Sun™ StorEdge™ MultiPack Storage Guide

Software Instructions for Hot-Plugging Hard Disk Drives

Sun
microsystems

THE NETWORK IS THE COMPUTER™

Please
Recycle

Adobe PostScript™

Preface

Sun™ StorEdge™ MultiPack Storage Guide provides instructions for performing hot-plug replacement of hard disk drives in the Sun StorEdge MultiPack enclosure.

These instructions are designed for an experienced system administrator.

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

Application	Title	Part Number
Installation	*Sun StorEdge MultiPack Installation*	805-3953-10
Service	*Sun StorEdge MultiPack Service Manual*	805-3956-10
User's Guide	*Sun StorEdge MultiPack User's Guide*	805-3954-10

Ordering Sun Documents

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

TABLE P-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 Web. You can browse the `docs.sun.com` archive or search for a specific book title or subject at:

    http://docs.sun.com.

Sun Welcomes Your Comments

We are interested in improving our documentation and welcome your comments and suggestions. You can email your comments to us at:

    smcc-docs@sun.com.

Please include the part number of your document in the subject line of your email.

Contents

CHAPTER **1**

Hot-Plug Disk Replacement for the Sun StorEdge MultiPack Disk Drive Enclosure

The Sun StorEdge MultiPack disk drive enclosure is a customer-serviceable disk tray with removable disk modules. When coupled with high-availability software solutions (such as Solstice™ DiskSuite™), the disk modules are hot-pluggable.

Caution – Drives should not be pulled out randomly. If the drive is active, you must stop that activity before removing the drive. This can be done without shutting down the operating system or powering off the Sun StorEdge MultiPack unit. The Sun StorEdge MultiPack hardware supports hot-plugging, but there are software considerations that must be taken into account. Follow the procedures in this installation supplement when removing, replacing, and adding drives.

While there is no Solaris system software that provides hot-plug functionality to shield the operating system from the physical removal and replacement of a disk drive, there are several scenarios where a disk drive can be safely removed or added to the enclosure as long as the software framework managing the disk drives in the enclosure is taken into account..

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

In general, hot-plug reconfiguration operations involve three stages:

1. Preparing for hot-plug reconfiguration

2. Adding, replacing, or removing a disk drive

3. Reconfiguring the operating environment

Three specific cases exist where the hot-plug feature is useful.

- Adding a disk drive to a system to increase storage capacity:

  Chapter 2, "Adding a Disk Drive to a Sun StorEdge MultiPack Disk Drive Enclosure"

- Replacing a faulty disk drive while the system is running:

  Chapter 3, "Replacing a Faulty Disk in a Sun StorEdge MultiPackUnit"

  When you intend to replace a faulty drive, prepare replacement disks ahead of time to simplify replacement later.

  Each replacement disk should be formatted, labeled, and partitioned the same as the disks to be replaced, and have file systems or other application specific preparation performed.

- Removing a drive from a system that no longer needs it:

  Chapter 4, "Removing a Disk Drive from a Sun StorEdge MultiPack Unit"

Adding a Disk Drive to a Sun StorEdge MultiPack Disk Drive Enclosure

This chapter 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 in which 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. Each application is different.

In all cases, you must select a slot, physically 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.

2.1 Selecting a Slot for the New Disk Drive

When you install an additional drive in your Sun StorEdge MultiPack enclosure, the preferred loading order is the same as the SCSI address order.
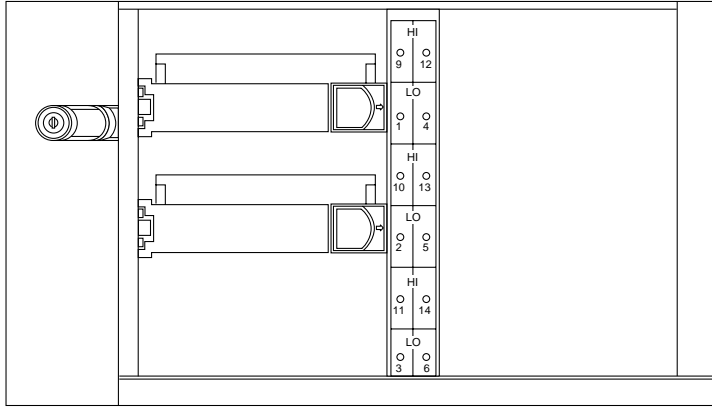
FIGURE 2-1   Sun StorEdge MultiPack Drive Bays and Address IDs

