Storage Subsystem Manager 2.0 Software User's Guide

Sun StorEdge™ D240 Media Tray

Sun StorEdge S1 Array

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Contents

Storage Subsystem Manager 2.0 Software User's Guide

This user's guide describes how to install and use Storage Subsystem Manager (SSM) 2.0 software to monitor the supported storage devices.

Note – The SSM software supports only the Sun StorEdge™ D240 media tray, Netra™ st D130 storage array[1], and Sun StorEdge S1 array. The software does not support the Netra st A1000 array, the Netra st D1000 array, or any other Sun™ storage product.

The Storage Subsystem Manager (SSM) software monitors the status of the storage device's enclosure and of the disk drives within the enclosure.

The software monitors all connected supported storage devices (which are referred to as units by the software) and displays a status change message if any device goes offline. The software also displays a message if an individual disk drive goes offline, fails, or is moved to a different drive bay within the storage device. Finally, the software monitors the temperature of the disk drives and displays a message if the temperature exceeds the warning and critical thresholds you define.

By default, the software saves these status change messages to the system log. You can also view these messages either from the directly connected host running the server software or from any host on the network running the client software, by using the `ssmadmin` utility. You can also change the configuration settings to suit your server environment.

For more information about the software, refer to the `ssmadmin`(1M) and `ssmon.conf`(4) man pages. To view these man pages, you must add the `/opt/SUNWssmu/man` directory to your `$MANPATH` environment variable. Refer to your Solaris™ documentation, if needed, for instructions on setting environment variables.

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1. The Netra st D130 storage array is no longer available for sale at Sun.

Task Map

TABLE 1, TABLE 2, and TABLE 3 list the tasks performed when installing, administering, and removing the SSM software and provide links to the procedures.

TABLE 1 lists the installation procedures.

TABLE 1   Installing the SSM Software

Task	Procedure
Find out whether an earlier SSM version is installed [1]	"Finding Out if Earlier SSM Software is Installed" on page 3
If necessary, remove an earlier SSM version	See TABLE 3.
Install the SSM 1.0 software	"Installing the SSM Software" on page 4

1. If the Netra st D130 Storage Subsystem Manager 1.0 software is installed on the host server or client, you must remove the earlier version before installing this version.

TABLE 2 lists the administration procedures.

TABLE 2   Administering the SSM Software

Task	Procedure
View status messages	"Viewing Status Messages" on page 10
Change software settings	"Changing the Software Settings" on page 14
Create and update the configuration file	"Creating and Updating the Configuration File" on page 17
Create and use a different configuration file.	"Creating and Using a Different Configuration File" on page 21

TABLE 3 lists the removal procedure.

TABLE 3   Removing the SSM Software

Task	Procedure
Remove the SSM software	"Removing the SSM Software" on page 9

Software Package Names

TABLE 4 lists the two SSM software packages. Install both software packages on host servers that are directly-connected to storage devices. Install only the `SUNWssmu` package on client systems to be used for remote monitoring.

TABLE 4   Storage Subsystem Manager Software Packages

Package Name	Contents
SUNWssmr	Contains the SSM startup scripts.
SUNWssmu	Contains the SSM utility and daemon files.

Finding Out if Earlier SSM Software is Installed

If either of the Netra st D130 Storage Array Storage Subsystem Manager 1.0 software packages is installed on the host, you must remove the earlier package before installing the current package.

▼ To Find if Earlier SSM Software is Installed

1. **Log in as superuser on the host.**

2. **Type the** `pkginfo`**(1M) command followed by the package name, as shown in the screen example.**

   ```
   # pkginfo SUNWssmr SUNWssmu
   ```

   See TABLE 4 for the names of the packages.

3. **If the packages are present, remove the SSM 1.0 software.**

   Go to "Removing the SSM Software" on page 9.

Installing the SSM Software

TABLE 5 lists the methods for accessing the SSM software and provides links to the procedures for each method.

TABLE 5 Methods for Accessing SSM Software

Access Method	Procedure
From Sun's software download center	See the procedure "To Access the Software from Sun's Web Site" on page 4.
From the *Storage Subsystem Manager* 2.0 CD	See the procedure "To Access the Software from the CD-ROM" on page 5.

TABLE 6 lists the installation tasks and provides links to the procedures for each task.

