CONVEX C3800 Series SPU System Manager's Guide

First Edition

CONVEX COMPUTER CORPORATION

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CONVEX
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System Manager's Guide

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Purpose and audience

The *CONVEX C3800 Series SPU System Manager's Guide* provides information and instructions on the routine operation of CONVEX C3800 Series SPU hardware and software. This guide addresses system managers and computer operations personnel responsible for:

- Powering up and powering down the SPU and C3800 Series system
- Booting the SPU and ConvexOS operating system

The information presented in this book applies to CONVEX C3800 Series computers running ConvexOS version 10.0 or greater.

Organization

This guide is organized into the following chapters and appendixes:

- Chapter 1 introduces the C3800, the SPU, and explains hardware, software, and general functionality.
- Chapter 2 contains information about how to use the X Window System SPU interface.
- Chapter 3 contains information on files and utilities.
- Chapter 4 gives instructions on how to perform basic system administration tasks on the SPU workstation.
- Chapter 5 contains instructions for powering up.
- Chapter 6 contains instructions for powering down.
- Chapter 7 contains instructions on booting.
- Chapter 8 is a troubleshooting guide.
- Appendix A contains basic instructions on using the mouse, accessing menus, and manipulating windows.

Notational conventions

This section discusses notational conventions used in this book.

Command syntax

Consider this example:

COMMAND *input_file* `[...]` `{a | b}` `[`*output_file*`]`
① ② ③ ④ ⑤

1. **COMMAND** must be typed as it appears.
2. *input_file* indicates a file name that must be supplied by the user.
3. The horizontal ellipsis in brackets indicates that additional input file names may be supplied.
4. Either **a** or **b** must be supplied.
5. [*output_file*] indicates an optional file name.

General conventions

In general, the following conventions are used in this guide:

- **`Bold constant-width font`** identifies user input in examples.
- *Italics*
  - Designate user-supplied variables in a command-line example
  - Introduce new and important terms
  - Identify variables in mathematical equations
  - Indicate document titles
- `Constant-width font` designates input and output, including:
  - Command names and options
  - System calls
  - Data structures and types
  - Directives, program statements, display examples, printout examples, and error messages returned

- Horizontal ellipsis (...) shows repetition of the preceding item(s).
- Vertical ellipsis shows that lines of code have been left out of an example.
- Words and abbreviations that indicate keyboard keys you press are identified in a distinctive bold type. For example, **RETURN** refers to the carriage return key. Words separated by a hyphen indicate two keys that you must press simultaneously. For example, **CTRL-x** indicates that you must press and hold down the **CTRL** key and then press the **x** key.
- The word "enter" in a phrase such as "enter **`ls`**" means that you type the command and then press **RETURN**.

Note

A Note highlights supplemental information.

Caution

A Caution points out special considerations for trusted sites running ConvexOS/Secure.

Associated documents

Using the SPU hardware and software may require information not specific to the tasks described in this document.

For more information on the ConvexOS operating system, you can order these books from CONVEX Computer Corporation:

- *ConvexOS Primer* (DSW-133). This book introduces new users to the ConvexOS operating system.
- *ConvexOS Man Pages for Programmers* (DSW-332). This book is the standard programming reference for the ConvexOS operating system.
- *ConvexOS Man Pages for System Managers* (DSW-332). This book is the standard system management reference for the ConvexOS operating system.
- *ConvexOS Man Pages for Users* (DSW-332). This book is the standard user reference for the ConvexOS operating system.
- *Managing ConvexOS: Configuration Guide* (DSW-030). Describes tasks required to configure ConvexOS.
- *Managing ConvexOS: Operations Guide* (DSW-031). Describes tasks required to monitor and maintain the system.

Ordering documentation

To order the current edition of this or any other CONVEX document, send requests to:

CONVEX Computer Corporation
Customer Service
P.O. Box 833851
Richardson TX 75083-3851 USA

Include the order number or the exact title, as listed on the front cover.

Technical assistance

If you have questions that are not answered in this book, contact the CONVEX Technical Assistance Center (TAC).

- Within the continental U.S., call 1(800)952-0379.
- From Canada, call 1(800)345-2384.
- Outside continental U.S., contact local CONVEX office.

The `contact` utility

The TAC recommends using the `contact` utility to report a hardware, software, or documentation problem. The `contact` utility is an interactive program that helps the TAC track reports and route them to the CONVEX personnel most qualified to fix a problem.

After you invoke `contact`, it prompts you for information about the problem. When you finish your report, `contact` mails it to the TAC electronically. The TAC notifies you within 48 hours that your report has been received.

To use `contact` requires:

- UNIX-to-UNIX Communication Protocol (UUCP) connection to the TAC.
- Full path name of the program or utility in question.
- Version number of the program or utility in question.

Refer to the contact(1) man page for complete details.

Introduction to the C3800 Series SPU

1

The Convex C3800 Series Service Processor Unit (SPU) hardware and software provides an interface for:

- Powering up and powering down
- Booting
- Monitoring SPU and ConvexOS environments

C3800 Series hardware

Each C3800 Series system can contain several different cabinets and bays, depending on that system's configuration. Each C3800 Series system contains at least:

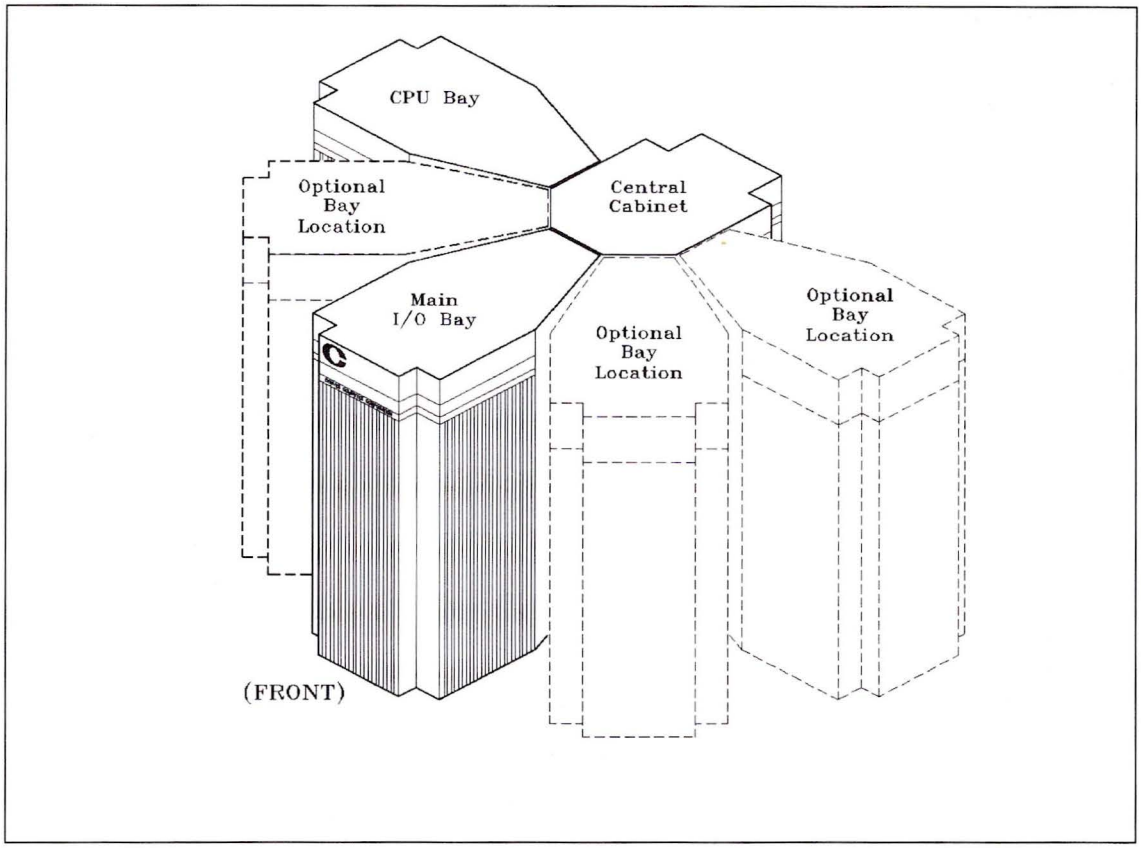
- A central cabinet
- A CPU bay (bay 0, 1, 2, or 3)
- A main I/O bay (bay 4), also called base I/O

Optional bays may also be included in a C3800 Series system. An optional bay may be configured as one of the following:

- A CPU bay
- An expansion I/O bay
- A CPU and expansion I/O combination bay

The suggested locations of the central cabinet, CPU bay, main I/O bay, and optional I/O bays are shown in Figure 1.

Figure 1 Suggested bay locations



C3800 Series system and corresponding CPU configurations are:

- **C3810**—One CPU
- **C3820**—Two CPUs
- **C3840**—Four CPUs
- **C3860**—Six CPUs
- **C3880**—Eight CPUs

The number of bays a system has is dependent on both the number of CPU boards it contains and the amount of memory it has.

Important hardware components you should be familiar with are:

- Hardware keyswitch
- Main bay breakers (MBBs)
- Bay power controllers (BPCs)

- Bay power supplies (BPSs)
- SPU workstation power switch

You will use these components in powering up and down and booting procedures. These components and their locations are described in the following sections.

Caution

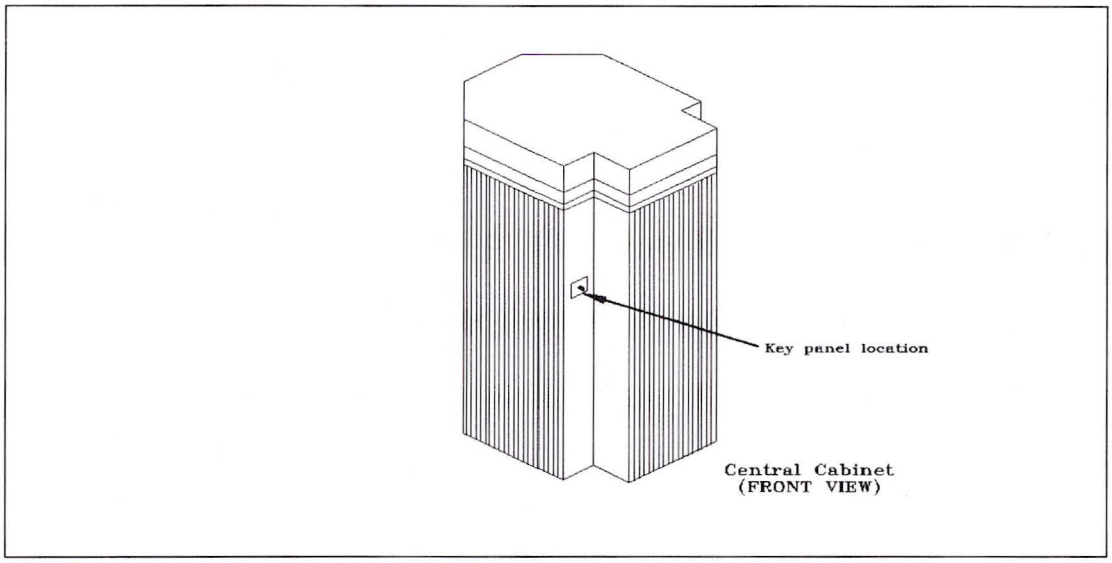
Restrict physical access to the SPU workstation to those users who are authorized to access all information processed by the C3800 Series system.

Hardware keyswitch

The central cabinet houses a panel with four keyswitch positions that interact with window operation of the SPU software.

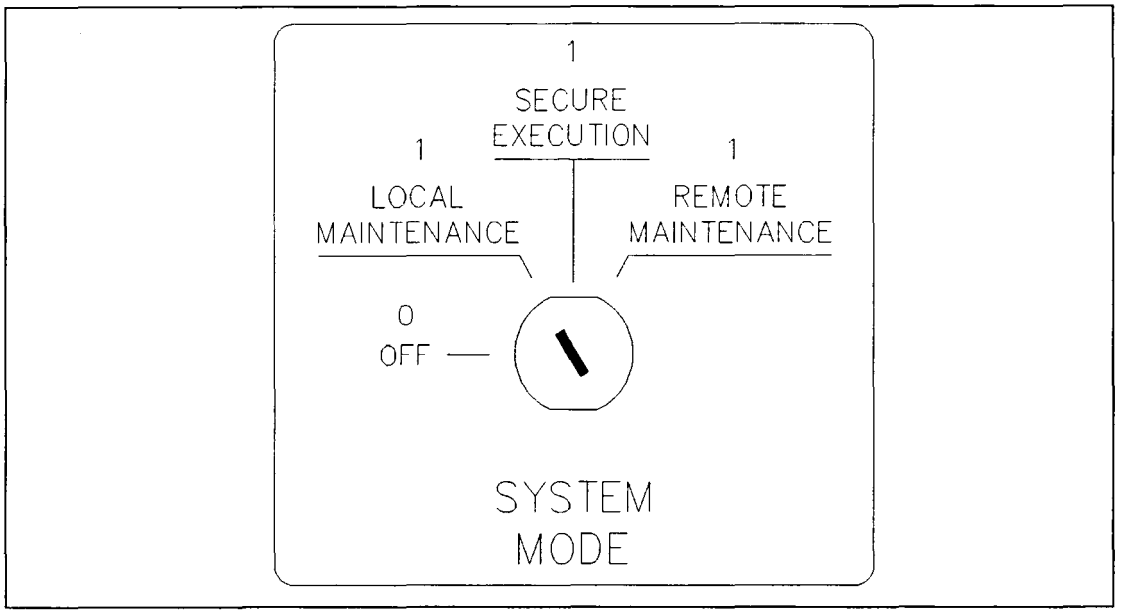
This hardware keyswitch is located on the outside of the upper back panel of the main bay, as shown in Figure 2.

Figure 2 Hardware keyswitch location



This keyswitch has four settings: OFF, LOCAL, SECURE, and REMOTE, as shown in Figure 3. You can move the keyswitch between LOCAL, SECURE, and REMOTE while the system is up and in normal multiuser operation. However, you should never turn the keyswitch to OFF without first following the instructions in Chapter 6, "Powering down".

Figure 3 Hardware keyswitch



Keyswitch positions interact with window operation of the SPU software (described in Chapter 2). The following sections describe the use and behavior of each keyswitch setting.

OFF

When the keyswitch is in the OFF position, no power is applied to any logic board. In this position, there are no restrictions on workstation keyboard and mouse movement. The OFF position does not imply that no power is coming into the system, only that the logic boards are not powered up. The keyswitch is in the OFF position when the system is powered down.

LOCAL

When the keyswitch is in the LOCAL position, there is no restriction on mouse or keyboard input to windows. The keyswitch must be in the LOCAL position in order to boot to single-user mode, multiuser mode, or to an alternate operating system.

The SPU modem may be used to dial in or out when the keyswitch is in LOCAL mode. However, logins by user rmtdiag (a special, privileged login) are disallowed unless the machine is in REMOTE mode.

SECURE

When the keyswitch is in the SECURE position, all SPU logins are disabled. Use of the SPU modem to dial out is possible, but since logins are disallowed, modem dial-in is impossible. The ConvexOS console driver disables the ability of CTRL-p to allow access to the SPU.

The SECURE position locks all SPU activity. In SECURE mode, all input on the SPU workstation is restricted to the CONVEXOS CONSOLE window.

REMOTE

The REMOTE position is used for remote dial-in communication with CONVEX field engineers and the Technical Assistance Center (TAC) in order to monitor your system or run diagnostics. Remote diagnostics are normally run as user rmtdiag; this user is given control of the CONVEXOS CONSOLE window upon logging in. Because rmtdiag is highly privileged, you should not put the keyswitch in this position unless instructed to by a CONVEX employee.

For more information on rmtdiag, refer to the section titled "Running diagnostics remotely" on page 47.

Caution

If you are running ConvexOS/Secure, networking is not supported in the evaluated configuration. It is recommended that you do not provide networking access in a trusted atmosphere.

Main bay breakers (MBBs)

Each bay, both mandatory and optional, has main bay breakers (MBBs) that control that bay's power supply. MBBs are located at the bottom back of each bay, as shown in Figure 4.

Bay power controllers (BPCs)

Each bay, both mandatory and optional, has a bay power controller (BPC) that control that bay's power via the bay power supplies, described in the next section. Bay power controllers are located at the bottom rear of each bay, as shown in Figure 4.

Bay power supplies (BPSs)

Each bay, both mandatory and optional, has bay power supplies (BPSs) that are controlled by that bay's bay power controller. Bay power supplies are located at the bottom front of each bay, as shown in Figure 5.

