

Lucent Technologies
Bell Labs Innovations



Call Management System Release 3 Version 2

Sun[®] SPARCserver[™] Computers
Installation and Maintenance

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Call Management System

Release 3 Version 2

Sun[®] SPARCserver[™] Computer

Installation and Maintenance

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General Information

The *Installation and Maintenance* (AT&T 585-215-129) document is written for technicians and AT&T call center customers of the CMS (Call Management System). This document refers to *Sun SPARCserver* computers using the *Solaris 2.4* operating system.

Organization

This document is organized as follows:

- **Chapter 1, "Introduction"**

Provides an overview of the supported CMS software, supported hardware platforms, required software, and supported switch releases. Also, it includes the purpose of the *Sun SPARCserver* computer, roles and responsibilities, and helpline information.

- **Chapter 2, "CMSADM and CMSSVC Menus"**

Provides an overview of the CMSSVC and CMSADM menu options.

- **Chapter 3, "Installing the Sun SPARCserver Computer"**

Describes how to set up the *Sun SPARCserver* computer at the customer's location.

- **Chapter 4, "Installing Terminals, Printers, and Modems"**

Describes how to install terminals, printers, and modems for the CMS application.

- **Chapter 5, "Connecting the Sun SPARCserver Computer to the Switch"**

Describes how to connect the *Sun SPARCserver* computer to AT&T switches. In addition, discusses multi-ACD connectivity.

- **Chapter 6, "Setting Up CMS and Installing Feature Packages"**

Explains how to set up the CMS application and install additional CMS feature packages.

- **Chapter 7, "Turning the System Over to the Customer"**
Provides the procedures that a technician performs before system cutover and a worksheet that the technician fills out for the customer.
- **Chapter 8, "Maintenance"**
Discusses the CMSADM file system backup, recovering from a disk crash, recovering system space, and other maintenance procedures.
- **Chapter 9, "Troubleshooting"**
Discusses how to fix various software, hardware (including terminals, printers, and modems), power, and installation problems.
- **Chapter 10, "Upgrading or Updating the CMS Software"**
Describes how to upgrade or update the R3V2 CMS software application.
- **Appendix A, "Generic 3i and Generic 1 Administration"**
Describes how to administer the CMS application for Generic 3i and Generic 1 switches.
- **Appendix B, "Generic 2 and System 85 Administration"**
Describes how to administer the CMS application for Generic 2 and System 85 R2V4 switches.
- **Appendix C, "Generic 3r Administration"**
Describes how to administer the CMS application for Generic 3r switches.
- **Appendix D, "Sun SPARCserver Computer Factory Installation Procedures"**
Outlines the factory hardware and software installation procedures for the *Sun SPARCserver* computer. A technician would also use these procedures at a customer site if problems occurred.

CMS-Related Documents

The following documents are available for the R3V2 CMS product:

- *Call Management System Release 3 Version 2 Administration, Issue 1* (AT&T 585-215-521)
- *Call Management System Release 3 Version 2 Custom Reports, Issue 1* (AT&T 585-215-523)
- *Call Management System Release 3 Version 2 Migration, Issue 1* (AT&T 585-215-124)
- *Call Management System Release 3 Version 2 Change Description* — request the most current issue (AT&T 585-215-421)
- *Call Management System Release 3 Version 2 External Call History, Issue 1* (AT&T 585-215-125).

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

Overview

The R3V2 CMS (Release 3 Version 2 Call Management System) is a software application offered in association with the ACD (Automatic Call Distribution) feature of AT&T switches. The CMS application provides monitoring and recording of ACD calls, agents handling these calls, and the use of VDNs (Vector Directory Numbers) for these calls to measure system and agent performance.

The CMS software supports the following features which AT&T enables at installation:

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

Supported Hardware Platforms

The R3V2 CMS is certified to run on the following computers:

- *Sun SPARCserver 20*
- *Sun SPARCserver 10*
- *Sun SPARCserver 5*
- 3332
- AT&T Star Server S
- AT&T 6386 WGS 33/S
- AT&T 6386 WGS 25/S.

Note

This manual specifically addresses the following *Sun SPARCserver* Computers:

- *Sun SPARCserver 5 and 20* (new installs only)
- *Sun SPARCserver 10*.

Required Software

The R3V2 CMS requires the following software packages to operate properly:

- HSI/S 2.0 (for all *Sun SPARCserver* computers having multiple ACDs)
- INFORMIX-SE 5.04
- 1.0 Network Terminal Server
- *Solaris 2.4*
- *SunLink X.25 Network Interface Software Version 8.02.*

Supported Switch Releases

The R3V2 CMS is certified to run with the following AT&T switches:

- DEFINITY Communications System Generic 2.2 Release 3.0 and later (QPPCN 696DR)
- DEFINITY Communications System Generic 3i Release 13.3 and later (QPPCN 576)
- 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 2 Load 82 and later
- DEFINITY Communications System Generic 1.1 Release 7.1 (QPPCN 559DR) and later
- DEFINITY Communications System Generic 3 Version 3
- System 85 R2V4 Release 2.3 (QPPCN 560DR) and later
- DEFINITY Communications System Generic 2.1 Release 3.3 (QPPCN 629DR) and later.

Purpose of *Sun SPARCserver* Computers

The *Sun SPARCserver* computers provide a hardware/software platform that enhances and supports the current Call Management System R3V2 software application and is designed to do the following:

- Improve performance, input/output capacity, and reliability.
- Meet the needs of any call center customer by providing support for a varying number of devices typically configured for printers, terminals, and modems (up to 252 serial ports and 4 parallel ports).
- Provide multiprocessor capabilities for performance (2 CPUs, 60 MHz clock).
- Enhance system availability by using error correcting memory — protects customer's system and data from single-bit soft errors that can occur frequently depending on the environment.
- Improve real-time report refresh rate.
- Increase processor power using RISC (reduced instruction set computer) technology.
- Include up to two 1-GB internal disks and ten 2-GB external disks for a total of twelve hard disks (see Table 1-1).

Table 1-1: *Sun SPARCserver* Computer Disk Capacity

<i>Sun SPARCserver 5</i> Computer	<i>Sun SPARCserver 10</i> Computer	<i>Sun SPARCserver 20</i> Computer
One or two 1-GB internal disks	Two 1-GB internal disks	Two 1-GB internal disks
Up to ten 2-GB external disks	Up to ten 2-GB external disks	Up to ten 2-GB external disks

- Allow for cost-effective upgrades (for example, disk storage, memory, processor power, etc.).
- Provide on-line help via *AnswerBook* software package.

AnswerBook Software Package

AnswerBook software package is on-line documentation provided by *Sun Microsystems, Inc.* To access the *AnswerBook* software package, you must be at the local system console (monitor) and have the *OpenWindows* interface running. *AnswerBook* software package uses the following pair of windows for browsing, searching, bookmarking, and printing on-line document collections:

- *AnswerBook Navigator* v3.4
- *AnswerBook Viewer* v3.4.

The *Solaris 2.4 AnswerBook* software package should be installed on your system.

If the *Solaris 2.4 AnswerBook* software package is not installed on your system, see the “Installing the Solaris 2.4 AnswerBook Software” section in Appendix D, “Sun SPARCserver Computer Factory Installation Procedures,” for details.

To reduce the amount of disk space used, the data for *Solaris 2.4 System AnswerBook* software package is not stored on the hard disk. To access the data, you must insert the *Solaris 2.4 System AnswerBook* CD-ROM software into the CD-ROM drive.

See the *Solaris 2.4 AnswerBook Administration Guide* for more details.

Starting AnswerBook Software

To start the *AnswerBook* software, do the following:

1. Start the *OpenWindows* interface.

If the *OpenWindows* interface is not displayed, do the following:

- a. Log off the system console.
- b. Log back on the system console.
- c. Answer yes to the question: `Open Windows? y/n:`

Note

When in the *OpenWindows* interface, if you get a window that says “xterm” at the top of the screen, then the TERM should be set to `xterm`. If the window says “*Sun* command window,” then the TERM should be set to `sun-cmd`.

2. Remove the “*Solaris 2.4 System AnswerBook*” CD-ROM from its case. If you have an external CD-ROM drive, follow the steps below. Otherwise, go to step 3.
 - a. Place the CD-ROM in the CD-ROM caddy. When the CD-ROM is properly inserted in the caddy, the CD-ROM label is visible.

- b. Insert the CD-ROM caddy into the CD-ROM drive slot.
 - c. Go to step 6.
3. Open the CD-ROM drive tray by pressing the eject button on the CD-ROM drive unit.
4. 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.
5. Push the CD-ROM drive tray in (towards the system unit) until it closes.
6. Select **one** of the following ways to access the *AnswerBook* software:
 - From a command window:
 - a. Enter the following command, and press **Return**:

```
# answerbook
```

- From the desktop:
 - a. Click somewhere on the desktop (outside of an open window) to display the menu and menu options.
 - b. Use the Right Mouse Button (Menu) to display the menus and make menu selections:

From the Workspace menu, select the Programs option.

From the Programs menu, select the AnswerBook option.

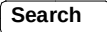
The *AnswerBook* Navigator v3.4 window appears. This window allows you to locate the information you want and then display it in the *AnswerBook* Viewer v3.4 window.

Navigating Through *AnswerBook* Software

1. To browse the contents of an *AnswerBook* software package, click on **Contents**, and continue to double-click on areas until done.



To access the sections of the document you want to see, you can either double-click or single click on the topic, and then click the View button.

2. To search for an item of interest:
 - a. Click on the  button.
 - b. Enter the item to search for at the prompt, and press .
 - c. Use the  key to search for a different item.
3. To delete the *AnswerBook* Viewer window:
 - a. Select `Quit` at the Window menu.
4. To get the Window menu:
 - a. Click the cursor in the bar at the top of the window.
 - b. Press the right mouse button.
 - c. While holding down the right mouse button, select `Quit`.
5. To view a topic, select the `View` option to access the *AnswerBook* Viewer v3.4 window.

The *AnswerBook* Viewer v3.4 window appears. This window allows you to read the documents you select in the *AnswerBook* Navigator window and to print them.

Exiting *AnswerBook* Software

To exit the *AnswerBook* software package, do the following:

1. Close each window by choosing `Close` from its window menu or by pressing the  key on your keyboard (which toggles Open/Close).
2. Exit each window, or its icon, by choosing `Quit` from its window menu.

When you quit both the *AnswerBook* Navigator v3.4 window and the *AnswerBook* Viewer v3.4 window, you quit both the Navigator and the Viewer; quitting the *AnswerBook* Viewer v3.4 window exits **only** the Viewer.



You can also use the keyboard equivalents that apply to all Desk Set applications to close or quit the Navigator and the Viewer.

3. At the system prompt, enter the `eject cdrom` command, and press .

Roles and Responsibilities

This document was written for AT&T TSC (Technical Service Center) technicians, and CMS administrators who want to install, set up, and maintain CMS on a *Sun SPARCserver* computer.

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

Note The factory hardware/software installation procedures can be found in Appendix D, "Sun SPARCserver Computer Factory Installation Procedures".

Table 1-2 lists the major tasks, who is responsible for performing each task, and the chapter where the task is located.

Table 1-2: Task Responsibility

Chapter	Task	Tech	TSC	Customer
3	Installing the <i>Sun SPARCserver</i> computers and network peripherals	X		
4	Installing terminals, printers, and modems	X		
4	Administering the ports	X	X	
5	Connecting the CMS to the switch	X		
5	Multiple ACD connectivity (adding an ACD)	X	X	X
6	Setting authorizations		X	
6	Setting up data storage parameters		X	
6	Setting up the CMS application		X	
6	Installing the Forecasting feature package			X
6	Installing the External Call History package			X
7	Verifying the system date and time	X		
7	Testing the CMS connection to the TSC		X	
7	Testing the R3V2 CMS software	X		
7	Turning the system over to the customer	X		
8	Performing backups and restores			X
8	Recovering from a disk crash	X	X	
8	Checking installed software packages	X	X	

Table 1-2: Task Responsibility (Contd)

Chapter	Task	Tech	TSC	Customer
9	Solving CMS-related problems	X	X	X
9	Solving hardware-related problems	X	X	
9	Solving terminal-related problems	X	X	X
9	Solving printer-related problems	X	X	X
9	Solving modem-related problems	X	X	X
9	Solving power-related problems	X	X	X
9	Solving installation-related problems	X	X	
9	Checking error logs	X	X	
10	Upgrading or Updating the CMS Software	X	X	X
10	Installing <i>Solaris</i> Patches	X	X	X

CMS Helplines

If an installation problem arises that requires assistance, AT&T technicians or the customer may call the following numbers:

Customer Number 1-800-344-9670

The problem will be reported, and a trouble ticket will be generated so the problem can be escalated through the services organization.

The customer will be prompted to identify the type of problem (ACD, hardware, or R3V2 CMS) 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 SPARCserver* computer, 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 AT&T Bell Laboratories.

**International
Support**

For International Support, contact your AT&T Representative/Distributor for more information.

CMS Administration Menu (CMSADM)

The CMSADM (CMS Administration) menu is intended for use primarily by the CMS Administrator (see Figure 2-1).

```
Call Management System Administration Menu
Select a command from the list below.
 1) acd_create   Define a new ACD
 2) acd_remove  Remove all administration and data for an ACD
 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 CMS on or off
Enter choice (1-9) or q to quit:
```

Figure 2-1: CMSADM Menu Example

The CMS Administrator can do the following from this menu:

- Define a new ACD (Automatic Call Distribution).
- Remove an ACD.
- Back up the file system to tapes.
- Estimate CMS disk requirements, memory requirements, and real-time refresh rate.
- Install or remove a feature package.
- Turn CMS on or off.

Note

You must log in as *root* to access this menu. To access the cmsadm (CMS Administration) menu, enter cmsadm at the prompt. Select from options on the CMS Administration menu.

The following sections explain the options on the CMS Administration menu.

acd_create

The acd_create option on the CMS Administration (cmsadm) menu allows you to define a new ACD.

Note

The ACD must be authorized, and therefore purchased, before it can be added to the CMS. See the “Setting Authorizations” section in Chapter 6, “Setting Up CMS and Installing Feature Packages,” for details.

1. Access the CMS Administration menu by entering:

```
# cmsadm
```

The CMS Administration menu appears.

```
Call Management System Administration Menu
Select a command from the list below.
 1) acd_create  Define a new ACD
 2) acd_remove  Remove all administration and data for an ACD
 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 CMS on or off
Enter choice (1-9) or q to quit:
```

2. Before you define a new ACD, you must turn off the CMS. Do the following:
 - a. Enter 9 to select run_cms on the CMS Administration menu.
 - b. Enter 2 to turn off the CMS. You will see the system prompt.
 - c. Enter cmsadm. The CMS Administration menu appears.
3. Enter 1 to choose acd_create.

4. At the prompts, you need to enter the following information:

- Switch name for the new ACD
- Switch model (release)
- Vectoring enabled on the switch
- Local port assigned to the switch
- Remote port assigned to the switch
- Link number
- Number of splits/skills
- Total split/skill members, summed over all splits/skills
- Number of shifts
- Start and stop times of all shifts
- Number of agents logged into all splits/skills during all shifts
- Number of trunk groups
- Number of trunks
- Number of unmeasured (trunk) facilities
- Number of call work codes
- Number of vectors (if “Y” is answered to Vectoring enabled on the switch)
- Number of VDNs (if “Y” is answered to Vectoring enabled on the switch).

After you have entered all the required information, the message Updating database appears, followed by ACD created successfully.

5. Turn the CMS back on by doing the following:

- a. Enter cmsadm. The CMS Administration menu appears.
- b. Enter 9 to select run_cms on the CMS Administration menu.
- c. Enter 1 to turn on the CMS.

A message appears telling you that CMS is running.

acd_remove

The acd_remove option on the CMS Administration menu allows you to remove an ACD.



You must first create an ACD before you can remove an ACD. For procedures, see the "acd_create" section in this chapter.

1. Access the cmsadm (CMS Administration) menu by entering cmsadm. The CMS Administration menu appears.
2. Before you can remove an ACD, you must turn off the CMS. Do the following:
 - a. Enter 9 to select run_cms on the CMS Administration menu.
 - b. Enter 2 to turn off the CMS. You will see the system prompt.
 - c. Enter cmsadm. The CMS Administration menu appears.
3. Enter 2 to select the acd_remove option.
4. To select the ACD you want to remove, enter your choice (1 - 3).

A message appears telling you that all administration and historical data for this ACD will be deleted.
5. Answer y at the following prompt: "Do you want to continue and delete all data for this ACD?"

The ACD will be removed in the background. A message appears telling you where you can find the complete message confirming the removal (for example, /cms/install/logdir/admin.log).
6. To turn the CMS back on, see the previous procedure "acd_create."

backup

The backup option on the CMS Administration menu allows you to back up your file systems.

Note

You do not need to turn CMS off to start the backup. If CMS is on, the system automatically turns CMS off during the portion of the backup which needs CMS off. After that portion is completed, the system automatically turns CMS back on.

See the "Performing a CMSADM File System Backup" section in Chapter 8, "Maintenance," for more information about this option.

diskmap

The diskmap option on the CMS Administration menu allows you to estimate CMS disk requirements.

1. Access the CMS Administration menu by entering `cmsadm` at the system prompt. The CMS Administration menu appears.
2. Enter 4 to select the `diskmap` option.
3. Answer the prompts that appear on the screen to estimate CMS disk requirements.

Note

You may back up one prompt at a time by entering any negative number (for example, -1).

You need the following information:

- Customer name
- CMS host computer type

<If you answer "y" to go to the table allocation part of the program, you must enter the following information:>

- Total amount of disk space (in megabytes)

Note

If the amount of data is known, you can skip this section and go to the disk allocation section. If the amount of data is not known, you must enter the amount of data for each of the types listed below.

- Number of agent positions you have purchased
- Number of splits

- Number of trunks
- Number of trunk groups
- Number of vectors
- Number of VDNs
- Number of call work codes
- Number of exception records
- Number of agent trace records
- Number of call history records
- Amount of forecast data
- Amount of agent login/logout data
- Amount of non-CMS customer data

<You are asked if you want to run another case? (y/n)>

<If you answer “n” to go to the table allocation part of the program, you must enter the following information:>

- Will pseudo-ACD data be added? (y/n)

Note If you answer “y” to add pseudo-ACD data, you will be prompted to enter the following pseudo-ACD data for each data type. For example, amount of agent pseudo-ACD data or number of trunk pseudo-ACD.

- Number of ACDs (1-4)
- Number of minutes in one interval (15, 30, 60)
- Start and stop times for data collection
- Number of shifts

<You must enter the following information for each shift:>

- Number of agents
- Start time
- Stop time
- Number of splits
- Number of trunk groups
- Number of trunks
- Number of vectors
- Number of VDNs

- Number of CWC (call work codes)
- Internal or External Call History enabled?

<If you answer “n” to internal call history enabled, you will be asked if external call history is enabled (y/n).>

- Number of exception records
- Number of agent trace records
- Number of call history records
- Number of days of intrahour data saved for, number of days of daily data saved for, number of weeks of weekly data saved for, and number of months of monthly data saved for
 - splits
 - agents
 - trunk groups
 - trunks
 - vectors
 - VDNs
 - call waiting codes (CWC).
- Number of times an agent logs out during a shift
- Forecasting enabled?

<If you answer “y” to forecasting enabled, you must enter the following information:>

- Number of days of intrahour data for splits
- Number of days of intrahour data for trunk groups
- Number of days of daily data for splits
- Number of special days (average per split)
- Number of days that current day reports will be saved (average per split)
- Extra non-CMS disk space specified by the customer
- Total recommended disk space.

<You are asked if you want to do disk allocations now (y/n).>

<You are asked if you want to run another case (y/n).>

memory

The memory option on the CMS Administration menu allows you to estimate your memory requirements.

1. Access the CMS Administration menu by entering cmsadm at the system prompt. The CMS Administration menu appears.
2. Enter 5 to select the memory option.
3. At the prompts, enter the requested information.

Note

You may back up one prompt at a time by entering any negative number (for example, -1).

You need the following information:

- Customer name
- CMS host computer type
- Number of ACDs
- Switch model
- Maximum number of agents simultaneously logged in

Note

If an agent logs in to multiple splits or skills, count that agent multiple times.

- Number of splits/skills
- Number of trunk groups
- Number of trunks
- Number of VDNs
- Number of call work codes
- Agent trace enabled?
- Internal or external call history enabled?

<If you answer “n” to internal call history enabled, you will be asked if external call history is enabled (y/n).>

- Number of terminals simultaneously logged into CMS
- Number of real-time reports running per terminal
- Number of agent group reports
- Number of agents per group

- Number of agent, split-status, event-count-summary, or queue/agent status reports
- Number of trunk group reports
- Number of split reports
- Number of splits per split report
- Number of VDN reports
- Number of VDNs per VDN report
- Number of VDN-skill-preference reports
- Number of VDNs per VDN-skill-preference report
- Number of vector reports
- Number of vectors per vector report
- Number of call profile reports
- Number of graphical reports (excluding the graph call profile report)
- Number of queue/agent summary reports
- Number of historical and forecasting reports running simultaneously during the busy hour
- Number of real-time exception reports running simultaneously during the busy hour
- Will custom reports be created or edited during busy hour?
- If yes, number of windows running administration screens simultaneously during the busy hour?

<If you answer “y” to custom reports being created or edited during the busy hour, then you must enter the following information:>

- Number of windows doing custom report creation or editing during busy hour

<If you answer “y” to internal call history or agent trace reports to run during the busy hour, then you must enter the following information.>

- Number of windows running call history or agent trace reports during busy hour.
- Will backups be done during the busy hour?
- Do you want to run another case?

<If you answer “y” to running another case, you are returned to entering a CMS host computer type.>

realtime

The `realtime` option on the CMS Administration menu allows you to estimate the real-time report refresh rate your system needs.

1. Access the CMS Administration menu by entering `cmsadm` at the `$` or system prompt. The CMS Administration menu appears.
2. Enter 6 to select the `realtime` option.
3. Answer the prompts that appear on the screen.

Note

You may back up one prompt at a time by entering any negative number (for example, -1).

You need the following information:

- Customer name
- CMS host computer type
- Number of ACDs
- Number of agents per split
- Number of trunks per trunk group
- Number of agents per group report
- Number of splits per split report
- Number of vectors per vector report
- Number of VDNs per VDN report
- Number of VDNs per VDN skill preference report
- Is vectoring enabled?
- Archiving intervals in minutes (15, 30, or 60)
- Will either of the following be used?
 - Agents in multiple splits, without EAS, or
 - Generic 2.2 EAS.
- Will most calls be complex? (For example, will they involve either a hold, transfer, conference, or supervisor assist.)
- Exceptions enabled?
- Internal call history enabled?
- External call history enabled?
- Call rate in calls per hour
- Agent trace enabled?

<If you answered “y” to the agent trace enabled, you must enter the following information:>

- Approximate average agent service time, in minutes
- Number of agents traced simultaneously.
- Number of internal call history or agent trace reports that will be run per hour (during prime time)
- Number of historical plus forecasting reports that will be run per hour while real-time reports are running

<If you enter “1” to get different periods for different types of reports, you must enter the following information:>

- Number of terminals
- Number of real-time reports running per terminal

<You can answer “y” to give preferential treatment to running some reports faster at the expense of other reports.>

- Do you want to change the number of the reports?

<If you answer “y” to changing the number of the reports, you are returned to choose either “1” or “2”.>

<If you enter “2” to get a single period, you need to enter the number of each type of report that is running.>

- Split/Skill Report
- Split Report Status
- Split Call Profile Report
- Agent Report
- Group Report
- Queue/Agent Status Report
- Queue/Agent Summary Report
- Trunk Group Report
- Event Count Summary Report
- Multi-ACD Report
- Graph Split Report
- Graph Queue Report
- Graph Split Call Profile Report
- Graph VDN Call Profile Report
- Vector Report

- VDN Report
- VDN Call Profile Report
- VDN Skill Preference Report.

Do you want to change the number of reports?

Do you want to analyze another case?

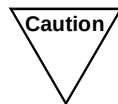
pkg_install

The `pkg_install` option on the CMS Administration menu allows you to install a feature package.

For more information on this option, see "Chapter 6, "Setting Up CMS and Installing Feature Packages".

pkg_remove

The `pkg_remove` option on the CMS Administration menu allows you to remove a feature package. This procedure removes all files and database items associated with the feature package.



Care should be taken when removing a package as all features and data associated with that package will be lost.

1. Access the CMS Administration menu by entering `cmsadm` at the system prompt. The CMS Administration menu appears.
2. Enter `8` to select the `pkg_remove` option.

A list of CMS features that can be removed is displayed.

3. Enter the number corresponding to the feature package that you want to remove.

A message is displayed telling you when the feature is removed.

run_cms

The `run_cms` option on the CMS Administration menu allows you to turn CMS on or off.

1. Access the CMS Administration menu by entering `cmsadm` at the system prompt. The CMS Administration menu appears.
2. Enter 9 to select the `run_cms` option.
3. Enter 1 to turn *on* CMS or 2 to turn *off* CMS.

CMS Services Menu (CMSSVC)

The CMS Services menu is intended for use primarily by AT&T Services personnel (see Figure 2-2).

```
Commands for CMS Services Personnel

Select a command from the list below.
 1) auth_display Display feature authorizations
 2) auth_set    Authorize CMS capabilities/capacities
 3) backup      Filesystem backup
 4) run_cms     Turn CMS on or off
 5) setup       Set up the initial CMS configuration
 6) swinfo      Display switch information
 7) swsetup     Change switch information
 8) upd_install Install update from disk files
 9) upd_remove  Back out the currently installed update
10) upd_save    Save update on disk for later installation
Enter choice (1-10) or q to quit:
```

Figure 2-2: CMSSVC Menu Example

This menu allows services personnel to do the following:

- Display CMS authorizations.
- Authorize CMS feature packages and capacities.
- Do a backup of file systems to tapes.
- Turn CMS on and off.
- Set up the initial CMS configuration.
- Display switch information.
- Change switch information.
- Install a CMS software update from disk files.
- Back out of an installed update.
- Save an update on disk for later installation.

Note You must log in as *root* to access this menu.

The following sections explain the options on the CMS Services menu.

auth_display

From the `auth_display` option on the CMS Services menu, you can display CMS authorizations.

1. Access the CMS Services menu by entering:

```
# cmssvc
```

The CMS Services menu appears:

Commands for CMS Services Personnel

Select a command from the list below.

- 1) `auth_display` Display feature authorizations
- 2) `auth_set` Authorize CMS capabilities/capacities
- 3) `backup` Filesystem backup
- 4) `run_cms` Turn CMS on or off
- 5) `setup` Set up the initial CMS configuration
- 6) `swinfo` Display switch information
- 7) `swsetup` Change switch information
- 8) `upd_install` Install update from disk files
- 9) `upd_remove` Back out the currently installed update
- 10) `upd_save` Save update on disk for later installation

Enter choice (1-10) or q to quit:

2. Enter 1 to select the `auth_display` option.

The current authorization status for CMS features and capacities is displayed.

The possibilities for authorization status are as follows:

- Authorized – The feature has been paid for, and authorization has been turned on.
- Not authorized – The feature has not been paid for, or authorization has not been turned on.
- Installed – The feature is authorized, and the software to support the feature has been installed.

For more information on this option, see Chapter 6, "Setting Up CMS and Installing Feature Packages".

auth_set

From the `auth_set` option on the CMS Services menu, you can authorize CMS features and capacities.

See the “Setting Authorizations” section in Chapter 6, “Setting Up CMS and Installing Feature Packages,” for more information.

backup

From the `backup` option on the CMS Services menu, you can back up your file system to tapes.

Note

You do not need to turn CMS off to start the backup. If CMS is on, the system automatically turns CMS off during the portion of the backup which needs CMS off. After that portion is completed, the system automatically turns CMS back on.

1. Access the CMS Services menu by entering `cmssvc` at the system prompt. The CMS Services menu appears.
2. Enter 3 to select the backup option. The system responds:

```
Select a tape drive to use:
```

- 1) 150 MB cartridge tape
- 2) 60 MB cartridge tape
- 3) 14.0 Gbyte 8mm tape
- 4) 5.0 Gbyte 8mm tape

```
Enter choice (1-4):
```


Note

All systems are shipped with one or more tape drives (QIC-150, 5-GB, and/or a 14-GB). For systems with multiple tape drives, the QIC-150 is the first drive on the SCSI chain. For quicker backups (1 hour versus several hours), we recommend using the 5- or 14-GB tape drive.

`/dev/rmt/0` indicates the first tape drive in the SCSI chain
`/dev/rmt/1` indicates the second tape drive in the SCSI chain
`/dev/rmt/0c` indicates the first tape drive in the SCSI chain in compressed mode (only the 14-Gb tape drive can support compressed mode)
`/dev/rmt/1c` indicates the second tape drive in the SCSI chain in compressed mode

3. Select the tape drive to use (for example: 1, 2, 3, or 4).

Note

If you have two tape drives and choose 1, 2, or 4; the system responds:

Select the tape drive to use:

- 1) `/dev/rmt/0`
- 2) `/dev/rmt/1`

Enter choice (1-2):

If you have two tape drives and you choose 3 (14-GB), the system responds:

Select the tape drive to use:

- 1) `/dev/rmt/0c`
- 2) `/dev/rmt/1c`

Enter choice (1-2):

The system displays the number of tapes required. The 14-GB tape backup is the most common backup scenario and usually requires one tape. The QIC-150 tape usually requires more tapes.

4. Insert the cartridge tape.
5. When you are ready to proceed, press **Return**.

The system displays a message that indicates the backup is in progress. Leader dots are displayed as the system continues to back up the files.

6. When the end of the tape is reached, do the following:
 - a. Remove the backup tape.

b. Label the backup tape(s) with the date.

c. Label the backup tape(s) with the current CMS version number.

If the backup requires more than one tape, the following information is also needed:

d. Number the backup tapes consecutively in the order they are inserted.

7. If using more than one tape, insert the next tape when prompted. Repeat steps 6-8 until all tapes are backed up.

The backup is complete. You can now turn the CMS back on.

run_cms

From the `run_cms` option on the CMS Services menu, you can turn CMS on and off.

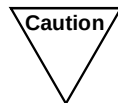
1. Access the CMS Services menu by entering `cmssvc` at the system prompt. The CMS Services menu appears.
2. Enter `4` to select the `run_cms` option.
3. Enter `1` to turn *on* CMS or `2` to turn *off* CMS.

setup

From the `set up` option on the CMS Services menu, you can set up the initial CMS configuration. For example, you can set up the type of backup device you want to use (QIC-150 or 14-GB tape).



Do not confuse this option with the `swsetup` which is for changing the switch information.



If you run `set up` on an operating system, you will lose all customer data on that system.

See Chapter 6, "Setting Up CMS and Installing Feature Packages", for more information about this option.

swinfo

From the `swinfo` option on the CMS Services menu, you can display the switch parameters.

1. Access the CMS Services menu by entering `cmssvc` at the system prompt. CMS Services menu appears.
2. Enter 6 to select the `swinfo` option.

The following switch information is displayed:

- Switch name
- Switch model (release)
- Local port number
- Remote port number

- Vectoring
- Expert agent
- Link number.

swsetup

From the swsetup option on the CMS Services menu, you can change the switch parameters.

Note

Do not confuse this option with the setup option which is for setting up CMS.

Note

When you change switch parameters, you should also check the parameters in the CMS System Setup: Data Storage Allocation window. In particular, if you enable vectoring, you will need to allocate space for VDNs and vectors. Changing the switch release may change the number of measured entities allowed and may also have an impact on the storage allocation for each entity.

1. Access the CMS Services menu by entering cmssvc at the system prompt. The CMS Services menu appears.
2. Enter 7 to select the swsetup option.
3. Answer the prompts that appear on the screen.

You need the following information:

- Switch name
- Switch model (release)
- Local port assigned to the switch
- Remote port assigned to the switch
- Link number.

The link number represents the port that is connected to the switch.

Note

- 1) Serial Port B
- 2) Corresponds to HSI/S Port 0
- 3) Corresponds to HSI/S Port 1
- 4) Corresponds to HSI/S Port 2
- 5) Corresponds to HSI/S Port 3
- 6) Software loopback link 0
- 7) Software loopback link 1

upd_install

From the upd_install option on the CMS Services menu, you can install an update from disk files.

See the “Installing the CMS Update from Disk Files” (one or two system disks) section in Chapter 10, “Upgrading or Updating the CMS Software,” for more information on this option.

upd_remove

From the upd_remove option on the CMS Services menu, you can back out of the currently installed software update.

See the “Removing the Currently Installed Update” section in Chapter 10, “Upgrading or Updating the CMS Software,” for more information about this option.

upd_save

From the upd_save option on the CMS Services menu, you can save updated software to disks for later installation.

See the “Saving the CMS Update to Disk Files” section in Chapter 10, “Upgrading or Updating the CMS Software,” for more information about this option.

Overview

This chapter describes how to install the *Sun SPARCserver* computers and related peripheral equipment, including:

- *Sun SPARCserver* computer and system console
- External SCSI devices
- *SunLink* HSI/S (High-Speed Serial Interface/SBus) patch panel
- Black Box RS-232/RS-422 interface converter
- Network Hub unit
- 8-,16- and 64-port Network Terminal Servers (NTSs) and 16-port NTS patch panel(s)
- UPS (Uninterruptible Power Supply [optional])
- Remote Console modem.

Figure 3-1, Figure 3-2, and Figure 3-3 show the rear panels of the different *Sun SPARCserver* computers and the locations of peripheral connections.