TABLE 6 Installation Tasks for Host Servers and Optional Client Systems

Task	Procedure
Install both packages on the host server	"To Install the Software on a Directly Connected Host System" on page 6
Optional: Install the client package on a client system	"To Install the SSM Software on a Client System" on page 8. [1]

1 Setting up a client system is optional

▼ To Access the Software from Sun's Web Site

1. **Log in as superuser to the host to be directly connected to the storage device.**

2. **Go to** `http://sun.com/downloads`**.**

3. **Download the software.**

   a. **Click "System Administration."**

   b. **Under "Storage Management," click "StorEdge S1 Storage Subsystem Manager (SSM) 2.0."**

   c. **Follow the instructions to download a compressed tar file of the software. Save the tar file to a working directory, such as your system's** `/tmp` **directory.**

4. **Change directories to the working directory.**

5. **Uncompress and extract the files from the compressed tar file.**

The screen example shows using the zcat(1) and tar(1) commands to extract the files.

```
# zcat filename.tar.Z | tar xvf -
```

A new directory called Storage_Subsystem_Manager is created in the working directory.

6. **If you are installing the software on a host server connected to a storage device, go to "To Install the Software on a Directly Connected Host System" on page 6.**

7. **If you are installing the software on a client system to be used only for remote monitoring, go to "To Install the SSM Software on a Client System" on page 8.**

▼ To Access the Software from the CD-ROM

1. **Log in as superuser to the host where the package is being installed.**

2. **Insert the CD into a CD-ROM or DVD-ROM drive.**

> **Note –** If your system is running Volume Manager, your system automatically mounts the CD to the /cdrom/cdrom0 directory.

a. **If your system is running Volume Manager, go to Step 4.**

b. **If your system is not running Volume Manager, go to Step 3.**

3. **Mount the CD as shown in the following screen example.**

```
# mkdir -p /cdrom/cdrom0
# mount -F hsfs -o ro /dev/dsk/c0t6d0s0 /cdrom/cdrom0
```

4. **If you are installing the software on a host server directly connected to the storage device, go to "To Install the Software on a Directly Connected Host System" on page 6.**

5. **If you are installing the software on client systems to be used only for remote monitoring, go to "To Install the SSM Software on a Client System" on page 8.**

▼ To Install the Software on a Directly Connected Host System

On a host system that is directly connected to one or more storage devices, you must install both software packages.

1. **Log in as superuser to the server.**

2. **Use the** `pkgadd` **command to install the software packages.**

Note – You *must* install the `SUNWssmu` package before installing the `SUNWssmr` package.

---

   a. **If you downloaded the software from the Sun web site, install the software from your working directory by typing:**

```
# pkgadd -d working-directory/storage_subsystem_manager_2_0/Packages SUNWssmu SUNWssmr
```

   b. **If you are installing the software from the CD, type:**

```
# pkgadd -d /cdrom/cdrom0/storage_subsystem_manager_2_0/Packages SUNWssmu SUNWssmr
```

3. **When prompted during the package installation, answer** `y` **to permit the** `pkgadd` **utility to launch the installation scripts.**

```
This package contains scripts which will be executed with superuser
permission during the process of installing this package.

Do you want to continue with the installation of this package
[y,n,?] y
```

The `pkgadd` utility installs the software and starts the SSM daemon (`ssmond`) if the installation succeeds. Refer to the `pkgadd`(1M) man page for more information about installing software packages.

4. **If the following message displays, go to** Step 6 **to create the configuration file and complete the installation.**

```
starting SSM server.
To complete installation, please type the command
/opt/SUNWssmu/bin/ssmadmin -c /etc/opt/SUNWssmu/ssmon.conf

Installation of <SUNWssmr> was successful.
```

Although the message states that installation was successful, you must continue with Step 6.

5. **If the following error message displays, which indicates that a previous version of SSM is detected on the system, stop the installation until you remove the previous version.**

```
WARNING:
    A version of <SUNWssmr> package "Storage Subsystem
    Manager (Root)" (which is incompatible with the package
    that is being installed) is currently installed and
    must be removed.
```

   a. **Answer** n

```
Do you want to continue with the installation of <SUNWssmr.2>
[y,n,?]
```

   b. **Remove the previous version as described in "Removing the SSM Software" on page 9.**

   c. **Go back to** Step 2 **to start installing the SSM 2.0 software again.**

6. **Create the configuration file by typing the following:**

```
# /opt/SUNWssmu/bin/ssmadmin -c /etc/opt/SUNWssmu/ssmon.conf
```

See"Creating and Updating the Configuration File" on page 17 for procedures.