Figure 4 Main bay breakers

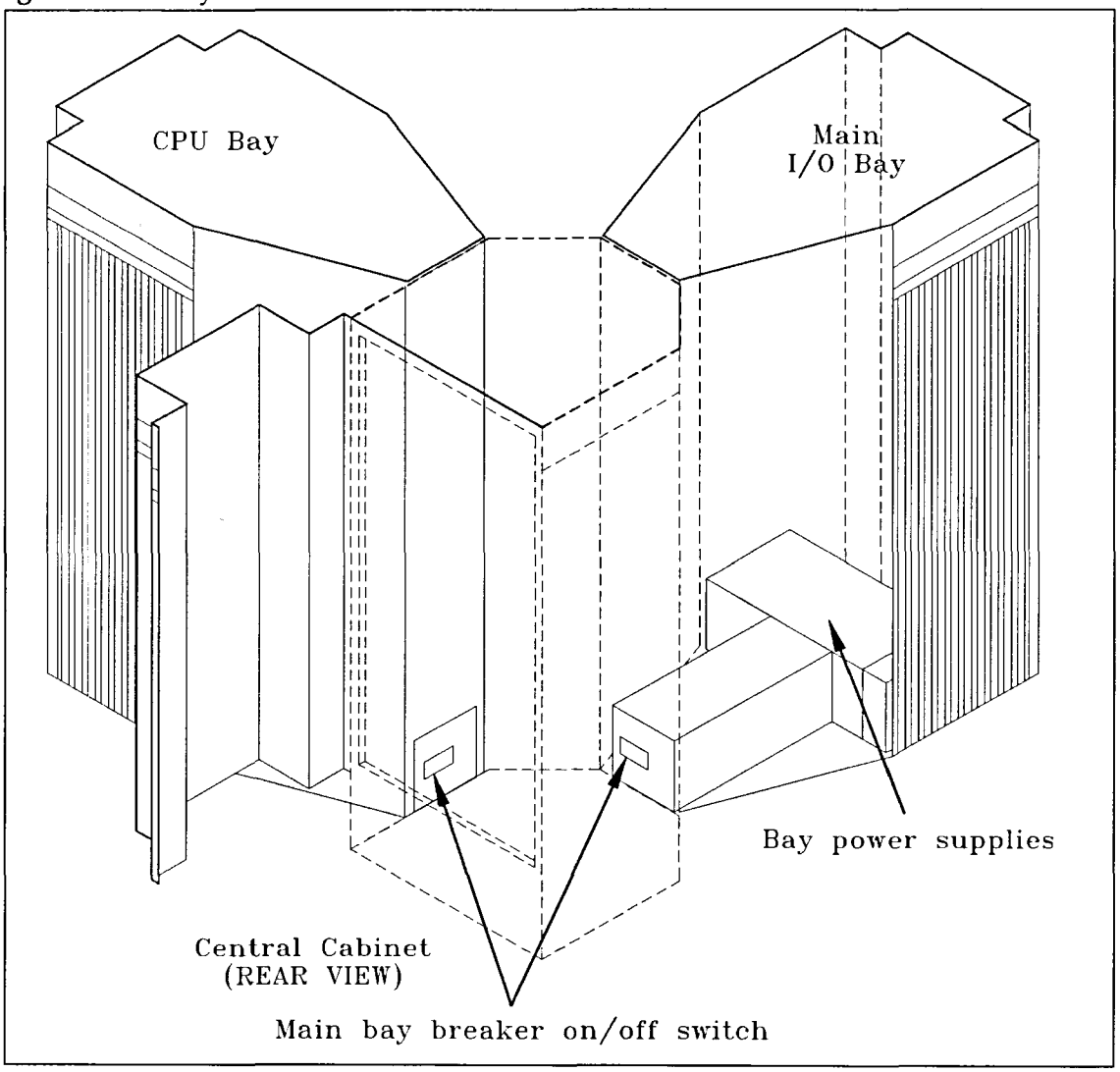
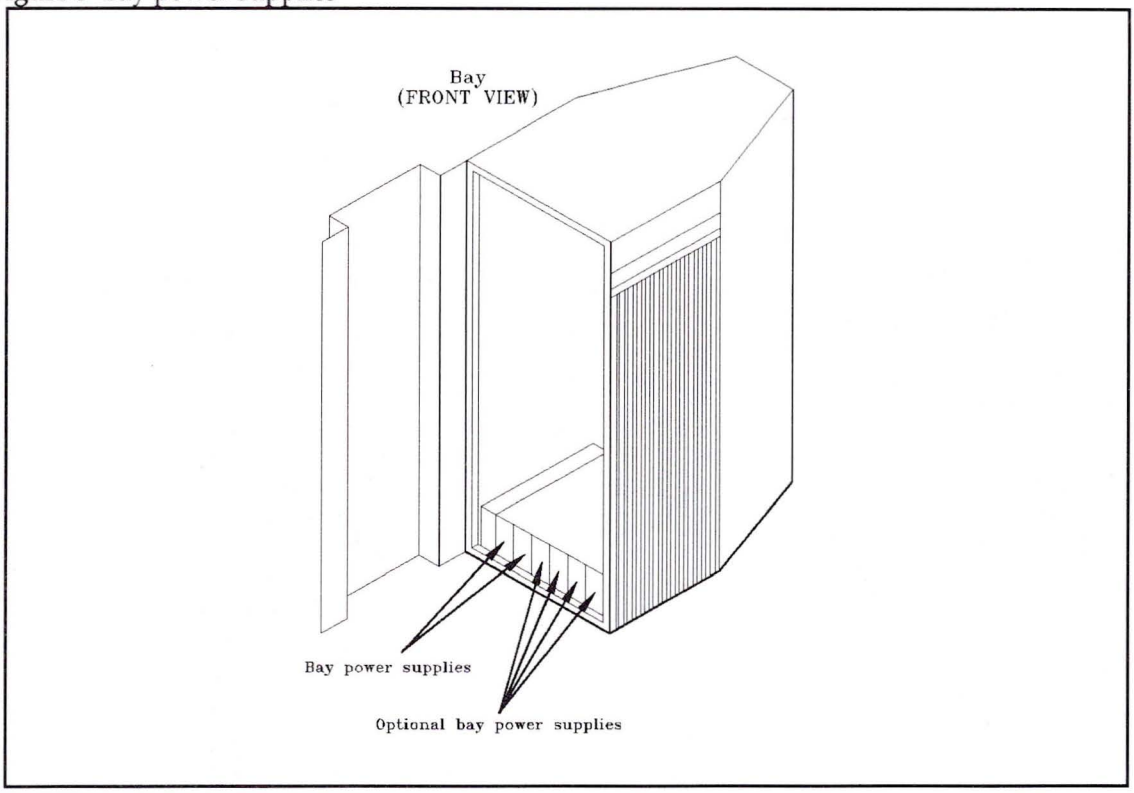


Figure 5 Bay power supplies



SPU hardware

The CONVEX C3800 Series service processor unit (SPU) is housed in a workstation. The SPU hardware and software provide a platform that manages:

- Powering up and powering down
- Booting
- Monitoring SPU and ConvexOS environments
- Setting the execution of diagnostics

Basic components

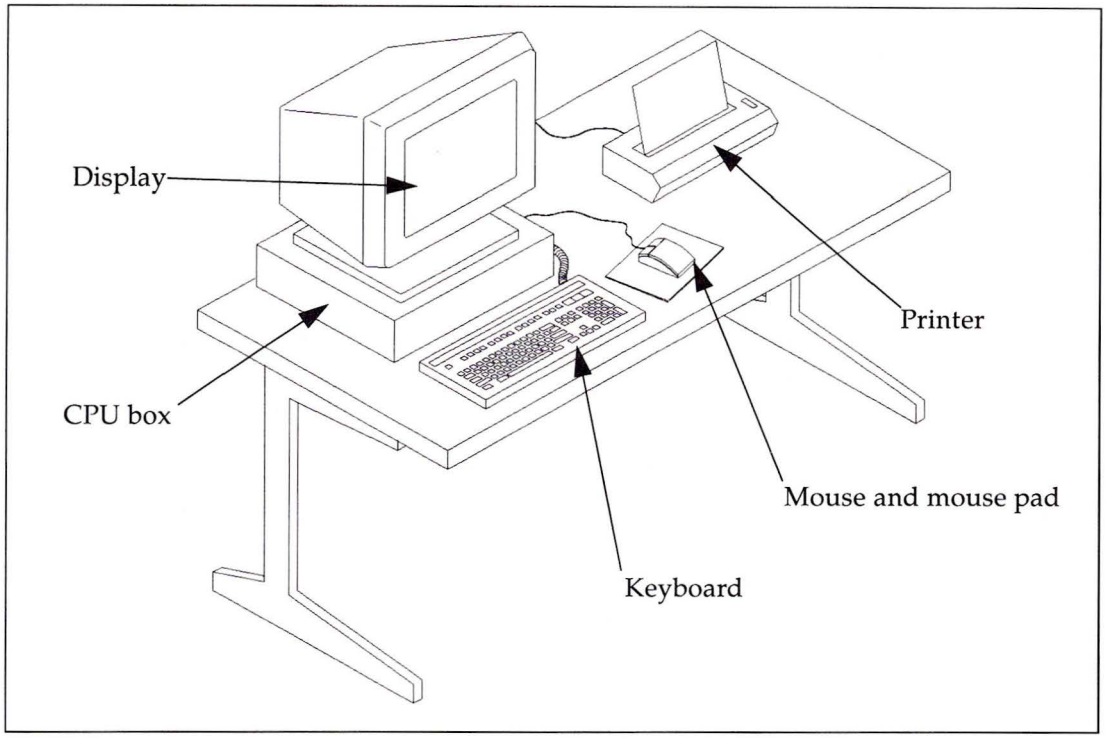
The C3800 Series SPU subsystem consists of the following hardware:

- Workstation CPU
- Workstation monitor and printer
- Hard disk drive—The disk drive stores the SPU operating system, utilities, diagnostic utilities, and associated kernel files. The disk drive is mounted in the workstation CPU box.
- DAT tape drive—The SPU tape drive loads SPU software onto the SPU disk. The tape drive is mounted in the workstation CPU box.
- A 3.5-inch floppy disk drive—This drive can be used for transporting copies of files to other sites, for keeping records of important files, and as a convenient medium for storing and transporting relatively small amounts of data.
- Modem—Used for remote dial-in communication with CONVEX field engineers and Technical Assistance Center (TAC) to monitor your system or run diagnostics. The modem is generally located on the workstation's table.

The *workstation CPU box* contains the workstation disk and tape drive, the hard disk drive, and the DAT tape drive. It also contains interface boards that are connected to the C3800 system hardware through the NCU board in the I/O bay.

These components are illustrated in Figure 6.

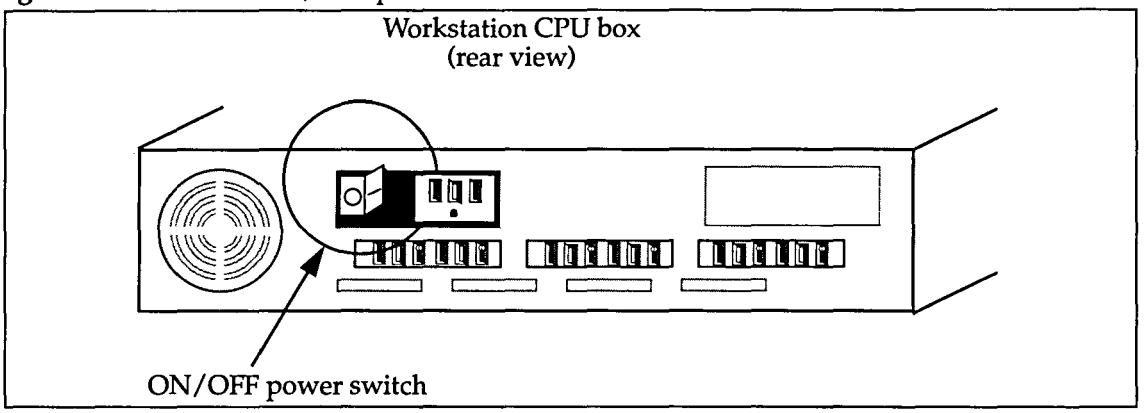
Figure 6 SPU hardware component locations



Workstation power switch

The *workstation power switch* is located at the back of the workstation CPU box and is responsible for beginning the power-up process for the entire C3800 Series system, as shown in Figure 7.

Figure 7 Workstation ON/OFF power switch



SPU modem operation

Use of the modem to dial out is permitted with the keyswitch in any position. Normal users may dial in using the SPU modem with the keyswitch in OFF, LOCAL, or REMOTE mode. However, user rmtdiag (a specially privileged login for running remote diagnostics) may only dial in when the keyswitch is in REMOTE mode. For more information on rmtdiag, refer to the section titled "Running diagnostics remotely" on page 47.

SPU software

The SPU software components in a C3800 Series system consists of files and utilities that boot, monitor, and perform basic diagnostic tasks on the SPU and ConvexOS.

The SPU disk contains the SPU operating system and parts of the ConvexOS operating system.

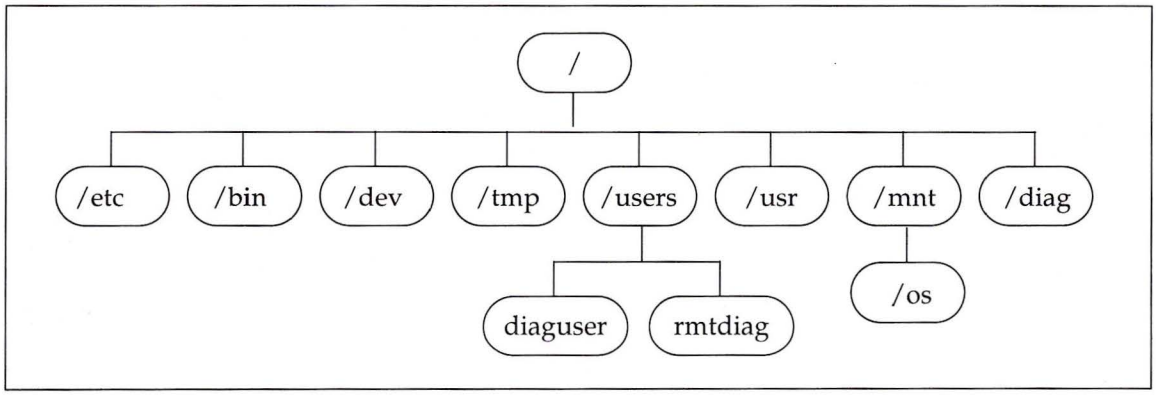
The SPU operating system contains all files and utilities required to:

- Initialize and boot ConvexOS
- Create and retain system performance records
- Monitor system performance
- Run diagnostics

These tasks are performed by SPU-based programs that execute under the SPU operating system.

Figure 8 shows the standard directory structure for the SPU operating system.

Figure 8 Standard SPU file system hierarchical structure



The SPU environment consists of many tightly-coupled files and utilities. You should not alter SPU files or file systems, except to add passwords to the /etc/passwd file or hostnames to the /etc/hosts file.

The contents of main directories are listed in Table 1.

Table 1 Main directory contents

Name	Contents of directory
/bin	Often-used commands
/dev	Special device files
/diag	Diagnostic and hardware-related software
/etc	Most system administration commands
/mnt	Utilities—ConvexOS, vmunix, device drivers, etc.
/tmp	Temporary files
/users	User directories and files
/usr	Commands and log files

Refer to Chapter 3, "SPU files" for detailed information on SPU files and the SPU directory structure.

Software operations on the SPU are performed in an X Window System environment. Refer to Chapter 2, "Using SPU windows," for information on how to use the X Window System with SPU software.

Using SPU windows

2

Operations on the CONVEX C3800 Series SPU workstation are performed in an X Window System environment. If you are unfamiliar with the X Window System, use of a mouse, or the `mwm` window manager, please refer to Appendix A, "Using windows, menus, and the mouse".

This chapter describes:

- SPU software windows
  - Names, locations, and functions
  - Logins and prompts
- Root window menus

Understanding SPU windows

The X Window System serves as the windowing environment on the SPU workstation. At the end of the boot process, the X server is automatically started on the workstation, the `mwm` window manager is started, and the following windows are created:

- **SPU CONSOLE**—A window that serves as the SPU console.
- **CONVEXOS CONSOLE**—The window where ConvexOS is booted.
- **xsfp**—An X-based soft front panel window that provides buttons to control the SPU printer and the C3800 boot process.
- **Xterm**—An `xterm` window running on the SPU workstation.
- **Icons**—A window that contains icons representing all other windows on the screen.

The appearance and location of these windows is shown in Figure 9.

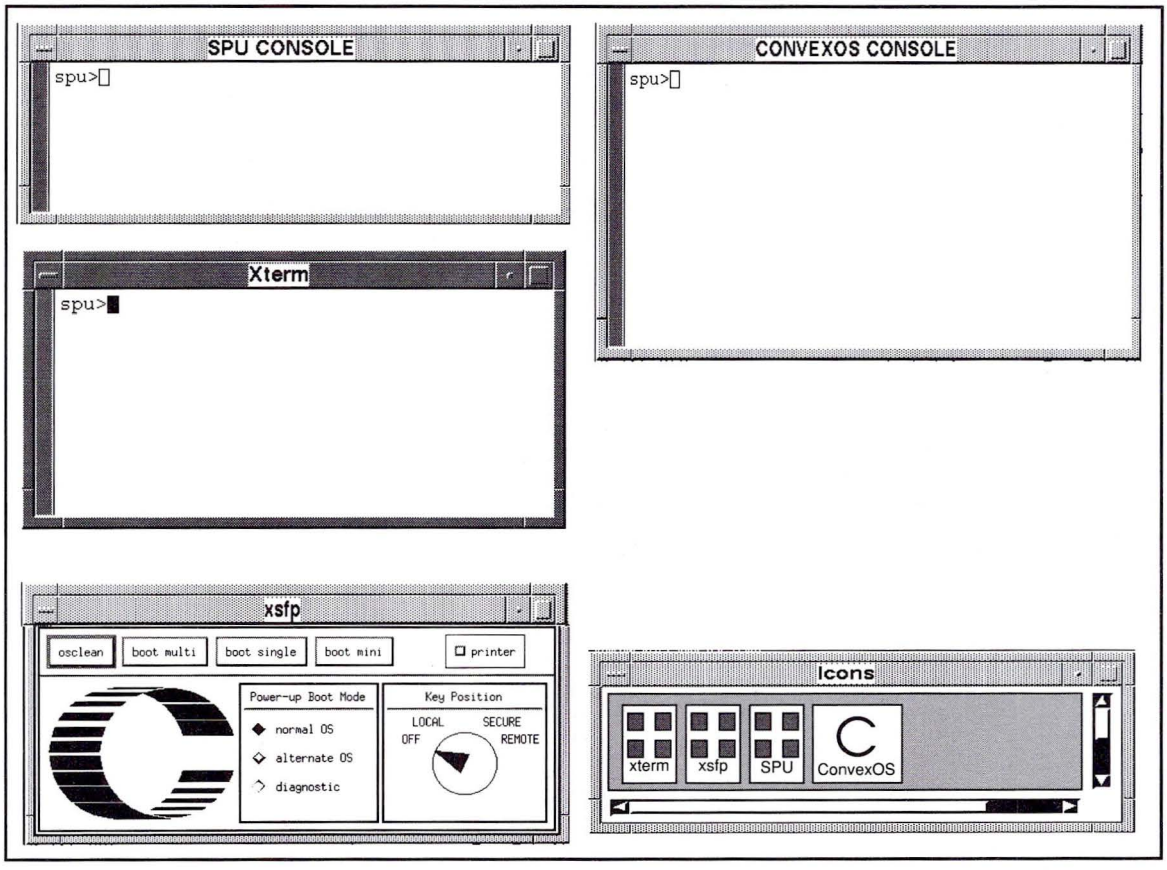
A user named "diaguser" is logged in at the SPU CONSOLE, CONVEXOS CONSOLE, and Xterm windows. The "diaguser" user account exists only on the SPU workstation. Most SPU tasks can be done as this user.

The xsfp process is the last process started, and is the controlling process for the SPU windows environment. If the xsfp process terminates, the X environment will terminate also.

Note

The .mwmrc and .Xdefaults files in ~diaguser control the appearance of the windows and menus that appear on the SPU display. Do not modify these files for personal use. If these files get inadvertently modified, copies can be found in /usr/lib/X/app-defaults.

Figure 9 Workstation screen and window layout



These windows are described in the following sections.

SPU CONSOLE window

The SPU CONSOLE window is located in the top left corner of the workstation screen. Output written to the /dev/console device file on the SPU is displayed in this window. Because all SPU error messages are written to this window, it should always be left open.

The SPU CONSOLE window has a scroll bar buffer depth of 500 lines.

If this window is terminated, a new one will be started automatically by the init process.

The SPU CONSOLE window is a normal `xterm` window that has been started with the `-C` option, which indicates that messages written to the /dev/console device on the SPU workstation are displayed on it. If additional `xterm` windows are started on the SPU with the `-C` option, only the most recently created window will receive /dev/console messages.

When you terminate additional SPU CONSOLE windows, you should be certain to terminate all of them, including the original one. Once the original SPU CONSOLE window has terminated, another one will be created automatically.

CONVEXOS CONSOLE window

The CONVEXOS CONSOLE window is located on the upper right side of the workstation screen and is the `xterm` window in which ConvexOS is booted. This window functions much like a traditional console terminal.

This window is started automatically by the xsfp process and should never be started manually.

Use of this window varies depending on the state of ConvexOS:

- When ConvexOS is not booted, "diaguser" is logged in and this window may be used to access SPU files.
- When ConvexOS is booted in single-user mode, the login in this window becomes the ConvexOS superuser (or "root"), and files on the C3800 may be accessed.
- When ConvexOS is booted in multiuser mode, a standard login prompt appears and any valid C3800 user may log in.

When the system is booted in either single-user or multiuser mode, this window displays output written to the /dev/console device on the C3800.

When ConvexOS is booted and the keyswitch is not in SECURE mode, you may return to the SPU prompt in this window by entering **CTRL-p**, and you may return to ConvexOS by entering **CTRL-d**. However, since there is usually at least one SPU window available (either the Xterm window or the SPU CONSOLE), you should not need to use these keystrokes. (The **CTRL-d** and **CTRL-p** functionality is included for backward compatibility with other C-Series machines.)

The CONVEXOS CONSOLE window has a scroll bar buffer depth of 1000 lines and cannot be closed through menu or accelerator keys. When the keyswitch is in the OFF position, this window is not visible.