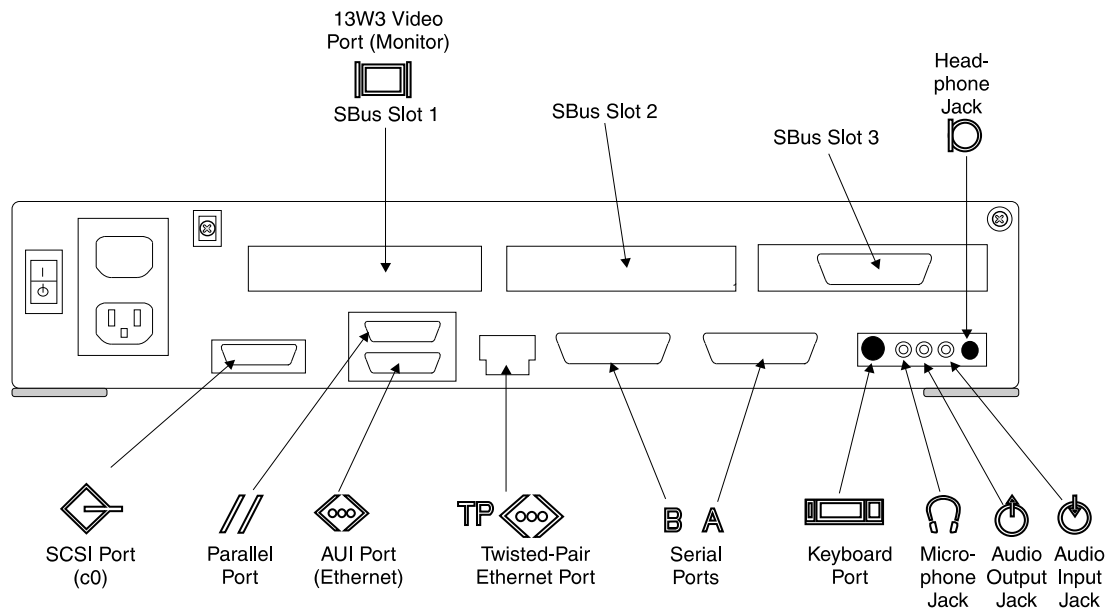


Figure 3-1: Rear Panel of the *Sun SPARCserver* 5 Computer

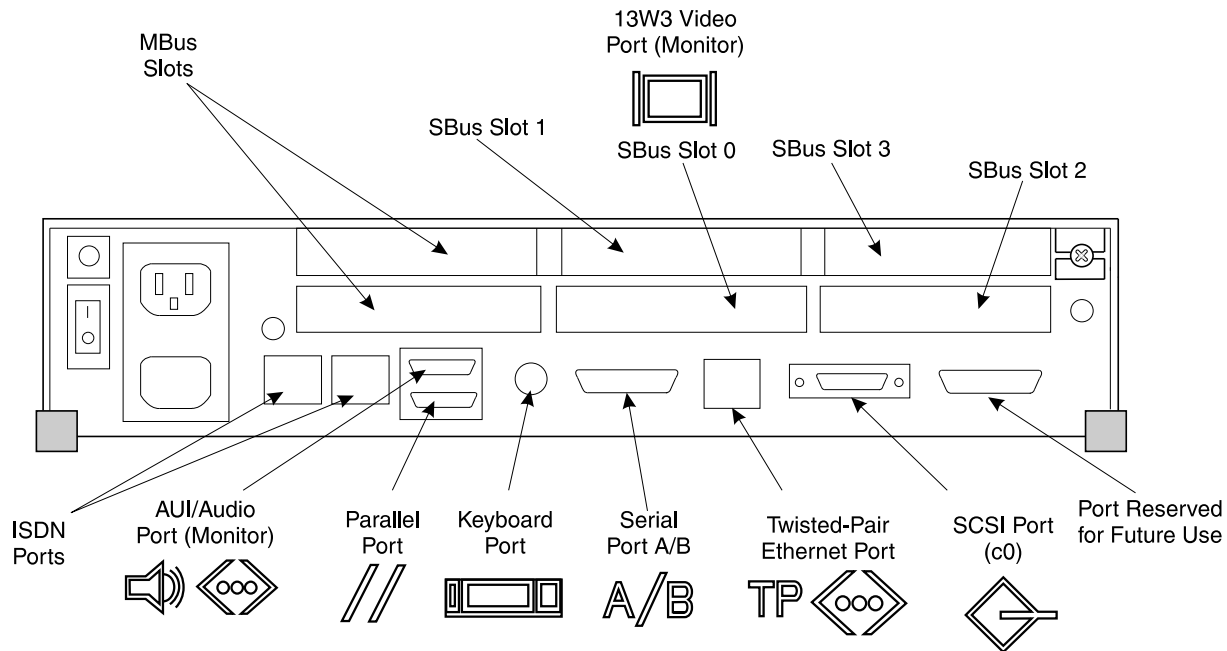


Figure 3-2: Rear Panel of the *Sun SPARCserver 10* Computer

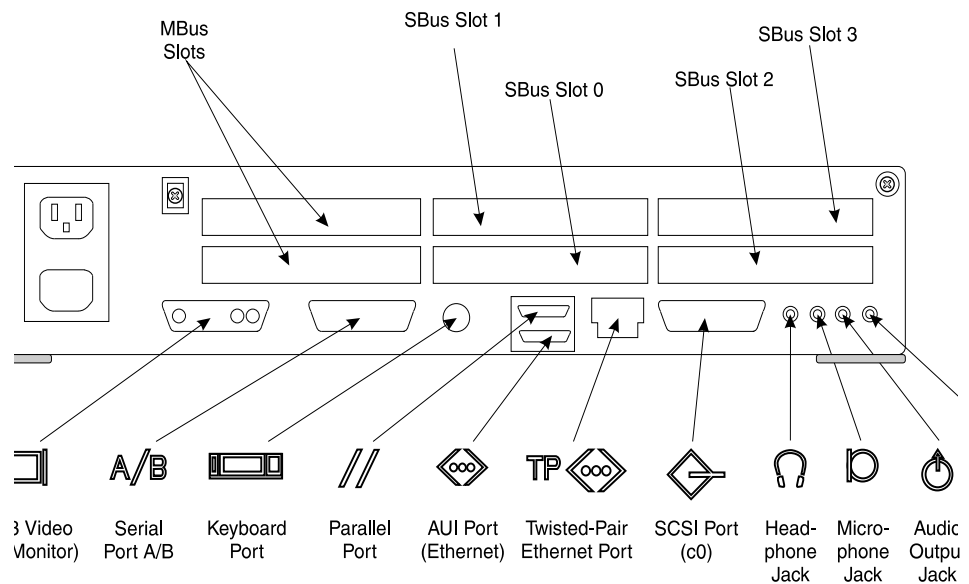


Figure 3-3: Rear Panel of the *Sun SPARCserver 20* Computer

Figure 3-4 shows how the peripheral equipment is connected to the *Sun SPARCserver 5* computer. Note the example of NTS connectivity. This illustration shows the different types of NTSs you can install on your system.

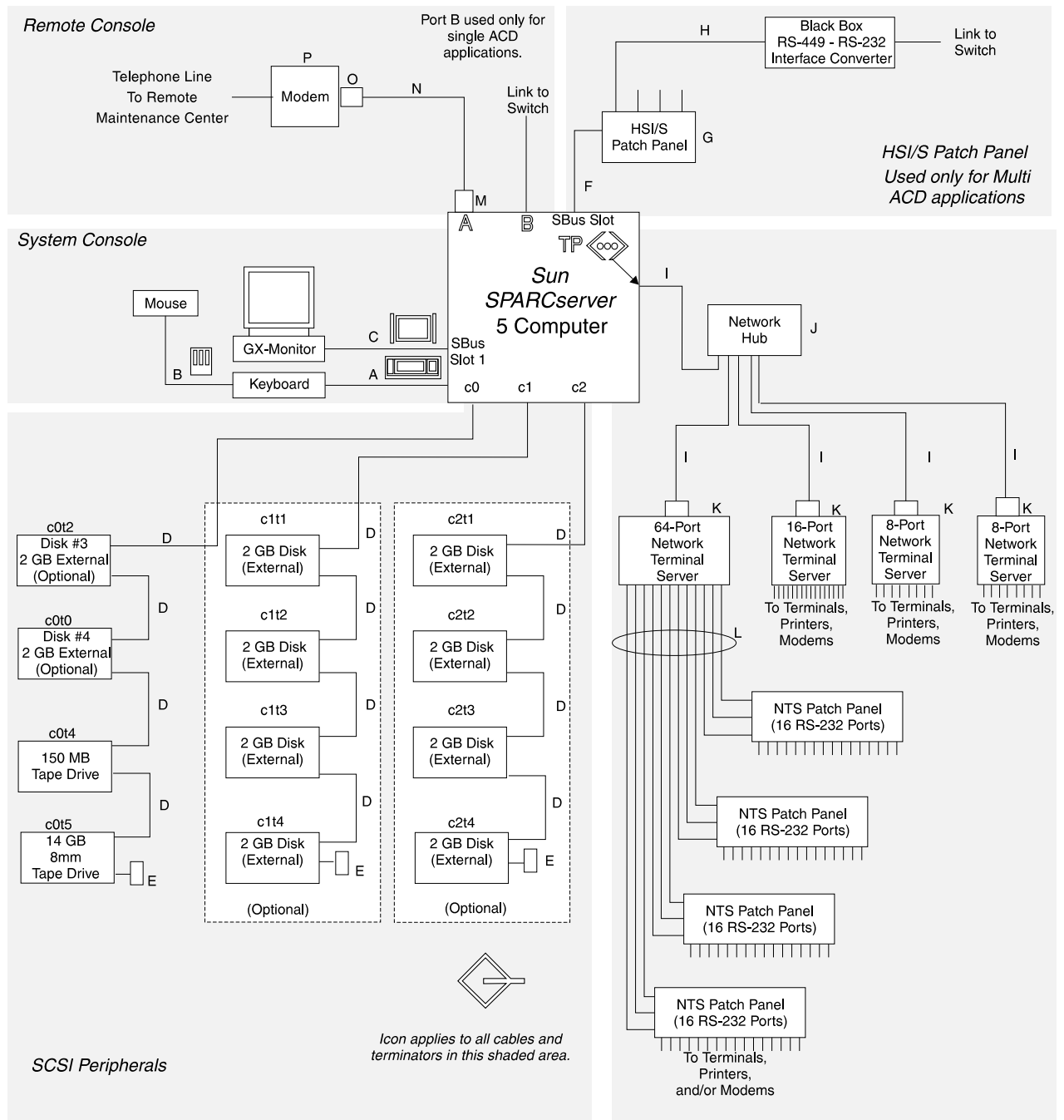


Figure 3-4: Sun SPARCserver 5 Computer — Peripheral Connectivity

Figure 3-5 shows how the peripheral equipment is connected to the *Sun SPARCserver 10 and 20* computer. Note the example of NTS connectivity. This illustration shows the different types of NTSs you can install on your system.

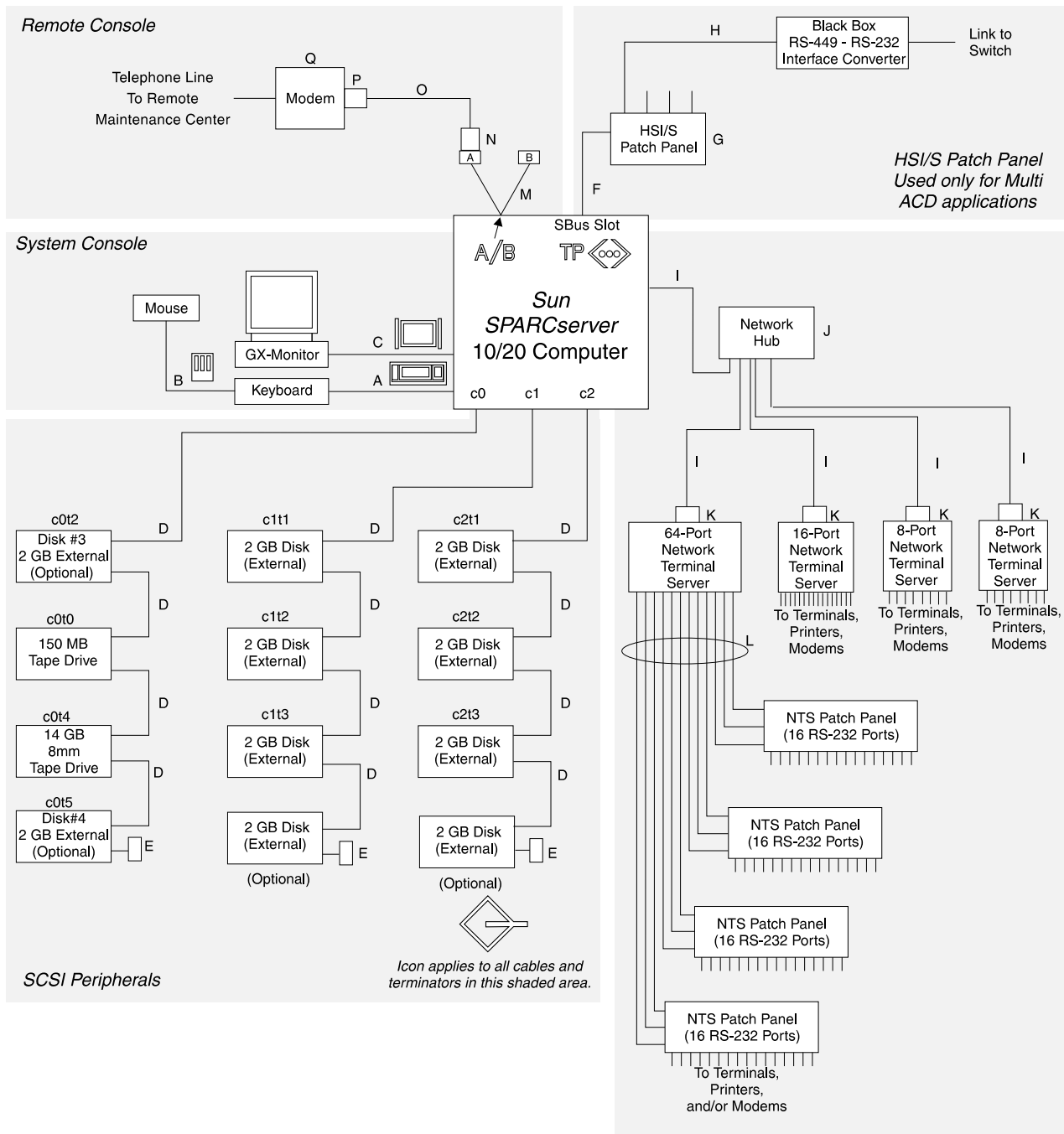


Figure 3-5: Sun SPARCserver 10/20 Computer — Peripheral Connectivity

Table 3-2 lists all the parts required to connect the peripherals to the *Sun SPARCserver 5* computer.

Table 3-1: *Sun SPARCserver 5* Computer Connectivity References

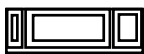
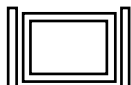
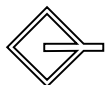
Associated <i>Sun</i> Icon	Figure 3-4 Call Out	Part Number and Cable Description
	A	530-1442-02 Rev C (keyboard cable - 2.5') 15' keyboard Extension Cable available through PEC 12093, Comcode 407361815
	B	370-1398-02 (mouse w/cable)
	C	9330 (monitor cable - 2.5') 4 meter monitor cable available through PEC 12093, comcode 407361807 Note: In some instances, the monitor cable is permanently attached to the monitor; therefore, it will not be a separate item.
	D	530-1793-02 Rev 50 (SCSI cable)
	E	530-1785-02 (SCSI terminator)
	F	530-1685-02 Rev 52 (HSI/S cable - 10')
	G	540-2191 (HSI/S patch panel)
	H	EDN37K-MM (RS-449 cable - 10')
	I	180-1529-01 Rev A (UTP [Unshielded Twisted Pair] cable - 4 meters) Anixter Part Number - 143987 (Category 5 UTP cable - 10 feet) Anixter Part Number - 143992 (Category 5 UTP cable - 25 feet) Anixter Part Number - A111714-C (Category 5 UTP cable - 50 feet)
	J	IBM Part Number - 60G0625 (IBM 8222 Network Hub Unit) or <i>Allied Telesis</i> CentreCOM (AT-MR820T-15) Network Hub Unit
	K	10T (LDI 10Base-T transceiver) or 10T <i>Allied Telesis</i> CentreCOM 210TS transceiver (Part Number: AT-210-05)
	L	460-093-900 Rev A1 (PBX-Champ cable for 64-port NTS - 1 meter)
	M	AT&T Comcode 846362754 (ACU modem adapter)
	N	AT&T Comcode 846983039 (10-foot Shielded Cable)

Table 3-1: Sun SPARCserver 5 Computer Connectivity References (Contd)

Associated Sun Icon	Figure 3-4 Call Out	Part Number and Cable Description
	O	AT&T Comcode 846362770 (Remote Console Adapter)
	P	Remote Console Modem
	Q	AT&T 4261-1002-0600 StarLAN 10 Network Fiber Hub
	R	LDI-10FL (LDI - 10 Base FL Transceiver)
	S	Fiber Optic cable (62.5 mm 2-strand cable)

Note The parts associated with callouts Q, R, and S are for the optional fiber optic network configurations.

Table 3-2 lists all the parts required to connect the peripherals to the *Sun SPARCserver 10* computer.

Table 3-2: Sun SPARCserver 10 Computer Connectivity References

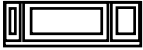
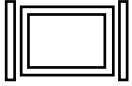
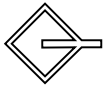
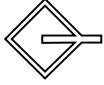
Associated Sun Icon	Figure 3-5 Call Out	Part Number and Cable Description
	A	530-1442-02 Rev C (keyboard cable) 15' keyboard Extension Cable available through PEC 12093, Comcode 407361815
	B	401162-035/D (mouse w/cable)
	C	9330 (monitor cable) 4 meter monitor cable available through PEC 12093, comcode 407361807
	D	530-1793-02 Rev 50 (SCSI cable)
	E	150-1785-02 (SCSI terminator)
	F	530-1685-02 Rev 52 (HSI/S cable - 10')
	G	540-2191 (HSI/S patch panel)
	H	EDN37K-MM (RS-449 cable - 10')

Table 3-2: *Sun SPARCserver 10* Computer Connectivity References (Contd)

Associated Sun Icon	Figure 3-5 Call Out	Part Number and Cable Description
	I	180-1529-01 Rev A [UTP (Unshielded Twisted Pair) cable - 4 meters] Anixter Part Number - 143987 (Category 5 UTP cable - 10 feet) Anixter Part Number - 143992 (Category 5 UTP cable - 25 feet) Anixter Part Number - A111714-C (Category 5 UTP cable - 50 feet)
	J	IBM Part Number- 60G0625 (IBM 8222 Network Hub unit) or <i>Allied Telesis</i> CentreCOM (AT-MR820T-15) Network Hub unit)
	K	10T (LDI 10Base-T transceiver) 10T <i>Allied Telesis</i> CentreCOM 210TS transceiver (Part Number: AT-210TS-05)
	L	460-093-900 Rev A1 (PBX-Champ cablem - 1 meter)
A/B	M	530-1869-02 Rev 50 (splitter cable)
	N	AT&T Comcode 846362754 (ACU modem adapter)
	O	AT&T Comcode 846983039 (10-foot Shielded Cable)
	P	AT&T Comcode 846362770 (Remote Console adapter)
	Q	Remote Console modem
	R	AT&T 4261-1002-0600 StarLAN 10 Network Fiber Hub
	S	LDI-10FL (LDI - 10BaseFL Transceiver)
	T	Fiber Optic cable (62.5 mm 2-strand cable)

Note The parts associated with callouts R, S, and T are for the optional fiber optic network configuration.

Table 3-3 lists all the parts required to connect the peripherals to the *Sun SPARCserver 20* computer.

Table 3-3: *Sun SPARCserver 20* Computer Connectivity References

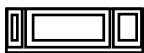
Associated Sun Icon	Figure 3-5 Call Out	Part Number and Cable Description
	A	530-1442-02 Rev C (keyboard cable - 2.5') 15' keyboard Extension Cable available through PEC 12093, Comcode 407361815

Table 3-3: *Sun SPARCserver 20* Computer Connectivity References (Contd)

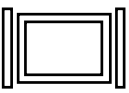
Associated Sun Icon	Figure 3-5 Call Out	Part Number and Cable Description
	B	370-1398-02 (mouse w/cable)
	C	9330 (monitor cable - 2.5') 4 meter monitor cable available through PEC 12093, comcode 407361807 Note: In some instances, the monitor cable is permanently attached to the monitor; therefore, it will not be a separate item.
	D	530-1793-02 Rev 50 (SCSI cable)
	E	150-1785-02 (SCSI terminator)
	F	530-1685-02 Rev 52 (HSI/S cable - 10')
	G	540-2191 (HSI/S patch panel)
	H	EDN37K-MM (RS-449 cable - 10')
	I	180-1529-01 Rev A [UTP (Unshielded Twisted Pair) cable - 4 meters] Anixter Part Number - 143987 (Category 5 UTP cable - 10 feet) Anixter Part Number - 143992 (Category 5 UTP cable - 25 feet) Anixter Part Number - A111714-C (Category 5 UTP cable - 50 feet)
	J	IBM Part Number- 60G0625 (IBM 8222 Network Hub unit) or <i>Allied Telesis</i> (AT-MR820T-15) Network Hub unit)
	K	10T (LDI 10Base-T transceiver) or 10T <i>Allied Telesis</i> CentreCOM 210TS transceiver (Part Number: AT-210TS-05)
	L	460-093-900 Rev A1(PBX-Champ cable for 64-port NTS - 1 meter)
A/B	M	530-1869-02 Rev 50 (splitter cable)
	N	AT&T Comcode 846362754 (ACU modem adapter)
	O	AT&T Comcode 846983039 (10-foot Shielded Cable)
	P	AT&T Comcode 846362770 (Remote Console adapter)
	Q	Remote Console modem
	R	AT&T 4261-1002-0600 StarLAN 10 Network Fiber Hub

Table 3-3: Sun SPARCserver 20 Computer Connectivity References (Contd)

Associated <i>Sun</i> Icon	Figure 3-5 Call Out	Part Number and Cable Description
	S	LDI-10FL (LDI - 10BaseFL Transceiver)
	T	Fiber Optic cable (62.5 mm 2-strand cable)

Note

The parts associated with callouts R, S, and T are for the optional fiber optic network configurations.

Installing the *Sun SPARCserver* Computers

Unpacking and Inventorying the Equipment

Unpack the *Sun SPARCserver* computer and associated peripheral equipment (for example, external disks, tape drive, etc.). Verify the equipment delivered using the shipping papers.

Note

You should wear an ESD (electrostatic discharge) strap when handling internal components.

Table D-1 through Table D-14 in Appendix D, “*Sun SPARCserver* Computer Factory Installation Procedures,” provide the manufacturing information associated with the R3V2 CMS (Release 3 Version 2 Call Management System) and the *Sun SPARCserver* computer. You can use this information when ordering a part that is missing. Contact the TSC (Technical Service Center) for any *Sun SPARCserver* computer parts that are missing or DOA (defective on arrival). For International Support, contact your AT&T Representative/Distributor for more information.

As you unpack the system, find the HSI/S loopback plug. It is normally in the box with the HSI/S controller card. You may need it in the future for troubleshooting so make sure you can locate it later. For usage of the loopback plug, see “Testing HSI/S Card for Problems” section in Chapter 9, “Troubleshooting,” for details.

Assembling the Computer and System Console

This section describes how to connect the system console peripherals to the *Sun SPARCserver* computer (see Figure 3-6).

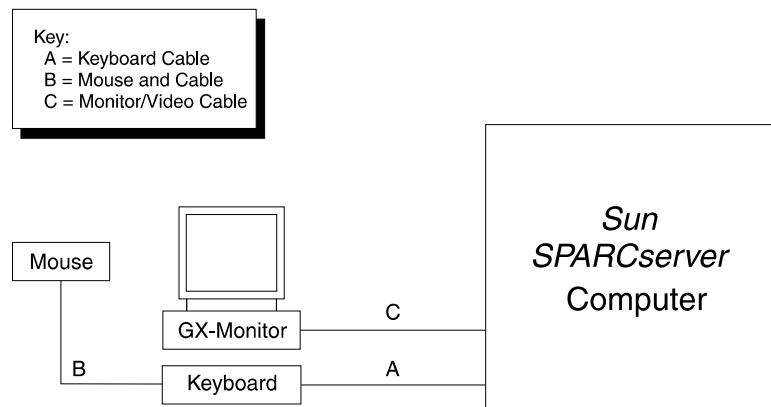


Figure 3-6: *Sun SPARCserver* Computer and System Console Connectivity

To assemble the *Sun SPARCserver* computer and system console, do the following:

1. Place the computer in the location selected by the customer. Make sure the power switch is set to *Off*.
2. Connect the following components:
 - Keyboard
 - Mouse
 - Monitor
 - Power cord (to a wall outlet or to a UPS [Uninterruptible Power Supply], if equipped).

This basic configuration represents the system console terminal. This may also be referred to as the CMS console terminal.

Additional References

For additional information, refer to the following documentation:

“Sun” “SPARCstation” 5 Installation Guide

“Sun” “SPARCstation” 10 Installation Guide

“Sun” “SPARCstation” 20 Installation Guide

Identifying Installed SBus Cards

This section describes how to identify SBus cards and their locations within the *Sun SPARCserver* computer and/or *Sun SBus Expansion Subsystem*.

The Hardware Inventory form received with your system contains a list of the SBus cards installed in your system. Use this information to reassemble your hardware. If the Hardware Inventory form has been misplaced, use the procedures described below to determine which SBus cards are installed.

The system provides a specific name for each SBus card used in either the *Sun SPARCserver* computer or the *Sun SBus Expansion Subsystem*. These names are:

SUNW,xbox (SBus Expansion Adaptor card)
 cgsix (Turbo GX video card)
 HSI (HSI/S card)
 lebuffer le dma esp (FSBE/S card in *Sun SPARCserver* computer)
 lebuffer dma (FSBE/S card in *Sun SBus Expansion Subsystem*)
 tr (Token Ring Interface card)

To identify SBus cards in the *Sun SPARCserver* computer, do the following:

1. Assemble your computer (keyboard, mouse, monitor, and power cord).
2. Enter the OpenBoot environment by doing one of the following:

<i>If You Have Already Booted the Sun SPARCserver Computer...</i>	<i>If You Have Not Yet Powered Up the Sun SPARCserver Computer...</i>
<i>then</i> stop the operating system by executing the shutdown command: <pre>shutdown -y -i0 -g0.</pre>	power it on, and <i>then</i> 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.

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

ok>

At the ok prompt, enter the following command:

show-sbus

See Table 3-4 for an example of what you would see after entering the show-sbus command:

Table 3-4: Summary of the show-sbus Command (no SBus Expansion Subsystem)

<i><u>For a Sun SPARCserver 5</u></i>	<i><u>For a Sun SPARCserver 10</u></i>
SBus Slot 5	SBus Slot f
SBus Slot 4	SBus Slot 0 HSI
SBus Slot 1 cgsix	SBus Slot 1 lebuffer le dma esp
SBus Slot 2 lebuffer le dma esp	SBus Slot 2 lebuffer le dma esp
SBus Slot 3	SBus Slot 3
SBus Slot 0	
 <i><u>For a Sun SPARCserver 20</u></i>	
SBus Slot f	
SBus Slot e	
SBus Slot 0 HSI	
SBus Slot 1 lebuffer le dma esp	
SBus Slot 2	
SBus Slot 3	

This particular information tells you that the *Sun SPARCserver 5* computer has a Turbo GX video card in SBus slot 1 and an FSBE/S card in SBus slot 2. The *Sun SPARCserver 10* computer has an HSI/S card in SBus slot 0 and FSBE/S cards in SBus slots 1 and 2. The *Sun SPARCserver 20* computer has an HSI/S card in SBus slot 0 and an FSBE/S card in SBus Slot 1.

Note Disregard SBus slots 5, 4, and 0 on the *Sun SPARCserver 5*, SBus slot f on the *Sun SPARCserver 10*, and SBus slots f and e on the *Sun SPARCserver 20*. These slots are already being used by devices directly integrated into the system board.

To identify SBus cards in the *Sun SBus Expansion Subsystem*, do the following:

1. Before connecting the SBus Expansion Subsystem, make sure the power is turned off. Use the following sequence to turn the power off:
 - a. *Sun SPARCserver* computer (system unit).
 - b. *Sun SBus Expansion Subsystem*.
 - c. System monitor.
 - d. Continue turning off each device moving away from the system unit.
 - e. External drive units, starting with the unit closest to the system unit.
2. Attach one end of the SBus Expansion Subsystem cable to the SBus Expansion connector on the Expansion Adapter card. Attach the other end of the cable to the SBus Expansion connector (labeled SBus EXP) on the rear end of the SBus Expansion Subsystem.
3. Turn the power on in the following sequence:
 - a. Devices connected to the SBus Expansion Subsystem.

Note Remember to power on the SCSI devices starting with the device at the end of the SCSI chain, and work your way down to the *Sun SPARCserver* computer.

- b. Devices attached to the *Sun SPARCserver*
- c. *Sun SBus Expansion Subsystem*
- d. *Sun SPARCserver* computer
- e. Monitor.

4. Run the `show-sbus` command. Follow procedure 2 on page 3-13.

Below are examples of what would appear on your screen after you enter the `show-sbus` command for a *Sun SPARCserver* computer with a *Sun SBus Expansion Subsystem* installed:

Example 1: `SBus Slot 2 SUNW,xbox lebuffer dma lebuffer dma HSI`

Example 2: `SBus Slot 2 SUNW,xbox lebuffer dma HSI`

Example 3: `SBus Slot 2 SUNW,xbox HSI`

The names of the SBus cards in the SBus Expansion Subsystem appear after the name of the Expansion Adapter card (SUNW,xbox).

Table 3-5, Table 3-6, and Table 3-7 provide explanations of the above examples. Note that the contents of the *Sun SBus Expansion Subsystem's* SBus slots are displayed in reverse order (slot 0 being last).

**Table 3-5: Summary of *show-sbus* Command (3 SBus cards in SBus Expansion Subsystem)
Example 1**

SBus Slot 2	SUNW,xbox	lebuffer dma	lebuffer dma	HSI
Refers to the SBus slot in the SPARCserver computer	SBus Expansion Adapter card in slot 2 of the SPARCserver computer	FSBE/S card in slot 2 of the SBus Expansion Subsystem	FSBE/S card in slot 1 of the SBus Expansion Subsystem	HSI/S card in slot 0 of the SBUS Expansion Subsystem

**Table 3-6: Summary of *show-sbus* Command (2 SBus cards in SBus Expansion Subsystem)
Example 2**

SBus Slot 2	SUNW,xbox	lebuffer dma	HSI
Refers to the SBus slot in the SPARCserver computer	SBus Expansion Adapter card in slot 2 of the SPARCserver computer	FSBE/S card in slot 1 of the SBUS Expansion Subsystem	HSI/S card in slot 0 of the SBus Expansion Subsystem

Table 3-7: Summary of *show-sbus* Command (1 SBus card in SBus Expansion Subsystem)
Example 3

SBus Slot 2	SUNW,xbox	HSI
Refers to the SBus slot in the SPARCserver computer	SBus Expansion Adapter card in slot 2 of the SPARCserver computer	HSI/S card in slot 0 of the SBus Expansion Subsystem

5. Power everything off again using the power off sequence on page 3-15.
6. After you have turned the power off on all components, finish connecting all other external devices. Procedures begin on page 3-18.

Connecting External SCSI Devices

This section describes how to connect the SCSI peripherals/devices (tape drives, CD-ROM drives, and hard disks) to the *Sun SPARCserver* computer or *Sun SBus Expansion Subsystem*.

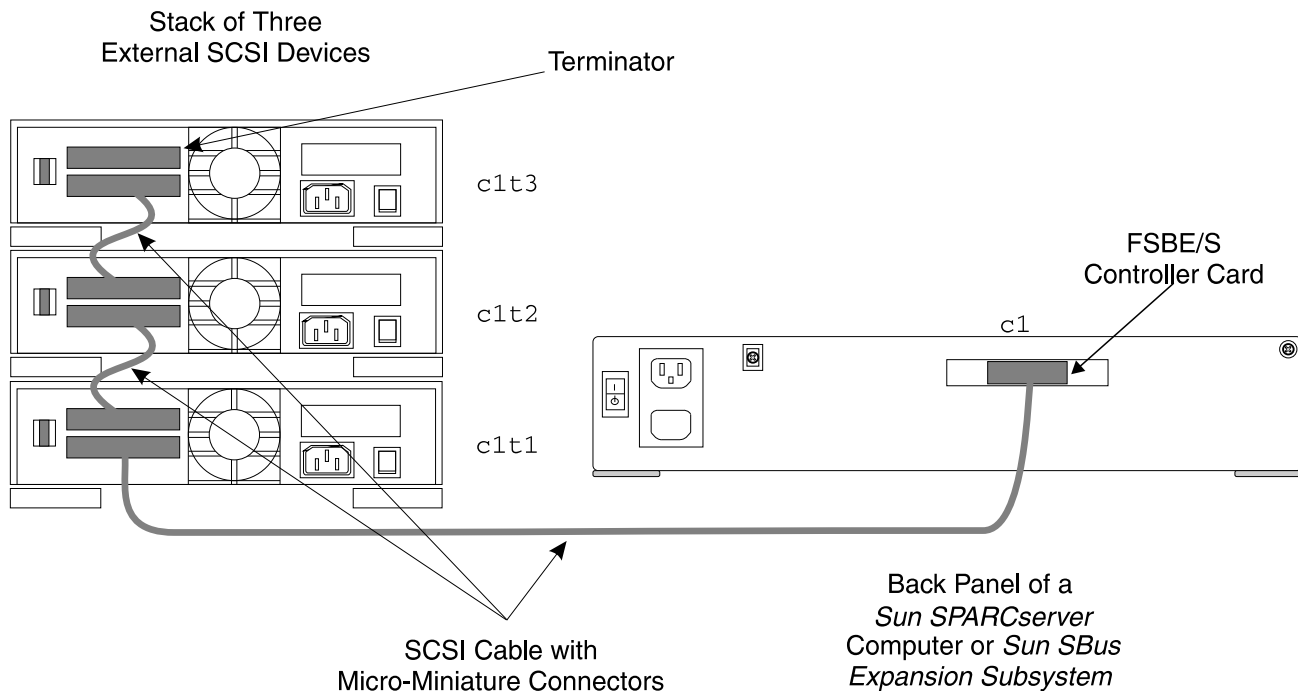
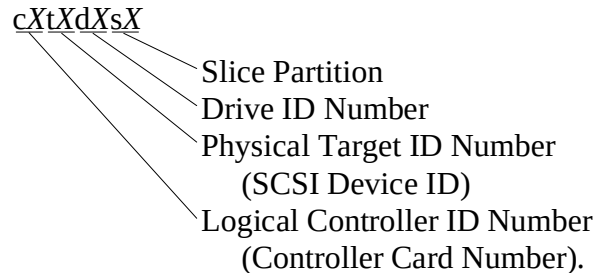


Figure 3-7: Sample Daisy Chaining of External SCSI Devices

The SCSI devices are daisy-chained together which allows a single FSBE/S controller card to support more than one device on a single SCSI bus (see Figure 3-7). A SCSI cable connects the controller card port to one of the micro-miniature connectors on the back of the SCSI device. The next SCSI device is connected to the previous device using another SCSI cable. This process continues until all of the assigned devices have been connected to the SCSI bus. The last device in each chain must have a SCSI terminator attached to one of the micro-miniature connectors on the back of that device.

