Lucent Technologies
Bell Labs Innovations

CentreVu® Call Management System
Release 3 Version 6

Hardware Maintenance and Troubleshooting

585-215-861
Comcode 108145400
Issue 1
May 1998

Notice

Every effort was made to ensure that the information in this document was complete and accurate at the time of printing. However, information is subject to change.

Your Responsibility for Your System's Security

Toll fraud is the unauthorized use of your telecommunications system by an unauthorized party, for example, persons other than your company's employees, agents, subcontractors, or persons working on your company's behalf. Note that there may be a risk of toll fraud associated with your telecommunications system and, if toll fraud occurs, it can result in substantial additional charges for your telecommunications services.

You and your system manager are responsible for the security of your system, such as programming and configuring your equipment to prevent unauthorized use. The system manager is also responsible for reading all installation, instruction, and system administration documents provided with this product in order to fully understand the features that can introduce risk of toll fraud and the steps that can be taken to reduce that risk. Lucent Technologies does not warrant that this product is immune from or will prevent unauthorized use of common-carrier telecommunication services or facilities accessed through or connected to it. Lucent Technologies will not be responsible for any charges that result from such unauthorized use.

Lucent Technologies Fraud Intervention

If you *suspect that you are being victimized* by toll fraud and you need technical support or assistance, call Technical Service Center Toll Fraud Intervention Hotline at 1-800-643-2353.

Canadian Department of Communications (DOC) Interference Information

This digital apparatus does not exceed the Class A limits for radio noise emissions set out in the radio interference regulations of the Canadian Department of Communications.

Le Présent Appareil Nomérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la class A préscrites dans le reglement sur le brouillage radioélectrique édicté par le ministére des Communications du Canada.

Trademarks

- *ANIXTER* is a registered trademark of ANIXTER BROS., Inc.
- *CentreCOM* is a registered trademark of Allied Telesis.
- *CentreVu* is a registered trademark of Lucent Technologies.
- *DEFINITY* is a registered trademark of Lucent Technologies.
- *IBM* is a registered trademark of International Business Machines Corp.
- *INFORMIX* is a registered trademark of Informix Software, Inc.
- *UNIX* is a registered trademark of Novell, Inc. in the United States and other countries, licensed exclusively through X/Open Corporation.
- *Enterprise, Sun, Sun Microsystems, Sun Microsystems* Computer Corporation, the *Sun* logo, the *SMCC* logo, *SunLink, SunSelect, Solaris, Openwindows*, and *Solstice DiskSuite* are trademarks or registered trademarks of Sun Micro-systems, Inc. All other product names mentioned herein are the trademarks of their respective owners.

Ordering Information

Call: Lucent Technologies Publications Center
Voice: 1-800-457-1235
International Voice: +1-317-361-5353
Fax: 1-800-457-1764
International Fax: +1-317-361-5355

Write: Lucent Technologies Publications Center
P.O. Box 4100
Crawfordsville, IN 47933
U.S.A.

Order: *CentreVu* CMS R3V6 Hardware Maintenance and Troubleshooting
Document No. 585-215-861
Comcode 108145400
Issue 1, May 1998

For additional documents, refer to the section entitled "Related Documents" in the Preface.

You can be placed on a Standing Order list for this and other documents you may need. Standing Order will enable you to automatically receive updated versions of individual documents or document sets, billed to account information that you provide. For more information on Standing Orders, or to be put on a list to receive future issues of this document, please contact the Lucent Technologies Publications Center.

Lucent Technologies National Customer Care Center

Lucent Technologies provides a telephone number for you to use to report problems or to ask questions about your call center. The support telephone number is 1-800-242-2121.

Document Support Telephone Number

Lucent Technologies provides telephone numbers for you to use to report errors or to ask questions about the information in this document. The support telephone numbers are:
Voice: 1-888-584-6366 and
International Voice: +1-317-322-6848.

European Union Declaration of Conformity

Lucent Technologies Business Communications Systems declares that the equipment specified in this document conforms to the referenced European Union (EU) Directives and Harmonized Standards listed below:

EMC Directive89/336/EEC
Low Voltage Directive73/23/EEC

The "CE" mark affixed to the equipment means that it conforms to the above Directives.

Heritage Statement

Lucent Technologies—formed as a result of AT&T's planned restructuring—designs, builds, and delivers a wide range of public and private networks, communication systems and software, consumer and business telephone systems, and microelectronics components. The world-renowned Bell Laboratories is the research and development arm for the company.

CentreVu®
Call Management System
Hardware Maintenance and Troubleshooting

Table of Contents

List of Figures

List of Tables

Preface

Overview

The *CentreVu*® *Call Management System Release 3 Version 6 Hardware Maintenance and Troubleshooting* (585-215-861) document is written for technicians and Lucent Technologies call center customers who install and maintain the *CentreVu* Call Management System (CMS). This document addresses *Sun** platforms using the *Solaris*† 2.5.1 operating system.

Organization

This document is organized as follows:

- **Chapter 1 — Introduction**

  Provides an overview of the supported *CentreVu* CMS, supported hardware platforms, required software, and supported switch releases. It also includes the purpose of the *Sun* platforms, roles and responsibilities, and helpline information.

- **Chapter 2 — Enterprise 3000 Maintenance**

  Discusses recovering from a disk corruption or crash, recovering system space, and other maintenance procedures.

- **Chapter 3 — Enterprise 3000 Troubleshooting**

  Discusses how to fix various hardware (including terminals, printers, and modems), power, and installation problems.

- **Chapter 4 — *SPARCserver* Maintenance**

  Discusses recovering from a disk corruption or crash, recovering system space, and other maintenance procedures.

- **Chapter 5 — *SPARCserver* Troubleshooting**

  Discusses how to fix various hardware (including terminals, printers, and modems), power, and installation problems.

**Sun* is a registered trademark of Sun Microsystems, Inc.
†*Solaris* is a registered trademark of Sun Microsystems, Inc.

- **Glossary**

  Lists and defines technical terms used in this, and related documents. Also lists and expands abbreviations and acronyms used in this and related documents.

- **Index**

  Provides a reference for material covered in this document.

Related *CentreVu* Documents

The following documents are available for the *CentreVu*® CMS R3V6, *CentreVu* Supervisor, and *CentreVu* Explorer products:

- *CentreVu® Call Management System Release 3 Version 5 Custom Reports* (585-215-822)
- *CentreVu® Call Management System Release 3 Version 5 Forecast* (585-215-825)
- *CentreVu® Call Management System Release 3 Version 6 Administration* (585-215-850)
- *CentreVu® Call Management System Release 3 Version 6 Open Database Connectivity* (585-215-852)
- *CentreVu® Call Management System Release 3 Version 6 Lucent Call Center Change Description* (585-215-853)
- *CentreVu® Call Management System Release 3 Version 6 External Call History Interface* (585-215-854)
- *CentreVu® Advocate Users Guide* (585-215-855)
- *CentreVu® Call Management System Release 3 Version 6 Upgrades and Migration* (585-215-856)
- *CentreVu® Call Management System Release 3 Version 6 Sun® SPARCserver™ Computers, Hardware Installation* (585-215-857)
- *CentreVu® Call Management System Release 3 Version 6 Sun® SPARCserver™ Computers, Connectivity Diagram* (585-215-858)
- *CentreVu® Call Management System Release 3 Version 6 Sun® Enterprise™ 3000 System Connectivity Diagram* (585-215-865)
- *CentreVu® Call Management System Release 3 Version 6 Software Installation* (585-215-866)
- *CentreVu® Call Management System Release 3 Version 6, Sun® Enterprise™ 3000 System Hardware Installation* (585-215-867)
- *CentreVu® Call Management System Release 3 Version 6, Planning, Configuration, and Implementation* (585-215-879)

- *Lucent Call Center Documentation CD-ROM* (585-215-892)
- *CentreVu® Explorer Installation and Getting Started* (585-215-835)
- *CentreVu® Explorer User Guide* (585-215-840)
- *CentreVu® Supervisor Version 6 Reports* (585-215-851)
- *CentreVu® Supervisor and Report Designer Version 6 User Guide* (585-215-859)
- *CentreVu® Supervisor Version 6 Installation and Getting Started* (585-215-860).

To order, call the BCS Publication Center at **1-800-457-1235**.

Introduction

Overview

The *CentreVu*® Call Management System Release 3 Version 6 (CMS R3V6) is a software application offered in association with the Automatic Call Distribution (ACD) feature of Lucent Technologies switches. The *CentreVu* CMS application provides monitoring and recording of ACD calls, agents handling these calls, and the use of Vector Directory Numbers (VDNs) for these calls to measure system and agent performance.

Supported Features

The *CentreVu* CMS software supports the following features, which Lucent Technologies can enable at installation:

- Expert Agent Selection (EAS) (switch feature)
- Call Vectoring (switch feature and *CentreVu* CMS feature package)
- Forecasting Feature Package (*CentreVu* CMS)
- Graphics Package (*CentreVu* CMS)
- External Call History Feature Package (*CentreVu* CMS)
- Multiple ACDs (*CentreVu* CMS).

Supported Hardware Platforms

The *CentreVu* CMS R3V6 is certified to run on the following computers:

- *Sun** *Enterprise*† 3000 system
- *Sun SPARCserver*‡ 20
- *Sun SPARCserver* 10§
- *Sun SPARCserver* 5.

This manual addresses the *Sun Enterprise* 3000 system and the *Sun SPARCserver* platforms.

**Sun* is a registered trademark of Sun Microsystems, Inc.
†*Enterprise* is a trademark of Sun Microsystems, Inc.
‡*SPARCserver* is a trademark of SPARC International Inc.
§Supports *CentreVu* CMS R3V6 only as a bug fix.

Required Software

To operate properly, *CentreVu* CMS R3V6 requires the following software packages:

- *Sun Solaris*[*] 2.5.1 operating system (Hardware: 11/97 version)
- Common Desktop Environment (CDE) 1.0.2
- *Solaris* 2.5.1 *AnswerBook*[†]
- *Solaris* on *Sun* Hardware *AnswerBook,* and *Sun* Validation Test Suite (VTS) 2.1.1
- *SunLink*[‡] HSI/S Version 2.0 software (for systems having multiple ACDs)
- Bay Networks R10.0-R4.2 *Network Terminal Server*[§] (NTS)
- *Solstice*[\] for Server Connect X.25 Network Interface Version 9.1
- *INFORMIX*[¶] 7.2
- *INFORMIX* ILS 9.13
- *Solstice DiskSuite*[**] 4.1
- *Sun Solaris* patches
- CMS patches
- *Solstice* PPP 3.0.1 (required for TCP/IP over PPP connections)
- IONA ORBIX version 2.2 (required for ACD Administration Server).

Supported Switch Releases

The *CentreVu* CMS R3V6 is certified to run with the following Lucent Technologies switches:

- *DEFINITY* ® Communications System Generic 2.1 Release 3.3 (QPPCN 629DR) and later.
- *DEFINITY* Communications System Generic 2.2 Release 3.0 (QPPCN 696DR) and later
- *DEFINITY* Communications System Generic 3i Release 13.3 (QPPCN 576) and later

**Solaris* is a registered trademark of Sun Microsystems, Inc.
†*AnswerBook* is a trademark of Sun Microsystems, Inc.
‡*SunLink* is a registered trademark of Sun Microsystems, Inc.
§*Network Terminal Server* is a trademark of Sun Microsystems, Inc.
Solstice is a trademark of Sun Microsystems, Inc.
¶*INFORMIX* is a registered trademark of Informix Software, Inc.
***Solstice DiskSuite* is a trademark of Sun Microsystems, Inc.

- *DEFINITY* Communications System Generic 3r Release 8.5 and later
- *DEFINITY* Communications System Generic 3s Release 14.2 and later
- *DEFINITY* Communications System Generic 3 Version 1
- *DEFINITY* Communications System Generic 3 Version 2 Load 82 and later
- *DEFINITY* Communications System Generic 3 Version 3
- *DEFINITY* Communications System Generic 3 Version 4
- *DEFINITY* Enterprise Communications Server Release 5
- *DEFINITY* Enterprise Communications Server Release 6.

Purpose of the *Sun Enterprise* 3000 and *SPARCserver* Systems

The *Sun Enterprise* 3000 and *SPARCserver* systems provide a hardware/software platform that enhances and supports the current *CentreVu* Call Management System R3V6 software application and is designed to do the following:

- Improve performance, input/output capacity, and reliability
- Provide multiprocessor capabilities for performance (up to six CPUs, 250-MHz clock)
- Improve reliability (redundant power supplies, redundant cooling fans, Disk Mirroring, enhanced Automatic Recovery System [ARS])
- Improve storage capacity (up to 42 GB of internal disk storage)
- Allow for cost-effective future upgrades (Ultra *SPARC* processors, disks, tape drives, SBus cards, and network interface cards).

Roles and Responsibilities

This document was written for the Lucent Technologies Technical Service Center (TSC), field technicians, and *CentreVu* CMS administrators who want to maintain or troubleshoot a *CentreVu* CMS.

The installation of the prerequisite hardware/software should have been completed by the factory before the platform was shipped to the customer.

NOTE:

The factory hardware installation procedures can be found in *CentreVu*® Call Management System, Release 3 Version 6, *Sun Enterprise* 3000, Hardware Installation document 585-215-867.

Table 1-1 lists the major tasks, who is responsible for performing each task, and the chapter where the task is described.

Table 1-1: Task Responsibility

Chapter	Task	Tech	TSC	Customer
2	Recover from Disk Corruption		X	
2	Recover System Space		X	
2	Add Hard Disk Drive	X	X	
2	Add Memory	X	X	
2	Install a High Speed Interface (HSI) Card	X	X	
2	Change the Date or Time	X		X
2	Add, Remove or Replace Tape Drive	X	X	
2	Add Network Terminal Servers	X	X	
2	Replace the Clock Board	X	X	
3	Solving hardware-related problems	X	X	
3	Solving terminal-related problems	X	X	X
3	Solving printer-related problems	X	X	X
3	Solving modem-related problems	X	X	X
3	Solving power-related problems	X	X	X
3	Solving clock synchronization problems		X	
4	Disk Recovery		X	
4	Recovering from Disk Corruption (One-System Disk)		X	
4	Recovering from a Disk Crash (One-System Disk)	X	X	
4	Adding SCSI Hard Disk Drives - Disk 2 (One-System Disk)	X	X	
4	Adding SCSI Hard Disk Drives - Disks 3 through 12 (One-System Disk)	X	X	
4	Recovering from Disk Corruption (Two- System Disks)	X	X	
4	Recovering from a Disk Crash (Two-System Disks)	X	X	
4	Adding SCSI Hard Disk Drives - Disks 3 through 9 (Two-System Disks)	X	X	
4	Recovering from Disk Corruption (System running *Solstice DiskSuite* 4.1 Software)		X	

Table 1-1: Task Responsibility (Contd)

Chapter	Task	Tech	TSC	Customer
4	Adding SCSI Hard Disk Drives to a System Running *Solstice DiskSuite* 4.1 Software	X	X	
4	Recovering System Space		X	
4	Adding Memory	X	X	
4	Installing HSI Cards	X	X	
4	Change the Date or Time	X	X	X
4	Adding, Removing or Replacing Tape Drives	X	X	
4	Identifying Device Entry Names for Ports on the Aurora Expander Box	X	X	X
4	Removing Aurora SBus Multiport Software Driver(s)		X	
4	Adding, Removing or Moving and Aurora SBus Multiport Card	X	X	
4	Adding Network Terminal Servers	X	X	
5	Solving Hardware-Related Problems	X	X	
5	Solving Terminal-Related Problems	X	X	X
5	Solving Printer-Related Problems	X	X	X
5	Solving Modem-Related Problems	X	X	X
5	Solving Power-Related Problems	X	X	X

CentreVu CMS Helplines

If an installation problem arises that requires assistance, Lucent Technologies technicians or the customer may call the following numbers:

Customer Number

1-800-242-2121

By calling this number, the customer reports the problem and generates a trouble ticket so the problem can be escalated through the services organization.

The customer will be prompted to identify the type of problem (ACD, hardware, or *CentreVu* CMS R3V6) and will be connected to the appropriate service organization.

Technician Number

1-800-248-1234

The technician should provide the TSC personnel with the customer's name, the password for the *root* login ID on the *Sun Enterprise* 3000 *Sun SPARCserver* systems, the phone number of the dial-in port, and a description of the problem.

If the TSC engineers cannot solve the problem, they will escalate it to the Customer Support Organization of Lucent Technologies.

International Support

For international support contact your Lucent Technologies representative/distributor for more information.

Enterprise 3000 Maintenance

Overview

This chapter explains some of the principle maintenance and upgrade issues for the *CentreVu*® Call Management System Release 3 Version 6 (CMS R3V6) hardware. See the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document and the *Sun** *Enterprise*† 3000 system documentation for additional information.

This chapter discusses the following maintenance procedures:

- Recover from Disk Corruption
- Recover System Space
- Add Hard Disk Drives
- Add Memory
- Install a High Speed Interface (HSI) Card
- Change the Date or Time
- Add, Remove, or Replace Tape Drives
- Add Network Terminal Servers.

Personnel at the Technical Service Center (TSC) will need assistance from an on-site technician or the customer's *CentreVu* CMS administrator to do most of the procedures in this chapter.

NOTE:

If you should need to remove a side panel from the *Sun Enterprise* 3000 System for any reason, it is necessary to pull out on the bottom center of the panel before sliding the panel upwards to remove it. See the *Sun Enterprise* 3000 System, System Manual for additional information.

**Sun* is a registered trademark of Sun Microsystems, Inc.
†*Enterprise* is a trademark of Sun Microsystems, Inc.

Recover from Disk Corruption

Overview

CAUTION:

Only **TSC PERSONNEL** should perform the procedures in this section.

The procedures for recovering a disk drive depend upon whether the disk is merely corrupted or has crashed, and whether the drive contained the operating system. If the disk is merely corrupted (you can boot up from the *Solaris** CD-ROM), you may be able to simply restore `/cms`.

If the disk has crashed, or if the corrupted disk drive contained the operating system files, you may have to reinstall the entire system.

Restore /cms

To restore the /cms file system only, follow the procedure in this section.

1. Remove stale information from system files, and clear and reinitiate the metadevice by entering an `olds -cleanup` command:

   NOTE:

   This will remove everything from the CMS file system.

```
# /olds/olds  -cleanup
      .
      .
      .
Success, cleanup of DiskSuite, now reboot system.
#
```

2. Reboot the system with an `init 6` command.

```
# init  6
```

3. When the system prompt reappears, log on as root.

**Solaris* is a trademark of Sun Microsystems Inc. in the United States and other countries.*

4. Check disk partitioning with an `olds -check_disks` command as follows:

```
#  /olds/olds  -check_disks
     .
     .
     .
disk:cot0d0 is partitioned ok
disk:cot1d0 is partitioned ok
disk:cot2d0 is partitioned ok
Warning: Current Disk has mounted partitions
disk:cot0d0 is partitioned ok
Success, checking disks
#
```

5. Make sure all drives are accounted for with an `olds -mk_files` command as follows:

```
#  /olds/olds  -mk_files
     .
     .
     .
Success, creating md.tab.new and/or vfstab.new
#
```

6. Set up the `/cms` metadevice with an `olds -setup` command as follows:

```
#  nohup  ./olds/olds  -setup  |  tee
     .  .  .
prtvtoc:  c0t6d0so:  device busy
device:  c0tod0 will not be used
valid disks are c0t0d0  c0t1d0  c0t2d0  c0t3d0
     .  .  .
super-block backups (for fsck -F ufs -o b=#) at:
32, 16240, 32448, 48656, 64864, 81072, 97280, 113488,
     .  .  .
10532656, 10548864, 10565072, 10580000, 10596208
ufs fsck: sanity check: /dev/md/rdsk/d19 okay
Success, activating or growing /cms metadevice
#
```

7. Mount the file system as follows:

```
# mount /cms
```

8. Verify disk space by entering a `df -k` command as follows:

```
# df -k  /cms
```

The system responds by displaying file system information for `/cms` as follows:

```
Filesystem          kbytes     used     avail    capacity  Mounted on
/dev/dsk/c0t3d0s0   10772308   310956   383882   45%       /
/proc               0          0        0         0%       /proc
fd                  0          0        0         0%       /dev/fd
/dev/md/dsk/d19     xxxxxxxx   9        yyyyyy    0%       /cms
```

The `kbytes` figure on the `/cms` line (shown here as "xxxxxx") is the critical number. You use it to verify that the *Solstice DiskSuite 4.1** software is administering all the available disks. Use Table 2-1 to make the necessary calculations:

Table 2-1: Disk Space Verification (4-GB Disks)

Calculation	Result
(1a) Divide the /cms line's 'kbytes' figure by 1000 (move the decimal point three places to the left) and record the result:	(1a)
(1b) Enter the figure from the "/cms Size (MB)" column below corresponding to the number of hard disks in your system	(1b)
(1a) and (1b) should be *approximately* equal (the correspondence will not be exact, but must be within 4000MB)	

No. of 4-GB Disks	/cms Size (MB)
1	3104
2	7137
3	11170
4	15203
5	19236
6	23269

**Solstice* and *DiskSuite* are registered trademarks of Sun Microsystems Inc. in the United States and other countries.

Table 2-1: Disk Space Verification (4-GB Disks)

7	27302
8	31335
9	35368
10	39401

If there is a problem, check to see that the file `/etc/opt/SUNWmd/md.tab` accounts for all your disk drives. The `d19` line of the `#/cms` section should reflect the precise number of disk drives on your system.

9. Install the swap file on the CMS file system as follows:

```
# /olds/olds -oldswapfile /cms
```

10. Reboot the system as follows:

```
# init  6
```

Restore the Latest CMSADM Backup

CAUTION:

Perform this procedure only if you have a CMSADM backup available.

If you do not have a CMSADM backup, skip to “Reinstall *CentreVu* CMS.”

1. Restore the latest available CMSADM backup data by loading the backup tape into the tape drive and entering the following command:

```
# nohup  cpio  -icmudf  -C  10240 -I /dev/rmt/0c  -M “Please
remove the current tape, insert tape number %d and then
press ENTER” “/cms”  “/cms/*” | tee
```

The device name in this example is `/dev/rmt/0c`. This will be the usual case. However, the device name used depends upon the drive's SCSI ID and whether the drive supports data compression (indicated by the c suffix). The device name must be one of the following:

- `/dev/rmt/0` Indicates the internal noncompressing tape drive (14-GB, 8-mm drive) with the lowest target address.
- `/dev/rmt/1` Indicates the external noncompressing tape drive (QIC-150 or 5-GB, 8-mm drive) with the second lowest target address.
- `/dev/rmt/0c` Indicates the internal compressed-mode tape drive (usually a 14-GB tape drive) with the lowest target address (the most common usage with the *Sun Enterprise* 3000 system).
- `/dev/rmt/1c` Indicates the external compressed-mode tape drive (either a 2.5-GB QIC*, 4-8 GB SLR, or a 14-GB tape drive) with the second lowest target address.

NOTE:

You may get four error messages concerning the `/home` directory. These errors display when the directory is already present, so you can ignore them.

2. If you have *CentreVu* CMS maintenance backups dated after the latest CDMADM backup, also restore the latest maintenance backups. See the *CentreVu Call Management System Release 3 Version 6 Administration* (585-215-850) document for more information.

Reinstall *CentreVu* CMS

Perform this procedure only if you have no CMSADM backup available. If you have a CMSADM backup, perform "Restore the Latest CMSADM Backup" on page 2-5 instead.

1. Reinstall *CentreVu* CMS. See the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for details.

*The QIC 2.5-GB external tape drive is no longer available, however, if the customer has one it can be used. The 4-8 GB SLR external tape drive is the current replacement.

2. Run CMS setup.See the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for information on Setting Up *CentreVu* CMS and Installing Feature Packages.
3. Restore *CentreVu* CMS data from the *CentreVu* CMS maintenance backup. See the *CentreVu Call Management System Release 3 Version 6 Administration* (585-215-850) document for more details.

Restore an Entire System

If you have a disk crash that disables the operating system disk drive, you must re-enable the system to boot, then reinstall the missing packages. If a CMSADM backup is available (see “When a CMSADM Backup is Available”), the process takes much less time.

When a CMSADM Backup is Not Available

If a CMSADM backup is not available, do the following:

1. Reinstall the entire system including the following:
   a. *Solaris* operating system software
   b. *Solaris* patches
   c. X.25
   d. *INFORMIX*
   e. CMS
   f. CMS patches
   g. Any add-on packages.

   See the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for details.
2. Run CMS setup. See the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for details.
3. Restore *CentreVu* CMS data from the *CentreVu* CMS maintenance backup. See the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for information on performing a *CentreVu* CMS Maintenance restore.

4. Readminister Terminals, Printers, Modems, and other peripherals as needed. See the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for information on installing terminals, printers and modems.
5. Contact Professional Services for any previously installed customization.

When a CMSADM Backup is Available

If a CMSADM backup is available, do the following procedures:

- Install the Solaris Operating System:
  - — From a local console see the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for more information.
  - — From a remote console see page 2-30 for more information.
- Install *Solstice DiskSuite* 4.1.
- Run the *Solstice DiskSuite* 4.1 Setup Scripts
- Run the CMSADM Backup Tape as described on page 2-33.

Install the *Solaris* Operating System

The *Solaris* installation program is a menu-driven, interactive program that guides you step by step through installing the *Solaris* software. It also has on-line help to answer your questions.

For more information on installing the *Solaris* Operating System, please refer to the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for information on installing the *Solaris* Operating System.

Boot from the *Solaris* 2.5.1 11/97 CD-ROM Using a Remote Terminal

To perform this operation using a local terminal, see the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for information on booing from the *Solaris* 2.5.1 CD-ROM using the local terminal.

Overview

This section describes how to boot the system from the *Solaris* 2.5.1 11/97 CD-ROM using a remote terminal.

Dial In to the Customer's System

If you are doing the boot remotely, use the following steps to dial in to a system remotely:

1. Dial up the customers system.
2. Enter the terminal type for the remote terminal. You will be prompted for this information when you dial up the system. Select `other` and the enter `6300+`.
3. Log in with the root login and password.

Give Control to the Remote Console

If you are doing the *Solaris* part of the upgrade remotely, use the following instructions to transfer control of the console from the local system to the remote system. This procedure takes about 10 minutes.

CAUTION:

If you are controlling the console remotely and the phone connection is interrupted during the *Solaris* upgrade, you cannot dial back in to the system. If that should happen, you can reset back to the local console with this procedure:

a. Turn off the SPARCstation.

b. Simultaneously hold down the Stop and N keys as you turn the machine back on. Keep holding down Stop and N until the screen displays an `OK` prompt.

You can now redirect the console again.

NOTE:

You must first access the system with the dial command:

```
dkcu -b 8 mod9600.
```

This allows the remote console to maintain control in the firmware mode.

1. Turn off the administration at serial port A by enter the following command as shown below:

```
# /cms/install/bin/abcadm -r ttya
```

   The system responds as shown below:

```
ttya is currently turned off

Are you sure you want to change it? [y,n,?]
```

2. Answer y.

   The system responds as shown below:

```
ttya administration removed
#
```

3. Enter the following command to enable the console for remote operation on serial port A:

```
# /cms/install/bin/abcadm -c ttya
```

   The system responds as shown below:

```
Console set to remote

This change requires a reboot to take affect

Are you ready to reboot? [y,n,?]
```

4. Answer y.

The shutdown begins as shown below:

```
Starting port monitor
Setting console parameters
Proceeding to reboot
    .
    .
    .
system console login:
```

5. Log in with the root login and password.

   The local console screen blanks out and displays a console login and password prompt. Nothing should be done at the local console while the upgrade is being done remotely.

Boot Procedure

To boot the computer from the CD-ROM, do the following:

1. Make sure CMS is turned off.
2. Sync your system by entering the command:

```
init  0
```

1. Load the *Solaris* 2.5.1 11/97 Hardware: CD into the CD-ROM drive and, from the `ok` prompt, enter the command:

```
ok  boot cdrom
```

   The boot process takes about 5-10 minutes. When the boot process completes, you are prompted to enter the terminal type of the remote console as shown below:

```
What type of terminal are you using?
 1) ANSI Standard CRT
 2) DEC VT52
 3) DEC VT100
 4) Heathkit 19
 5) Lear Siegler ADM31
 6) PC Console
 7) Sun Command Tool
 8) Sun Workstation
 9) Televideo 910
 10) Televideo 925
 11) Wyse Model 50
 12) X Terminal Emulator (xterms)
 13) Other
Type the number of your choice and press Return:
```

2. Enter the number that corresponds to your terminal type. If you select `13) Other`, you are prompted to enter your terminal type (for example, `6300+`).

After you identify your terminal type, the system displays the following screen:

```
The Solaris Installation Program

You are now interacting with the Solaris installation
program. The program is divided into a series of short
sections. At the end of each section, you will see a summary
of the choices you've made, and be given the opportunity to
make changes.

As you work with the program, you will complete one or more
of the following tasks:

  1 - Identify peripheral devices
  2 - Identify your system
  3 - Install Solaris software

About navigation...

  - The mouse cannot be used.

  - If your keyboard does not have function keys, or they do
    not respond, press ESC; the legend at the bottom of the
    screen will change to show the ESC keys to use for
    navigation.

  F2_Continue     F6_Help
```

NOTE:

The keys you need to press for a given function differ depending on the terminal type. This manual refers only to function names; text at the bottom of each screen tells you how to execute available functions.

If you need help during the installation, use the `Help` function to get more information about the current procedure.

3. To continue, select the `Continue` function.

Identify the System

When you select `Continue` in step 3 above, the following screen appears:

```
Identify This System

On the next screens, you must identify this system as
networked or non-networked, and set the default time zone
and date/time.

If this system is networked, the software will try to find
the information it needs to identify your system; you will
be prompted to supply any information it cannot find.

> To begin identifying this system, press F2.


  F2_Continue     F6_Help
```

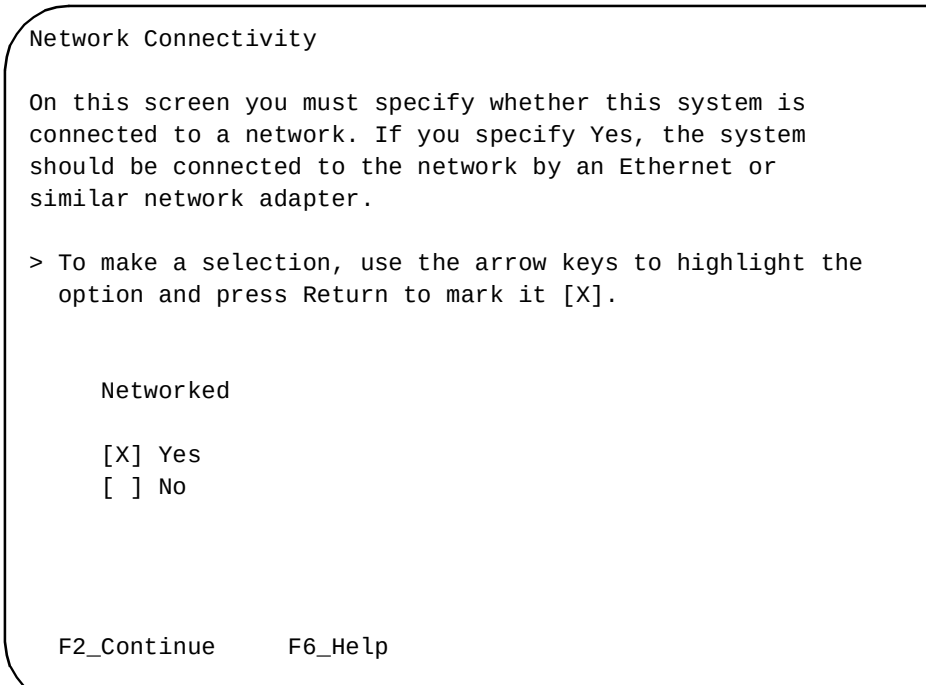
1. To continue, select `Continue`.

   The following screen appears:

```
Host Name

On this screen you must enter your host name, which
identifies this system on the network. The name must be
unique within your domain; creating a duplicate host name
will cause problems on the network after you install Solaris

A host name must be at least two characters; it can contain
letters, digits, and minus signs (-).


  Host name: _____________________



  F2_Continue     F6_Help
```

2. Type the host name for the workstation (also known as the system name). Then select `Continue`.

   The following screen appears:



3. Use the arrow keys to select the `Yes` box; then press **Enter** to mark it. Then select `Continue`.

   NOTE:

   If the system is equipped with more than one network board, the `Primary Network Interface` screen displays. You should:

   a. select the `hme0` option

   b. press **Enter**

   c. select `Continue`.

The following screen appears:

```
IP Address

On this screen you must enter the Internet Protocol (IP)
address for this system. It must be unique and follow your
site's address conventions, or a system/network failure
could result.

IP addresses contain four sets of numbers separated by
periods (for example 129.200.9.1


  IP address: ____________________




  F2_Continue     F6_Help
```

4. Type the IP address for the workstation; then select `Continue`.

   The following screen appears:

```
Confirm Information

> Confirm the following information. If it is correct, press
  F2; to change any information, press F4.


   Host name: abcxyz
   Networked: Yes
  IP address: 123.45.6.789




  F2_Continue     F4_Change    F6_Help
```

5. If the displayed information is correct, select `Continue`. If you select `Change`, the program returns to the `Name Service` screen.

   The following screen appears:

```
Name Service

On this screen you must provide name service information.
Select NIS+ or NIS if this system is known to the name
server; select Other if your site is using another name
service (for example, DCE or DNS); select None if your site
is not using a name service, or if it is not yet established.

> To make a selection, use the arrow keys to highlight the
  option and press Return to mark it [X].


  Name service

  [ ] NIS+
  [ ] NIS (formerly yp)
  [ ] Other
  [X] None



  F2_Continue     F6_Help
```

6. Use the arrow keys to select the `None` box; then press **Enter** to mark it. Then select `Continue`.

The following screen appears:

```
Subnets

On this screen you must specify whether this system is part
of a subnet. If you specify incorrectly, the system will
have problems communicating on the network after you reboot.

> To make a selection, use the arrow keys to highlight the
  option and press Return to mark it [X].


  System part of a subnet

  [ ] Yes
  [X] No




  F2_Continue     F6_Help
```

7. Use the arrow keys to select the No box; then press **Enter** to mark it. Select Continue.

   The following screen appears:

```
Confirm Information

> Confirm the following information. If it is correct, press
  F2; to change any information, press F4.


           Name service: None
System part of a subnet: No









  F2_Continue     F4_Change    F6_Help
```

8. If the displayed information is correct, select Continue. If you select Change, the program returns to the Name Service screen.

Set the Date and Time

When you select `Continue` (in step 8 above) the following screen appears:

```
Time Zone

On this screen you must specify your default time zone. You
can specify a time zone in three ways: select one of the
geographic regions from the list, select other - offset from
GMT, or other - specify time zone file.

> To make a selection, use the arrow keys to highlight the
  option and press Return to mark it [X].


    Regions
    [ ] Asia, Western
    [ ] Australia / New Zealand
    [ ] Canada
    [ ] Europe
    [ ] Mexico
    [ ] South America
    [X] United States
    [ ] other - offset from GMT
    [ ] other - specify time zone file

  F2_Continue     F6_Help
```

1. Choose an option by using the arrow keys to position the cursor in the selection box next to the region appropriate to the customer's location. Press **Enter** to mark your choice. Finally, select `Continue` to record your choice and move on.

The following screen appears:

```
> To make a selection, use the arrow keys to highlight the
  option and press Return to mark it [X].

    Time zones

    [ ] Eastern
    [ ] Central
    [X] Mountain
    [ ] Pacific
    [ ] East-Indiana
    [ ] Arizona
    [ ] Michigan
    [ ] Samoa
    [ ] Alaska
    [ ] Aleutian
    [ ] Hawaii


  F2_Continue     F5_Cancel     F6_Help
```

2. Select the appropriate time zone for the customer's location by using the arrow keys to position the cursor, and then pressing **Enter** to mark your choice. Select `Continue` to record your choice and move on.

   The following screen appears:

```
Date and Time

> Accept the default date and time or enter
  new values.

Date and time: 06/08/95 10:08

  Year   (4 digits) : 1995
  Month  (1-12)     : 06
  Day    (1-31)     : 08
  Hour   (0-23)     : 10
  Minute (0-59)     : 13




  F2_Continue     F6_Help
```

3. Select `Continue` to accept the default data and time, or use the arrow keys to select the fields that need correction and enter the correct information. When all the information is correct, select `Continue`.

   The following screen appears:

```
Confirm Information

> Confirm the following information. If it is correct, press
  F2; to change any information, press F4.


      Time zone: US/Mountain
  Date and time: 06/08/95 10:13:00









  F2_Continue     F4_Change     F6_Help
```

4. Select `Continue` if the displayed information is correct. If you select `Change`, the program returns to the `Time Zone` screen.

   The system date and time are now set. After a brief pause, the program continues with the installation of *Solaris* 2.5.1 11/97 system files.

Install the *Solaris* 2.5.1 11/97 System Files

After the brief pause, the following screen appears:

```
Upgrade System?

This system is upgradable. Choosing the upgrade option means
any bundled Solaris software will be updated to the new
release, and as many local modifications as possible will be
saved.

While your system is upgradable, you can choose the initial
option; however, files on your disk will be overwritten and
data will be lost.

CAUTION: If you choose the upgrade option, it is
especially important to back up your system. However,
backing up is also recommended for the initial option if
there is any data on the disk that you want to save.

> To start the upgrade option, choose F2.

> To start the initial option, choose F4.


  F2_Upgrade     F4_Initial     F5_Exit     F6_Help
```

1. To continue, select `Initial`.
2. Select Continue. The following screen appears:

```
System Type

On this screen you must specify one of the following system
types. A system type determines where a system will get its
directories and file systems, and whether it provides portions
of Solaris software to other systems.

> To make a selection, use the arrow keys to highlight the
  option and press Return to mark it [X].

                        [ ] Standalone
                        [ ] Server
                        [ ] Dataless Client




  F2_Continue     F3_Go Back     F4_Customize     F5_Exit
```

3. Put the cursor in the box next to `Standalone` and select `Continue`.

The following screen appears:

```
Software

On this screen you must select the Solaris software to install
on your system. The software groups shown are bundled and
defined by SunSoft. You can accept the default [X], or select
another.

     NOTE: After selecting a software group, you can add or
     remove software from it by selecting F4 to customize.
     However, this requires understanding of software
     dependencies and how Solaris is packaged.

> To make a selection, use the arrow keys to highlight the
  option and press Return to mark it [X]; then press F4 to
  customize or F2 to continue.

   [ ] Entire Distribution plus OEM support ... 449.34 MB
   [ ] Entire Distribution ..................... 449.21 MB
   [ ] Developer System Support ................ 362.06 MB
   [X] End User System Support ................. 269.22 MB (F4 to
       customize)
   [ ] Core System Support ..................... 164.89 MB




  F2_Continue     F3_Go Back     F4_Customize     F5_Exit
```

4. Move the cursor to the box next to `End User System Support` and press Return. Then select `Continue`.

The following screen appears:

```
Disks

On this screen you must select the disks for installing Solaris
software. Start by looking at the Suggested Minimum field; this
value is the approximate space needed to install the software
you've selected. Keep selecting disks until the Total Selected
value exceeds the Suggested Minimum value.

> To make selections, use the arrow keys to highlight options
  and press Return to mark them [X].

        Disk Device    (Size)               Available Space
    ========================================================
    [X] c0t3d0        (4028 MB) bootdrive        4028 MB
    [X] c0t1d0        (4028 MB)                  4028 MB

                                 Total Selected:     0 MB
                              Suggested Minimum:   269 MB


  F2_Continue     F3_Go Back     F4_Customize     F5_Exit
```

5. Select every disk listed by marking each one. (Mark a disk by following the directions on the screen.) When all are marked, select `Continue`.

   The following screen appears:

```
At least one of the disks you've selected has file system or
unnamed slices that you may want to save.

> To save file systems or unnamed slices, press F4.

> To allow current file systems and unnamed slices to be
  overwritten when Solaris software is installed, press F2.




  F2_Continue     F3_Go Back     F4_Customize     F5_Exit
```

6. Select `Continue`.

   The Automatically Layout File Systems? screen appears.

Partition the Hard Disks Using a Remote Terminal

To partition a hard disk from a remote terminal, use the following procedure.

```
Automatically Layout File Systems?

Do you want to use the auto-layout feature to automatically
layout file systems on your disks? Manually laying out file
systems on disks requires advanced system administration skills.

> To use the auto-layout feature, press F2.

> To manually layout file systems, press F4.









 F2_Auto Layout     F3_Go Back     F4_Manual Layout     F5_Exit
```

1. Select `Manual Layout`. The system responds with the following screen:

```
Select Disk to Customize


> To select a disk, use the arrow keys to highlight it
  and press F4.

      Disk         (Size)          Configured File Systems
      ============================================
      c0t0d0       (3880 MB)
      c0t1d0       (3084 MB)









   F2_OK     F4_Customize     F6_Help
```

2. Highlight the first disk and select `Customize`.

The system displays the following screen:

```
Customize Disk: c0t0d0

 Entry:            Recommended:     MB    Minimum   MB

============================================================
 Slice  Mount Point           Size (MB)
        1                        0
        2       overlap          3880
        3                        0
        4                        0
        5                        0
        6                        0
        7                        0
============================================================
                     Capacity:    4028 MB
                    Allocated:       0 MB
                         Free:    3880 MB

  F2_OK     F4_Options     F5_Cancel     F6_Help
```

3. Select `Options` (in order to partition disks by cylinders instead of MegaBytes). The system responds with the following screen:

```
Select options (F4)


 Disk Editing Options

       Show size in:
           [ ]  MB
           [X]  Cylinders

       Other Options:
           [ ] cylinder boundaries
           [ ] Load existing slices from VTOC label




  F2_OK     F5_Cancel          F6_Help
```

4. Mark `Cylinders` and select `OK`.

The system responds with the following screen:

```
Customize Disk: c0t0d0

 Entry:            Recommended:    Cyls  Minimum:   Cyls

============================================================
 Slice  Mount Point           Size (Cyls)
   0      /                        1023
   1                               7
   2    overlap                   3880
   3                              2788
   4                                 0
   5                                 0
   6                                 0
   7                                 0
============================================================
                      Capacity:    3880 Cyls
                     Allocated:       0 Cyls
                          Free:    3880 Cyls

  F2_OK     F4_Options     F5_Cancel     F6_Help
```

5. Partition c0t0d0 according to Table 2-2 (below). Use Tab to move between fields. When you have filled out the necessary fields, select OK.

Table 2-2: Internal Disk 1 (c0t0d0) Partitioning

Slice	File System Name	4.2 GB Disk Partition Size (cylinders
0	/	1023
1	unassigned (OLDS replicas)	7
2	overlap	3880
3	unassigned (1st md for /cms)	2788
4	swap	62

The system responds:

```
Select Disk to Customize


> To select a disk, use the arrow keys to highlight it
  and press F4.

      Disk (Size)            Configured File Systems
      ============================================
      c0t0d0    (3880 Cyls)    /
      c0t1d0    (3084 MB)
      c0t2d0    (3084 MB)




  F2_OK     F4_Customize     F6_Help
```

6. Select the next disk (c0t1d0, for example) and select `Customize`.

   The system responds:

```
Customize Disk: c0t1d0

 Entry:            Recommended:    Cyls  Minimum:   Cyls

============================================================
 Slice  Mount Point           Size (Cyls)
   0                             0
   1                             0
   2    overlap                3084
   3                             0
   4                             0
   5                             0
   6                             0
   7                             0
============================================================
                     Capacity:    4024 Cyls
                    Allocated:       0 Cyls
                         Free:    3084 Cyls

  F2_OK     F4_Options     F5_Cancel     F6_Help
```

7. Configure this disk using Table 2-3, and select OK.

Table 2-3: Partitioning for Disks 2-10

Slice #	File System	4.2 GB Disk Size (cylinders)
0	(unnamed)	2
1	(unnamed)	3878
2	overlap	3880

The system responds with the following screen:

```
Customize Disk: c0t1d0

 Entry:            Recommended:    Cyls  Minimum:   Cyls

============================================================
 Slice  Mount Point           Size (Cyls)
   0                             2
   1                          3878
   2    overlap               3880
   3                             0
   4                             0
   5                             0
   6                             0
   7                             0
============================================================
                     Capacity:    4024 Cyls
                    Allocated:    3880 Cyls
                         Free:       0 Cyls

  F2_OK     F4_Options     F5_Cancel     F6_Help
```

8. Select OK.

The system responds with the following screen:

```
Select Disk to Customize


> To select a disk, use the arrow keys to highlight it
  and press F4.

      Disk (Size)            Configured File Systems
      ============================================
      c0t3d0    (3880 Cyls)    /
      c0t1d0    (3880 Cyls)









  F2_OK     F4_Customize     F6_Help
```

NOTE:

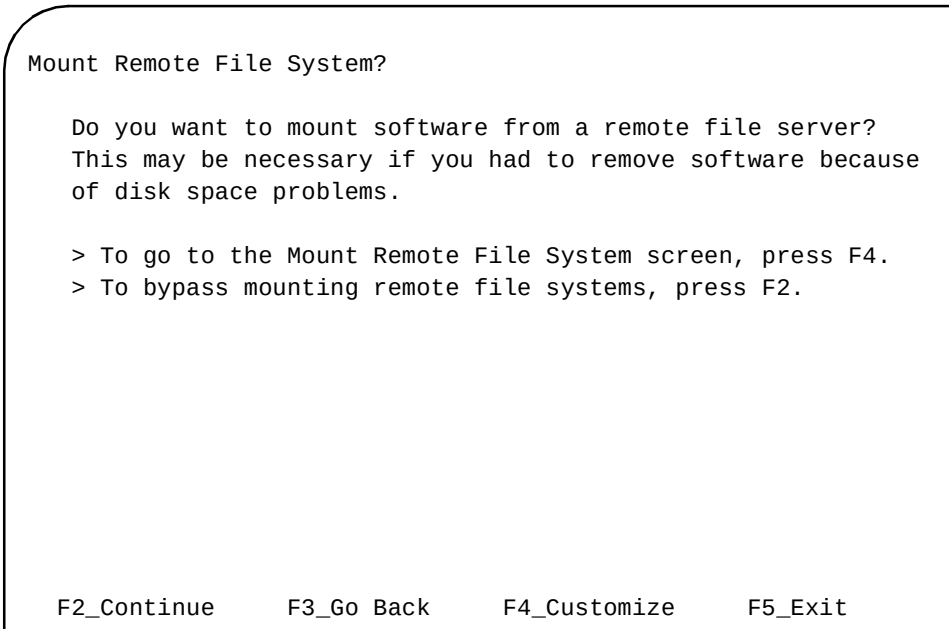
If there are more disks to configure, repeat steps 6 through 8 for each one. Do not go on until all disks in the system have been configured.

9. Select OK.

   The following screen appears:

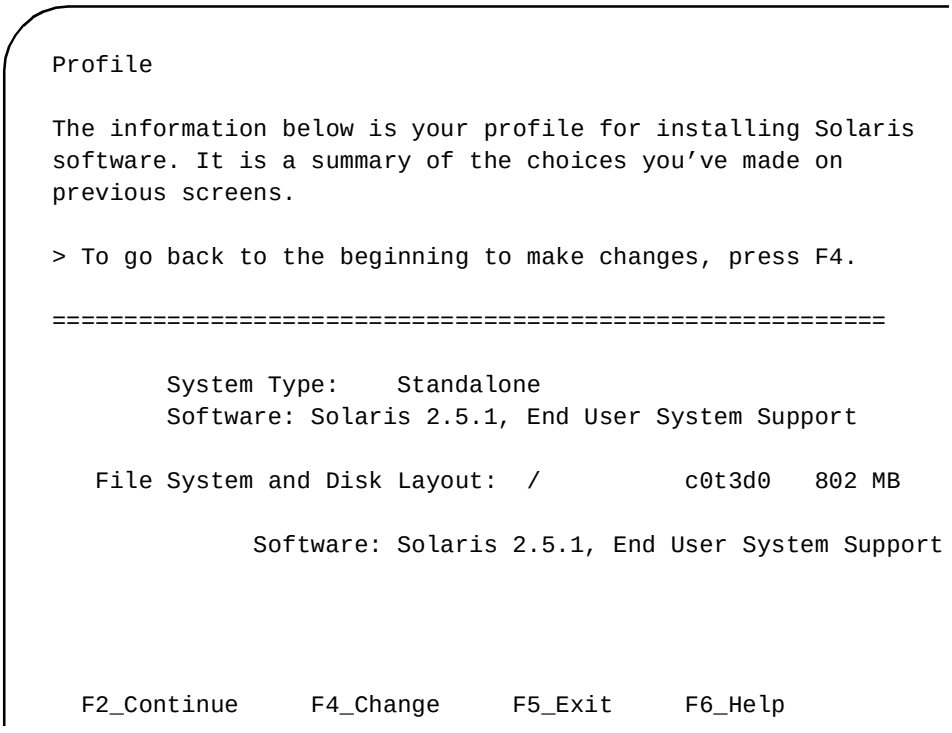
```
File System and Disk Layout

The current file system layout for your disks is shown below.

   NOTE: If you press F4 to customize, you should understand
   file systems, their intended purpose on the disk, and how
   changing the plan may affect the operation of the system.

> To accept the layout and continue, press F2.
> To customize the layout, press F4.

      File system/Mount point    Disk/Slice        Size
      ================================================
      /                          c0t3d0s0        802 MB



  F2_Continue     F3_Go Back     F4_Customize     F5_Exit
```

10. Select `Continue`. The system responds with the following screen:



11. Select `Continue`.

    The following screen displays:



12. Select `Continue`.

The system displays the following screen:

```
Begin Installing Solaris

   By default, your system will reboot after Solaris is
   installed. However, you can bypass rebooting and access a
   UNIX shell to make changes before rebooting.

> To begin installing Solaris, press F2; to go back and make
  changes, press F5.
============================================================

            [X]  Reboot
            [ ]  Do not reboot









  F2_Begin Installation          F5_Cancel
```

13. Select `Begin Installation`. The installation begins showing the following messages:

```
Finding modified files. This may take several minutes.
Calculating space requirements.
Space check complete.
Starting upgrade:
Removing obsolete packages and saving modified files:
   .
   .
   .
```

This part of the upgrade takes about one hour, and does the following:

- Finds modified files
- Calculates space requirements
- Starts the upgrade
- Removes obsolete packages and saves modified files
- Removes patches
- Installs new packages.

The disk partitioning is now complete. Complete the installation with the procedure “Assign a Root Password.”

Assign a Root Password

When the installation completes, the machine reboots and displays:

```
On this screen you can create a root password.

A root password can contain any number of characters, but only the
first eight characters in the password are significant. (For
example, if you create ‘a1b2c3d4e5f6’ as your root password, you
can use ‘a1b2c3d4’ to gain root access.)

You will be prompted to type the root password twice; for
security, the password will not be displayed on the screen as you
type it.

> If you do not want a root password, press RETURN twice.

Root password:

Press Return to continue.
```

14. Enter the root password. The program responds with the following screen:

```
Please reenter your root password?

Press Return to continue.
```

15. Reenter the root password. The program responds with the following screen:

```
. . . . .
. . . . .
syslog services starting.
Print services started.
volume management starting.
The system is ready.

hostname console login:
```

16. Log in as root. The system prompt displays.

Install *Solstice DiskSuite* 4.1

For more information on installing *Solstice DiskSuite* 4.1 please see the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for information on installing the *Solstice DiskSuite* 4.1 software.

Run the *Solstice DiskSuite* 4.1 Setup Scripts

For more information on running the *Solstice DiskSuite* 4.1 Setup Scripts please see the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for information on installing the *Solstice DiskSuite* setup scripts.

Run the CMSADM Backup Tape

To complete the restoration of you system and its files you must now run the CMSADM backup tape.

To do this, simply insert the tape into the tape drive and run the tape using one of the two following options.

1. If you want to restore everything (including CMS data enter the following command:

```
#  ulimit unlimited
#  cd /
#  cpio -icvmud -C102040 -I <device name>
```

2. If you want to restore the system without restoring CMS data enter the following command:

```
#  ulimit unlimited
#  cd /
#  cpio -icvmudf -C10240 _I <device name>
```

Restore Specific Files

To restore specific files, enter the following commands at the system prompt:

```
# ulimit unlimited
# cpio -icmudv -C 10240 -I /dev/rmt/0c -M “Please remove the
current tape, insert tape number %d, and press ENTER”
<full_path_name>
```

NOTE:

The device name in this example is `/dev/rmt/0c`. This will be the usual case. However, the device name used depends upon the drive's SCSI ID. You must use one of the following device names in the `cpio` command:

- `/dev/rmt/0` Indicates the tape drive with the lowest target number in the SCSI chain.
- `/dev/rmt/1` Indicates the tape drive with the second lowest target number in the SCSI chain.
- `/dev/rmt/0c` Indicates the tape drive with the lowest target number in the SCSI chain in compressed mode (the 14 GB internal tape drive is the most common usage with the *Sun Enterprise* 3000 system).
- `/dev/rmt/1c` Indicates the tape drive with the second lowest target number in the SCSI chain in compressed mode (the QIC 2.5-GB and the 4-8 GB SLR tape drives support compressed mode).

Recover System Space

Overview

This section describes how to regain system space and *CentreVu* CMS file system space.

Regain System Space

When the amount of *CentreVu* CMS data to save is reduced, data stored in *INFORMIX*- SQL tables will still use the original amount of space. The *INFORMIX*- SQL tables must be removed and re-created to regain the system space. There are two ways to remove the *INFORMIX*- SQL tables and regain the system space, as explained in the following two sections.

CAUTION:

Only **TSC PERSONNEL** should perform the procedures in this section.

Reinitialize *CentreVu* CMS

One option is to reinitialize the *CentreVu* CMS database tables which you can do in the following manner:

1. Reduce the amount of historical data saved by making changes in the Data Storage Allocation window.
2. Run the daily, weekly and/or monthly archiver.

   The tables now contain the correct amount of data. When the archiver runs, it cleans up the data that is older than the new values you entered in Step 1. You may let the archiver(s) run automatically for the day, week, or month, or you may manually run the archiver(s) as follows:

   - If the amount of `intra-hour` data was reduced:

     Manually run the daily archiver for the previous day.

     OR

     Let the daily archiver run automatically at the end of the current day.

   - If the amount of `daily` data was reduced:

     Manually run the daily archiver for the previous day.

     OR

     Let the daily archiver run automatically at the end of the current day.

- If the amount of `weekly` data was reduced:

  Manually run the weekly archiver for the previous week.

  OR

  Let the weekly archiver run automatically at the end of the current week.

- If the amount of `monthly` data was reduced:

  Manually run the monthly archiver for the previous month.

  OR

  Let the monthly archiver run automatically at the end of the current month.

3. Perform a full *CentreVu* CMS Maintenance backup.
4. Print the following CMS windows:
   - Data Storage Allocation
   - Free Space Allocation
   - Storage Intervals
   - Switch Setup.
5. Run the CMSSVC `setup` option to reinitialize the *CentreVu* CMS database. Use the printouts obtained in step 4 and verify that the *CentreVu* CMS software has the same configuration as it did before setup was run.
6. Restore the *CentreVu* CMS from the *latest CentreVu* CMS maintenance backups. This restore loads the *CentreVu* CMS data up to the time of the last *CentreVu* CMS backup. See the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for information on performing a *CentreVu* CMS Maintenance restore."
7. Stop and start *CentreVu* CMS when the *CentreVu* CMS maintenance restore is finished. See the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for information on starting and stopping *CentreVu* CMS.

Recreate Specific Tables

Another option is to manually remove and rebuild specific database tables, which you can do in the following manner:

1. Perform Steps 1 and 2 of the previous section Reinitialize CentreVu CMS.
2. Perform a full *CentreVu* CMS maintenance backup.

3. Save the schemas of the historical database tables for which the amount of data to save was reduced. Do this in the following manner:

   a. Log in as root.

   b. Enter the following:

      `DBPATH=/cms/db/inf;export DBPATH`

   c. Change to the directory where you want to place a file. For example, enter the following:

      `cd /export/home/cmssvc`

   d. Use the following command to save the database table schema(s):

      `/usr/informix/bin/dbschema -t <tablename> -d cms -p all <table.sql>`

      This command produces an SQL command file (such as table.sql) that contains the necessary statements required to create the database table.

      You must supply the two arguments enclosed in brackets above. The two arguments are defined as follows:

      - `-t <tablename>` is the *INFORMIX* database table name of the table that has had its size reduced.
      - *`<table.sql>`* is the file name where the SQL commands are written. The suffix "`.sql`" should be used for the output file name to simplify creating the database tables. This file is placed in the directory where the `dbschema` command is executed.

        CAUTION:

        If the `-t <tablename>` option is omitted, **all** the schemas for **all** the database tables in the database are saved.

4. Note the file system of *CentreVu* CMS data. Output from the `dbschema` command does not contain the file system/directory of the database table. The file produced by the `dbschema` command must be edited, and the correct path must be added to the create table statement(s). Even if the historical data is in the */cms* file system, the historical database tables are located in the */cms/cmstables* directory. Historical data includes any of the following:

   - Trunk group
   - Agent trace
   - Exceptions
   - Call work codes
   - Forecasting
   - Trunks
   - Agents
   - Splits
   - Vectors
   - VDNs
   - Call records
   - Login/logout.

   Following is an example of the dtrunk schema edited for th*e /cms* file system:

   ```
   {root is owner of table dtrunk}
   create table dtrunk
   (
   row_date date,
   acd smallint,
   eqloc char(9),
   incalls integer,
   intime integer,
   abncalls integer,
   o_abncalls integer,
   outcalls integer,
   outtime integer,
   failures integer,
   ```

```
audio integer,
mbusytime integer,
acdcalls integer,
othercalls integer,
shortcalls integer,
o_acdcalls integer,
o_othercalls integer,
incomplete smallint
) in
"/cms/cmstables/dtrunk";
{root is owner of index
dtk_ndx1}
create index dtk_ndx1 on dtrunk (row_date,eqloc,tkgrp);
revoke all on dtrunk from public;
grant dba to root;
grant resource to public;
grant insert on dtrunk to public;
grant delete on dtrunk to public;
grant index on dtrunk to public;
grant select on dtrunk to public;
grant update on dtrunk to public;
```

In this example, the statement in bold is what you add to the schema.

5. Turn off *CentreVu* CMS. From the `run_cms` option on the *CentreVu* CMS Services menu, you can turn *CentreVu* CMS off.
   a. Access the *CentreVu* CMS Services menu by entering `cmssvc`. The menu appears.
   b. Enter 3 to select the `run_cms` option.
   c. Enter 2 to turn off *CenrtreVu* CMS.
6. Remove (drop) the database tables for which the administration changes were made by doing the following:
   a. Enter the command:

      `/usr/informix/bin/dbaccess`

      The dbaccess main menu appears.
   b. Select `Table` from the main menu.
   c. Select `Drop` from the `Table` menu.

You are prompted for a table name to drop.

d. Enter the table name you want dropped.

e. Select `Exit` to exit the `Table` menu.

7. Create the database tables in the correct directory as follows:

   a. Select `Query-Language` from the dbaccess main menu.

      You are prompted for the database name.

   b. Enter `cms`.

   c. Select `Choose` from the menu.

      A list of the `.sql` files on the file system (such as your work directory) is displayed.

   d. Select a file.

   e. Select `Run` to execute the commands in the file to create the database tables(s).

   f. Select `Exit` to exit the `Query Language` menu.

   g. Select `Exit` (to exit dbaccess) when all the database tables have been created.

8. Turn on *CentreVu* CMS. From the `run_cms` option on the *CentreVu* CMS Services menu, you can turn *CentreVu* CMS on.

   a. Access the *CentreVu* CMS Services menu by entering `cmssvc`. The menu appears.

   b. Enter `3` to select the `run_cms` option.

   c. Enter `1` to turn on *CenrtreVu* CMS.

9. Perform a *CentreVu* CMS restore for all ACDs to restore the historical data into the *CentreVu* CMS database tables. If the *CentreVu* CMS full maintenance backup uses more than one tape, an automatic *CentreVu* CMS restore is most efficient. The automatic restore prompts for the necessary tapes to restore the historical data. You have the following options:

   - Use the `specific tables` option to restore data for specific database tables. This will save time if only one type of data is being changed.
   - Restore historical data using the `Start date` and `Start time` input fields in the Restore Data window to restore data from a specific period of time.

Recover *CentreVu* CMS File System Space

When you log into the system as a *CentreVu* CMS user, a program is executed that checks the free blocks available to */, /usr*, and the various *CentreVu* CMS-related file systems located on the hard disks. If one of these file systems has less than 5000 but more than 1000 free blocks, a message similar to the following will be displayed on your terminal screen:

```
WARNING: File system, "<file system>", has only "<XXXX>"
blocks free.
```

When this message occurs, file system maintenance must be done as soon as possible to keep the file system from running out of free blocks.

If one of these file systems has less than 1000 free blocks, a message similar to the following will be displayed:

```
*********************************************************
* CAUTION CAUTION CAUTION CAUTION CAUTION               *
*                                                       *
*                                                       *
*                                                       *
* File system, "<file system>", has only "<XXXX>"       *
* blocks free.                                          *
*********************************************************
```

When these messages occur, the file system is almost out of free blocks, and the *CentreVu* CMS software application can shut down at any time.

To reallocate space, use the Free Space Allocation window located in the System Setup subsystem. See the *CentreVu Call Management System Release 3 Version 6 Administration* (585-215-850) document for more information.

Add Hard Disk Drives

Overview

The *Solstice DiskSuite* 4.1 software treats all the hard disks on your system as a single logical disk, allowing the call center data base to grow quite large. All factory-installed R3V6 systems have OLDS; systems upgraded in the field must have had OLDS installed to accommodate requirements of R3V6 CMS.

To add a hard disk drive to a system follow the procedure in this section.

Add the Disk Drive

To add more disks to a system that is already up and running, perform these steps:

1. Do a cmsadm backup.

   See *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document, for more details.

2. Make sure the system is in firmware mode (use the `init 0` command to get to the `ok` prompt).

3. Do the following in sequential order:

   a. Turn off the system unit.

   b. Turn off the system monitor.

   c. Turn off all external devices starting with the device closest to the system unit and working toward the farthest device.

4. Install the new disk drives. See the *CentreVu Call Management System Release 3 Version 6, Sun Enterprise 3000 System Hardware Installation* (585-215-867) document for more details.

5. Set the SCSI IDs on the new disk drives such that they do not conflict with devices already on the system. Turn on the power to the system units, in the opposite order in which you powered them off.

   When you power on the system, the system begins to boot. Interrupt the boot by entering **Stop** **A**. The system responds:

```
ok
```

CAUTION:

If you are on a *Sun Enterprise* 3000 system, see Chapter 3, *Enterprise* 3000 Troubleshooting, “Probe-SCSI Command Problem” section before executing the next command.

6. To verify that the system sees all devices, including the new disk drive, enter the following command:

```
ok probe-scsi-all
```

The system responds as follows:

```
/iommu@f,e0000000/sbus@f.e0001000/esp@3,200000
Target 1
  Unit 0 Disk SEAGATE ST14801 SUN04246266 Copyright (C) 1991
Target 3
  Unit 0 Disk SEAGATE ST14801 SUN04246266 Copyright (C) 1991
. . . . .
. . . . .
. . . . .
Target 6
  Unit 0 Disk Removable Read Only Device SONY CD-ROM CDU-8012

ok
```

NOTE:

The actual devices listed depends on the devices installed on the SCSI bus.

7. Enter the following command:

```
ok boot -r
```

The system responds as follows:

```
Boot device ...
   .
   .
   .
Configuring the /dev directory
Configuring the /dev directory (compatibility devices)
The system is coming up. Please wait.
checking filesystems
/dev/rdsk/c0t1d0s0:    is clean
/dev/rdsk/c0t3d0s5:    is clean
   .
   .
   .
/dev/rdsk/c0t1d0s1 mounted
/dev/rdsk/c0t3d0s5 mounted
/dev/rdsk/c0t1d0s0 mounted
   .
   .
   .
Starting terminal server network daemons.
Network Terminal Server daemon(s) startup complete.
The system is ready.

hostname console login:
```

8. Log in as root.

   You may now partition the disks.

Partition the Disks

To partition the disks, do the following steps:

1. At the system prompt, enter the `format` command:

```
# format
```

The following screen appears:

```
Searching for disks ... done

AVAILABLE DISK SELECTIONS:
   0.  c0t0d0 <SUN4.2G cyl 3880 alt 2 hd 16 sec 135
       /sbus@3,0/SUNW,fas@3,8800000/sd@0,0
   1.  c0t1d0 <SUN4.2G cyl 3880 alt 2 hd 16 sec 135
       /sbus@3,0/SUNW,fas@3,8800000/sd@1,0
   2.  c0t2d0 <SUN4.2G cyl 3880 alt 2 hd 16 sec 135
       /sbus@3,0/SUNW,fas@3,8800000/sd@2,0
   3.  c1t4d0 <SUN4.2G cyl 3880 alt 2 hd 16 sec 135
       /sbus@3,0/SUNW,fas@3,8800000/sd@e,0
Specify disk (enter its number):
```

2. Enter the number that corresponds to the disk you added.

NOTE:

Be careful to specify the number that exactly matches the disk you are adding.

```
Specify disk (enter its number):
```

The system displays the disk you are partitioning (for example, `c1t1d0` for disk 5) and the Format Menu as shown below:

```
selecting c1t1d0

FORMAT MENU:
disk            —   select a disk
type            —   Select (define) a disk type
partition       —   select (define) a partition table
current         —   describe the current disk
format          —   format and analyze the disk
repair          —   repair a defective sector
label           —   write label to the disk
analyze         —   surface analysis
defect          —   defect list management
backup          —   search for backup labels
verify          —   read and display labels
save            —   save new disk/partition definitions
inquiry         —   show vendor, product and revision
volname         —   set 8-character volume name
quit            —

format>
```

3. At the `format>` prompt, enter `partition`.

```
format> partition
```

The program displays a confirmation message and the Partition menu as follows:

```
PARTITION MENU:
0         -change ‘0’partition
1         -change ‘1’partition
2         -change ‘2’partition
3         -change ‘3’partition
4         -change ‘4’partition
5         -change ‘5’partition
6         -change ‘6’partition
7         -change ‘7’partition
select    -select a predefined table
modify    -modify a predefined partition table
name      -name the current table
print     -display the current table
label     -write partition map and label to the disk
quit
partition> Current partition table (original):
Total disk cylinders available: 3880 + 2 (reserved cylinders)
```

4. At the `partition>` prompt, enter the `print` menu option to check the default partition table.

```
partition> print
```

The system displays the default partition table, for example, the table for a 4.2-GB disk could look like the following:

```
Current partition table (original):
Total disk cylinders available: 3880 + 2 (reserved cylinders)

Part       Tag    Flag     Cylinders     Size            Blocks
  0  unassigned    wm       0 -    1      2.11MB      (2/0/0)       43
  1  unassigned    wm       2 - 3879     3.99GB     (3878/0/0)   83764
  2      backup    wm       0 - 3879     4.00GB     (3880/0/0)   83808
  3  unassigned    wm       0            0          (0/0/0)
  4  unassigned    wm       0            0          (0/0/0)
  5  unassigned    wm       0            0          (0/0/0)
  6  unassigned    wm       0            0          (0/0/0)
  7  unassigned    wm       0            0          (0/0/0)
```

You may have to set up the partitions on the disks you added.