7. **After creating the configuration file, stop and restart the SSM daemon using the** ssmgmt **script.**

```
# /etc/init.d/ssmgmt stop
# /etc/init.d/ssmgmt start
```

8. **Verify that the SSM daemon (**ssmond**) is running on the host system.**

   Use the ps command to see if the ssmond daemon is running. If the scripts successfully started the daemon, you should see output similar to the following:

```
# ps -e | grep ssmond
   310 ?        0:01 ssmond
```

   If the ssmond daemon is not running, check the system console and the /var/adm/messages file for error messages. Also, verify that the storage device has been installed correctly and is in good working order. You might need to remove the SSM software packages (see "Removing the SSM Software" on page 9) and re-install them.

▼ To Install the SSM Software on a Client System

Install only the SUNWssmu package on client systems. After installing the package, you can view status messages about remote storage devices from the client host.

1. **Log in to the client host as superuser.**

2. **Change directories to the** Packages **directory.**

   - If you downloaded the software from the Sun web site as in "To Access the Software from Sun's Web Site" on page 4, change to the Packages directory in your working directory, as shown in the screen example.

```
# cd working-directory/storage_subsystem_manager_2_0/Packages
```

   - If you are installing the software from the CD, change to the Packages directory using the pathname shown in the screen example:

```
# cd /cdrom/cdrom0/storage_subsystem_manager_2_0/Packages
```

3. **Use the** `pkgadd` **command to install the software packages.**

   a. **If you are installing the software on a client system, type:**

   ```
   # pkgadd -d . SUNWssmu
   ```

   b. **If you are installing the software to a diskless client system, you must specify the client's root directory using the** `pkgadd` **command's** `-R` **option. For example, if your client's root directory is** `/export/root/client1`**, you would type:**

   ```
   # pkgadd -R /export/root/client1 -d . SUNWssmu
   ```

   Refer to the `pkgadd`(1M) man page for more information about installing Solaris software packages.

   When the installation is complete, messages display saying that the software has been installed correctly.

Removing the SSM Software

This section describes how to stop the SSM daemon and remove the SSM software from a host system.

▼ To Remove the SSM Software

1. **Log in as superuser to the server where the storage device is connected.**

2. **Stop the SSM daemon.**

   ```
   # /etc/init.d/ssmgmt stop
   ```

3. **Use the** `pkgrm` **command to remove the SSM software packages.**

   ```
   # pkgrm SUNWssmr SUNWssmu
   ```

Viewing Status Messages

After you install the SSM software on a server, the software begins to check the status of the storage device(s) at regular intervals. By default, the software saves these status messages to the server's /var/adm/messages file every 5 seconds, using the system logging daemon, syslogd(1M).

You can view these status messages either on the server or on a client system on the network using the ssmadmin utility. If you use ssmadmin with the -view option, the utility displays a status message showing the current temperature thresholds and the status (online or offline) of the storage devices connected to the server. The utility also displays the temperature and status of each disk drive in the storage device(s). See FIGURE 1 for an example of a status message.

```
$ /opt/SUNWssmu/bin/ssmadmin -view hostname
Number of s1-D130 Units: 1
Critical Temperature Threshold:60 Degrees Celsius
Warning  Temperature Threshold:50 Degrees Celsius

TIME: Wed May 24 11:32:36 2000
****************************************************************
calistoga::s1-D130-1: Online
------------------
        DISK1[c1t11d0s2]:
                Serial Number: 9835416280
                Vendor: SEAGATE
                Model:  SUN9.0G
                Status: Online
                Current Temperature: 30 Degrees Celsius
        DISK2[c1t12d0s2]:
                Serial Number: 9835417742
                Vendor: SEAGATE
                Model:  SUN9.0G
                Status: Online
                Current Temperature: 31 Degrees Celsius
```

FIGURE 1   SSM Status Message

Note – If a disk drive is offline or bad, or if the drive does not support temperature readings, the temperature of the drive is not displayed.

You can also start the ssmadmin utility in blocking mode (using the -b option), which makes the utility display status messages only when there are changes to the status (for example, if a disk drive reaches a critical temperature or if you replace a disk drive). See "To View Messages Only When Status Changes" on page 12 for more information.

Note – See "Status Change Messages Format" on page 25 for a description of the SSM status messages.

▼ To View Status Messages

You can use the ssmadmin utility with the -view option for viewing status messages for a storage device from a directly connected host server or from a remote client system.

