Netra™ st D130 Storage Subsystem Manager 1.0 User's Guide

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Netra st D130 Storage Subsystem Manager Software 1.0 User's Guide

This user's guide describes how to install and use the Netra™ st D130 Storage Subsystem Manager (SSM) 1.0 software. This guide contains the following sections:

Note – The SSM software supports the Netra st D130 thin storage *only*. The software is not supported on the Netra st A1000 storage enclosure, the Netra st D1000 storage enclosure, or any other Sun™ storage product.

Introducing the Netra st D130 SSM Software

The Netra st D130 Storage Subsystem Manager (SSM) software monitors the status of the Netra st D130 thin storage and the disk drives within the storage enclosure.

The SSM software monitors the storage enclosures (which are referred to as units by the software) and displays a status change message if one goes offline. The software also displays a message if a storage enclosure disk drive has gone offline, has failed, or has been moved to a different drive bay within the storage enclosure. 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 on either the host system or from any system on the network using the `ssmadmin` utility. You can also change the SSM configuration settings to suit your server environment.

For more information about the SSM 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 for instructions on setting environment variables.

Installing the SSM Software

You can either download the SSM software from the Sun web site, or you can install the software from the *Netra st D130 Storage Subsystem Manager* 1.0 CD.

The following table lists the two SSM software packages. You must install both software packages on host servers that have storage enclosures, but you only need to install the `SUNWssmu` package on client systems that will be used to monitor host servers.

TABLE 1 Netra st D130 Storage Subsystem Manager Software Packages

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

▼ To Download the Software From the Sun Website

1. **Using a web browser, go to the** `http://sun.com/downloads/` **web site.**
2. **Download the Netra Storage System Manager software.**

   Follow the instructions on the web site to download a compressed tar file of the software. Save the tar file to a working directory, such as your system's `/tmp` directory.
3. **Change directories to the working directory.**
4. **Uncompress and un-tar the tar file.**

   You can use the `zcat` and `tar` commands to extract the files from the tar file:

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

   A new directory called `Storage_Subsystem_Manager` will be created in your working directory. If you are installing the software on a host server with storage enclosures, go to "To Install the Software on a Host Server" on page 4. If you are installing the software on client systems that will be used only to monitor servers, go to "To Install the Software on a Client System" on page 5.

▼ To Mount the CD-ROM

- **Insert the CD into a CD-ROM or DVD-ROM drive.**
  - If your system is running Volume Manager, it will automatically mount the CD to the `/cdrom/cdrom0` directory.
  - If your system is not running Volume Manager, become superuser, then mount the CD as follows:

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

After mounting the CD-ROM, continue with the software installation as described in the following procedures. If you are installing the software on a host server with storage enclosures, go to "To Install the Software on a Host Server" on page 4. If you are installing the software on client systems that will be used only to monitor servers, go to "To Install the Software on a Client System" on page 5.

▼ To Install the Software on a Host Server

On a host server that has one or more storage enclosures, you must install both software packages.

1. **Log in to the host server as superuser.**
2. **Use the** pkgadd **command to install the software packages.**

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

- 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/Packages SUNWssmu SUNWssmr
```

- If you are installing the software from the CD, type:

```
# pkgadd -d /cdrom/cdrom0/Storage_Subsystem_Manager/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 run scripts to create the default configuration file (ssmon.conf) and to start the SSM daemon (ssmond). Refer to the pkgadd(1M) man page for more information about installing Solaris software packages.

4. **Verify that the SSM daemon (`ssmond`) is running on the host server.**

   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 enclosures have been installed correctly and are in good working order. You may need to remove the SSM software packages (see “Removing the SSM Software From Your System” on page 20) and re-install them.

▼ To Install the Software on a Client System

You only need to install the `SUNWssmu` package on client systems. After installing the package, you can view status messages of host servers over the network.

1. **Log in to the client system as superuser.**
2. **Change directories to the `Packages` directory.**
   - If you downloaded the software from the Sun website, the `Packages` directory will be in your working directory.

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

   - If you are installing the software from the CD, change to the `Packages` directory by typing:

```
# cd /cdrom/cdrom0/Storage_Subsystem_Manager/Packages
```

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

   - If you are installing the software on a client system with a local disk drive, type:

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

   - 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, you will see messages saying that the software has been installed correctly.

Viewing the Status Messages

After you have installed the SSM software on server systems, it will begin to check the status of the storage enclosures at regular intervals. By default, the software will save these status change messages to the server's /var/adm/messages file using the system logging daemon, syslogd(1M), every 5 seconds.