If this window is terminated, it is automatically restarted by xsfp. However, if this window is restarted while ConvexOS is booted, programs that attempt to write to /dev/console on the C3800 will hang. Refer to Chapter 8, "Troubleshooting" for additional information.

Xterm window

The Xterm window is located in the center left of the workstation screen and is a general purpose `xterm` window that is used to issue commands on the SPU. It may be iconified and it has a scroll bar with a scroll buffer depth of 500 lines.

xsfp window

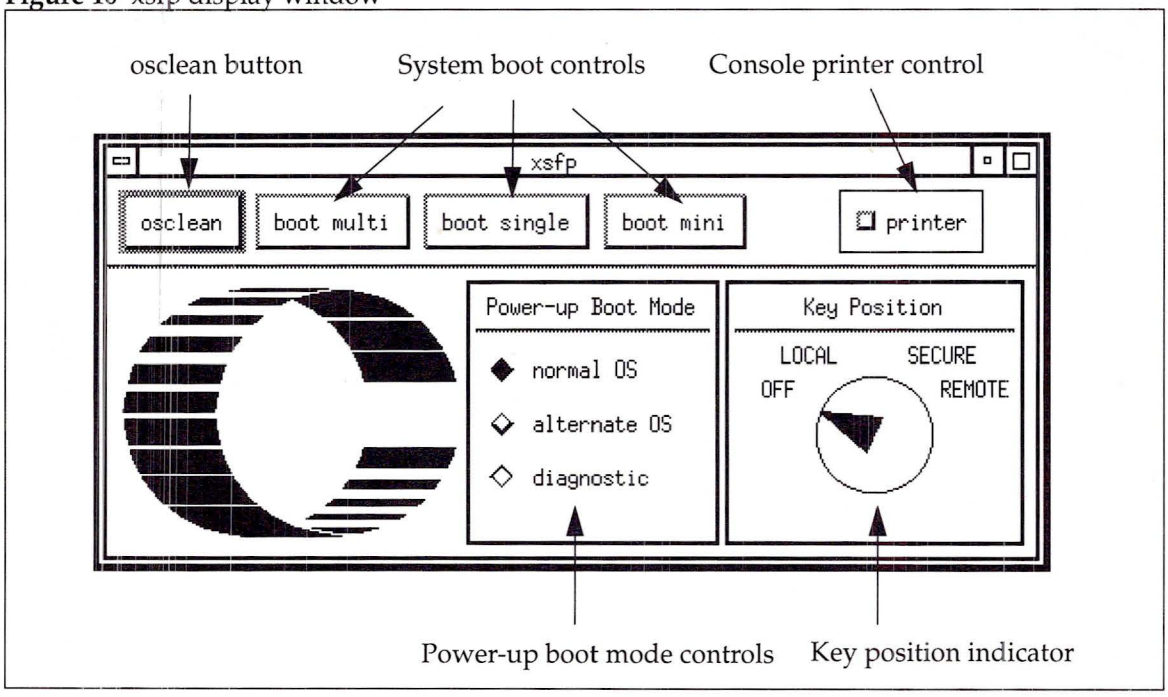
The xsfp (the X-based soft front panel) window provides controls for booting ConvexOS. It also monitors the keyswitch position and controls the SPU printer.

The xsfp process is not restartable. If the xsfp window disappears, the X server on the SPU will terminate. If this happens, refer to the section titled "If the X server on the SPU terminates" on page 78.

xsfp is started automatically by `xinit` and should never be started manually.

Figure 10 shows the xsfp display window.

Figure 10 xsfp display window



The purpose of each button is described in the following sections.

Power-up Boot Mode buttons

The Power Up Boot Mode buttons set a parameter that controls what happens when the system is powered up or the keyswitch is moved from OFF to any other position. The setting of these buttons determines which level of initialization occurs during the ConvexOS boot process.

The three boot modes are:

- **normal OS**—The boot process will complete automatically, and ConvexOS will be booted to multiuser mode. Under normal circumstances, this parameter should be set.
- **alternate OS**—The diaginit process will run, but the boot will not continue automatically. You must enter the boot command manually to complete the boot process.
- **diagnostic**—ConvexOS will not be booted and the diaginit process will not run. You must enter the boot command manually to complete the boot process.

If you change the boot parameter when ConvexOS is already booted, the change will take affect on the next boot.

For more information on these options, refer to Chapter 5, "Powering up".

System boot control

These buttons, boot multi, boot single, and boot mini, provide a simple means of executing these commands. For more information on the function of these buttons, refer to Chapter 7, "Booting procedures".

osclean button

This button runs the `osclean` program. `osclean` should be run only when recovering from a system crash.

Console printer control

The toggle printer button enables and disables the capability of the SPU printer to print all the characters that appear in the CONVEXOS CONSOLE window. When the printer is toggled on, anything that appears in the CONVEX CONSOLE window is printed.

You should make sure that the printer is online before toggling the printer control button on. If the printer is offline, characters that appear in the CONVEXOS CONSOLE window will be buffered; the buffer may eventually grow large enough to fill all of the memory on the SPU.

If you use the `lpr` command to print a file on the SPU printer, the printer must be toggled off.

The printer only prints characters written to the CONVEXOS CONSOLE window. To print from another window, first toggle the printer on, then enter **`cat > /dev/null`** in the CONVEXOS CONSOLE window. Then, highlight the desired material by dragging the mouse over it and paste it into the CONVEXOS CONSOLE window by moving the mouse into that window and pressing the middle mouse button.

To return printing to the CONVEXOS CONSOLE window, terminate the `cat` process by pressing **CTRL-d** in the CONVEXOS CONSOLE window.

Key Position

The Key Position portion of the xsfp window reflects the current status of the hardware keyswitch position. Whenever a keyswitch change occurs, and if the xsfp window has been iconified, xsfp deiconifies itself to allow the keyswitch change to be visible on the SPU workstation display.

Icons window

The workstation screen contains an icon box, titled Icons, that contains icons for all of the windows available for display. You can iconify the Icons box. When iconified, the box becomes its own small icon. To restore the Icons box, double-click on it.

Refer to Appendix A, "Using windows, menus, and the mouse" for instructions on how to open, close, iconify, restore, enlarge, reduce, and move windows.

Login accounts and prompts

This section describes SPU login accounts and their default prompts.

Login accounts

There are three login accounts on the SPU:

- **diaguser**—The login shells in all SPU windows are owned by this user. Most SPU maintenance tasks can be performed by this user.
- **rmtdiag**—This login is used only for performing remote diagnostics over the SPU modem. See the section titled "Running diagnostics remotely" on page 47 for more information.
- **root**—This is the SPU superuser.

You should not need to create additional login accounts on the SPU.

Prompts

The default prompts for the SPU login accounts are shown in Table 2.

Table 2 SPU CONSOLE window prompts

Login account	Prompt
diaguser	`spu>`
superuser	`#`
superuser (via `su`)	`spu\>` or `#`

Root Window Menus

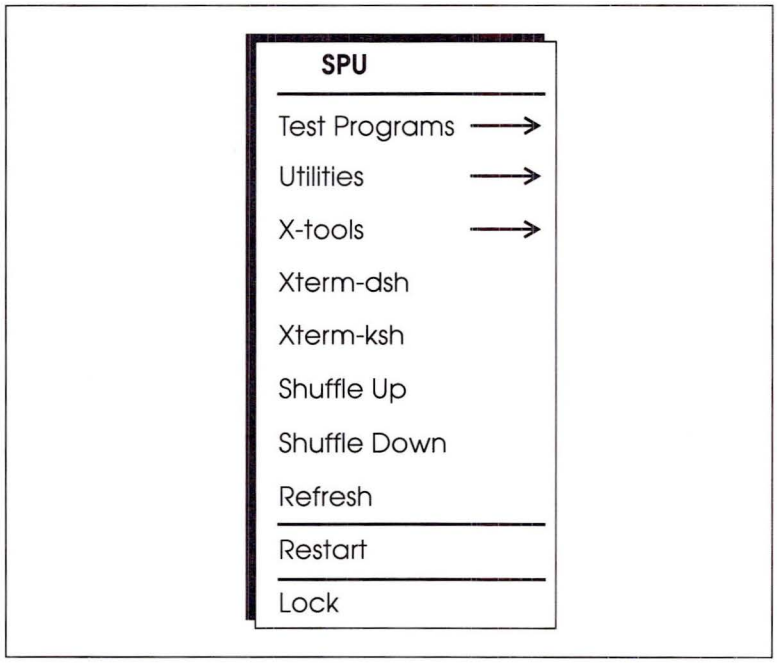
The root window menus can be accessed by holding down either the left or right mouse button while the cursor is in the root window. The following sections describe the contents of each of the root window menus.

Main menu

The main menu, SPU, contains simple functions that access diagnostic commands. The main menu is a pop-up menu; you activate it by holding down either the far left or far right mouse button while the cursor is in the root window. The root window is the background of the screen that is not covered by a window.

The main menu has three options that activate cascading pop-up menus. These options are marked by arrows, as shown in Figure 11.

Figure 11 Main SPU pop-up menu



The functions of the main menu are shown in Table 3.

Table 3 Main SPU menu options

Name	Function
Test Programs	Pop-up test program cascading menu
Utilities	Pop up the utility cascading menu
X-tools	Pop up the X-tools cascading menu
Xterm-dsh	Start an `xterm` window with dshl as default shell
Xterm-ksh	Start an `xterm` window with ksh as default shell
Shuffle up	Modify stacking order of windows
Shuffle down	Modify stacking order of windows
Refresh	Refresh all windows being displayed
Restart	Restart the Motif window manager
Lock	Lock the screen

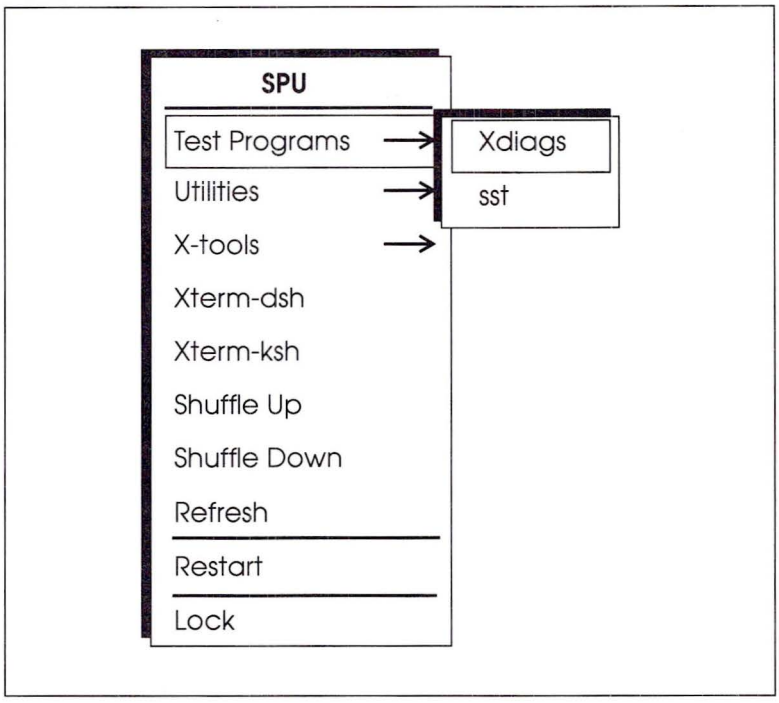
To activate any of these options, first access the main menu by holding down the far left or far right mouse button while the cursor is in the display's background (not in any window). When the main menu appears, hold down the mouse button and drag the mouse down until the selection you desire is highlighted, then release. The action indicated by the selected item will take place immediately.

Test Programs cascading menu

The Test Programs cascading menu contains two options: `Xdiags` and `sst`. Selecting the `Xdiags` option invokes the `xdiag` utility, which provides an X-based interface to execute process-based diagnostics. The `sst` command invokes the `sst` test inside an `xterm` window.

This menu's options are shown in Figure 12.

Figure 12 Test Programs cascading options



For detailed information about why and how to use these utilities, refer to the *CONVEX Processor Diagnostics Guide: C3800 Series*.

Utilities cascading menu

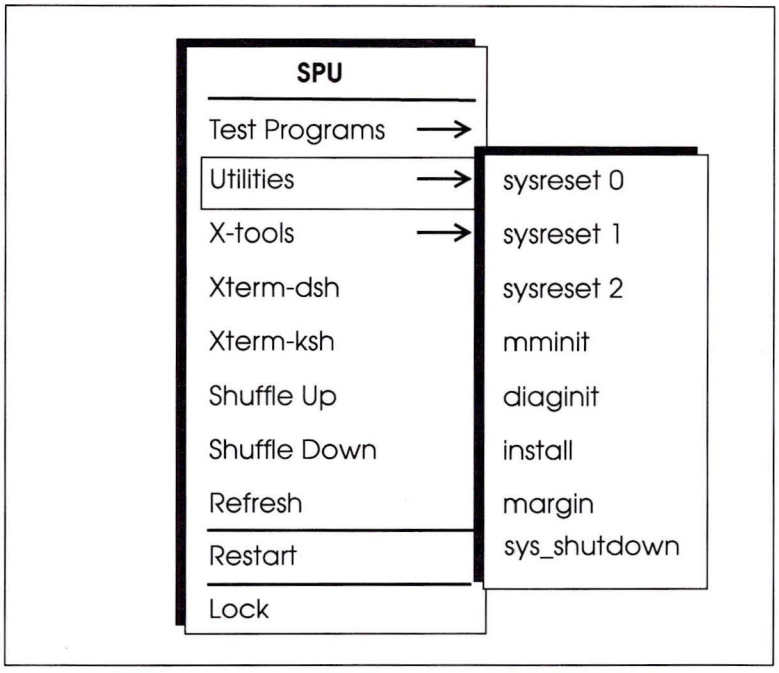
The Utilities cascading menu gives you access to several frequently-used command-line driven diagnostic utilities. When you invoke an option from this menu, the utilities direct their output to the workstation's SPU CONSOLE window.

Caution

Some of the utilities on this menu are used to reset or alter the state of C3800 hardware. Selecting them inadvertently could have undesirable consequences, especially if ConvexOS is booted.

The Utilities cascading menu is shown in Figure 13.

Figure 13 Utilities cascading menu



Options in the Utilities cascading menu are shown in Table 4.

Table 4 Utilities cascading menu options

Name	Executes
sysreset 0	`/diag/bin/sysreset -l0`
sysreset 1	`/diag/bin/sysreset -l1`
sysreset 2	`/diag/bin/sysreset -l2`
mminit	`/diag/bin/mminit`
diaginit	`/diag/bin/diaginit`
install	`/diag/bin/install`
margin	`/diag/bin/margin`
sys_shutdown	`/diag/bin/sys_shutdown`

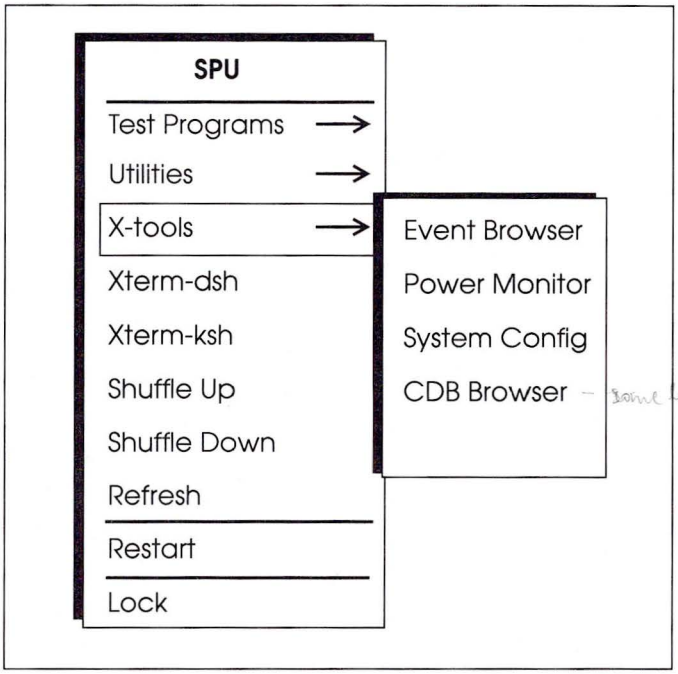
For more information regarding these options, refer to the *CONVEX Processor Diagnostics Guide: C3800 Series.*

X-tools cascading menu

The X-tools cascading menu provides access to the diagnostic utilities that have an X Window System interface.

This menu's options are shown in Figure 14.

Figure 14 X-tools cascading menu



Menu options are given in Table 5.

Table 5 X-tools cascading menu options

Name	Invokes
Event browser	/diag/bin/xeventbrowser
Power Monitor	/diag/bin/xpowermon
System Config	/diag/bin/xsysconfig
CDB Browser	/diag/bin/xcdbbrowser

For more information regarding these options, refer to the *CONVEX Processor Diagnostics Guide: C3800 Series.*

SPU files

3

This chapter explain the SPU directory structure and lists the owners and permissions for SPU files that are necessary for normal operation.

SPU directory structure

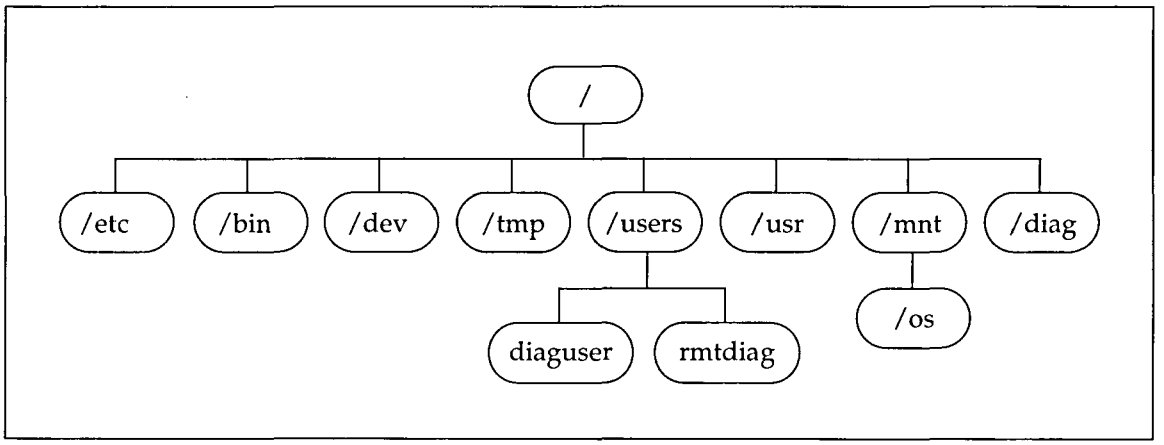
The SPU operating system contains all files and utilities required to:

- Initialize and boot ConvexOS
- Create and retain records of system performance
- Maintain system performance
- Work in conjunction with diagnostics

These tasks are performed by SPU-based programs that execute under the SPU operating system.

Figure 15 illustrates the directory structure for the SPU operating system.

Figure 15 Standard SPU file system hierarchical structure



The SPU directory structure is shown in Table 6.

