Using Power Management

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Preface

The *Using Power Management*™ manual describes how to use software provided with the Solaris™ release to configure and operate desktop computers to conserve energy. System power management is not intended for use on server computers, though managing power for a display connected to a computer used as a server may be of value.

This manual describes use of these features in terms of how they can be applied to workstations produced by Sun Microsystems™, Inc. If you are using this Solaris release on hardware supplied by another manufacturer, refer to information sources for those products to determine whether this Power Management software can be used with your hardware, and which distinctions within this manual (such as between machines with sun4m and sun4u architectures) apply to your hardware.

The Solaris 2.6 release is the first time Power Management™ software is provided as an integral part of the Solaris operating environment.

Who Should Use This Book

This manual is intended for anyone wanting to use Power Management software to reduce the power used by a SPARC workstation.

Note - The features described in this manual are in effect only for SPARC workstations running this Solaris release.

How This Book Is Organized

This manual contains the following chapters and appendixes:

Chapter 1, describes the value of reducing power consumption through Power Management features and provides an overview of how those features can be used.

Chapter 2, describes how to use desktop software features to turn off power to the display monitor when that device isn't in use.

Chapter 3, describes the features that enable a desktop system to power off automatically when not in use. This power saving method is made practical by using the Suspend-Resume feature, which can record the system's current state when it is powered down, and then return it to that state when powered up again.

Appendix A, describes a way to configure Power Management features through the `pmconfig` command and the `power.conf` file. This appendix also explains how to change the idleness definition by editing the `power.conf` file.

Appendix B, explains how to respond to various problems and error messages related to Power Management software.

Related Books

If you have a SPARCstation™ Voyager™ system, there are some special power management features for that hardware. For information about those features, see *Platform Notes: SPARCstation Voyager Software Guide*, which is available in the *Solaris 2.6 on Sun Hardware AnswerBook* supplied by Sun Microsystems Computer Company.

Developers of products that will use Power Management features should refer to the *Writing Device Drivers* manual.

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	`#`

Ordering Sun Documents

SunDocs® 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–3   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/`

Introduction to Power Management

Value of Power Management

Power Management software contributes to improving your system's energy efficiency.

Power Management reduces the amount of power that your system consumes. Reduction of power use is accomplished in two levels:

■ Reducing the power consumed by the display monitor

■ Removing power to a system completely in a way that allows a quick restoration of the system at the next power on

Use of this software may be needed for a workstation to meet the United States Environmental Protection Agency (EPA) Energy Star guidelines.

Note - As an Energy Star Partner, Sun Microsystems, Inc. has determined that its hardware products that have the Energy Star symbol on the shipping box or on the product itself meet the Energy Star guidelines for energy efficiency.

Display Monitor Power Management

The display can be set to power down after the keyboard and mouse have been idle for a length of time that you specify, and then come back on readily when you're ready to see the display again. Details on this are provided in Chapter 2.

> **Note -** A monitor is handled more effectively by Power Management software if it has qualified for the Energy Star logo.

System Power Management

The entire system can power down when it isn't needed and then return to the same working state when you power up the system again. Shut down and start up can happen automatically or at any time you choose. The steps for doing this are explained in Chapter 3.

> **Caution -** System Power Management should not be used on some systems, because the type of work those systems are used for should not be interrupted to save power. Conditions where you should choose not to use Power Management are described in Chapter 3.

dtpower

The Power Management graphical user interface, a program called dtpower, allows you to designate periods of inactivity after which the system will shut down. You can also use this tool to set the time of day to activate the automatic shutdown; for example, if you wish to use this AutoShutdown feature only after your regular work hours.

On sun4u-architecture workstations, you can also use an AutoWakeup feature of dtpower to power on the system at a specific time of day following an AutoShutdown.

Suspend-Resume

Suspend-Resume is a time-saving feature in the Power Management software that allows you to power cycle your system without losing the state of your current activities. Your workspace and files are preserved when the system is powered off so that they can be restored to the same state when the system is powered on.

For example, you can be in the process of editing a document when you decide to leave and power off your system. By using the Suspend-Resume feature, your edit session is automatically restored and appears in the same state the next time you power on the system.

Suspend-Resume is used automatically when the Power Management software performs an autoshutdown of your workstation. You also can Suspend or Resume your system whenever you choose through the keyboard.

Hardware Support for Power Management Features

Nearly all SPARC hardware is capable of using Power Management software features to some extent. However, some features only work on certain types of hardware. Some default power states vary from one type of system to another.

Here's a quick guide to what Power Management features to expect the hardware you have to support, and to the defaults that will be in effect when you first use this Solaris release with your hardware.

Note - The Power Management features described in this manual are only provided in the SPARC Platform Edition of this Solaris release.

System Architecture Distinctions

The Power Management features available on a workstation depends on the SPARC architecture of that system, as described in Table 1–1.

TABLE 1–1 Availability of Power Management Features in Different SPARC Architectures

SPARC Architecture	Display Power Management	Suspend-Resume	Power Off Under Software Control	AutoWakeup
sun4c	Yes	No	No	No
sun4d	Yes	No	No	No
sun4m	Yes	Yes	Yes	No
sun4u	Yes	Yes	Yes	Yes

Note - The SPARCstation Voyager is a sun4m-architecture system, but has special Power Management features, as described in *Platform Notes: SPARCstation Voyager Software Guide.*

Monitor Hardware Distinctions

Some models of monitors are capable of screen blanking, while other monitors can also be placed in a power-saving mode through the Power Management software.

Default Distinctions

The default behavior in Power Management functions varies on systems as described in this section.

AutoShutdown: Off by default for sun4m-architecture systems; on by default for sun4u architecture systems,

Display Power Management: Off by default for the OpenWindows™ desktop; on by default for the CDE desktop.

Note - Customers with Sun Microsystems Computer Company (SMCC) hardware may find information about Power Management features supported on additional hardware published in the *SMCC Hardware Platform Guide* for this Solaris release.

Power Managing Displays

This chapter explains how your display monitor can use less power through Power Management features. In the CDE or OpenWindows windowing environments, you can set your screen to go blank when the keyboard and mouse are idle for a specified amount of time.

When the screen goes blank, some monitors are able to power down, and then power up again when you start using the computer again. Other monitors will only blank the screen but not power down; however, most monitors will use less power in this state than if the monitor is displaying a screen saver pattern.

You can control power management of your display without needing root access to your machine (that is, you don't need to become superuser to do these tasks).

Note - Some past versions of the `dtpower` command managed display power as well as system power. In this Solaris release, Power Management for displays is handled through your windowing system's screen-saver options, rather than through the `dtpower` program.

Power Managing Displays with CDE Software

In CDE, you can set up your screen to blank through the Style Manager. If your display hardware has the right capabilities, it will operate on reduced power when the screen blanking begins.