1. **To view the status messages while logged into a directly connected host server (**FIGURE 1**), use the** ssmadmin **utility as shown in the following screen example.**

```
# /opt/SUNWssmu/bin/ssmadmin -view
```

2. **To view the status messages while logged into a remote client host on the network, add the** *hostname* **of the directly connected server to the command:**

```
# /opt/SUNWssmu/bin/ssmadmin -view hostname
```

▼ To View the Status Message at Regular Intervals

1. **Use the** ssmadmin **utility with the** -i **option.**

   Replace *seconds* with the number of seconds between displaying the status messages.

```
# /opt/SUNWssmu/bin/ssmadmin -i seconds
```

2. **To view the status message of a remote server on the network, add the** *hostname* **of the server to the command:**

```
$ /opt/SUNWssmu/bin/ssmadmin -i seconds hostname
```

While the ssmadmin utility displays the status message at the interval you specify, the SSM software does not check the temperatures and status of the hardware at this interval. You must change the polling interval, as described in "Changing the Software Settings" on page 14, to make the SSM server software check the hardware status at different intervals.

▼ To View Messages Only When Status Changes

When you start the ssmadmin utility in blocking mode, the utility displays the status message (FIGURE 1), and it subsequently displays status change messages only if there are changes to the status of a disk drive or a storage device. See "Status Change Messages Format" on page 25 for a description of these messages.

Note – When starting the ssmadmin utility with the -b option, you should add an ampersand (&) to force the utility to run as a background process. Using the ampersand returns the system prompt to you, which enables you to continue to use the terminal window. The SSM status change messages are displayed in the terminal window where you started the utility.

● **To view status change messages, start the** ssmadmin **utility with the** -b **option.**

To view the status changes messages of the storage device(s) connected to the server, use the ssmadmin utility while logged in to the server:

```
# /opt/SUNWssmu/bin/ssmadmin -b &
```

To view the status change messages of a remote server on the network, add the *hostname* of the server to the command:

```
# /opt/SUNWssmu/bin/ssmadmin -b hostname &
```

After displaying a status message, the ssmadmin utility displays status change messages if the status of the hardware changes (see FIGURE 2 for an example).

```
# /opt/SUNWssmu/bin/ssmadmin -b hostname &
Number of s1-D130 Units: 1
Critical Temperature Threshold:60 Degrees Celsius
Warning  Temperature Threshold:50 Degrees Celsius

TIME: Wed May 24 15:16:42 2000
***************************************************************
host-1a::s1-D130-1: Online
------------------
        DISK1[c1t2d0s2]:
                Serial Number: 9905E95586
                Vendor: SEAGATE
                Model:  SUN18G
                Status: Online
                Current Temperature: 30 Degrees Celsius
Mon Jul 23 14:30:19 2001: WARNING TEMPERATURE (30 Degrees Celsius)
Threshold Exceeded: atqa99::s1-D130-2==>c0t10d0s0[sn=9943571437,
model=SUN18G, vendor=SEAGATE]
Mon Jul 23 14:30:34 2001: Temperature within the normal range:
atqa99::s1-D130-2==>c0t10d0s0[sn=9943571437, model=SUN18G,
vendor=SEAGATE]
```

FIGURE 2   SSM Blocking Mode Status Change Messages (ssmadmin -b)

Changing the Software Settings

This section defines the default SSM software configuration settings, and explains how you can change these settings temporarily with the `ssmadmin` utility or permanently by editing the `smmon.conf` file.

Default Software Configuration Settings

During the software installation, the installation scripts create the `/etc/opt/SUNWssmu/ssmon.conf` configuration file. This file (shown below) contains the default software settings and a description of the storage devices.

```
# Copyright (c) 2000 by Sun Microsystems, Inc.
#
#
# @(#)ssmon.conf 1.5 00/05/05 SMI
#

# Polling Granularity in seconds
poll_interval   5

# Enable/Disable (1/0) syslog of status changes
syslog_enable   1

# Critical temperature threshold in Celsius

critical_temperature_threshold  60

# Warning temperature threshold in Celsius

warning_temperature_threshold   50
# AVAILABLE DEVICES:
```

Note – If the SERIAL NUMBER field is blank, the SSM software still runs correctly. The field might be blank if the disk drive was bad when the software was first installed or when the configuration file was updated using the `ssmadmin` utility (see "Creating and Updating the Configuration File" on page 17). You can use the SSM software to verify that the disk drive is operating correctly.

The following table describes the configurable SSM software settings.

TABLE 7   Configurable SSM Software Settings

Setting	Description
poll_interval	The time interval in seconds that the software checks the status of the storage device hardware. The default polling interval is 5 seconds.
syslog_enable	Enable or disable the logging of status change and error messages to the server's system log file (/var/adm/messages). 0 = Disabled 1 = Enabled (default value)
critical_temperature_threshold	The maximum critical temperature threshold (in degrees Celsius) of a disk drive within a storage device. The default threshold is 60°C: this setting is appropriate for a typical installation.
warning_temperature_threshold	The warning temperature threshold (in degrees Celsius) of a hard drive within a storage device. The default threshold is 50°C.