Table 6 Directory structure

Directory	Contents of directory
/bin	Often-used commands
/dev	Block and character special device files used to communicate with devices
/diag	Diagnostics and hardware-related software
/diag/bin	All diagnostic utilities
/diag/data	Log files
/diag/db	Configuration database, RT database, Scan ring definitions, CPU Microcode, CXTS database, firmware for power system
/diag/test	All test programs
/diag/test/CPU	SPU test C-series object files
/diag/test/cti	CTI RC files, info files, and parameter files
/diag/test/spu	SPU-based executables
/etc	Most system administrator commands and configuration files
/mnt	ConvexOS data files and error logs
/mnt/bin	A link to /diag/bin
/mnt/iotest	All diagnostics and utilities
/mnt/os	Files related to ConvexOS
/sst	`sst` packed pattern sets
/tmp	Used to hold files temporarily
/users	Directories for users and the files and subdirectories they create. Diaguser and rmtdiag home directories are located here.
/usr	Commands and log files
/usr/adm	System administration data files
/usr/bin	Commands not required to boot, restore, or repair file system
/usr/local/man	Online documentation for CONVEX SPU man pages
/usr/man/cat1... cat9	Online documentation that has already been formatted to speed up access

Table 6 (continued) Directory structure

Directory	Contents of directory
/usr/man/man1. ..man9	Unformatted documentation pages
/usr/spool	Receives spooled files for various programs
/usr/spool/lp	Control and working file for the `lp` spooler
/usr/spool/uucp	Receives queued work files and contains lock files, log files, status files, and other files for uucp
/usr/tmp	An alternative directory for placing temporary files, typically large files

The default search path for diaguser is:

/bin:/usr/bin:/diag/bin:/mnt/os:/diag/test/spu:/diag/test:
/diag/local:/sst:/diag/hw:/diag/db:/usr/bin/X11:/usr/local
/bin:/etc:/usr/etc:/usr/ucb:/usr/contrib/bin:/usr/local/etc:.

File permissions

Table 7 lists the correct owners and file permissions for necessary SPU files.

File permissions can be viewed with the command

```
ls -l
```

If you are unfamiliar with file ownership and permissions or the chown and chmod commands, refer to the *ConvexOS Primer*, *Managing ConvexOS: Configuration Guide*, or the chmod(1) and chown(8) man pages.

Note

File access permissions for the C3800 SPU software have been set optimally. Do not change permissions on any file or directory that ships with the SPU, unless to return access permission for a file or directory to its original state.

Table 7 SPU file permission settings

SPU Directory	File	Owner	Proper permission setting
/diag/	DIAG_REV	root	`-r--r--r--`
	bin	root	`drwxrwxr-x`
	data	root	`drwxrwxr-x`
	db	diaguser	`drwxrwxr-x`
	etc	root	`drwxr-xr-x`
	hw	diaguser	`drwxrwxr-x`
	local	diaguser	`drwxrwxr-x`
	scripts	diaguser	`drwxrwxr-x`
	test	diaguser	`drwxrwxr-x`

Table 7 (continued) SPU file permission settings

SPU Directory	File	Owner	Proper permission setting
/diag/bin/	CONVEXOS_ CONSOLE	diaguser	-rwxr-xr-x
	altsetpts	diaguser	-rwxrwxr-x
	boot	diaguser	-rwxrwxr-x
	boot_hsp	diaguser	-rwxrwxr-x
	boot_iop	diaguser	-rwxrwxr-x
	bpccomd	diaguser	-rwsr-xr-x
	bpcwatchd	diaguser	-rwsr-xr-x
	cdb_browser	diaguser	-rwxrwxr-x
	cdb_dump	diaguser	-rwxrwxr-x
	cdb_get	diaguser	-rwxrwxr-x
	cdb_startup	diaguser	-rwxrwxr-x
	cdb_update	diaguser	-rwxrwxr-x
	cdbserver	diaguser	-rwxrwxr-x
	console_s	diaguser	-rwxrwxr-x
	cop	diaguser	-rwxrwxr-x
	cpualloc	diaguser	-rwxrwxr-x
	cs	diaguser	-rwxrwxr-x
	ddb	diaguser	-rwxrwxr-x
	diaginit	diaguser	-rwsr-xr-x
	diaplay_log	diaguser	-rwxrwxr-x
	dsh	diaguser	-rwxrwxr-x
	dump_soft_log	diaguser	-rwxrwxr-x
	errintd	convexos	-rwxrwxr-x
	errlogd	diaguser	-rwxrwxr-x

Table 7 (continued) SPU file permission settings

SPU Directory	File	Owner	Proper permission setting
/diag/bin/ (continued)	event_browser	diaguser	-rwxrwxr-x
	hard_logger	diaguser	-rwsr-xr-x
	hard_logger.exc	diaguser	-rwsr-xr-x
	hsputil	diaguser	-rwxrwxr-x
	idcfmt	diaguser	-rwxrwxr-x
	initall	diaguser	-rwxrwxr-x
	kill_by_name	diaguser	-rwxrwxr-x
	lib	diaguser	drwxrwxr-x
	logmsg	diaguser	-rwxrwxr-x
	margin	diaguser	-rwsr-xr-x
	mm_sniff	convexos	-rwsrwxr-x
	mmap	diaguser	-rwxrwxr-x
	mminit	diaguser	-rwxrwxr-x
	modem_init	diaguser	-rwxrwxr-x
	nologin_create	root	-rwsr-xr-x
	nologin_delete	root	-rwsr-xr-x
	powerdown	diaguser	-rwsr-xr-x
	powermon	diaguser	-rwsr-xr-x
	powerup	diaguser	-rwsr-xr-x
	pwr_util	diaguser	-rwsr-xr-x
	rbcdb_init	diaguser	-rwxrwxr-x
	remote_disconnect	diaguser	-rwsr-xr-x
	remove_bd	diaguser	-rwxrwxr-x
	scan_shm_init	diaguser	-rwxrwxr-x
	scn_util	diaguser	-rwxrwxr-x

Table 7 (continued) SPU file permission settings

SPU Directory	File	Owner	Proper permission setting
/diag/bin (continued)	sfp	diaguser	-rwxrwxr-x
	swix_load	diaguser	-rwxrwxr-x
	sys_shutdown	diaguser	-rwsr-xr-x
	sysreset	diaguser	-rwxrwxr-x
	vioputil	diaguser	-rwxrwxr-x
	xcdb_browser	diaguser	-rwxrwxr-x
	xdiag	diaguser	-rwxrwxr-x
	xevent_browser	diaguser	-rwxrwxr-x
	xpowermon	diaguser	-rwsr-xr-x
	xsfp	diaguser	-rwxrwxr-x
	xsys_config	diaguser	-rwxrwxr-x
/diag/bin/lib	DBtapefmt	diaguser	-rwxrwxr-x
	controllers	diaguser	-rwxrwxr-x
	dev5210.dhelp	diaguser	-rwxrwxr-x
	dev5210.help	diaguser	-rwxrwxr-x
	dev5300.dhelp	diaguser	-rwxrwxr-x
	dev5300.help	diaguser	-rwxrwxr-x
	dev5510.dhelp	diaguser	-rwxrwxr-x
	dev5510.help	diaguser	-rwxrwxr-x
	dev_ultra.help	diaguser	-rwxrwxr-x
	dev_vscsit.dhelp	diaguser	-rwxrwxr-x
	dev_vscsit.help	diaguser	-rwxrwxr-x
	hsputil.x00	diaguser	-rwxrwxr-x
	names.idc4000	diaguser	-rwxrwxr-x
	vioputil.x00	diaguser	-rwxrwxr-x

Table 7 (continued) SPU file permission settings

SPU Directory	File	Owner	Proper permission setting
/diag/data	error_log	root	-rwxrwxrwx
/diag/db	bpcpid	diaguser	-rw-rw-rw-
	cdb.db	diaguser	-rw-rw-rw-
	cdb.db.chkpt	diaguser	-rw-rw-rw-
	cdb.map	diaguser	-rw-rw-rw-
	cdb.map.chkpnt	diaguser	-rw-rw-rw-
	cdb.pid	root	-rw-rw-rw-
	cdb_setup	diaguser	-rwxrwxr-x
	fw	diaguser	drwxrwxr-x
	fw_rev_update	diaguser	-rwxrwxr-x
	lab_machine	diaguser	-rwxrwxr-x
	lca_images	diaguser	drwxrwxr-x
	linefreq	diaguser	-rw-r--r--
	modem_parms	diaguser	-rw-r--r--
	osc_update	diaguser	-rwxrwxr-x
	rb.pid	root	-rw-rw-rw-
	rb_config_file	diaguser	-rw-rw-rw-
	rb_config_file.chkpt	diaguser	-rw-rw-rw-
	rm_rbcdb_pids	diaguser	-rwxrwxr-x
	rt.dat	diaguser	-rw-r--r--
	scn_ovr	diaguser	-rwxrwxr-x
	scn_ring	diaguser	drwxrwxr-x
	secure	diaguser	-rw-r--r--
	set_lab_busses	diaguser	-rwxrwxr-x
	standard.db	diaguser	-rw-rw-rw
	standard.map	diaguser	-rw-rw-rw

Table 7 (continued) SPU file permission settings

SPU Directory	File	Owner	Proper permission setting
/diag/db (continued)	standard.rb	diaguser	-rw-rw-rw
	ucode	diaguser	drwxr-xr-x
	ucode-	diaguser	drwxrwxr-x
	ucode_rev_update	diaguser	-rwxrwxr-x
	xsfptab	diaguser	-rw-r--r--
/diag/db/fw/	all files	diaguser	-rwxrwxr--
/diag/db/ lca_images/	all files	diaguser	-rw-r--r--
/diag/db/scn_ring/	all files	diaguser	-rwxr-xr-x
/diag/db/ucode/	all files	diaguser	-rwxrwxr-x
/diag/test/	all files	diaguser	-rwxrwxr-x
/diag/test/CPU/	all files	diaguser	-rwxrwxr-x
/diag/test/cti/	all files	diaguser	-rwxrwxr--
/diag/test/script	all files	diaguser	-rw-r--r--
/diag/test/spu	all files	diaguser	-rwxrwxr-x

SPU management tasks

4

You must perform a few basic tasks to prepare and maintain the SPU workstation software. These tasks are described in this chapter.

Becoming superuser on the SPU

User "diaguser" is normally logged in to all SPU windows. To perform privileged tasks, you must become the superuser (or *root*) in one of the windows. Because SPU system error messages are logged to the SPU CONSOLE window, it is recommended that you use the Xterm window to perform SPU maintenance tasks.

To become superuser on the SPU:

Step 1 Enter **su** at the `spu>` prompt.

Step 2 Enter the password if required.

The SPU is shipped without a root password, so you will not be prompted for one if this is the first time you are using `su`. You should assign a root password immediately. Refer to the section titled "Assigning passwords" on page 40.

The superuser prompt may be either # or `spu\>`. The examples in this chapter use #, as shown in Figure 16.

Figure 16 Using `su` command to become superuser

```
spu>su
Password:

#
```

Step 3 To end a superuser session, enter

```
exit
```

Passwords

The SPU is shipped without passwords set for any user. For security purposes, you should assign passwords for the following users:

- root
- diaguser
- rmtdiag

Assigning passwords

To assign a password:

Step 1 If you are changing the password for either root or rmtdiag, become superuser on the SPU.

Step 2 Enter

passwd *username*

where *username* is the name of the user whose password you are changing. You will be prompted for a new password.

Step 3 Enter the password you have chosen. The password must contain at least six letters. The system does not display the password as you type it.

Step 4 Re-enter the password when prompted, as shown in Figure 17.

Figure 17 Assigning superuser password

```
# passwd root
New password:
Retype new password:
#
```

Changing passwords

To maintain the highest security possible, you should change the passwords for root, diaguser, and rmtdiag periodically using the `passwd` command. Passwords should be at least six characters long and should contain numbers, mixed case letters, or punctuation.

Do not modify any other aspect of the root, diaguser, or rmtdiag user accounts. Do not set a password for user convexos.

For more information on assigning or changing passwords, refer to the passwd(1) man page.

Changing date and time

The SPU workstation, whether powered on or off, keeps track of the date and time. You need to set the date and time when you:

- Initially set up the system
- Recover from a clock failure

To change the system's date and time:

Step 1 Become superuser in the SPU CONSOLE window.

Step 2 Enter

`date` *time*,

where *time* [*yynnddhhmm*] is:

- *yy*—The last two digits of the year (0-99)
- *nn*—The number of the month (01-12)
- *dd*—The date (01-31)
- *hh*—The hour (0-23)
- *mm*—The minute (0-59)

The system responds by displaying the new date and time, as shown in Figure 18.

Figure 18 Changing date and time

```
# date 9101301604
Fri Jan 30 16:04 PST 1991
#
```

The `date` command can also be used to display the current date and time. For more information, refer to the date(1) and time(1) man pages.

Backing up SPU files

Hardware or software problems with the SPU disk, damage to workstation equipment, or accidental deletion of files can cause data stored on disks to be lost. To ensure against loss, make back-up tapes of the SPU disk on a regular basis.

The `backup` script copies files from disks to tapes.You can recover files that are lost or corrupted on disk by restoring them from back-up tapes. You can restore either individual files or an entire file system from these tapes. For more information, refer to the section titled "Restoring SPU files from tape", on page 43.

Suggested frequency

You should back up the SPU file system:

- Once a month
- After installing new SPU software

These backups should be full backups, rather than incremental backups.

Performing backups

Use the following instructions to back up the SPU file system. Backups can be done while the SPU is in multiuser mode.

Step 1 Become superuser in an Xterm window on the SPU.

Step 2 Insert a tape into the DAT drive located in the workstation CPU box. A DAT tape is large enough to hold the entire disk.

Step 3 Back up the file systems on the SPU to the tape by entering **`/etc/backup`**, as shown in Figure 19. `/etc/backup` is a script that calls the `dump` utility.

Figure 19 Using the `backup` command

```
# /etc/backup
```

A full backup usually takes about an hour.

Step 4 When the backup is complete, remove the tape from the drive. Label the tape and keep it in a safe place.

Restoring SPU files from tape

The `restore` utility can be used to restore the entire SPU file system or a single file or directory.

Restoring the entire SPU file system

Step 1 Become superuser on the SPU. Since system error messages are written to the SPU CONSOLE window, you should use an Xterm window for this task.

Step 2 Insert the back-up tape into the DAT disk drive located in the workstation CPU box.

Step 3 Make the root directory your current working directory by entering the command

```
cd /
```

Step 4 Restore the contents of the tape by entering the command

```
/etc/restore x
```

Caution

This command copies all the files on back-up tape to their original locations and will overwrite current versions of those files.

A complete restore usually takes about an hour.

Restoring an individual file or directory

Step 1 Become superuser on the SPU. Because system error messages are written to the SPU CONSOLE window, use an Xterm window for this task.

Step 2 Insert the back-up tape into the DAT disk drive, located in the workstation CPU box.

Step 3 Make the /tmp directory your current working directory by entering

```
cd /tmp
```

Step 4 Restore the file or directory by entering

`/etc/restore x` *filename*

where *filename* is the name of the file or directory you want to restore. Directories are restored recursively, so if you specify the name of a directory, its contents will also be restored.

Step 5 Copy the newly restored file or directory from the /tmp directory to its proper location using the `cp` command.

Transferring files

Files can be transferred between the C3800 Series and the SPU. For information regarding transferring files, refer to the spu(8) and spucmd(8) man pages.

Controlling the SPU remotely

It is possible to display all windows for all processes running on the SPU on a remote workstation or an X terminal.

Caution

If you are running ConvexOS/Secure, networking is not supported in the evaluated configuration. It is recommended that you do not provide networking access to the SPU in a trusted environment.

To control the SPU remotely, complete the following steps.

Step 1 Become the superuser on the SPU.

Step 2 Edit the file ~diaguser/.xinitrc. Add the line

```
DISPLAY=workstation:0.0
```

where *workstation* is the hostname of the remote workstation or X terminal. This line must be added directly below the line

```
xsetroot -solid navy
```

This change causes all the X-based applications that are started from ~diaguser/.xinitrc to be displayed on the remote display. By default, these include:

- CONVEXOS CONSOLE
- xsfp
- One `xterm` window
- An icon box, if you are using `mwm`

Step 3 To make the menus available in the root window on the SPU workstation also available on the networked display, add the line

```
mwm &
```

directly below the line you added in Step 2.

If you do not wish to use these menus, or if want to use a window manager other than `mwm`, do not add this line. In this case, the networked display must be running both the X server and a window manager.

Step 4 Edit ~diaguser/.cshrc. Change the word "unix" in the line

```
DISPLAY=unix:0.0
```

to the name of the remote display you specified in Step 2.

Step 5 Edit ~diaguser/.profile. Change the word "unix" in the line

```
: ${DISPLAY:=unix:0.0}
```

to the name of the remote display you specified in Step 2.

Step 6 If you want to display the SPU CONSOLE window on the remote display, edit the /etc/spu_console_start file and replace the word "unix" in the following line

```
 /bin/su diaguser -c '/usr/bin/X11/xterm -C -ls -name "SPU CONSOLE" \
-sl 0 0 -sb -geometry 80x4+1+1 -display unix:0.0'
```

with the name of the remote display.

Step 7 Reboot the SPU workstation so these changes take effect.

Running diagnostics remotely

rmtdiag is a privileged login for running diagnostics remotely. It is intended for use only by CONVEX Field Engineers or the Technical Assistance Center (TAC). The hardware keyswitch must be in REMOTE mode for rmtdiag to log in.

Upon logging in, user rmtdiag inherits control of the CONVEXOS CONSOLE window and the processes running in it. If rmtdiag has logged in from a VT100 terminal or an X terminal, the window will resize to match the size of the terminal or xterm window.

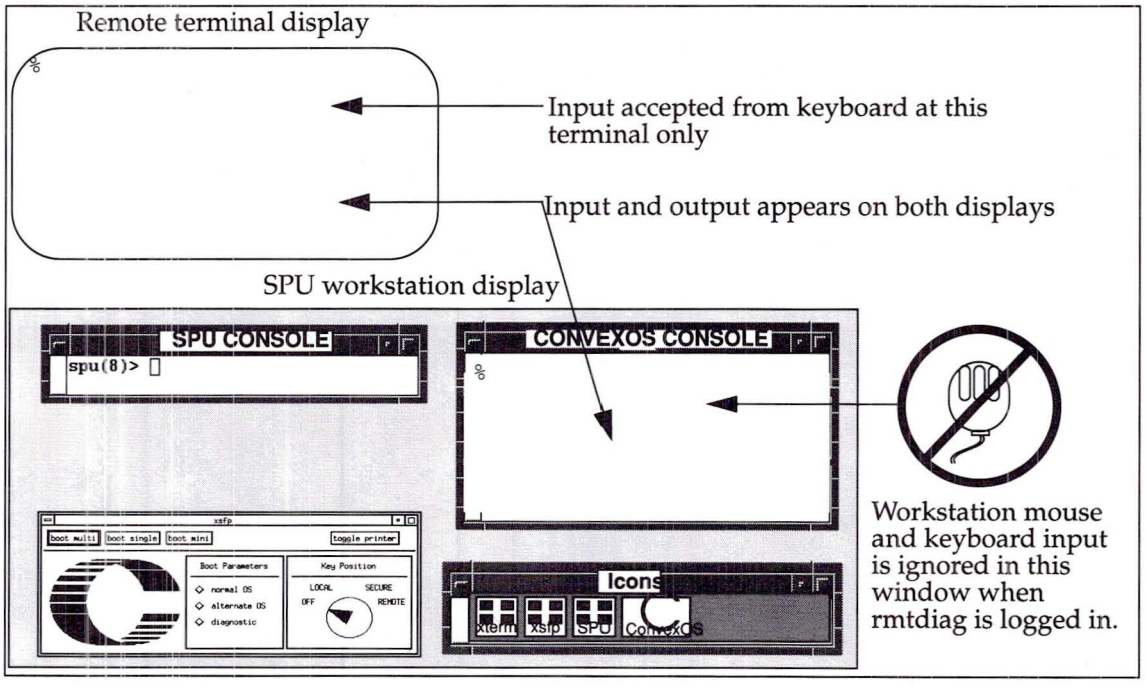
When rmtdiag is logged in, input from the SPU keyboard is ignored in the CONVEXOS CONSOLE window. The SPU mouse may be used to manipulate the scroll bar on the CONVEXOS CONSOLE window, but all other mouse input to this window will be ignored.