▼ To Control Screen Power Management Through CDE Style Manager

1. Select Style Manager from the CDE toolbar.

2. Either click on the Style Manager icon or bring up the menu from the Program icon and select Style Manager.

3. Select the Screen option within Style Manager.
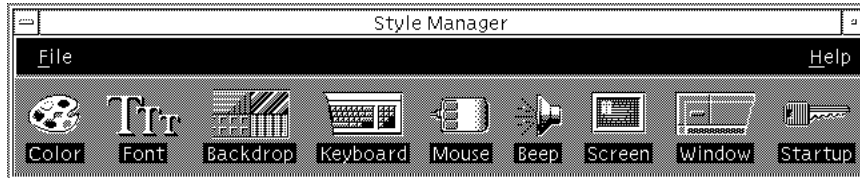
Figure 2–1   CDE Style Manager Main Window

4. View your present settings in the Style Manager - Screen window.
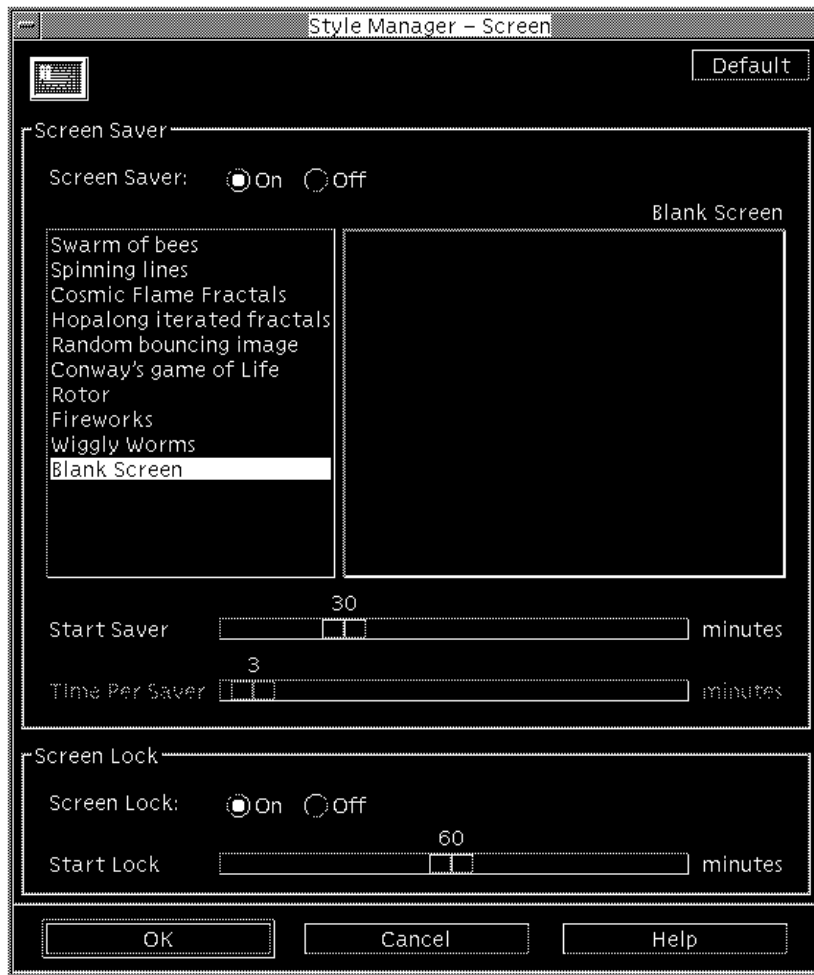
Figure 2–2   CDE Style Manager - Screen Window

5. **Turn on Screen Saver.**

6. **Select "Blank Screen" as your only sceen saver pattern.**
   Other styles of screen saver will not activate display power management.

7. **Deselect all other choices in the list of screen saver types.**
   If additional styles are selected, the display will not power down when the screen saver is activated

8. **Set the amount of idle time before the screen saver begins by sliding the bar.**

   The range is 1 minute to 120 minutes of idle time.

9. **Click OK at the bottom of the window.**

   Display Power Management is now active according to your settings.

▼ To See a Display after Power Management Shuts It Down

♦ **Move the mouse or press any key.**

You may also have activated screen locking through the CDE Style Manager - Screen window. In that case, when a system is idle long enough, the screen will be locked as well as power managed. When you start using the system again, you see a prompt to enter your password before returning to the CDE desktop.

Power Managing Displays with OpenWindows Software

▼ To Control Screen Power Management Through the OpenWindows Desktop

1. **Bring up the Workspace menu.**

2. **Select Properties.**

3. **Select the Miscellaneous category.**

4. **Set Screen Saver to Auto.**

5. **Type the number of minutes of idle time before the screen saver stars up.**

6. **Press Apply.**

   You can now dismiss this window.

Power Managing Displays in a Non-Windowing Environment

When you are no longer in a windowing environment, the Screen Saver settings you made through the CDE Style Manager or the OpenWindows Properties windows do not have any effect.

You can control the display when operating at the console level by editing the contents of the `/etc/power.conf` file. This is covered in Appendix A.

Managing System Power

This chapter explains how to use the `dtpower` program to activate or turn off system power management features, and to specify when you want the desktop system to shut down automatically to reduce energy use. This tool can be used within the OpenWindows and Common Desktop Environment (CDE) desktops.

This chapter also describes how to use Suspend-Resume features to selectively shut down your system and start it up again in the same working state.

There are a few differences in how `dtpower` operates on sun4m-architecture desktop machines (such as the SPARCstation 20) and on sun4u-architecture desktop machines (such as the Sun Ultra 1). In this chapter, any such differences are pointed out.

Note - A command line interface is also provided for a system administrator to change a desktop machine's system default settings and to change the idleness definition. For information on using the `pmconfig` program and the `power.conf` file, go to Appendix A.

Choosing to Use Power Management

Powering off a desktop system may interfere with some operations that involve that machine. Take into account the following guidelines before deciding when to use Power Management features on a desktop machine.

Electronic Mail Issues

Mail is not sent to any mail spool file on a machine while the machine is suspended. Typically, if mail cannot be delivered for more than three days, it is returned to the sender as undeliverable.

If you suspend your system for three days or longer, and your machine has a local mail spool, you may fail to receive items of mail that have been bounced back to the sender.

Mail Alias Issues

Mail aliases on a machine are not available to other users while that machine is suspended. If the machine is suspended long enough (typically three days), messages sent to an alias on that machine are bounced back to the sender.

Remote Login Issues

You cannot use `rlogin (1)` to connect to a machine while that machine is suspended. This command does not cause the machine to resume from a suspended state.

While your machine is suspended, you cannot access it by remote dial in.

