

# **Sun System Diagnostics Manual**

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## Introduction

The System Diagnostic (`sysdiag`) test system is a high-level diagnostic designed to test system hardware. It runs under UNIX<sup>†</sup> and is divided into two sections; the tests themselves, and the `sysdiag` menus used to select and configure the tests. The tests cover three major hardware resources; memory, secondary memory (disk and tape), and peripherals. By placing a heavy load on the system, `sysdiag` tests these resources under less-than-ideal conditions. Heavy loading uncovers problems that do not show up when the tests are run under a light or normal load.

### Conventions

To make things a little clearer, different fonts are used to identify text used in special ways. The fonts are roman, typewriter, **typewriter bold**, *italic*, and bold. They are used as follows:

#### Roman

Roman font is the standard for normal text, just as it appears here.

#### Typewriter

Typewriter font has two meanings, depending on where it appears. It may represent something that appears in the manual exactly as the computer displays it on the screen, or it may represent a program path/name.

#### Typewriter bold

**Typewriter bold** also has two meanings; when it is used in a section of dialogue, it represents something that you must type verbatim into the computer. It sometimes appears together with normal typewriter font: the computer output appears in typewriter, and what you must type appears in typewriter bold.

If **Typewriter bold** appears in a menu, it is used to highlight the aspect of the menu under discussion.

#### Italic

In addition to emphasising normal text, *italic font* is used in dialogue boxes to represent variables for which you or the computer must provide the exact details. For example:

---

<sup>†</sup> UNIX is a trademark of AT&T Bell Laboratories.

error: obs *nnnn*, exp *nnnn*

### **Bold**

**Bold font indicates that something deserves more attention than the surrounding text.**

## Coverage

Sysdiag can test the following hardware components (if they are installed correctly):

### **Sun-2 or Sun-3 Systems:**

- Xylogics disks — xy0, xy1, xy2 and xy3
- SCSI disks — sd0, sd1, sd2, and sd3
- SCSI ¼ in. tape drive — st0
- Archive ¼ in. tape drive — ar0
- ½ in. Magnetic tapes — mt0, mt1
- SKY FPP (Floating Point Processor) board
- Serial ports — a and b, 0 through 3, and 00 through 3F
- Data Communications ports — A0 through D3
- Color board
- Ethernet boards
- GP and GB (Graphics Processor and Buffer) boards *manufacturing test only*
- Physical memory
- Virtual memory

### **Sun-3 Systems:**

- FPA (Floating Point Accelerator) board
- MC68881 (Floating Point Coprocessor Chip)

## 1.1. Environment

The *sysdiag* system is run as a separate user under UNIX from the `/usr/diag/sysdiag` directory. The environment is set by the `.login`, `.cshrc`, and `.suntools` files in that directory. You can change the test environment by altering these files, or by altering the `sysdiag` shell script file.

Because of the heavy demand *sysdiag* places on system resources, the system may sometimes appear to be stopped, when it is only running very slowly. This effect is most pronounced on systems with only 1 megabyte of memory.



## Setting the Display

To use `sysdiag`, the UNIX environment variable `TERM` must reflect the terminal type used as the `sysdiag` console. If the variable isn't set correctly `sysdiag` will not work properly. To fix this, change `TERM` using the `setterm` command.

Before changing anything, see what display type UNIX is set to now. To do this, login the device (console or terminal) you plan to run `sysdiag` from (do not login as `sysdiag`!) and enter the following commands:

```
example% printenv
HOME=...
SHELL=...
PATH=...
TERM=terminal_type

more environment settings...
```

The `terminal_type` string what device UNIX thinks you are working from. The default setting for a user working from the bitmapped display is `sun`, a common setting for a user on a terminal is `tvi925` (a teletype terminal), `vt100` or `ansi` (a generic ansi terminal). If the `terminal_type` accurately describes the device you are using, don't change anything.

If you need to change the terminal type, log into the system on the device you plan to run `sysdiag` on, become root, and use `setterm` to change `terminal_type` to the device type you are using.

```
example login: root
Password: enter password

login messages are displayed

example# /usr/diag/sysdiag/setterm terminal_type
example# logout
example login:
```

The `/etc/termcap` file contains a list of all valid terminal types and their characteristics. In order to see the list of valid terminals, use the following command:

```
example% egrep "^.." /etc/termcap | more
```

A typical output line would look like this:

```
Mu|sun|Sun Microsystems Workstation console:\
```

Each line is divided up into pieces by vertical slashes (`|`). The last piece is a description of the terminal. The second piece is the name used to set `sysdiag` to look for that terminal (`terminal_type`). The `terminal_type` is usually `sun`, which

is the bitmapped display. Use this setting if you are working on the high-resolution display and workstation keyboard.

If you are using a terminal hooked to the Sun through its RS-232 ports, use the setting that most closely corresponds to the terminal you are using. If you can't find the setting for your terminal in the `termcap` file, try using `ansi`.

#### Caveats

This section describes some side effects of `sysdiag` that can cause problems. All of them can be avoided if you take proper precautions.

#### QIC-24

The 1/4" tape test has a number of configuration options. One of the options selects the QIC-24 tape format to write and read the tape with. Exercise extreme caution when testing a tape drive using the QIC-24 format. If you test a drive with the QIC-24 option and the drive does not support it, the SCSI bus may lock up. The only way to free up the system is to cycle the power and reboot. To avoid this, only test the drive using QIC-24 when you are certain the drive supports it. Read the tape test section in chapter 2 and appendix A for details.

