 seconds.
Number of Retries field	The default number of retries before flagging an error is three, but can be changed. Use a range between 0 to 128 retries.
Print Warning	Disabled by default. Click Enable to see warning errors, such as retry on timeout.

nettest Test Modes

All three modes are supported by nettest. Different test schemes are performed on the network device based on the mode selected.

TABLE 23-2 nettest Test Modes

Test Mode	Description
Connection Test	Checks whether the device is connected. It searches through all the network interfaces fora specified device name. If nettest does not find the device connected the test fails, otherwise it returns: `device is connected.`
Functional Test	Performs all three tests (Random test, Incremental test, and Pattern test) sequentially. It allows you to specify options that will perform heavy stress testing. If you invoke SunVTS through SyMON, the following Functional Test description applies: Online mode, nettest is aware that the user's application may be running, it tries to minimize the influence on the application while it is testing. So the nettest uses only random test in online mode. Since the network device can be shared and the system resource is available, applications shall be affected fairly small
Online Mode	Provides a means to run nettest through SyMON. The following Online Functional Test description applies: nettest is aware that the user's application may be running, it tries to minimize the influence on the application while it is testing. So nettest uses only random test in Online mode. Since the network device is shared and system resources are available, applications are minimally affected.

nettest Command Line Syntax

/opt/SUNWvts/bin/nettest *standard_arguments* **-o target=***h1+h2+...*,**dev=***interface*,**test=***type*,**packets=***n*,**pattern=***hex*,**delay=***seconds*,**timeout=***seconds*,**retry=***n*,**warn**

TABLE 23-3 nettest Command Line Syntax

Argument	Explanation
target=*h1+h2+...*	A list of test targets by host name or Internet address.
dev=*interface*	Network interface name. The default value is le0 for Ethernet networks.
test=*type*	The test type. Type **Random**, **Increment**, or **Pattern** for the desired test. The default value is Random+Increment+Pattern where all tests run.
packets=*n*	Number of random / pattern packets. The default is 256.
pattern=*hexn*	Specifies a data pattern, in hexadecimal form. The default is all patterns from 0 to 0xff.
delay=*seconds*	Indicates the time between subtests in seconds; the default is 30 seconds.
timeout=*seconds*	Indicates the number of seconds to wait before a timeout; the default is 20 seconds.
retry=*n*	Indicates the number of test timeout retries; the default is three retries.
warn	When enabled, prints warning messages.

nettest Error Messages

TABLE 23-4 nettest Error Messages

	Error Message	Probable Cause(s)	Recommended Action
6000	RPC broadcast failure *error_message*		
6001	Unable to resolve *host_name* Ethernet address		
6002	No ICMP echo reply from *host_name*	System load too heavy.	Reduce system load or increase timeout time.
		No cable connection.	Check cable connection!
		Target machine too busy.	Reduce target machine load.
6003	ICMP echo reply incorrect length from *host_name*, exp *data* obs *data*		
6004	ICMP echo reply length *number* from *host_name*, data mismatch at byte *number*, exp *value* obs *value*		
6005	Unable to find any test target		
6006	Unable to find necessary test targets for the ethernet switch		
8000	Unable to open *device_name* *error_message*		
8001	Bad ioctl *name* *error_message*		
8002	Unable to allocate *number* bytes of memory *error_message*		
8003	System call *name* returned *value* *error_message*		
8004	Unable to map network entry for *host_name*		
8005	ATM device *device_name* requires target specification		

TABLE 23-4 `nettest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
8006	`Failed to allocate` *number* `bytes of swap space for configuration`		
8007	`dl_primitive response =` *value*		
8008	`dl_ok_ack: short response`		
8009	`dl_phys_addr_ack: short response`		
8010	`Invalid Argument string`		
8011	`Interface` *device_name* `not configured in system`		

CHAPTER 24

NVRAM Card Test (nvtest)

`nvtest` tests the SBus NVRAM card. During the probe phase, it attempts to open all `/dev/nvram`*X* devices. If successful, it makes an ioctl (NVRAMIOCGETINFO) call to determine that the card size is non-zero and makes an entry under "Other devices" for that instance of the card.

`nvtest` performs the following actions:

1. Opens the device
2. Uses the ioctl (NVRAMIOCGETINFO) call to determine the size of the available memory to be tested.
3. Uses the ioctl (NVRAMIOCGETREGS) call to determine whether all the batteries are connected and not low on voltage. This call also verifies that the board is not in a "dirty" state. The test aborts if the dirty state is true or if a battery problem is detected.
4. Starts the memory test which consists of:
   - mapping the memory board to the user address space.
   - checking the functionality of the EDC (error detection & correction unit) In this phase, the board is put in the checkbit injection mode and the checkbits are written corresponding to an error in bit 0 through 63. The data is read back to verify that the bits in error were corrected. The syndrome bits are also checked to make sure they were generated correctly. In addition to the 64 bits of data, the error correction for the 8 checkbits are also verified.
   - performing write-read-compare tests once the board is set to normal mode with parity checking enabled. The write-read-compare is done in byte, short, long, long and 64 bit burst modes. The number selected to test burst mode is a sequential number, and patterns 0xaa and 0x55 are used to test the long burst mode.
   - examining the diagnostic register for single-bit and multi-bit errors while the board is set to diagnostic output mode.

- clearing the diagnostic registers, returning the board to normal mode with parity checking enabled, setting all the memory to zero using the NVRAMIOCZAP ioctl call, and unmapping the memory board.

Note – In normal mode the error checking and correction is enabled.

nvtest Options

nvtest does not have options.

nvtest Test Modes

nvtest only supports offline mode since the test is intrusive. It is a non-scalable test because simultaneously writing to the same memory will cause the test to fail.

nvtest Command Line Syntax

/opt/SUNWvts/bin/nvtest *standard_arguments* **-o dev=***device*

TABLE 24-1 nvtest Command Line Syntax

Argument	Explanation
dev=*device*	*device* is the name of the device being tested such as nvram0

nvtest Error Messages

TABLE 24-2 nvtest Error Messages

	Error Message	Probable Cause(s)	Recommended Action
6000	*string*		
6001	Nvmem ioctl failed: *command*		
6002	Nvmem ECC multibit error		
6003	Nvmem ECC single-bit error		
6004	byte compare: location = *number*, observed = *number*, expected = *number*	On-board memory error.	Contact your authorized Sun Service provider.
6005	word compare: location = *number*, observed = *number*, expected = *number*	On-board memory error.	Contact your authorized Sun Service provider.
6006	long compare: location = *number*, observed = *number*, expected d = *number*	On-board memory error.	Contact your authorized Sun Service provider.
6007	lseek() failed: error *message*		
6008	NVRAM write failed: *error message*		
6009	NVRAM read failed:*error message*		
6010	Failed to mmap nvmem: *error message*		
6011	Failed to munmap nvmem: *error message*		
6012	Failed to mmap nvmem:*error message*		
6013	Failed to munmap nvmem:*error message*		

TABLE 24-2 `nvtest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
6014	`Nvmem ECC error count is non-zero`		
6016	`Data compare failed.`		
6018	`Nvmem test is applicable in Offline mode only`		
6019	`NVMEM battery 1 voltage is low`	Battery.	Contact your authorized Sun service provider.
6020	`NVMEM battery 1 is disabled`	Battery may not be jumpered correctly.	Please refer to the hardware manual for instructions for connecting the battery jumper. If the problem persists, contact your authorized Sun service provider.
6021	`Nvmem battery 2 voltage is low`	Battery.	Contact your authorized Sun Service provider.
6022	`Nvmem battery 2 is disabled`	Battery may not be jumpered correctly.	Please refer to the hardware manual for instructions for connecting the battery jumper. If the problem persists, contact your authorized Sun service provider.
6023	`Nvmem battery 3 voltage is low`	Battery.	Contact your authorized Sun Service provider.
6024	`Nvmem battery 3 is disabled`	Battery may not be jumpered correctly.	Please refer to the hardware manual for instructions for connecting the battery jumper. If the problem persists, contact your authorized Sun service provider.
6025	`Nvmem battery 4 voltage is lo`	Battery.	Contact your authorized Sun Service provider.
6026	`Nvmem battery 4 is disabled`	Battery may not be jumpered correctly.	Please refer to the hardware manual for instructions for connecting the battery jumper. If the problem persists, contact your authorized Sun service provider.
6027	`Nvmem ECC multibit error`	On-board memory error.	Contact your authorized Sun service provider.

TABLE 24-2 nvtest Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
6028	Nvmem ECC single-bit error	On-board memory error.	Contact your authorized Sun service provider.
6029	Nvmem ECC error count is non-zero!	On-board memory error.	Contact your authorized Sun service provider.
6030	vmem ECC Diagnostic Registers num of errors = *number* error type = *number* Last ckbit = *number* Last syndrome = *number* First ckbit = *number* First syndrome = *number*	On-board memory error.	Contact your authorized Sun service provider.
6031	Nvmem: valloc failed, skipping burst mode test		
6032	Nvmem: EDC test failed in bitno *number* corrected data sbe: *number* data is:*number*	On-board memory error.	Contact your authorized Sun service provider.
6033	Nvmem: EDC test failed in bitno: *number* syndrome sbe:*number* is:number checkbits sbe:*number* is:*number*	On-board memory error.	Contact your authorized Sun service provider.
8000	*string*		
8001	Failed to open nvmem board: *device*		
8003	Battery Error		
8004	memory_check (*pass number*) failed		
8005	The board is dirty, exit memory test		
8008	Open directory failed: *error* Please enter test file directory		

CHAPTER 25

PCMCIA Modem Card Test (pcsertest)

pcsertest verifies the functionality of the PCMCIA modem card. The pcsertest issues a series of commands to the modem that instructs the modem's firmware to run an internal analog loopback diagnostic test. Upon completion, the firmware sends back a three-digit status message indicating whether the test passed or failed.

As an option, the pcsertest tests socket I/O cards. This test writes an 8-Kbyte incrementing data pattern to the I/O card, which is then looped back, read, and verified.

Note – When testing socket I/O cards, a 9-pin loopback connector is required. However, no loopback connector is required when testing the default modem card. See Appendix A for loopback connector wiring instructions.

pcsertest Options

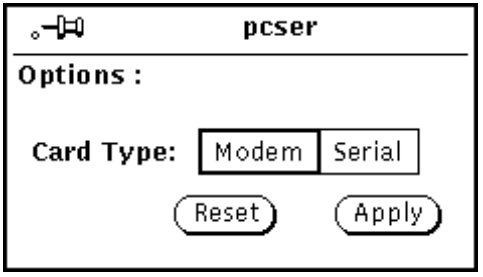


FIGURE 25-1 pcsertest Option Menu

The default card type for each PCMCIA slot is a modem card. If only one modem card is plugged in, the empty slot is ignored.

From the `pcsertest` Option window, you can choose to test socket I/O cards. To test a socket card, choose Socket on the Card Type switch. If you choose to test a socket I/O card in an empty slot, the test fails.

Any combination of modem and socket I/O cards can be placed in the PCMCIA slots. However, you must select the correct type of card in the Option window. If you select an incorrect card type, the test fails.

`pcsertest` Test Mode

This test only supports Functional Test mode.

`pcsertest` Command Line Syntax

`/opt/SUNWvts/bin/pcsertest` *standard_arguments* **`-o dev=`***device_name*, **`type=`***card_type*

TABLE 25-1 `pcsertest` Command Line Syntax

Argument	Explanation
`dev=`*device_name*	The device name (for example, `dev=pc0` and `pc1`)
`type=`*card_type*	The card type for the previously specified device name (for example, `type`=serial). You do not need to specify the type if the device is a modem, since modem is the default card type.

pcsertest Error Messages

TABLE 25-2 pcsertest Error Messages

	Error Message	Probable Cause(s)	Recommended Action
6000	tcgetattr failed for modem card *number error message*		
6001	tcsetattr failed for modem card *number error message*		
6002	Write failed while setting modem card *number error message*		
6003	ioctl TIOCSSOFTCAR failed for serial card *number error message*		
6004	tcgetattr failed for serial card *number error message*		
6005	tcsetattr failed for serial card *number error message*		
6006	Card in slot *number* is not a serial card		
6007	Data miscompare error		
6008	Modem card *number* returned unknown status		
6009	ioctl TIOCMSET failed for serial card *number error message*		
6010	ioctl TIOCMBIS failed for serial card *number error message*		
6011	Write to serial card *number* failed. *error message*		
6012	Timeout waiting for data from serial card *number*		

TABLE 25-2 `pcsertest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
6013	`Read from serial card` *number* `failed.` *error message*		
6014	`Status timeout from modem card` *number*		
6015	`Read from modem card` *number* `failed.` *error message*		
6016	`Card in slot %d is not a modem card`		
8000	`can't open <device>` *error message*		
8001	`Serial card` *number* `loopback defective`		
8002	`Write to modem card` *number* `failed.` *error message*		

CHAPTER 26

SPARCstorage Array Controller Test (plntest)

plntest checks the functionality of the controller board on the SPARCstorage™ Array. The SPARCstorage Array (SSA) is a large disk storage I/O subsystem capable of housing up to 30 SCSI hard drives. The SSA communicates with a host system over a fiber-optic link provided by an SBus-based host adapter card in the host system and the corresponding SSA controller board hardware.

The SSA controller card is an intelligent, CPU-based board with its own memory and ROM-resident software. In addition to providing a communications link to the disk drives, it also buffers data between the host system and disk drives in its nonvolatile RAM (NVRAM). For data to go from the host to a particular disk, it must first be successfully transferred to this NVRAM space.

The host machine, SBus host adapter card, fiber-channel connection, and the SSA controller board must be working properly to perform this data transfer operation. By verifying and stressing this operation, plntest can isolate failures on the SSA disk drives from failures on the SSA controller board.

Note – disktest transfers data on the SSA disk drives over the same path mentioned above. However, disktest does not transfer data as quickly as plntest.

plntest Controller Test

The plntest exercises the hardware and software by invoking SCSI read buffer commands of various sizes to the NVRAM. These operations exercise the host fiber channel hardware, the SSA fiber channel hardware, the SSA resident management software, and the hardware component interaction on the SSA controller card (all components except the SCSI devices). In addition, the plntest reports failure of the fan module and the NVRAM battery module of the SPARC storage array.

plntest Options

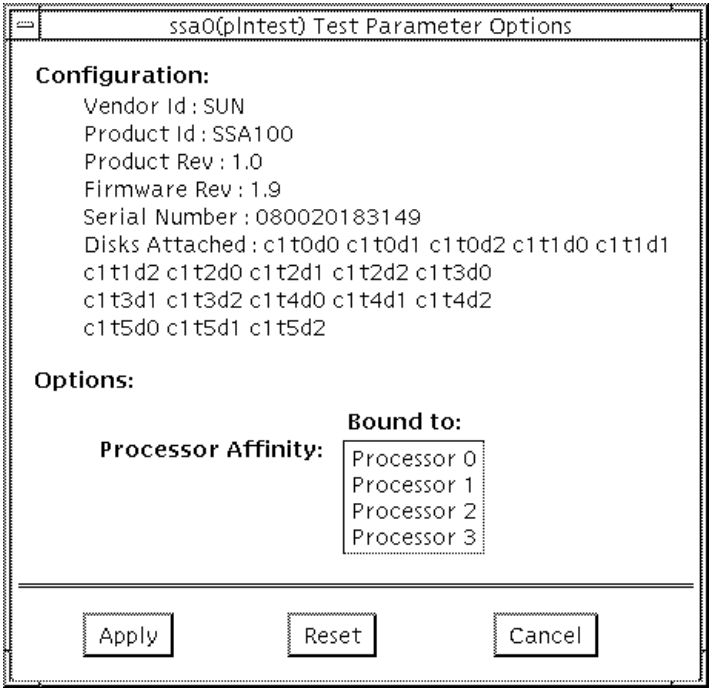


FIGURE 26-1 plntest Option Menu

Configuration lists the names of all the logical disk drives (both single and grouped) that are attached to the SPARCstorage Array controller board. `plntest` is not a scalable test.

Note – If no disks are present, `none` is displayed under the Attached Disks heading.

`plntest` Test Modes

TABLE 26-1 `plntest` Test Modes

Test Mode	Description
Connection Test	In this mode, `plntest` checks the state of the battery module and the fan module of the SPARCstorage array.
Functional Test	Performs the same type of tests as Online mode.
Online Mode	Provides a means to run `plntest` through SyMON. In Online mode, the following Functional Test description applies: `plntest` checks the state of the battery module and the fan module of the SPARCstorage array. The `plntest` issues a SCSI command, `READBUFFER`, causing the entire NVRAM to be read. This test uses different transfer buffer sizes

`plntest` Command Line Syntax

`/opt/SUNWvts/bin/plntest` *standard_arguments* **`-o ?,dev=`***device_name*`,` **`x,`**

TABLE 26-2 `plntest` Command Line Syntax

Argument	Explanation
?	Probes the system for valid SSA controller devices and prints them to screen (see “Probing for SSA Controller Devices.”)
`dev=`*device_name*	Specifies the physical path name of the SSA controller card to be tested. This argument *must* be included when running `plntest` from the command line, unless the `?` argument is used.

TABLE 26-2 `plntest` Command Line Syntax

Argument	*(Continued)*Explanation
x	Probes the specified SSA controller card for the single and grouped disks attached to the controller card, and prints their logical names to the screen. Note: The `dev=`*device_name* must be specified for this option to work.

Probing for SSA Controller Devices

Unlike most other hardware devices, the SSA controller card does not have a logical device name (one you would find in the `/dev` directory). Therefore, the SSA controller card is identified by its longer, physical device name.

Note – The physical device name of the SSA controller card cannot be used to run `plntest`.

When running `plntest` from the command line, the physical device name of the SSA controller card cannot be used, so a logical name must be specified. ANSI standards require commas as delimiters between items. Since the physical name of the SSA controller contains embedded commas, if you use a physical name that contains commas as a command line option, `plntest` misinterprets the option.

There are two ways that you can create a logical name:

- Run the SunVTS kernel (vtsk), which automatically creates a logical name entry for the SSA controller under the `/dev` directory, such as:

```
# /dev/ssaXX , where XX represents the decimal number of the controller
```

Use this name as the parameter for the dev= option of `plntest`.

- Manually make a soft link from the actual physical device name to a logical name of your choice (under `/dev`). Use this name as the parameter for the dev= option of `plntest`, as shown in the following example:

```
machine# ./plntest "?"

1: /devices/io-unit@f,e3200000/sbi@0,0/SUNW,soc@1,0/
SUNW,pln@0c0d,0e0f0102:ctlr
2: /devices/io-unit@f,e0200000/sbi@0,0/SUNW,soc@3,0/
SUNW,pln@0c0d,0e0f0102:ctlr

machine# ln -s \ /devices/io-unit@f,e3200000/sbi@0,0/SUNW,soc@1,0/
SUNW,pln@0c0d,0e0f0102:ctlr \
/dev/ssa1
machine# /opt/SUNWvts/bin/plntest dev=/dev/ssa1
```

plntest Error Messages

TABLE 26-3 plntest Error Messages

	Error Message	Probable Cause(s)	Recommended Action
6010	*device_name text1* during *text2*. *text1* indicates SCSI sense information for the SCSI command *text2*		
6011	*device_name* SCSI status returned is *text*, Command issued was *text*		
6012	*device_name*: NVRAM Battery is low or has failed	Suspect battery module.	Fast writes will be disabled. Consult your authorized Sun service provider.
8000	*device_name* Failed to open()(*error_message*	Suspect fiber optic cable.	Consult your authorized Sun service provider.
		Suspect SSA controller board.	
		Suspect SOC host adapter.	

TABLE 26-3 `plntest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
8010	*device_name text1* `during` *text2*. *text1* `indicates SCSI sense information for the SCSI command` *text2*		
8011	*device_name* `SCSI status returned is` *text*, `Command issued was` *text*		
8012	*device_name* `Fans have failed`	Fan failure.	Consult your authorized Sun service provider.

CHAPTER 27

Physical Memory Test (pmem)

The pmem test checks the physical memory of the system. The pmem 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.

pmem Options

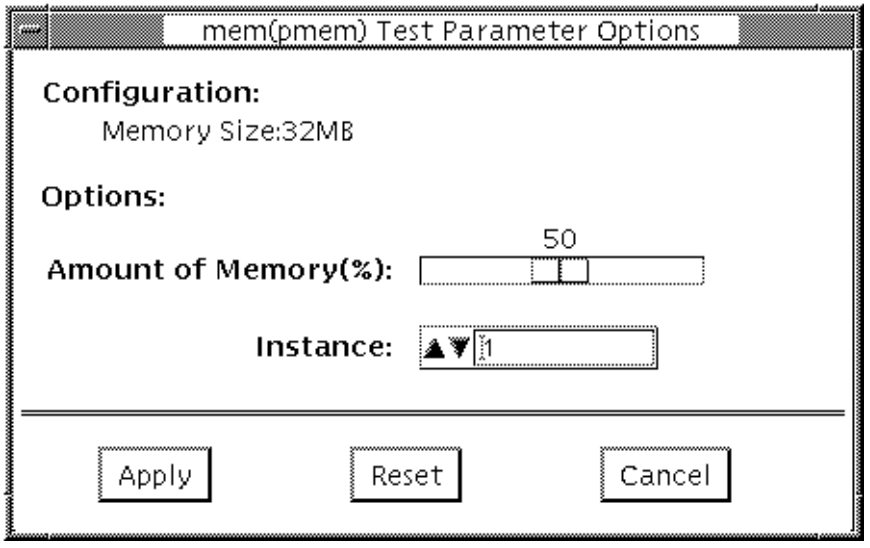


FIGURE 27-1 pmem Option Menu

The amount of memory shown in the Configuration field is the total physical memory probed by the SunVTS kernel. It reflects the amount of physical memory found, rounded up to the nearest megabyte. The test options enable you to choose the amount of memory to be read.

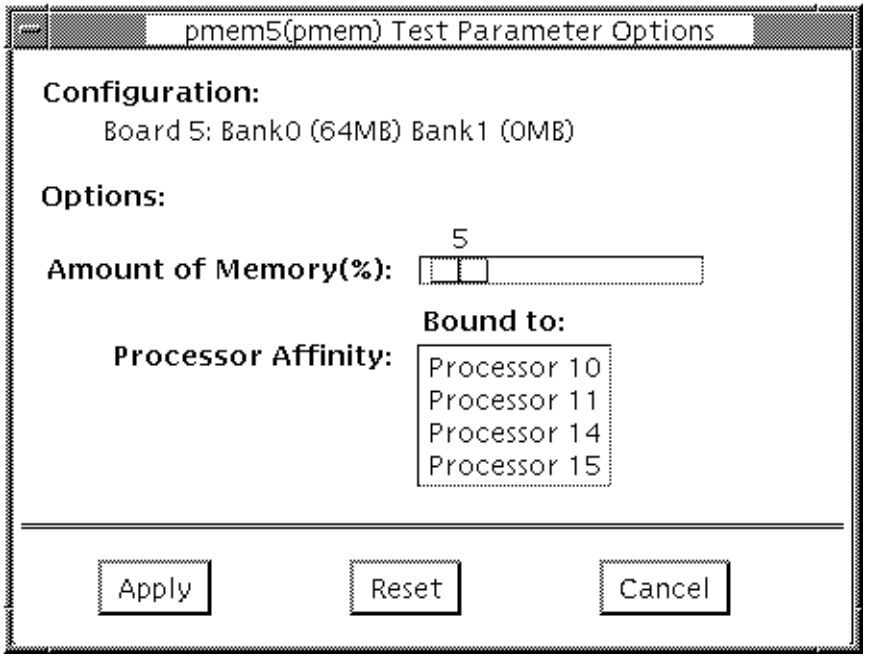


FIGURE 27-2 `pmem` UltraSPARC Server Option Menu

In the case of UltraSPARC servers, the configuration field lists the banks of memory on each cpu or memory board separately. When physical mapping is used `pmem` test is registered for each cpu or memory board separately.

pmem Test Modes

TABLE 27-1 pmem Test Modes

Test Mode	Description
Connection Test	In this mode, 1 percent of the memory is read; pmem also informs the user of how much physical memory is available. For sun4m, sun4u, and UltraSPARC servers, the test reports the ECC errors that have occurred since it was last invoked. The test reports ECC errors for a particular CPU or memory board when physical mapping is selected, otherwise it provides the SIMM number of the ECC memory error.
Functional Test	In Functional test, the amount of memory to be read can vary; the default is 100 percent. For UltraSPARC servers, this test mode reports all ECC errors that have occurred since the system was brought online
Online Mode	Provides a means to run pmem through SyMON. In Online mode, the following Functional Test description applies: A variable amount of memory is read in Online mode; the default is 100 percent. For UltraSPARC servers, the ECC error reporting is the same as for the Connection test.

pmem Command Line Syntax

/opt/SUNWvts/bin/pmem *standard_arguments* [**-p=***n*] [**-i=***n*] [**-w=***n*] [**size=***n*] [**bdinfo=***n*]

TABLE 27-2 pmem Command Line Syntax

Argument	Explanation
size=*number*	Specifies the percentage of memory to be read.
bdinfo=*number*	For UltraSPARC servers, indicates board number information. For example, if board 0 and board 5 have memory and you want the test to read the memory on these two boards, then bdinfo=*33 (2**5 + 2**0).*

pmem Error Messages

TABLE 27-3 pmem Error Messages

	Error Message	Probable Cause(s)	Recommended Action
6003	*number* intermittent errors on *text*. *text* would indicate the SIMM locations		
6004	Symbol *text* not found in kernel image. *text* will indicate the name of the symbol not found in the kernel image		
6005	*number* persistent errors on *text* SIMM(s). *text* would indicate the SIMM locations	SIMM(s), check the SIMM location	Call your Sun service representative.
8000	kvm_open() failed: *error_message*		
8001	sysinfo(SI_PLATFORM) failed: *error_message*		
8002	Symbol *text* not found in kernel image. *text* will indicate the name of the symbol not found in the kernel image		
8003	Couldn't open file /dev/mem: *error_message*		
8004	Unable to read pointer to memlist structure		
8005	Unable to read “size” and “address” in memlist		
8006	llseek() to address *address* failed (*error_message*)		
8007	read() at address *address* failed (*error_message*)		
8008	sysconf(_SC_NPROCESSORS_ONLN) failed: *error_message*		

TABLE 27-3 `pmem` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
8009	`llseek to address` *address* `failed (`*error_message*`)`		
8010	`llseek to address` *address* `[`*text*`] failed (`*error_message*`)`	This message is seen on UltraSPARC servers only. The *text* indicates to which board and bank the physical address *address* maps.	
8011	`read() at address` *address* `[`*text*`] failed (`*error_message*`)`	This message is seen on UltraSPARC servers only. The *text* indicates to which board and bank the physical address *address* maps.	

CHAPTER 28

Prestoserve Test (pstest)

Prestoserve™ is an NFS accelerator. It reduces the frequency of disk I/O access by caching the written data blocks in nonvolatile memory. Prestoserve then flushes the cached data to disk asynchronously, as necessary.

`pstest` verifies the Prestoserve accelerator's functionality with the following three checks:

- Board Battery Check

To ensure proper battery power level, the test runs this check before running the other two checks. If it finds a bad battery, it exits `pstest` immediately with a fatal error message.

- Board Memory Check

This check maps the entire board memory to a process address space and locks the board to prevent multiple accesses. The test then travels through the mapped address spaces sequentially, doing a character, short, and long comparison on each space. The `pstest` runs this check twice.

