Platform Notes:
Using `luxadm` Software

Solaris™ 2.6 Hardware: 5/98

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Preface

Platform Notes: Using luxadm Software contains information about the luxadm administrative program for the Sun™ StorEdge™A5000 and SPARCstorage™ disk arrays. These instructions are designed for an experienced system administrator.

Note – The Sun StorEdge A5000 disk array was formerly named the Sun Enterprise Network Array™.

Using UNIX Commands

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

See one or more of the following for this information:

- *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

TABLE P-3   Related Documentation

Title	Part Number
Sun StorEdge A5000 Installation and Service Manual	802-7573

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-4   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

The `docs.sun.com` web site enables you to access Sun technical documentation on the World Wide Web. You can browse the `docs.sun.com` archive or search for a specific book title or subject at `http://docs.sun.com.`

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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.

Using the `luxadm` Command

The `luxadm` program is an administrative command that manages both the StorEdge A5000 and SPARCstorage Array subsystems. `luxadm` performs a variety of control and query tasks, depending on the command line arguments and options used.

The command line must contain a subcommand.

```
luxadm [options] subcommand [options] {enclosure[,dev]... |
pathname...}
```

You may also enter options, usually at least one enclosure name or pathname, and other parameters depending on the subcommand.You specify a device by entering a physical path name, or a logical path name. See "Addressing" on page 2".

You only need to enter as many characters as are required to uniquely identify a subcommand. For example, to run the `display` subcommand on an enclosure named `box1`, you could enter:

```
#luxadm disp box1
```

Addressing

Addressing a StorEdge A5000 Disk Array

Pathname

Either a complete physical path name or a complete logical path name may be entered to specify the device or controller. A typical physical path name for a StorEdge A5000 device is:

```
/devices/sbus@1f,0/SUNW,socal@1,0/sf@0,0/
ssd@w2200002037000f96,0:a,raw
```

or

```
/devices/io-unit@f,e0200000/sbi@0,0/SUNW,socal@2,0/sf@0,0/
ssd@34,0:a,raw
```

For all StorEdge A5000 disk array interface boards (IBs) on the system, a logical link to the physical paths is kept in the directory /dev/es. An example of a logical link is /dev/es/ses0.

Enclosure

For the StorEdge A5000 disk array, the WWN may be used in place of the pathname to select a device or interface board. The WWN is a unique 16 digit hexadecimal value that specifies either the port used to access the device or the device itself. A typical WWN value is: 2200002037000f96.

Or you can specify the name of the StorEdge A5000 enclosure and an identifier for the particular device in the enclosure. A device in a StorEdge A5000 enclosure is identified as follows:

```
BOX_NAME,[f|r]slot_number
```

where:

TABLE 1-1   Addressing a StorEdge A5000 by Enclosure Name

Options/Arguments	Description
BOX_NAME	is the name of the StorEdge A5000 enclosure, as specified by the enclosure_name subcommand
f or r	specifies the front or rear slots in the StorEdge A5000 enclosure
slot_number	is the slot number in the StorEdge A5000 enclosure, 0-6 or 0-10

When addressing the StorEdge A5000 subsystem the pathname or enclosure name specifies the StorEdge A5000 IB.

Addressing a SPARCstorage Array

When addressing the SPARCstorage Array, the pathname specifies the SPARCstorage Array controller or a disk in the SPARCstorage Array.   The controller name is specified by its physical name, for example

```
/devices/.../.../SUNW,soc@3,0/SUNW,pln@axxxxxxx,xxxxxxxx:ctlr
```

or by a name of the form cN, where N is the logical controller number. luxadm uses the cN name to find an entry in the /dev/rdsk directory of a disk that is attached to the SPARCstorage Array controller. The /dev/rdsk entry is then used to determine the physical name of the SPARCstorage Array controller. A disk in the SPARCstorage Array is specified by its logical or physical device name, for example,

```
/dev/rdsk/c1t0d0s2
```

or

```
/devices/.../.../SUNW,soc@3,0/SUNW,pln@axxxxxxx,xxxxxxxx/
ssd@0,0:c,raw
```

See the disks(1M) and devlinks(1M) manpages for more information on logical names for disks and subsystems.

Addressing a SPARCstorage RSM Tray

When addressing the SPARCstorage RSM tray, the pathname specifies the controller or a disk in the SPARCstorage RSM tray. The controller name is specified by its physical name, for example

```
/devices/sbus@1f,0/QLGC,isp@1,10000/sd@8,0:c,raw
```

or by a name of the form cN, where N is the logical controller number. luxadm uses the cN name to find an entry in the /dev/rdsk directory of a disk that is attached to the SPARCstorage Array controller. The /dev/rdsk entry is then used to determine the physical name of the controller. A disk in the SPARCstorage RSM tray is specified by its logical or physical device name, for example,

```
/dev/rdsk/c2t8d0s2
```

See the disks(1M) and devlinks(1M) manpages for more information on logical names for disks and subsystems.

Subcommand Support Matrix

The following table lists the `luxadm` subcommands that are supported on the StorEdge A5000, the SPARCstorage Array, and SPARCstorage RSM trays. Subcommands that are preceded by -e are expert mode subcommands and should only be used by qualified system personnel.

TABLE 1-2   Subcommand Support Matrix

Subcommand	StorEdge A5000	SPARCstorage Array	Sparcstorage RSM	page
alarm_off	—	yes	yes	page 22
alarm_on	—	yes	yes	page 23
alarm_set	—	yes	yes	page 23
-e bus_getstate	yes	yes	yes	page 59
-e bus_quiesce	yes	yes	yes	page 59
-e bus_reset	yes	yes	yes	page 59
-e bus_resetall	yes	yes	yes	page 59
-e bus_unquiesce	yes	yes	yes	page 59
-e dev_getstate	yes	yes	yes	page 59
-e dev_reset	yes	yes	yes	page 59
display	yes	yes	—	page 12
download	yes	yes	—	page 18
enclosure_name	yes	—	—	page 24
env_display	—	—	yes	page 21
fast_write	—	yes	—	page 30
fc_s_download	—	yes	—	page 19
fcal_s_download	yes	—	—	page 20
-e forcelip	yes	—	—	page 59
inquiry	yes	yes	yes	page 15
insert_device	yes	—	yes	page 36
led	yes	yes	yes	page 8
led_blink	yes	—	—	page 8

TABLE 1-2   Subcommand Support Matrix *(Continued)*

Subcommand	StorEdge A5000	SPARCstorage Array	Sparcstorage RSM	page
led_off	yes	yes	—	page 9
led_on	—	yes	yes	page 10
nvram_data	—	yes	—	page 31
-e offline	yes	yes	—	page 59
-e online	yes	yes	—	page 59
perf_statistics	—	yes	—	page 25
power_off	yes	yes	—	page 25
power_on	yes	—	—	page 26
probe	yes	—	—	page 11
purge	—	yes	—	page 31
-e rdls	yes	—	—	page 59
release	yes	yes	yes	page 27
remove_device	yes	—	yes	page 34
replace_device	—	—	yes	page 37
reserve	yes	yes	—	page 27
set_boot_dev	n/a	n/a	n/a	page 28
start	—	yes	—	page 28
stop	—	yes	—	page 29
sync_cache	—	yes	—	page 32

`luxadm` Subcommands

This chapter discusses the `luxadm` subcommands and is divided into the following sections:

- Disk LEDs—page 7
- Displaying—page 10
- Downloading—page 17
- Enclosure Services Card—page 21
- Enclosure and Disk Operations—page 24
- NVRAM—page 30
- Removing, Inserting, and Replacing—page 33

Disk LEDs

Displaying the Current State of a Disk LED

Use the `led` subcommand to display the current state of the yellow LED associated with a specific disk.