#### Renamed files

Under certain circumstances, `sysdiag` will rename the files `/dev/sky` and `/etc/ttys` to `/dev/sky-SD` and `/etc/ttys-SD` respectively. Before it exits, `sysdiag` changes the files back to their proper names. If `sysdiag` terminates abnormally, however, one or both of the files may still have the wrong name. There are two ways to handle this problem if it occurs:

1. Login then logout as `sysdiag`. When `sysdiag` exits normally, it changes the files to their proper names.

```
example login: sysdiag
Password: enter password

login messages are displayed

main menu is displayed

Enter selection and press return: q
example# logout

example login:
```

2. Rename the files yourself. Become root (superuser) and use the `mv` command to rename the files.

```
example% su
Password: enter root password
example# mv /dev/sky-SD /dev/sky
example# mv /etc/ttys-SD /etc/ttys
example# exit
example%
```

## System Security

Because `sysdiag` has its own user ID with root permissions it should have a password installed. If you can log on as `sysdiag` without entering a password, install one. You can do this during the test phase of `sysdiag`. If you are running `sysdiag` on the bit-mapped display, run `passwd` in the console window, if you are running from the terminal, run it as soon as you get the UNIX prompt. Set `sysdiag`'s password by doing the following:

*These steps are done during sysdiag's test phase*

```
example# passwd
Changing password for sysdiag on example
New password: enter password
Retype new password: enter password again
example#
```

## Sysdiag Organization

When you login as `sysdiag`, its `.login` file starts up the `sysdiag` program, which in turn displays the main menu. If you select menu items 1,2 or 3, `sysdiag` starts `devtop`, `memtop`, `disktop`, and `tapetop`. These programs determine what devices the system is configured with, then starts one or more of the following tests:

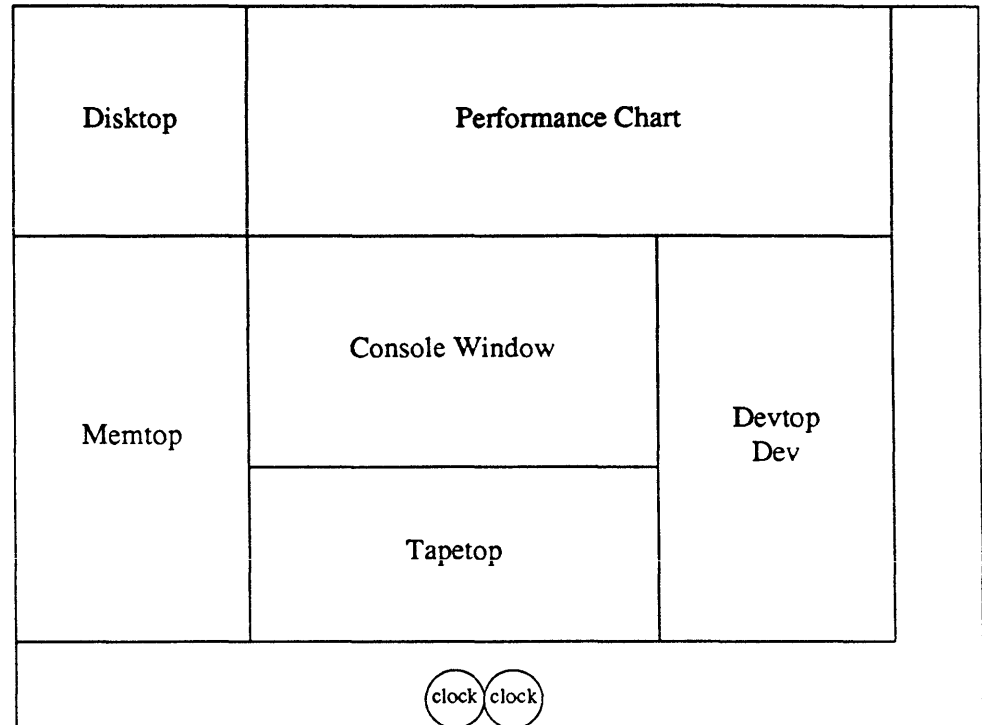
Sysdiag Tests			
<i>devtop/dev</i>	<i>disktop</i>	<i>memtop</i>	<i>tapetop</i>
devtest	disk	pmem	devtest
c160		vmem	
fpatest			
dcptest			
gpmtest			
reply			
mc68881			
softfp			
sptest			
ffpusr			

The `sysdiag` program uses the contents `/dev` directory to help determine the system hardware configuration. The files in `/dev` should accurately reflect the actual hardware on the system. The list of tests `sysdiag` runs is determined by the `/dev` directory, commands entered in the options menu, and use of the *Select Mode* option in the main menu.

The `sysdiag` program can be operated from a workstation or an alphanumeric terminal. The menus appear the same regardless of the type of display you use. When `sysdiag` is running tests, the display varies depending on whether you use a workstation or a terminal.

### Sysdiag with Sun Windows

When running tests on a Sun workstation, `sysdiag` creates a Sunwindows environment with one window each for primary memory, secondary memory (disk and tape), peripherals, a console window and a window containing performance charts. Here is a diagram showing the positions of `sysdiag` windows:



### Sysdiag with a Terminal

When run from an alphanumeric terminal, `sysdiag` cannot create separate windows for each test. It runs the same tests and creates the same files, but it displays its message output onto the terminal screen. As a result, the test message lines are mixed together.