5. At the `partition>` prompt, enter `0.`

```
partition> 0
```

   The system responds as follows:

```
Enter partition id tag [unassigned]:
```

6. Enter `root` for root (/).

   The system responds as follows:

```
Enter partition permission flags [wm]:
```

7. Press Enter to accept the default `wm`. This indicates that the partition is writable and mountable.

   The system responds as follows:

```
Enter new starting cyl [0]:
```

8. Press Enter to accept `0` as the starting cylinder. The system responds as follows:

```
Enter partition size [205632b, 204c, 100.41mb]:
```

9. Enter `2c` for the size of the partition.

   The system responds with the `partition>` prompt.

10. At the `partition>` prompt, enter `1` as shown below:

```
partition> 1
```

11. Enter `un` for the partition ID tag, `wm` for the partition permission flags, and `2` as the starting cylinder.

12. Enter the size of the partition as shown below:

```
Enter partition size [133056, 132c,64.9mb]:
```

13. At the `partition>` prompt, enter the `print` menu option to verify that the partition table is accurate.

```
partition> print
```

NOTE:

If partitions 3 through 7 have cylinders assigned, zero them out. **Do not** zero out partition 2, leave it as the whole disk.

14. At the `partition>` prompt, enter the `label` menu option.

```
partition> label
```

15. To label the disk, enter `y` at the message prompt.

```
partition> label
Ready to label disk, continue: y
```

The system responds as follows:

```
partition>
```

NOTE:

If you added more than one disk drive to your system, repeat steps 1 through 18 for each drive.

16. Exit the partition menu by entering q at the `partition>` prompt and q at the `format>` prompt. The system prompt returns as shown below:

```
partition> q
format > q
#
```

17. If cms is running, stop it by running `cmsadm` and executing the `run_cms` option as follows:

```
# cmsadm
Lucent Technologies CentreVu(TM) Call Management System
Select a command from the list below.
  1) acd_create  Define a new ACD
  2) acd_remove  Remove all administration and data for an A
  3) backup      Filesystem backup
  4) diskmap     Estimate disk requirements
  5) memory      Estimate memory requirements
  6) realtime    Estimate real-time report refresh rate
  7) pkg_install Install a feature package
  8) pkg_remove  Remove a feature package
  9) run_cms     Turn CentreVu on or off
Enter choice (1-9) or q to quit: 9

Select one of the following
1) Turn on CMS
2) Turn off CMS
Enter choice (1-2): 2

*** Turning off CMS, Please wait ***
.  .  .
*** CMS is now off
#
```

NOTE:

It is important that CMS be turned off for the remaining steps. If it is on, anyone trying to write to the filesystem will receive multiple error messages.

18. Determine the current size of the /cms file system. You can do that by entering a `df -k` command. The system responds by listing the current file systems. For example:

```
# df  -k  /cms

Filesystem           kbytes    used   avail  capacity Mounted on
/dev/dsk/c0t3d0s0    xxxxxx  310956  xxxxxx       45%  /
/proc                     0       0       0        0%  /proc
fd                        0       0       0        0%  /dev/fd
/dev/md/dsk/d19      xxxxxx       9  xxxxxx        0%  /cms

#
```

The operative figures are the "`kbytes`" and "`available`" figures for the `/` and `/cms` file systems, shown here as "`xxxxxx`." Divide each of those numbers by 1000, and record the results. You will use them later to verify that the figures have increased as a result of adding a disk drive.

19. Check disk partitioning by entering the following commands:

```
# export  PATH=$PATH:/usr/opt/SUNWmd/sbin:/olds
# olds  -check_disks cxtydz
      .
      .
#
```

where c*xtydz* is the device name of the disk you added.

20. Create a new md.tab file by entering the following commands:

```
# olds  -metadbs
# olds  -mk_files  /dev/dsk/cxtydz
      .
      .
      .
#
```

When the system prompt reappears, check to make sure that all the disk drives on your system have been recognized.

To do that, read the file `/olds/md.tab.new` into an editor such as VI. Find the `#/cms` section; it should reflect the precise number of disk drives on your system.

The following example shows three disk drives on the system:

```
# vi /olds/md.tab.new

<contents of the file is displayed>

   .
   .
   .
#/cms
d19 3 1 /dev/dsk/c0t1d0s1 1 /dev/dsk/c0t3d0s3 1 /dev/dsk/c0t2d0s1
```

If the file reflects the precise number of drives on your system, go directly to step 21 on page 2-54.

If the number of drives is incorrect, complete steps a through h as follows:

a. Reboot the system with an `init 0` command. The system reboots and displays the ok prompt as follows:

```
# init 0
    .
    .
    .
ok
```

b. Do the following in sequential order:

   1. Turn off the system unit.
   2. Turn off the system monitor.
   3. Turn off all external devices starting with the device closest to the system unit and working toward the farthest device.

c. Check all disk drive connections to make certain they are secure. Also check the SCSI IDs on the disk drives to make sure no two drives have the same IDs.

d. Turn on the power to the system units in the opposite order in which you powered them off.

When you power on the system unit, the system begins to boot. Interrupt the boot by entering Stop A. The system responds as follows:

```
ok
```

CAUTION:

If you are on a *Sun Enterprise* 3000 system, see Chapter 3, *Enterprise* 3000 Troubleshooting, “Probe-SCSI Command Problem” section before executing the next command.

e. To verify that the system sees all SCSI devices, including the new disk drive, enter the following command:

```
ok probe-scsi-all
```

The system responds as follows:

```
/iommu@f,e0000000/sbus@f.e0001000/esp@3,200000
Target 1
  Unit 0 Disk SEAGATE ST14801 SUN04246266 Copyright (C) 1991
    .
    .
    .
Target 6
  Unit 0 Disk Removable Read Only Device SONY CD-ROM CDU-8012

ok
```

f. When you have verified that the system is recognizing all its disk drives, enter the following command:

```
ok boot -r
```

The system responds as follows:

```
Boot device ...
   .
   .
   .
Configuring the /dev directory
   .
   .
   .
/dev/rdsk/c0t1d0s1 mounted
   .
   .

hostname console login:
```

g. Log in as root, and press **Enter**. The system displays the last login on the console (same date and time) and returns you to the system prompt. For example:

```
Sun Microsystems Inc. SunOS 5.2 Generic November 1995
#
```

h. Repeat steps 19 and 20 until all the disk drives have been recognized.

21. Attach the new disk and grow the /cms file system by running the olds script as follows:

```
# /olds/olds  -setup  /dev/rdsk/cxtydz
```

where c*x*t*y*d*z* is the device name of the disk you added.

The system responds with a series of system messages reflecting the disk drive setup process, eventually reporting success. For example:

```
valid disks are <device>
    .
    .
    .
super-block backups (for fsck -F ufs -o b=#) at:
32, 16240, 32448, 48656, 64864, 81072, 97280, 113488,
     .
     .
     .
1854992, 1871200, 1887408, 1903616, 1919824, 1936032

re-adding swap files

Success, activating or growing /cms metadevice.
#
```

22. Check to make sure that the new disk was indeed attached. You can do that by executing a `df -k` command on the /cms file system, and doing some quick math on the result. For example:

```
# df  -k  /cms

Filesystem          kbytes used availcapacityMounted on
/dev/dsk/c0t3d0s0   xxxxxx310956xxxxxx45% /
/proc               0    0 0      0%   /proc
fd                  0    0 0      0% /dev/fd
/dev/md/dsk/d19     xxxxxx9xxxxxx0%    /cms

#
```

The `/` and `/cms` “`kbytes`” and “`avail`” figures (shown here as “`xxxxxx`”) are the critical numbers. Divide each one by 1000 to determine the size, in megabytes, of your newly expanded disk drive system. Compare these new numbers to the ones you recorded in step Step 18.

The numbers should have increased as the result of adding the disk drives.

23. Finish the procedure by rebooting the system:

```
# init  6
```

24. Start CMS (type a `cmssvc` or `cmsadm` command, and select the `Run CMS` option).

Add Memory

Overview

This section describes the procedures use to add more memory to a *Sun Enterprise* 3000 system that is already up and running. To add memory to the system, do the following:

Prepare the System

1. Enter the `prtconf` command, and record the displayed memory size as follows:

```
# prtconf | grep Memory

Memory size: xx Megabytes
```

2. Make sure the system is in the firmware mode by using the `init 0` command to get to the `ok` prompt.
3. Do the following in sequential order:
   a. Turn off the *Sun Enterprise* 3000 system.
   b. Turn off the system monitor.
   c. Turn off all external devices starting with the device closest to the *Sun Enterprise* 3000 system and working toward the farthest device.

Install the Single In-line Memory Modules (SIMMs)

Install the SIMMs into the *Sun Enterprise* 3000 system using the procedures described in *CentreVu Call Management System Release 3 Version 6, Sun Enterprise 3000 System Hardware Installation* (585-215-867) document for more information on installing SIMMs.

Restart the System

1. Do the following in sequential order:
   a. Turn on devices attached to the *Sun Enterprise* 3000 system starting with the most distant device and working toward the computer.
   b. Turn on the *Sun Enterprise* 3000 system.

c. Turn on the system monitor.

2. Boot the system.

```
ok boot -r
```

3. After the machine is booted, log in as root.
4. Enter the `prtconf` command.

```
# prtconf | grep Memory

Memory size: xx Megabytes
```

5. Verify that the displayed memory size is correct (compare with value recorded in Step 1). If not, see *CentreVu Call Management System Release 3 Version 6, Sun Enterprise 3000 System Hardware Installation* (585-215-867) document for more information.

Add/Install Swap Space

Your system requires two swap files: one in the root file system and one in the `/cms` file system. You create the files with the olds script. The script determines how big the files need to be.

NOTE:

When you install new memory, you will needs new swaps.

Create the files with the following steps.

1. Create the files by running the olds script with swap file options, as follows:

```
# olds  -addswapfile  /cms
```

2. Reboot the system by entering the following command:

```
# init  6
```

3. When the reboot completes, add the swap by entering the following command:

```
# swap  -a /cms/swap
```

4. Finally, enter the `swap -l` command to verify that the swap devices have been configured as they should have been.

```
#  swap  -l
```

Install a High Speed Interface (HSI) Card

Overview

HSI cards allow the *CentreVu* CMS system to support up to eight ACDs. For eight ACDs, two HSI cards and Patch Panels are needed.

If this is the initial installation of one or two HSI cards, use the following procedure. If a second HSI card is being added to a system already up and running, see “Add a Second HSI Card’ on page 2-62.

HSI Card Installation Procedures

To install an HSI card in the *Sun Enterprise* 3000 system, do the following:

1. Log into the system as root.
2. Turn off *CentreVu* CMS. From the `run_cms` option on the *CentreVu* CMS Services menu, you can turn *CentreVu* CMS off.
   a. Access the *CentreVu* CMS Services menu by entering `cmssvc`. The menu appears.
   b. Enter 3 to select the `run_cms` option.
   c. Enter 2 to turn off *CenrtreVu* CMS
3. Remove the *CentreVu* CMS software using the `pkgrm` command. See the *CentreVu Call Management System Release 3 Version 6 Upgrades and Migration* (858-215-856) document for more information.

   Enter `y` when asked:

   “Do you want to preserve CMS data? [y,n,?]”
4. Shut the system down by using the `shutdown` command.

```
# /usr/sbin/shutdown -y -i0 -g0
```

5. Do the following in sequential order:
   a. Turn off the *Sun Enterprise* 3000 system.
   b. Turn off the system monitor.
   c. Turn off all external devices starting with the device closest to the *Sun Enterprise* 3000 system and working toward the farthest device.

6. Install the HSI card into the *Sun Enterprise* 3000 system by following the instructions described in *CentreVu Call Management System Release 3 Version 6 Sun Enterprise 3000 System Hardware Installation* (585-215-867) document.
7. Attach the HSI patch panel by following the instructions described in *CentreVu Call Management System Release 3 Version 6 Sun Enterprise 3000 System Hardware Installation* (585-215-867) document.
8. Connect the switch links to the HSI/S patch panel by following the instructions described in *CentreVu Call Management System Release 3 Version 6 Sun Enterprise 3000 System Hardware Installation* (585-215-867) document.

   NOTE:

   Do not use the “B” serial port to connect switch links when an HSI card is installed. The “B” serial port is used only for single ACD installations. In a multiple ACD arrangement, all switch links must be connected to an HSI patch panel.

9. Do the following in sequential order:
   a. Turn on devices attached to the *Sun Enterprise* 3000 system starting with the device at the end of the SCSI chain and working toward the computer.
   b. Turn on the *Sun Enterprise* 3000 system.
   c. Turn on the system monitor.
10. Press the Stop and A keys simultaneously after the display console banner appears, but before the system starts booting.
11. Boot the system with the -r option so it will recognize the new HSI/S card:

```
ok boot -r
```

12. When the system comes back up, log in as root.

Install HSI Software

Install the HSI software by following the instructions described in the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document.

Install *Solaris* Patches

Install the *Solaris* patches package by following the instructions described in the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document.

Install *CentreVu* CMS Software

Install the *CentreVu* CMS software by following the instructions described in the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document.

Switch Link Administration (for all ACDs)

1. Change the switch link administration for ACD 1 by using the `cmssvc` command as follows:

```
# cmssvc
```

2. The system responds as follows:

```
CentreVu(TM) Call Management System Services Menu

Select a command from the list below.
  1) auth_display Display feature authorizations
  2) auth_set     Authorize CMS capabilities/capacities
  3) run_cms      Turn CentreVu CMS on or off
  4) setup        Set up the initial configuration
  5) swinfo       Display switch information
  6) swsetup      Change switch information
  7) upd_install  Install update from disk files
  8) upd_remove   Back out the currently installed update
  9) upd_save     Save update on disk for later installation
Enter choice (1-9) or q to quit:
```

3. Select the `swsetup` option 4).
4. Select ACD 1.

5. Accept the existing defaults for the following:
   - Switch name
   - Switch model (release)
   - Vectoring
   - Expert agent
   - Central Office Disconnect Supervision
   - Local port
   - Remote port.
6. Select “HSI link 0” when prompted for the link information.
7. Perform a CMSADM file system backup to save the updated system software and hardware configuration. See the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for information.
8. Turn on *CentreVu* CMS using the `run_cms` option of the cmssvc command.

Add a Second HSI Card

Use the following procedures if you are adding a second HSI card to a system that is already up and running. Prior to this procedure, make sure the new cms is installed.

Procedure

1. Log into the system as root.
2. Edit the /etc/path_to_inst file and search for HSI. Remove all such lines.
3. Run the following command:

```
# rm /dev/hih*
```

4. Now run this command:

```
# rm /devices/sbus*/HSI*
```

5. Now you can install the card. See the *CentreVu Call Management System Release 3 Version 6, Sun Enterprise 3000 System Hardware Installation* (585-215-867) document for more information.

6. Do the following in sequential order:
   a. Turn on devices attached to the *Sun Enterprise* 3000 system starting with the device at the end of the SCSI chain and working toward the computer.
   b. Turn on the *Sun Enterprise* 3000 system.
   c. Turn on the system monitor.
7. Press the Stop and A keys simultaneously after the display console banner appears, but before the system starts booting.
8. Boot the system with the -r option so it will recognize the new HSI/S card:

```
ok boot -r
```

9. When the system comes back up, log in as root.
10. Once *Solaris* is up, run the following command:

```
# /cms/toolsbin/lnSBusdev
```

Change the Date or Time

Overview

The switch time is displayed at the top of most *CentreVu* CMS screens.

NOTE:

Changing the switch time may cause a small distortion in the *CentreVu* CMS data when the change is made. A small amount of data may also be lost when the change occurs. For example, if the *Solaris* system time is advanced, the switch connection is reestablished causing a small amount of data to be lost. Furthermore, the time must be within 24 hours of the switch or the link will dropped.

Change the System Date and Time

Do the following steps to change the *Solaris* system time:

1. Log in as root.
2. Change to an OpenBoot mode with the following command:

```
# init 0
     .
     .
     .
```

3. At the ok prompt, enter the following command:

```
ok  boot -s
     .
     .
     .
Resetting...
Type Ctrl-d to proceed with normal startup
(or give root password for system maintenance):
```

4. Enter the root password.

The system responds as follows:

```
Entering System Maintenance Mode
Enter Terminal Type: (default is 615):
```

5. At the prompt, enter the terminal type.
6. At root, enter the `date` command to set the time and date.

```
# date mmddHHMM[[cc]yy]
```

For example:

- ***mm* (month):** Enter the month (numeric). Range: 1-12 (1=January, 2=February, and so on).
- ***dd* (day):** Enter the day of the month. Range: 1-31
- ***HH* (hour):** Enter the hour of day, military time. Range: 00-23.
- ***MM* (minute):** Enter the minute of the hour. Range: 00-59.
- ***[cc]* (century):** Enter the century minus 1. For example, for the 20th century, enter 19.
- ***[yy]* (year):** Enter the last two digits of the year (98, for example, means 1998).

7. Set the time zone environment variable in the `/etc/default/init` file by doing the following:
   a. Examine the `/usr/share/lib/zoneinfo` directory for time zones. For more information about time zones, see the next section Change the System Country and Time Zones.
   b. Edit the `/etc/default/init` file with a text editor (for example, vi).
   c. Change the `/etc/default/init` file by using the `w!` command to overwrite the file.

8. Return to a multi-user state with the following command:

```
# /usr/sbin/shutdown -i6 -g0 -y
```

The `-i6` option of the `shutdown` command changes the system to a multi-user state.

Change the System Country and Time Zones

To set the country and time zones, do the following:

1. At the console, exit the *OpenWindows** environment if it is currently running.
2. To initiate an OpenBoot mode, enter the following command:

```
# init 0
```

3. At the `ok` prompt, enter the following command:

```
ok  boot -s
     .
     .
     .
Resetting...
Type Ctrl-d to proceed with normal startup
(or give root password for system maintenance):
```

4. Enter the root password.

   The system responds as follows:

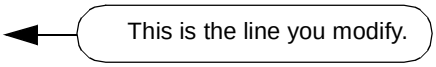
```
Entering System Maintenance Mode
Enter Terminal Type: (default is 615):
```

5. At the prompt, enter the terminal type.

**OpenWindows* is a trademark of Sun Microsystems, Inc.*

6. Edit the `/etc/default/init` file and set the `TZ` variable to equal the appropriate value in the `/usr/share/lib/zoneinfo` directory. Then write and quit the file. See the following example:

```
# vi /etc/default/init

<contents of the file is displayed>

# @(#)init.dfl 1.2 92/11/26
#
# This file is /etc/default/init. /etc/TIMEZONE is a symlink to this file.
# This file looks like a shell script, but it is not. To maintain
# compatibility with old versions of /etc/TIMEZONE, some shell constructs
# (i.e., export commands) are allowed in this file, but are ignored.
#
# Lines of this file should be of the form VAR=value, where VAR is one of
# TZ, LANG, or any of the LC_* environment variables.
#
TZ=US/Mountain
```



As an example for Mountain Standard Time, the `TZ` variable can be set to `MST` or `US/Mountain`. The entry in the `init` file is essentially a relative path name from the `/usr/share/lib/zoneinfo` directory. `MST` to a file in `/usr/share/lib/zoneinfo`, and `Mountain` is a file in `/usr/share/lib/zoneinfo/US`.

7. Reboot the machine using the following command:

```
# /usr/sbin/shutdown -i6 -g0 -y
```

Synchronize Clocks

Each I/O board has its own clock. These clocks must be synchronized for proper system operation. After removing and replacing an I/O board, the system may experience a clock synchronization problem. That is, the clock on the I/O board will become un-synchronized with the clock on the Clock Board.

To resync the clocks, do the following:

1. If CMS is running, turn it off.
2. Go to the boot prompt. You can do that in one of three ways:
   a. You can type `init 0`, or
   b. You can type `/usr/sbin/shutdown -y -g0 -i0`, or
   c. You can simultaneously press the Stop and the A keys while the *Sun Enterprise* is booting, after the *Sun* logo appears.
3. Type the following command:
   ```
   copy-clock-tod-to-io-boards
   ```
4. Boot the machine by typing one of the following commands:
   ```
   boot
   boot -r     (to reconfigure for new devices)
   ```

Add, Remove, or Replace Tape Drives

Overview

This section describes how to replace the internal tape drive and how to add and remove an external tape drive from an existing system. External SCSI devices are not generally supported on the *Sun Enterprise* 3000 system. The only exception is for migration purposes. For migration purposes, connect the external SCSI tape drive, perform the migration, and then remove the external SCSI tape drive.

Replace the Internal Tape Drive

The basic configuration for the *Sun Enterprise* 3000 system equipped for CMS application includes a 14-GB internal tape drive. This tape drive is installed in the right hand side of the SCSI tray which mounts from the front of the system (see Figure 2-1).

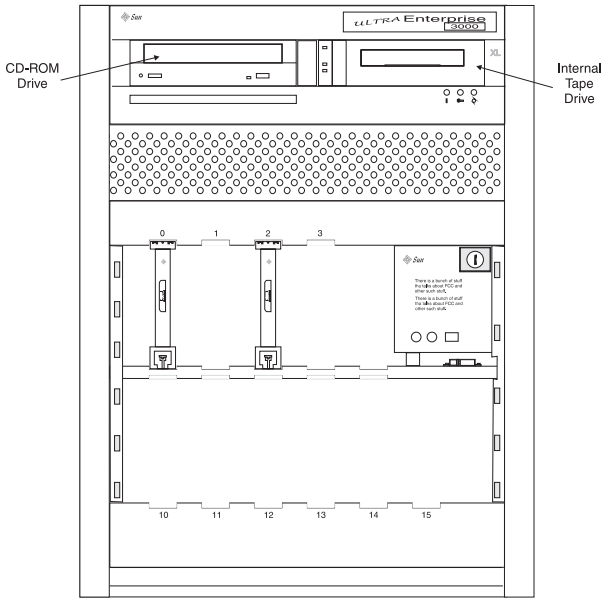


Figure 2-1: Front View of the *Sun Enterprise* 3000 System

Procedure

To replace a tape drive in the SCSI tray:

1. Remove the front bezel

   NOTE:

   It may be necessary to apply pressure to release the front bezel anchor pins. To do this, place your thumbs against the face of the SCSI tray installed units and press in with your thumbs while pulling out with your fingers.

2. Loosen the two captive screws.

   CAUTION:

   When loosening or tightening the captive screws, use your thumb and fingers only. The shaft of these screws is thin and can easily be broken if too much pressure is applied.

3. Remove the SCSI tray with any installed devices.
4. Remove seven screws on top of the tray and remove the top panel.
5. Remove the old tape drive:
   a. Loosen the three captive screws securing the tape drive to the tray.
   b. Remove the mounting plate from the old tape drive and attach it to the new tape drive using the same screws.
   c. Set the SCSI address to 5.
   d. Secure the tape drive with the mounting bracket to the SCSI tray using the three captive screws.
6. Reverse Steps 1 through 4.

Add an External Tape Drive

This procedure is use only as a temporary measure during the migration process.

When adding an external tape drive to an existing system, do the following:

- Remove existing SCSI device files (to prepare for new SCSI hardware configuration).
- Install an FSBE card.
- Set the SCSI device ID(s).
- Connect the tape drive(s) to the FSBE card.
- Reboot and reconfigure the system.

Procedures

To remove SCSI device files, do the following:

1. Enter the following command:

```
# rm /dev/rmt/*
```

   If you do not remove the device files before rebooting the system, the SCSI device files may not match the hardware configuration.

2. Shut the system down using the following command:

```
# init 0
```

3. Do the following in sequential order:
   a. Turn off the *Sun Enterprise* 3000 system.
   b. Turn off the system monitor.
   c. Turn off all external devices starting with the device closest to the *Sun Enterprise* 3000 system and working toward the farthest device.
4. Install an FSBE card on the SBus I/O board. See the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for information.
5. Set the SCSI ID to 4.
6. Connect the tape drive to the FSBE card.

Connect the SCSI cable between the FSBE card to the in-connector on the back of the device. Figure 2-2 shows the SCSI cabling scheme.

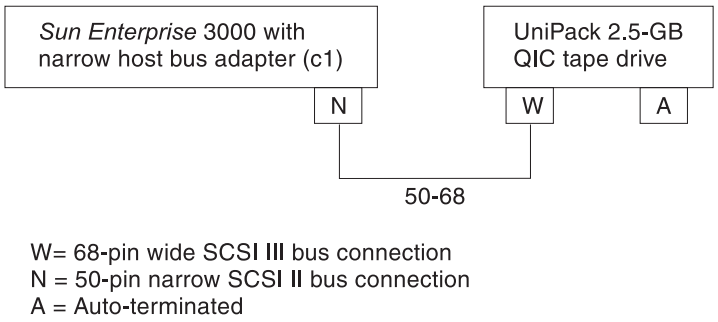


Figure 2-2: SCSI Cabling Scheme

7. Connect the power cord from the tape drive to a power source.

   The power-on diagnostics will occur when the computer is turned on.

   While the system is booting up, enter the OpenBoot environment by doing the following:

8. Press the Stop and A keys simultaneously after the display console banner appears but before the system starts booting the operating system.

   CAUTION:

   See Chapter 3, *Enterprise* 3000 Troubleshooting, “Probe-SCSI Command Problem” section before executing this command.

   After you are in the OpenBoot environment, the following prompt appears:

```
ok
```

9. Enter the following command and verify that the system recognizes the SCSI devices:

CAUTION:

See Chapter 3, *Enterprise* 3000 Troubleshooting, “Probe-SCSI Command Problem” section before executing this command.

```
ok probe-scsi-all
```

The system responds as follows:

```
/sbus@3,0/sunw,fas@3,8800000
Target 0
  Unit 0 Disk SEAGATE ST14801 SUN04246266 Copyright (C) 1991
Target 1
  Unit 0 Disk SEAGATE ST14801 SUN04246266 Copyright (C) 1991


. . . . .
. . . . .
. . . . .
Target 6
  Unit 0 Disk Removable Read Only Device SONY CD-ROM CDU-8012

ok /sbus@2,0/sunw,fas@3,8800000
```

The actual response (devices listed) depends on the devices installed on the SCSI bus.

10. Enter the following command to reboot the system and reconfigure the devices.

```
ok boot -r
```

Remove the External Tape Drive

When removing the external tape drive from an existing system, you need to do the following:

- Remove SCSI device files (to prepare for new SCSI hardware configuration).
- Remove the SCSI tape drive.
- Remove the FSBE card.
- Reboot and reconfigure the system.

Remove SCSI Device Files

To remove SCSI device files, enter the following command:

```
# rm /dev/rmt/*
```

NOTE:

If you do not remove the device files before rebooting the system, the SCSI device files may not match the hardware configuration.

Remove the SCSI Tape Drive

To remove the SCSI tape drive, do the following:

1. Shut the system down using the following command:

```
# /usr/sbin/shutdown -i0 -g0 -y
```

2. Do the following in sequential order:
   a. Turn off the *Sun Enterprise* 3000 system.
   b. Turn off the system monitor.
   c. Turn off all external devices starting with the device closest to the *Sun Enterprise* 3000 system and working toward the farthest device.
3. Remove the tape drive from the FSBE card.

Remove the FSBE Card

Remove the FSBE card from the SBus I/O board using the procedures given in *CentreVu Call Management System Release 3 Version 6 Sun Enterprise 3000 System Hardware Installation* (585-215-867) document.

Reboot and Reconfigure the System

To reboot and reconfigure the system, do the following:

1. Disconnect the tape drive power cord from the power source.
2. Do the following in sequential order:
   a. Turn on the *Sun Enterprise* 3000 system.
   b. Turn on the system monitor.

   The power-on diagnostics will occur when the computer is turned on.

   While the system is booting up, enter the OpenBoot environment by doing the following:
3. Press the Stop and A keys simultaneously after the display console banner appears but before the system starts booting the operating system.

   After you are in the OpenBoot environment, the following prompt appears:

```
ok
```

4. Enter the following command, and verify that the system recognizes the SCSI devices.

   CAUTION:

   See Chapter 3, *Enterprise* 3000 Troubleshooting, “Probe-SCSI Command Problem” section before executing this command.

```
ok probe-scsi-all
```

The system responds as follows:

```
/sbus@3,0/sunw,fas@3,8800000
Target 0
  Unit 0 Disk SEAGATE ST14801 SUN04246266 Copyright (C) 1991
Target 1
  Unit 0 Disk SEAGATE ST14801 SUN04246266 Copyright (C) 1991


. . . . .
. . . . .
. . . . .
Target 6
  Unit 0 Disk Removable Read Only Device SONY CD-ROM CDU-8012

ok /sbus@2,0/sunw,fas@3,8800000
```

The actual response (devices listed) depends on the devices installed on the SCSI bus.

5. Enter the following command to reboot the system and reconfigure the devices:

```
ok boot -r
```

Add Network Terminal Servers

Overview

To connect additional Network Terminal Servers (NTSs) to your current configuration, use the procedures in *CentreVu Call Management System Release 3 Version 6 Sun Enterprise 3000 System Hardware Installation* (585-215-867) document. Also see the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document. You can connect a maximum of four NTSs per *Sun Enterprise* 3000 system.

Change Network Addresses

If you want to change the network address of your *Sun Enterprise* 3000 system and each NTS. See *CentreVu Call Management System Release 3 Version 6 Sun Enterprise 3000 System Hardware Installation* (585-215-867) document, for further information.

Replace the Clock Board

Overview

This procedure applies only to the *Sun Enterprise* 3000 System platform. This operation should be performed by or with the assistance of a Sun Microsystems Inc. technician.

Procedure

1. Remove the faulty clock board. See the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for more details.
2. Remove the Non-Volatile Random Access Memory (NVRAM) chip from the old Clock Board and insert it into the new Clock Board.
3. Install the new Clock Board in the system. See the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for more details.
4. If this does not solve the problem, you need to replace the NVRAM chip.
5. If you replace the NVRAM chip, you will need to call Sun Microsystems Inc. and obtain a new licence.

Replace the Non-Volatile Random Access Memory (NVRAM)

If the NVRAM needs to be replaced, use the following procedure to insure that the boot device is set correctly.

1. Use the `eeprom` command to check that the new NVRAM has the boot device set correctly. The result should look like the following:

```
# eeprom | grep boot-device
  boot-device=disk diskbrd diskisp disksoc net
```

2. The first device must be `disk` to boot off the local disk. If this is not the case, enter the following command:

```
# eeprom boot-device=disk
```

If the system will not boot and reports that it is trying to boot up from the network, you can fix the problem from the ok> prompt using the `printenv` and `setenv` commands.

3. First enter the `printenv` command as shown below:

```
ok> printenv boot-device
```

4. Check the first parameter. If it is not disk, change it using the `setenv` command as shown below:

```
ok> setenv boot-device disk
```

Enterprise 3000 Troubleshooting

Overview

This chapter contains troubleshooting information about the *Sun** *Enterprise*† 3000 System and the *CentreVu*® Call Management System Release 3 Version 6 (CMS R3V6) application.

You should use the information to clear problems that may arise during and after the *CentreVu* CMS installation.

The following list outlines the sections in this chapter:

- Solving Hardware-Related Problems
- Solving Terminal-Related Problems
- Solving Printer-Related Problems
- Solving Modem-Related Problems
- Solving Power-Related Problems
- Solving Clock Synchronization Problems.

*_Sun_ is a registered trademark of Sun Microsystems, Inc.
†_Enterprise_ is a trademark of Sun Microsystems, Inc.

Solving Hardware-Related Problems

Overview

This section describes how to solve the most common system hardware problems that may arise before or after the installation of the *CentreVu* CMS software.

Hardware Diagnostic Tools and Resources

The remote maintenance person has four tools/resources that do hardware diagnostics:

- OpenBoot Diagnostics (requires console redirection [see “Redirect the Remote Console Using Solaris Operating System” on page 3-45])
- Power on self test (POST) messages during a reboot (requires console redirection)
- *Sun* Validation Test Suite (VTS)
- Error logs (do not require console redirection).

OpenBoot Diagnostics

The OpenBoot firmware serves two purposes:

- Boots the operating system from either a mass storage device or from a network
- Provides extensive features for testing hardware and software interactively.

Using OpenBoot Diagnostics

To use OpenBoot Diagnostics, do the following steps:

1. Do **one** of the following to enter the OpenBoot environment:
   - Stop the operating system with either the *Solaris** `/usr/sbin/shutdown -y -i0 -g0 command` (preferred method) or the command sequence `sync` Enter next turn off CMS. Now do `halt` Enter.
   - Press the Stop and A keys simultaneously on the keyboard while *Solaris* is running.

**Solaris* is a registered trademark of Sun Microsystems, Inc.

CAUTION:

Using the Stop and A keys simultaneously while *Solaris* is running breaks the execution of the operating system and should be used with caution. Use this key combination as a last resort if the previous method fails.

- Power off and power on the *Sun Enterprise* 3000 system. Press the Stop and A keys simultaneously on the keyboard after the display console banner appears but before the system starts booting the operating system (referred to as power-cycling the system)

CAUTION:

Use this method **only** if the previous methods fail to work.

After you are in the OpenBoot environment, the following prompt appears:

```
ok
```

2. At the `ok` prompt, enter `help` for a list of available commands, or see Table 3-1 for a summary of some of the OpenBoot diagnostic test commands.

Additional Reference

Additional information about the OpenBoot firmware is available by contacting the Technical Service Center (TSC).

Table 3-1: Summary of OpenBoot Diagnostic Test Commands

<table>
<tr><th>Test Command</th><th colspan="2">Description</th></tr>
<tr><td>probe-scsi</td><td colspan="2">This command identifies the devices attached to the built-in SCSI bus.
Note: If your platform is a Sun Enterprise 3000 System, see “Probe-SCSI Command Problem” on page 3-40 for procedures used with the <code>probe-scsi</code> and <code>probe-scsi-all</code> commands.</td></tr>
<tr><td>probe-scsi-all [device-path]</td><td colspan="2">This command is the same as the probe-scsi command except that it includes all of the SCSI buses installed in the system below the specified device tree node. If the device path is absent, the root node is used.</td></tr>
<tr><td>test [Alias}</td><td colspan="2">This command executes the specified device’s self-test method. Possible values for device-specifier are listed in the Alias column below:</td></tr>
<tr><td rowspan="10"></td><td>Alias</td><td>Description</td></tr>
<tr><td>memory</td><td>memory</td></tr>
<tr><td>cdrom</td><td>cdrom</td></tr>
<tr><td>tape1</td><td>14-GB for the Sun Enterprise 3000 system or QIC 2.5-GB or 4-8 GB SLR* for SPARCserver platforms</td></tr>
<tr><td>tape2</td><td>QIC 2.5-GB or 4-8 GB SLR</td></tr>
<tr><td>disk</td><td>disk 1</td></tr>
<tr><td>disk1</td><td>disk 1</td></tr>
<tr><td>disk2</td><td>disk 2</td></tr>
<tr><td>floppy</td><td>floppy</td></tr>
<tr><td colspan="2">Note: If you need to test additional devices that do not have an alias, use the test-all command.</td></tr>
<tr><td>test-all [device-specifier]</td><td colspan="2">This command tests all of the devices that have built-in self-test methods below the specified device tree node. If <device-specifier> is absent, the root node is used.</td></tr>
<tr><td>watch-clock</td><td colspan="2">This command tests the clock function.</td></tr>
<tr><td>eject [device-specifier]</td><td colspan="2">This command ejects either the floppy or cdrom devices.</td></tr>
</table>

*The 4-8 GB SLR tape drive replaces the QIC 2.5-GB tape drive which is no longer available for new systems.

POST Messages Diagnostics

Procedure

To use the Power On Self Test (POST) messages (during a reboot) to diagnose remote hardware problems, do the following steps:

1. At the `ok>` prompt, enter the following command to boot your system:

```
ok> boot
```

2. Scan the displayed messages on the screen. Watch for error messages.

SUNVTS Diagnostics

The *Sun* Validation Test Suite (VTS) replaces the earlier diagnostic tool *SunDiag*.

Check Error Log Files

The `/var/adm/messages` files contain system messages that are often helpful in diagnosing problems.

Check Tape Related Problems

The `mt` command can be useful if you are having tape problems. Run this command with a tape inserted into the applicable drive.

NOTE:

If you run the `mt` command with no tape in the drive you get the following message:

```
# mt -f /dev/rmt/0  status
/dev/rmt/0:   no tape loaded or drive offline
```

To run the `mt` command enter one of the following, as appropriate for the tape drive with which you are having the problem:

```
# mt -f /dev/rmt/0  status
Tandberg 2.5 Gig QIC tape drive:
   sense key (0x0)= No Additional Senseresidual= 0retries= 0
    file no= 0block no= 0
```

and/or

```
# mt -f /dev/rmt/1  status
Exabyte EXB-8500 8mm tape drive:
   sense key (0x6)= Unit Attentionresidual= 0retries= 0
    file no= 0block no= 0
```

and/or

```
# mt -f /dev/rmt/0c  status
Tandberg 2.5 Gig QIC tape drive:
   sense key (0x0)= No Additional Senseresidual= 0retries= 0
    file no= 0block no= 0
```

and/or

```
# mt -f /dev/rmt/1c  status
Exabyte EXB-8500 8mm tape drive:
   sense key (0x0)= No Additional Senseresidual= 0retries= 0
    file no= 0block no= 0
```

Diagnose Remote Console Problems

This section addresses problem scenarios that develop when you dial-in to the remote console port. In general, you should have a person on site to look at remote console problems.

No Ringing and Answered Responses

You do not get the `RINGING` and `ANSWERED` responses displayed on the screen.

Solutions:

- Check the port connectivity — see Figure 3-1. Refer to the hardware installation document for your platform, Chapter 2, dealing with

installing your platform, and the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for more details.

- Check modem setup — see Figure 3-1. Refer to the hardware installation document for your platform, Chapter 2, dealing with installing your platform, and the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for more details.
- Check port A administration. Refer to the hardware installation document for your platform, Chapter 2, dealing with installing your platform, and the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for more details.

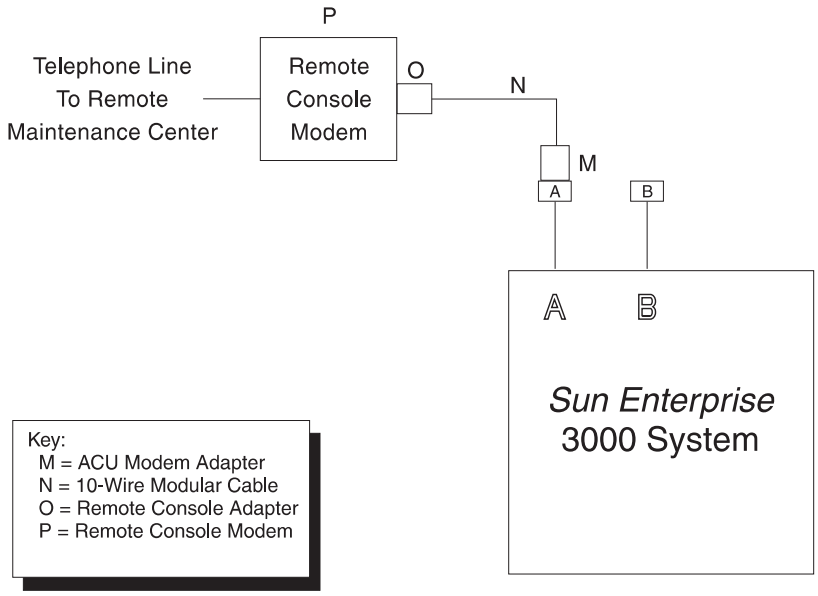


Figure 3-1: Remote Console Connectivity for *Sun Enterprise* 3000 System

No Login Prompt

You get the `RINGING` and `ANSWERED` responses displayed on the screen, but get no login.

Solutions:

- Check the dial-in parameters — see “Diagnose Dial-In Access Problems” on page 3-9 for details.

- Check the state of the system — the console may not be remoted, and there may not be a port monitor on the port.

  NOTE:

  The system could also be at the OpenBoot prompt (ok>), which would indicate that the console is local.

  To have an on-site person check the state of the system, enter the following command, and press Enter a few times:

```
# /cms/install/bin/abcadm -k
```

Dial-In Returns Garbage Characters

The dial-in gives you garbage characters instead of a login.

Solution:

Try pressing a few keys to see if the problem corrects itself.

Scenario 4:

The dial-in continues to display garbage characters instead of a *login*.

Solution:

Check the baud rate of the remote console by doing the following:

a. Have an on-site person run the following command:

```
# /cms/install/bin/abcadm -k
```

b. Make sure the baud rate is consistent with the modem connected on site and the modem and terminal at the remote site.

c. If there is a baud rate inconsistency on site, reconfigure the machine with the appropriate baud rate for the modem with the following command:

```
# abcadm -c -b<baud> <ttya>
```

The system responds by rebooting.

d. If there is a baud rate inconsistency with the remote site, reconfigure the remote site and redial.

Scenario 5:

None of the above scenarios resolve the symptoms.

Solution:

Set the console back to local by switching to the local console via the OpenBoot method. See “Diagnose Problems Using the Remote Console” on page 3-44 for details.

Scenario 6:

You experience problems when trying to:

- set the console to remote,
- create a command menu from XDM, or
- boot from XDM.

Solution:

Power on (turn on) your modem.

In addition, this section also describes what to do if you suspect a problem with the remote console.

Diagnose Dial-In Access Problems

This section describes the scenarios where the console is local and you are attempting to dial-in via port A. It often takes a person on-site to look at the dial-in access problems.

Scenario 1:

The remote dial-in does not get the `Answered` and `Connected` responses displayed on the screen.

Solution:

At the on-site location, make sure the modem is on, and check the following cabling connections:

- Phone line to the modem
- Modem to port A
- Port A to the *Sun Enterprise* 3000 system.

Scenario 2:

The remote user gets `Answered` and `Connected` responses displayed on the screen, but no login.

Solution:

1. Enter **one** of the following commands to make sure that a monitor is running:

```
# pmadm -l; sacadm -l
        <or>
# /cms/install/bin/abcadm -k
```

2. If no port monitor is running, start a port monitor by entering the following command:

```
# /cms/install/bin/abcadm -i -b <baud> ttya
```

3. If a port monitor is running, make sure that the port monitor is set up at the correct baud rate relative to the local modem.

4. If the baud rate is not correct, remove the current port monitor, and start a new port monitor at the correct baud rate. Enter the following commands:

```
# /cms/install/bin/abcadm -r ttya
         <and>
# /cms/install/bin/abcadm -i -b <baud> ttya
```

5. If the port monitor is running and is at the correct baud rate, try to fix the problem by disabling and enabling the port monitor by entering the following commands:

```
# pmadm -d -p ttymona -s ttya
        <and>
# pmadm -e -p ttymona -s ttya
```

Scenario 3:

The remote user gets the `Answered` and `Connected` responses displayed on the screen, but the *login* is scrambled (for example, a short line of graphics characters).

Solution:

Have the remote user enter a few keys (any keys), and see if it clears up the problem. If this does not clear up the problem, then the port monitor is probably not the same baud rate as the modem.

Identifying Link Problems

This section describes how you can diagnose link problems on your platform.

How to Identify Link Problems

To diagnose link problems, do the following:

- Check the status of Link Access Protocol B (LAPB) for the link in question.
- Stop and start the X.25.
- Check the switch administration.
- Check the cabling.
- Check the RS-232 to RS-422 Interface Converter. (Used only with a High Speed Serial Interface/SBus (HSI) card.)
- Check the HSI card.
- Monitor the LAPB and X.25 protocol.

Check the Status of LAPB

The first item to check for troubleshooting link problems is the status of LAPB for the link in question.

To check if LAPB (layer 2 of the X.25 Protocol) is up, do the following:

1. Examine the */var/adm/messages* files or the system console for the last message about the link. One of the following messages appear:

   Message 1: ‘‘LAPB Up on link x.’’

   Diagnosis: LAPB is up for the link indicated.

   Message 2: ‘‘LAPB Down on link x.’’

   Diagnosis: LAPB is down for the link/port indicated.

   Message 3: ‘‘hihx: xmit hung.’’

   Diagnosis: LAPB is down for the link/port indicated.

2. If LAPB is not up, answer the following questions:
   - Has X.25 been started without errors?
   - Is the switch administration correct?
   - Is the cabling correct?
   - Is the Interface Converter operating correctly?
   - Is the HSI card ok?
3. If LAPB is up, answer the following questions:
   - Has data collection been turned on?
   - Is the switch administration correct?
   - Does the error log contain any link-related messages?
   - Does the `spi.err` file contain messages about mismatched administration?

Stop and Start Individual Links

The `linkstop` command is used to “stop” a link. The link will not respond to any LAPB messages until the link is restarted with the `linkreset` or the `linkstart` command. To stop a link enter the following command:

```
# /opt/SUNWconn/x25/bin/linkstop <linkid>
```

a <linkid> of 5 refers to Serial Port B (single ACD application only)

a <linkid> of 10 refers to HSI port 0

a <linkid> of 11 refers to HSI port 1

a <linkid> of 12 refers to HSI port 2

a <linkid> of 13 refers to HSI port 3

a <linkid> of 14 refers to HSI port 0 of second HSI Patch Panel

a <linkid> of 15 refers to HSI port 1 of second HSIHSI Patch Panel

a <linkid> of 16 refers to HSI port 2 of second HSI Patch Panel

a <linkid> of 17 refers to HSI port 3 of second HSI Patch Panel

The `linkreset` command is used to “start” a link which has been stopped with the `linkstop` command. To start a link enter the following command:

```
# /opt/SUNWconn/x25/bin/linkstart <linkid>
```

The `linkreset` command is used to “reset” a link. It may also be used to “start” a link which has been stopped with the `linkstop` command. To reset a link enter the following command:

```
# /opt/SUNWconn/x25/bin/linkreset <linkid>
```

NOTE:

All links are reset when X.25 is started.

The most common use of these commands would be to reset an X.25 link while troubleshooting a problem. For example, to reset link 1, enter the following command:

```
# /opt/SUNWconn/x25/bin/linkreset 1
```

Or enter the following commands:

```
# /opt/SUNWconn/x25/bin/linkstop 1
  /opt/SUNWconn/x25/bin/linkstart 1
```

NOTE:

X.25 must have been started prior to entering these commands.

Start and Stop X.25

When you start and stop X.25, you are starting and stopping it for all links on the machine.

To start and stop the X.25, do the following:

1. Check the status of the network daemons by entering the following command:

```
# /etc/init.d/x25.control status
```

   The system responds:

```
The network is up
#
```

2. To stop the network daemons, enter the following command:

```
# /etc/init.d/x25.control stop
```

3. To start the network daemons, enter the following command:

```
# /etc/init.d/x25.control start
```

   The system responds:

```
Starting the X.25 software - please wait
X.25 has found a valid license
The network has been brought up.
#
```

4. If other messages are displayed, the network did not start successfully. For example:

```
x25netd: failed to open driver "/dev/hih0" (Bad file
     number[9])
#
```

NOTE:

You will see the above message if you tried to restart the network too quickly after stopping it. When you see this message, wait a minute before starting X.25.

5. If X.25 cannot start due to license problems, check the license manager. The license manager (lmgrd) is started when the *Sun Enterprise* 3000 system is booted.

   a. To check if the license manager is running, enter the following command:

```
# ps -ef | grep lmgrd
```

   b. If the license manager is not running, enter the following script command:

```
# /etc/rc2.d/S85lmgrd
```

   c. Examine the messages in the */tmp/license_log* file.

Refer to the *SunLink** *X.25 8.0.2 Installation Guide* for more information on licensing error messages.

The system responds:

```
The X.25 software is being stopped - please wait.
The network programs are being killed - please wait
The network has been stopped.
#
```

**SunLink* is a registered trademark of Sun Microsystems, Inc.

Check Switch Administration

To verify that the switch link administration is correct, see the hardware installation document for your platform, regarding connecting your platform to the switch, and switch administration, for details.

Make the following required G3r switch administration changes:

1. Set the `Number of Outstanding Frames(w)` field on the data module for the *CentreVu* CMS link to `7`.

NOTE:

If the window size for your system is not 7, the link will reset under the heavy load. Checking B Port Administration.

If you are using the B port on your system for the switch link, verify that there is no login administration on the B port. Enter the following command to list any login administration on the B port:

```
# pmadm -l | grep /dev/term/b
```

If the `pmadm -l` command shows the login administration on the B port use the `pmadm -r` command to remove the login administration. Remove **only** the login administration for the B port.

Check the Cabling

If the link is not operating reliably and does not operate for speeds above 9600 baud, do the following:

- Check that the ‘‘Link Adapter’’ is placed correctly between the Interface Converter and the IDI.
- If using the B port the link adapter must be between the B port and the IDI.

To verify the link cabling is correct, see the hardware installation document for your platform, dealing with connecting your platform to the switch, and the appendix, describing switch administration procedures, as appropriate for details.

Check the RS-232 to RS-422 Interface Converter

The purpose of the RS-232 to RS-422 converter is to convert the RS-422 electrical/RS-449 physical interface on the HSI card to the RS-232 interface supported in existing switch connections. Each switch link that is connected to the HSI card uses one converter.

NOTE:

The Interface Converter is only used with the HSI card and not on the B port.

Check Correct DTE/DCE Settings

The RS-232 to RS-422 converter described in the previous paragraph is shipped with the RS-422/RS-449 port configured as Data Terminal Equipment (DTE) and the RS-232 port configured as Data Communications Equipment (DCE). This is exactly the opposite of what is required for the *CentreVu* CMS X.25 switch link.

As part of the assembly process, each converter must be taken apart. The Dual In-line Package (DIP) shunts in jumpers XW1A, XW2A, and XW3A must be moved to jumpers XW1B, XW2B, and XW3B. This changes the RS-422/RS-449 port to DCE. The DIP shunts in jumpers XW4B and XW5B must be moved to jumpers XW4A and XW5A. This changes the RS-232 port to DTE. See Table 3-2 for an example.

Table 3-2: DTE/DCE DIP-Shunt Settings

Move DIP shunts	
From	**To**
XW1A	XW1B
XW2A	XW2B
XW3A	XW3B
XW4B	XW4A
XW5B	XW5A

NOTE:

The DIP shunts are fragile. Be careful when you move them.

For more information, see the hardware installation document for your platform, Chapter 2, dealing with installing your platform or the *Installation and Operation Manual* shipped with each converter.

Check LEDs

The Interface Converter has six LEDs (light indicators) on the front panel of the black box which help troubleshoot link problems. Three LEDs (DSR, CTS, and DATA) are located on the left side of the monitor. These LEDs are the *Sun Enterprise* 3000 system's HSI portion of the connection. Three LEDs (DSR,CTS, and DATA) are located on the right side of the monitor. These LEDs are the switch portion of the connection. See Figure 3-2.

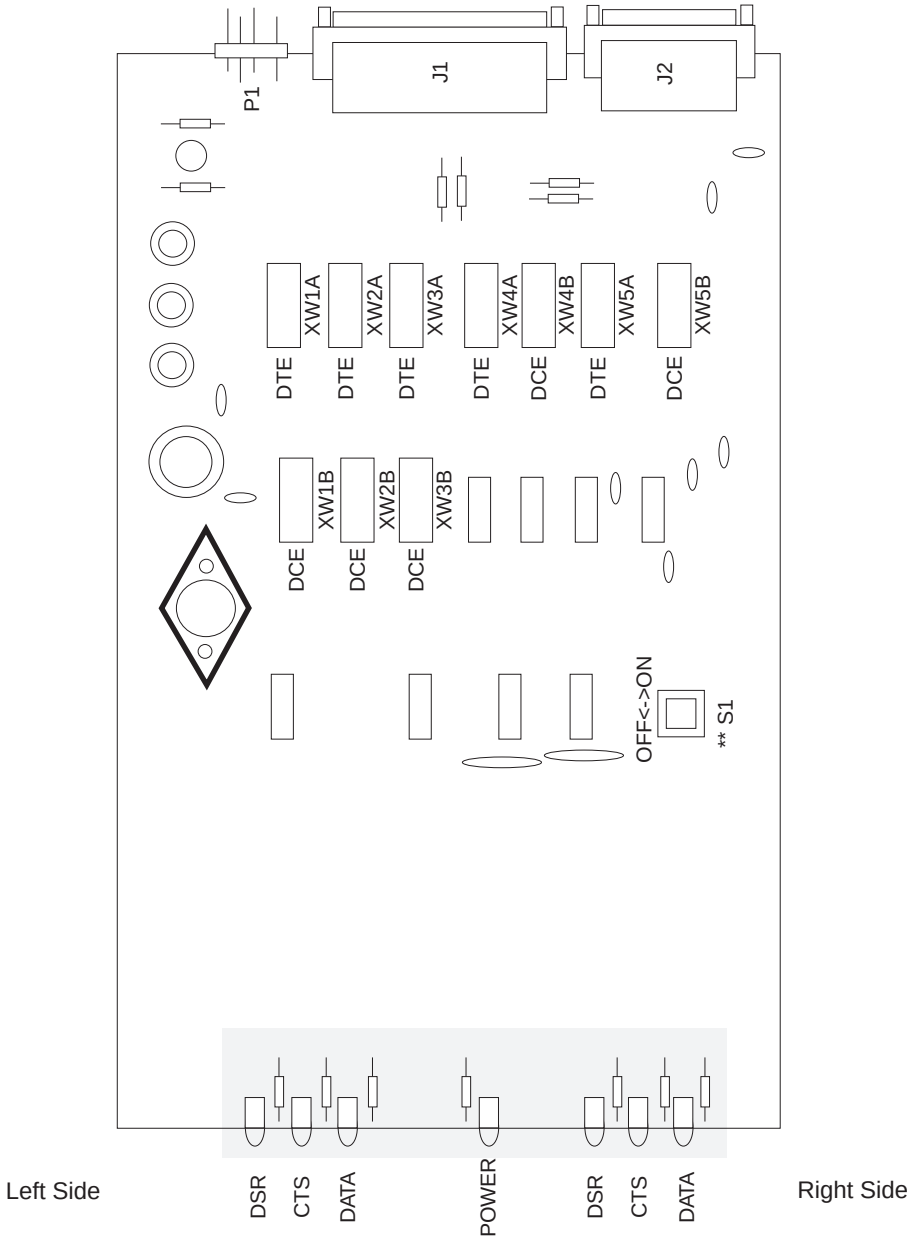


Figure 3-2: Black Box Component Layout — LEDs Location

When the X.25 daemons are started, the LEDs on the left side are lit.

NOTE:

It is normal for the DSR LED on the right (switch) side of the converter to be out or to be very dim when IDI-based connections are being used.

If the LEDs on the left side are not lit, check the following items:

- DCE/DTE DIP-shunt settings inside the converter
- Status of the *SunLink* X.25 daemons
- Cabling between the interface converter and the *Sun Enterprise* 3000 system.

When the X.25 daemons are started and the link is administered and enabled on the switch, the LEDs on the right side of the interface converter are lit. If the LEDs on the right side are not lit, check the following items:

- Switch administration for the link
- Cabling between the interface converter and the switch.

Test the HSI Card for Problems

Each HSI card and HSI Patch Panel on the *Sun Enterprise* 3000 system provides a break-out for four separate female 37-pin RS-449 connections. *CentreVu* CMS on the *Sun Enterprise* 3000 System platform supports eight physical switches connected to two HSI cards (ports 0-7).

To test an individual port on the HSI card for problems, execute the loopback test by doing the following:

1. Log in as root.
2. Stop the X.25 daemons with the following command:

```
# /etc/init.d/x25.control stop
```

3. Remove the cable from the port to be tested, and attach the loopback plug (which was shipped with the HSI card).

4. Run the following two loopback tests:
   - Internal loopback test
   - Loopback test using the loopback plug.

NOTE:

These tests send approximately 100 packets each. No transmission errors should be reported.

a. To run an internal loopback test, enter the following command:

```
# /opt/SUNWconn/bin/hsi_loop -t 1 hih0
```

The system responds:

```
hih0: [Using /dev/hiho0]
hih0: speed=9600, loopback=yes, nrzi=no, txc=baud, rxc=rxc
   .
   .
   .
Port CRC errors Aborts Overruns Underruns   In <-Drops-> Out
hih0:    0    0    0    0    0    0
#
```

b. To run a loopback test using the loopback plug (which was shipped with the system), enter the following command:

```
# /opt/SUNWconn/bin/hsi_loop -t 2 hih0
```

The system responds:

```
hih0: [Using /dev/hiho0]
hih0: speed=9600, loopback=yes, nrzi=no, txc=baud, rxc=rxc
   .
   .
   .
Port CRC errors Aborts Overruns Underruns   In <-Drops-> Out
hih0:    0    0    0    0    0    0
#
```

5. If the loopback test fails, you should suspect HSI hardware problems. Prior to replacing the HSI card, do the following:

   a. Verify that the loopback plug is in the correct HSI port.

b. Check the cabling to the HSI break-out module.

6. Remove the loopback plug.
7. Recable the link.
8. Restart X.25 after completing this test.

System Fails to Recognize a New or Relocated HSI Card

Sometimes when a new HSI card is installed or an existing HSI card is moved to a new location, the system will fail to recognize the new or moved card. This can happen after adding a second HSI card for more than four ACDs. This is shown when the `show-devs` command (run from the open boot prompt) does not show the HSI card and when `/var/adm/messages` fails to recognize the card upon bootup even after booting with `boot -r`. If this happens, try running the following command:

```
/cms/toolsbin/lnSBusdev
```

If that does not work, perform the following procedures in the order given.

Backout (Remove) the HSI Patch

Use the following procedure to backout or remove the current HSI patch (should be 101130-9, 101130-10 or 101130-12).

1. Go to the patch directory at `/var/sadm/patch/101130.09` and read the README.101130-09 file.
2. Become super-user.
3. Change directories.

```
# cd /var/sadm/patch
```

4. Backout the current patch by entering the following:

```
# <patch number>/backoutpatch <patch number>
```

Where `<patch number>` is the number of the current patch. This should be 101130-9, 101130-10 or 101130-12.

Remove HSI Software /Driver

Use the following procedure to remove the HSI software/driver.

1. Enter the following:

```
# pkginfo | grep HSI
```

The system responds with an information screen similar to the following:

```
# pkginfo | grep HSI
system  SUNWhsis    HSI  Driver/Utilities  2.0  v1.6
system  SUNWhsis.2  HSI  Driver/Utilities  2.0  Patch 101130-09 v1.=37
```

In the above example, `v1.6` and `101130-09 v1.=37` are examples. Your system numbers may be different.

2. Remove the software by entering the following commands:

```
# pkgrm  SUNWhsi.2
# pkgrm SUNWhsi
```

Move or Install HSI Card

Move or install the HSI card(s) using procedures given in *CentreVu Call Management System Release 3 Version 6 Sun Enterprise 3000 System Hardware Installation* (585-215-867) document.

Administer the HSI Software/Driver

Readminister the HSI software/driver with the following procedure:

1. Remove the "*SunLink* HSI 2.0" CD-ROM from its case.
2. Open the CD-ROM drive tray by pressing the eject button on the CD-ROM drive unit.
3. Gently press the CD-ROM in place in the CD-ROM disk tray. When the CD-ROM is properly inserted in the disk tray, the CD-ROM label is visible.
4. Push the CD-ROM drive tray in (towards the system unit) until it closes.
5. Enter the following command to verify the name of the CD-ROM:

```
# mount
```

6. The program responds with a list of devices/file systems currently mounted. Locate the device that corresponds to the CD-ROM drive:

```
      . . .
      . . .
      . . .
/cdrom/unnamed_cdrom on /vol/dev/dsk
```

7. Enter the following command to start the installation of the HSI software:

```
# /usr/sbin/pkgadd -d /cdrom/unnamed_cdrom
```

The program responds with a list of the packages available on the CD-ROM (similar to the one below).

```
The following packages are available:
1   SUNWhsis     HSI Driver/Utilities 2.0 v1.6
                 (sparc) 2.0

Select package(s) you wish to process (or 'all' to
process all packages). (default: all) [?,??,q]:
```

8. Enter `all`.

Complete the Licensing Agreement

1. The program responds by displaying the *Sun* licensing information.

```
Processing package instance <SUNWhsis> from
                                </cdrom/unnamed_cdrom>

HSI Driver/Utilities 2.0 v1.6
(sparc) 2.0
      Copyright 1993 Sun Microsystems, Inc. All Rights
      Reserved.
            Printed in the United States of America.
2550 Garcia Avenue, Mountain View, California, 94043-1100 U.S.A.

This product and related documentation is protected by
copyright and distributed under licenses restricting its
use, copying, distribution and decompilation.  No part of this
product or related documentation may be reproduced in any form by
any means without prior written authorization of Sun and its
licensors, if any.
      . . .
      . . .
      . . .
```

The licensing information finishes, and the program begins checking for software/machine dependencies.

```
      . . .
      . . .
      . . .

The X Window System is a product of the Massachusetts
Institute of Technology.

This product incorporates technology used under license
from Fulcrum Technology.

Using </opt> as the package base directory.
## Processing package information.
## Processing system information.
## Verifying package dependencies.
## Verifying disk space requirements.
## Checking for conflicts with packages already installed.
## Checking for setuid/setgid programs.

This package contains scripts which will be executed with
super-user permission during the process of installing this
package.

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

2. Enter y. The program continues:

```
Installing HSI Driver/Utilities 2.0 v1.6 as <SUNWhsis>
## Installing part 1 of 1.
/opt/SUNWconn/hsis/drv/HSI
/opt/SUNconn/hsis/drv/HSI.SUN4d
/opt/SUNWconn/hsis/man/hsi.7
/opt/SUNWconn/hsis/man/hsi_init.1m
/opt/SUNWconn/hsis/man/hsi_loop.1m
/opt/SUNWconn/hsis/man/hsi_stat.1m
/opt/SUNWconn/hsis/SUNdiag/.usertest.hsis.diag
/opt/SUNWconn/hsis/SUNdiag/README.hsis.diag
/opt/SUNWconn/hsis/SUNdiag/SunLink.hsis.diag
/opt/SUNWconn/hsis/utilities/hsi_init
/opt/SUNWconn/hsis/utilities/hsi_loop
/opt/SUNWconn/hsis/utilities/hsi_stat
/opt/SUNWconn/hsis/utilities/hsi_trace
[ verifying class <none> ]
## Executing postinstall script.