- Board Performance and File I/O Access Check

This check exercises only synchronous read/write access. `pstest` writes data equal to the amount of on-board memory to the memory cache and reads the data back for comparison. The time taken to write that data is measured twice: the first time with the Prestoserve accelerator disabled, the second time with Prestoserve enabled. The first value is divided by the second to get the performance ratio. If the ration is less than 1.5 on three passes of the test, the Prestoserve board may or may not have a problem.

Since the Prestoserve accelerator speeds up the `/opt` partition during testing and this partition may be mounted remotely, there may or may not be a problem with the Prestoserve board itself, a network performance problem could be the problem. In either case, a warning message is displayed if the performance ratio is less than 1:5.

Caution – To ensure consistent results, run as many concurrent tests as possible when a Prestoserve product has been installed. Tests are selected from the Option menu. The default is 2; the maximum is 10. However, do not run `pstest` and `kmem` tests at the same time. Running these tests together causes SunVTS to report erroneous errors.

`pstest` Options

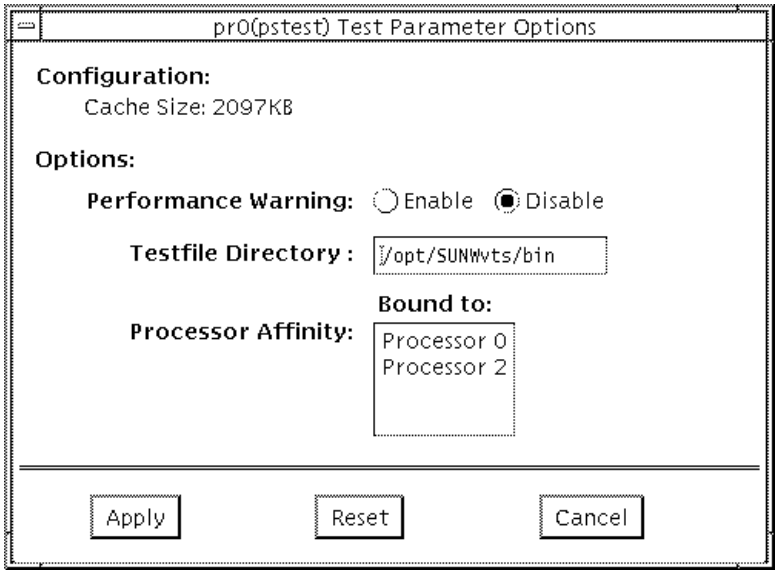


FIGURE 28-1 `pstest` Option Menu

pstest Test Modes

TABLE 28-1 pstest Test Modes

Test Mode	Description
Functional Test	The test runs the Board Battery Check subtest, Board Memory Check subtest, and Board Performance and File I/O Access Check subtest.

pstest Command Line Syntax

/opt/SUNWvts/bin/pstest *standard_argument* **-o e,l,f=***testfile_directory*

TABLE 28-2 pstest Command Line Syntax

Argument	Explanation
e	Enables performance warning, which displays a warning message if the performance ratio is less than 1:5.
l	Enables the long memory test.
f=*testfile_directory*	Specifies the directory of a test file.

pstest Error Messages

TABLE 28-3 pstest Error Messages

	Error Message	Probable Cause(s)	Recommended Action
6001	Checking prstatus failed:		
6002	Failed to turn prestoserve DOWN:		
6003	File I/O test failed with low performance ratio: *number*		Check that Prestoserve is configured for /tmp.
6004	byte compare: location = *address*, observed = *number*, expected = *number*		
6005	word compare: location = *address*, observed = *number*, expected =*number*		
6006	(data type) long compare: location = *address*, observed = *number*, expected = *number*		
6007	lseek() failed:		
6008	NVRAM write failed:		
6009	NVRAM read failed:		
6010	Failed to get status of Prestoserve failed:		
6011	Failed to reinitialize Prestoserve:		
6012	Failed to turn prestoserve UP:		
6013	Failed to munmap prestoserve:		
6014	File write failed:		
6015	File read failed:		
6016	Data compare failed		
6017	Failed to restore prestoserve state: %s		

TABLE 28-3 `pstest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
6018	`Prestoserve test is applicable in Functional test only`		
8001	`Failed to open prestoserve board:`	Prestoserve hardware not installed.	
		NVSIMM / NVRAM SBus board not seated correctly.	
		Prestoserve software not installed.	
		Not in superuser mode.	
8002	`Prestoserve is in the ERROR state`	Errors occurred on a disk drive.	
8003	`Some batteries are not good or not enabled`		
8004	`memory_check (pass` *pass_id*`) failed`		
8005	`fileio_check (pass` *pass_id*`) failed`		
8006	`File I/O test failed (Prestoserve down)`		
8007	`File I/O test failed (Prestoserve up)`		
8008	`Open %s also failed: %s. Please enter test file directory`		
8009	`PRESTOSERVE TESTS FAILED!`		

CHAPTER 29

SunVideo Test (rtvctest)

rtvctest verifies the functionality of the SunVideo™ SBus card. SunVideo technology captures and compresses video input in realtime, making it possible to have realtime video conferencing over standard Ethernet networks.

rtvctest is available as a customtest. To display the test on the SunVTS user interface, you must:

1. Edit the .customtest_OtherDevices file in the SunVTS bin directory.
2. Uncomment the line starting with the label SunVideo.

The rtvctest was originally written for Sundiag™ and the messages from the test are displayed on the SunVTS console within a SunVTS INFO message wrapper.

The rtvctest is available under the OtherDevices group, and is only available in the Functional Test mode.

rtvctest Subtests

rtvctest is divided into four subtests: PROMCheck, Memory, Jalapeno, and CL4000. The PROMCheck subtest verifies the SunVideo card's programmable read-only memory. The memory test verifies all of the memory on the card, including the 2 Mbytes of memory on the CL4000 compression engine and the memory on the Jalapeno application-specific integrated circuit (ASIC). The Jalapeno subtest verifies the interface logic between the SBus, A/D conversion chips, and the CL4000 compression engine. The CL400 subtest verifies that the compression engine ASIC is able to compress digitized video data from the A/D chips and send this data to the SBus through the Jalapeno ASIC.

The `rtvctest` is composed of 49 verification test modules. TABLE 29-1 lists these modules and their associated test sequence numbers.

TABLE 29-1 `rtvctest` Verification Modules

SunVideo Verification Module Name	Test Sequence Number
RTVC SUNDIAG Start	0
RTVC Checksum	1
RTVC Jalapeno SMEM	2
RTVC CL4000 DMEM	3
RTVC Jalapeno SBus Interrupt Mask	4
RTVC CL4000 Interrupt Mask	5
RTVC DVMA Control Register	6
RTVC DVMA Transfer Size Counter	7
RTVC DVMA Memory Address Counter	8
RTVC DVMA Virtual Memory Address Counter	9
RTVC DVMA Slave SBus Rerun Register	10
RTVC IIC Control Register	11
RTVC IIC Data Register	12
RTVC Video DMA Control Register	13
RTVC Video DMA Transfer Size Counter	14
RTVC Video DMA Memory Address Counter	15
RTVC User Interrupt 0	16
RTVC User Interrupt 1	17
RTVC User Interrupt 2	18
RTVC User Interrupt 3	19
RTVC Video Control and Status Register	20
RTVC Video Control Field Line Interrupt 1	21
RTVC Video Control Field Line Interrupt 2	22
RTVC Video Scan Line Mask Registers	23
RTVC Video Input Format Type	25
RTVC Video Horizontal Lock	26
RTVC Video Even Odd Field	27
RTVC CL4000 Host Control	28

TABLE 29-1 `rtvctest` Verification Modules *(Continued)*

SunVideo Verification Module Name	Test Sequence Number
RTVC CL4000 Host Lock	29
RTVC CL4000 Video Port A Control	30
RTVC CL4000 Video Port B Control	31
RTVC CL4000 Video Port A FIFO	32
RTVC CL4000 Video Port B FIFO	33
RTVC CL4000 Address Memory Registers	34
RTVC CL4000 Instruction Memory Access Registers	35
RTVC Time Stamp Register	36
RTVC CL4000 Register Memory	37
RTVC CL4000 Scratch Memory	38
RTVC CL4000 DMA Mode	39
RTVC CL4000 Motion Estimation Registers	40
RTVC CL4000 PSW	41
RTVC CL4000 Variable Length Coder Registers	42
RTVC CL4000 Channel Memory Registers	43
RTVC CL4000 CPU Control	44
RTVC CL4000 Multiply Control	45
RTVC CL4000 DMA Interrupt Control	46
RTVC CL4000 Block Transfer Mode	47
RTVC CL4000 Accumulator MSB	48
RTVC CL4000 JPC Field	49
RTVC SUNDIAG Finish	50

rtvctest Options

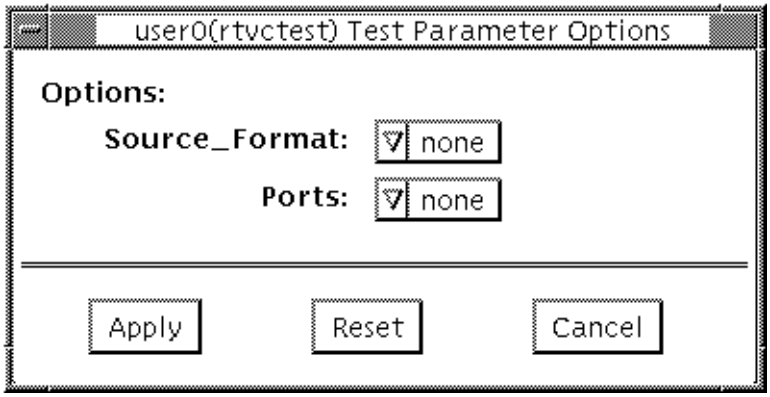


FIGURE 29-1 `rtvctest` Option Window

You may test the SunVideo card without any video device (camera, video disc player, or VCR) connected to an input port. However, if you connect a video device to the card, then you must state the format of the video source and the input port to which the device is connected.

Note – If you do not state both the video source and the input port, the `rtvctest` prints an error and terminates testing.

Source Format

Select the format of the video source used for testing. You may select from the sources shown in TABLE 29-2.:

TABLE 29-2 `rtvctest` Source Format Options

Video Source	Definition
None	No video source.
NTSC	National Television System Committee (NTSC) video source, which is the video standard in the United States and Japan.
PAL	Phase alternate line video source, which is the video standard in Europe.

Ports

If you have selected a video source for testing, then you must state which input port you have used to connect the source to the SunVideo card. You may select from the ports shown in TABLE 29-3:

TABLE 29-3 `rtvctest` Port Options

Input Port	Definition
None	No input port used.
CV1	Composite video input Port 1 (RCA type input).
CV2	Composite video input Port 2 (RCA type input).
SVHS	Super VHS input port.

`rtvctest` Command Line Syntax

`/opt/SUNWvts/bin/rtvctest` [**`fmt=`**`none|ntsc|pal`] [**`port=`**`none|cv1|cv2|svhs`] **`dev=`***`rtvc_device`*

TABLE 29-4 `rtvctest` Command Line Syntax

Arguments	Description
`fmt`	Select the format of the video source used for testing. Select either `ntsc` (video standard in the United States and Japan) or `pal` (video standard in Europe).
`port`	If you have selected a video source for testing, then you must state which input port you have used to connect the source to the SunVideo card. You may select from the following ports: • `cv1`Composite video input port 1 (RCA type) • `cv2`Composite video input port 2 (RCA type) • `svhs`Super VHS port
dev	You are required to state the SunVideo device when running the `rtvctest` from the command line. Replace *rtvc_device* with `rtvc`*n*, where *n* is the device number (from 0 to 31) of the SunVideo card being tested.

rtvctest Error Messages

TABLE 29-5 rtvctest Error Messages

Error Message	Description
SunVideo 10	*message* Where: *message* is one of the following: Missing REQUIRED argument D=rtvc[0..31]
SunVideo 20	*message* Error # *number* Where: *message* is one of the following: ioctl RTVC_CMD_RESET fault ioctl RTVC_CMD_SET_VIDEO fault ioctl RTVC_CMD_GET_VIDEO fault open /dev/rtvc fault close /dev/rtvc fault open /dev/rtvcctl fault close /dev/rtvcctl fault Unknown Jalapeno Version *number* is one of the following: ioctl error module version
SunVideo 30	*message name* Error # *number* Where: *message* is one of the following: memory map fault for memory unmap fault for selected /dev/rtvc and /dev/rtvcc1 not available. *name* is one of the following: prom sram buses reset dmem rtvc *number* is the error number

TABLE 29-5 `rtvctest` Error Messages *(Continued)*

Error Message	Description
`SunVideo 40`	RTVC Fault Detected via module *name* Physical Address *value* Expected Value *value* Actual Value *value* RTVC Sundiag Module number *number* Location *location* Message: *message(s)* Where: *name* is the name of the module under test *value* are the values associated with physical address, expected value, actual value *number* is the Sundiag Module under test. *location* is the U location of the faulty component. *message(s)* are any additional messages.
`SunVideo 41`	RTVC Fault Detected via module *name* Where: *name* is the name of the module under test.

`SunVideo 42`	*message value1 Actual value2*
	Where:
	message is one of the following:
	`Video Format Expected`
	`Video Port Expected`
	value1 is the expected value.
	value2 is the actual value.

`SunVideo 50`	*message number*
	Where:
	message is one of the following:
	`Unknown RTVC CL4000 test module`
	`Unknown RTVC Jalapeno test module`
	`Unknown RTVC test module`
	`Unknown RTVC memory test module`
	`Unknown Start Bit`
	number is the module number or start bit location.

CHAPTER 30

Serial Asynchronous Interface (PCI) Test (saiptest)

saiptest checks the functionality of the Serial Asynchronous Interface card through its device driver.

saiptest Hardware Requirements

Before running the SunVTS diagnostics software, make sure you install the device driver and the cards to be tested. Also, you should reboot your system with the boot -r command to reconfigure the system and allow the SunVTS kernel to recognize the new driver.

Note – You must run the saiptest in intervention mode.

The following minimum hardware configuration is required to successfully run the Internal test:

- PCI-based SPARC desktop system with a PCI slot
- Serial Asynchronous Interface card, installed in one of the PCI slots

The following hardware is also required to run other SunVTS Serial Asynchronous Interface tests:

- Serial Asynchronous Interface Patch Panel (Part No. 7600-0027)
- 25-pin serial loopback plugs (Part No. 540-1558)
- RS-232 serial cables (Part No. 530-1685)
- TTY terminal

saiptest Options

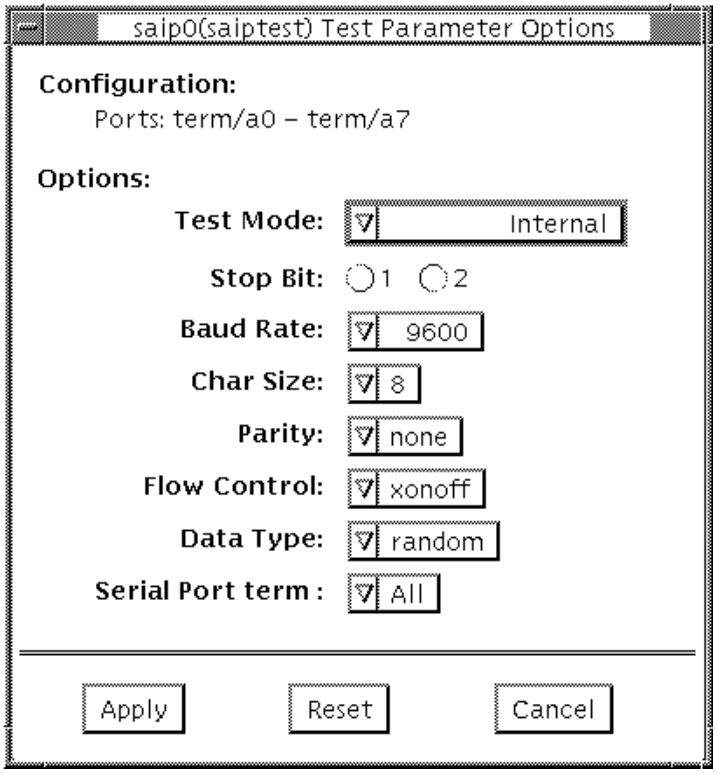


Figure 30-1 `saiptest` Options Menu

The Configuration section of the option menu displays the asynchronous serial ports available for the Serial Asynchronous Interface board. Table 4-1 shows the available ports.

Table 30-1 `saiptest` Asynchronous Serial Ports

Board Number	Board Device	Serial Ports
0	saip0	term / a000-a007
1	saip1	term / b000-b007
2	saip2	term / c000-c007
3	saip3	term / d000-d007

Table 30-1 `saiptest` Asynchronous Serial Ports *(Continued)*

Board Number	Board Device	Serial Ports
4	saip4	term / e000-e007
5	saip5	term / f000-f007
6	saip6	term / g000-g007
7	saip7	term / h000-h007
8	saip8	term / i000-i007
9	saip9	term / j000-j007
10	saip10	term / k000-k007
11	saip11	term / l000-l007

Table 30-2 `saiptest` Options

`saiptest` Option	Description
Internal Test	Performs internal loopback testing on the Serial Asynchronous Interface card(s) installed in PCI slots. You do not need to attach anything to the card(s) to perform this test.
25-pin Loopback	Provides full-duplex transmission and full-modem loopback testing of the serial port selected in the Serial Port section of the option menu. You must attach the 25-pin loopback plug to the serial port on the Serial Asynchronous Interface Patch Panel that is being tested. This test cannot be run concurrently with the Echo-TTY option enabled.
Echo-TTY	Checks the proper operation of the serial port selected in the Serial Port selection of the option menu by echoing characters typed on a TTY terminal keyboard to the TTY terminal screen. The characters you type on your TTY keyboard display on the TTY screen. **NOTE**: A TTY connection to the Serial Asynchronous Interface serial port requires corresponding character size se up. For example, if a TTY attachment is running with 8-bit character size, then the Char Size `saiptest` option should be set to 8-bits. If you do not type any characters within two minutes, this test times-out.

Table 30-2 `saiptest` Options *(Continued)*

`saiptest` **Option**	**Description**
Baud Rate	Specifies the baud rate; choose 110, 300, 600, 1200, 2400, 4800, 9600, 19200, or 38400 baud. **NOTE**: The baud rate of 38400 can only be used if the Internal Test is disabled and you are testing one port at a time.
Char Size	Specifies the character length; choose 5, 6, 7, or 8 characters.
Stop Bit	Specifies the number of stop bits; choose 1 or 2 bits.
Parity	Specifies the selectable parity; choose none, odd, or even.
Flow Control	Specifies the selectable flow control; choose XOnOff, rtscts, or both.
Data Type	Specifies the selectable data type pattern; choose 0x55555555 (0x55), 0xaaaaaaaa (0xaa), or random.
Serial Port	Specifies the serial port to be tested. The available ports are listed in the Configurations section at the top of the `saiptest` options menu.

`saiptest` Test Modes

`saiptest` is only available in the Functional Test mode.

saiptest Command Line Syntax

/opt/SUNWvts/bin/saiptest *standard_arguments* **-o dev=***device_name*,**M=***test_mode*,**B=baud_rate,Size=***character_size*,**Stop=***#of_stop_bits*,**Parity=***parity*,**F=***flow_control*,**Data=***test_pattern*,**sp=***serial_port*

Table 30-3 saiptest Command Line Syntax

Argument	Explanation
dev=device_name	Specifies the asynchronous serial ports of the PCI card slots tested. Since there is no default, you must type a device name–either a board(saip0-12) or an individual port (term/x000-term/x007, where x is a-l): •saip0 = the 8 asynchronous serial ports in the first card •saip1 = the 8 asynchronous serial ports in the second card •saip2 = the 8 asynchronous serial ports in the third card •saip3 = the 8 asynchronous serial ports in the fourth card •saip4 = the 8 asynchronous serial ports in the fifth card •saip5 = the 8 asynchronous serial ports in the sixth card •saip6 = the 8 asynchronous serial ports in the seventh card •saip7 = the 8 asynchronous serial ports in the eighth card •saip8 = the 8 asynchronous serial ports in the ninth card •saip9 = the 8 asynchronous serial ports in the tenth card •saip10 = the 8 asynchronous serial ports in the eleventh card •saip11 = the 8 asynchronous serial ports in the twelfth card or /dev/term/x00*m* Where *x* is a-l and m is 0 to 7 (any of the asynchronous serial ports in PCI card slots).
M=test_mode	Specifies Internal, 25_pin_loopback, or Echo_TTY test mode.
B=baud_rate	Sets the baud rate to 110, 300, 600, 1200, 2400, 4800, 9600, 19200, 38400; the default is 9600.
Stop=#of_stop_bits	Toggles the number of stop bits between 1 or 2; the default is 1.
Size=character_size	Sets the character size as an integer between 5 and 8.
Parity=parity	Specifies the parity as none, odd, or even; the default is none.
F=flow_control	Specifies flow control as xonoff, rtscts, or both.
Data=test_pattern	Specifies test pattern as 0x55555555, 0xAAAAAAAA, or random.
sp=serial_port	Specifies the terminal and asynchronous serial port number, such as term/a003.

saiptest Error Messages

The saiptest error messages are generated when the SunVTS Serial Asynchronous Interface discovers errors. The error descriptions in Table 30-4 identify probable causes for the card or test failure, and identify the Field Replaceable Unit (FRU) and recommended action, if possible. The three FRUs under test are: the Serial Asynchronous Interface card, the 78-pin shielded cable, and the Patch panel.

Table 30-4 saiptest Error Messages

Error Message	Probable Cause(s)	Recommended Action
6000 *error_message*		
6001 Expected = *value*, observed = *value*		
6002 Expected *value*:		
6003 Observed *value*:		
6004 Modem Loopback test failed on *device_name*		
6005 Off-line error on device *device_name*		
6007 Busy error on device *device_name*		
6008 Error on device *device_name*		
6009 Retry *number* exceeds limit *number* rc =s *value*		
6010 Expected *number* bytes, observed *number* bytes		
6011 Internal test failed on *device_name*		
6012 Data Loopback test failed on *device_name*		
6013 Ioctl TIOCSSOFTCAR error on *device_name*		
8000 Must provide device name!		
8001 No SAI/P card found or device driver not installed		

Table 30-4 `saiptest` Error Messages *(Continued)*

Error Message	Probable Cause(s)	Recommended Action
8002 Ioctl TCSETS failed on *device_name*		
8003 Open error on *device_name* - device driver may not be installed properly		
8004 Device *device_name* is already opened		
8005 Ioctl SAIP_ENLOOP error in *device_name*		
8006 Ioctl SAIP_DISLOOP error in *device_name*		
8011 Ioctl TIOCMGET failed on *device_name*		
8012 *device_name*: Expected DSR set, observed clear		
8013 *device_name*: Expected DSR clear, observed set		
8014 Ioctl TIOCMSET failed on *device_name*		
8015 Ioctl TIOCMBIC failed on *device_name*		
8016 Read error on *device_name*		
8017 Write error on *device_name*		
8020 Timeout error on *device_name*	No loopback plug.	Check the loopback plug.
8021 Timeout error on *device_name*	TTY terminal not connected.	Check the TTY terminal connected to the device.
8022 Timeout error on *device_name*		

CHAPTER 31

Sun Enterprise Cluster 2.0 Network Hardware Test (scitest)

scitest verifies the functionality of the Sun Enterprise Cluster 2.0 by checking the networking hardware. For this test to be meaningful, the cluster must already be configured before the testis run. For details on how to configure the cluster, refer to *Sun Enterprise Cluster 2.0 Hardware Site Preparation, Planning, and Installation Guide*.

scitest reads the /etc/sma.ip file to determine the target nodes in the cluster. scitest mainly uses the Internet Control Message Protocol (ICMP) to test the connections between cluster nodes.

After finding the cluster nodes (targets), scitest performs the following tests:

- **Random test** sends out 256 packets with random data length and random data.
- **Incremental test** sends out packets with length from minimum to maximum packet size using incremental data.
- **Pattern test** sends 256 packets of maximum length, where each packet contains one test pattern and all byte patterns (0 to 0xFF) are used.

Note – scitest is a scalable test. The maximum number of instances is two per SCI card.

`scitest` Options

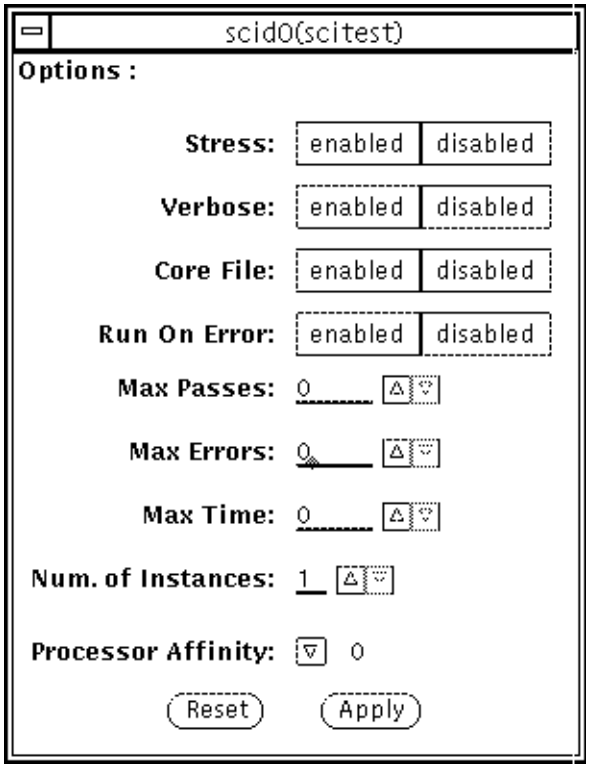


FIGURE 31-1 `scitest` Option Menu

TABLE 31-1 `scitest` Options

`scitest` **Options**	**Description**
Target Host	Not used.
Receive Timeout field	Specify a number between 0–600 seconds. The default is 120 seconds.
Number of Retries field	The number of retries before an error is flagged. Specify a number between 0–128.
Print Warning	Disabled by default. Choose Enable to see warning errors, such as `retry on timeout` errors.

scitest Test Modes

Connection, Functional and Online modes are supported by scitest. Different test schemes are performed on the network device based on the mode selected.

TABLE 31-2 scitest Test Modes

Test Mode	Description
Connection Test	scitest checks if the device is connected. It searches through all the network interfaces for the specified device name. scitest finds the device not connected the test fails, otherwise, it returns device is connected.
Functional Test	scitest performs all three tests (Random test, Incremental test, and Pattern test) sequentially. It allows you to specify an option in such a way that scitest performs a very stressful test.
Online Mode	Running scitest through SyMON. In Online mode, the following Functional Test description applies: scitest is aware that the user's application may be running, it tries to minimize the influence on the application while it is testing by only running the random test. Since the network device is shared and system resources are available, applications will not be heavily impacted.

scitest Command Line Syntax

/opt/SUNWvts/bin/scitest *standard_arguments* **-o dev=***interface***,test=***type***,packets=***n***,pattern=***hex***,delay=***seconds***, timeout=***seconds***,retry=***n***,warn**

TABLE 31-3 scitest Command Line Syntax

Argument	Explanation
dev=*interface*	Network interface name. The default value is le0 for Ethernet networks.
test=*type*	The test type. Specify random, increment, or pattern. The default value is random+increment+pattern to run.
packets=*n*	Number of random / pattern packets. The default is 256.