### Log Files

The `sysdiag` program stores messages in *log files*. Log files are regular UNIX text files that live in the directory `/usr2/hostname/sysdiag.log`. `Sysdiag` generates several types of log files:

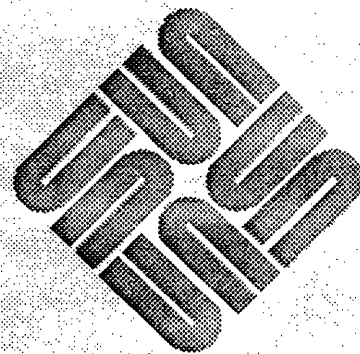
- Logtimes — A text file containing the starting and ending messages for `sysdiag`.
- Core files — Certain error conditions cause core dumps; `sysdiag` changes the name of the core file to `core.n`, where `n` starts at 1 and increments for each new core dump.
- *log script* files — Scripts place messages in text files with the name `log.script.n`, where *script* is the name of the script, and `n` is a number that starts at 1 and increments each time you run `sysdiag` without resetting log files.

- `log test` files — Test routines place messages in text files with the name `log.test.pid`, where *test* is the name of the test routine, and *pid* is the UNIX process number of the test. Every time it is run, `sysdiag` greets new test files.
- `log.sky` — The sky board test puts messages into files with the name `log.sky.n`, where *n* is a number that starts at 1 and increments each time you run `sysdiag` without resetting log files.

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## Using sysdiag

To run `sysdiag`, you must log on to the system as user `sysdiag`. If you are logged in presently, you must fully log out of the system. If you are using `sun-tools`, you must quit out of it first, then log out:

```
example% logout
```

```
example login:
```

Once you are out of the system, and have gotten the *login* prompt, login as `sysdiag`:

```
example login: sysdiag  
Password: enter password
```

```
login messages are displayed
```

```
main menu is displayed
```

## Main Menu

When you login, you will see the UNIX login messages, then the screen should clear and you see `sysdiag`'s main menu displayed:

```

SYSTEM DIAGNOSTICS                                sun microsystems
                                                Version 2.13

SELECTIONS:
-----
1 - Automatic mode of System Diagnostics.
2 - Verify mode of System Diagnostics.
3 - Select mode of System Diagnostics.

o - options for System Diagnostics.
s - set date and time.
d - display System Diagnostic log files.
r - reset System Diagnostic log files.

q - quit System Diagnostics and exit to the operating system.

Enter selection and press return:

```

1

Selecting 1 from the main menu starts `sysdiag`'s *Automatic mode*. This is the simplest way to test the system, and the method most users choose. If you choose *automatic mode*, `sysdiag` immediately enters its `suntools` environment (if you're on a workstation), and begins probing for devices to test. It starts all appropriate tests for devices it finds. `Sysdiag` runs each test continuously until the user halts it, it finds a hardware error, or there is a problem with `sysdiag` itself.

You can run `sysdiag` as long as you like. However, to obtain accurate test results, you should run the tests until they all have finished at least one complete pass.

If a test finds a hardware error, it displays a message, places an entry in the appropriate log file, and quits.

When the user stops the tests, `sysdiag` displays the log files, then asks if you want to reset them. If you answer `y` it erases all of the log files; if you answer `n`, they remain, and the next time you run `sysdiag` it generates a new set of log files with a higher number in the file names.

After taking care of the log files, `sysdiag` returns to the main menu.

2

Selecting 2 from the main menu starts `sysdiag`'s *Verify Mode*. In verify mode, `sysdiag` probes for the devices installed in the system. It lists the devices it found, then asks you if the list is correct. If you answer `n`, it asks you to correct the problem and returns to the main menu. If you answer `y` it continues, and performs all of the operations described in automatic mode.



If you have any doubt about the system configuration, or of the accuracy of the `/dev` directory, you should run `verify` mode.

3

Selecting 3 from the main menu starts `sysdiag`'s *Select Mode*. This mode starts the same way automatic mode does; `sysdiag` immediately enters its `suntools` environment (if you're on a workstation), and starts probing for devices to test. But instead of running a test for every device it finds, the program first prompts the user for the tests to run. This allows him select only the tests he wants to run.

After you have selected the tests `sysdiag` performs all of the operations described in automatic mode, using only the tests chosen. Note that `sysdiag` stresses the system more, providing more accurate test results, when many tests are run simultaneously.

o [*filename*]

Selecting o with no argument displays the *options menu*. It is described in the next section. If the o option is entered followed by a *filename*, `sysdiag` will immediately execute the *restore options* command (from the options menu). This method can be used as a shortcut, to configure `sysdiag` from the configuration information that has been previously stored in the file. See the *Options Menu* section for information on storing and saving `sysdiag` configurations.

s

Selecting s allows the user to *set date and time*. The user is shown the current system time, and is asked to enter a new time. If the time is correct, press return. Otherwise, enter the new time and date, then press return.

d

When d is selected, `sysdiag` *displays log files*. The program uses the UNIX `more` command to display all of the log files in the `/usr2/hostname/sysdiag.log` directory.

r

When r is selected in the main menu, `sysdiag` *resets log files*. The program removes all of the log files in the `/usr2/hostname/sysdiag.log` directory.

q

Selecting the q option causes `sysdiag` to *quit and return to the operating system*. `sysdiag` will exit, and you will be logged out of the system.