The external hard disk drives (shipped from the factory) have already been partitioned and assigned logical addresses. The logical address format is as follows:



You must connect the disk drives to the same controller card that they were connected to when they were partitioned at the factory. To ensure that the drives are connected properly, a label has been attached to each disk drive. This label uses the first four characters of the address format (for example, `c1t2`) to identify the drive. Figure 3-7 shows an example of three external disks connected to the FSBE/S controller card `c1`. Therefore, the external disks are labeled `c1t1`, `c1t2`, and `c1t3`, respectively.

You can have up to three SCSI controllers on your system. One is built into the *Sun SPARCserver* computer and the other two are provided through FSBE/S controller cards. Controller `c1` is the first FSBE/S card and controller `c2` is the second. The system determines which FSBE/S card is first (`c1`) by searching the SBus slots in the order they are listed in Table 3-4 on page 3-14.

For example: the *Sun SPARCserver* 10 computer, listed in Table 3-4, has controller `c1` in SBus slot 1 and controller `c2` in SBus slot 2.

Connect any external SCSI devices to the computer. Figure 3-8 shows how to daisy chain the SCSI bus through these devices. In addition, you need to make the power connections for the drives. Make sure that the last device in each chain has a SCSI terminator attached to one of the micro-miniature connectors.

Figure 3-8 shows the maximum number of external drives configured for the *Sun SPARCserver* computer. If the customer's external configuration is less than the maximum, the number of devices in each daisy-chain may vary. The SCSI terminator must be placed on the last device in the chain.

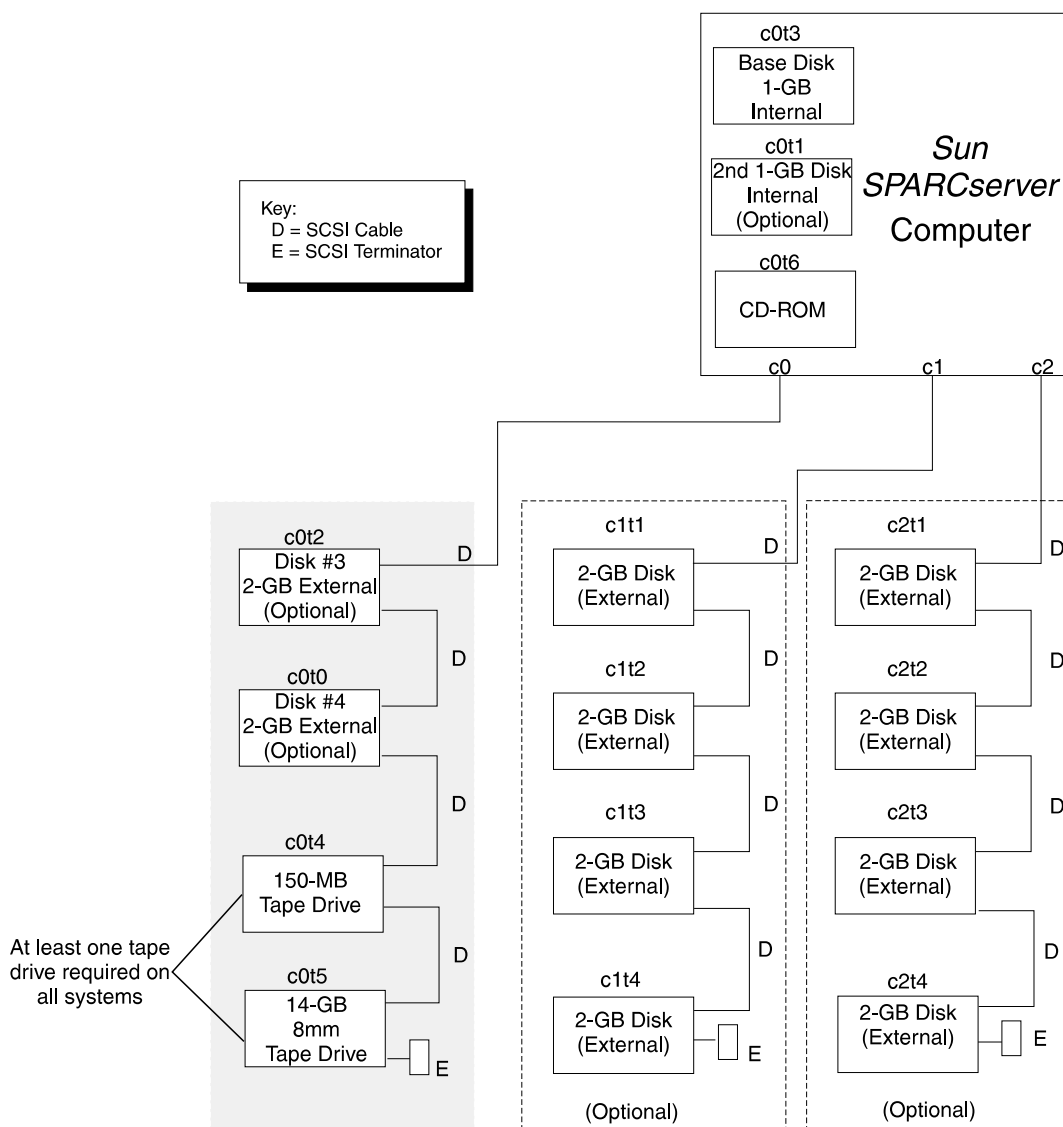


Figure 3-8: External SCSI Device Connectivity

If you need additional information about installing SCSI devices, refer to Appendix D, "Sun SPARCserver Computer Factory Installation Procedures", and the following "Additional References" section.

Additional References For additional information, refer to the following documentation:

"Sun" "Solaris" 2.x Handbook for SMCC Peripherals,
Chapter 2: "Setting Up Disk Drives"
Chapter 3: "Setting Up Tape Drives"
Chapter 4: "Setting Up CD-ROM Drives."

Desktop Storage Pack Installation and Operation Manual,
Appendix B: "Small Computer Serial Interface Information."

Connecting the *SunLink* HSI/S Patch Panel

This section describes how to connect the HSI/S patch panel to the HSI/S controller card (previously installed in the *Sun SPARCserver* computer) using a 96-pin cable (see Figure 3-9, shaded portion).

Note The *Sun SPARCserver* 5 needs a *SunLink* HSI/S Patch Panel **only** if you have an HSI/S card installed.

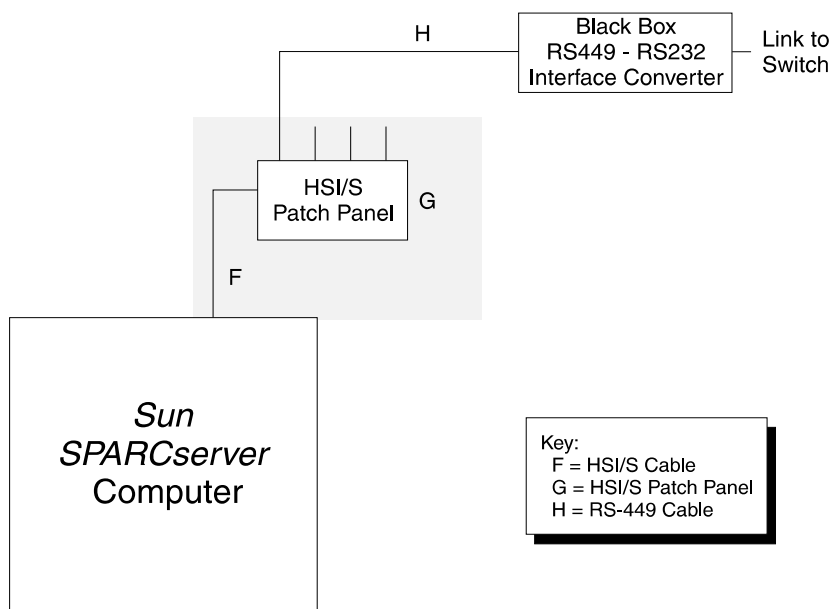


Figure 3-9: *SunLink* HSI/S Patch Panel Connectivity

To connect the HSI/S patch panel to the HSI/S controller card, do the following:

1. Connect one end of the 96-pin cable to the 96-pin connector on the HSI/S patch panel.
2. Connect the other end of the 96-pin cable to the 96-pin connector on the HSI/S controller card.
3. Make sure the locking mechanisms on each end of the 96-pin cable click closed.

Additional References For additional information, refer to the following documentation:

“SunLink” HSI/S 2.0 Installation and Administration Guide,
Chapter 2: “Installing the HSI/S Controller Card and
Patch Panel” (Sections 2.11 and 2.12).

Setting the Black Box DTE/DCE DIP Shunts

This section describes how to set the DIP shunts inside the interface converter to assign the RS-422/RS-449 input port for DCE operation and the RS-232 output port for DTE operation (see Table 3-8 and Figure 3-10).

Table 3-8: DTE/DCE DIP - Shunt Settings

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

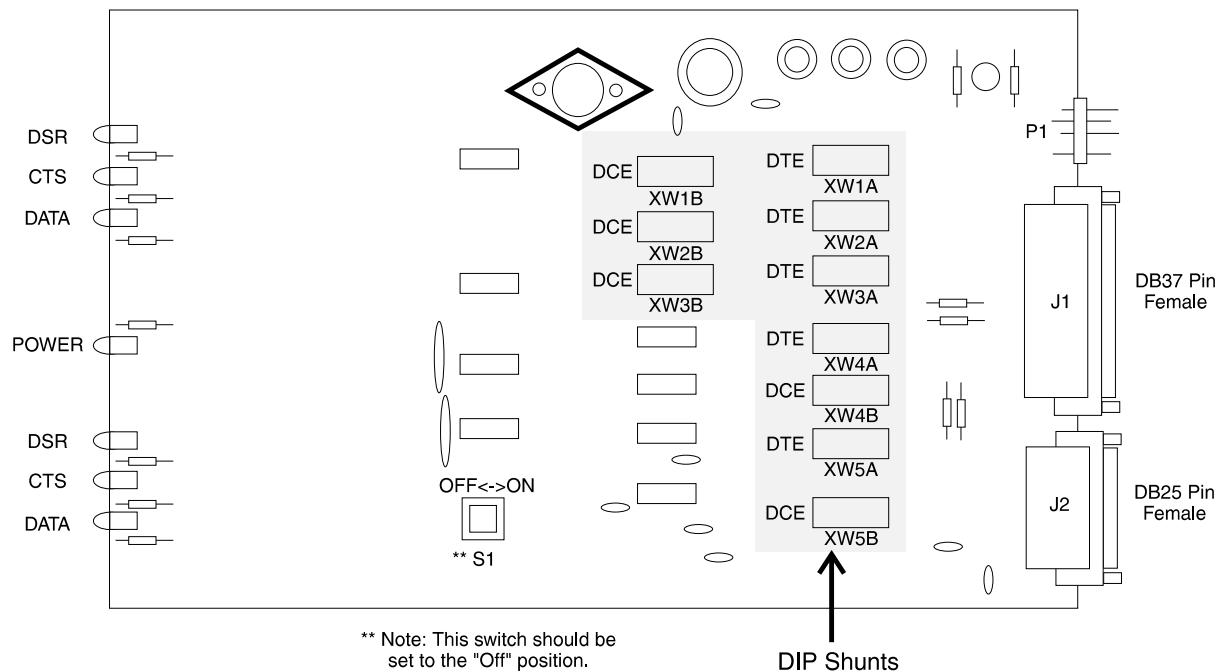
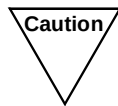


Figure 3-10: Black Box Component Layout — DTE/DCE DIP-Shunt Locations

To reassign these ports:

1. Disconnect all power and cables from the Black Box converter.
2. Open the interface converter.
3. Move the DIP shunts to the appropriate DIP-shunt sockets by doing the following:
 - a. Carefully slide the tip of a common screwdriver between the DIP-shunt jumper and the DIP-shunt socket.



Be very careful when moving the DIP shunts. The DIP-shunt pins are fragile and could easily be bent or broken.

- b. Gently pry/wiggle the DIP-shunt jumper free from the socket.
 - c. Move the DIP-shunt jumper to the appropriate socket (see Table 3-8).
 - d. Carefully align the pins, and gently press the DIP-shunt jumper into place.

Additional References For additional information, refer to the following documentation:

*RS-232 ↔ RS-422 Interface Converter
Installation and Operation Manual,*
Section 2.0: "Introduction"
Section 3.0: "Installation"
Section 4.0: "Configuration."

Connecting the HSI/S Patch Panel to the Interface Converter

This section describes how to connect an RS-449 port on the HSI/S patch panel to the RS-422/RS-449 DCE port on the Black Box interface converter (see Figure 3-11, shaded portion).

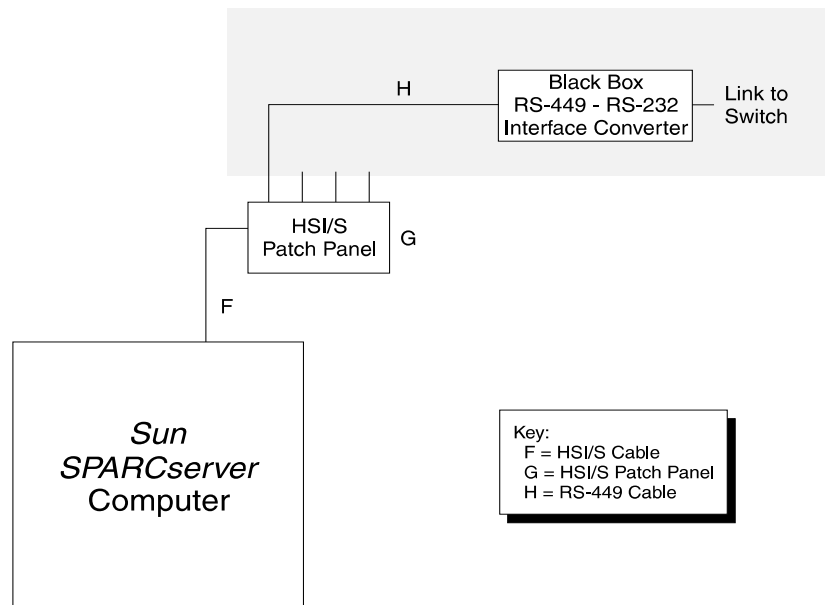


Figure 3-11: Black Box Interface Converter Connectivity

To connect the RS-449 port on the HSI/S patch panel to the DCE input port on the Black Box interface converter, do the following:

1. Connect the EDN37K-MM (RS-449) cable to the 37-pin port on the rear panel of the interface converter.
2. Connect the other end of the EDN37K-MM (RS-449) cable to the RS-449 port on the HSI/S patch panel.

Note

If you connect more than one switch to the system, connect the switches in the following order:

First switch to HSI/S Port 0

Second switch to HSI/S Port 1

Third switch to HSI/S Port 2

Fourth switch to HSI/S Port 3.

Additional References

For additional information, refer to the following documentation:

“Sun” “SPARCstation” 20 Installation Guide.

“Sun” “SPARCstation” 10 Installation Guide.

“Sun” SPARCstation” 5 Installation Guide.

Connecting Network Hub Unit

This section describes how to connect the network hub unit(s) to the *Sun SPARCserver* computer using Unshielded Twisted-Pair (UTP) cables in a Twisted-Pair Ethernet (TPE) configuration.

Note

Do **not** use telephone extension cables in 10Base-T networks. The telephone extension cable wire pairs are not twisted and do not meet the requirements for use in a 10Base-T network.

Three different types of network hub units can be used:

- IBM 8222 Network Hub unit (uses standard UTP network cables)
- Allied Telesis - MR820T Network Hub unit (used standard UTP network cables)
- StarLAN Fiber Optic Hub unit (uses fiber optic network cables).

The standard CMS configuration uses the IBM 8222 Network Hub unit or the Allied Telesis - MR820T Network Hub unit. The StarLAN fiber optic hub can be used when you need more distance between the hub unit and the NTS(s). Table 3-9 outlines the maximum distances associated with each type of network cables being used.

Table 3-9: Maximum Network Cable Distances

Type of Cable	Maximum Cable Distance
UTP (Unshielded Twisted Pair) (Category 3 or 5)	100 meters / 328 feet
15-pin AUI	100 meters / 328 feet
Fiber Optic cable (62.5 mm dual strand cable)	3000 feet

If you need more distance between the network hub unit and the NTS(s), refer to the following “Optional Fiber Optic Network Configurations” section in this chapter.

Optional Fiber Optic Network Configurations

This section briefly describes additional network configurations which can be used to increase the distance between the network hub and the NTS(s). These configurations use fiber optic cables and/or fiber optic hubs.

The configuration shown in Figure 3-12 illustrates two network hubs connected through a fiber optic network hub. This configuration allows the network to be spread across multiple buildings. For example, this would be useful in a situation where the *Sun SPARCserver* computer, network hub, and one NTS are located in one building, the fiber hub and another NTS are located in an adjacent building, and another network hub with two additional NTSSs are located in another adjacent building.

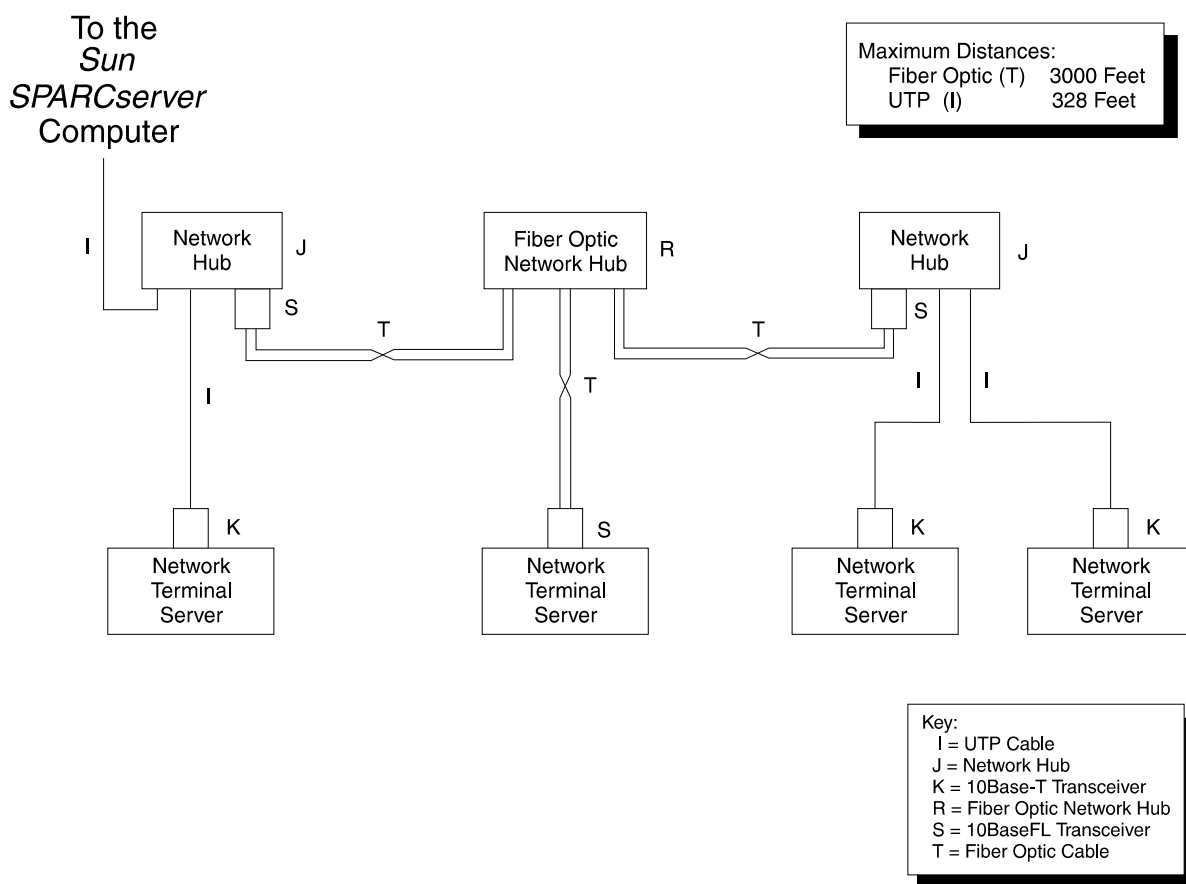


Figure 3-12: Optional/Sample Fiber Optic Configuration

The configuration shown in Figure 3-13 illustrates two network hubs connected with a fiber optic cable. This configuration allows the network to be spread across two adjacent buildings. For example, this would be useful in a situation where the *Sun SPARCserver* computer, network hub, and two NTSSs are located in one building, while the other network hub and remaining two NTSSs are located in an adjacent building.

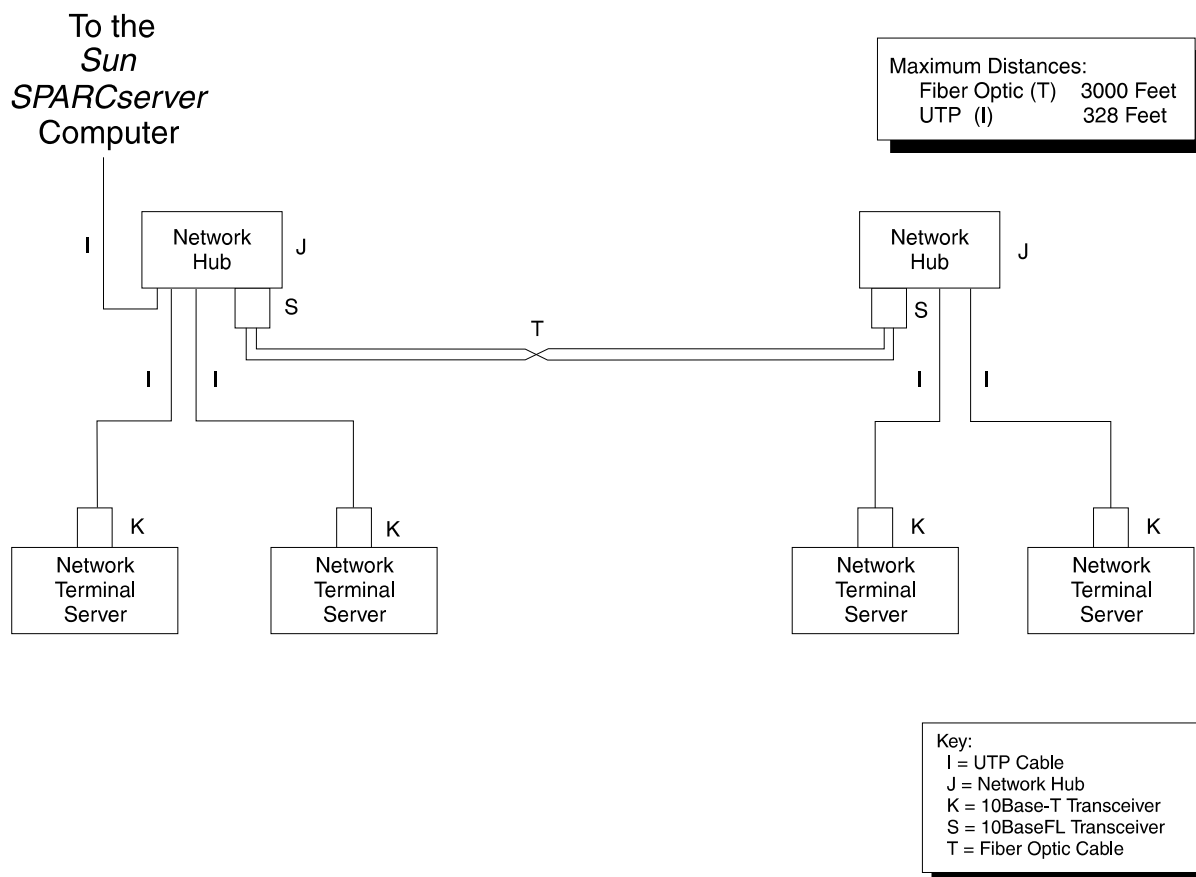


Figure 3-13: Optional/Sample Fiber Optic Configuration

The configuration shown in Figure 3-14 illustrates a network hub connected to four NTSSs. This configuration allows the network to be spread across multiple buildings. For example, this would be useful in a situation where the *Sun SPARCserver* computer, network hub, and three NTSSs are located in one building, while an additional NTS is located in an adjacent building.

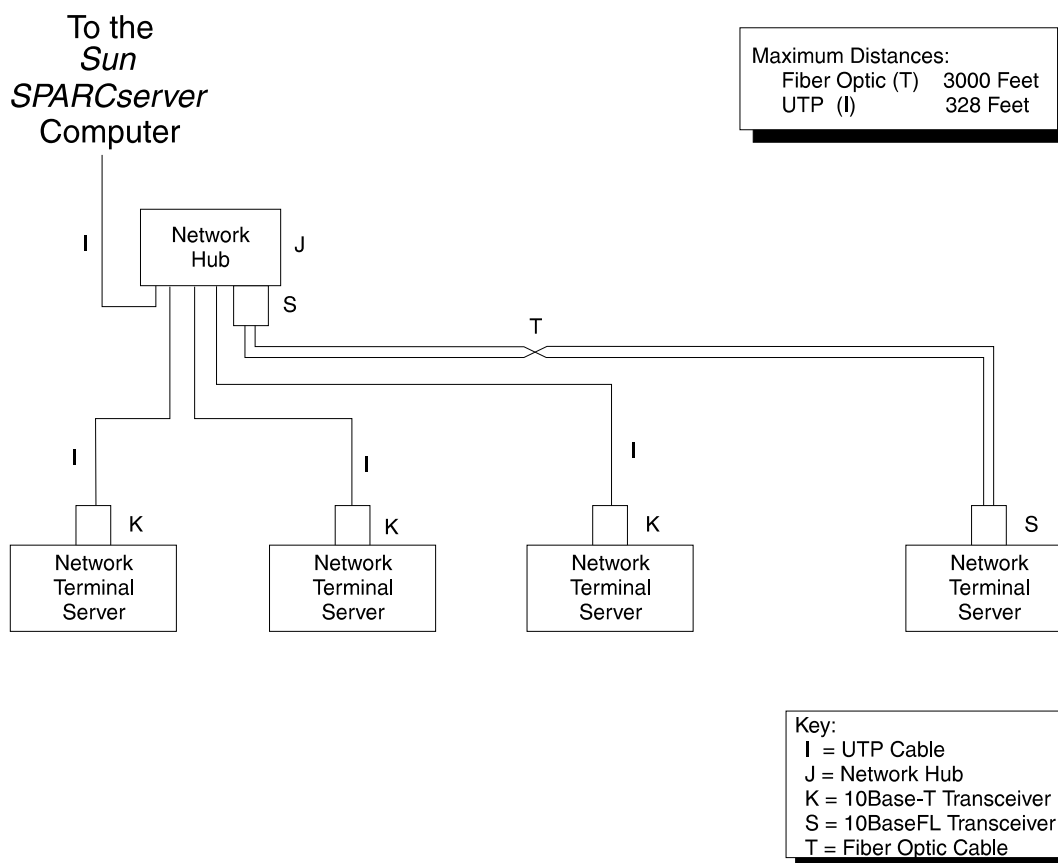


Figure 3-14: Optional/Sample Fiber Optic Configuration

Installing the IBM 8222 or the Allied Telesis Network Hub Unit

This section describes how to connect the IBM 8222 or the Allied Telesis Network Hub unit to the *Sun SPARCserver* computer. These hub units may be used in conjunction with other network hub units.

To connect the Network Hub unit to the *Sun SPARCserver* computer, do the following (see Figure 3-15):

1. Position the network hub unit in the location selected by the customer. Make sure the power switch is set to *Off*.
2. Plug the power cord into a wall outlet or to a UPS (if equipped).
3. Plug one end of the UTP cable into the twisted-pair connector on the back of the *Sun SPARCserver* computer.

Use the UTP cable that came with your *Sun SPARCserver* computer (part number 180-1529-01).

4. Plug the other end of the UTP cable into Port 1 of the 10Base-T ports on the Network Hub unit (see Figure 3-15).

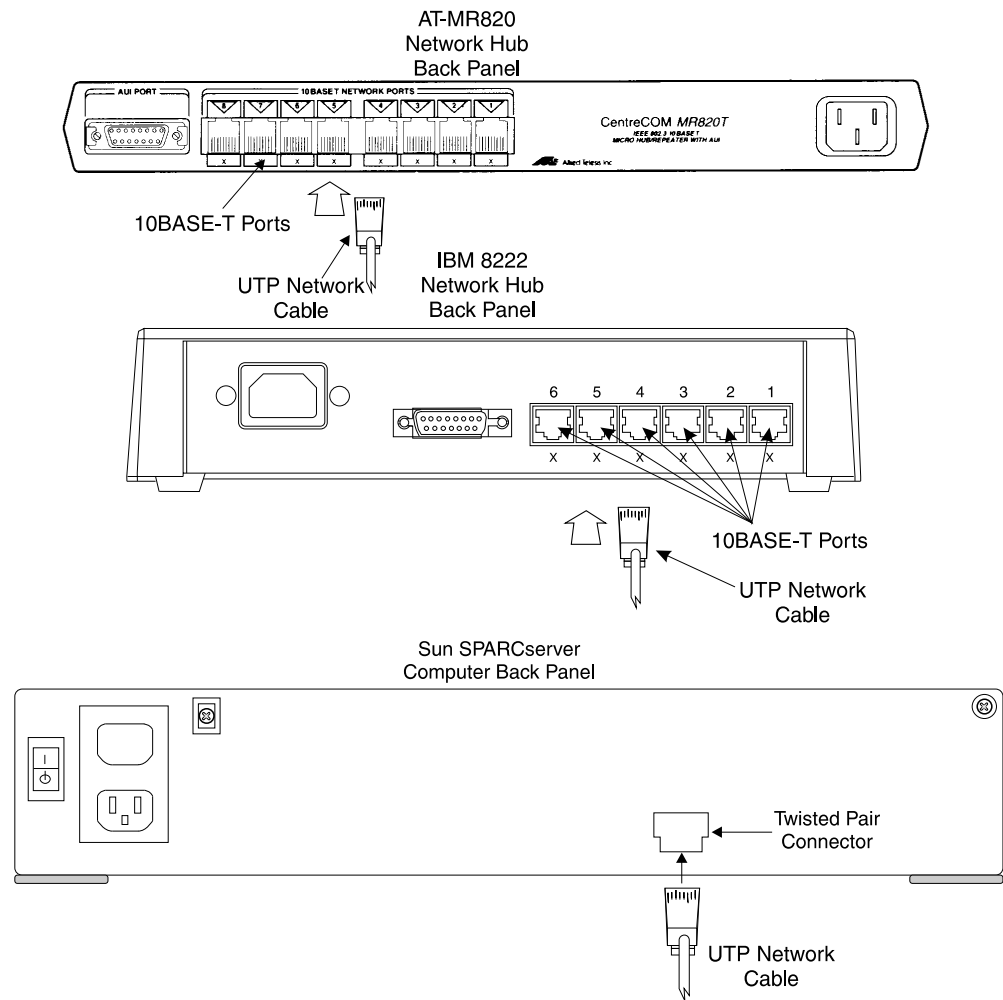


Figure 3-15: Network Hub Units — Back Panel

Additional References For additional information, refer to the following documentation:

IBM 8222 6-Port 10Base-T Workgroup Hub Installation and Planning Guide,

Chapter 2: "Installing the IBM 8222."

Allied Telesis CentrCom AT-820T Multiport 10BASE-T Micro Repeaters Users Manual,

Chapter 2: "Installation."

Installing the StarLAN 10 Network Fiber Hub Unit

This section describes how to connect the StarLAN 10 Network Fiber Hub unit to the *Sun SPARCserver* computer. This hub unit may be used in conjunction with other network hub units.

To connect the Starlan 10 Network Fiber Hub unit to the network, do the following (see Figure 3-16):

1. Position the network fiber hub unit in the location selected by the customer. Make sure the power switch is set to *Off*.
2. Plug the power cord into a wall outlet or to a UPS (if equipped).
3. Plug one end of the fiber optic cable into the transmit (Tx) and receive (Rx) connectors on the front of the network fiber hub unit (see Figure 3-16).

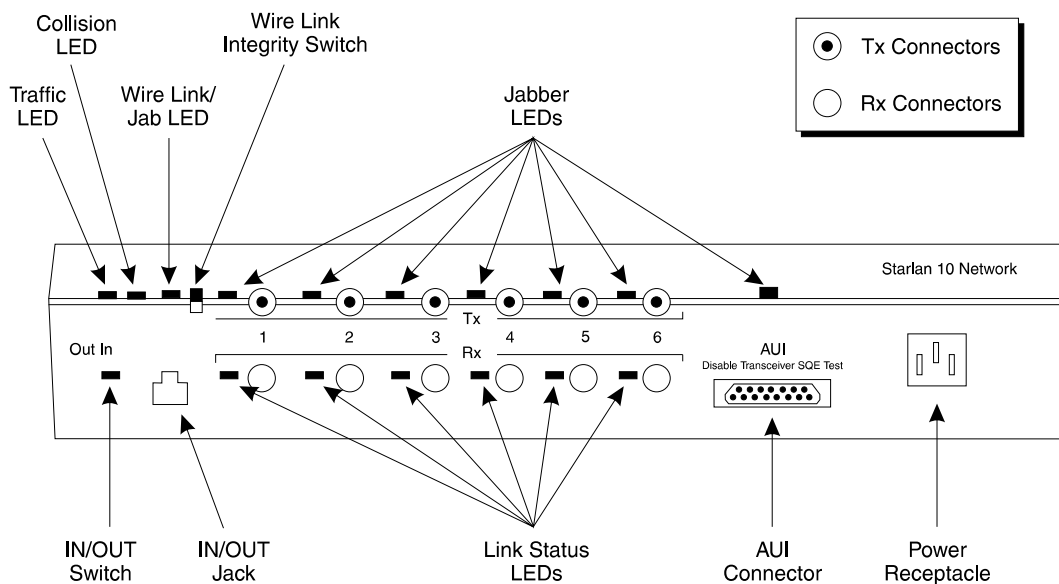


Figure 3-16: StarLAN 10 Network Fiber Hub Unit

The fiber optic cable has two plugs on each end. Generally, the two plugs are color-coded or identified in some other manner. Make a note of which plug is attached to the Tx and Rx ports on the hub unit.