Networked Software Issues

Suspend-Resume may have an impact on a networked application. A networked program may fail if it is not resilient in cases where a peer system does not respond to network traffic due to being suspended.

One example of this is when you run an Xhosted application from one system and display it on another system. If Power Management software suspends the latter system, the application software may fail.

Solstice AutoClient Issues

Do not use Suspend-Resume features on a machine that uses Solstice™ AutoClient™ software.

ATM Issues

Power Management software is not supported on SunATM™ devices. The ATM protocol is connection oriented, which means calls must be established between two endpoints (such as workstations) before data can be transferred. Each end of the call must maintain the connection actively, so neither end of an ATM connection can use Power Management software to suspend and then resume the connection later.

Cron Job Issues

Operations specified in a cron file do not run while a machine is suspended.

When the time arrives for a cron job to begin for a machine that is suspended, that job does not run at that time, nor is the job queued up to run later when that machine resumes.

Calendar Manager Issues

Calendar Manager does not display pop-up windows for scheduled events that occur while the desktop machine is suspended.

Thermal Stress Issues

The goal of Power Management is to conserve electricity. However, you should also take into account how an increase in power cycling will affect the overall reliability of the hardware.

Power Management software is active by default on sun4u systems (such as the Sun Ultra™ 1). Accordingly, the Power Management system for those machines is designed to evaluate each automatic power-cycle request that occurs due to the system being idle. If this evaluation determines that the thermal shock of power cycling on this occasion would contribute to decreasing hardware reliability, then this power-cycle request is deferred.

Despite this feature, you can still choose to turn off a sun4u system manually at any time. This checking feature is intended as a brake on the hardware being subjected to an excessive number of automatic power-cycle requests.

Starting the Power Manager Program: `dtpower`

You can use the Power Management program, `dtpower`, to do the following tasks for your system:

- Check current Power Management settings

- Activate or deactivate AutoShutdown and AutoWakeup features

- Set the idle time for the AutoShutdown feature

- Set the time of day when AutoShutdown can take place

- Set the time AutoWakeup will start up your system each day

If `dtpower` is already running, it may appear on your desktop as this icon:

Figure 3–1   `dtpower` Icon

If you need to start it, or need to start it again as superuser to make changes, perform one of the following procedures.

▼ To Start `dtpower` From the Command Line

1. **Become superuser by typing:**

```
example% su
Password: root_password
```

You must become superuser before you can modify any settings in the Power Management software. Otherwise, the `dtpower` window only allows you to check current system power settings.

2. **Start `dtpower` by typing:**

```
example% /usr/openwin/bin/dtpower &
```

▼ To Start `dtpower` From a CDE or OpenWindows Menu

♦ **Select Power Manager under the Programs option in the Workspace menu.**

If you are using CDE, you also can start up `dtpower` the following way:

♦ **Click the Power Manager icon in the Application manager - System-Admin folder.**

For more information on the Workspace menu, refer to the *Solaris Common Desktop Environment: User's Guide* or the *Solaris User's Guide*.

Remember that you cannot modify settings in the Power Manager window unless you were superuser for the system when you started `dtpower`.

Using the `dtpower` Program

The `dtpower` Window

When you start up `dtpower` (or double-click the `dtpower` icon), a window is displayed, as shown in Figure 3–2.
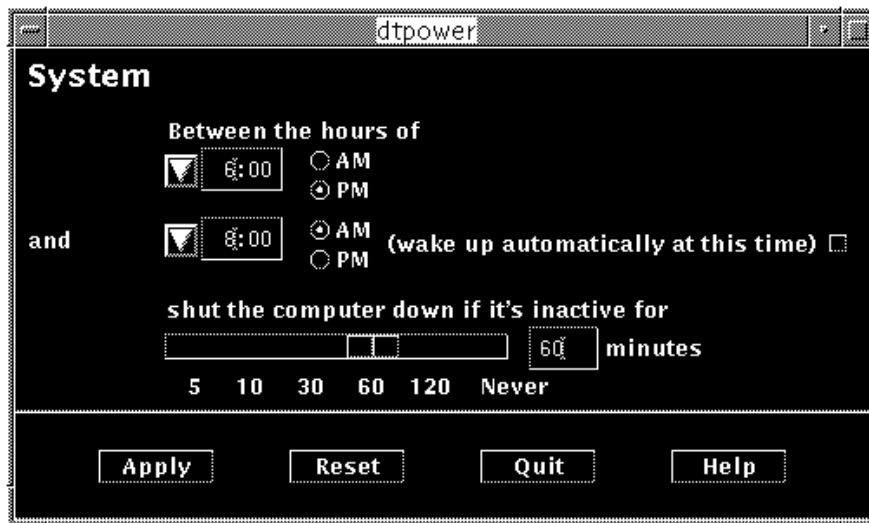
Figure 3–2   The `dtpower` Window

> **Note -** The "wake up" option only appears in this window for sun4u desktop systems.

In this window, you can see the current settings for Power Management features on your system. If you started this program as superuser, you also can change the settings, as described in the procedures in this chapter.

> **Note -** If you are not superuser, the dtpower window will include this message: "Start dtpower as root to change settings."

General dtpower Window Controls

The buttons at the bottom of this window have the following effects:

- Apply puts into effect all of the settings currently displayed in the window.

- Reset changes all of the settings back to the state they were in when Apply was previously selected (or back to the machine's default values if this is the first time you have run dtpower). Reset, however, will not return to earlier values if you have already selected Apply.

- Quit dismisses the dtpower window; no icon remains on the screen. Any setting that was not put into effect with the Apply button is lost.

- Help displays a separate window of information about using the dtpower window.

You can reduce this dtpower window to an icon using your desktop environment's window commands.

System AutoShutdown and AutoWakeup Controls

You can specify, through the dtpower window, the timing conditions that will cause your system to shut down automatically after being idle. This feature is called *AutoShutdown*.

If you have a sun4u desktop machine, you also can set your system to power on automatically at a specified time each day. This feature is called *AutoWakeup*.

> **Note -** Be sure to read "Choosing to Use Power Management" on page 11 before changing the AutoShutdown settings.

AutoShutdown uses the Suspend feature to automatically power off your system. When the system powers up again, it resumes in the same state as when it was suspended.

Through the `dtpower` window, you can activate or deactivate the AutoShutdown and AutoWakeup features, and specify the following time values:

- The number of minutes of idle time before AutoShutdown attempts to suspend the system

- The start and finish times of the period each day when AutoShutdown can occur (specifying the same time for both start and finish enables AutoShutdown to occur at any time of day)

- The AutoWakeup time of day when the system will automatically power up and resume after being suspended by AutoShutdown (sun4u desktop systems only)

Note - AutoWakeup does not occur after you Suspend a system manually; it can occur only after AutoShutdown.