▼ To Change the Software Settings Temporarily

You can use this procedure to change the SSM software's critical and warning temperature thresholds using the ssmadmin utility. However, if you stop and restart the SSM daemon, the settings revert back to the values set in the ssmon.conf file.

1. **Log in to the server as superuser.**

2. **Use the** ssmadmin **utility to change the thresholds to the temperatures you want.**

   TABLE 8 lists the ssmadmin options to use to change the software temperature thresholds.

TABLE 8   ssmadmin Utility Options

ssmadmin **Option**	Description
-sc *temperature*	Set the critical temperature threshold.
-sw *temperature*	Set the warning temperature threshold.

You can set one or both of the settings at once. The following example sets the critical threshold to 50°C and the warning threshold to 40°C.

```
# /opt/SUNWssmu/bin/ssmadmin -sc 50 -sw 40
```

▼ To Change the Software Settings Permanently

If you want the configuration settings to be saved after the SSM daemon is restarted, or after the server is rebooted, you must to edit the ssmon.conf file and then restart the SSM daemon.

1. **Log in to the server as superuser.**

2. **Using a text editor, edit the** ssmon.conf **file and change the settings to your preferred values.**

   See TABLE 7 for a description of the ssmon.conf settings.

   Note – Do not edit below the AVAILABLE DEVICES line of the configuration file. You must use the ssmadmin utility to update the hardware section of the configuration file (see "Creating and Updating the Configuration File" on page 17).

   ---

3. **After editing the configuration file, stop and restart the SSM daemon.**

   ```
   # /etc/init.d/ssmgmt stop
   # /etc/init.d/ssmgmt start
   ```

Creating and Updating the Configuration File

The SSM configuration file (`ssmon.conf`) describes the storage devices attached to the server. Create this file after loading the SSM 2.0 software. If you change the hardware setup of the server or storage device (for example, if you add a new storage device or replace a disk drive), use the `ssmadmin` utility to update the `ssmon.conf` file so that it describes the hardware accurately.

▼ To Create or Update the Configuration File

1. **Log in to the server as superuser.**

2. **Type the `ssmadmin` command as shown in the screen example to start the creation or re-creation of the SSM configuration file.**

   ```
   # /opt/SUNWssmu/bin/ssmadmin -c /etc/opt/SUNWssmu/ssmon.conf
   ```

   A list of disk units (storage devices) is displayed. Select the base target addresses for the storage device installed on the system.

   Note – For Sun StorEdge S1 arrays, the base target address is the SCSI address of the first disk. For D240 media trays, the default target addresses are 0 and 1, or if daisy-chained, the single target address is 0 only. For Netra D130 storage arrays, the default target addresses are 2 and 10. A disk drive must be installed in the base target address of the storage device.

   ---

3. **Select the first base address for the storage device.**

   The screen example shows the first base target address is 2. Menu selection 2 selects the drive at bus 0 target 2 and the three drives associated with that base address are marked with asterisks.

```
Reading configuration file:  /etc/opt/SUNWssmu/ssmon.conf

Searching for disks...done

WARNING: A disk drive must be physically installed in the
         base target slot of each storage unit.

Press enter to continue:

Disks found on the system:

Disk
Number  Bus     Target  Disk
    1       0       0      c0t0d0s0
    2       0       2      c0t2d0s0
    3       0       3      c0t3d0s0
    4       0       4      c0t4d0s0
    5       0      10      c0t10d0s0
    6       0      11      c0t11d0s0
    7       0      12      c0t12d0s0

Please enter the disk number of the base target address of
the storage unit.  NOTE:  An asterisk denotes a selected disk.

Enter 'q' when finished.  (#,q): 2

Disks found on the system:

Disk
Number  Bus     Target  Disk
    1       0       0      c0t0d0s0
*   2       0       2      c0t2d0s0
*   3       0       3      c0t3d0s0
*   4       0       4      c0t4d0s0
    5       0      10      c0t10d0s0
    6       0      11      c0t11d0s0
    7       0      12      c0t12d0s0
```

4. **Select the second (and subsequent) base address(es) for the storage device.**

   The screen example shows the second base target address is 10. Menu selection 5 selects the drive at bus 0 target 10 and the three drives associated with that base address are marked with asterisks.

```
Please enter the disk number of the base target address of
the storage unit.  NOTE:  An asterisk denotes a selected disk.

Enter 'q' when finished.  (#,q): 5

Disks found on the system:

Disk
Number  Bus      Target  Disk
    1     0         0      c0t0d0s0
*   2     0         2      c0t2d0s0
*   3     0         3      c0t3d0s0
*   4     0         4      c0t4d0s0
*   5     0        10      c0t10d0s0
*   6     0        11      c0t11d0s0
*   7     0        12      c0t12d0s0


Please enter the disk number of the base target address of
the storage unit.  NOTE:  An asterisk denotes a selected disk.