StorEdge A5000	SPARCstorage Array	SPARCstorage RSM
Supported	Supported	Supported

```
luxadm [ -v ] led { enclosure,dev... | pathname...}
```

TABLE 2-1   led Options and Arguments

Option/Argument	Description
enclosure	is the enclosure name of a StorEdge A5000 disk array[1].
dev	is the name of a specific disk in an enclosure[1].
pathname	is the physical or logical path name of a specific disk in an array[1].

[1]See "Addressing" on page 2.

Example:

```
# luxadm led /devices/sbus@3,0/SUNW,socal@0,0/sf@0,0/
ssd@w21000020370412ec,0:c,raw
LED state is OFF for device in location: front,slot 0
#
```

Setting a Disk LED to the Blink Mode

Use the led_blink subcommand to start blinking (flashing) the yellow LED associated with a specific disk. The led_blink subcommand only applies to subsystems that support this functionality.

StorEdge A5000	SPARCstorage Array	SPARCstorage RSM
Supported	Not Supported	Not Supported

```
luxadm [ -v ] led_blink { enclosure,dev... | pathname...}
```

TABLE 2-2   led_blink Options and Arguments

Option/Argument	Description
enclosure	is the enclosure name of a StorEdge A5000 disk array[1].
dev	is the name of a specific disk in an enclosure[1].
pathname	is the physical or logical path name of a specific disk in an array[1].

[1] See "Addressing" on page 2.

Example:

```
# luxadm led_blink /devices/sbus@3,0/SUNW,socal@0,0/sf@0,0/
ssd@w21000020370412ec,0:c,raw
LED state is BLINKING for device in location: front,slot 0
#
```

Turning Off a Disk LED

Use the led_off subcommand to turn off the yellow LED associated with a specific disk.

StorEdge A5000	SPARCstorage Array	SPARCstorage RSM
Supported	Supported	Supported

```
luxadm [ -v ] led_off { enclosure,dev... | pathname...}
```

TABLE 2-3 led_off Options and Arguments

Option/Argument	Description
enclosure	is the enclosure name of a StorEdge A5000 disk array[1].
dev	is the name of a specific disk in an enclosure[1].
pathname	is the physical or logical path name of a specific disk in an array[1].

[1] See "Addressing" on page 2.

Note – On a StorEdge A5000 disk array this may or may not cause the yellow LED to turn off or stop blinking depending on the state of the StorEdge A5000 disk array. Refer to *StorEdge A5000 Installation and Service Manual* for details.

Example:

```
# luxadm led_off /devices/sbus@3,0/SUNW,socal@0,0/sf@0,0/
ssd@w21000020370412ec,0:c,raw
LED state is OFF for device in location: front,slot 0
#
```

Turning On a Disk LED

Use the led_on subcommand to turn on the yellow LED associated with a specific disk.

StorEdge A5000	SPARCstorage Array	SPARCstorage RSM
Not Supported	Supported	Supported

```
luxadm [ -v ] led_on pathname
```

TABLE 2-4   led_on Options and Arguments

Option/Argument	Description
dev	is the name of a specific disk in an enclosure[1].
pathname	is the physical or logical path name of a specific disk in an array[1].

[1] See "Addressing" on page 2.

Displaying

Probing for StorEdge A5000 Disk Arrays

Use the probe subcommand to display information about all attached StorEdge A5000 disk arrays. Information displayed includes the logical pathnames, the WWNs, and the enclosure names.

StorEdge A5000	SPARCstorage Array	SPARCstorage RSM
Supported	Not Supported	Not Supported

```
luxadm [ -v ] probe [-p]
```

TABLE 2-5   `probe` Options

Option	Description
-p	also displays the physical pathname.

Example:

```
# luxadm probe
Found
SENA Name:macs1   Node WWN:1234123412341234
  Logical Path:/dev/es/ses0
  Logical Path:/dev/es/ses1
#
```

Example:

```
# luxadm probe -p
Found
SENA               Name:macs1   Node WWN:5080020000000598
  Logical Path:/dev/es/ses0
  Physical Path:/devices/sbus@1f,0/SUNW,socal@0,0/sf@1,0/
ses@w5080020000000599,0:0
  Logical Path:/dev/es/ses1
  Physical Path:/devices/sbus@1f,0/SUNW,socal@0,0/sf@1,0/
ses@w508002000000059a,0:0
  Logical Path:/dev/es/ses2
  Physical Path:/devices/sbus@1f,0/SUNW,socal@0,0/sf@1,0/
ses@w5080020000000599,0:0
  Logical Path:/dev/es/ses3
  Physical Path:/devices/sbus@1f,0/SUNW,socal@0,0/sf@1,0/
ses@w508002000000059a,0:0
#
```

Displaying Enclosure or Device Specific Data

Use the `display` subcommand to display enclosure specific or device specific data.

Enclosure data consists of enclosure environmental sense information and status for all subsystem devices including disks. Device data consists of inquiry, capacity, and configuration information.

StorEdge A5000	SPARCstorage Array	SPARCstorage RSM
Supported	Supported	Not Supported

```
luxadm [ -v ] display enclosure[,dev]... | pathname...
```

TABLE 2-6   `display` Options and Arguments

Option/Argument	Description
-v	mode sense data is also displayed
enclosure	is the enclosure name of a StorEdge A5000[1].
dev	is the name of a specific disk in an enclosure[1].
pathname	is the physical or logical path name of a StorEdge A5000, SPARCstorage Array, or a specific disk in an array[1].
-p	displays performance information for the specified device or subsystem
-r	displays error information for the specified device or subsystem

[1]See "Addressing" on page 2.

Example:

```
# luxadm display macs1
                   (luxadm version: 1.36 98/03/10)
                               SENA
                            DISK STATUS
SLOT    FRONT DISKS       (Node WWN)        REAR DISKS         (Node WWN)
0      On (O.K.)        2000002037049dfa    Not Installed
1      On (O.K.)        2000002037070608    On (O.K.)         200000203704a9e1
2      On (O.K.)        2000002037070498    On (O.K.)         200000203704a285
3      On (O.K.)        2000002037049f31    On (O.K.)         200000203704a252
4      On (O.K.)        20000020370705e1    On (O.K.)         2000002037049d61
5      On (O.K.)        2000002037049b32    On (O.K.)         200000203704a8f1
6      On (O.K.)        2000002037049987    On (O.K.)         200000203704a9de
                            SUBSYSTEM STATUS
FW Revision:1.05   Box ID:0   Node WWN:5080020000000598   Enclosure Name:macs1
Power Supplies (0,2 in front, 1 in rear)
   0 O.K.(rev.-02)1 O.K.(rev.-02)2 O.K.(rev.-02)
Fans (0 in front, 1 in rear)
   0 O.K.(rev.-05)1 O.K.(rev.-00)
ESI Interface board(IB) (A top, B bottom)
   A: O.K.(rev.-04)
   GBIC module (1 on left, 0 on right in IB)
   0 O.K.(rev.-05)1 O.K. (rev.-05): Not Installed

   B: O.K.(rev.-04)
   GBIC module (1 on left, 0 on right in IB)
   0 O.K.(rev.-05)1 O.K. (rev.-05): Not Installed

Disk backplane (0 in front, 1 in rear)
   Front Backplane: O.K.(rev.-05)
     Temperature sensors (on front backplane)
     0:42°C 1:42°C 2:40°C 3:39°C 4:40°C 5:42°C
     6:43°C  (All temperatures are NORMAL.)
   Rear Backplane:  O.K.(rev.-05)
     Temperature sensors (on rear backplane)
     0:37°C 1:37°C 2:39°C 3:39°C 4:39°C 5:40°C
     6:42°C  (All temperatures are NORMAL.)
Interconnect assembly
   O.K.(rev.-03)
Loop  configuration
   Loop A is configured as a single loop.
   Loop B is configured as a single loop.
Language       USA English
#
```