## Options Menu

Selecting `o` from the main menu displays the options menu:

```

SYSTEM DIAGNOSTIC OPTIONS
-----
i - intervention tests (disabled)
m - manufacturing tests (disabled)

f - file (save) current options.
o - use (restore) options previously filed.
h - help information for options.
q - quit option menu and return to the System Diagnostic selection menu.
Q - quit System Diagnostics and exit to the operating system.

Enter selection and press return:

```

`i`

If you enter `i` in the options menu, you enable the intervention tests. The options menu is redisplayed with additional intervention menu items. The intervention tests, and the new menu items, are described in a later section.

`m`

If you enter the `m` command in the options menu, you will start the *manufacturing tests* dialogue. This dialogue is described in a later section.

**CAUTION** The commands in the manufacturing test dialogue are designed for use during the manufacture of Sun hardware. Most of the tests require special fixtures, or provide functionality that is not useful to the customer.

`f filename`

Entering `f` allows the user to *file current options* that have been set in this session. The current configuration of `sysdiag` is saved in *filename*, the name of the file supplied by the user. These options can be used later to configure `sysdiag` during another session (see the `o` option, below).

`o filename`

The `o` option is used to configure `sysdiag` with the option setting saved in a configuration file named *filename*. The file is built using the `f` command. All of the configuration files are stored in the `/usr2/hostname/sysdiag.log` directory.

`h [menu_option]`

Entering `h` with no argument displays the *help information menu*. This menu allows you to display help messages which describe the different option commands. The help menu is described in a later section.

Entering `h` with a *menu\_option* argument displays the help message for the specified selection directly, without leaving the options menu. *Menu\_option* can be any of the selections listed in the options menu, including the help selection.

q

Entering `q` in the options menu causes the user to *return to the main menu*. This command is used to exit the options menu.

Q

Selecting the `Q` option causes `sysdiag` to *quit and return to the operating system*. `sysdiag` exits, and you are logged off the system.

## Intervention Test Configuration

The serial port test, tape test and data communication test are "intervention" tests; they require you to perform some actions before running them.

If you choose *intervention tests* in the options menu, `sysdiag` displays the prompt shown below.

```

Allow intervention tests? y for yes/n for no: y
*****
*   If testing tape drives, clean the tape   *
*   drive read/write heads and install a    *
*   scratch tape in each drive to be tested. *
*****
Press return to continue.

```

Choose `y` to enable the intervention tests, or choose `n` to disable them. If you answer `n`, the options menu is redisplayed.

If you answer `y`, the tape drive message (shown above) is displayed: when you hit return, `sysdiag` displays the options menu, showing additional intervention test selections.

The options menu has three new entries; `t` (tape), `s` (serial port), and `d` (data communication processor). These lines appear between the `i` and `m` options. The menu below shows the options menu with the intervention tests enabled. The new options are shown in bold face.

The tape drive test is enabled and set to its default configuration when the intervention tests are enabled. To prevent errors, you must load a scratch tape in the tape drive (see the Tape Test section for details). The data communications processor and serial port tests remain inactive until you select ports for them to test.

**WARNING:** any tape in the ¼ inch tape drive will have its data destroyed when the tape test runs. Make sure to insert a scratch tape in the drive if you enable the tape test.

## SYSTEM DIAGNOSTIC OPTIONS

```

i - intervention tests (enabled)
t - 1/4 inch tape drive options (short test, 4 tracks)
s - serial port test options, loop port(s) tty: (none)
d - data communications processor test options, loop port(s) dcp: (none)
m - manufacturing tests (disabled)

f - file (save) current options.
o - use (restore) options previously filed.
h - help information for options.
q - quit option menu and return to the System Diagnostic selection menu.
Q - quit System Diagnostics and exit to the operating system.

```

Enter selection and press return:

t

The *tape drive options* allows you to describe the type of tape drive you have on your system. The system prompts you for specific tape drive information. Details on the tape drive options command are in the Tape Drive section in this manual.

s

The *serial port options* selection allows you to select the serial ports you want to test on your system. The serial port test is disabled until you actually select the ports to test. Details for selecting the serial ports to test are in the Serial Port Options section of this manual.

d

The *data communications processor options* selection allows you to select the data communication ports you want to test on your system. This option is only visible if `sysdiag` finds a data communications processor on your system. The data communications processor test is disabled until you actually select the ports to test. Details for selecting the data communication ports to test are in the Data Communications Port Options section of this manual.

## Tape Drive Options

To change the configuration of the tape drive test, enter `t` in the options menu. This option is only visible after enabling the interventions test option. (see the options menu section for details). After entering `t`, you answer a series of questions. Your answers configure the tape drive, and select the test to run (long or short test). The example below shows every question `sysdiag` can ask. You may not be asked all of the questions in this example if you answer differently.

After describing the type of tape drive to `sysdiag`, insert a "scratch" tape (tape that can be overwritten) into the drive. It is a good idea to clean the tape read/write heads, so the tape test returns accurate results.