TABLE 31-3 `scitest` Command Line Syntax

Argument	Explanation *(Continued)*
`pattern=`*hex*	Specifies a data pattern in hexadecimal form. The default is all patterns from `0` to `0xff`.
`delay=`*seconds*	Indicates the time between subtests in seconds. The default is 30 seconds.
`timeout=`*seconds*	Indicates the number of seconds to wait before a timeout. The default is 20 seconds.
`retry=`*n*	Indicates the number of test timeout retries. The default is three retries.
`warn`	When enabled, prints warning messages.

scitest Error Messages

TABLE 31-4 scitest Error Messages

	Error Message	Probable Cause(s)	Recommended Action
4001	Unable to communicate from *string*	SCI adapter failure or no cable connected.	Check cable connections. Replace the SCI adaptor.
4002	Can not access /etc/sma.ip file. "I WILL STOP TESTING SCI INTERFACES"	/etc/sma.ip is missing, or the cluster is not configured, or this is an old cluster version.	Use sm_config to configure the cluster. Restore the files from a backup tape. Specify the cluster machines in the target host of test options before running the test.
6000	RPC broadcast failure *error_message*		
6001	Unable to resolve *host_name* ethernet address		
6002	No ICMP echo reply from *string*	SCI adaptor failure or no cable connected.	Check cable connections. Replace the SCI adaptor.
6003	ICMP echo reply incorrect length from *host_name*, exp *data* obs *data*		
6004	ICMP echo reply length *number* from *host_name*, data mismatch at byte *number*, exp *value* obs *value*		
6005	Unable to find any test target		
8000	Unable to open *device_name* *error_message*		
8001	Bad ioctl *name* *error_message*		
8002	Unable to allocate *number* bytes of memory *error_message*		
8003	System call *name* returned *value* *error_message*		
8004	Unable to map network entry for *host_name*		

TABLE 31-4 `scitest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
8006	`Failed to allocate` *number* `bytes of swap space for configuration`		
8007	`dl_primitive response =` *value*		
8008	`dl_ok_ack: short response`		
8009	`dl_phys_addr_ack: short response`		
8010	`Invalid Argument` *string*		
8011	`Interface` *device_name* `not configured in system`		
8012	`SCITEST can not open/read /etc/sma.ip`		

CHAPTER 32

Environmental Sensing Card Test (sentest)

`sentest` checks the SCSI Environmental Sensing card (SEN) installed in the SPARCstorage RSM to monitor the enclosure environment. The SEN card monitors the enclosure's over-temperature condition, fan-failures, power-supply failures, and drive activity.

`sentest` verifies the SEN card by first setting each control function to a predetermined value, and then reading it back to verify if the value is correct.

`sentest` verifies the following control functions in the enclosure:

- **Alarm** (enable / disable)–`sentest` toggles the alarm to the disable state, then to the enable state.
- **Alarm time** (0-0xff seconds)–`sentest` sets the time (from 0 to 4095), then reads it back to verify the time setting.
- **Drive fault LED** (DL0-DL6)–`sentest` toggles each LED to its OFF and ON states.

`sentest` is a nonscalable test. It cannot verify the control function settings correctly if another instance is changing the setting.

sentest Options

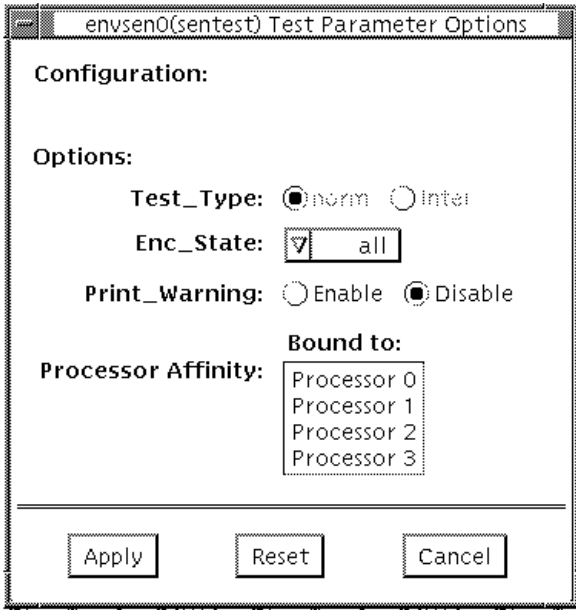


FIGURE 32-1 sentest Options Menu

TABLE 32-1 `sentest` Options

`sentest` **Option**	**Description**
Test Type	Specifies the test to be performed. `Norm` test type performs normal testing as alarm enable / disable, alarm time setting, and drive LED on / off testing; Interactive test type reports the current enclosure status.
Enc_state	Specifies which subsystem's status in the enclosure is reported. Default is ALL. This test is only used with the inter test type and in Functional test. The test options are: • Alarm enable / disable status • Drive present status • Drive LED status • Power modules status • Fan modules status • Over temperature, abs (abnormal, no immediate attention needed), chk (abnormal, immediate attention needed) status • All of the above

`sentest` Test Modes

`sentest` supports all three test modes. Each mode performs a different test scheme on the SEN card.

TABLE 32-2 `sentest` Test Modes

Test Mode	**Description**
Connection Test	Checks the device connection by opening the device. If the device does not open, the device is not connected.
Functional Test	Checks three components within the enclosure. It checks alarm enable / disable, alarm time setting, and the drive LEDs. It does not test the power on / off function (only functions whose values can be changed are tested).
Online Mode	Provides a means to run `sentest` through SyMON. In Online mode, the following Functional Test description applies: `sentest opens the device and reports the current enclosure status.`

sentest Command Line Syntax

/opt/SUNWvts/bin/sentest *standard arguments*
-o dev=*interface***,test=***type***,enc=***component*

TABLE 32-3 sentest Command Line Syntax

Argument	Explanation
dev=*interface*	SEN card device name; the default value is ses0.
test=*type*	Specifies the test type; select Norm for normal testing or Inter for interactive testing; the default value is Norm. Possible values are: norm and inter.
enc=*component*	Indicates which part of the enclosure status is reported; the default value is ALL. Possible values are: enalm, dp, dl, pm, fan, ovt, and ALL.

sentest Error Messages

TABLE 32-4 sentest Error Messages

Error Message	Probable Cause(s)	Recommended Action
6000 Check alenb failed, exp=*value*, obs=*value*		
6001 Check alenb failed, exp=*value*, obs=*value*		
6002 Check alenb failed, exp=*value*, obs=*value*		
6003 Check altime failed, exp time=*value*, obs=*value*		
6004 Fan failed		
6005 Dual fan failed		
6006 Enclosure over temperature		
6007 Device failed, need immediate attention		

TABLE 32-4 `sentest` Error Messages *(Continued)*

Error Message	Probable Cause(s)	Recommended Action
6008 Power module A failed		
6009 power module B failed		
8000 power module B failed		
8001 ioctl get state failed, errmsg=*message*		
8002 ioctl get state failed, errmsg=*message*		

CHAPTER 33*

Soc+ Host Adapter Card Test (socaltest)

socaltest aids the validation and fault isolation of the SOC+ host adapter card. In the case of a faulty card, the test tries to isolate the fault to the card, the GBIC module, or the DMA between the host adapter card and the host memory.

socaltest Options

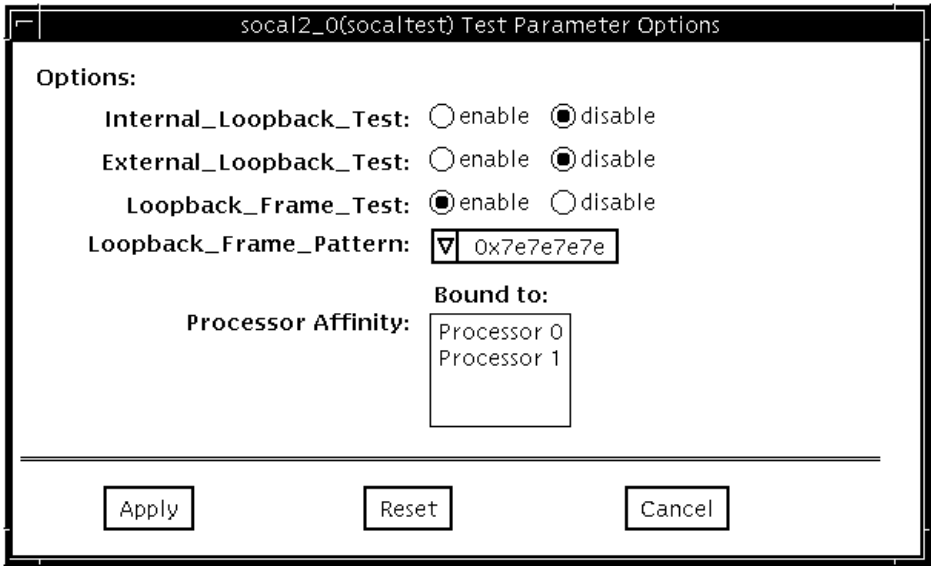


FIGURE 33-1 socaltest Options Menu

socaltest Options

TABLE 33-1 socaltest Options

socaltest **Options**	**Description**
Internal Loopback Test	Checks the host adapter card and the direct memory access (DMA) with the host system. This is accomplished as follows: • A frame is created in the host adapter local memory, sent out through the SOC+ transmitter and internally looped back to the SOC+ receiver. The received data is compared with the original data. • A frame is created in the host adapter local memory, sent out through the SOC+ transmitter and looped back through the SERDES (serialiser-deserialiser) chip on the host adapter card. The received data is compared with the original data. • A frame is created in the host main memory, transferred through the DMA to the host adapter transmitter, looped back within the SOC+ chip, and transferred from the receiver to the host main memory through the DMA. The received frame is compared with the original transmitted frame, which tests the host memory to the host adapter DMA path.
External Loopback Test	The External Loopback Test verifies the proper functioning of the GBIC module. A frame is created in the host adapter local memory, sent out and looped back through the external loopback connector attached to the port. If the external loopback test is run together with the internal loopback test, the DMA path is also tested by creating a frame in host main memory, transferring it to the host adapter through the DMA, looping it back through the external loopback connector and transferring the received frame back to the host main memory by DMA.
Loopback Frame Test	Sends out a buffer initialized with the selected pattern and compares it with the looped back frame. It passes if the two compare and fails if they do not.
Loopback Frame Pattern	List of selectable patterns for the Loopback Frame Test.

Note – In addition to the tests described above, socaltest also tests the basic functions of the SOC+ chip, the on-board XRAM, and the host control buffer by invoking the appropriate tests implemented in firmware.

socaltest Test Modes

socaltest can only be run in the Functional Test modes.

Note – You cannot run the internal and external loopback tests if the port is connected to a disk array.

socaltest Command Line Syntax

/opt/SUNWvts/bin/socaltest *standard arguments*
-o dev=*device name*,**elb=***enabled* | *disabled*,**ilb=***enabled* | *disabled*,**lbf=***enable* | *disable*,**ptn=***pattern*

TABLE 33-2 socaltest Command Line Syntax

Argument	Explanation
dev=*device name*	The name of the socal port to be tested.
elb=*enabled* | *disabled*	Enables or disables the external loopback test.
ilb=*enabled* | *disabled*	Enables or disables the internal loopback test.
lbf=*enable* | *disable*	Enables or disables the loopback frame test.
ptn=*pattern*	Specify the pattern in hexadecimal, for example: ptn=0x7e7e7e7e

socaltest Error Messages

TABLE 33-3 socaltest Error Messages

Error Message	Probable Cause(s)	Recommended Action
8000 Couldn't open *device_name*	SOC+ card not installed.	Verify that the target SOC+ card is installed properly.
8002 {SOC+ host adapter}--{host memory} loopback test failed!	Fault in DMA between host and SOC+ host adapter.	Contact your authorized Sun service provider.
8006 SOC+ host adapter external loopback test failed!	Loopback cable not connected.	Connect loopback cable.
	OEC module faulty or not installed properly.	Replace OEC module and retry.
		Contact your authorized Sun service provider.
8009 SOC+ host adapter internal loopback test failed!	SOC+ host adapter is faulty or is not properly installed.	Verify that the SOC+ host adapter is installed properly.
		Replace the host adapter and retry.
		Contact your authorized Sun service provider.
8010 Failed ioctl *ioctl_name*	System error.	Contact your authorized Sun service provider.
8011 Host control buffer test failed	SOC+ host adapter is faulty.	Replace the host adapter and retry.
		Contact your authorized Sun service provider.
8012 SOC+ selftest fails	SOC+ host adapter is faulty.	Replace the host adapter and retry.
		Contact your authorized Sun service provider.

TABLE 33-3 `socaltest` Error Messages *(Continued)*

Error Message	Probable Cause(s)	Recommended Action
8013 `XRAM test fails`	SOC+ host adapter is faulty.	Replace the host adapter and retry.
		Contact your authorized Sun service provider.
8015 `Loopback frame test failed` `Mismatch in looped back frame` `Expected:` *value* `Observed:` *value*		

CHAPTER 34

NeWSprinter Test (spdtest)

spdtest is a two-part test that checks the printer support hardware. The first part is a register test that checks the NeWSprinter™ 20 SBus printer card's internal functions. The second part is a printing test that checks the interaction between the printer and the print server, as well as the printer's capabilities.

spdtest Options

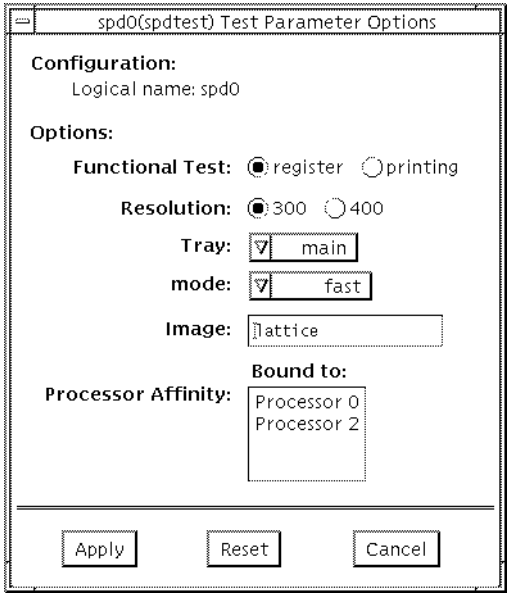


FIGURE 34-1 spdtest (NeWSprinter) Option Menu

TABLE 34-1 `spdtest` Options

spdtest Options	Description
Functional Test	This test is composed of two subtests: • The `Register subtest` checks the NeWSprinter 20 SBus printer card. • The `Printing subtest` tests the printer's capabilities. The default setting is Register.
Resolution	This exclusive setting defines the printer resolution of the printer test pattern. You can choose either 300 or 400 dots per inch (dpi). The default setting is 300 dpi.
Tray	From the Tray menu, you can choose from five types of paper cassettes: • Main Tray (or Tray 1) is the top cassette that feeds paper to the printer. • Tray 2 is the bottom cassette that feeds paper to the printer. • Tray 3 is an optional tray. • Manual Tray is a manual feed tray connected to the rear of the printer. This tray is used to hand-feed print media that cannot be accommodated by the paper cassettes. • Auxiliary Feeder is optionally installed in place of the manual feed tray. The Feeder stores and automatically feeds print media that would otherwise require the manual feed. The default setting is the Main tray.
Mode	From the Mode menu, you can set the interval at which images are printed. The choices are: • `Fast`: prints an image every 10 seconds. • `Medium:` prints an image every 12 minutes. • `Extended`: prints an image every 30 minutes. The default setting is `Fast`.
Image	Use this option to enter the file name of the test image to print.

`spdtest` Test Mode

This test only supports the Functional Test mode.

spdtest Command Line Syntax

/opt/SUNWvts/bin/spdtest *standard_arguments* **-o dev=***device_name*, **func=f***unction*,**reso=***resolution*,**tray=***tray*,**mode=***mode*,**image=***image*

TABLE 34-2 spdtest Command Line Syntax

Argument	Explanation
dev=*device_name*	Specifies the full path name of the device.
func=*function*	Represents one of the following functional tests: register = Register test printing = Printing test
reso=*resolution*	Specifies a number that indicates print resolution: 300 = 300 dpi 400 = 400 dpi
tray=*tray*	Specifies a number that represents the printer cassette type: main = Main tray (Tray 1) tray2 = Tray 2 tray3 = Tray 3 (optional) manual = Manual Tray aux = Auxiliary feeder (optional)
mode=*mode*	Specifies a number that represents how often to print the test image: fast = Fast (Prints an image every 10 seconds) medium = Medium (Prints an image every 12 minutes) extended = Extended (Prints an image every 30 minutes)
image=*image*	Specifies a raster file name.

spdtest Error Messages

TABLE 34-3 spdtest Error Messages

	Error Message	Probable Cause(s)	Recommended Action
6000	Test function is not selected		Select from register and printing for the Functional Test (func) parameter.
6001	Error occurred while driver was running self diagnostics on spd device	Initialization Error.	Retry. If failure persists, contact your authorized Sun service provider.
6002	Error occurred while driver was running self diagnostics on spd device	Read / Write Error.	Retry. If failure persists, contact your authorized Sun service provider.
6003	Error occurred while driver was running self diagnostics on spd device	Loopback Error.	Retry. If failure persists, contact your authorized Sun service provider.
6004	Error occurred while printing raster image	Printer RAM failure.	Retry. If failure persists, contact your authorized Sun service provider.
6005	Error occurred while printing raster image	Printer motor failure.	Retry. If failure persists, contact your authorized Sun service provider.
6006	Error occurred while printing raster image	Printer ROS failure.	Retry. If failure persists, contact your authorized Sun service provider.
6007	Error occurred while printing raster image	Printer fuser failure.	Replace the fuser unit.
6008	Error occurred while printing raster image	Printer XERO failure.	Properly install or replace toner kit.
6009	Error occurred while printing raster image	No toner kit.	Install a new toner kit.
6010	Error occurred while printing raster image	Toner end of life.	Replace toner kit.
6011	Error occurred while printing raster image	Printer cover open.	Close the printer cover.
6012	Error occurred while printing raster image	Paper jam.	Clear the paper jam.
6013	Error occurred while printing raster image	No cassette in the selected tray.	

TABLE 34-3 `spdtest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
6014	`Error occurred while printing raster image`	No paper in the selected tray.	
6015	`Error occurred while printing raster image`	No paper in the manual tray.	
6023	`Error occurred while printing raster image`	Late error.	Retry. If failure persists, contact your authorized Sun service provider.
6024	`Error occurred while printing raster image`	Serial buffer overrun.	Retry. If failure persists, contact your authorized Sun service provider.
6025	`Error occurred while printing raster image`	Serial error.	Retry. If failure persists, contact your authorized Sun service provider.
6026	`Error occurred while printing raster image, in setting tray or resolution`		
6027	`Error in setting tray or resolution`		
6028	`Error occurred while printing raster image`	Specified file is not a raster file.	
6029	`Error occurred while printing raster image`	Specified file is not a raster file.	
		Not enough memory.	
6030	`Error occurred while printing raster image`	File error: raster width does not fall on 32-bit boundary.	
6031	`Failure to write raster header to file`		
6032	`Failure to write raster image to file`		
8000	*device_name* `not found`	Device does not exist on system under test.	
8001	*device_name* `could not be opened`	The device is not configured correctly.	
8002	`Image file could not be opened`	The specified image file does not exist.	
8003	`Invalid parameter(s)`		Please refer to “spdtest Command Line Syntax” on page 311

TABLE 34-3 `spdtest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
8004	`Can not create raster file`		Check the directory permission and user status.
8005	`Error occurred while printing raster image`	Printer power off.	
8006	`Cannot get memory`		

CHAPTER 35

Serial Parallel Controller Test (spif)

The spif test accesses card components such as the cd-180 and ppc2 chips, and the serial and parallel ports through the serial parallel controller device driver.

spif Hardware Requirements

Before running the SunVTS system exerciser, make sure you install the cards to be tested and the device driver. You should also reboot your system with the boot -r command to reconfigure the system and allow the SunVTS kernel to recognize the new driver.

Note – The spif test must be run in Intervention mode.

The following minimum hardware configuration is required to successfully run the Internal test:

- SBus-based SPARC desktop system with an SBus slot
- Serial parallel controller card, installed in one of the SBus slots

The following hardware is also required to run the other SunVTS serial parallel controller tests:

- Serial parallel controller patch panel (part number 540-2007)
- 96-pin loopback plugs (part number 370-1366)
- 25-pin serial loopback plugs (part number 540-1558)
- RS-232 serial cables (part number 530-1685)
- TTY terminal

spif Options

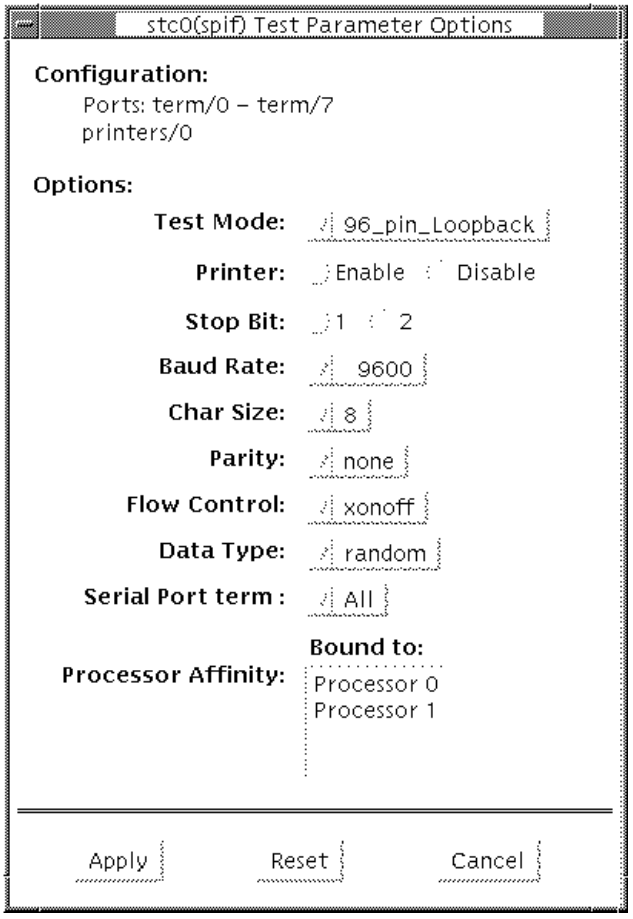


FIGURE 35-1 spif Option Menu

The Configuration section of the Option menu displays the serial ports available for the SPC/S board. The available ports are listed in TABLE 35-1.

TABLE 35-1 `spif` Serial Ports for the SPC/S Board

Board Number	Board Device	Serial Ports	Parallel Ports
0	stc0	term/0-7	printers/0
1	stc1	term/8-15	printers/1
2	stc2	term/16-23	printers/2
3	stc3	term/24-31	printers/3
4	stc4	term/32-39	printers/4
5	stc5	term/40-47	printers/5
6	stc6	term/48-55	printers/6
7	stc7	term/56-63	printers/7

The `spif` test options are described in TABLE 35-2.

TABLE 35-2 `spif` Options

spif Option	Description
96-pin Loopback (LB)	Provides data transmission, full-modem loopback, and parallel port loopback testing. You *must* attach a 96-pin loopback connector (part number 370-1366) to the card before running this test (see Appendix A, “96-Pin Female Loopback Connector).
Internal Test	Performs a quick internal check of the serial parallel controller card(s) installed in SBus slots. You do not need to attach anything to the card(s) to perform this test.
25-pin Loopback (LB)	Provides full-duplex transmission and full-modem loopback testing of the serial port selected in the Serial Port selection of this menu. You *must* attach the 25-pin Loopback plug to the serial port on the Serial Parallel Controller Patch Panel that is being tested (See Appendix A). This test cannot be run concurrently with the Echo-TTY option enabled.

TABLE 35-2 `spif` Options

spif Option	Description
Echo-TTY	Checks the proper operation of the serial port selected in the Serial Port section of this menu by echoing characters typed on a TTY terminal keyboard to the TTY terminal screen. The characters you type should be displayed on the TTY screen. Note: TTY connection to the `spif` serial port requires corresponding character size setup. For example, if a TTY attachment is running with 8-bit character size, then the `spif` test option 'Char Size' should also be set to 8 bits. If you do not type within two minutes, this test will time-out. Terminate testing by pressing Control-C. After a short delay, the Status window updates the Pass Count. This test cannot be run concurrently with the 25-pin Loopback subtest.
Printer	Sends the entire ASCII character set to a parallel printer. You must attach a parallel printer to the parallel port on the Serial Parallel Controller patch panel. Observe the printer output to validate the test.
Baud Rate	Specifies the baud rate; choose 110, 300, 600, 1200, 2400, 4800, 9600, 19200, or 38400 baud. Note: The baud rate of 38400 can only be used if one port is tested at a time and the Internal Test is disabled.
Char Size	Indicates character length; choose 5, 6, 7, or 8 characters.
Stop Bit	Specifies the number of stop bits; choose 1 or 2 bits.
Parity	Specifies the selectable parity; choose `none`, `odd` or `even`.
Flow Control	Specifies the selectable flow control; choices are XOnOff, rtscts, or both.
Data Type	Specifies the selectable data type pattern; it can be 0x55555555 (0x55), 0xaaaaaaaa (0xaa), or random.
Serial Port	Specifies the serial port to be tested. The available ports are listed in the Configurations section at the top of the `spif` Options menu.

You can also change the test options by modifying the `/opt/SUNWvts/bin/.customtest` file. See "Adding Your Own Tests" in `.customtest` in the *SunVTS 2.1 User's Guide*.

`spif` Test Modes

The `spif` test supports only the Functional test mode.

spif Command Line Syntax

/opt/SUNWvts/bin/spif *standard_arguments* **-o dev=***device_name*,**M=***test_mode*,**Ptr=***enable/disable*,**B=***baud_rate*,**Size=***character_size*,**S=***#of_stop_bits*,**Parity=***parity*,**F=***flow_control*, **Data=***test_pattern*, **sp=***serial_port*

TABLE 35-3 spif Command Line Syntax

Argument	Explanation
dev=*device_name*	Specifies the serial ports in SBus card slots (0-63) being tested. Since there is no default, you must type a device name—either a board (stc0-7) or an individual port (term/0 - term/63): stc0 = the 8 serial ports in the first card stc1 = the 8 serial ports in the second card stc2 = the 8 serial ports in the third card stc3 = the 8 serial ports in the fourth card stc4 = the 8 serial ports in the fifth card stc5 = the 8 serial ports in the sixth card stc6 = the 8 serial ports in the seventh card stc7 = the 8 serial ports in the eighth card or /dev/term/*mm* Where *mm* is 0 to 63 (any of the serial ports in SBus card slots)
M=*test_mode*	Specifies Internal, 96_pin_Loopback, 25_pin_loopback, or Echo_TTY test mode.
Ptr=*printer_test*	Enables or disables the Printer subtest.
B=*baud_rate*	Sets the baud rate to 110, 300, 600, 1200, 2400, 4800, 9600, 19200, or 38400; the default is 9600. To use the 38400 rate, only one port at a time can be tested, and the Internal test must be disabled.
Stop=*#of_stop_bits*	Toggles the number of stop bits between 1 or 2; the default is 1.
Size=*character_size*	Sets character size as a number between 5 and 8.
P=*parity*	Specifies the parity as none, odd, or even; the default is none.
F=*flow_control*	Specifies flow control as xonxoff,rtscts, or both.
Data=*test_pattern*	Specifies test pattern as 0x55555555, 0xAAAAAAAA, or random.
sp=*serial_port*	Specifies the terminal and serial port number, such as term/3.

spif Error Messages

These error messages are generated when the SunVTS serial parallel controller discovers any errors. The error descriptions below identify probable causes for the card or test failure, and identify the Field Replaceable Unit (FRU), if possible. The three FRUs affected are: the serial parallel controller card, the 96-pin shielded cable, and the patch panel.