Example:

```
# luxadm display -r macs1

                     (luxadm version: 1.36 98/03/10)
            SENA
   Information for FC Loop on port 0 of FC100/S Host Adapter
   at path: /devices/sbus@1f,0/SUNW,socal@0,0:0
Version Resets  Req_Q_Intrpts  Qfulls Requests Sol_Resps Unsol_Resps Lips
  1       0          0            0       0         0           0       2
Els_sent  Els_rcvd  Abts      Abts_ok Offlines Onlines Online_loops
  0          0       18         18       4        0         5
   Information from sf driver:
Version  Lip_count  Lip_fail Alloc_fail  #_cmds Throttle_limit  Pool_size
  1        0           0         0         0       1024            1
   TARGET ERROR INFORMATION:
AL_PA  Els_fail Timouts Abts_fail Tsk_m_fail  Data_ro_mis Dl_len_mis Logouts
 1        0       5        0         0            0           0        0
 d2       0       2        0         0            0           0        0
 ef       0       3        0         0            0           0        0
 e8       0       0        0         0            0           0        0
 e4       0       0        0         0            0           0        0
 e2       0       2        0         0            0           0        0
 e1       0       2        0         0            0           0        0
 e0       0       0        0         0            0           0        0
 dc       0       0        0         0            0           0        0
 b5       0       0        0         0            0           0        0
 cc       0       0        0         0            0           0        0
 cb       0       0        0         0            0           0        0
 ca       0       0        0         0            0           0        0
 c9       0       0        0         0            0           0        0
 c7       0       0        0         0            0           0        0
 c6       0       0        0         0            0           0        0
```

Displaying `inquiry` Information

Use the `inquiry` subcommand to display `inquiry` information for a specific disk.

StorEdge A5000	SPARCstorage Array	SPARCstorage RSM
Supported	Supported	Supported

```
luxadm [ -v ] inquiry { enclosure[,dev]... | pathname...}
```

TABLE 2-7 `inquiry` Options and Arguments

Option/Argument	Description
enclosure	is the enclosure name of a StorEdge A5000[1].
dev	is the name of a specific disk in an enclosure[1].
pathname	is the physical or logical path name of a StorEdge A5000, SPARCstorage Array, or a specific disk in an array.[1]

[1]See "Addressing" on page 2.

Example:

```
# luxadm inquiry macs1
INQUIRY:
  Physical path:
  /devices/sbus@1f,0/SUNW,socal@0,0/sf@1,0/ses@w5080020000000599,0:0
Vendor:                   SUN
Product:                  SENA
Revision:                 1.05
Device type:              0xd (SES device)
Removable media:          no
Medium Changer Element:   no
ISO version:              0
ECMA version:             0
ANSI version:             3 (Device complies to SCSI-3)
Terminate task:           no
Response data format:     2
Additional length:        0x7b
Command queueing:         no
            VENDOR-SPECIFIC PARAMETERS
Byte#                Hex Value                          ASCII
51    00 00 00 00                                       ....
95    6d 61 63 73 31 00 00 00 00 00 00 00 00 00 00 00   macs1...........
      00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00   ................
#
```

Downloading

Downloading Firmware

Use the `download` subcommand to download a prom image to the FEPROMs on a StorEdge A5000 disk array IB or on a SPARCstorage Array controller board.

In a StorEdge A5000 disk array, when the download is complete, the disk array will be reset and the downloaded code will be executed.

In a SPARCstorage Array, when the download is complete, you must reset the SPARCstorage Array to execute the downloaded code.

StorEdge A5000	SPARCstorage Array	SPARCstorage RSM
Supported	Supported	Not Supported

```
luxadm [ -v ] download [-s] [-f filename-path ]
```

Caution – When using the `-s` option the download modifies the FEPROM in the StorEdge A5000 disk array and should be used with caution.

Note – The `-s` option does not apply to the SPARCstorage Array controller as it always writes the downloaded firmware into the FEPROM.

TABLE 2-8 `download` Options and Arguments

Option/Argument	Description
`-s`	saves the downloaded firmware in the FEPROM in a StorEdge A5000 disk array . If `-s` is not specified the downloaded firmware will not be saved across power cycles.
`-f filename`	downloads the prom image in filename. If you do not specify a filename, the default prom image will be used.
	The default prom image in a StorEdge A5000 is in the directory `/usr/lib/locale/C/LC_MESSAGES` and is named `ibfirmware`.
	The default prom image in a SPARCstorage Array is in the directory `/usr/lib/firmware/ssa` and is named `ssafirmware`.
`-w WWN`	This option is for the SPARCstorage Array only. See "Changing a SPARCstorage Array World Wide Name" on page 18.

[1] See "Addressing" on page 2.

Changing a SPARCstorage Array World Wide Name

Use the download subcommand to change the World Wide Name of a SPARCstorage Array controller board.

StorEdge A5000	SPARCstorage Array	SPARCstorage RSM
Not Supported	Supported	Not Supported

```
luxadm [ -v ] download [-w WWN] pathname
```

TABLE 2-9 download Options and Arguments

Option/Argument	Description
pathname	is a SPARCstorage Array controller
`-w WWN`	changes the World Wide Name for the SPARCstorage Array. `WWN` is a twelve-digit hex number; leading zeros are required. The new SPARCstorage Array controller's image will have the least significant 6 bytes of the 8-byte World Wide Name modified to `WWN`.

Downloading fcode to a FC25/S Host Adapters

Use the `fc_s_download` subcommand to download new fcode into all the FC25/S Sbus Cards. (This is the 25 MHz host adapter card which connects to SPARCstorage Arrays.)

The `fc_s_download` subcommand is interactive and expects user confirmation before downloading the fcode.

The version of the FC/S Sbus Cards fcode that was released with this version of the Operating System is kept in the directory `usr/lib/firmware/fc_s` and is named `fc_s_fcode`.

Caution – Ensure that you download the `usr/lib/firmware/fc_s/fc_s_fcode` file.

Note – The `fc_s_download` subcommand should be used only in single user mode; otherwise the FC/S card could be reset.

StorEdge A5000	SPARCstorage Array	SPARCstorage RSM
Not Supported	Supported	Not Supported

```
luxadm [ -v ] fc_s_download [-F] [-f fcode-file]
```

TABLE 2-10 `fc_s_download` Options

Option	Description
`-F`	Forcibly downloads the fcode. The subcommand still expects user confirmation before the download.
`-f fcode-file`	is the name of the file that has the new fcode. When the `fc_s_download` subcommand is invoked without the `[-f fcode-file]` option, the current version of the fcode in each FC/S Sbus card is printed.

Downloading fcode to FC100 Host Adapters

Use the `fcal_s_download` subcommand to download new fcode into sll the
FC100/S Sbus or FC100/P PCI host adapters or to display the current version of the
fcode in each host adapter. (This is the 100MHz host adapter card which connects to
StorEdge A5000 disk arrays.)

When downloading new fcode, the `fcal_s_download` subcommand is interactive
and expects user confirmation before downloading the fcode.

Caution – Ensure that you download the `/usr/lib/firmware/fc_s/`
`fcal_s_fcode` file.

Caution – Do not attempt to download fcode to a FC100/S Sbus Card that is in
your boot path. Boot from another device, such as a CDROM, and then dowload the
fcode.

StorEdge A5000	SPARCstorage Array	SPARCstorage RSM
Supported	Not Supported	Not Supported

```
luxadm [ -v ] fcal_s_download [ -f fcode-file ]
```

TABLE 2-11 `fcal_s_download` Options

Option	Description
-f fcode-file	`fcode-file` is the name of the file that has the new fcode. If you invoke the `fcal_s_download` subcommand without the `[ -f fcode-file ]` option, the current version of the fcode in each FC100/S Sbus card is displayed. The version of the FC100/S Sbus Cards fcode released with this operating system is kept in the directory `usr/lib/firmware/fc_s` and is named `fcal_s_fcode`.

Enclosure Services Card

The `env_display` and `alarm` subcommands apply only to an Enclosure Services Card (SES) in a RSM tray in a SPARCstorage Array. The RSM tray is addressed by using the logical or physical path of the SES device or by specifying the controller followed by the tray number. The controller is addressed by `cN` or the physical path to the controller inthe SSA .