Output is written to both the remote CONVEXOS CONSOLE window and the local one displayed on the SPU. This configuration is shown in Figure 20.

Caution

If you are running ConvexOS/Secure, networking is not supported in the evaluated configuration. It is recommended that you do not provide networking access to the SPU in a trusted atmosphere.

Figure 20 Using a remote CONVEXOS CONSOLE



Restricting input from the SPU in REMOTE mode

The setting of _REMOTE_RESTRICT in the /diag/db/xsfptab file on the SPU controls whether or not input is accepted from the SPU workstation when the keyswitch is in REMOTE mode.

- If _REMOTE_RESTRICT is set to 1, all input from the SPU keyboard and mouse is ignored when the keyswitch is in REMOTE mode.
- If _REMOTE_RESTRICT is set to 0, input is allowed to occur in any SPU window except the CONVEXOS CONSOLE window. This is the default mode.

However, even if _REMOTE_RESTRICT is set to 0, input from the SPU keyboard and mouse is ignored in the CONVEXOS CONSOLE window (except for the scroll bar) when user rmtdiag logs in.

You can change the setting of _REMOTE_RESTRICT by editing the /diag/db/xsfptab file. The change will take effect the next time keyswitch is put into REMOTE mode.

Controlling multiple rmtdiag logins

The setting of _RMTDIAG_OWN in the /diag/db/xsfptab file controls what happens when a second rmtdiag user logs in.

- If _RMTDIAG_OWN is set to 0, the second rmtdiag user takes control of the CONVEXOS CONSOLE window. A message is written to the terminal of the first rmtdiag user and they are disconnected. This mode is the default.
- If _RMTDIAG_OWN is set to 1, the first rmtdiag user retains control of the CONVEXOS CONSOLE window. Login attempts by subsequent rmtdiag users will fail with a message indicating that there is already an rmtdiag user logged in.

You can change the setting of _RMTDIAG_OWN by editing the /diag/db/xsfptab file. The change will take effect next time user rmtdiag attempts to log in.

Terminating an rmtdiag session

To terminate an rmtdiag login session, execute

```
remote_disconnect
```

at the remote terminal.

Note

Do not use the `logout` command to terminate an rmtdiag login session.

Powering up

5

Read and become familiar with the information in Chapters 1-3 before you perform tasks described in this chapter.

Overview

Before you can boot the system, power must be applied to all system components. The process of applying power is referred to as *powering up*. This chapter describes how to power up all system components, including the SPU workstation, to which power is applied first.

When to power up

You must power up the system after:

- Powering down for routine maintenance
- Repairing a board or bay
- An emergency powerdown
- A power outage

How to power up

The C3800 power-up procedures are chiefly automatic. That is, when you begin the power-up process, the system continues applying power to components successively, until all components have power, the SPU operating system is booted and the X Window System is started. This power-up process is discussed in the next section, "Understanding power control."

Understanding power control

The SPU controls the power-up process of the C3800 series system. You can power up the SPU without powering up the entire system. In addition, you can remove power from the SPU without removing power from the rest of the system. The numbers in the following list illustrate the steps in the SPU power control flow chart in Figure 21.

1. Power is initially applied to the SPU when the OFF/ON switch located on the back of the workstation is physically set to ON.
2. After power is applied to the SPU, the SPU initializes itself and then performs system checks (self-tests).
3. When the system checks are complete, the SPU workstation boots automatically.
4. The workstation boot brings up the X Window System environment.
5. Power is applied to all other system components.

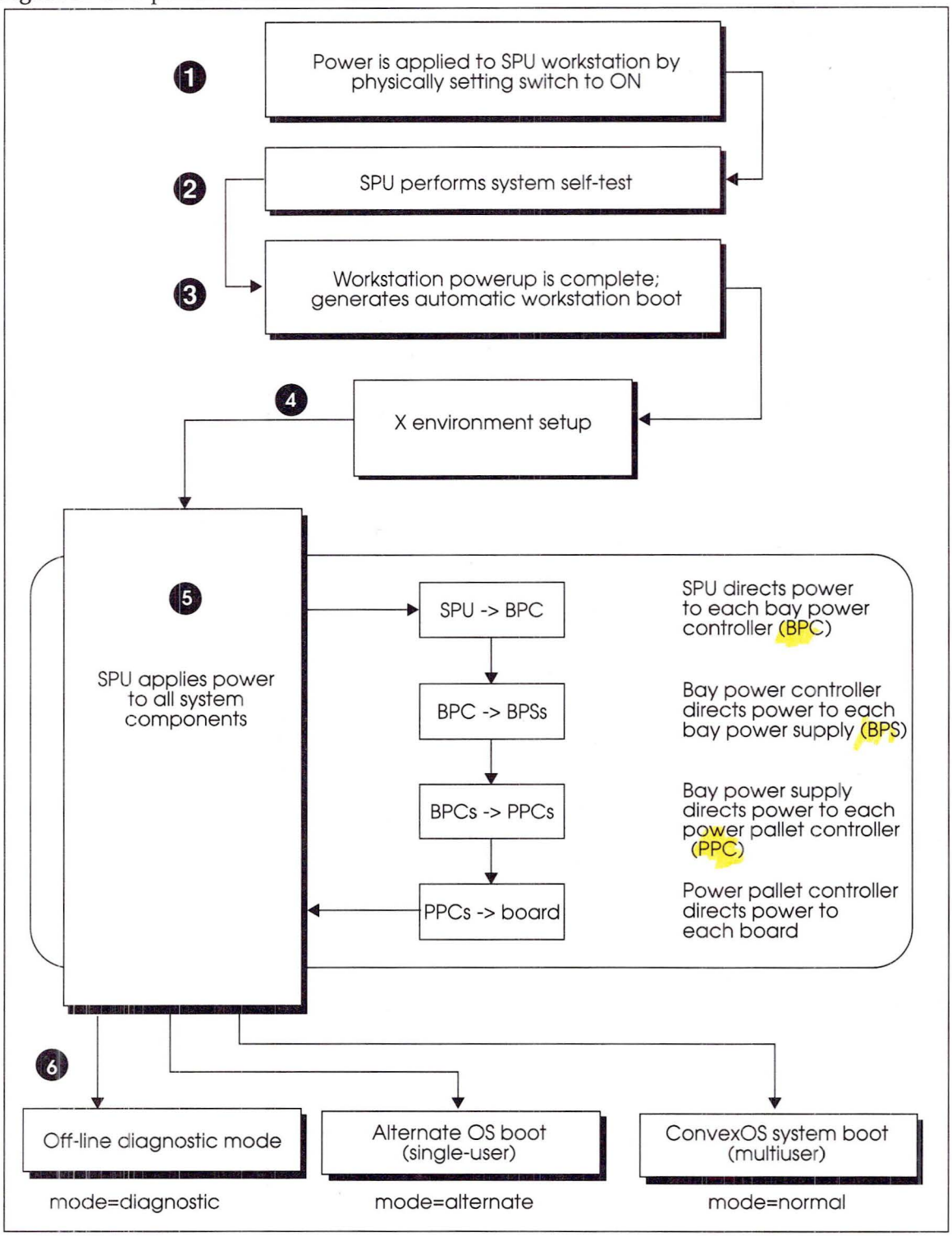
   The SPU applies and removes power from each bay—each bay has its own power supplies (BPSs), which are controlled by a single bay power controller (BPC). The BPCs receive commands from the SPU directing it to apply or remove power from each bay.

   Power is applied to most logic boards through power pallets. Each power pallet has a power pallet controller (PPC) that communicates with a bay power controller (BPC). In this way, all boards have their power controlled indirectly by the SPU.
6. When the system is completely powered up, it is ready to boot to either ConvexOS, an alternate operating system, or the off-line diagnostic mode, as defined by the settings of the soft front panel.

The automation of the power-up process simplifies the role of the system manager in powering up and booting the SPU and ConvexOS.

To power up the system, follow the instructions in the remaining sections of this chapter.

Figure 21 SPU power control flow chart



Powering up the system

Which steps you use to power up the system depends on the state of the CONVEX system before powering up. When your system is down, it will be in one of the following states:

- **Partially powered down**—The system is partially powered down if it has been powered down from SPU software, but every system component's hardware power switch is not physically turned off. This includes all bay power supplies (BPSs) and main bay breakers (MBBs). This is the most common powered-down state.
- **Completely powered down**—Your system is completely powered down if SPU software has powered it down and every system component's power switch is physically turned off. This includes all bay power controllers (BPCs), bay power supplies (BPSs), and main bay breakers (MBBs).

Use the instructions in the following sections to power up the system, which automatically boots the SPU workstation and starts the X Window System.

If partially powered down

If the system is partially powered down, as defined above, perform the following steps to power up.

Step 1 Make sure the hardware keyswitch located at the back of the central cabinet is set to LOCAL.

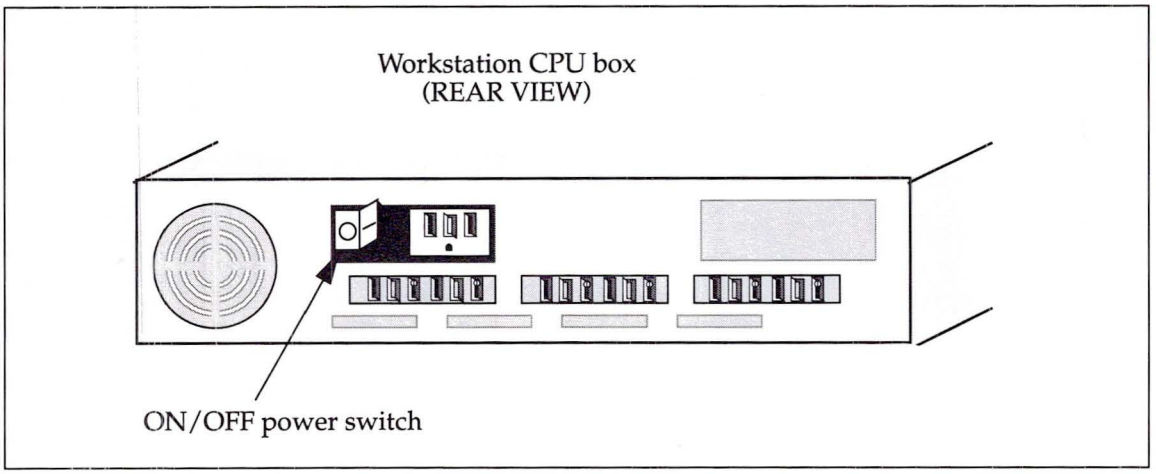
Step 2 Make sure that the MBBs are ON. If not, set them to ON.

Step 3 Make sure that all BPSs are ON. If not, set them to ON.

Step 4 Physically apply power to the SPU by setting the ON/OFF switch located on the back of the CPU box to ON. Setting the workstation power switch to ON applies power first to the workstation, then to the C3800 series system.

This power switch is illustrated in Figure 22.

Figure 22 Workstation CPU box power switch



The system responds by resetting the workstation's processor to begin executing code from ROM located within the workstation.

The boot ROM locates the default console (the keyboard and bitmapped display) and begins to run diagnostics. Diagnostics are performed on the workstation's interface cards, RAM, and processors. As each component completes its self-test, the self-test status is displayed.

If the workstation already has power but the C3800 Series system does not, and you wish to apply power to the system, enter **`diaginit`** in any SPU window.

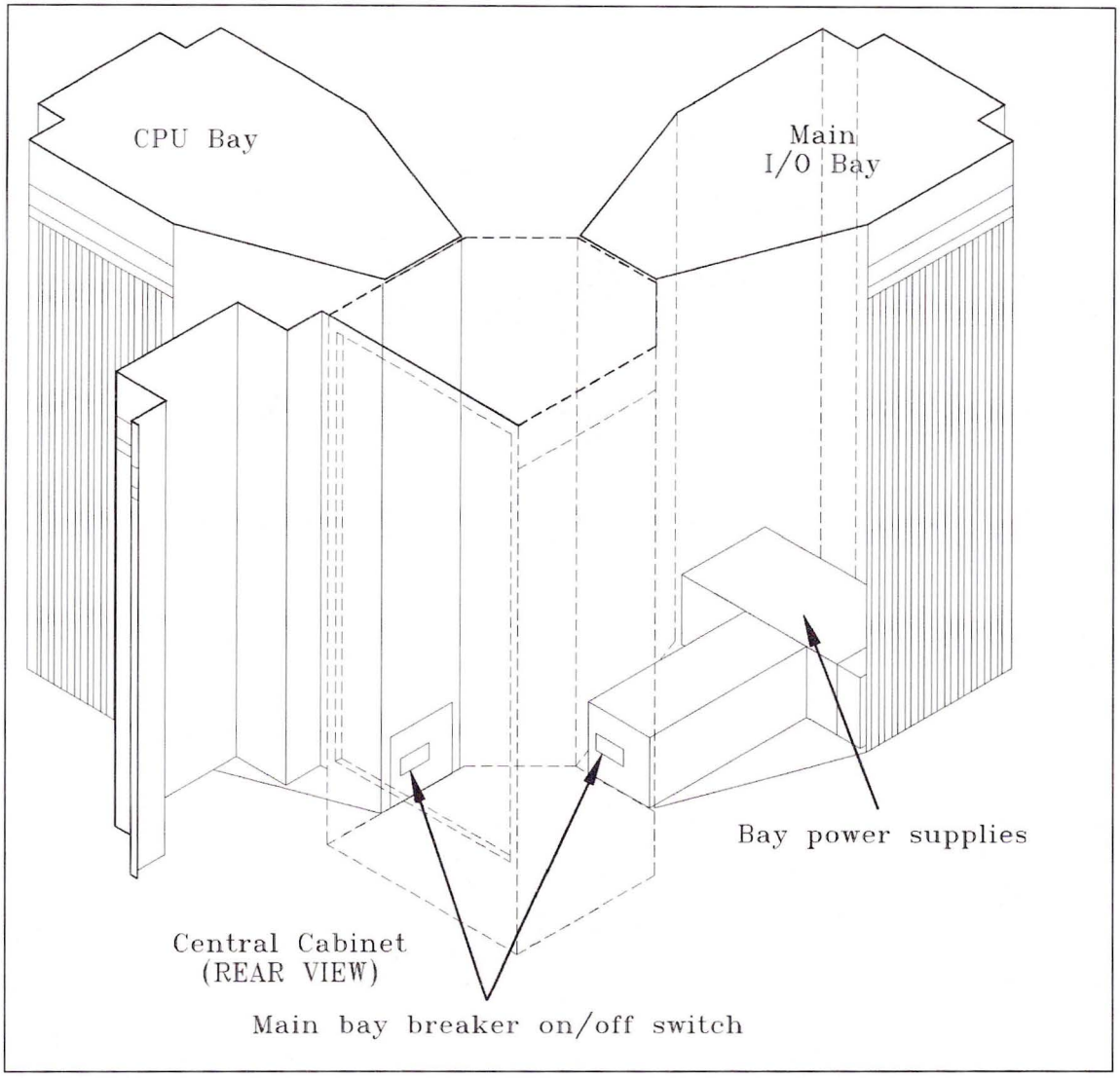
The SPU workstation and C3800 Series system are now powered up, and the workstation has booted the X Window System. Refer to Figure 21 for a flow chart of this process.

If completely powered down

Follow these instructions to power up the system from a completely powered down state. Follow each step in sequence.

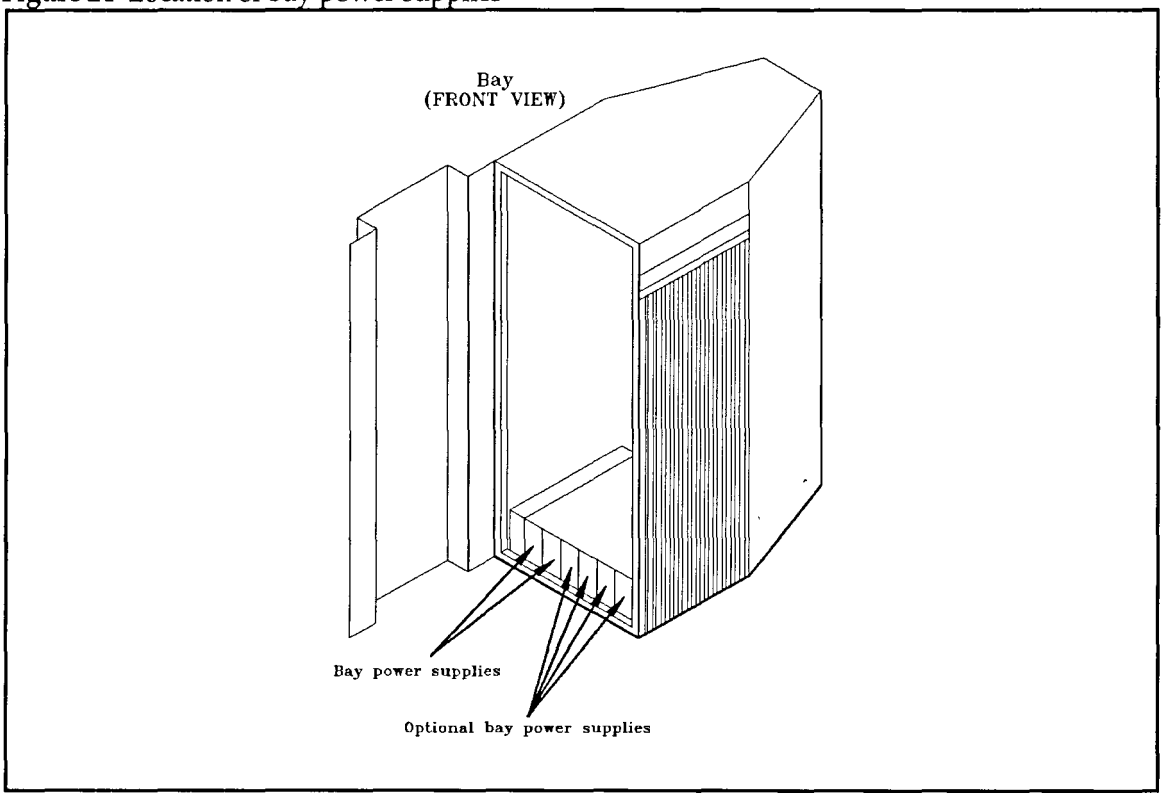
Step 1 Locate the main bay breakers (MBBs) on the bottom back of each bay, as shown in Figure 23. Turn each one ON.

Figure 23 Location of main bay breakers



Step 2 Locate each of the bay power supplies (BPSs) located on the bottom front panel of each bay, as shown in Figure 24. Turn each one ON.