Use a good quality tape. If you are running the long test, use a tape that is 450 feet long. The test may write past the end of a tape that is too short, producing incorrect test results, or not test all of the tape drive tracks, if the tape is too long.

```
Enter selection and press return: t
Long 1/4 inch tape test? y for yes/n for no: y
1/4 inch tape drive tracks =? Enter 4 or 9: 9
Test "QIC-24"? y for yes/n for no: y
Is the tape controller an Emulex? y for yes/n for no: y
```

When you answer all of the questions, `sysdiag` re-displays the options menu, with the new tape options (shown in bold type) updated to reflect your choices. This is what the menu looks like after entering the choices above:

#### SYSTEM DIAGNOSTIC OPTIONS

```
i - intervention tests (enabled)
t - 1/4 inch tape drive options (long test, 9 tracks, QIC-24, Emulex ctrlr)
s - serial port test options, loop port(s) tty: (none)
d - data communications processor test options, loop port(s) dcp: (none)
m - manufacturing tests (disabled)

f - file (save) current options.
o - use (restore) options previously filed.
h - help information for options.
q - quit option menu and return to the System Diagnostic selection menu.
Q - quit System Diagnostics and exit to the operating system.
```

Enter selection and press return:

The new text in parenthesis (shown in bold in this menu) displays what options are currently selected. This example shows every tape option selected. The line can be interpreted as follows:

**WARNING:** If the `QIC-24` option is selected, and the tape drive does not support it, UNIX will display an error message on the console, and the system may hang. You may have to cycle the power and reboot the system in order to continue. To avoid this problem, read Appendix A to determine what options your tape drive supports before configuring this test.

- long test — the long tape test is enabled.
- short test — the short tape test is enabled.
- **9 tracks** — the machine has a 9 track tape drive.
- **4 tracks** — the machine has a 4 track tape drive.
- **QIC-24** — the machine's tape drive supports the `QIC-24` tape format
- **Emulex ctrlr** — the machine uses an Emulex tape controller board.

After you have configured the tape options, you can make other configuration changes, or enter `q` if you are finished. To turn off intervention tests, enter `i`, then answer `n(o)` to the prompt.

## Serial Port Options

To enable or reconfigure the serial port test, enter **s** in the options menu. This option is only visible after enabling the interventions test option (see the options menu section for details). After entering **s**, you are prompted for the names of the ports you want to test. Input the ports you want to test after the prompt, using the format described below. To disable the test, enter **none** or simply hit return without entering any ports.

There are two types of serial port tests; single port loopback and dual port loopback. To select a single port loopback, enter the ports you want to test (a or b for internal ports, 0 through 3 for SCSI ports, and 00 to 3F for Systech ports) individually. For a dual port loopback, enter a pair of ports connected by a dash (-). Separate each single and dual loopback entry with a space.

Serial port tests will not pass unless you install the correct loopback connectors on the serial ports you are testing. On every single port in the configuration line, attach a single port loopback plug, for every pair of ports connected by a dash, link them with a loopback cable.

```

Enter selection and press return: s

Select serial ports to test: 0 a-b

*****
*   Install the appropriate test fixture(s) on the   *
*   selected serial port(s) before starting tests.   *
*****

Press return to continue.

```

When you have selected the desired ports, **sysdiag** warns you to install the correct loopback connectors, then redisplay the options menu, with the options updated to reflect your choices.

## SYSTEM DIAGNOSTIC OPTIONS

```

-----
i - intervention tests (enabled)
t - 1/4 inch tape drive options (short test, 4 tracks)
s - serial port test options, loop port(s) tty: (0 a-b)
d - data communications processor test options, loop port(s) dcp: (none)
m - manufacturing tests (disabled)

f - file (save) current options.
o - use (restore) options previously filed.
h - help information for options.
q - quit option menu and return to the System Diagnostic selection menu.
Q - quit System Diagnostics and exit to the operating system.

```

Enter selection and press return:

The new serial port configuration is shown in bold face. All of the selected ports appear in the serial port menu entry.

After indicating the serial ports to test, install a loopback cable between every port pair, and a loopback plug on every single port you indicated. The above example requires a single port loopback plug for SCSI port 0, and a dual port

loopback cable between internal ports a and b.

## Data Communications Port Options

**NOTE** *The dcp test option is only displayed if there is a dcp board installed on the system. The program looks for a file named /usr/sunlink/dcp/dcpload to determine whether the dcp board is installed.*

To enable or reconfigure the data communications processor test, enter `d` in the options menu. This option is only visible after enabling the interventions test option (see the options menu section for details). After entering `d`, you are prompted for the the ports you want to test. Input the ports you want tested using the format described below. To disable the test, enter `none` or simply hit return, without entering any ports.

To select the ports to test, enter the port names separated by spaces. The data communication port names consist of a letter (a,b,c,or d) followed by a number (0 - 3). The letter indicates the data communications processor board, and the number shows the port on that board to check. If you only have one board on your system, it will be board a. Additional boards are lettered in increasing order. In this example, the first three ports on the first data communications processor board is being tested.

The data communication processor test will not pass unless you install the correct loopback connectors on the ports you are testing. On every port you enter in the configuration line, attach a loopback plug.

```

Enter selection and press return: d

Select data communications ports to test: a0 a1 a2

*****
*   Install the appropriate test fixture(s) on the   *
*   selected data communications port(s) before     *
*   starting tests.                                 *
*****

Press return to continue.

sysdiag: Initializing the data communications processor.

```

After indicating the data communication ports to test, install a loopback plug on every port you indicated. This example requires three loopback plugs for ports; one for port 0, 1 and 2 on board a.

When you have selected the desired ports, `sysdiag` displays the loopback connector warning, then redisplay the options menu, with the options updated to reflect your choices.