Displaying Environmental Information

Use the `env_display` subcommand to display the environmental information for a SPARCstorage Array.

StorEdge A5000	SPARCstorage Array	SPARCstorage RSM
Not Supported	Supported	Supported

```
luxadm [ -v ] env_display { pathname | controller tray-number }
```

TABLE 2-12 `env_display` Options and Arguments

Option/Argument	Description
pathname	is the path to an SES device[1].
controller	is the path to a SPARCstorage Array controller [1].
tray-number	is an RSM tray number. *tray-number* is only valid for an RSM tray in a SPARCstorage Array.

[1]See "Addressing a SPARCstorage Array" on page 3.

Disabling the Alarm

Use the `alarm_off` subcommand to disable the audible alarm for this enclosure. When invoked without an option, the current state of audible alarm is printed.

StorEdge A5000	SPARCstorage Array	SPARCstorage RSM
Not Supported	Supported	Supported

```
luxadm [ -v ] alarm_off { pathname | controller tray-number }
```

TABLE 2-13 `alarm_off` Options and Arguments

Option/Argument	Description
pathname	is the path to an SES device[1].
controller	is the path to a SPARCstorage Array controller [1].
tray-number	is an RSM tray number. *tray-number* is only valid for an RSM tray in a SPARCstorage Array.

[1] See "Addressing a SPARCstorage Array" on page 3.

Enabling the Alarm

Use the `alarm_on` subcommand to enable the audible alarm for this enclosure. When invoked without an option, the current state of audible alarm is printed.

StorEdge A5000	SPARCstorage Array	SPARCstorage RSM
Not Supported	Supported	Supported

```
luxadm [ -v ] alarm_on { pathname | controller tray-number }
```

TABLE 2-14 `alarm_on` Options and Arguments

Option/Argument	Description
pathname	is the path to an SES device[1].
controller	is the path to a SPARCstorage Array controller [1].
tray-number	is an RSM tray number. *tray-number* is only valid for an RSM tray in a SPARCstorage Array.

[1] See "Addressing a SPARCstorage Array" on page 3.

Setting the Alarm

Use the `alarm_set` subcommand to set the duration of the audible alarm to a specified number of seconds.

StorEdge A5000	SPARCstorage Array	SPARCstorage RSM
Not Supported	Supported	Supported

```
luxadm [ -v ] alarm_set { pathname | controller tray-number } [seconds]
```

TABLE 2-15 `alarm_set` Options and Arguments

Option/Argument	Description
pathname	is the path to an SES device[1].
controller	is the path to a SPARCstorage Array controller [1].
tray-number	is an RSM tray number. *tray-number* is only valid for an RSM tray in a SPARCstorage Array.
seconds	is the number of seconds.

[1] See "Addressing a SPARCstorage Array" on page 3.

Enclosure and Disk Operations

Renaming a StorEdge A5000 Disk Array

Use the `enclosure_name new_name` subcommand to change the enclosure name of one or more StorEdge A5000 disk arrays. The new name must be 16 or less characters. The only allowed characters are alphabetic or numeric digits.

StorEdge A5000	SPARCstorage Array	SPARCstorage RSM
Supported	Not Supported	Not Supported

```
luxadm [ -v ] enclosure_name #### enclosure... | pathname...
```

TABLE 2-16 `enclosure_name` Options and Arguments

Option/Argument	Description
####	is the new enclosure name.
enclosure	is the enclosure name of a StorEdge A5000[1].
pathname	is the physical or logical path name of a StorEdge A5000[1].

[1] See "Addressing a StorEdge A5000 Disk Array" on page 2.

Collecting Performance Statistics

Use the `perf_statistics` subcommand to enable or disable the accumulation of performance statistics for a specific SPARCstorage Array controller.

Note – The accumulation of performance statistics must be enabled before using the `display -p` subcommand.

StorEdge A5000	SPARCstorage Array	SPARCstorage RSM
Not Supported	Supported	Not Supported

```
luxadm [ -v ] perf_statistics [ -e ] pathname
```

TABLE 2-17 `perf_statistics` Options and Arguments

Option/Argument	Description
pathname	is a SPARCstorage Array controller[1].
-e	Enable the accumulation of performance statistics.

[1] See "Addressing a SPARCstorage Array" on page 3.

Powering Off an Enclosure or Disk Drive

Use the power_off subcommand to set an enclosure to the power-save mode.

Note – StorEdge A5000 disk drives are not available when in the power-save mode.

When an Enclosure Services card in a SPARCstorage Array is addressed, the RSM tray is powered off.

When a disk drive in a StorEdge A5000 is addressed, the drive is set to the drive off/ unmated state. When set to the drive off/unmated state, the drive is spun down (stopped) and put in the bypass mode.

StorEdge A5000	SPARCstorage Array	SPARCstorage RSM
Supported	Supported	Not Supported

```
luxadm [ -v ] power_off { enclosure[,dev]... | pathname...}
```

TABLE 2-18 `power_off` Options and Arguments

Option/Argument	Description
enclosure	is the enclosure name of a StorEdge A5000[1].
dev	is the name of a specific disk in an enclosure[1].
pathname	is the physical or logical path name of a StorEdge A5000, SPARCstorage Array, or a specific disk in an array[1].

[1] See "Addressing" on page 2.

Powering On Enclosures or Disk Drives

Use the power_on subcommand to set a drive to its normal power on state. If you specify a StorEdge A5000 disk drive, the power_on subcommand sets the specified disks to the normal start-up state.

StorEdge A5000	SPARCstorage Array	SPARCstorage RSM
Supported	Not Supported	Not Supported

```
luxadm [ -v ] power_on { enclosure[,dev]... | pathname...}
```

TABLE 2-19 power_on Options and Arguments

Option/Argument	Description
enclosure	is the enclosure name of a StorEdge A5000[1].
dev	is the name of a specific disk in an enclosure[1].
pathname	is the physical or logical path name of a StorEdge A5000 or a specific disk in an array[1].

[1] See "Addressing a StorEdge A5000 Disk Array" on page 2.

Releasing Disks

Use the release subcommand to release one or more disk drives from reservation.

StorEdge A5000	SPARCstorage Array	SPARCstorage RSM
Supported	Supported	Supported

```
luxadm [ -v ] release { pathname...}
```

TABLE 2-20 `release` Options and Arguments

Option/Argument	Description
enclosure	is the enclosure name of a StorEdge A5000[1].
dev	is the name of a specific disk in an enclosure[1].
pathname	is the physical or logical path name of a StorEdge A5000, SPARCstorage Array, or a specific disk in an array[1].

[1] See "Addressing" on page 2.

Reserving Disks

Use the `reserve` subcommand to reserve the specified disk(s) for exclusive use by the host from which the subcommand was issued.

StorEdge A5000	SPARCstorage Array	SPARCstorage RSM
Supported	Supported	Supported

```
luxadm [ -v ] reserve { pathname...}
```

TABLE 2-21 `reserve` Options and Arguments

Option/Argument	Description
enclosure	is the enclosure name of a StorEdge A5000[1].
dev	is the name of a specific disk in an enclosure[1].
pathname	is the physical or logical path name of a StorEdge A5000, SPARCstorage Array, or a specific disk in an array[1].

[1] See "Addressing" on page 2.

Setting the Boot Device Variable

Use the `set_boot_dev` subcommand to set the boot-device variable in the system PROM to physical device name. The `set_boot_device` subcommand normally runs interactively; it requests confirmation for setting the default boot-device in the PROM.

StorEdge A5000	SPARCstorage Array	SPARCstorage RSM
n/a	n/a	n/a

```
luxadm [ -v ] set_boot_dev [ -y ] pathname
```

TABLE 2-22 `set_boot_dev` Options and Arguments

Option/Argument	Description
pathname	is a block special device or a mount-point[1].
-y	runs non-interactively; no confirmation is requested or required.