Figure 24 Location of bay power supplies

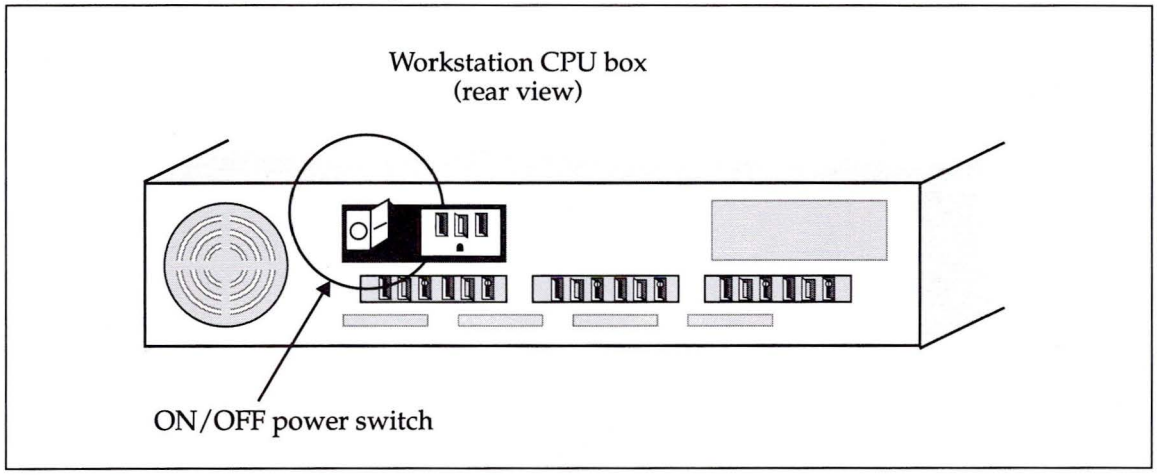


Step 3 Locate the hardware keyswitch at the top rear of the main bay. Turn the keyswitch position from OFF to LOCAL.

Step 4 Physically apply power to the SPU by setting the ON/OFF switch located on the back of the CPU box to ON. Setting the workstation power switch to ON applies power first to the workstation, then to the C3800 Series system.

The CPU box power switch is illustrated in Figure 25.

Figure 25 Workstation CPU box power switch



The system responds by applying a reset to the workstation's processor to begin executing code from ROM located within the workstation.

The boot ROM locates the default console (the keyboard and bitmapped display) and begins to run diagnostics. Diagnostics are performed on the workstation's interface cards, RAM, and processors. As each component completes its self-test, its self-test status is displayed.

Step 5 If the workstation already has power but the C3800 Series system does not, and you wish to apply power to the system, enter **`diaginit`** in the SPU CONSOLE window.

The SPU workstation and C3800 Series system are now powered up, and the X Window System is running on the workstation. Refer to Figure 21 for a flow chart of this process.

Powering down

6

Read and become familiar with the information in Chapters 1-3 before you perform tasks described in this chapter.

Overview

You will sometimes need to power down the system—perhaps to avoid a system crash during an expected power outage or to perform routine maintenance. When you power down the system, power is removed from every system component.

When to power down

You must power down the system:

- To perform routine maintenance to the machine
- To replace or repair a specific board or bay
- To avoid a system crash during an expected power outage
- During an emergency

Halting ConvexOS

Before the system is shut down, it must be brought from multiuser mode to single-user mode, and the C3800 processors must be halted.

Step 1 If ConvexOS is booted to multiuser mode, become the superuser in the CONVEXOS CONSOLE window.

Step 2 If ConvexOS is already in single-user mode, skip this step. Bring the system to single-user mode by issuing the `shutdown` command:

`/etc/shutdown` *+minutes "reason"*

minutes is the amount of time before the system shuts down to single-user mode. *reason* is a few words describing why the system is being taken down. Warning messages will be periodically sent to users informing them of the impending shutdown and the reason for it.

To bring the system to single-user mode instantly, use the command

```
/etc/shutdown now "for hardware maintenance"
```

Step 3 Halt the C3800 processors and bring the system down to the SPU with the commands shown in Figure 26. Be certain to enter the `sync` command twice.

Figure 26 Using the `halt` command

```
# cd /
# /etc/umount -a
# sync
# sync
# /etc/halt
```

You may skip this step if you ran shutdown with the -h option, which causes the machine to halt automatically:

`/etc/shutdown -h` *+minutes "reason"*

Powering down from SPU mode

To power down from SPU mode, use the `sys_shutdown` command:

`sys_shutdown`

`sys_shutdown` partially powers down the system; it puts the bay power controllers into reset and shuts down the power pallet controllers. To reapply power to system components, see Chapter 5, "Powering up".

Caution

Do not run `sys_shutdown` if ConvexOS is booted. Doing so will cause the C3800 to crash immediately.

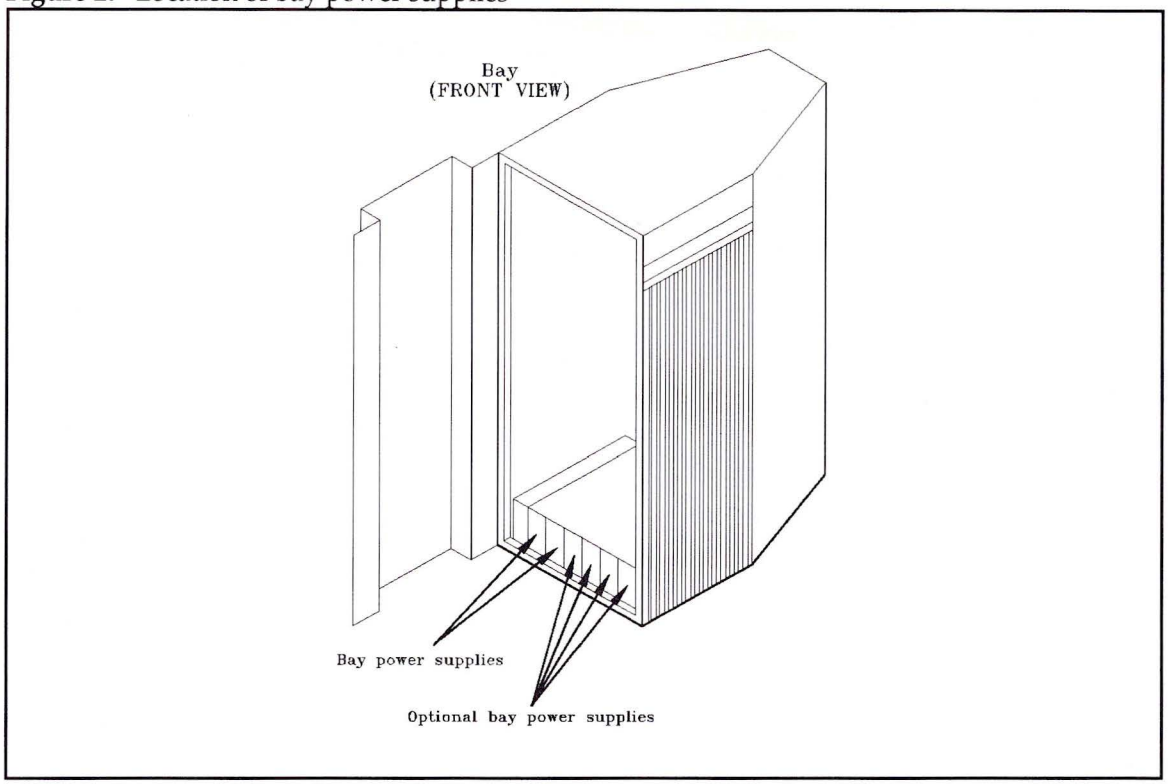
Turning off hardware components

After the system is powered down, follow the steps in this section to turn off the hardware switches.

Step 1 Turn the hardware keyswitch to OFF.

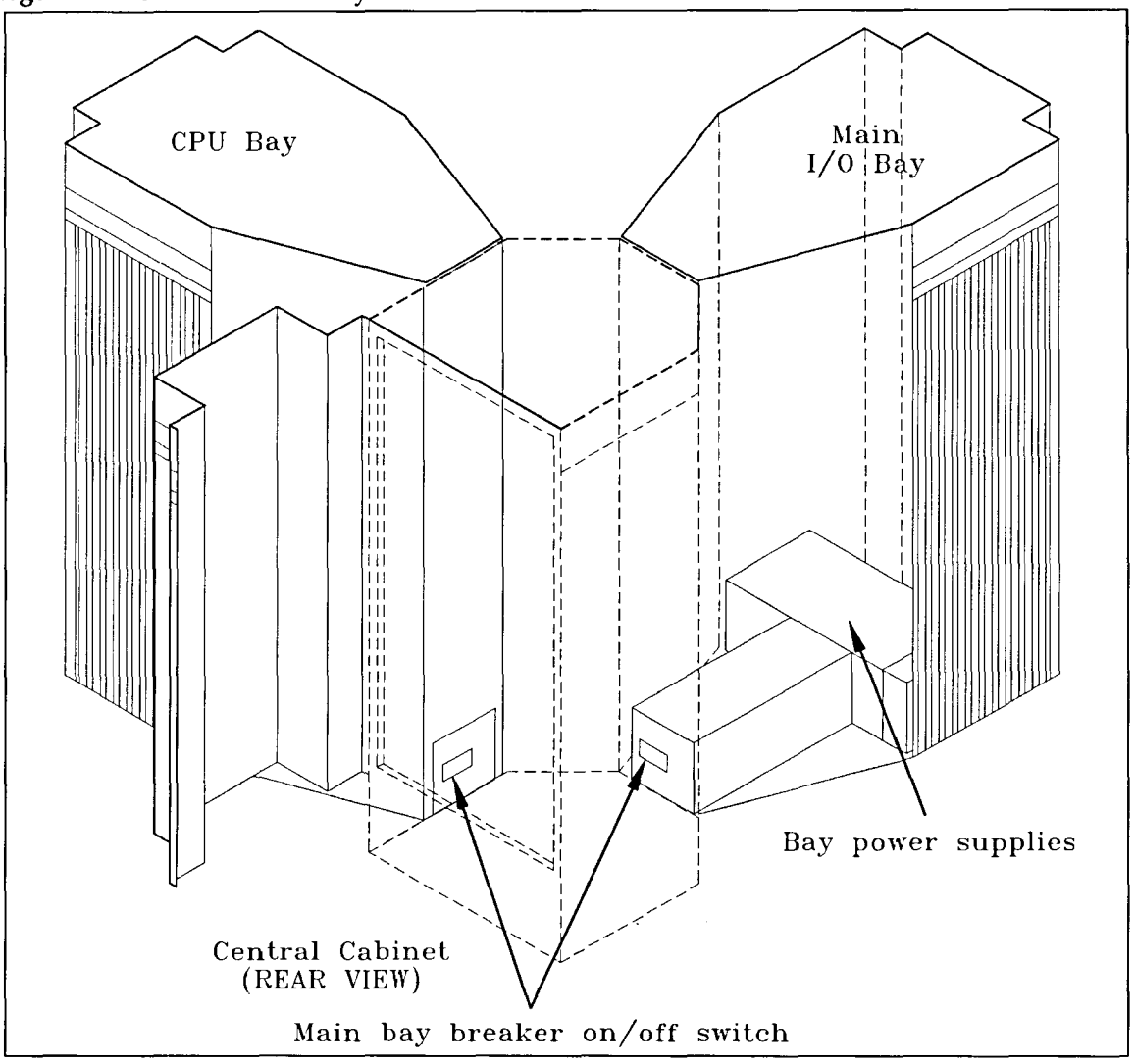
Step 2 Turn OFF each of the bay power supplies located at the front bottom of each bay, as shown in Figure 27.

Figure 27 Location of bay power supplies



Step 3 Turn OFF the main bay breakers located at the bottom rear inside panel, as shown in Figure 28.

Figure 28 Location of main bay breakers



The system is now completely powered down, and may be powered up according to the instructions in Chapter 5, "Powering up".

Shutting down the SPU

If the workstation needs to be powered down, first shut down the C3800 by following the steps in the sections titled "Halting ConvexOS", "Powering down from SPU mode", and "Turning off hardware components".

Step 1 Shut down the SPU by entering the `fasthalt` command

```
fasthalt
```

Step 2 Turn the ON/OFF power switch on the back of the SPU CPU box to OFF.

Caution

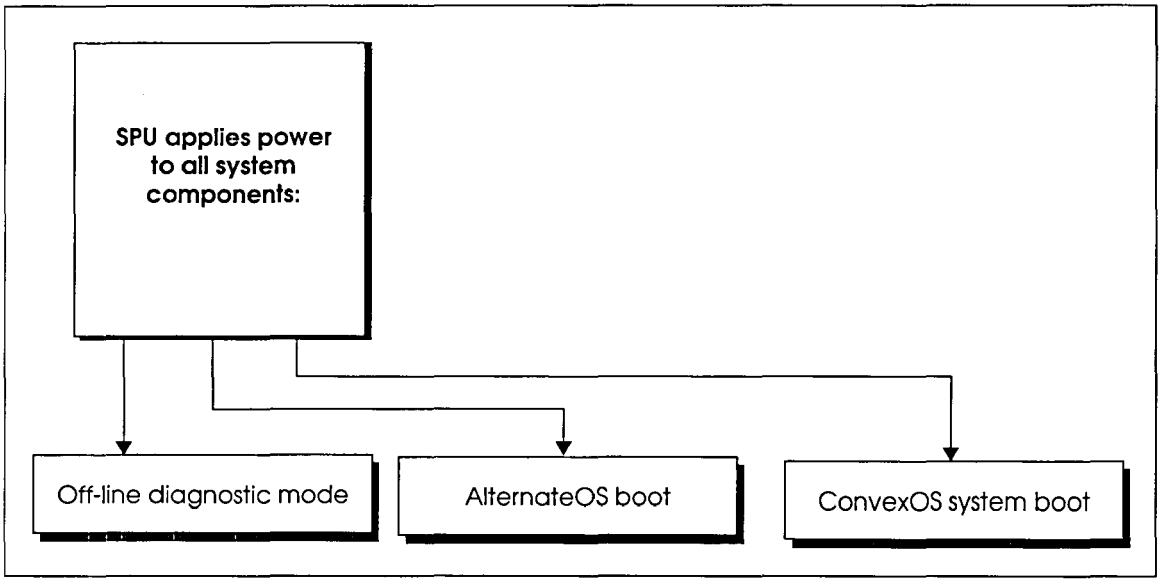
Do not shut down the workstation without first shutting down ConvexOS. Otherwise, as soon as the SPU is rebooted, ConvexOS will crash without first cleaning up jobs currently running on the system, which will cause unnecesary problems.

Booting procedures

7

The power control flow chart in Figure 21 on page 53 ends with the system completely powered up, and with three boot parameter options, as shown in Figure 29.

Figure 29 Boot options flow chart

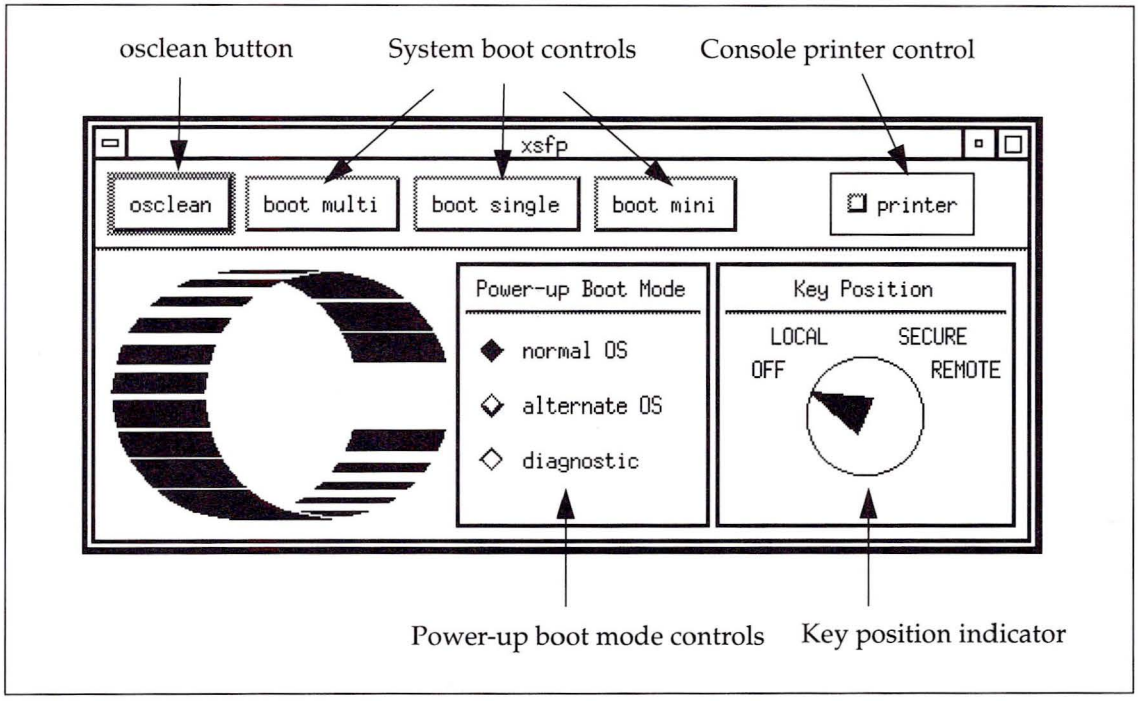


Booting processes build on this power-up process.

Boot options

The parameters for booting are defined by controls in the soft front panel, represented by the xsfp window. The xsfp window is shown in Figure 30.

Figure 30 xsfp display window



The following sections describe the xsfp window.

Hardware keyswitch positions

The xsfp window displays the setting of the hardware keyswitch. You cannot change the position of the keyswitch by clicking in the xsfp window—its position is merely *reflected* in the xsfp window. The hardware keyswitch is located at the upper back panel of the central cabinet, and must be changed physically in order to alter the keyswitch setting.

Keyswitch positions are:

OFF

When the keyswitch is in the OFF position, no power is applied to any logic board. In this position, there are no restrictions on workstation keyboard and mouse movement. The OFF position does not imply that no power is coming into the system, only that the logic boards are not powered up. The keyswitch is in the OFF position when the system is powered down.

LOCAL

When the keyswitch is in the LOCAL position, there is no restriction on mouse or keyboard input to windows. The keyswitch must be in the LOCAL position to boot to single-user mode, multiuser mode, or to an alternate operating system.

Normal users may use the SPU modem to dial in or out when the keyswitch is in LOCAL mode. However, logins by user rmtdiag (a special, privileged login for running remote diagnostics) are disallowed unless the machine is in REMOTE mode.

SECURE

When the keyswitch is in the SECURE position, all SPU logins are disabled. Use of the SPU modem to dial out is possible, but because logins are disallowed, modem dial in is impossible. The ConvexOS console driver disables the ability of **CTRL-p** to allow access to the SPU.

In SECURE mode, the C3800 may only be accessed through the CONVEXOS CONSOLE window.

REMOTE

The REMOTE position is used for remote dial-in communication with CONVEX field engineers and the Technical Assistance Center (TAC) in order to monitor your system or run diagnostics. Remote diagnostics are normally run as user rmtdiag and the keyswitch must be in REMOTE mode for user rmtdiag to log in. Because rmtdiag is highly priviledged, you should not put the keyswitch in this position unless instructed to by a CONVEX employee.

Caution

If you are running ConvexOS/Secure, networking is not supported in the evaluated configuration. It is recommended that you do not provide networking access in a trusted atmosphere.

Power-up Boot Mode buttons

The Power-Up boot Mode buttons set a parameter that controls what happens when the system is powered up or the keyswitch is moved from OFF to any other posistion. The setting of these buttons determines which level of initialization occurs during the ConvexOS boot process.

The three boot modes are:

- **normal OS**—The boot process will complete automatically, and ConvexOS will be booted to multiuser mode. Under normal circumstances, this parameter should be set.
- **alternate OS**—The diaginit process will run, but the boot will not continue automatically. You must enter the boot command manually to complete the boot process.
- **diagnostic**—ConvexOS will not be booted and the diaginit process will not run. You must enter the boot command manually to complete the boot process.

If you change the boot parameter when ConvexOS is already booted, the change will take affect on the next boot.

System boot controls

These buttons provide a simple way of executing commands.