## SYSTEM DIAGNOSTIC OPTIONS

```

i - intervention tests (enabled)
t - 1/4 inch tape drive options (short test, 4 tracks)
s - serial port test options, loop port(s) tty: (none)
d - data communications processor test options, loop port(s) dcp: (a0 a1 a2)
m - manufacturing tests (disabled)

f - file (save) current options.
o - use (restore) options previously filed.
h - help information for options.
q - quit option menu and return to the selection menu.
Q - Quit System Diagnostics.

```

Enter selection and press return:

## Manufacturing Test Options

**CAUTION** Manufacturing tests are for use by manufacturing only. They require custom test jigs, and may interfere with other tests if you select conflicting options.

When you select manufacturing tests, the following interactive dialogue takes place:

```

Enter selection and press return: m

Allow special manufacturing tests? y for yes/n for no: y

Vmem wait time (in minutes). Enter 0, 30, 60, or 90: 90

Graphics processor? y for yes/n for no: y
Graphics buffer? y for yes/n for no: y

Serial port board(s)? Enter number [1-4] or n for none: 4
Board 0 ports to test? Enter 8, 14 or 16: 8
Board 1 ports to test? Enter 8, 14 or 16: 14
Board 2 ports to test? Enter 8, 14 or 16: 16
Board 3 ports to test? Enter 8, 14 or 16: 8

*****
*   Install the appropriate serial port board   *
*   loopback test device before starting tests. *
*****

Press return to continue.

```



The serial port board test uses a special test jig capable of connecting 8, 14 or 16 serial ports. After the selections have been entered, `sysdiag` redisplay the menu, showing the options that have been entered during the dialogue. The new options are displayed in bold face here:

#### SYSTEM DIAGNOSTIC OPTIONS

```

i - intervention tests (disabled)
m - manufacturing tests (enabled gp&b sp0-8 sp1-14 sp2-16 sp3-8 vmem wait= 90)

f - file (save) current options.
o - use (restore) options previously filed.
h - help information for options.
q - quit option menu and return to the System Diagnostic selection menu.
Q - quit System Diagnostics and exit to the operating system.

```

Enter selection and press return:

The new text in parenthesis, displayed on the manufacturing test selection, shows what options are currently selected. This example has every manufacturing option selected. The line can be interpreted as follows:

- **enabled** — manufacturing test is enabled.
- **gp&b** — both the graphics processor and graphic buffer are selected.
- **gp** — only the graphics processor is selected.
- **spboard# - #ofports** — one or more of the serial port board tests are selected. One entry per board. The number of ports can be 8,14,or 16.
- **vmem wait =delay** — how long to wait before rerunning the vmem test. delay can be 0, 30, 60, or 90 minutes.

#### Option Help Menu

When you select `h` from the options menu, `sysdiag` displays the the help menu. This menu has an entry for each of the major commands in the option menu. Each help menu entry has the same name as the option command it describes.

## OPTION HELP INFORMATION

```

*****
i - intervention tests.
t - 1/4 inch tape drive options.
s - serial port test options.
d - data communications processor test options.
m - manufacturing test options.

f - file (save) current options.
o - use (restore) options previously filed.
h - help information for options.
q - quit option help and return to the previous menu.
Q - quit System Diagnostics and exit to the operating system.
*****

```

Enter help selection and press return:

This menu contains an entry for every selection in the options menu. For information about a `sysdiag` option, enter the corresponding letter at the prompt. The menu will display a screenfull of text about the option. Hit return to go back to the help menu. From the help menu, use `q` to return to the options menu, or `Q` to exit `sysdiag`.

You can display a help message directly from the options menu. From the options menu, enter `h` followed by the help option letter. The corresponding help message is displayed immediately, without going through the help menu. After displaying the help message, the program redisplay the options menu.

## Exiting Sysdiag

The procedure for stopping `sysdiag` involves two steps; stopping the tests that are running (if any) and exiting from `sysdiag` itself.

## Stopping the `sysdiag` tests

The procedure for stopping the tests in progress varies whether `sysdiag` is running from a terminal or a workstation.

To halt it from a workstation:

1. First end any tests in progress. Enter `^C` (while holding down the `ctrl` key, press `C`) in each window that has a test running. Use the mouse to move from window to window.
2. Next, use the mouse to move to the gray background area and press the right hand mouse button to activate the root window menu. Select `EXIT`, and press the left button to confirm. If no gray area is visible, use `^D` (while holding down the `control` key, press `D`) to remove one of the test windows (but NOT the console window!).
3. Before returning to the main menu, `sysdiag` displays the log files, then asks if you want to reset them. Answer `y` if you want to throw away the

data in the log files, and `n` if you want to save it. It erases the log files (if you asked it to) and returns to the main menu.

4. When the main menu appears, enter your next selection (enter `q` to exit `sysdiag`).

From a terminal:

1. Enter the command `endt`. When the message:

```
endt: enter "exit" and press return to continue
```

appears, enter `exit`.

**NOTE** *The `endt` command takes quite a while to halt all of the tests, and can occasionally fail. Give `endt` a good length of time before giving up on it. If it appears that the command didn't kill all of the tests, run `endt` again. It nearly always runs correctly the second time.*

2. Before returning to the main menu, `sysdiag` displays the log files, then asks if you want to reset them. Answer `y` if you want to throw away the data in the log files, and `n` if you want to save it. It erases the log files (if you asked it to) and returns to the main menu.

If `sysdiag` terminates abnormally, you may have to reboot the system, and rerun `sysdiag` to make sure the special files `/dev/sky` and `/etc/ttys` are named correctly (see the caveats section for details).