[1] See "Addressing" on page 2.

Starting Disks

Use the `start` subcommand to spin up one or more disks.

StorEdge A5000	SPARCstorage Array	SPARCstorage RSM
Not Supported	Supported	Not Supported

```
luxadm [ -v ] start [ -t tray number ] pathname
```

TABLE 2-23 `start` Options and Arguments

Option/Argument	Description
-t tray-number	is the tray number.
pathname	is the physical or logical path name of a SPARCstorage Array, or a specific disk in an array[1].

[1] See "Addressing" on page 2.

Stopping Disks

Use the stop subcommand to spin down one or more disks.

StorEdge A5000	SPARCstorage Array	SPARCstorage RSM
Not Supported	Supported	Not Supported

```
luxadm [ -v ] stop [ -t tray-number ] pathname
```

TABLE 2-24 stop Options and Arguments

Option/Argument	Description
-t tray-number	is the tray number.
pathname	is the physical or logical path name of a SPARCstorage Array, or a specific disk in an array[1].

[1] See "Addressing" on page 2.

NVRAM

Enabling and Disabling Fast Writes

Use the fast_write subcommand to enable or disable the use of the NVRAM to enhance the performance of writes in the SPARCstorage Array.

StorEdge A5000	SPARCstorage Array	SPARCstorage RSM
Not Supported	Supported	Not Supported

```
luxadm [ -v ] fast_write [-s] -c pathname
```

TABLE 2-25 fast_write Options and Arguments

Option/Argument	Description
pathname	pathname is a SPARCstorage Array controller or an individual disk[1].
-e	causes the SPARCstorage Array to save the change so it will persist across power-cycles.
-c	enables fast writes for synchronous writes only.
-e	enables fast writes.
-d	disables fast writes.

[1] See "Addressing a SPARCstorage Array" on page 3.

Displaying Fast Write Data

Use the nvram_data subcommand to display the amount of fast write data in the NVRAM for a specific disk. This command can only be used for an individual disk.

StorEdge A5000	SPARCstorage Array	SPARCstorage RSM
Not Supported	Supported	Not Supported

```
luxadm [ -v ] nvram_data pathname
```

TABLE 2-26 `nvram_data` Options and Arguments

Option/Argument	Description
pathname	pathname is a SPARCstorage Array controller or an individual disk[1].

[1] See "Addressing a SPARCstorage Array" on page 3.

Purging Fast Write Data from NVRAM

Caution – The `purge` subcommand should be used with caution, usually only when a drive has failed.

Use the `purge` subcommand to purge any fast write data from NVRAM for one or more disks.

StorEdge A5000	SPARCstorage Array	SPARCstorage RSM
Not Supported	Supported	Not Supported

```
luxadm [ -v ] purge pathname
```

TABLE 2-27 `purge` Options and Arguments

Option/Argument	Description
pathname	is a SPARCstorage Array controller or an individual disk. If you specify a SPARCstorage Array controller, fast write data for all disks associated with that controller will be purged[1].

[1] See "Addressing a SPARCstorage Array" on page 3.

Flushing NVRAM

Use the `sync_cache` subcommand to flush all outstanding writes for one or more disks from NVRAM to the media.

StorEdge A5000	SPARCstorage Array	SPARCstorage RSM
Not Supported	Supported	Not Supported

```
luxadm [ -v ] sync_cache pathname
```

TABLE 2-28   `sync_cache` Options and Arguments

Option/Argument	Description
pathname	is a SPARCstorage Array controller or an individual disk. If you specify a SPARCstorage Array controller, outstanding writes for all disks associated with that controller will be flushed[1].

[1] See "Addressing a SPARCstorage Array" on page 3.

Removing, Inserting, and Replacing

This section discusses how to remove, insert, and replace disk drives, enclosures, or a chain of enclosures. For more detailed instructions on performing these operations with a StorEdge A5000 disk array, see Chapter 3 and refer to the *Sun StorEdge A5000 Installation and Service Manual*, part number 802-7573.

Removing Devices

Use the `remove_device` subcommand to hot remove a disk drive, enclosure, or a chain of enclosures. This subcommand interactively guides you through the hot removal of one or more devices.

In the StorEdge A5000 disk array, the `remove_device` subcommand:

- Checks whether the device is busy and if so warns you.
- Offlines the device (this fails if the disk is open).
- Informs you when device(s) can be safely removed.
- Informs you which device to remove by blinking the activity LED on the enclosure.
- Requests confirmation that the list(s) is/are as expected.
- Removes the logical device(s) names for the device that was removed.

In the SPARCstorage RSM, the `remove_device` subcommand:

- Takes the device offline.
- Quiesces the bus for buses that support quiescing.
- Informs you that the device can be safely replaced.
- Requests confirmation that the device has been replaced.
- Unquiesces the bus for buses that support quiescing.
- Brings the (now removed) device back online
- Removes the logical device name for the device that was removed.

StorEdge A5000	SPARCstorage Array	SPARCstorage RSM
Supported	Not Supported	Supported

```
luxadm [ -v ] remove_device [ -F ] { enclosure,dev... | pathname... }
```

TABLE 2-29 `remove_device` Options and Arguments

Option/Argument	Description
-F	force the hot-plugging operation on one or more devices even if those devices are being used by the host (and are, therefore, busy). **Caution**— Removing devices which are in use will cause unpredictable results. You should attempt to hot-plug normally (without -F) first, only resorting to this option when you are sure of the consequences of overriding normal hot-plugging checks.
enclosure	is the enclosure name of a StorEdge A5000 disk array[1].
dev	is the name of a specific disk in an enclosure[1].
pathname	is the physical or logical path name of a StorEdge A5000 or a specific disk in an array[1].

[1] See "Addressing a StorEdge A5000 Disk Array" on page 2.

Example:

```
# luxadm remove_device macs1,f1


  WARNING!!! Please ensure that no filesystems are mounted on these
device(s).
  All data on these devices should have been backed up.



The list of devices which will be removed is:

  1: Box Name "macs1" frontslot 1

Please enter 'q' to Quit OR <Return> to Continue:

stopping: Drive in "macs1" front slot 1....Done
offlining: Drive in "macs1" front slot 1....Done

Hit <Return> after removing the device(s).
```

You must physically remove the device at this time. After you hit a key, the following is displayed:

```
 Drive in Box Name "macs1" front slot 1
    Removing Logical Nodes:
    Removing c2t1d0s0
    Removing c2t1d0s1
    Removing c2t1d0s2
    Removing c2t1d0s3
    Removing c2t1d0s4
    Removing c2t1d0s5
    Removing c2t1d0s6
    Removing c2t1d0s7
#
```

Inserting Devices

Use the `insert_device` subcommand for hot insertion of a new disk drive, enclosure, or chain of enclosures. If you specify more than one enclosure, you can perform concurrent hot insertions on multiple busses.

The `insert_device` subcommand interactively guides you through the hot insertion of one or more devices. In the StorEdge A5000 disk array the `insert_device` subcommand:

- Informs you when the device(s) can be safely inserted.
- Requests confirmation that the list(s) is/are as expected.
- Creates the logical device names for the new devices.
- Displays the logical path name for the devices.

In the SPARCstorage RSM the `insert_device` subcommand:

- Quiesces the bus for buses that support quiescing
- Informs you that the device can be safely inserted
- Requests confirmation that the device has been inserted
- Unquiesces the bus for buses that support quiescing
- Creates the logical device name for the new device.

StorEdge A5000	SPARCstorage Array	SPARCstorage RSM
Supported	Not Supported	Supported

```
luxadm [ -v ] insert_device enclosure,dev...
```

TABLE 2-30 insert_device Options and Arguments

Option/Argument	Description
enclosure	is the enclosure name of a StorEdge A5000[1].
dev	is the name of a specific disk in an enclosure[1].

[1] See "Addressing a StorEdge A5000 Disk Array" on page 2.