4. Plug the other end of the fiber optic cable into the 10Base-FL transceiver connected to either the network hub or NTS.

Connect the plugs just opposite of how they were attached at the other end (i.e., the plug that was attached to the Tx port at the other end should be connected to the Rx port at this end and the plug that was attached to the Rx port at the other end should be connected to the Tx port at this end).

Additional References For additional information, refer to the following documentation:

AT&T StarLAN 10 Network Fiber Hub Installation Guide (999-100-458).

Connecting the NTS(s) to the Network Hub

This section describes how to connect the 8-, 16-, and 64-port NTS (see Figure 3-17) to the network hub unit. This section also describes how to connect the four 16-port NTS patch panels to the 64-port NTS.

Note Do **not** use telephone extension cables in 10Base-T networks. The telephone extension cable wire pairs are not twisted and do not meet the requirements for use in a 10Base-T network.

The 64-port NTS provides twelve 50-pin PBX-champ connectors used to attach 64 serial devices using the patch panel cables and patch panels. These serial devices are accessed via the local Ethernet network.

Note If the NTS needs to be administered (for example the NTS has not been administered or if you are adding an NTS to your system), follow the procedure outlined in the “Administering the Network Terminal Servers” section of Appendix D, “*Sun SPARCserver Computer Installation Procedures*.”

Additional References

For additional information, refer to the following documentation:

Network Terminal Server: Hardware Installation Guide,
Chapter 2: “Installing the NTS.”

“*Xylogics*” Micro Annex Communications Server Hardware
Installation Guide,
Chapter 2: “Installing the Micro Annex.”

Figure 3-17 shows the rear panels of the 8-, 16-, or 64-port NTS, but does not show the rear panel of the 8-port (0 parallel port) NTS..

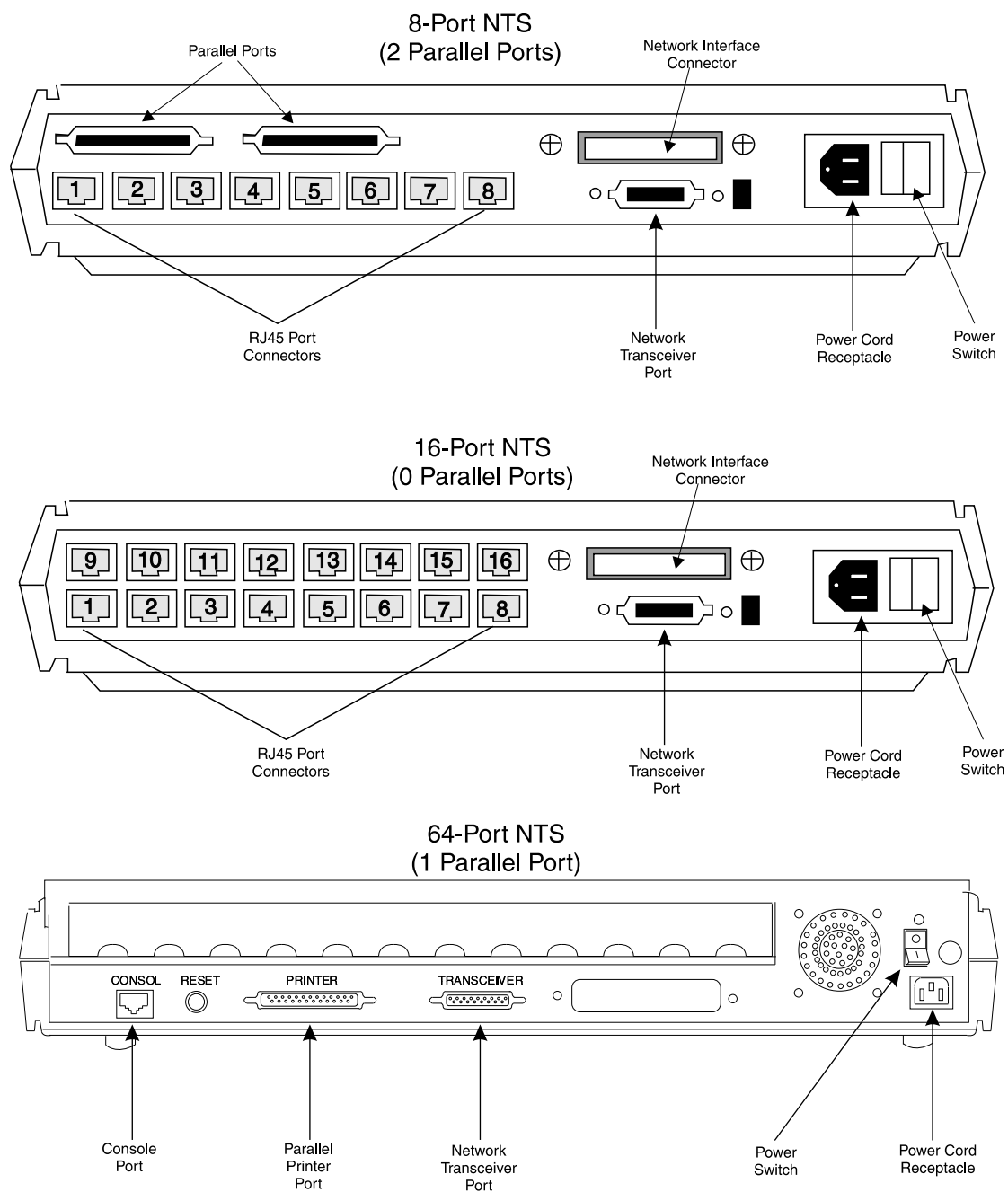


Figure 3-17: 8-, 16-, and 64-Port NTSs — Back Panels

If you are connecting more than one NTS to the network hub unit, use Table 3-10 to determine how to connect the UTP cable between the network hub unit and the NTS.

Table 3-10: Network Hub Port Connectivity

NTS	NTS Name	Network Hub Port
First	cmsterm1	2
Second	cmsterm 2	3
Third	cmsterm3	4
Fourth	cmsterm4	5
Fifth	cmsterm5	6
Sixth	cmsterm6	7
Seventh	cmsterm7	8

To connect the NTS(s) to the network hub unit, do the following:

1. Position the NTS(s) in the location selected by the customer. Make sure each power switch is set to *Off*.
2. Plug each power cord into a wall outlet or to an UPS (if equipped).
3. Plug one end of the UTP cable into the next available port on the 10Base-T ports on the Network Hub unit.

4. Connect the 10Base-T transceiver to the transceiver port on the back of the NTS. Verify that the 10Base-T Transceiver switch setting is set to SQE = Off.

Note

You may have an older version of a 10Base-T Transceiver which allows you to physically change three switch setting: SQE, Link, and LRT. If you have this older version, verify that the switch settings are set to the following:

- SQE = Off
- Link = On
- LRT = Off.

5. Plug the other end of the UTP cable into the transceiver previously connected to the back of the NTS.

Note

The 8-port (0 parallel ports) NTS comes with two connectors that can be used to connect the NTS to the Network Hub:

- Transceiver connector (instructions above)
- Ethernet connector.

You can use either connector to connect the NTS to the Network Hub. To use the Ethernet connector, do the following:

1. Plug one end of the UTP cable into a port on the 10Base-T ports on the Network Hub unit.
2. Plug the other end of the UTP cable into the RJ45 jack located on the back of the NTS.

See Figure 3-18 to see how the NTS is connected to the network hub unit.

Figure 3-18 shows how to connect either the 8-, 16-, or 64-port NTS to the network hub unit.

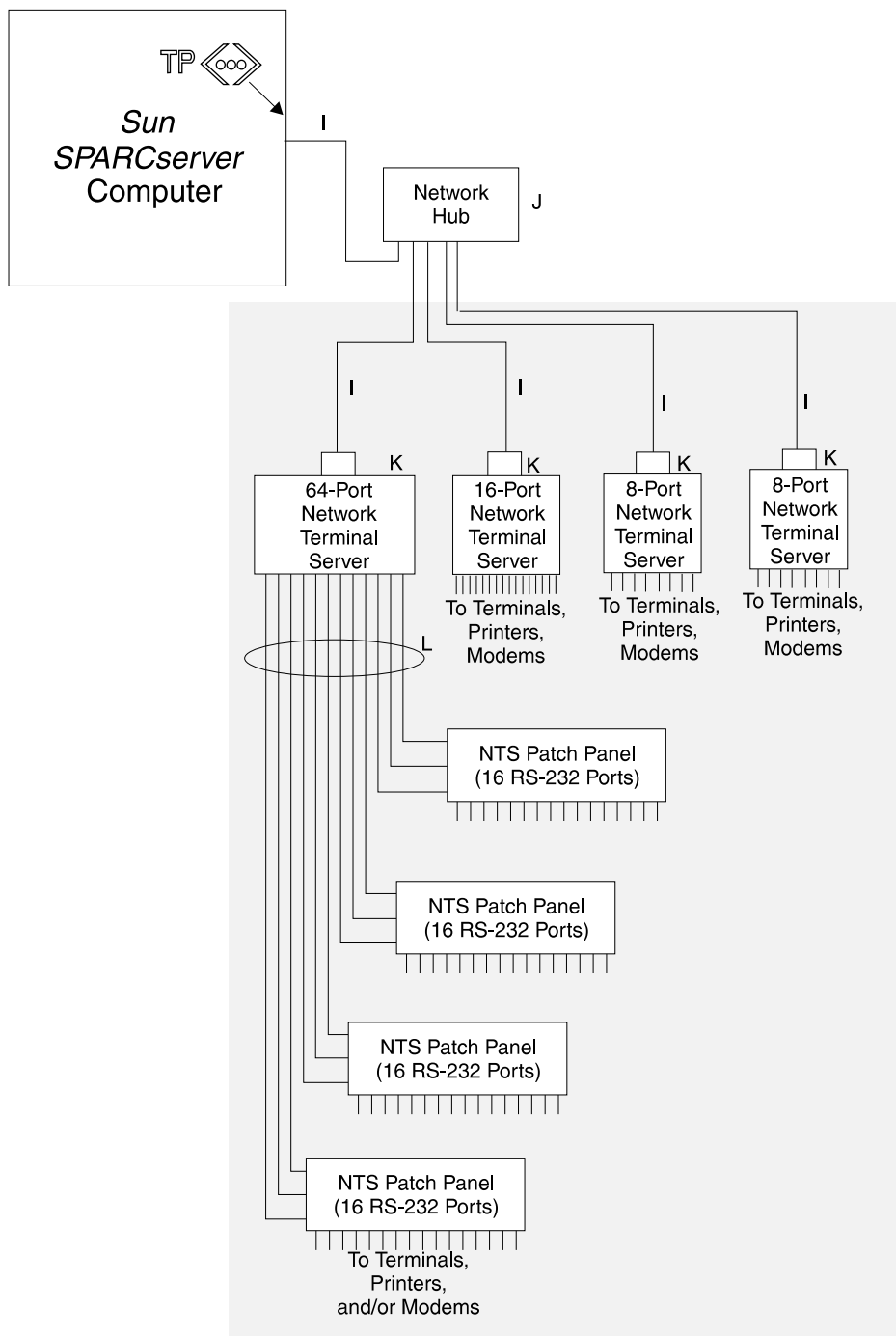


Figure 3-18: Sun SPARCserver Computer NTS Connectivity

Connecting the NTS Patch Panel(s) to the 64- Port NTS

This section describes how to connect the 16-port patch panel(s) to the 64-port NTS (see Figure 3-19 and Figure 3-20).

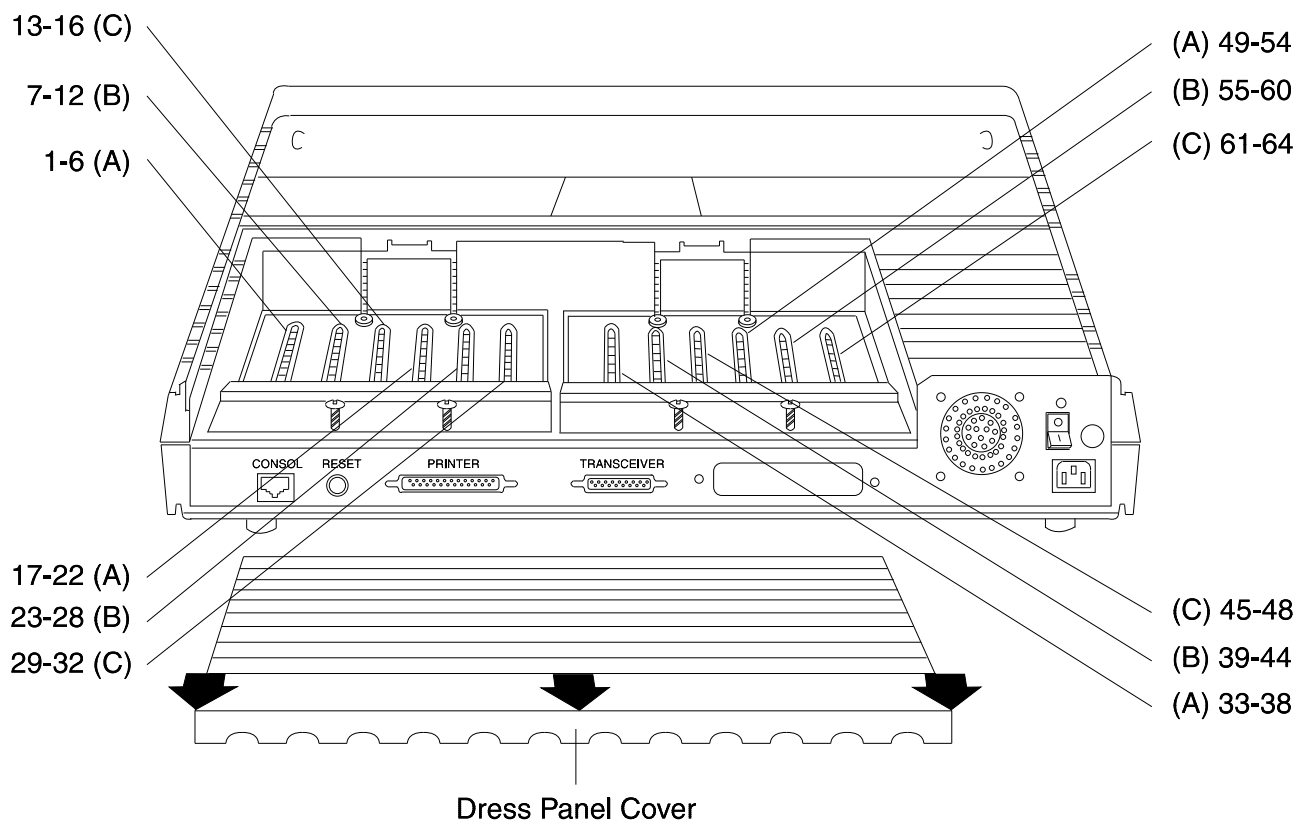


Figure 3-19: 64-Port Network Terminal Server — PBX-Champ Connectors and Port Definitions

To connect a 16-port NTS patch panel (see Figure 3-20) to the 64-Port NTS (see Figure 3-19), do the following:

1. Remove the back panel of the NTS by sliding it toward the back of the NTS. (This cover is located on the top back corner of the NTS.)
2. Slide the cable retainer back to allow room for the cable(s).
3. Position the 16-port patch panel in the location selected by the customer.
4. Connect the PBX ends of the patch panel cable to the PBX-champ connector.

Each 16-port patch panel has three connectors (see Figure 3-20) which connect to the PBX-champ connectors located inside the NTS (see Figure 3-19). The PBX-champ connectors are also labeled A, B, and C, respectively.

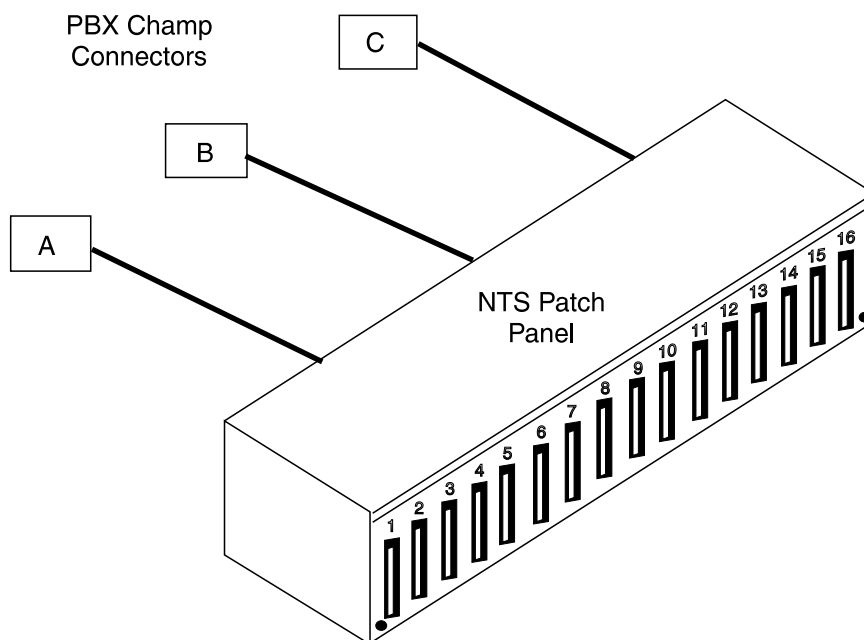


Figure 3-20: NTS Patch Panel

5. Tighten the screw on the PBX end of the cable.
6. Slide the cable retainer forward. Make sure that the lip of the retainer secures the connector.

Repeat Steps 3 through 6 for each NTS patch panel being installed.

7. Replace the back panel of the 64-Port NTS (to its original position) by sliding it toward the front of the NTS.

Connecting the UPS

The Uninterruptible Power Source (UPS) provides a temporary electrical supply to the *Sun SPARCserver* computer for about 7 minutes. If the computer is without power for longer than 7 minutes, the system may shut down and you could lose data.

Use the procedures in this section to connect the UPS to the *Sun SPARCserver* computer.

Note

These procedures apply to an AT&T UPS. If another UPS is used, refer to the documentation provided with that UPS.

Required Parts

Obtain the following parts:

- UPS (see Table 3-11):

Table 3-11: UPS(s) and Part Numbers

UPS Model	PEC	Comcode
1KVA	2403-405	407195379
2KVA	2403-204	406312983
3KVA	2403-123	406672345
4.5KVA	2403-245	406929620
6KVA	2403-206	406974071
8KVA	2403-208	406929638
10KVA	2403-220	406974089
12KVA	2403-222	406974097
14KVA	2403-314	406687616
18KVA	2403-318	406672352

- Appropriate power supply and outlet strip(s).

Procedure

To connect the UPS, do the following:

1. Plug the power cord of the UPS into a 120 V AC outlet.
2. Turn on the power to the UPS.

Setting Up the Remote Console

This section describes how to set up the Remote Console (also called the remote access port) which allows the TSC to dial in and do remote maintenance. To set up the Remote Console, do the following:

- Verify the Remote Console modem options
- Connect the Remote Console modem to the A port on the *Sun SPARCserver* computer.

If you need additional information, refer to the Remote Console section(s) of Appendix D, "Sun SPARCserver Computer Factory Installation Procedures".

Setting the Remote Console Modem Options

This section describes how to set the Remote Console modem options.

Before you connect the Remote Console modem to the computer, you need to set the modem options. The *Sun SPARCserver* computer supports the following modems:

- AT&T Paradyne DataPort Express (Model 3715)
- AT&T Paradyne Comsphere 3830.

To set the modem options, see the appropriate section that follows.

AT&T Paradyne DataPort Express (Model 3715)

Do these steps to set the options for the AT&T Paradyne DataPort Express (Model 3715) modem:

1. Connect a dumb terminal to the 25-pin connector located at the back of the modem. For information on connecting the terminal to the modem, refer to the user documentation that came with the modem.

Note

The terminal speed must be set to **either** 2400 or 9600 baud. The terminal speed must match the intended modem setting.

2. Make the necessary power connections to the modem and the terminal.
3. Turn the modem and terminal *On*.
4. At the terminal, enter the following soft options (use only zeros and numerical ones in the commands):

```
AT&F      (factory default settings)
AT%B9600 (Modulation/Data Rate is set to V.32bis/V.32-max.rate
9600bps)
AT&T5     (denies request for Remote Digital Loopback test)
AT&C2     (LSD Control forced on, but turns off momentarily when
disconnected)
AT&D2     (follows standard RS-232 operation)
ATE0Q1&W0 (disable echo, disable result codes, save to
profile 0)
```

If you are using a modem with 9600 baud speed, use AT%B9600 (<9600> baud) instead of AT%B2400 (<2400> baud).

If needed, reset the modem using the power switch on the back.

Note

It is not necessary to enter the AT&D2 option since it is the default. However, the AT&D3 option which was used for AT&T Modem 3710 should **not** be used for this modem.

AT&T Paradyne Comsphere 3830

Do these steps to set the options for the AT&T Paradyne Comsphere 3830 modem:

1. Connect a dumb terminal to the 25-pin connector located at the back of the modem. For information on connecting the terminal to the modem, refer to the user documentation that came with the modem.

Note

The terminal speed must be set to **either** 2400 or 9600 baud. The terminal speed must match the intended modem setting.

2. Make the necessary power connections to the modem and the terminal.
3. Turn on the modem and terminal.
4. At the terminal, enter the following soft options (use only zeros and numerical ones in the commands):

```
AT&F3      (factory default settings)
ATS41=3    (9600 baud handshake)
AT&C1&D1&R0&S1\D1 (set up standard RS-232 handshaking)
AT&W0      (save to active profile)
```

If you are using a modem with 9600 baud speed, use `ATS41=3 (<9600> baud handshake)` instead of `ATS41=6 (<2400> baud handshake)`.

If needed, reset the modem using the power switch on the back.

Connecting the Remote Console to the Sun SPARCserver Computer

This section describes how to connect the Remote Console modem to the *Sun SPARCserver* computer (see Figure 3-21).

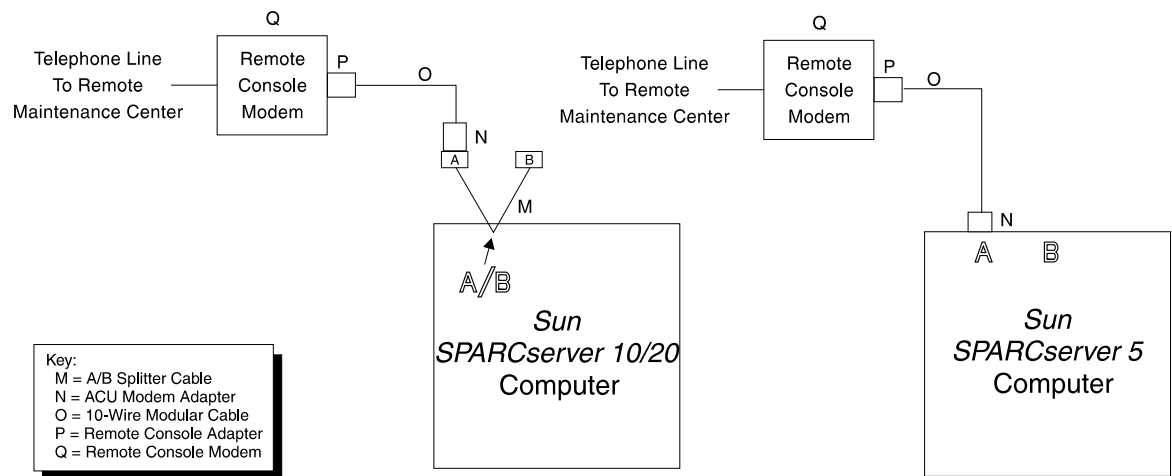


Figure 3-21: Remote Console Connectivity

To connect the Remote Console modem to the *Sun SPARCserver*, do the following (see Figure 3-21):

Note

If you have a *Sun SPARCserver* 10 or 20, use Steps 1-6. For *Sun SPARCserver* 5, use Steps 2-6.

1. Connect the male end of the serial interface (A/B splitter) cable to the serial connector on the back panel of the *Sun SPARCserver* CPU.
2. Connect the ACU Modem adapter to the "A" serial port interface.
3. Connect one end of a 10-conductor cable to the ACU Modem adapter installed in the previous step.
4. Connect the other end of the 10-conductor cable to the Remote Console adapter.
5. Connect the Remote Console adapter to the RS-232C port on the modem.

6. Connect the telephone line to the jack labeled "LINE" on the modem.

Powering Up the Computer and Verifying POST

Once you have assembled the computer, including the peripheral devices shipped with your system, power up the system, verify POST (Power On Self Test), and verify the connectivity of the SCSI peripherals.

When turning the system power *On*, use the following sequence:

1. Devices connected to the *Sun SBus Expansion Subsystem*

Note

Remember to power on the SCSI devices starting with the device at the end of the SCSI chain, and work your way down to the *Sun SPARCserver* computer.

2. Devices attached to the *Sun SPARCserver*
3. *Sun SBus Expansion Subsystem*
4. *Sun SPARCserver* computer
5. Monitor.

Note

The **power-on diagnostics** will occur each time you turn on the computer. The power-on diagnostics program tests the basic system components.

6. While the system is booting up, press the **Stop** and **A** keys simultaneously to put the system in the monitor mode. The system should respond with the following prompt:

```
ok
```

7. At the prompt, enter the following command:

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

The program responds:

```
/iommu@f,e00000000/sbus@f.e0001000/esp@3,200000
Target 6
  Unit 0 Disk Removable Read Only Device SONY CD-ROM CDU-8012

/iommu@f,e00000000/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.

8. Verify that the system sees all of the SCSI peripherals attached to your system.
9. Reboot the system by entering the following command:

```
ok boot
```

The system reboots.

Additional References

For additional information, refer to the following documentation:

“Sun” Desktop SPARC Hardware Owner’s Guide,
Chapter 3: “Turning the System Power On and Off.”

Connecting to Another Network

This section describes how to change the IP addresses on the *Sun SPARCserver* computer and the NTS(s). This should only be done if you are connecting your system to another network.

Note

Connecting to another network represents a nonstandard configuration. Support for nonstandard configurations is handled on a Time-and-Materials basis. Contact the CMS Helpline for more information.

To connect to another network, the IP address on the *Sun SPARCserver* and on each NTS needs to be changed so it can be recognized by the new network.

Note

The administration process needs to be completed on each NTS being installed.

If you administer more than one NTS for this system, the IP addresses must be unique.

To connect to another network and change the IP addresses for your system, do the following:

1. Obtain the following information from the network administrator of the network you are connecting to:
 - *Sun SPARCserver* computer IP address (use Table 3-12 to record this information)
 - NTS IP address for each NTS (use Table 3-12 to record this information).

Table 3-12: CMS Standard Network IP Addresses

Device	Network Name	IP Address
<i>SPARCserver</i> Computer		
First NTS		
Second NTS		
Third NTS		
Fourth NTS		
Fifth NTS		
Sixth NTS		
Seventh NTS		

2. Edit the */etc/hosts* file by entering:

```
# vi /etc/hosts
```

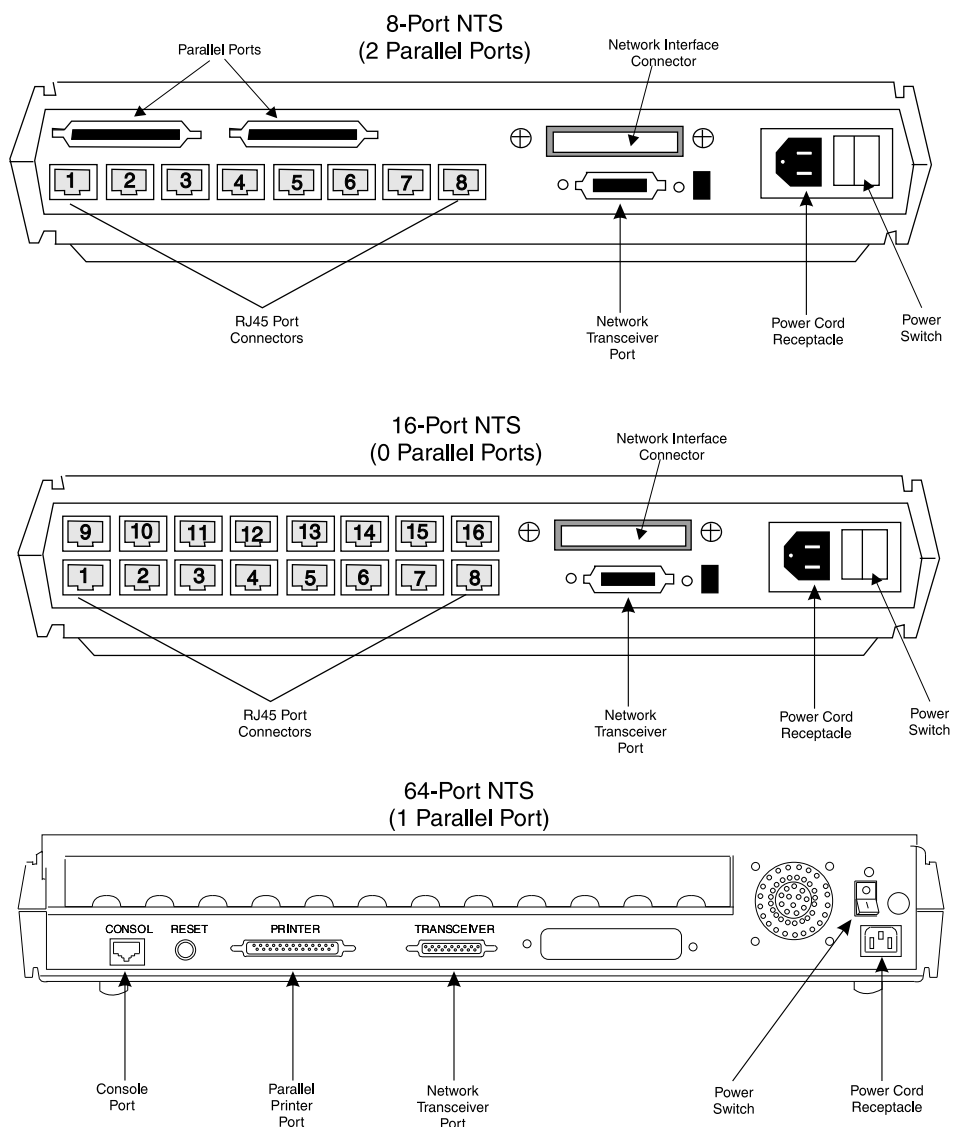
3. Locate the lines (in the */etc/hosts* file) that contain the IP addresses for the *Sun SPARCserver* Computer and the NTS(s).
4. Change the existing IP addresses (in the file) to the new addresses recorded in Table 3-12.
5. Write and quit the file.
6. Check with the network administrator for additional routing functions in the */etc/netmasks* and */etc/networks* files.
7. Connect a dumb terminal to the **CONSOLE** port on the rear of the NTS using the console cable that came with the NTS. On the 8- and 16-port NTSs, the **CONSOLE** port is port #1 (see Figure 3-22).

You will need the following for the 8- and 16-port NTS(s):

- Console Cable
- Adapter - comcode 407361823
- Null Modem - comcode 407122043.

You will need the following for the 64-port NTS(s):

- Console Cable
- Adapter - part number 06-988-260-20.

**Figure 3-22: Network Terminal Servers - Back Panel**

8. Turn the NTS *Off* and *On* again. Within 15 seconds, push the **TEST** button on the front of the NTS (see Figure 3-23).

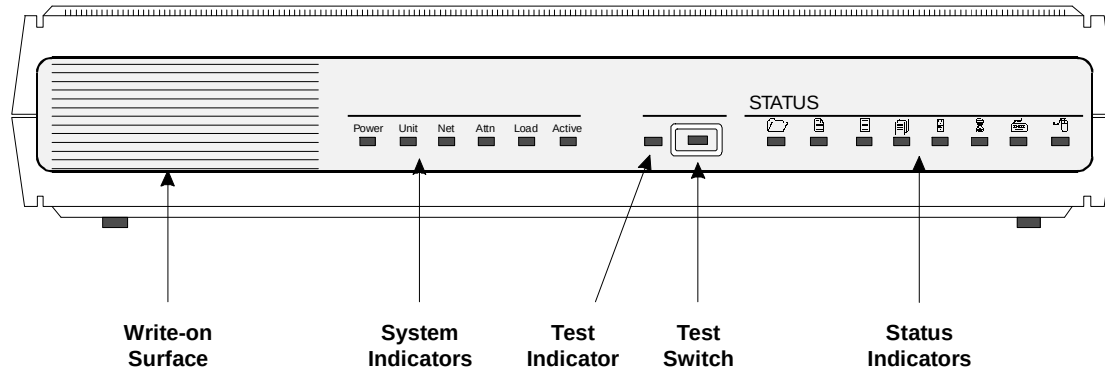


Figure 3-23: Front Panel of the Network Terminal Server

9. The NTS goes through its hardware diagnostics, and the following prompt should appear:

```
Monitor:
```

10. Enter the following command at the `monitor::` prompt:

```
Monitor:: erase
```

Note

There are two types of information that can be erased:

- EEPROM (configuration information)
- FLASH (self boot image)

If just one type of information is present, the program begins to erase it. If there are two types of information, the program prompts you to select what you want to erase. Erase both the EEPROM and the FLASH information.

11. The program responds:

```
Erase
  1) EEPROM (i.e., Configuration Information)
  2) FLASH (i.e., Self Boot Image)
Enter 1 or 2::
```

12. Enter 1 to erase EEPROM. The program responds:

```
Erase all non-volatile EEPROM memory? (y/n) [n]::
```

13. Enter y. The program responds:

```
Erasing xxxx bytes of non-volatile memory. Please wait....
.....
Erased xxxx bytes of non-volatile memory complete.
```

14. The program returns to the monitor:: prompt. Repeat steps 11-14 to erase the FLASH information.
15. After you have completed the erase command, enter the following command at the monitor prompt:

```
Monitor:: addr
```

16. The program responds:

```
Enter Internet address [<uninitialized>]::
```

17. Enter the IP address for this NTS. This should follow the IP address structure outlined in Table 3-12 on page 3-51.

The program responds:

```
Internet address : XXX.XXX.XXX.XXX  
Enter Subnet mask [255.255.255.0]::
```

18. Press **Return** to accept the default subnet mask. The program responds:

```
Subnet mask: 255.255.255.0  
Enter preferred load host Internet address [<any host>]::
```

19. Enter the IP address of the *Sun SPARCserver* computer.

The program responds:

```
Preferred load host address XXX.XXX.XXX.XXX  
Enter Broadcast address [0.0.0.0]::
```

20. Press **Return** to accept the default broadcast message address. The program responds:

```
Enter Preferred dump address [0.0.0.0]::)
```

21. Enter the IP address of the *Sun SPARCserver* computer.

The program responds:

```
Preferred dump address: xxx.xx.x.x  
Select type of IP packet encapsulation (ieee802/ethernet)  
[<ethernet>] ::
```

22. Press **Return** to accept the default IP packet encapsulation. The program responds with the following question if you have an 8- or 16-port NTS. The program returns to the `monitor::` prompt if you have a 64-port NTS.