▼ To Set an Idle Time for AutoShutdown

1. **Start** `dtpower` **as superuser (see "Starting the Power Manager Program: `dtpower`" on page 14).**

2. **Drag the Suspend slider to the number of minutes of idle time you want before the system will power down automatically.**

   If you want to completely deactivate the AutoShutdown feature, select the Never setting at the far right of the slider. A dash symbol (-) appears in the numeric box when AutoShutdown is deactivated.

   Also, you can type the number of minutes directly in the numerical box to the right of the slider.

   Note - Consecutive AutoShutdowns won't occur less than 5 minutes apart, even if the idle time setting is under 5 minutes.

3. **Select the start time of the period each day when you want AutoShutdown to be able to occur.**

   You can select the time (in 15-minute increments) through a menu that drops down from the button to the left of the numerical box.

   Also, you can type the start time directly into the numerical box.

4. **Click AM or PM for the start time.**

5. **Select the finish time of the period each day when you want AutoShutdown to be able to occur.**

You can select the time (in 15-minute increments) through a menu that drops down from the button to the left of the numeric box. The last setting on this menu is All Day, which means AutoShutdown can occur at any time of day.

Also, you can type the finish time directly into the numerical box and press the enter key. You can specify an "All Day" setting this way by entering a finish time that is identical to the start time.

6. **Click AM or PM for the finish time.**

7. **Click the Apply button when all the settings you want are displayed.**

   If you want to reject the displayed settings, select Reset; the currently active settings (that is, whatever settings were last put into effect by selecting Apply) will be displayed in the window.

   In Figure 3–3, the dtpower window is set for AutoShutdown to occur after 90 minutes of idle time between 7:30 pm and 9:00 am.
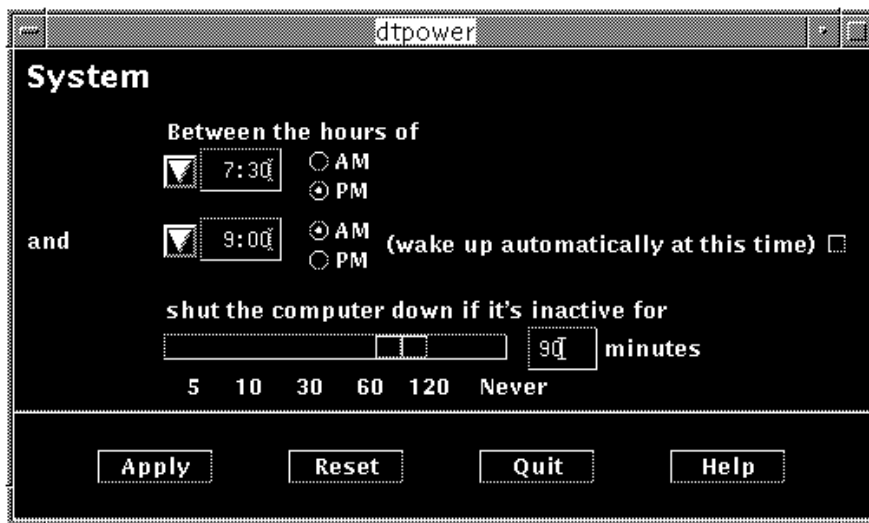
Figure 3–3   Setting the AutoShutdown Timing

In Figure 3–4, the dtpower window is set to disable AutoShutdown of this system. Note that a dash appears in the numeric box showing the idle time.
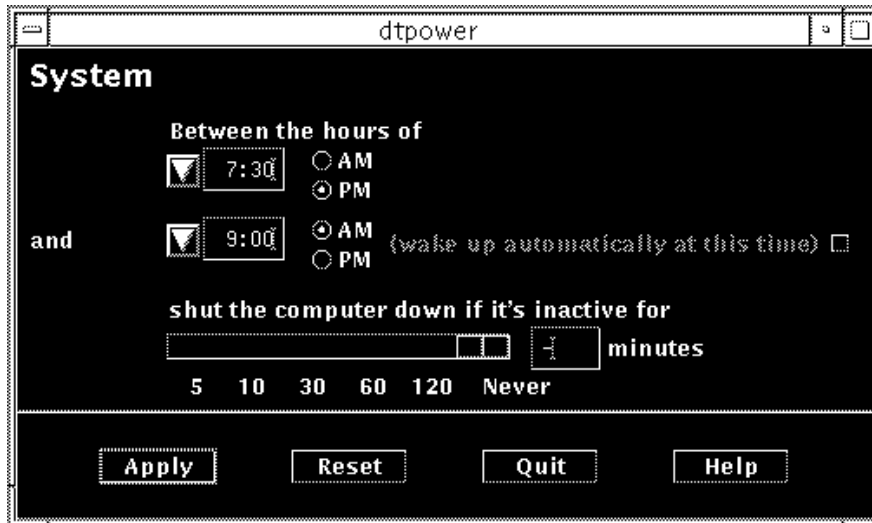
Figure 3–4   Disabling AutoShutdown

▼ To Enable or Disable AutoWakeup

Note - AutoWakeup is available only on sun4u desktop systems.

1. **Start** `dtpower` **as superuser (see "Starting the Power Manager Program:** `dtpower`**" on page 14).**

2. **Move the slider to the amount of idle time you desire (that is, any setting other than Never).**

3. **Set the Finish time to the time you want the machine to power up from a suspended state every day.**

4. **Click the button to the right of the "wake up" message to turn this feature on or off.**

5. **Click the Apply button when all the settings you want are displayed.**

    If you want to reject the displayed settings, select Reset and the currently active settings (that is, whatever settings were last put into effect by selecting Apply) will be displayed in the window.

In Figure 3–5, the `dtpower` window is set for AutoWakeup to occur at 9:00 am every day if an AutoShutdown has occurred after 7:30 pm.
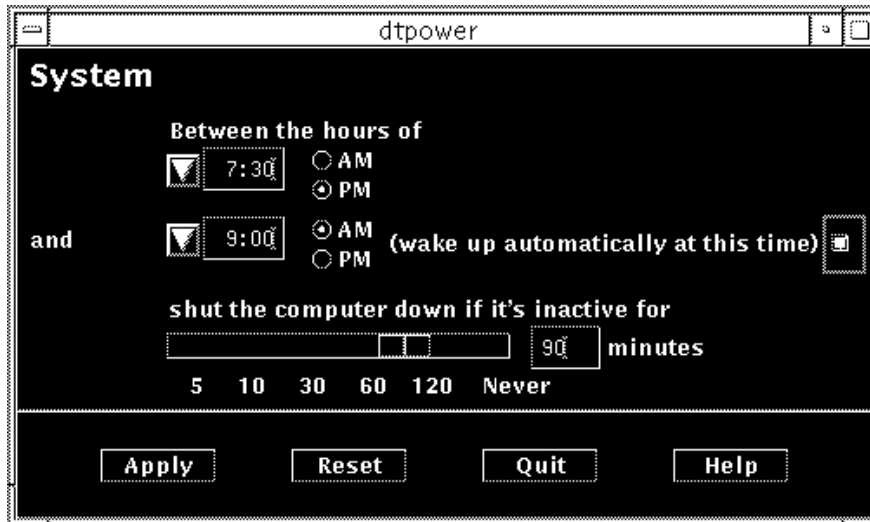
Figure 3–5   Enabling AutoWakeup

▼ To Exit `dtpower`

1. **Make sure to click Apply if you want to activate new settings you made in the `dtpower` window.**

2. **Click Quit.**

   This causes the window to disappear without the `dtpower` icon remaining on the screen.