Adding entries to /etc/devlink.tab
Checking if HSI hardware was installed
Installing driver into kernel; wait ... done
```

As the program continues, port initialization messages similar to the following appear on the screen:

```
hih0: reset
hih0: up and running baud ...
hih1: reset
hih1: up and running baud ...
    .
    .
    .
NOTE: HSI driver will be loaded when it is referenced

Installation of <SUNWhsis> was successful.
```

The program continues:

```
The following packages are available:
  1 SUNWhsis     HSI Driver/Utilities 2.0 v1.6
                 (sparc) 2.0

Select package(s) you wish to process (or 'all' to
process all packages). (default: all) [?,??,q]:
```

Quit the Install Program and Remove the CD-ROM

1. Enter q. The program returns you to the system prompt.
2. Enter the following command to remove the CD-ROM from the drive:

```
# eject cdrom
```

3. Remove the CD-ROM from the disk tray, place the CD-ROM back in its case, and push the CD-ROM tray in until it closes.

The installation of the HSI software is now complete.

Install HSI Patch

To install HSI patch 101130-12 use the installpatch command as follows:

1. Become super-user.
2. Apply the patch by entering the following:

```
# <dir>/101130-12/installpatch /<dir>/101130-12
```

Where <dir> is the directory containing the patch. In the above example, 101130-12 is the patch number for the HSI patch. This procedure can be used to install other patches by substituting the appropriate patch number.

The entry for <dir> must be a full path name entry.

If any errors are reported, see "Patch Installation Errors" in the README file.

3. Reboot the system after the patch has been successfully installed.

See the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for additional information on software procedures.

Monitor LAPB and X.25 Protocol

1. To monitor the LAPB (level 2) or the X.25 (level 3) protocol for any given link, enter the following command:

```
# /opt/SUNWconn/x25/bin/x25trace
```

In many situations this command can be used in place of a line monitor.

2. To monitor the LAPB protocol for link 0, enter the following command:

```
# /opt/SUNWconn/x25/bin/x25trace -i /dev/lapb -l 0 lapb
```

3. To monitor the X.25 protocol for link 0, enter the following command:

```
# /opt/SUNWconn/x25/bin/x25trace -i /dev/x25 -l 0 x25
```

Bring Up the Link

If the link will not come up, you can also check the following:

- Examine cms /usr/elog/elog for messages.
- Verify that cms data collection is on, and examine the spi.err file for messages.
- Examine link and MIS status on the switch.

Identifying Port Problems

This section describes what to do if you suspect a problem with a specific port.

NOTE:

To find which port corresponds to a user, use an editor (for example, vi editor) to search through the `/etc/local.admin/nts*info` files. If the files are not current or do not exist, they can be written from within the `na` administration. The command is: `write cmsterm1 /etc/local.admin/nts1info` (if you are using `cmsterm1`). See the hardware installation document for your platform, Chapter 3, dealing with installing terminals, printers and modems for specific details.

To view the port(s) in question, enter the `show port=<number(s)>` command. You can specify one port or multiple ports (for example, `port 1 or port 1-10`). The port(s) you selected are displayed.

For parallel printers, use the `show printer=<number(s)>` instead of the `show port=<numbers(s)` command.

Network Terminal Server (NTS) Port Problems

To diagnose an NTS-related port problem, you can print out each NTS login along with the NTS port each login is using. To do this, enter the following command:

```
# /cms/toolsbin/cmstermwho
```

A list of NTS logins and NTS ports are displayed.

If none of the NTS ports seem to be working upon installation, you can do the following:

1. Check the ethernet wiring. One cable should run from the *Sun Enterprise* 3000 system to the first port on the network hub unit, and a second should run from one of the other ports on the network hub unit to a transceiver. The transceiver should connect directly to the back of the NTS.
2. If the cabling is correct, enter the following command:

```
# /usr/sbin/ping cmsterm1
```

The system responds:

```
cmsterm1 is alive
```

3. If the command times out or gives some other error condition, cycle the power on the NTS, and retry the command.
4. If the NTS is functioning properly, the power lights should eventually stop flickering and display a green Unit and Net light. The TEST LED light may also be lit.
5. If the NTS still fails to respond, you can check and reset the NTS address by doing the following:
   a. Reattach a terminal (set to 9600 baud, no parity, 1 stop bit) to the console port, and cycle the power on the NTS.
   b. Press the Test key within 30 seconds, and wait for the `monitor:` prompt to appear.
   c. To check that the unit has a current address and load, enter the following command at the `monitor:` prompt:

```
monitor: addr
```

NOTE:

If the values displayed are not correct, change them to match the addresses given on the *Sun Enterprise* 3000 system in the */etc/hosts* file. If the addresses were not changed via user error, notify the Technical Service Center (TSC).

6. Try different ethernet cables and swap out the transceiver. If the failure persists, call the TSC for assistance.
7. As a last resort, if the NTS still fails to respond, replace the NTS.

Replace the NTS

If the NTS fails and needs to be replaced, you can use files to readminister the NTS.

You can store configuration information on multiple files to use as a backup in the event your NTS loses translation. If the backup fails, you can use the files in Table 3-3 to readminister the ports.

Table 3-3: Configuration Information for the *Sun Enterprise* 3000 System

Device	IP Address	NTS	File Name
Sun Enterprise 3000 systems	129.200.9.1	host_computer	NA
NTS (#1)	129.200.9.11	cmsterm1	nts1info
NTS (#2)	129.200.9.12	cmsterm2	nts2info
NTS (#3)	129.200.9.13	cmsterm3	nts3info
NTS (#4)	129.200.9.14	cmsterm4	nts4info
NTS (#5)	129.200.9.15	cmsterm5	nts5info
NTS (#6)	129.200.9.16	cmsterm6	nts6info
NTS (#7)	129.200.9.17	cmsterm7	nts7info

Use the `read` command to repopulate the nonvolatile memory on the NTS with your latest translation (assuming you wrote them) by doing the following:

1. Default to an NTS using the `annex cmsterm<1>` command. For details, see the hardware installation document for your platform, Chapter 3, dealing with installing printers terminals and modems, specifically the section that describes administering terminals.

2. To read back the stored configuration information for the first NTS from a file, enter the following command:

```
# command: read /etc/local.admin/nts1info
```

NOTE:

The configuration information is also stored in nonvolatile memory on the NTS.

The system responds:

```
Setting annex parameters
Setting serial port parameters for port 1
Setting serial port parameters for port 2
   .
   .
   .
Setting serial port parameters for port 64
command:
```

3. When you are done, enter the following command to reset the terminal ports:

```
command: reset all@cmsterm1
```

The system responds:

```
# resetting all serial ports of annex cmsterm1
```

Check Port Connectivity

To check the port connectivity for problems, do the following:

- For 8-, 16- and 64-port NTSs, check the connection to each terminal, printer, or modem. See the hardware installation document for your platform, Chapter 3, dealing with installing printers, terminals and modems, for details.
- For a 64-port NTS, check the three cables (A, B, and C) that run from the NTS to each NTS patch panel (see Figure 3-3). Check to see that the cables are correctly seated at each end.

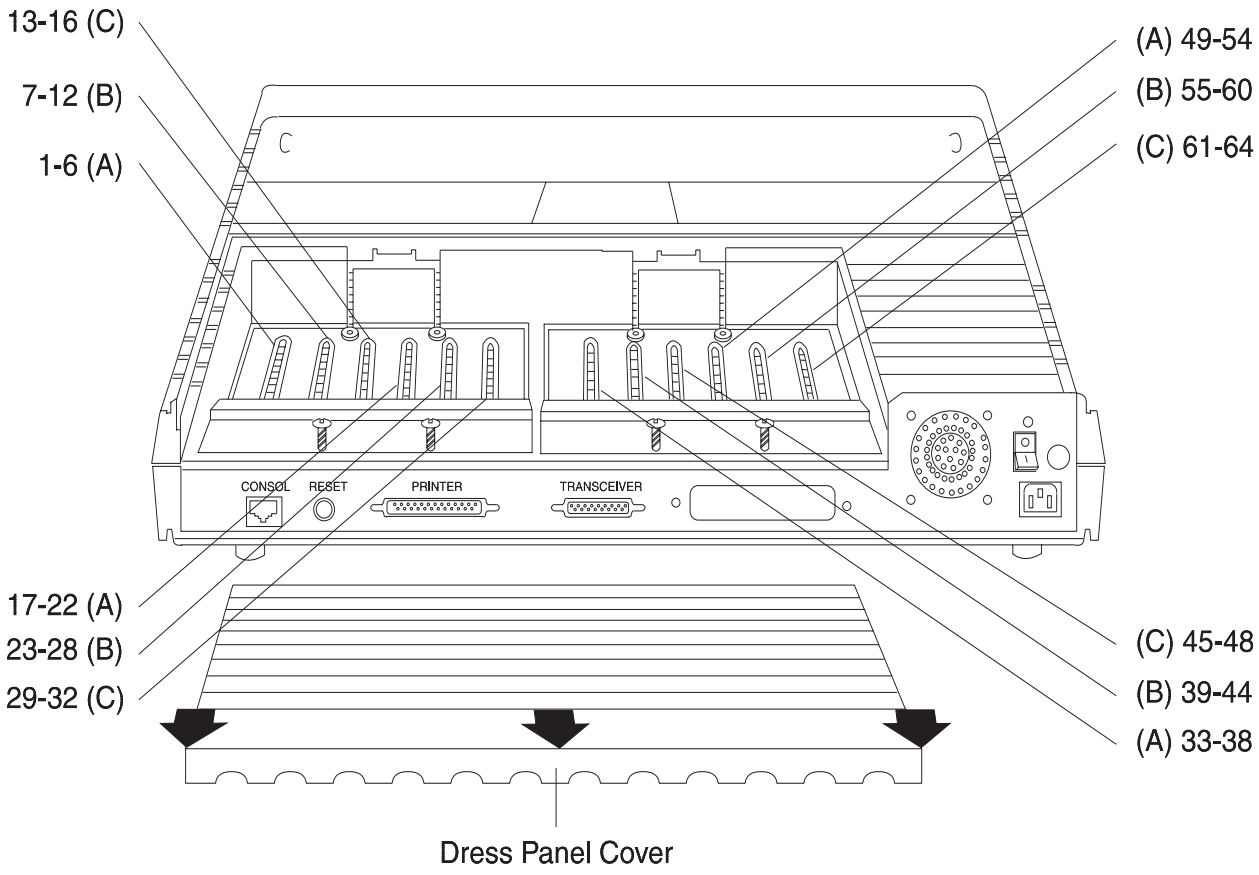


Figure 3-3: Network Terminal Server — PBX-Champ Connectors and Port Definitions

Reset the Port

If the na port administration is questionable, reset the port to its default configuration.

Check Port Administration

Do the following steps:

1. Check the port administration. See the hardware installation document for your platform, regarding installing printers, terminals and modems, specifically the section describing administering terminals, for details.
2. To reset the port to its default configuration, enter the na command at the system prompt.

```
# command: na
```

3. To associate all subsequent administration with a specific NTS, enter the following command at the prompt:

```
# annex cmsterm1
```

NOTE:

The terminal address, `cmsterm1,` is the name defined in the */etc/hosts* file.

Reset the Port(s) to the Default Configuration

To reset the port(s), do the following:

1. To reset one port (x), enter the following command:

```
# command: reset x
```

2. To reset multiple ports (x-y), enter the following command:

```
# command: reset x-y
```

3. To reset additional ports (`x-y,z`), enter the following command:

```
# command: reset x-y,z
```

NOTE:

The preceding command makes the specified ports the default set. All subsequent port commands will refer to these ports.

Reset Port Parameters

1. Enter the following command to reset the parameters associated with the default port set:

NOTE:

This returns the parameters to their factory defaults except for `user_name`, `location`, and `dedicated_address`.

```
# command: read /etc/local.admin/defport
```

2. To reset to a 9600 baud terminal, enter the following command:

```
# command: read /etc/local.admin/96term
```

3. To make any additional changes to the speed or parity, enter the following command (2400 is only one of the baud rates that you can use):

```
# command: set port speed 2400
```

NOTE:

If the ports are not specified, the default setting is used.

Store Port Configurations

1. To store the port configurations to a file (for example, `nts1info`), enter the following:

```
# command: write cmsterm1/etc/local.admin/nts1.info
```

NOTE:

At the end of provisioning, the `write` command downloads the port(s) and settings you selected to a flat file for use at a later date (for example, when you want to do a search or use the editor).

The system responds:

```
cmsterm1: Annex-3-UX R7.0, 64 ports
        writing...
command:
```

2. Reset the port by entering the following command:

```
# command: reset x
# command: quit
```

Send a Message to the Port Using CLI Commands

1. To send a message to a port using CLI commands while logged in to the *Sun Enterprise* 3000 system enter the following command:

```
# telnet cmsterm1
```

The system responds:

```
Trying 129.200.9.11 ...
Connecting to 129.200.9.11
Escape character is ...
```

NOTE:

If the connection does not work, you may have the wrong address for your NTS. (See Table 3-3 for more information).

2. Press **Enter**.

   The system responds:

```
Rotaries defined:Cli
Enter the Annex port name or number
```

3. Enter the `cli` command.

   The system responds:

```
annex:
```

4. To get into the super-user mode on the NTS, enter the following command:

```
annex: su
```

   The system responds:

```
password:
```

5. The default password is the NTS internet address (if you have not changed addresses, this is 129.200.9.11 for cmsterm1).

   The system responds:

```
annex#:
```

6. At the `annex#:` prompt, enter `tap x` (where x is the port number in question). The system responds:

```
*** Warning.  This port is being tapped. ***
```

   This warning message appears on both the origination and tapped monitors. The system now monitors all the communications to/from this port.

7. To send data to a terminal (to determine, for example, what user corresponds to a specific port), simultaneously press the Control and A keys. Then enter the following command:

```
admin: broadcast=x HELLO
```

   NOTE:

   If either of the above commands cause garbage to appear on the screen, adjust the speed, parity, or data bits to match the settings on the terminal to 9600 baud, 8 data bits, and no parity.

Check for a Bad Port

1. To check for a bad port, connect the wiring to a different port. If you get results with a different port that is administered identically, you have a bad port on either the NTS or the NTS patch panel. Call the TSC for assistance.
2. To exit `admin`, type `q` at the `admin:` prompt.
3. Enter the `jobs` command:

```
annex: jobs
```

   For example, the following may appear:

```
+1 tap x
```

4. To stop the job, enter the `kill 1` command (where the job number is 1).

The system responds:

```
+1 tap x
annex#
```

5. To exit the super-user mode, enter the su command at the annex# prompt.

```
annex# su
```

The system responds:

```
annex:
```

6. To exit the CLI mode, enter the hangup command at the annex: prompt.

```
annex: hangup
```

The system responds:

```
#
```

7. After verifying the port and the connectivity, you can now readminister a terminal, modem, or printer with the na command.

```
# na
```

See the hardware installation document for your platform, regarding installing printers, terminals and modems, specifically the section describing administering terminals, for more information.

System Fails to Boot Properly

This section discusses some common reasons why your system fails to boot properly and provides some corrective procedures.

Power-On Initialization Sequence

You can identify problems more accurately if you are familiar with the system power-on initialization messages. These messages show you the types of functions the system performs at various stages of system start-up. These messages can also show the transfer of control from OpenBoot firmware to POST.

Procedures

Table 3-4 describes the OpenBoot initialization command sequences provided by the *Sun Enterprise* 3000 system. These commands are useful in some boot-failure situations. To use the commands, hold down the keys after turning on the power to your system. Keep the keys pressed until the keyboard lights flash and the screen displays the firmware (`ok>`) prompt.

Table 3-4: Keyboard Commands

Command	Description
`Stop`	Bypass POST. This command does not depend on the security-mode. (Note: some systems bypass POST as a default; in such cases, use the Stop and A key combination to start POST.)
`Stop-A`	Abort.
`Stop-D`	Enter diagnostic mode (set `diag-switch?` to `true`).
`Stop-F`	Enter Forth on TTYA instead of probing. Use `exit` to continue with the initialization sequence. This is useful if hardware is broken.
`Stop-N`	Reset NVRAM contents to default values.

Preserving Data After a System Crash

Enter the Prom monitor (OpenBoot) `sync` command at the `ok>` prompt to force any information on its way to the hard disk to be written out immediately. This is useful if the operating system has crashed or has been interrupted before preserving all data.

The `sync` command returns control to the operating system and performs the data saving operations. After the disk data has been synchronized, the operating system begins to save a core image of itself. If you do not need this core dump, you can interrupt the operation using the Stop and A key sequence.

System Will Not Boot from Disk

Problem: You are booting from a disk, and the system fails with the following message:

```
The file just loaded does not appear to be executable.
```

Solution: The boot block is missing or corrupted. Reinstall the *Solaris* operating system, and restore all of the data.

Problem: You are booting from a disk, and the system fails with the following message:

```
The file just loaded does not appear to be executable.
```

Solution: The disk may be powered down (especially if it is an external disk). Turn on the power to the disk, and make sure the SCSI cable is connected to the disk and the system.

Probe-SCSI Command Problem

Problem: When using the "`probe-scsi`" or "`probe-scsi-all`" command, users may get the following message

> "`This command may hang the system if a Stop-A or halt command has been executed. Please type reset-all to reset the system before executing this command. Do you wish to continue [Y/N].`"

The appropriate user response is not intuitively obvious.

Solution:

Do Not continue. Instead, do the following:

1. Type “n” so that the `probe-scsi` does not continue.
2. Type “`setenv auto-boot? false`”

   Otherwise, when you do run the `reset-all` command the machine automatically reboots instead of leaving you at the `OK` prompt.
3. Type “`reset-all`”

   This may take a minute or so to complete.
4. Now it is all right to execute “`probe-scsi`” or “`probe-scsi-all`” and perform any other boot prom level diagnostics.
5. Before booting up the machine, be sure reset the system to “`setenv auto-boot? true`”

   Failure to do this will cause the reboot commands to stop at the boot prompt instead of proceeding through the normal boot-up.

SCSI Problems

Problem: Your system has more than one disk installed, and you get SCSI-related errors.

Solution:

1. To quickly check the SCSI-related errors, enter the following command:

```
ok probe-scsi-all
```

The program responds:

```
/sbus@3,0/sunw,fas@3,8800000
Target 0
  Unit 0 Disk SEAGATE ST14801 SUN04246266 Copyright (C) 1991
Target 1
  Unit 0 Disk SEAGATE ST14801 SUN04246266 Copyright (C) 1991


. . . . .
. . . . .
. . . . .
Target 6
  Unit 0 Disk Removable Read Only Device SONY CD-ROM CDU-8012

/sbus@2,0/sunw,fas@3,8800000
ok
```

NOTE:

The actual response (devices listed) depends on the devices installed on the SCSI bus.

2. Fix any obvious errors.

Your system might have duplicate SCSI target number settings on one bus. Try the following procedure:

NOTE:

Two targets may have the same target number if they are on different SCSI busses.

1. Unplug all but one of the disks.
2. At the ok prompt, enter:

```
ok probe-scsi-all
```

CAUTION:

See “Probe-SCSI Command Problem” on page 3-40 before executing this command.

NOTE:

Use the target number and its corresponding unit number.

3. Plug in another disk, and perform Step 2 again.
4. If you get an error, change the target number of this disk to one of the unused target numbers.
5. Repeat Steps 2-4 until all the disks are plugged back in.

Blank Screen — No Output

Problem: The local monitor is blank.

Solutions:

1. Check to see if the machine is in the process of booting up; the screen goes blank during initialization and stays blank for a few minutes. This is especially true if the system is being booted to a remote console.
2. Find out if the console is remoted and the remote user is in the OpenBoot mode. Check the lights on the modem to indicate if someone might be dialed-in.
3. If all else fails, power-down and immediately hold down the Stop and N keys until something appears on the screen. Hold the keys down for at least a minute. If the machine is functioning properly, this forces the console to be local. Take a look at the keyboard — look for flashing green lights on the keys.
4. If nothing is seen after a minute or so, there is probably a hardware failure. Do the following:
    a. Check to make sure the keyboard is attached. If the keyboard is unplugged, the output goes to TTYA instead. To fix this problem, power down the system and do the following in sequential order:
        1. Turn off the *Sun Enterprise* 3000 system.
        2. Turn off the system monitor.
        3. Turn off all external devices starting with the device closest to the *Sun Enterprise* 3000 system and working toward the farthest device.
    b. Plug in the keyboard, and power on again by using the following sequence:
        1. Turn on devices attached to the *Sun Enterprise* 3000 system starting with the device at the end of the SCSI chain and working toward the system.

2. Turn on the *Sun Enterprise* 3000 system.
3. Turn on the system monitor.

c. Check to make sure the monitor is turned on and plugged in. Check the power cable on the monitor. Make sure the monitor cable is plugged into the system frame buffer; then, turn the monitor on.

d. Check to make sure the `output-device` is set to TTYA. This means that the NVRAM parameter `output-device` is set to `ttya` instead of being set to `screen`. You can do **one** of the following:

— Power down the system (using the preceding steps). Then, turn it on (using the proceeding steps), and immediately press the Stop and N keys. This sets all NVRAM parameters to their default values. As a result, the `output-device` parameter is set to `screen`.

WARNING:

In addition, all previous nondefault settings are reset to their default values. You must restore the settings as needed. See "Method 2 — From Local Site" in the following section of this chapter to restore the settings.

— Connect a terminal to TTYA, and reset the system. After getting to the `ok` prompt on the terminal, enter `screen output` to send the output to the frame buffer. Use the `setenv` command to change the default display device, if needed.

e. Check to see if the system has multiple frame buffers. If your system has several plugged-in frame buffers, then it is possible that the wrong frame buffer is being used as the console device.

Refer to your system documentation and call the TSC.

Diagnose Problems Using the Remote Console

If your system will not boot, the TSC personnel could ask you to redirect the remote console to identify a problem. You can redirect the remote console using **either** of the following methods:

- Using *Solaris* operating system.
- Using OpenBoot diagnostics.

Redirect the Remote Console Using *Solaris* Operating System

This section describes how to redirect the console to port A on the *Sun Enterprise* 3000 system using the *Solaris* operating system. Redirecting the console allows the TSC to dial in and do remote maintenance.

Set the Console to Remote:

To set the console to the remote, do the following:

1. Dial in (from the remote terminal) to the remote console modem (for example, access port A on the system), and log in as root.
2. Remove the port monitor by entering the following command:

```
# /cms/install/bin/abcadm -r ttya
```

The program responds:

```
ttya is currently set to incoming

Are you sure you want to remove it?
```

3. Enter y. The program responds:

```
ttya administration removed
```

4. Redirect the console to port A (remote console) by entering the following commands:

```
# /cms/install/bin/abcadm -c -b 9600 ttya
```

The program responds:

```
This change requires a reboot to take affect

Are you ready to reboot? [y,n,?]
```

5. Press Y. The system will automatically reboot, and port A will come up as the console.

   As the system reboots, the shutting down messages will appear on the *Sun Enterprise* 3000 system monitor. When the system starts to come back up, the *Sun Enterprise* 3000 system monitor should go blank, and the system boot diagnostics should appear on the remote console terminal. After the system reboots, a `console login:` prompt should appear on the remote console terminal.

6. Log into the remote console as root.

   NOTE:

   At this time, an *Openwindows** login window will appear on the *Sun Enterprise* 3000 system monitor.

To set the console to local, do the following:

1. Redirect the console back to the local console by entering the following command:

```
# /cms/install/bin/abcadm -c local
```

The program responds:

```
Console set to local

This change requires a reboot to take affect

Are you ready to reboot? [y,n,?]
```

2. Press Y.

**Openwindows* is a trademark of Sun Micro-systems, Inc.

The program responds:

```
Starting port monitor.
Setting console parameters.
Proceeding to reboot.
```

3. The system will automatically reboot, and port A will come up as the dial in. A `login:` prompt appears.

   As the system reboots, the shutting down reset and rebooting messages will appear on the remote console monitor. When the system starts to come back up, the system boot diagnostics should appear on the system monitor. After the system reboots, a login prompt should appear on the system monitor.

4. Log into the local console as root.

   See the hardware installation document for your platform, describing factory installation procedures, for more information about setting the remote console modem options, connecting the remote console to the platform, and administering the remote console ports.

Redirect the Remote Console Using OpenBoot Diagnostics

Use the OpenBoot mode to redirect port A (remote console port) on the *Sun Enterprise* 3000 system when the *Solaris* method does not work (typically because the system will not boot).

To redirect the local console to the remote console from the OpenBoot environment (prompt is `ok>`), do the following steps:

Enter the OpenBoot environment (prompt is `ok>`) in **one** of the following ways:

- If in the *Solaris* environment, halt the operating system with the *Solaris* `halt` command.
- If in the *Solaris* environment and the `halt` command does not work (for example, the system is hung up), press the Stop and A keys simultaneously.

  CAUTION:

  The Stop and A key combination abruptly breaks the execution of the operating system and should be used with caution.

- If the above methods fail, press the Stop and A keys simultaneously after the display console banner appears but before the system starts booting the operating system.

To redirect the console to remote from the OpenBoot environment (prompt is ok>), perform the following steps:

1. To display a list of the current parameter settings on your system, enter the following command:

```
ok> printenv
```

   The system responds:

```
Parameter Name        Value          Default Value
output-device         screen         screen
input-device          keyboard       keyboard
   .
   .
   .
```

2. At the ok> prompt, enter the `setenv` command to set the configuration parameters. Set the parameters to the values specified. (See Table 3-5.) For example:

```
ok>setenv output-device ttya
```

   The system responds:

```
output device=ttya
```

Table 3-5: Parameter Commands

Parameter	Values
output-device	ttya
input-device	ttya
ttya-rts-dtr-off	true
ttya-ignore-cd	true

Table 3-5: Parameter Commands

Parameter	Values
ttya-mode	9600,8,n,1,- In this example, the baud rate is 9600. The baud rate should correspond to the setting on the local modem. Typically, a 3830 would call for a setting of 9600, a 3715 would call for a setting of 9600, and an 2400 would call for a setting of 2400.

3. To verify the parameter changes, enter the following command:

```
ok> printenv
```

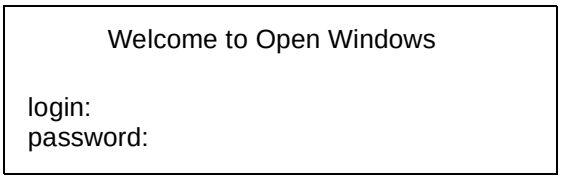
The system responds:

```
Parameter Name        Value          Default Value
output-device         ttya           screen
input-device          ttya           keyboard
   .
   .
   .
```

4. For the changes to take effect, boot the system by entering:

```
ok> boot
```

The system responds on the local console with the XDM login prompt (see the following example) or on the remote console with the console login:



To redirect the remote console to the local console, enter the OpenBoot environment (prompt is `ok>`) in the following way:

- If in the *Solaris* environment, halt the operating system with the *Solaris* `halt` command.

To redirect the remote to the console from the OpenBoot environment (prompt is `ok>`), use one of the following methods:

Method 1 — From the Remote Site (Use this method from the remote site when the *Solaris* method does not work)**.**

1. From the remote console, if not in OpenBoot, get into OpenBoot mode in **one** of the following ways:
   - If in the *Solaris* environment, halt the operating system with the *Solaris* halt command.
   - Power-cycle the machine, and press **Break** from the remote console (requires a local person).
2. To display a list of the current parameter settings on your system, enter the following command:

```
ok> printenv
```

The system responds:

```
Parameter Name        Value          Default Value
output-device         ttya           screen
input-device          ttya           keyboard
   .
   .
   .
```

3. To set the configuration parameters, enter the parameters (see Table 3-6) via the `setenv` command at the `ok>` prompt. For example:

```
ok> setenv output-device ttya
```

Table 3-6: Specific Parameter Commands

Parameter	Values
output-device	screen
input-device	keyboard
ttya-rts-dtr-off	true
ttya-ignore-cd	false

4. To activate the changes, boot the system by entering:

```
ok> reset
```

5. Log into the system as root at the local monitor.
6. From the local monitor, enter the `cms/install/bin/abcadm -k` command to see what is on the `ttya` port. Start a port monitor on the `ttya` port if there is not one already.

```
# /cms/install/bin/abcadm -k
```

7. Reset the default console parameters by entering the following command:

```
# /cms/install/bin/abcadm -c -b <baud>ttya
```

   The system responds:

```
answer n to "Do you want to reboot?"
```

8. Press **N**.

Method 2 — From the Local Site (Use this method when the previous OpenBoot method does not work or if you want to switch the console from the local site).

At the local site (when the system is not running *Solaris*), do the following:

1. Power down the machine.
2. Press the **Stop** and **N** keys simultaneously. Continue to press the **Stop** and **N** keys simultaneously until something appears on the screen. The system reboots to the local console.

3. Log into the system as root at the standard interface.
4. From the local monitor, enter the following command to check what is on the `ttya` port:

```
# /cms/install/bin/abcadm -k
```

5. Reset the default console parameters by entering the following command:

```
# /cms/install/bin/abcadm -c -b <baud>ttya
```

   The system responds:

```
#
```

6. Enter n in response to the following message:

```
# answer n to "Do you want to reboot?"
```

7. Start a port monitor on ttya.

```
# abcadm -i -b<baud>ttya
```

Single-User Mode and the Remote Console

Prerequisite: You must be logged into the customer's machine through the remote console interface.

To place the system in single-user mode, do the following:

1. At the remote console, enter the following command:

```
# /usr/sbin/shutdown -y -is -g0
```

NOTE:

The system will **not** successfully enter single-user mode if you execute the `shutdown` command from the local console while the console is redirected. When this occurs, the local console will not respond if you try to enter data. The remote console will also be unresponsive.

To recover from the situation described in the previous note, put the system into single-user mode by doing the following:

1. Select a new window on the local console.
2. In the new window, enter the following command:

```
# /usr/sbin/shutdown -y -i0 -g0
```

3. On the remote console, enter the following command at the `ok>` prompt:

```
ok> boot -s
```

Machine Panics

If a machine panic is detected on your system, you must call the TSC (domestic) or remote (international) support personnel. The TSC may request that you deliver the following information on a tape:

- Crash dump from `/var/crash/<hostname>/vmcore.n.`
- Namelist from `/var/crash/<hostname>/unix.n.`
- Output of the `showrev -p` (put the information in a file). See the hardware installation document for your platform, Appendix D, describing factory installation procedures for details.
- Output of the `prtconf -pv` (put the information in a file).
- Possibly output from the `/var/adm/messages` file.

Procedure

To put all the files on one tape, do the following procedures:

1. Log in as root.
2. Change to the `dump` directory by entering the following command:

```
# cd /var/crash/<hostname>
```

3. Verify that *unix.n* and *vmcore.n* are present, and match the date for the crash in question.

4. To retrieve the output from the `showrev -p` buffer, enter the following command:

```
# showrev -p>showrev.out
```

5. To retrieve the output from the prtconf -pv buffer, enter the following command:

```
# prtconf -pv>prtconf.out
```

6. To copy the output from the */var/adm/messages* file, enter the following command:

```
# cp /var/adm/messages messages
```

7. Insert a tape into the default backup tape drive.

8. Enter the following command:

```
# tar cvf <device-name> unix.n vmcore.n dmesg.out showrev.out
prtconf.out messages
```

NOTE:

The letter n represents the number of the crashdump.

The system responds with a list of all of the files.

9. To remove the temporary files, enter the following command:

```
# rm unix.n vmcore.n dmesg.out showrev.out prtconf.out messages
```

NOTE:

The letter n represents the number of the crash dump.

10. Log out of the system.
11. Remove the tape from the disk drive.
12. Send the tape to the TSC.

Keyboard Gets Unplugged

If the console keyboard cable gets unplugged during system operation, the system will continue to run. If the console is reattached to the cable, the system freezes on its current display.

Do the following to correct the problem:

1. Plug in the keyboard. The system responds:

```
ok>
```

2. Enter the following command at the ok> prompt:

```
ok> go
```

The system responds by continuing to run. It was not running during the time between getting the ok> prompt and entering go.

NOTE:

If the system is rebooted, instead of entering go, you may be prompted to use the fsck command to repair the *Solaris* file systems.

Solving Terminal-Related Problems

Overview

This section describes some of the day-to-day problems that may occur during the normal operation of the terminals supporting the *CentreVu* CMS application.

In each section you will find several documented symptoms and corresponding solution steps. When you find a symptom that is similar to the problem you are experiencing with your terminal, follow the solution step(s) until the problem is resolved.

In some of the solution steps, you may have to refer to your terminal manual.

If you are experiencing a problem with a terminal that has just been installed and has never been used, go to the hardware installation document for your platform, regarding installing printers, terminals and modems, specifically the section describing supported terminals for more information.

NOTE:

If after you have tried to solve your terminal problem by using this section and your terminal manual and the terminal is still not functioning properly, escalate the problem through normal procedures.

When an Existing Terminal Fails to Operate

For problems with existing terminals, find the problem in this section and follow the corresponding solution step(s).

Problem: Several unexpected or “garbage” characters are displayed on the window.

Solution:

1. Mismatches to speed, parity, and data bits will cause gibberish on the terminal. Reset the terminal or use the na administration as needed.
2. Try pressing the Control and L keys simultaneously. This should cause the screen to be repainted without the “garbage” characters.

Problem: The screen suddenly goes blank.

Solution:

1. If the terminal has not been used recently, press any key on the keyboard. The screen should be restored if the power is on. (After about 1 hour of non-use, the screen will automatically go blank to protect the screen.)
2. Check the power cord at the back of the terminal. Wiggle both ends of the cord. If the terminal screen flashes, the power cord is not connected properly, or the power cord is defective.
3. Locate the power switch at the rear of the terminal. Turn the terminal OFF. Wait a few seconds. Turn the terminal ON.
4. If all the other terminals have gone blank, a major power supply loss has probably occurred. Check the power source for the terminals.

Problem: The terminal “bell" is too loud or cannot be heard.
Solution: Adjust the volume control. (Refer to your terminal manual for details.)

Problem: Characters are not being displayed on the screen when the keys are pressed.
Solution: On the back of the terminal, locate the power switch. Turn the terminal off. Wait a few seconds. Turn the terminal on.

Problem: You turn the terminal on, but nothing is being displayed on the screen.
Solution:

1. The terminal intensity may need adjusting. The intensity control is located underneath the lower left side of the terminal screen. (Refer to your terminal manual for details.)
2. Make sure that the terminal has been turned on. Check the power switch on the back of the terminal.
3. Check the power cord on the back of the terminal. Wiggle both ends of the cord. If the terminal screen flashes, the power cord is not connected properly, or the power cord is defective.

Problem: You turn the terminal on, and it displays “garbage" characters.

Solution:

1. Press the Enter key once. Pause for a few seconds. Press the Enter key about four times.

2. Locate the power switch at the rear of the terminal. Turn the terminal off. Wait a few seconds. Turn the terminal on.

Problem: The terminal is “locked up.” In other words, the terminal screen does not respond to keyboard input.

Solution:

1. If your last request is taking an extremely long time to complete, press the F8 key to bring up the main menu. Wait a few seconds. If the terminal does not respond, press the F8 key again. Wait a few seconds.
2. If the terminal still does not respond, turn the terminal off. Wait a few seconds. Turn the terminal on and log in again.

Problem: You cannot find a problem that relates to your terminal, or the solution step(s) corresponding to your terminal did not work.

Solution: The solution involves a list of things to try. If a particular step does not work or you have already tried it, go to the next step in the list.

NOTE:

In some cases, you will be logged off. If this happens, log in again.

1. Press the Control and L keys simultaneously. In most cases, doing this will refresh the screen.
2. Locate the power switch at the rear of the terminal. Turn the terminal OFF, wait a few seconds, and turn the terminal ON. (Refer to your terminal manual if necessary.)
3. Check the terminal connections by doing the following:
    a. Check the power cord at the back of the terminal. Wiggle both ends of the cord. If the terminal screen flashes, the power cord is not connected properly, or the power cord is defective.
    b. Check for a loose connection at the keyboard and the terminal.
    c. At the rear of the terminal, locate the cable connected to the connector labeled “modem.” Make sure that the cable is connected properly to the “modem” connector. If possible, follow this cable to the system end, and check the connection there.
    d. If another terminal is available, try using it.

e. See the *CentreVu* CMS administrator, or escalate the problem through normal procedures.

Problem: The message “login incorrect” is displayed when you try to log in.

Solution: Either the login or password you entered is not correct. Carefully, reenter your login and password. Make sure you are not trying to enter an old password. If you still cannot log in, see the *CentreVu* CMS administrator, or escalate the problem through normal procedures.

When a New Terminal Fails to Operate

If a new terminal fails to operate, do the following:

- Check the physical connectivity to the terminal. See *CentreVu Call Management System Release 3 Version 6 Sun Enterprise 3000 System Hardware Installation* (585-215-867) document for details.
- If the terminal is connected to an NTS, reset the port using the correct script file (96term, 48term, 24term, 12term). Make sure the data bits and parity settings are the same for the terminal and the na administration.

For problems with new terminals, find the problem in this section and follow the corresponding solution step(s) (log in on the system console or another working terminal to diagnose the problems).

Problem: Terminal does not display anything.

Solution:

1. Make sure that the terminal has been turned on. Check the power switch at the rear of the terminal.
2. Check the power cord at the back of the terminal. Wiggle both ends of the cord. If the terminal screen flashes, the power cord is not connected properly, or the power cord is defective.
3. The terminal intensity may need adjusting. The intensity control is located underneath the lower left side of the terminal screen. (See your terminal manual for details.)

Problem: The terminal prints “garbage” on the screen.

Solution: Mismatches to speed, parity, and data bits will cause gibberish on the terminal. Reset the terminal.

The terminal baud rate and the system baud rate may not match. Refer to the hardware installation document for your platform, regarding installing printers, terminals and modems, specifically the section describing terminal options, to verify that the terminal options have been properly set and that the terminal baud rate has been properly administered on the system.

If the terminal is connected to an NTS, use the `na` administration as needed.

Look for the correct baud rate, `cs8`, and `parenb` options. Verify that the following are not present: `cs7` and `-parenb` options.

Problem: “Trying 129.200.9.1” message displays but does not give you a login prompt afterwards (only applicable to terminals connected to an NTS).

Solution: You probably have an address mismatch for the *Sun Enterprise* 3000 system. Check the address in the `/etc/hosts` file on the *Sun Enterprise* 3000 system, and reset the `dedicated_address` parameter for ports using an `na` administration.

Problem: The terminal screen displays `login:` but does not respond to keyboard input.

Solution:

1. Check for a loose connection at the keyboard and at the terminal.
2. Turn off the power to the terminal, wait for a few seconds, and turn the terminal back ON. (Refer to your terminal manual if necessary.)

Diagnosing Network Terminal Server (NTS) Problems

If you are experiencing terminal problems, the NTS can be remotely diagnosed in one of two ways:

- Connect a modem directly to the NTS in question, or
- Diagnose the problem through the *Sun Enterprise 3000 system*.

See “Network Terminal Server (NTS) Port Problems” on page 3-28 in this chapter and the *Network Terminal Server User’s Guide* for details.

To diagnose a problem with the terminal server, you can use the following:

- Network Administrator (na) Utility
- CLI Commands
- Panel Indicators.

Use Network Administrator Utility

The *Solaris* 2.4 Network Administrator (NA) utility on the *Sun Enterprise* 3000 system provides the commands for managing the NTS. These commands allow the user (also remote users) to do the following:

- Set and display the operating characteristics of the NTS and its ports.
- Reboot or reset the NTS and its ports.
- Broadcast messages to the NTS ports.

Table 3-7 provides the na commands that are available.

Table 3-7: Network Administrator Utility Commands

Command	Description
annex	Defines default annex_list.
boot	Boots the NTS.
broadcast	Sends a broadcast message to one or more ports.
copy	Copies NTS port configuration parms to other ports.
dumpboot	Boots the NTS and produces a dump.
echo	Writes remainder of the line to the standard output.
help	Displays help for commands.
password	Defines the administrative password.

Table 3-7: Network Administrator Utility Commands (Contd)

Command	Description
port	Defines a default port_set.
printer	Defines a default printer_set.
quit	Terminates na command.
read	Reads and executes a script file.
reset	Resets the NTS or a port_set.
set	Defines or modifies the value of a parameter.
show	Displays current value of a parameter.
write	Writes current configuration to a file.

Use (CLI) Tool

You can use the CLI tool to do the following:

- Check port or NTS statistics (see Example 1 on page 3-67).
- Check port or NTS statistics and administration (see Example 2 on page 3-67).
- Tap into any port to see the data being transmitted and received (see Example 3 on page 3-68).

To access CLI tool, do the following steps:

1. Log into the *Sun Enterprise* 3000 system. Enter the following command from any active *Solaris* session on the *Sun Enterprise* 3000 system:

```
$ telnet cmsterm1
```

The system responds:

```
Trying 129.200.9.11 ...
Connecting to 129.200.9.11
Escape character is ...
```

2. Press Enter. The system responds:

```
Rotaries defined: cli
Enter Annex port name or number:
```

3. Enter the `cli` command.

```
$ cli
```

The system responds:

```
annex:
```

4. At the `annex:` prompt, enter a `cli` command.

Table 3-8 includes a list of the available `cli` commands. Enter the `help` command to get a list of allowable `cli` commands at any point in a CLI session.

Table 3-8: CLI Commands

Command	Description
`bg`	Puts the job in the background.
`connect`	Uses LAT to connect to an advertised LAT service.
`fg`	Returns to an established job.
`hangup`	Disconnects all jobs and resets user CLI connections.
`help`	Displays help info for commands.
`hosts`	Displays current *Sun Enterprise* 3000 system table.
`jobs`	Displays a list of current jobs.

Table 3-8: CLI Commands (Contd)

Command	Description
`kill`	Terminates a job.
`lock`	Locks a port.
`netstat`	Displays network status.
`ppp`	Converts a CLI port to a PPP interface port.
`queue`	Displays/Removes queued requests.
`rlogin`	Connects to a *Sun Enterprise* 3000 system.
`services`	Displays/Removes queued requests.
`slip`	Converts a CLI port to a SLIP port.
`stats`	Displays NTS statistics.
`stty`	Displays and modifies CLI port parameters.
`telnet`	Connects to a *Sun Enterprise* 3000 system.
`who`	Displays NTS users.

Example 1: Check NTS or ports statistics

To display a list of all NTS users with port numbers, enter the `who` command at the prompt. The system responds with a list of administered user names, locations per port, and the NTS status.

Example 2: Check NTS or port statistics and administration

The `stats` command, without any arguments, gives overall statistics on the NTS. You can check the Internet address, the serial ports received, and the transmitted numbers.

The `stats -s5-7` command gives statistics on ports 5-7. This can be helpful to check the receive and transmit on a per-port basis.

Using the CLI (in super-user mode) allows more flexibility. Do the following steps to enter the CLI mode:

- At the `Annex:` prompt, enter the `su` command. You will be asked for a password. The default password is the Internet address to the NTS.
- To clear the statistics (in super-user mode), enter the `stats -c` command.
- Use NTS administration with the `admin` command (the `admin` interface is the same as the `na` administration). See “Use Network Administrator Utility” on page 3-64 for more details.

Example 3: Tap a port to check the data

To monitor all communications to or from a port (in super-user mode), do the following steps:

- At the prompt, enter the `tap x` command (`x` is the port number).
- To stop monitoring the port, press the Control and A keys simultaneously.
- At the prompt, enter the `jobs` command. The system responds: `+1 tap 7`.
- To stop the job, enter the `kill 1` (1 is the job number) command.
- To exit the CLI mode, enter the `hangup` command.
- To check the connectivity of the *Sun Enterprise* 3000 system, enter the `ping 129.200.9.1` (or whatever the address is) command.
- To stop the output, press the Control and A keys simultaneously.

See the *Network Terminal Server Administrator User's Guide* for more in-depth information.

Use Panel Indicators

The NTS's front panel has six system indicators and eight status indicators. The system indicators are labeled:

- Power
- Unit
- Net
- Attn
- Load
- Active.

The system indicators provide information about normal operations and problems that occur. Use the system indicators and the ROM Monitor commands to diagnose problems.

The status indicators are numbered one through eight.

The status indicators display port activity during normal operations; each indicator supports eight ports. When the NTS encounters a problem or an internal error condition, the indicators display error information.

NOTE:

If an error occurs, save the status of the indicators. TSC personnel can use this information to diagnose the problem.

During power-up and booting, it is more complicated to diagnose problems because they can originate in the NTS, the transceiver, the ethernet, or the load server *Sun Enterprise* 3000 system. However, the indicators provide both a progress report and an error display to assist you in troubleshooting.

See “Solving Power-Related Problems” on page 3-89 and the *Network Terminal Server User’s Guide* for specific power-up and boot procedures.

Solving Printer-Related Problems

Overview

This section provides solutions to problems that may occur during the normal operation of the printers supporting the *CentreVu* CMS application.

If you are experiencing a printer problem, do the following:

- Check the cabling to the printer. See the hardware installation document for your platform, regarding installing printers, terminals and modems, specifically the section describing administering printers for details.
- Check that the printer is plugged in and that there is power to the printer.

Printers Connected to the NTS

If you are experiencing a problem with a printer connected to the NTS, do the following:

- Check the cables from the NTS to the NTS patch panel to make sure they are connected to the correct port and that the cables are correctly seated. See “Identifying Port Problems” on page 3-28 for procedures.
- Check the parity, data bits, and speed settings of the printer — make sure the settings agree with the `na` administration (Network Administration).
- If the port administration and connectivity (using `cli` commands) is correct, check the `rtelnet` and `lpadmin` administration. To check the `rtelnet` administration, enter the following command at the prompt:

```
# ps -ef | grep rtelnet
```

The system responds with a line that indicates `rtelnet` administration is running for the appropriate port with a corresponding device name. For example:

```
root xyz 1 8 14:46:18 ?    0:14 rtelnet -bra cmsterm1
63/dev/s_pdev163
```

NOTE:

The above example assumes the printer is connected to port 63 on the NTS cmsterm1.

If the `rtelnet` command did not appear, enter the `rtelnet` command again. To make sure the command executes after the machine reboots, add the same `rtelnet` command to the `/etc/rc2.d/Speripherals` file.

NOTE:

Make sure that two rtelnets are not active for the same NTS port. If this is the case, quit one of the two job numbers (identified in the `xyz` response portion of the `ps -ef | grep rtelnet` command with the `kill -9 xyz` command). See the example below.

To quit one of the two job numbers, do the following:

1. Enter the `ps -ef | grep rtelnet` command.

```
# ps -ef | grep rtelnet
```

For example, the system responds with the following screen:

```
# ps -ef | grep rtelnet   root   238   1  3 15:18:41 ?
0:00 rtelnet -bra cmsterm1 16 /dev/s_p

dev116   root   241   1 44 15:18:41 ?    0:00 rtelnet -bra
cmsterm1 15 /dev/s_p

dev115 cmssvc   695   687  5 15:38:03 pts/0   0:00 grep
telnet
```

2. Enter the `kill -9 <number>` command.

```
# kill -9 <xxx>
```

NOTE:

<xxx> is the process id of the rtelnet which is being killed. For example, you could use the `kill -9 241` command to kill one of the processes shown in the `rtelnet` example above.

Additional Solutions

If problems persist, and if disabling and enabling the printer does not clear the problem, reenter the `lpadmin` command using the correct printer type. Check the `lpadm` using the `lpstat -p printer -l` command for the baud rate, parity, etc. The defaults are: `9600, no parity, and 1 stop bit`. Any exceptions will be noted. .

Additional printer problems, along with the suggested actions for resolving the problems, are documented in the following sections:

- When the Printer Is Out of Paper
- When the Current Printer Output Is Bad
- How to Stop and Discard Current Print Job
- How to Stop and Reprint Current Print Job
- When Print Jobs Are Not Being Printed
- When Printer Is Out-of-Service — One Printer Configuration
- When Printer Is Out-of-Service — Two Printer Configuration.

NOTE:

If you are experiencing a printer problem that is not documented in this section or is not documented in your printer manual, escalate the problem through normal procedures.

Some of the commands used in the following sections can be executed while logged in *only* as lp or root; the commands are as follows:

- `/usr/lib/accept`
- `/usr/lib/lpshut`
- `/usr/lib/lpsched`
- `/usr/lib/lpmove`
- `/usr/lib/lpadmin.`

Other commands used in the following sections that can be executed while logged in *only* as lp or root are as follows:

- `disable`
- `enable.`

Commands used in the following sections that can be executed while logged in as cms, lp, or root are as follows:

- `lpstat`
- `cancel`.

NOTE:

Only lp or root can cancel any print job, but any user can cancel their own job.

If you do not know the name(s) of the printer(s) connected to the system, enter the following command:

```
$ lpstat -v
```

If you are currently in the *CentreVu* CMS environment and you want to test the printer, press the **Commands** Screen Labeled Key (SLK), and select the “Print Window” option. In a few seconds, the printer should start printing your test print job (if it is the first print job in the queue).

Whenever you enter the `disable, enable`, or `cancel` commands in the following sections, the printer will continue to print until the buffer is empty.

When the printer(s) do not function properly, additional information about the errors associated with the printer(s) can be seen in the *services error* log by entering the following command:

```
$ tail /usr/elog/elog
```

When the Enabled Printer Does Not Print

When the `lpstat` command shows that the printers are enabled but not working, do the following to correct the problem:

1. From the *CentreVu* CMS windows environment, move to the *Solaris* environment by pressing the **Commands** SLK and selecting the `UNIX (r) system` option.
2. Stop the print job currently printing by entering the following command:

```
$ disable <printer_name>
```

   Replace the string `<printer_name>` with the real name of the printer.

3. Enable the printer by entering the following command:

```
$ enable <printer_name>
```

If the above method to get printers to print fails, do the following:

4. Enter the following command to disable the printer again:

```
$ disable <printer_name>
```

5. Turn the printer power off and on.
6. Enable the printer by entering the following command:

```
$ enable <printer_name>
```

When the Printer Is Out of Paper

The printer will stop printing the current job when it detects an out-of-paper situation. To reload the printer with paper, do the following:

NOTE:

The following steps are an overview of what to do when the printer runs out of paper. The steps may vary depending on the printer model. For more information, refer to your printer manual.

1. Mark the position on the last sheet of paper where the printer stopped printing.
2. Remove the last sheet of paper from the printer.
3. Thread the first sheet on the new stack of paper into the printer (see your printer manual if necessary).
4. Position the first sheet of paper to the location where the printer stopped printing on the last sheet of paper.
5. Press the “ready printer” button (press the **correct** button on your printer; see your printer manual if necessary).

The printer should continue with the print job at the point where it stopped printing.

When the Current Printer Output Is Bad

If the output from the current print job is unreadable, the printer may be out of paper, the paper may be jammed, or the ribbon or cartridge may need replacing. Do the following to correct the printer problem:

1. From the *CentreVu* CMS windows environment, move to the *Solaris* environment by pressing the **Commands** SLK and selecting the `UNIX (r)system` option.
2. Disable the printer by entering the following command:

```
$ disable <printer_name>
```

   Replace the string *<printer_name>* with the real name of the printer. The printer will continue to print until the buffer is empty.

   NOTE:

   The print job currently printing will be reprinted when the printer has been enabled. While the printer is disabled, new print jobs routed to this printer will be queued (saved) and will be printed when the printer becomes available.

3. Fix the problem as necessary. (Refer to your printer manual if necessary.)
4. After the printer has been fixed, properly align the paper in the printer.
5. Enable the printer by entering the following command:

```
$ enable <printer_name>
```

   Replace the string *<printer_name>* with the real name of the printer.

   The printer should start printing the current job over again.

6. Exit the *Solaris* environment by entering the following command:

```
$ exit
```

How to Stop and Discard Current Print Job

1. From the *CentreVu* CMS windows environment, move to the *Solaris* environment by pressing the **Commands** SLK and selecting the `UNIX (r) system` option.
2. Cancel the print job currently printing by entering the following command:

```
$ cancel <printer_job>
```

Replace the string <printer_job> with the real name of the print job.

NOTE:

The printer will continue to print until the buffer is empty.

3. Reposition the paper in the printer.

How to Stop and Reprint Current Print Job

1. From the *CentreVu* CMS windows environment, move to the *Solaris* environment by pressing the **Commands** SLK and selecting the `UNIX (r) system` option.
2. Stop the print job currently printing by entering the following command:

```
$ disable <printer_name>
```

Replace the string *<printer_name>* with the real name of the printer.

NOTE:

The printer will continue to print until the buffer is empty.

3. Reposition the paper in the printer.

4. Enable the printer by entering the following command:

```
$ enable <printer_name>
```

   The printer should start reprinting the print job from the beginning.

When Print Jobs Are Not Being Printed

If the printer is no longer printing the jobs in the queue, the *Solaris* system scheduler may not be running. To find out if the scheduler is running, do the following:

1. From the *CentreVu* CMS windows environment, move to the *Solaris* environment by pressing the **Commands** SLK and selecting the `UNIX (r) system` option.

2. When the $ prompt appears, enter the following command:

```
$ lpstat -t
```

   From the output, determine if the scheduler is running.

3. If the scheduler is not running, enter one of the following commands to log in as lp or root:

```
$ su lp
-- or --
$ su root
```

4. Enter the correct password when prompted to do so.
5. Next, enter the following command to turn the scheduler on:

```
# /usr/lib/lpsched
```

6. Enter the next command to verify that the scheduler is running:

```
# lpstat -t
```

7. To return to the *CentreVu* CMS environment, enter the following command:

```
# exit
```

When Printer Loses Power

When the printer is disconnected or loses power, the job currently printing is lost. To correct the problem, do the following:

- Disable the printer until it is operational.
- Enable the printer.
- Resubmit the print jobs.

If you want the system to recognize your administration for terminals, printers, and modems, you must reboot your system after performing the initial administration procedures.

NOTE:

For more information about resubmitting print jobs because of a power failure or terminal, printer or modem administration, see *CentreVu Call Management System Release 3 Version 6 Sun Enterprise 3000 System Hardware Installation* (585-215-867) document for further information.

When Printer Is Out-of-Service — One Printer Configuration

If the customer's system has only one printer and it breaks down, you can choose one of the following methods to maintain report production:

- Save all print jobs until the printer has been fixed.
- Reject all print jobs until the printer has been fixed.

However, you could replace the broken printer and immediately continue with report production.

How to Save Print Jobs

To save the print jobs currently in the queue and future print jobs submitted to the queue until the printer has been fixed, do the following:

1. From the *CentreVu* CMS windows environment, move to the *Solaris* environment by pressing the **Commands** SLK and selecting the `UNIX (r) system` option.
2. Disable the printer by entering the following command:

```
$ disable <printer_name>
```

3. Fix the problem as necessary. (Refer to your printer manual if necessary.)
4. After the printer has been fixed, reposition the paper in the printer.
5. Enable the printer by entering the following command:

```
$ enable <printer_name>
```

   Replace the string *<printer_name>* with the real name of the printer.

   The printer should start printing the first print job in the queue over again.

6. To return to the *CentreVu* CMS environment, enter the following command:

```
$ exit
```

How to Reject Print Jobs

To reject print jobs until the printer has been fixed, do the following:

1. From the *CentreVu* CMS windows environment, move to the *Solaris* environment by pressing the **Commands** SLK and selecting the `UNIX (r) system` option.
2. Disable the printer by entering the following command:

```
$ disable <printer_name>
```

3. Enter one of the following commands to log in as lp or root:

```
$ su lp
-- or --
$ su root
```

4. Enter the correct password when prompted to do so.

5. Reject all future print jobs by entering the following command:

```
# /usr/lib/reject <printer_name>
```

6. If you want to cancel the print jobs already in the queue, enter the following command to list the print jobs:

```
# lpstat -t
```

7. Next, use the *cancel* command as follows to cancel the print jobs in the queue:

```
# cancel <print_jobX> <print_jobY> <etc>
```

NOTE:

When you cancel a print job it is removed from the print queue. If you want this job to print do not cancel it.

8. To return to the *CentreVu* CMS environment, enter the following command:

```
# exit
```

9. Fix the printer as necessary. (Refer to your printer manual if necessary.)
10. If you are in the *CentreVu* CMS environment, return to the *Solaris* system environment by pressing the **Commands** SLK and selecting the `UNIX (r) system` option.
11. After the printer has been fixed, reposition the paper in the printer.

12. Enable the printer by entering the following command:

```
$ enable <printer_name>
```

    Replace the string *<printer_name>* with the real name of the printer.

13. Enter one of the following commands to log in as lp or root:

```
# su lp
-- or --
# su root
```

14. Enter the correct password when prompted to do so.
15. Accept all future print jobs by entering the following command:

```
# /usr/lib/accept <printer_name>
```

    NOTE:

    A few seconds after you enter this command, the printer should start printing the first print job in the queue.

16. To return to the *CentreVu* CMS environment, enter the following command:

```
$ exit
```

When Printer Is Out-of-Service — Two Printer Configuration

If the customer's system has two or more printers and one of the printers breaks down, you can choose one of the following methods to maintain report production:

- Redirect all print jobs from the broken printer to a printer that works.
- Reject all print jobs until the broken printer has been fixed.

However, you could replace the broken printer and immediately continue with report production.

How to Route Print Jobs to Another Printer

To redirect future print jobs from a broken printer to one that works, do the following:

1. Access the Printer Administration window from the Maintenance subsystem. See the *CentreVu Call Management System Release 3 Version 6 Admininstarion* (585-215-850) document for details.
2. Enter the name of the broken printer in the `CMS printer name:` field.
3. Do a `Find one` to view the values (entries) associated with the printer.
4. When the values (entries) have been displayed, move to the LP `printer name:` field, and change the printer name to the printer which is still operational.
5. Do a `Modify` to change the destination printer.

The *CentreVu* CMS printer name is now associated with a printer that is functional. The print jobs sent to the *CentreVu* CMS printer_name will be redirected to the functional LP printer.

NOTE:

After the printer is operational, remember to reassign the *CentreVu* CMS printer_name to the LP printer_name.

How to Move Print Jobs in Queue to Another Printer

To move current print jobs from the queue of a broken printer to a working printer, do the following:

1. From the *CentreVu* CMS windows environment, move to the *Solaris* environment by pressing the **Commands** SLK and selecting the `UNIX (r) system` option.
2. Enter the following command to **move all the print jobs** currently queued to the broken printer (<`printer1`>) to a printer (<`printer2`>) that works:

```
# /usr/lib/lpmove <printer1> <printer2>
```

3. Enter the following command to **move selected print jobs** currently queued to the broken printer (<`printer1`>) to a printer (<`printer2`>) that works:

```
$ lpmove <print-jobX> <printer2>
```

4. To return to the *CentreVu* CMS environment, enter the following command:

```
$ exit
```

How to Reject Print Jobs

To reject print jobs until the printer has been fixed, do the following:

1. From the *CentreVu* CMS windows environment, move to the *Solaris* environment by pressing the **Commands** SLK and selecting the `UNIX (r) system` option.
2. Disable the printer by entering the following command:

```
$ disable <printer_name>
```

3. Enter one of the following commands to log in as lp or root:

```
$ su lp
-- or --
$ su root
```

4. Enter the correct password when prompted to do so.
5. Reject all future print jobs by entering the following command:

```
# /usr/lib/reject <printer_name>
```

6. If you want to cancel the print jobs already in the queue, enter the following command to list the print jobs:

```
# lpstat -t
```

7. Next, use the `cancel` command as follows to cancel the print jobs in the queue:

```
# cancel <print_jobX> <print_jobY> <etc>
```

NOTE:

You can save any particular print job by not canceling it.

8. To return to the *CentreVu* CMS environment, enter the following command:

```
$ exit
```

9. Fix the printer as necessary. (Refer to your printer manual if necessary.)

10. If you are in the *CentreVu* CMS environment, return to the *Solaris* environment by pressing the **Commands** SLK and selecting the `UNIX (r) system` option.
11. After the printer has been fixed, reposition the paper in the printer.
12. Enable the printer by entering the following command:

```
$ enable <printer_name>
```

    Replace the string *<printer_name>* with the real name of the printer.

13. Enter one of the following commands to log in as lp or root:

```
$ su lp
-- or --
$ su root
```

14. Enter the correct password when prompted to do so.
15. Accept all future print jobs by entering the following command:

```
# /usr/lib/accept <printer_name>
```

16. To return to the *CentreVu* CMS environment, enter the following command:

```
$ exit
```

Solving Modem-Related Problems

Overview

If your modem does not seem to be working upon installation, you can do the following:

- Check the physical connections. See “Identifying Port Problems” on page 3-28 for more details.
- Check the modem settings. See *CentreVu Call Management System Release 3 Version 6 Sun Enterprise 3000 System Hardware Installation* (585-215-867) document for more information.

NOTE:

The default modem script assumes 8 data bits, 1 stop bit, no parity.
Check the network administration (`na`) and reset it to match the modem settings. Outbound Modem `speed` must match the speed specified in the na administration (for example, 9600 baud). Inbound modem `speed` is unimportant if set to `autobaud`.

Disconnecting *U.S. Robotics* Modems

If you are using a *U.S. Robotics** *Sportster*† and you enter the `exit` command to end a dial-in session from a dumb terminal to a CMS system, a new `login` prompt may be returned. To actually disconnect these modems, you should enter `+++` at the dumb terminal to return to the on-line command mode from the data mode. Then, enter `ATH0` to disconnect the modem.

*U.S. Robotics is a registered trademark of U.S. Robotics, Inc.
†Sportster is a registered trademark of U.S. Robotics, Inc.

Solving Power-Related Problems

Overview

This section provides some troubleshooting solutions to power-related problems (for example, when the *CentreVu* CMS *Sun Enterprise* 3000 system loses power). If you cannot solve the power-related problems, escalate the problem through normal procedures. For printers with power-related problems, see “Solving Printer-Related Problems.”

When System Loses Power

If the *Sun Enterprise* 3000 system loses power, it is recommended (but not required) to empty the CD-ROM and tape drive(s). The system boots from the disk by default.

To turn the power back *on*, use the following sequence:

1. Turn on devices attached to the *Sun Enterprise* 3000 system.
2. Turn on the *Sun Enterprise* 3000 system.
3. Turn on the system monitor.

If the *Sun Enterprise* 3000 system is operating properly, the monitor displays a banner screen up to 3 minutes after it is powered on.