TABLE 35-4 spif Error Messages

	Error Message	Probable Cause(s)	Recommended Action
6000	*error_message*		
6001	Expected = *value*, observed = *value*		
6002	Expected *value*:		
6003	Observed *value*:		
6004	Modem Loopback test failed on *device_name*		
6005	Off-line error on device *device_name*		
6006	Paper out error on device *device_name*		
6007	Busy error on device *device_name*		
6008	Error on device *device_name*		
6009	retry *number* exceeds limit *number* rc =s *value*		
6010	Expected *number* bytes, observed *number* bytes		
6011	Internal test failed on *device_name*		
6012	Data Loopback test failed on *device_name*		
6013	ioctl TIOCSSOFTCAR error on *device_name*		
8000	Must provide device name!		

TABLE 35-4 `spif` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
8001	No SPC/S card found or device driver not installed		
8002	ioctl TCSETS failed on *device_name*		
8003	Open error on *device_name* - device driver may not be installed properly		
8004	Device *device_name* is already opened		
8005	ioctl STC_SREGS(STC_IOREG-COR2) error in *device_name*		
8006	ioctl STC_GREGS(STC_IOREG-CCR) error in *device_name*		
8007	ioctl STC_S1REGS(STC_IOREG-CCR) error in *device_name*		
8008	ioctl STC_SREGS(STC_PPCREG-PDATA) error in *device_name*		
8009	ioctl STC_GREGS(STC_PPCREG-PDATA) error in *device_name*		
8011	ioctl TIOCMGET failed on *device_name*		
8012	*device_name*: Expected DSR set, observed clear		
8013	*device_name*: Expected DSR clear, observed set		
8014	ioctl TIOCMSET failed on *device_name*		
8015	ioctl TIOCMBIC failed on *device_name*		
8016	Read error on *device_name*		
8017	Write error on *device_name*		
8018	ioctl STC_GPPC error on device *device_name*		
8019	Can’t kill all processes		

TABLE 35-4 `spif` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
8020	`Timeout error on` *device_name*`.`	There is no loopback plug	Check the loopback plug.
8021	`Timeout error on` *device_name*	TTY terminal not connected	Check the TTY terminal connection.
8022	`Timeout error on` *device_name*		

CHAPTER 36

Serial Ports Test (sptest)

sptest checks the system's on-board serial ports (zs[0,1], zsh[0,1], se[0,1], se_hdlc[0,1]), as well as any multi-terminal interface (ALM2) boards (mcp[0-3]). Data is written and read in asynchronous and synchronous modes utilizing various loopback paths.

Intervention mode must be enabled to run this test. This test is non-scalable.

TABLE 36-1 Serial Port Tests

Mode	Description
Asynchronous Testing	This mode 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 user can select the loopback paths to use, the amount of data to transfer, and the baud rate to use. 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.

TABLE 36-1 Serial Port Tests *(Continued)*

Mode	Description
Synchronous Testing	This mode 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 user can select the loopback paths to use and the clock rate. 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 `sptest` 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. The test allows a percentage of the packets to be dropped. The user can set the drop tolerance between 0 percent and 99 percent. The default is 20 percent. If the system is extremely busy then the drop tolerance should be increased. Each packet is compared with its original for length and content. If a mismatch is detected, the test exits with an error.

Synchronous Testing Software Requirements

If you have `zs(7D)` serial ports on your machine, the synchronous devices may not exist. Look in the `/dev` directory for `zs`*h* (where *h*=`0` and / or `1`). If they do not exist, you can create them. Verify that the following two lines are in the `/etc/devlink.tab` file. If they are not there, add them.

```
type=ddi_pseudo;name=zsh zsh\M0
type=ddi_pseudo;name=clone;minor=zsh zsh
```

Caution – The white spaces in the lines above *must* be a single tab character before and after the `zsh` variables; using spaces will not work.

When these lines have been added to the `/etc/devlink.tab` file:

- **Change directories to `/kernel/drv`, and run the `add_drv zsh` command.**

If this command does not work:

- **run the `rem_drv zsh` command and then run the `add_drv zsh` command again.**

sptest Options

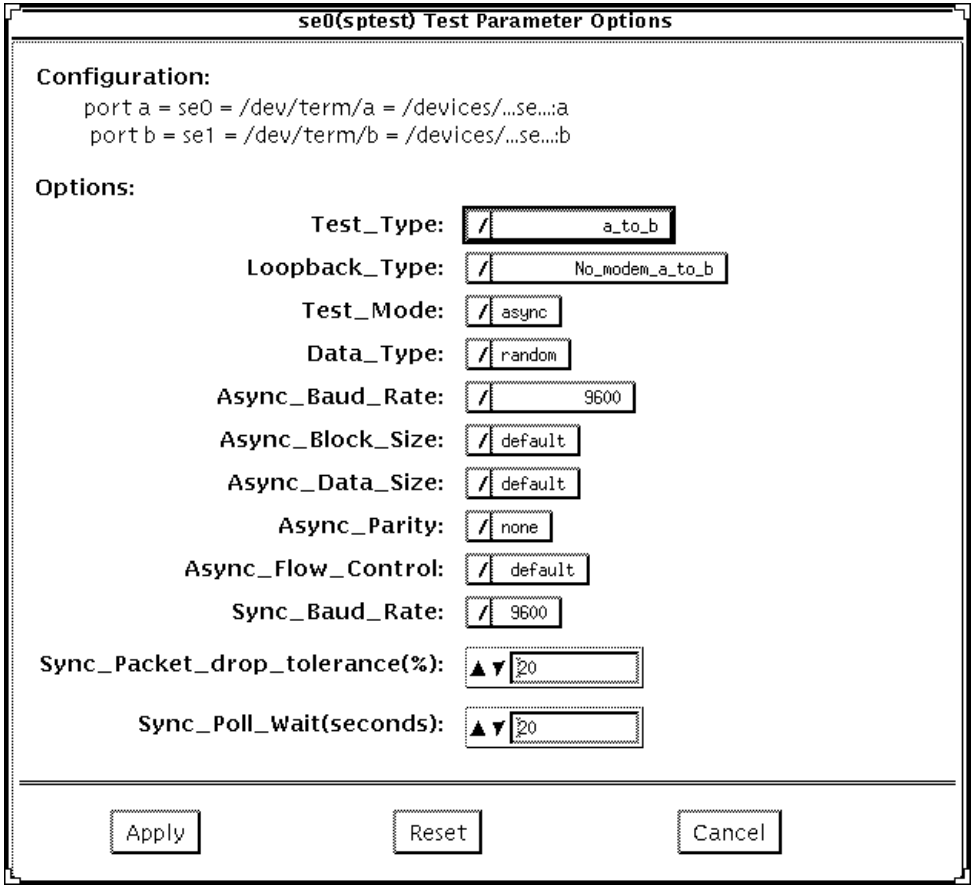


FIGURE 36-1 `sptest` Option Menu

There are a variety of loopback paths available. The internal loopback paths do not require an external connector. Their availability depends on the device. The `zs(7D)` device has an internal path for synchronous mode and the `se(7D)` device has an internal path for asynchronous mode. The external loopback connectors are described in Appendix A. The exact type of loopback connector required depends on the system I/O panel.

Legend: In the following table, *a* represents port a of the CPU board (motherboard), *b* represents port b of the CPU board, and the device names of the ports for each CPU board are listed.

TABLE 36-2 `sptest` Serial Devices

CPU	Port	Async Device	Sync Device
0	a b	`zs0` or `se0` `zs1` or `se1`	`zsh0` or `se_hdlc0` `zsh1` or `se_hdlc1`
1	a b	`zs2` `zs3`	`zsh2` * `zsh3` *
2	a b	`zs4` `zs5`	`zsh4` * `zsh5` *

* Currently, only `zsh0` and `zsh1` are supported by device drivers.

TABLE 36-3 `sptest` Options

sptest Options	Description
Test Type	Selects how the test will run. Test options include: • `a=` runs the test on port a • `b=` runs the test on port b • `a_b=` runs the test on ports a and b sequentially • `a_b_concurrent=` runs the test on port a and port b concurrently.
Test Mode	Selects the mode to put the serial device into before running the test. The modes available are Asynchronous, Synchronous or Both. When Both is selected, the test runs in Asynchronous mode then Synchronous mode.
Loopback Type	Selects the loopback test. Options include: •`Internal` is an internal path for a, b, a_b, and a_b_concurrent test types. •`Plug_a_to_a__b_to_b` is an external loopback plug for a, b, a_b, and a_b_concurrent test types. •`no_modem_a_to_b` is an external loopback cable for a_to_b and a_to_b_concurrent test types. •`Modem_a_to_b` is an external loopback cable with a modem attached to generate synchronous Transmit and Receive clocks. This type is only available in synchronous test mode.

TABLE 36-3 `sptest` Options

sptest Options	Description
Data Type	Selects the data pattern to transfer. The user can select: •`Random` •`Sequential` •`Alphanumeric` •`0x00-0xff`
Async Baud Rate	Selects the baud rate for Asynchronous mode testing. The valid rates are: 110, 300, 600, 1200, 4800, 9600, 19200, 38400, 57600, 76800, 115200, 153600, 230400, 307200, 460800, and ALL. The default rate is 9600 baud. Some platforms can only support up to 38400 or 76800. The test will return an error if you try to use a higher baud rate then is supported. For baud rates greater then 153600 the serial line drivers must be set for RS-423 mode and not RS-232 mode. The RS-423 and RS-232 modes are usually selected by a hardware jumper on the motherboard. Consult your hardware installation manual for more information.
Async Block Size	Selects the size (in bytes) of each write. This can range from 1 to 10000. The default is 100. If it is larger than the async size it will be truncated to the async size.
Async Data Size	Selects the total number of bytes to transfer in Asynchronous mode. This can range from 1 to 10000.
Async Parity	Selects the parity to use in asynchronous mode. The user can select even, odd, or none. The default is `none`.
Async Flow Control	Selects the type of flow control to use in asynchronous mode testing. The user can select `Hardware` (RTS/CTS), `Software` (XON/XOFF) or `None`. The default depends on the loopback type. Software flow control is not allowed on a, b, a_b, or a_b_concurrent loopback types.
Sync Baud Rate	Selects the device generated clock rate for synchronous mode testing. The valid rates are from 110 to 230400. The rate does not have to be a specific value as required for async mode baud rates. The default rate is 9600. Some platforms can only support up to 38400 or 76800. The test will return an error if you try to use a higher rate then is supported. For rates greater then 100000 the serial line drivers must be set for RS-423 mode and not RS-232 mode. The RS-423 and RS-232 modes are usually selected by a hardware jumper on the motherboard. Consult your hardware installation manual for more information.
Sync Packet Drop Tolerance	Selects the tolerance level of Synchronous mode dropped packets during the many_packets subtest. The default is 20 percent. The valid range is from 0 percent to 99 percent. Some packet drops are expected especially at higher clock rates and on a heavily loaded system.

TABLE 36-3 `sptest` Options

sptest Options	Description
Sync Poll Count	Selects the number of seconds in additional time to wait for a Synchronous mode packet to be sent. Additional time may be needed when there is heavy system activity and time-outs are being detected. In general, the user can decrease the value to `0` when the system load is light or increase the value when there is a heavy system load.

`sptest` Test Modes

`sptest` supports all three SunVTS test modes.

TABLE 36-4 `sptest` Test Modes

Test Mode	Description
Connection Test	In this mode, the `sptest` tries to open the port to determine if the device is connected. If it fails and the port is not busy, the test exits with an error. If it is successful or fails with a busy or exclusive use error, then the port is considered connected, and the test passes.
Functional Test	In Functional test, `sptest` performs the selected loopback test.
Online Mode	Provides a means to run `sptest` through SyMON. In Online mode, the following Functional Test description applies: `sptest` tries to minimize the impact on the applications that are running. The Online test runs in synchronous and asynchronous modes. If the device supports an internal loopback then the functional test is run utilizing the internal loopback. The `zs(7D)` device supports an internal synchronous loopback and the `se(7d)` device supports an internal asynchronous loopback.

sptest Command Line Syntax

/opt/SUNWvts/bin/sptest *standard_arguments* **-o dev=***device_name*,**porta=**first_*port_name*,**T=**port,**L=***loopback_type*,**M=***mode*,**D=***data_pattern*,**AB=**async_baudrate,**BS=***async_write_size*,**S=***async_total_size*,**PAR=***parity*,**F=***flow_control*,**B=***sync_speed*,**DP=***sync_drop_tolreance*,**P=***sync_timeout*

TABLE 36-5 sptest Command Line Syntax

Argument	Explanation
dev=*device_name*	Identifies the serial port(s) to test. There is no default value; you must specify a device name such as: se0, zs0, zs1 zs2, zs3 ..., ...
porta=*port_name*	The name of the first device of a serial device pair. The default is a.
M=*mode*	The default test mode is asynchronous. Specify one of the following modes: • asynch • synch • both
T=*test_type*	Specifies the type of test to run: • a= runs the test on port a. • b= runs the test on port b. • a_b= runs the test on ports a and b sequentially. • a_b_concurrent= runs the test on port a and port b concurrently. • a_to_b= runs the test from port a to port b.
L=*test_loopback*	The type of loopback connector attached to ports: • No_modem_a_to_b • Internal_a_to_a__b_to_b • Plug_a_to_a__b_to_b • Modem_a_to_b
D=data_pattern	Selects the data pattern to transfer. The user can select: • Random • Sequential • Alphanumeric • 0x00-0xFF
AB=*baud_rate*	Asynchronous baud rate (default = 9600). The valid values are between 110 - 460800. Note: Some platforms can only support asynchronous baud rates up to 38400 or 76800. For baud rates greater then 153600 the serial line drivers must be set for RS-423 mode and not RS-232 mode.

TABLE 36-5 `sptest` Command Line Syntax *(Continued)*

Argument	Explanation *(Continued)*
BS=*write_size*	Asynchronous mode write size; from 1 to 10000 bytes.
S=*size*	Asynchronous mode total number of bytes to write. 1 to 10000 bytes.
PAR=*parity*	Asynchronous mode parity type: • `None` • `Even` • `Odd`
F=*flow_control and default*	Asynchronous mode flow control • `Hardware` (RTS / CTS) • `Software` (xon / xoff) • `None`
B=*baud_rate*	Synchronous baud rate (default = 9600). The valid rates are between `110 - 256000.` Note: Some platforms can only support synchronous rates up to 38400 or 76800. For rates greater then 100000 the serial line drivers must be set for RS-423 mode and not RS-232 mode.
DP=*drop_tolerance*	Synchronous mode drop packet tolerance (default=20 percent)
P=*poll_seconds*	Synchronous mode additional wait time during poll (in seconds).

sptest Error Messages

TABLE 36-6 sptest Error Messages

	Error Message	Probable Cause(s)	Recommended Action
6003	data miscompare, cnt = *number*, exp = *value*, obs = *value*, receive device = *name*, source device = *name*, baud rate = *value*	System load too heavy for selected baud rate.	Reduce the system load.
		Loopback connection defective.	Lower the baud rate.
		Bad serial port hardware.	Check loopback connection.
		System software error.	If the problem persists, contact your authorized Sun service provider.
6011	*name*: packet read failed, error = *error_message*, speed = *number*	System load too heavy.	Reduce the system load.
		Loopback connection missing or defective.	Check loopback connection.
		Bad serial port hardware.	If the problem persists, contact your authorized Sun service provider.
		System software error.	
6012	*name*: packet write failed, error = *error_message*, speed = *number*	System load too heavy.	Reduce the system load.
		Bad serial port hardware.	If the problem persists, contact your authorized Sun service provider.
		System software error	
6013	Device '*device_name*' not responding. No data detected after *number* seconds. Received *number* bytes out of *number* sent. Baud rate = *number*	System load too heavy for selected baud rate.	Reduce the system load.
		Loopback connection missing or defective.	Lower the baud rate.
		Bad serial port hardware.	Check the loopback connection.
		System software error.	If the problem persists, contact your authorized Sun service provider.
6014	*name*: expected *text* got *text*		

TABLE 36-6 `sptest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
6015	`Incomplete write on Port` *name*`, len` *number* `should be` *number*`, speed =` *number*	System load too heavy.	Reduce the system load.
		Loopback connection missing or defective.	Check loopback connection.
		Bad serial port hardware.	If the problem persists, contact your authorized Sun service provider.
		System software error.	
6016	`Incomplete read on Port` *name*`, len` *number* `should be` *number*`, speed =` *number*	System load too heavy.	Reduce the system load.
		Loopback connection missing or defective.	Check loopback connection.
		Bad serial port hardware	If the problem persists, contact your authorized Sun service provider.
		System software error.	
6018	*name*`: port not ready for writing after` *number* `seconds, speed =` *number*	System load too heavy	Reduce the system load.
		Loopback connection missing or defective.	Check loopback connection.
		Bad serial port hardware.	If the problem persists, contact your authorized Sun service provider.
		System software error.	
6020	`packet data miscompare, cnt =` *number* `exp =` *value*`, obs =` *value*`, device =` *name*`, speed =` *number*	System load too heavy	Reduce the system load.
		Loopback connection defective.	Check loopback connection.
		Bad serial port hardware.	If the problem persists, contact your authorized Sun service provider.
		System software error.	
6021	*name*`: port not ready for reading after` *number* `seconds, no data available, speed =` *number*	System load too heavy.	Reduce the system load.
		Loopback connection missing or defective.	Check loopback connection.
		Bad serial port hardware.	If the problem persists, contact your authorized Sun service provider.
		System software error.	
6022	*name*`: port not ready for writing after` *number* `seconds, wrote` *number* `bytes out of` *number*`. Baud rate =` *number*	System load too heavy.	Reduce the system load.
		Loopback connection missing or defective.	Check loopback connection.
		Bad serial port hardware.	If the problem persists, contact your authorized Sun service provider.
		System software error	

TABLE 36-6 `sptest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
8001	`Test Type a_to_b is not allowed on Quick Test!`		
8002	*name*`: open() failed, error =` *error_message*		
8003	`Invalid Data Type: I=`*text*		
8004	*name*`: poll() error, (revents & (POLLERR | POLLHUP | POLLNVAL)) =` *value*		
8005	`Siemens serial device (se) does not support synchronous internal loopback test`		
8006	`Invalid port parameter:` *name*		
8007	`Invalid device name '`*name*`', must specify either zs`*X*` or se`*X*`, where X is the first instance number of a device pair (ex., zs0)`		
8009	`Failed ioctl` *name*`, device =` *name*`, error =` *error_message*		
8010	*name*`: Not able to push Tty compatibility STREAMS module`		
8011	`Invalid Test Type: T=`*name*		
8012	`Invalid Mode: M=`*name*		
8013	*name* `device does not exist`		
8014	`Invalid baud_rate:` *number*		
8015	`write() to` *name* `failed:` *error_message*`, baud rate =` *number*		
8016	`read() to` *name* `failed:` *error_message*`, baud rate =` *number*		

TABLE 36-6 `sptest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
8017	`Invalid size, requested =` *number* `bytes, min =` *number*`, max` *number*		
8018	`Could not open` *name* `after waiting` *number* `seconds`	Another process is using the port	Stop other process using the port.
		Port is hung	If the problem persists, contact your authorized Sun service provider.
		Bad serial port hardware	
		System software error	
8021	*name*`: No valid packets returned after` *number* `attempts, last error =` *error_message*`, wrote` *number* `packets, read` *number* `packets, device accounting shows` *number* `packets sent and` *number* `packets received`	System load too heavy	Reduce the system load.
		Timeout too short	Increase `Sync_Poll_Count` from pop menu.
		Loopback connection missing or defective	Check the loopback connection.
		Bad serial port hardware	If the problem persists, contact your authorized Sun service provider.
		System software error	
8022	`printdlprim: unsupported primitive type` *value*		
8023	`stringtoaddr: invalid input string:` *text*		
8025	`dlinfoack: response ctl.len too short:` *number*		
8026	`dlinfoack: DL_INFO_ACK was not M_PCPROTO`		
8027	`dlokack: response ctl.len too short:` *number*		
8028	`dlokack: DL_OK_ACK was not M_PCPROTO`		
8029	`dlerrorack: response ctl.len too short:` *number*		
8030	`dlerrorack: DL_OK_ACK was not M_PCPROTO`		
8031	`dlbindack: response ctl.len too short:` *number*		
8032	`dlbindack: DL_OK_ACK was not M_PCPROTO`		
8033	`sigalrm: TIMEOUT`		

TABLE 36-6 `sptest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
8037	`invalid packet length:` *number*		
8038	*name*`: poll() failed, error =` *error_message*	System load too heavy	Reduce the system load.
		Bad serial port hardware	If the problem persists, contact your authorized Sun service provider.
		System software error	
8039	`Failed I_STR ioctl, cmd =` *name*`, device =` *name*`, error =` *error_message*		
8040	*name*`: No packets sent, last error =` *error_message*`, wrote` *number* `packets, read` *number* `packets, device accounting shows` *number* `packets sent and` *number* `packets received`	No transmit clock present	Reduce the system load.
		System load too heavy	Increase `Sync_Poll_Count` from the pop menu.
		Timeout too short	Check the loopback connection.
		Loopback connection missing or defective	If the problem persists, contact your authorized Sun service provider.
		Bad serial port hardware	
		System software error	
8041	`Sporadic packets detected on` *name*`. The port must be quiescent before running test`	Another process is generating activity on the port	Stop other process using the port.
		Bad serial port hardware	Stop other process using the port.
		System software error	
8042	`syncinit:` *name* `missing minor device number`		
8046	`Test requires local or remote modem loopback (external data loop, external clocking)`		
8047	*name* `loopback type not allowed on Connection test`		
8048	*name* `loopback type not allowed on online mode`		
8049	`Invalid baud rate for device` *name*`, select between` *number* `and` *number*		

TABLE 36-6 `sptest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
8050	*name* internal loopback test not allowed on *name* device		
8051	Thread creation failed, *error_message*		
8054	*name*: At least *number* packets dropped (tolerance = *number*), last error = *error_message*. Wrote *number* packets, read *number* packets. Device statistics shows *number* packets sent and *number* packets received. *number* packets dropped in outbound queueing, *number* packets dropped in inbound queueing	System load too heavy	Reduce the system load.
		Loopback connection missing or defective	Increase the drop tolerance option.
		Bad serial port hardware	Check the loopback connection.
		System software error	If the problem persists, contact your authorized Sun service provider.
8055	*name*: *number* bad packets received, last error = *error_message*, wrote *number* packets, read *number* packets, device accounting shows *number* packets sent and *number* packets received	System load too heavy	Reduce the system load.
		Loopback connection missing or defective	Check the loopback connection.
		Bad serial port hardware	If the problem persists, contact your authorized Sun service provider.
		System software error	

CHAPTER 37

SunButtons Test (sunbuttons)

The sunbuttons test verifies that the SunButtons graphics manipulation device is working correctly.

Note – Install SunVTS2.1 making sure that the following packages are installed: SUNWdial and SUNWdialh.

Running the sunbuttons Tests

The following tests verify the functionality of SunButtons:

▼ Create a .customtest file in /opt/SUNWvts/bin

Create a .customtest file to verify that each button functions; each button lights up in a round-robin fashion.

Edit the .customtest file to include the following lines:

```
sunbuttons;sunbuttons; Mode<CYCLE|diag|diag|mode>
sundials;sundials; Mode<CYCLE|diag|diag|mode>
(For diag mode you may have to execute the xhost + command)
```

▼ Configure the Port Using the bdconfig Command

To configure the port, perform the following steps:

1. **Run the** `/usr/sbin/bdconfig` **command to configure the** `/dev/term/a` **or** `/dev/term/b` **port and enable it. The following example shows how to check a configured serial port b**:

```
# ls -l /dev/bd*
lrwxrwxrwx  1 root   other    11 Nov 12 15:39 /dev/bd -> /dev/term/b
#
```

2. **Connect the sunbuttons/sundials device to your configured serial port (a or b).**

Starting SunVTS

After starting SunVTS, you should see Customtest as one of the available options with `sundials` and `sunbuttons` available for selection.

1. **Change to the Functional test mode and enable intervention.**
2. **Enable the sunbuttons and sundials tests.**
3. **Start testing.**

   In Diag mode, a pop-up window is displayed.
4. **Select the Diagnostics button.**

   Let the test run its course (the Diagnostics button will be selectable again).
5. **Close the pop-up window.**

   The test should register a single pass.

▼ Running the `sunbuttons` Test From a Shell Command Line

This is an interactive test. The test displays a screen representation of the buttonbox (see FIGURE 37-1) where you can press each of the buttons and see the corresponding button's display change.

To run the diagnostic test, select the Diagnostics Button on the top of the menu representation. The buttonbox buttons on the screen do not change while the diagnostics test is running.

Be sure that the buttonbox is connected to one of the serial ports, and that the buttonbox has a power transformer.

There is no option menu for this test.

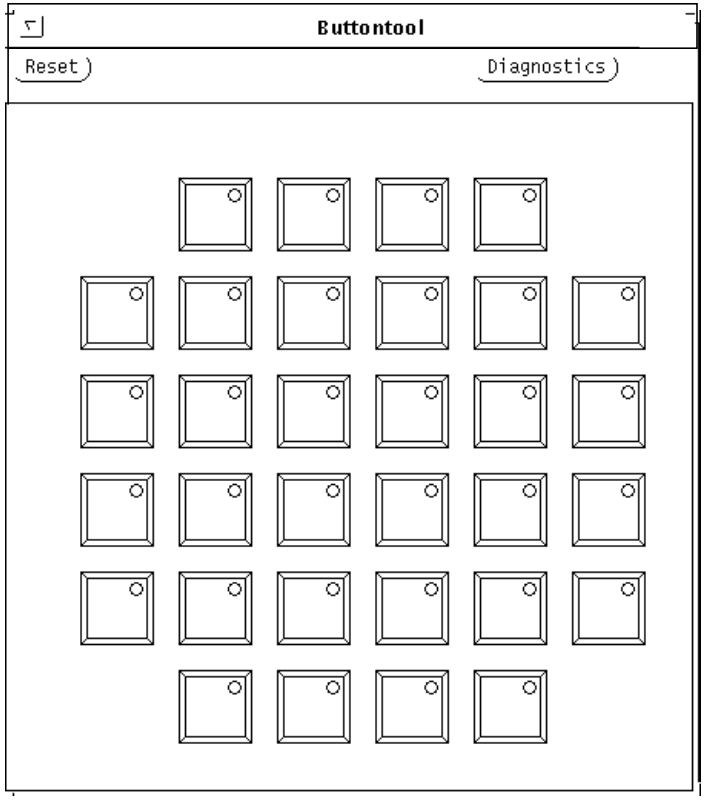


FIGURE 37-1 `sunbuttons` Test Menu

sunbuttons Command Line Syntax

/opt/SUNWvts/bin/sunbuttons diag *standard_arguments*

sunbuttons Test Modes

Available only in the Functional test mode. In the Functional test mode, the sunbuttons test verifies the functionality of each button, and that each button lights up in sequence.

sunbuttons Error Messages

TABLE 37-1 sunbuttons Error Messages

	Error Message	Probable Cause(s)	Recommended Action
6000	Cannot open device		
6001	ioctl(VUIDSFORMAT, VUID_NATIVE)		
6002	Writing diag command failed		
6003	No response from Buttonbox		
6004	Selftest failed		
6005	Weird unknown kind of error		
6006	Can not open device /dev/db		
6007	ioctl(VUIDSFORMAT, VUID_NATIVE) -- you may need to run bdconfig		

CHAPTER 38

SunDials Test (sundials)

The sundials test verifies that the SunDials graphics manipulation device controls are working properly. sundials also verifies the connection between the dialbox and serial port.