Using Suspend-Resume Features Manually

The Power Management software includes a timesaving feature, called *Suspend-Resume*. This feature is used automatically through the AutoShutdown and AutoWakeup features of the dtpower program. You also can Suspend and Resume your system whenever you choose by following the procedures in "Suspending Your System" on page 22 and "Resuming Your System" on page 26.

The traditional process of powering off your system can be time consuming. Similarly, the process of rebooting and setting up your workspace also can take some time. With the Suspend-Resume feature, you can power off your system and quickly save all your current work-in-process automatically. Then, at the next power on, your workspace quickly returns to the way it was when you last used the system.

You can leave your system suspended and powered off for an indefinite length of time without losing data. However, there are some outside operations (such as receiving mail) that may be affected while your system is suspended. Before you use the Suspend-Resume features, be sure to read "Choosing to Use Power Management" on page 11.

Note - The Suspend-Resume feature is not supported on systems configured as diskless clients.

Suspending a system can occur automatically through the AutoShutdown feature in the Power Management software. Also, you can suspend your system manually using the keyboard by following instructions in the next section.

Suspend allows you to do the following without losingyour system's current state:

■ Move your system from one location to another

■ Power off your system to conserve energy

■ Switch the system power source from a battery to the wall outlet (AC power supply) or vice-versa (only on SPARCstation Voyager systems)

Note - Do not use the Suspend feature if you need to reconfigure your system. You must halt the operating system whenever you want to reconfigure your system.

Before you suspend a system, you must wait for operations such as the following to finish:

■ Audio activity

■ Floppy disk activity

■ Tape activity

- ISDN activity
- Synchronous TTY activity

Suspending Your System

Initiating a Suspend and a subsequent Resume usually requires less than a minute. You can initiate Suspend in several ways:

- Using the power key, then responding to a prompt
- Using the Shift and power keys to Suspend without a further prompt
- Using the CDE desktop's Workspace menu
- Using the OpenWindows desktop's Workspace Utilities menu
- Using the `sys-suspend` command

▼ To Initiate Suspend Using the Keyboard

1. **Press the power key.**

   See Figure 3–6 and Figure 3–7 for the location of the power key.
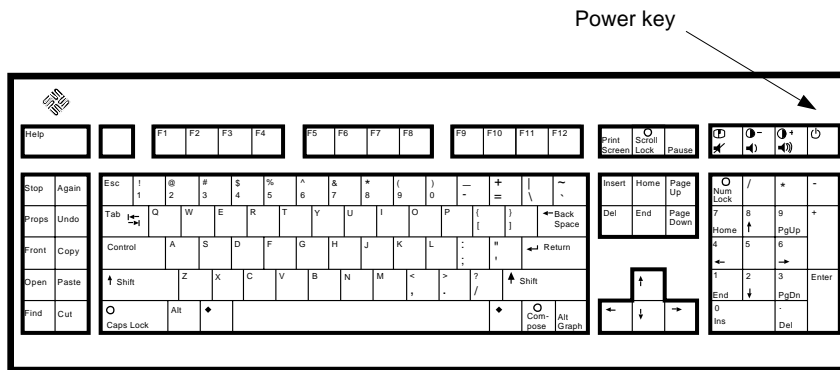
Figure 3–6   Power Key Location: Sun Type 5 Keyboard
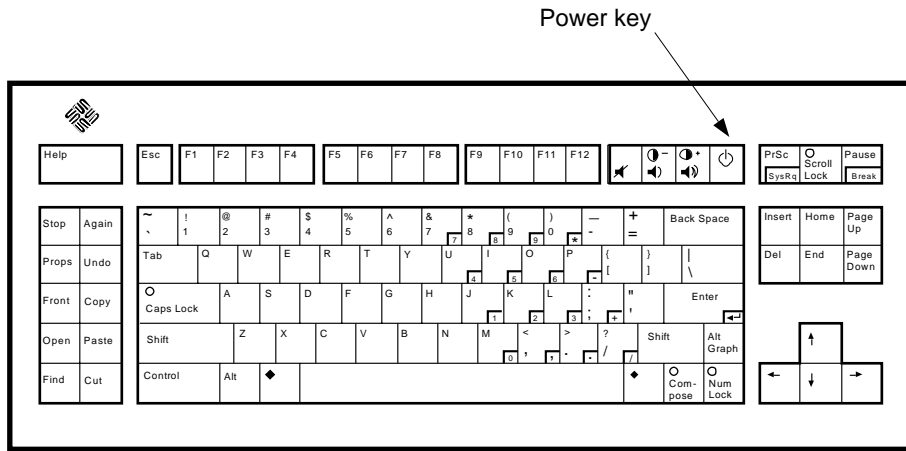
Power key

Figure 3–7　Power Key Location: Sun Compact 1 Keyboard

After you press the power key, a confirmation window is displayed:
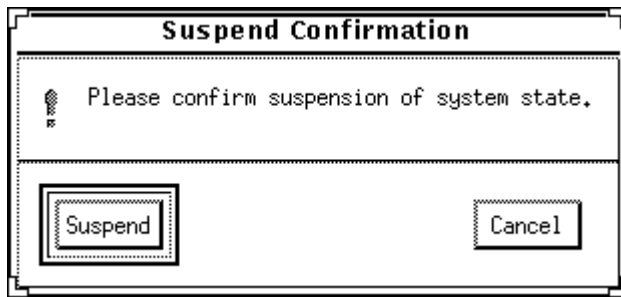
Figure 3–8　Suspend Confirmation Window

2. Click Suspend in the confirmation window.

3. Wait for the system to power off.

4. Power off all external devices.
   External devices include disk drives, printers, or other serial or parallel
   peripherals. See the manual supplied with the external device for instructions.

▼ To Initiate Suspend Immediately Using a Keyboard Shortcut

1. Press Shift and the power key.

See Figure 3–6 or Figure 3–7 for the location of the power key.