```
        UE3000 MP (2x390Z55), Keyboard Present
        ROM Rev. 2.12, XX MB memory installed, Serial #XXX
        Ethernet address X:X:YY:Z:BB, Host ID: XXXXXXXX
$
```

The following sequence is recommended to turn off the power:

1. Turn off the *Sun Enterprise* 3000 system.
2. Turn off the system monitor.
3. Turn off all external devices starting with the device closest to the *Sun Enterprise* 3000 system and working toward the farthest device.

When the `Console Login:` prompt appears on the console terminal, the system will be up and running.

NOTE:

For more information about restarting the *Sun Enterprise* 3000 system because of a power failure, refer to the user documentation that came with the system.

System Fails to Auto-Boot After Power Failure or When Given Reboot Command

If the system fails to automatically pass the boot prompt (stops at the `ok` prompt) when the reboot command is given or on a restart from a power failure, a boot environment variable may be set incorrectly.

To correct this problem do the following:

1. At the `ok` prompt enter `printenv`
2. Scroll until you come to the variable `auto-boot?`

The auto-boot variable should be set to `true`. If not, do the following:

1. Enter the command `setenv auto-boot? true`
2. Enter `boot`

The system should now reboot after a power failure without stopping at the boot prompt.

Solving Clock Synchronization Problems

Overview

Each I/O board has its own clock. These clocks must be synchronized for proper system operation. After removing and replacing an I/O board, the system may experience a clock synchronization problem. That is, the clock on the I/O board will become un-synchronized with the clock on the Clock Board.

Re-Synchronize Clocks

To re-synchronize the clocks, do the following:

1. If CMS is running, turn it off.
2. Go to the boot prompt. You can do that in one of three ways:
   a. You can type `init 0`, or
   b. You can type `/usr/sbin/shutdown -y -g0 -i0`, or
   c. You can press Stop-A while the *Enterprise* is booting, after the *Sun* logo displays
3. Type the following command:
   ```
   copy-clock-tod-to-io-boards
   ```
4. Boot the machine by typing one of the following commands:
   ```
   boot
   boot -r     (to reconfigure for new devices)
   ```

*SPARC*server Maintenance

Overview

This chapter explains how to maintain the *CentreVu®* Call Management System Release 3 Version 6 (CMS R3V6) hardware. Refer to the *Sun*[*] *SPARCserver*[†] computer documentation for additional maintenance information. Also, see the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for software maintenance information.

This chapter discusses the following maintenance procedures:

- Recovering from Disk Corruption
- Recovering from a Disk Crash
- Adding SCSI Hard Disk Drives
- Recovering System Space
- Adding Memory
- Installing HSI Cards
- Changing the Date or Time
- Adding, Removing, or Replacing Tape Drives
- Identifying Device Entry Names for Ports on the Aurora Expander Box
- Removing Aurora SBus *Multiport*[‡] Software Drivers
- Adding, Removing, or Moving Aurora SBus *Multiport* Cards
- Adding Network Terminal Servers.

Personnel at the Technical Service Center (TSC) will need assistance from an on-site technician or the customer's *CentreVu* CMS administrator to do most of the procedures in this chapter.

---

*_Sun_ is a registered trademark of Sun Microsystems, Inc.
†_SPARCserver_ is a trademark of SPARC International, Inc.
‡_Multiport_ is a trademark of Aurora Technologies, Inc.

Disk Recovery

Overview

A *CentreVu* CMS system can have one of three disk partitioning schemes. The schemes are:

- One-system disk scheme — *Solaris** operating system located on one disk.
- *Solstice DiskSuite*† scheme — *Solaris* operating system, and everything else as well, is located on a single logical disk consisting of up to 12 physical disk drives.

  NOTE:

  With the one-system disk and *Solstice DiskSuite* partitioning schemes, the partitions on a 1.05-GB disk 1 differ from the partitions on a 2.1-GB disk 1.

- Two-system disks scheme — *Solaris* operating system located on two disks.

Figure 4-1 shows the differences between a one-system disk and a two-system-disk scheme. In this context, a *Solstice DiskSuite* scheme is identical to a one-system disk scheme.

**Solaris* is a registered trademark of Sun Microsystems, Inc.
†*Solstice DiskSuite* is a trademark of Sun Microsystems, Inc.

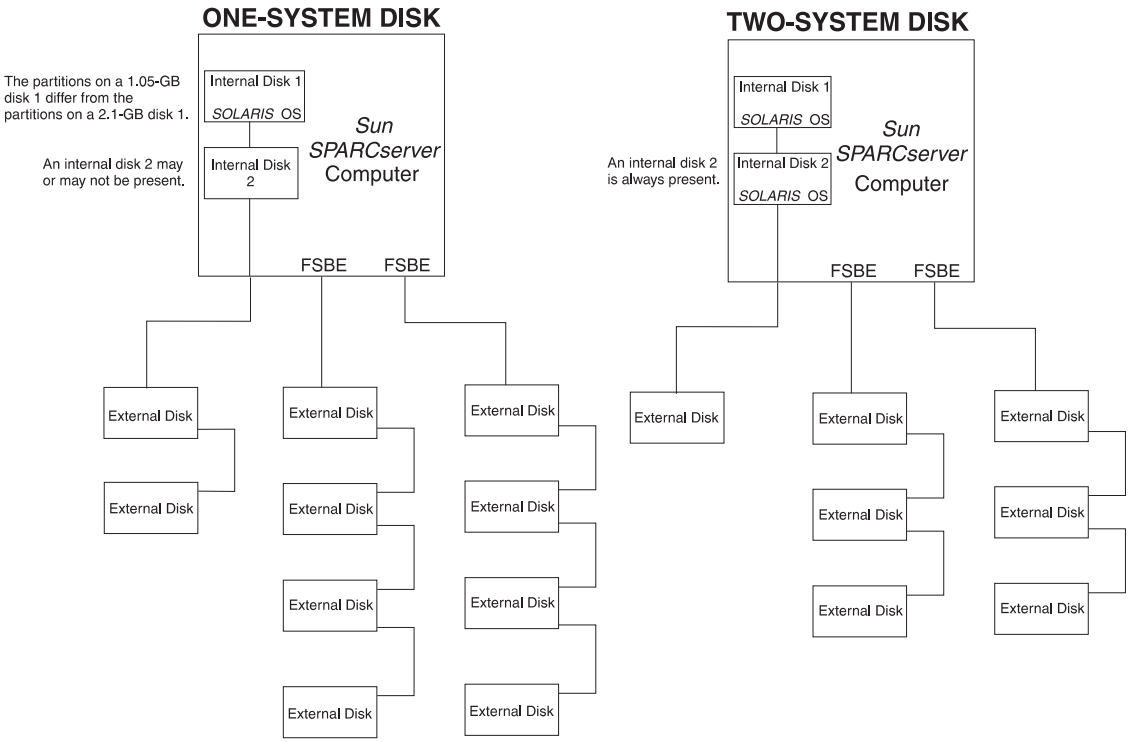


Figure 4-1: Disk Schemes

Determine Your Partitioning Scheme

To determine the partitioning scheme on your system, do the following:

1. Log in as root.
2. Enter the following command to display the volume table of contents of disk 1.

:

```
# prtvtoc /dev/dsk/c0t3d0s0
```

A screen displays similar to the following example (this example is for a 1.05-GB disk):

```
* /dev/dsk/c0t3d0s0 partition map
*
* Dimensions:
*     512 bytes/sector
*      72 sectors/track
*      14 tracks/cylinder
*    1008 sectors/cylinder
*    2038 cylinders
*    2036 accessible cylinders
*
* Flags:
*   1: unmountable
*  10: read-only
*
*                           First     Sector    Last
* Partition  Tag  Flags    Sector     Count    Sector  Mount Directory
       0      2    00          0     41328     41327   /
       1      3    01      41328    393120    434447
       2      5    00          0   2052288   2052287
       3      6    00     434448    300384    734831   /dump
       4      6    00     734832    409248   1144079   /cms
       5      6    00    1144080    205632   1349711   /opt
       6      4    00    1349712    307440   1657151   /usr
       7      7    00    1657152    395136   2052287   /var
#
```

3. Note the size of the disk by checking `Dimensions: accessible cylinders`. Accessible cylinders equal:
   - 2733 for a 2.1-GB disk, or
   - 2036 for a 1.05-GB disk.
4. Confirm `/` (root) is mounted on partition 0.
5. Look at which file systems are mounted on partitions 3 and 4 (refer to Table 4-1):
   - If `/opt` and `/usr` are mounted on partitions 3 and 4, the system is a one-system disk scheme with a 2.1-GB disk 1.
   - If `/dump` and `/cms` are mounted on partitions 3 and 4, the system is a one-system disk scheme with a 1.05-GB disk 1.
   - If nothing is mounted on partitions 3 and 4, the system is a two-system disks scheme.
   - If nothing is mounted on any of partitions 3 through 7, it is a *Solstice DiskSuite* partitioning scheme.

Table 4-1: Partitioning Scheme - Internal Disk 1

Partition	One-System Disk		System with *SolsticeDiskSuite* Software		Two-System Disks
	File System (2.1-GB Disk)	File System (1.05-GB Disk)	File System (2.1-GB Disk)	File System (1.05-GB Disk)	File System (1.05-GB Disk)
0	/ (root)	/ (root)	/ (root)	/ (root)	/ (root)
1	/dump	swap*			swap*
2	backup*	backup*	overlap	overlap	backup*
3	/opt	/dump			(blank)
4	/usr	/cms			(blank)
5	/var	/opt			/opt
6	swap*	/usr			/usr
7	/cms	/var			/var

*The `prtvtoc` command does not display the word “swap,” “backup,” or “overlap” as indicated in the table. The Tag column, however, indicates swap or backup/overlap by displaying “03” or “05,” respectively.

6. An internal disk 2 may be present and should be checked. Enter the following command to display the volume table of contents of disk 2:

```
# prtvtoc /dev/dsk/c0t1d0s0
```

NOTE:

If disk 2 is not present, this message displays:
`No such file or directory`.

7. Note the size of disk 2 by checking `Dimensions: accessible cylinders`. Accessible cylinders equal:
   - 2733 for a 2.1-GB disk, or
   - 2036 for a 1.05-GB disk.
8. Compare the results of the `prtvtoc` command for disk 2 with Table 4-2.

Table 4-2: Partitioning Scheme - Internal Disk 2

Partition	One-System Disk		System with *Solstice DiskSuite* Software		Two-System Disks
	File System (2-GB Disk)	File System (1-GB Disk)	File System (2-GB Disk)	File System (1-GB Disk)	File System (1-GB Disk)
0	/cms1	/cms1			/usr/dbtemp
1		swap*			/export/home
2	backup*	backup*	overlap*	overlap*	/dump†
3					/cms†

*The `prtvtoc` command does not display the word “swap,” “backup,” or “overlap” as indicated in the table. The Tag column, however, indicates swap and backup/overlap by displaying “03” or “05,” respectively.

†On some systems, `/dump` and `/cms` may be mounted on partitions 3 and 4, respectively.

If you have a one-system disk partitioning scheme, follow the procedures discussed in “Recovering from Disk Corruption (One-System Disk)” on page 4-8.

If you have a two-system disks partitioning scheme, follow the procedures discussed in “Recovering from Disk Corruption (Two-System Disks)” on page 4-66.

If you have a *Solstice DIskSuite* partitioning scheme, follow the procedures discussed in “Recovering from Disk Corruption (Systems running Solstice DiskSuite 4.1 Software)” on page 4-113.

Valid Internal Disk Configurations

CentreVu CMS systems have shipped from the Lucent Technologies factory with the following internal disk configurations:

- one 1.05-GB disk
- two 1.05-GB disks
- one 2.1-GB disk
- two 2.1-GB disks.

If a disk fails in the field due to a disk crash, it will be replaced with a disk of like capacity. However, if existing customers want to expand their disk capacity by adding a second internal disk, a 2.1-GB disk will be installed. Table 4-3 summarizes the valid internal disk configurations for *CentreVu* CMS systems:

Table 4-3: Valid Internal Disk Configurations

Configuration	Internal Disk 1 1.05-GB	Internal Disk 2 1.05-GB	Internal Disk 1 2.1-GB	Internal Disk 2 2.1-GB
A*	x			
B	x	x		
C			x	
D			x	x
E†	x			x

*This configuration is not supported by systems using *Solstice DiskSuite* software

†This configuration is only for existing customers with a 1.05-GB internal disk 1 who expand their disk capacity.

Recovering from Disk Corruption (One-System Disk)

Overview

This section provides information about file system restore procedures and explains how to recover *CentreVu* CMS databases after disk corruption occurs.

NOTE:

The procedures in this section apply only to non-DiskSuite systems with "one-system disk" partitioning schemes. If your system has *Solstice DiskSuite* software installed, use the procedures in "Recovering from Disk Corruption (Systems running Solstice DiskSuite 4.1 Software)" on page 4-113. If you have a "two-system disks" partitioning scheme, use the procedures in "Recovering from Disk Corruption (Two-System Disks)" on page 4-66.

The difference between disk corruption and a disk crash is the extent of the damage involved. On a corrupted disk, the disk and the file systems are still intact, and minor repair to the disk is needed. On a disk crash, the disk failed and needs to be replaced or reformatted. If a disk crashed and needs to be replaced, see "Recovering from a Disk Crash (One-System Disk)" section in this chapter for details.

CAUTION:

Only **TSC PERSONNEL** should perform the procedures in this section.

The procedures for recovering the disk depend on if a backup is available and which disk is effected. This section is organized as follows:

- When the CMSADM backup is available
  - — Recovering from corruption on the first disk
  - — Recovering from corruption on the second through twelfth disks.
- When the CMSADM backup is **not** available
  - — Recovering from corruption on the first disk
  - — Recovering from corruption on the second through twelfth disks.

Restoring Disk(s) When A CMSADM Backup Is Available

If a CMSADM backup is available, do the following tasks:

- Restore the file systems on the disk from the latest CMSADM backup.
- Restore the *CentreVu* CMS data from the latest *CentreVu* CMS maintenance backup.

The following sections provide the commands used to restore the file systems from the CMSADM backup.

First Disk

Use the procedures in this section to restore the first disk when a CMSADM backup is available.

To restore the first disk, do the following steps:

1. Log in as *root*.
2. Insert the first CMSADM backup tape.
3. At the system prompt, enter the following commands:

```
# ulimit unlimited
# cpio -icmudfv -C 10240 -I <device name> -M "Please remove
the current tape, insert tape number %d, and press ENTER"
<"/cms?/*"...>
```

Helpful Hints

- If any disks 2 through 12 are present, you must substitute the <"/cms?/*"...> portion of the `cpio` command with "/cms1/*" "/cms2/*" and so on for these disks. For example, if you have four disks, you would substitute <"/cms?/*"...> with "/cms1/*" "/cms2/*" "/cms3/*" for the second, third, and fourth disks. The "-f" option of the cpio command restores all files **except** those specified, so in this example, the files on disks 2, 3, and 4 are not restored. See Table 4-4 to determine on which disks the `/cms` file systems reside.

Table 4-4: /cms File Systems

Device	Disk	Slice	/cms File System
c0t1d0s0	2	0	/cms1
c0t2d0s0	3	0	/cms2
c0t0d0s0	4	0	/cms3
c1t1d0s0	5	0	/cms4
c1t2d0s0	6	0	/cms5
c1t3d0s0	7	0	/cms6
c1t4d0s0	8	0	/cms7
c2t1d0s0	9	0	/cms8
c2t2d0s0	10	0	/cms9
c2t3d0s0	11	0	/cms10
c2t4d0s0	12	0	/cms11

- You must substitute one of these device names for *<device name>* in the `cpio` command:

  `/dev/rmt/0` Indicates the tape drive with the lowest target number in the SCSI chain. See Table 4-26, “Internal SCSI Bus ID Map (c0),” on page 4-172.

  `/dev/rmt/1` Indicates the tape drive with the second lowest target number in the SCSI chain.

  `/dev/rmt/0c` Indicates the tape drive with the lowest target number in the SCSI chain in compressed mode (the QIC 2.5-GB, 4-8GB SLR and the 14-GB tape drives support compressed mode).

  `/dev/rmt/1c` Indicates the tape drive with the second lowest target number in the SCSI chain in compressed mode (the QIC 2.5-GB, 4-8GB SLR and the 14-GB tape drives support compressed mode).

- You may get four error messages concerning the `/home` directory. These errors display when the directory is already present, so you can ignore them.

4. If the backup required more than one tape, follow the directions displayed on the screen:

```
Please remove the current tape, insert tape number <X>, and
press ENTER.
```

   The system responds:

```
XXXXXX Blocks
#
```

5. After you restore the first disk, sync the file systems by entering the following commands:

```
# sync
```

6. Reboot the system by entering the command:

```
# init 6
```

7. Restore the *CentreVu* CMS from the latest *CentreVu* CMS maintenance backups. See the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for details.

Second Through Twelfth Disks

Do these steps to restore data on the second through the twelfth disks when a CMSADM backup is available:

1. Log in as root.
2. Insert the first CMSADM backup tape.
3. To restore the data, enter the following commands at the system prompt:

```
# ulimit unlimited
# cpio -icmudv -C 10240 -I <device name> -M “Please remove the
current tape, insert tape number %d, and press ENTER”
“/cms?/*”
```

Helpful Hints

- You must substitute the "?" in the `cpio` command with the number that corresponds to the `/cms` file system that resides on the disk you are restoring. For example, disk 2="`/cms1/*`", disk 3="`/cms2/*`" and so on for each disk. See Table 4-4, "/cms File Systems," on page 4-10 to determine on which disks the `/cms` file systems reside.
- You must substitute one of the following device names for *<device name>* in the `cpio` command:

  `/dev/rmt/0` Indicates the tape drive with the lowest target number in the SCSI chain. See Table 4-26, "Internal SCSI Bus ID Map (c0)," on page 4-172.

  `/dev/rmt/1` Indicates the tape drive with the second lowest target number in the SCSI chain.

  `/dev/rmt/0c` Indicates the tape drive with the lowest target number in the SCSI chain in compressed mode (the QIC 2.5-GB, 4-8GB SLR and the 14-GB tape drives support compressed mode).

  `/dev/rmt/1c` Indicates the tape drive with the second lowest target number in the SCSI chain in compressed mode (the QIC 2.5-GB, 4-8GB SLR and the 14-GB tape drives support compressed mode).

4. Verify that the *CentreVu* CMS data is accessible (via cmsql), and resolve any problems before proceeding.
5. Restore the *CentreVu* CMS from the latest *CentreVu* CMS maintenance backups. See *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for more information.

   See the *CentreVu Call Management System Release 3 Version 6 Administration* (585-215-850) document for more information.

Restoring Disk(s) When No CMSADM Backup Is Available

If a CMSADM backup is not available, do the following:

- Restore all the information on the disk from the original installation sources (if other than *CentreVu* CMS data).
- Restore the *CentreVu* CMS data from CMS maintenance backups (if available).

First Disk

If the first disk is corrupted and a CMSADM backup is not available, do the following steps:

1. Reinstall *Solaris* software package, all add-on packages, spatches, and *CentreVu* CMS. See the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for details.
2. Run setup. See the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for details.
3. Restore *CentreVu* CMS data from the *CentreVu* CMS maintenance backup. See the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for details.
4. Administer Terminals, Printers, Users, etc. as needed.

Second Through Twelfth Disks

If any of the second through twelfth disks is destroyed and a CMSADM backup is not available, do the following steps:

1. Run setup. See the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for details.
2. Restore the *CentreVu* CMS data from the *CentreVu* CMS maintenance backup. See the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for details.

Restore an Entire System

To do a complete file system restore, load the CMSADM backup tape into the tape drive and enter the following commands at the system prompt:

```
# ulimit unlimited
# cpio -icmudv -C 10240 -I <device name> -M “Please remove the
current tape, insert tape number %d, and press ENTER”
```

NOTE:

You must substitute one of these device names for *<device name>* in the `cpio` command:

`/dev/rmt/0` Indicates the tape drive with the lowest target number in the SCSI chain. See Table 4-26, “Internal SCSI Bus ID Map (c0),” on page 4-172.

`/dev/rmt/1` Indicates the tape drive with the second lowest target number in the SCSI chain.

`/dev/rmt/0c` Indicates the tape drive with the lowest target number in

the SCSI chain in compressed mode (the QIC 2.5-GB, 4-8GB SLR and the 14-GB tape drives support compressed mode).

`/dev/rmt/1c` Indicates the tape drive with the second lowest target number in the SCSI chain in compressed mode (the QIC 2.5-GB, 4-8GB SLR and the 14-GB tape drives support compressed mode).

Restore Specific Files

To restore specific files, enter the following commands at the system prompt:

```
# ulimit unlimited
# cpio -icmudv -C 10240 -I <device name> -M "Please remove the
current tape, insert tape number %d, and press ENTER"
<full_path_name>
```

NOTE:

You must substitute one of these device names for *<device name>* in the `cpio` command:

`/dev/rmt/0` Indicates the tape drive with the lowest target number in the SCSI chain. See Table 4-26, "Internal SCSI Bus ID Map (c0)," on page 4-172.

`/dev/rmt/1` Indicates the tape drive with the second lowest target number in the SCSI chain.

`/dev/rmt/0c` Indicates the tape drive with the lowest target number in the SCSI chain in compressed mode (the QIC 2.5-GB, 4-8GB SLR and the 14-GB tape drives support compressed mode).

`/dev/rmt/1c` Indicates the tape drive with the second lowest target number in the SCSI chain in compressed mode (the QIC 2.5-GB, 4-8GB SLR and the 14-GB tape drives support compressed mode).

Recovering from a Disk Crash (One-System Disk)

Overview

This section provides information about file system restore procedures, and explains how to recover *CentreVu* CMS databases after a disk crash occurs.

NOTE:

The procedures in this section apply only to non-DiskSuite systems with “one- system disk” partitioning schemes. If your system has *Solstice DiskSuite* software installed, use the procedures in “Recovering from Disk Corruption (Systems running Solstice DiskSuite 4.1 Software)” on page 4-113. If you have a “two-system disks” partitioning scheme, use the procedures in “Recovering from a Disk Crash (Two-System Disks)” on page 4-76.

The difference between disk corruption and a disk crash is the extent of the damage involved. On a corrupted disk, the disk and the file systems are still intact, and minor repair to the disk is needed. On a disk crash, the disk failed and needs to be replaced or reformatted. If a disk needs minor repair, see the “Recovering from Disk Corruption (One-System Disk)” section in this chapter for details.

CAUTION:

Only **TSC PERSONNEL** should perform the procedures in this section.

The procedures for recovering the disk depend on whether a backup is available and which disk is effected. This section is organized as follows:

- When the CMSADM backup is available
  - — Recovering from a crash on the first disk
  - — Recovering from a crash on the second disk
  - — Recovering from a crash on the third through twelfth disks
- When the CMSADM backup is **not** available
  - — Recovering from a crash on the first disk
  - — Recovering from a crash on the second disk
  - — Recovering from a crash on the third through twelfth disks.

Recovering Disk(s) When A CMSADM Backup Is Available

If a CMSADM backup is available, then the number of tasks required to recover a disk are reduced. The following sections provide the commands to restore the file systems.

First Disk

This section describes the procedures for replacing the first disk when a CMSADM backup is available and includes the following:

- Reinstall *Solaris* software package (see the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for details.
- Restore the file systems on the first disk.
- Restore the *CentreVu* CMS data.

To restore the first disk, do the following steps:

1. Install a new disk.
2. Power on the system and stop the boot procedure.

   To stop the boot procedure, press the Stop and A keys simultaneously after the display console banner appears, but before the system starts booting the operating system. The system responds with the ok prompt.
3. At the ok prompt, enter the following command:

```
ok probe-scsi-all
```

   The system displays a list of all the SCSI devices.
4. Verify that the first disk is displayed as Target 3 Unit 0.

NOTE:

If the disk is not displayed, then it was not installed correctly.

5. Reinstall the *Solaris* software package, but configure **only** the **first** disk:
   a. Boot from the CD-ROM (for example, use the `boot cdrom` command). See the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for details.
   b. Follow the factory installation procedures for partitioning the first disk **only**. See *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for details. After configuring the first disk, you are at the Customized Disks screen. From the Customized Disks screen, click on `ok`.

CAUTION:

Do **not** configure the second and additional disks.

   c. Continue with the *Solaris* 2.5.1 operating system installation procedures in the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for details.
6. After *Solaris 2.5.1* operating system is booted, log in as root.
7. Eject the CD-ROM with the following command:

```
# eject cdrom
```

All the necessary factory installation procedures to recover the first disk are complete.

NOTE:

Stop after completing the “Installing the *Solaris* 2.5.1 Operating System” section — do **not** install the add-on packages, patches, or *CentreVu* CMS.

8. Log in as root.
9. Insert the first CMSADM backup tape.

10. To restore file systems on the first disk, enter the following commands:

```
# ulimit unlimited
# cpio -icmudfv -C 10240 -I <device name> -M “Please remove
the current tape, insert tape number %d, and press ENTER”
<“/cms?/*”...>
```

Helpful Hints

- If any disks 2 through 12 are present, you must substitute the <“/cms?/*”...> portion of the `cpio` command with “/cms1/*” “/cms2/*” and so on for these disks. For example, if you have a total of four disks, you would substitute <“/cms?/*”...> with “/cms1/*” “/cms2/*” “/cms3/*” for the second, third, and fourth disks. See Table 4-4, “/cms File Systems,” on page 4-10 to determine on which disks the `/cms` file systems reside.
- You must substitute one of these device names for *<device name>* in the `cpio` command:

  `/dev/rmt/0` Indicates the tape drive with the lowest target number in the SCSI chain. See Table 4-26, “Internal SCSI Bus ID Map (c0),” on page 4-172.

  `/dev/rmt/1` Indicates the tape drive with the second lowest target number in the SCSI chain.

  `/dev/rmt/0c` Indicates the tape drive with the lowest target number in the SCSI chain in compressed mode (the QIC 2.5-GB, 4-8GB SLR and the 14-GB tape drives support compressed mode).

  `/dev/rmt/1c` Indicates the tape drive with the second lowest target number in the SCSI chain in compressed mode (the QIC 2.5-GB, 4-8GB SLR and the 14-GB tape drives support compressed mode).
- You may get four error messages concerning the `/home` directory. These errors display when the directory is already present, so you can ignore them.

  The `cpio` command restores all of the entries on the first disk that are needed for all the file systems to be mounted.

11. Because the *Solaris* operating system was installed on the first disk, only the file systems on the first disk are mounted. To mount all file systems on the second through twelfth disks, enter the following command:

```
# mountall
```

    The system displays all the mounted file systems.

12. To verify that all file systems mounted properly, check the displayed response and resolve any problems.
13. After you restore the first disk, synchronize the file systems by entering the following command:

```
# sync
```

14. To reboot the machine, enter the following command:

```
# init 6
```

15. Log in as root.
16. Restore *CentreVu* CMS data from the *CentreVu* CMS maintenance backup.

Second Disk

This section describes the procedures for replacing the second disk when a CMSADM backup is available and includes the following:

- Reformat the disk.
- Repartition the disk.
- Re-create the file systems.
- Restore the file systems.
- Restore the *CentreVu* CMS data.

To restore the second disk, do the following steps:

1. Install a new disk.
2. Power on the system, and stop the boot procedure.

To stop the boot procedure, press the Stop and A keys simultaneously after the display console banner appears, but before the system starts booting the operating system. The system responds with the `ok` prompt.

3. At the `ok` prompt, enter the following command:

```
ok probe-scsi-all
```

The system displays a list of all the SCSI devices.

4. Verify that the second disk is displayed as Target 1 Unit 0.

NOTE:

If the disk is not displayed, then it was not installed correctly.

5. Boot the system:

```
ok boot
```

NOTE:

During the reboot, the system displays one or two messages for each disk that was replaced. These messages inform you to run the `fsck` command and occur because the system cannot find the appropriate file systems on the replacement disks.

6. At each prompt that asks you to enter the `fsck` command for the missing file systems, press Control D simultaneously to continue booting.
7. After the machine is booted, log in as *root*.
8. Verify that no jobs are attempting to access file systems on the second disk (for example, check cron jobs, etc). If any jobs are running, stop them and record the information for your records.
9. To format the disk, see the “Adding SCSI Hard Disk Drives - Disk 2 (One-System Disk)” section in this chapter for procedures. The device name should be `c0t1d0`.

NOTE:

Formatting the disk takes approximately 1 hour.

10. To partition the disk, see the “Adding SCSI Hard Disk Drives - Disk 2 (One-System Disk)” section in this chapter as a guideline, and do the following:

    a. At the `partition>` prompt, enter the following command to check the default partition table:

    ```
    partition> print
    ```

    The system displays the default partition table.

    b. Change the partitions to match Tables 4-5 or 4-6 on pages 4-43 and 4-44.

    c. At the `partition>` prompt, enter the following command to verify that the partition table is accurate:

    ```
    partition> print
    ```

    The system displays the partition table.

    d. After the partitions are correct, label the disk. To label the disk, enter the following command at the `partition>` prompt:

    ```
    partition> label
    ```

    The system responds with a question.

    e. At the question, enter `y`.

    f. To quit the partition submenu, enter `q`.

    g. To quit the format program, enter `q`.

    The system prompt is displayed.

11. Use the “Adding SCSI Hard Disk Drives - Disk 2 (One-System Disk)” section in this chapter as a guideline, and do the following:

    a. Make the file system for the partition by entering the following command:

    ```
    # newfs -m 0 /dev/rdsk/c0t1d0s0
    ```

The system responds with the following question:

```
news: construct a new file system /dev/rdsk/<device>:(y/n)
```

b. Enter y.

NOTE:

These file system(s) were not mounted because they did not exist on the new disk. However, since the operating system was initially installed with these file system(s), they exist in the */etc/vfstab* file.

12. To mount the file system(s) on the second disk, enter the following command:

```
# mountall
```

The system displays all the file systems mounted.

13. To verify that all file systems are mounted properly, check the displayed response and resolve any problems.
14. To ensure that the system initializes cleanly, reboot the system with the following command:

```
# init 6
```

15. Log in as *root*.
16. To restore the file systems on the second disk, enter the following commands:

```
# ulimit unlimited
# cpio -icmudv -C 10240 -I <device name> -M “Please remove the
current tape, insert tape number %d, and press ENTER”
“/cms1/*”
```

NOTE:

You must substitute one of these device names for *<device name>* in the `cpio` command:

`/dev/rmt/0` Indicates the tape drive with the lowest target number in the SCSI chain. See Table 4-26, “Internal SCSI Bus ID Map (c0),” on page 4-172.

`/dev/rmt/1` Indicates the tape drive with the second lowest target number in the SCSI chain.

`/dev/rmt/0c` Indicates the tape drive with the lowest target number in the SCSI chain in compressed mode (the QIC 2.5-GB, 4-8GB SLR and the 14-GB tape drives support compressed mode).

`/dev/rmt/1c` Indicates the tape drive with the second lowest target number in the SCSI chain in compressed mode (the QIC 2.5-GB, 4-8GB SLR and the 14-GB tape drives support compressed mode).

17. Restore *CentreVu* CMS data from the *CentreVu* CMS maintenance backup.
18. Restart any stopped jobs. See Step 8.

Third Through Twelfth Disks

This section describes the procedures for replacing the third through twelfth disks when a CMSADM backup is available and includes the following:

- Reformat the disk.
- Repartition the disk.
- Re-create the file system.
- Restore the file system.
- Restore the *CentreVu* CMS data.

To restore the third through twelfth disk, do the following steps:

1. Install a new disk.
2. Power on the system, and stop the boot procedure.

   To stop the boot procedure, press the Stop and A keys simultaneously after the display console banner appears, but before the system starts booting the operating system. The system responds with the `ok` prompt.

3. At the `ok` prompt, enter the following command:

```
ok probe-scsi-all
```

   The system displays a list of all the SCSI devices.

4. Verify that the replaced disk is displayed. See Table 4-7, “SCSI Information for External Disks,” on page 4-52.

   NOTE:

   If the disk is not displayed, then it was not installed correctly.

5. Boot the system:

```
ok boot
```

   NOTE:

   During the reboot, the system displays one or two messages for each disk that was replaced. These messages inform you to run the `fsck` command and occur because the system cannot find the appropriate file systems on the replacement disks.

6. At each prompt that asks you to enter the `fsck` command for the missing file systems, press Control D simultaneously to continue booting.

7. Log in as *root*.

8. After the machine is booted, verify that no jobs are attempting to access file systems on the disk being replaced (for example, check cron jobs, etc.). If any jobs are running, stop them and record the information for your records.

9. To format the disk, see the “Adding SCSI Hard Disk Drives - Disk 2 (One-System Disk)” section in this chapter for procedures. See Table 4-7, “SCSI Information for External Disks,” on page 4-52 for device names.

   NOTE:

   Formatting the disk takes approximately 1 hour.

10. To partition the disk, see the “Adding SCSI Hard Disk Drives - Disk 2 (One-System Disk)” section in this chapter as a guideline, and do the following:
    a. At the `partition>` prompt, enter the following command to check the default partition table:

```
partition> print
```

    The system displays the default partition table.

    b. Change the `0` partition. Enter un for the partition ID tag, `wm` for the partition permission flags, and `0` as the starting cylinder. For size, enter one of the following values: `2733c` for a 2-GB disk or `2036c` for a 1-GB disk.

    c. At the `partition>` prompt, enter the following command to verify that the partition table is accurate:

```
partition> print
```

    The system displays the partition table.

    d. After the partitions are correct, label the disk. To label the disk, enter the following command at the `partition>` prompt:

```
partition> label
```

    The system responds with a question.

    e. At the question, enter `y`.

    f. To quit the partition submenu, enter `q`.

    g. To quit the format program, enter `q`.

11. Use the “Adding SCSI Hard Disk Drives - Disk 2 (One-System Disk)” section in this chapter as a guideline, and do the following:
    a. To make a file system for the partition, enter the following command:

```
# newfs -m 0 /dev/rdsk/<device>
```

See Table 4-7, “SCSI Information for External Disks,” on page 4-52 for the *<device>*. For each command you enter, the system responds with the following question:

```
news: construct a new file system /dev/rdsk/<device>:(y/n)?
```

b. Each time the message prompt appears, enter y.

NOTE:

These file system(s) were not mounted because they did not exist on the new disk. However, since the operating system was initially installed with these file system(s), they exist in the */etc/vfstab* file.

12. To mount the file system on the new disk, enter the following command:

```
# mountall
```

The system displays all the file systems mounted.

13. To verify that all file systems mounted properly, check the displayed response and resolve any problems.
14. To ensure that the system initializes cleanly, reboot the system using the following command:

```
# init 6
```

15. Log in as root.
16. To restore the file systems on the new disk, enter the following commands:

```
# ulimit unlimited
# cpio -icmudv -C 10240 -I <device name> -M “Please remove the
current tape, insert tape number %d, and press ENTER”
“/cms?/*”
```

Helpful Hints

- You must substitute the "?" in the `cpio` command with the number that corresponds to the `/cms` file system that resides on the disk you are restoring. For example, disk 3="`/cms2/*`", disk 4="`/cms3/*`" and so on for each disk. See Table 4-7, "SCSI Information for External Disks," on page 4-52 to determine on which disks the `/cms` file systems reside.
- You must substitute one of these device names for *<device name>* in the `cpio` command:

  `/dev/rmt/0` Indicates the tape drive with the lowest target number in the SCSI chain. See Table 4-26, "Internal SCSI Bus ID Map (c0)," on page 4-172.

  `/dev/rmt/1` Indicates the tape drive with the second lowest target number in the SCSI chain.

  `/dev/rmt/0c` Indicates the tape drive with the lowest target number in the SCSI chain in compressed mode (the QIC 2.5-GB, 4-8GB SLR and the 14-GB tape drives support compressed mode).

  `/dev/rmt/1c` Indicates the tape drive with the second lowest target number in the SCSI chain in compressed mode (the QIC 2.5-GB, 4-8GB SLR and the 14-GB tape drives support compressed mode).

17. Restore *CentreVu* CMS data from the *CentreVu* CMS maintenance backup.
18. Restart any stopped jobs. See Step 8.

Recovering Disk(s) When No CMSADM Backup Is Available

If no CMSADM backup is available, do the following:

- Restore all the information on the disk from the source (if other than *CentreVu* CMS data).
- Restore the *CentreVu* CMS data.

First Disk

This section describes the procedures for replacing the first disk when a CMSADM backup is not available and includes the following:

- Reinstalling the *Solaris* software package.
- Reinstalling all add-on packages (for example, X.25).
- Reinstalling the *CentreVu* CMS software.
- Running setup.
- Restoring the *CentreVu* CMS data.

If the first disk is destroyed and a backup is not available, do the following steps:

1. Install a new disk.
2. Power on the system, and stop the boot procedure.

   To stop the boot procedure, press the Stop and A keys simultaneously after the display console banner appears, but before the system starts booting the operating system. The system responds with the ok prompt.
3. At the ok prompt, enter the following command:

```
ok probe-scsi-all
```

   The system displays a list of all SCSI devices.
4. Verify that the first disk is displayed as Target 3 Unit 0.

   NOTE:

   If the disk is not displayed, then it was not installed correctly.

5. Reinstall the *Solaris* operating system, all add-on packages, spatches, and *CentreVu* CMS. *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for details on reinstalling the *Solaris* operating system.
6. Run setup. See the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for details.
7. Restore *CentreVu* CMS data from the *CentreVu* CMS backup. See the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for details.
8. Administer Terminals, Printers, Users, etc. as needed.

Second Disk

This section describes the procedures for replacing the second disk when a CMSADM backup is not available and includes the following:

- Reformat the disk.
- Repartition the disk.
- Re-create the file systems.
- Run setup.
- Restore the *CentreVu* CMS data.

If the second disk is destroyed and a backup is not available, do the following steps:

1. Install a new disk.
2. Power on the system, and stop the boot procedure.

   To stop the boot procedure, press the Stop and A keys simultaneously after the display console banner appears, but before the system starts booting the operating system. The system responds with the `ok` prompt.
3. At the `ok` prompt, enter the following command:

```
ok probe-scsi-all
```

   The system displays a list of all the SCSI devices.
4. Verify that the second disk is displayed as Target 1 Unit 0.

   NOTE:

   If the disk is not displayed, then it was not installed correctly.
5. Boot the system.

```
ok boot
```

   NOTE:

   During the reboot, the system displays one or two messages for each disk that was replaced. These messages inform you to run the `fsck` command and occur because the system cannot find the appropriate file systems on the replacement disks.
6. At each prompt that asks you to enter the `fsck` command for the missing file systems, press Control D simultaneously to continue booting.
7. After the machine is booted, verify that no jobs are attempting to access file systems on the second disk (for example, check cron jobs, etc.). If any jobs are running, stop them and record the information for your records.
8. To format the disk, see the “Adding SCSI Hard Disk Drives - Disk 2 (One-System Disk)” section in this chapter for procedures. The device name should be `c0t1d0`.

NOTE:

Formatting the disk takes approximately 1 hour to complete.

9. To partition the disk, see the “Adding SCSI Hard Disk Drives - Disk 2 (One-System Disk)” section in this chapter as a guideline, and do the following:

   a. At the `partition>` prompt, enter the following command to check the default partition table:

   ```
   partition> print
   ```

   The system displays the default partition table.

   b. Change the partitions to match Tables 4-5 or 4-6 on pages 4-43 and 4-44.

   c. At the `partition>` prompt, enter the following command to verify that the partition table is accurate:

   ```
   partition> print
   ```

   The system displays the partition table.

   d. After the partitions are correct, label the disk. To label the disk, enter the following command at the `partition>` prompt:

   ```
   partition> label
   ```

   The system responds with a question.

   e. At the question, enter `y`.

   f. To quit the partition submenu, enter `q`.

   g. To quit the format program, enter `q`.

10. Use the “Adding SCSI Hard Disk Drives - Disk 2 (One-System Disk)” section in this chapter as a guideline, and do the following:

    a. Make file systems for all partitions by entering the following command:

```
# newfs -m 0 /dev/rdsk/<device>
```

    The system responds with the following question:

```
news: construct a new file system /dev/rdsk/<device>:(y/n)?
```

    b. Enter y.

    NOTE:

    These file system(s) were not mounted because they did not exist on the new disk. However, since the operating system was initially installed with these file system(s), they exist in the */etc/vfstab* file.

11. To mount the file system on the second disk, enter the following command:

```
# mountall
```

    The system displays all the file systems mounted.

12. To verify that all file systems mounted properly, check the displayed response and resolve any problems.

13. To ensure that the system initializes cleanly, reboot the system using the following command:

```
# init 6
```

14. Log in as *root*.

15. Run setup.

16. Restore *CentreVu* CMS data from the *CentreVu* CMS maintenance backup. See *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for details.

Third Through Twelfth Disks

This section describes the procedures for replacing the third through twelfth disks:

- Reformat the disk.
- Repartition the disk.
- Re-create the file system.
- Rerun setup.
- Restore the *CentreVu* CMS data.

If the third through twelfth disks are destroyed and a backup is not available to restore the third through twelfth disk, do the following steps:

1. Install a new disk.
2. Power on the system, and stop the boot procedure.

   To stop the boot procedure, press the Stop and A keys simultaneously after the display console banner appears, but before the system starts booting the operating system. The system responds with the `ok` prompt.
3. At the `ok` prompt, enter the following command:

   ```
   ok probe-scsi-all
   ```

   The system displays a list of all the SCSI devices.
4. Verify that the replaced disk is displayed. See Table 4-7, “SCSI Information for External Disks,” on page 4-52.

   NOTE:

   If the disk is not displayed, then it was not installed correctly.
5. Boot the system:

   ```
   ok boot
   ```

   NOTE:

   During the reboot, the system displays one or two messages for each disk that was replaced. These messages inform you to run the `fsck` command and occur because the system cannot find the appropriate file systems on the replacement disks.
6. At each prompt that asks you to enter the `fsck` command for the missing file systems, press Control D simultaneously to continue booting.

7. After the machine is booted, log in as *root*.
8. Verify that no jobs are attempting to access file systems on the disk being replaced (for example, check cron jobs, etc.). If any jobs are running, stop them, and record the information for your records.
9. To format the disk, see the "Adding SCSI Hard Disk Drives - Disk 2 (One-System Disk)" section in this chapter for procedures. See Table 4-7, "SCSI Information for External Disks," on page 4-52 for device names.

   NOTE:

   Formatting the disk takes approximately 1 hour.

10. To partition the disk, see the "Adding SCSI Hard Disk Drives - Disk 2 (One-System Disk)" section in this chapter as a guideline, and do the following:

    a. At the `partition>` prompt, enter the following command to check the default partition table:

    ```
    partition> print
    ```

    The system displays the default partition table.

    b. Change the `0` partition. Enter `un` for the partition ID tag, `wm` for the partition permission flags, and `0` as the starting cylinder. For size, enter one of the following values: `2733c` for a 2-GB disk or `2036c` for a 1-GB disk.

    c. At the `partition>` prompt, enter the following command to verify that the partition table is accurate:

    ```
    partition> print
    ```

    The system displays the partition table.

    d. After the partitions are correct, label the disk. To label the disk, enter the following command at the `partition>` prompt:

    ```
    partition> label
    ```

    The system responds with a question.

    e. At the question, enter `y`.

f. To quit the partition submenu, enter q.

g. To quit the format program, enter q.

11. Use the “Adding SCSI Hard Disk Drives - Disk 2 (One-System Disk)” section in this chapter as a guideline, and do the following:

    a. To make a file system for the partition, enter the following command:

```
# newfs -m 0 /dev/rdsk/<device>
```

    See Table 4-7, “SCSI Information for External Disks,” on page 4-52 for *<device>*.

    For each command you enter, the system responds with the following question:

```
news: construct a new file system /dev/rdsk/<device>:(y/n)?
```

    b. Each time the message prompt appears, enter y.

    NOTE:

    These file system(s) were not mounted because they did not exist on the new disk. However, since the operating system was initially installed with these file system(s), they exist in the */etc/vfstab* file.

12. To mount all file systems on the new disk, enter the following command:

```
# mountall
```

    The system displays all the file systems mounted.

13. To verify that all file systems are mounted properly, check the displayed response, and resolve any problems.

14. To ensure that the system initializes cleanly, reboot the system using the following command:

```
# init 6
```

15. Log in as *root*.
16. Run setup.
17. Restore *CentreVu* CMS data from the *CentreVu* CMS backup.

Recover Specific Database Tables

When a CMSADM file system backup is *not* available to recover specific database tables, then you must do these steps to reinitialize the *CentreVu* CMS database:

1. Rerun the `setup` option on the CMSSVC menu. This reinitializes (removes and creates) all the *CentreVu* CMS *INFORMIX* database tables. See the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for details.
2. Restore the *CentreVu* CMS from the latest *CentreVu* CMS maintenance backups. This restore loads the *CentreVu* CMS data up to the time of the last *CentreVu* CMS backup.

Adding SCSI Hard Disk Drives - Disk 2 (One-System Disk)

Overview

This section describes how to install additional SCSI Hard Disk Drives to expand the capacity of the *Sun SPARCserver* computer. These procedures apply to systems without the *Solstice DiskSuite* 4.1 software installed. For systems with the *Solstice DiskSuite* 4.1 software installed, see “Adding SCSI Hard Disk Drives to a System Running Solstice DiskSuite 4.1 Software” for more information.

Add Disk 2

To add disk 2 to the *Sun SPARCserver* computer that is already up and running, do the following steps:

1. Make sure the system is in the firmware mode (use the `init 0` command to get to the `ok` prompt).
2. Do the following in sequential order:
   a. Turn off the *Sun SPARCserver* computer.
   b. Turn off the system monitor.
   c. Turn off all external devices starting with the device closest to the *Sun SPARCserver* computer and working toward the farthest device.
3. Install disk 2 into the *Sun SPARCserver* computer. See the *CentreVu Call Management System Release 3 Version 6 Sun SPARCserver Computers, Hardware Installation* (585-215-857) document for details.
4. Do the following in sequential order:
   a. Turn on devices attached to the *Sun SPARCserver* computer starting with the device at the end of the SCSI chain and working toward the computer.
   b. Turn on the *Sun SPARCserver* computer.
   c. Turn on the system monitor.
5. Press **Stop** **A**. The system responds:

```
> ok
```

6. To verify that the system sees all SCSI devices, enter the following command:

```
ok probe-scsi-all
```

The system responds:

```
/iommu@f,e0000000/sbus@f.e0001000/esp@3,200000
Target 1
  Unit 0 Disk SEAGATE ST14801 SUN04246266 Copyright (C) 1991
Target 3
  Unit 0 Disk SEAGATE ST14801 SUN04246266 Copyright (C) 1991


. . . . .
. . . . .
. . . . .
Target 6
  Unit 0 Disk Removable Read Only Device SONY CD-ROM CDU-8012

ok
```

NOTE:

The actual response (devices listed) depends on the devices installed on the SCSI bus.

7. Enter the following command:

```
> ok boot -r
```

The system responds:

```
Boot device ...
   .
   .
   .
Configuring the /dev directory
Configuring the /dev directory (compatibility devices)
The system is coming up. Please wait.
checking filesystems
/dev/rdsk/c0t1d0s0:  is clean
/dev/rdsk/c0t3d0s5:  is clean
/dev/rdsk/c0t2d0s0:  is clean    ***if c0t2d0 is already in system***
/dev/rdsk/c0t1d0s1:  is clean
/dev/rdsk/c0t1d0s3:  is clean
/dev/rdsk/c0t1d0s4:  is clean
/dev/rdsk/c0t2d0s0 mounted  ***if c0t2d0 is already in system***
/dev/rdsk/c0t1d0s3 mounted
/dev/rdsk/c0t1d0s1 mounted
/dev/rdsk/c0t3d0s5 mounted
/dev/rdsk/c0t1d0s0 mounted
checking for crash dump ...
starting routing daemon.
starting rpc services: rpcbind deyserv kerbd done.
Setting default interface for multicast: add net 224.090.0 gateway
hostname.
syslog service starting.
Print services started.
volume management starting.

Starting terminal server network daemons.
Network Terminal Server daemon(s) startup complete.
The system is ready.

hostname console login:
```

8. Log in as *root*. The system displays the last login on the console (date and time).

Format Disk 2

⚠ CAUTION:

Only **TSC PERSONNEL** should perform the procedures in this section.

To format the disks, do the following steps:

1. At the system prompt, enter the following command:

```
# format
```

The system responds:

```
Searching for disks ... done

AVAILABLE DISK SELECTIONS:
   0.  c0t1d0 <SUN1.05 cyl 2036 alt 2 hd 14 sec 727
       /iommu@f,e0000000/sbus@f,e0001000/espdma@f,800000/sd@1,0
   1.  c0t2d0 <SUN1.05 cyl 2036 alt 2 hd 14 sec 727
       /iommu@f,e0000000/sbus@f,e0001000/espdma@f,800000/sd@2,0
   2.  c0t3d0 <SUN1.05 cyl 2036 alt 2 hd 14 sec 727
       /iommu@f,e0000000/sbus@f,e0001000/espdma@f,800000/sd@3,0
   3.  c1t1d0 <SUN1.05 cyl 2036 alt 2 hd 14 sec 727
       /iommu@f,e0000000/sbus@f,e0001000/dma@1,81000/sd@1,0
   4.  c1t2d0 <SUN1.05 cyl 2036 alt 2 hd 14 sec 727
       /iommu@f,e0000000/sbus@f,e0001000/dma@1,81000/sd@2,0
Specify disk (enter its number):
```

2. Enter the disk number for disk c0t1d0 (for example, 0).

```
Specify disk (enter its number): 0
```

The system displays the disk you are adding (for example, `c0t1d0` for disk 2) and the format menu:

```
selecting c0t1d0

FORMAT MENU:
disk
type
partition
current
format
repair
label
analyze
defect
backup
verify
save
inquiry
volname
quit

format>
```

3. At the `format>` prompt, enter `format`. The system responds:

```
Ready to format. Formatting cannot be interrupted
and takes 23 minutes (estimated). Continue?
```

4. To continue formatting, enter y. The system responds:

```
Beginning formatting. The current time is <date>.
Formatting...
```

5. Wait for the disk to format and verify the media.

   When the disk is formatted, the system responds:

```
done.

Verifying media..
        pass 0 - pattern = 0xc6dec6de
   2035/12/18
        pass 1 - pattern = 0x6db6db6d
   2035/12/18

Total of 0 defective blocks repaired.
format>
```

   Now you can partition the disk.

Partition Disk 2

To partition the disks, do the following steps:

1. At the `format>` prompt, enter the following command, and press **Enter**:

```
format> partition
```

The program displays a confirmation message and the Partition menu:

```
***Do not format the drive, it is formatted already***

PARTITION MENU:
0         -change ‘0’partition
1         -change ‘1’partition
2         -change ‘2’partition
3         -change ‘3’partition
4         -change ‘4’partition
5         -change ‘5’partition
6         -change ‘6’partition
7         -change ‘7’partition
select    -select a predefined table
modify    -modify a predefined partition table
name      -name the current table
print     -display the current table
label     -write partition map and label to the disk
quit

partition>
```

2. At the `partition>` prompt, enter the `print` command to check the default partition table.

```
partition> print
```

The system displays the default partition table.

Most likely, you will need to change the partitions to correspond to your system’s internal disk configuration.

3. Use the following decision table to determine which table to use to partition disk 2:

IF disk 1 is. . .	AND disk 2 is. . .	THEN use. . .
2.1-GB	2.1-GB	Table 4-5
1.05-GB	2.1-GB	Table 4-6
1.05-GB	1.05-GB	Table 4-6

NOTE:

A 2.1-GB disk 1 and a 1.05-GB disk 2 is not a valid configuration. See the “Valid Internal Disk Configurations” section in this chapter.

Table 4-5: Partitioning Information for Disk 2 if Disk 1 = 2.1-GB

			2.1-GB Disk 2	
Partitions	**Partition ID Tag**	**Partition Permission Flags**	**Start Cylinder**	**Size (Cylinders)**
0	unassigned	wm	0	2733
1	unassigned	wm	0	0
2	backup	wm	0	2733
3-7	unassigned	wm	0	0

Table 4-6: Partitioning Information for Disk 2 if Disk 1 = 1.05-GB

					2.1-GB Disk 2		1.05-GB Disk 2	
If equipped RAM in (MB) is:		Partition	Partition ID Tag	Partition Permission Flags	Start Cylinder	Size (Cylinders)	Start Cylinder	Size (Cylinders)
more than	but less than or equal to							
0	96	0	unassigned	wm	0	2733	0	2036
		1	unassigned	wm	0	0	0	0
		2	backup	wm	0	2733	0	2036
		3-7	unassigned	wm	0	0	0	0
96	160	0	unassigned	wm	0	2473	0	1776
		1	swap	wu	2473	260	1776	260
		2	backup	wm	0	2733	0	2036
		3-7	unassigned	wm	0	0	0	0
160	224	0	unassigned	wm	0	2213	0	1516
		1	swap	wu	2213	520	1516	520
		2	backup	wm	0	2733	0	2036
		3-7	unassigned	wm	0	0	0	0
224	288	0	unassigned	wm	0	1953	0	1256
		1	swap	wu	1953	780	1256	780
		2	backup	wm	0	2733	0	2036
		3-7	unassigned	wm	0	0	0	0
288	352	0	unassigned	wm	0	1693	0	996
		1	swap	wu	1693	1040	996	1040
		2	backup	wm	0	2733	0	2036
		3-7	unassigned	wm	0	0	0	0
352	416	0	unassigned	wm	0	1433	0	736
		1	swap	wu	1433	1300	736	1300
		2	backup	wm	0	2733	0	2036
		3-7	unassigned	wm	0	0	0	0
416	512	0	unassigned	wm	0	1173	0	476
		1	swap	wu	1173	1560	476	1560
		2	backup	wm	0	2733	0	2036
		3-7	unassigned	wm	0	0	0	0

4. At the `partition>` prompt, enter `0.`

```
partition> 0
```

   The system responds:

```
Enter partition id tag [unassigned]:
```

5. Enter un for unassigned.

   The system responds:

```
Enter partition permission flags [wm]:
```

6. Enter `wm` to indicate the partition is writable and mountable.

   The system responds:

```
Enter new starting cyl [0]:
```

7. Enter `0` as the starting cylinder.

   The system responds:

```
Enter partition size [205632b, 204c, 100.41mb]:
```

8. Enter the size for partition `0` (see Tables 4-5 or 4-6).

   The system returns to the `partition>` prompt.

9. If you need to set up swap space on disk 2, continue with Step 10; otherwise, go to Step 15.

10. At the `partition>` prompt, enter `1`.

```
partition> 1
```

    The system responds:

```
Enter partition id tag [unassigned]:
```

11. Enter `swap`.

    The system responds:

```
Enter partition permission flags [wm]:
```

12. Enter `wu` to indicate that the partition is writable and unmountable.

    The system responds:

```
Enter new starting cyl [0]:
```

13. Enter the starting cylinder (see Table 4-6).

    The system responds:

```
Enter partition size [205632b, 204c, 100.41mb]:
```

14. Enter the size of the swap partition (see Table 4-6).

    The system returns to the `partition>` prompt.

15. At the `partition>` prompt, enter the `print` menu option to verify that the partition table is accurate.

```
partition> print
```

16. At the `partition>` prompt, enter the `name` menu option.

```
partition> name
```

17. Enter “cms1” as the `table name.`

```
partition> name
Enter table name (remember quotes): “cms1”
```

18. At the `partition>` prompt, enter the `label` menu option.

```
partition> label
```

19. To label the disk, enter `y` at the message prompt.

```
partition> label
Ready to label disk, continue: y
```

20. To exit the partition menu, enter `q` at the `partition>` prompt and `q` at the `format>` prompt.

    The system responds:

```
partition> q
format > q
#
```

Construct a New File System Disk 2

See the “Construct a New File System Disk 2” section on page 4-61 of this chapter.

Mount the File System Disk 2

See the “Mount the File System Disk 2” section on page 4-61 of this chapter.

Set Up the Swap Space Disk 2

If you have partitioned disk 2 to contain swap space, the `/etc/vfstab` file must be updated.

NOTE:

If no swap space was partitioned on disk 2, then you do not need to change the /etc/vfstab file.

If the swap space was partitioned on disk 2, do the following:

1. Edit the `/etc/vfstab` file to add the following line:

```
/dev/dsk/c0t1d0s1 - - swap - no -
```

2. Verify that the `/etc/vfstab` file is correct by entering the `grep` command.

```
# grep swap /etc/vfstab
```

The following lines should be displayed (they represent the swap space on disk 1 and disk 2).

```
/dev/dsk/c0t3d0s1 -- swap - no -
/dev/dsk/c0t1d0s1 -- swap - no -
```

NOTE:

The following comment line may also be displayed:

```
# swap - /tmp tmpfs - yes -
```

Ignore this line.

3. Reboot the system using the init command.

```
# init 6
```

You should perform a CMSADM file system backup to save the updated system software and hardware configuration. See the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document.

Adding SCSI Hard Disk Drives - Disk 3 through 12 (One-System Disk)

Overview

This section describes how to install additional SCSI Hard Disk Drives to expand the capacity of the *Sun SPARCserver* computer. These procedures apply to systems without the *Solstice DiskSuite* software. For systems with the *Solstice DiskSuite* software, see “Adding SCSI Hard Disk Drives to a System Running Solstice DiskSuite 4.1 Software” for details.

Add SCSI Disks

To add more SCSI Disks to a *Sun SPARCserver* computer that is already up and running, do the following steps:

1. Make sure the system is in the firmware mode (use the `init 0` command to get to the `ok` prompt).
2. At the `ok` prompt, enter the following command:

   ```
   show-sbus
   ```

This command provides a listing of the SBus cards and their locations in your system. Refer to “*Identifying Installed SBus Cards*” section in *CentreVu Call Management System Release 3 Version 6 Sun SPARCserver Computers, Hardware Installation* (585-215-857) document for more information.

3. Do the following in sequential order:
   a. Turn off the *Sun SPARCserver* computer.
   b. Turn off the system monitor.
   c. Turn off all external devices starting with the device closest to the *Sun SPARCserver* computer and working toward the farthest device.
4. Install the first additional FSBE/S card in the next available SBus slot.

   NOTE:

   You need to install additional FSBE/S cards when you have reached the *CentreVu* CMS limit on the number of hard disks per SCSI controller. This limit is four for systems with one-system disk and three for systems with two-system disks. See the “Disk Recovery” section of this chapter to determine your disk scheme.

5. Install the second FSBE/S card in the next available SBus slot. See the *Sun FSBE/S SBus Card Manual* for more details.
6. Set the SCSI IDs on the external SCSI disks.
7. Connect the external SCSI disks to the desired FSBE/S cards.

   See the *Sun FSBE/S SBus Card Manual* in *CentreVu Call Management System Release 3 Version 6 Sun SPARCserver Computers, Hardware Installation* (585-215-857) document for details.

   See the *CentreVu Call Management System Release 3 Version 6 Sun SPARCserver Computers, Hardware Installation* (585-215-857) document for details.
8. Do the following in sequential order:
   a. Turn on devices attached to the *Sun SPARCserver* computer starting with the device at the end of the SCSI chain and working toward the computer.
   b. Turn on the *Sun SPARCserver* computer.
   c. Turn on the system monitor.
9. Enter Stop A. The system responds:

```
ok
```

10. To verify that the system sees all SCSI devices, enter the following command:

```
ok probe-scsi-all
```

The system responds:

```
/iommu@f,e0000000/sbus@f.e0001000/esp@3,200000
Target 1
  Unit 0 Disk SEAGATE ST14801 SUN04246266 Copyright (C) 1991
Target 3
  Unit 0 Disk SEAGATE ST14801 SUN04246266 Copyright (C) 1991


. . . . .
. . . . .
. . . . .
Target 6
  Unit 0 Disk Removable Read Only Device SONY CD-ROM CDU-8012

ok
```

NOTE:

The actual response (devices listed) depends on the devices installed on the SCSI bus (see Table 4-7 below).

Table 4-7: SCSI Information for External Disks

Device	Disk	Target	Unit	File System
c0t2d0s0	3	2	0	/cms2
c0t0d0s0	4	0	0	/cms3
c1t1d0s0	5	1	1	/cms4
c1t2d0s0	6	2	1	/cms5
c1t3d0s0	7	3	1	/cms6
c1t4d0s0	8	4	1	/cms7
c2t1d0s0	9	1	2	/cms8
c2t2d0s0	10	2	2	/cms9
c2t3d0s0	11	3	2	/cms10
c2t4d0s0	12	4	2	/cms11

11. Enter the following command:

```
ok boot -r
```

The system responds:

```
Boot device ...
   .
   .
   .
Configuring the /dev directory
Configuring the /dev directory (compatibility devices)
The system is coming up. Please wait.
checking filesystems
/dev/rdsk/c0t1d0s0:  is clean
/dev/rdsk/c0t3d0s5:  is clean
/dev/rdsk/c0t2d0s0:  is clean  ***if c0t2d0 is already in system***
/dev/rdsk/c0t1d0s1:  is clean
/dev/rdsk/c0t1d0s3:  is clean
/dev/rdsk/c0t1d0s4:  is clean
/dev/rdsk/c0t2d0s0 mounted     ***if c0t2d0 is already in system***
/dev/rdsk/c0t1d0s3 mounted
/dev/rdsk/c0t1d0s1 mounted
/dev/rdsk/c0t3d0s5 mounted
/dev/rdsk/c0t1d0s0 mounted
checking for crash dump ...
starting routing daemon.
starting rpc services: rpcbind deyserv kerbd done.
Setting default interface for multicast: add net 224.090.0 gateway
hostname.
syslog service starting.
Print services started.
volume management starting.

Starting terminal server network daemons.
Network Terminal Server daemon(s) startup complete.
The system is ready.

hostname console login:
```

12. Log in as root.

Format Disks

To format the disks, do the following steps:

1. At the system prompt, enter the following command:

```
# format
```

   The following appears:

```
Searching for disks ... done

AVAILABLE DISK SELECTIONS:
   0.  c0t1d0 <SUN1.05 cyl 2036 alt 2 hd 14 sec 727
       /iommu@f,e0000000/sbus@f,e0001000/espdma@f,800000/sd@1,0
   1.  c0t2d0 <SUN1.05 cyl 2036 alt 2 hd 14 sec 727
       /iommu@f,e0000000/sbus@f,e0001000/espdma@f,800000/sd@2,0
   2.  c0t3d0 <SUN1.05 cyl 2036 alt 2 hd 14 sec 727
       /iommu@f,e0000000/sbus@f,e0001000/espdma@f,800000/sd@3,0
   3.  c1t1d0 <SUN1.05 cyl 2036 alt 2 hd 14 sec 727
       /iommu@f,e0000000/sbus@f,e0001000/dma@1,81000/sd@1,0
   4.  c1t2d0 <SUN1.05 cyl 2036 alt 2 hd 14 sec 727
       /iommu@f,e0000000/sbus@f,e0001000/dma@1,81000/sd@2,0
Specify disk (enter its number):
```

   NOTE:

   Be careful to specify the number that exactly matches the disk you are adding. See Table 4-7, “SCSI Information for External Disks,” on page 4-52 for more information.

2. Enter the number that corresponds to the disk you added.

```
Specify disk (enter its number):
```

The system displays the disk you are adding (for example, `c1t1d0` for disk 5) and the format menu:

```
selecting c1t1d0

FORMAT MENU:
disk
type
partition
current
format
repair
label
analyze
defect
backup
verify
save
inquiry
volname
quit

format>
```

3. At the `format>` prompt, enter `format`.

   The system responds:

```
Ready to format. Formattting cannot be interrupted
and takes 23 minutes (estimated). Continue?
```

4. To continue formatting, enter `y`. The system responds:

```
Beginning formatting. The current time is <date>.
Formatting...
```

5. Wait for the disk to format and verify the media. When the disk is formatted, the system responds:

```
done.

Verifying media..
        pass 0 - pattern = 0xc6dec6de
   2035/12/18
        pass 1 - pattern = 0x6db6db6d
   2035/12/18

Total of 0 defective blocks repaired.
format>
```

Now you can partition the disk.

Partition Disks

To partition the disks, do the following steps:

1. At the `format>` prompt, enter the following command:

```
format> partition
```

The program displays a confirmation message and the Partition menu.

```
***Do not format the drive, it is formatted already***

PARTITION MENU:
0         -change ‘0’partition
1         -change ‘1’partition
2         -change ‘2’partition
3         -change ‘3’partition
4         -change ‘4’partition
5         -change ‘5’partition
6         -change ‘6’partition
7         -change ‘7’partition
select    -select a predefined table
modify    -modify a predefined partition table
name      -name the current table
print     -display the current table
label     -write partition map and label to the disk
quit

partition>
```

2. At the `partition>` prompt, enter the `print` menu option to check the default partition table.

```
partition> print
```

The system displays the default partition table.

You may have to set up the partitions on the external disks you added. Table 4-8 lists the partitioning information for both 2.1- and 1.05-GB external disks.

Table 4-8: Partitioning Information for External Disks

			2.1-GB Disk		1.05-GB Disk	
Partitions	**Partition ID Tag**	**Partition Permission Flags**	**Start Cylinder**	**Size (Cylinders)**	**Start Cylinder**	**Size (Cylinders)**
0	unassigned	wm	0	2733	0	2036
1	unassigned	wm	0	0	0	0
2	backup	wm	0	2733	0	2036
3-7	unassigned	wm	0	0	0	0

3. At the `partition>` prompt, enter `0.`

```
partition> 0
```

The system responds:

```
Enter partition id tag [unassigned]:
```

4. Enter un for unassigned.

The system responds:

```
Enter partition permission flags [wm]:
```

5. Enter `wm` to indicate that the partition is writable and mountable.

The system responds:

```
Enter new starting cyl [0]:
```

6. Enter `0` as the starting cylinder.

   For example, the system responds:

```
Enter partition size [205632b, 204c, 100.41mb]:
```

7. Enter the size of the partition (see Table 4-8).

   The system responds with the `partition>` prompt.

8. At the `partition>` prompt, enter `1`.

```
partition> 1
```

9. Enter `un` for the partition ID tag, `wm` for the partition permission flags, and `0` as the starting cylinder.
10. Enter `0c` for the size of the partition.

```
Enter size of partition ’1’ [133056, 132c,64.9mb]: 0c
```

11. At the `partition>` prompt, enter the `print` menu option to verify that the partition table is accurate (see Table 4-8).

```
partition> print
```

12. At the `partition>` prompt, enter the `name` menu option.

```
partition> name
```

13. Enter the *table name*.

```
partition> name
Enter table name (remember quotes): "cms?"
```

NOTE:

The variable *?* represents a number and varies depending on the disk you added (see Table 4-7, "SCSI Information for External Disks," on page 4-52).

14. At the partition> prompt, enter the label menu option.

```
partition> label
```

15. To label the disk, enter y at the message prompt.

```
partition> label
Ready to label disk, continue: y
```

16. Repeat the above partitioning procedure for each disk that you are adding. The system responds:

```
partition>
```

17. To exit the partition menu, enter q at the partition> prompt and q at the format> prompt. The system responds:

```
partition> q
format > q
#
```

Construct a New File System

To construct a new file system, do the following:

1. Enter the following command at the system prompt:

```
# newfs -m 0 /dev/rdsk/<device>
```

NOTE:

The value you enter for *<device>* varies depending on the disk you added (see Table 4-7, “SCSI Information for External Disks,” on page 4-52).

The system responds:

```
# newfs -m 0 /dev/rdsk/<device>
newfs: construct a new file system /dev/rdsk/<device>: (y/n)?
```

2. At the message prompt, enter y. The system responds:

```
/dev/rdsk/<device>: ...
   .
   .
   .
#
```

3. Repeat the above new file system procedure for each disk you added; then, mount the file system.

Mount the File System

To mount the file system, do the following steps:

1. Edit the `/etc/vfstab` file by entering the following command:

```
# vi /etc/vfstab
```

The system responds:

```
<contents of the file is displayed>
   .
   .
   .
```

2. Add the following line to the */etc/vfstab* file:

   `/dev/dsk/<device> /dev/rdsk/<device> /cms? ufs <nn> yes`

   NOTE:

   The variables *<device>* and *?* in the above string vary depending on the disk you added (see Table 4-7). The variable *<nn>* represents the mount sequence number (see Table 4-9).

3. Write and quit the file.
4. Make a new directory for each new disk added to the *Sun SPARCserver* computer. At the system prompt, enter the following command:

```
# mkdir /cms?
```

NOTE:

The variable *?* represents a number and varies depending on the disk you added (see Table 4-9).

Table 4-9: Make Directory for SCSI Disks

Directory	Description	Mount Sequence Number
/cms1	****for 2nd disk on (c0)****	10
/cms2	****for 3rd disk on (c0)****	11
/cms3	****for 4th disk on (c0)****	12
/cms4	****for 1st disk on (c1)****	13
/cms5	****for 2nd disk on (c1)****	14

Table 4-9: Make Directory for SCSI Disks

Directory	Description	Mount Sequence Number
/cms6	***for 3rd disk on (c1)***	15
/cms7	***for 4th disk on (c1)***	16
/cms8	***for 1st disk on (c2)***	17
/cms9	***for 2nd disk on (c2)***	18
/cms10	***for 3rd disk on (c2)***	19
/cms11	***for 4th disk on (c2)***	20

5. Enter the `mountall` command at the system prompt.