Running the sundials Test

The following tests verify SunDial functionality.

▼ From a .customtest File

Create a .customtest file to test the SunDials.

Here is an example of a .customtest entry for sundials:

```
sundials;sundials;text<TEXT|20|-s|>
```

▼ From a Command Line

Running the sundials test from a command line starts an interactive test that displays a screen representation of the dialbox (see FIGURE 38-1). You can move each of the dials and see the corresponding dial's display change. To run the interactive test, select the Diagnostics button on the top of the window representation. The dialbox dials on the screen will not move while the diagnostics test is running

Be certain that the dialbox is connected to one of the serial ports, and that the dialbox has a power transformer.

There is no option menu for this test.

The sundials Test menu is shown in FIGURE 38-1.

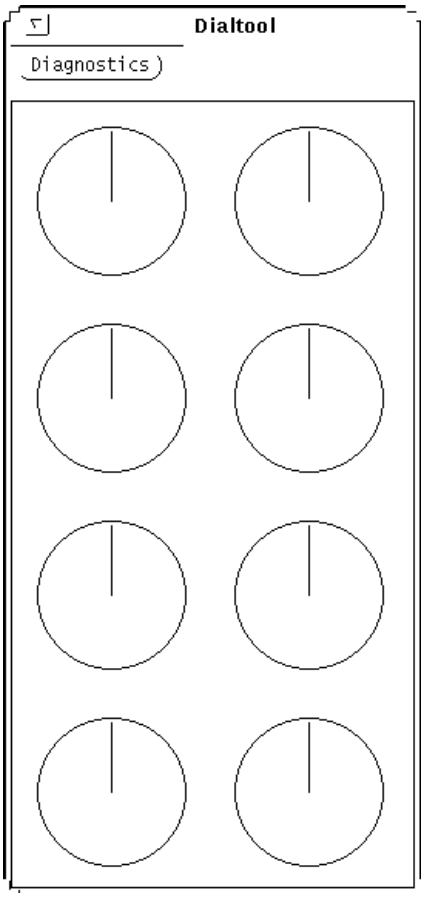


FIGURE 38-1 sundials Test Menu

sundials Test Modes

This test is available only in the Functional test mode. The sundials test verifies the connection between the dialbox and serial port. The test also verifies all manipulation device controls.

sundials Command Line Syntax

/opt/SUNWvts/bin/sundials diag *standard_arguments*

sundials Error Messages

TABLE 38-1 sundials Error Messages

	Error Message	Probable Cause(s)	Recommended Action
6000	Open failed for /dev/bd		
6001	ioctl(VUIDSFORMAT, VUID_NATIVE) error		
6002	ioctl(VUIDSFORMAT, VUID_EVENT) error		
6003	Could not talk to Dialbox		
6004	Cannot open device		
6005	Writing Diag Command failed		
6006	No response from Dialbox		
6007	Selftest failed		
6008	Weird unknown kind of error		
6009	ioctl(VUIDSFORMAT, VUID_NATIVE) -- you may need to run bdconfig		

CHAPTER 39

HSI/S Board Test (sunlink)

The sunlink test verifies the functionality of the SBus HSI boards. sunlink tests the HDLC and SDLC protocol of SBus HSI boards and PCI bus HSI boards. sunlink downloads the DCP microcode, initializes the selected channel, and configures the selected channel to the protocol being tested.

Next, sunlink opens a datagram socket and tries to modify the socket to accept ioctl communications with the driver, and receive Synchronous mode information from it.

sunlink then opens the ports, linking the upper and lower layers with ioctl calls. After initialization, this test checks for activity before attempting to send or receive data. An error message is returned if activity is detected; otherwise the transmit buffer is filled with random data. Random data is used by default; other patterns may be specified. The data is then transmitted. If the transmission succeeds, sunlink then receives the returned data and verifies that it is identical to what was sent. Finally, statistics about the send and receive are gathered from the socket.

A full sunlink test takes approximately eight minutes per port and makes a brief check of the board ports before the actual test begins. If the port is bad, the test immediately aborts and returns an error message.

Note – This test will not pass unless you install the correct loopback connectors or port to port cables on the ports you are testing. The ports specified for test in the option menu must have loopback connectors attached. See Appendix A for loopback connector part numbers and wiring instructions.

---

sunlink Options

The Configuration field displays the available ports. (See FIGURE 39-1.)

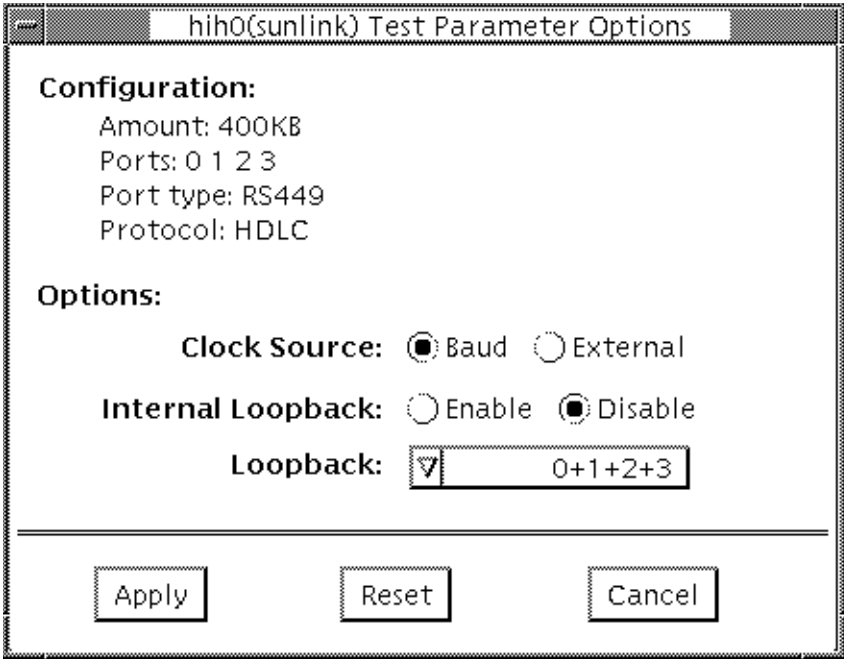


FIGURE 39-1 sunlink Options menu

TABLE 39-1 `sunlink` Options

`sunlink` **Options**	**Description**
Clock source	Select either the on-board clock or an external clock for use when using `sunlink`. To use the external clock option, the transmit, receive, and clock data lines must be physically loopbacked.
Internal Loopback	Enables or disables internal loopback tests. Internal Loopback is only needed when the Loopback setting is not port-to-port, and the clock source is on-board.
Loopback	Specifies the loopback type: simple single external port loopback, multiple external port loopback, and port-to-port external loopback.

`sunlink` Command Line Syntax

`/opt/SUNWvts/bin/sunlink` *standard_arguments* **`-o`**
`dev=`*device_name*`,P=`*port#*`, p=`*data_pattern*`,I,C=`*B/E*

TABLE 39-2 `sunlink` Command Line Syntax

Argument	**Explanation**
`dev=`*device_name*	Specifies the device to be tested.
	`hih0` HDLC and SDLC protocols
`P=`*ports*	Specifies the port number to be tested.
`p=`*data_pattern*	Specifies the *data_pattern* as one of the following:
	`c:` Character (0x55)
	`i:` Incrementing
	`d:` Decrementing
	`r:` Random (default)
`I`	Enables internal loopback for HSI/S (external).
`c=`*clocksource*	Specifies the clock source value as one of the following:
	`B`: On-board clock source
	`E`: External clock source

The following is a typical command line syntax for testing an HSI/S Sbus card:

```
# /opt/SUNWvts/bin/sunlink -o dev=hih0,P=0_to_1+2_to_3
```

Typing this at the command line tests the internal loopback for port 0.

sunlink Test Modes

The sunlink test only supports the Functional test mode.

sunlink Loopback Connectors

Refer to Appendix A of this manual, and the High Speed Serial Interface hardware manuals for information on loopback connectors.

sunlink Error Messages

TABLE 39-3 sunlink Error Messages

	Error Message	Probable Cause(s)	Recommended Action
6000	Device name must be provided!		
6001	Invalid port specification		
6002	Invalid port number		
6003	BSC protocol is not implemented for *device_name*		
6004	ASYNC protocol is not implemented for *device_name*		
6005	Illegal protocol specified for '*device_name*'		
6006	Could not open file: *file_name*		

TABLE 39-3 sunlink Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
6007	Could not open file devname *device_name*		
6008	Could not open file (clonename)*file_name*		
6009	Can't get sync mode info for *device_name*		
6010	Can't set sync mode info for *device_name*		
6011	Couldn't successfully execute '/usr/sunlink/dcp/dcp *file_name*		
6012	Packet received but none sent! Activity on-line. Quiesce other end before starting		
6013	Transmit failed on '*device_name*'		
6014	Receive failed on '*device_name*'		
6015	Data compare error on '*device_name*', exp = *value*, actual = *value*, offset = *number*		
6016	*device_name* does not respond	No loopback plug.	Check the loopback plug.
		System load is too heavy.	Reduce the system load.
6017	sigalrm: TIMEOUT	No loopback plug.	Check the loopback plug.
		System load is too heavy.	Reduce the system load.
8000	Unsupported primitive type *value*		
8001	*text* (*error_message*)		
8002	Response ctl.len too short: *value*		
8003	DL_INFO_ACK was not M_PCPROTO		
8004	DL_OK_ACK was not M_PCPROTO		

CHAPTER 40

Pixel Processor Test (sxtest)

sxtest checks models of SPARCstation 10 and SPARCstation 20 machines equipped with an onboard Pixel Processor module. sxtest is specific to the VSIMM (Video SIMM)/SX Memory Controller) devices in the SPARCstation 10 SX and SPARCstation 20 SX.

Note – Because of possible conflicts between cg14 SunVTS frame buffer tests and OpenWindows applications that use the cg14 frame buffer, the following restrictions apply when running the sxtest SunVTS test:

Do not run any graphic applications other than OpenWindows while running SunVTS frame buffer tests.

To start SunVTS with vtsui, but without vtsk, you must add the host name to xhost as: xhost + *hostname*.

Do not run any OpenWindows programs that generate video updates outside or on top of the SunVTS window.

Do not close the SunVTS window to an icon while it is running frame buffer tests.

Enable the frame buffer locking option from the Options window for the system console cg14 device (see "The sxtest test parameter options are described in TABLE 40-1." on page 356).

If you run sxtest with VRAM enabled, then frame buffer locking *must* be enabled.

---

sxtest locates load error, store error, ALU error, logic error, and so on, of the pixel processor by reading and verifying data from the control registers of the pixel processor, virtual memories, or video memories.

This test also verifies the integration function of the cg14 frame buffer and its device driver, video memories, and data memories. sxtest also writes a test pattern to the frame buffer for visual verification. The accuracy of this test is dependant on other hardware, such as the CPU, memory card(s), and cg14 graphics card. Run the cg14test and other tests before running sxtest. sxtest is a series of 13 modules, described FIGURE 40-1.

sxtest Options

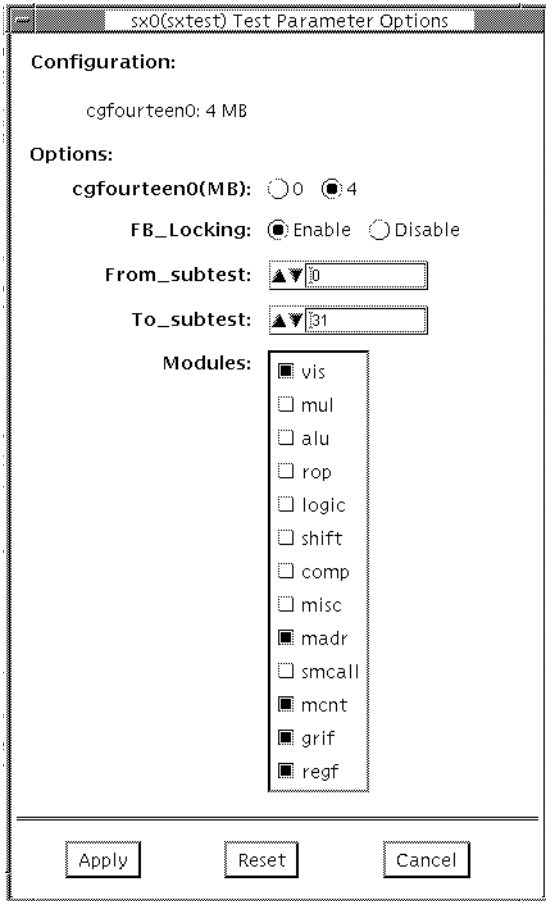


FIGURE 40-1 sxtest Option Menu (CMEM:0MB, none, cg14 board)

Note – The `sxtest` option menu is customized, based on the configuration of the test system.

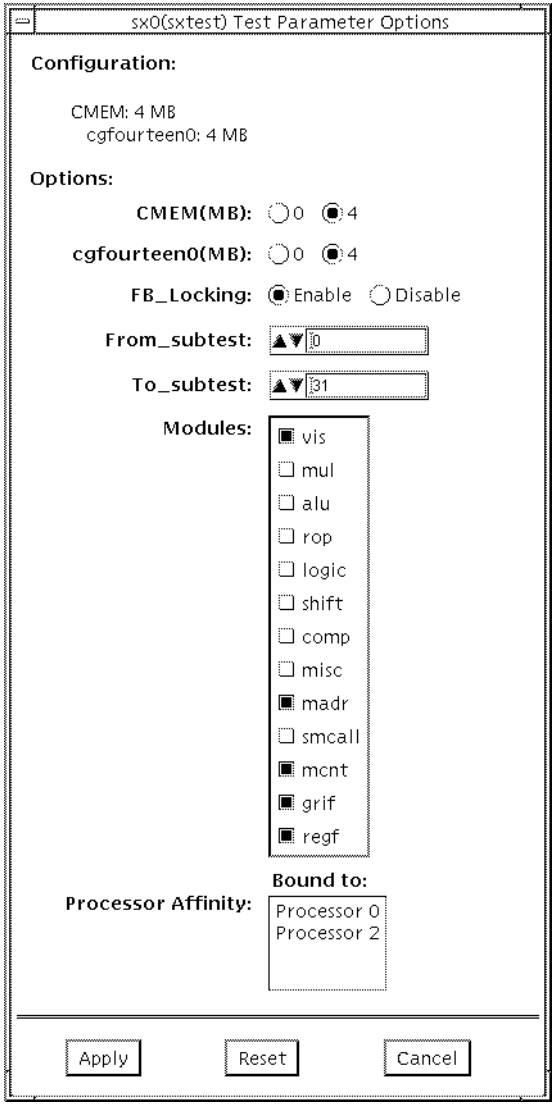


FIGURE 40-2 `sxtest` Option Menu (CMEM:4MB, cg14:4MB)

sxtest Test Parameters

The sxtest test parameter options are described in TABLE 40-1.

TABLE 40-1 sxtest Test Parameter Options

Option	Description
FB Locking	Frame buffer locking is enabled by default on the window server running the OpenWindows software. See the section about testing multiple frame buffers in the *SunVTS 2.1 User's Guide* for details.

CMEM (Contiguous Memory)	Choose either 0 or 4 if your system has 4 Mbytes (or more) of contiguous memory available.
	
	To set CMEM on a SPARCstation 10, enter the following:
	`cd /usr/platform/SUNW,SPARCstation10,SX/sbin`
	
	The system must have 32 Mbytes of memory or more to set CMEM. For example:
	`% sxconfig -s 4 -1 28 -f`

VRAM (Video Random Access Memory)	Choose either 0|4|8 video random access memory. **CAUTION:** If sxtest is run with its VRAM enabled, then frame buffer locking must be enabled or SunVTS results in errors.

sxtest Module Descriptions

The 13 sxtest modules are described in TABLE 40-2.

TABLE 40-2 sxtest Modules

Module	Description
Display (module0)	Click Enable to display visual patterns. Three subtests call the SPAM library and display pictures to verify the integrity of a subset of the kernel and the SPAM libraries through the SPARCstation 10 SX video system. These routines are ported from the SPAM demonstration programs. All subtests in this module are skipped if the cg14 frame buffer does not exist, or if the VRAM is disabled. One of the following subtests displays screens between other subtests. This helps you determine whether the system is hung or if sxtest is running. rect_test: The screen is filled with random rectangles. The rectangles are drawn in CHUNKY_XBGR mode if 32-bit mode OpenWindows is running. If not, they are drawn in CHUNKY_C8 mode with the SPAM library routine sl_rect_fill_32. shaa: A picture of shaded lines is drawn in CHUNKY_BGR mode with the SPAM library routines sl_line_shaa_32, sl_span_load_8, and sl_rect_fill_8. **NOTE**: The shaa test is skipped if the test is running on an 8-bit window. lines — The screen is filled with lines of various colors. These lines are drawn in CHUNKY_XBGR mode if 32-bit mode OpenWindows is running; If not, they are drawn in CHUNKY_C8 mode with SPAM library routine sl_line_fill_8.

TABLE 40-2 `sxtest` Modules *(Continued)*

Module	Description

MUL (module1)	Click Enable to test the multiplier operations.
	
	Eight subtests are called, each having 2500 randomly generated MUL SPAM macros.
	`sp_mul0`
	`sp_mul1`
	`sp_mul2`
	`sp_mul3`
	`sp_mul4`
	`sp_mul5`
	`sp_mul6`
	`sp_mul7`
	
	Each subtest tests SPAM MUL instruction sets by running random SPAM MUL macro patterns, for example:
	`spam_dot(S_0,R42,R45,R31,5)`
	`spam_mulr(L_16,R44,R29,R52,1)`
	`spam_mul(S_15,R115,R114,R58,4)`
	`spam_mul(L_16,R89,R110,R81,8)`
	`spam_mulr(S_8,R21,R76,R53,1)`
	`spam_saxpr(S_8,R54,R46,R98,2)`
	`spam_dotr(L_16,R75,R40,R20,5)`
	`spam_dot(L_16,R44,R45,R84,4)`
	`spam_saxp(L_0,R93,R96,R44,8)`
	`spam_mulr(L_0,R86,R56,R56,5)`
	`spam_dotr(L_0,R14,R62,R40,2`
	`spam_saxpr(S_15,R112,R85,R95,7)`

ALU (Module2)	Click Enable to test ALU operations.
	
	Five subtests are called, each having 2500 randomly generated ALU SPAM macros.
	`sp_alu0`
	`sp_alu1`
	`sp_alu2`
	`sp_alu3`
	`sp_alu4`
	
	Each subtest tests SPAM ALU instruction sets by running random SPAM ALU macro patterns, for example:
	`spam_subv(R101,R31,R42,1)`
	`spam_subs(R90,R44,R90,14)`
	`spam_subv(R44,R70,R29,14)`
	`spam_sum(R58,R95,R114,9)`
	`spam_adds(R54,R46,R98,10)`
	`spam_addi(R9,51,R68,9)`
	`spam_abs(R76,R28,7)`
	`spam_addv(R80,R59,R93,11)`

TABLE 40-2 `sxtest` Modules *(Continued)*

Module	Description

ROP (Module3)	Click Enable to test the ROP operations.
	
	Five subtests are called, each having 2500 randomly generated ROP SPAM macros.
	`sp_rop0`
	`sp_rop1`
	`sp_rop2`
	`sp_rop3`
	`sp_rop4`
	
	Each subtest tests SPAM ROP instruction sets by running random SPAM ROP macro patterns, for example:
	`spam_selb(R101,R31,R42,1)`
	`spam_ropl(R90,R27,R44,14)`
	`spam_sels(R19,R16,R112,15)`
	`spam_ropm(R47,R29,R96,16)`
	`spam_selb(R52,R43,R29,5)`
	`spam_ropb(R115,R114,R58,7)`
	`spam_selv(R57,R75,R16,2)`
	`spam_ropm(R110,R93,R83,13)`

LOGIC (Module4)	Click Enable to test the logical operations.
	
	Five subtests are called, each having 2500 randomly generated LOGIC SPAM macros.
	`sp_logic0`
	`sp_logic1`
	`sp_logic2`
	`sp_logic3`
	`sp_logic4`
	
	Each subtest tests SPAM LOGIC instruction sets by running random SPAM LOGIC macro patterns, for example:
	`spam_xors(R101,R31,R42,1)`
	`spam_xori(R90,101,R90,14)`
	`spam_xorv(R30,R19,R95,13)`
	`spam_ands(R108,R16,R125,1)`
	`spam_andv(R115,R114,R58,7)`
	`spam_ors(R46,R89,R8,16)`
	`spam_orv(R57,R75,R16,2)`
	`spam_andi(R9,51,R68,9)`

TABLE 40-2 `sxtest` Modules *(Continued)*

Module	Description

SHIFT (Module5)	Click Enable to test the shift operations.
	
	Five subtests are called, each having 2500 randomly generated SHIFT SPAM macros.
	`sp_shift0`
	`sp_shift1`
	`sp_shift2`
	`sp_shift3`
	`sp_shift4`
	
	Each subtest checks SPAM SHIFT instruction sets by running random SPAM SHIFT macro patterns, for example:
	`spam_sllv(R101,R31,R42,1)`
	`spam_slli(R90,5,R90,14)`
	`spam_srai(R30,19,R95,13)`
	`spam_srli(R108,16,R125,1)`
	`spam_sllv(R52,R43,R29,5)`
	`spam_slfi(R46,25,R8,16)`
	`spam_slfs(R57,R75,R16,2)`
	`spam_srav(R54,R44,R93,8)`
	`spam_srlv(R58,R60,R96,16)`

COMP (Module6)	Click Enable to test the compare operations.
	
	Five subtests are called, each having 2500 randomly generated COMP SPAM macros.
	`sp_comp0`
	`sp_comp1`
	`sp_comp2`
	`sp_comp3`
	`sp_comp4`
	
	Each subtest checks SPAM COMP instruction sets by running random SPAM COMP macro patterns. For example:
	`spam_cmpv_gt(R101,R31,R42,1)`
	`spam_cmps_lt(R90,R44,R90,14)`
	`spam_cmps_eq(R95,R112,R19,12)`
	`spam_cmpv_gt(R44,R43,R29,14)`
	`spam_cmpv_lt(R115,R114,R58,7)`
	`spam_cmps_gt(R46,R89,R8,16)`
	`spam_cmps_eq(R57,R75,R16,2)`
	`spam_cmpv_le(R54,R46,R98,10)`
	`spam_cmpv_eq(R9,R51,R68,9)`
	`spam_cmps_gt(R76,R103,R28,7)`
	`spam_cmpv_eq(R52,R37,R50,8)`
	`spam_cmpv_ge(R61,R86,R16,12)`

TABLE 40-2 `sxtest` Modules *(Continued)*

Module	Description

MISC (Module7)	Click Enable to test the miscellaneous operations.
	
	Five subtests are called, each having 2500 randomly generated MISC SPAM macros.
	`sp_misc0`
	`sp_misc1`
	`sp_misc2`
	`sp_misc3`
	`sp_misc4`
	
	Each subtest checks SPAM MISC instruction sets by running random SPAM MISC macro patterns, for example:
	`spam_scat(R45,-1,R29,1)`
	`spam_gath(R95,-6,R114,9)`
	`spam_delt(R89,R9,R16,16)`
	`spam_plot(R54,R46,R98,10)`
	`spam_plot(R53,R20,R75,16)`
	`spam_scat(R91,-2,R70,9)`
	`spam_gath(R120,-2,R51,15)`
	`spam_delt(R59,R95,R120,1)`

MADR (Module8)	Click Enable to test the address lines of `sx`.
	
	Eight subtests are called; each subtest verifies the 0x100000 SPAM address with `spam_stld` and `spam_ldld` instructions. All address bits and data bits of 4 Mbytes of VRAM and 4 Mbytes of DRAM are tested after running through the eight subtests.
	`0x00000000-0x000fffff`
	`0x00100000-0x001fffff`
	`0x00200000-0x002fffff`
	`0x00300000-0x003fffff`
	`0xfc000000-0xfc0fffff *`
	`0xfc100000-0xfc1fffff *`
	`0xfc200000-0xfc2fffff *`
	`0xfc300000-0xfc3fffff *`
	
	* These subtests are skipped if the CMEM option is disabled.

TABLE 40-2 `sxtest` Modules *(Continued)*

Module	Description

SMCALL (Module9)	Click Enable for a brief test of `sxtest` functionality.
	
	Eleven subtests are called from `spam.smcall` to verify the general function of the SMC chip. All subtests have a cg14 version and a non-cg14 version. These subtests repeat four times, each time with the `IQ FIFO` programmed to a different number of entries (8, 16, 32, or 64).
	`shift_ldst`
	`instr_mix *`
	`arith_ldst`
	`cmp_ldst`
	`select_ldst`
	`interlock_all *`
	`logic_ldst`
	`mult_ldst`
	`rop`
	`scat_ldst`
	`delt_ldst`
	* These subtests are skipped if the VRAM option is set to disable.

MCNT (Module10)	Click Enable to test the load and store functions with different repeat counts.
	
	Twelve subtests are called; they test the SPAM store functions by varying address offset and item count.
	`spsd_stba_cnt`
	`spsd_stbd_cnt`
	`spsd_stbds_cnt`
	`spsd_stcd_cnt`
	`spsd_stla_cnt`
	`spsd_stld_cnt`
	`spsd_stlds_cnt`
	`spsd_stpd_cnt`
	`spsd_stqd_cnt`
	`spsd_stsa_cnt`
	`spsd_stsd_cnt`
	`spsd_stsds_cnt`

TABLE 40-2 `sxtest` Modules *(Continued)*

Module	Description

GRIF (Module11)	Click Enable to test the graphic interface logic.
	