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## Tests and Messages

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## Tests and Messages

This section describes the tests run by `sysdiag`. It contains descriptions of the tests themselves, and some of the more common messages that these tests might produce.

### 3.1. Tests

To check out the hardware, `sysdiag` uses one or more of the following tests:

- The test *disk* exercises the disk controller and drive. It writes two 1/2 MB files with random data, then reads and compares them. It selects the drive by issuing the UNIX command `df`, and using the first local drive listed.
- `sysdiag` tests physical memory with *pmem* and virtual memory with *vmem*.

#### *pmem*

locates parity errors, memory read errors, and addressing problems. It maps, then reads a page repeatedly throughout memory.

#### *vmem*

tests virtual memory by allocating, writing, and reading as much virtual memory as feasible. It leaves only enough for UNIX to operate and for device tests to load and execute.

If *vmem* decides it does not have enough virtual memory to run properly, it exits without testing, generates a proper ending message on the screen and in its log file, with a pass count of 0.

- `sysdiag` provides ten device tests; *devtest*, *ffpusr*, *gpmtest*, *c160*, *dcptest*, *reply*, *fpatest*, *mc68881*, *softfp*, and *sptest*. It decides whether to run *devtest* by scanning */dev* for testable devices, It runs *ffpusr* if it can find the SKY board by directly probing for it. It runs *gpmtest*, *sptest* and *dcptest* if they were enabled in the options menu.

#### *devtest*

tests local disks and tape drives using generic read and write routines. It only reads disks but it writes and reads tape drives. It starts by using the largest block size available (64k bytes), and when it gets near the end, where 64k is too big, it uses 512 byte blocks for the remainder.

#### *ffpusr*

tests the Sky FPP board by using it to perform calculations, then repeating the calculations in software and comparing the results. For more

The tape drive should have a scratch tape installed. Since it is an optional test, the tape is not tested unless you select intervention tests in the options menu (see the intervention tests section in this manual for details).

detail on this test, see the "SKY FFP Test Procedure".

#### *gpmtest*

*gpmtest* only runs if it is enabled from the options menu. The menu selection for *gpmtest* can only be chosen after enabling the manufacturing tests (see the manufacturing test section for details). *gpmtest* tests the graphics processor and graphics buffer, if they are installed.

Loopback connectors must be installed on the serial ports to be tested. Since it is an optional test, the serial port test does not run unless you enable it from the intervention tests in the options menu (see the intervention tests section in this manual for details).

#### *sptest*

The *sptest* only runs if it is enabled from the options menu. The menu selection for *sptest*, *s*, can only be chosen after enabling the intervention tests (see the intervention test section for details). *sptest* tests the system's serial ports.

#### *c160*

This test checks the system's color board (if it is installed).

#### *dcptest*

This test checks the data communications processor ports installed on the system. It only runs if it is enabled from the options menu. The menu selection for *dcptest* can only be chosen after enabling the intervention tests (see the intervention test section for details).

Loopback connectors must be installed on the data communication ports to be tested. Since it is an optional test, the data communications processor test does not run unless you enable it from the intervention tests in the options menu (see the intervention tests section in this manual for details).

#### *reply*

This test checks the ethernet boards in the system.

#### *fpatest*

This test checks the floating point accelerator board (on Sun-3 systems only).

#### *mc68881*

This test checks the floating point chip (on Sun-3 systems only).

#### *softfp*

This test checks the software floating point routines (on Sun-3 systems only).

## 3.2. Messages

Most *sysdiag* messages fall into one of three categories: routine messages from tests, messages from UNIX and error messages from tests.

### *sysdiag* Messages

The tests generate routine messages in their window (or on the screen) each time they start and stop, and they generate error messages when they encounter an error. They place copies of all these messages in their log files.

When *sysdiag* generates a message, it appends the name of the test that generated the message to it. Messages that appear on the screen without a test name prefix are probably from somewhere besides *sysdiag*. Sometimes, *sysdiag* generates a message and appends a UNIX perror message to it.

*sysdiag* generates routine messages when it starts and stops a test and when it finds or fails to find a device. It generates an error message when it encounters an error. It displays messages in the appropriate window, and it places copies of them in the appropriate *log* file.

## UNIX Messages

If UNIX generates a message, it normally appears in the console window if the windows environment is active, and it appears mixed with the other messages if you are using a terminal. The three most common UNIX messages are:

```
NOTICE: Window display lock broken after time limit
was exceeded by process n
WARNING: You may see display garbage because of
this action.
```

or

```
nd: disk server not responding; still trying
nd: disk server OK
```

or

```
mt: unknown command: retension
```

1. The first message occurs when the system is overloaded (a condition that `sysdiag` creates on purpose!).
2. The second occurs when the disk server is busy.
3. The third only occurs when `sysdiag` tries to `retension` a tape, if the system doesn't support the `retension` command.

# A

---

## Tape Drive Hardware

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## Tape Drive Hardware

Use this appendix to identify the type of tape drive hardware on your Sun. You need this information to correctly configure the tape test (see the *Tape Test* section in chapter 2 for details).

If the tape test is not configured properly, the SCSI bus can hang, freezing up the system. If this happens, you may have to cycle the system's power and reboot to start it up again.

### A.1. Parameters

Here are the parameters you will have to determine about your tape drive in order to test it correctly:

- **Number of Tape Tracks** — does your tape drive have 4 or 9 tape tracks?
- **Tape Formats Supported** — does your tape drive support the QIC-24 tape format?
- **Tape Controller Board** — does your tape drive use the Emulex tape controller board?