---

2.2 Adding the Disk Drive

Refer to the *Sun StorEdge MultiPack User's Guide* for drive installation instructions.

2.3 Configuring the Solaris Environment

A new device entry must 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 in the Sun StorEdge MultiPack enclosure into which the drive was installed.

The naming convention for disks attached to a host port or a host adapter is `c`*w*`t`*x*`d`*y*`s`*z*, where:

w corresponds to the SBus controller in your system
x corresponds to the Sun StorEdge MultiPack disk slot
y is the logical unit for the disk drive (always 0)
z is the slice (or partition) on the disk.

For example, if the Sun StorEdge MultiPack box is connected to a host adapter corresponding to controller `c2` and a drive was added to slot 4 on a Sun StorEdge MultiPack unit, the new drive appears as `/dev/dsk/c2t4d0s[0-7]` and `/dev/rdsk/c2t4d0s[0-7]`.

1. **Become superuser and use the** `drvconfig` **and** `disks` **commands to add the new device:**

```
# drvconfig
# disks
```

2. **Verify that the new disk has been created:**

```
# ls -l /dev/dsk/c1t4d0s*
```

where: `c1t4d0s*` is the expected device name for the new drive in slot 4.

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.

2.4   Configuring the New Disk Drive Within Your Application

● **Continue adding the disk with the instructions for your application.**

   ■ Section 2.5, "Configuring the New Disk Drive for a Unix File System (UFS)."

   ■ Section 2.6, "Adding a Disk to a Solstice DiskSuite Disk Set."

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.

2.5   Configuring the New Disk Drive for a Unix File System (UFS)

Use the following procedure to configure a slice (single physical partition) on a disk to be used with a UNIX File System. For instructions about adding a file system to a SDS 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. **After you have selected a disk slice for your UFS file system, check to see if it has a clean file system:**

   ```
   # fsck /dev/rdsk/cwtxdysz
   ```

   For example: `fsck /dev/rdsk/c1t2d0s2`

3. **If you get an error message, you may need to create a file system on the slice:**

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

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

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

   ```
   # mkdir mount_point
   ```

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

5. **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.

6. **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.

2.6 Adding a Disk to a Solstice DiskSuite Disk Set

1. **You can use any disk you add to a Sun StorEdge MultiPack for Solstice DiskSuite new or existing metadevices.**

2. **Refer to the** *Sun StorEdge MultiPack Users Guide* **for drive installation instructions.**

3. **Refer to the Solstice DiskSuite documentation for information on configuring the disk drive.**

Replacing a Faulty Disk in a Sun StorEdge MultiPackUnit

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

The way in which you replace a faulty disk drive depends on the application you are using. Each application is different, but each 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 or applications on the disk; unmount it; 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.

3.1 Preparing Spare Drives

If possible, prepare replacement disk drives in advance. Each replacement disk drive should be formatted, labeled, and partitioned the same as the disk it will replace. See the documentation for your application for instructions on how to format and partition the disk, and add that disk to your application.

3.2 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. The information is also logged in the `/usr/adm/messages` file(s). Refer to the documentation that came with your application for more information.

Note – Parity or time out messages may result from a non-UltraSCSI configuration. Verify your configuration before you decide the drive is bad. Refer to the *Sun StorEdge MultiPack User's Guide* for configuration information.