	Thirty-six subtests are called; they test the SPAM graphic interface login with load / store instructions. All subtests are skipped if `cg14` does not exist.
	`spsd_stbd_dram`
	`spsd_stbd_xbgr`
	`spsd_stbd_bgr`
	`spsd_stbd_8x`
	`spsd_stbd_8c`
	`spsd_stbd_x32`
	`spsd_stbd_b32`
	`spsd_stbd_g32`
	`spsd_stbd_r32`
	`spsd_stsd_dram`
	`spsd_stsd_xbgr`
	`spsd_stsd_bgr`
	`spsd_stsd_8x`
	`spsd_stsd_8c`
	`spsd_stsd_x32`
	`spsd_stsd_b32`
	`spsd_stsd_g32`
	`spsd_stsd_r32`
	`spsd_ldbd_dram`
	`spsd_ldbd_xbgr`
	`spsd_ldbd_bgr`
	`spsd_ldbd_8x`
	`spsd_ldbd_8c`
	`spsd_ldbd_x32`
	`spsd_ldbd_b32`
	`spsd_ldbd_g32`
	`spsd_ldbd_r32`
	`spsd_ldsd_dram`
	`spsd_ldsd_xbgr`
	`spsd_ldsd_bgr`
	`spsd_ldsd_8x`
	`spsd_ldsd_8c`
	`spsd_ldsd_x32`
	`spsd_ldsd_b32`
	`spsd_ldsd_g32`
	`spsd_ldsd_r32`

TABLE 40-2 `sxtest` Modules *(Continued)*

Module	Description
REGF (Module12)	Click Enable to test the register file pointer logic. Twenty-two subtests are called from `spam.regfile` to verify the register file's logic with assorted SPAM instructions. `readpointer1` * `readpointer2` * `readpointer3` * `readpointer4` * `writepointer1` * `writepointer2` * `writepointer3` * `writepointer4` * `readpointer5` * `writepointer5` * rdptr0 † wrptr0 † rdptr1 † wrptr1 † rdptr2 † wrptr2 † rdptr3 † wrptr3 † rdptr4 † wrptr4 † rdptr5 † wrptr5 † * These subtests are skipped if the VRAM option is disabled. † These subtests are skipped if the CMEM option is disabled.

`sxtest` Test Modes

Due to the nature of graphic tests, reading from or writing to the frame buffer during testing will disturb user production. `sxtest` is available only in the Functional test mode.

In Functional test, `sxtest` runs the visual subtest, memory address subtest, memory count subtest, graphic interface subtest, and register file subtest by default. The user can select or de-select other subtests as needed.

sxtest Command Line Syntax

/opt/SUNWvts/bin/sxtest *standard_arguments* **-o dev=***device_name*, **lock=***E(nable)/D(isable)*,**tm=***to_module#*,**cmem=***n*,**vram=***n*, **md=***XXX*

TABLE 40-3 sxtest Command Line Syntax

Argument	Explanation
dev=*device_name*	Specifies the device_name to be tested.
lock=*E(nable)/ D(isable)*	Enables / disables frame buffer locking. See "Testing Multiple Frame Buffers" in Chapter 3 of the *SunVTS 2.1 User's Guide* for details. Frame buffer locking is enabled by default on the window server running the OpenWindows software.
tm=*to_module#*	Specifies an ending module number; use these last four arguments to narrow sxtest to a specific test scope.
cmem=*0|4*	Enables or disables the contiguous memory; choose either 1 to enable or 0 to disable. Note: You must choose disable (0) if your system is equipped with less then 4 Mbytes of contiguous memory.
cgfourteen0=*0|4|8*	Enables or disables the video random access memory; choose 1 to enable or 0 to disable.
md=*vis+alu+...*	Selects which modules are tested in a pass.

sxtest Error Messages

TABLE 40-4 sxtest Error Messages

	Error Message	Probable Cause(s)	Recommended Action
6002	Unable to lock frame buffer	FB lock was enabled while Window System was not running.	
6004	Can`t get sem *number*		
6006	Failed lock sem:dev *number*, type *number*		
6008	Failed unlock sem		
6010	Failed GETVAL sem=		
6012	Failed sem_val		
6014	console_p() failed:		
6016	Failed sem_setall		
6017	Failed sem_rmid		
6018	Failed get sem		
6020	ioctl command *name* failed		
6022	*error_message*		
6024	Failed to malloc for *name*		
6026	mem ccitt[*name*+*number*,*name*+*number*]: o:*number* e:*number* o^e:*number*		
6028	mem crc16[*name*+*number*,*name*+*number*]: o:*number* e:*number* o^e:*number*		
6030	reg ccitt: o:*number* e:*number* o^e:*number*		
6032	reg crc16: o:*number* e:*number* o^e:*number*		
6034	Failed to open *name* device		
6035	First Open of sx device		
6036	Modules selected improperly!!!		

TABLE 40-4 `sxtest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
6038	*name*, i_module = *name*		
6040	FB unlock request failed		
8000	Can't acquire console semaphore	System load too heavy.	Reduce the system load.
		System error.	If the problem persists, call your authorized Sun service provider.
8002	Can`t get sem *number*		
8004	Unable to set page bounds		
8006	mmap: unable to map MDI control register space		
8008	Failed to mmap *name*		
8010	sxtest is only running in Functional test		
8012	Failed to open *name*		

CHAPTER 41

System Test (systest)

systest checks the CPU board by exercising the I/O, memory, and CPU channels simultaneously as threads. There is no quick test option for systest; it is a CPU stress test.

systest Options

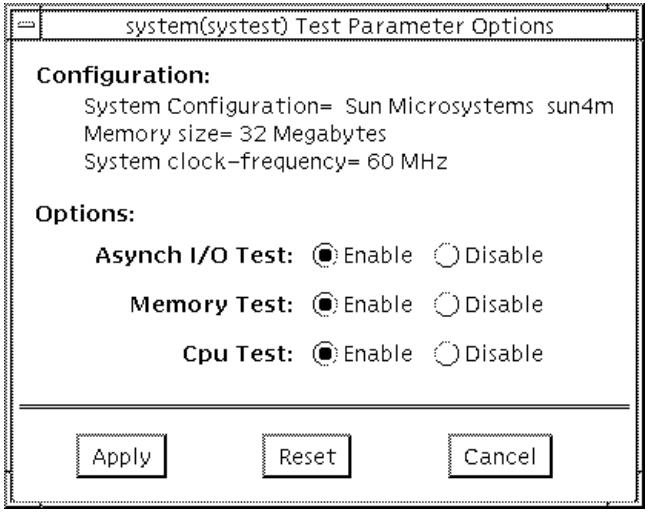


FIGURE 41-1 systest Option Menu

systest Test Modes

The Functional test is the only test mode available for systest.

systest Command Line Syntax

/opt/SUNWvts/bin/systest *standard_arguments*

systest Error Messages

TABLE 41-1 systest Error Messages

	Error Message	Probable Cause(s)	Recommended Action
6005	(*thread_id*)Couldn't open file /dev/mem: *error_message*		
6006	(*thread_id*)'valloc' results incorrect: *error_message*		
6007	(*thread_id*)Bad 'mmap' results: *error_message*, page = *value*/*value*, addr = *address*		
6008	(*thread_id*)kvm_open() failed: *error_message*		
6009	(*thread_id*)kvm_nlist() failed: *error_message*		
6010	(*thread_id*)Defective namelist in '/vmunix'		
6011	(*thread_id*)Couldn't read physical memory list: *error_message*		
6012	(*thread_id*)Couldn't read physical memory address		

TABLE 41-1 `systest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
6013	(*thread_id*)Couldn't read physical memory size: *error_message*		
6014	Cannot open *device_name*		
6015	Test Failed due to segment violation error	Lack of sufficient memory resources.	Retry the test after increasing available memory.
6016	Test Failed due to fpu bus error	Lack of sufficient memory resources.	Retry test after increasing available memory.
6017	Test Failed due to fpu exception error	Lack of sufficient memory resources.	Retry test after increasing available memory.
6018	Test Failed due to illegal instruction	Lack of sufficient memory resources.	Retry test after increasing available memory.
8000	Failed system test (FPU, VMEM, I/O)		

CHAPTER 42

Tape Drive Test (tapetest)

The tapetest synchronous I/O test writes a pattern to a specified number of blocks (or, for a SCSI tape, writes to the end of the tape). The tapetest then rewinds the tape and reads and compares the data just written. The tapetest asynchronous I/O test sends a series of up to five asynchronous read/write requests to the tape drive, writing to the tape and then reading and comparing the data. The tapetest file test writes four files to the tape and then reads them back, comparing the data. For tape library testing, the pass count is incremented only after all tapes in the library have been tested.

Note – If you have a tape drive in your system, load a blank writable tape (scratch tape) before you start SunVTS. If you fail to do this, the tapetest option displays drive type:unknown on the option menu for the tapetest.

tapetest Options

tapetest supports 4-mm, 8-mm, DLT, 1/4-inch cartridge, and 1/2-inch front-load tape drive testing. The options available for each of the tape devices differ slightly. An example of the option pop-up menu for a device is shown in FIGURE 42-1.

The Async I/O subtest uses the asynchronous read and write feature of the Solaris tape driver to exercise tape drives. In read-only mode the test sends a maximum of four asynchronous read packets, each with a random size and a random offset, to the tape drive. The test then waits for all outstanding I/O activity to complete before issuing another round of packets. This process continues until the whole area being tested has been covered. In read-write mode, one write packet is issued for every four read packets to ensure a spot check of the write operation. The area of the tape to be tested is written to first in order for the test to work correctly. This test is only supported under Solaris 2.6 and later releases.

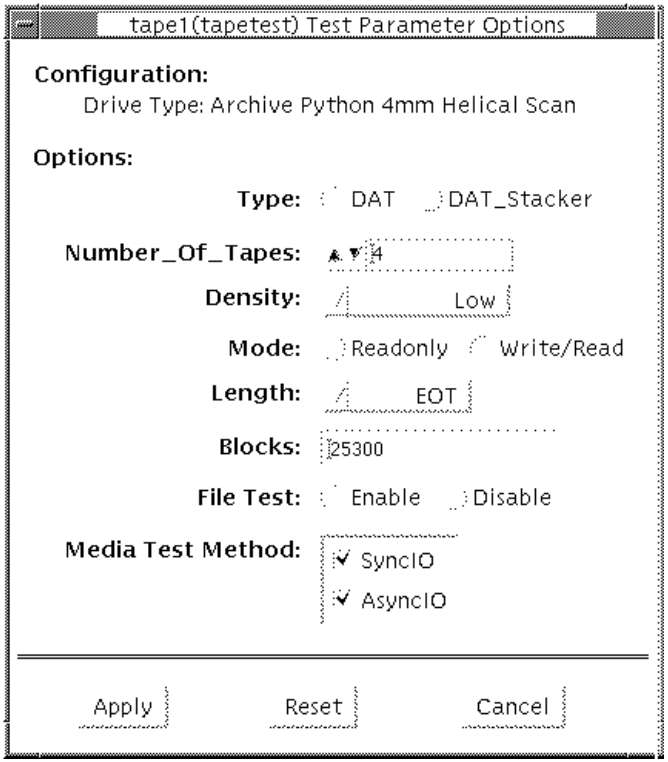


FIGURE 42-1 `tapetest` Option Menu (4-mm tape drives)

Note – This test does not immediately stop after being disabled.

FIGURE 42-1 shows an example of the options menu for a 4-mm tape drive.

Note – The option menus for the 1/4-inch, 1/2-inch, DLT, and 8-mm tape drives differ slightly from FIGURE 42-1.

TABLE 42-1 `tapetest` Options

`tapetest` **Options**	**Description**
Type	Normal tape drive or tape library (stacker).
# of Tapes	The number of tapes in the tape library. `tapetest` registers a single tape library pass only after all tapes in the library pass.
Format	QIC-11 and QIC-24 are quarter-inch tape formats that this test uses when it writes to the scratch tape you inserted. QIC-11 uses a 1-byte block ID; QIC-24 uses a 4-byte block ID, so 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; however, you can choose QIC-24 only, or both of QIC-11 and QIC-24 formats. If you choose both, the test first writes one pass to the tape in QIC-11 format, and then writes a second pass over it in QIC-24 format.
Density	The following settings are available for 8-mm tape drives: `-EXB8200`: Writes 2.3 Gbytes of data to the tape `-EXB8500`: Increases the density and writes 5 Gbytes of date to the tape `-Both`: Writes both 2.3 Gbytes, and 5 Gbytes of data to the tape. For half-inch tape drives the available settings are `800`, `1600`, and `6250` BPIs.
Mode	If you enable Write/Read mode, the test first writes to the tape and then reads it back to compare. If you enable Read_Only mode, the test assumes the tape has been properly written and merely reads and compares. This mode is useful to check proper head alignment.
Length	The amount of the tape to be tested. The choices are: `-EOT`: The default; tests to the entire tape. `-Long`: The SCSI tape tests 70,000 blocks of the tape. `-Short`: Only the first 1000 blocks are tested. `-Specified`: You must type the number of blocks to be tested in the `# of blocks` field.
# of Blocks	If you select Specified under the Length option, you must type the number of blocks you want to test.
Blocksize	Block size specification. This option is only available for Tandberg QIC tape drives. There are two possible values; 512-bytes for use with older tape media that have transfer size restrictions, or 64-kbytes for use with current, high-capacity tape media.

TABLE 42-1 `tapetest` Options

`tapetest` **Options**	**Description**
File Test	The *tape file* test sequence is as follows: -Writes three files -Rewinds -Reads part of the first file -Forward spaces to the start of the second file -Reads the second file -Forward spaces to the start of the third file -Tries to read to the end of that file for SCSI tapes only, the tape file test tries to backspace to the start of the second file and read it
Retension	When enable is selected, the program retensions the tape.
Media Test Method	Sync I/O: tapetest reads and or writes the number of blocks selected in Length. Async I/O: tapetest makes four asynchronous read requests to the tape drive. If read and write testing is selected, one asynchronous write request is also sent. The test continues after completing the requests. Note – When testing Tandberg QIC drives, Async I/O testing is restricted to read-only due to asynchronous behavior differences with other tape drives.

`tapetest` Test Modes

The `tapetest` supports all three modes. It performs different test schemes on the tape device, according to the mode you select.

TABLE 42-2 `tapetest` Test Modes

Test Mode	**Description**
Connection Test	In this mode, `tapetest` 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 `tapetest` fails if the open operation is unsuccessful for any reason other than the drive is busy.
Functional Test	`tapetest` checks the status, rewinds the tape, erases and retensions it. If the device is a cartridge tape, `tapetest` writes a pattern to `nblks` or `eot` (default), rewinds the tape, and then reads and compares of the pattern. If you invoke SunVTS through SyMON, the following Functional test description applies: `tapetest` opens the device and reads several blocks from it. If the read operation is successful, the test passes. On the other hand, if the device is busy or if no tape cartridge can be found in the drive, the test cannot run and fails.

tapetest Command Line Syntax

/opt/SUNWvts/bin/tapetest *standard_arguments* **-o dev=***device_name*,**s=***block_count*,**d=***density*,**m=***mode*,**l=***length*,**method=**method,**ft=***enables/disables*,**ret=***enables/disables*, **dat=***dat_type*,**8mm=***8mm_type* **num=***magazine_size*,**blocksize=***block_size*

TABLE 42-3 tapetest Command Line Syntax

Argument	Explanation
dev=*device_name*	Specifies the *device_name* of the tape drive (required).
s=*block_count*	Specifies the number of blocks to be tested.
d=*density*	Specifies the density of the tape to open.
m=*mode*	Enables either the Write_Read or Read_Only tests.
l=*length*	Specifies the length of the test (EOT, Specified, Long, or Short).
method=method	Specifies the media test method (SyncI/O and or AsyncI/O) used.
ft=*enables/disables*	Enables or disables the file test.
ret=*enables/disables*	Enable or disables tape retention.
dat=*dat_type*	If you are testing a digital audio tape drive, specify whether it is a regular DAT drive or a DAT stacker. The choices are DAT and DAT_Stacker.
8mm=*8mm_type*	If you are testing an 8-mm tape drive, specify whether it is a regular 8-mm tape drive or a tape library. The command line choices are 8mm and 8mm_Library.
num=*magazine_size*	If you are testing a tape library, specify the magazine size.
blocksize=*block_size*	If you are testing a Tandberg QIC drive, specify whether to use a 64 kbyte block transfer or a 512 byte block transfer. Use 512 bytes when testing older media in the drive.

tapetest Error Messages

TABLE 42-4 tapetest Error Messages

	Error Message	Probable Cause(s)	Recommended Action
6000	`Missing device name`	No device name is specified.	Retry test with correct device name specification.
6001	`failed ioctl on unload and load next tape: err_code =` *number*`!`	This stacker/library unit may lack the Automatic Cycle option.	Run the test with Single Pass Option enabled.
6002	`Cannot open` *device_name*`:` *error_message*	No tape media in drive.	Load tape media and retry test.
6005	`Cannot close` *device_name*`:` *error_message*	Bad drive.	Retry test; if problem persists, check or replace the drive.
6006	*text* `write failed on` *error_message*`, block` *number*`: EOF reached`	EOF reached prematurely.	Retry test with reduced blocksize specification or until EOF.
6007	*text* `write failed on` *device_name*`, block` *number*`:` *error_message*`, sense key(0x`*value*`) =` *text*	Drive needs attention.	Perform action to reset sense key and retry the test.
6008	*text* `read failed on` *device_name*`, block` *number*`: EOF reached`	EOF reached prematurely.	Retry test with reduced blocksize specification or until EOF.
6009	*text* `read failed on` *device_name*`, block` *number*`:` *error_message*`, sense key(0x`*value*`) =` *text*	Drive needs attention.	Perform action to reset sense key and retry test.
6010	*text* `compare failed on` *device_name*`, block` *number*`, offset` *number*`, pattern 0x`*value*`, data= 0x`*value*	Bad drive.	Retry test; if problem persists, check or replace the drive.
6011	*device_name* `tape MTIOCGETDRIVETYPE ioctl:` *number*	Bad drive.	Retry test; if problem persists, check or replace the drive.
6012	*text* `failed on` *device_name*`:` *error_message*	Bad drive.	Retry test; if problem persists, check or replace the drive.
6013	`Failed Connection test on` *device_name*`:`*error_message*	Broken cable.	Check or replace the cable.
		Bad drive.	Check or replace the drive.

TABLE 42-4 `tapetest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
6014	`Failed Online test:`*device_name*	Device may be in use.	Retry later.
6015	`Failed Online test:`*device_name*`:`*error_message*	No tape media in drive.	Load tape media and retry test.
6016	`Online test was unsuccessful:`*device_name*	No tape media in drive.	Load tape media and retry test.
6017	`Failed Online read test:`*device_name*	Bad drive.	Retry test; if problem persists, check or replace the drive.
6018	`Open Failed on` *device_name*`:` *error_message*	Broken cable.	Check or replace the cable.
		Bad drive.	Check or replace the drive.
6018	`recon: No Corresponding SCSI disk device`		
6019	`Needs both SCSI disk and SCSI tape to run the test`		
6020	`Couldn't retension '`*device_name*`'`		
6021	`Couldn't read file '`*device_name*`'`		
6022	`SCSI disconnect/ reconnect failed`		
6023	`Spurious signal received from child`		
2005	`Tandberg QIC Read/Write media failure.`	Incorrect test settings for older QIC tape media.	Retry the test and specify a 512-byte blocksize. Retry the test with a read-only setting. Use the highest capacity tape media that the drive will allow (refer to tape drive documentation for QIC media compatibilities.).

CHAPTER 43

S24 Frame Buffer Test (`tcxtest`)

Through a series of protocol, memory, acceleration, and colormap tests, `tcxtest` checks the functionality of the S24 Frame Buffer SBus card used on the SPARCstation5 and checks the FSV (fast SBus video) ASIC on the SPARCstation4 motherboard.

Note – Disable all screen savers before testing any graphics device. Type **`xset s off`** at a UNIX prompt to disable the Solaris screen saver.

Test Groups

`tcxtest` has four distinct test groups:

- AFX Protocol tests (in 8/16/32/64-bit mode)
  - `WRC`
- Frame Buffer Memory tests (in 8/16/32/64-bit14 mode)
  - `address`
  - `constant`
  - `random`
- Acceleration tests (both User and Raw modes)
  - `blit`
  - `stip`
- Colormap and Cursor tests
  - `cursor` (does not apply to SPARCstation4)
  - `colormap`

tcxtest Subtests

TABLE 43-1 tcxtest Subtests

tcxtest Subtests	Description
WRC	By performing multiple writes and reads, and then verifying the results, the WRC test exercises the FIFO inside the S24 chip. The WRC test is composed of these three subtests: test_afx_alt_wr, test_memafx, and test_afx_random. If these tests fail, they print an error message showing the expected and observed data.
Test_afx_alt_wr	This test performs 16 writes to alternative pages (for example: WR (Page1), WR (Page2), WR (Page1+off), WR (Page2+off), etc.). It then reads back the data and compares it with the expected results. This test also writes to the frame buffer space 16 times, followed by a write to a different page in the frame buffer space. The test then reads this data back and verifies it with the expected results.
Test_memafx	The CPU in the SWIFT chip has closely coupled interfaces for the DRAM and the AFX bus. This test checks the arbitration between the two accesses. This test performs a number of alternating writes to the AFX and the CPU memory. After writing to different locations, the test reads and verifies the data. By performing an access across the page boundaries, the test covers both the cached and non-cached accesses.
Test_afx_random	After writing to one page in the DRAM memory, the test performs a few random writes / reads to random locations in the AFX space. The test then writes to a different page in the DRAM space, where it performs random accesses. This test does not perform any data verification, it just checks to see if any of these random accesses caused a time out.
Constant	This test writes a data pattern to the whole memory. This pattern is read back and compared with the expected data. Once the memory fill operation is completed, the test reads the memory back and verifies that the value read is correct.
Address	This test writes a data pattern (which is same as the value of the address) to the whole memory. This pattern is then read back to verify that it is the correct value.
Random	This test writes a random data pattern to the whole memory. This pattern is read back and compared with the expected data. After the memory fill operation is completed, the test reads the memory and verifies the values read are correct.

TABLE 43-1 `tcxtest` Subtests

tcxtest Subtests	Description
Blit	This test has two parts; the raw `blit` test and the user `blit` test. The raw `blit` test draws a 64x64x24 pixel image at the top-left corner of screen. Next it `blits` the image to the screen. The destination images are read back and compared with the original image to verify the raw `blit` operation has run correctly. The user `blit` test draws a 64x64x24 pixel image at the top left corner of screen. It then `blits` the image to the screen. The destination images are read back and compared with the original image. The user `blit` test is the same as the raw `blit` test, except the user `blit` test uses the user data space for the `blit` command.
Stip	This test performs numerous corner cases for stipple. The test writes to the destination with different data values using a stipple operation. The destination data is read back and verified. For the fast SBus video (SV), the following is checked: • Walks 1 through pixel mask • Walks 1 through ROP bits • Walks 1 through destination byte • Walks 1 through IDX byte
Cursor (does not apply to SPARCstation 4)	This test performs a data register regression test. It writes a walking 1 pattern to the cursor data registers. The data is then read back and verified with the expected results. The test is repeated using a walking 0 as the data pattern
Colormap	Loads all locations in the colormap with varying values of RGB. Note: If the system being tested has a monochrome or greyscale monitor, visual color problems are undetectable.

tcxtest Options

FB Locking is the only test parameter options for this test. See the section about testing multiple frame buffers in the *SunVTS 2.1 User's Guide* for details.

- **Click enable or disable to configure Frame Buffer locking.**

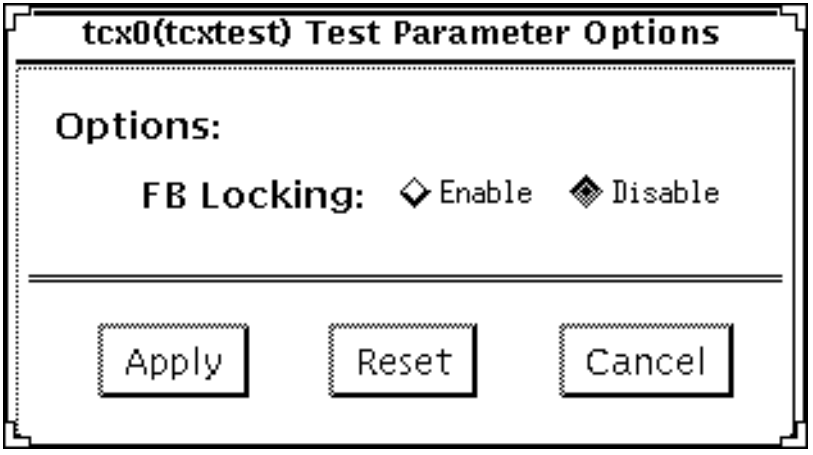


FIGURE 43-1 `tcxtest` Option Menu

tcxtest Test Modes

Available only in the Functional test mode. Functional test is the default for tcxtest. `tcxtest` runs the appropriate subtests for the hardware platform being tested.

tcxtest Command Line Syntax

/opt/SUNWvts/bin/tcxtest *standard_arguments* **-o dev=***device_name***,lock=**E(nable)/D(isable), **X=***bit_mode***,T=***test***,S=***[dfb8, dfb24, dfb32]*

TABLE 43-2 tcxtest Command Line Syntax

Argument	Explanation
dev=*device_name*	Specifies the filename of the device to be tested, for example: dev=tcx0.
lock=*E(nable)/ D(isable)*	Enables or disables the window system locking option. See the section about Testing Frame Buffers in *SunVTS 2.1 User's Guide* for details. Do not use when device is the window system display.
X=*bit_mode*	Specifies the data transfer size; supported values are: 8byte 16short 32long 64double word
T=*test*	Specifies a particular test; to specify an individual test, replace *test* with: a=Address c=Constant r=Random b=Blit s=Stipple h=Cursor w=WRC Note: When you select either the Blit or Stipple test, both the User and Raw mode tests are run.
S=*[dfb8, dfb24, dfb32]*	Specifies which frame buffer memory space to use. -dfb8Dumb frame buffer 8-bit space. Memory is accessed only by bytes. -dfb24Dumb frame buffer 24-bit space. Memory is accessed only by 24-bit reads and writes. -dfb32Dumb frame buffer 8-bit space. Memory is accessed by 8-bit reads and writes.

tcxtest Error Messages

TABLE 43-3 tcxtest Error Messages

	Error Message	Probable Cause(s)	Recommended Action
6000	FBIOGATTR failed in is_24bit subroutine	Driver not installed.	Examine system message files (/var/adm/messages) for other information.
		OS driver problem.	
		AFX bus error.	
6010	Colormap failure, Address: *address*, red, Expected: *value* Observed: *value*	Bad RAMDAC.	Replace the frame buffer card.
		Bad a24 board.	Examine system message files (/var/adm/messages) for other information.
		AFX bus error.	
6011	Colormap failure, Address: *address*, green, Expected: *value* Observed: *value*	Bad RAMDAC.	Replace the frame buffer card.
		Bad a24 board.	Examine system message files (/var/adm/messages) for other information.
		AFX bus error	
6012	Colormap failure, Address: *address*, blue, Expected: *value* Observed: *value*	Bad RAMDAC.	Replace the frame buffer card.
		Bad a24 board.	Examine system message files (/var/adm/messages) for other information.
		AFX bus error.	
6013	THC Cursor Regression failed Address: *address*, Expected: *value*, Observed: *value*	Bad a24 board.	Replace the frame buffer card.
		AFX bus error.	Examine system message files (/var/adm/messages) for other information.
6014	Can't clear frame buffer, dst_start: *address*, src_start: *address*, Address: *value*, Observed: *value* Expected: *value*	Bad a24 board.	Replace the frame buffer card.
		AFX bus error.	Examine system message files (/var/adm/messages) for other information.