```
Type of IP packet encapsulation: <ethernet>

Load Broadcast Y/N [Y]::
```

23. Enter `n`. The program returns to the `monitor::` prompt.
24. Enter the following command at the `monitor` prompt to reinitialize the NTS with the new parameters:

```
monitor:: boot
```

The program responds:

```
Enter boot file name [oper.42.enet]::
```

Note The boot file name differs depending on the type of NTS. For the 8- and 16-port NTS, the boot file name is `[(ip) "oper.52.enet", (mop) "OPER_52_ENET.SYS"]::`. For the 64- port NTS, the boot file name is `oper.42.enet`.

25. Press **Return** to accept the default boot file name. The program continues with:

```
Requesting boot file "oper.42.enet".
Unanswered requests shown as '?',
                                transmission errors as '*'.

```

```
Booting file: oper.42.enet from 129.200.9.1

```

```
Loading image from 129.200.9.1

```

```
.....

```


The periods (dots) continue to appear as the NTS is initialized and set up.

Note

If the program displays “SELF” instead of the IP address (129.200.9.1) it means that you did not erase EEPROM. Go back to step 11 to erase EEPROM.

When the initialization finishes, the following appears:

```
annex::
```

26. Disconnect the dumb terminal from the NTS.

The NTS has been administered.

Additional References

For additional information, refer to the following documentation:

Network Terminal Server Guide,
Quick Installation Guide for the “Sun” Network Terminal Server
Leaflet.

Overview

This chapter describes how to connect the terminals, printers, and modems to the *Sun SPARCserver* computer.

Refer to Chapter 3, "Installing the Sun SPARCserver Computer", prior to connecting the terminals, printers, and modems.

You can use an 8-, 16-, or 64-port Network Terminal Server (NTS) to connect to the terminals, serial printers, and modems. The 64-port NTS, along with its required NTS patch panels (16-port RS-232), provides the largest amount of serial device connectivity — up to 252.

You can also use the parallel port(s) on the back of the Network Terminal Server and on the back of the *Sun SPARCserver* to connect parallel printers. One parallel printer can be connected directly to the *Sun SPARCserver*. Additional parallel printers can be connected to the parallel port on an NTS when provided.

See the "Connecting Terminals, Printers, and Modems to the NTS" section in this chapter for details about how to use cabling and adapters to connect the NTS to terminals, printers, and modems.

The following sections describe how to administer approved terminals, printers, and modems:

- "Administering Terminals"
- "Administering Printers"
- "Administering Modems"

Supported Communications and Terminal/Printer Equipment

Use scenario 1 or 2 depending on whether you are connecting a terminal or printer (see Figure 4-1). Scenario 1 gives you three options to use to connect a terminal and scenario 2 gives you two options to connect a printer. The different options are explained in this section.

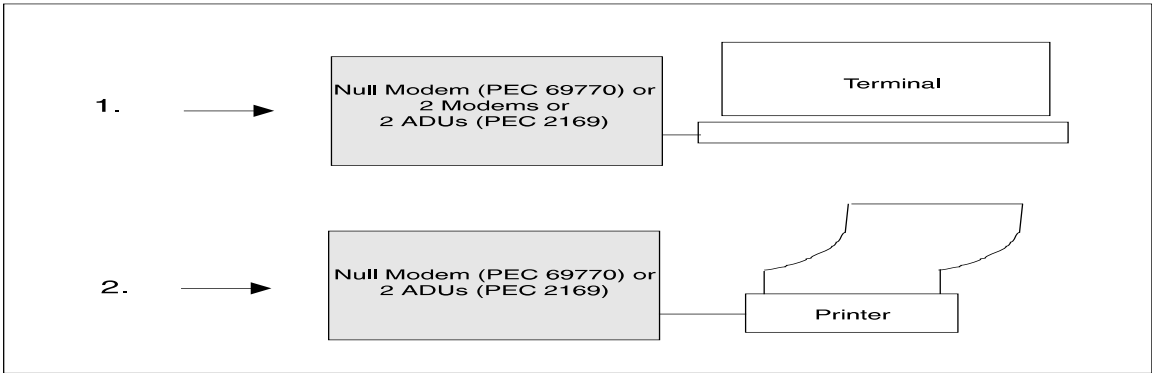


Figure 4-1: Supported Communications and Terminal/Printer Equipment

You can connect a terminal or printer by using a null modem (see Table 4-2).

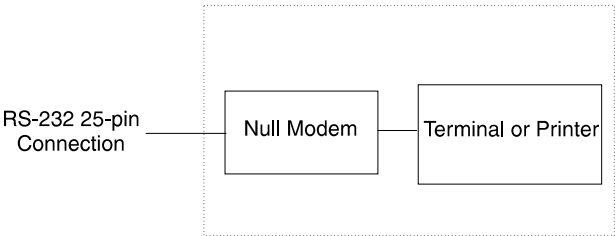


Figure 4-2: Sample Connection Using a Null Modem

Figure 4-3 shows the adapters used to connect 8-wire and 10-wire straight-through cabling to the NTS patch panel.

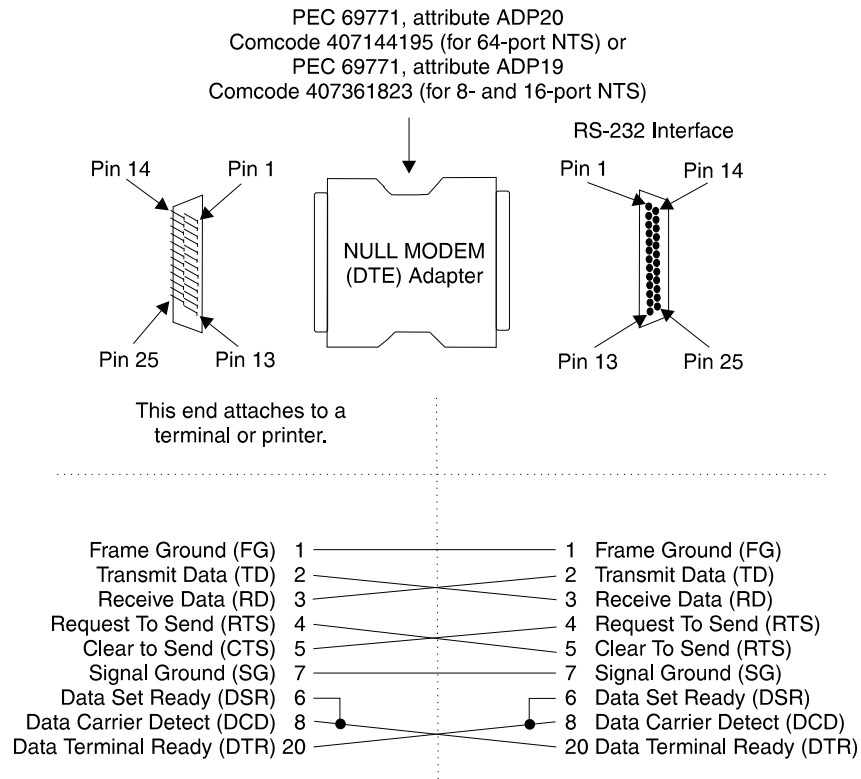


Figure 4-3: Null Modem Adapter

You can also connect a terminal by using two modems (see Figure 4-4).

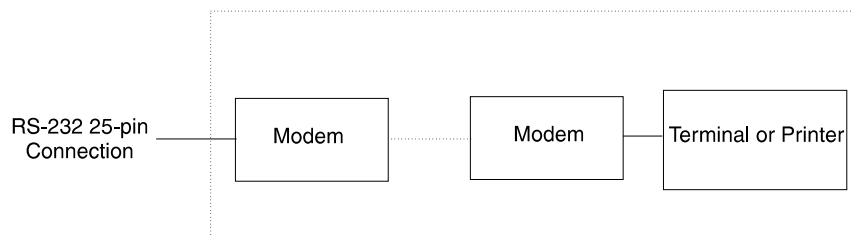


Figure 4-4: Sample Connection Using Modems

Figure 4-5 shows how to connect ADUs between a printer or a terminal.

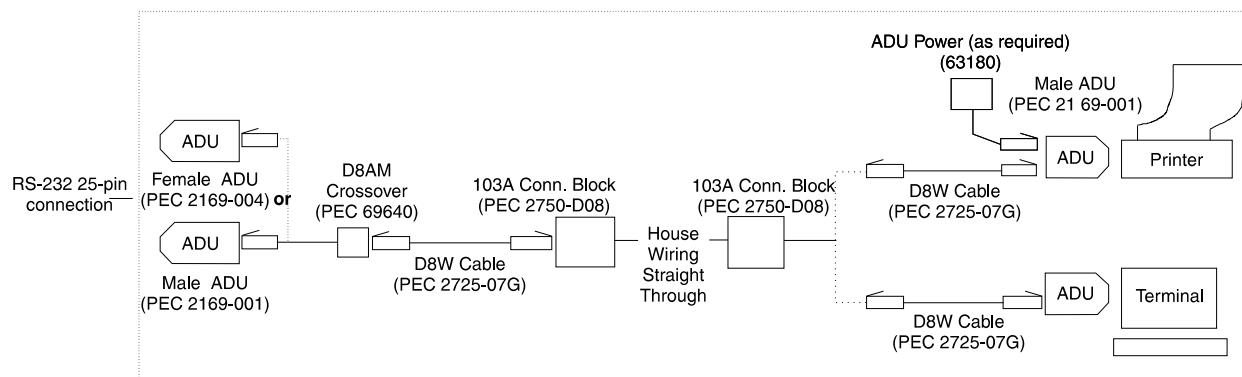


Figure 4-5: Sample Connection Between ADU and Terminal or Printer

When using ADUs with the 64-port NTS, one male ADU (PEC 2169-001) will be plugged in directly to the NTS and one male ADU (PEC 2169-004) will be plugged into the terminal or printer. Optionally, an 8- or 10-wire cable with two NTS serial port adapters (PEC 69771, attribute ADP20 for 64-port or attribute ADP19 for 8- and 16-port) may be connected between the NTS and a female ADU rather than plugging the male ADU directly into the NTS. For the 64-port NTS you can connect terminals and printers directly without using NTS serial ports adaptors if it is convenient.

Supported Terminals

This section describes the terminals that can be connected to the *Sun SPARCserver* computer for use with the R3V2 CMS software application. See Table 4-1 for a list of the approved and supported terminals.

Note

The *Sun SPARCserver* computer currently supports up to 252 peripherals (terminals, printers, and modems).

Table 4-1: Approved Terminals

Model	Description	Offered	Discontinued	PE Code
605 MT	Multi-Tasking Terminal		X	NA
615 CMT	Color Multi-Tasking Terminal (color controller, color monitor, 6000 series 98-key keyboard)		X	69644 (Controller) 68571 (Monitor) 69567 (Keyboard)
615 MT	Multi-Tasking Terminal		X	NA
620 MTG	Multi-Tasking Graphics Terminal		X	NA
705 MTG	Multi-Tasking Terminal (controller, monitor, and keyboard)	X		69643 (Amber or White)
715 BCT	Business Communications Terminal (controller, monitor, and keyboard)	X		6950-ET6 (Amber) 6950-ET7 (White)
2900/AWTC	Color Terminal		X	69774 (Monitor) 69775 (Controller) 69776 (Keyboard)
4000/AWTC	Color Terminal		X	NA
2900/260lf	Small Footprint Terminal	X		69779 (Monitor) 69780 (Controller) 69781 (Keyboard)

Supported Printers

This section describes the printers that can be connected to the *Sun SPARCserver* computer for use with the R3V2 CMS software application. See Table 4-2 for a list of the approved and supported printers.

Table 4-2: Approved Printers

Type of Printer	Offered	Discontinued	PEC
321 Okidata 120 Column Dot Matrix Printer	X		69765
475 Dot Matrix Printer		X	NA
476 Dot Matrix Printer		X	NA
477 Dot Matrix Printer		X	NA
495 Laser Printer		X	NA
570 Parallel Dot Matrix Printer		X	NA
571 Parallel Dot Matrix Printer		X	NA
572 Serial Dot Matrix (Narrow Platen) Printer	X		6950-EP5
573 Serial Dot Matrix (Wide Platen) Printer	X		69646
580 Parallel Dot Matrix		X	NA
583 Dot Matrix Printer		X	NA
593 Laser Printer		X	NA
595 Laser Printer		X	NA
830 Plus Okidata Laser Printer	X		6951-LSR
6417 GIS Parallel Dot Matrix Printer	X		6951-417

Note

After the printer has been connected to the computer, the printer port must be administered so that the computer can recognize the new printer.

Supported Modems

This section describes the modems that can be connected to the *Sun SPARCserver* computer for use with the R3V2 CMS software application.

Table 4-3 lists the approved and supported modems for use with the *Sun SPARCserver* computer and the R3V2 CMS software application:

Table 4-3: Approved Modems

Type of Modem	Offered	Discontinued	PE Code
AT&T Paradyne DataPort Express (Model 3715)	X		2271-GEI
AT&T Paradyne Comsphere 3830	X		63184

Note

After the modem is connected to the computer, the modem port must be administered so that the computer can recognize the new modem.

In the following figures, the shaded portion corresponds to the shaded portion of Figure 4-1 on page 4-2. You can use Figure 4-1 to determine what type of connections you need between your terminal and/or printer.

Connecting Terminals, Printers, and Modems to the NTS

This section describes how to connect the NTS(s) to printers, terminals, and modems via adapters and cabling.

The NTS patch panel (16-port RS-232) is a serial asynchronous connector that is used to convert PBX Champ-pin/signal allocations to RS-232 data signal specifications. Each NTS patch panel (16-port RS-232) has 16 DB-25 connector ports. Each 64-port Network Terminal Server requires four NTS patch panels (16-port RS-232) to reach a total of 64 serial ports. The first port must be set aside for AT&T services personnel.

Note The 64-port NTS has one parallel port, and the 8-port NTS can have either two parallel ports or none. These ports can be used to connect parallel printers. See the "Parallel Printers connected to NTS" section in this chapter for more information.

You can connect terminals and printers directly to the NTS to meet RS-232 specifications for up to a recommended distance of 300 feet. You can use new or existing 8- or 10-wire straight-through modular cables, house wiring, or ADUs (Asynchronous Data Units) and house wiring to extend the distance between the NTS and the terminal, printer, or modem. The 8- and 16-port NTS(s) provide RJ45 jacks and need an adapter (ANIXTER RJ-45 DB25) to convert to a 25 pin RS-232 connection. The 64-port NTS has four NTS patch panels which provide sixteen 25 pin RS-232 connections each.

Note If the system is being upgraded and connected to an existing printer/terminal configuration, you must replace the old adapters with the new adapters. See the "Upgrade Installation Procedures" section in this chapter for more information.

New Installation Procedures

Connect a terminal, printer, modem, or ADU to an NTS patch panel (16-port RS-232) or 8- and 16-port NTS using new 8- or 10-wire straight-through cabling. You can extend up to 50 feet using 10-wire straight-through cabling or up to 25 feet using 8-wire straight-through cabling scenarios.

Note

To extend cabling beyond the 25 or 50 feet described in Figure 4-6 or Figure 4-8, use house wiring up to 300 feet, or see the “Asynchronous Data Units” section in this chapter. If you are using ADUs or modems, you do **not** need to use a null modem (see Figure 4-4 on page 4-3 or Figure 4-5 on page 4-4).

To connect terminals or printers to the serial ports on NTS(s) you need the following:

1. Null modem adapter or
2. Pair of modems or
3. Pair of ADUs.

Connecting Supported Communications and Terminal/Printer Equipment to a 64-port NTS

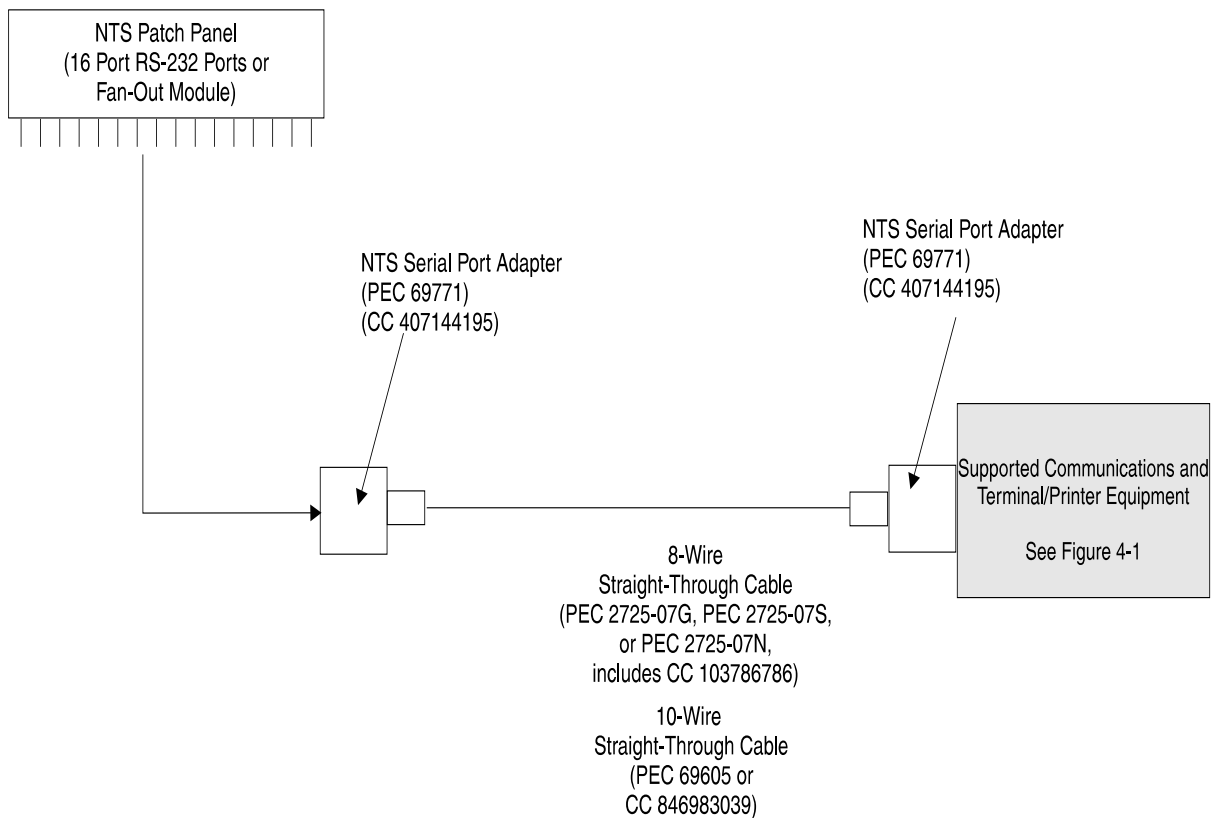


Figure 4-6: New Installation Cabling Scenarios — Terminals and Printers

Note For 10-wire straight-through upgrade scenarios, you can substitute an ACU/Modem adapter for an NTS Serial Port adapter.

Figure 4-7 shows the adapters used to connect 8- and 10-wire straight-through cabling to the NTS patch panel.

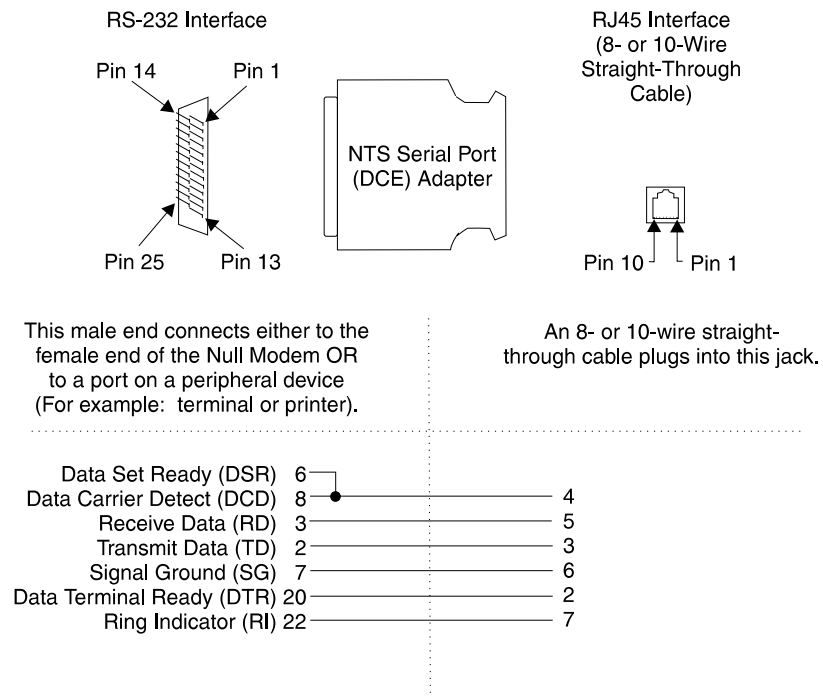


Figure 4-7: Micro Annex Serial Port Adapter Connection Example

Connecting Supported Communications and Terminal/Printer Equipment to an 8- and 16-port NTS

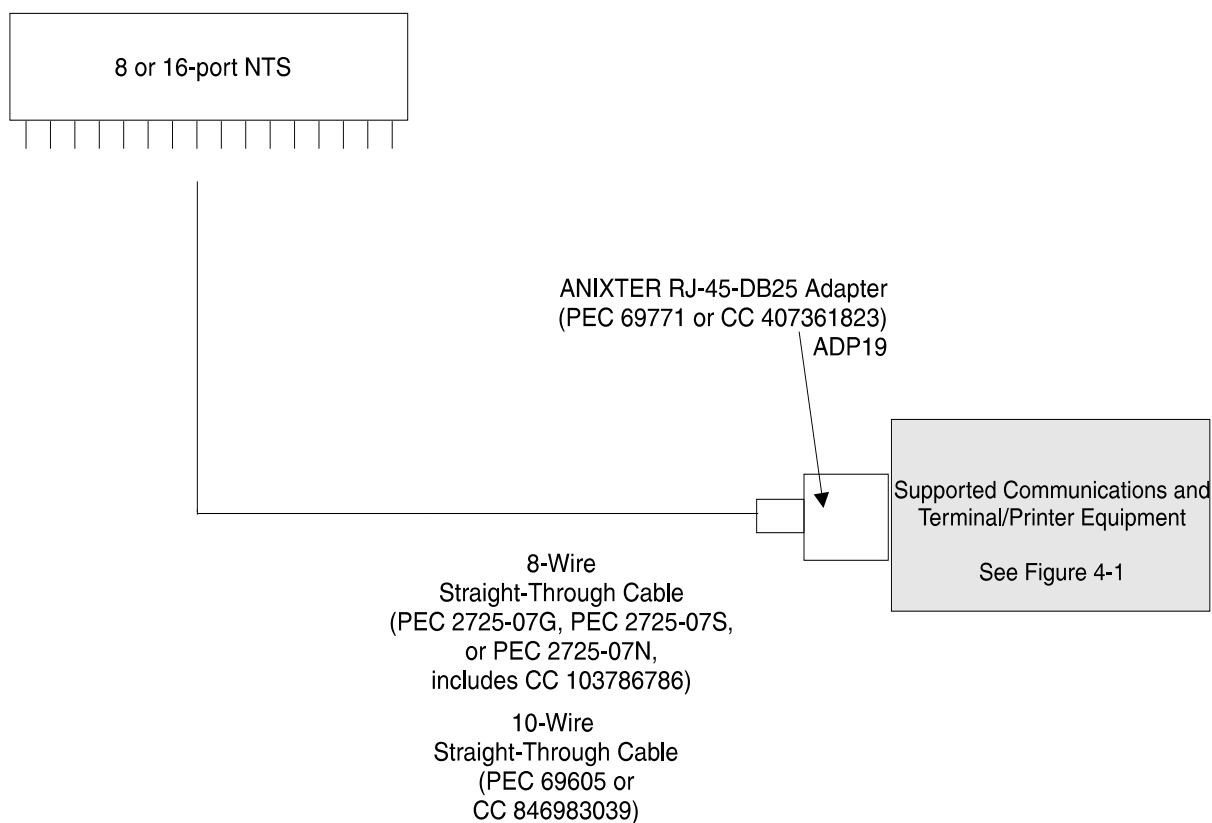


Figure 4-8: New Installation and Cabling Scenarios — Terminals and Printers

Note If you are using ADUs, a female ADU will connect to the ANIXTER Adapter. See the Supported Communications and Terminal/Printer Equipment for more information.

Figure 4-9 shows the cabling for the ANIXTER RJ25-DB25 adapter.

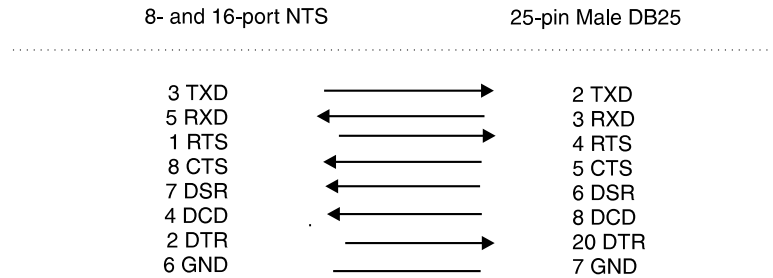


Figure 4-9: ANIXTER RJ45-DB25 Adapter

Using 8- or 10-Wire Straight-Through Cabling for 8- or 16-port NTS

You can connect the Supported Communications and Terminal/Printer Equipment to an R3V2 CMS using 8- or 10-wire modular straight-through cables. In this case, you will need the following required parts for each terminal or printer connected to the NTS:

- ANIXTER RJ-45 DB25 Adapter
- One 8- or 10-wire cable.

Refer to Figure 4-6 and Figure 4-8, “New Installation Cabling Scenarios,” and the following procedure for more details.

Procedure

Do the following steps to connect a terminal, printer, or modem to an NTS:

1. Plug 8- or 10-wire cable into NTS.
2. Connect ANIXTER Adapter to other end of cable.
3. Connect ANIXTER Adapter to modem, ADU or null modem adapter.
4. The null modem adapter can be connected directly to the terminal or printer.

Using 8- or 10-Wire Straight-Through Cabling for 64-port NTS

You can connect Supported Communications and Terminal/Printer Equipment to an R3V2 CMS using 8- or 10-wire modular straight-through cables. In this case, you will need the following required parts for each terminal or printer connected to the NTS patch panel (16-port RS-232):

- Two NTS Serial Port adapters
- One 8- or 10-wire cable.

Refer to Figure 4-6 and Figure 4-8, “New Installation Cabling Scenarios,” and the following procedure for more details.

Procedure

Do the following steps to connect a terminal, printer, or modem to an NTS patch panel (16-port RS-232):

1. Connect the NTS Serial Port adapter to either end of a 8- or 10-wire modular straight-through cable.
2. Connect the other end of the 8- or 10-wire modular straight-through cable to the second NTS Serial Port adapter.
3. Connect one NTS serial port adapter to the NTS patch panel, the other to a modem, ADU, or null modem adapter.

Upgrade
Installation
Procedures

To upgrade the connection of a terminal, printer, modem, or ADU to an NTS, use new 8- or 10-wire straight-through cabling and new adapters.

Using Existing
Cabling

The Network Terminal Server offers serial connectivity cabling. You can have three possible connectivity upgrade scenarios to the NTS for the existing CMS platforms.

If you are upgrading to a new *Sun SPARCserver* computer, you may have one of the following cable schemes (see Table 4-4):

Table 4-4: Cabling Upgrade Scenarios

Platform	Serial Card	Cabling	Color of Cable
3B2	EPORTS	8-wire flipped	black
Intel	IPC-1600	10-wire straight-through	gray
3332	EQUINOX	8-wire flipped	black

Note

The 8-wire cabling used with the earlier platforms is flipped (for example, pin 1 RS-232 signals at one end of the cable are present at pin 8 of the other end). See “Cable Adapter” figures in this chapter for details of each adapter’s pin connectivity. With the NTS, both the 8- and 10-wire cables must have straight-through RS-232 signals.

If you are upgrading the cabling for a 3B2 or a 3332, you must replace the cables and adapters with new cables and adapters. See Figure 4-10, Figure 4-11, and Figure 4-12 (on the following pages) for upgrade scenarios with a 64-port NTS and Figure 4-13, Figure 4-14, and Figure 4-15 for upgrade scenarios with an 8- or 16-port NTS.

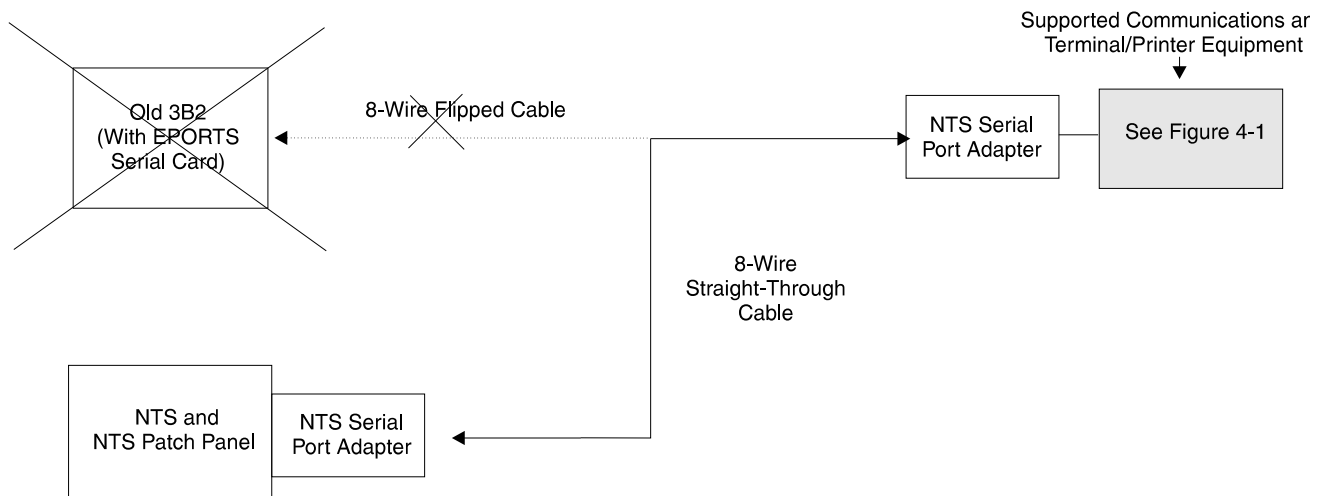


Figure 4-10: Upgrade Existing 3B2 Cabling Example to 64-port NTS

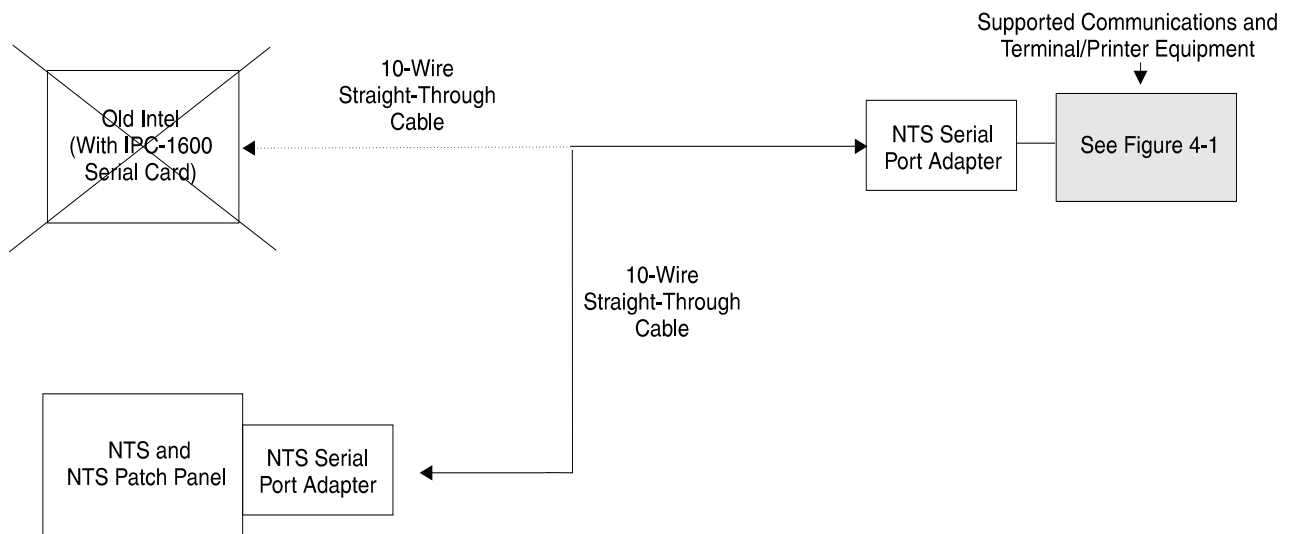


Figure 4-11: Upgrade Existing Intel Cabling Example to 64-port NTS

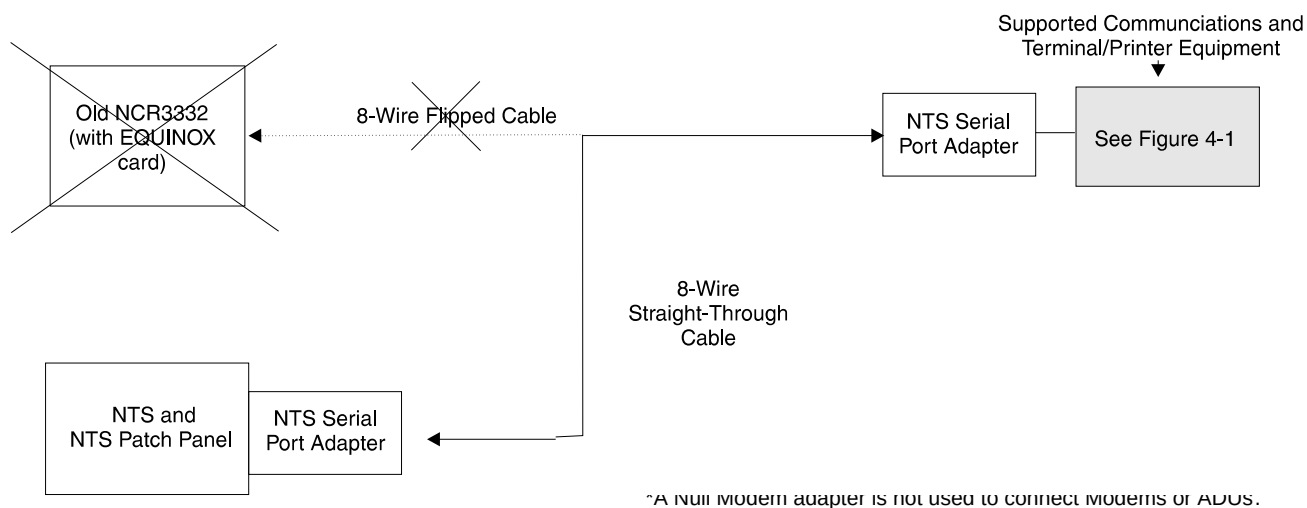


Figure 4-12: Upgrade Existing 3332 Cabling Example to 64-port NTS

See "Using 8- or 10-Wire Straight-Through Cabling for 8- or 16-port NTS" and "Using 8- or 10-Wire Straight-Through Cabling for 64-port NTS" sections in this chapter for more details.

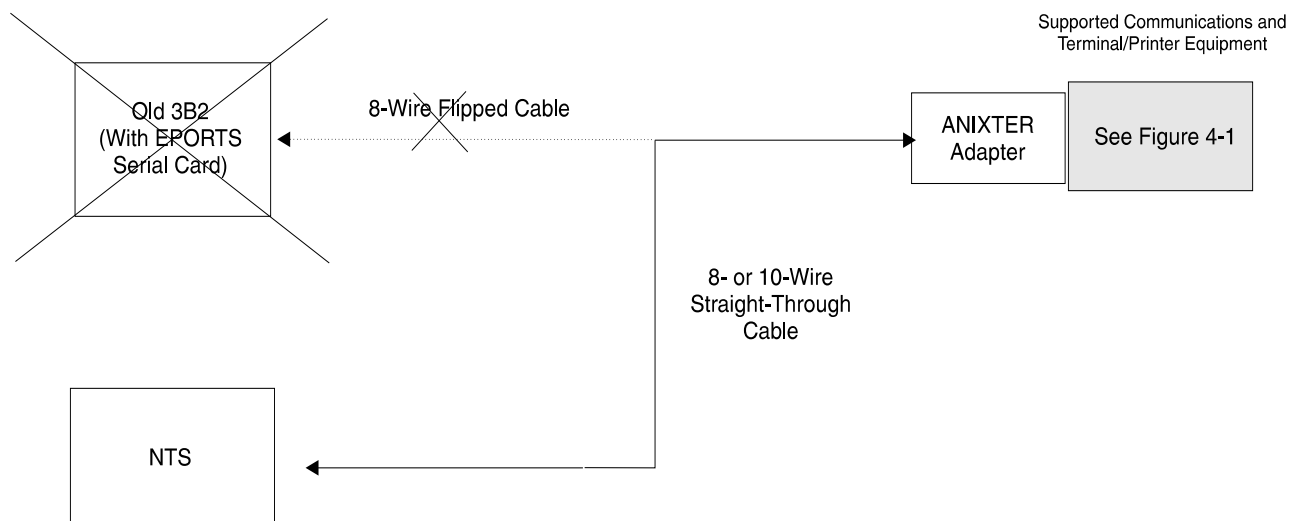


Figure 4-13: Upgrade Existing 3B2 Cabling Example to 8- and 16-port NTS

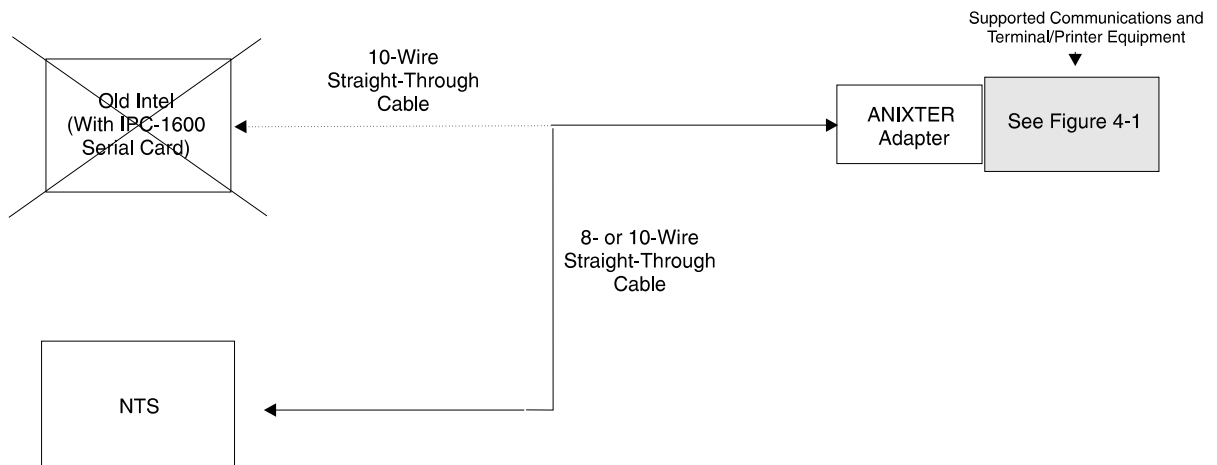


Figure 4-14: Upgrade Existing Intel Cabling Example to 8- and 16-port NTS

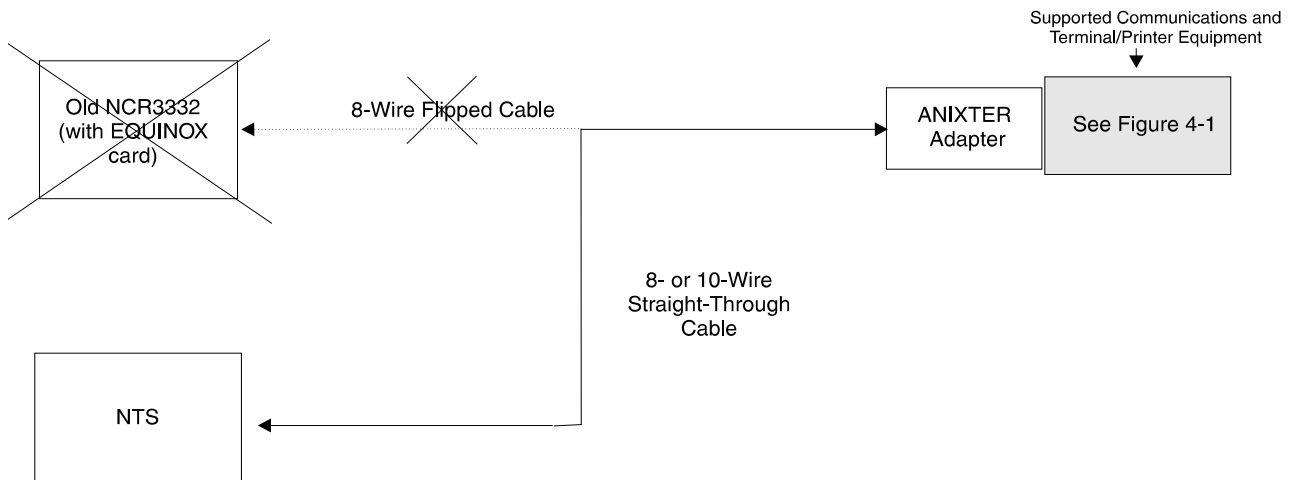


Figure 4-15: Upgrade Existing 3332 Cabling Example to 8- and 16-port NTS

Administering Terminals

This section describes how to set port parameters for terminals connected to an NTS patch panel or 8- and 16-port NTS.

Note After the terminals are connected, you must complete the na administration for the *Sun SPARCserver* computer to recognize the new terminal(s).

You can complete na administration for the terminals using **either** of the following methods:

- Complete NA Administration — provides in-depth step-by-step procedures for completing terminal administration
- Quick NA Administration — provides a short cut to administering terminals by using scripts.

Note For terminals that have different configurations and parameters, see the *Network Terminal Server Administration Guide* for details.

Complete NA Administration Method

The Complete NA Administration Method provides in-depth step-by-step procedures for administering terminals.

Note If the terminals are set to the recommended default (9600 baud, 8 data_bits, no parity, and 1 stop_bit), you can skip to the “Quick NA Administration Method.”

Procedure

To address and configure the NTS ports for terminals, complete the following steps:

1. Log in as *root*.
2. At the system prompt, enter the na command to access the NTS administration software:

```
# na
```

The following appears:

```
Annex network administrator R7.0 October 13, 1992
command:
```

3. To associate all subsequent administration with a specific Network Terminal Server, enter `annex cmsterm1` at the command prompt:

```
command: annex cmsterm1
```

Note

When you enter `annex cmsterm1` (or `annex 129.200.9.11`), `cmsterm1` becomes the default NTS until another NTS is selected using the `annex` command. The default setting for the NTS ports is 9600 bps, 8 bits, no parity, and 1 stop bit.

You can specify one NTS or multiple NTSs. See Table 4-5 for the recommended NTS names and addresses found in the `/etc/hosts` file.

Table 4-5: Configuration Information

Device	IP Address	Terminal	File Name
<i>Sun SPARCserver</i> computer	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

The system responds:

cmsterm1: Annex-3-UXR7, 64 ports

command:

4. For terminals, enter the `set port` string command (include all the parameters you want to change):

command: `set port=x-y mode dedicated type hardwired
dedicated_address <SUNaddress> control_lines modem_control
location "<a location>" user_name "<a user>" speed <9600>`

Note

The `set port` string command sets the parameters for the serial line ports. The x-y values you enter are the port numbers on the NTS. You can specify a range of ports in the above string command, but the `location` and `user_name` attributes should be port specific.

For more details about using the `set port` string command, use Table 4-6. You do not have to set any parameters if the default parameters are correct.

Table 4-6: Terminal Configuration Guidelines

Port Generic Parameter	Default Parameter	Recommended Setting	Comments
mode	cli	dedicated	NA
type	hard-wired	hard-wired	NA
dedicated_address	0.0.0.0	Set to 129.200.9.1 (Sun SPARCserver computer address)	Set to your Sun SPARCserver computer internet address.
control_lines	none	modem_control	NA
location	""	"a location"	It is important to set this parameter so port problems can be traced.

Table 4-6: Terminal Configuration Guidelines (Contd)

Port Generic Parameter	Default Parameter	Recommended Setting	Comments
user_name	""	"a user"	It is important to set this parameter so port problems can be traced.
speed	9600	Match the baud rate of your terminal (for example, 9600).	Speed may be changed to your baud rate.
data_bits	8	8	Can be set to match the terminal settings.
parity	none	none	Can be set to match the terminal settings.
stop_bits	1	1	Can be set to match the terminal settings.

Note

You can use the `show port` command to review your changes.

- To initialize the port with the new options, use the following command to reset the terminal ports:

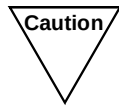
```
command: reset <port number>
```

Note

The options will not take effect until the port is reset.

The following appears:

```
resetting serial port <port number> of <annex cmsterm1>
```



You can also use the `reset all@cmsterm1` command to terminate all active sessions on the NTS. Use the `reset all@cmsterm1` command only if no one is logged in.

6. To store the configuration information to a file (For example, `nts1info`), enter the following command:

```
command: write cmsterm1 /etc/local.admin/nts1info
```

The system responds:

```
cmsterm1: Annex-3-UX R7.0, 64 ports
        writing...
command:
```

You can store configuration information on multiple files to use as a backup in the event your NTS loses translation. Use a corresponding file name for each NTS. See Table 4-5 on page 4-21 for examples.



You can use these files (for example, `/etc/local.admin/nts1info`) to readminister the NTS in case of failure, or these files can be used with the text editor to search for and diagnose port problems. For example, you can search by name to find the port location. See the "NTS Port Problems" section in Chapter 9, "Troubleshooting," for details.

7. To quit, enter the following command:

```
command: quit
```

The system responds:

```
#
```

8. If this is the initial installation, reboot the *Sun SPARCserver* computer (required).

Note

You can wait to reboot your system after you complete all the terminal, printer, and modem administration, if desired.

Quick NA Administration Method

In an attempt to simplify the terminal administration, Network Administration (na) scripts are available for the recommended terminal settings. Any differences from the parameters specified in these scripts need to be handled separately.

For example:

Assume the system is set up with one NTS and 29 terminals. Most of the terminals are running at 9600 baud, 8 data bits, no parity, and 1 stop bit. The printers are 8 data bits, no parity, 1 stop bit. Half of the terminals are running at 4800 baud and the other half are running at 9600 baud.

Using the above example as a scenario, the administration could be handled using the following procedures.

Procedure

To address and configure the NTS ports for terminals, complete the following steps:

1. Log in as *root*.
2. At the system prompt, enter the na command to access the NTS administration software:

```
# na
```

The following appears:

Annex network administrator R7.0 October 13, 1992
command:

3. To associate all subsequent administration with a specific Network Terminal Server, enter `annex cmsterm1` at the command prompt:

command: `annex cmsterm1`

Note When you enter `annex cmsterm1` (or `annex 129.200.9.11`), `cmsterm1` becomes the default NTS until another NTS is selected using the `annex` command. The default setting for the NTS ports is 9600 bps, 8 bits, no parity, and 1 stop bit.

You can specify one NTS or multiple NTSs. Use the recommended NTS names and addresses in the `/etc/hosts` file. See Table 4-6, “Configuration Information” in this chapter for specific devices, IP addresses, terminals, and file names.

The system responds:

`cmsterm1: Annex-3-UXR7, 64 ports`
command:

4. Make ports 2-30 the default set, enter `port 2-30` at the command prompt:

command: `port 2-30`

Note All subsequent commands refer to ports 2-30.

The system responds:

```
command:
```

5. To use a script to administer 9600 baud terminals, enter the following at the command: prompt:

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

The system responds:

```
Setting all port parameters in specified port set to correct
settings for a 9600 baud terminal, 8 data bits, no parity, 1
stop bit.
```

```
user_name and location are not set (values remain as
previously set), and the dedicated_address is set to
129.200.9.1
```

```
Please allow a slight delay before resetting the ports.
```

```
command:
```

When you use a script to administer terminals, you must always specify a default port set before reading in one of the scripts.

If your terminals are running at a different speed, you may use any of the scripts in Table 4-7.

Table 4-7: Terminal Scripts

Script	Parameters
192term	19200 baud terminal, 8 bits, 1 stop bit, no parity.
96term	9600 baud terminal, 8 bits, 1 stop bit, no parity.
48term	4800 baud terminal, 8 bits, 1 stop bit, no parity.
24term	2400 baud terminal, 8 bits, 1 stop bit, no parity.

Table 4-7: Terminal Scripts

Script	Parameters
12term	1200 baud terminal, 8 bits, 1 stop bit, no parity.

These scripts do not clear or set the `user_name` or `location` for each port. All of these scripts set the dedicated address to the CMS factory default (129.200.9.1).

- Set the `user_name` and `location` for each port:

```
command: set port=<x> user_name "<name>" location "<name>"
```

Note

The `x` values you enter are the port numbers on the NTS. You can specify a range of ports, but the `user_name` and `location` attributes should be port specific. Set the `location` and `user_name` so that any user-reported problems can be traced to the correct port.

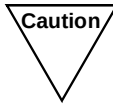
You are returned to the `command :` prompt.

- When you are done, use the following command to reset the terminal ports:

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

The following appears:

```
cmsterm1: Annex-3-UX R7.0, 64 ports
resetting all serial ports of annex cmsterm1
resetting virtual CLI ports of annex cmsterm1
command:
```



The `reset all@cmsterm1` command terminates all active sessions on the NTS. Use the `reset all@cmsterm1` command **only** if no one else is logged in.

8. To store the new port configurations to a file (for example, `nts1info`), enter the following:

```
command:write cmsterm1/etc/local.admin/nts1info
```

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:
```

9. To check the new port configurations, enter the following command:

```
command: show port=<number(s)>
```

You can specify one port or multiple ports (For example, `show port=1` or `show port=1-10`).

The port(s) and settings you selected are displayed.

10. If this is the initial installation, reboot the *Sun SPARCserver* computer (required).

Note

You can wait to reboot your system after you complete all the terminal, printer, and modem administration, if desired.

Terminal Options

After you connect the terminal to the computer, you need to set the options for the terminal. This section contains samples of option settings for some of the CMS supported terminals:

- 715 BCS (Business Communications Terminal)
- 705 MT (Multi-Tasking Terminal)
- 615 CMT (Color Multi-Tasking Terminal)
- 605 BCT (Business Communications Terminal)
- 620 MTG (Multi-Tasking Graphics Terminal)
- 2900/AWTC Display Terminal
- 4000/AWTC Display Terminal
- 2900/260lf Small Footprint Terminal

Note Although the 605 BCT, 615 CMT, 615 MT, 620 MTG, 2900/AWTC, and 4000/AWTC terminals are CMS approved, they have been discontinued.

715 BCS (Business Communications Terminal)

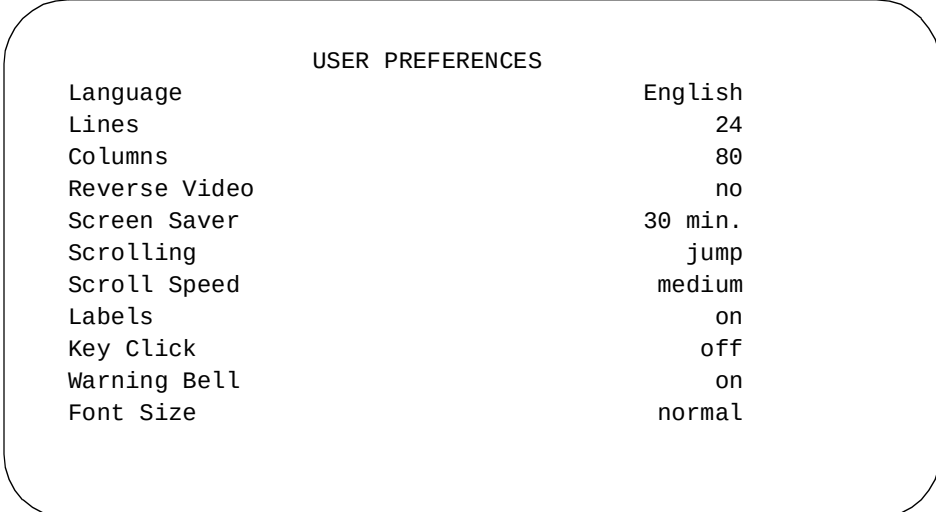
The 715 BCS Terminal replaces or emulates the 705 MT Terminal. To properly set up the terminal, you may need to change some of the options on the Terminal Setup screen. Also, port 2 is used as the main port. Therefore, connect the communications cable to port 2 and when logging into CMS, identify the terminal type as a 705.

The default options are correct with the exception of the “Emulation Mode” option. This should be set to “705” so that it will emulate the 705 MT terminal. Refer to the *715 Business Communications Terminal User’s Guide* (AT&T 999-300-733) for instructions on how to change the options.

After making the change, you should set the 715 BCS options to the values shown below.

User Preferences Window

Figure 4-16 shows the recommended user preference option.



USER PREFERENCES	
Language	English
Lines	24
Columns	80
Reverse Video	no
Screen Saver	30 min.
Scrolling	jump
Scroll Speed	medium
Labels	on
Key Click	off
Warning Bell	on
Font Size	normal

Figure 4-16: User Preferences Options for a 715 BCS

Communications
Options Window

Figure 4-17 shows the recommended communications options.

COMMUNICATIONS OPTIONS		
MAIN		AUX
port 1	Port Mapping	port 2
host	Port Service	printer
9600	Speed	9600
1 bit	Stop Bits	1 bit
8 bits	Data Bits	8 bits
none	Send Parity	space
no	Check Parity	no
off	Local Echo	-
off	Encoding	-
XON/XOFF	Generate Flow	XON/XOFF
XON/XOFF	Receive Flow	XON/XOFF
240	XOFF at	240
no	Transmit Limit	-
no	Answerback on Connect	-
Main	Clear Communication Port	Aux

Figure 4-17: Communications Options for a 715 BCS

General Options
Window

Figure 4-18 shows the recommended general options.

GENERAL OPTIONS		
PRIMARY/WINDOW 1		WINDOW 2
715	Emulation	705
715	Terminal ID	705
no	Newline on LF	no
8 bits	Transmit Controls	8 bits
normal	Backspace Mode	normal
unlocked	User Features	locked
no	Conceal Answerback	no
(blank)	Answerback	(blank)

Figure 4-18: General Options for a 715 BCS

Display Options Window

Figure 4-19 shows the recommended display options.

DISPLAY OPTIONS		
PRIMARY/WINDOW 1		WINDOW 2
off	Monitor Mode	off
block	Cursor Type	block
off	Cursor Blink	off
yes	Display Cursor	yes
bottom	Status Line Position	bottom
host	Status Line Type	host
multnatl	Character Mode	multnatl
ISO Latn	International Font	ISO Latn
on	Autowrap	on

Figure 4-19: Display Options for a 715 BCS

Keyboard Options Window

Figure 4-20 shows the recommended keyboard options.

KEYBOARD OPTIONS		
PRIMARY/WINDOW 1		WINDOW 2
Caps Lck	Caps/Shift Lock Key	Caps Lck
CR	<--	CR
<--	Enter Key	<--
yes	Autorepeat	yes
yes	Margin Bell	yes
enabled	Compose Key	enabled
enabled	Break Key	enabled
US	Keyboard Language	US
numeric	Numeric Pad	numeric
normal	Cursor Keys	normal
no	Swap Delete	no
none	Control Key Swapping	none
-	Legends	-
-	User Defined Keys	-
BS	Backspace Keys	BS

Figure 4-20: Keyboard Options for a 715 BCS

Printer Options Window

Figure 4-21 shows the recommended printer options.

PRINTER OPTIONS		
PRIMARY/WINDOW 1		WINDOW 2
page	Select Print Region	page
normal	Print Mode	normal
none	Printer Terminator	none
National	Printer Font Restriction	National
no	Printer Alarm	no
yes	Printer to Host	yes

Figure 4-21: Printer Options for a 715 BCS

705 MT (Multi-Tasking Terminal)

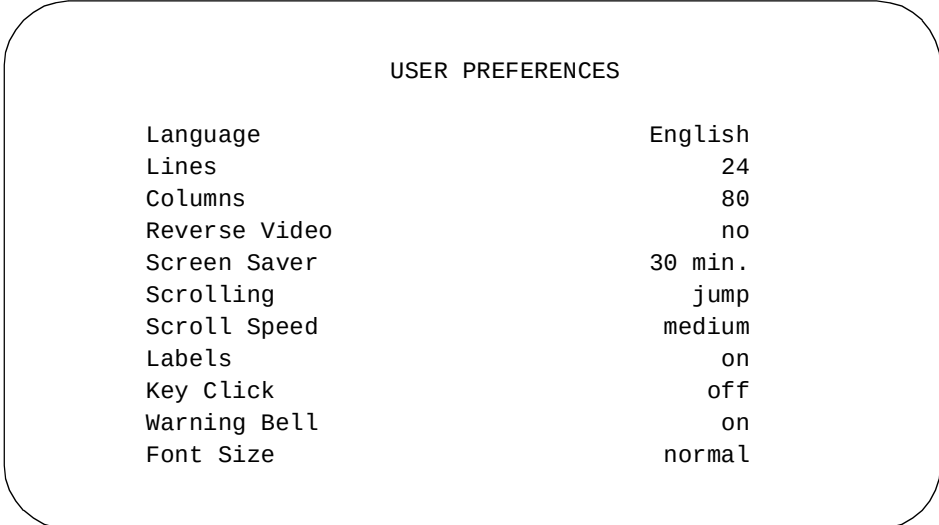
The 705 MT Terminal replaces or emulates the 605 BCT Terminal. To properly set up the terminal, you may need to change some of the options on the Terminal Setup screen.

The default options are correct with the exception of the "Port Mapping" option. This should be set so that it will read Port 2 for Main and Port 1 for AUX. Refer to the *705 Multitasking Terminal User's Guide* (AT&T 999-300-733) for instructions on how to change the options.

After making the change, you should set the 705 MT options to the values shown below.

User Preferences Window

Figure 4-22 shows the recommended user preference options.



USER PREFERENCES	
Language	English
Lines	24
Columns	80
Reverse Video	no
Screen Saver	30 min.
Scrolling	jump
Scroll Speed	medium
Labels	on
Key Click	off
Warning Bell	on
Font Size	normal

Figure 4-22: User Preferences Options for a 705 MT

Communications Options Window

Figure 4-23 shows the recommended communications options.

COMMUNICATIONS OPTIONS		
MAIN		AUX
port 1	Port Mapping	port 2
host	Port Service	printer
9600	Speed	9600
1 bit	Stop Bits	1 bit
8 bits	Data Bits	8 bits
none	Send Parity	space
no	Check Parity	no
off	Local Echo	-
off	Encoding	-
XON/XOFF	Generate Flow	XON/XOFF
XON/XOFF	Receive Flow	XON/XOFF
240	XOFF at	240
no	Transmit Limit	-
no	Answerback on Connect	-
Main	Clear Communication Port	Aux

Figure 4-23: Communications Options for a 705 MT

General Options Window

Figure 4-24 shows the recommended general options.

GENERAL OPTIONS		
PRIMARY/WINDOW 1		WINDOW 2
705	Emulation	705
705	Terminal ID	705
no	Newline on LF	no
8 bits	Transmit Controls	8 bits
normal	Backspace Mode	normal
unlocked	User Features	locked
no	Conceal Answerback	no
(blank)	Answerback	(blank)

Figure 4-24: General Options for a 705 MT

Display Options Window

Figure 4-25 shows the recommended display options.

DISPLAY OPTIONS			
PRIMARY/WINDOW 1		WINDOW 2	
off	Monitor Mode	off	
block	Cursor Type	block	
off	Cursor Blank	off	
yes	Display Cursor	yes	
bottom	Status Line Position	bottom	
host	Status Line Type	host	
multnat1	Character Mode	multnat1	
ISO Latn	International Font	ISO Latn	
on	Autowrap	on	

Figure 4-25: Display Options for a 705 MT

Keyboard Options Window

Figure 4-26 shows the recommended keyboard options.

KEYBOARD OPTIONS			
PRIMARY/WINDOW 1		WINDOW 2	
Caps Lck	Caps/Shift Lock Key	caps Lck	
CR	<--	CR	
<--	Enter Key	<--	
yes	Autorepeat	yes	
yes	Margin Bell	yes	
enabled	Compose Key	enabled	
enabled	Break Key	enabled	
US	Keyboard Language	US	
numeric	Numeric Pad	numeric	
normal	Cursor Keys	normal	
no	Swap Delete	no	
none	Control Key Swapping	none	
-	Legends	-	
-	User Defined Keys	-	
BS	Backspace Keys	BS	

Figure 4-26: Keyboard Options for a 705 MT

Printer Options Window

Figure 4-27 shows the recommended printer options.

PRINTER OPTIONS		
PRIMARY/WINDOW 1		WINDOW 2
page	Select Print Region	page
normal	Print Mode	normal
none	Printer Terminator	none
National	Printer Font Restriction	National
no	Printer Alarm	no
yes	Printer to Host	yes

Figure 4-27: Printer Options for a 705 MT

615 CMT (Color Multi-Tasking Terminal)

Figure 4-28 shows the recommended 615 CMT Terminal options.

OPTIONS SETUP

COMMUNICATIONS	USER PREFERENCES
Speed _9600_	Columns _80_
Send Parity _none_	Reverse Video _no_
Check Parity _no_	Volume _4_
Local Echo _off_	Key Click _off_
Encoding _off_	Scrolling _jump_
Flow Control DC1/DC3	Scroll Speed _medium_
Generate Flow _on_	Alternate Keypad _off_
Receive Flow _off_	Swap Delete/Del _no_
Pass Flow _yes_	
Monitor Mode _off_	Cursor Type _block_
Autowrap _on_	Cursor Blink _no_
Newline on LF _no_	Labels _no_
Return Key _CR_	Foreground
Enter Key	Background

615 CMT 1.0

CHANGE
OPTION

DEFAULT
VALUES

SAVED
VALUES

SAVE

NEXT
SETUP

CLEAR
TO END

Figure 4-28: Terminal Options for a 615 CMT

If any of the 615 CMT options are incorrect, refer to the *615 Color Multitasking Terminal User's Guide* (AT&T 999-300-570) for instructions on how to change the options.

Note

When you are prompted to enter the terminal type, you need to enter "615c" to get the colors to appear. The "c" part of the terminal type enables the colors to be seen.

615 MT (Multi-Tasking Terminal)

Figure 4-29 shows the recommended 615 MT Terminal options.

OPTIONS SETUP

COMMUNICATIONS		USER PREFERENCES	
I/O Card	idle	Cartridge	idle
Speed	9600	Columns	_80_
Send Parity	spac	Reverse Video	_no_
Check Parity	_no_	Volume	_1_
Local Echo	_off_	Key Click	_off_
Encoding	_off_	Scrolling	_jump_
Generate Flow	_off_	Scroll Speed	med_
Receive Flow	_off_		
Pass Flow	_off_		
Monitor Mode	_off_	Cursor Type	_blck_
Autowrap	_on_	Cursor Blink	_no_
Newline on LF	_no_	Labels	_on_
Return Key	_CR_		
Enter Key	<--		

DONE

615MT 1.1

CHANGE
OPTION

DEFAULT
VALUES

SAVED
VALUES

SAVE

NEXT
SETUP

CLEAR
TO END

Figure 4-29: Terminal Options for a 615 MT

If any of the 615 MT options are incorrect, refer to the *615 Multi-Tasking Terminal User's Guide* (AT&T 999-300-302 IS) for instructions on how to change the options.

605 BCT (Business Communications Terminal)

Figure 4-30 shows the recommended 605 BCT Terminal options.

OPTIONS SETUP			
Communications		User Preferences	
Speed	9600	Columns	<u>80</u>
Send Parity	spac	Reverse Video	<u>no</u>
Check Parity	<u>no</u>	Bell	<u>on</u>
Local Echo	<u>off</u>	Key Click	<u>off</u>
Monitor Mode	<u>off</u>	Scrolling	<u>jump</u>
Auto Wrap	<u>on</u>	Scroll Speed	<u>med</u>
Newline on LF	<u>no</u>	Cursor Type	<u>blck</u>
Return Key	<u>CR</u>	Cursor Blink	<u>no</u>
Enter Key	<u><--</u>	Labels	<u>on</u>
Terminal Mode	norm	Swap Delete/Del	<u>no</u>

DONE 605 BMT - 1.0

Figure 4-30: Terminal Options for a 605 BCT

If any of the 605 BCT options are incorrect, refer to the *605 Business Communications Terminal User's Guide* (AT&T 999-300-299 IS) for instructions on how to change the options.

620 MTG
(Multi-Tasking
Graphics
Terminal)

Figure 4-31 shows the recommended 620 MTG Terminal options.

OPTIONS SETUP

Communications		User Preferences	
Speed	9600	Reverse Video	_no_
Send Parity	spac	Volume	_jump_
Check Parity	_no_	Key Click	_no_
Local Echo	_off		
Generate Flow	_off	Mouse Movement	_1:1
Receive Flow	_on_	Mouse Button 3	_right_
Pass Flow	_off		
		Printer Type	5320
		Printer Alarm	_no_
		Printer Speed	1200
		Printer Parity	none
Monitor Mode	_no_	Cursor Type	blck
Auto Wrap	_on_	Cursor Blink	_no_
Newline on LF	_no_	Labels	_on_
Return Key	_CR_		
Enter Key	<- -		

DONE

CHANGE
OPTION

DEFAULT
VALUES

SAVED
VALUES

SAVE

NEXT
SETUP

CLEAR
TO END

620/Basic - 1.1

Figure 4-31: Terminal Options for a 620 MTG

If any of the 620 MT options are incorrect, refer to the *620 Multi-Tasking Graphics Terminal User's Guide* (AT&T 999-300-211 IS) for instructions on how to change the options.

2900/AWTC Display Terminal

To properly set up the terminal, you may need to change some of the options on the Setup menu.

User Preferences Window

Figure 4-32 shows the recommended user preference options.

The screenshot shows a window titled "USER PREFERENCES" with a list of settings and their current values. The settings are as follows:

Screen Lines	27
Screen Columns	80
Reverse Video	no
Relative Reverse Video	yes
Screen Saver	30 min
Scrolling	jump
Scroll Speed	
Labels	on
Key Click	off
Warning Bell	on
Font Size	large
Keyboard language	US
Mouse Hand	right
Parallel Port	printer
Enhanced Function Keys	off
Status Line Position	bottom
Control Graphics	ASCII
Background Pattern	default

At the bottom of the window, there are several buttons: "SETUP MENU", "PREVIOUS SCREEN", "NEXT SCREEN", "CHANGE OPTION", and four empty rectangular boxes.

Figure 4-32: User Preference Options for a 2900/AWTC

Communications
Options Windows

There are two communications options submenus, one for each port.

SES 1
Communications
Options

The default options are correct with the exception of the “Data Bits” option. This should be set so that it will read 8 bits.
Figure 4-33 shows the recommended SES 1 communications options.

SES 1 COMMUNICATIONS OPTIONS
(EIA port)

Power-up Port	SES 1
Port Service	host
Speed	9600
Stop Bits	1 bit
Data Bits	8 bits
Send Parity	space
Check Parity	no
Local Echo	off
Generate Flow	XON/XOFF
Receive Flow	XON/XOFF
XOFF at	240
Transmit Limit	500 cps
Answerback on Connect	no
Line Break	280 ms
Clear Communications	SES 1

SETUP
MENU

PREVIOUS
SCREEN

NEXT
SCREEN

CHANGE
OPTION

Figure 4-33: SES 1 Communications Options for a 2900/AWTC

SES 2 Communications Options

The default options are correct with the exception of the “Speed” option (should read 9600) and the “Data Bits” option (should read 8 bits).