● **Once you have identified which disk drive is faulty, determine the SCSI ID and slot position for that drive in the Sun StorEdge MultiPack box.**
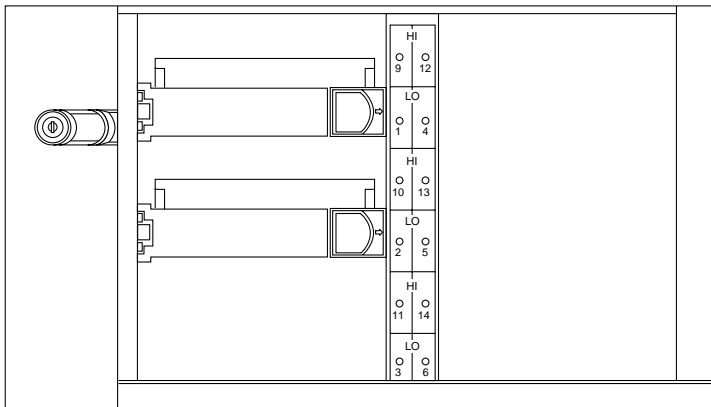
FIGURE 3-1   Sun StorEdge MultiPack Slot and Address ID

3.3 Device Naming Convention in the Solaris Environment

The naming convention for disks attached to a host port or a host adapter is
$cwtxdysz$, where:

w corresponds to the SBus controller in your system
x corresponds to the Sun StorEdge MultiPack disk slot
y is the logical unit for the disk drive (always 0)
z is the slice (or partition) on the disk

For example, if the Sun StorEdge MultiPack box is connected to a host adapter
corresponding to controller `c2` and a drive was added to slot 4 on a Sun StorEdge
MultiPack unit, the new drive appears as
`/dev/dsk/c2t4d0s[0-7]` and `/dev/rdsk/c2t4d0s[0-7]`.

3.4 Replacing the Disk Drive Within Your Application

Continue the disk replacement by going to the instructions for your application:

■ Section 3.5, "Unconfiguring a Disk With a UNIX File System (UFS)."

■ Section 3.6, "Solstice DiskSuite."

3.5 Unconfiguring a Disk With a 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.

3.5.1 Preparing to Replace the Disk Drive

1. **Become superuser and open the Sun StorEdge MultiPack unit to find the target address ID for the disk you intend to replace.**

   The target address ID appears on the label between the drive bays.

2. **Identify activities or applications attached to the device you plan to remove.**

   Use the `mount` and `ps -ef` commands.

   For example, where the controller number is `1` and the target ID is `2`:

   ```
   # mount | grep c1t2
   /export/home1 on /dev/dsk/c1t2d0s2 setuid/read/write on
   # ps -f | grep c1t2
   root   1225     450     4 13:09:58  pts/2      0:00 grep c1t2
   ```

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

   In the example, the only process running on the drive is `grep`, which has finished.

4. **Back up your system.**

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

   ```
   # mount | grep cwtx
   ```

   For example, if the device to be removed is `c1t3d0`, type:

   ```
   # mount | grep c1t3
   /export/home  (/dev/dsk/c1t3d0s7 ):  98892 blocks  142713 files
   /export/home2 (/dev/dsk/c1t3d0s5 ): 153424 blocks  112107 files
   ```

6. **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 enable you to configure the replacement disk so that its layout matches the current disk.

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

7. **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 5.

For example:

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


3.5.2   Removing and Replacing the Disk Drive

Refer to the *Sun StorEdge MultiPack User's Guide* for instructions on how to remove and replace disk drives.

3.5.3   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'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.

You have defined your disk's partition table and have identified the disk slice on which to build your UFS file system.

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

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

3. **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.

3.6 Solstice DiskSuite

The following procedures describe how to replace a disk in use by Solstice DiskSuite. Refer to the Solstice DiskSuite documentation for more information.

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.

3.6.1 Preparing to Replace the Disk Drive

1. **Back up your system.**

2. **Become superuser and open the Sun StorEdge MultiPack unit to find the target address ID for the disk you intend to replace.**

   The target address ID appears on the label between the drive bays.