TABLE 43-3 `tcxtest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
6015	`Frame buffer pattern test failed, dst_space:` *address*`, src_space:` *address*`, check_x =` *value*`, check_y =` *value*`, Address:` *value*`, Observed:` *value* `Expected:` *value*	Bad a24 board.	Replace frame buffer card
		AFX bus error.	Examine system message files (`/var/adm/messages`) for other information.
6016	`Can't clear frame buffer pattern, dst_space:` *address*`, src_space:` *address*`, check_x:` *value*`, check_y:` *value*`, Address:` *value* `Observed:` *value* `Expected:` *value*	Bad a24 board.	Replace the frame buffer card.
		AFX bus error.	Examine system message files (`/var/adm/messages`) for other information.
6017	`Can't clear frame buffer after write, Address:` *value*`, Expected:` *value* `Observed:` *value*	Bad a24 board.	Replace the frame buffer card.
		AFX bus error.	Examine system message files (`/var/adm/messages`) for other information.
6018	`Raw Blit test failed, Offset:` *address*`, Expected:` *value* `Observed:` *value*	Bad a24 board.	Replace the frame buffer card.
		AFX bus error.	Examine system message files (`/var/adm/messages`) for other information.
6019	`Blit test failed CHECKING, Offset:` *address*`, Expected:` *value* `Observed:` *value*	Bad a24 board.	Replace the frame buffer card.
		AFX bus error.	Examine system message files (`/var/adm/messages`) for other information.
6020	`Blit test failed, Offset:` *value*`, Expected:` *value* `Observed:` *value*	Bad a24 board.	Replace the frame buffer card.
		AFX bus error.	Examine system message files (`/var/adm/messages`) for other information.
6021	`Blit accel test failed. Offset:` *value*`, Expected:`*value* `Observed:` *value*	Bad a24 board.	Replace the frame buffer card.
		AFX bus error.	Examine system message files (`/var/adm/messages`) for other information.
6022	`Stipple test failed. Offset:` *address*`, Expected:`*value* `Observed:` *value*	Bad a24 board.	Replace the frame buffer card.
		AFX bus error.	Examine system message files (`/var/adm/messages`) for other information.

TABLE 43-3 `tcxtest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
6025	`Raw Stipple test failed. Offset:` *address*, `Expected:`*value* `Observed:` *value*	Bad a24 board.	Replace the frame buffer card.
		AFX bus error.	Examine system message files (`/var/adm/messages`) for other information.
6027	`Frame buffer pattern test miscompare, y:` *value* `x:` *value* `Observed:` *value* `Expected:` *value* `Address:` *value*	Bad RAMDAC.	Replace the frame buffer card.
		Bad a24 board.	Examine system message files (`/var/adm/messages`) for other information.
		AFX bus error.	
6029	`Afx protocol test` *message* `Expected:` *value*	AFX bus error.	Examine system message files (`/var/adm/messages`) for other information.
		Bad a24 board.	
		Bad CPU board.	
6030	`Null allocation to membase`	AFX bus error.	Examine system message files (`/var/adm/messages`) for other information.
		Bad a24 board.	
		Bad CPU board.	
6031	`Afx_mem test failure, Address:` *address*, `Expected:` *value*	AFX bus error.	Examine system message files (`/var/adm/messages`) for other information.
		Bad a24 board.	
		Bad CPU board.	
6032	`Afx_mem Mem test failure, Address+0x4000 Value:` *value*, `Exp 0x5555aaaa`	AFX bus error.	Examine system message files (`/var/adm/messages`) for other information.
		Bad a24 board.	
		Bad CPU board.	
6033	`Pattern test failed in Byte mode for DFB`*value*`. Offset:` *address*, `Expected:` *value* `OBserved:` *value* `xor(`*value*`)`	AFX bus error.	Examine system message files (`/var/adm/messages`) for other information.
		Bad a24 board.	
		Bad CPU board.	

TABLE 43-3 `tcxtest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
6034	`Pattern test failed in Short mode for DFB`*value*`. Offset:` *value*`, Expected:` *value* `OBserved:` *value* `xor(`*value*`)`	AFX bus error.	Examine system message files (`/var/adm/messages`) for other information.
		Bad a24 board.	
		Bad CPU board.	
6035	`Pattern test failed in Long mode for DFB`*value*`. Offset:` *value*`, Expected:` *value* `OBserved:` *value* `xor(`*value*`)`	AFX bus error.	Examine system message files (`/var/adm/messages`) for other information.
		Bad a24 board.	
		Bad CPU board.	
6036	`Pattern test failed in Long mode for DFB`*value* `Offset:` *value*`, Expected:` *value* `OBserved:` *value*	AFX bus error.	Examine system message files (`/var/adm/messages`) for other information.
		Bad a24 board.	
		Bad CPU board.	Examine system message files (`/var/adm/messages`) for other information.
6039	`Random test failed in Byte mode for DF`*value*`, Offset:` *value*`, Expected:` *value* `Observed:` *value* `xor:` *value*	AFX bus error.	
		Bad a24 board.	
		Bad CPU board.	
6040	`Random test failed in Short mode for DFB`*value*`, Offset:` *value*`, Expected:` *value* `Observed:` *value* `xor:` *value*	AFX bus error.	Examine system message files (`/var/adm/messages`) for other information.
		Bad a24 board.	
		Bad CPU board.	
6041	`Random test failed in Long mode for DFB`*value*`, Offset:` *value*`, Expected:` *value* `Observed:` *value* `xor:` *value*	AFX bus error.	Examine system message files (`/var/adm/messages`) for other information.
		Bad a24 board.	
		Bad CPU board.	
6042	`Pattern test failed in Dblword mode for DFB`*value*`, Offset:` *value*`, Expected:` *value* `Observed:`*value*`, xor:`*value*	AFX bus error.	Examine system message files (`/var/adm/messages`) for other information.
		Bad a24 board.	
		Bad CPU board.	

TABLE 43-3 `tcxtest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
6043	`Address test failed in Char mode for DFB`*value*`. Offset:` *value*`, Expected:` *value* `Observed:` *value* `xor:` *value*	AFX bus error.	Examine system message files (`/var/adm/messages`) for other information.
		Bad a24 board.	
		Bad CPU board.	
6044	`Address test failed in Short mode for DFB`*value*`, Offset:` *value*`, Expected:` *value* `Observed:` *value* `xor:` *value*	AFX bus error.	Examine system message files (`/var/adm/messages`) for other information.
		Bad a24 board.	
		Bad CPU board.	
6045	`Address test failed in Long mode for DFB`*value*`, Offset:` *value*`, Expected:` *value* `Observed:` *value* `xor:` *value*	AFX bus error.	Examine system message files (`/var/adm/messages`) for other information.
		Bad a24 board.	
		Bad CPU board.	
6046	`Address test failed in Dblword mode for DFB`*value*`, Offset:` *value*`, Expected:` *value* `Observed:` *value* `xor: value>`	AFX bus error.	Examine system message files (`/var/adm/messages`) for other information.
		Bad a24 board.	
		Bad CPU board.	
6047	`Verifying Double:word writes`	AFX bus error.	Examine system message files (`/var/adm/messages`) for other information.
		Bad a24 board.	
		Bad CPU board.	
8000	`Open failure for device` *device name*	Driver not installed.	Examine system message files (`/var/adm/messages`) for other information.
		OS driver problem.	
		AFX bus error.	
8001	`Pattern test failed in Long mode, Offset:` *value*`, Expected:` *value* `Observed:` *value*	Driver not installed.	Examine system message files (`/var/adm/messages`) for other information.
		AFX bus error.	
		Bad CPU board.	

TABLE 43-3 `tcxtest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
8002	`can't acquire console semaphor`	Not enough memory.	Examine system message files (`/var/adm/messages`) for other information.
		Not enough swap space.	
8003	`XCreateSimpleWindow failed`	Not enough memory.	Examine system message files (`/var/adm/messages`) for other information.
		Not enough swap space.	
8004	`Multibuffering extension does not exists`	Not enough memory.	Examine system message files (`/var/adm/messages`) for other information.
		Not enough swap space.	
8005	`Couldn't create enough buffers`	Not enough memory.	Examine system message files (`/var/adm/messages`) for other information.
		Not enough swap space.	

CHAPTER 44

Virtual Memory Test (vmem)

The vmem test checks virtual memory; that is, it tests the combination of physical memory and the swap partitions of the disk(s).

Note – This test may not stop immediately after being disabled.

This test uses the Solaris valloc (page aligned) system call to allocate, write, read, and compare virtual memory. These operations normally cause heavy paging activity on the system and simulates a stressful environment for the operating system. This test also detects ECC parity errors, memory read errors, addressing problems, and displays the corresponding virtual memory addresses on failure.

Handling Swap Space

Running this test places a significant burden on the operating system, since it uses the majority of swap space available for testing. You should use the swap space reserve option to vmem when non-SunVTS test processes are started after SunVTS testing has started. See "*Swap Space Requirements*" in the *SunVTS User's Guide* for a complete discussion of swap space requirements.

vmem Options

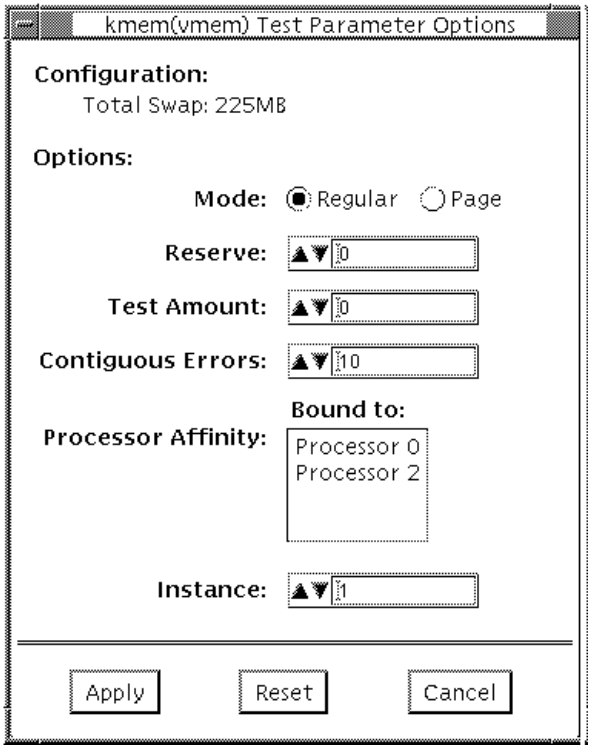


FIGURE 44-1 vmem Option Menu

TABLE 44-1 `vmem` Options

vmem Options	Description
`vmem` Configuration	The amount of memory listed in the configuration field is equivalent to the sum of the used and available swap space amounts returned by the `swap -s` command. It indicates the amount of virtual memory found, rounded up to the nearest Kbyte.
Test Amount	An amount can be specified to test the virtual memory, instead of the default. Specifying a number greater than the available memory, can cause `vmem` or other running tests to fail.
Mode	Two modes are available: • Regular mode tests the amount of memory and is limited by the amount of physical memory available to the system under test. • Page mode tests assign virtual memory one page at a time. Each page is mapped to the temporary file `/tmp/vmem.page` and is then paged out to storage once test data is written. Next, the temporary page is paged back into memory for a read and compare. When the stress test execution option is selected, the `vmem` test allocates the entire assigned system memory (through `valloc`), writing from beginning to end. The memory is then read back and compared with the original pattern, one long word at a time.
Reserve	The Reserve option specifies the amount of memory to reserve from being tested by `vmem`. The reserved space is used for other processes running concurrently with the or SunVTS tests. The Reserve option can be used to reserve memory in addition to the default. This option applies only to a specific instance. Trying to reserve more memory than what is assigned to be tested by this instance will cause the test to fail.

vmem Test Modes

This test is only available in the Functional test mode. In this mode the, vmem test writes a pattern to an amount of virtual memory specified by the user. Then the data is read back and compared. If there is a miscompare, the data is read again and compared. Whenever there is a miscompare, the virtual address is reported. When there is a miscompare on recomparison, an attempt is made to convert the virtual address to the physical address if the SunVTS diagnostic driver is installed.

vmem Command Line Syntax

/opt/SUNWvts/bin/vmem *standard_arguments* **-o mode=***type***, reserve=***number***, amount=***number***, bdinfo=***number***r, cerr=***number*

TABLE 44-2 vmem Command Line Syntax

Argument	Explanation
mode=*type*	Specifies which mode of the vmem test you want to run; you can choose between page mode, which tells the write/read memory test to proceed one system memory page at a time, and regular, which valloc's the entire assigned memory which is read and compared, one long word at a time.
reserve=*number*	Specifies the amount of Mbytes of virtual memory to reserve in addition to the default amount.
amount=*number*	Specifies the number of Mbytes of memory to be tested instead of the default amount.
bdinfo=*number*	Provides the board number information for all the CPU/memory boards in the system. For example, if board 0 and board 5 have memory, then the bdinfo=33 (2**5+2**0).
cerr=number	Specifies the maximum number of contiguous errors to be dumped when a memory error occurs.

vmem Error Messages

TABLE 44-3 vmem Error Messages

	Error Message	Probable Cause(s)	Recommended Action
6001	`setrlimit(RLIMIT_DATA) failed to set to RLIM_INFINITY:` *error_message*	Failed to increase the size of test process's heap to 2GB (fatal error).	
6002	`Test terminated after finding maximum number (`*number*`) of noncontiguous errors`	Fatal error.	
6003	`msync() failed:` *error_message*	Failed to synchronize memory with physical storage (fatal error).	
6004	`Test terminated after finding miscompared data`	Test failed (fatal error).	
8001	`Test completed. Found` *data* `noncontiguous miscompare errors`	Suspect swap partition(s) (fatal error).	Consult your authorized Sun service provider.
		Suspect SCSI controller.	
		Faulty system software.	
8002	`Increase swap space to allocate at least` *number* `MB from the process' heap`	Failed to increase `mem` process' heap storage.	
8003	`Attempt to reserve more than what's been assigned`	Fatal error.	Reduce the "reserve" amount.
8004	`valloc(`*address*`) failed:` *error_message*	Fatal error.	Increase swap space or reduce the reserve amount.
8005	`Open(`*file_name*`) failed:` *error_message*	Failed to open the file *file_name* used in the "page" mode (fatal error).	
8006	`mmap() virtual address` *address* `to` *file_name* `failed:` *error_message*	Failed to map a region at the virtual address of the file *file_name* used in the "page" mode (fatal error).	

TABLE 44-3 `vmem` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
8007	`munmap(`*address*`) failed:` *error_message*	Failed to unmap a region at the virtual address of the file *file_name* used in the "page" mode (fatal error).	
8008	`close() failed on` *file_name*`:` *error_message*	Fatal error.	
8009	`Not enough space to store miscompare information`	Failed to allocate space to store miscompare data (fatal error).	Increase swap space or reduce the load on the system.
8010	`swapctl() failed:` *error_message*	Failed to obtain the amount of swap space configured in the system (fatal error)	

CHAPTER 45

SBus Expansion Subsystem Test (xbtest)

xbtest verifies the functionality of the Sun SBus expansion subsystem (XBox) hardware and its peripherals. The SBus expansion subsystem can be used in two mutually exclusive modes: Transparent and Nontransparent. In Transparent mode, xbtest checks SBus expansion subsystem peripherals, such as SBus cards and disk drives. In Nontransparent mode xbtest checks the actual expansion subsystem itself.

Note – Do not select the Nontransparent mode if SBus cards are installed in the SBus expansion slots. Do not select Transparent mode if the SBus expansion slots are empty.

xbtest Modes

The xbtest modes are described in the following table:

TABLE 45-1 xbtest Modes

Mode	Description
Transparent Mode	In Transparent mode, the wait_for_error test is used. When xbtest is started, a child process is created. The parent process waits for the child process to terminate and then it exits. The child process issues a WAIT_FOR_ERROR_PAK ioctl call and then enters sleep mode. When the device driver receives an error, it wakes up and passes an error packet to the child process. The child process dumps the contents of the error packet, and also exits. If the child process does not receive an error message before the end of the test period specified by the time option, it exits. The parent process then exits. The default value for the time option is one minute. If you do not specify another value for the Time option, the default value is used in both regular and stress test modes.
Nontransparent Mode	In Nontransparent mode, self_diagnostic test is used. If you do not have an XBox SBus card in any slot of your system, you must add the following line to the /etc/system file: set xbox:xbox_no_cards_in_slot0=1 After adding this line to /etc/system, reboot the machine using the -r option. You can now run the Nontransparent mode test of xbtest. This test checks the expansion subsystem hardware; the subtests are described below. The subtests, part of the diagnostic test, are repeated three times in both Regular and Stress test modes. Time-out checks are included to avoid indefinite hangs. If any test should fail, it does not result in a system panic; however, full recovery is not guaranteed.

▼ To Perform a Self-Diagnostic Test

1. **Reset your system using the <L1-A> or <Stop-A> keyboard commands.**
2. **Check for the expected value from the XAC register.**

3. **Run a DVMA XAC Interrupt test:**

   a. **Create a DVMA transfer by asserting DVTE + INTT in control register 1 of XAC.**

   b. **Wait for the interrupt.**

   c. **Compare the error status packet with the expected values.**

4. **Run a DVMA XBC Interrupt test:**

   a. **Create a DVMA transfer by asserting DVTE + INTT in control register 1 of XBC.**

   b. **Wait for the interrupt.**

   c. **Compare the error status packet with the expected values.**

`xbtest` Options

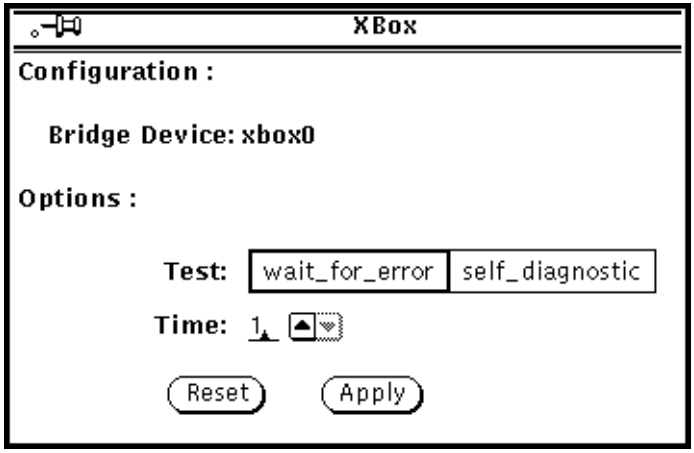


FIGURE 45-1 `xbtest` Option Menu

The top section of the xbtest Options menu displays the device name of the SBus Expansion Subsystem card being tested.

TABLE 45-2 xbtest Options

xbtest Options	Description
Test	Specifies self_diagnostic or wait_for_error test. See "Nontransparent Mode" on page 400 before running the self_diagnostic test.
Time	The number of minutes xbtest waits for an error to be returned. You can change the xbtest time setting by selecting the text field and typing the number of minutes you want the test to run (minimum 1 minute; maximum 20 minutes).

xbtest Test Modes

This test is only available in the Functional test mode. A wait time of 10 seconds is used with the wait_for_error test if the XBox is in Transparent mode. If the XBox is in nontransparent mode, the subtests that are part of the self-diagnostic test are repeated three times.

xbtest Command Line Syntax

/opt/SUNWvts/bin/xbtest -o dev=*xbox#***,test=***we* | *sd***,time=***test_time*

TABLE 45-3 xbtest Command Line Syntax

Argument	Explanation
dev=*xbox#*	Specifies the physical path name of the subsystem unit to be tested (*.xbox#*), where # is the instance number defined in path_to_inst(4). You need to search the /devices tree to find the physical pathname of the subsystem. Note: You must include the *device_name* path when running xbtest from the command line.

TABLE 45-3 `xbtest` Command Line Syntax

Argument	Explanation
`time=`*test_time*	The number of minutes this test waits for an error to be returned. Used only with the we option. Substitute *test_time* with the number of minutes you want `xbtest` to wait. The default is one minute.
`test=`*we* | *sd*	`we`= specifies wait_for_error test. This option directs `xbtest` to run in Transparent mode. This option runs `xbtest` continually until an error is returned, or until the time interval specified with the *T=test_time* option has ended.
	`sd`= specifies self_diagnostic test. This option is used in Nontransparent mode. See TABLE 45-1 on page 400, before running Nontransparent mode.

For example, to run `xbtest`, type:

```
# /opt/SUNWvts/bin/xbtest -o dev=xbox0,test=we,time=2
```

`xbtest` Error Messages

TABLE 45-4 `xbtest` Error Messages

	Error Message	Probable Cause(s)	Recommended Action
6002	`Incorrect options`	Failed to increase the size of test process's heap to 2GB (fatal error).	
6003	`XAC_WAIT_FOR_ERROR ioctl command fail (`*error_message*`)`		
6004	`XAC_CLEAR_WAIT_FOR_ERROR ioctl command fail (`*error_message*`)`		
6005	`XAC_WRITE0 ioctl command fail (`*error_message*`)`		
6006	`Failed to open /etc/path_to_inst file (`*error_message*`)`		
6007	*device_name* `invalid device name`		

TABLE 45-4 `xbtest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
6008	*device_name*'s instance number() not in /etc/path_to_inst file		
6009	error status dirty bit *number*	This bit is set to 0 when the XBox detects an error.	
6010	error status indicator *number*	This bit is set to 0 when the XBox detects an error.	
6011	expansion sbus slave selects 0x%x		
6012	parent master request *data*		
6013	packet type		
6014	physical address info		
6015	sbus size *data*		
6016	cable resend limit timeout error (dpr1)	This error is detected by the XBox controller.	
6017	cable parity error (dpr1)	This error is detected by the XBox controller.	
6018	expansion sbus read error (err ack)	The signal `err ack` is asserted on the expansion SBus by XBox slave while being read by an XBox master.	
6019	expansion sbus read error (rsvd ack)	The signal `rsvd ack` is asserted on the expansion SBus by XBox slave while being read by an XBox master.	
6020	expansion sbus read error (late error)	The signal `rsvd ack` is asserted on the expansion SBus by XBox slave while being read by an XBox master.	
6021	expansion sbus timeout error	XBox controller detects a timeout on the expansion SBus during a read or write to an XBox slave.	
6022	write 0 error		
6023	buffer write error (err ack)	The signal `err ack` is asserted on the expansion or host SBus while the XBox controller / XAdapter was performing a DVMA write.	

TABLE 45-4 `xbtest` Error Messages *(Continued)*

	Error Message	Probable Cause(s)	Recommended Action
6024	`buffer write error (rsvd ack)`	The signal `rsvd ack` is asserted on the expansion or host SBus while the XBox controller / XAdapter was performing a DVMA write.	
6025	`buffer write error (late error)`	The signal late error is asserted on the expansion or host SBus while the XBox controller / XAdapter was performing a DVMA write.	
6026	`cable resend timeout error (dpr0)`	This error is detected by the XAdapter controller.	
6027	`cable ack timeout error`	This error occurs when XAdapter does not detect cable acknowledgment.	
6028	`cable parity error (dpr0)`	This error is detected by the XAdapter controller.	
6029	`cable serial interrupt parity error`	This error is detected by the XAdapter controller.	
6030	`child not ready error`	This error indicates that the XBox controller can no longer communicate with the XAdapter.	
6031	`XAC_GET_REG_VALUES ioctl command fail (`*error_message*`)`		
6032	`XAC_GET_ERROR_PKT ioctl command fail (`*error_message*`)`		
6033	`XAC_TRANSPARANT ioctl command fail (`*error_message*`)`		
6034	`XAC_NON_TRANSPARANT ioctl command fail (`*error_message*`)`		
8003	`XAC_NON_TRANSPARANT ioctl command fail (`*error_message*`)`		
8004	`XAC_REG_CHECK ioctl command fail (`*error_message*`)`		

APPENDIX **A**

Loopback Connectors

Loopback connectors are designed for the testing of communication ports. They take the form of either a single plug or a port-to-port cable with some communication connections shorted (looped-back).

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 cause erroneous diagnostic error messages.

TABLE A-1 depicts the pin assignments for most loopback plugs and cables that may be used when testing a system.

TABLE A-1 Pin Connections for Loopback Plugs

Signal Description	EIA	CCITT #	RS-449 "A"	RS-449 "B"	DIN 8 8-pin round	DB9 9-pin	DB25 25-pin	Direction	Alpha ID
Chassis/Frame Ground	AA	101	1	NC*	NC*	NC*	1	none	AA
Transmit Data (TxDa)	BA	103	4	22	3	3	2	output	BA
Receive Data (RxDa)	BB	104	6	24	5	2	3	input	BB
Request To Send (RTSa)	CA	105	7	25	6	7	4	output	CA
Clear To Send (CTSa)	CB	106	9	27	2	8	5	input	CB
Data Set Ready (DSRa)	CC	107	11	29	NC*	6	6	input/ output	CC

TABLE A-1 Pin Connections for Loopback Plugs *(Continued)*

Signal Description	EIA	CCITT #	RS-449 "A"	RS-449 "B"	DIN 8 8-pin round	DB9 9-pin	DB25 25-pin	Direction	Alpha ID
Signal Ground (SG)	AB	102	19	NC*	4	5	7	none	AB
Data Carrier Detect (DCDa)	CF	109	13	31	7	1	8	input	CF
Transmit Clock In (TRxCa)	DB	114	5	23	NC*	NC*	15	input	DB
Receive Clock in (RTxCa)	DD	115	8	26	8	NC*	17	input	DD
Data Terminal Ready (DTRa)	CD	108	12	30	1	4	20	output	CD
External Clock Out (TRxCa)	DA	113	17	35	NC*	NC*	24	output	DA
Secondary Data Carrier Detect (DCDb)	SCF	122	NC*	NC*	NC*	NC*	12	input	SCF
Secondary Clear to Send (CTSb)	SCB	121	NC*	NC*	NC*	NC*	13	input	SCB
Secondary Transmit Data (TxDb)	SBA	118	NC*	NC*	NC*	NC*	14	output	SBA
Secondary Receive Data (RxDb)	SBB	119	NC*	NC*	NC*	NC*	16	input	SBB
Secondary Request to Send (RTSb)	SCA	120	NC*	NC*	NC*	NC*	19	output	SCA

NC = No connection

25-Pin RS-232 Loopback Plug

The RS-232 and RS-423 single-port loopback plug is a specially wired male DB-25 connector. It is plugged in to a serial port in the back of the system under test. The wiring is shown in FIGURE A-1.