Figure 4-34 shows the recommended SES 2 communications options.

SES 2 COMMUNICATIONS OPTIONS
(AUX port)

Power-up Port	SES 1
Port Service	mouse
Speed	9600
Stop Bits	1 bit
Data Bits	8 bits
Send Parity	none
Check Parity	no
Local Echo	
Generate Flow	
Receive Flow	
XOFF at	
Transmit Limit	
Answerback on Connect	
Line Break	
Clear Communications	SES 2

SETUP MENU PREVIOUS SCREEN NEXT SCREEN CHANGE OPTION

Figure 4-34: SES 2 Communications Options for a 2900/AWTC

General Options Window

Figure 4-35 shows the recommended general options.

GENERAL OPTIONS

WINDOW TITLE (VT #)

Emulation	705
Terminal ID	track
Newline on LF	no
Newline on CR	no
Transmit Controls	8 bits
Backspace Mode	normal
User Features	unlocked
Conceal Answerback	no
Answerback	
	
	

SETUP MENU

PREVIOUS SCREEN

NEXT SCREEN

CHANGE OPTION

CLEAR TO END

Figure 4-35: General Options for a 2900/AWTC

Display Options Window

Figure 4-36 shows the recommended display options.

The screenshot shows a terminal window titled "DISPLAY OPTIONS" with a subtitle "WINDOW TITLE (VT #)". The window contains a list of settings with their current values. At the bottom, there are four buttons: "SETUP MENU", "PREVIOUS SCREEN", "NEXT SCREEN", and "CHANGE OPTION", followed by four empty rectangular boxes.

DISPLAY OPTIONS	
WINDOW TITLE (VT #)	
Monitor Mode	off
Cursor Type	block
Cursor Blink	off
Display Cursor	yes
Status Line Type	host
Character Mode	multnati
International Font	ISO Latin
Autowrap	on
Destructive Scroll	yes

SETUP MENU PREVIOUS SCREEN NEXT SCREEN CHANGE OPTION

Figure 4-36: Display Options for a 2900/AWTC

Keyboard Options Window

Figure 4-37 shows the recommended keyboard options.

KEYBOARD OPTIONS

WINDOW TITLE (VT #)

Caps/Shift Lock Key	caps lck
<--	CR
Enter Key	<--
Autorepeat	yes
Margin Bell	no
Compose Key	enabled
Break Key	enabled
Numeric Pad	numeric
Cursor Keys	normal
Swap Delete	no
Control Key Swapping	none
Legends	
User Defined Keys	
Backspace key	BS
ESC Key	ESC

SETUP MENU

PREVIOUS SCREEN

NEXT SCREEN

CHANGE OPTION

CLEAR TO END

Figure 4-37: Keyboard Options for a 2900/AWTC

Printer Options Window

Figure 4-38 shows the recommended printer options.

The screenshot shows a terminal window titled "PRINTER OPTIONS" with a subtitle "WINDOW TITLE (VT #)". Inside the window, there is a list of settings with their current values:

Select Print Region	page
Print mode	normal
Print Terminator	none
Printer Type/Driver	Propmtr
Printer Alarm	no
Printer To host	no

At the bottom of the window, there are several buttons: "SETUP MENU", "PREVIOUS SCREEN", "NEXT SCREEN", "CHANGE OPTION", and four empty rectangular boxes.

Figure 4-38: Printer Options for a 2900/AWTC

If any of the 2900/AWTC terminal options are incorrect, refer to the *2900/AWT Color Guide to Operations* for instructions on how to change the terminal options.

4000/AWTC
Display Terminal

To properly set up the terminal, you may need to change some of the options on the Setup Menu.

User Preferences
Window

Figure 4-39 shows the recommended user preference options.

USER PREFERENCES

Screen Lines	27
Screen Columns	80
Reverse Video	no
Relative Reverse Video	yes
Screen Saver	30 min
Scrolling	jump
Scroll Speed	
Labels	on
Key Click	off
Warning Bell	on
Font Size	large
Keyboard language	US
Mouse Hand	right
Parallel Port	printer
Enhanced Function Keys	off
Status Line Position	bottom
Control Graphics	ASCII
Background Pattern	default

SETUP MENU

PREVIOUS SCREEN

NEXT SCREEN

CHANGE OPTION

Figure 4-39: User Preference Options for a 4000/AWTC

Communications Options Windows

There are two communications options submenus, one for each port.

SES 1 Communications Options

The default options are correct with the exception of the “Data Bits” option. This should be set so that it will read 8 bits.

Figure 4-40 shows the recommended SES 1 communications options.

**SES 1 COMMUNICATIONS OPTIONS
(EIA port)**

Power-up Port	SES 1
Port Service	host
Speed	9600
Stop Bits	1 bit
Data Bits	8 bits
Send Parity	space
Check Parity	no
Local Echo	off
Generate Flow	XON/XOFF
Receive Flow	XON/XOFF
XOFF at	240
Transmit Limit	500 cps
Answerback on Connect	no
Line Break	280 ms
Clear Communications	SES 1

SETUP
MENU

PREVIOUS
SCREEN

NEXT
SCREEN

CHANGE
OPTION

Figure 4-40: SES 1 Communications Options for a 4000/AWTC

SES 2
Communications
Options

The default options are correct with the exception of the “Speed” option (should read 9600) and the “Data Bits” option (should read 8 bits).

Figure 4-41 shows the recommended SES 2 communications options.

SES 2 COMMUNICATIONS OPTIONS
(AUX port)

Power-up Port

SES 1

Port Service

mouse

Speed

9600

Stop Bits

1 bit

Data Bits

8 bits

Send Parity

none

Check Parity

no

Local Echo

Generate Flow

Receive Flow

XOFF at

Transmit Limit

Answerback on Connect

Line Break

Clear Communications

SES 2

SETUP
MENU

PREVIOUS
SCREEN

NEXT
SCREEN

CHANGE
OPTION

Figure 4-41: SES 2 Communications Options for a 4000/AWTC

General Options Window

Figure 4-42 shows the recommended general options.

GENERAL OPTIONS

WINDOW TITLE (VT #)

Emulation	705
Terminal ID	track
Newline on LF	no
Newline on CR	no
Transmit Controls	8 bits
Backspace Mode	normal
User Features	unlocked
Conceal Answerback	no
Answerback	

SETUP
MENU

PREVIOUS
SCREEN

NEXT
SCREEN

CHANGE
OPTION

CLEAR
TO END

Figure 4-42: General Options for a 4000/AWTC

Display Options Window

Figure 4-43 shows the recommended display options.

DISPLAY OPTIONS

WINDOW TITLE (VT #)

Monitor Mode	off
Cursor Type	block
Cursor Blink	off
Display Cursor	yes
Status Line Type	host
Character Mode	multnati
International Font	ISO Latn
Autowrap	on
Destructive Scroll	yes

SETUP MENU

PREVIOUS SCREEN

NEXT SCREEN

CHANGE OPTION

Figure 4-43: Display Options for a 4000/AWTC

Keyboard Options Window

Figure 4-44 shows the recommended keyboard options.

KEYBOARD OPTIONS

WINDOW TITLE (VT #)

Caps/Shift Lock Key	caps lck
<-	CR
Enter Key	<-
Autorepeat	yes
Margin Bell	no
Compose Key	enabled
Break Key	enabled
Numeric Pad	numeric
Cursor Keys	normal
Swap Delete	no
Control Key Swapping	none
Legends	
User Defined Keys	
Backspace key	BS
ESC Key	ESC

SETUP
MENU

PREVIOUS
SCREEN

NEXT
SCREEN

CHANGE
OPTION

CLEAR
TO END

Figure 4-44: Keyboard Options for a 4000/AWTC

Printer Options Window

Figure 4-45 shows the recommended printer options.

PRINTER OPTIONS

WINDOW TITLE (VT #)

Select Print Region	page
Print mode	normal
Print Terminator	none
Printer Type/Driver	Propmtr
Printer Alarm	no
Printer To host	no

SETUP
MENU

PREVIOUS
SCREEN

NEXT
SCREEN

CHANGE
OPTION

Figure 4-45: Printer Options for a 4000/AWTC

If any of the 4000/AWTC terminal options are incorrect, refer to the *4000/AWT Color Guide to Operations* for instructions on how to change the terminal options.

2900/260If Small Footprint Terminal

The recommended 2900/260If Terminal values are as follows. Twelve of the menus are accessed by the function keys F1 through F12. The thirteenth menu is accessed by the Print Screen key and provides terminal operations which may be executed.

In order to enter the terminal Setup mode, press **Ctrl** **Scroll Lock**. To exit Setup, press **Pause** and y or n.

F1 Quick Window

F1 Quick	F2 Genrl	F3 Displ	F4 Kybd	F5 Keys	F6 Ports	F7 Host	F8 Print	F9 Emul	F10 Tabs	F11 Ansbk	F12 Prog	PrtSc Exec																					
Emulation=VT-300-7 Comm Mode=Full Duplex Enhanced=0n Host/Printer=EIA/Para				Parameters EIA Baud Rate=9600 Aux Baud Rate=9600 Lanuguage=U.S.				EIA Data Format=8/1/N Aux Data Format=8/1/N Sessions=One																									
Choices <table> <tr> <td>ADDS-VP</td> <td>Wyse-60</td> <td>Wyse-325</td> <td>Wyse-50+</td> <td>Wyse-350</td> <td>PC-Term</td> <td>TVI-925</td> </tr> <tr> <td>VT-300-7</td> <td>VT-300-8</td> <td>Intecolor</td> <td>VT-200-7</td> <td>VT-200-8</td> <td>VT-100</td> <td></td> </tr> <tr> <td>SCO Console</td> <td>AT386</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>													ADDS-VP	Wyse-60	Wyse-325	Wyse-50+	Wyse-350	PC-Term	TVI-925	VT-300-7	VT-300-8	Intecolor	VT-200-7	VT-200-8	VT-100		SCO Console	AT386					
ADDS-VP	Wyse-60	Wyse-325	Wyse-50+	Wyse-350	PC-Term	TVI-925																											
VT-300-7	VT-300-8	Intecolor	VT-200-7	VT-200-8	VT-100																												
SCO Console	AT386																																
↑ → ↓ ← : Parameter				Select Enter/S-Enter: Next/Prev Choice				Exit : PauseKey																									

Figure 4-46: F1 Quick Values for 2900/260If

You must change the EIA Data Format parameter manually in Window F1 because the default is 7/1/N.

F2 Genrl (General)
Window

F1 Quick	F2 Genrl	F3 Displ	F4 Kybd	F5 Keys	F6 Ports	F7 Host	F8 Print	F9 Emul	F10 Tabs	F11 Ansbk	F12 Prog	PrtSc Exec
Emulation=VT-300-7 Auto Font Load=0n Monitor Mode=Off Warning Bell=0n Sessions=One				Parameters Enhanced=0n Auto Page=Off Screen Saver=5-min Bell Length=350 ms Color Mode=Direct				Auto Wrap=Off Auto Scroll=0n Bell Volume=06 Host Printer=EIA/Para				
Choices ADDS-VP Wyse-60 Wyse-325 Wyse-50+ Wyse-350 PC-Term TVI-925 VT-300-7 VT-300-8 Intecolor VT-200-7 VT-200-8 VT-100 SCO Console AT386												
↑>↓< : Parameter				Select Enter/S-Enter: Next/Prev Choice				Exit : PauseKey				

Figure 4-47: F2 Genrl Values for 2900/260lf

F3 Displ (Display)
Window

F1 Quick	F2 Genrl	F3 Displ	F4 Kybd	F5 Keys	F6 Ports	F7 Host	F8 Print	F9 Emul	F10 Tabs	F11 Ansbk	F12 Prog	PrtSc Exec
Page Length=25 Display Cursor=0n Columns=80 Scroll=Jump				Parameters Screen Length=26 Lines Cursor=Blink Block Erase Color=Black				Screen Video=Normal Auto Adjust Cursor=0n Speed=Fast				
Choices 24 25 42 43 48 50 84 86 96 100 168 172 192 200 *24 *25 *42 *43												
↑ → ↓ ← : Parameter				Select Enter/S-Enter: Next/Prev Choice				Exit : PauseKey				

Figure 4-48: F3 Displ Values for 2900/260lf

F4 Kybd (Keyboard) Window

F1 Quick	F2 Genrl	F3 Displ	F4 Kybd	F5 Keys	F6 Ports	F7 Host	F8 Print	F9 Emul	F10 Tabs	F11 Ansbk	F12 Prog	PrtSc Exec
Language=U.S. Keyclick=Off Margin Bell=Off Num Lock=Toggle				Parameters Char Set Mode=ANSI Key Repeat=On Key Lock=Caps				Key Mode=ASCII Key Rate=20 cps Caps Lock=Toggle				
Choices U.S. U.K. Danish Finnish French German Norwegian Portuguese Spanish Swedish Dutch Belgian-Flemsh Fr-Canadian Italian Latin-American Swiss-German Swiss-French												
↑ → ↓ ← : Parameter				Select Enter/S-Enter: Next/Prev Choice				Exit : PauseKey				

Figure 4-49: F4 Kybd Values for 2900/260lf

F5 Keys Window

F1 Quick	F2 Genrl	F3 Displ	F4 Kybd	F5 Keys	F6 Ports	F7 Host	F8 Print	F9 Emul	F10 Tabs	F11 Ansbk	F12 Prog	PrtSc Exec
Enter Key=<CR> Alt Key=Compose Pound Key=U.S.				Parameters Return Key=<CR> Disconnect=Pause Return Key Repeat=Off				Backspace=<BS>/<DEL> Desk Acc=Ctrl+ UDKs=Emul Dependent				
					Choices <CR> <CR><LF> <TAB>							
↑↓↔← : Parameter				Select Enter/S-Enter: Next/Prev Choice				Exit : PauseKey				

Figure 4-50: F5 Keys Values for 2900/260lf

F6 Ports Window

F1 Quick	F2 Genrl	F3 Displ	F4 Kybd	F5 Keys	F6 Ports	F7 Host	F8 Print	F9 Emul	F10 Tabs	F11 Ansbk	F12 Prog	PrtSc Exec
					Parameters							
EIA Baud Rate=9600					EIA Data Format=8/1/N			EIA Parity Check=Off				
AUX Baud Rate=9600					AUX Data Format=8/1/N			AUX Parity Check=Off				
EIA Xmt=No Protocol					EIA Recv=Xany-Xoff(XPC)			EIA Xmt Pace=Baud				
AUX Xmt=No Protocol					AUX Recv=Xany-Xoff(XPC)			AUX Xmt Pace=Baud				
EIA Break=250 ms					EIA Modem Control=Off			EIA Disconnect=2 sec				
AUX Break=250 ms					AUX Modem Control=Off			AUX Disconnect=2 sec				
Choices												
110 150 300 600 1200 2000 2400 4800 9600												
19200 38400 57600 76800 115200												
					Select							
↑ → ↓ ← : Parameter					Enter/S-Enter: Next/Prev Choice			Exit : PauseKey				

Figure 4-51: F6 Ports Values for 2900/260lf

You must change the EIA Data Format parameter manually in Window F6 because the default is 7/1/N.

F7 Host Window

F1 Quick	F2 Genrl	F3 Displ	F4 Kybd	F5 Keys	F6 Ports	F7 Host	F8 Print	F9 Emul	F10 Tabs	F11 Ansbk	F12 Prog	PrtSc Exec
Comm Mode=Full Duplex Recv <DEL>=Ignore Send Region=Screen Alt Input Data=On				Parameters Local=Off Send ACK=On Send End=Region				Recv <CR>=<CR> Send Block Term=None Null Supress=Off				
Choices Full Duplex Half Duplex Full Block Half Block												
↑ → ↓ ← : Parameter				Select Enter/S-Enter: Next/Prev Choice				Exit : PauseKey				

Figure 4-52: F7 Host Values for 2900/260lf

F8 Print Window

F1 Quick	F2 Genrl	F3 Displ	F4 Kybd	F5 Keys	F6 Ports	F7 Host	F8 Print	F9 Emul	F10 Tabs	F11 Ansbk	F12 Prog	PrtSc Exec
Prnt Mode=Normal Secondary Recv=0n				Parameters Prnt Region=Screen				Prnt Block Term=None				
Normal Auto Controller						Choices						
↑ → ↓ ← : Parameter				Select Enter/S-Enter: Next/Prev Choice				Exit : PauseKey				

Figure 4-53: F8 Print Values for 2900/260lf

F9 Emul (Emulation) Window

F1 Quick	F2 Genrl	F3 Displ	F4 Kybd	F5 Keys	F6 Ports	F7 Host	F8 Print	F9 Emul	F10 Tabs	F11 Ansbk	F12 Prog	PrtSc Exec	
Numeric Kpd=Numeric Print=National UPSS=ANSI-Supplemental				Parameters Cursor Kpd=Cursor ANSI-ID=VT320 Feature Lock=Off				Send Data=All Function Key Lock=Off Status Line=Off					
Numeric Application								Choices					
↑⇒⇐ : Parameter				Select				Enter/S-Enter: Next/Prev Choice				Exit : PauseKey	

Figure 4-54: F9 Emul Values for 2900/260lf

F10 Tabs Window

F1 Quick	F2 Genrl	F3 Displ	F4 Kybd	F5 Keys	F6 Ports	F7 Host	F8 Print	F9 Emul	F10 Tabs	F11 Ansbk	F12 Prog	PrtSc Exec
Parameters												
Auto Init Tabs=Off					Default Tabs							
.....10.....20.....30.....40.....50.....60..... T T T T T T T												
.....70.....80.....90.....100.....110.....120.....130..... T T T T T T T												
Choices												
Off On												
Select												
↑>↓<				: Parameter				Enter/S-Enter: Next/Prev Choice			Exit : PauseKey	

Figure 4-55: F10 Tabs Values for 2900/260lf

F11 AnsBk (Answerback) Window

F1 Quick	F2 Genrl	F3 Displ	F4 Kybd	F5 Keys	F6 Ports	F7 Host	F8 Print	F9 Emul	F10 Tabs	F11 Ansbk	F12 Prog	PrtSc Exec
Parameters												
Answerback Mode=Off				Answerback Conceal								
Answerback Message:												
Bytes Remaining:												
Choices												
Off On												
Select												
↑ → ↓ ← : Parameter				Enter/S-Enter: Next/Prev Choice				Exit : PauseKey				

Figure 4-56: F11 AnsBk Values for 2900/260lf

F12 Prog (Program) Window

F1 Quick	F2 Genrl	F3 Displ	F4 Kybd	F5 Keys	F6 Ports	F7 Host	F8 Print	F9 Emul	F10 Tabs	F11 Ansbk	F12 Prog	PrtSc Exec
Parameters Key=F1 Program=F/Key Key Dir=Comm Dependent												
Text:												
Label: Bytes Remaining:												
Choices F1 F2 F3 F4 F5 F6 F7 F8 F9 F10 F11 F12												
Select ↑ ⇒ ↓ ⇐ : Parameter Enter/S-Enter: Next/Prev Choice Exit : PauseKey												

Figure 4-57: F12 Prog Values for 2900/260lf

PrtSc Exec (Print
Screen Execute)
Window

F1 Quick	F2 Genrl	F3 Displ	F4 Kybd	F5 Keys	F6 Ports	F7 Host	F8 Print	F9 Emul	F10 Tabs	F11 Ansbk	F12 Prog	PrtSc Exec
Save Terminal Save Session Reset Terminal Clear Screen				Parameters Recall Terminal Recall Session Reset Session Default Session UDks				Default Terminal Default Session Reset Ports				
Choices												
Use Enter Key to Execute Action												
↑ → ↓ ← : Parameter				Select				Enter/S-Enter: Next/Prev Choice Exit : PauseKey				

Figure 4-58: PrtSc Exec Values for 2900/260If

Administering Printers

This section describes how to configure port parameters for printers. A printer can be configured in one of three ways:

- Serial Printers — connected to ports on the NTS patch panel.

Note After the serial printers are connected, you must complete the `na`, `rtnet`, and `lpadmin` administration for the *Sun SPARCserver* computer to recognize the new serial printer(s).

You can complete `na` administration for serial printers connected to an NTS using **either** of the following methods:

- Complete NA Administration — provides in-depth step-by-step procedures for completing printers' administration.
- Quick NA Administration — provides a short cut to administering printers by using scripts

Note For printers that have different configurations and parameters, see the *Network Terminal Server Administration Guide* for details.

- Parallel Printers — connected to a back-panel port on an NTS (an NTS can have 0, 1, or 2 parallel ports).

Note After the parallel printers are connected, you must complete the `na` and `lpadmin` administration for the *Sun SPARCserver* computer to recognize the new parallel printer(s).

- Parallel Printers — connected to the parallel port on the *Sun SPARCserver* computer.

Caution If your job is printing during a power outage, you may need to resubmit your job.

Serial Printers on the NTS

Set up the serial printers by connecting a serial printer to one of the NTS serial ports.

Complete NA Administration Method

The Complete NA Administration Method provides in-depth step-by-step procedures for administering serial printers.

Note

If the serial printers are set to the recommended default (9600 baud, 8 data_bits, no parity, and 1 stop_bit), you can skip to the “Quick NA Administration Method.”

Procedure

To address and configure the NTS ports for serial printers, complete the following steps:

1. Log in as *root*.
2. At the system prompt, enter the *na* command to access the NTS administration software:

```
# na
```

The following appears:

```
Annex network administrator R7.0 October 13, 1992
command:
```

3. To associate all subsequent administration with a specific Network Terminal Server, enter *annex cmsterm1* at the command prompt:

```
command: annex cmsterm1
```

Note

When you enter annex cmsterm1 (or annex 129.200.9.11), cmsterm1 becomes the default NTS until another NTS is selected using the annex command. The default setting for the NTS ports is 9600 bps, 8 bits, no parity, and 1 stop bit.

You can specify one NTS or multiple NTSS. Use the recommended NTS names and addresses in the */etc/hosts* file.

See Table 4-5 on page 4-21 “Configuration Information,” for specific devices, IP addresses, terminals, and file names.

The system responds:

cmsterm1: Annex-3-UXR7, 64 ports

command:

4. For serial printers, enter the following set port string command to administer the printer:

command: set port=x-y mode slave type hardwired
control_lines none input_flow_control start/stop
output_flow_control start/stop location "<name>" speed <9600
or whatever printer speed is>

See Table 4-8 for more details about using the set port string command. You do not have to set any parameters if the default parameters are correct.

Table 4-8: Serial Printer Configuration Guidelines

Port Generic Parameter	Default Parameter	Recommended Setting	Comment
mode	cli	slave	NA
type	hardwired	hardwired	NA

Table 4-8: Serial Printer Configuration Guidelines (Contd)

Port Generic Parameter	Default Parameter	Recommended Setting	Comment
dedicated_address	0.0.0.0	Set to 129.200.9.1 (Sun SPARCserver computer).	Set to your <i>Sun SPARCserver</i> computer internet address.
control_lines	none	Set to none.	NA
input_flow_control	bell	Set to start/stop.	NA
output_flow_control	none	Set to start/stop.	NA
location	""	"a location"	It is important to set this parameter so port problems can be traced.
user_name	""	"a user"	It is important to set this parameter so port problems can be traced.
speed	9600	Set to match the speed of the printer. Do not use autobaud.	Speed may be changed to match your printer's baud rate.
data_bits	8	Set to match the requirements of the printer.	Can be set to match the printer settings.
parity	none	Set to none.	Can be set to match the printer settings.
stop_bits	1	Set to match the requirements of the printer.	Can be set to match the printer settings.

Note

You can use the `show port` command to review your changes.

The system responds:

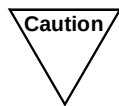
Changes will take effect at next annex boot or port reset.
command:

5. Use the following command to reset the printer ports:

```
command: reset <port number>
```

The following appears:

```
# resetting serial port <port number> of annex <cmsterm1>
```



You can also use the `reset all@cmsterm1` command to terminate all active sessions on the NTS. Use the `reset all@cmsterm1` command **only** if no one else is logged in.

6. To quit, enter the following command:

```
command: quit
```

The system responds:

```
#
```

RTELNET Administration

Serial printers require some additional administration:

- You must place the command in a file (as specified below).
- You must run the command — enter the command as described below or reboot the *Sun SPARCserver* computer.

To place the command for serial printers in a file, continue with the following:

7. Place the `Speripherals` file into the `/etc/rc2.d` directory:

- a. To change from the *root* directory, at the system prompt, enter the following command:

```
# cd /etc/rc2.d
```

- b. Access the `Speripherals` file using an editor (for example, `vi`):

```
# vi Speripherals
```

- c. Enter the name(s) of the character special device(s) into the file. For example:

```
rtelnet -brao cmsterm1 16 /dev/s_pdev116
rtelnet -brao cmsterm1 15 /dev/s_pdev115
rtelnet -brao cmsterm1 17 /dev/s_pdev117
```

- d. To exit the file and return to the system prompt, press **Shift** and **Z** **Z**.

- e. To return to the *root* directory, enter the following command:

```
# cd /
```

- At the *Sun SPARCserver* console, enter the following system command (one line per each serial printer):

```
# rtelnet -brao cmsterm1 16 /dev/s_pdev116
```

Note

The 116 in the device name indicates the first NTS and port 16 (as does the parameter 16). You can choose your own names, but it is recommended that the device name reflect the terminal server and port names (For example, `rtelnet -brao cmsterm2 64 /dev/s_pdev264`).

LPADMIN Administration

To run the command to administer serial printers, continue with the following steps:

- For serial printers connected to the NTS, enter the following command at the system prompt

```
# lpadmin -p <printrname> -D "comment about printer location"
-i /usr/spool/lp/cmstermintf -o <no>banner -v/dev/s_pdev116 -
A mail -T <type> -o "stty=<baud rate>"
```

- For serial printers **not** connected to the NTS, enter the following command at the system prompt:

```
# lpadmin -p <printrname> -D "comment about printer location"
-o <no>banner -v/dev/term/xxx -A mail -T <type> -o "stty=<baud
rate>"
```

Note

Where the printer name is your choice, use the `banner` or `nobanner` command according to your preference. If the *Sun SPARC* server is replacing an existing Intel-based product, check the CMS: Maintenance: Printer Administration window to match settings. Use the device name from the `rtnet` command (see step 8). If the speed is **not** 9600, use `-o "stty=<baud rate>"`.

See Table 4-9 to identify the correct `lpadmin` type.

Table 4-9: Printer Device Types

Printer	"lpadmin" Type	Emulation Mode	Product Status
475 Dot Matrix	475	—	Discontinued
476 Dot Matrix	476	—	Discontinued
477 Dot Matrix	477	—	—
495 Laser	495hp	HP	Discontinued
570 Parallel Dot Matrix	570ibm	IBM	Discontinued
571 Parallel Dot Matrix	571libm	IBM	Discontinued
572 Serial Dot Matrix (Narrow Platen)	572	—	—
573 Serial Dot Matrix (Wide Platen)	573	—	—
580 Parallel Dot Matrix	580ibm	IBM	Discontinued
581	581ibm	IBM	—
583 Dot Matrix	583ibm	IBM	Discontinued
593 Laser	593hp	HP	Discontinued
595 Laser	hplaserjet	HP	Discontinued
5310 Dot Matrix	5310	—	Discontinued
5320 Dot Matrix	5320	—	Discontinued

Table 4-9: Printer Device Types (Contd)

Printer	“lpadmin” Type	Emulation Mode	Product Status
6417 GIS Parallel Dot Matrix	ibmproprinter	IBM	—
Okidata 830 Plus	hplaserjet	HP	—
Okidata 183	ibmproprinter	IBM	—
Okidata 321	ibmproprinter	IBM	—
Okidata 320	ibmproprinter	IBM	—

11. To make a printer the default destination, enter the following command at the system prompt:

```
# lpadmin -d <printername>
```

12. To enable the printer, enter the following command:

```
# enable <printername>
```

The system responds:

```
<printername> enabled
```

13. To complete the printer default destination and put the printer into service, enter the following command:

```
# accept <printername>
```

The system responds:

```
<printername> accepted
```

14. If this is the initial installation, reboot the *Sun SPARCserver* computer (required).

Note

You can wait to reboot your system after you complete all the terminal, printer, and modem administration, if desired.

Quick NA Administration Method

In an attempt to simplify the serial printer administration, Network Administration (na) scripts are available for the recommended serial printers settings (8 data bits, no parity, one stop, and running 4800 or 9600 baud). Any differences from the parameters specified in these scripts need to be handled separately.

For example:

Assume the system is set up with one NTS and 20 printers. The printers are set to 8 data bits, no parity, and 1 stop bit. Half of the printers are running at 4800 baud and the other half are running at 9600 baud.

Using the above example as a scenario, the administration could be handled using the following procedures.

Procedure

To address and configure the NTS ports for serial printers, complete the following steps:

1. Log in as *root*.
2. At the system prompt, enter the *na* command to access the NTS administration software:

```
# na
```

The following appears:

```
Annex network administrator R7.0 October 13, 1992
command:
```

3. To associate all subsequent administration with a specific Network Terminal Server, enter *annex cmsterm1* at the command prompt:

```
command: annex cmsterm1
```

Note

When you enter `annex cmsterm1` (or `annex 129.200.9.11`), `cmsterm1` becomes the default NTS until another NTS is selected using the `annex` command. The default setting for the NTS ports is 9600 bps, 8 bits, no parity, and 1 stop bit.

You can specify one NTS or multiple NTSS. Use the recommended NTS names and addresses in the `/etc/hosts` file.

See Table 4-5 on page 4-21, for specific devices, IP addresses, terminals, and file names.

The system responds:

```
cmsterm1: Annex-3-UXR7, 64 ports
```

```
command:
```

4. Make ports 31-40 the default set for 9600 baud serial printers. Enter `port 31-40` at the `command:` prompt:

```
command: port 31-40
```

Note

All subsequent commands refer to ports 31-40.

The system responds:

```
command:
```

5. To use a script to administer 9600 baud serial printers, enter the following at the `command:` prompt:

```
command: read /etc/local.admin/96print
```

The system responds:

```
Setting all port parameters in specified port set to correct
settings for a 9600 baud printer, 8 data bits, no parity, 1
stop bit.
```

```
user_name and location are not set (values remain as
previously set), and the dedicated_address is set to
129.200.9.1
```

Please allow a slight delay before resetting the ports.

```
command:
```

6. Make ports 41-50 the default set for 4800 serial printers. Enter port 41-50 at the command : prompt:

```
command: port 41-50
```

Note

All subsequent commands refer to ports 41-50.

The system responds:

```
command:
```

7. If you want to use a script to administer 4800 baud serial printers instead, enter the following at the command : prompt:

```
command: read /etc/local.admin/48print
```

The system responds:

```
Setting all port parameters in specified port set to correct
settings for a 4800 baud printer, 8 data bits, no parity, 1
stop bit.
```

```
user_name and location are not set (values remain as
previously set), and the dedicated_address is set to
129.200.9.1
```

```
Please allow a slight delay before resetting the ports.
```

```
command:
```

When you use a script to administer serial printers, you must always specify a default port set before reading in the scripts.

If your serial printers are running at a different speed, you may use any of the scripts in Table 4-10.

Table 4-10: Serial Printer Scripts

Script	Parameters
192print	19200 baud printer, 8 bits, 1 stop bit, no parity.
96print	9600 baud serial printers, 8 bits, 1 stop bit, no parity.
48print	4800 baud serial printers, 8 bits, 1 stop bit, no parity.
24print	2400 baud serial printers, 8 bits, 1 stop bit, no parity.
12print	1200 baud serial printer, 8 bits, 1 stop bit, no parity.

These scripts do not clear the `user_name` or `location`. All of these scripts set the dedicated address to the CMS factory default (129.200.9.1).

8. Set the `user_name` and `location` for each port:

```
command: set port=<x> user_name "<name>" location "<name>"
```

Note

The `x` values you enter are the port numbers on the NTS. You can specify a range of ports, but the `user_name` and `location` attributes should be port specific. Set the `location` and `user_name` so that any user-reported problems can be traced to the correct port.

You are returned to the `command:` prompt.

9. When you are done, use the following command to reset the terminal ports:

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

The following appears:

```
# resetting all@cmsterm1
```

Caution

The `reset all@cmsterm1` command terminates all active sessions on the NTS. Use the `reset all@cmsterm1` command **only** if no one else is logged in.