3. **Save the partition table for the disk, if possible.**

   If the disk label can still be read, save the disk partitioning at this time.

Note – Save all the disk partitioning information immediately after configuring metadevices or file systems for use when recovering from device failure later.

   Use the `prtvtoc` command to save the partition information.

   ```
   # prtvtoc /dev/rdsk/cwtxdys0 > saved_partition_table_file
   ```

   For example:

   ```
   # prtvtoc /dev/rdsk/c1t2d0s0 > /etc/c1t2d0s0.vtoc
   ```

   For example:

   ```
   # metadb | grep c1t2d0
   # metastat | grep c1t2d0
   # mount | grep c1t2d0
   ```

   Save the output of the commands to reconstruct the metadevice configuration after you replace the disk.

4. **Delete database replicas.**

   If there are database replicas on the disk, these must be deleted. First record the size and number of database replicas on each slice; then delete them.

   ```
   # metadb -d cwtxdysz
   ```

   For example:

   ```
   # metadb -d c1t2d0s0
   ```

5. **Detach submirrors.**

   If any slices of the disk are used by submirrors, the submirrors should be detached.

   ```
   # metadetach d20 d21
   ```

6. **Delete hotspares.**

   If any slices are used by hotspare pools, remove them. Record the hotspare pools containing the slices; then delete them.
   For example:

   ```
   # metahs -d all c1t2d0s1
   ```

7. **Terminate all other metadevice activity on the disk.**

   Check metastat output for other slices of the disk used by metadevices that cannot be detached (stripes not in mirrors, etc.). These metadevices must be unmounted if they contain file systems, or they must otherwise be brought off-line.

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

8. **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 5.

   For example:

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

3.6.2 Removing and Replacing the Disk Drive

Refer to the *Sun StorEdge MultiPack User's Guide* for instructions on how to remove and replace disk drives.

3.6.3 Restoring the Solstice DiskSuite Diskset Files

Use the following procedure to configure a slice on a disk to be used with the Solstice DiskSuite system.

1. **Restore the disk partitioning.**

   If you have saved the disk partitioning to a file, you can restore it with fmthard. For

   ```
   # fmthard -s /etc/c1t2d0s0.vtoc   /dev/rdsk/c1t2d0s0
   ```

   example:

   If you have not saved the disk partitioning, use the format (1M) or fmthard(1M) commands to repartition the disk.

2. **Replace any database replicas.**

   For example:

   ```
   # metadb -a -l 2000 -c 2 c1t2d0s0
   ```

3. **Reattach any submirrors.**

   For example:

   ```
   # metattach d20 d21
   ```

4. **Recreate hotspares for each hotspare pool that contained a slice on the new disk.**

   For example:

   ```
   # metahs -a hsp001 c1t2d0s1
   ```

5. **Fix any broken metadevices, using slices from the new disk.**

If the disk to be replaced had caused any metadevices to go into the maintenance state, these metadevices can be repaired by reenabling the slices.

```
# metareplace -e mirror_or_RAID5_metadeice cwtxdysz
```

6. **Remount any file systems and restart any applications that were using metadevices that could not be taken off line.**

```
# mount file_system
```

Refer to the Solstice DiskSuite documentation for more information.

Removing a Disk Drive from a Sun StorEdge MultiPack Unit

This chapter 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 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.

4.1 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. The information is logged in the `/usr/adm/messages` file(s). See the documentation that came with your application for more information.