Example:

```
# luxadm insert_device, macs1,f1

The list of devices which will be inserted is:
  1: Box Name "macs1" front slot 1

Please enter 'q' to Quit or <Return> to Continue:


Hit <Return> after inserting the device(s).
```

You must physically install the disk drive at this time. After hitting any key, the following is displayed:

```
  Drive in Box Name "macs1" front slot 1
  Logical Nodes under /dev/dsk and /dev/rdsk :
    c2t1d0s0
    c2t1d0s1
    c2t1d0s2
    c2t1d0s3
    c2t1d0s4
    c2t1d0s5
    c2t1d0s6
    c2t1d0s7
#
```

Replacing Devices

Use the `replace_device` subcommand to hot replace a device.

The `replace_device` subcommand interactively guides you through the hot insertion of one or more devices. The `replace_device` subcommand:

- Takes the device offline.
- Quiesces the bus for buses that support quiescing.
- Informs you that the device can be safely replaced.
- Requests confirmation that the device has been replaced.
- Unquiesces the bus for buses that support quiescing.
- Brings the device back online.

StorEdge A5000	SPARCstorage Array	SPARCstorage RSM
Not Supported	Not Supported	Supported

```
luxadm [ -v ] replace_device [ -F ] pathname
```

TABLE 2-31   `replace_device` Options and Arguments

Option/Argument	Description
-F	force the hot-plugging operation on one or more devices even if those devices are being used by the host (and are, therefore, busy). **Caution—** Replacing devices which are in use will cause unpredictable results. You should attempt to hot-plug normally (without -F) first, only resorting to this option when you are sure of the consequences of overriding normal hot-plugging checks.
pathname	pathname is a SPARCstorage Array controller or an individual disk[1].

[1] See "Addressing a SPARCstorage RSM Tray" on page 4.

Hot-Plugging in the StorEdge A5000 Disk Array

This chapter discusses hot-plugging StorEdge A5000 disk arrays and disk drives. It is divided into the following sections:

- Adding a Disk Drive—page 40
- Replacing a Disk Drive—page 43
- Removing a Disk Drive—page 53

Refer to the *Sun StorEdge A5000 Installation and Service Manual*, part number 802-7573, for details on removing disk drives.

Note – The procedure for hot-plugging an entire StorEdge A5000 disk array is very similar to the procedure for removing and replacing an individual disk drive. Instead of specifying an *enclosure,dev* you only need to specify the *enclosure* in the appropriate procedure.

Hot-plug reconfiguration or hot-plug operations cannot be performed on an active disk drive. All disk access activity must be stopped prior to a disk drive being removed or replaced.

Caution – As with other high-RAS products, disk drives should not be pulled out randomly. The StorEdge A5000 disk array design provides support to replace failed drives in redundant (mirrored or RAID) configurations. If the drive is active, you must stop that activity before removing it. This can be done without bringing down the operating system or powering down the unit. The StorEdge A5000 disk array fully supports hot-plugging, but there are software considerations that must be taken into account. Follow the procedures in this section when removing, replacing, and adding disk drives.

Adding a Disk Drive

This section contains information on how to configure your system when you add a disk drive while the power is on and the operating system is running.

The way you add a disk drive depends on the application you are using. Each application requires that you decide where to install the new disk drive, add the drive, and then reconfigure the operating environment.

In all cases, you must select a slot, install the disk drive, and configure the Solaris environment to recognize the drive. Then you must configure your application to accept the new disk drive.

> ⚠ **Caution –** These procedures should be performed only by a qualified system administrator. Performing hot-plug operations on an active disk drive may result in data loss and/or data corruption.

A new device entry needs to be created for the drive in the /devices and /dev/dsk and /dev/rdsk hierarchy. The new drive is assigned a name associated with the slot into which the drive was installed.

1. **Select any available slot in the StorEdge A5000 disk array for the new disk drive.**

   For reference when you configure the software environment, make a note of which enclosure and slot you chose.

2. **Use the** luxadm insert_device **command to add the new device.**

   This command is interactive. You will be guided through the procedure for inserting a new device or chain of devices.

```
# luxadm insert_device macs1,f1


The list of devices which will be inserted is:
  1: Box Name "macs1" front slot 1

Please enter 'q' to Quit or <Return> to Continue:


Hit <Return> after inserting the device(s).
```

3. **You must physically insert the disk drive at this time. After the drive is installed, hit Return. The following is displayed:**

```
 Drive in Box Name "macs1" front slot 1
  Logical Nodes under /dev/dsk and /dev/rdsk :
    c2t1d0s0
    c2t1d0s1
    c2t1d0s2
    c2t1d0s3
    c2t1d0s4
    c2t1d0s5
    c2t1d0s6
    c2t1d0s7
#
```

The new disk drive is now available for use as a block or character device. Refer to the sd(7) man pages for further details.

Unix File System (UFS)

Use the following procedure to configure a slice (single physical partition) on a disk to be used with a UFS file system. For instructions about adding a file system to a Volume Manager logical disk, refer to the documentation that came with your application.

1. **Verify that the device label meets your requirements.**

You can use the prtvtoc command to inspect the label for your disk. To modify the label, use the format command. Refer to the prtvtoc(1M) and format(1M) man pages for more information.

2. **Once you have selected a disk slice for your UFS file system, create a file system on the slice:**

```
# newfs /dev/rdsk/cwtxdysz
```

Refer to the newfs(1M) man page for more information.

3. **If necessary, create a mountpoint for the new file system:**

```
# mkdir mount_point
```

where: *mount_point* is a fully qualified pathname. Refer to the mount(1M) man page for more information.

4. **After the file system and mountpoint have been created, modify the** /etc/vfstab **file to reflect the new file system.**

   See the vfstab(4) man page for more details.

5. **Mount the new file system using the** mount **command:**

```
# mount mount_point
```

   where: *mount_point* is the directory you created.

   The file system is ready to be used.

Sun Enterprise Volume Manager

Use the following procedure to configure the new device to be used with a new or existing Volume Manager disk group.

1. **Configure the Volume Manager to recognize the disk drive.**

```
# vxdctl enable
```

2. **Add the new disk to a new or existing Volume Manager disk group:**

```
# vxdiskadd cwtxdysz
```

   where: *cwtxdysz* is the new disk.

   Refer to the vxdiskadd(1M) man page for further details.

   The disk is now ready for use with Volume Manager: as part of a new volume, added to an existing volume as a plex, or to increase an existing volume. Refer to your *Sun Enterprise Volume Manager User's Guide* for more information.

Replacing a Disk Drive

This section contains information on configuring your system to replace a disk drive while the power is on and the operating system is running.

The way you replace a faulty disk drive depends on the application you are using. Each application is different, but requires that you

1. Determine which disk drive is failing or has failed

2. Remove the disk

3. Add the replacement drive

4. Reconfigure the operating environment.

In all cases you must stop any activity on the disk; physically remove the old drive and install the new one; and configure the Solaris environment to recognize the drive. Then you must configure your application to accept the new disk drive.

Caution – These procedures should be performed only by a qualified system administrator. Performing hot-plug operations on an active disk drive may result in data loss and/or data corruption.

Identifying the Faulty Disk Drive

Different applications provide various levels of error logging. In general, you can find messages about failing or failed disks in your system console window. The information is also logged in the `/usr/adm/messages` file(s). See the documentation that came with your application for more information.

UNIX File System (UFS)

The following procedure describes how to unconfigure a disk being used by one or more UFS file systems.

Caution – These procedures should be performed only by a qualified system administrator. Performing hot-plug operations on an active disk drive can result in data loss.