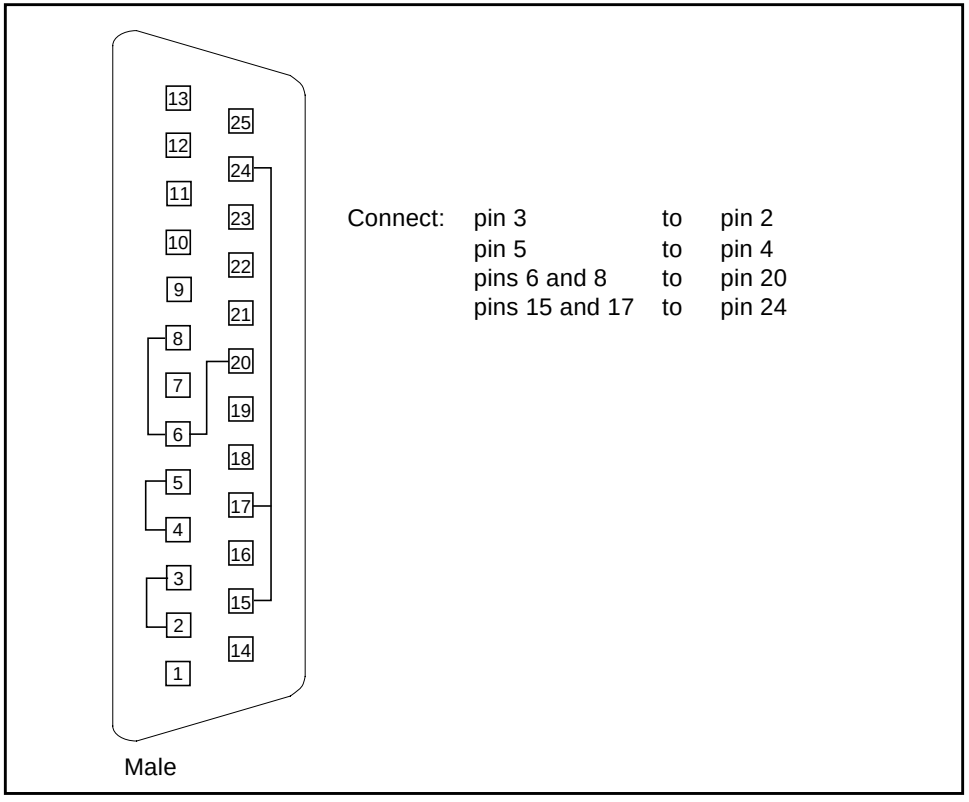
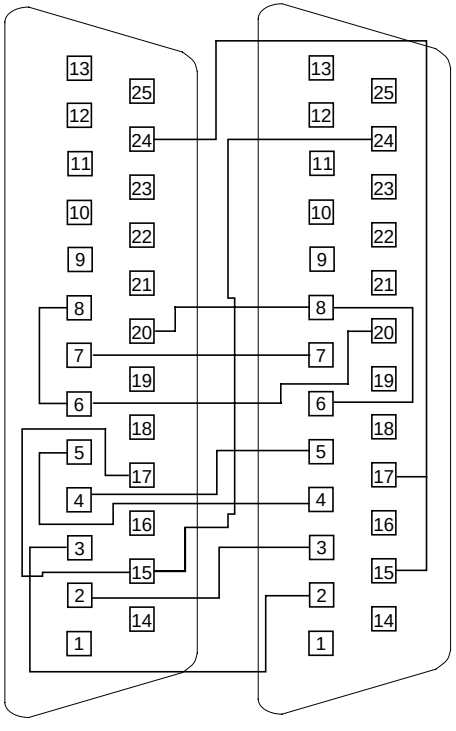


FIGURE A-1 25-pin RS-232 Loopback Plug

25-pin RS-232 Port-to-Port Loopback Cable

Use these wiring instructions for 25-pin RS-232 and RS-423 port to 25-pin RS 232 and RS 423 port loopback cables (two DB-25 connections). It is plugged into a pair of serial ports in the back of the system under test. Both connectors are male. The wiring is shown in FIGURE A-2.



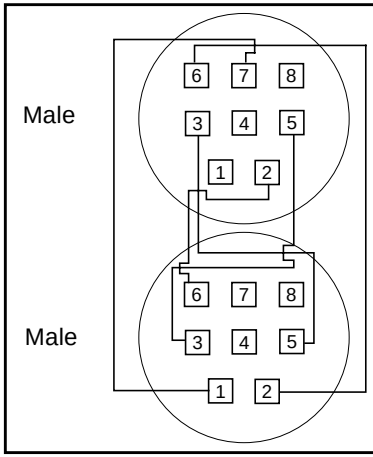
Connect:

First Connector	to	Second Connector
pin 2		pin 3
pin 3		pin 2
pin 4		pin 5
pin 5		pin 4
pins 6 and 8		pin 20
pin 7		pin 7
pins 15 and 17		pin 24
pin 20		pins 6 and 8
pin 24		pins 15 and 17

FIGURE A-2 25-pin RS-232 Port-to-Port Loopback Cable

8-Pin to 8-Pin Loopback Cable

Use these wiring directions for 8-pin round DIN RS-232 port to RS-423 to 8-pin round-DIN RS-232 and RS-423 port loopback cable (see FIGURE A-3). Both connectors are male.



Connect: First Connector	to	Second Connector
pin 3		pin 5
pin 5		pin 3
pin 6		pin 2
pin 2		pin 6
pin 7		pin 1

FIGURE A-3 8-Pin to 8-Pin Loopback Cable

Pin 8, Receive clock In (DD), remains unconnected.

8-Pin Loopback Plug

Use these wiring directions for male 8-pin round-DIN RS-232 and RS-423 Single port loopback plugs (see FIGURE A-4).

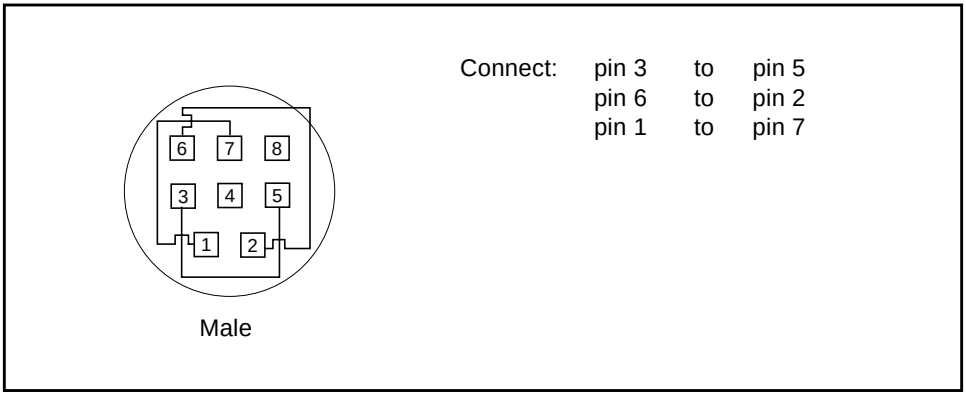


FIGURE A-4 8-Pin Loopback Plug

Pin 8, Receive Clock In (DD), remains unconnected.

25-pin Port A-to-Port B Loopback Plug

Use these wiring directions for a 25-pin Port A to Port B loopback plug for most systems (see FIGURE A-5).

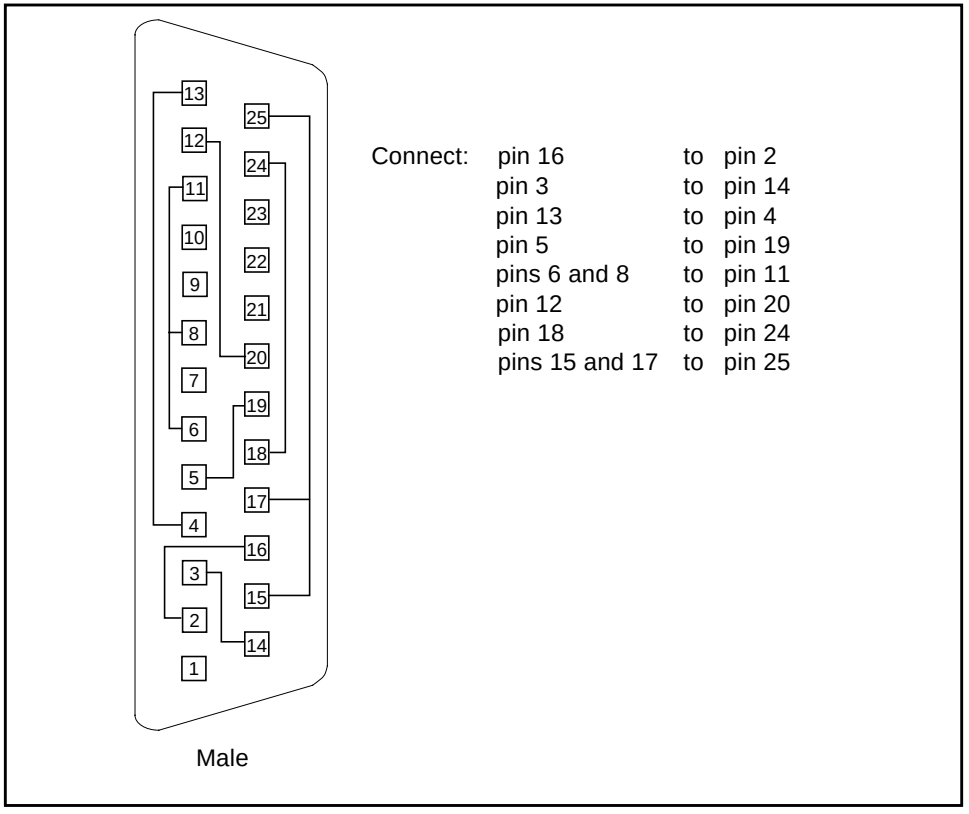
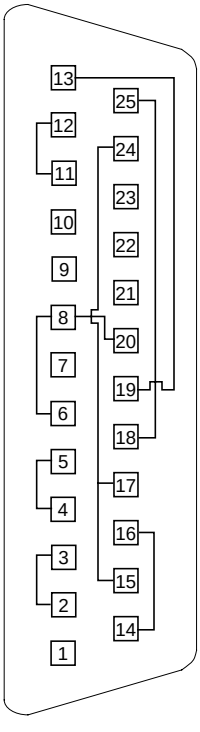


FIGURE A-5 Port A-to-Port B Loopback Plug

25-pin Port A-to-A Port B-to-B Loopback Plug

If your system has a single communication port to connect it to peripherals, use these wiring instructions for making a male 25-pin loopback plug for that communication port (see FIGURE A-6):

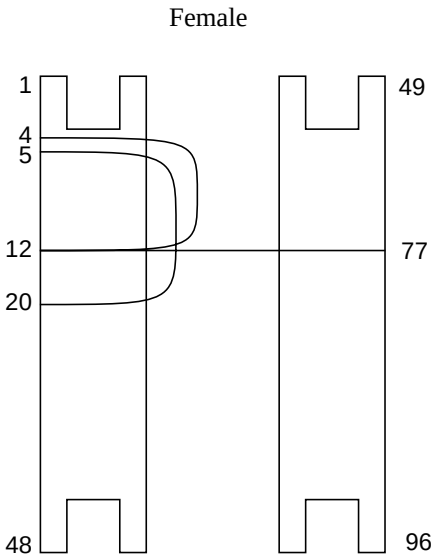


Connect:			
	pin 3	to	pin 2
	pin 5	to	pin 4
	pins 6 and 8	to	pin 20
	pin 12	to	pin 11
	pin 13	to	pin 19
	pin 16	to	pin 14
	pins 15 and 17	to	pin 24
	pin 25	to	pin 18

FIGURE A-6 Port A-to-A, Port B-to-B Loopback Plug

96-Pin Female Loopback Connector

This 96-pin connector (see FIGURE A-7) can be ordered from Sun Microsystems (Part Number 370-1366).



Materials:

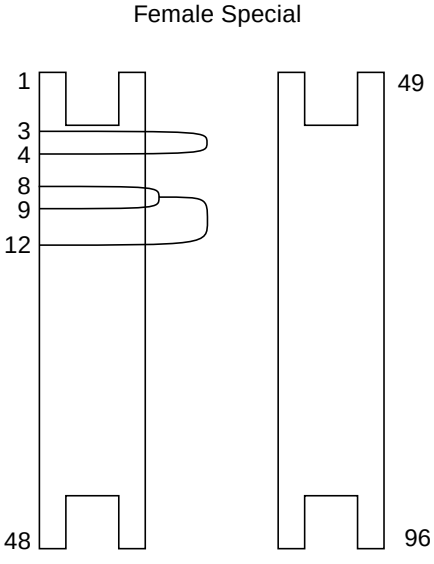
PCR-E96FA	(1)
PCS-E96LKPA	(1)
3751 Metal Plug (9563K42)	(1)
AWG28 Madison Cable UL/CSA Approved	(8” long)

Connect:			
	pins 4 and 12	to	pin 77
	pin 5	to	pin 20
	pin 6	to	pin 36
	pin 7	to	pin 44
	pin 10	to	pin 11
	pin 13	to	pin 16
	pin 14	to	pin 15
	pin 18	to	pin 19
	pin 21	to	pin 24
	pin 28	to	pin 60
	pin 29	to	pin 68
	pin 30	to	pin 34
	pin 37	to	pin 40
	pin 38	to	pin 39
	pin 42	to	pin 43
	pin 45	to	pin 48
	pin 46	to	pin 47
	pin 52	to	pin 78
	pin 53	to	pin 55
	pin 54	to	pin 75
	pin 58	to	pin 59
	pin 61	to	pin 64
	pin 62	to	pin 63
	pin 66	to	pin 67
	pin 69	to	pin 72
	pin 76	to	pin 79
	pin 82	to	pin 83
	pin 85	to	pin 88
	pin 86	to	pin 87
	pin 90	to	pin 91
	pin 93	to	pin 96
	pin 94	to	pin 95

FIGURE A-7 96-Pin Female Loopback Connector

96-Pin Female Special Loopback Connector

This 96-pin connector (see FIGURE A-8) can be ordered from Sun Microsystems (Part Number 370-1381).



Connect:

pin 3	to	pin 4
pin 5	to	pin 7
pins 8 and 9	to	pin 12
pin 10	to	pin 11
pin 13	to	pin 14
pin 15	to	pin 17
pins 18 and 19	to	pin 22
pin 20	to	pin 21
pin 27	to	pin 28
pin 29	to	pin 31
pins 32 and 33	to	pin 36
pin 34	to	pin 35
pin 37	to	pin 38
pin 39	to	pin 41
pins 42 and 43	to	pin 46
pin 44	to	pin 45
pin 51	to	pin 52
pin 53	to	pin 55
pins 56 and 57	to	pin 60
pin 58	to	pin 59
pin 61	to	pin 62
pin 63	to	pin 65
pins 66 and 67	to	pin 70
pin 68	to	pin 69
pin 75	to	pin 76
pin 77	to	pin 79
pins 80 and 81	to	pin 84
pin 82	to	pin 83
pin 85	to	pin 86
pin 87	to	pin 89
pins 90 and 91	to	pin 94
pin 92	to	pin 93

Materials:

PCR-E96FA	(1)
PCS-E96LKPA	(1)
9563K999 Cap	(1)
Madison Cable	(6” long)
(#28 SCSI UL/CSA Approved)	

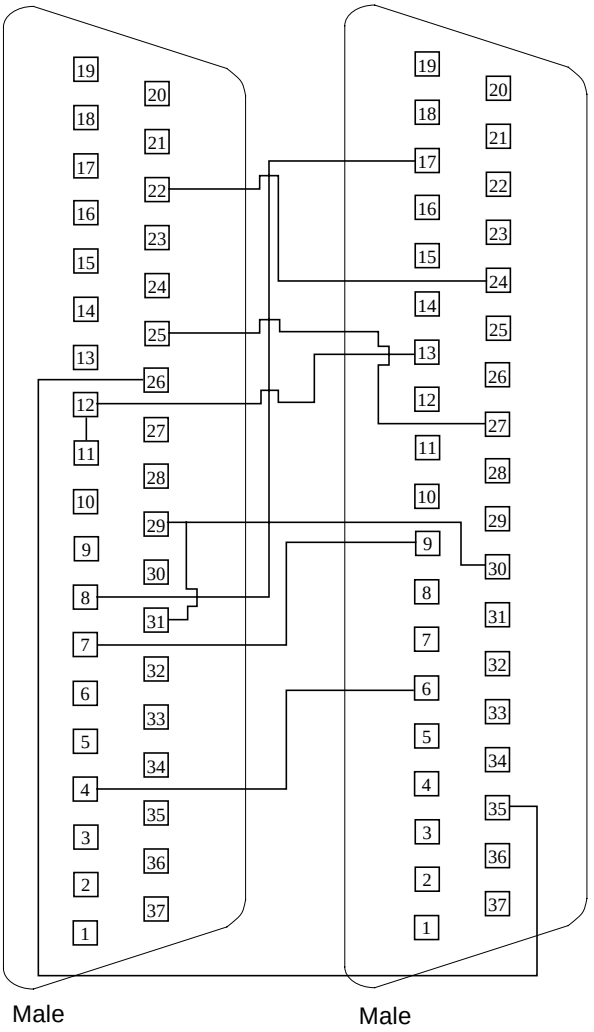
Open Contacts:

1, 2, 6,16, 23, 24, 25, 26, 30, 40, 47, 48, 49, 50, 54, 64, 71, 72, 73, 74, 78, 88, 95, 96

FIGURE A-8 96-Pin Female Special Loopback Connector

37-Pin RS-449 Loopback Cable

Use these wiring instructions for a loopback cable for two 37-pin RS-449 synchronous ports (see FIGURE A-9).



Connect:
- pin 4 to pin 6
- pin 7 to pin 9
- pin 8 to pin 17
- pins 11 and 12 to pin 13
- pin 22 to pin 24
- pin 25 to pin 27
- pin 26 to pin 35
- pins 29 and 31 to pin 30

FIGURE A-9 37-Pin RS-449 Loopback Cable

37-Pin RS-449 Loopback Plug

Use these wiring instructions for making a male 37-pin RS-449 loopback plug (see FIGURE A-10). This connector is also available from Sun (Part Number 530-1430).

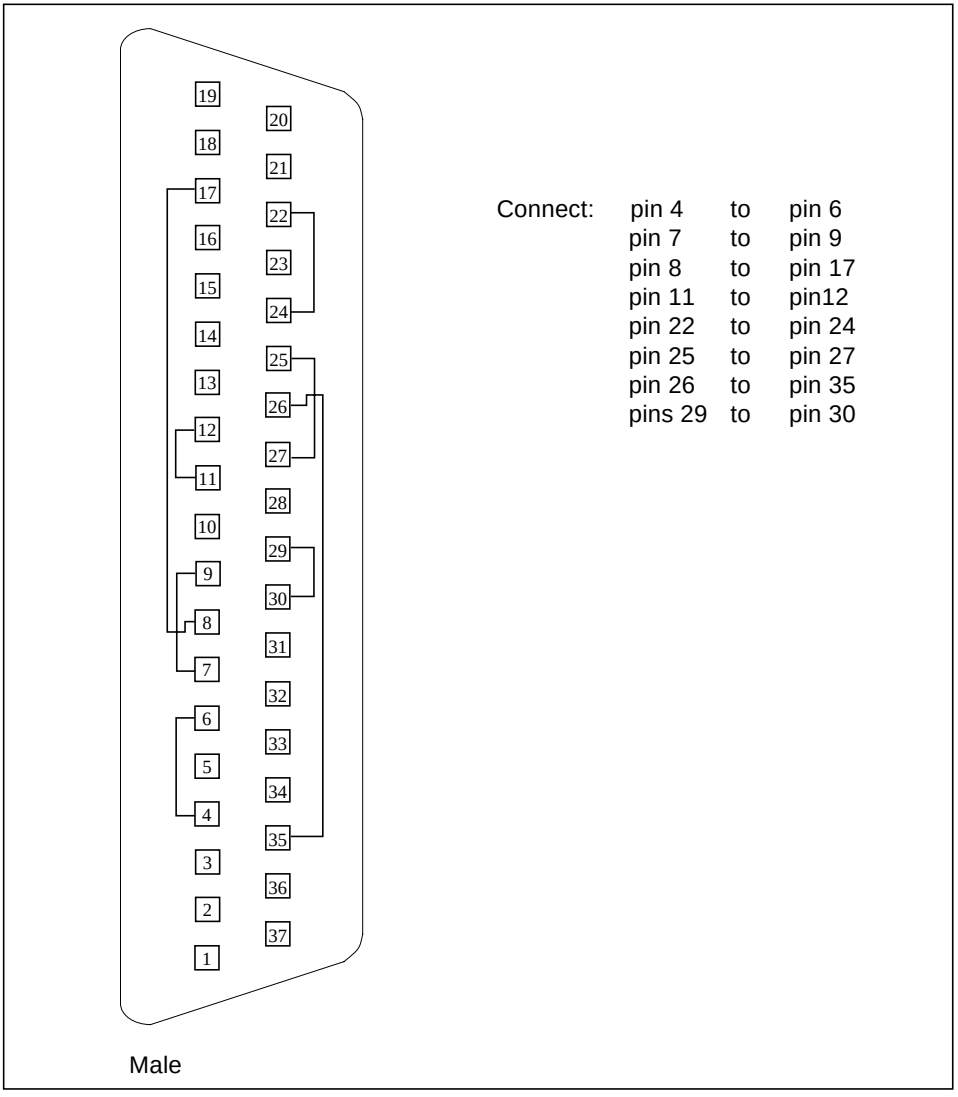


FIGURE A-10 37-Pin RS-449 Loopback Plug

9-pin Male Single-port Loopback Plug

Use these wiring instructions for male 9-pin RS-232 and RS-423 single-port loopback plugs (see FIGURE A-11):

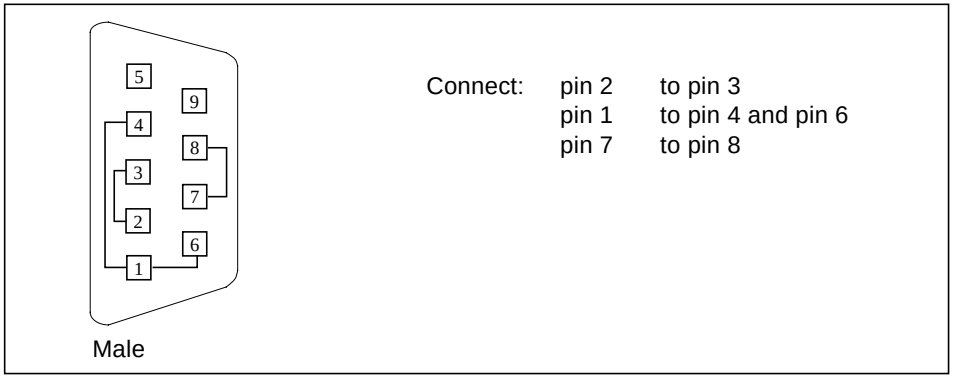


FIGURE A-11 9-Pin Male Single-port Loopback Plug

9-pin Female Single-port Loopback Plug

Use these wiring directions for female 9-pin RS-232 and RS-423 single-port loopback plugs (see FIGURE A-12):

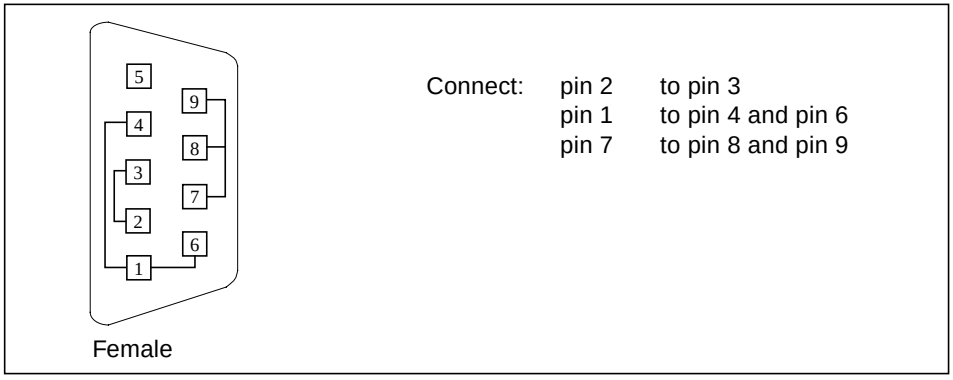


FIGURE A-12 9-Pin Female Single-port Loopback Plug

Note – Use this loopback plug with the `pcmciatest`.

9-Pin to 25-Pin Port-to-Port Loopback Cable

Use these wiring instructions for a 9-pin RS-232 and RS-423 port to 25-pin RS-232 and RS 423 port loopback cables (see FIGURE A-13). Both connectors are male.

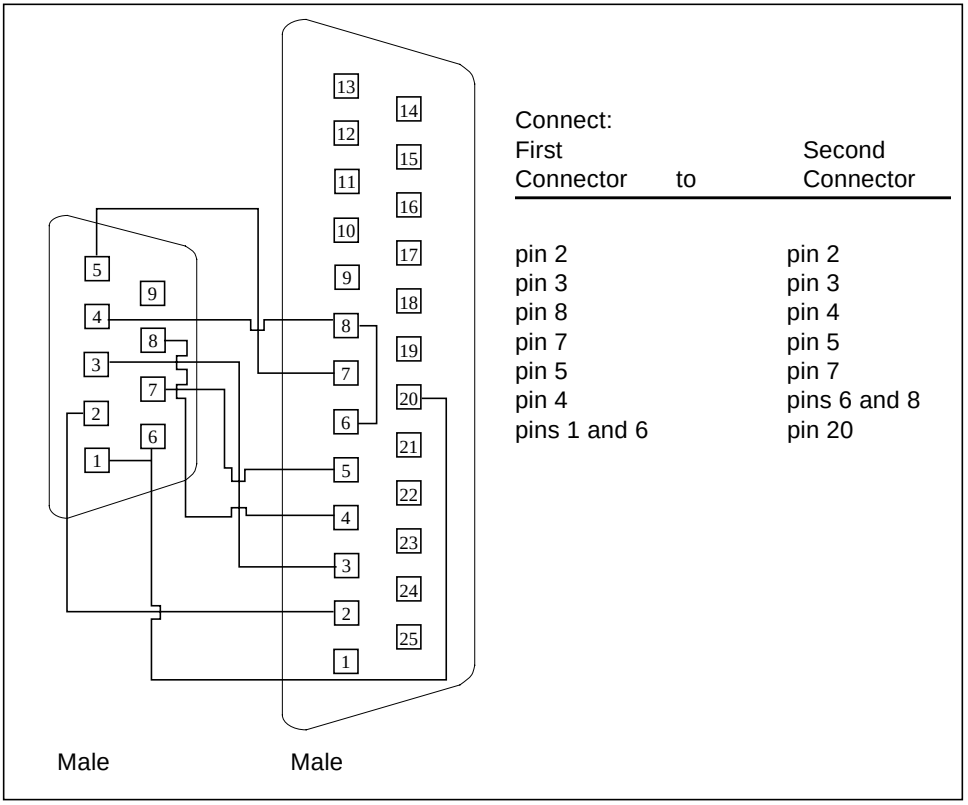
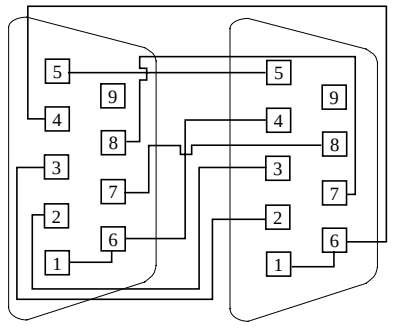


FIGURE A-13 9-Pin to 25-Pin Port-to-Port Loopback Cable

9-Pin to 9-Pin Port-to-Port Loopback Cable

Use these wiring instructions for 9-pin RS-232 and RS 423 port to 9-pin RS-232 and RS-423 port loopback cables (see FIGURE A-14). Both connectors are male.



Connect: First Connector	to	Second Connector
pins 1 and 6		pin 4
pin 2		pin 3
pin 3		pin 2
pin 4		pins 1 and 6
pin 5		pin 5
pin 7		pin 8
pin 8		pin 7

FIGURE A-14 9-Pin to 9-Pin Port-to-Port Loopback Cable

Please note that this cable has no Sun part number assigned to it.

NT to TE Loopback Cable

Using two standard RJ45 connectors, and connect pin1 to pin1, pin 2 to pin 2, and so on, for all pins. This loopback is a “straight-through” connection.

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