Note – Parity or time-out messages may result from a non-UltraSCSI configuration. Verify your configuration before you decide the drive is bad. Refer to the *Sun StorEdge MultiPack User's Guide* for configuration information.
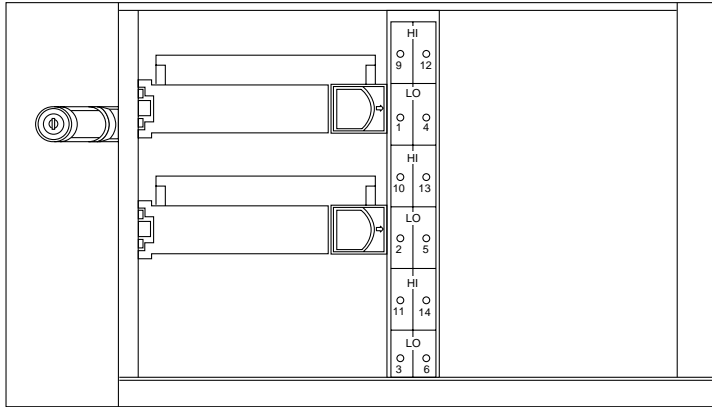

FIGURE 4-1   Sun StorEdge MultiPack Drive Bays and Address IDs

---

4.2   Device Naming Convention in the Solaris Environment

The naming convention for disks attached to a host port or to a host adapter is
`cwtxdysz`, where:

w corresponds to the SBus controller in your system
x corresponds to the Sun StorEdge MultiPack disk slot
y is the logical unit for the disk drive (always 0)
z is the slice (or partition) on the disk.

For example, if the Sun StorEdge MultiPack enclosure is connected to a SWIS/S host
adapter corresponding to controller `c2` and a drive was added to slot 4 on a Sun
StorEdge MultiPack unit, the new drive appears as
`/dev/dsk/c2t4d0s[0-7]` and `/dev/rdsk/c2t4d0s[0-7]`.

4.3   Removing a Disk Drive from Your Application

Continue the hot disk removal by going to the instructions for your application:

■ Section 4.4, "UNIX File System (UFS)."

■ Section 4.5, "Solstice DiskSuite."

4.4 UNIX File System (UFS)

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

1. **Become superuser and open the Sun StorEdge MultiPack unit to find the target address ID for the disk you intend to remove.**

   The target address ID appears on the label between the drive bays.

2. **Identify activities or applications attached to the device you plan to remove.**

   For example, where the controller number is 1 and the target ID is 2:

   ```
   # mount | grep c1t2
   /export/home1 on /dev/dsk/c1t2d0s2 setuid/read/write
   # ps -ef | grep c1t2
   root    1225     450     4 13:09:58  pts/2      0:00 grep c1t2
   ```

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

   In the example, the only process running on the drive is grep, which has finished.

4. **Back up your system.**

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

   ```
   # mount | grep cwtx
   ```

6. **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 5.

For example:

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

4.4.1 Removing the Disk Drive

Refer to the *Sun StorEdge MultiPack User's Guide* for instructions on how to remove disk drives.

4.5 Solstice DiskSuite

The following procedure describes how to unconfigure a disk in use by Solstice DiskSuite. For more information, refer to the Solstice DiskSuite documentation.

1. **Back up your system.**

2. **Become superuser and open the Sun StorEdge MultiPack unit to find the target address ID for the disk you intend to remove.**

   The target address ID appears on the label between the drive bays.

3. **Identify metadevices or applications using the device you plan to remove.**

   For example:

```
# metadb | grep c1t2d0
# metastat | grep c1t2d0
# mount | grep c1t2d0
```

4. **Delete database replicas.**

   If there are database replicas on the disk, these must be deleted. For example:

```
# metadb -d c1t2d0s0
```

5. **Replace slices or clear metadevices.**

   If any slices of the disk are in use by submirrors or within RAID metadevices, they can be replaced by other available slices. For example:

   ```
   # metareplace d20 c1t2d0s1 c2t2d0s1
   ```

   If there are no replacement slices available, the metadevices must be cleared. For example:

   ```
   # metaclear d21
   ```

6. **Replace slices or clear hotspares.**

   If any slices of the disk are used by hotspare pools, they can be replaced by other available slices. For example:

   ```
   # metahs -r all c1t2d0s1 c2t2d0s1
   ```

7. **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, type:

   ```
   # umount filesystem
   ```

   For example:

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

   Refer to the Solstice DiskSuite documentation for more information.