```
# mountall
```

NOTE:

The `mountall` command will mount all of the file systems. You can verify that the file systems you added were mounted correctly by reviewing the displayed output. See Table 4-10 for other disk possibilities.

For example, messages containing the following file system information may be displayed:

Table 4-10: Mount File System for SCSI Disks

Disk with Mounted File System	Description
/dev/dsk/c0t1d0s0 /cms1	***for 2nd disk on (c0)***
/dev/dsk/c0t2d0s0 /cms2	***for 3rd disk on (c0)***
/dev/dsk/c0t0d0s0 /cms3	***for 4th disk on (c0)***
/dev/dsk/c1t1d0s0 /cms4	***for 1st disk on (c1)***
/dev/dsk/c1t2d0s0 /cms5	***for 2nd disk on (c1)***
/dev/dsk/c1t3d0s0 /cms6	***for 3rd disk on (c1)***
/dev/dsk/c1t4d0d0 /cms7	***for 4th disk on (c1)***

Table 4-10: Mount File System for SCSI Disks (Contd)

Disk with Mounted File System	Description
/dev/dsk/c2t1d0s0 /cms8	****for 1st disk on (c2)****
/dev/dsk/c2t2d0s0 /cms9	****for 2nd disk on (c2)****
/dev/dsk/c2t3d0s0 /cms10	****for 3rd disk on (c2)****
/dev/dsk/c2t4d0s0 /cms11	****for 4th disk on (c2)****

If error messages are displayed and the file system failed to mount, you must unmount the problem file system and edit the files again.

- To unmount the file system, enter one of the following commands:

```
# umount /dev/dsk/<device>
or
# umount /cms?
```

- Repeat the mount procedures described in steps 1-5.

6. To display how the disks are allocated (in kilobytes) for a successful mount, enter the following command:

```
# df -k
```

The system responds:

```
    Filesystem      kbytes    used    avail   capacity   Mounted on
/dev/dsk/c0t3d0s0   17300       -       -        -       /
/dev/dsk/c0t3d0s4  129600       -       -        -       /usr
/proc                   0       0       0       0%       /proc
fd                      0       0       0       0%       /dev/fd
/dev/dsk/c0t3d0s5  248447                                /var
/dev/dsk/c0t3d0s7                -       -        -       /cms
/dev/dsk/c0t1d0s0                -       -        -       /cms1
/dev/dsk/c0t2d0s0                -       -        -       /cms2
/dev/dsk/c0t0d0s0                -       -        -       /cms3
/dev/dsk/c1t1d0s0                -       -        -       /cms4
/dev/dsk/c1t2d0s0                -       -        -       /cms5
/dev/dsk/c1t3d0s0                -       -        -       /cms6
/dev/dsk/c1t4d0s0                -       -        -       /cms7
/dev/dsk/c2t1d0s0                -       -        -       /cms8
/dev/dsk/c2t2d0s0                -       -        -       /cms9
/dev/dsk/c2t3d0s0                -       -        -       /cms10
/dev/dsk/c2t4d0s0                -       -        -       /cms11
```

NOTE:

Disks for `/cms2` through `/cms11` are mounted only if they are installed.

You should perform a CMSADM file system backup to save the updated system software and hardware configuration. See the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for details.

Recovering from Disk Corruption (Two-System Disks)

Overview

This section provides information about file system restore procedures and explains how to recover *CentreVu* CMS databases after disk corruption occurs.

NOTE:

The procedures in this section apply only to non-DiskSuite systems with "two- system disks" partitioning schemes. If your system has *Solstice DiskSuite* software installed, use the procedures in "Recovering from Disk Corruption (Systems running Solstice DiskSuite 4.1 Software)" on page 4-113. If you have a "one-system disk" partitioning scheme, use the procedures in "Recovering from Disk Corruption (One-System Disk)" on page 4-8.

The difference between disk corruption and a disk crash is the extent of the damage involved. On a corrupted disk, the disk and the file systems are still intact, and minor repair to the disk is needed. On a disk crash, the disk failed and needs to be replaced or reformatted. If a disk crashed and needs to be replaced, see the "Recovering from a Disk Crash (Two-System Disks)" section in this chapter for details.

CAUTION:

Only **TSC PERSONNEL** should perform the procedures in this section.

The procedures for recovering the disk depends on if a backup is available and which disk was effected. This section is organized as follows:

- When the CMSADM backup is available
  - — Recovering from corruption on the first disk
  - — Recovering from corruption on the second disk
  - — Recovering from corruption on the third through ninth disks
- When the CMSADM backup is **not** available
  - — Recovering from corruption on the first disk
  - — Recovering from corruption on the second disk
  - — Recovering from corruption on the third through ninth disks.

Restore Disk(s) When a CMSADM Backup Is Available

If a CMSADM backup is available, do the following tasks:

- Restore the file systems on the disk from the latest CMSADM backup.
- Restore the latest *CentreVu* CMS data from the latest *CentreVu* CMS backup.

The following sections provide the commands used to restore the file system from the CMSADM backup.

First Disk

Use the procedures in this section to restore the first disk when a CMSADM backup is available. Refer to Tables 4-11 and 4-12 to determine how the data is stored on the first and second disks.

When a CMSADM backup is available, do the following:

- Restore the file systems
- Restore the *CentreVu* CMS data.

Table 4-11: First Internal Disk - Partitioning Information

Device	Disk	Partition	File System
c0t3d0s0	1	0	/
c0t3d0s1	1	1	swap
c0t3d0s5	1	5	/opt
c0t3d0s6	1	6	/usr
c0t3d0s7	1	7	/var

Table 4-12: Second Internal Disk - Partitioning Information

Device	Disk	Partition	File System
c0t1d0s0	2	0	/usr/dbtemp
c0t1d0s1	2	1	/export/home
c0t1d0s3	2	3	/dump
c0t1d0s4	2	4	/cms

To restore the first disk, do the following steps:

1. Log in as root.
2. Insert the first backup tape.
3. At the system prompt, enter the following command:

```
# cpio -icmudf -C 10240 -I <device name> -M "Please remove the
current tape, insert tape number %d, and press ENTER"
"/usr/dbtemp/*" "/export/home/*" "/dump/*" "/cms/*"
<"/cms?/*"...>
```

Helpful Hints

- If any disks 3 through 9 are present, you must substitute the <"/cms?/*"...> portion of the `cpio` command with "/cms1/*" "/cms2/*" and so on for these disks. For example, if you have a total of five disks, you would substitute <"/cms?/*"...> with "/cms1/*" "/cms2/*" "/cms3/*" for the third, fourth, and fifth disks. See Table 4-13, "Additional External Disks - Partitioning Information," on page 4-71 to determine on which disks the `/cms` file systems reside.
- You must substitute one of these device names for *<device name>* in the `cpio` command:

  `/dev/rmt/0` Indicates the tape drive with the lowest target number in the SCSI chain. See Table 4-26, "Internal SCSI Bus ID Map (c0)," on page 4-172.

  `/dev/rmt/1` Indicates the tape drive with the second lowest target number in the SCSI chain.

  `/dev/rmt/0c` Indicates the tape drive with the lowest target number in the SCSI chain in compressed mode (the QIC 2.5-GB, 4-8GB SLR and the 14-GB tape drives support compressed mode).

  `/dev/rmt/1c` Indicates the tape drive with the second lowest target number in the SCSI chain in compressed mode (the QIC 2.5-GB, 4-8GB SLR and the 14-GB tape drives support compressed mode).
- You may get four error messages concerning the `/home` directory. These errors display when the directory is already present, so you can ignore them.

4. If the restore requires more than one tape, follow the directions displayed on the screen:

```
Please remove the current tape, insert tape number <X>, and
press ENTER.
```

   The system responds:

```
XXXXXX Blocks
#
```

5. After you restore the first disk, synchronize the file systems by entering the following commands:

```
# sync
```

6. After the first disk is restored, you should reboot the system via the following system command:

```
# init 6
```

7. Restore the *CentreVu* CMS from the latest *CentreVu* CMS maintenance backups. See the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for details.

Second Disk

Use the procedures in this section to restore the second disk when a CMSADM backup is available. Refer to Table 4-12 to determine how the data is stored on the second disk.

If a CMSADM backup is available, do the following:

- Restore the file systems
- Restore the *CentreVu* CMS data.

Do these steps to restore the second disk:

1. Log in as *root*.

2. Insert the first backup tape.

3. To restore the data, enter the following commands at the system prompt:

```
# ulimit unlimited
# cpio -icmud -C 10240 -I <device name> -M “Please remove the
current tape, insert tape number %d, and press ENTER”
“/usr/dbtemp/*” “/export/home/*” “/dump/*” “/cms/*”
```

Helpful Hints

- Enter the above `cpio` command all on one line. The `cpio` command for restoring the second disk uses the `-icmud` options of the command, instead of `-icmudf`.
- You must substitute one of these device names for *<device name>* in the `cpio` command:

  `/dev/rmt/0` Indicates the tape drive with the lowest target number in the SCSI chain. See Table 4-26, “Internal SCSI Bus ID Map (c0),” on page 4-172.

  `/dev/rmt/1` Indicates the tape drive with the second lowest target number in the SCSI chain.

  `/dev/rmt/0c` Indicates the tape drive with the lowest target number in the SCSI chain in compressed mode (the QIC 2.5-GB, 4-8GB SLR and the 14-GB tape drives support compressed mode).

  `/dev/rmt/1c` Indicates the tape drive with the second lowest target number in the SCSI chain in compressed mode (the QIC 2.5-GB, 4-8GB SLR and the 14-GB tape drives support compressed mode).

4. Verify that the *CentreVu* CMS data is accessible (via cmsql), and resolve any problems before proceeding.
5. Restore the *CentreVu* CMS from the latest *CentreVu* CMS maintenance backups. See the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for details.

Third Through Ninth Disks

Use the procedures in this section to restore data on the third through ninth disk when a CMSADM backup is available. Refer to Table 4-13 to determine how the data is stored on the third through ninth disk.

If a CMSADM backup is available, do the following:

- Restore the file system
- Restore the *CentreVu* CMS data.

Table 4-13: Additional External Disks - Partitioning Information

Device	Disk	File System
c0t2d0s0	3	/cms1
c1t1d0s0	4	/cms2
c1t2d0s0	5	/cms3
c1t3d0s0	6	/cms4
c2t1d0s0	7	/cms5
c2t2d0s0	8	/cms6
c2t3d0s0	9	/cms7

Do these steps to restore the third through ninth disk:

1. Log in as root.
2. Insert the first backup tape.
3. To restore the data, enter the following commands at the system prompt:

```
# ulimit unlimited
# cpio -icmud -C 10240 -I <device name> -M "Please remove the
current tape, insert tape number %d, and press ENTER"
"/cms?/*"
```

Helpful Hints

- You must substitute the "?" in the `cpio` command with the number that corresponds to the `/cms` file system that resides on the disk you are restoring. For example, disk 3="`/cms1/*`", disk 4="`/cms2/*`", disk 5="`/cms3/*`" and so on for each disk. Refer to Table 4-13 to determine on which disks the `/cms` file systems reside.

- You must substitute one of these device names for *<device name>* in the `cpio` command:

  `/dev/rmt/0` Indicates the tape drive with the lowest target number in the SCSI chain. See Table 4-26, “Internal SCSI Bus ID Map (c0),” on page 4-172.

  `/dev/rmt/1` Indicates the tape drive with the second lowest target number in the SCSI chain.

  `/dev/rmt/0c` Indicates the tape drive with the lowest target number in the SCSI chain in compressed mode (the QIC 2.5-GB, 4-8GB SLR and the 14-GB tape drives support compressed mode).

  `/dev/rmt/1c` Indicates the tape drive with the second lowest target number in the SCSI chain in compressed mode (the QIC 2.5-GB, 4-8GB SLR and the 14-GB tape drives support compressed mode).

4. Verify that the *CentreVu* CMS data are accessible (via cmsql), and resolve any problems before proceeding.
5. Restore the *CentreVu* CMS from the latest *CentreVu* CMS maintenance backups. See the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for details.

See the *CentreVu Call Management System Release 3 Version 6 Administration* (585-215-850) document for more information.

Restore Disk(s) When No CMSADM Backup Is Available

If no CMSADM backup is available, do the following:

- Restore all the information on the disk from the source (if other than just CMS data).
- Restore the *CentreVu* CMS data.

NOTE:

The procedures for restoring the first or second disk tend to involve actions that affect the other disk. It is important to understand that the first and second disks are not independent of each other.

For example, the installation database resides on the first disk, but the CMS package (for example, `/cms`) resides on the second disk. It is important for the cms package and installation database to be consistent. In addition, *CentreVu* CMS installs data files on both disks.

First Disk

If the first disk is corrupted and a backup is not available, do the following steps:

1. Reinstall *Solaris* software package, all add-on packages, spatches, and CMS. See the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for details.
2. Run setup. See the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for details.
3. Restore *CentreVu* CMS data from the *CentreVu* CMS Maintenance backup. See the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for details.
4. Administer Terminals, Printers, Users, etc. as needed.

Second Disk

If the second disk is corrupted and a backup is not available, do the following steps:

1. Remove the CMS package using the procedures described in the *CentreVu Call Management System Release 3 Version 6 Upgrades and Migration* (585-215-856) document.
2. Install the CMS package using the procedures described in the *CentreVu Call Management System Release 3 Version 6 Upgrades and Migration* (585-215-856) document.
3. Run setup. See the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for further information.
4. Restore *CentreVu* CMS data from the *CentreVu* CMS maintenance backup. See the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for further information.

Third Through Ninth Disks

If the third through ninth disks are destroyed and a backup is not available, do the following steps:

1. Run setup. See the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for further information.
2. Restore the *CentreVu* CMS data from the *CentreVu* CMS maintenance backup. See the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for further information.

Restore All Disks and File Systems

To do a complete file system restore, enter the following commands at the system prompt:

```
# ulimit unlimited
# cpio -icmud -C 10240 -I <device name> -M “Please remove the
current tape, insert tape number %d, and press ENTER”
```

NOTE:

You must substitute one of these device names for *<device name>* in the `cpio` command:

`/dev/rmt/0` Indicates the tape drive with the lowest target number in the SCSI chain. See Table 4-26, “Internal SCSI Bus ID Map (c0),” on page 4-172.

`/dev/rmt/1` Indicates the tape drive with the second lowest target number in the SCSI chain.

`/dev/rmt/0c` Indicates the tape drive with the lowest target number in the SCSI chain in compressed mode (the QIC 2.5-GB, 4-8GB SLR and the 14-GB tape drives support compressed mode).

`/dev/rmt/1c` Indicates the tape drive with the second lowest target number in the SCSI chain in compressed mode (the QIC 2.5-GB, 4-8GB SLR and the 14-GB tape drives support compressed mode).

Restore Specific Files

To restore specific files, enter the following commands at the system prompt:

```
# ulimit unlimited
# cpio -icmud -C 10240 -I <device name> -M “Please remove the
current tape, insert tape number %d, and press ENTER”
<full_path_name>
```

NOTE:

You must substitute one of these device names for *<device name>* in the `cpio` command:

`/dev/rmt/0` Indicates the tape drive with the lowest target number in

the SCSI chain. See Table 4-26, “Internal SCSI Bus ID Map (c0),” on page 4-172.

`/dev/rmt/1` Indicates the tape drive with the second lowest target number in the SCSI chain.

`/dev/rmt/0c` Indicates the tape drive with the lowest target number in the SCSI chain in compressed mode (the QIC 2.5-GB, 4-8GB SLR and the 14-GB tape drives support compressed mode).

`/dev/rmt/1c` Indicates the tape drive with the second lowest target number in the SCSI chain in compressed mode (the QIC 2.5-GB, 4-8GB SLR and the 14-GB tape drives support compressed mode).

Recovering from a Disk Crash (Two-System Disks)

Overview

This section provides information about file system restore procedures, and explains how to recover *CentreVu* CMS databases after a disk crash occurs.

NOTE:

The procedures in this section apply only to non-DiskSuite systems with "two- system disks" partitioning schemes. If your system has *Solstice DiskSuite* software installed, use the procedures in "Recovering from Disk Corruption (Systems running Solstice DiskSuite 4.1 Software)" on page 4-113. If you have a "one-system disk" partitioning scheme, use the procedures in "Recovering from a Disk Crash (One-System Disk)" on page 4-15.

The difference between disk corruption and a disk crash is the extent of the damage involved. On a corrupted disk, the disk and the file systems are still intact, and minor repair to the disk is needed. On a disk crash, the disk failed and needs to be replaced or reformatted. If a disk needs minor repair, see the "Recovering from Disk Corruption (Two-System Disks)" on page 4-66 for details.

CAUTION:

Only **TSC PERSONNEL** should perform the procedures in this section.

The procedures for recovering the disk depends on whether a backup is available and which disk was effected. This section is organized as follows:

- When the CMSADM backup is available
  - — Recovering from a crash on the first disk
  - — Recovering from a crash on the second disk
  - — Recovering from a crash on the third through ninth disks
- When the CMSADM backup is **not** available
  - — Recovering from a crash on the first disk
  - — Recovering from a crash on the second disk.
  - — Recovering from a crash on the third through ninth disks.

Recover Disk(s) When a CMSADM Backup Is Available

If a CMSADM backup is available, then the number of tasks required to recover a disk is reduced. The following sections provide the commands to restore the file systems.

First Disk

This section describes the procedures for replacing the first disk when a CMSADM backup is available and includes the following:

- Reinstall the *Solaris* software package.
- Restore the file systems.
- Restore the *CentreVu* CMS data.

To restore the first disk, do the following steps:

1. Install a new disk.
2. Power on the system, and stop the boot procedure.

   To stop the boot procedure, press the **Stop** and **A** keys simultaneously after the display console banner appears, but before the system starts booting the operating system. The system responds with the ok prompt.
3. At the ok prompt, enter the following command:

```
ok probe-scsi-all
```

   The system displays a list of all the SCSI devices.
4. Verify that the first disk is displayed as Target 3 Unit 0.

   NOTE:

   If the disk device number is not displayed, then it was not installed correctly.
5. Reinstall the *Solaris* software package. See the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for details.

NOTE:

When reinstalling *Solaris*, you must configure all disks. Your system will be partitioned to use the one system disk scheme.

6. After the *Solaris* 2.5.1 operating system is installed and the system has rebooted, log in as *root*.
7. Eject the CD-ROM with the following command:

```
# eject cdrom
```

All the necessary factory installation procedures to recover the first disk are complete.

NOTE:

Stop after completing the “Installing the *Solaris* Operating System” section — do **not** install the add-on packages, patches, or CMS.

8. Log in as root.
9. Insert the first backup tape.
10. To restore file systems on all disks, enter the following commands:

```
# ulimit unlimited
# cpio -icmudf -C 10240 -I <device-name> -M “Please remove the
current tape, insert tape number %d, and press ENTER”
“/etc/vfstab” “/etc/mnttab” “/etc/device.tab” “/dev/dsk/*”
“/dev/rdsk/*”
“/dev/sd*” “/dev/rsd*” “/devices/*esp*” “/export/home”
“/usr/dbtemp”
```

Helpful Hints

- You must substitute one of these device names for *<device-name>* in the `cpio` command:

  `/dev/rmt/0` Indicates the tape drive with the lowest target number in the SCSI chain. See Table 4-26, “Internal SCSI Bus ID Map (c0),” on page 4-172.

  `/dev/rmt/1` Indicates the tape drive with the second lowest target number in the SCSI chain.

  `/dev/rmt/0c` Indicates the tape drive with the lowest target number in the SCSI chain in compressed mode (the QIC 2.5-GB, 4-8GB SLR and the 14-GB tape drives support compressed mode).

  `/dev/rmt/1c` Indicates the tape drive with the second lowest target number in the SCSI chain in compressed mode (the QIC 2.5-GB, 4-8GB SLR and the 14-GB tape drives support compressed mode).

- You may get four error messages concerning the `/home` directory. These errors display when the directory is already present, so you can ignore them.

11. After you restore the first disk, synchronize the file systems by entering the following command:

```
# sync
```

12. To shut down the machine, enter the following command:

```
# init 0
```

13. To reboot the machine, enter the following command at the `ok` prompt:

```
ok boot -r
```

14. Log in as root.
15. Restore *CentreVu* CMS data from the *CentreVu* CMS backup.

Second Disk

This section describes the procedures for replacing the second disk when a CMSADM backup is available and includes the following:

- Reformat the disk.
- Repartition the disk.
- Re-create the file systems.
- Restore the file systems.
- Restore the *CentreVu* CMS data.

To restore the second disk, do the following steps:

1. Install a new disk.
2. Power on the system, and stop the boot procedure.

   To stop the boot procedure, press the Stop and A keys simultaneously after the display console banner appears, but before the system starts booting the operating system. The system responds with the `ok` prompt.
3. At the `ok` prompt, enter the following command:

```
ok probe-scsi-all
```

   The system displays a list of all the SCSI devices.
4. Verify that the second disk is displayed as Target 1 Unit 0.

   NOTE:

   If the disk is not displayed, then it was not installed correctly.
5. Boot the system.

```
ok boot
```

   NOTE:

   During the reboot, the system displays one or two messages for each disk that was replaced. These messages inform you to run the `fsck` command and occur because the system cannot find the appropriate file systems on the replacement disks.

6. At each prompt that asks you to enter the `fsck` command for the missing file systems, press Control D simultaneously to continue booting.
7. After the machine is booted, log in as *root*.
8. Verify that no jobs are attempting to access file systems on the second disk (for example, check cron jobs, etc). If any jobs are running, stop them, and record the information for your records.
9. To format the disk, see the “Adding SCSI Hard Disk Drives - Disk 2 (One-System Disk)” section in this chapter for procedures. The device name should be `c0t1d0`.

NOTE:

Formatting the disk takes approximately 1 hour.

10. To partition the disk, do the following:
    a. At the `partition>` prompt, enter the following command to check the default partition table:

```
partition> print
```

The system displays the default partition table.

b. Change partitions 0, 1, 3, and 4 using the values in Table 4-14.

Table 4-14: Second Internal Disk - Partitioning Information

Partition	Partition ID Tag	Partition Permission Flags	Start Cylinder	Size (Cylinders)
0	unassigned	wm	0	204
1	unassigned	wm	204	204
2	backup	wm	0	2036
3	unassigned	wm	408	1049
4	unassigned	wm	1457	579
5-7	unassigned	wm	0	0

c. At the `partition>` prompt, enter the following command to verify that the partition table is accurate:

```
partition> print
```

The system displays the partition table.

d. After the partitions are correct, label the disk. To label the disk, enter the following command at the `partition>` prompt:

```
partition> label
```

The system responds with a question.

e. At the question, enter `y`.

f. To quit the partition submenu, enter `q`.

g. To quit the format program, enter `q`.

The system prompt is displayed.

11. Use the “Adding SCSI Hard Disk Drives - Disks 3 through 9 (Two-System Disks)” section in this chapter as a guideline, and do the following:

a. To make file systems for all partitions, enter the following commands:

```
# newfs /dev/rdsk/c0t1d0s0
# newfs /dev/rdsk/c0t1d0s1
# newfs /dev/rdsk/c0t1d0s3
# newfs -m 0 /dev/rdsk/c0t1d0s4
```

For each command you enter, the system responds with the following question:

```
news: construct a new file system /dev/rdsk/<device>:(y/n)?
```

b. Each time the message prompt appears, enter y.

NOTE:

These file system(s) were not mounted because they did not exist on the new disk. However, since the operating system was initially installed with these file system(s), they exist in the */etc/vfstab* file.

12. To mount all file systems on the second disk, enter the following command:

```
# mountall
```

The system displays all the file systems mounted.

13. To verify that all file systems are mounted properly, check the displayed response and resolve any problems.
14. To set the permissions on */usr/dbtemp* directory, enter the following command:

```
# chmod 777 /usr/dbtemp
```

The system prompt is displayed.

15. To ensure that the system initializes cleanly, reboot the system using the following command:

```
# init 6
```

16. Log in as root.

17. To restore the file systems on the second disk, enter the following commands:

```
# ulimit unlimited
# cpio -icmud -C 10240 -I <device name> -M “Please remove the
current tape, insert tape number %d, and press ENTER”
“/usr/dbtemp/*” “/export/home/*” “/dump/*” “/cms/*”
```

NOTE:

You must substitute one of these device names for *<device name>* in the `cpio` command:

`/dev/rmt/0` Indicates the tape drive with the lowest target number in the SCSI chain. See Table 4-26, “Internal SCSI Bus ID Map (c0),” on page 4-172.

`/dev/rmt/1` Indicates the tape drive with the second lowest target number in the SCSI chain.

`/dev/rmt/0c` Indicates the tape drive with the lowest target number in the SCSI chain in compressed mode (the QIC 2.5-GB, 4-8 GB SLR, and the 14-GB tape drives support compressed mode).

`/dev/rmt/1c` Indicates the tape drive with the second lowest target number in the SCSI chain in compressed mode (the QIC 2.5-GB, 4-8 GB SLR, and the 14-GB tape drives support compressed mode).

18. Restore *CentreVu* CMS data from the *CentreVu* CMS maintenance backup.
19. Restart any stopped jobs. See Step 8.

Third Through Ninth Disks

This section describes the procedures for replacing the third through ninth disks when a CMSADM backup is available and includes the following:

- Reformat the disk.
- Repartition the disk.
- Re-create the file system.
- Restore the file system.
- Restore the *CentreVu* CMS data.

To restore the third through ninth disk, do the following steps:

1. Install a new disk.
2. Power on the system, and stop the boot procedure.

   To stop the boot procedure, press the Stop and A keys simultaneously after the display console banner appears, but before the system starts booting the operating system. The system responds with the `ok` prompt.
3. At the `ok` prompt, enter the following command:

```
ok probe-scsi-all
```

   The system displays a list of all the SCSI devices.
4. Verify that the replaced disk is displayed. See Table 4-15, “SCSI Information for External Disks,” on page 4-100.
5. Boot the system:

```
ok boot
```

   NOTE:

   During the reboot, the system displays one or two messages for each disk that was replaced. These messages inform you to run the `fsck` command and occur because the system cannot find the appropriate file systems on the replacement disks.
6. At each prompt that asks you to enter the `fsck` command for the missing file systems, press Control D simultaneously to continue booting.
7. Log in as root.
8. After the machine is booted, verify that no jobs are attempting to access file systems on the disk being replaced (for example, check cron jobs, etc). If any jobs are running, stop them, and record the information for your records.
9. To format the disk, see the “Adding SCSI Hard Disk Drives - Disks 3 through 9 (Two-System Disks)” section in this chapter for procedures. See Table 4-15, “SCSI Information for External Disks,” on page 4-100 for device names.

NOTE:

Formatting the disk takes approximately 1 hour.

10. To partition the disk, see the “Adding SCSI Hard Disk Drives - Disks 3 through 9 (Two-System Disks)” section in this chapter as a guideline, and do the following:

    a. At the `partition>` prompt, enter the following command to check the default partition table:

```
partition> print
```

    The system displays the default partition table.

    b. Change the `0` partition. Enter `un` for the partition ID tag, `wm` for the partition permission flags, and `0` as the starting cylinder. For size, enter one of the following values: `2733c` for a 2.1-GB disk or `2036c` for a 1.05-GB disk.

    c. At the `partition>` prompt, enter the following command to verify that the partition table is accurate:

```
partition> print
```

    The system displays the partition table.

    d. After the partitions are correct, label the disk. To label the disk, enter the following command at the `partition>` prompt:

```
partition> label
```

    The system responds with a question.

    e. At the question, enter `y`.

    f. To quit the partition submenu, enter `q`.

    g. To quit the format program, enter `q`.

11. To make a file system for the partition, enter the following command:

```
# newfs -m 0 /dev/rdsk/<device>
```

    See Table 4-13, “Additional External Disks - Partitioning Information,” on page 4-71 for the *<device>*. For each command you enter, the system responds with the following question:

```
news: construct a new file system /dev/rdsk/<device>:(y/n)?
```

    Each time the message prompt appears, enter y.

    NOTE:

    These file system(s) were not mounted because they did not exist on the new disk. However, since the operating system was initially installed with these file system(s), they exist in the */etc/vfstab* file.

12. To mount the file system on the new disk, enter the following command:

```
# mountall
```

    The system displays all the file systems mounted.

13. To verify that all file systems mounted properly, check the displayed response, and resolve any problems.

14. To ensure that the system initializes cleanly, reboot the system using the following command:

```
# init 6
```

15. Log in as root.
16. To restore the file systems on the new disk, enter the following commands:

```
# ulimit unlimited
# cpio -icmud -C 10240 -I <device name> -M "Please remove the
current tape, insert tape number %d, and press ENTER"
"/cms?/*"
```

Helpful Hints

- You must substitute the "?" in the `cpio` command with the number that corresponds to the `/cms` file system that resides on the disk you are restoring. For example, disk 3="`/cms1/*`", disk 4="`/cms2/*`", disk 5="`/cms3/*`" and so on for each disk. Refer to Table 4-13, "Additional External Disks - Partitioning Information," on page 4-71 to determine on which disks the `/cms` file systems reside.

- You must substitute one of these device names for *<device name>* in the `cpio` command:

  `/dev/rmt/0` Indicates the tape drive with the lowest target number in the SCSI chain. See Table 4-26, "Internal SCSI Bus ID Map (c0)," on page 4-172.

  `/dev/rmt/1` Indicates the tape drive with the second lowest target number in the SCSI chain.

  `/dev/rmt/0c` Indicates the tape drive with the lowest target number in the SCSI chain in compressed mode (the QIC 2.5-GB, 4-8 GB SLR, and the 14-GB tape drives support compressed mode).

  `/dev/rmt/1c` Indicates the tape drive with the second lowest target number in the SCSI chain in compressed mode (the QIC 2.5-GB, 4-8 GB SLR, and the 14-GB tape drives support compressed mode).

17. Restore *CentreVu* CMS data from the *CentreVu* CMS backup.
18. Restart any stopped jobs. See Step 8.

Recover Disk(s) When No CMSADM Backup Is Available

If no CMSADM backup is available, do the following:

- Restore all the information on the disk from the source (if other than CMS data).
- Restore the *CentreVu* CMS data.

NOTE:

The procedures for restoring the first or second disk tend to involve actions that affect the other disk. It is important to understand that the first and second disk are not independent of each other.

For example, the installation database resides on the first disk, but the CMS package (for example, `/cms`) resides on the second disk. It is important for the CMS package and installation database to be consistent. In addition, *CentreVu* CMS installs data files on both disks.

First Disk

This section describes the procedures for replacing the first disk when a CMSADM backup is not available and includes the following:

- Reinstall the *Solaris* software package.
- Reinstall all add-on packages (for example, X.25).
- Reinstall the *CentreVu* CMS software.
- Run setup.
- Restore the *CentreVu* CMS data.

If the first disk is destroyed and a backup is not available, do the following steps:

1. Install a new disk.
2. Power on the system, and stop the boot procedure.

   To stop the boot procedure, press the Stop and A keys simultaneously after the display console banner appears, but before the system starts booting the operating system. The system responds with the `ok` prompt.
3. At the `ok` prompt, enter the following command:

```
ok probe-scsi-all
```

   The system displays a list of all SCSI devices.

4. Verify that the first disk is displayed as Target 3 Unit 0.

   NOTE:

   If the disk is not displayed, then it was not installed correctly.

5. Reinstall the *Solaris* operating system, all add-on packages, spatches, and CMS. See the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document, for details.

   NOTE:

   When you reinstall *Solaris*, your system will be partitioned to use the one system disk partitioning scheme.

6. Run setup. See the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for details.
7. Restore *CentreVu* CMS data from the *CentreVu* CMS backup. See the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for details.
8. Administer Terminals, Printers, Users, etc. as needed. See the *CentreVu Call Management System Release 3 Version 6 Sun SPARCserver Computers, Hardware Installation* (585-215-857) document for details.

Second Disk

This section describes the procedures for replacing the second disk when a CMSADM backup is not available and includes the following:

- Reformat the disk.
- Repartition the disk.
- Re-create the file systems.
- Remove the *CentreVu* CMS package.
- Install the *CentreVu* CMS software.
- Run setup.
- Restore the *CentreVu* CMS data.

If the second disk is destroyed and a backup is not available, do the following steps:

1. Install a new disk.

2. Power on the system, and stop the boot procedure.

   To stop the boot procedure, press the Stop and A keys simultaneously after the display console banner appears, but before the system starts booting the operating system. The system responds with the `ok` prompt.

3. At the `ok` prompt, enter the following command:

```
ok probe-scsi-all
```

   The system displays a list of all the SCSI devices.

4. Verify that the second disk is displayed as Target 1 Unit 0.

   NOTE:

   If the disk is not displayed, then it was not installed correctly.

5. Boot the system.

```
ok boot
```

   NOTE:

   During the reboot, the system displays one or two messages for each disk that was replaced. These messages inform you to run the `fsck` command and occur because the system cannot find the appropriate file systems on the replacement disks.

6. At each prompt that asks you to enter the `fsck` command for the missing file systems, press Control D simultaneously to continue booting.

7. After the machine is booted, verify that no jobs are attempting to access file systems on the second disk (for example, check cron jobs, etc.). If any jobs are running, stop them, and record the information for your records.

8. To format the disk, see the “Adding SCSI Hard Disk Drives - Disks 3 through 9 (Two-System Disks)” section in this chapter for procedures. The device name should be `c0t1d0`.

NOTE:

Formatting the disk takes approximately 1 hour.

9. To partition the disk, do the following:
   a. At the `partition>` prompt, enter the following command to check the default partition table:

```
partition> print
```

   The system displays the default partition table.

   b. Change partitions 0, 1, 3, and 4 using the values in Table 4-14, “Second Internal Disk - Partitioning Information,” on page 4-81.

   c. At the `partition>` prompt, enter the following command to verify that the partition table is accurate:

```
partition> print
```

   The system displays the partition table.

   d. After the partitions are correct, label the disk by entering the following command at the `partition>` prompt:

```
partition> label
```

   The system responds with a question.

   e. At the question, enter `y`.

   f. To quit the partition submenu, enter `q`.

   g. To quit the format program, enter `q`.

10. To make file systems for all partitions, enter the following commands:

```
# newfs /dev/rdsk/c0t1d0s0
# newfs /dev/rdsk/c0t1d0s1
# newfs /dev/rdsk/c0t1d0s3
# newfs -m 0 /dev/rdsk/c0t1d0s4
```

    For each command you enter, the system responds with the following question:

```
news: construct a new file system /dev/rdsk/<device>:(y/n)?
```

    Each time the message prompt appears, enter y.

    NOTE:

    These file system(s) were not mounted because they did not exist on the new disk. However, since the operating system was initially installed with these file system(s), they exist in the */etc/vfstab* file.

11. To mount all file systems on the second disk, enter the following command:

```
# mountall
```

    The system displays all the file systems mounted.

12. To verify all file systems mounted properly, check the displayed response, and resolve any problems.

13. Remove the CMS package using the procedures described in the *CentreVu Call Management System Release 3 Version 6 Upgrades and Migration* (585-215-856) document.

14. Install *CentreVu* CMS using the procedures described in the *CentreVu Call Management System Release 3 Version 6 Upgrades and Migration* (585-215-856) document.

15. Run setup. See the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for details.
16. Restore *CentreVu* CMS data from the *CentreVu* CMS backup. See the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for details.

Third Through Ninth Disks

This section describes the procedures for replacing the third through ninth disks:

- Reformat the disk.
- Repartition the disk.
- Re-create the file system.
- Rerun setup.
- Restore the *CentreVu* CMS data.

If the third through ninth disks are destroyed and a backup is not available to restore third through ninth disk, do the following steps:

1. Install a new disk.
2. Power on the system, and stop the boot procedure.

   To stop the boot procedure, press the Stop and A keys simultaneously after the display console banner appears, but before the system starts booting the operating system. The system responds with the ok prompt.

3. At the ok prompt, enter the following command:

```
ok probe-scsi-all
```

   The system displays a list of all the SCSI devices.

4. Verify that the replaced disk is displayed. See Table 4-15, “SCSI Information for External Disks,” on page 4-100.

   NOTE:

   If the disk is not displayed, then it was not installed correctly.

5. Boot the system.

```
ok boot
```

NOTE:

During the reboot, the system displays one or two messages for each disk that was replaced. These messages inform you to run the `fsck` command and occur because the system cannot find the appropriate file systems on the replacement disks.

6. At each prompt that asks you to enter the `fsck` command for the missing file systems, press Control D simultaneously to continue booting.
7. After the machine is booted, log in as *root*.
8. Verify that no jobs are attempting to access file systems on the disk being replaced (for example, check cron jobs, etc.). If any jobs are running, stop them, and record the information for your records.
9. To format the disk, see the “Adding SCSI Hard Disk Drives - Disks 3 through 9 (Two-System Disks)” section in this chapter for procedures. See Table 4-15, “SCSI Information for External Disks,” on page 4-100 for device names.

NOTE:

Formatting the disk takes approximately 1 hour.

10. To partition the disk, see the “Adding SCSI Hard Disk Drives - Disks 3 through 9 (Two-System Disks)” section in this chapter as a guideline, and do the following:
    a. At the `partition>` prompt, enter the following command to check the default partition table:

```
partition> print
```

The system displays the default partition table.

b. Change the `0` partition. Enter un for the partition ID tag, `wm` for the partition permission flags, and `0` as the starting cylinder. For size, enter one of the following values: `2733c` for a 2-GB disk or `2036c` for a 1-GB disk.

c. At the `partition>` prompt, enter the following command to verify that the partition table is accurate:

```
partition> print
```

The system displays the partition table.

d. After the partitions are correct, label the disk. To label the disk, enter the following command at the `partition>` prompt:

```
partition> label
```

The system responds with a question.

e. At the question, enter y.

f. To quit the partition submenu, enter q.

g. To quit the format program, enter q.

11. To make a file system for the partition, enter the following command:

```
# newfs -m 0 /dev/rdsk/<device>
```

See Table 4-15, “SCSI Information for External Disks,” on page 4-100 for *<device>*. For each command you enter, the system responds with the following question:

```
news: construct a new file system /dev/rdsk/<device>:(y/n)?
```

Each time the message prompt appears, enter y.

NOTE:

These file system(s) were not mounted because they did not exist on the new disk. However, since the operating system was initially installed with these file system(s), they exist in the */etc/vfstab* file.

12. To mount all file systems on the new disk, enter the following command:

```
# mountall
```

The system displays all the file systems mounted.

13. To verify that all file systems are mounted properly, check the displayed response and resolve any problems.
14. To ensure that the system initializes cleanly, reboot the system using the following command:

```
# init 6
```

15. Log in as root.
16. Run setup.
17. Restore *CentreVu* CMS data from the *CentreVu* CMS backup. See the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for details.

Recover Specific Database Tables

When a CMSADM file system backup is *not* available to recover specific database tables, then you must do these steps to reinitialize the *CentreVu* CMS database:

1. Rerun the `setup` option on the CMSSVC menu. This reinitializes (removes and creates) all the *CentreVu* CMS *INFORMIX* database tables. See the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for details.
2. Restore the *CentreVu* CMS from the latest *CentreVu* CMS maintenance backups. This restore loads the *CentreVu* CMS data up to the time of the last *CentreVu* CMS backup.

Adding SCSI Hard Disk Drives - Disks 3 through 9 (Two-System Disks)

Overview

This section describes how to install additional SCSI Hard Disk Drives to expand the capacity of the *Sun SPARCserver* computer.

Add SCSI Disks

To add more SCSI Disks to a *Sun SPARCserver* computer that is already up and running, do the following steps:

1. Make sure the system is powered down and in the firmware mode (use the `init 0` command to get to the `ok` prompt).
2. At the `ok` prompt, enter the following command:

   `show-bus`

   This command provides a listing of the SBus cards and their locations in your system.
3. Do the following in sequential order:
   a. Turn off the *Sun SPARCserver* computer.
   b. Turn off the system monitor.
   c. Turn off all external devices starting with the device closest to the *Sun SPARCserver* computer and working toward the farthest device.
4. Install the first additional FSBE/S card in the next available SBus slot.

   NOTE:

   You need to install additional FSBE/S cards only when you have reached the *CentreVu* CMS limit on the number of hard disks per SCSI controller. This limit is four for systems with one-system disk and three for systems with two-system disks. See “Disk Recovery” on page 4-2 to determine which system disk scheme you have.
5. Install the second FSBE/S card in the next available SBus slot. See the *Sun FSBE/S SBus Card Manual* for more details.
6. Set the SCSI IDs on the external SCSI disks.
7. Connect the external SCSI disks to the desired FSBE/S cards.

See the *Sun FSBE/S SBus Card Manual* or the *CentreVu Call Management System Release 3 Version 6 Sun SPARCserver Computers, Hardware Installation* (585-215-857) document for details.

See the *CentreVu Call Management System Release 3 Version 6 Sun SPARCserver Computers, Hardware Installation* (585-215-857) document for details.

8. Do the following in sequential order:
   a. Turn on devices attached to the *Sun SPARCserver* computer starting with the device at the end of the SCSI chain and working toward the computer.
   b. Turn on the *Sun SPARCserver* computer.
   c. Turn on the system monitor.
9. Enter **Stop** **A**. The system responds:

```
ok
```

10. To verify that the system sees all SCSI devices, enter the following command:

```
ok probe-scsi-all
```

The system responds:

```
/iommu@f,e0000000/sbus@f.e0001000/esp@3,200000
Target 6
  Unit 0 Disk Removable Read Only Device SONY CD-ROM CDU-8012

/iommu@f,e0000000/sbus@f.e0001000/esp@3,200000
Target 1
  Unit 0 Disk SEAGATE ST14801 SUN04246266 Copyright (C) 1991
Target 3
  Unit 0 Disk SEAGATE ST14801 SUN04246266 Copyright (C) 1991


. . . . .
. . . . .
. . . . .
Target 6
  Unit 0 Disk Removable Read Only Device SONY CD-ROM CDU-8012

ok
```

NOTE:

The actual response (devices listed) depends on the devices installed on the SCSI bus. See Table 4-15 below.

Table 4-15: SCSI Information for External Disks

Device	Disk	Target	Unit	File System
c0t2d0s0	3	2	0	/cms1
c1t1d0s0	4	1	1	/cms2
c1t2d0s0	5	2	1	/cms3
c1t3d0s0	6	3	1	/cms4
c2t1d0s0	7	1	2	/cms5
c2t2d0s0	8	2	2	/cms6
c2t3d0s0	9	3	2	/cms7

NOTE:

If the disk is not displayed, then it was not installed correctly.

11. Enter the following command:

```
ok boot -r
```

The system responds:

```
Boot device ...
   .
   .
   .
Configuring the /dev directory
Configuring the /dev directory (compatibility devices)
The system is coming up. Please wait.
checking filesystems
/dev/rdsk/c0t1d0s0:  is clean
/dev/rdsk/c0t3d0s5:  is clean
/dev/rdsk/c0t2d0s0:  is clean    ***if c0t2d0 is already in system***
/dev/rdsk/c0t1d0s1:  is clean
/dev/rdsk/c0t1d0s3:  is clean
/dev/rdsk/c0t1d0s4:  is clean
/dev/rdsk/c0t2d0s0 mounted  ***if c0t2d0 is already in system***
/dev/rdsk/c0t1d0s3 mounted
/dev/rdsk/c0t1d0s1 mounted
/dev/rdsk/c0t3d0s5 mounted
/dev/rdsk/c0t1d0s0 mounted
checking for crash dump ...
starting routing daemon.
starting rpc services: rpcbind deyserv kerbd done.
Setting default interface for multicast: add net 224.090.0 gateway
hostname.
syslog service starting.
Print services started.
volume management starting.

Starting terminal server network daemons.
Network Terminal Server daemon(s) startup complete.
The system is ready.

hostname console login:
```

12. Log in as root. The system displays the last login on the console (same date and time) and returns you to the system prompt.

    For example:

```
Sun Microsystems Inc. SunOS 5.2 Generic March 1993
#
```

Format Disks

CAUTION:

Only **TSC PERSONNEL** should perform the procedures in this section.

To format the disks, do the following steps:

1. At the system prompt, enter the following command:

```
# format
```

The following appears:

NOTE:

Be careful to specify the exact disk and associated number.

```
Searching for disks ... done

AVAILABLE DISK SELECTIONS:
   0.  c0t1d0 <SUN1.05 cyl 2036 alt 2 hd 14 sec 727
       /iommu@f,e0000000/sbus@f,e0001000/espdma@f,800000/sd@1,0
   1.  c0t2d0 <SUN1.05 cyl 2036 alt 2 hd 14 sec 727
       /iommu@f,e0000000/sbus@f,e0001000/espdma@f,800000/sd@2,0
   2.  c0t3d0 <SUN1.05 cyl 2036 alt 2 hd 14 sec 727
       /iommu@f,e0000000/sbus@f,e0001000/espdma@f,800000/sd@3,0
   3.  c1t1d0 <SUN1.05 cyl 2036 alt 2 hd 14 sec 727
       /iommu@f,e0000000/sbus@f,e0001000/dma@1,81000/sd@1,0
   4.  c1t2d0 <SUN1.05 cyl 2036 alt 2 hd 14 sec 727
       /iommu@f,e0000000/sbus@f,e0001000/dma@1,81000/sd@2,0
Specify disk (enter its number):
```

2. Enter the disk number you want to add.

```
Specify disk (enter its number):
```

See Table 4-15, “SCSI Information for External Disks,” on page 4-100 for more information.

The system displays the disk you are adding (for example, `c1t1d0` for disk 4) and the format menu.

```
selecting c1t1d0

FORMAT MENU:
disk
type
partition
current
format
repair
label
analyze
defect
backup
verify
save
inquiry
volname
quit

format>
```

3. At the `format>` prompt, enter `format`.

The system responds:

```
Ready to format. Formattting cannot be interrupted
and takes 23 minutes (estimated). Continue?
```

4. To continue formatting, enter `y`. The system responds:

```
Beginning formatting. The current time is <date>.
Formatting...
```

5. Wait for the disk to format and verify the media.

   When the disk is formatted, the system responds:

```
done.

Verifying media..
        pass 0 - pattern = 0xc6dec6de
   2035/12/18
        pass 1 - pattern = 0x6db6db6d
   2035/12/18

Total of 0 defective blocks repaired.
format>
```

   Now you can partition the disk.

Partition Disks

To partition the disks, do the following steps:

1. At the `format>` prompt, enter the following command:

```
format> partition
```

   The program displays a confirmation message and the Partition menu.

```
***Do not format the drive, it is formatted already***

PARTITION MENU:
0         -change ‘0’partition
1         -change ‘1’partition
2         -change ‘2’partition
3         -change ‘3’partition
4         -change ‘4’partition
5         -change ‘5’partition
6         -change ‘6’partition
7         -change ‘7’partition
select    -select a predefined table
modify    -modify a predefined partition table
name      -name the current table
print     -display the current table
label     -write partition map and label to the disk
quit
```

2. At the `partition>` prompt, enter the `print` menu option to check the default partition table.

```
partition> print
```

The system displays the default partition table.

You may have to set up the partitions on the external disks you added. Table 4-16 lists the partitioning information for both 2.1- and 1.05-GB external disks.

Table 4-16: Partitioning Information for External Disks

			2.1-GB Disk		1.05-GB Disk	
Partitions	**Partition ID Tag**	**Partition Permission Flags**	**Start Cylinder**	**Size (Cylinders)**	**Start Cylinder**	**Size (Cylinders)**
0	unassigned	wm	0	2733	0	2036
1	unassigned	wm	0	0	0	0
2	backup	wm	0	2733	0	2036
3-7	unassigned	wm	0	0	0	0

3. At the `partition>` prompt, enter `0.`

```
partition> 0
```

The system responds:

```
Enter partition id tag [unassigned]:
```

4. Enter un for unassigned.

The system responds:

```
Enter partition permission flags [wm]:
```

5. Enter `wm` to indicate that the partition is writable and mountable.

   The system responds:

```
Enter new starting cyl [0]:
```

6. Enter `0` as the starting cylinder.

   For example, the system responds:

```
Enter partition size [205632b, 204c, 100.41mb]:
```

7. Enter the size of the partition (see Table 4-16).

   The system responds with the `partition>` prompt.

8. At the `partition>` prompt, enter `1`.

```
partition> 1
```

9. Enter `un` for the partition ID tag, `wm` for the partition permission flags, and `0` as the starting cylinder.
10. Enter `0c` for the size of the partition.

```
Enter size of partition '1' [133056, 132c,64.9mb]: 0c
```

11. At the `partition>` prompt, enter the `print` menu option to verify that the partition table is accurate (see Table 4-16).

```
partition> print
```

12. At the `partition>` prompt, enter the `name` menu option.

```
partition> name
```

13. Enter the *`table name`*.

```
partition> name
Enter table name (remember quotes): "cms?"
```

NOTE:

The variable *?* represents a number and varies depending on the disk you added (see Table 4-15, "SCSI Information for External Disks," on page 4-100).

14. At the `partition>` prompt, enter the `label` menu option.

```
partition> label
```

15. To label the disk, enter `y` at the message prompt.

```
partition> label
Ready to label disk, continue: y
```

16. Repeat the above partitioning procedure for each disk that you are adding. The system responds:

```
partition>
```

17. To exit the partition menu, enter `q` at the `partition>` prompt and `q` at the `format>` prompt. The system responds:

```
partition> q
format > q
#
```

Construct a New File System

To construct a new file system, do the following:

1. Enter the following command at the system prompt.

```
# newfs -m 0 /dev/rdsk/<device>
```

NOTE:

The value you enter for *<device>* varies depending on the disk you added (see Table 4-15).

The system responds:

```
# newfs -m 0 /dev/rdsk/<device>
newfs: construct a new file system /dev/rdsk/<device>: (y/n)?
```

2. At the message prompt, enter y. The system responds:

```
/dev/rdsk/<device>: ...
   .
   .
   .
#
```

3. Repeat the above new file system procedure for each disk that you added; then, mount the file system.

Mount the File System

To mount the file system, do the following steps:

1. Edit the `/etc/vfstab` file by entering the following command:

```
# vi /etc/vfstab
```

The system responds:

```
<contents of the file is displayed>
   .
   .
   .
```

2. Add the following line to the */etc/vfstab* file:

   `/dev/dsk/<device> /dev/rdsk/<device> /cms? ufs <nn> yes`

   NOTE:

   The variables *<device>* and *?* in the above string vary depending on the disk you added (see Table 4-15). The variable *<nn>* represents the mount sequence number (see Table 4-17).

3. Write and quit the file.
4. Make a new directory for each new disk added to the *Sun SPARCserver* computer. At the system prompt, enter the following command:

```
# mkdir /cms?
```

NOTE:

The variable *?* represents a number and varies depending on the disk you added (see Table 4-17).

Table 4-17: Make Directory for SCSI Disks

Directory	Description	Mount Sequence Number
/cms2	****for 1st disk on (c1)****	11
/cms3	****for 2nd disk on (c1)****	12
/cms4	****for 3rd disk on (c1)****	13
/cms5	****for 1st disk on (c2)****	14
/cms6	****for 2nd disk on (c2)****	15

Table 4-17: Make Directory for SCSI Disks

Directory	Description	Mount Sequence Number
/cms7	***for 3rd disk on (c2)***	16

5. Enter the `mountall` command.

```
# mountall
```

NOTE:

The `mountall` command will mount all of the file systems. You can verify that the file systems you added were mounted correctly by reviewing the displayed output. See Table 4-18 for other disk possibilities.

For example, messages containing the following file system information may be displayed:

Table 4-18: Mount File System for SCSI Disks

Disk with Mounted File System	Description
/dev/dsk/c1t1d0s0 /cms2	***for 1st disk on (c1)***
/dev/dsk/c1t2d0s0 /cms3	***for 2nd disk on (c1)***
/dev/dsk/c1t3d0s0 /cms4	***for 3rd disk on (c1)***
/dev/dsk/c2t1d0s0 /cms5	***for 1st disk on (c2)***
/dev/dsk/c2t2d0s0 /cms6	***for 2nd disk on (c2)***
/dev/dsk/c2t3d0s0 /cms7	***for 3rd disk on (c2)***

If error messages are displayed and the system failed to mount, you must unmount the problem file system and edit the files again.

- To unmount the file system, enter one of the following commands:

```
# umount /dev/dsk/<device>
or
# umount /cms?
```

- Repeat the mount procedures described in steps 1-5.

6. To display how the disks are allocated (in kilobytes) for a successful mount, enter the following command:

```
# df -k
```

The system responds:

```
    Filesystem     kbytes   used   avail   capacity   Mounted
on
/dev/dsk/c0t3d0s0   19183     -      -       -     /
/dev/dsk/c0t3d0s6  143927       -       -       -     /usr
/proc                   0       0       0      0%     /proc
fd                      0       0       0      0%     /dev/fd
/dev/dsk/c0t3d0s7  248447           -     -      /var
/dev/dsk/c0t1d0s4                  -     -      /cms
/dev/dsk/c0t2d0s0                  -       -      -     /cms1
/dev/dsk/c1t1d0s0                  -       -      -     /cms2
/dev/dsk/c1t2d0s0                  -       -      -     /cms3
/dev/dsk/c1t3d0s0                  -       -      -     /cms4
/dev/dsk/c2t1d0s0                  -       -      -     /cms5
/dev/dsk/c2t2d0s0                  -       -      -     /cms6
/dev/dsk/c2t3d0s0                  -       -      -     /cms7
```

NOTE:

Disks for `/cms2` through `/cms7` are mounted only if they are installed.

You should perform a CMSADM file system backup to save the updated system software and hardware configuration. See the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for details.

Recovering from Disk Corruption (Systems running *Solstice DiskSuite* 4.1 Software)

Overview

CAUTION:

Only **TSC PERSONNEL** should perform the procedures in this section.

NOTE:

The procedures in this section apply only to systems with *Solstice DiskSuite* installed on them. If you have a non-DiskSuite system with a "one-system disk" partitioning scheme, see "Recovering from Disk Corruption (One-System Disk)" on page 4-8 or "Recovering from a Disk Crash (One-System Disk)" on page 4-15. If you have a non-DiskSuite system with a "two-system disks" partitioning scheme, see "Recovering from Disk Corruption (Two-System Disks)" on page 4-66 or "Recovering from a Disk Crash (Two-System Disks)" on page 4-76.

The procedures for recovering a disk drive depend upon whether the disk is merely corrupted or has crashed, and whether the drive contained the operating system. If the disk is merely corrupted, you may be able to simply restore /cms. If the disk has crashed, or if the corrupted disk drive contained the operating system files, you may have to reinstall the entire system.

Restore /cms

To restore the /cms file system only, follow the procedure in this section.

1. Remove stale information from system files, and clear and reinitiate the metadevice by entering an `olds -cleanup` command:

```
# /olds/olds  -cleanup
      .
      .
      .
Success, cleanup of DiskSuite, now reboot system.
#
```

2. Reboot the system with an init 6 command.

```
# init  6
```

3. When the system prompt reappears, log on as root.
4. Check disk partitioning with an `olds -check_disks` command.

```
#  /olds/olds  -check_disks
      .
      .
      .
disk:cot0d0 is partitioned ok
disk:cot1d0 is partitioned ok
disk:cot2d0 is partitioned ok
Warning: Current Disk has mounted partitions
disk:cot3d0 is partitioned ok
Success, checking disks
#
```

5. Re-create system files with an `olds -mk_files` command.

```
#  /olds/olds  -mk_files
      .
      .
      .
Success, creating md.tab.new and/or vfstab.new
#
```

6. Set up metadevice replicas with an `olds -metadbs` command.

```
#  nohup  ./olds  -metadbs  |  tee
      .
      .
      .
Success, setting up metadb replicas
#
```

7. Set up the /cms metadevice with an `olds -setup` command. For example:

```
#  nohup  ./olds  -setup  |  tee
     .  .  .
prtvtoc:  c0t6d0so:  device busy
device:  c0tod0 will not be used
valid disks are c0t0d0  c0t1d0  c0t2d0  c0t3d0
     .  .  .
super-block backups (for fsck -F ufs -o b=#) at:
32, 16240, 32448, 48656, 64864, 81072, 97280, 113488,
     .  .  .
10532656, 10548864, 10565072, 10580000, 10596208
ufs fsck: sanity check: /dev/md/rdsk/d19 okay
Success, activating or growing /cms metadevice
#
```

8. Mount the file system.

```
# mount /cms
```

9. Verify disk space by entering a `df -k` command. The system responds by displaying file system information for /cms. For example:

```
# df -k  /cms
Filesystem         kbytes    used    avail capacity  Mounted on
/dev/md/dsk/d19  2047027  317080  1525247      17%  /cms
#
```

Use the information to verify that *DiskSuite* is administering all the available disks. You can use the following table to make the necessary calculations:

Calculation	Result
(1a) Enter the /cms line's 'used' figure:	
(1b) Enter the /cms line's 'avail' figure:	
(1c) Add (1a) and (1b):	
(1d) Divide (1c) by 1000:	
(2a) If Disk1=1.05G, enter 109 If Disk1=2.10G, enter 998	
(2b) Enter (# of other 1G disks) * 866	
(2c) Enter (# of other 2G disks) * 1755	
(2d) Add (2a) through (2c):	

Results (1d) and (2d) should be *approximately* equal (they need not be exact). If they are far off from one another, you may have a connectivity problem.

10. Find out how much RAM you have in your system by entering the following command. For example:

```
# prtconf  |  grep  Mem
Memory size: 288 Megabytes
#
```

11. Create the swap file by entering:

```
# mkfile  <x>m  /cms/swap
```

where <*x*>—the swap file size—depends upon the amount of RAM displayed by the command in step 10. See Table 4-19, below.

Table 4-19: Swap File Size

If megabytes of RAM is at least...	... but not more than...	... your swap file must be this size:
0	32	61
33	64	122
65	96	183
97	128	244
129	160	305
161	192	366
193	224	427
225	256	488
257	320	610
321	384	732
385	448	931
449	512	977

For example, for a system with 288MB of RAM, the command would look like this: `mkfile 610m /cms/swap`

12. Reactivate the swap files by entering a `swap -a` command for each one. For example:

```
# swap  -a  /cms/swap
```

13. Edit the /etc/vfstab file and uncomment the /cms/swap entry. Then save the file. For example:

```
# vi  /etc/vfstab

<contents of the file is displayed>

#Device    device    mount    FS    fsck    mount    mount
#to mount  to fsck   point    type  pass    at boot  option
    .  .  .
#/cms/swap    -    -    swap     -    no       -
    .  .  .
```

In this case, you would delete the pound sign (#) at the beginning of the */cms/swap* line, and write and quit the file.

14. Reboot the system.

```
# init  6
```

15. **Perform this step only if you have a CMSADM backup available.** If you have no CMSADM backup, skip to step 16.

    a. Restore the latest available CMSADM backup data by loading the backup tape into the tape drive and entering the following command:

```
# nohup  cpio  -icmud  -C  10240 -I <device-name>  -M
“Please remove the current tape, insert tape number %d and
then press ENTER” “/cms”  “/cms/*” | tee
```

Where *<device-name>* is the device name of the drive. The device name depends upon the drive's SCSI ID (see Table 4-26, "Internal SCSI Bus ID Map (c0)," on page 4-172) and whether the drive supports data compression, and must be one of the following:

`/dev/rmt/0`	Indicates the noncompressing tape drive (QIC-150 or 5-GB, 8-mm drive) with the lowest target address in the SCSI chain.
`/dev/rmt/1`	Indicates the noncompressing tape drive (QIC-150 or 5-GB, 8-mm drive) with the second lowest target address in the SCSI chain.
`/dev/rmt/0c`	Indicates the compressed-mode tape drive (either a QIC 2.5-GB, 4-8 GB SLR, or a 14-GB tape drive) with the lowest target address in the SCSI chain
`/dev/rmt/1c`	Indicates the compressed-mode tape drive (either a QIC 2.5-GB, 4-8 GB SLR, or a 14-GB tape drive) with the second lowest target address in the SCSI chain.

NOTE:

You may get four error messages concerning the `/home` directory. These errors display when the directory is already present, so you can ignore them.

b. If you have *CentreVu* CMS maintenance backups dated after the latest CDMADM backup, also restore the latest maintenance backups. See the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for details.

See the See the *CentreVu Call Management System Release 3 Version 6 Administration* (585-215-850) document for more information.

16. **Perform this step only if you have no CMSADM backup available.** If you have a CMSADM backup, perform step instead.

a. Reinstall *CentreVu* CMS. See the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for details on reinstalling *CentreVu* CMS.

b. Run CMS setup. See the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for details.

c. Restore *CentreVu* CMS data from the *CentreVu* CMS maintenance backup. See the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for details.

Restore an Entire System

If you have a disk crash that disables the operating system disk drive, you must perform one of the following procedures outlined in this section. The procedures are essentially a new install: you will have to reinstall the operating system, all add-on packages, and all spatches, in addition to *CentreVu* CMS.

Restoring when a CMSADM backup is available

If your operating system disk is corrupted, or if you had to replace your system's disk 1, perform the following steps:

1. Reinstall the *Solaris* operating system software and repartition the disks. See the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document Factory Software Installation Procedures for details.
2. Reinstall *Solstice DiskSuite* 4.1. For more information on installing *Solstice DiskSuite* 4.1 please refer to the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for details.
3. Run the *Solstice DiskSuite* 4.1 Setup Scripts. For more information on running the *Solstice DiskSuite* 4.1 Setup Scripts please refer to the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for details.
4. Restore the CMSADM backup. See the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for details.
5. Run CMS setup. See the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for details.
6. Restore *CentreVu* CMS data from the *CentreVu* CMS maintenance backup. See the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for details.
7. Administer Terminals, Printers, Users, etc. as needed.

Restoring when a CMSADM backup is not available

If you do not have a CMSADM backup available, follow the procedures outlined in the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for more details.

Restore Specific Files

To restore specific files, enter the following commands at the system prompt:

```
# ulimit unlimited
# cpio -icmudv -C 10240 -I <device name> -M "Please remove the
current tape, insert tape number %d, and press ENTER"
<full_path_name>
```

NOTE:

You must substitute one of these device names for *<device name>* in the `cpio` command:

`/dev/rmt/0` Indicates the tape drive with the lowest target number in the SCSI chain. See Table 4-26, "Internal SCSI Bus ID Map (c0)," on page 4-172.

`/dev/rmt/1` Indicates the tape drive with the second lowest target number in the SCSI chain.

`/dev/rmt/0c` Indicates the tape drive with the lowest target number in the SCSI chain in compressed mode (the QIC 2.5-GB, 4-8 GB SLR, and the 14-GB tape drives support compressed mode).

`/dev/rmt/1c` Indicates the tape drive with the second lowest target number in the SCSI chain in compressed mode (the QIC 2.5-GB, 4-8 GB SLR, and the 14-GB tape drives support compressed mode).

Adding SCSI Hard Disk Drives to a System Running *Solstice DiskSuite* 4.1 Software

Overview

The *Solstice DiskSuite* software treats all the hard disks on your system as a single logical disk, allowing the call center data base to grow quite large. All factory-installed R3V6 systems have OLDS; systems upgraded in the field usually will have had OLDS installed only when needed to allow CMS to handle more than 5200 agents.

To add a hard disk drive to a system running *Solstice DiskSuite* software, follow the procedure in this section.

Add SCSI Disks

To add more SCSI disks to a *Sun SPARCserver* computer that runs with *Solstice DiskSuite* software and that is already up and running, perform these steps:

1. Do a CMSADM backup.

   See the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for details.

2. Make sure the system is in firmware mode (use the `init 0` command to get to the `ok` prompt).

3. Do the following in sequential order:

   a. Turn off the system unit.

   b. Turn off the system monitor.

   c. Turn off all external devices starting with the device closest to the system unit and working toward the farthest device.

4. Install the FSBE/S card (if needed) in the next available Sbus slot.

   NOTE:

   You need to install an additional FSBE/S card only when you have reached the limit on the number of disk drives per SCSI controller. That limit is four for systems running *Solstice DiskSuite* software.

5. Attach the new disk drives to the appropriate FSBE/S cards. See the *Sun FSBE/S SBus Card Manual,* or the *CentreVu Call Management System Release 3 Version 6 Sun SPARCserver Computers, Hardware Installation* (585-215-857) document for details.

6. Set the SCSI IDs on the new disk drives such that they do not conflict with devices already on the same SCSI chain. In the case of a normal external disk unit, a rotary switch on the rear of the unit sets the SCSI ID.
7. Turn on the power to the system units, in the opposite order in which you powered them off.

   NOTE:

   Power on the SCSI devices first, starting with the device at the end of the chain and working toward the system unit. Then power on other devices, again working toward the system unit. Then power on the system unit itself and, finally, the system monitor.

   When you power on the system unit, the system begins to boot. Interrupt the boot by entering Stop A. The system responds:

```
ok
```

8. To verify that the system sees all SCSI devices, including the new disk drive, enter the following command:

```
ok probe-scsi-all
```

   The system responds:

```
/iommu@f,e0000000/sbus@f.e0001000/esp@3,200000
Target 1
  Unit 0 Disk SEAGATE ST14801 SUN04246266 Copyright (C) 1991
Target 3
  Unit 0 Disk SEAGATE ST14801 SUN04246266 Copyright (C) 1991
. . . . .
. . . . .
. . . . .
Target 6
  Unit 0 Disk Removable Read Only Device SONY CD-ROM CDU-8012

ok
```

NOTE:

The actual devices listed depends on the devices installed on the SCSI bus (see Table 4-20 below).

Table 4-20: SCSI Information for External Disks (Systems running *Solstice DiskSuite* Software)

Device	Disk	Target	Unit	File System
c0t2d0s0	3	2	0	overlap
c0t0d0s0	4	0	0	overlap
c1t1d0s0	5	1	1	overlap
c1t2d0s0	6	2	1	overlap
c1t3d0s0	7	3	1	overlap
c1t4d0s0	8	4	1	overlap
c2t1d0s0	9	1	2	overlap
c2t2d0s0	10	2	2	overlap
c2t3d0s0	11	3	2	overlap
c2t4d0s0	12	4	2	overlap

9. Enter the following command:

```
ok boot -r
```

The system responds:

```
Boot device ...
   .
   .
   .
Configuring the /dev directory
Configuring the /dev directory (compatibility devices)
The system is coming up. Please wait.
checking filesystems
/dev/rdsk/c0t1d0s0:        is clean
/dev/rdsk/c0t3d0s5:        is clean
   .
   .
   .
/dev/rdsk/c0t1d0s1 mounted
/dev/rdsk/c0t3d0s5 mounted
/dev/rdsk/c0t1d0s0 mounted
   .
   .
   .
Starting terminal server network daemons.
Network Terminal Server daemon(s) startup complete.
The system is ready.

hostname console login:
```

10. Log in as root.

    You may now format and partition the disks.

Formatting and Partition the Disks

CAUTION:

Only **TSC PERSONNEL** should perform the procedures in this section.

To format and partition the disks, do the following steps:

1. At the system prompt, enter the `format` command:

```
# format
```

The following appears:

NOTE:

Be careful to specify the number that exactly matches the disk you are adding. See Table 4-20, “SCSI Information for External Disks (Systems running Solstice DiskSuite Software),” on page 4-124 for more information.

```
Searching for disks ... done

AVAILABLE DISK SELECTIONS:
   0.  c0t1d0 <SUN1.05 cyl 2036 alt 2 hd 14 sec 727
       /iommu@f,e0000000/sbus@f,e0001000/espdma@f,800000/sd@1,0
   1.  c0t2d0 <SUN1.05 cyl 2036 alt 2 hd 14 sec 727
       /iommu@f,e0000000/sbus@f,e0001000/espdma@f,800000/sd@2,0
   2.  c0t3d0 <SUN1.05 cyl 2036 alt 2 hd 14 sec 727
       /iommu@f,e0000000/sbus@f,e0001000/espdma@f,800000/sd@3,0
   3.  c1t1d0 <SUN1.05 cyl 2036 alt 2 hd 14 sec 727
       /iommu@f,e0000000/sbus@f,e0001000/dma@1,81000/sd@1,0
   4.  c1t2d0 <SUN1.05 cyl 2036 alt 2 hd 14 sec 727
       /iommu@f,e0000000/sbus@f,e0001000/dma@1,81000/sd@2,0
Specify disk (enter its number):
```

2. Enter the number that corresponds to the disk you added.

```
Specify disk (enter its number):
```

The system displays the disk you are adding (for example, `c1t1d0` for disk 5) and the format menu:

```
selecting c1t1d0

FORMAT MENU:
disk
type
partition
current
format
repair
label
analyze
defect
backup
verify
save
inquiry
volname
quit

format>
```

3. At the `format>` prompt, enter `format`.

   The system responds:

```
Ready to format. Formattting cannot be interrupted
and takes 23 minutes (estimated). Continue?
```

4. Enter `y`. The system responds:

```
Beginning formatting. The current time is <date>.
Formatting...
```

5. Wait for the disk to format and verify the media. When the disk is formatted, the system displays:

```
done.

Verifying media..
        pass 0 - pattern = 0xc6dec6de
   2035/12/18
        pass 1 - pattern = 0x6db6db6d
   2035/12/18

Total of 0 defective blocks repaired.
format>
```

6. At the `format>` prompt, enter the `partition` command.

```
format> partition
```

The program displays a confirmation message and the Partition menu.

```
***Do not format the drive, it is formatted already***

PARTITION MENU:
0         -change ‘0’partition
1         -change ‘1’partition
2         -change ‘2’partition
3         -change ‘3’partition
4         -change ‘4’partition
5         -change ‘5’partition
6         -change ‘6’partition
7         -change ‘7’partition
select    -select a predefined table
modify    -modify a predefined partition table
name      -name the current table
print     -display the current table
label     -write partition map and label to the disk
quit

partition>
```

7. At the `partition>` prompt, enter the `print` menu option to check the default partition table.

```
partition> print
```

The system displays the default partition table, for example, the table for a 2.1-GB disk could look like this:

```
Current partition table (original):
Total disk cylinders available: 2733 + 2 (reserved cylinders)

Part          Tag      Flag      Cylinders      Size          Blocks
  0    unassigned      wm        0 -    1      1.48MB      (2/0/0)
  1    unassigned      wm        2 - 2732      1.98GB      (2731/0/0)
  2        backup      wm        0 - 2732      1.98GB      (2733/0/0)
  3    unassigned      wm        0             0           (0/0/0)
  4    unassigned      wm        0             0           (0/0/0)
  5    unassigned      wm        0             0           (0/0/0)
  6    unassigned      wm        0             0           (0/0/0)
  7    unassigned      wm        0             0           (0/0/0)
```

You may have to set up the partitions on the external disks you added. Table 4-21 lists the partitioning information for both 2.1- and 1.05-GB external disks.

Table 4-21: Partitioning Information for External Disks

			2.1-GB Disk		1.05-GB Disk	
Partitions	**Partition ID Tag**	**Partition Permission Flags**	**Start Cylinder**	**Size (Cylinders)**	**Start Cylinder**	**Size (Cylinders)**
0	unassigned	wm	0	2	0	2
1	unassigned	wm	2	2731	2	2034
2	backup	wm	0	2733	0	2036
3-7	unassigned	wm	0	0	0	0

8. At the `partition>` prompt, enter `0.`

```
partition> 0
```

   The system responds:

```
Enter partition id tag [unassigned]:
```

9. Enter `un` for unassigned.

   The system responds:

```
Enter partition permission flags [wm]:
```

10. Enter `wm` to indicate that the partition is writable and mountable.

    The system responds:

```
Enter new starting cyl [0]:
```

11. Enter `0` as the starting cylinder. The system responds:

```
Enter partition size [205632b, 204c, 100.41mb]:
```

12. Enter `2c` for the size of the partition (see Table 4-21).

    The system responds with the `partition>` prompt.

13. At the `partition>` prompt, enter `1`.