2. Wait for the system to power off.

The suspend confirmation window isn't displayed if you use this method.

3. Power off all external devices.

External devices include external disk drives, printers, or other serial or parallel peripherals. See the manual supplied with the external device for instructions.

▼ To Initiate Suspend Using the CDE Desktop

1. Place your cursor in the workspace and hold down the menu button.

The Workspace menu is displayed.

2. Select Suspend System from the Workspace menu.

3. Select the Suspend menu option.

The Suspend confirmation window is displayed, as shown in Figure 3–8.

4. Select Suspend in the confirmation window.

5. Wait for the system to power off.

6. Power off all external devices.

External devices include disk drives, printers, or other serial or parallel peripherals. See the manual supplied with the external device for instructions.

▼ To Initiate Suspend Using the OpenWindows Desktop

1. Place your cursor in the workspace and hold down the menu button.

The Workspace menu is displayed.

2. Select Utilities with the menu button.

3. **Select the Suspend menu option.**

   The Suspend confirmation is displayed, as shown in Figure 3–8.

4. **Select Suspend.**

5. **Wait for the system to power off.**

6. **Power off all external devices.**

   External devices include disk drives, printers, or other serial or parallel peripherals. See the manual supplied with the external device for instructions.

▼ To Initiate Suspend Using the `sys-suspend` Command

Note - You do not need to be running a window system, such as the OpenWindows environment, for the `sys-suspend` shell command to work. You also do not need to login as superuser.

---

1. **At the prompt, type:**

   ```
   example% /usr/openwin/bin/sys-suspend
   ```

   The Suspend confirmation pop-up window is displayed, as shown in Figure 3–8. If a window system is not running, the command executes without displaying the confirmation pop-up window.

2. **Click Suspend.**

3. **Wait for the system to power off.**

4. **Power off all external units.**

   External devices include disk drives, printers, or other serial or parallel peripherals. See the manual supplied with the external device for instructions.

Resuming Your System

You can use the following method to manually Resume using a system that had been put into a suspended state by any method.

▼ To Resume Using a Suspended System

1. **Power on all external devices connected to your system.**

2. **Press the power key.**

   See Figure 3–6 or Figure 3–7for power key locations.

3. **Enter your password to unlock the system.**

   Whenever the system is suspended, it is automatically locked.

Configuring Power Management Using the Command Line

This chapter explains how you can change the system default settings for the Power Management utilities on systems that are not configured to run the CDE or OpenWindows environment. Also, you can edit the `/etc/power.conf` file to change the definition of idleness for a system in ways that cannot be set through the `dtpower` user interface.

Note - Refer to the `power.conf(4)` man page for additional information.

Idleness Definition

In earlier releases of Power Management software, inactivity of a system was defined only in terms of the amount of time since the last keyboard or mouse activity. Now, additional aspects of a machine's activity are taken into account. By default, a machine is considered inactive when all of these conditions apply:

- No keyboard stroke
- No mouse movement
- No TTY characters are input or output
- No disk reads
- No NFS requests
- A 1-minute load average is no greater than 0.04

To change the idleness definition from these defaults, see "Changing the Idleness Definition" on page 31.

Note - Running a screen saver pattern in CDE, other than the blank screen option, may create additional system activity that prevents the system from being idle enough to qualify for AutoShutdown. To enable a system that runs a screen pattern to AutoShutdown at a specified idle time, you may need to change the threshold settings for load average or disk reads.

The `power.conf` File

The `power.conf` file in the `/etc` directory lets you set the configuration for managing system power. It also enables you to set display power configurations that are followed for that display when a CDE or OpenWindows desktop isn't present. (See Chapter 2, for details on managing display power in those windowing environments.)

The default `/etc/power.conf` file has the following content:

```
# Power Management Configuration File
#
# Putting an entry in this file will only be effective if the
# driver for the device supports device power management.
# After the file is modified, pmconfig(1M) command must be
# executed to activate the new change.
#
# Fields must be separated by white space or semicolons.
# Note that physical dependents are automatically considered
# by the power management framework.

# Name            Threshold(s)        Logical Dependent(s)
/dev/kbd          1800
/dev/mouse        1800

# NOTE: The entries below are only used when no window
# system is running. When running the window system, monitor
# power management is done by the screen saver functions.

/dev/fb           0 0                 /dev/kbd      /dev/mouse

# Auto-Shutdown  Idle(min)  Start/finish(hh:mm)  Behavior
autoshutdown     30             9:00 9:00            default

statefile        /.CPR
```

Logical Dependents

In the `/etc/power.conf` file, there are entries for "Logical Dependent(s)." These are physical devices (such as a mouse) whose activity is related to another device (such as a frame buffer) without being physically attached to it.

If a logical dependent device is active, then the main device is considered active as well. This affects idle times for the main device.

Becoming Superuser

To change any of the system default settings by using the procedures in this section, you first must become superuser.

▼ To Become Superuser

♦ **Type:**

```
example% su
Password: root password
example#
```

Setting Device Idle Time

You specify the length of idle time before a system device (such as a screen) uses the low power mode by changing the threshold field in the `/etc/power.conf` file.

▼ To Change the Length of Idle Time

1. **Edit the** `/etc/power.conf` **file. Type:**

```
example# vi /etc/power.conf
```

2. **Modify the desired entry.**

The idle threshold for the keyboard and mouse devices has been revised to be 300 seconds (5 minutes) in the /etc/power.conf file, as shown below.

```
# Power Management Configuration File
#
# Putting an entry in this file will only be effective if the
# driver for the device supports device power management.
# After the file is modified, pmconfig(1M) command must be
# executed to activate the new change.
#
# Fields must be separated by white space or semicolons.
# Note that physical dependents are automatically considered
# by the power management framework.

# Name            Threshold(s)       Logical Dependent(s)
/dev/kbd          300
/dev/mouse        300

# NOTE: The entries below are only used when no window
# system is running. When running the window system, monitor
# power management is done by the screen saver functions.

/dev/fb           0 0            /dev/kbd     /dev/mouse

# Auto-Shutdown  Idle(min)   Start/finish(hh:mm)  Behavior
autoshutdown     30              9:00 9:00            default

statefile         /.CPR
```

3. **Inform the Power Management framework of the new settings. Type:**

```
example# /usr/sbin/pmconfig
```

Running pmconfig informs the Power Management framework of the new setting according to the thresholds that are now defined in the /etc/power.conf file.