Preparing to Replace the Disk Drive

1. **Stop any application processes on the file systems to be unconfigured.**

2. **Back up your system.**

3. **Determine what file system(s) are on the disk:**

```
# mount | grep cwtxdysz
```

For example, if the device to be removed is c2t1d0, enter the following:

```
# mount | grep c2t3d0
/export/home   (/dev/dsk/c2t1d0s7 ):   98892 blocks   142713 files
/export/home2  (/dev/dsk/c2t1d0s5 ):  153424 blocks   112107 files
```

4. **Determine and save the partition table for the disk.**

   If the replacement disk is the same type as the faulty disk, you can use the format command to save the partition table of the disk. Use the save command in format to save a copy of the partition table to the /etc/format.dat file. This will allow you to configure the replacement disk so that its layout matches the current disk.

   Refer to the format(1M) man page for more information.

5. **Unmount any file systems on the disk.**

   Note – If the file system(s) are on a disk that is failing or has failed, the umount operation may not complete. A large number of error messages may be displayed in the system console and in the /var directory during the umount operation. If the umount operation does not complete, you may have to reboot the system.

   For each file system from Step 3 returned, type:

```
# umount filesystem
```

   where *filesystem* is the first field for each line returned in Step 3.

   For example:

```
# umount /export/home
# umount /export/home2
```

6. Using the df **command, verify that the file system has been unmounted.**

Removing the Disk Drive

1. Use the luxadm remove_device **command to remove the disk.**

The luxadm remove_device command is interactive. You will be guided through the procedure for removing a device or chain of devices.

```
# luxadm remove_device /dev/rdsk/c2t1d0s5


  WARNING!!! Please ensure that no filesystems are mounted on these
device(s).
   All data on these devices should have been backed up.



The list of devices which will be removed is:
  1: Box Name "macs1" front slot 1

Please enter 'q' to Quit or <Return> to Continue:

stopping:  Drive in "macs1" front slot 1....Done
offlining: Drive in "macs1" front slot 1....Done

Hit <Return> after removing the device(s).
#
```

2. You must physically remove the disk drive at this time. After the drive is removed, hit any key. The following is displayed:

> **Note –** The yellow LED on the designated disk drive(s) should be flashing.

```
 Drive in Box Name "macs1" front slot 1

    Removing Logical Nodes:
    Removing c2t1d0s0
    Removing c2t1d0s1
    Removing c2t1d0s2
    Removing c2t1d0s3
    Removing c2t1d0s4
    Removing c2t1d0s5
    Removing c2t1d0s6
    Removing c2t1d0s7
 #
```

Installing the New Disk Drive

1. Use the `luxadm insert_device` **command to add the new device.**

This command is interactive. You will be guided through the procedure for inserting a new device or chain of devices.

```
# luxadm insert_device, macs1,f1

The list of devices which will be inserted is:
  1: Box Name "macs1" front slot 1

Please enter 'q' to Quit or <Return> to Continue:


Hit <Return> after inserting the device(s).
```

2. **You must physically insert the disk drive at this time. After the drive is installed, hit Return. The following is displayed:**

```
  Drive in Box Name "macs1" front slot 1
  Logical Nodes under /dev/dsk and /dev/rdsk :
    c2t1d0s0
    c2t1d0s1
    c2t1d0s2
    c2t1d0s3
    c2t1d0s4
    c2t1d0s5
    c2t1d0s6
    c2t1d0s7
#
```

The new disk drive is now available for use as a block or character device. Refer to the `sd(7)` man pages for further details.

Restoring the UFS File System

Use the following procedure to configure a slice on a disk to be used with the UFS file system.

1. **Verify that the device label meets your requirements.**

   You can use the `prtvtoc` command to inspect the label for your disk. To modify the label, use the `format` command. See the `prtvtoc(1M)` and `format(1M)` man pages for more information.

2. **Verify that the device's partition table satisfies the requirements of the file system(s) you intend to re-create.**

   You can use the `prtvtoc` command to inspect the label for your device. If you need to modify the label, use the `format` command. Refer to the `prtvtoc(1M)` and `format(1M)` man pages for more information.
   For example:

```
 # prtvtoc /dev/rdsk/cwtxdysz
```

   If you have saved a disk partition table using the format utility and the replacement disk type matches the old disk type, then you can use the `format` utility's `partition` section to configure the partition table of the replacement disk. See the `select` and `label` commands in the partition section.

If the replacement disk is of a different type than the disk it replaced, you can use the partition size information from the previous disk to set the partition table for the replacement disk. Refer to the prtvtoc(1M) and format(1M) man pages for more information.

3. **Once you have selected a disk slice for your UFS file system, create a file system on the slice:**

```
# newfs /dev/rdsk/cwtxdysz
```

4. **Mount the new file system using the** mount **command:**

```
# mount mount_point
```

where: *mount_point* is the directory on which the faulty disk was mounted.

The new disk is ready to be used. You can now restore data from your backups.

Sun Enterprise Volume Manager

The following procedure assumes that all user- and application-level processes on all volumes, plexes, and/or subdisks that are located on the drive to be removed have been terminated.

⚠️ **Caution –** These procedures should be performed only by a qualified system administrator. Performing hot-plug operations on an active disk drive may result in data loss.

Preparing to Replace the Disk Drive

1. **Back up your system.**

Refer to the documentation that came with your system for backup details.

2. **Identify the disk media name for the disk you intend to replace.**

```
# vxdisk list | grep cwtxdysz
```

For example, if the disk to be removed is `c2t1d0`, enter:

```
# vxdisk list | grep c0t1d0
c2t1d0s2     sliced     disk01        rootdg        online
```

The disk media name is the third field in the output above: `disk01`.

You can use the `vxdiskadm` utility to prepare the disk for replacement.

3. **Type** `vxdiskadm` **in a shell.**

For example:

```
# vxdiskadm
```

This operation is interactive and requires user confirmation of the operation.

4. **Select the "Remove a disk for replacement" option.**

When prompted for a disk name to replace, type the disk media name from Step 2.

`vxdiskadm` marks the disk for replacement and saves the subdisk information to be rebuilt on the replacement disk.

Redundant data is automatically recovered after the replacement disk has been reattached to Volume Manager. Non-redundant data is identified as unusable and must be recreated from backups.

Refer to the `vxdiskadm(1M)` man page for further details.

5. **Quit the** `vxdiskadm` **utility.**

Removing the Disk Drive

1. Use the `luxadm remove_device` **command to remove the disk.**

The `luxadm remove_device` command is interactive. You will be guided through the procedure for removing a device or chain of devices.

```
# luxadm remove_device macs1,f1


  WARNING!!! Please ensure that no filesystems are mounted on these
device(s).
   All data on these devices should have been backed up.



The list of devices which will be removed is:

  1: Box Name "macs3" rear slot 1

Please enter 'q' to Quit OR <Return> to Continue:

stopping:  Drive in "macs1" front slot 1....Done
offlining: Drive in "macs1" front slot 1....Done

Hit <Return> after removing the device(s).
```

2. You must physically remove the disk drive at this time. After the drive is removed, hit any key. The following is displayed:

Note – The yellow LED on the designated disk drive(s) should be flashing.

```
 Drive in Box Name "macs1" front slot 1
    Removing Logical Nodes:
    Removing c2t18d0s0
    Removing c2t18d0s1
    Removing c2t18d0s2
    Removing c2t18d0s3
    Removing c2t18d0s4
    Removing c2t18d0s5
    Removing c2t18d0s6
    Removing c2t18d0s7
 #
```

Installing the Disk Drive

1. **Use the** `luxadm insert_device` **command to add the new device.**

   This command is interactive. You will be guided through the procedure for inserting a new device or chain of devices.

   ```
   # luxadm insert_device macs1,f1

   The list of devices which will be inserted is:
     1: Box Name "macs1" front slot 1

   Please enter 'q' to Quit or <Return> to Continue:

   Hit <Return> after inserting the device(s).
   ```

2. **You must physically insert the disk drive at this time. After the drive is installed, hit Return. The following is displayed:**

   ```
     Drive in Box Name "macs1" front slot 1
     Logical Nodes under /dev/dsk and /dev/rdsk :
       c2t1d0s0
       c2t1d0s1
       c2t1d0s2
       c2t1d0s3
       c2t1d0s4
       c2t1d0s5
       c2t1d0s6
       c2t1d0s7
    #
   ```

   The new disk drive is now available for use as a block or character device. Refer to the `sd(7)` man pages for further details.