```
partition> 1
```

14. Enter `un` for the partition ID tag, `wm` for the partition permission flags, and `2` as the starting cylinder.

15. Enter the size of the partition (see Table 4-21).

```
Enter partition size [133056, 132c,64.9mb]:
```

16. At the `partition>` prompt, enter the `print` menu option to verify that the partition table is accurate (see Table 4-21).

```
partition> print
```

NOTE:

If partitions 3 through 7 have cylinders assigned, zero them out. **Do not** zero out partition 2, leave it as the whole disk.

17. At the `partition>` prompt, enter the `label` menu option.

```
partition> label
```

18. To label the disk, enter `y` at the message prompt.

```
partition> label
Ready to label disk, continue: y
```

The system responds:

```
partition>
```

NOTE:

If you added more than one disk drive to your system, repeat steps 1 through 18 for each drive.

19. Exit the partition menu by entering `q` at the `partition>` prompt and `q` at the `format>` prompt. The system prompt returns.

```
partition> q
format > q
#
```

20. If cms is running, stop it by running `cmsadm` and executing the `run_cms` option:

```
# cmsadm
Lucent Technologies CentreVu(TM) Call Management System
Select a command from the list below.
  1) acd_create  Define a new ACD
  2) acd_remove  Remove all administration and data for an A
  3) backup      Filesystem backup
  4) diskmap     Estimate disk requirements
  5) memory      Estimate memory requirements
  6) realtime    Estimate real-time report refresh rate
  7) pkg_install Install a feature package
  8) pkg_remove  Remove a feature package
  9) run_cms     Turn CentreVu on or off
Enter choice (1-9) or q to quit: 9

Select one of the following
1) Turn on CMS
2) Turn off CMS
Enter choice (1-2): 2

*** Turning off CMS, Please wait ***
.  .  .
*** CMS is now off
#
```

NOTE:

It is important that CMS be turned off for the remaining steps. If it is on, anyone trying to write to the filesystem will receive multiple error messages.

21. Determine the current size of the /cms file system. You can do that by entering a `df -k` command. The system responds by listing the current file systems. For example:

```
# df  -k  /cms

Filesystem           kbytes    used   avail  capacity Mounted on
/dev/dsk/c0t3d0s0    xxxxxx  310956  xxxxxx       45%  /
/proc                     0       0       0        0%  /proc
fd                        0       0       0        0%  /dev/fd
/dev/md/dsk/d19      xxxxxx       9  xxxxxx        0%  /cms

#
```

The operative figures are the “kbytes” and “available” figures for the / and /cms file systems, shown here as “xxxxxx.” Divide each of those numbers by 1000, and record the results. You will use them later to verify that the figures have increased as a result of adding a disk drive.

22. Check disk partitioning by entering the following commands:

```
# export  PATH=$PATH:/usr/opt/SUNWmd/sbin:/olds
# olds  -check_disks cxtydz
      .
      .
#
```

where c*x*t*y*d*z* is the device name of the disk you added. See Table 4-20, “SCSI Information for External Disks (Systems running Solstice DiskSuite Software),” on page 4-124 for details about external SCSI disks.

23. Create a new md.tab file by entering the following commands:

```
# olds  -metadbs
# olds  -mk_files  /dev/dsk/cxtydz
      .
      .
      .
#
```

When the system prompt reappears, check to make sure that all the disk drives on your system have been recognized.

To do that, read the file `/olds/md.tab.new` into an editor. Find the `#/cms` section; it should reflect the precise number of disk drives on your system. The example below, for instance, shows three disk drives on the system:

```
# vi /olds/md.tab.new

<contents of the file is displayed>

   .
   .
   .
#/cms
d19 3 1 /dev/dsk/c0t1d0s1 1 /dev/dsk/c0t3d0s3 1 /dev/dsk/c0t2d0s1
```

If the file reflects the precise number of drives on your system, go directly to step 24 on page 4-136.

If the number of drives is incorrect, complete the following steps a through g.

a. Reboot the system with an `init 0` command. The system reboots and displays the ok prompt:

```
# init 0
    .
    .
    .
ok
```

b. Do the following in sequential order:

   1. Turn off the system unit.
   2. Turn off the system monitor.
   3. Turn off all external devices starting with the device closest to the system unit and working toward the farthest device.

c. Check all disk drive connections to make certain they are secure. Also check the SCSI IDs on the disk drives to make sure no two drives on the same SCSI chain have the same IDs. (A normal external disk unit has a rotary switch on the rear of the unit that sets the SCSI I).

d. Turn on the power to the system units in the opposite order in which you powered them off.

   Power on the SCSI devices first, starting with the device at the end of the chain and working toward the system unit. Then power on other devices, again working toward the system unit. Then power on the system unit itself and, finally, the system monitor.

   When you power on the system unit, the system begins to boot. Interrupt the boot by entering Stop A. The system responds:

```
ok
```

e. To verify that the system sees all SCSI devices, including the new disk drive, enter the following command:

```
ok probe-scsi-all
```

   The system responds:

```
/iommu@f,e0000000/sbus@f.e0001000/esp@3,200000
Target 1
  Unit 0 Disk SEAGATE ST14801 SUN04246266 Copyright (C) 1991
    .
    .
    .
Target 6
  Unit 0 Disk Removable Read Only Device SONY CD-ROM CDU-8012

ok
```

f. When you have verified that the system is recognizing all its disk drives, enter the following command:

```
ok boot -r
```

The system responds:

```
Boot device ...
   .
   .
   .
Configuring the /dev directory
   .
   .
   .
/dev/rdsk/c0t1d0s1 mounted
   .
   .

hostname console login:
```

g. Log in as root, and press **Enter**. The system displays the last login on the console (same date and time) and returns you to the system prompt. For example:

```
Sun Microsystems Inc. SunOS 5.2 Generic November 1995
#
```

h. Repeat steps 22 and 23.

24. Attach the new disk and grow the /cms file system by running the olds script:

```
# /olds/olds  -setup  /dev/rdsk/cxtydz
```

where c*x*t*y*d*z* is the device name of the disk you added. See Table 4-20, “SCSI Information for External Disks (Systems running Solstice DiskSuite Software),” on page 4-124 for details about external SCSI disks.

The system responds with a series of system messages reflecting the disk drive setup process, eventually reporting success. For example:

```
valid disks are <device>
    .
    .
    .
super-block backups (for fsck -F ufs -o b=#) at:
32, 16240, 32448, 48656, 64864, 81072, 97280, 113488,
     .
     .
     .
1854992, 1871200, 1887408, 1903616, 1919824, 1936032

re-adding swap files

Success, activating or growing /cms metadevice.
#
```

25. Check to make sure that the new disk was indeed attached. You can do that by executing a `df -k` command on the /cms file system, and doing some quick math on the result. For example:

```
# df  -k  /cms

Filesystem            kbytes    used   avail  capacity   Mounted on
/dev/dsk/c0t3d0s0     xxxxxx  310956  xxxxxx       45%   /
/proc                      0       0       0        0%   /proc
fd                         0       0       0        0%   /dev/fd
/dev/md/dsk/d19       xxxxxx       9  xxxxxx        0%   /cms

#
```

The / and /cms “kbytes” and “avail” figures (shown here as “xxxxxx”) are the critical numbers. Divide each one by 1000 to determine the size, in megabytes, of your newly expanded disk drive system. Compare these new numbers to the ones you recorded in step 21.

The numbers should have increased as the result of adding the disk drives. For each 2.1-GB disk that you add, you should gain about 998 MB of space; for each new 1.05-GB disk, about 109 MB.

26. Finish off the procedure by rebooting the system:

```
# init  6
```

27. Start CMS (type a `cmssvc` or `cmsadm` command, and select the `Run CMS` option).

Recovering System Space

Overview

This section describes how to regain system space and *CentreVu* CMS file system space.

Regain System Space

When the amount of *CentreVu* CMS data to save is reduced, data stored in *INFORMIX*- SQL tables will still use the original amount of space. The *INFORMIX*- SQL tables must be removed and re-created to regain the system space. There are two ways to remove the *INFORMIX*- SQL tables and regain the system space, as explained in the following two sections.

CAUTION:

Only **TSC PERSONNEL** should perform the procedures in this section.

Reinitialize *CentreVu* CMS

One option is to reinitialize the *CentreVu* CMS database tables which you can do in the following manner:

1. Reduce the amount of historical data saved by making changes in the Data Storage Allocation window.
2. Run the daily, weekly and/or monthly archiver.

   The tables now contain the correct amount of data. When the archiver runs, it cleans up the data that is older than the new values you entered in Step 1. You may let the archiver(s) run automatically for the day, week, or month, or you may manually run the archiver(s) as follows:

   - If the amount of `intra-hour` data was reduced:

     Manually run the daily archiver for the previous day.

     OR

     Let the daily archiver run automatically at the end of the current day.

   - If the amount of `daily` data was reduced:

     Manually run the daily archiver for the previous day.

     OR

     Let the daily archiver run automatically at the end of the current day.

- If the amount of `weekly` data was reduced:

  Manually run the weekly archiver for the previous week.

  OR

  Let the weekly archiver run automatically at the end of the current week.

- If the amount of `monthly` data was reduced:

  Manually run the monthly archiver for the previous month.

  OR

  Let the monthly archiver run automatically at the end of the current month.

3. Perform a full *CentreVu* CMS Maintenance backup.
4. Print the following CMS windows:
   - Data Storage Allocation
   - Free Space Allocation
   - Storage Intervals
   - Switch Setup.
5. Run the CMSSVC `setup` option to reinitialize the *CentreVu* CMS database. Use the printouts obtained in step 4 and verify that the *CentreVu* CMS software has the same configuration as it did before setup was run.
6. Restore the *CentreVu* CMS from the *latest CentreVu* CMS maintenance backups. This restore loads the *CentreVu* CMS data up to the time of the last *CentreVu* CMS backup. See the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for details.
7. Stop and start *CentreVu* CMS when the *CentreVu* CMS maintenance restore is finished. To start and stop the *CentreVu* CMS, see the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for details.

Re-create Specific Tables

Another option is to manually remove and rebuild specific database tables, which you can do in this manner:

1. Perform Steps 1 and 2 of the previous section, “Reinitialize CentreVu CMS” on page 4-139.
2. Perform a full *CentreVu* CMS maintenance backup.

3. Save the schemas of the historical database tables for which the amount of data to save was reduced. Do this in the following manner:

   a. Log in as *root*.

   b. Enter the following:

      ```
      DBPATH=/cms/db/inf;export DBPATH
      ```

   c. Change to the directory where you want to place a file. For example, enter the following:

      ```
      cd /export/home/cmssvc
      ```

   d. Use the following command to save the database table schema(s):

      ```
      /usr/informix/bin/dbschema -t <tablename> -d
      cms -p all <table.sql>
      ```

      This command produces an SQL command file (such as table.sql) that contains the necessary statements required to create the database table.

      NOTE:

      You must supply the two arguments enclosed in brackets above. The two arguments are defined as follows:

      - `-t <tablename>` is the *INFORMIX* database table name of the table that has had its size reduced.
      - *<table.sql>* is the file name where the SQL commands are written. The suffix "`.sql`" should be used for the output file name to simplify creating the database tables. This file is placed in the directory where the `dbschema` command is executed.

      CAUTION:

      If the `-t <tablename>` option is omitted, **all** the schemas for **all** the database tables in the database are saved.

4. Note the file system of *CentreVu* CMS data. Output from the `dbschema` command does not contain the file system/directory of the database table. The file produced by the `dbschema` command must be edited, and the correct path must be added to the create table statement(s). Even if the historical data is in the */cms* file system, the historical database tables are located in the */cms/cmstables* directory. Historical data includes any of the following:
   - Trunk group
   - Agent trace
   - Exceptions
   - Call work codes
   - Forecasting
   - Trunks
   - Agents
   - Splits
   - Vectors
   - VDNs
   - Call records
   - Login/logout

   Following is an example of the dtrunk schema edited for th*e /cms* file system:

```
{root is owner of table dtrunk}
create table dtrunk
(
row_date date,
acd smallint,
eqloc char(9),
incalls integer,
intime integer,
abncalls integer,
o_abncalls integer,
outcalls integer,
outtime integer,
failures integer,
```

```
audio integer,
mbusytime integer,
acdcalls integer,
othercalls integer,
shortcalls integer,
o_acdcalls integer,
o_othercalls integer,
incomplete smallint
) in "/cms/cmstables/dtrunk";
{root is owner of index dtk_ndx1}
create index dtk_ndx1 on dtrunk (row_date,eqloc,tkgrp);
revoke all on dtrunk from public;
grant dba to root;
grant resource to public;
grant insert on dtrunk to public;
grant delete on dtrunk to public;
grant index on dtrunk to public;
grant select on dtrunk to public;
grant update on dtrunk to public;
```

5. Turn off *CentreVu* CMS by using the `run_cms` option on either the CMSADM or CMSSVC menu. See the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for details.
6. Remove (drop) the database tables for which the administration changes were made by doing the following:
   a. Enter the command:

      `/usr/informix/bin/dbaccess`

      The dbaccess main menu appears.
   b. Select `Table` from the main menu.
   c. Select `Drop` from the `Table` menu.

      You are prompted for a table name to drop.
   d. Enter the table name you want dropped.
   e. Select `Exit` to exit the `Table` menu.

7. Create the database tables in the correct directory as follows:
   a. Select `Query-Language` from the dbaccess main menu.

      You are prompted for the database name.

   b. Enter `cms`.

   c. Select `Choose` from the menu.

      A list of the `.sql` files on the file system (such as your work directory) is displayed.

   d. Select a file.

   e. Select `Run` to execute the commands in the file to create the database tables(s).

   f. Select `Exit` to exit the `Query Language` menu.

   g. Select `Exit` (to exit dbaccess) when all the database tables have been created.

8. Turn on *CentreVu* CMS by using the `run_cms` option on either the CMSADM or CMSSVC menu. See the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for details.

9. Perform a *CentreVu* CMS restore for all ACDs to restore the historical data into the *CentreVu* CMS database tables. If the *CentreVu* CMS full maintenance backup uses more than one tape, an automatic *CentreVu* CMS restore is most efficient. The automatic restore prompts for the necessary tapes to restore the historical data. You have the following options:
   - Use the `specific tables` option to restore data for specific database tables. This will save time if only one type of data is being changed.
   - Restore historical data using the `Start date` and `Start time` input fields in the Restore Data window to restore data from a specific period of time.

Recover *CentreVu* CMS File System Space

When you log into the system as a *CentreVu* CMS user, a program is executed that checks the free blocks available to */, /usr*, and the various *CentreVu* CMS-related file systems located on the hard disks. If one of these file systems has less than 5000 but more than 1000 free blocks, a message similar to the following will be displayed on your terminal screen:

```
WARNING: File system, "<file system>", has only "<XXXX>"
blocks free.
```

When this message occurs, file system maintenance must be done as soon as possible to keep the file system from running out of free blocks.

If one of these file systems has less than 1000 free blocks, a message similar to the following will be displayed:

```
**********************************************************
* CAUTION CAUTION CAUTION CAUTION CAUTION                *
*                                                        *
*                                                        *
*                                                        *
* File system, "<file system>", has only "<XXXX>"        *
* blocks free.                                           *
**********************************************************
```

When these messages occur, the file system is almost out of free blocks, and the *CentreVu* CMS software application can shut down at any time.

To reallocate space, use the Free Space Allocation window located in the System Setup subsystem. See the *CentreVu Call Management System Release 3 Version 6 Administration* (585-215-850) document for details. Read the "Things to Know Before You Start" and "Prerequisite System Administration" sections before changing any fields in the window.

Adding Memory

Overview

This section describes how to add memory to your *Sun SPARCserver* system.

Adding Additional Memory

NOTE:

You need to perform a CMSADM backup before continuing. Refer to the *CentreVu Call Management System Release 3 Version 6 Administration* (585-215-850) document for details.

To add more memory to a *Sun SPARCserver* computer that is already up and running, do the following:

1. Make sure the system is in the firmware mode by using the `init 0` command to get to the `ok` prompt.
2. Do the following in sequential order:
   a. Turn off the *Sun SPARCserver* computer.
   b. Turn off the system monitor.
   c. Turn off all external devices starting with the device closest to the *Sun SPARCserver* computer and working toward the farthest device.
3. Install the DSIMM into the *Sun SPARCserver* computer.
4. Do the following in sequential order:
   a. Turn on devices attached to the *Sun SPARCserver* computer starting with the device at the end of the SCSI chain and working toward the computer.
   b. Turn on the *Sun SPARCserver* computer.
   c. Turn on the system monitor.
5. Boot the system.

```
ok boot -r
```

6. After the machine is booted, log in as root.

7. Enter the `prtconf` command, and verify that the displayed memory size is correct.

```
# prtconf | grep Memory

Memory size: xx Megabytes
```

After you have added memory to your system, you may need to configure additional swap space. To find out whether you do, first determine how your system is partitioned. (See the “Disk Recovery” section in this chapter. In addition, note whether disk 1 is a 2.1-GB disk or a or 1.05-GB disk.) Then use the following table to determine what to do next:

Table 4-22: Swap Space Decision Table

System Type	Condition	Action
Two-system disks	-	STOP. No changes to swap space are needed.
One-system disk	RAM = 96MB or less	STOP. No changes to swap space are needed.
	Disk 1 = 2.1 GB (swap space is on disk 1)	See the “Partition Swap Space on Disk 1” section on page 4-148.
	Disk 1 = 1.05 GB (swap space is on disk 2)	See the “Partition Swap Space on Disk 2” section on page 4-157.
System with *Solstice DiskSuite* Software	-	“Adding Swap Space to a System with Solstice DiskSuite 4.1 Software Installed” on page 4-162.

Partition Swap Space on Disk 1

CAUTION:

Only **TSC PERSONNEL** should perform the procedures in this section.

This section describes how to change the swap space on disk 1. If you change the swap space, you will also have to change the space allocated to `/cms`. `Swap` and `/cms` are mounted on partitions 6 and 7 on a 2.1-GB disk 1.

1. Determine the amount of swap space configured on your machine by entering the following command:

```
# format
```

The system responds:

```
Searching for disks ... done

AVAILABLE DISK SELECTIONS:
   0.  c0t1d0 <SUN1.05 cyl 2036 alt 2 hd 14 sec 727
       /iommu@f,e0000000/sbus@f,e0001000/espdma@f,800000/sd@1
,0
   1.  c0t2d0 <SUN1.05 cyl 2036 alt 2 hd 14 sec 727
       /iommu@f,e0000000/sbus@f,e0001000/espdma@f,800000/sd@2
,0
   2.  c0t3d0 <SUN1.05 cyl 2036 alt 2 hd 14 sec 727
       /iommu@f,e0000000/sbus@f,e0001000/espdma@f,800000/sd@3
,0
   3.  c1t1d0 <SUN1.05 cyl 2036 alt 2 hd 14 sec 727
       /iommu@f,e0000000/sbus@f,e0001000/dma@1,81000/sd@1,0
   4.  c1t2d0 <SUN1.05 cyl 2036 alt 2 hd 14 sec 727
       /iommu@f,e0000000/sbus@f,e0001000/dma@1,81000/sd@2,0
Specify disk (enter its number):
```

2. Enter the number for disk c0t3d0 (for example, 2).
3. At the `format>` prompt, enter the following:

```
format> partition
```

4. At the `partition>` prompt, enter the following:

```
partition> print
```

5. Compare the displayed cylinder values for partitions 6 and 7 with the required values listed in Table 4-23.

Table 4-23: Partitioning Swap Space on Disk 1 - (Disk 1 = 2.1-GB)

If equipped RAM (in MB) is:		Partition	File System	Size (Cylinders)	Approximate Kilobytes
more than	but less than or equal to				
0	64	6	swap	181	
		7	/cms	1470	763700
64	192	6	swap	543	
		7	/cms	1108	575400
192	320	6	swap	906	
		7	/cms	745	386400
320	512	6	swap	1268	
		7	/cms	383	198800

6. Enter q at the `partition>` and `format>` prompts to return to the system prompt.

```
partition> q
format> q
#
```

If your current partitioning is correct (see Step 5), all the activities required to install the additional memory are complete. If your current partitioning on disk 1 is not correct, continue.

7. Reduce the amount of data stored in `/cms` so that disk 1 may be repartitioned. Use the `df` command to determine the kilobytes currently used in `/cms`.

```
# df -k /cms

Filesystem         Kbytes   Used  Avail   Capacity    Mounted On
/dev/dsk/c0t3d0s0  xxx      xxx   xxx     xxx         /cms
```

8. If the number of kilobytes used in `/cms` is larger than the "Approximate Kilobytes" column in Table 4-23, use the *CentreVu* CMS Free Space Allocation window to move data out of the `/cms` file system. The kilobytes used as reported by the `df` command must be less than the "Approximate Kilobytes" for the repartitioned `/cms` before you proceed.

   NOTE:

   If your system does not have available file system space, you may need to add an additional SCSI hard disk to store data moved from `/cms`.

9. Turn off *CentreVu* CMS using the `cmsadm` command.
10. Perform a CMSADM file system backup. See "Restoring Disk(s) When A CMSADM Backup Is Available" section in this chapter. This backup will be needed to restore the `/cms` file system after disk 1 has been repartitioned.
11. Unmount the `/cms` file system with the following command:

```
# umount /cms
```

Partition Disk 1

To partition disk 1, do the following steps:

1. At the system prompt, enter the following command:

```
# format
```

The system responds:

```
Searching for disks ... done

AVAILABLE DISK SELECTIONS:
   0.  c0t1d0 <SUN1.05 cyl 2036 alt 2 hd 14 sec 727
       /iommu@f,e0000000/sbus@f,e0001000/espdma@f,800000/sd@1
,0
   1.  c0t2d0 <SUN1.05 cyl 2036 alt 2 hd 14 sec 727
       /iommu@f,e0000000/sbus@f,e0001000/espdma@f,800000/sd@2
,0
   2.  c0t3d0 <SUN1.05 cyl 2036 alt 2 hd 14 sec 727
       /iommu@f,e0000000/sbus@f,e0001000/espdma@f,800000/sd@3
,0
   3.  c1t1d0 <SUN1.05 cyl 2036 alt 2 hd 14 sec 727
       /iommu@f,e0000000/sbus@f,e0001000/dma@1,81000/sd@1,0
   4.  c1t2d0 <SUN1.05 cyl 2036 alt 2 hd 14 sec 727
       /iommu@f,e0000000/sbus@f,e0001000/dma@1,81000/sd@2,0
Specify disk (enter its number):
```

2. Enter the number for disk c0t3d0 (for example, 2).
3. At the `format>` prompt, enter the following:

```
format> partition
```

The program displays a confirmation message and the Partition menu.

```
***Do not format the drive, it is formatted already***

PARTITION MENU:
0         -change ‘0’partition
1         -change ‘1’partition
2         -change ‘2’partition
3         -change ‘3’partition
4         -change ‘4’partition
5         -change ‘5’partition
6         -change ‘6’partition
7         -change ‘7’partition
select    -select a predefined table
modify    -modify a predefined partition table
name      -name the current table
print     -display the current table
label     -write partition map and label to the disk
quit

partition>
```

4. At the `partition>` prompt, enter `6`.
5. Enter `swap` for the partition ID tag, `wu` for the partition permission flags, the starting cylinder, and the size. See Table 4-24.
6. At the `partition>` prompt, enter `7`.
7. Enter `un` for the partition ID tag, `wm` for the partition permission flags, the starting cylinder, and the size. See Table 4-24.

WARNING:

Do not change partitions 0 through 5. If you do, disk corruption may occur when you enter the `label` command in Step 11.

Table 4-24: Partitioning a 2.1-GB Disk 1 - Partitions 6 and 7

If equipped RAM in (MB) is:		Partition	Partition ID Tag	Partition Permission Flags	Start Cylinder	Size (Cylinders)
more than	but less than or equal to					
0	64	6	swap	wu	1082	181
		7	unassigned	wm	1263	1470
64	192	6	swap	wu	1082	543
		7	unassigned	wm	1625	1108
192	320	6	swap	wu	1082	906
		7	unassigned	wm	1988	745
320	512	6	swap	wu	1082	1268
		7	unassigned	wm	2350	383

8. At the `partition>` prompt, enter the `print` menu option to verify that the partition table is accurate.

```
partition> print
```

9. At the `partition>` prompt, enter the `name` menu option.

```
partition> name
```

10. Enter "`cms`" for the *`table name`*.

```
partition> name
Enter table name (remember quotes): "cms"
```

11. At the `partition>` prompt, enter the `label` menu option.

```
partition> label
```

12. To label the disk, enter y at the message prompt.

```
partition> label
Ready to label disk, continue: y
```

The system responds:

```
partition>
```

13. To exit the partition menu, enter q at the `partition>` prompt and q at the `format>` prompt. The system responds:

```
partition> q
format > q
#
```

Create and Mount the /cms File System

To recreate and remount the `/cms` file system, do the following:

1. Enter the following command at the system prompt:

```
# newfs -m 0 /dev/rdsk/c0t3d0s7
```

The system responds:

```
# newfs -m 0 /dev/rdsk/c0t3d0s7
newfs: construct a new file system /dev/rdsk/c0t3d0s7: (y/n)?
```

2. At the message prompt, enter y. The system responds:

```
/dev/rdsk/c0t3d0s7: ...
   .
   .
   .
#
```

3. At the system prompt, enter the following command:

```
# mountall
```

   The system displays all the file systems mounted.

4. To verify that all file systems are mounted properly, check the displayed response, and resolve any problems.
5. Restore the contents of the `/cms` file system using the `cpio` commands.

```
# ulimit unlimited
# cpio -icumd -C 10240 -I <device name> -M
“Please remove the current tape, insert tape number %d, and
press Enter” “/cms”
```

   NOTE:

   You must substitute one of these device names for *<device name>* in the `cpio` command:

   `/dev/rmt/0` Indicates the tape drive with the lowest target number in the SCSI chain. See Table 4-26, “Internal SCSI Bus ID Map (c0),” on page 4-172.

   `/dev/rmt/1` Indicates the tape drive with the second lowest target number in the SCSI chain.

   `/dev/rmt/0c` Indicates the tape drive with the lowest target number in the SCSI chain in compressed mode (the QIC 2.5-GB, 4-8 GB SLR, and the 14-GB tape drives support compressed mode).

   `/dev/rmt/1c` Indicates the tape drive with the second lowest target number in the SCSI chain in compressed mode (the QIC 2.5-GB, 4-8 GB SLR, and the14-GB tape drives support compressed mode).

6. Turn on *CentreVu* CMS using the `cmsadm` command.

You should perform a CMSADM file system backup to save the updated system software and hardware configuration. See the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for details.

Partition Swap Space on Disk 2

This section describes how to change the swap space on disk 2. If you change the swap space, you will also have to change the space allocated to `/cms1`. `Swap` and `/cms1` are mounted on partitions 0 and 1 on disk 2.

NOTE:

If additional swap space is required on disk 2, but disk 2 is not installed, then you need to install, format, and partition disk 2. In addition, you need to create and mount a `/cms1` file system on disk 2.

Use the procedures in the “Adding SCSI Hard Disk Drives - Disk 2 (One-System Disk)” on page 4-36 of this chapter instead of the procedures described here.

1. Determine the amount of swap space configured on your machine using the following command:

```
# format
```

The system responds:

```
Searching for disks ... done

AVAILABLE DISK SELECTIONS:
   0.  c0t1d0 <SUN1.05 cyl 2036 alt 2 hd 14 sec 727
       /iommu@f,e0000000/sbus@f,e0001000/espdma@f,800000/sd@1
,0
   1.  c0t2d0 <SUN1.05 cyl 2036 alt 2 hd 14 sec 727
       /iommu@f,e0000000/sbus@f,e0001000/espdma@f,800000/sd@2
,0
   2.  c0t3d0 <SUN1.05 cyl 2036 alt 2 hd 14 sec 727
       /iommu@f,e0000000/sbus@f,e0001000/espdma@f,800000/sd@3
,0
   3.  c1t1d0 <SUN1.05 cyl 2036 alt 2 hd 14 sec 727
       /iommu@f,e0000000/sbus@f,e0001000/dma@1,81000/sd@1,0
   4.  c1t2d0 <SUN1.05 cyl 2036 alt 2 hd 14 sec 727
       /iommu@f,e0000000/sbus@f,e0001000/dma@1,81000/sd@2,0
Specify disk (enter its number):
```

2. Select the disk 2 (`c0t1d0`).

3. At the `format>` prompt, enter the following:

```
format> partition
```

4. At the `partition>` prompt, enter the following:

```
partition> print
```

5. Compare the displayed cylinder values for partitions 0 and 1 with the required values listed in Table 4-25.

Table 4-25: Internal Disk 2 (c0t1d0) - Partition Information

				2.1-GB Disk 2		1.05-GB Disk 2	
If equipped RAM (in MB) is:		Partition	File System	Size (Cylinders)	Approximate Kilobytes	Size (Cylinders)	Approximate Kilobytes
more than	but less than or equal to						
0	96	0	/cms1	2733	1419600	2036	701400
		2	backup	2733		2036	
96	160	0	/cms1	2473	1284500	1776	611800
		1	swap	260		260	
		2	backup	2733		2036	
160	224	0	/cms1	2213	1149400	1516	522200
		1	swap	520		520	
		2	backup	2733		2036	
224	288	0	/cms1	1953	1014300	1256	432600
		1	swap	780		780	
		2	backup	2733		2036	
288	352	0	/cms1	1693	879200	996	343000
		1	swap	1040		1040	
		2	backup	2733		2036	

Table 4-25: Internal Disk 2 (c0t1d0) - Partition Information (Contd)

				2.1-GB Disk 2		1.05-GB Disk 2	
If equipped RAM (in MB) is:		Partition	File System	Size (Cylinders)	Approximate Kilobytes	Size (Cylinders)	Approximate Kilobytes
more than	but less than or equal to						
352	416	0	/cms1	1433	744100	736	253400
		1	swap	1300		1300	
		2	backup	2733		2036	
416	512	0	/cms1	1173	609000	476	163800
		1	swap	1560		1560	
		2	backup	2733		2036	

6. Enter quit at the `partition>` and `format>` prompts to return to the system prompt.

```
partition> quit
format> quit
#
```

If your current partitioning is correct (see Step 5), all the activities required to install the additional memory are complete. If your current partitioning on disk 2 is not correct, continue.

Reallocate Data Stored on /cms1

1. Reduce the amount of data stored in `/cms1` so that disk 2 may be repartitioned. Use the `df` command to determine the K-bytes currently used in `/cms1`.

```
# df -k /cms1

Filesystem         Kbytes   Used  Avail   Capacity    Mounted On
/dev/dsk/c0t3d0s0  xxx      xxx   xxx     xxx         /cms
or
/dev/dsk/c0t1d0s0  xxx      xxx   xxx     xxx         /cms1
```

2. If the number of kilobytes used in `/cms1` is larger than the "Approximate Kilobytes" column in Table 4-25, use the *CentreVu* CMS Free Space Allocation window to move data out of the `/cms1` file system. The kilobytes used as reported by the `df` command must be less than the "Approximate Kilobytes" for the repartitioned `/cms1` before you proceed.

   NOTE:

   If your system does not have available file system space, you may need to add an additional external SCSI hard disk to store data moved from `/cms1`.

3. Turn off *CentreVu* CMS using the `cmsadm` command.
4. Perform a CMSADM file system backup. See "Restoring Disk(s) When A CMSADM Backup Is Available" section in this chapter. This backup will be needed to restore the `/cms1` file system after disk 2 has been repartitioned.
5. Unmount the `/cms1` file system with the following command:

:

```
# umount /cms1
```

6. Now, you need to repartition the disk and create the`/cms1` file system. You also need to inform the *Solaris* operating system about the additional swap space.

   See the "Partition Swap Space on Disk 2" section in this chapter for procedures on partitioning disk 2.

   See the "Construct a New File System Disk 2" and "Mount the File System Disk 2" sections in this chapter for procedures on creating and mounting the `/cms1` file system.

   See the "Set Up the Swap Space Disk 2" section of this chapter for procedures on informing *Solaris* about the additional swap space.

7. Use the `mount` command to verify that the `/cms1` file system is mounted.

```
# mount | grep /cms1
```

The system responds:

```
/cms1 on /dev/dsk/c0t1d0s0...
```

8. Restore the contents of the `/cms1` file system using the `cpio` commands.

```
# ulimit unlimited
# cpio -icumd -C 10240 -I <device name> -M
“Please remove the current tape, insert tape number %d, and
press Enter” “/cms1”
```

NOTE:

You must substitute one of these device names for *<device name>* in the `cpio` command:

`/dev/rmt/0` Indicates the tape drive with the lowest target number in the SCSI chain. See Table 4-26, “Internal SCSI Bus ID Map (c0),” on page 4-172.

`/dev/rmt/1` Indicates the tape drive with the second lowest target number in the SCSI chain.

`/dev/rmt/0c` Indicates the tape drive with the lowest target number in the SCSI chain in compressed mode (the QIC 2.5-GB, 4-8 GB SLR, and the 14-GB tape drives support compressed mode).

`/dev/rmt/1c` Indicates the tape drive with the second lowest target number in the SCSI chain in compressed mode (the QIC 2.5-GB, 4-8 GB SLR, and the14-GB tape drives support compressed mode).

9. Turn *CentreVu* CMS on using the `cmsadm` command.

You should perform a CMSADM file system backup to save the updated system software and hardware configuration. See the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for details.

Adding Swap Space to a System with *Solstice DiskSuite 4.1* Software Installed

A system that uses *Solstice DiskSuite* software to manage disk space maintains its CMS swap space in a file whose size depends entirely upon the amount of RAM installed on the system. If you add memory, you must also increase the size of the swap file. Follow these steps:

1. Delete the old swap file by entering the following command:

```
# olds  swap  -d  /cms/swap
```

   If that command should fail, you can still delete the file by doing the following:

   a. Load the file */etc/vfstab* into an editor and comment out the `/cms/swap` line.

   b. Reboot the system with the command: `init 6`

   c. Remove the swap file with the command: `rm  /cms/swap`

2. Recreate the swap files by running the following command:

```
# olds  -addswapfile  /cms
```

3. To verify the swap space, do this:

   a. Reboot the system by entering the command: `init 6`

   b. When the reboot completes, verify the space has been allocated by entering the command: `swap  -l`

      If you receive the message “No swap devices configured,” load the */etc/vfstab* file into an editor. Check the */swap* and */cms/swap* entries. If they are commented out, uncomment them and execute the following commands:

```
swap  -a  /swap
swap  -a  /cms/swap
```

   c. Reenter the `swap -l` command to verify the swap devices have been configured as they should have been.

Installing an HSI Card

Procedure

HSI cards allow the *CentreVu* CMS system to support up to four ACDs. To install an HSI card in the *Sun SPARCserver* computer, do the following:

1. Log into the system as root.
2. Turn off *CentreVu* CMS by using the *run_cms* option of the `cmssvc` command. See the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for details.
3. Remove the *CentreVu* CMS software using the procedures described in the *CentreVu Call Management System Release 3 Version 6 Upgrades and Migration* (585-215-856) document.

   NOTE:

   Enter y when asked:

   ```
   Do you want to preserve CMS data? [y,n,?]
   ```

4. Shut the system down by using the `shutdown` command:

.

```
# shutdown -y -i0 -g0
```

5. Do the following in sequential order:
   a. Turn off the *Sun SPARCserver* computer.
   b. Turn off the system monitor.
   c. Turn off all external devices starting with the device closest to the *Sun SPARCserver* computer and working toward the farthest device.
6. Install the HSI card into the *Sun SPARCserver* computer.
7. Attach the HSI patch panel.
8. Connect the switch links to the HSI patch panel.

NOTE:

Do not use the “B” serial port to connect switch links when an HSI card is installed. All switch links must be connected to the HSI patch panel.

9. Do the following in sequential order:
   a. Turn on devices attached to the *Sun SPARCserver* computer starting with the device at the end of the SCSI chain and working toward the computer.
   b. Turn on the *Sun SPARCserver* computer.
   c. Turn on the system monitor.
10. Press the Stop and A keys simultaneously after the display console banner appears, but before the system starts booting.
11. Boot the system with the -r option so it will recognize the new HSI card:

```
ok boot -r
```

12. When the system comes back up, log in as root.
13. Enter the `pkginfo` command to see if there are any Aurora *Multiport* drivers installed on the system. For example:

```
# pkginfo
  system          AURAcs      Aurora 400/800 S/SX/S+ device
                              driver
  system          AURAsio16   Aurora 1600 S/SM/SE device driver
  application     SUNWabe     Solaris 2.5.1 User AnswerBook
  system          SUNWaccr    System Accounting, (Root)
  .
  .
  .
```

NOTE:

If the system has Aurora *Multiport* drivers installed, they will have to be removed before the HSI driver can be installed.

14. If Aurora *Multiport* drivers are installed, remove them using the `pkgrm` command:

```
# pkgrm AURAcs
and/or
# pkgrm AURAsio16
```

15. Remove all terminal and printer administration for the Aurora SBus *Multiport* cards.
16. Install the HSI software by following the instructions described in the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document.
17. Reinstall the Aurora *Multiport* drivers by following the instructions in the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document.
18. Readminister all terminals and printers on the Aurora SBus *Multiport* cards.
19. Install the *Solaris* patches package by following the instructions described in the *CentreVu Call Management System Release 3 Version 6 Upgrades and Migration* (585-215-856) document.
20. Install the *CentreVu* CMS software by following the instructions described in the *CentreVu Call Management System Release 3 Version 6 Upgrades and Migration* (585-215-856) document.
21. Change the switch link administration for ACD 1 by using the `cmssvc` command.

.

```
# cmssvc
```

22. The system responds:

```
CentreVu(TM) Call Management System Services Menu

Select a command from the list below.
  1) auth_display Display feature authorizations
  2) auth_set     Authorize CMS capabilities/capacities
  3) run_cms      Turn CentreVu CMS on or off
  4) setup        Set up the initial configuration
  5) swinfo       Display switch information
  6) swsetup      Change switch information
  7) upd_install  Install update from disk files
  8) upd_remove   Back out the currently installed update
  9) upd_save     Save update on disk for later installation
Enter choice (1-9) or q to quit:
```

23. Select the `swsetup` option.
24. Select ACD 1.
25. Accept the existing defaults for the following:
    - Switch name
    - Switch model (release)
    - Vectoring
    - Expert agent
    - Central Office Disconnect Supervision
    - Local port
    - Remote port.
26. Select “HSI link 0” when prompted for the link information.
27. Perform a CMSADM file system backup to save the updated system software and hardware configuration. See the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for details.
28. Turn on *CentreVu* CMS using the `run_cms` option of the cmssvc command.

Change the Date or Time

Overview

The switch time is displayed at the top of most *CentreVu* CMS screens.

NOTE:

Changing the switch time may cause a small distortion in the *CentreVu* CMS data when the change is made. A small amount of data may also be lost when the change occurs. For example, if the *Solaris* system time is advanced, the switch connection is reestablished causing a small amount of data to be lost.

Change the System Date and Time

Do these steps to change the *Solaris* system time:

1. Log in as *root*.
2. Change to an OpenBoot mode with the following command:

```
# init 0
     .
     .
     .
```

3. At the ok prompt, enter the following command:

```
ok  boot -s
     .
     .
     .
Resetting...
Type Ctrl-d to proceed with normal startup
(or give root password for system maintenance):
```

4. Enter the *root* password.

   The system responds:

```
Entering System Maintenance Mode
Enter Terminal Type: (default is 6300+):
```

5. At the prompt, enter the terminal type.
6. At root, enter the `date` command to set the time and date.

.

```
# date mmddHHMM[[cc]yy]
```

For example:

- ***mm* (month):** Enter the month (numeric). Range: 1-12 (1=January, 2=February, etc.).
- ***dd* (day):** Enter the day of the month. Range: 1-31
- ***HH* (hour):** Enter the hour of day, military time. Range: 00-23.
- ***MM* (minute):** Enter the minute of the hour. Range: 00-59.
- ***[cc]* (century):** Enter the century minus 1. For example, for the 20th century, enter 19.
- ***[yy]* (year):** Enter the last two digits of the year (96, for example, means 1996).

7. Set the time zone environment variable in the */etc/default/init* file by doing the following:
   a. Examine the */usr/share/lib/zoneinfo* directory for time zones. For more information about time zones, see the next section “Changing the System Country and Time Zones” in this chapter.
   b. Edit the */etc/default/init* file with a text editor (for example, vi).
   c. Change the */etc/default/init* file by using the `w!` command to overwrite the file.
8. Return to a multi-user state with the following command:

```
# shutdown -i6 -g0 -y
```

NOTE:

The `-i6` option of the `shutdown` command changes the system to a multi-user state.

Change the System Country and Time Zones

To set the country and time zones, do the following:

1. At the console, exit the *OpenWindows** environment if it is currently running.
2. To initiate an OpenBoot mode, enter the following command:

```
# init 0
```

3. At the ok prompt, enter the following command:

```
ok  boot -s
     .
     .
     .
Resetting...
Type Ctrl-d to proceed with normal startup
(or give root password for system maintenance):
```

4. Enter the root password.

   The system responds:

```
Entering System Maintenance Mode
Enter Terminal Type: (default is 6300+):
```

5. At the prompt, enter the terminal type.

**OpenWindows* is a trademark of Sun Microsystems, Inc.*

6. Edit the */etc/default/init* file and set the TZ variable to equal the appropriate value in the */usr/share/lib/zoneinfo* directory. Then write and quit the file. For example:

```
# vi /etc/default/init

<contents of the file is displayed>

# @(#)init.dfl 1.2 92/11/26
#
# This file is /etc/default/init. /etc/TIMEZONE is a symlink to this file.
# This file looks like a shell script, but it is not. To maintain
# compatibility with old versions of /etc/TIMEZONE, some shell constructs
# (i.e., export commands) are allowed in this file, but are ignored.
#
# Lines of this file should be of the form VAR=value, where VAR is one of
# TZ, LANG, or any of the LC_* environment variables.
#
TZ=US/Mountain
```

This is the line you modify.

As an example for Mountain Standard Time, the TZ variable can be set to MST or US/Mountain. The entry in the *init* file is essentially a relative path name from the */usr/share/lib/zoneinfo* directory. MST is a file in */user/share/lib/zoneinfo,* and Mountain is a file in */usr/share/lib/zoneinfo/US*.

7. Reboot the machine using the following command:

:

```
# shutdown -i6 -g0 -y
```

NOTE:

For more information, enter the man date command at the system prompt.

Adding, Removing, or Replacing Tape Drives

Overview

This section describes how to add, remove, or replace tape drives from an existing system.

Add or Replace a Tape Drive

When adding or replacing a tape drive to an existing system, you need to do the following:

- Remove existing SCSI device files (to prepare for new SCSI hardware configuration).
- Set the SCSI device ID(s).
- Connect the tape drive(s) to the SCSI chain.
- Reboot and reconfigure the system.

To remove SCSI device files, do the following:

1. Enter the following command:

```
# rm /dev/rmt/*
```

NOTE:

If you do not remove the device files before rebooting the system, the SCSI device files may not match the hardware configuration. If this occurs, repeat Steps 1 through 10.

2. Shut the system down using the following command:

```
# init 0
```

3. Do the following in sequential order:
   a. Turn off the *Sun SPARCserver* computer.
   b. Turn off the system monitor.

c. Turn off all external devices starting with the device closest to the *Sun SPARCserver* computer and working toward the farthest device.

4. Set the SCSI ID(s) by doing the following:

   a. Locate the target address switch on the rear panel of the SCSI device (see Figure 4-2).

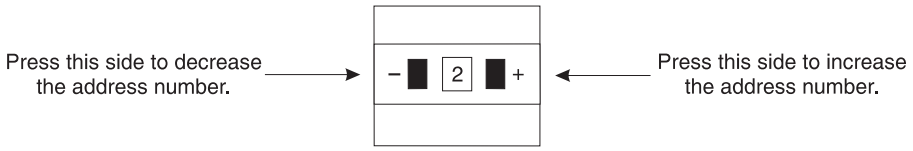


Figure 4-2: Setting the SCSI ID/Target Address

   b. Identify which SCSI ID will be associated with each of the devices on a specific SCSI bus (see Table 4-26).

   c. Press the left or right button on the switch until the appropriate SCSI ID number appears in the window.

Table 4-26: Internal SCSI Bus ID Map (c0)

Device	SCSI ID	Node	Location
Base Disk	3	c0t3	Internal
Disk #2	1	c0t1	Internal
4-8 GB SLR Tape Drive*	4	c014	External
2.5-GB QIC UniPack Tape Drive†	4	c0t4	External
5-GB or 14-GB 8mm	5	c0t5	External
CD-ROM	6	c0t6	Internal
Disk #3	2	c0t2	External
Disk #4	0	c0t0	External
SCSI Controller	7	N/A	Internal

*The 4-8 GB SLR Tape Drive is the replacement for the QIC 2.5-GB Tape Drive. These two units are mutually exclusive.
†The QIC 2.5-GB UniPack Tape Drive is no longer available with new systems, however, if the customer has one it can be used.

NOTE:

All systems are shipped with one or more tape drives (QIC-150, QIC 2.5-GB, 4-8 GB SLR, 5-GB, and/or 14-GB). For systems with multiple tape drives, either the QIC-150, 4-8 GB SLR, or the QIC 2.5-GB is the first drive in the SCSI chain.

Valid device names are as follows:

`/dev/rmt/0` Indicates the tape drive with the lowest target number in the SCSI chain. See Table 4-26, “Internal SCSI Bus ID Map (c0),” on page 4-172.

`/dev/rmt/1` Indicates the tape drive with the second lowest target number in the SCSI chain.

`/dev/rmt/0c` Indicates the tape drive with the lowest target number in the SCSI chain in compressed mode (the QIC 2.5-GB, 4-8GB SLR and the 14-GB tape drives support compressed mode).

`/dev/rmt/1c` Indicates the tape drive with the second lowest target number in the SCSI chain in compressed mode (the QIC 2.5-GB, 4-8GB SLR and the14-GB tape drives support compressed mode).

5. Connect the tape drive to the other SCSI devices.

   Figure 4-3 shows how to connect a SCSI cable from SCSI port c0 on the back of the *Sun SPARCserver* to the in-connector on the back of the UniPack device that is closest to the *SPARCserver* in the chain. Another SCSI cable is then connected from the out-connector of that device to the in-connector of the next device. You continue this process until all assigned devices are connected in the SCSI chain.

   Since UniPack devices are auto-terminated, the last UniPack device in a SCSI chain does not require a terminator. To verify that the last UniPack device is terminated, check the LEDs on the back panel of the device labeled Auto Term High and Auto Term Low. In a CMS configuration, both LEDs are lit on the last device in the SCSI chain. If a Unipack device in the SCSI chain is not the last device, then neither termination LEDs are lit.

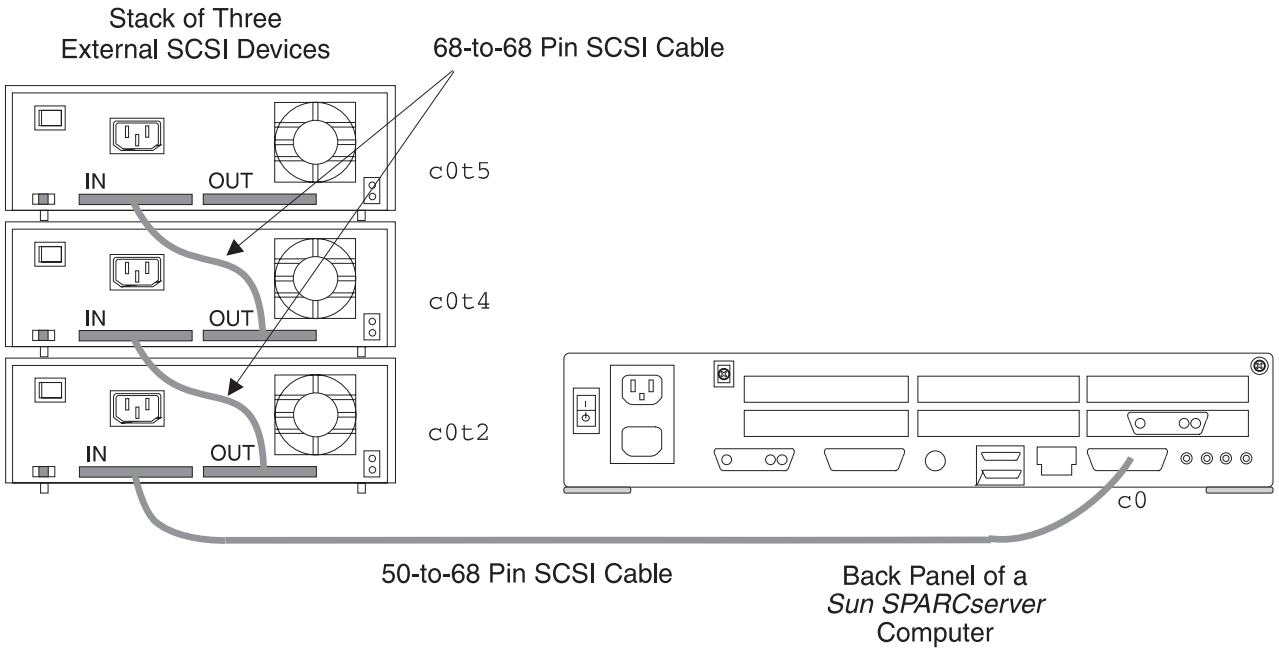


Figure 4-3: Sample Daisy Chaining of External SCSI Devices

Figure 4-4 shows the SCSI cabling scheme when one or more UniPack enclosures are present.

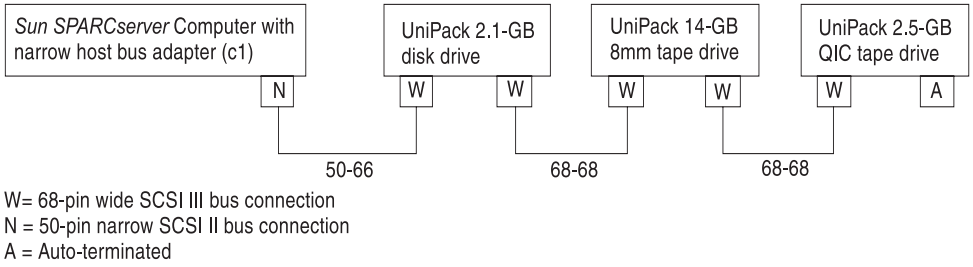


Figure 4-4: SCSI Cabling Schemes

6. Connect the power cord from the tape drive to a power source.
7. Do the following in sequential order:
   a. Turn on devices attached to the *Sun SPARCserver* computer starting with the device at the end of the SCSI chain and working toward the computer.
   b. Turn on the *Sun SPARCserver* computer.
   c. Turn on the system monitor.

The power-on diagnostics will occur when the computer is turned on.

While the system is booting up, enter the OpenBoot environment by doing the following:

8. Press the Stop and A keys simultaneously after the display console banner appears but before the system starts booting the operating system.

   After you are in the OpenBoot environment, the following prompt appears:

```
ok
```

9. Enter the following command and verify that the system recognizes the SCSI devices:

```
ok probe-scsi-all
```

The system responds:

```
/iommu@f,e0000000/sbus@f.e0001000/esp@3,200000
Target 1
  Unit 0 Disk SEAGATE ST14801 SUN04246266 Copyright (C) 1991
Target 3
  Unit 0 Disk SEAGATE ST14801 SUN04246266 Copyright (C) 1991


. . . . .
. . . . .
. . . . .
Target 6
  Unit 0 Disk Removable Read Only Device SONY CD-ROM CDU-8012

ok
```

NOTE:

The actual response (devices listed) depends on the devices installed on the SCSI bus.

10. Enter the following command to reboot the system and reconfigure the devices.

```
ok boot -r
```

Fix for the UniPack 2.5-GB QIC Tape Drive

When adding a 2.5-GB QIC tape drive to a *CentreVu* CMS system running *Solaris* 2.5.1, it is necessary to edit the `/kernel/drv/st.conf` file so the new tape drive is recognized.

NOTE:

The UniPack 2.5-GB QIC Tape Drive is no longer available for new installations, however, if the customer has one, it can be used. The 2.5-GB QIC Tape Drive has been replaced by the 4-8 GB SLR Tape Drive (also in a UniPack housing).

Do these steps to add the fix for the 2.5-GB QIC tape drive:

1. Log in as root.
1. Edit the `/kernel/drv/st.conf` file by entering the following command:

```
# vi /kernel/drv/st.conf
```

The system responds:

```
<contents of the file is displayed>
   .
   .
   .
```

2. Add the following four lines to the `/kernel/drv/st.conf` file:

```
tape-config-list=
“TANDBERG TDC 4200”, “Tandberg 2.5 Gig QIC”,“TAND-25G-FIXED”;
TAND-25G-FIXED=1,0x37,512,0x867a,1,0x00,0;
TAND-25G-VAR=1,0x37,0,0x867b,1,0x00,0;
```

3. Write and quit the file.

Remove a Tape Drive

When removing a tape drive from an existing system, you need to do the following:

- Remove SCSI device files (to prepare for new SCSI hardware configuration).
- Remove the SCSI tape drive. Reboot and reconfigure the system.

To remove SCSI device files, do the following:

1. Enter the following command:

```
# rm /dev/rmt/*
```

NOTE:

If you do not remove the device files before rebooting the system, the SCSI device files may not match the hardware configuration. If this occurs, repeat Steps 1 through 10.

2. Shut the system down using the following command:

```
# shutdown -i0 -g0 -y
```

3. Do the following in sequential order:
   a. Turn off the *Sun SPARCserver* computer.
   b. Turn off the system monitor.
   c. Turn off all external devices starting with the device closest to the *Sun SPARCserver* computer and working toward the farthest device.
4. Remove the tape drive from the SCSI chain.

5. Disconnect the tape drive power cord from the power source.
6. Reconnect the remaining SCSI devices using the procedures starting on page 4-173.
7. Do the following in sequential order:
   a. Turn on devices attached to the *Sun SPARCserver* computer starting with the device at the end of the SCSI chain and working toward the computer.
   b. Turn on the *Sun SPARCserver* computer.
   c. Turn on the system monitor.

   The power-on diagnostics will occur when the computer is turned on.

   While the system is booting up, enter the OpenBoot environment by doing the following:
8. Press the **Stop** and **A** keys simultaneously after the display console banner appears but before the system starts booting the operating system.

   After you are in the OpenBoot environment, the following prompt appears:

```
ok
```

9. Enter the following command, and verify that the system recognizes the SCSI devices:

```
ok probe-scsi-all
```

The system responds:

```
/iommu@f,e0000000/sbus@f.e0001000/esp@3,200000
Target 1
  Unit 0 Disk SEAGATE ST14801 SUN04246266 Copyright (C) 1991
Target 3
  Unit 0 Disk SEAGATE ST14801 SUN04246266 Copyright (C) 1991


. . . . .
. . . . .
. . . . .
Target 6
  Unit 0 Disk Removable Read Only Device SONY CD-ROM CDU-8012

ok
```

NOTE:

The actual response (devices listed) depends on the devices installed on the SCSI bus.

10. Enter the following command to reboot the system and reconfigure the devices:

```
ok boot -r
```

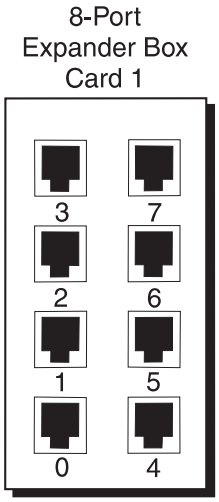
Identifying Device Entry Names for Ports on the Aurora Expander Box

Overview

When the Aurora AURAcs and AURAsio drivers are installed, device entries are created to access the physical ports on the expander box(es).

The device name that is created is `/dev/term/N`, where N is a number. When only one Aurora SBus *Multiport* card is installed, the number matches the number that is printed next to the physical port on the expander box (see Figure 4-5). If there is more than one Aurora SBus *Multiport* card installed, the system will create device names for all 8-port cards first and then create device names for 16-port cards (see Figure 4-7). To display the /dev/term devices used by each card, you can use the `/cms/toolsbin/display_ports` command. An output example from the display-ports tool is shown below:

```
Aurora 8 port card in Sbus slot 1:
/dev/term devices: 0 1 2 3 4 5 6 7

Aurora 16 port card in Sbus slot 2:
/dev/term devices: 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
```




```
/dev/term/0 = port 0
/dev/term/1 = port 1
/dev/term/2 = port 2
/dev/term/3 = port 3
/dev/term/4 = port 4
/dev/term/5 = port 5
/dev/term/6 = port 6
/dev/term/7 = port 7
```

Figure 4-5: Device Names for a Single Aurora SBus Card — No HSI Card Installed

NOTE:

If an HSI card is installed in the system (prior to an Aurora SBus card), the HSI card is considered to be card 1 and uses device names `/dev/term/0` through `/dev/term/4`. An Aurora SBus *Multiport* card would be considered as card 2 and would begin at device name `/dev/term/5`.

When two Aurora SBus *Multiport* cards are installed, the system will create device names for all 8-port cards first and then create device names for 16-port cards. The device name for the second SBus card will start at the next available number. Thus, the device entry `/dev/term/0` corresponds to the physical port labeled “0” on the 8-port expander box connected to the first Aurora SBus *Multiport* card (see Figure 4-6). The device entry `/dev/term/8` corresponds to the physical port labeled “0” on the 16-port expander box connected to the second Aurora SBus *Multiport* card (see Figure 4-6).

The above scenario does not include an HSI card.

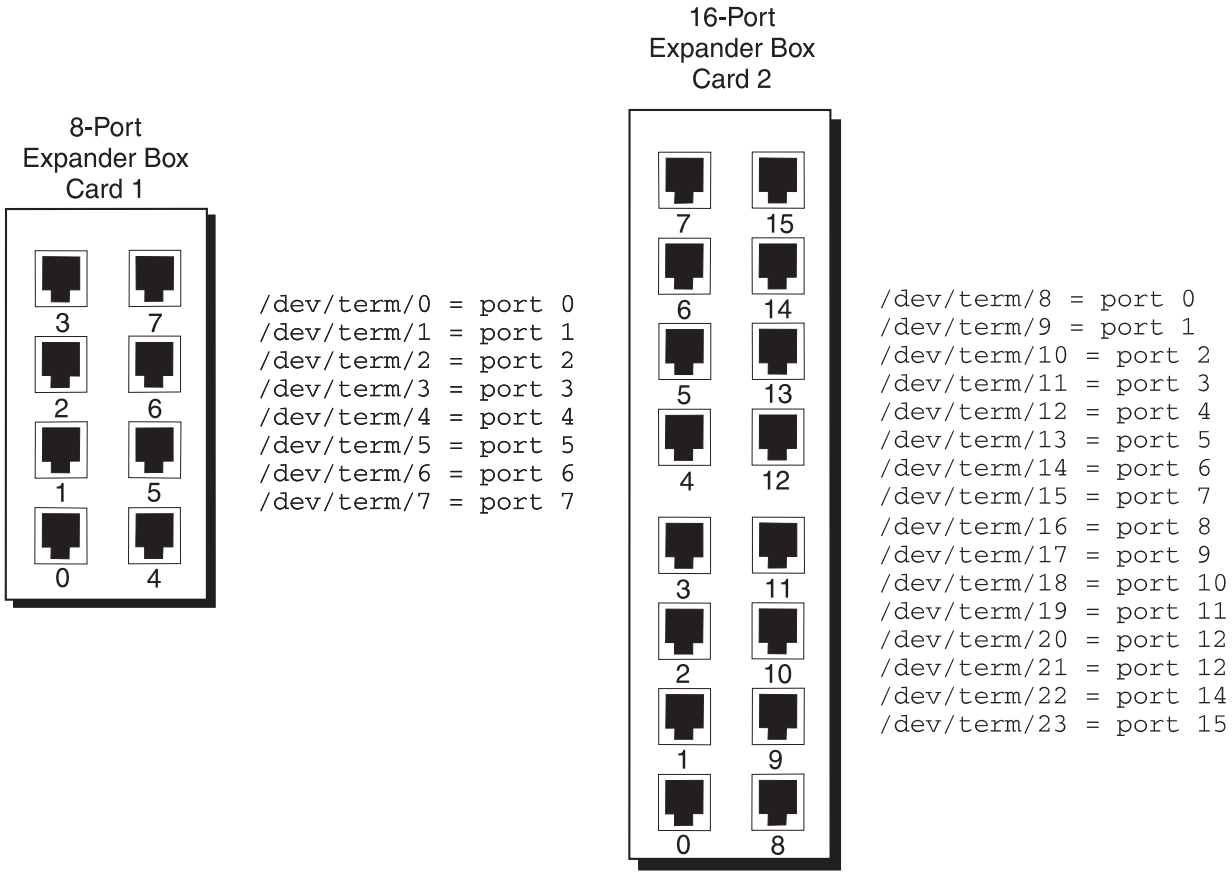


Figure 4-6: Device Names for Second Aurora SBus Card — No HSI Card Installed

If three or more Aurora ports cards are installed, the system creates device names for all 8-port cards first and then creates device names for 16-port cards regardless of the physical location of the cards (see Figure 4-7).

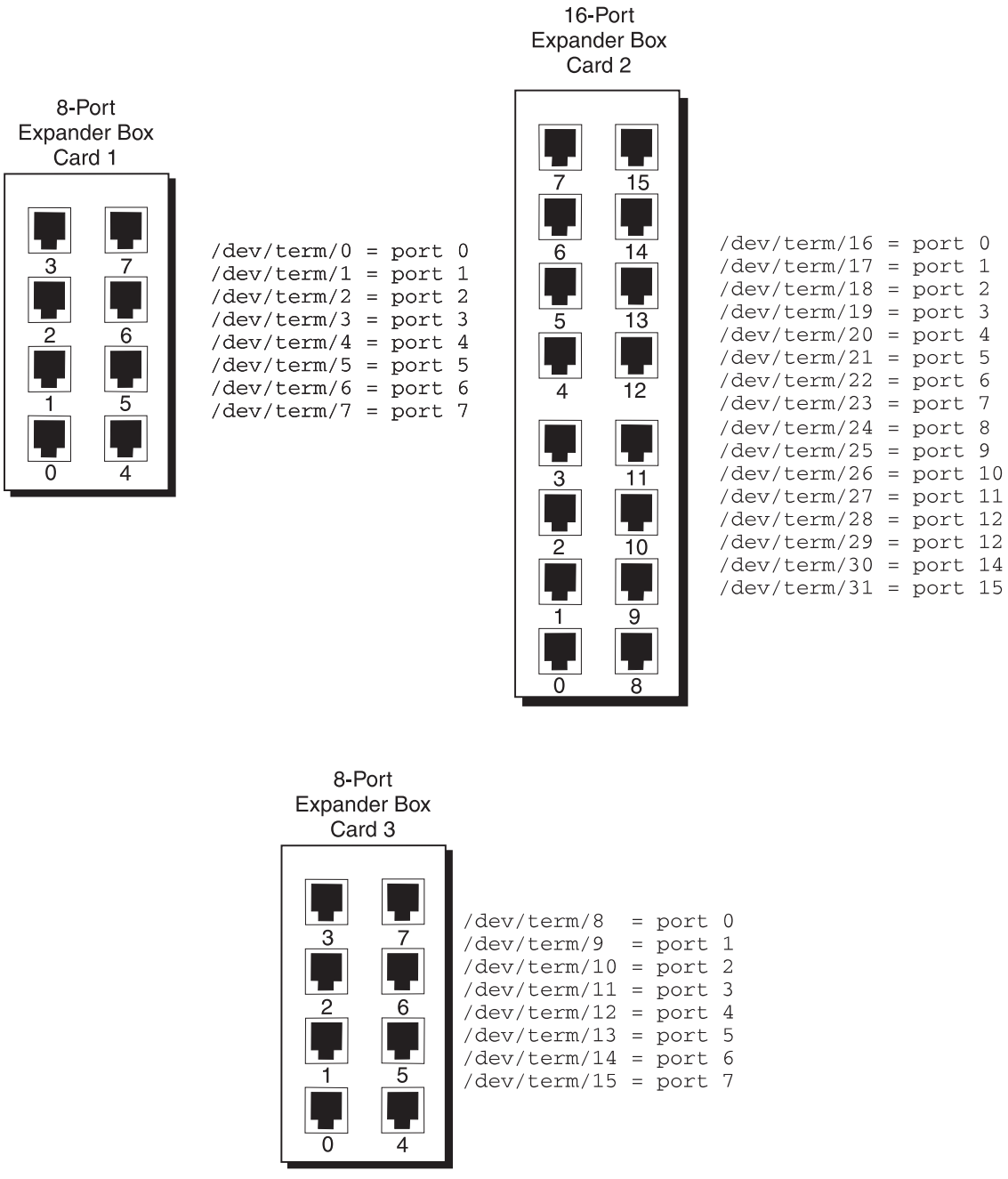


Figure 4-7: Device Names for Third Aurora SBus Card — No HSI Card Installed

The order sequence of the Aurora SBus *Multiport* card(s) is determined by the SBus slot it occupies in the *Sun SPARCserver* computer and the type of Aurora card (8-port or 16-port) it has. Each SBus slot in the *Sun SPARCserver* computer is numbered.

When device names are created, the 8-port SBus cards inserted into the lowest numbered SBus slots are considered first, then the 16-port SBus cards inserted into the lowest numbered SBus slots are considered second, and so on. (see Figure 4-8).

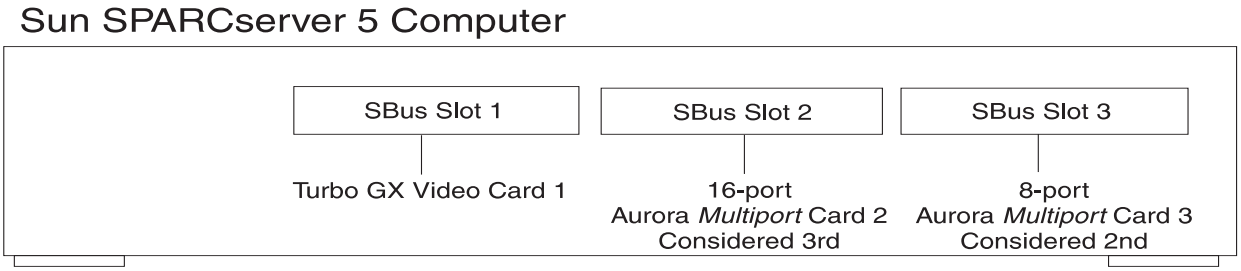


Figure 4-8: Determining the Order of Device Names for Aurora *Multiport* SBus Cards — No HSI Card Installed

In Figure 4-8, the Aurora SBus *Multiport* cards would be ordered as follows:

- 8-port Card 3- /dev/term/0-7
- 16-port Card 2- /dev/term/8-23

A system containing both an HSI card and Aurora SBus *Multiport* cards would be ordered differently than a system without an HSI card. Remember, HSI cards are always considered first (see Figure 4-9).

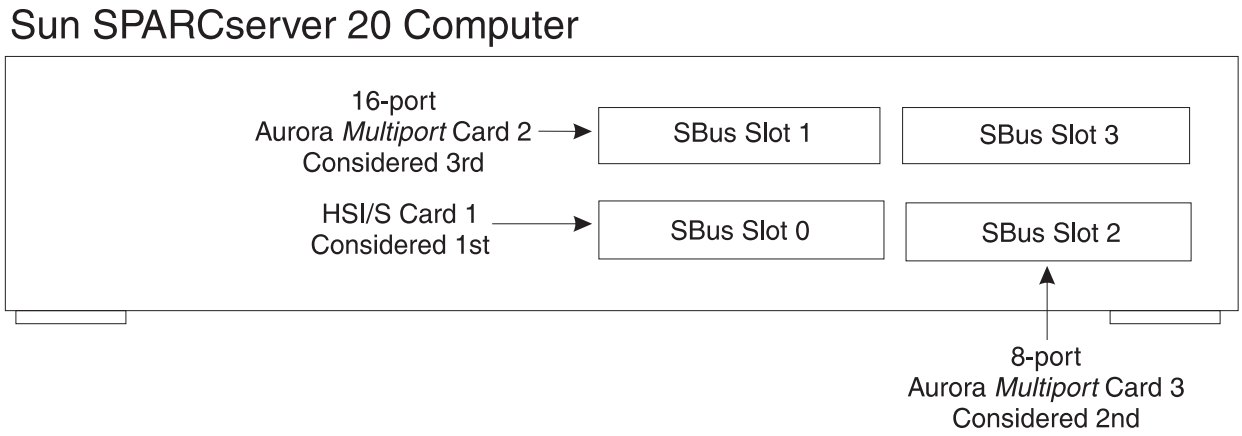


Figure 4-9: Determining the Order of Device Names for Aurora *Multiport* SBus Cards and HSI Card

In Figure 4-9, the HSI card and Aurora SBus *Multiport* cards would be ordered as follows:

- HSI Card 1- /dev/term/0-4
- 8-port Card 3- /dev/term/5-12
- 16-port Card 2- /dev/term/13-28.

Removing Aurora SBus *Multiport* Software Driver(s)

Overview

The following steps describe how to remove the Aurora SBus *Multiport* software driver(s):

1. Determine which Aurora software driver(s) is installed on the system by entering the following command:

```
# pkginfo |  grep AURA
```

The system displays the installed Aurora software drivers. For example:

```
# pkginfo |  grep AURA
system         AURAcs        Aurora 400/800 S/SX/S+ device driver
```

The Aurora software drivers that may be installed on your system are:

- AURAcs 8-port
- AURAsio16 16-port.

2. Identify which Aurora software driver(s) you want to remove.

NOTE:

Complete the following steps for each software driver you want to remove.

3. Start the software removal by entering the `pkgrm` command for each Aurora software driver you have. (The command for an 8-port driver is: `pkgrm AURAcs` and `pkgrm AURAsio16` for a 16-port driver.) For example:

```
# pkgrm AURAcs
```

The system responds:

```
# The following package is currently installed:
     AURAcs         Aurora 400/800 S/SX/S+ device driver
                    (sparc) 5.52

Do you want to remove this package?
```

4. Enter y to start the removal of the AURAcs software driver. The system responds:

```
## Removing installed package instance <AURAcs>

   This package contains scripts which will be executed with
   super-user permission during the process of removing this
   package.