Setting AutoShutdown

▼ To Change the Automatic Shutdown Time

1. **Edit the AutoShutdown entry in** /etc/power.conf **file. Type:**

```
example# vi /etc/power.conf
```

The AutoShutdown feature is set to be ready to activate "always" in the portion
of an /etc/power.conf file shown below, by entering identical Start and Finish
time values. This means your system will power off at any time of day after a
30-minute period of inactivity.

```
# Auto-Shutdown     Idle(min)     Start/Finish(hh:mm)     Behavior
autoshutdown        30            0:00 0:00               shutdown
```

The AutoShutdown time in the portion of the /etc/power.conf file shown
below is set to power off your system every day between 5:30 pm and 8:00 am
after a 30-minute period of inactivity.

Note - The start and finish times must be entered into the power.conf file in a
24-hour format.

```
# Auto-Shutdown     Idle(min)     Start/Finish(hh:mm)     Behavior
autoshutdown        30            17:30 8:00              shutdown
```

2. **Inform the Power Management framework of the new settings. Type:**

```
example# /usr/sbin/pmconfig
```

Running pmconfig informs the Power Management framework of the new
setting according to the thresholds that are now defined in the
/etc/power.conf file.

Changing the Idleness Definition

You can change the idleness definition for a system from the default by adding
entries to the /etc/power.conf file. These entries change the thresholds for certain
system operations that could occur on a system that was still considered inactive:

- `ttychars` changes the number of TTY characters that can be input or output before the system is considered active (the default is no characters)

- `diskreads` changes the number of disk reads that can occur before the system is considered active (the default is no disk reads)

- `nfsreqs` changes the number of NFS requests that can occur before the system is considered active (the default is no NFS requests)

- `loadaverage` changes the 1-minute load average that is reached before the system is considered active (the default is 0.04)

You cannot, however, change the threshold for keyboard or mouse activity. Any such activity concludes the period of idleness for a system.

For example, you can revise your `power.conf` file to change the system's idleness definition so that it is still considered idle if:

- No more than 400 TTY characters are input or output

- No more than 10 disk reads occur

- No more than 5 NFS requests occur

- The 1-minute load average hasn't exceeded 0.1

The resulting `/etc/power.conf` file appears like the following:

```
# Power Management Configuration File
#
# Putting an entry in this file will only be effective if the
# driver for the device supports device power management.
# After the file is modified, pmconfig(1M) command must be
# executed to activate the new change.
#
# Fields must be separated by white space or semicolons.
# Note that physical dependents are automatically considered
# by the power management framework.

# Name            Threshold(s)       Logical Dependent(s)
/dev/kbd          1800
/dev/mouse        1800

# NOTE: The entries below are only used when no window
# system is running. When running the window system, monitor
# power management is done by the screen saver functions.

/dev/fb           0 0            /dev/kbd      /dev/mouse

# Auto-Shutdown  Idle(min)  Start/finish(hh:mm)  Behavior
autoshutdown     30             15:00 8:00              default

statefile        /.CPR

ttychars               400
diskreads              10
```

(continued)

```
nfsreqs          5
loadaverage      0.1
```

Using a Script to Define Idleness

You can create a script that tests additional criteria that must be met before a system is considered inactive long enough to trigger an autoshutdown. After all other idleness criteria have been met, an idlecheck entry in the /etc/power.conf file causes the script you name in that entry to run.

For example, a script located in the /home/grumpy directory will be run on a system that has the following idlecheck line in its /etc/power.conf file whenever the system has been idle according to all other criteria defined in the power.conf file:

```
# The idlecheck program is passed autoshutdown idle time entry
# in $PM_IDLETIME and returns the number of minutes the system
# has been idle in exit code
idlecheck          /home/grumpy/idlecheck
```

Your script should return an exit code representing minutes of idle time. If the exit code is equal or greater than the idle time listed in the "autoshutdown" entry of the /etc/power.conf file, your system will shut down. If the script reports a lower number than the stated idle time, your system will not shut down.

Note - When you create such a script for idlecheck, make sure it is executable and that it returns an exit code. If the script does not produce an explicit exit code, the value zero is returned, which indicates that the system is busy and autoshutdown does not occur.

Changing the Statefile Location

When the system is suspended, a statefile is created by the Suspend-Resume software that preserves checkpoint information about that system at the time it was shut down. You can specify any UFS location for this statefile by editing the `/etc/power.conf` file to include an entry in this format:

statefile	*location*

For *location*, provide the absolute path name of a local UFS file.

The size of the file created at this location depends on a variety of factors, including the size of the system's memory, the number of loadable drivers or modules in use, the number and type of processes running, and the amount of user memory that has been "locked down."

Power Management for Two Monitors on One System

If your workstation has two monitors (sometimes called a "double-headed system"), Power Management of both displays is supported through the CDE and OpenWindows windowing environments. The `/etc/power.conf` file no longer needs to be edited to provide support for the second monitor.

Troubleshooting

This appendix provides troubleshooting procedures to follow if the power key does not suspend your system or if you need to recover from a hung system.

Power Key Problems

If pressing the power key does not suspend your system, refer to the following procedure.

▼ To Respond When the Power Key Does Not Suspend the System

1. **Verify that the key processing daemon is present by typing this command.:**

```
% ps -eaf | grep speckeysd
```

If the resulting message does not list `/usr/openwin/bin/speckeysd`, you will need to start the key processing daemon.

2. **Start the key processing daemon (if necessary) by becoming superuser and entering this command:**

```
% /usr/openwin/bin/speckeysd
```

Suspend Failures

When the system fails to suspend, an alert pop-up window appears. The exact message within the window may vary, depending on the cause of the problem, but the "Suspend Failed" window will appear similar to Figure B–1.
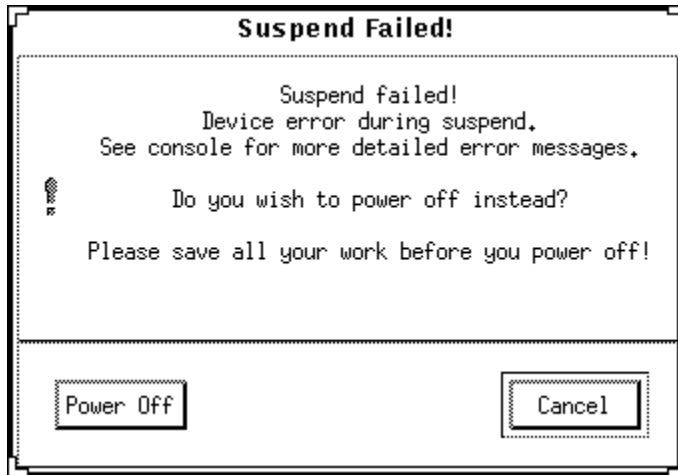

Figure B–1   Example of a "Suspend Failed" Alert Pop-Up Window

When a "Suspend Failed" window appears, you can choose to click either of the buttons at the bottom of the window:

- Power Off turns off power *without* preserving the current operating state, as a suspend operation usually does.