```

5. **Once the base addresses are selected, type** q **to exit the utility.**

```
Enter 'q' when finished.  (#,q): q
```

A list of all selected drives is displayed and you are asked to save the configuration.

6. **Type** y **to save the configuration.**

```
The following disks have been selected:

/dev/rdsk/c0t2d0s0
/dev/rdsk/c0t3d0s0
/dev/rdsk/c0t4d0s0
/dev/rdsk/c0t10d0s0
/dev/rdsk/c0t11d0s0
/dev/rdsk/c0t12d0s0

Save configuration? (y,n): y


The SSM daemon must be stopped and restarted after re-creating
the configuration file. Use the ssmgmt script to stop and start
the daemon:
    # /etc/init.d/ssmgmt stop
    # /etc/init.d/ssmgmt start
```

The following message appears if disks designated in the configuration file do not physically exist.

```
root[ksh]@atqa99:/% /opt/SUNWssmu/bin/ssmadmin -c
/etc/opt/SUNWssmu/ssmon.conf

Reading configuration file:  /etc/opt/SUNWssmu/ssmon.conf

Searching for disks...done

WARNING:  The following disks were listed in
          the configuration file but were
          not found on the system:

/dev/rdsk/c0t13d0s0
/dev/rdsk/c0t14d0s0
/dev/rdsk/c0t15d0s0

Continue with configuration (y/n)? n
```

7. If the previous message displays, type n to stop working on the configuration file, and start again at Step 2 after making sure the disks are physically connected.

8. **After re-creating the configuration file, type the commands shown in the following screen example to stop and restart the SSM daemon.**

```
# /etc/init.d/ssmgmt stop
# /etc/init.d/ssmgmt start
```

Creating and Using a Different Configuration File

You can also use the ssmadmin utility to create a configuration file with a different file name or to create a new configuration file in a different directory location from that of the default ssmon.conf file. For example, you might want to create a different configuration file to save your software settings before reinstalling the Solaris software or to save a copy of the hardware settings in a different location.

▼ To Create and Use a Different Configuration File

1. **Log in to the host server where the storage device is connected as superuser.**

2. **Create a different configuration file.**

   Replace *filename* with the absolute path name (for example, /etc/opt/SUNWssmu/newfile.conf) of the new configuration file.

   ```
   # /opt/SUNWssmu/bin/ssmadmin -c filename
   ```

3. **Select the base address(es) for the storage device(s).**

   A list of disk units (storage devices) is displayed from which you select the base target addresses for the storage devices installed on the system.

   Note – For Sun StorEdge S1 arrays, the base target address is the SCSI address of the first disk. For D240 media trays, the default target addresses are 0 and 1, or if daisy-chained, the single target address is 0 only. For Netra st D130 storage arrays, the default target addresses are 2 and 10. A drive must be installed in the base target address of the array.

   ---

4. **Select the first base address for the storage device.**

    The screen example shows the first base target address is 2, which selects the drive at bus 0 target. The three drives associated with that base address are marked with asterisks.

```
Reading configuration file:  /etc/opt/SUNWssmu/ssmon.conf

Searching for disks...done

WARNING: A disk drive must be physically installed in the
         base target slot of each storage unit.

Press enter to continue:

Disks found on the system:

Disk
Number  Bus     Target  Disk
   1      0        0     c0t0d0s0
   2      0        2     c0t2d0s0
   3      0        3     c0t3d0s0
   4      0        4     c0t4d0s0
   5      0       10     c0t10d0s0
   6      0       11     c0t11d0s0
   7      0       12     c0t12d0s0

Please enter the disk number of the base target address of
the storage unit.  NOTE:  An asterisk denotes a selected disk.

Enter 'q' when finished.  (#,q): 2

Disks found on the system:

Disk
Number  Bus     Target  Disk
   1      0        0     c0t0d0s0
*  2      0        2     c0t2d0s0
*  3      0        3     c0t3d0s0
*  4      0        4     c0t4d0s0
   5      0       10     c0t10d0s0
   6      0       11     c0t11d0s0
   7      0       12     c0t12d0s0
```

5. **Select the second (and subsequent) base address(es) for the storage device.**