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

5. Answer y. The system responds:

```
## Verifying package dependencies.
## Processing package information.
## Executing preremove script.
```

If the removal is successful, the following message displays (this particular message is for the removal of an 8-port driver):

```
Removal of <AURAcs> was successful.
```

The system prompt returns to your screen.

Adding, Removing, or Moving an Aurora SBus *Multiport* Card

Overview

This section describes how to add, remove or move an Aurora SBus *Multiport* card from or to your *Sun SPARCserver*.

Add an Aurora SBus *Multiport* Card

⚠ CAUTION:

Only **TSC PERSONNEL** should perform the procedures in this section.

The following steps describe how to add another Aurora SBus *Multiport* card to a system that is already up and running:

1. Identify and remove Aurora software packages.
2. Identify the existing Aurora SBus *Multiport* card(s) installed in the system.
3. Decide where you will install the new Aurora SBus *Multiport* card. Insert the Aurora SBus *Multiport* card into the *Sun SPARCserver* computer.
4. Connect the expander box to the new Aurora SBus *Multiport* card.
5. Do the following in sequential order:
   a. Turn on devices attached to the *Sun SPARCserver* computer starting with the device at the end of the SCSI chain and working toward the computer.
   b. Turn on the *Sun SPARCserver* computer.
   c. Turn on the system monitor.
6. Press the Stop and A keys simultaneously after the display console banner appears, but before the system starts booting.
7. Boot the system using the `boot` command.

```
ok boot -r
```

8. Do a "`sacadm -l`" and a "`pmadm -l`" command to get existing administration information. Record this information for later use.
9. Remove port administration for all Aurora SBus cards by using the following example:

```
# sacadm -r -p ttyaur2
# sacadm -r -p ttyaur3
# sacadm -r -p ttyaur4
```

10. Remove the Aurora SBus *Multiport* Software driver(s). Refer to the "Removing Aurora SBus *Multiport* Software Drivers" section in this chapter for instructions.
11. Install the Aurora SBus *Multiport* software driver (the 8-port driver must be installed before the 16-port driver). See the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for details.
12. Administer all Aurora ports cards.
13. Perform a CMSADM file system backup to backup the updated system software and hardware configuration. See the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for details.

Remove an Aurora SBus *Multiport* Card

The following steps describe how to remove an Aurora SBus *Multiport* card from a system that is already up and running:

NOTE:

You must remove the port administration for all Aurora SBus cards in an ordering sequence behind the Aurora SBus card you remove. To avoid readministering, always try to remove the **last** card in the ordering sequence as described in the "Identifying Device Entry Names for Ports on the Aurora Expander Box(es)" section of this chapter.

For example: there are four Aurora SBus cards installed and you want to remove the second Aurora SBus card in the ordering sequence.

With this scenario, you must remove the port administration for the second through fourth Aurora SBus cards and then readminister cards 2 and 3.

1. Do a "`sacadm -l`" and a "`pmadm -l`" command to get existing administration information. Record this information for later use.
2. Remove the port administration for the card you are moving as well as all Aurora SBus cards that follow the card you are removing by using the following example:

```
# sacadm -r -p ttyaur2
# sacadm -r -p ttyaur3
# sacadm -r -p ttyaur4
```

3. Remove the Aurora SBus *Multiport* Software driver(s). Refer to the "Removing Aurora SBus *Multiport* Software Drivers" section in this chapter for instructions.
4. Remove the Aurora SBus *Multiport* card from the system.
5. Do the following in sequential order:
   a. Turn on devices attached to the *Sun SPARCserver* computer starting with the device at the end of the SCSI chain and working toward the computer.
   b. Turn on the *Sun SPARCserver* computer.
   c. Turn on the system monitor.
6. Press the Stop and A keys simultaneously after the display console banner appears, but before the system starts booting.
7. Boot the system using the `boot` command.

```
ok boot -r
```

8. Readminister all terminals, modems, and printers that are connected to the Aurora Expander Box(es) that were ordered **after** the card that was removed.
9. Perform a CMSADM file system backup to backup the updated system software and hardware configuration. See the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for details.

Move an Aurora SBus *Multiport* Card

When moving Aurora SBus cards, make sure you preserve the original ordering sequence of the cards. To do this, you many need to move more than one card. See the “Identifying Device Entry Names for Ports on the Aurora Expander Box(es)” section in this chapter to determine the ordering sequence.

The following steps describe how to move an Aurora SBus *Multiport* card to a different SBus slot location in the *Sun SPARCserver* computer:

1. Remove the Aurora SBus *Multiport* software driver. See the “Removing Aurora SBus *Multiport* Software Drivers” section in this chapter for details.

After the software is removed, the system prompt returns to your screen.

2. Enter this command:

```
# shutdown -g0 -y -i0
```

3. Do the following in sequential order:
   a. Turn off the *Sun SPARCserver* computer.
   b. Turn off the system monitor.
   c. Turn off all external devices starting with the device closest to the *Sun SPARCserver* computer and working toward the farthest device.
4. Remove the Aurora SBus *Multiport* card from the SBus slot.
5. Install the Aurora SBus *Multiport* card into a different SBus slot by using the instructions described in the *CentreVu Call Management System Release 3 Version 6 Sun SPARCserver Computers, Hardware Installation* (585-215-857) document.

   CAUTION:

   Make sure you preserve the original ordering sequence of the Aurora SBus cards.

6. Do the following in sequential order:
   a. Turn on devices attached to the *Sun SPARCserver* computer starting with the device at the end of the SCSI chain and working toward the computer.
   b. Turn on the *Sun SPARCserver* computer.

c. Turn on the system monitor.

7. Press the Stop and A keys simultaneously after the display console banner appears, but before the system starts booting.
8. Boot the system using the `boot` command.

```
ok boot -r
```

9. Reinstall the Aurora SBus *Multiport* software driver. See the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for details.
10. Perform a CMSADM file system backup to back up the updated system software and hardware configuration. See the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for details.

Adding Network Terminal Servers

Overview

You can connect a maximum of four NTSs per *Sun SPARCserver* computer.

Change Network Addresses

If you want to change the network address of your *Sun SPARCserver* computer and each NTS, see the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for details.

*SPARC*server Troubleshooting

Overview

This chapter contains hardware troubleshooting information about the *Sun** *SPARCserver*† computer and the *CentreVu*® Call Management System Release 3 Version 6 (CMS R3V6) application. You should use the information to clear problems that may arise during and after the *CentreVu* CMS installation.

The following list outlines the troubleshooting sections in this chapter:

- Solving Hardware-Related Problems
- Solving Terminal-Related Problems
- Solving Printer-Related Problems
- Solving Modem-Related Problems
- Solving Power-Related Problems.

*_Sun_ is a registered trademark of Sun Microsystems, Inc.
†_SPARCserver_ is a trademark of SPARC International, Inc.

Solving Hardware-Related Problems

Overview

This section describes how to solve the most common computer hardware problems that may arise before or after the installation of the *CentreVu* CMS.

Hardware Diagnostic Tools and Resources

The remote maintenance person has four tools/resources that do hardware diagnostics:

- OpenBoot Diagnostics (requires console redirection)
- Power on self test (POST) messages during a reboot (requires console redirection)
- *SunDiags* on-line system tool/exerciser (does not require console redirection)
- Error logs (do not require console redirection).

OpenBoot Diagnostics

The OpenBoot firmware serves two purposes:

- Boots the operating system from either a mass storage device or from a network
- Provides extensive features for testing hardware and software interactively.

Using OpenBoot Diagnostics

To use OpenBoot Diagnostics, perform the following steps:

1. Do **one** of the following to enter the OpenBoot environment:
   - Stop the operating system with the *Solaris** `halt` or `shutdown -y -i0 -g0` command. This is the preferred method of stopping the operating system.
   - Press the Stop and A keys simultaneously on the keyboard while *Solaris* is running.

     CAUTION:

     Using the Stop and A keys simultaneously while *Solaris* is running breaks the execution of the operating system and should be used with caution. Use this key combination if the previous method fails.

**Solaris* is a registered trademark of Sun Microsystems, Inc.

- Power off and power on the *Sun SPARCserver* computer. Press the Stop and A keys simultaneously on the keyboard after the display console banner appears but before the system starts booting the operating system (referred to as power-cycling the system).

CAUTION:

Use this method **only** if the previous two methods fail to work.

Once you are in the OpenBoot environment, the following prompt appears:

```
ok
```

2. At the `ok` prompt, enter `help` for a list of available commands, or see Table 5-1 for a summary of some of the OpenBoot diagnostic test commands.

   Additional information about the OpenBoot firmware is available by contacting the Technical Service Center (TSC).

Table 5-1: Summary of OpenBoot Diagnostic Test Commands

<table>
<tr><th>Test Command</th><th colspan="2">Description</th></tr>
<tr><td>probe-scsi</td><td colspan="2">This command identifies the devices attached to the built-in SCSI bus.</td></tr>
<tr><td>probe-scsi-all [device-path]</td><td colspan="2">This command is the same as the probe-scsi command except that it includes all of the SCSI buses installed in the system below the specified device tree node. If the device path is absent, the root node is used.</td></tr>
<tr><td rowspan="12">test device-specifier</td><td colspan="2">This command executes the specified device's self-test method. Possible values for device-specifier are listed in the Alias column below:</td></tr>
<tr><td>Alias*</td><td>Description</td></tr>
<tr><td>memory</td><td>memory</td></tr>
<tr><td>cdrom</td><td>cdrom</td></tr>
<tr><td>tape</td><td>QIC 2.5-GB or 4-8 GB SLR*</td></tr>
<tr><td>tape1</td><td>QIC 2.5-GB or 4-8 GB SLR</td></tr>
<tr><td>tape2</td><td>14-GB</td></tr>
<tr><td>disk</td><td>disk 1</td></tr>
<tr><td>disk1</td><td>disk 1</td></tr>
<tr><td>disk2</td><td>disk 2</td></tr>
<tr><td>floppy</td><td>floppy</td></tr>
<tr><td colspan="2">*If you need to test additional devices that do not have an alias, use the test-all command.</td></tr>
<tr><td>test-all [device-specifier]</td><td colspan="2">This command tests all of the devices that have built-in self-test methods below the specified device tree node. If <device-specifier> is absent, the root node is used.</td></tr>
<tr><td>watch-clock</td><td colspan="2">This command tests the clock function.</td></tr>
<tr><td>eject [device-specifier]</td><td colspan="2">This command ejects either the floppy or cdrom devices.</td></tr>
</table>

*The 4-8 GB SLR tape drive replaces the QIC 2.5-GB tape drive which is no longer available on new installs.

POST Messages Diagnostics

To use the Power On Self Test (POST) messages (during a reboot) to diagnose remote hardware problems, do the following steps:

1. At the ok> prompt, enter the following command to boot your system:

```
ok> boot
```

2. Scan the displayed messages on the screen. Watch for error messages.

SunDiag Diagnostics

NOTE:

This procedure must be run locally.

SunDiag exerciser is an on-line system tool (an exerciser) that runs diagnostic hardware tests.

WARNING:

Running the *SunDiag* exerciser will cause system response delays in the default test configuration.

The *SunDiag* exerciser uses the following interfaces:

- *SunDiag OpenWindow* Interface — provides a graphical user interface that requires an *OpenWindows** environment with a local monitor.
- TTY Interface — provides a screen interface on a regular terminal. This is the default mode when trying to remote the system.
- Command Line Interface (CLI) — provides a nonscreen interface.

Table 5-2 provides an overview of the available tests.

**OpenWindows* is a trademark of Sun Microsystems, Inc.

Table 5-2: *SunDiag* Test Descriptions

Type of Device	Test Command	Description
Memory Devices	`pmem`	Read-only Physical Memory Test — checks the physical memory of the system. Locates parity errors, hard and soft Error Correction Code (ECC) errors, memory read errors, and address problems.
	`vmem`	Write/Read/Compare Virtual Memory Test — checks the virtual memory. Tests the combination of physical memory and the swap partitions of the disk(s).
CPU Devices	`fputest`	Floating Point Unit Test — uses various subtests to check the floating point unit on the *Sun SPARCserver* computer.
	`nettest`	Network Interface Test — checks all the networking hardware on the system CPU board and separate networking controllers.
	`autest`	Audio Hardware Test — checks the MAP registers in the audio chip.
	`mptest`	Multiprocessing Test — verifies that the processors are functioning properly.
Disk Devices	`rawtest`	Disk Read/Write/Compare Test — performs read-only or read-write tests on “raw” disk partitions.
	`fstest`	Disk File System Test — uses the *Solaris* file system device driver to check the disk controller and drive. Reads and compares specified data patterns from two files.
	`cdtest`	Compact Disc Test — checks the CD table of contents and verifies that the table of contents matches `cdtest's` own Table of Contents table.
Tape Devices	`tapetest`	Tape Drive Test — waits 60 seconds to clear any bus traffic, rewinds the tape, erases it, writes a pattern to a specified number of blocks (or, for a SCSI tape, writes to the end of the tape). It rewinds the tape, reads, and compares the information just written.

Table 5-2: *SunDiag* Test Descriptions (Contd)

Type of Device	Test Command	Description
SBus Devices	`fbtest`	Frame Buffer Test — tests the frame buffer by sequentially writing, reading, and verifying small blocks of random patterns across the entire video RAM. Serves as a generic test for all dumb frame buffers used with *Solaris* 2.4.

For more information about the *SunDiag* exerciser, see the following resource:

- *SunDiag* on-line manual page (for example, the `man sundiag` command).

OpenWindows or TTY Interface Procedures

To use the *SunDiag* on-line tool to diagnose hardware problems via the *OpenWindows* or TTY interface, do the following steps:

1. Log in as root.
2. If running the *SunDiag* exerciser in TTY mode, set the terminal type **before** attempting to start the *SunDiag* exerciser.
3. Start the *SunDiag* on-line tool with the command syntax:

```
/opt/SUNWdiag/bin/sundiag [-Cpqtw] [-i number]
[-o options-file] [-b batch-file] [-k kernel-name]
```

To start the *SunDiag* on-line system tool, enter the following command:

```
# /opt/SUNWdiag/bin/sundiag <options>
```

The system brings up the *SunDiag* on-line system tool.

WARNING:

The *SunDiag* exerciser in the *OpenWindows* environment or in the TTY mode on a terminal can grab control of the local monitor while running. To avoid this, make sure you disable the system with the Frame Buffer Test (see step 4).

4. To disable the system with the Frame Buffer Test, do the following:

   From the *OpenWindows* interface:

   On the *SunDiag* Main Display menu (graphic window), select the following if they are listed under the CPU or SBUS category:
   `cgfourteen0` (a CPU device)
   `sx0` (a CPU device)
   `cgsix0` (an SBUS device).

   From a TTY terminal interface:

   On the System Status Display Screen (text window), enter the following command:

```
   .
   .
Command: sx0
Command: cgfourteen0
Command: cgsix0
```

   If your system does not contain all these frame buffers, you may see `Message: Command error!` displayed. Ignore this message.

   See the *Solaris SunDiag 4.1 User's Guide* for more details.

5. To exit the *SunDiag* exerciser, do the following:

   From the *OpenWindows* interface:

   a. Select **Stop** to stop any tests that are running. Some of the tests, such as the tape tests, may delay before actually stopping, because these tests require time to rewind the tapes.

   b. Move the cursor to the top bar on the *SunDiag* window, and select the `QUIT` option.

   From a TTY terminal interface:

   a. Enter `t` to execute the STOP command. This command stops any test that is currently running. Some of the tests, such as the tape tests, may delay before actually stopping, because these tests require time to rewind the tapes.

   b. Enter q to execute the QUIT command.

Command Line Interface (CLI) Procedures

To use the *SunDiag* on-line tool to diagnose hardware problems via the Command Line interface, do the following steps:

1. Log in as root.
2. Set the terminal type **before** attempting to start the *SunDiag* exerciser.
3. Change the directory to match the *SunDiag* exerciser location on your system:

```
# cd /opt/SUNWdiag/bin
```

   The system prompt appears.

4. To start a specific test from the command line, enter the following command for an individual test:

```
# /opt/SUNWdiag/bin/<testname> test-specific-arguments
[cprqvudt] [h hostname]
```

   The system prompt appears.

For more information about values for `<testname>` and `<test-specific-arguments>`, see any of the following resources:

- *SunDiag* on-line manual page (for example, the `man sundiag` command).

Check Error Log Files

The `/var/adm/messages` files contain system messages that are often helpful in diagnosing problems. See the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for details.

Diagnosing Remote Console Problems

This section addresses problem scenarios that develop when you dial-in to the remote console port. In general, you should have a person on site to look at remote console problems.

Scenario 1 — No `RINGING` and `ANSWERED` Responses

You do not get the `RINGING` and `ANSWERED` responses displayed on the screen.

Solutions

- Check the port connectivity — see Figure 5-1.
- Check modem setup — see Figure 5-1.
- Check port A administration.

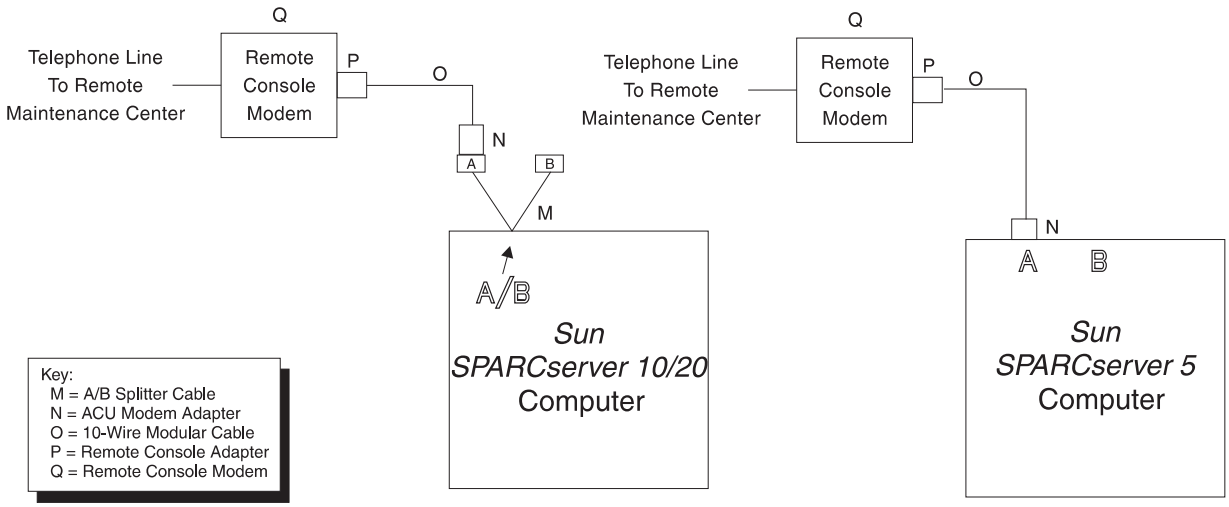


Figure 5-1: Remote Console Connectivity

Scenario 2 — No Login Prompt

You get the `RINGING` and `ANSWERED` responses displayed on the screen, but get no login.

Solutions:

- Check the dial-in parameters — see the “Diagnose Dial-In Access Problems” section on page 5-13 for details.

- Check the state of the customers system — the console may not be remoted, and there may not be a port monitor on the port.

  1. To have an on-site person check the state of the customers system, enter the following command, and press **Enter** a few times:

```
# /cms/install/bin/abcadm -k
```

  2. The system could also be at the OpenBoot prompt (ok>), which would indicate that the console is local.
  3. If the console is not remoted, then remote the console.

Scenario 3 — Dial-In Returns Garbage Characters

The dial-in gives you garbage characters instead of a login prompt.

Solutions

1. Try pressing a few keys to see if the problem corrects itself.
2. If step 1 doesn't solve the problem, check the baud rate of the remote console by doing the following:

   a. Have an on-site person run the following command:

```
# /cms/install/bin/abcadm -k
```

   b. Make sure the baud rate is consistent with the modem connected on site and the modem and terminal at the remote site.

c. If there is a baud rate inconsistency on site, reconfigure the machine with the appropriate baud rate for the modem with the following command:

```
# abcadm -c -b<baud> <ttya>
```

The system responds by rebooting.

d. If there is a baud rate inconsistency with the remote site, reconfigure the remote site and redial.

3. If none of the above steps resolve the problem, set the console back to local by switching to the local console via the OpenBoot method. See the ‘‘Diagnose Problems Using the Remote Console’’ section on page 5-42 in this chapter for details.

Scenario 4 — Problems Setting the Console to Remote or XDM Problems

You experience problems when trying to:

- Set the console to remote,
- Create a command menu from XDM, or
- Boot from XDM.

Solution

Power on (turn on) your modem.

In addition, this section also describes what to do if you suspect a problem with the remote console.

Diagnose Dial-In Access Problems

This section describes the scenarios where the console is local and you are attempting to dial-in via port A. It often takes a person on-site to look at the dial-in access problems.

Scenario 1 — No ANSWERED and CONNECTED Responses

The remote dial-in does not get the `Answered` and `Connected` responses displayed on the screen.

Solution

At the on-site location, make sure the modem is on, and check the following cabling connections:

- Phone line to the modem
- Modem to port A
- Port A to the *Sun SPARCserver* computer.

Scenario 2 — No Login

The remote user gets `Answered` and `Connected` responses displayed on the screen, but no login.

Solution

1. Enter **one** of the following commands to make sure that a monitor is running:

```
# pmadm -l; sacadm -l
        <or>
# /cms/install/bin/abcadm -k
```

2. If no port monitor is running, start a port monitor by entering the following command:

```
# /cms/install/bin/abcadm -i -b <baud> ttya
```

3. If a port monitor is running, make sure that the port monitor is set up at the correct baud rate relative to the local modem.
4. If the baud rate is not correct, remove the current port monitor, and start a new port monitor at the correct baud rate. Enter the following commands:

```
# /cms/install/bin/abcadm -r ttya
         <and>
# /cms/install/bin/abcadm -i -b <baud> ttya
```

5. If the port monitor is running and is at the correct baud rate, try to fix the problem by disabling and enabling the port monitor by entering the following commands:

```
# pmadm -d -p ttymona -s ttya
         <and>
# pmadm -e -p ttymona -s ttya
```

Scenario 3 — Login Prompt Is Scrambled

The remote user gets the `Answered` and `Connected` responses displayed on the screen, but the login is scrambled (for example, a short line of graphics characters or garbage characters).

Solution

Have the remote user press a few keys (any keys), and see if it clears up the problem. If this does not clear up the problem, then the port monitor is probably not the same baud rate as the modem. Check the baud rates and adjust as necessary.

Identify Link Problems

This section describes how you can diagnose link problems on the *Sun SPARCserver* computer. To diagnose link problems, do the following:

- Check the status of Link Access Procedure Balanced (LAPB) for the link in question.
- Stop and start the X.25.
- Check the switch administration.
- Check the cabling.
- Check the RS-232 to RS-422 Interface Converter. (Used only with a High Speed Serial Interface/SBus (HSI) card.)
- Check the HSI card.
- Monitor the LAPB and X.25 protocol.

Check the Status of Link Access Procedure Balanced (LAPB)

The first item to check for troubleshooting link problems is the status of LAPB for the link in question.

Procedure

To check if LAPB (layer 2 of the X.25 Protocol) is up, do the following:

1. Examine the `/var/adm/messages` files or the system console for the last message about the link. One of the following messages appear:

   Message 1: "`LAPB Up on link x`."

   Diagnosis: LAPB is up for the link indicated.

   Message 2: "`LAPB Down on link x`."

   Diagnosis: LAPB is down for the link/port indicated.

   Message 3: "`hihx: xmit hung`."

   Diagnosis: LAPB is down for the link/port indicated.

2. If LAPB is not up, answer the following questions:
   - Has X.25 been started without errors?
   - Is the switch administration correct?
   - Is the cabling correct?
   - Is the Interface Converter operating correctly?
   - Is the HSI card ok?
3. If LAPB is up, answer the following questions:
   - Has data collection been turned on?
   - Is the switch administration correct?
   - Does the error log contain any link-related messages?
   - Does the `spi.err` file contain messages about mismatched administration?

Stop and Start Individual Links

The `linkstop` command is used to “stop” a link. The link will not respond to any LAPB messages until the link is restarted with the `linkreset` or the `linkstart` command. To stop a link enter the following command:

```
# /opt/SUNWconn/x25/bin/linkstop <linkid>
```

Where:

- a <`linkid`> of 0 refers to HSI port 0
- a <`linkid`> of 1 refers to HSI port 1
- a <`linkid`> of 2 refers to HSI port 2
- a <`linkid`> of 3 refers to HSI port 3
- a <`linkid`> of 5 refers to Serial Port B

The `linkreset` command is used to “start” a link which has been stopped with the `linkstop` command. To start a link enter the following command:

```
# /opt/SUNWconn/x25/bin/linkstart <linkid>
```

The `linkset` command is used to “reset” a link. It may also be used to “start” a link which has been stopped with the `linkstop` command. To reset a link enter the following command:

```
# /opt/SUNWconn/x25/bin/linkreset <linkid>
```

NOTE:

All links are reset when X.25 is started.

The most common use of these commands would be to reset an X.25 link while troubleshooting a problem. For example, to reset link 1, enter the following command:

```
# /opt/SUNWconn/x25/bin/linkreset 1
```

Or enter the following commands:

```
# /opt/SUNWconn/x25/bin/linkstop 1
  /opt/SUNWconn/x25/bin/linkstart 1
```

NOTE:

X.25 must have been started prior to entering these commands.

Start and Stop X.25

When you start and stop X.25, you are starting and stopping it for all links on the machine.

To start and stop the X.25, do the following:

1. Check the status of the network daemons by entering the following command:

```
# /etc/init.d/x25.control status
```

The system responds with the following:

```
The network is up
#
```

2. To stop the network daemons, enter the following command:

```
# /etc/init.d/x25.control stop
```

3. To start the network daemons, enter the following command:

```
# /etc/init.d/x25.control start
```

The system responds:

```
Starting the X.25 software - please wait
X.25 has found a valid license
The network has been brought up.
#
```

4. If other messages are displayed, the network did not start successfully. For example:

```
x25netd: failed to open driver "/dev/hih0" (Bad file
     number[9])
#
```

NOTE:

You will see the above message if you tried to restart the network too quickly after stopping it. When you see this message, wait a minute before starting X.25.

5. If X.25 cannot start due to license problems, check the license manager. The license manager (lmgrd) is started when the *Sun SPARCserver* computer is booted.

   a. To check if the license manager is running, enter the following command:

```
# ps -ef | grep lmgrd
```

   b. If the license manager is not running, enter the following script command:

```
# /etc/rc2.d/S85lmgrd
```

c. Examine the messages in the `/tmp/license_log` file.

Refer to the *SunLink** *X.25 8.0.2 Installation Guide* for more information on licensing error messages.

The system responds as follows:

```
The X.25 software is being stopped - please wait.
The network programs are being killed - please wait
The network has been stopped.
#
```

Check Switch Administration

To verify that the switch link administration is correct.

In general, the switch administration is the same for connecting to the *Sun SPARCserver* platform. There is one exception in the G3r switch administration for the *Sun SPARCserver* computer.

Make the following required G3r switch administration changes:

1. Set the `Number of Outstanding Frames(w)` field on the data module for the *CentreVu* CMS link to `4`.

   NOTE:

   If the window size for the *Sun SPARCserver* computer is not `4`, the link will reset under the heavy load.

Check B Port Administration

If you are using the B port on your *Sun SPARCserver* computer for the switch link, verify that there is no login administration on the B port. Enter the following command to list any login administration on the B port:

```
# pmadm -l | grep /dev/term/b
```

If the `pmadm -l` command shows the login administration on the B port use the `pmadm -r` command to remove the login administration. Remove **only** the login administration for the B port.

Check the Modem Cabling

If the link is not operating reliably and does not operate for speeds above 9600 baud, do the following:

- Check that the ‘‘Link Adapter’’ is placed correctly between the Interface Converter and the Isolating Data Interface (IDI).

**SunLink* is a registered trademark of Sun Microsystems, Inc.

- If using the B port the link adapter must be between the B port and the IDI.

Check the RS-232 to RS-422 Interface Converter

The purpose of the RS-232 to RS-422 converter is to convert the RS-422 electrical/RS-449 physical interface on the HSI card to the RS-232 interface supported in existing switch connections. Each switch link that is connected to the HSI card uses one converter.

NOTE:

The Interface Converter is only used with the HSI card and not on the B port.

Check for Correct DTE/DCE Settings

The RS-232 to RS-422 converter described in the previous paragraph is shipped with the RS-422/RS-449 port configured as Data Terminal Equipment (DTE) and the RS-232 port configured as Data Communications Equipment (DCE). This is exactly the opposite of what is required for the *CentreVu* CMS X.25 switch link.

As part of the assembly process, each converter must be taken apart. The Dual In-line Package (DIP) shunts in jumpers XW1A, XW2A, and XW3A must be moved to jumpers XW1B, XW2B, and XW3B. This changes the RS-422/RS-449 port to DCE. The DIP shunts in jumpers XW4B and XW5B must be moved to jumpers XW4A and XW5A. This changes the RS-232 port to DTE. See Table 5-3 for an example.

Table 5-3: DTE/DCE DIP-Shunt Settings

Move DIP shunts	
From	**To**
XW1A	XW1B
XW2A	XW2B
XW3A	XW3B
XW4B	XW4A
XW5B	XW5A

NOTE:

The DIP shunts are fragile. Be careful when you move them.

Check LEDs

The Interface Converter has six Light Emitting Diodes (LEDs) as indicators on the front panel of the black box which help troubleshoot link problems. Three LEDs (labeled DSR, CTS, and DATA) are located on the left side of the monitor. These LEDs are the *Sun SPARCserver* computer's HSI portion of the connection. Three LEDs (labeled DSR, CTS, and DATA) are located on the right side of the monitor. These LEDs are the switch portion of the connection. See Figure 5-2.

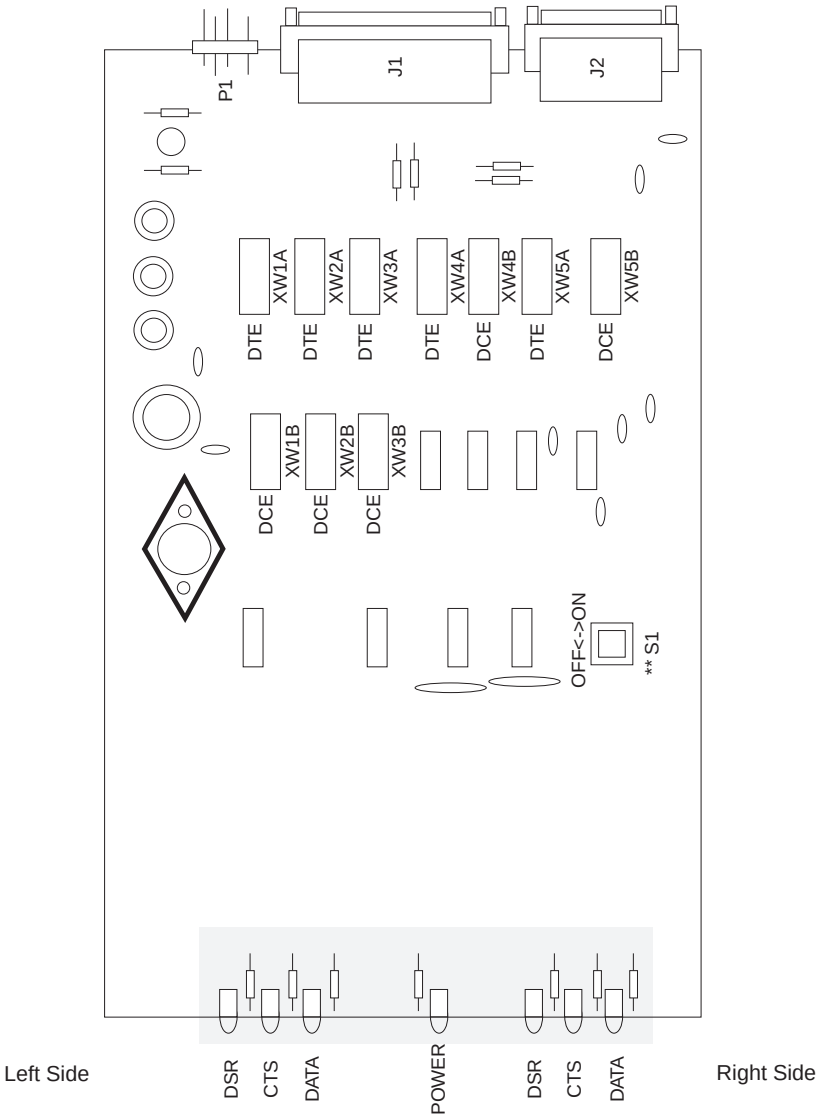


Figure 5-2: Black Box Component Layout — LEDs Location

When the X.25 daemons are started, the LEDs on the left side are lit.

NOTE:

It is normal for the DSR LED on the right (switch) side of the converter to be out or to be very dim when IDI-based connections are being used.

If the LEDs on the left side are not lit, check the following items:

- DCE/DTE DIP-shunt settings inside the converter
- Status of the *SunLink* X.25 daemons
- Cabling between the interface converter and the *Sun SPARCserver* computer.

When the X.25 daemons are started and the link is administered and enabled on the switch, the LEDs on the right side of the interface converter are lit. If the LEDs on the right side are not lit, check the following items:

- Switch administration for the link
- Cabling between the interface converter and the switch.

Test the HSI Card for Problems

HSI card for the *Sun SPARCserver* computer provides a break-out for four separate female 37-pin RS-449 connections. *CentreVu* CMS on the *Sun SPARCserver* hardware platform supports four physical switches connected to a single HSI card (ports 0-3).

To test an individual port on the HSI card for problems, execute the loopback test by doing the following:

1. Log in as root.
2. Stop the X.25 daemons with the following command:

```
# /etc/init.d/x25.control stop
```

3. Remove the cable from the port to be tested, and attach the loopback plug (which was shipped with the HSI card).

4. Run the following two loopback tests:
   - Internal loopback test
   - Loopback test using the loopback plug.

NOTE:

These tests send approximately 100 packets each. No transmission errors should be reported.

Run the Internal Loopback Test

To run an internal loopback test, enter the following command:

```
# /opt/SUNWconn/bin/hsi_loop -t 1 hih0
```

The system responds as follows:

```
hih0: [Using /dev/hiho0]
hih0: speed=9600, loopback=yes, nrzi=no, txc=baud, rxc=rxc
   .
   .
   .
Port CRC errors Aborts Overruns Underruns   In <-Drops-> Out
hih0:    0    0    0    0    0    0
#
```

Run the Loopback Test using the Loopback Plug

To run a loopback test using the loopback plug (which was shipped with the system), enter the following command:

```
# /opt/SUNWconn/bin/hsi_loop -t 2 hih0
```

The system responds as follows:

```
hih0: [Using /dev/hiho0]
hih0: speed=9600, loopback=yes, nrzi=no, txc=baud, rxc=rxc
   .
   .
   .
Port CRC errors Aborts Overruns Underruns   In <-Drops-> Out
hih0:    0    0    0    0    0    0
#
```

5. If the loopback test fails, you should suspect HSI hardware problems. Prior to replacing the HSI card, do the following:
   a. Verify that the loopback plug is in the correct HSI port.
   b. Check the cabling to the HSI break-out module.
6. Remove the loopback plug.
7. Recable the link.
8. Restart X.25 after completing this test. See “Start and Stop X.25” on page 5-17.

Monitor LAPB and X.25 Protocol

1. To monitor the LAPB (level 2) or the X.25 (level 3) protocol for any given link, enter the following command:

```
# /opt/SUNWconn/x25/bin/x25trace
```

   In many situations this command can be used in place of a line monitor.

2. To monitor the LAPB protocol for link 0, enter the following command:

```
# /opt/SUNWconn/x25/bin/x25trace -i /dev/lapb -l 0 lapb
```

3. To monitor the X.25 protocol for link 0, enter the following command:

```
# /opt/SUNWconn/x25/bin/x25trace -i /dev/x25 -l 0 x25
```

Bring Up the Link

If the link will not come up, check the following:

- Examine cms `/usr/elog/elog` for messages.
- Verify that cms data collection is on, and examine the `spi.err` file for messages.
- Examine link and MIS status on the switch.

Identify Port Problems

This section describes what to do if you suspect a problem with a specific port.

> **NOTE:**
>
> To find which port corresponds to a user, use an editor (for example, vi editor) to search through the `/etc/local.admin/nts*info` files. If the files are not current or do not exist, they can be written from within the na administration. The command is: `write cmsterm1 /etc/local.admin/nts1info` (if you are using `cmsterm1`).

To view the port(s) in question, enter the `show port=<number(s)>` command. You can specify one port or multiple ports (for example, `port 1 or port 1-10`). The port(s) you selected are displayed.

For parallel printers, use the `show printer=<number(s)>` instead of the `show port=<numbers(s)>` command.

NTS Port Problems

To diagnose an NTS-related port problem, you can print out each NTS login along with the NTS port each login is using. To do this, enter the following command:

```
# /cms/toolsbin/cmstermwho
```

A list of NTS logins and NTS ports is displayed.

If none of the NTS ports seem to be working upon installation, do the following:

1. Check the ethernet wiring. One cable should run from the *Sun SPARCserver* computer to the first port on the network hub unit. A second cable should run from one of the other ports on the network hub unit to a transceiver. The transceiver should connect directly to the back of the NTS.
2. If the cabling is correct, enter the following command:

```
# /usr/sbin/ping cmsterm1
```

The system should respond as follows:

```
cmsterm1 is alive
```

3. If the command times out or gives some other error condition, cycle the power on the NTS, and repeat step 2.
4. If the NTS is functioning properly, the power lights should eventually stop flickering and display a green Unit and Net light. The TEST LED light may also be lit.
5. If the NTS still fails to respond, you can check and reset the NTS address by doing the following:
   a. Reattach a terminal (set to 9600 baud, no parity, 1 stop bit) to the console port, and cycle the power on the NTS.
   b. Press the Test key within 30 seconds, and wait for the `monitor:` prompt to appear.
   c. To check that the unit has a current address and load, enter the following command at the `monitor:` prompt:

```
monitor: addr
```

NOTE:

If the values displayed are not correct, change them to match the addresses given on the *Sun SPARCserver* computer in the `/etc/hosts` file. See the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document for information on administering the network terminal servers. If the addresses were not changed via user error, notify the Technical Service Center (TSC).

6. Try different ethernet cables and swap out the transceiver. If the failure persists, call the TSC for assistance.
7. As a last resort, if the NTS still fails to respond, replace the NTS.

Replace the NTS

Use the procedures in the *CentreVu Call Management System Release 3 Version 6 Sun SPARCserver Computers, Hardware Installation* (585-215-857) document and in the *CentreVu Call Management System Release 3 Version 6 Software Installation* (585-215-866) document.

Use Files to Readminister the NTS

If the NTS fails and needs to be replaced, you may be able to use files to readminister the NTS.

You can store configuration information on multiple files to use as a backup in the event your NTS loses translation. If the backup fails, you can use the files in Table 5-4 to readminister the ports.

Table 5-4: Configuration Information

Device	IP Address	NTS	File Name
Sun SPARCserver computers	`129.200.9.1`	`host_computer`	`NA`
NTS (#1)	`129.200.9.11`	`cmsterm1`	`nts1info`
NTS (#2)	`129.200.9.12`	`cmsterm2`	`nts2info`
NTS (#3)	`129.200.9.13`	`cmsterm3`	`nts3info`
NTS (#4)	`129.200.9.14`	`cmsterm4`	`nts4info`
NTS (#5)	`129.200.9.15`	`cmsterm5`	`nts5info`
NTS (#6)	`129.200.9.16`	`cmsterm6`	`nts6info`
NTS (#7)	`129.200.9.17`	`cmsterm7`	`nts7info`

Use the `read` command to repopulate the nonvolatile memory on the NTS with your latest translation (assuming you wrote them) by doing the following:

1. Default to an NTS using the `annex cmsterm<1>` command.

2. To read back the stored configuration information for the first NTS from a file, enter the following command:

```
# command: read /etc/local.admin/nts1info
```

NOTE:

The configuration information is also stored in nonvolatile memory on the NTS.

The system responds:

```
Setting annex parameters
Setting serial port parameters for port 1
Setting serial port parameters for port 2
   .
   .
   .
Setting serial port parameters for port 64
command:
```

3. When you are done, enter the following command to reset the terminal ports:

```
command: reset all@cmsterm1
```

The system responds:

```
# resetting all serial ports of annex cmsterm1
```

Check Port Connectivity

To check the port connectivity for problems, do the following:

- For 8-, 16- and 64-port NTSs, check the connection to each terminal, printer, or modem.
- For a 64-port NTS, check the three cables (A, B, and C) that run from the NTS to each NTS patch panel (see Figure 5-3). Check to see that the cables are correctly seated at each end.

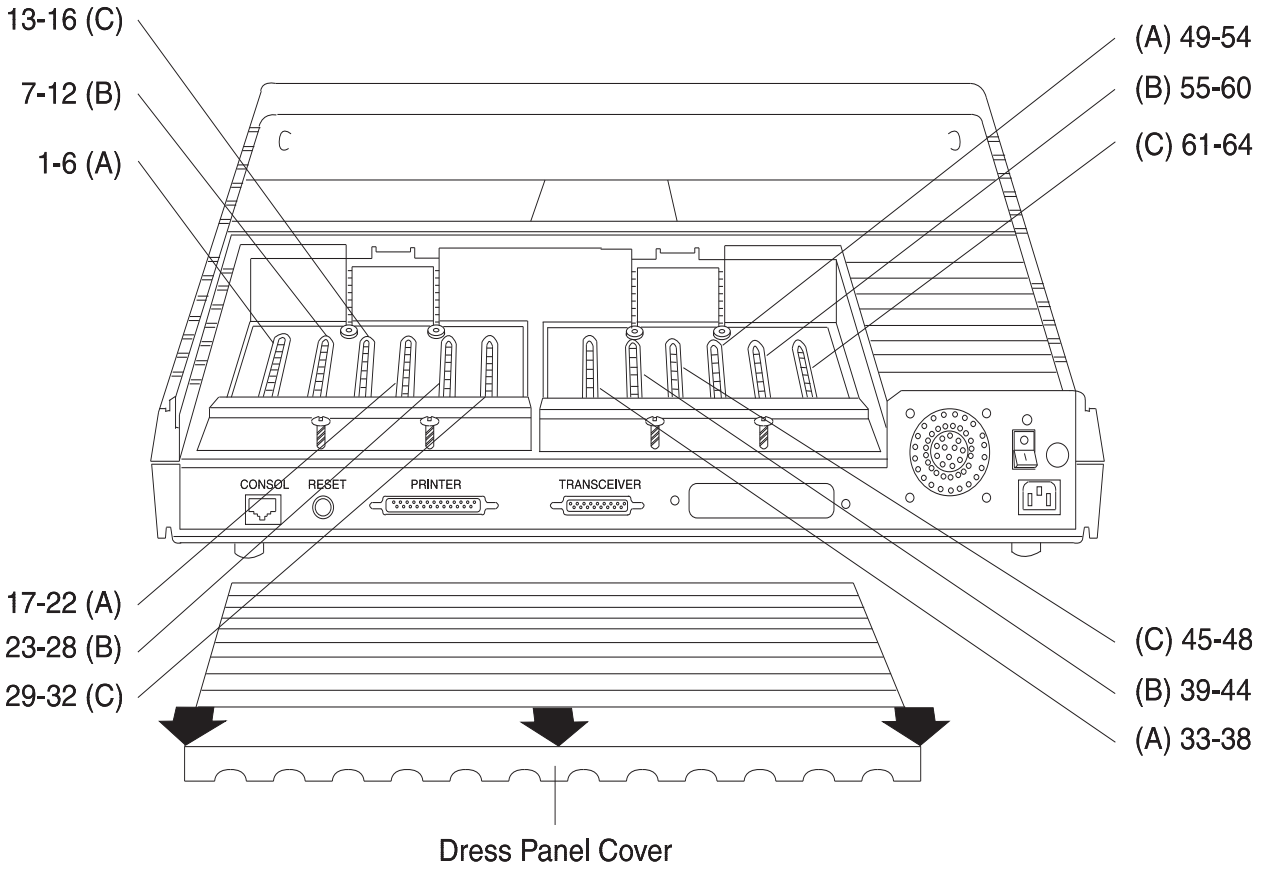


Figure 5-3: Network Terminal Server — PBX-Champ Connectors and Port Definitions

Reset the Port

If the na port administration is questionable (see “Use Network Administrator (na) Utility”), reset the port to its default configuration. Do the following steps:

1. Check the port administration.
2. To reset the port to its default configuration, enter the na command at the system prompt, as shown below:

```
# command: na
```

3. To associate all subsequent administration with a specific NTS, enter the following command at the prompt:

```
# annex cmsterm1
```

NOTE:

The terminal address, `cmsterm1,` is the name defined in the `/etc/hosts` file.

4. To reset the port(s), do the following:

   a. To reset one port (x), enter the following command:

```
# port x
```

   b. To reset two ports (`x-y`), enter the following command:

```
# port x-y
```

   c. To reset additional ports (`x-y,z`), enter the following command:

```
# port x-y,z
```

NOTE:

The preceding command makes the specified ports the default set. All subsequent port commands will refer to these ports.

5. Enter the following command to reset the parameters associated with the default port set:

NOTE:

This returns the parameters to their factory defaults except for `user_name`, `location`, and `dedicated_address`.

```
# read/etc/local.admin/defport
```

6. To reset to a 9600 baud terminal, enter the following command:

```
# read/etc/local.admin/96term
```

7. To make any additional changes to the speed or parity, enter the following command (2400 is only one example of the baud rates that you can use):

```
# set port speed 2400
```

NOTE:

If the ports are not specified, the default setting is used.

8. To store the port configurations to a file (for example, `nts1info`), enter the following:

```
command: write cmsterm1/etc/local.admin/nts1.info
```

NOTE:

At the end of provisioning, the `write` command downloads the port(s) and settings you selected to a flat file for use at a later date (for example, when you want to do a search or use the editor).

The system responds:

```
cmsterm1: Annex-3-UX R7.0, 64 ports
        writing...
command:
```

Call Level Interface (CLI) Mode

1. Reset the port by entering the following command:

```
# reset x
```

2. To send a message to a port using Call Level Interface (CLI) commands while logged in to the *Sun SPARCserver* computer, enter the following command:

```
# telnet cmsterm1
```

The system responds with the following messages:

```
Trying 129.200.9.11 ...
Connecting to 129.200.9.11
Escape character is ...
```

NOTE:

If the connection does not work, you may have the wrong address for your NTS. (See Table 5-4 for more information).

3. Press **Enter**.

The system responds with the following messages:

```
Rotaries defined:Cli
Enter the Annex port name or number
```

1. Enter the `cli` command.

   The system responds as follows:

```
annex:
```

Enter Super-User Mode

1. To get into the super-user mode on the NTS, enter the following command:

```
annex: su
```

   The system responds with the following prompt:

```
annex:
```

2. At the `annex:` prompt, enter your password. The system prompts you for a password (one in the super-user mode). The default is the NTS internet address (if you have not changed addresses, this is 129.200.9.11 for cmsterm1).

   The system responds with the following:

```
annex#:
```

3. At the `annex#:` prompt, enter `tap x` (where x is the port number in question).

   The system now monitors all the communications to/from this port. For example, the system responds with the following messages:

```
Trying 129.200.9.1 ...
Connected to 129.200.9.1
Escape character ...
Unix(r) System V Release
Login:
```

If you see the above messages on your CLI screen but not on the terminal, you have a connectivity problem from the NTS to the patch panel or the patch panel to the terminal.

4. To send data to a terminal (to determine, for example, what user corresponds to a specific port), enter the following commands:

```
Login: admin
admin: broadcast=x HELLO
```

NOTE:

If either of the above commands cause garbage to appear on the screen, adjust the speed, parity, or data bits to match the settings on the terminal to 9600 baud, 8 data bits, and no parity.

Check for a Bad Port

1. To check for a bad port, connect the wiring to a different port. If you get results with a different port that is administered identically, you have a bad port on either the NTS or the NTS patch panel. Call the TSC for assistance.
2. To exit `admin`, type `q` at the `admin:` prompt.
3. To stop tapping the port, simultaneously press the Control and A keys.
4. Enter the `jobs` command as shown below:

```
annex: jobs
```

The following may appear:

```
+1 tap x
```

5. To stop the job, enter the `kill 1` command (where the job number is 1).

The system responds:

```
+1 tap x
annex#
```

Exit Super-User Mode

To exit the super-user mode, enter the `su` command at the `annex#` prompt as shown below:

```
annex# su
```

The system responds as follows:

```
annex:
```

Exit the CLI Mode

To exit the CLI mode, enter the `hangup` command at the `annex:` prompt.

```
annex: hangup
```

The system responds:

```
#
```

Readminister the Terminal, Printer or Modem

After verifying the port and the connectivity, you can now readminister the terminal, printer, or modem with the `na` command as shown bellow:

```
# na
```

Diagnose Terminal-Related Problems on Aurora SBus *Multiport* Cards

Determine the extent of the problem. If only terminals connected to the same Aurora SBus *Multiport* cards have problems, try disabling and then enabling the ttymon process.

To disable and enable an individual port, enter (system response is in bold):

```
# pmadm -d -p ttyaur<board number> -s <port number>
# pmadm -e -p ttyaur<board number> -s <port number>
```

If this does not help, then disable and enable the entire ttymon by entering the following commands:

```
# sacadm -d -p ttyaur<board number>
# sacadm -e -p ttyaur<board number>
```

Verify that the administration is correct:

```
# sacadm -l
```

The output should show that there is one tty mon for each Aurora SBus *Multiport* card. For example:

```
# /usr/sbin/sacadm -l
PMTAG   PMTYPE  FLGS RCNT STATUS  COMMAND
ttyaur1 ttymon        0    ENABLED /usr/lib/saf/ttymon#
```

In this example, only the ttymon monitor, which is identified by the default port monitor tag of ttyaur1 (first Aurora card), is started, and the status is ENABLED.

Verify that the ports are correctly administered on the Aurora SBus *Multiport* card by entering `pmadm -l`. Verify that each port is administered with the correct device name (/dev/term/N).

Table 5-8 describes the fields in the sacadm -l output.

Table 5-5: Fields in the sacadm -l Output

Field	Description
PMTAG	A unique tag that identifies a particular port monitor. The `pmtag` is used by the sac to identify the port monitor for all administration. Use the default `ttymon` `pmtag`, `zsmon`, for `ttymon` ports A and B; use the listen `pmtag`, tcp for listen ports in the United States. PMTAG can contain up to 14 alphanumeric characters.

Table 5-5: Fields in the sacadm -l Output

Field	Description
PMTYPE	The type of the port monitor: ttymon or listen.
FLGS	If no flag is specified, the port monitor is started and enabled. The d flag specifies that when the port monitor is started, it is not enabled. The x flag specifies that the port monitor is not to be started.
RCNT	Retry count specifies the number of times a port monitor can fail before its state is changed to FAILED. If no count is specified, the field is set to 0, and the port monitor is not restarted if it fails.
STATUS	The status of activity for the port monitor. Possible states are STARTING, ENABLED, DISABLED, STOPPING, NOTRUNNING, and FAILED. The FAILED message is displayed if the sac cannot start the port monitor after the number of tries specified by RCNT.
COMMAND	The complete path name of the command that starts the port monitor followed by a # and any comment that was entered when the port monitor was configured.

Table 5-9 describes the fields in the pmadm -l output.

Table 5-6: Fields in the pmadm -l Output

Field	Description
PMTAG	A unique tag that identifies a particular port monitor. The system administrator assigns the name of the port monitor. The `pmtag` is used by the sac to identify the port monitor for all administration. Use the default `pmtag zsmon` for `ttymon` ports; use the `pmtag` tcp for listen ports. PMTAG can contain up to 14 alphanumeric characters.

Table 5-6: Fields in the pmadm -l Output

Field	Description
PMTYPE	The type of the port monitor: ttymon or listen.
SVCTAG	A tag unique to the port monitor that identifies a service. The service tags for the serial ports are `ttya` and `ttyb`. A service requires both a service tag and a port monitor tag to identify it uniquely.
FLGS	If no flag is specified, the port is enabled and no utmp entry is created for the service. The x flag specifies that the port should not be enabled; the u flag specifies that a utmp entry should be created for this service. Some services, such as login, will not start unless a utmp entry has been created.
ID	The login name of the person who starts the service, typically root.
PMSPECIFIC	The address, name of a process, name of a STREAMS pipe, or baud rate and configuration for a login port.

You can also check the logs for any hints about the source of the problem. The sac process records port monitor behavior in the /var/saf/_log file. In addition, each ttymon port monitor has its own log file, /var/saf/*pmtag*/log, where it records information such as messages that it receives from sac and services that it starts.

An example of the end of the /var/saf/_log file follows. This information shows that the system was rebooted three times and that the ttymon port monitor ttyaur1 was started and enabled successfully each time.

```
# tail /var/saf/_log

Mon Mar 15 14:23:12 1993; 199; port monitor <ttyaur1> changed
state from STARTING to ENABLED

Fri Mar 19 09:43:18 1993; *** SAC starting ***

Fri Mar 19 09:43:19 1993; 203; starting port monitor <ttyaur1>

Fri Mar 19 09:43:19 1993; 119; port monitor <ttyaur1> changed
state from STARTING to ENABLED

Wed Mar 24 15:24:24 1993; 437; *** SAC starting ***

Wed Mar 24 15:24:25 1993; 443; starting port monitor <ttyaur1>

Wed Mar 24 15:24:25 1993; 437; port monitor <ttyaur1> changed
state from STARTING to ENABLED
```

```
Thu Mar 25 20:36:11: 1993; 201; *** SAC starting ***
Thu Mar 25 20:36:12 1993; 208; starting port monitor <ttyaur1>
Thu Mar 25 20:36:13 1993; 201; port monitor <ttyaur1> changed
state from STARTING to ENABLED
```

An example of the end of the /var/saf/ttyaur1/log file is shown next. This information gives more details about how the ttymon port monitor ttyaur1 was initialized successfully.

```
#oak tail /var/saf/ttyaur1/log
Thu Mar 25 20:36:13 1993; 208; PMTAG: ttyaur1
Thu Mar 25 20:36:13 1993: 208; Starting state: enabled
Thu Mar 25 20:36:13 1993; 208; Got SC_ENABLE message
Thu Mar 25 20:36:13 1993: 208; max open files = 1024
Thu Mar 25 20:36:13 1993: 208; max ports ttymon can monitor = 1017
Thu Mar 25 20:36:13 1993; 208; *ptr == 0
Thu Mar 25 20:36:13 1993; 208; SUCCESS
Thu Mar 25 20:36:13 1993; 208; *ptr == 0
Thu Mar 25 20:36:13 1993; 208; SUCCESS
Thu MAr 25 20:36:13 1993; 208; Initialization Completed
```

Diagnose Network Terminal Server (NTS) Problems

If you are experiencing terminal problems, the NTS can be remotely diagnosed in one of two ways:

- Connect a modem directly to the NTS in question, or
- Diagnose the problem through the *Sun SPARCserver* computer.

See the ‘‘Network Terminal Server (NTS) Port Problems’’ section and the *Network Terminal Server User’s Guide* for details.

To diagnose a problem with the terminal server, you can use the following:

- Network Administrator (na) Utility
- CLI Commands
- Panel Indicators.

Use Network Administrator (na) Utility

The *Solaris* 2.5.1 Network Administrator (na) utility on the *Sun SPARCserver* computer provides the commands for managing the NTS. These commands allow the user (also remote users) to do the following:

- Set and display the operating characteristics of the NTS and its ports.
- Reboot or reset the NTS and its ports.

- Broadcast messages to the NTS ports.

Table 5-10 provides the na commands that are available.

Table 5-7: Network Administrator Utility Commands

Command	Description
annex	Defines default annex_list.
boot	Boots the NTS.
broadcast	Sends a broadcast message to one or more ports.
copy	Copies NTS port configuration parms to other ports.
dumpboot	Boots the NTS and produces a dump.
echo	Writes remainder of the line to the standard output.
help	Displays help for commands.
password	Defines the administrative password.
port	Defines a default port_set.
printer	Defines a default printer_set.
quit	Terminates na command.
read	Reads and executes a script file.
reset	Resets the NTS or a port_set.
set	Defines or modifies the value of a parameter.
show	Displays current value of a parameter.
write	Writes current configuration to a file.

Use the CLI Tool

You can use the CLI tool to do the following:

- Check port or NTS statistics (see Example 1 on 5-67).
- Check port or NTS statistics and administration (see Example 2 on 5-67).
- Tap into any port to see the data being transmitted and received (see Example 3 on 5-68).

To access CLI tool, do the following steps:

1. Log into the *Sun SPARCserver* computer. Enter the following command from any active *Solaris* session on the *Sun SPARCserver* computer:

```
$ telnet cmsterm1
```

   The system responds:

```
Trying 129.200.9.11 ...
Connecting to 129.200.9.11
Escape character is ...
```

2. Press **Enter**. The system responds:

```
Rotaries defined: cli
Enter Annex port name or number:
```

3. Enter the `cli` command.

```
$ cli
```

   The system responds:

```
annex:
```

4. At the `annex:` prompt, enter a `cli` command.

   Table 5-11 includes a list of the available `cli` commands. Enter the `help` command to get a list of allowable `cli` commands at any point in a CLI session.

Table 5-8: CLI Commands

Command	Description
`bg`	Puts the job in the background.
`connect`	Uses LAT to connect to an advertised LAT service.
`fg`	Returns to an established job.
`hangup`	Disconnects all jobs and resets user CLI connections.
`help`	Displays help info for commands.
`hosts`	Displays current *Sun SPARCserver* computer table.
`jobs`	Displays a list of current jobs.
`kill`	Terminates a job.
`lock`	Locks a port.
`netstat`	Displays network status.
`ppp`	Converts a CLI port to a PPP interface port.
`queue`	Displays/Removes queued requests.
`rlogin`	Connects to a *Sun SPARCserver* computer.
`services`	Displays/Removes queued requests.
`slip`	Converts a CLI port to a SLIP port.
`stats`	Displays NTS statistics.
`stty`	Displays and modifies CLI port parameters.
`telnet`	Connects to a *Sun SPARCserver* computer.
`who`	Displays NTS users.

Example 1: Check NTS or ports statistics

To display a list of all NTS users with port numbers, enter the `who` command at the prompt. The system responds with a list of administered user names, locations per port, and the NTS status.

Example 2: Check NTS or port statistics and administration

The `stats` command, without any arguments, gives overall statistics on the NTS. You can check the Internet address, the serial ports received, and the transmitted numbers.

The `stats -s5-7` command gives statistics on ports 5-7. This can be helpful to check the receive and transmit on a per-port basis.

Using the CLI (in super-user mode) allows more flexibility. Do the following steps to enter the CLI mode:

- At the `Annex:` prompt, enter the `su` command. You will be asked for a password. The default password is the Internet address to the NTS.
- To clear the statistics (in super-user mode), enter the `stats -c` command.
- Use NTS administration with the `admin` command (the `admin` interface is the same as the `na` administration). See the ‘‘Using Network Administrator (NA) Utility’’ section in this chapter for more details.

Example 3: Tap a port to check the data

To monitor all communications to or from a port (in super-user mode), do the following steps:

- At the prompt, enter the `tap x` command (`x` is the port number).
- To stop monitoring the port, press the Control and A keys simultaneously.
- At the prompt, enter the `jobs` command. The system responds: `+1 tap 7`.
- To stop the job, enter the `kill 1` (1 is the job number) command.
- To exit the CLI mode, enter the `hangup` command.
- To check the connectivity of the *Sun SPARCserver* computer, enter the `ping 129.200.9.1` (or whatever the address is) command.
- To stop the output, press the Control and A keys simultaneously.

See the *Network Terminal Server Administrator User’s Guide* for more in-depth information.

Use Panel Indicators

The NTS’s front panel has six system indicators and eight status indicators. The system indicators are labeled:

- Power
- Unit
- Net
- Attn

- Load
- Active.

The system indicators provide information about normal operations and problems that occur. Use the system indicators and the ROM Monitor commands to diagnose problems.

The status indicators are numbered one through eight.

The status indicators display port activity during normal operations; each indicator supports eight ports. When the NTS encounters a problem or an internal error condition, the indicators display error information.

NOTE:

If an error occurs, save the status of the indicators. TSC personnel can use this information to diagnose the problem.

During power-up and booting, it is more complicated to diagnose problems because they can originate in the NTS, the transceiver, the ethernet, or the load server *Sun SPARCserver* computer. However, the indicators provide both a progress report and an error display to assist you in troubleshooting.

See the Solving Power-Related Problems section in this chapter and the *Network Terminal Server User's Guide* for specific power-up and boot procedures.

System Fails to Boot Properly

This section discusses some common reasons why your system fails to boot properly and provides some corrective procedures.

Power-On Initialization Sequence

You can identify problems more accurately if you are familiar with the system power-on initialization messages. These messages show you the types of functions the system performs at various stages of system start-up. These messages can also show the transfer of control from OpenBoot firmware to POST.

Procedures

Table 5-5 describes the OpenBoot initialization command sequences provided by the *Sun SPARCserver* computer. These commands are useful in some boot-failure situations. To use the commands, hold down the keys after turning on the power to your system. Keep the keys pressed until the keyboard lights flash and the screen displays the firmware (ok>) prompt.

Table 5-9: Keyboard Commands

Command	Description
`Stop`	Bypass POST. This command does not depend on the security-mode. (Note: some systems bypass POST as a default; in such cases, use the Stop and A key combination to start POST.)
`Stop-A`	Abort.
`Stop-D`	Enter diagnostic mode (set `diag-switch?` to `true`).
`Stop-F`	Enter Forth on TTYA instead of probing. Use `exit` to continue with the initialization sequence. This is useful if hardware is broken.
`Stop-N`	Reset Non-Volatile Random Access Memory (NVRAM) contents to default values.

Preserve Data After a System Crash

Enter the Prom monitor (OpenBoot) `sync` command at the `ok>` prompt to force any information on its way to the hard disk to be written out immediately. This is useful if the operating system has crashed or has been interrupted before preserving all data.

The `sync` command returns control to the operating system and performs the data saving operations. After the disk data has been synchronized, the operating system begins to save a core image of itself. If you do not need this core dump, you can interrupt the operation using the Stop and A key sequence.