You can view these status messages on either the host server or from another 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 enclosures on the host server. The utility will also display the temperature and status of each storage enclosure disk drive. See FIGURE 1 for an example of a status message.

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

TIME: Wed May 24 11:32:36 2000
************************************************************
calistoga::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, bad, or if the drive does not support temperature readings, the temperature of the drive will not be displayed.

You can also start the `ssmadmin` utility in blocking mode (using the `-b` option), which makes the utility display status change messages only when there are changes to the status (for example, if a disk drive reaches a critical temperature or if you replace a drive). See “To View Status Change Messages” on page 9 for more information.

Note – See “Status Change Messages” on page 17 for a description of the SSM status change messages.

▼ To View the Status Message

- **To view the status message, start the `ssmadmin` utility with the `-view` option.**

  To view the status message for the storage enclosures on the host server (FIGURE 1), use the `ssmadmin` utility while logged in to the host server:

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

  To view the status message of another server on the network, add the *hostname* of the server to the command:

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

- **To view the status message at regular intervals, 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
  ```

  To view the status message of another server on the network, add the *hostname* of the server to the command:

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

  While the `ssmadmin` utility will display the status message at the interval you specify, the SSM software will 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 12, to make the SSM server software check the hardware status at different intervals.

▼ To View Status Change Messages

When you start the `ssmadmin` utility in blocking mode, the utility will display the status message (FIGURE 1) and then it will display status change messages only if there are changes to the status of a disk drive or a storage enclosure. See “Status Change Messages” on page 17 for a description of these messages.

Note – When starting the `ssmadmin` utility with the `-b` option, you should add an ampersand (&) in order to force the utility to be run as a background UNIX process. Using the ampersand will return the system prompt, which will allow you to continue to use the terminal window. The SSM status change messages will be 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 enclosures on the host server, use the `ssmadmin` utility while logged in to the host server:

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

  To view the status change messages of another 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 will display status change messages if the status of the hardware changes (see FIGURE 2 for an example).

```
$ /opt/SUNWssmu/bin/ssmadmin -b host-1a &
Number of 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::D130-1: Online
------------------
        DISK1[c1t2d0s2]:
                Serial Number: 9905E95586
                Vendor: SEAGATE
                Model:  SUN18G
                Status: Online
                Current Temperature: 30 Degrees Celsius
Wed May 24 15:27:13 2000: host-1a::D130-1==>c1t2d0s2[SN=9905E95586,
MODEL=SUN18G, VENDOR=SEAGATE]: CRITICAL Temperature (60 Degrees Celsius)
Threshold Exceeded
Wed May 24 15:47:34 2000: host-1a::D130-1==>c1t2d0s2[SN=9905E95586,
MODEL=SUN18G, VENDOR=SEAGATE]: Temperature Below Critical Threshold
```

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

`ssmadmin` Utility Error Messages

When using the `ssmadmin` utility, you may 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 into 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 mis-typed or incorrect command-line argument, or you forgot to include a value with an argument. For example, you may 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 mis-typed 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.

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 enclosures.

```
# 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:

#DEVICE NAME        D130 NAME       DISK NAME  MODEL   VENDOR   SERIAL NUMBER

/dev/rdsk/c1t2d0s2  hostname::D130-1  DISK1     SUN18G   SEAGATE  0004B58316
/dev/rdsk/c1t3d0s2  hostname::D130-1  DISK2     SUN18G   SEAGATE  9905E95586
/dev/rdsk/c1t4d0s2  hostname::D130-1  DISK3     SUN18G   SEAGATE  0004B67108
```

Note – If the SERIAL NUMBER field is blank, the SSM software will still run correctly. The field may be blank if the disk drive was bad when the software was first installed or when the configuration file was updated using `ssmadmin` utility (see "Updating the Configuration File" on page 15). 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 2 Configurable SSM Software Settings

Setting	Description
`poll_interval`	The time interval in seconds that the software checks the status of the storage enclosure 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 enclosure. The default threshold is 60˚C.
`warning_temperature_threshold`	The warning temperature threshold (in degrees Celsius) of a disk drive within a storage enclosure. The default threshold is 50˚C.

▼ To Change the Settings Temporarily

You can 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 will revert back to the values set in the `ssmon.conf` file.

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

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

   TABLE 3 lists the `ssmadmin` options to use to change the software temperature thresholds.

TABLE 3 `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 55˚C and the warning threshold to 45˚C.