- **boot multi**—This button issues the command `boot multi` in the CONVEXOS CONSOLE window. The system is subsequently booted to multiuser mode.
- **boot single**—This button issues the `boot single` command in the CONVEXOS CONSOLE window, causing the system to boot to single-user mode.
- **boot mini**—This button issues the `boot mini` command in the CONVEXOS CONSOLE window. This causes the system to boot from a *miniroot*, a small operating system that is used only when the ConvexOS root file system is damaged or being upgraded.

Caution

Clicking on these buttons sends output to the CONVEXOS CONSOLE window. If there is an interactive program (such as an editor) running in the CONVEXOS CONSOLE window, the boot command line will be input to the interactive program. The system will not boot, and the interactive program may exit or generate error messages. If there is a non-interactive program running in the CONVEXOS CONSOLE window, the boot command will not be issued until the program exits.

Booting up procedures

Generally, before a system boot, the SPU operating system will be powered up and booted, and the C3800 system will be powered up. This situation is referred to as being in SPU mode.

SPU mode to single-user mode

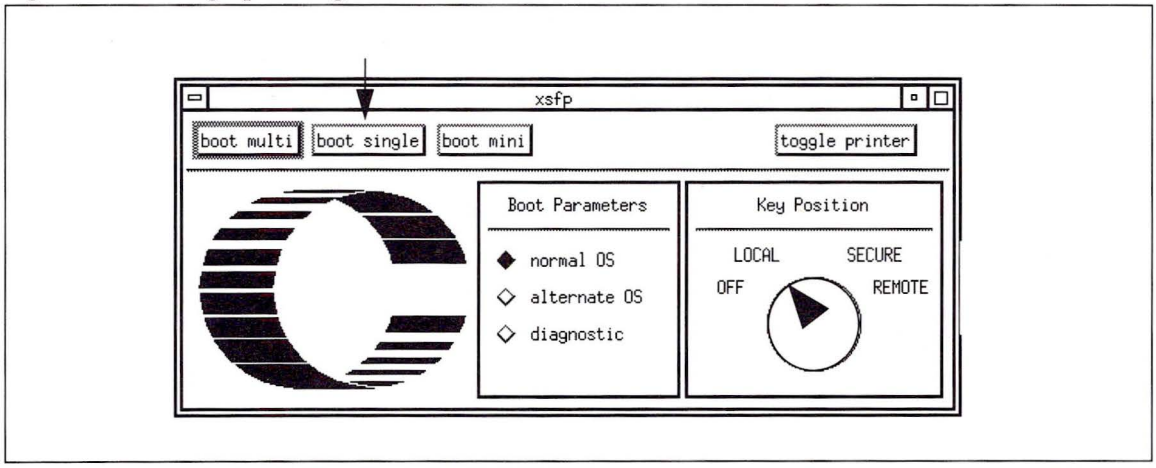
Use these instructions to boot from SPU to single-user mode.

Step 1 Set the hardware keyswitch located at the upper back panel of the main bay to LOCAL. This change is reflected in the xsfp window.

Step 2 Click the normal OS button in the xsfp window.

Step 3 Click the boot single button in the xsfp window, as shown in Figure 31.

Figure 31 Booting up to single-user mode



Clicking on a boot parameter in the xsfp window causes the equivalent command to appear in the CONVEXOS CONSOLE window.

You can also perform this function, after setting the hardware keyswitch to LOCAL, by clicking normal OS in the xsfp window, then entering **`boot single`** in the SPU Console window.

The system responds by booting the C3800 Series system to ConvexOS single-user mode.

SPU mode to multiuser mode

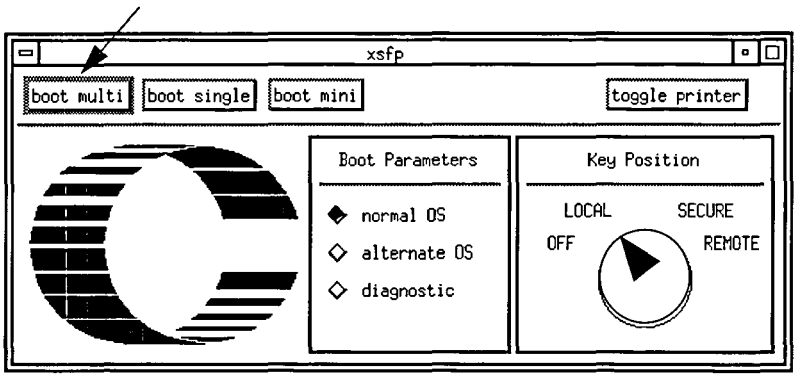
Use these instructions to boot from SPU to multiuser mode.

Step 1 Set the hardware keyswitch located at the upper back panel of the main bay to LOCAL. This change is reflected in the xsfp window.

Step 2 Click the normal OS button in the xsfp window.

Step 3 Click the boot multi button in the xsfp window, as shown in Figure 32. Clicking on a boot parameter in the xsfp window causes the equivalent command to appear in the CONVEXOS CONSOLE window.

Figure 32 Booting up to multiuser mode



You can also perform this function, after setting the hardware keyswitch to LOCAL, by clicking the normal OS button in the xsfp window, then entering **`boot multi`** in the SPU Console window.

The system responds by booting ConvexOS to multiuser mode on the C3800 Series system.

Booting multiuser from single-user mode

To boot to multiuser mode from single-user mode, enter **CTRL-d** in the CONVEXOS CONSOLE window.

Booting down procedures

This section describes how to boot down:

- From multiuser mode to single-user mode
- From single-user mode to SPU mode

Multiuser to single-user mode

Step 1 Become the superuser in the CONVEXOS CONSOLE window. Bring the system to single-user mode by issuing the `shutdown` command:

`/etc/shutdown +`*minutes "reason"*

minutes is the amount of time before the system shuts down to single user mode. *reason* is a few words describing why the system is being taken down. Warning messages will be periodically sent to users informing them of the impending shutdown and the reason for it.

To bring the system to single-user mode instantly, enter

```
/etc/shutdown now "for hardware maintenance"
```

Single-user mode to SPU mode

To bring the system from to single-user mode to SPU mode, enter the commands shown in Figure 33.

Figure 33 Booting from single-user to SPU mode

```
# cd /
# umount -a
# sync
# sync
# halt
```

Once the system is in SPU mode, it can be safely powered down if needed.

Multiuser mode to SPU mode

Alternatively, you can use the `-h` option to the `shutdown` command, which will bring the system to single-user mode and immediately execute the `halt` command.

The use of the `-h` option is shown in Figure 34.

Figure 34 Booting down from multiuser to SPU mode

```
root# cd /
root# /etc/shutdown -h now
.
.
spu>
```

The system responds by killing all job processor daemons, unmounting and syncing all disks, halting the CPU, and returning control to the SPU. Once the system is booted down to SPU mode, it can be safely powered down if needed.

Troubleshooting

8

This chapter contains information that you may find useful when a problem arises. If, after using the information provided here, your system does not respond appropriately, call the CONVEX Technical Assistance Center (TAC).

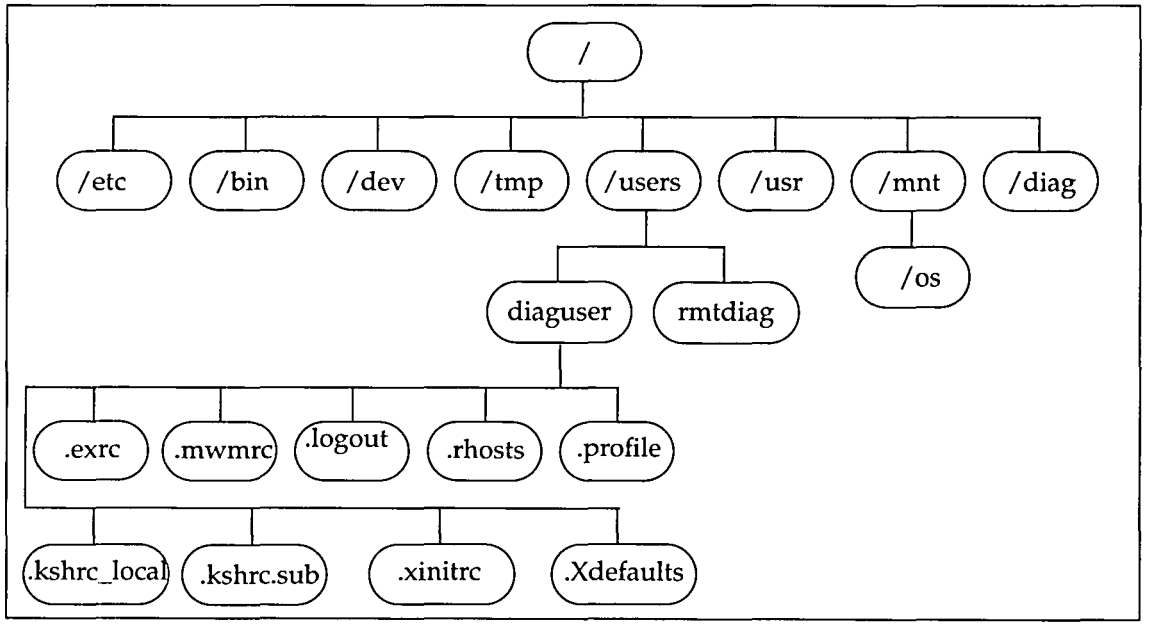
Normal directory structure and processes

This section describes the normal directory structure and lists processes that are normally running.

Correct directory structure setup

Under normal operating circumstances, the SPU's directory structure should be set up as shown in Figure 35.

Figure 35 Correct directory structure setup



Normal SPU processes

The `ps` command displays information about currently running processes. It provides information that can be useful in troubleshooting. For troubleshooting purposes, the recommended format for this command is

```
ps -aucx
```

where the:

- `-a` displays information on all processes
- `-u` displays user-oriented output
- `-c` displays the name of the program that is running, rather than the command line used to invoke it.
- `-x` displays information about processes that are running with no terminal

Figure 36 displays output from this command.

Figure 36 Output from `ps -aucx`

```
spu> ps -aucx
USER       PID %CPU %MEM    SZ   RSS TT STAT START   TIME COMMAND
diaguser   940 15.4  2.7   172   404 p6 R    17:13   0:00 ps
root         0  0.0  0.0     0     0 ?  D    Jan 31  0:07 swapper
root         1  0.0  0.0    52     0 ?  IW   Jan 31  0:00 init
root         2  0.0  0.0     0     0 ?  D    Jan 31  0:00 pagedaemon
root        90  0.0  0.0   116     0 ?  IW   Jan 31  0:00 sendmail
root        50  0.0  0.0    68     0 ?  IW   Jan 31  0:01 portmap
root       179  0.0  0.0    52     0 ?  IW   Jan 31  0:00 lpd
root        53  0.0  0.0    40     0 ?  IW   Jan 31  0:00 keyserv
root        59  0.0  0.4    44    52 ?  S    Jan 31  0:00 in.routed
root        65  0.0  0.0    16     0 ?  I    Jan 31  0:00 biod
root        96  0.0  0.0   100     0 ?  IW   Jan 31  0:00 rpc.lockd
root       167  0.0  0.0    56     0 ?  IW   Jan 31  0:00 cron
root        78  0.0  0.0    76     0 ?  IW   Jan 31  0:08 syslogd
root        94  0.0  0.0    52     0 ?  IW   Jan 31  0:00 rpc.statd
diaguser   245  0.0  0.0   256     0 ?  IW   Jan 31  3:53 cdbserver
diaguser   246  0.0  0.0   136     0 p2 IW   Jan 31  0:07 dsh
diaguser   186  0.0  0.0    32     0 ?  IW   Jan 31  0:00 xinit
root       164  0.0  0.0    12     0 ?  IW   Jan 31  4:09 update
diaguser   187  0.0  0.0   532     0 ?  IW   Jan 31  7:53 X
root       175  0.0  0.0    56     0 ?  IW   Jan 31  0:00 inetd
root       183  0.0  0.0    40     0 ?  IW   Jan 31  0:00 getty
root       201  0.0  0.0   428     0 co IW   Jan 31  0:05 xterm
diaguser   195  0.0  0.0   360     0 ?  IW   Jan 31  0:16 mwm
diaguser   204  0.0  0.0   508     0 ?  IW   Jan 31  0:01 xsfp
diaguser   227  0.0  0.6    40    88 ?  S    Jan 31  1:40 bpccommd
diaguser   244  0.0  1.8    88   268 ?  S    Jan 31  0:22 rbserver
diaguser   220  0.0  0.0    20     0 ?  IW   Jan 31  0:02 errlogd
diaguser   237  0.0  2.1   160   316 ?  S    Jan 31  0:23 bpcwatchd
diaguser   243  0.0  0.0   836     0 ?  IW   Jan 31  0:06 CONVEXOS_CONSOLE
diaguser   242  0.0  0.0    60     0 ?  IW   Jan 31  0:00 cdb_startup
root       907  0.0  0.0    56     0 ?  IW   16:42   0:00 in.telnetd
diaguser   532  0.0  0.5    76    68 p2 S    Jan 31  0:01 errintd
root       924  0.0  0.3    56    44 ?  S    16:53   0:00 in.telnetd
```

This figure lists SPU processes that are normally running when ConvexOS is not booted. Some processes that terminate unexpectedly will be automatically restarted. If you suspect that some normal processes are not running, wait two or three minutes to see if they restart. If they do not, you may restart them by rebooting the SPU.

Do not attempt to start these processes individually by entering commands.

Problems and solutions

This section lists specific problems and their solutions.

If indicator lights are not lit when the system is powered up

Indicator lights on the main bay breakers and the bay power supplies are illuminated during normal operation. If they are not lit, contact your CONVEX Field Representative or the CONVEX Technical Assistance Center (TAC).

If the SPU workstation's self-test fails

Reboot the workstation again. If the self-test fails a second time, contact the CONVEX Technical Assistance Center (TAC) or your CONVEX Field Representative.

If you accidentally click a boot button

Step 1 Immediately enter **CTRL-c** in the CONVEXOS CONSOLE window.

Step 2 If this action has no effect, the boot procedure has reached a stage where it cannot be interrupted. You must wait for the boot to complete.

If you click a boot button but the system does not respond by initiating booting procedures

Clicking on a boot button simply sends a command to the CONVEXOS CONSOLE window. If there is an interactive application (such as an editor) running in this window, the command will be read by the application, which may display an error message.

If there is a non-interactive command executing in the CONVEXOS CONSOLE window, the boot process will be initiated as soon as the command finished executing.

If the X server on the SPU terminates

If the xsfp window terminates for any reason, the X server on the SPU will terminate as well. If this happens and the SPU appears to require rebooting, you should reboot the SPU.

If the SPU CONSOLE window does not display output written to /dev/console

There may be more than one SPU CONSOLE window running. Output written to /dev/console on the SPU is only displayed on the most recently created SPU CONSOLE window. To recover from this:

Step 1 Determine whether or not multiple SPU CONSOLE windows are running by executing

```
ps aux
```

Step 2 If multiple SPU CONSOLE processes are running, terminate each of them using the command

`kill -9` *pid*

where *pid* is the process ID as shown by the output of the `ps aux` command executed in Step 1.

You must kill all the SPU CONSOLE processes. Once you have terminated the original SPU CONSOLE process, a new SPU CONSOLE window will be automatically created.

If programs hang when attempting to write to /dev/console on the C3800

If the CONVEXOS CONSOLE window on the SPU is destroyed, it will be automatically restarted via xsfp. However, if this happens while ConvexOS is running, programs that attempt to write to /dev/console on the C3800 will hang. The only method of recovery in this case is to reboot the system. Refer to Chapter 7, "Booting procedures".

Using windows, menus, and the mouse

A

This appendix provides an introduction to the mwm window manager and the use of a mouse. If you are not familiar with X-based graphical displays, you should read this appendix before using the SPU interface.

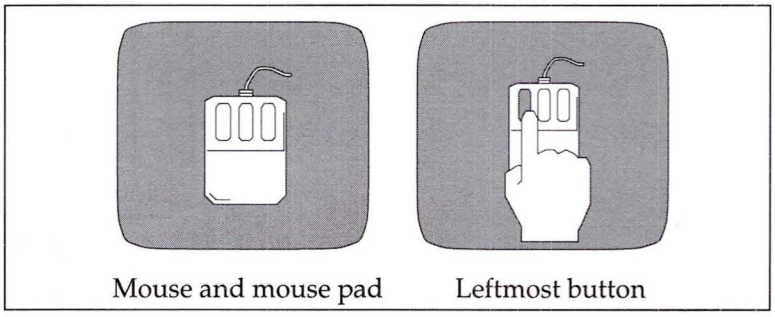
Using the mouse

The following terms and definitions explain how to use the mouse:

- **Mouse cursor**—The icon that moves about the workstation screen when you move the mouse. It may change forms when you move it to different areas of the screen.
- **Select**—Use the mouse to place the mouse cursor on top of a desired screen or screen item.
- **Click**—Quickly press and then release the left mouse button.
- **Double-click**—Quickly press and then release the left mouse button twice.
- **Hold down**—Press a mouse button and hold it down.
- **Drag**—Press and hold down the left mouse button while moving it to a new location. Release the mouse button.

Figure 37 shows the mouse and the mouse buttons.

Figure 37 Using the mouse

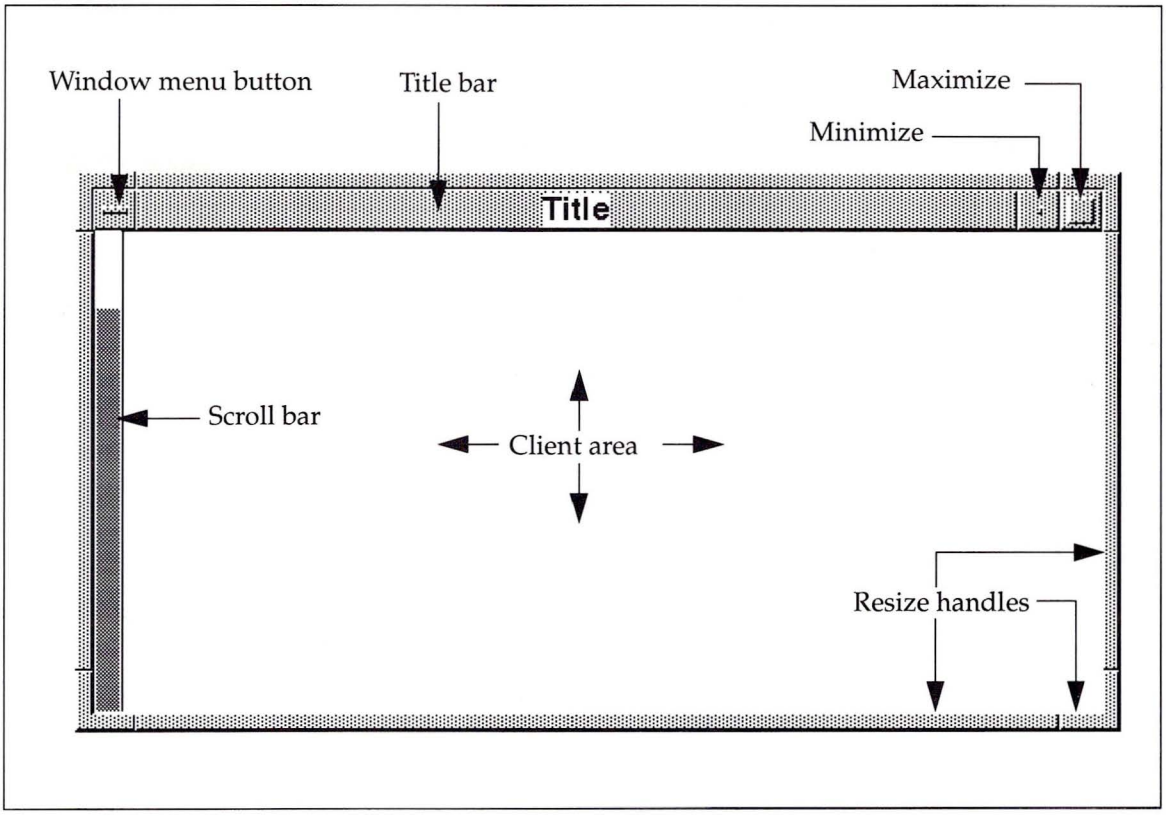


Windows

You can change the position, size, and appearance of workstation windows.