System Will Not Boot from Disk

You are booting from a disk, and the system fails with the following message:

```
The file just loaded does not appear to be executable.
```

Solution

The boot block is missing or corrupted. Reinstall the *Solaris* operating system, and restore all of the data.

Problem

You are booting from a disk, and the system fails with the following message:

```
The file just loaded does not appear to be executable.
```

Solution

The disk may be powered down (especially if it is an external disk). Turn on the power to the disk, and make sure the SCSI cable is connected to the disk and the system.

SCSI Problems

Your system has more than one disk installed, and you get SCSI-related errors.

Solution

1. To quickly check the SCSI-related errors, enter the following command:

```
ok probe-scsi-all
```

The program responds:

```
/iommu@f,e0000000/sbus@f.e0001000/esp@3,200000
Target 6
  Unit 0 Disk Removable Read Only Device SONY CD-ROM CDU-8012

/iommu@f,e0000000/sbus@f.e0001000/esp@3,200000
Target 1
  Unit 0 Disk SEAGATE ST14801 SUN04246266 Copyright (C) 1991
Target 3
  Unit 0 Disk SEAGATE ST14801 SUN04246266 Copyright (C) 1991


. . . . .
. . . . .
. . . . .
Target 6
  Unit 0 Disk Removable Read Only Device SONY CD-ROM CDU-8012

ok
```

NOTE:

The actual response (devices listed) depends on the devices installed on the SCSI bus.

2. Compare output with the physical devices present. Work trouble (with the TSC) until all devices can be probed.

Duplicate SCSI Target Number

If your system has duplicate SCSI target number settings. Try the following procedure:

1. Unplug all but one of the disks.
2. At the ok prompt, enter:

```
ok probe-scsi-all
```

NOTE:

Use the target number and its corresponding unit number.

3. Plug in another disk, and repeat step 2.
4. If you get an error, change the target number of this disk to one of the unused target numbers.
5. Repeat steps 2-4 until all the disks are plugged back in.

Blank Screen — No Output

The local monitor is blank.

Solutions

1. Check to see if the machine is in the process of booting up; the screen goes blank during initialization and stays blank for a few minutes. This is especially true if the system is being booted to a remote console.
2. Find out if the console is remoted and the remote user is in the OpenBoot mode. Check the lights on the modem to indicate if someone might be dialed-in.
3. If all else fails, cycle the power (power-down and power-up), and immediately hold down the **Stop** and **N** keys until something appears on the screen. Hold the keys down for at least a minute. If the machine is functioning properly, this forces the console to be local. Take a look at the keyboard — look for flashing green lights on the keys.
4. If nothing is seen after a minute or so, there is probably a hardware failure. Do the following:
    a. Check to make sure the keyboard is attached. If the keyboard is unplugged, the output goes to TTYA instead. To fix this problem, shut down the system and do the following in sequential order:
        1. Turn off the *Sun SPARCserver* computer.
        2. Turn off the system monitor.
        3. Turn off all external devices starting with the device closest to the *Sun SPARCserver* computer and working toward the farthest device.

b. Plug in the keyboard, and power on again by using the following sequence:

   1. Turn on devices attached to the *Sun SPARCserver* computer starting with the device at the end of the SCSI chain and working toward the computer.
   2. Turn on the *Sun SPARCserver* computer.
   3. Turn on the system monitor.

c. Check to make sure the monitor is turned on and plugged in. Check the power cable on the monitor. Make sure the monitor cable is plugged into the system frame buffer; then, turn the monitor on.

d. Check to make sure the `output-device` is set to TTYA. This means that the NVRAM parameter `output-device` is set to `ttya` instead of being set to `screen`. You can do **one** of the following:

   — Power down the system (using the proceeding steps). Then, turn it on (using the proceeding steps), and immediately press the Stop and N keys. This sets all NVRAM parameters to their default values. As a result, the `output-device` parameter is set to `screen`.

   WARNING:

   In addition, all previous nondefault settings are reset to their default values. You must restore the settings as needed. See “Method 2 — From Local Site” in the following section of this chapter to restore the settings.

   — Connect a terminal to TTYA, and reset the system. After getting to the `ok` prompt on the terminal, enter `screen output` to send the output to the frame buffer. Use the `setenv` command to change the default display device, if needed.

e. Check to see if the system has multiple frame buffers. If your system has several plugged-in frame buffers, then it is possible that the wrong frame buffer is being used as the console device.

Refer to your system documentation and call the TSC.

Diagnose Problems Using the Remote Console

If your system will not boot, the TSC personnel could ask you to redirect the remote console to identify a problem. You can redirect the remote console using **either** of the following methods:

- Using *Solaris* software package
- Using OpenBoot diagnostics.

Redirect the Remote Console Using *Solaris* Operating System

This section describes how to redirect the console to port A on the *Sun SPARCserver* computer using the *Solaris* operating system. Redirecting the console allows the TSC to dial in and do remote maintenance.

To set the console to the remote, do the following:

1. Dial in (from the remote terminal) to the remote console modem (for example, access port A on the computer), and log in as root.
2. Remove the port monitor by entering the following command:

```
# /cms/install/bin/abcadm -r ttya
```

The program responds:

```
ttya is currently set to incoming

Are you sure you want to remove it?
```

3. Enter y. The program responds:

```
ttya administration removed
```

4. Redirect the console to port A (remote console) by entering the following commands:

```
# /cms/install/bin/abcadm -c -b 2400 ttya
```

The program responds:

```
This change requires a reboot to take affect

Are you ready to reboot? [y,n,?]
```

NOTE:

The baud rate will vary depending on the modem (for example, 2400 or 9600).

5. Press Y. The system will automatically reboot, and port A will come up as the console.

   As the system reboots, the shutting down messages will appear on the *Sun SPARCserver* computer monitor. When the system starts to come back up, the *Sun SPARCserver* computer monitor should go blank, and the system boot diagnostics should appear on the remote console terminal. After the system reboots, a `console login:` prompt should appear on the remote console terminal.

6. Log into the remote console as root.

   NOTE:

   At this time, an *OpenWindows* login window will appear on the *Sun SPARCserver* computer monitor.

Set the Console to Local

To set the console to local, do the following:

1. Redirect the console back to the local console by entering the following command:

```
# /cms/install/bin/abcadm -c local
```

The program responds:

```
Console set to local

This change requires a reboot to take affect

Are you ready to reboot? [y,n,?]
```

2. Press Y.

   The program responds:

```
Starting port monitor.
Setting console parameters.
Proceeding to reboot.
```

3. The system will automatically reboot, and port A will come up as the dial in. A `login:` prompt appears.

   As the system reboots, the shutting down reset and rebooting messages will appear on the remote console monitor. When the system starts to come back up, the system boot diagnostics should appear on the *Sun SPARCserver* computer monitor. After the system reboots, a login prompt should appear on the *Sun SPARCserver* computer monitor.

4. Log into the local console (*Sun SPARCserver* system) as root.

Redirect the Remote Console Using OpenBoot Diagnostics

Use the OpenBoot mode to redirect port A (remote console port) on the *Sun SPARCserver* computer when the *Solaris* method does not work (typically because the system will not boot).

NOTE:

This procedure should be done only at the direction of the TSC.

To redirect the local console to the remote console from the OpenBoot environment (prompt is `ok>`), do the following steps:

Enter the OpenBoot environment (prompt is `ok>`) in **one** of the following ways:

- If in the *Solaris* environment, halt the operating system with the *Solaris* `halt` command.
- If in the *Solaris* environment and the `halt` command does not work (for example, the system is hung up), press the Stop and A keys simultaneously.

  CAUTION:

  The Stop and A key combination abruptly breaks the execution of the operating system and should be used with caution.

- If the above methods fail, press the Stop and A keys simultaneously after the display console banner appears but before the system starts booting the operating system.

To redirect the console to remote from the OpenBoot environment (prompt is `ok>`), perform the following steps:

1. To display a list of the current parameter settings on your system, enter the following command:

```
ok> printenv
```

The system responds:

```
Parameter Name        Value          Default Value
output-device         screen         screen
input-device          keyboard       keyboard
   .
   .
   .
```

2. At the ok> prompt, enter the `setenv` command to set the configuration parameters. Set the parameters to the values specified. (See Table 5-6.) For example:

```
ok>setenv output-device ttya
```

The system responds:

```
output device=ttya
```

Table 5-10: Parameter Commands

Parameter	Values
output-device	ttya
input-device	ttya
ttya-rts-dtr-off	true
ttya-ignore-cd	true
ttya-mode	9600,8,n,1,- In this example, the baud rate is 9600. The baud rate should correspond to the setting on the local modem. Typically, a 3830 would call for a setting of 9600, a 3715 would call for a setting of 9600, and an 2400 would call for a setting of 2400.

3. To verify the parameter changes, enter the following command:

```
ok> printenv
```

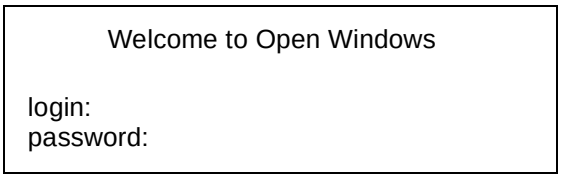
The system responds:

```
Parameter Name        Value          Default Value
output-device         ttya           screen
input-device          ttya           keyboard
   .
   .
   .
```

4. For the changes to take effect, boot the system by entering:

```
ok> boot
```

The system responds on the local console with the XDM login prompt (see the following example) or on the remote console with the console login:



To redirect the remote console to the local console, enter the OpenBoot environment (prompt is `ok>`) in the following way:

- If in the *Solaris* environment, halt the operating system with the *Solaris* `halt` command.

To redirect the remote to the console from the OpenBoot environment (prompt is `ok>`), use one of the following methods:

Method 1 — From the Remote Site

Use this method from the remote site when the *Solaris* method does not work**.**

1. From the remote console, if not in OpenBoot, get into OpenBoot mode in **one** of the following ways:
   - If in the *Solaris* environment, halt the operating system with the *Solaris* halt command.

- Power-cycle the machine, and press **Break** from the remote console (requires a local person).

2. To display a list of the current parameter settings on your system, enter the following command:

```
ok> printenv
```

The system responds:

```
Parameter Name        Value          Default Value
output-device         ttya           screen
input-device          ttya           keyboard
   .
   .
   .
```

3. To set the configuration parameters, enter the parameters (see Table 5-7) via the `setenv` command at the `ok>` prompt. For example:

```
ok> setenv output-device ttya
```

Table 5-11: Specific Parameter Commands

Parameter	Values
output-device	screen
input-device	keyboard
ttya-rts-dtr-off	true
ttya-ignore-cd	false

4. To activate the changes, boot the system by entering:

```
ok> reset
```

5. Log into the system as *root* at the local monitor.

6. From the local monitor, enter the `cms/install/bin/abcadm -k` command to see what is on the `ttya` port. Start a port monitor on the `ttya` port if there is not one already.

```
# /cms/install/bin/abcadm -k
```

7. Reset the default console parameters by entering the following command:

```
# /cms/install/bin/abcadm -c -b <baud>ttya
```

   The system responds:

```
answer n to "Do you want to reboot?"
```

8. Press **N**.

Method 2 — From the Local Site

Use this method when the previous OpenBoot method does not work or if you want to switch the console from the local (customer) site.

At the local site (when the system is not running *Solaris*), do the following:

1. Power down the machine.
2. Press the **Stop** and **N** keys simultaneously. Continue to press the **Stop** and **N** keys simultaneously until something appears on the screen. The system reboots to the local console.
3. Log into the system as root at the standard interface.

4. From the local monitor, enter the following command to check what is on the `ttya` port:

```
# /cms/install/bin/abcadm -k
```

5. Reset the default console parameters by entering the following command:

```
# /cms/install/bin/abcadm-c-b <baud>ttya
```

   The system responds with the following prompt:

```
#
```

6. Enter n in response to the following message:

```
# answer n to "Do you want to reboot?"
```

7. Start a port monitor on ttya.

```
# /cms/install/bin/abcadm -i -b<baud>ttya
```

Single-User Mode and the Remote Console

Prerequisite: You must be logged into the customer's machine through the remote console interface.

To place the system in single-user mode, at the remote console, enter the following command:

```
# shutdown -y -is -g0
```

NOTE:

The system will **not** successfully enter single-user mode if you execute the `shutdown` command from the local console while the console is redirected. When this occurs, the local console will not respond if you try to enter data. The remote console will also be unresponsive.

To recover from the situation described in the previous note, put the system into single-user mode by doing the following:

1. Select a new window on the local console.
2. In the new window, enter the following command:

```
# shutdown -y -i0 -g0
```

3. On the remote console, enter the following command at the `ok>` prompt:

```
ok> boot -s
```

Machine Panics

If a machine panic is detected on your system, you must call the TSC (domestic) or remote (international) support personnel. The TSC may request that you deliver the following information on a tape:

- Crash dump from `/var/crash/<`*`hostname`*`>/vmcore.n.`
- Namelist from `/var/crash/<`*`hostname`*`>/unix.n.`
- Output of the `showrev -p` (put the information in a file).
- Output of the `prtconf -pv` (put the information in a file).
- Possibly output from the `/var/adm/messages` file.

Create a Panic Tape for the TSC

To put all the files on one tape, do the following procedures:

1. Log in as root.
2. Change to the `dump` directory by entering the following command:

```
# cd /var/crash/<hostname>
```

3. Verify that `unix.n` and `vmcore.n` are present, and match the date for the crash in question.
4. To retrieve the output from the `showrev -p` buffer, enter the following command:

```
# showrev -p>showrev.out
```

5. To retrieve the output from the prtconf -pv buffer, enter the following command:

```
# prtconf -pv>prtconf.out
```

6. To copy the output from the `/var/adm/messages` file, enter the following command:

```
# cp /var/adm/messages messages
```

7. Insert a tape into the default backup tape drive.

8. Enter the following command:

```
# tar cvf <device-name> unix.n vmcore.n dmesg.out showrev.out
prtconf.out messages
```

NOTE:

The letter n represents the number of the crashdump.

The system responds with a list of all of the files.

Remove the Temporary Files

1. To remove the temporary files, enter the following command:

```
# rm unix.n vmcore.n dmesg.out showrev.out prtconf.out messages
```

NOTE:

The letter n represents the number of the crash dump.

2. Log out of the system.
3. Remove the tape from the tape drive.
4. Send the tape to the TSC.

Keyboard Gets Unplugged

If the console keyboard cable gets unplugged during system operation, the system will continue to run. If the console is reattached to the cable, the system freezes on its current display. Do the following to correct the problem:

1. Plug in the keyboard. The system responds:

```
ok>
```

2. Enter the following command at the ok> prompt:

```
ok> go
```

The system responds by continuing to run. It was not running during the time between getting the ok> prompt and entering go.

NOTE:

If the system is rebooted, instead of entering go, you may be prompted to use the fsck command to repair the *Solaris* file systems.

Solving Terminal-Related Problems

Overview

This section describes some of the day-to-day problems that may occur during the normal operation of the terminals supporting the *CentreVu* CMS application.

In each section you will find several documented symptoms and corresponding solution steps. When you find a symptom that is similar to the problem you are experiencing with your terminal, follow the solution step(s) until the problem is resolved.

In some of the solution steps, you may have to refer to your terminal manual.

NOTE:

If after you have tried to solve your terminal problem by using this section and your terminal manual and the terminal is still not functioning properly, escalate the problem through normal procedures.

When an Existing Terminal Fails to Operate

For problems with existing terminals, find the problem in this section and follow the corresponding solution step(s).

Garbage Characters Display

Several unexpected or “garbage” characters are displayed on the window.

Solution

1. Mismatches to speed, parity, and data bits will cause gibberish on the terminal. Reset the terminal or use the na administration as needed.
2. Try pressing the Control and L keys simultaneously. This should cause the screen to be repainted without the “garbage” characters.

Screen Goes Blank

The screen suddenly goes blank.

Solution

1. If the terminal has not been used recently, press any key on the keyboard. The screen should be restored if the power is on. (After about 1 hour of non-use, the screen will automatically go blank to protect the screen.)
2. Check the power cord at the back of the terminal. Wiggle both ends of the cord. If the terminal screen flashes, the power cord is not connected properly, or the power cord is defective.
3. Locate the power switch at the rear of the terminal. Turn the terminal OFF. Wait a few seconds. Turn the terminal ON.
4. If all the other terminals have gone blank, a major power supply loss has probably occurred. Check the power source for the terminals.

Terminal Bell Problems

The terminal “bell" is too loud or cannot be heard.

Solution

Adjust the volume control. (Refer to your terminal manual for details.)

Keyboard Entries Not Echoed on Screen

Characters are not being displayed on the screen when the keys are pressed.

Solution

On the back of the terminal, locate the power switch. Turn the terminal off. Wait a few seconds. Turn the terminal on.

Terminal is Turned on But Nothing is Displayed

You turn the terminal on, but nothing is being displayed on the screen.

Solution

1. The terminal intensity may need adjusting. The intensity control is located underneath the lower left side of the terminal screen. (Refer to your terminal manual for details.)
2. Make sure that the terminal has been turned on. Check the power switch on the back of the terminal.
3. Check the power cord on the back of the terminal. Wiggle both ends of the cord. If the terminal screen flashes, the power cord is not connected properly, or the power cord is defective.

Terminal Displays Garbage Characters When Turned On

You turn the terminal on, and it displays “garbage'' characters.

Solution

1. Press the Enter key once. Wait for a few seconds. Press the Enter key about four times.
2. Turn the terminal off. Wait a few seconds. Turn the terminal on.

Terminal Locks Up

The terminal is “locked up.” In other words, the terminal screen does not respond to keyboard input.

Solution

1. If your last request is taking a long time to complete, press the F8 key to bring up the main menu. Wait a few seconds. If the terminal does not respond, press the F8 key again. Wait a few seconds.
2. If the terminal still does not respond, turn the terminal off. Wait a few seconds. Turn the terminal on and log in again.

When All Else Fails

You cannot find a problem that relates to your terminal, or the solution step(s) corresponding to your terminal did not work.

Solution

The solution involves a list of things to try. If a particular step does not work or you have already tried it, go to the next step in the list.

NOTE:

In some cases, you will be logged off. If this happens, log in again.

1. Press the Control and L keys simultaneously. In most cases, doing this will refresh the screen.
2. Turn the terminal OFF, wait a few seconds, and turn the terminal ON. (Refer to your terminal manual if necessary.)
3. Check the terminal connections by doing the following:
   a. Check the power cord at the back of the terminal. Wiggle both ends of the cord. If the terminal screen flashes, the power cord is not connected properly, or the power cord is defective.
   b. Check for a loose connection at the keyboard and the terminal.
   c. At the rear of the terminal, locate the cable connected to the connector labeled “modem.” Make sure the cable is connected properly to the “modem” connector. If possible, follow this cable to the computer, and check the connection at the computer end.
   d. If another terminal is available, try using it.
   e. See the *CentreVu* CMS administrator, or escalate the problem through normal procedures.

“Login Incorrect” is Displayed

The message “login incorrect” is displayed when you try to log in.

Solution

Either the login or password you entered is not correct. Carefully, reenter your login and password. Make sure you are not trying to enter an old password. If you still cannot log in, see the *CentreVu* CMS administrator, or escalate the problem through normal procedures.

When a New Terminal Fails to Operate

If a new terminal fails to operate, do the following:

- Check the physical connectivity to the terminal.
- If the terminal is connected to an NTS, reset the port using the correct script file (96term, 48term, 24term, 12term). Make sure the data bits and parity settings are the same for the terminal and the na administration.

For problems with new terminals, find the problem in this section and follow the corresponding solution step(s) (log in on the system console or another working terminal to diagnose the problems).

Terminal Displays Nothing (Blank)

Terminal does not display anything.

Solution

1. Make sure that the terminal has been turned on. Check the power switch at the rear of the terminal.
2. Check the power cord at the back of the terminal. Wiggle both ends of the cord. If the terminal screen flashes, the power cord is not connected properly, or the power cord is defective.
3. The terminal intensity may need adjusting. The intensity control is located underneath the lower left side of the terminal screen. (Refer to your terminal manual for details.)

Terminal on Aurora SBus *Multiport* Card Displays Nothing (Blank)

Terminal connected to an Aurora SBus *Multiport* card does not display anything.

Solution

1. Check the steps above first.
2. Verify that the port has been enabled by entering the following command:
   `# pmadm -l -p ttyaur<board number> -s<port number>` Verify that under the FLGS field there is a u (not ux), and that a correct device is being used.

3. Check the following two logs for hints about what the trouble might be: `/var/saf/_log` and `/var/saf/ttyaur<board number>/log`.
4. Set the terminal to 9600 baud. Test the connectivity by entering the following commands:

   ```
   # pmadm -d -p ttyaur<board number> -s<port number>
   # cat /etc/group > /dev/term/<port number>
   ```

   The contents of the `/etc/group` file should now be displayed on the screen. If not, check the wiring (refer to Chapter 3).
   Reenable the port by entering the following command:

   ```
   # pmadm -e -p ttyaur<board number> -s<port number>
   ```

   Set the terminal to the correct baud rate (if not 9600 baud).

Terminal Displays Garbage Characters

The terminal prints “garbage” on the screen.

Solution

Mismatches to speed, parity, and data bits will cause gibberish on the terminal. Reset the terminal.

The terminal baud rate and the computer baud rate may not match. Refer to the *CentreVu Call Management System Release 3 Version 6 Sun SPARCserver Computers, Hardware Installation* (585-215-857) document, to verify that the terminal options have been properly set and that the terminal baud rate has been properly administered on the computer.

If the terminal is connected to an NTS, use the `na` administration as needed.

If the terminal is connected to an Aurora SBus *Multiport* card, verify the port settings by entering the following command from another terminal or console while the port is active:

```
# stty -a < /dev/term/<port number>
```

Look for the correct baud rate, `cs8`, and `parenb` options. Verify that the following are not present: `cs7` and `-parenb` options.

Terminal on NTS Displays "Trying <address>" Message But Does Not Return Login Prompt

"Trying 129.200.9.1" message displays but does not give you a login prompt afterwards (only applicable to terminals connected to an NTS).

Solution

You probably have an address mismatch for the *Sun SPARCserver* computer. Check the address in the `/etc/hosts` file on the *Sun SPARCserver* computer, and reset the `dedicated_address` parameter for ports using an `na` administration.

Terminal Displays Login Prompt But Does Not Respond to Keyboard Input

The terminal screen displays `login:` but does not respond to keyboard input.

Solution

1. Check for a loose connection at the keyboard and at the terminal.
2. Turn off the power to the terminal, wait for a few seconds, and turn the terminal back ON. (Refer to your terminal manual if necessary.)

Solving Printer-Related Problems

Overview

This section provides solutions to problems that may occur during the normal operation of the printers supporting the *CentreVu* CMS application.

If you are experiencing a printer problem, do the following:

- Check the cabling to the printer.
- Check that the printer is plugged in and that there is power to the printer.

Printers Connected to the NTS

If you are experiencing a problem with a printer connected to the NTS, do the following:

- Check the cables from the NTS to the NTS patch panel to make sure they are connected to the correct port and that the cables are correctly seated. See the “Identifying Port Problems” section in this chapter for procedures.
- Check the parity, data bits, and speed settings of the printer — make sure the settings agree with the `na` administration (Network Administration).
- If the port administration and connectivity (using `cli` commands) is correct, check the `rtelnet` and `lpadmin` administration. To check the `rtelnet` administration, enter the following command at the prompt:

```
# ps -ef | grep rtelnet
```

The system responds with a line that indicates `rtelnet` administration is running for the appropriate port with a corresponding device name. For example:

```
root xyz 1 8 14:46:18?    0:14 rtelnet -bra cmsterm1
63/dev/s_pdev163
```

NOTE:

The above example assumes the printer is connected to port 63 on the NTS cmsterm1.

If the `rtelnet` command did not appear, enter the `rtelnet` command again. To make sure the command executes after the machine reboots, add the same `rtelnet` command to the */etc/rc2.d/Speripherals* file.

NOTE:

Make sure that two rtelnets are not active for the same NTS port. If this is the case, quit one of the two job numbers (identified in the `xyz` response portion of the `ps -ef | grep rtelnet` command with the `kill -9 xyz` command). See the example below.

Cancel Jobs

To quit one of the two job numbers, do the following:

1. Enter the `ps -ef | grep rtelnet` command.

```
# ps -ef | grep rtelnet
```

For example, the system responds:

```
# ps -ef | grep rtelnet   root   238   1  3 15:18:41?
0:00 rtelnet -bra cmsterm1 16 /dev/s_p

dev116   root   241   1 44 15:18:41?     0:00 rtelnet -bra
cmsterm1 15 /dev/s_p

dev115 cmssvc   695   687  5 15:38:03 pts/0    0:00 grep
telnet
```

2. Enter the `kill -9 <number>` command.

```
# kill -9 <xxx>
```

NOTE:

<xxx> is the process id of the rtelnet which is being killed. For example, you could use the `kill -9 241` command to kill one of the processes shown in the `rtelnet` example above.

Printers Connected to the Aurora Expander Box

If the printer is printing garbage, you can verify that the printer port settings are set to 9600 baud, no parity, 8 data bits, 1 stop bit, and xon-xoff flow control by entering the following command:

`# stty -a < /dev/term/<port number>`

Enter the above command while the printer port is active.

Additional Solutions

If problems persist, and if disabling and enabling the printer does not clear the problem, reenter the `lpadmin` command using the correct printer type. Check the `lpadm` using the `lpstat -p printer -l` command for the baud rate, parity, etc. The defaults are: `9600, no parity, and 1 stop bit`. Any exceptions will be noted.

Additional printer problems, along with the suggested actions for resolving the problems, are documented in the following sections:

- When the Printer Is Out of Paper
- When the Current Printer Output Is Bad
- How to Stop and Discard Current Print Job
- How to Stop and Reprint Current Print Job
- When Print Jobs Are Not Being Printed
- When Printer Is Out-of-Service — One Printer Configuration
- When Printer Is Out-of-Service — Two Printer Configuration.

NOTE:

If you are experiencing a printer problem that is not documented in this section or is not documented in your printer manual, escalate the problem through normal procedures.

Some of the commands used in the following sections can be executed while logged in *only* as lp or root; the commands are as follows:

- `/usr/lib/accept`
- `/usr/lib/lpshut`
- `/usr/lib/lpsched`
- `/usr/lib/lpmove`
- `/usr/lib/lpadmin.`

Other commands used in the following sections that can be executed while logged in *only* as lp or root are as follows:

- `disable`
- `enable.`

Commands used in the following sections that can be executed while logged in as cms, lp, or root are as follows:

- `lpstat`
- `cancel`.

> **NOTE:**
>
> Only lp or root can cancel any print job, but any user can cancel their own job.

If you do not know the name(s) of the printer(s) connected to the computer, enter the following command:

```
$ lpstat -v
```

If you are currently in the *CentreVu* CMS environment and you want to test the printer, press the **Commands** Screen Labeled Key (SLK), and select the “Print Window” option. In a few seconds, the printer should start printing your test print job (if it is the first print job in the queue).

Whenever you enter the `disable, enable`, or `cancel` commands in the following sections, the printer will continue to print until the buffer is empty.

When the printer(s) do not function properly, additional information about the errors associated with the printer(s) can be seen in the services error log by entering the following command:

```
$ tail /usr/elog/elog
```

When the Enabled Printer Does Not Print

When the `lpstat` command shows that the printers are enabled but not working, do the following to correct the problem:

Procedure

1. Log in as root.
2. From the *CentreVu* CMS windows environment, move to the *Solaris* environment by pressing the **Commands** SLK and selecting the `UNIX (r) system` option.
3. Stop the print job currently printing by entering the following command:

```
$ disable <printer_name>
```

   Replace the string `<printer_name>` with the real name of the printer.

4. Enable the printer by entering the following command:

```
$ enable <printer_name>
```

If the above method to get printers to print fails, do the following:

5. Enter the following command to disable the printer again:

```
$ disable <printer_name>
```

6. Turn the printer power off and on.
7. Enable the printer by entering the following command:

```
$ enable <printer_name>
```

When the Printer Is Out of Paper

The printer will stop printing the current job when it detects an out-of-paper situation. To reload the printer with paper, do the following:

NOTE:

The following steps are a general procedure for what to do when the printer runs out of paper. The steps may vary depending on the printer model. For more information, refer to your printer manual.

Procedure

1. Mark the position on the last sheet of paper where the printer stopped printing.
2. Remove the last sheet of paper from the printer.
3. Thread the first sheet on the new stack of paper into the printer (see your printer manual if necessary).
4. Position the first sheet of paper to the location where the printer stopped printing on the last sheet of paper.
5. Press the “ready printer” button (press the **correct** button on your printer; see your printer manual if necessary).

The printer should continue with the print job at the point where it stopped printing.

When the Current Printer Output Is Bad

If the output from the current print job is unreadable, the printer may be out of paper, the paper may be jammed, or the ribbon or cartridge may need replacing. Do the following to correct the printer problem:

Procedure

1. Log in as root.
2. From the *CentreVu* CMS windows environment, move to the *Solaris* environment by pressing the **Commands** SLK and selecting the `UNIX (r)system` option.
3. Disable the printer by entering the following command:

```
$ disable <printer_name>
```

   Replace the string *<printer_name>* with the real name of the printer. The printer will continue to print until the buffer is empty.

   NOTE:

   The print job currently printing will be reprinted when the printer has been enabled. While the printer is disabled, new print jobs routed to this printer will be queued (saved) and will be printed when the printer becomes available.

4. Fix the problem as necessary. (Refer to your printer manual if necessary.)
5. After the printer has been fixed, properly align the paper in the printer.
6. Enable the printer by entering the following command:

```
$ enable <printer_name>
```

   Replace the string *<printer_name>* with the real name of the printer.

   The printer should start printing the current job over again.

7. Exit the *Solaris* environment by entering the following command:

```
$ exit
```

How to Stop and Discard Current Print Job

1. From the *CentreVu* CMS windows environment, move to the *Solaris* environment by pressing the **Commands** SLK and selecting the `UNIX (r) system` option.

   NOTE:

   You must be logged in as root or the owner of the current print job to do this.

2. Cancel the print job currently printing by entering the following command:

```
$ cancel <printer_job>
```

   Replace the string `<printer_job>` with the real name of the print job.

   NOTE:

   The printer will continue to print until the buffer is empty.

3. Reposition the paper in the printer.

How to Stop and Reprint Current Print Job

1. Login as root.
2. From the *CentreVu* CMS windows environment, move to the *Solaris* environment by pressing the **Commands** SLK and selecting the `UNIX (r) system` option.
3. Stop the print job currently printing by entering the following command:

```
$ disable <printer_name>
```

   Replace the string *<printer_name>* with the real name of the printer.

NOTE:

The printer will continue to print until the buffer is empty.

4. Reposition the paper in the printer.
5. Enable the printer by entering the following command:

```
$ enable <printer_name>
```

The printer should start reprinting the print job from the beginning.

When Print Jobs Are Not Being Printed

If the printer is no longer printing the jobs in the queue, the *Solaris* system scheduler may not be running. To find out if the scheduler is running, do the following:

1. From the *CentreVu* CMS windows environment, move to the *Solaris* environment by pressing the **Commands** SLK and selecting the `UNIX (r) system` option.
2. When the $ prompt appears, enter the following command:

```
$ lpstat -t
```

From the output, determine if the scheduler is running.

3. If the scheduler is not running, enter one of the following commands to log in as lp or root:

```
$ su lp
-- or --
$ su root
```

4. Enter the correct password when prompted to do so.

5. Next, enter the following command to turn the scheduler on:

```
# /usr/lib/lpsched
```

6. Enter the next command to verify that the scheduler is running:

```
# lpstat -t
```

7. To return to the *CentreVu* CMS environment, enter the following command:

```
# exit
```

When Printers Lose Power

When the printer is disconnected or loses power, the job currently printing is lost. To correct the problem, do the following:

- Disable the printer until it is operational.
- Enable the printer.
- Resubmit the print jobs.

If you want the system to recognize your administration for terminals, printers, and modems, you must reboot your system after performing the initial administration procedures.

When Printer Is Out-of-Service — One Printer Configuration

If the customer's system has only one printer and it breaks down, you can choose one of the following methods to maintain report production:

- Save all print jobs until the printer has been fixed.
- Reject all print jobs until the printer has been fixed.

However, you could replace the broken printer and immediately continue with report production.

How to Save Print Jobs

To save the print jobs currently in the queue and future print jobs submitted to the queue until the printer has been fixed, do the following:

1. Login as root.
2. From the *CentreVu* CMS windows environment, move to the *Solaris* environment by pressing the **Commands** SLK and selecting the `UNIX (r) system` option.
3. Disable the printer by entering the following command:

```
$ disable <printer_name>
```

4. Fix the problem as necessary. (Refer to your printer manual if necessary.)
5. After the printer has been fixed, reposition the paper in the printer.
6. Enable the printer by entering the following command:

```
$ enable <printer_name>
```

   Replace the string *<printer_name>* with the real name of the printer.

   The printer should start printing the first print job in the queue over again.

7. To return to the *CentreVu* CMS environment, enter the following command:

```
$ exit
```

How to Reject Print Jobs

To reject print jobs until the printer has been fixed, do the following:

1. From the *CentreVu* CMS windows environment, move to the *Solaris* environment by pressing the **Commands** SLK and selecting the `UNIX (r) system` option.

2. Disable the printer by entering the following command:

```
$ disable <printer_name>
```

3. Enter one of the following commands to log in as *lp* or *root*:

```
$ su lp
-- or --
$ su root
```

4. Enter the correct password when prompted to do so.
5. Reject all future print jobs by entering the following command:

```
# /usr/lib/reject <printer_name>
```

6. If you want to cancel the print jobs already in the queue, enter the following command to list the print jobs:

```
# lpstat -t
```

7. Next, use the `cancel` command as follows to cancel the print jobs in the queue:

```
# cancel <print_jobX> <print_jobY> <etc>
```

NOTE:

When you cancel a print job it is removed from the print queue. If you want this job to print do not cancel it.

8. To return to the *CentreVu* CMS environment, enter the following command:

```
# exit
```

9. Fix the printer as necessary. (Refer to your printer manual if necessary.)

Return Printer to Service

1. Login as root.
2. If you are in the *CentreVu* CMS environment, return to the *Solaris* system environment by pressing the **Commands** SLK and selecting the `UNIX (r) system` option.
3. After the printer has been fixed, reposition the paper in the printer.
4. Enable the printer by entering the following command:

```
$ enable <printer_name>
```

   Replace the string *<printer_name>* with the real name of the printer.

5. Enter one of the following commands to log in as lp or root:

```
# su lp
-- or --
# su root
```

6. Enter the correct password when prompted to do so.
7. Accept all future print jobs by entering the following command:

```
# /usr/lib/accept <printer_name>
```

NOTE:

A few seconds after you enter this command, the printer should start printing the first print job in the queue.

8. To return to the *CentreVu* CMS environment, enter the following command:

```
$ exit
```

When Printer Is Out-of-Service — Two Printer Configuration

If the customer's system has two or more printers and one of the printers breaks down, you can choose one of the following methods to maintain report production:

- Redirect all print jobs from the broken printer to a printer that works.
- Reject all print jobs until the broken printer has been fixed.

However, you could replace the broken printer and immediately continue with report production.

How to Route Print Jobs to Another Printer

To redirect future print jobs from a broken printer to one that works, do the following:

1. Access the Printer Administration window from the Maintenance subsystem. See the *CentreVu Call Management System Release 3 Version 6 Administration* (585-215-850) document for details.
2. Enter the name of the broken printer in the `CMS printer name:` field.
3. Do a `Find one` to view the values (entries) associated with the printer.
4. When the values (entries) have been displayed, move to the LP `printer name:` field, and change the printer name to the printer which is still operational.
5. Do a `Modify` to change the destination printer.

The *CentreVu* CMS printer name is now associated with a printer that is functional. The print jobs sent to the *CentreVu* CMS printer_name will be redirected to the functional LP printer.

NOTE:

After the printer is operational, remember to reassign the *CentreVu* CMS printer_name to the LP printer_name.

How to Move Print Jobs in Queue to Another Printer

To move current print jobs from the queue of a broken printer to a working printer, do the following:

1. From the *CentreVu* CMS windows environment, move to the *Solaris* environment by pressing the **Commands** SLK and selecting the `UNIX (r) system` option.
2. Enter the following command to **move all the print jobs** currently queued to the broken printer (<`printer1`>) to a printer (<`printer2`>) that works:

```
# /usr/lib/lpmove <printer1> <printer2>
```

3. Enter the following command to **move selected print jobs** currently queued to the broken printer (<`printer1`>) to a printer (<`printer2`>) that works:

```
$ lpmove <print-jobX> <printer2>
```

4. To return to the *CentreVu* CMS environment, enter the following command:

```
$ exit
```

How to Reject Print Jobs

To reject print jobs until the printer has been fixed, do the following:

1. Enter one of the following commands to log in as lp or root:

```
$ su lp
-- or --
$ su root
```

2. Enter the correct password when prompted to do so.
3. From the *CentreVu* CMS windows environment, move to the *Solaris* environment by pressing the **Commands** SLK and selecting the `UNIX (r) system` option.
4. Disable the printer by entering the following command:

```
$ disable <printer_name>
```

5. Reject all future print jobs by entering the following command:

```
# /usr/lib/reject <printer_name>
```

6. If you want to cancel the print jobs already in the queue, enter the following command to list the print jobs:

```
# lpstat -t
```

7. Next, use the `cancel` command as follows to cancel the print jobs in the queue:

```
# cancel <print_jobX> <print_jobY> <etc>
```

NOTE:

You can save any particular print job by not canceling it.

8. To return to the *CentreVu* CMS environment, enter the following command:

```
$ exit
```

9. Fix the printer as necessary. (Refer to your printer manual if necessary.)

Reenable the Printer

1. If not already logged in as lp or root, enter one of the following commands to log in as lp or root:

```
$ su lp
-- or --
$ su root
```

2. Enter the correct password when prompted to do so.
3. If you are in the *CentreVu* CMS environment, return to the *Solaris* environment by pressing the **Commands** SLK and selecting the `UNIX (r) system` option.
4. After the printer has been fixed, reposition the paper in the printer.
5. Enable the printer by entering the following command:

```
$ enable <printer_name>
```

Replace the string *<printer_name>* with the real name of the printer.

6. Accept all future print jobs by entering the following command:

```
# /usr/lib/accept <printer_name>
```

7. To return to the *CentreVu* CMS environment, enter the following command:

```
$ exit
```

Solving Modem-Related Problems

Overview

If your modem does not seem to be working upon installation, you can do the following:

- Check the physical connections. See “Identifying Port Problems” in this chapter for more details.
- Check to see whether the modem is connected to port 12, 13, 14, or 15 of an Aurora Expander Box. If it is, see Connect a Modem to an Aurora Expander Box below.
- Check the modem settings.

  NOTE:

  The default modem script assumes 8 data bits, 1 stop bit, no parity.

- Check the network administration (`na`) and reset it to match the modem settings. Outbound Modem `speed` must match the speed specified in the na administration (for example, 9600 baud). Inbound modem `speed` is unimportant if set to `autobaud`.

Disconnect *U.S. Robotics* or *Comsphere* 3830 and 3910 Modems

If you are using a *U.S. Robotics** *Sportster*†, a *Comsphere* 3830 or a *Comsphere* 3910 modem, and you enter the `exit` command to end a dial-in session from a dumb terminal to a CMS system, a new `login` prompt may be returned. To actually disconnect these modems, you should enter +++ at the dumb terminal to return to the on-line command mode from the data mode. Then, enter `ATH0` to disconnect the modem.

Connect a Modem to an Aurora Expander Box

A factory-configured Aurora Expander Box supports modems only on ports 0 through 11. Ports 12 through 15 do not transmit hardware flow control signals, and are used to support terminals and printers. Consequently, a modem attached to port 12, 13, 14, or 15 won’t work. The usual corrective measure for such a problem is to simply disconnect the modem and reconnect it to any available port numbered 0 through 11.

If necessary, ports 12 through 15 can be made to support modems by opening the RJ45 connector box and rearranging the jumper settings. For instructions, see the *Communications Controllers/1600SE User’s Manual*, which is shipped with the Aurora 16-port card and expander box.

**U.S. Robotics* is a registered trademark of U.S. Robotics, Inc.
†*Sportster* is a registered trademark of U.S. Robotics, Inc.

Solving Power-Related Problems

Overview

This section provides some troubleshooting solutions to power-related problems (for example, when the *CentreVu* CMS *Sun SPARCserver* system loses power). If you cannot solve the power-related problems, escalate the problem through normal procedures. For printers with power-related problems, see the “Solving Printer-Related Problems” section in this manual.

When System Loses Power

If the *Sun SPARCserver* (system unit) loses power, it is recommended (but not required) to empty the CD-ROM and tape drive(s). The system boots from the disk by default.

Power On Sequence

To turn the power back *on*, use the following sequence:

1. Turn on devices attached to the *Sun SPARCserver computer* starting with the device at the end of the SCSI chain and working toward the computer.
2. Turn on the *Sun SPARCserver* computer.
3. Turn on the system monitor.

If the *Sun SPARCserver* computer is operating properly, the monitor displays a banner screen up to 30 seconds after it is powered on.

```
        SPARCstation 10 MP (2x390Z55), Keyboard Present
        ROM Rev. 2.12, XX MB memory installed, Serial #XXX
        Ethernet address X:X:YY:Z:BB, Host ID: XXXXXXXX
$
```

Power Off Sequence

The following sequence is recommended to turn off the power:

1. Turn off the *Sun SPARCserver* computer.
2. Turn off the system monitor.
3. Turn off all external devices starting with the device closest to the *Sun SPARCserver* computer and working toward the farthest device.

When the `Console Login:` prompt appears on the console terminal, the computer will be up and running.

NOTE:

For more information about restarting the *Sun SPARCserver* computer because of a power failure, refer to the user documentation that came with the computer and call the TSC.

Glossary

Overview

This Glossary defines terms and acronyms used in this document that may not be familiar to you. The Glossary includes a separate list of Acronyms at the end.

Terminology

Access Permissions — Permissions assigned to a Call Management System (CMS) user so that the user can access different subsystems in CMS or administer specific elements (splits/skills, trunks, vectors, and so on) of Automatic Call Distribution (ACD). Access permissions are specified as **read** or **write** permission. Read permission allows the CMS user to access and view data (for example, run reports or view the Dictionary subsystem). Write permission allows the CMS user to add, modify, or delete data and execute processes.

Acknowledgment — A window that requires the user to confirm an action or to acknowledge a system message (for example, system going down, warning, or fatal error for the user window). This window cannot be moved, sized, or scrolled and disappears only when the user confirms the message.

Action List — A menu in the upper right corner of most user windows. The menu lists the actions available for that particular user window (for example, add, modify, delete, and so on). The user selects an action after entering necessary data in the window.

Add Package — A *Solaris** operating system command (`pkgadd`) that allows you to add an additional software package.

Agent — A person who answers calls to an extension in an ACD split. This person is known to CMS by a login identification keyed into a voice terminal.

Agent Login ID — A 1- to 4-digit number (Generic 2) or a 1- to 9-digit number (Generic 3) entered by the agent at the ACD extension to activate the position. Agent logins are required for all CMS-measured ACD agents.

**Solaris* is a registered trademark of Sun Microsystems, Inc.*

Agent Skill
The different types of calls a particular agent can handle. An agent can be assigned up to four skills. These skills are assigned as either primary or secondary skills. See “Primary Skill” or “Secondary Skill” definitions in this Glossary.

Agent State
A feature of agent call handling that allows agents to change their availability to the system (for example, ACW, AVAIL, ACD).

Announcement
A recorded message that tells the caller what destination the call has reached. The announcement also often tries to persuade the caller to stay on the line. With Call Vectoring, announcements can be part of a vector’s call processing. An announcement is assigned to a vector by entering an announcement number.

Asynchronous Connector
A logical device used to control the computer timing protocol in which a specific operation is begun upon receipt of an indication (signal) that the preceding operation has been completed.

Asynchronous Data Transmission
A scheme for transmitting data where each character is preceded by a start bit and followed by a stop bit, thus permitting data elements to occur at irregular intervals. This type of transmission is advantageous when transmission is not regular (when characters are typed at a keyboard).

Asynchronous Data Unit (ADU)
A data communications equipment (DCE) type device that allows direct connection between RS-232 equipment and the digital switch.

Automatic Call Distribution (ACD)
A switch feature. ACD is software that channels high-volume incoming call traffic to agent groups (splits or skills).

Also an agent state where the extension is engaged in an ACD call (with the agent either talking to the caller or the call waiting on hold).

Backup
The process of protecting data by writing the contents of the disk to a tape that can be removed from the computer and stored safely. A spare copy of data or software that you keep in case the original is damaged or lost. CMS provides three different types of backups: CMSADM File System Backup, CMS Full Maintenance Backup, and CMS Incremental Maintenance Backup.

Boot
To load the system software into memory and start it running.

Bus
A signal route to which several items of a computer system may be connected in parallel so that signals can be passed between them.

In general, a multiconductor electrical path used to transfer information over a common connection from any of several sources to any of several destinations.

Cables — Wires or bundles of wires configured with adapters or connectors at each end and used to connect two or more hardware devices.

Call Level Interface (CLI) — A database programming interface from the Structured Query Language (SQL) Access Group, an SQL membership organization. Under CLI, SQL statements are passed directly to the server without being recompiled.

Call Management System Query Language (CMS-QL) — A relational database management (operating) system used to organize most of CMS's data. Automatically comes with CMS and runs in the background.

Call Vectoring — A highly flexible method for processing ACD calls using Vector Directory Numbers (VDNs) and vectors as processing points between trunk groups and splits or skills. Call vectoring permits treatment of calls that is independent of splits or skills.

Cartridge Tape — A 0.25-inch (6.35-mm) magnetic tape used in the tape drive of the Desktop Backup Pack and External Storage Module to read and write data.

***CentreVu*® CMS** — *CentreVu* Call Management System (CMS). A software product used by business customers that have a Lucent Technologies telecommunications switch and receive a large volume of telephone calls that are processed through the Automatic Call Distribution (ACD) feature of the switch.

CMS Administration (CMSADM) Filesystem Backup — A backup that saves all the file systems on the machine which includes *Solaris* 2.5.1 system and programs, CMS programs and data, and non-CMS data you place on the computer in addition to the CMS data. See the "Backup" definition for more details.

Command — A command is an instruction used to tell the computer to perform a function or to carry out an activity.

Configuration — Configuration is the way that the computer is set up to allow for particular uses or situations.

Copy — Copy means to duplicate information.

Custom Reports — Real-time or historical reports that have been customized from standard reports or created from original design.

Daemon Pronounced “demon.” A *UNIX** program that executes in the background ready to perform an operation when required. Usually unattended processes initiated at start-up, such as print spoolers, e-mail handlers or schedulers.

Data Collection Off CMS is not collecting ACD data. If you turn off data collection, CMS will not collect data on current call activity.

Database A group of files that store ACD data according to a specific time frame: current and previous intrahour real-time data and intrahour, daily, weekly, and monthly historical data.

Database Item A name for a specific type of data stored in one of the CMS databases. A database item may store ACD identifiers (split numbers or names, login IDs, VDNs, and so on) or statistical data on ACD performance (number of ACD calls, wait time for calls in queue, current states of individual agents, and so on).

Database Tables Tables that CMS uses to collect, store, and retrieve ACD data. Standard CMS items (database items) are names of columns in the CMS database tables.

Data Communications Equipment (DCE) Modems are a good example of DCE. Any equipment that connects to Data Terminal equipment (DTE) using an RS-232 standard interface.

Data Communications Interface Unit (DCIU) A hardware device on the Generic 2 switches that prepares and sends architecture messages to other switches or application adjuncts.

Data Terminal Equipment (DTE) Data Terminal Equipment (DTE) includes terminals, personal computers, and workstations. A *Sun*† *SPARCserver*‡ computer is a DTE device.

Device The term used to refer to the peripheral itself; for example, a hard disk or a tape drive. A peripheral is sometimes referred to as a subdevice or an Logical Unit (LU).

Disk A round platter, or set of platters, coated with magnetic medium and organized into concentric tracks for storing data.

**UNIX* is a registered trademark in the United States and other countries, licensed exclusively through X/Open Company Limited.*

†Sun is a registered trademark of Sun Microsystems, Inc.

‡SPARCserver is a trademark of SPARC International, Inc.

Dynamic random access memory Single In-line Memory Module (DSIMM)

A small printed circuit card that contains Dynamic Random Access Memory (DRAM).

Error Correction Code (ECC)

A code that protects the customer's system and data from single bit soft errors that can occur frequently depending on the environment.

Error Message

An error message is a response from a program indicating that a problem has arisen or something unexpected has happened, requiring your attention.

Ethernet

A type of network hardware that allows communication between systems connected directly together by transceiver taps, transceiver cables, and a coaxial cable. Also implemented using twisted-pair telecommunications wire and cable.

Ethernet Address

A unique number assigned to each system when it is manufactured. The Ethernet address of your system is displayed on the banner screen that appears when you power on your system.

Exception

A type of activity on the ACD which falls outside of the limits the customer has defined. An exceptional condition is defined in the CMS Exceptions subsystem, and usually indicates abnormal or unacceptable performance on the ACD (by agents, splits or skills, VDNs, vectors, trunks, or trunk groups).

Expert Agent Distribution (EAD)

A call queued for a skill will go to the most idle agent (primary skill agent). Agents who are idle and have secondary agent skills will receive the call queued for a skill if there are no primary agents available.

Expert Agent Selection (EAS)

An optional feature that bases call distribution on agent skill (such as language capability). EAS matches the skills required to handle a call to an agent who has at least one of the skills required.

External Controller

A connector that is outside the cabinet and is accessible to the user without having to open any doors, remove any panels, or remove any cabinet covers (also known as an "External Connector").

Forecast Reports

These reports display expected call traffic and agent or trunk group requirements for the customer's call center for a particular day or period in the future.

Gigabyte (GB)

One gigabyte equals 2^{30} bytes (1073741824 bytes).

Hand-Shaking Logic A format used to initiate a data connection between two data module devices.

Hard Disk A device that stores operating systems, programs, and data files.

High Speed Serial Interface/SBus (HSI/S) The HSI/S controller card is a 4-port serial communications SBus card. Each of the four ports is used for a single physical X.25 link. It is an add-on package that is needed by CMS for multiple ACDs.

Historical Database Contains intrahour records for up to 62 days in the past, daily records for up to 5 years in the past, and weekly or monthly records for up to 10 years for each CMS-measured agent, split or skill, trunk, trunk group, vector, and VDN.

Historical Reports Reports that display past ACD data for various agent, split or skill, trunk, trunk group, vector, or VDN activities.

Host Adapter An I/O card that plugs into the computer backplane and is used as an interface between the computer system and the Small Computer System Interface (SCSI) bus.

Host Computer A computer that is attached to a network and provides services other than simply acting as a store-and-forward processor or communication switch. The *Sun SPARCserver* or *Sun Enterprise 3000* computer is your host computer and hosts the CMS application software.

Host Name A name that you (or your system administrator) assign to your system unit to uniquely identify it to the *Solaris 2.5.1* operating system (and also to the network).

Hung System A system that does not respond to input from the keyboard or mouse.

INFORMIX* A relational database management system used to organize CMS's data. An add-on software package needed by CMS.

Install The procedures used to set up the hardware and software of a computer, terminal, printer, and modem so that they can be used. Installing often includes customizing the system for a particular situation or user.

Interface A common boundary between two systems or pieces of equipment.

**INFORMIX* is a registered trademark of Informix Software, Inc.

International Telecommunications Union (ITU)
Formerly the Consultative Committee for International Telephony and Telegraphy (CCITT). An international organization that sets communications standards.

Internet Protocol (IP)
An integral part of the internet communication protocol system (see Transmission Control Protocol/Internet Protocol [TCP/IP]). The IP provides the routing mechanism of the TCP/IP. See also Network Address.

Interval-Based Items
A category of database items. These items represent the amount of time during a collection interval spent doing a particular activity. Interval-based items are updated throughout the collection interval and timing is restarted at the end of the interval. Interval-based items should only be used to show the amount of time in an interval for an activity or to calculate percentages of time spent in an interval. Interval-based items should not be used to calculate averages (such as average hold time).

Intrahour Interval
A 15-, 30-, or 60-minute segment of time starting on the hour. An intrahour interval is the basic unit of CMS report time.

Keyboard
An input device for entering information by typing.

Keyboard Port
The port on your Desktop *Sun SPARCserver* computer unit where the keyboard cable is connected.

Link Access Procedure Balanced
The ITU standard error correction protocol used on most current X.25 packet switching networks.

Link
A transmitter-receiver channel or system that connects two locations.

Log In
The process of gaining access to a system by entering a user name and, optionally, a password.

Log Out
The process of exiting from a system.

Logical Unit
The term used to refer to a peripheral device such as a disk drive.

Measured
A term that means an ACD element (agent, split or skill, trunk, trunk group, vector, VDN) has been identified to CMS for collection of data.

Megabyte (MB)
One megabyte equals 2^{20} bytes (1048576 bytes).

Menu
A list of items from which the user can select one. A menu cannot be moved or sized and does not count in the user window count.

Messages Temporary windows used only for displaying information like “field help” and syntactical field errors. Message windows cannot be moved, sized, or scrolled and do not count in the user-window count. Messages windows are automatically removed when the user corrects the error or moves to the next field.

Modem A device that enables a computer or terminal to establish a connection with another computer or terminal and to communicate data through telephone lines.

Multi-user Mode A mode of CMS in which any administered CMS user can log into CMS. Data continues to be collected if data collection is “on.”

Network Address A unique number assigned to each system on a network, consisting of the network number and the system number. Also known as Internet Address or Internet Protocol (IP) address.

Network Hub Hardware that connects a computer to a Network Terminal Server (NTS).

Network Terminal Server (NTS) A hardware terminal that connects to the Network Hub via cabling. The NTS provides 50-pin switch champ connectors used to attach 64 serial devices using the patch panel cables and patch panels.

Network Terminal Server Patch Panel Hardware that has ports for connecting serial peripheral devices (for example, printers, terminals and modems). The NTS patch panel connects to the NTS via PBX-Champ cabling.

Non-Volatile Random Access Memory (NVRAM) A random access memory (RAM) system that holds its contents when external power is lost.

Open Window A window that remains open because the user has not yet closed it with the “Exit” Screen Label Key (SLK). An open window becomes the current window when it initially appears on the screen or when the user makes it the current window using the “Current” SLK.

Operating System (OS) The software that controls and allocates the resources, such as memory, disk storage, and the screen display for the computer.

Partitions Sections of the hard disk that are used to store an operating system and data files or programs. By dividing the disk into partitions, you can use the space allocated in a more efficient and organized manner.

Password A character string that is associated with a user name. Provides security for a user account. Desktop *Sun SPARCserver* computers require you to type a

password when you log into the system, so that no unauthorized person can use your system.

Port (I/O Port) A designation of the location of a circuit that provides an interface between the system and lines and/or trunks.

Primary Skill An agent will handle calls to many skills before calls to secondary skills. See “Agent Skill” in this Glossary.

Primary Window The first window opened in response to a menu selection. A primary window may also generate another user window (secondary window). A primary window can be moved, sized, or scrolled, and counts in the window count.

Printer A physical device that takes electronic signals, interprets them, and prints them on paper.

Private Branch Exchange (PBX) A private switch system providing voice-only or voice and data communications services (including access to public and private networks) for a group of terminals within a customer’s premises. Also see Switch.

Processor Interface (PI) A hardware device on the Generic 3i switches that prepares and sends architecture messages to other switches or application adjuncts.

Queue A holding area for calls waiting to be answered in the order in which they were received. Calls in a queue may have different priority levels, in which case, calls with a higher priority are answered first.

Read Permission A mode that allows a CMS user to access and view data (for example, run reports or view the Dictionary subsystem). Read permission is granted from the User Permissions subsystem.

Real-Time Database A database that consists of the current and previous intrahour data on each CMS-measured agent, split or skill, trunk, trunk group, vector, and Vector Directory Number (VDN).

Real-Time Reports Reports that display current ACD call activity on agents, splits or skills, trunks, trunk groups, vectors, and VDNs for the current or previous intrahour interval. Current intrahour interval real-time reports are constantly updated as data changes during the interval. Previous intrahour interval real-time reports show data totals for activity that occurred in the previous intra-hour interval.

Recommended Standard (RS) Any one of several Electronic Industries Association (EIA) standards commonly used in U.S. electronic applications.

Refresh Rate The number of seconds CMS should wait for each update of the real-time report data. A user's fastest allowable refresh rate is defined in the User Permissions — User Data window as a minimum refresh rate. The default refresh rate when a user brings up the report input window is the administered minimum refresh rate plus 15 seconds.

RS-232 An electrical interface standard, normally using a 25-pin (DB-25) physical connector. The electrical portion of the interface is unbalanced (for example, RS-232 has a positive voltage and a ground). This standard was officially renamed TIA/EIA-232-E in 1984, but the RS-232 designation is still most commonly used.

RS-422 A balanced electrical interface (for example, RS-422 has a positive and a negative voltage). This interface is used by the HSI/S card.

RS-423 An unbalanced electrical interface (for example, RS-423 has a positive voltage and a ground).

RS-449 A 37-pin physical interface used by the HSI/S card.

SBus The Input/Output bus for the *Sun SPARCserver* computer. Provides slots for additional cards (for example, HSI Controller Card).

SBus Expansion Subsystem A peripheral device attached to a computer system. The SBus expansion subsystem provides three additional SBus slots and space for two optional SCSI hard disk drives. The SBus expansion subsystem consists of the following: the SBus expansion chassis, the expansion adapter card (in the computer system), and the SBus expansion subsystem cable.

Screen Labeled Key (SLK) The first eight function keys at the top of the keyboard that correspond to the screen labels at the bottom of the terminal screen. The screen labels indicate the function each key performs.

Scroll Cursor *INFORMIX* provides two kinds of cursors when traversing select results. A scroll cursor allows relative movement backward or forward within the query results while a non-scroll cursor allows only forward movement, one record at a time.

SCSI See Small Computer System Interface.

SCSI Bus An industry standard peripheral bus that is used to connect intelligent peripherals to a computer. It uses a daisy-chained cabling arrangement that originates at the Host Adapter to interconnect up to seven intelligent

	peripheral controllers on the bus. The *Sun SPARCserver* computer uses a fast SCSI-2 implementation.
SCSI ID	Each tap on the SCSI bus is required to have a unique identification or address, which is the SCSI ID. The ID is set by a switch located on each controller. In a Lucent Technologies' implementation, the Host Adapter card (with a SCSI ID of 7) is preset. The remainder can be set with external devices "push buttons." Users never have to open a chassis or touch a circuit-board switch.
SCSI Single-Ended Bus	A version of the SCSI bus designed to minimize cost and space. Cable lengths up to 6 meters are supported. It is not compatible with the differential version of the SCSI bus.
Secondary Skill	An agent will handle secondary skill calls after primary skill calls. See "Agent Skill" in this Glossary.
Secondary Window	A user window that is generated from a primary window. Secondary windows can be moved, sized, or scrolled and do not count in the user window count.
Serial Interface Y-Cable	A cable that attaches to the A/B port on the back of the *Sun SPARCserver* 10/20 computer. The Desktop *Sun SPARCserver* 10/20 computer system has two serial ports located on the two terminations of its optional serial interface Y-cable.
Shortcut	A series of tasks which are run immediately on the screen. Shortcut is a fast, easy way to select windows that the customer might look at every day.
Single-User Mode	A CMS mode in which only one person can log into CMS. Data collection continues if data collection is "on." This mode is required to change some CMS administration.
Skill	In relationship to the call center, think of skill as a specific customer need or requirement, or perhaps a business need of the call center.
Slot	An electronic connection designed to receive a module or a printed circuit board (such as a Single In-line Memory Module [SIMM] or a frame buffer board).
Small Computer System Interface (SCSI)	A hardware interface that allows the connection of peripheral devices (such as hard disks, tape drives and CD-ROM drives) to a computer system.

Solaris	The operating system package on the *Sun SPARCserver* computer. *Solaris* is a version of the *UNIX* System V Release 4. CMS requires *Solaris* to run on the *Sun SPARCserver* computer or *Sun Enterprise 3000* computer.
Split	A group of extensions that receive special-purpose calls in an efficient, cost-effective manner. Normally, calls to a split arrive over one or a few trunk groups.
Storage Device	A hardware device that can receive data and retain it for subsequent retrieval. Such devices cover a wide range of capacities and speeds of access.
Structured Query Language (SQL)	A language used to interrogate and process data in a relational database. SQL commands can be used to interactively work with a database or can be embedded within a programming language to interface to a database.
Submenu	A menu that appears as a result of a menu selection. All menu selections followed by a “>’’ have submenus.
Subsystem	Each CMS main menu selection (for example, Reports, Dictionary, System Setup, Exceptions, and so on), along with Timetable and Shortcut, is referred to as a subsystem of the Call Management System throughout this document.
Sun Enterprise **System**	A series of host computer systems manufactured by Sun Microsystems Inc. The *Sun Enterprise 3000* computer is a platform used to support *CentreVu*® CMS R3V6 and later versions as a replacement for the discontinued *Sun SPARCserver* 10/20 platforms.
Sun SPARCserver **Computer**	A host computer that is attached to a network and provides services other than simply acting as a store-and-forward processor or communication switch. For CMS R3V6, the *Sun SPARCserver* 5 is available for new installations. See *Sun Enterprise* systems above for replacement information.
Super-user	A user with full access privileges on a system, unlike a regular user whose access to files and accounts is limited.
Switch	A private switch system providing voice-only or voice and data communications services (including access to public and private networks) for a group of terminals within a customer’s premises. Also see PBX.
Syntax	The format of a command line.

System A general term for a computer and its software and data.

Tap A tap is any intelligent (microprocessor-based) controller connected to the SCSI bus.

Tape Cartridge A magnetic piece of hardware that is used as a storage unit for data. The SCSI QIC-150, SCSI QIC 2.5-GB, SCSI 4-8 SLR, 8mm 5-GB, and 8mm 14-GB tape cartridges are used to back up and copy data for the platform.

Task Used with Timetables and Shortcuts. A task is a combination of inputs on a user window (like a report input window) and the completed action list selection (Add, Modify, and so on) which, when executed, performs an operation (for example, running a report).

Transmission Control Protocol/Internet Protocol (TCP/IP) A communications protocol that provides interworking between dissimilar systems. It is the de facto standard for *UNIX* systems.

Terminal A device that consists of a video display and keyboard that you use to type and display information. A terminal is connected to a serial port on the NTS. This is not the same thing as a monitor.

Timetable An activity task or group of activities tasks (like reports) scheduled for completion at a time that is convenient and nondisruptive for the call center's operation.

Trunk A telephone line that carries calls between two switches, between a Central Office (CO) and a switch, or between a CO and a phone.

Trunk Group A group of trunks that are assigned the same dialing digits — either a phone number or a Direct Inward Dialing (DID) prefix.

***UNIX* System** The operating system on the computer on which CMS runs. A user can access the *UNIX* system from the "Commands" SLK. *SUN* uses *Solaris* as its *UNIX* operating system.

User ID The login ID for a CMS user.

User Name A combination of letters, and possibly numbers, that identifies a user to the system.

User Window A window the user can move, size, or scroll. It may contain input fields, reports, or help information.

Vector — A list of steps that process calls in a user-defined manner. The steps in a vector can send calls to splits, play announcements and/or music, disconnect calls, give calls a busy signal, or route calls to other destinations. Calls enter vector processing by way of VDNs, which may have received calls from assigned trunk groups, from other vectors, or from extensions connected to the switch.

Vector Command — The keyword in a vector step that describes the action to be executed on an incoming call (for example, “Queue to main,” “check backup,” “disconnect”).

Vector Directory Number (VDN) — An extension number that is used in ACD software to permit calls to connect to a vector for processing. A VDN is not assigned an equipment location; it is assigned to a vector. A VDN can connect calls to a vector when the calls arrive over an assigned automatic-in trunk group or when calls arrive over a dial-repeating (DID) trunk group, and the final digits match the VDN. The VDN by itself may be dialed to access the vector from any extension connected to the switch.

Vector Step — One processing step listed in a vector. A vector step consists of a command and one or more conditions or parameters.

Voice Terminal — A telephone set, usually with buttons, that gives an agent some control over the way calls are handled.

Weekly/Monthly Data — Daily data that has been converted to a weekly or monthly summary.

Window — Any rectangle on the CMS screen that encloses a menu, data entry fields, reports, or messages.

Window Count — The number of primary windows that can be open at any one time.

Write Permission — A mode of CMS that allows the CMS user to add, modify, or delete data and execute processes. Write permission is granted from the User Permissions subsystem.

X.25 — An ITU communications protocol standard for packet switching networks that typically operates at 56 Kbps or less. An add-on software package that allows CMS to communicate with the switch using X.25 protocol.

Acronyms

ACD — Automatic Call Distribution

ADU — Asynchronous Data Unit

ANSI — American National Standards Institute

CLI — Call Level Interface

CMS — Call Management System

CMSADM — Call Management System Administration

CMSSVC — Call Management System Services

DCE — Data Communications Equipment

DCIU — Data Communications Interface Unit

DIP — Dual In-Line Package

DSIMM — Dynamic Random Access Memory Single In-line Memory Module

DTE — Data Terminal Equipment

EAD — Expert Agent Distribution

EAS — Expert Agent Selection

ECC — Error Correction Codes

EIA — Electronic Industries Association

ESQL/C — Embedded SQL within ‘C’ language

HSI/S — High Speed Serial Interface/SBus

IDI — Isolating Data Interface

ILS — International Language Supplement

IP — Internet Protocol

IPC — Intelligent Ports Card

ITU — International Telecommunication Union

LAPB — Link Access Procedure Balanced

NTS — Network Terminal Server

NVRAM — Non-Volatile Random Access Memory

PBX — Private Branch Exchange

PEC — Price Element Code

QPPCN — Quality Protection Plan Change Notice

RAM — Random Access Memory

RISC — Reduced Instruction Set Computer

RS—Recommended Standard

SCSI — Small Computer System Interface

SIMM—Single In-line Memory Module

SLK — Screen-labeled Key

SLR— Single-channel Linear Recording

SQL — Structured Query Language

TCP/IP—Transmission Control Protocol/Internet Protocol

TIA — Telecommunication Industry Association

TSC — Technical Service Center

UPS — Uninterrupted (or Uninterruptable) Power Supply

VDN — Vector Directory Number

Index

A

C

D

E

F

H

I

K

M

N

O

P

R

S

T

V

W