- Cancel cancels the suspend request, and the hardware continues to be powered up.

The following sections discuss specific "Suspend Failed" messages.

What to Do If a Device Suspend Fails

If a device fails to suspend, a "Suspend Failed" pop-up window is displayed, which includes the following message:

```
Device error during suspend.
```

▼ To Respond to a Device Suspend Failure

1. Select Cancel.

If you have not already saved your work, do so now. Take corrective action before retrying suspend again.

2. **Check for more information in the Console window in the Workspace.**

   An unsupported device or a device performing non-resumable activity may be the cause of this problem.

   If the device specified by the console message is performing a non-resumable activity, stop the activity and try suspend again, as described in Step 4 on page 37.

   If your system contains devices in addition to the default configuration, then these devices may not support the Suspend feature. In that case, continue with the next step.

3. **Unload the device driver.**

   Before you try to suspend again, do these steps:

   a. **Get the module ID by running** `modinfo`**.**

   b. **Unload that module by running this command:**

      `modunload -i` *module_id*

      However, you might not be able to unload a driver for one of these reasons:

      ■ There is no detach support in the code

      ■ Another driver must be unloaded first, such as `audio(7I)` and `dbri(7D)`

      ■ The device is actually in use and busy

      In such a case, contact your system administrator.

4. **Try Suspend again.**

   ■ If Suspend succeeds, the system saves your activities and the system powers off successfully.

   ■ If Suspend does not succeed, the alert pop-up window is displayed again. In this case, continue with the next step.

⚠ **Caution -** Save your work if you have not already done so.

---

5. **Select Power Off.**

   Since the error persists, suspend is not possible. Selecting "Power Off" shuts down the system properly without causing file system damage. (Remember— your data will *not* be saved unless you have saved it manually.) When you power on again, your system automatically reboots.

However, if you select Power Off and it fails, your system does not support software power off. An alert pop-up window is then displayed with information about the power-off failure, as shown in Figure B–2.
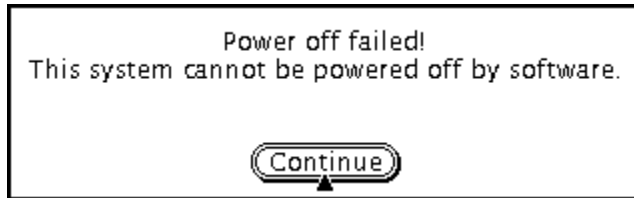

Figure B–2   Power Off Failure Window

6. **Select Continue.**

   Your system might not support software power off due to a non-type 5 keyboard or an outdated system PROM. If you do have a type 5 keyboard installed, then contact your system provider for a system PROM upgrade.

   Also, some sun4m-architecture systems will just drop to an OpenBoot PROM prompt after a suspend operation, because those systems do not support software power off.

7. **Save your work if you have not already done so.**

8. **Halt the Operating System.**

9. **Power off by pressing the power switch on the back panel of the system to the off (0) position.**

   Note - When possible, solve the problem for that device in the future by obtaining and installing a device driver that supports suspend, if one is available from your manufacturer.

What to Do If a Process Fails to Suspend

If a process fails to suspend, an alert pop-up window is displayed, which includes the following message:

```
Process can not be stopped.
```

Follow this procedure in response to this message.

▼ To Respond to a Process Suspend Failure

1. **Select Cancel.**

   Retry Suspend again. If you have not already saved your work, do so now.

2. **Check for more information in the Console window in the Workspace.**

   If a process is a real-time process or if it is performing certain special network operations, that process may refuse to suspend gracefully. In most cases, this is only a temporary condition and you can correct it by trying Suspend again.

   However, if the problem persists, stop the offending process (as specified in the console message) and retry Suspend again.

3. **Try Suspend again.**
   - If Suspend succeeds, the system saves your activities and the system powers off.
   - If Suspend does not succeed, the alert pop-up window is displayed again.

Caution - Save your work if you have not already done so.

---

4. **Select Power Off.**

   Remember—your data *won't* be saved unless you have done so manually.

   When you power on again, your system automatically reboots.

What to Do If More Disk Space Is Needed

When your system suspends, it creates a statefile to preserve the current state of your system. If the file system containing the statefile is full, an alert pop-up window is displayed, which includes the following message:

```
Suspend requires more disk space for statefile.
```

Perform the following procedure in response to this message.

▼ To Respond to a Disk Space Limitation

1. **Select Cancel.**

   You'll need to take corrective action before you can try to Suspend again.

   If you have not already saved your work, do so now.

2. **Check for more information in the Console window in the Workspace.**

You must have a minimum of 10 MBytes of space available. Clean up a partition before you try suspend again. Another solution is to change the location of the statefile to a file system with sufficient space, as described in "Changing the Statefile Location" on page 34. Contact your system administrator for assistance, if necessary.

3. **Try Suspend again.**
   - If Suspend succeeds, the system saves your activities and the system powers off.
   - If Suspend does not succeed, the alert pop-up window is displayed again. In that case, continue with the next step.

Caution - Save your work if you have not already done so.

4. **Select Power Off.**
   Remember—your data *won't* be saved unless you have done so manually.
   When you power on again, your system automatically reboots.

What to Do If Abnormal Conditions Occur

If an abnormal condition occurs, an alert pop-up window is displayed, which includes the following message:

```
Abnormal condition during suspend.
```

Perform the following procedure in response to this message.

▼ To Respond to an Abnormal Condition

1. **Select Cancel.**
   You'll need to take corrective action before you can try to suspend again.
   If you have not already saved your work, do so now.

2. **Check for more information in the Console window in the Workspace.**
   You may be able to take further corrective action by checking the console error messages.

3. **Try Suspend again.**

- If Suspend succeeds, the system saves your activities and the system powers off.
- If Suspend does not succeed, the alert pop-up window is displayed again. In this case, continue with the next step.

⚠ **Caution -** Save your work if you have not already done so.

---

4. **Select Power Off.**

   Remember—your data won't be saved unless you have done so manually.

   When you power on again, your system automatically reboots.

Disabling the Screen Lock

After a Resume, the system's screen lock is invoked by default. To disable the screen lock before the next time you use the power key to Suspend, use the following procedure.

Note - You cannot disable screen locking that is put into effect by AutoShutdown. This is a security feature. It ensures that only someone who knows your password can get access to your work session when the system Resumes.

▼ To Disable the Screen Lock

1. **Modify the** `speckeysd.map` **file to add the** `-x` **flag to the** `sys-suspend` **entry.**

   For more information, see the man page for `speckeysd.map(4)`.

⚠ **Caution -** Save your work if you have not already done so.

---

2. **Exit the current windowing session and restart.**

   In place of this step, you may also kill the `speckeysd` daemon and then restart the daemon.

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