The screen example shows the second base target address is 10. Menu selection 5 selects the drive at bus 0 target 10 and the three drives associated with that base address are marked with asterisks.

```
Please enter the disk number of the base target address of
the storage unit.  NOTE:  An asterisk denotes a selected disk.

Enter 'q' when finished.  (#,q): 5

Disks found on the system:

Disk
Number  Bus     Target  Disk
    1     0        0      c0t0d0s0
*   2     0        2      c0t2d0s0
*   3     0        3      c0t3d0s0
*   4     0        4      c0t4d0s0
*   5     0       10      c0t10d0s0
*   6     0       11      c0t11d0s0
*   7     0       12      c0t12d0s0


Please enter the disk number of the base target address of
the storage unit.  NOTE:  An asterisk denotes a selected disk.
```

6. **Once the base addresses are selected, type** q **to exit the utility and then save the configuration.**

   A list of all selected drives is displayed, and you are asked to save the configuration.

```
Enter 'q' when finished.  (#,q): q


The following disks have been selected:

/dev/rdsk/c0t2d0s0
/dev/rdsk/c0t3d0s0
/dev/rdsk/c0t4d0s0
/dev/rdsk/c0t10d0s0
/dev/rdsk/c0t11d0s0
/dev/rdsk/c0t12d0s0

Save configuration? (y,n): y


The SSM daemon must be stopped and restarted after re-creating
the configuration file. Use the ssmgmt script to stop and start
the daemon:
    # /etc/init.d/ssmgmt stop
    # /etc/init.d/ssmgmt start
```

7. **If the SSM daemon (**ssmond**) is running, stop it.**

```
# /etc/init.d/ssmgmt stop
```

8. **Start the SSM daemon using the new configuration file.**

   When using a different configuration file, do not use the ssmgmt script to start the SSM daemon. Instead, start the ssmond daemon using the -f *filename* option:

```
# /opt/SUNWssmu/bin/ssmond -f filename
```

   Replace *filename* with the absolute path name of the new configuration file. For example:

```
# /opt/SUNWssmu/bin/ssmond -f /etc/opt/SUNWssmu/newfile.conf
```

Status Change Messages Format

At regular intervals, the SSM software verifies the status of the disk drives within the storage device, as well as the device's enclosure. If there is a change to the hardware (for example, if a storage device goes offline or a disk drive exceeds a temperature threshold), the SSM daemon (`ssmond`) sends a status change message to the system's `/var/adm/messages` file. You can also view these messages using the `ssmadmin` utility, as described in "Viewing Status Messages" on page 10.

Status change messages follow this format:

date time: *status message*: *hostname*::*enclosure*==>*device*[sn=*serial-number*, model=*model*, vendor=*vendor*]:

Where:

- Each status change message is prefaced with the *date* and *time* that the software reported the message.
- *status message* is the status message. Status messages are described in TABLE 9.
- *hostname* is the host name of the system running the SSM software.
- *enclosure* is the name and number of the storage enclosure specified in the `ssmon.conf` file.
- *device* is the disk drive device name, including the SCSI controller number, target number, device number, and slice number.
- *serial-number* is the serial number of the disk drive, which is located on the drive's front panel. The field is blank if the disk drive was offline or bad when either the software was first installed or when the configuration file was updated using the `ssmadmin` utility.
- *model* is the model type of the disk drive.
- *vendor* is the disk drive vendor's name.

The following example status change message displays the message format when using the `ssmadmin` utility with the `-b` option (blocking mode):

```
Mon Jul 23 14:30:19 2001: WARNING TEMPERATURE (30 Degrees Celsius)
Threshold Exceeded: atqa99::s1-D130-2==>c0t10d0s0[sn=9943571437,
model=SUN18G, vendor=SEAGATE]
Mon Jul 23 14:30:34 2001: Temperature within the normal range:
atqa99::s1-D130-2==>c0t10d0s0[sn=9943571437, model=SUN18G,
vendor=SEAGATE]
```

See "Viewing Status Messages" on page 10 for more information about using
ssmadmin in blocking mode.