Recreating a Volume Manager Configuration on the New Drive

To recreate the replaced disk on the new drive:

1. **Configure the Volume Manager to recognize the disk drive.**

```
# vxdctl enable
```

2. **Use the** vxdiskadm **utility to replace the failed disk.**

   Select the "Replace a failed or removed disk" option.

   This operation requires user confirmation. When prompted for a disk name to replace, use the disk media name from Step 2 of "Preparing to Replace the Disk Drive" on page 48.

   vxdiskadm supplies a list of available disks to be used as replacements.

3. **Select the replacement drive.**

   vxdiskadm automatically configures the replacement drive to match the failed drive.

   Redundant data is recovered automatically. Space for non-redundant data is created and identified. Non-redundant data must be recovered from backing store.

   See the vxdiskadm man pages for further details.

   You have now completed the replacement of the failed drive.

Removing a Disk Drive

This section contains information on how to configure your system to remove a disk drive while the power is on and the operating system is running. Use the procedures in this chapter if you do *not* intend to replace the disk drive.

The way in which you prepare to remove a disk drive depends on the application you are using. Each application is different, but requires that you

1. Select the disk drive

2. Remove the disk

3. Reconfigure the operating environment.

In all cases you must select the disk and stop any activity or applications on it, unmount it, physically remove the drive, and configure the Solaris environment to recognize that the drive is no longer there. Then you must configure your application to operate without this device in place.

> ⚠ **Caution –** These procedures should be performed only by a qualified system administrator. Performing hot-plug operations on an active disk drive may result in data loss and/or data corruption.

Unix File System (UFS)

The following procedure describes how to unconfigure a disk being used by one or more UFS file systems.

> ⚠ **Caution –** These procedures should be performed only by a qualified system administrator. Performing hot-plug operations on an active disk drive may result in data loss.

1. **Stop any application processes on the file systems to be unconfigured.**

2. **Back up your system.**

3. **Determine what file system(s) are on the disk:**

```
# mount | grep cwtxdysz
```

For example, if the device to be removed is `c2t1d0`, enter the following:

```
# mount | grep c2t1d0
/export/home  (/dev/dsk/c2t1d0s7 ):   98892 blocks   142713 files
/export/home2 (/dev/dsk/c2t1d0s5 ):  153424 blocks   112107 files
```

4. **Unmount any file systems on the disk.**

Note – If the file system(s) are on a disk that is failing or has failed, the `umount` operation may not complete. A large number of error messages may be displayed in the system console and in the `/var` directory during the `umount` operation. If the `umount` operation does not complete, you may have to restart the system.

For each file system returned, type:

```
# umount filesystem
```

where: `filesystem` is the first field for each line returned in Step 3.

For example:

```
# umount /export/home
# umount /export/home2
```

Removing the Disk Drive

1. **Use the** `luxadm remove_device` **command to remove the disk.**

   The `luxadm remove_device` command is interactive. You will be guided through
   the procedure for removing a device or chain of devices.

   ```
   # luxadm remove_device /dev/rdsk/c2t1d0s2


     WARNING!!! Please ensure that no filesystems are mounted on these
   device(s).
     All data on these devices should have been backed up.



   The list of devices which will be removed is:
     1: Box Name "macs1" front slot 1

   Please enter 'q' to Quit or <Return> to Continue:

   stopping:  Drive in "macs1" front slot 1....Done
   offlining: Drive in "macs1" front slot 1....Done

   Hit <Return> after removing the device(s).
   ```

2. **You must physically remove the disk drive at this time. After the drive is
   removed, hit any key. The following is displayed:**

   Note – The yellow LED on the designated disk drive(s) should be flashing.

   ```
     Drive in Box Name "macs1" front slot 1
        Removing Logical Nodes:
        Removing c2t1d0s0
        Removing c2t1d0s1
        Removing c2t1d0s2
        Removing c2t1d0s3
        Removing c2t1d0s4
        Removing c2t1d0s5
        Removing c2t1d0s6
        Removing c2t1d0s7
     #
   ```

Sun Enterprise Volume Manager

The following procedure assumes that all user- and application-level processes on all volumes, plexes, and/or subdisks that are located on the drive to be removed have been terminated.

> ⚠ **Caution –** These procedures should be performed only by a qualified system administrator. Performing hot-plug operations on an active disk drive may result in data loss.

Preparing to Remove the Disk Drive

1. **Back up your system.**

2. **Identify the disk media name for the disk you intend to remove.**

   ```
   # vxdisk list | grep cwtxdysz
   ```

   For example, if the disk to be removed is c2t1d0, enter:

   ```
   # vxdisk list | grep c2t1d0
   c2t1d0s2     sliced    disk01        rootdg        online
   ```

   The disk media name is the third field in the output above: disk01.

   You can use the vxdiskadm utility to prepare the disk for removal.

3. **Type** vxdiskadm **in a shell.**

   For example:

   ```
   # vxdiskadm
   ```

   This operation is interactive and requires user confirmation of the operation.

4. **Select the "Remove a disk" option.**

   When prompted for a disk name to remove, type the disk media name from Step 2.

   vxdiskadm marks the disk to be removed.

   Refer to the vxdiskadm(1M) man page for further details.

Removing the Disk Drive

1. Use the `luxadm remove_device` command to remove the disk.

The `luxadm remove_device` command is interactive. You will be guided through the procedure for removing a device or chain of devices.

```
# luxadm remove_device /dev/rdsk/c2t1d0s2


  WARNING!!! Please ensure that no filesystems are mounted on these
device(s).
  All data on these devices should have been backed up.



The list of devices which will be removed is:
  1: Box Name "macs1" front slot 1

Please enter 'q' to Quit or <Return> to Continue:

stopping:  Drive in "macs1" front slot 1....Done
offlining: Drive in "macs1" front slot 1....Done

Hit <Return> after removing the device(s).
```

2. You must physically remove the disk drive at this time. After the drive is removed, hit any key. The following is displayed:

Note – The yellow LED on the designated disk drive(s) should be flashing.

```
  Drive in Box Name "macs1" front slot 1
     Removing Logical Nodes:
     Removing c2t1d0s0
     Removing c2t1d0s1
     Removing c2t1d0s2
     Removing c2t1d0s3
     Removing c2t1d0s4
     Removing c2t1d0s5
     Removing c2t1d0s6
     Removing c2t1d0s7
  #
```

Expert Mode Subcommands

Caution – The expert mode subcommands should only be used by qualified personnel who are knowledgeable about the systems they are managing.

The command line must contain the luxadm -e (expert mode) option and a subcommand.

```
luxadm [options] subcommand pathname
```

TABLE A-1 Expert Mode Subcommands

Subcommand	Description
bus_getstate	Gets and displays the state of the specified bus or the bus controlling the specified device.
bus_quiesce	Quiesces the specified bus or the bus controlling the specified device.
bus_reset	Resets the specified bus or the bus controlling the specified device.
bus_resetall	Resets the specified bus or the bus controlling the specified device, and all devices on that bus.
bus_unquiesce	Unquiesces the specified bus or the bus controlling the specified device.
dev_getstate	Gets and displays the state of the specified device.
dev_reset	Resets the specified device.
forcelip	Forces the link to reinitialize using the Loop Initialize Primitive (LIP) sequence. The forcelip subcommand is supported on the Sun Enterprise Network Array only.

TABLE A-1   Expert Mode Subcommands

Subcommand	Description
offline	Takes the specified device offline.
online	Puts the specified device online.
rdls	Reads the link error status block from a specified device. The rdls subcommand also displays the link error status information for the Host Adapter associated with the specified device, if available. The rdls subcommand is supported on the Sun Enterprise Network Array only.

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