```
# /opt/SUNWssmu/bin/ssmadmin -sc 55 -sw 45
```

▼ To Change the Settings Permanently

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

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

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

   See TABLE 2 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 "Updating the Configuration File" on page 15).

---

3. **After editing the configuration file, stop and restart the SSM daemon using the `ssmgmt` script.**

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

Updating the Configuration File

The SSM configuration file (`ssmon.conf`) describes the storage enclosures attached to the server. If you change the hardware setup of your server or storage enclosure (for example, if you add a new storage enclosure or replace a disk drive), use the `ssmadmin` utility to update the `ssmon.conf` file so that it describes the hardware accurately.

▼ To Update the Configuration File

1. **Log in to the host server as superuser.**
2. **Use the `ssmadmin` utility with the `-c` option to re-create the SSM configuration file.**

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

After re-creating the configuration file, stop and restart the SSM daemon using the `ssmgmt` script.

```
# /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 configuration file with a different file name or to create a new configuration file in a different directory than the default `ssmon.conf` file. You may want to create a different configuration file to save your software settings before reinstalling the Solaris software, or you may want 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 as superuser.**

2. **Use the `ssmadmin` utility with the `-c` option to create a different SSM 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. **If the SSM daemon (`ssmond`) is running, use the `ssmgmt` script to stop it.**

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

4. **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

At regular intervals, the SSM software verifies the status of the disk drives within the storage enclosures, as well as the storage enclosures themselves. If there is a change to the hardware (for example, if a storage enclosure 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 the Status Messages" on page 6.

Status change messages follow this format:

date time hostname`::`*enclosure*`==>`*device*`[SN=`*serial-number*`, MODEL=`*model*`, VENDOR=`*vendor*`]:`
status message

In the preceding message:

- Each status change message will be prefaced with the *date* and *time* that the software reported the message.
- *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 disk's front panel. The field may be blank if the disk drive was offline or bad when either the software was first installed or when the configuration file was updated using `ssmadmin` utility.
- *model* is the model type of the disk drive.
- *status message* is the status message. Status messages are described in TABLE 4.

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

```
Wed May 24 15:17:13 2000: host-1a::D130-1==>c1t2d0s2[SN=9905E95586, MODEL=SUN18G,
VENDOR=SEAGATE]: CRITICAL Temperature (60 Degrees Celsius) Threshold Exceeded
Wed May 24 15:17:34 2000: host-1a::D130-1==>c1t2d0s2[SN=9905E95586, MODEL=SUN18G,
VENDOR=SEAGATE]: Temperature Below Critical Threshold
```

See "Viewing the Status Messages" on page 6 for more information about using `ssmadmin` in blocking mode.

In the /var/adm/messages file, the Solaris kernel prefaces these status change messages with a the date, time, host name, and, if your system is running the Solaris 7 operating environment or future compatible versions, the process ID number of the SSM daemon.

```
May 26 14:15:58 host-1a ssmond[3254]:
host-1a::D130-1==>c1t11d0s2[SN=9835416280, MODEL=SUN9.0G, VENDOR=SEAGATE]:Disk
Online
May 26 16:27:03 host-1a ssmond[3254]:
host-1a::D130-1==>c1t11d0s2[SN=9835416280, MODEL=SUN9.0G,
VENDOR=SEAGATE]:Warning Temperature (20 Degrees Celsius) Threshold Exceeded
May 26 16:41:48 host-1a ssmond[3254]:
host-1a::D130-1==>c1t11d0s2[SN=9835416280, MODEL=SUN9.0G,
VENDOR=SEAGATE]:Temperature within the normal range
```

TABLE 4 Status Messages

Message	Cause	User Actions
Unit Offline	The storage enclosure (unit) has gone offline, or all of the disk drives have been removed.	Check to see if the enclosure is powered on, and verify that the cables are connected correctly. Add disk drives to the storage enclosure if all of the drive bays are empty.
Unit Online	The storage enclosure (unit) has successfully become 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 an enclosure, 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 “Updating the Configuration File” on page 15).
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.	

TABLE 4 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 may occur shortly.	Make sure the storage enclosure 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 may 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 may be reached soon.	Make sure the storage enclosure 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 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 may cause irreparable damage to the disk drive and the data saved on the drive.

Caution – If a disk drive temperature exceeds the warning or critical temperature threshold, the drive will be extremely hot and may cause burns if touched. Take steps to decrease the temperature of the drive before removing or replacing an overheated disk drive.

Removing the SSM Software From Your System

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

▼ To Remove the Software

1. **Log in to your system as superuser.**
2. **Stop the SSM daemon using the** `ssmgmt` **run control script.**

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

3. **Remove the SSM software packages using the** `pkgrm` **command.**

```
# pkgrm SUNWssmr SUNWssmu
```