In the /var/adm/messages file, the status change messages are prefaced with the
date, time, and, if the server is running a version of the Solaris operating
environment that supports this functionality, the process ID number of the SSM
daemon in the form ssmond[*PID*].

```
Mon Jul 23 13:58:40 2001: Disk Online:
atqa99::s1-D130-1==>c0t4d0s0[sn=0103D1G6QE, model=SUN36G,
vendor=SEAGATE]
Mon Jul 23 14:30:19 2001: WARNING TEMPERATURE (30 Degrees Celsius)
Threshold Exceeded: atqa99::s1-D130-2==>c0t10d0s0[sn=9943571437,
model=SUN18G, vendor=SEAGATE]
Jul 23 14:30:34 atqa99 ssmond[13105]: [ID 702911 daemon.crit]
Temperature within the normal range:
atqa99::s1-D130-2==>c0t10d0s0[sn=9943571437, model=SUN18G,
vendor=SEAGATE]
```

TABLE 9   Status Messages

Message	Cause	User Actions
UNIT OFFLINE	The storage device (unit) has gone offline, or all of the disk drives have been removed.	Check to see if the storage device is powered on, and verify that the cables are connected correctly. Add disk drives to the device if all of the drive bays are empty.
Unit Online	The storage device (unit) has successfully come online.	None.
DISK OFFLINE	The disk drive has gone offline.	Verify that the disk drive is installed correctly and is in working order. Replace the disk if necessary.
Disk Online	The disk drive has successfully come online and is operating normally.	None.
DISK MIGRATED	The disk drive has been moved to a different drive bay in a storage device, or a new disk drive has replaced the original drive.	Move the disk drive to the correct drive bay. Or, update the ssmon.conf file to reflect the new configuration (see "Creating and Updating the Configuration File" on page 17).
DISK BAD	The disk drive has failed.	Replace the faulty disk drive.
Disk Good	The disk drive has changed from bad to good and is operating normally.	None.

TABLE 9   Status Messages *(Continued)*

Message	Cause	User Actions
`CRITICAL TEMPERATURE` `(`*`temperature`* `Degrees` `Celsius) Threshold` `Exceeded`	The disk drive temperature is greater than critical threshold (shown as *temperature* in the message).	**Caution:** *Immediate* **action required.** Irreversible damage to the hardware and stored data might occur shortly. Make sure the storage device is receiving enough air circulation. Move any items blocking the front air filter, and clean the filter if it is dirty. If possible, lower the ambient temperature of the room.
`Temperature below` `Critical Temperature`	The disk drive temperature has fallen below the critical threshold.	None. However, the temperature might be higher than the warning temperature threshold. If possible, continue to decrease the temperature of the disk drive.
`WARNING TEMPERATURE` `(`*`temperature`* `Degrees` `Celsius) Threshold` `Exceeded`	The disk drive temperature is greater than the warning threshold (shown as *temperature* in the message).	**Caution: Action required.** The critical temperature threshold might be reached soon. Make sure the storage device is receiving enough air circulation. Move any item blocking the front air filter, and clean the filter if it is dirty. If possible, lower the ambient temperature of the room.
`Temperature within the` `normal range`	The disk drive temperature has fallen below the warning threshold and is operating in the normal temperature range.	None.

Caution – If a disk drive's temperature exceeds the warning or critical temperature threshold, you must take steps to decrease the temperature of the disk drives *immediately*. Failure to decrease the temperature might cause irreparable damage to the disk drive and the data saved on the drive.

Caution – If a disk drive's temperature exceeds the warning or critical temperature threshold, the disk drive might cause burns if touched. Take steps to decrease the temperature of the disk drive before removing or replacing an overheated disk drive.

`ssmadmin` Utility Error Messages

When using the `ssmadmin` utility, you might receive the following error messages.

`ssmadmin: Not super user`

Cause: You attempted to change the critical or warning temperature thresholds without being superuser on the SSM host server.

User Action: Become superuser, or log in to the SSM host server as root, before setting the temperature thresholds.

`ssmadmin: Not a valid host:` *hostname*

Cause: The host name was incorrectly typed or is not a valid host name on the network.

User Action: Confirm that the host name is correct and exists on the network, and retry the command.

`ssmadmin: Invalid command line arg:` *argument*

Cause: You started the utility with a mistyped or incorrect command-line argument, or you forgot to include a value with an argument. For example, you might have used the `-sc` or `-sw` arguments without giving a temperature value.

User Action: Verify that the command-line argument is correct. View the `ssmadmin`(1M) man page for the utility's correct command-line usage.

`ssmadmin: Cannot connect to remote host:` *hostname*
`SSM Server may not be running on host` *hostname* `or hostname`
hostname `is not correct.`

Cause: The SSM host server is offline or down, or you mistyped the host name.

User Action: Verify that the host name is correct. If host server is down, restart the server and the SSM server software.

`ssmadmin: SSM Server not responding. Exiting . . .`

Cause: The SSM daemon (`ssmond`) on the host server has been stopped or has exited. The `ssmadmin` utility will disconnect from the SSM host server.

User Action: If possible, restart the SSM daemon on the host server and restart the `ssmadmin` utility.