If you know the answers to these questions, go no further. You have the information you need to configure the tape test. You also are finished if you do not plan to test the tape drive at all, or are using the the default (short test, 4 tracks) configuration. Otherwise, proceed to the next section.

### A.2. Identifying Your Tape Drive

There are two types of 1/4 inch tape drives on Sun systems; the **8 - 1/4 Drive** and the **5 - 1/4 Drive** (the numbers refer to the width of the drive). Tape cartridges are inserted in these drives differently. With the 8 - 1/4 drive, the cartridge is inserted by its wide end; with the 5 - 1/4 drive, the cartridge is inserted by its narrow end. Both drives are represented in the figure below:

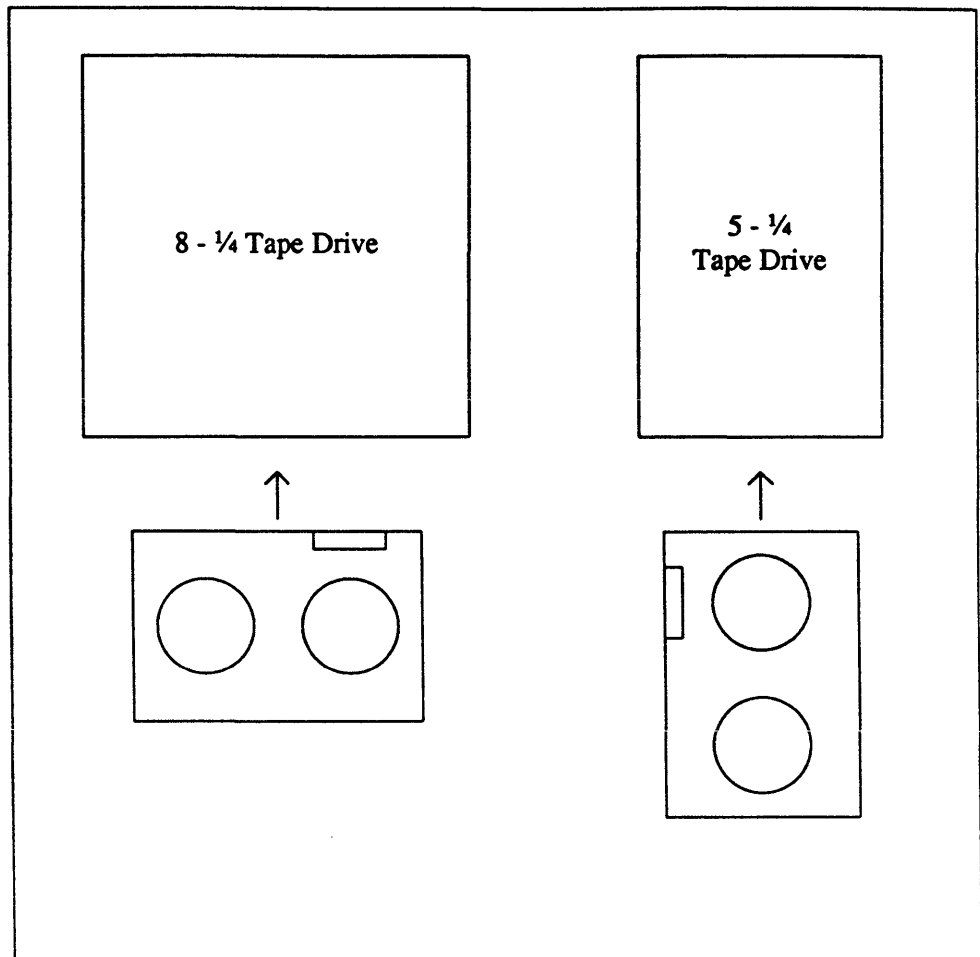


Figure A-1 5 - 1/4 and 8 - 1/4 inch tape drives

The 5 - 1/4 drives support the new features; they are 9 track drives that support QIC-24 format, and are the only drives that can have the Emulex tape controller board. See the sections below for details.

#### Number of Tracks

All tape drives in Sun machines have either 4 or 9 tracks. A machine with 9 tracks can record more information on a given tape than a 4 track machine can. All Sun-2/120's, Sun-1's and fatboxes (archive tape drives in a black metal box) are 4 track drives. All other drives are 9 track.

#### Tape Formats

QIC-24 is a data format used on 1/4 inch tapes. Sun systems support two 1/4 inch tape formats, QIC-11 and QIC-24. All 1/4 inch tape drives support QIC-11, and sysdiag knows that. QIC-24 is a newer more reliable format which is supported on Sun's newer machines. All of the drives that can use QIC-24 also support QIC-11.

Which tape drives support QIC-24? All Sun systems shipped after June 1, 1985 support it. This includes the following:

- All 5 - ¼ tape drives (see previous section for details)
- All drives in Sun shoeboxes.
- All Sun-2/120's shipped after 6/1/85

The drives in the older systems (cipher drives, for example) only support QIC-11.

## Controller Board

Every ¼ inch tape drive has a tape controller board driving it. This is a small printed circuit board located inside the workstation. To tell if you have an Emulex controller board, insert a tape into your system. If the tape is running off an Emulex controller, the tape automatically rewinds, and drive's LED stays on continuously. In any other controller, the LED does not light, and the tape remains still.

---

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