Windows are surrounded by a functional frame. Figure 38 shows the different components of a window frame.

Figure 38 Window frame components



Each of the components shown in Figure 38 serves a specific purpose, as shown in Table 8.

Table 8 Window frame components

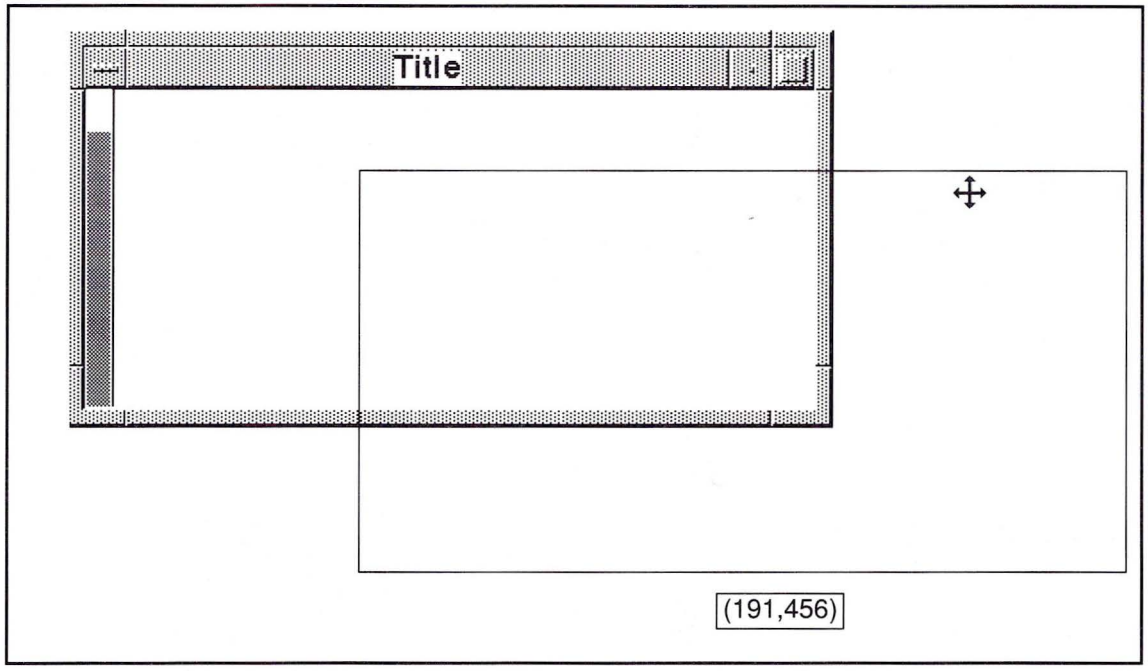
Use this	To do this
Title bar	Move a window.
Window menu	Display the window menu.
Minimize button	Close (iconify) a window.
Maximize button	Expand a window to fill the screen.
Resize handles	Stretch or shrink a window.
Scroll bar	View text in another part of the window buffer.

The actions in Table 8 are described in the following sections.

Moving a window

To move a window, hold down the leftmost mouse button anywhere in the title bar located at the top of the window. When you move the mouse, the pointer becomes a cross, and a shadow of the window moves across the screen according to mouse movement, as shown in Figure 39. When the shadow reaches the desired location, release the mouse button.The window appears in the new location.

Figure 39 Moving a window

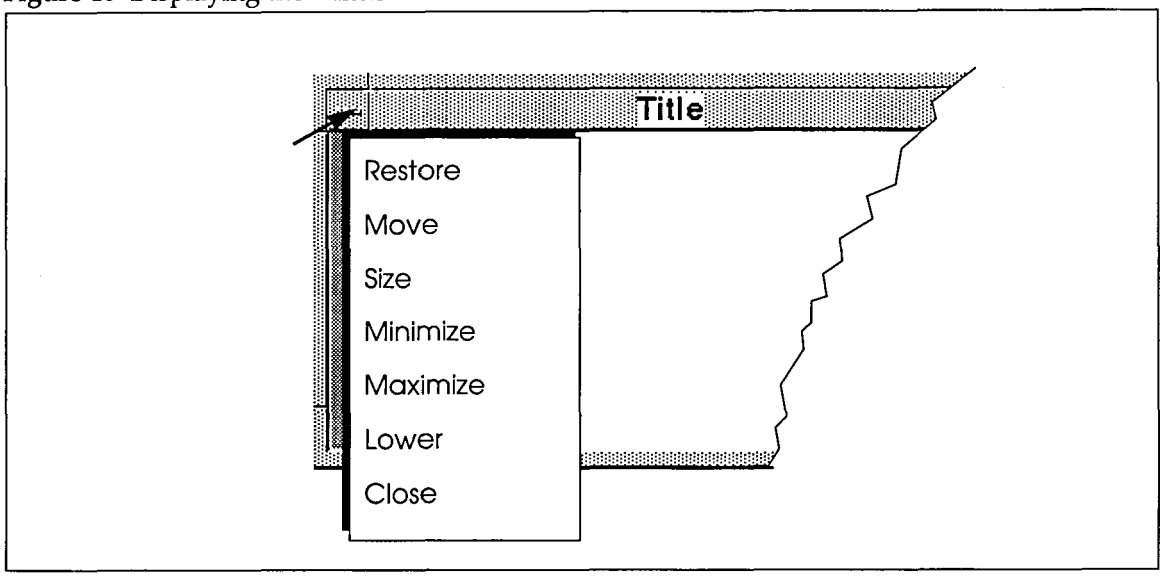


A small box reflecting the changing location of the window appears while you drag the mouse.

Displaying the window menu

Every window has a menu that allows you to access window manager functionality. The window menu pops up when you move the mouse cursor to the menu button and hold down the mouse button. To select an option, drag the cursor down the menu; when you have reached the option you want, release the mouse button. The window button and menu are shown in Figure 40.

Figure 40 Displaying the window menu



Window menu selections and their uses are shown in Table 9.

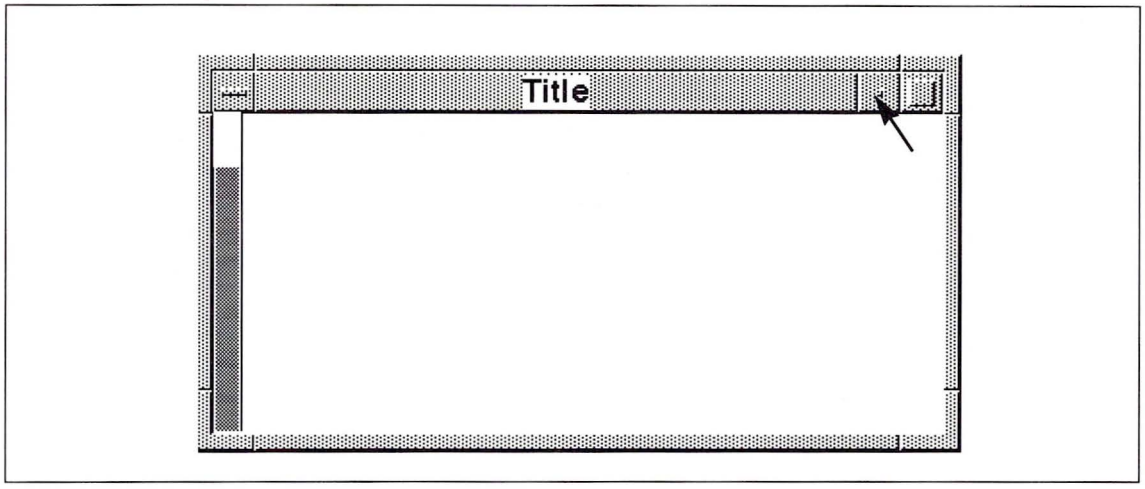
Table 9 Window menu selections and their uses

Use this	To do this
Restore	Restore a window to its normal size from an icon or after maximizing.
Move	Change the location of a window.
Size	Change the width or height of a window.
Minimize	Shrink a window to its icon.
Maximize	Enlarge a window to its maximum size.
Lower	Place a window on bottom of window stack.
Close	Terminate the client (destroy the window).

Iconifying (minimizing) a window

To close a window, with the leftmost mouse button, click the small dot located in the change bar of the upper right corner of that window, as shown in Figure 41.

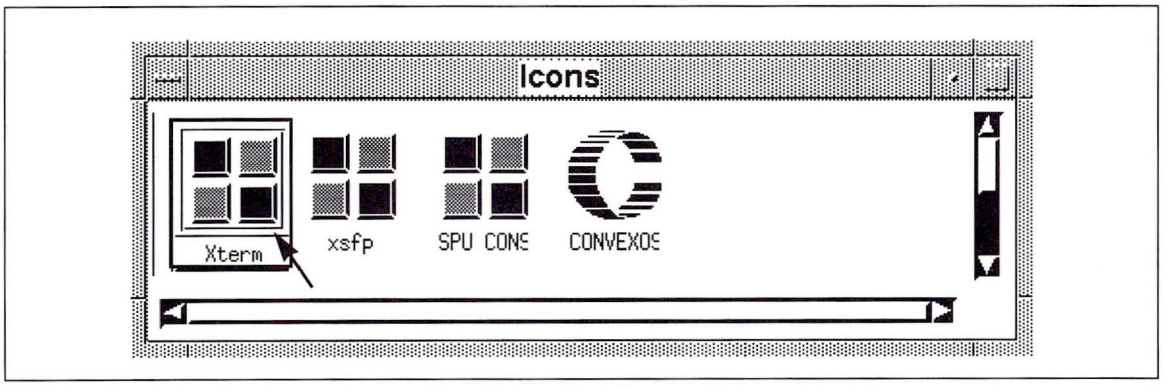
Figure 41 Closing a window



Deiconifying (restoring) a window

To restore a window, double click (click twice in rapid succession) with the left mouse button on the window's icon in the icon box, as shown in Figure 42.

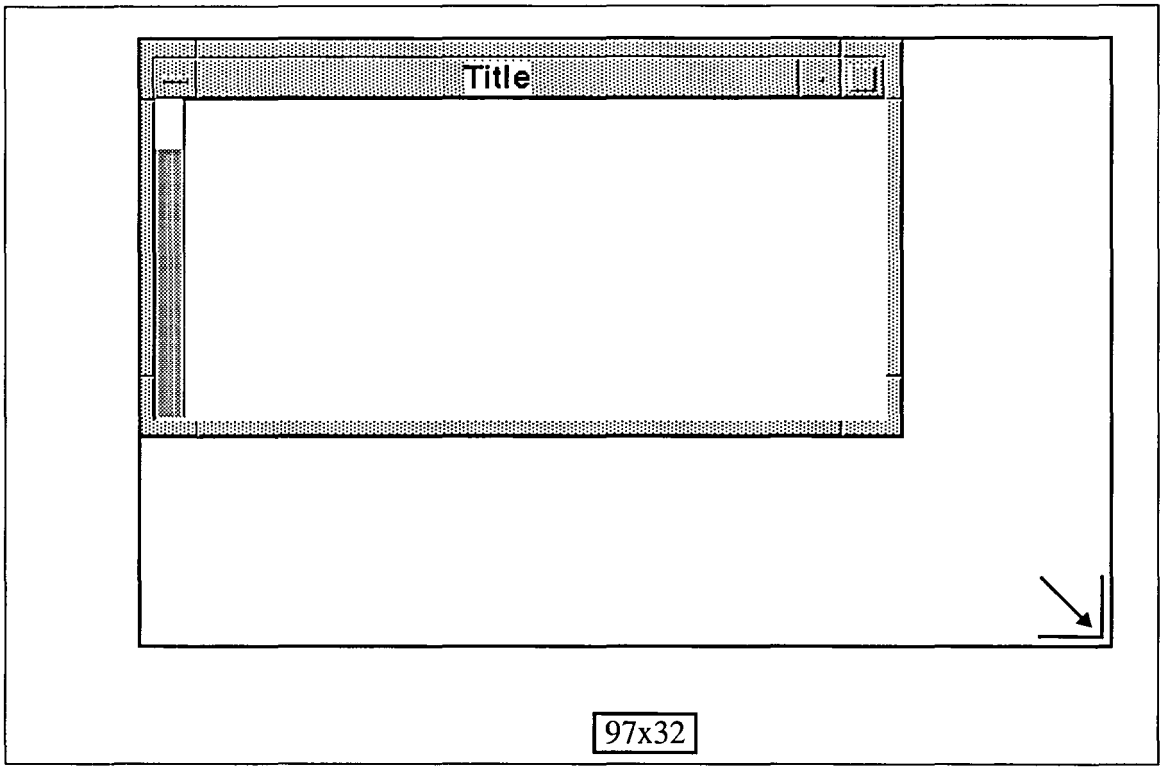
Figure 42 Opening a window



Enlarging and shrinking a window

To enlarge or shrink a window horizontally, vertically, or diagonally, move the cursor to any corner or far edge of the window, where it becomes an arrow. Drag the arrow in the desired direction. As you drag the arrow, a shadow of the screen appears, moving according to the movement of the arrow, as shown in Figure 43.

Figure 43 Enlarging a window



Release the mouse button when the window has reached the desired size. A small box reflecting the changing measurement of the window appears while you drag the mouse.

Root window menus

Root window menus are accessed by pressing a mouse button while the mouse cursor is in the root window. The root window is the background of the display that is not covered by any other window.

Items are selected from the root window menus just as they are selected from window menus—by holding down the mouse button and dragging to the item you wish to select.

The contents of root window menus are determined by the ~/.mwmrc file. Although `mwm` allows you to specify different root window menus for each mouse button, root window menus in the SPU environment may be accessed via either the left or right mouse button.

The contents of the SPU root window menus are discussed in Chapter 2, "Using SPU windows".

Glossary

B

backups
The back-up process copies files from disks to back-up tapes. Backups can be made of an entire file system (full backups) or of certain files only (incremental backups).

bay
C3800 Series cabinet. Includes main I/O bay, central cabinet bay, and optional bays.

boot
The process of bringing the system to a state in which ConvexOS is up and running.

boot mini
System boot control mode that boots to a small operating system used only when the ConvexOS root file system is damaged or destroyed.

boot multi
System boot control mode that boots to ConvexOS multiuser mode. Allows other users access to the system.

boot parameters
The three boot parameters are diagnostic, alternate os, and normal os.

boot single
System boot control mode that boots to ConvexOS single-user mode. Allows access to the system only by the superuser.

C

console printer control

Toggle printer button that enables and disables the capability of the workstation's printer to echo output to the CONVEXOS CONSOLE window. Located in the xsfp display window.

CONVEXOS CONSOLE window

The `xterm` window in which /mnt/os/boot is executed. When the system is booted and the ConvexOS console driver is running, this window is the console for ConvexOS.

D

DAT tape drive

SPU tape drive that loads SPU software onto the SPU disk. Mounted in the workstation CPU box.

deiconify

To open a window from its graphic representation in the Icons box, to which it can be closed. Running processes are not killed by iconifying or deiconifying a window.

H

hard disk drive

Stores the SPU operating system, utilities, diagnostic utilities, and associated kernal files. Mounted in the workstation CPU box.

hardware keyswitch

Located at the rear of the main cabinet, the settings of the hardware keyswitch affects the place from which the CONVEXOS CONSOLE window receives its output.

hardware keyswitch positions (states)

Includes settings for OFF, LOCAL, SECURE, and REMOTE.

I

iconify

To close a window to a graphic representation in the Icons box, from which it can be reopened. Running processes are not killed by iconifying or deiconifying a window.

Icons window

The window on the SPU workstation that contains icons for all windows currently available for display.

L

LOCAL state
Boot state used for booting to ConvexOS single-user or multiuser modes.

M

main bay breaker
Hardware switch located on the bottom rear panel of each bay that controls the power supplied to that bay.

menus
Window system tools that display options for the software running on the system and allow you to initiate activities based on those options.

mode
Term used to refer to either:

- The mode in which the system is powered up but is not booted (SPU mode)
- One of the three system boot destinations: boot mini, boot single, or boot multi.

modem
Used for remote dial-in communication with CONVEX field engineers and Technical Assitance Center (TAC) personnel in order to monitor the system or run diagnostics.

multiuser mode
Mode of SPU operation in which many users are allowed access to ConvexOS on the C3800 Series system.

O

OFF state
Boot state used in powering down the system.

P

powering down
Removing power from system, usually by using SPU software, occasionally by shutting down all hardware components physically.

powering up
Applying power to all system components. Refer to Chapter 5.

R

REMOTE state
The boot state used to allow remote login by the CONVEX Technical Assistance Center.

S

SECURE state
The boot state used to lock all SPU activity except in the CONVEXOS CONSOLE window. If ConvexOS is up and running in multiuser mode, you can set the hardware keyswitch to SECURE, thereby allowing the TAC to log in and take over without disrupting the activities of other users logged in to the system.

self-test (SPU workstation)
Tests run on the SPU workstation during the initial part of the power-up process. Includes file system checks, memory checks, and diagnostic tests. Upon completion, the SPU applies power to all components of the C3800 Series system.

single-user mode
Mode in which the system is booted, but only the superuser is allowed to login.

system console window
The window on the SPU workstation that runs SPU software.

SPU CONSOLE window
The window on the SPU workstation that runs SPU software and receives output destined for the /dev/console file on the SPU.

SPU mode
The mode in which the system is powered up but is not booted.

SPU modem keyswitch
Located on the modem, controls the routing of the SPU modem to either the workstation or the external serial port.

SPU workstation power switch
An ON/OFF power switch located on the back of the workstation's SPU box used to power up and down the SPU workstation.

state
Term used to refer to the four hardware keyswitch positions: OFF, LOCAL, REMOTE, and SECURE.

submenus
Menus pulled down from behind main menu. On SPU software, includes test, utility, and X-tools menus.

system boot control buttons
Located in the xsfp display window, these buttons allow the user to boot ConvexOS manually. Includes boot multi, boot mini, and boot single.

system boot control modes
Term used to refer to either:

- The mode in which the system is powered up but is not booted (SPU mode)
- One of the three system boot destinations; boot mini, boot single, or boot multi

workstation CPU box
Contains the workstation disk and tape drive, the hard disk drive, and the DAT tape drive. Also contains interface boards that are connected to the C3800 Series system hardware through the NCU board in the I/O bay.

workstation power switch
Located at the back of the workstation's CPU box, supplies power to the workstation, and thereafter to the entire C3800 Series system.

X

xsfp
An X-based version of the soft front panel. Refer to soft front panel entry for more information.

xsfp window
X-based window on the SPU workstation run by SPU software that controls and reflects activity of the system's soft front panel. Controls the power-up reboot of ConvexOS, monitors the keyswitch position, and controls the SPU printer.

xterm window
Located at the center of the workstation screen, this is a general purpose window that is used to issue commands on the SPU.

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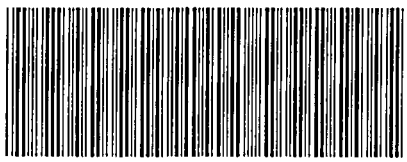

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