10. To store the new port configurations to a file (for example, `nts1info`), enter the following:

```
command:write cmsterm1/etc/local.admin/nts1info
```

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:
```

11. To check the new port configurations, enter the following command:

```
command: show port=<number(s)>
```

You can specify one port or multiple ports (For example, `show port=1` or `show port=1-10`).

The port(s) and settings you selected are displayed.

12. If this is the initial installation, reboot the *Sun SPARCserver* computer (required).

Note

You can wait to reboot your system after you complete all the terminal, printer, and modem administration, if desired.

Parallel Printers connected to NTS

Set up the printers by connecting the printer to the NTS parallel port. The port used to connect parallel printers is found on the back panel of the Network Terminal Server. (See Figure 4-60). This NTS parallel port supports either a *Centronics*- or *Dataproducts*-compatible printer.

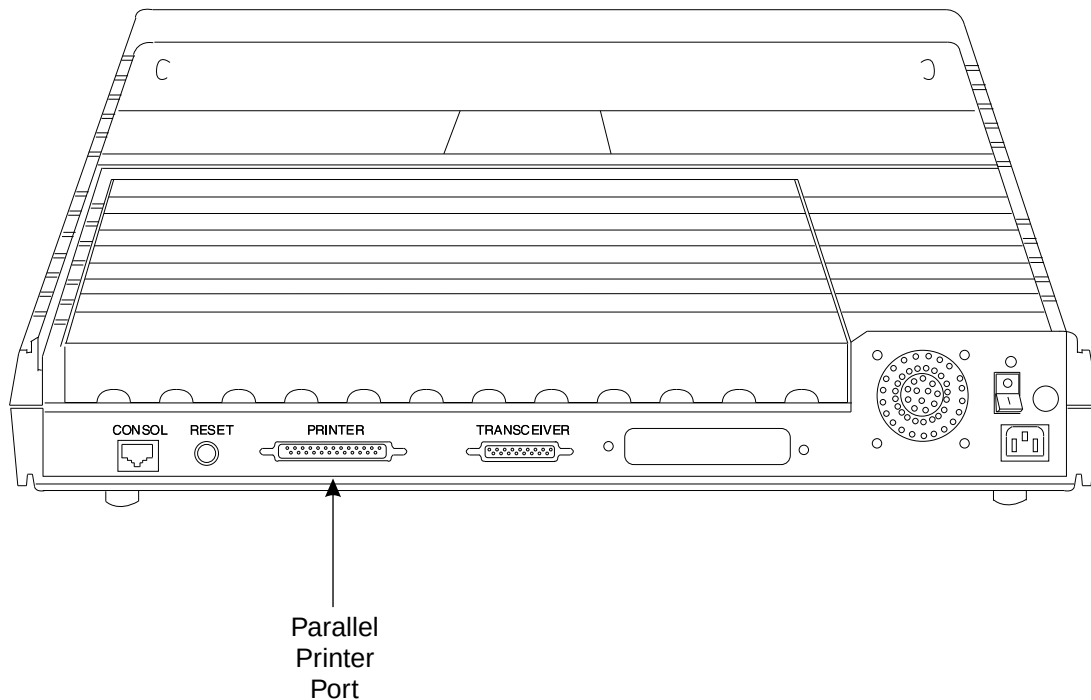


Figure 4-59: 64-Port NTS Parallel Printer Port Connection

Note If your parallel printer has a *Centronics* interface, no administration is required. If your parallel printer has a *Dataproducts* interface, you must continue with the following administration procedure. Check your printer manual to determine if your printer has a *Centronics* or *Dataproducts* interface.

If you are connecting your printer to the built-in parallel port on the *Sun SPARCserver* computer see Figure 4-61, Figure 4-62, or Figure 4-63. To connect your printer to the 64-port NTS, see Figure 4-59. To connect your printer to the 8-port NTS, see Figure 4-60.

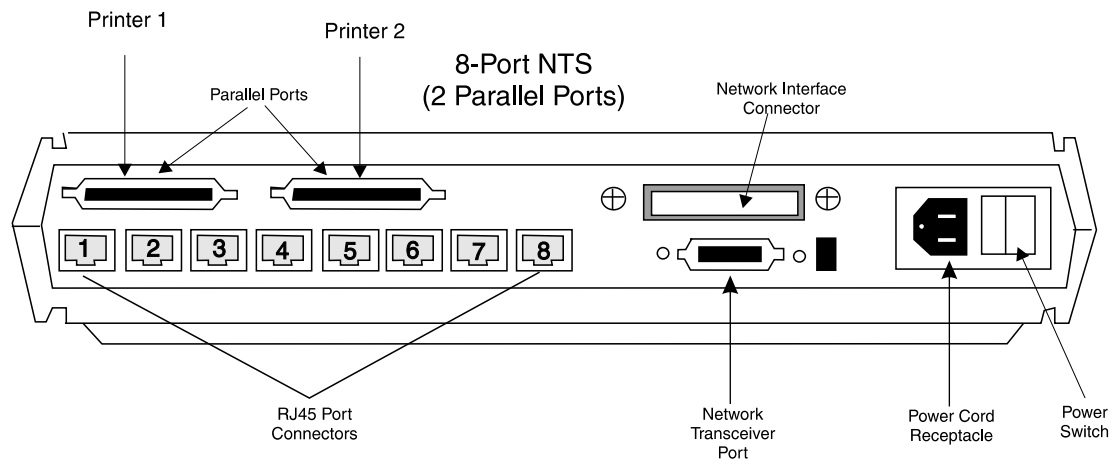


Figure 4-60: Parallel Printer Port Connection for 8-port NTS

Procedure

Complete the na administration to set the NTS parallel printer up as *Dataproducts*:

1. Log in as *root*.
2. At the system prompt, enter the na command to access the NTS administration software:

```
# na
```

The following appears:

```
Annex network administrator R7.0 October 13, 1992
command:
```

3. To associate all subsequent administration with a specific Network Terminal Server, enter `annex cmsterm1` at the command prompt:

```
command: annex cmsterm1
```

Note

When you enter `annex cmsterm1` (or `annex 129.200.9.11`), `cmsterm1` becomes the default NTS until another NTS is selected using the `annex` command. The default setting for the NTS ports is 9600 bps, 8 bits, no parity, and 1 stop bit.

You can specify one NTS or multiple NTSS. Use the recommended NTS names and addresses in the */etc/hosts* file.

See Table 4-5 on page 4-21 for specific devices, IP addresses, terminals, and file names.

The system responds:

```
cmsterm1: Annex-3-UXR7, 64 ports
```

```
command:
```

4. Depending on your terminal type, you must do the following:
 - a. For a *Centronics* interface, use the default value.
 - b. For a *Dataproducts* interface, use the following command:

```
command: set printer type dataproducts
```

Note

The `set printer` command sets parameters for the parallel printer port that you attach to a printer. Use the `set printer` command to configure the following parallel printer port parameters: `hardware_tabs`, `map_to_upper`, `printer_width`, `type`, and `printer_speed`.

For a *Centronics* interface, set the `type` parameter to the supplied default, `centronics`. For a *Dataproducts* interface, set the `type` to `dataproducts`.

You can use the `show printer` command to review your changes.

5. To reset the parallel printer when you are done, enter the following command:

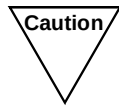
```
command: reset printer
```

Note

To reset printer 1 enter `reset printer 1` and to reset printer 2 enter `reset printer 2`.

The following appears:

```
resetting printer 1
```



You can also use the `reset all@cmsterm1` command to terminate all active sessions on the NTS. Use the `reset all@cmsterm1` command **only** if no one else is logged in.

6. To quit, enter the following command:

```
command: quit
```

The system responds:

```
#
```

LPADMIN Administration

Parallel printers require some additional administration:

7. For a parallel printer on the first NTS, issue the following command on the *Sun SPARCserver* console at the system prompt:

```
# lpadmin -p <printername> -D "comment about printer location"  
-v /dev/lpnull -A mail -i /usr/spool/lp/cmsterm1pr -T <type>
```



The first parallel printer ports on the three other NTSs will use `cmsterm2pr`, `cmsterm3pr`, and `cmsterm4pr` instead of `cmsterm1pr`. If the speed is not 9600, add the `-o stty=<baud>` to the command string. The second parallel printer ports will use `cmsterm1pr2` on the first NTS, `cmsterm2pr2` on the second, `cmsterm3pr2` on the third, and `cmsterm4pr2` on the fourth.

Note

Also, if your NTS has a different name (for example, `newnts`), use the following steps (from the system prompt) to create a printer interface program for your NTS: file.

- a. Copy the `/usr/spool/lp/cmsterm1pr` file to the `/usr/spool/lp/newntspr` file.
- b. Edit the `/usr/spool/lp/newntspr` file and replace the `ANNEX=cmsterm1` line with `ANNEX=newnts`.

See Table 4-9 on page 4-77 to identify the correct `lpadmin` type.

8. To make a printer the default destination, enter the following command from the *Sun SPARCserver* console:

```
# lpadmin -d <printername>
```

9. To enable the printer, enter the command:

```
# enable <printername>
```

The system responds:

```
<printername> enabled
```

10. To complete the printer default destination, enter the command:

```
# accept <printername>
```

The system responds:

`<printername>` accepted

11. If this is the initial installation, reboot the *Sun SPARCserver* computer (required).

Note

You can wait to reboot your system after you complete all the terminal, printer, and modem administration, if desired.

See Table 4-9 on page 4-77 to identify the correct lpadmin type.

Parallel Printers Connected to the Built-in Port on the *Sun SPARCserver Computer*

A parallel printer may be connected to a CMS system by using the parallel port on the *Sun SPARCserver* computer. There are two types of cable that can be used to connect the parallel printer to the *Sun SPARCserver* computer. They are *Centronics* and IBM-type (also called *Dataproducts*). One or the other is needed depending on what type of printer is being used. All the supported printers use *Centronics*. For the correct cable to use in connecting the printer to the parallel port see Table 4-11. (See Figure 4-61, Figure 4-62, and Figure 4-63 for the location of the parallel port).

Table 4-11: Parallel Printer Connections

Connector type	PEC(s)	Comcode
Centronics	12105	407361856
IBM-type (Dataproducts)	12106	407361831

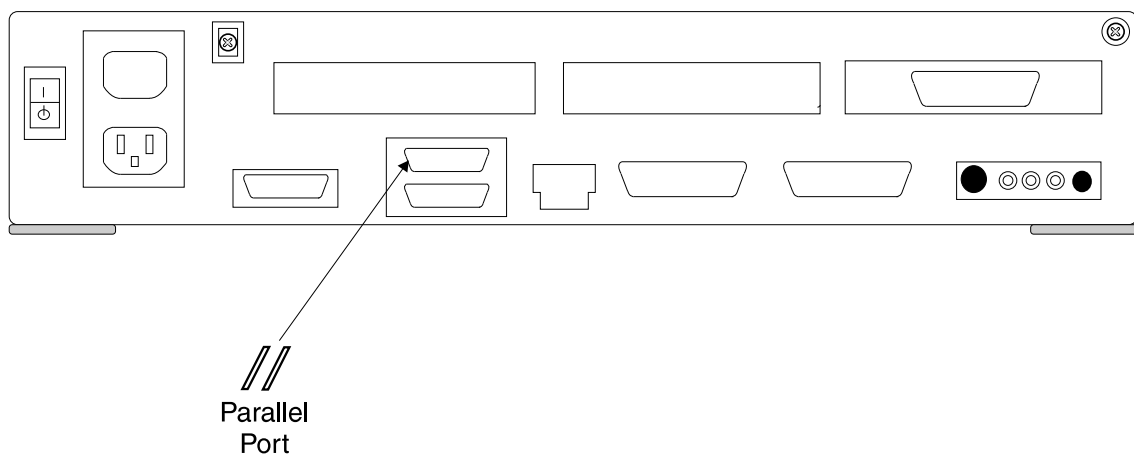


Figure 4-61: *Sun SPARCserver 5* Parallel Port

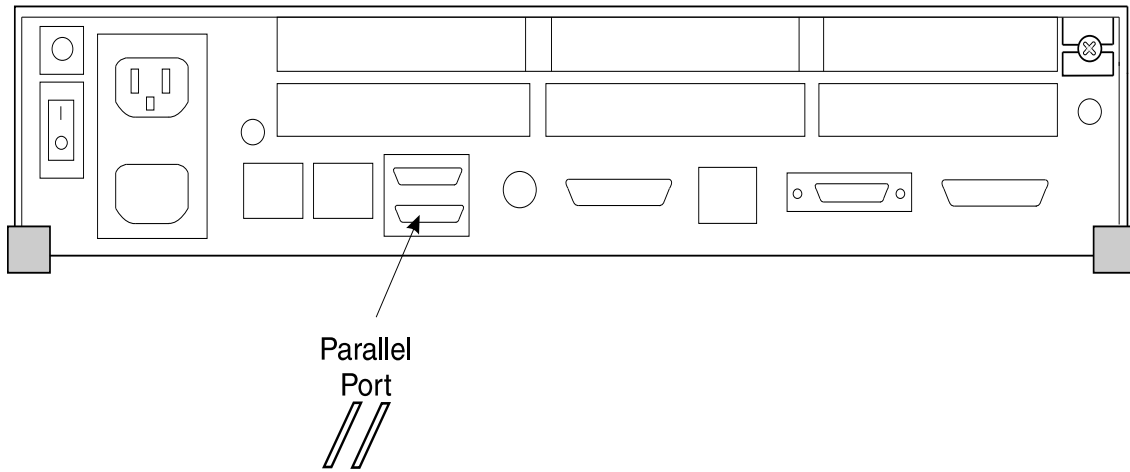


Figure 4-62: Sun SPARCserver 10 Parallel Port

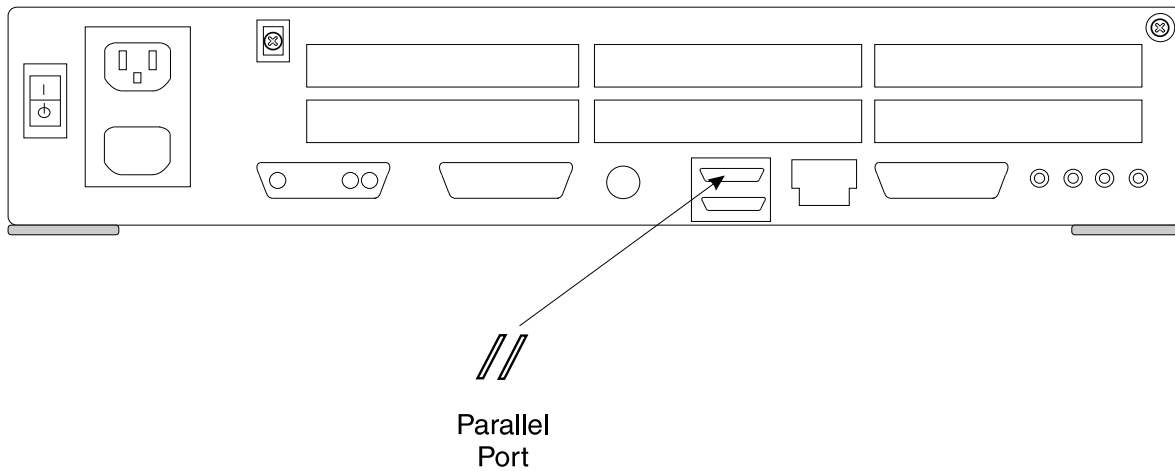


Figure 4-63: Sun SPARCserver 20 Parallel Port

1. For the built-in *Sun SPARCserver* parallel port, issue the following command on the console at the system prompt:

```
# lpadmin -p <prINTERname> -D "comment" -v /dev/bpp0 -A mail  
-i /usr/spool/lp/cmsppr -T <type>
```

2. To make a printer the default destination, enter the following command from the *Sun SPARCserver* console:

```
# lpadmin -d <prINTERname>
```

3. To enable the printer, enter the command:

```
# enable <prINTERname>
```

The system responds:

```
<prINTERname> enabled
```

4. To complete the printer default destination, enter the command:

```
# accept <prINTERname>
```

The system responds:

`<printername>` accepted

5. If this is the initial installation, reboot the *Sun SPARCserver* computer (required).

Note

You can wait to reboot your system after you complete all the terminal, printer, and modem administration, if desired.

Administering Modems

This section also describes how to configure port parameters for modems and for devices that behave like modems (for example, serial line switches).

A modem connected to an NTS can be configured in one of two ways:

- Outbound — initiates only outgoing calls.

Note

After the outbound modems are connected, you must complete the `na` and `rte1net` administration for the *Sun SPARCserver* computer to recognize the new outbound modem(s).

- Inbound — accepts only incoming calls.

Note

After the inbound modems are connected, you must complete the `na` administration for the *Sun SPARCserver* computer to recognize the new inbound modem(s).

You can complete `na` administration for modems using **either** of the following methods:

- Complete NA Administration — provides in-depth step-by-step procedures for completing modem administration.
- Quick NA Administration — provides a short cut to administering modems by using scripts.

Note

For modems that have different configurations and parameters, see the *Network Terminal Server Administration Guide* for details.

Outbound Modems

This section provides examples for configuring and administering port parameters for outbound modems.

Complete NA Administration Method

The Complete NA Administration Method provides in-depth step-by-step procedures for administering outbound modems.

Note If the outbound modems are set to the recommended default (9600 baud, 8 data_bits, no parity, and 1 stop_bit), you can skip to the “Quick NA Administration Method.”

Procedure

To address and configure the NTS ports for outbound modems, complete the following steps:

1. Log in as *root*.
2. At the system prompt, enter the *na* command to access the NTS administration software:

```
# na
```

The following appears:

```
Annex network administrator R7.0 October 13, 1992
command:
```

3. To associate all subsequent administration with a specific Network Terminal Server, enter *annex cmsterm1* at the command prompt:

```
command: annex cmsterm1
```

Note

When you enter `annex cmsterm1` (or `annex 129.200.9.11`), `cmsterm1` becomes the default NTS until another NTS is selected using the `annex` command. The default setting for the NTS ports is 9600 bps, 8 bits, no parity, and 1 stop bit.

You can specify one NTS or multiple NTSS. Use the recommended NTS names and addresses in the `/etc/hosts` file.

See Table 4-5 on page 4-21 “Configuration Information” for specific devices, IP addresses, terminals, and file names.

The system responds:

```
cmsterm1: Annex-3-UXR7, 64 ports
```

```
command:
```

4. For outbound modems, you can use the following `set port string` command. You must include all the parameters you want to change:

```
command: set port=x-y mode slave type dial_in
dedicated_address <Sunaddress> control_lines modem_control
location "<a location>" user_name "<a user>" speed <9600>
```

Note

The `set port string` command sets the parameters for the serial line ports. The `x-y` values you enter are the port numbers on the NTS. You can specify a range of ports in the above string command, but the `location` and `user_name` attributes should be port specific. Set the `location` and `user_name` so that any user-reported problems can be traced to the correct port.

See Table 4-12 for more details about entering the `set port string` command. You do not have to set any parameters if the default parameters are correct.

Table 4-12: Outbound Modems Configuration Guidelines

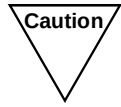
Port Generic Parameter	Default Parameters	Recommended Setting	Comments
mode	cli	slave	NA
type	hardwired	dial_in	NA
dedicated_address	0.0.0.0	Set to 129.200.9.1 (<i>Sun SPARCserver</i> computer).	Set to your <i>SunSPARCserver</i> computer internet address.
control_lines	none	modem_control	NA
location	""	"a location"	It is important to set this parameter so port problems can be traced.
user_name	""	"a user"	It is important to set this parameter so port problems can be traced.
speed	9600	Match the baud rate of your outbound modem (for example, 9600).	The speed may be changed to your modem's baud rate. It is important to set this parameter so port problems can be traced.
data_bits	8	8	Can be set to match the modem settings.
parity	none	none	Can be set to match the modem settings.
stop_bit	1	1	Can be set to match the modem settings.

5. When you are done, use the following command to reset the modem ports:

```
command: reset <port number>
```

The following appears:

```
resetting serial port <number>
```



You can also use the `reset all@cmsterm1` command to terminate all active sessions on the NTS. Use the `reset all@cmsterm1` command only if no one is logged in.

6. To quit, enter the following command:

```
command: quit
```

RTELNET Administration

Outbound modems require some additional administration:

- You must place the command in a file (as specified below).
- You must run the command — enter the command as described below, or reboot the *Sun SPARCserver* computer.

To place the command for outbound modems in a file, continue with the following:

7. Place the `Speripherals` file into the `/etc/rc2.d` directory:
 - a. To change from the *root* directory, at the system prompt, enter the following command:

```
# cd /etc/rc2.d
```

- b. Access the `Speripherals` file using an editor (for example, `vi`):

```
# vi Speripherals
```

- c. Enter the name(s) of the character special device(s) into the file. For example:

```
rtelnet -fmrt cmsterm2 20 /dev/s_pdev220
```

- d. To exit the file and return to the system prompt, press **Shift** and **Z** **Z**.

- e. To return to the *root* directory, enter the following command:

```
# cd /
```

8. At the *Sun SPARCserver* console, enter the following system command (one line per each outbound modem):

```
# rtelnet -fmrt cmsterm2 20/dev/s_pdev220
```

Note

The 220 in the device name indicates the first NTS and port 20 (as does the parameter 20). You can choose your own names, but it is recommended that the device name reflect the terminal server and port names (for example, `rtelnet -fmrt cmsterm2 20/dev/s_pdev220`).

9. If this is the initial installation, reboot the *SunSPARCserver* computer (required).

Note

You can wait to reboot your system after you complete all the terminal, printer, and modem administration, if desired.

Quick NA Administration Method

In an attempt to simplify the modem administration, Network Administration (na) scripts are available for recommended outbound modems. Any differences from the parameters specified in these scripts need to be handled separately.

For example:

Assume the system is set up with one NTS and two outbound modems.

Using the above example as a scenario, the administration could be handled using the following procedures.

Procedure

To address and configure the NTS ports for outbound modems, complete the following steps:

1. Log in as *root*.
2. At the system prompt, enter the na command to access the NTS administration software:

```
# na
```

The following appears:

```
Annex network administrator R7.0 October 13, 1992
command:
```

3. To associate all subsequent administration with a specific Network Terminal Server, enter `annex cmsterm1` at the command prompt:

```
command: annex cmsterm1
```

Note

When you enter `annex cmsterm1` (or `annex 129.200.9.11`), `cmsterm1` becomes the default NTS until another NTS is selected using the `annex` command. The default setting for the NTS ports is 9600 bps, 8 bits, no parity, and 1 stop bit.

You can specify one NTS or multiple NTSS. Use the recommended NTS names and addresses in the `/etc/hosts` file.

See Table 4-5 on page 4-21 for specific devices, IP addresses, terminals, and file names.

The system responds:

```
cmsterm1: Annex-3-UXR7, 64 ports
```

```
command:
```

4. Make ports 3 and 4 the default set. Enter `port 3,4` at the `command:` prompt:

```
command: port 3,4
```

Note

All subsequent commands refer to ports 3 and 4.

The system responds:

```
command:
```

5. To use a script to administer 9600 baud outbound modems, enter the following at the `command:` prompt:

```
command: read /etc/local.admin/96outmodem
```

The system responds:

```
Setting all port parameters in specified port set to correct
settings for a 9600 baud outgoing modem, 8 data bits, no
parity, 1 stop bit.
```

```
user_name and location are not set (values remain as
previously set), and the dedicated_address is set to
129.200.9.1
```

Please allow a slight delay before resetting the ports.

```
command:
```

When you use a script to administer outbound modems, you must always specify a default port set before reading in one of the these scripts.

If your outbound modems are running at a different speed, you may use any of the scripts in Table 4-13.

Table 4-13: Outbound Modem Scripts

Script	Parameters
96outmodem	9600 baud outbound modems, 8 bits, 1 stop bit, no parity.
192outmodem	19200 baud outbound modems, 8 bits, 1 stop bit, no parity.
48outmodem	4800 baud outbound modems, 8 bits, 1 stop bit, no parity.
24outmodem	2400 baud outbound modems, 8 bits, 1 stop bit, no parity.
12outmodem	1200 baud outbound modem, 8 bits, 1 stop bit, no parity.

These scripts do not clear the `user_name` or `location`. All of these scripts set the dedicated address to the CMS factory default (129.200.9.1).

6. Set the `user_name` and `location` for each port:

```
command: set port=<x> user_name "<name>" location "<name>"
```

Note

The `x` values you enter are the port numbers on the NTS. You can specify a range of ports, but the `user_name` and `location` attributes should be port specific. Set the `location` and `user_name` so that any user-reported problems can be traced to the correct port.

You are returned to the `command:` prompt.

7. When you are done, use the following command to reset the terminal ports:

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

The following appears:

```
resetting all@cmsterm1
```

Caution

The `reset all@cmsterm1` command terminates all active sessions on the NTS. Use the `reset all@cmsterm1` command only if no one is logged in.

8. To store the new port configurations to a file (for example, `nts1info`), enter the following:

```
command:write cmsterm1/etc/local.admin/nts1info
```

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:
```

9. To check the new port configurations, enter the following command:

```
command: show port=<number(s)>
```

You can specify one port or multiple ports (For example, `show port=1` or `show port=1-10`).

The port(s) and settings you selected are displayed.

10. If this is the initial installation, reboot the *Sun SPARCserver* computer (required).

Note

You can wait to reboot your system after you complete all the terminal, printer, and modem administration, if desired.

Inbound Modems

This section provides examples for configuring and administering port parameters for inbound modems connected to the NTS.

Complete NA Administration Method

The Complete NA Administration Method provides in-depth step-by-step procedures for administering inbound modems.



If the inbound modems are set to the recommended default (9600 baud, 8 data_bits, no parity, and 1 stop_bit), you can skip to the “Quick NA Administration Method.”

Procedures

To address and configure the NTS ports for inbound modems, complete the following steps:

1. Log in as *root*.
2. At the system prompt, enter the *na* command to access the NTS administration software:

```
# na
```

The following appears:

```
Annex network administrator R7.0 October 13, 1992
command:
```

3. To associate all subsequent administration with a specific Network Terminal Server, enter *annex cmsterm1* at the command prompt:

```
command: annex cmsterm1
```

Note

When you enter `annex cmsterm1` (or `annex 129.200.9.11`), `cmsterm1` becomes the default NTS until another NTS is selected using the `annex` command. The default setting for the NTS ports is 9600 bps, 8 bits, no parity, and 1 stop bit.

You can specify one NTS or multiple NTSS. Use the recommended NTS names and addresses in the `/etc/hosts` file.

See Table 4-5 on page 4-21 “Configuration Information” for specific devices, IP addresses, terminals, and file names.

The system responds:

```
cmsterm1: Annex-3-UXR7, 64 ports
```

```
command:
```

4. You must include all the parameters you want to change. For inbound modems, use the following `set port string` command:

```
command: set port=x-y mode dedicated type dial_in
dedicated_address <SUNaddress> control_lines modem_control
location "<a location>" user_name "<a user>" speed autobaud
```

Note

The `set port string` command sets the parameters for the serial line ports. The `x-y` values you enter are the port numbers on the NTS. You can specify a range of ports in the above string command, but the `location` and `user_name` attributes should be port specific. Set the `location` and `user_name` so that any user-reported problems can be traced to the correct port.

See Table 4-14 for more details about entering the `set port string` command.

Table 4-14: Inbound Modem Configuration Guidelines

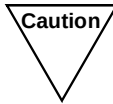
Port Generic Parameter	Default Parameter	Recommended Setting	Comments
mode	cli	dedicated	NA
type	hardwired	dial_in	NA
dedicated_address	0.0.0.0	Set to 129.200.9.1 (<i>Sun SPARCserver</i> computer)	Set to your <i>Sun SPARCserver</i> computer's internet address.
control_lines	none	modem_control	NA
location	""	"a location"	It is important to set this parameter so port problems can be traced.
user_name	""	"a user"	It is important to set this parameter so port problems can be traced.
speed	9600	Set the speed to autobaud.	Do not use a specific speed.
data_bits	8	8	Can be set to match the modem settings.
parity	none	none	Can be set to match the modem settings.
stop_bits	1	1	Can be set to match the modem settings.

5. When you are done, use the following command to reset the modem ports:

```
command: reset <port number>
```

The following appears:

```
resetting serial port <number>
```

You can also use the `reset all@cmsterm1` command to terminate all active sessions on the NTS. Use the `reset all@cmsterm1` command only if no one is logged in.

6. To quit, enter the following command:

```
command: quit
```

The system responds:

```
#
```

7. If this is the initial installation, reboot the *Sun SPARCserver* computer (required).

Note

You can wait to reboot your system after you complete all the terminal, printer, and modem administration, if desired.

Quick NA Administration Method

In an attempt to simplify the modem administration, Network Administration (na) scripts are available for recommended inbound modems. Any differences from the parameters specified in these scripts need to be handled separately.

For example:

Assume the system is set up with one NTS and two inbound modems.

Using the previous example as a scenario, the administration could be handled using the following procedures.

Procedure

To address and configure the NTS ports for inbound modems, complete the following steps:

1. Log in as *root*.

2. At the system prompt, enter the `na` command to access the NTS administration software:

```
# na
```

The following appears:

```
Annex network administrator R7.0 October 13, 1992
command:
```

3. To associate all subsequent administration with a specific Network Terminal Server, enter `annex cmsterm1` at the command prompt:

```
command: annex cmsterm1
```

Note

When you enter `annex cmsterm1` (or `annex 129.200.9.11`), `cmsterm1` becomes the default NTS until another NTS is selected using the `annex` command. The default setting for the NTS ports is 9600 bps, 8 bits, no parity, and 1 stop bit.

You can specify one NTS or multiple NTSs. Use the recommended NTS names and addresses in the `/etc/hosts` file.

See Table 4-5 on page 4-21 “Configuration Information” for specific devices, IP addresses, terminals, and file names.

The system responds:

```
cmsterm1: Annex-3-UXR7, 64 ports
command:
```

4. Make ports 1 and 2 the default set. Enter port 1,2 at the command: prompt:

```
command: port 1,2
```

Note

All subsequent commands refer to ports 1 and 2.

The system responds:

```
command:
```

5. To use a script to administer inbound modems, enter the following at the command: prompt:

```
command: read /etc/local.admin/inmodem
```

The system responds:

```
Setting all port parameters in specified port set to correct
settings for an incoming modem, 8 data bits, no parity, 1 stop
bit.
```

```
user_name and location are not set (values remain as
previously set), and the dedicated_address is set to
129.200.9.1
```

```
Please allow a slight delay before resetting the ports.
```

```
command:
```

When you use a script to administer inbound modems, you must always specify a default port set before reading in the script. See Table 4-15 for details.

Table 4-15: Inbound Modem Script

Script	Parameters
inmodem	Any baud rate, 8 bits, 1 stop bit, no parity, speed autobaud.

This script does not clear the `user_name` or `location`. This script sets the dedicated address to the CMS factory default (129.200.9.1).

- Set the `user_name` and `location` for each port:

```
command: set port=<x> user_name "<name>" location "<name>"
```

Note

The `x` values you enter are the port numbers on the NTS. You can specify a range of ports, but the `user_name` and `location` attributes should be port specific. Set the `location` and `user_name` so that any user-reported problems can be traced to the correct port.

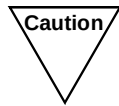
You are returned to the `command :` prompt.

- When you are done, use the following command to reset the terminal ports:

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

The following appears:

```
resetting all@cmsterm1
```



The `reset all@cmsterm1` command terminates all active sessions on the NTS. Use the `reset all@cmsterm1` command only if no one is logged in.

8. To store the new port configurations to a file (for example, `nts1info`), enter the following:

```
command:write cmsterm1/etc/local.admin/nts1info
```

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:
```

9. To check the new port configurations, enter the following command:

```
command: show port=<number(s)>
```

You can specify one port or multiple ports (For example, `show port=1` or `show port=1-10`).

The port(s) and settings you selected are displayed.

10. If this is the initial installation, reboot the Sun *SPARCserver* computer (required).

Note

You can wait to reboot your system after you complete all the terminal, printer, and modem administration, if desired.

Modem Options

After you connect the modem to the computer, you need to set the options for the terminal and modem. This section describes how to set the modem options. The modem port must be administered so that the computer can recognize the new modem.

To set AT&T Paradyne DataPort Express (Model 3715) and AT&T Paradyne Comsphere 3830 modem options, see the sections that follow.

AT&T Paradyne DataPort Express (Model 3715)

Do these steps to set the options for the AT&T Paradyne DataPort Express (Model 3715) modem:

1. Connect a dumb terminal to the 25-pin connector located at the back of the modem. For information on connecting the terminal to the modem, refer to the user documentation that came with the modem.

Note

The terminal speed must be set to **either** 2400 or 9600 baud before connecting the modem to the terminal.

2. Make the necessary power connections to the modem and the terminal.
3. Turn the modem and terminal *On*.
4. At the terminal, enter the following soft options (use only zeros and numerical ones in the commands):

```
AT&F      (factory default settings)
AT%B9600  (Modulation/Data Rate is set to V.22bis-max.rate
9600bps)
AT&T5     (denies request for Remote Digital Loopback test)
AT&C2     (LSD Control forced on, but turns off momentarily when
disconnected)
AT&D2     (follows standard RS-232 operation)
ATE0Q1&W0 (disable echo, disable result codes, save to
profile 0)
```

If you are using a modem with 9600 baud speed, use AT%B9600 (<9600>baud) instead of AT%B2400 (<2400>baud).

If needed, reset the modem using the power switch on the back.

Note

It is not necessary to enter the AT&D2 option since it is the default. However, the AT&D3 option which was used for AT&T Modem 3710 should **not** be used for this modem.

AT&T Paradyne Comsphere 3830

Do these steps to set the options for the AT&T Paradyne Comsphere 3830 modem:

1. Connect a dumb terminal to the 25-pin connector located at the back of the modem. For information on connecting the terminal to the modem, refer to the user documentation that came with the modem.

Note

The terminal speed must be set to **either** 2400 or 9600 baud. The terminal speed must match the intended modem setting.

2. Make the necessary power connections to the modem and the terminal.
3. Turn on the modem and terminal.
4. At the terminal, enter the following soft options (use only zeros and numerical ones in the commands):

```
AT&F3      (factory default settings)
ATS41=3    (9600 baud handshake)
AT&C1&D1&R0&S1\D1 (set up standard RS-232 handshaking)
AT&W0      (save to active profile)
```

If you are using a modem with 9600 baud speed, use `ATS41=3 (<9600> baud handshake)` instead of `ATS41=6 (<2400> baud handshake)`.

If needed, reset the modem using the power switch on the back.

Overview

AT&T technicians connect the *Sun SPARCserver* computer to the AT&T switch. This connection allows the CMS software on the *Sun SPARCserver* computer to receive, store, and format the ACD information it receives from the switch.

This chapter explains how to connect the CMS to the following AT&T switches:

- DEFINITY Communications System Generic 3r

Note

This includes the G3V2 (Generic 3r Version 2) and the G3V3 (Generic 3r Version 3) releases.

- DEFINITY Communications System Generic 3i
- DEFINITY Communications System Generic 2
- System 85, R2V2 (Release 2 Version 2)
- DEFINITY Communications System Generic 1.

Turn to one of these sections to connect the CMS to the switch:

- "Connecting the CMS to the Generic 3r"
- "Connecting the CMS to the Generic 2 or System 85"
- "Connecting the CMS to the Generic 3i or Generic 1"

A switch technician should be on site to make the final connection from the CMS to the switch and, if necessary, to administer the switch for the ACD/CMS feature.

The CMS software will not communicate with the switch if the ACD/CMS feature or the PGATE/DCIU/PI hardware on the switch is not properly administered.

An experienced switch technician can refer to these appendices to administer the switch:

- **Appendix A** — contains reference material about the link administration for the Generic 3i and Generic 1 switches.
- **Appendix B** — contains reference material about the DCIU (Data Communications Interface Unit) link administration for the Generic 2 and System 85 switch.
- **Appendix C** — contains reference material about the link administration for the Generic 3r switch.

Note When using a Generic 3r, set the Number of Outstanding Frames (w): field to 4. See Figure C-4 in Appendix C, “Administering CMS Interface on Generic 3r.”

Sun SPARCserver HSI/S Patch Panel

There are two different types of connectivity to the *Sun SPARCserver* based on the type of *Sun SPARCserver* and the number of ACDs supported.

The *SunLink* HSI/S Patch Panel is used on the Sun SPARCserver 10 and 20. It is only used on the *Sun SPARCserver* 5 for multiple ACD systems. (See Figure 5-1).

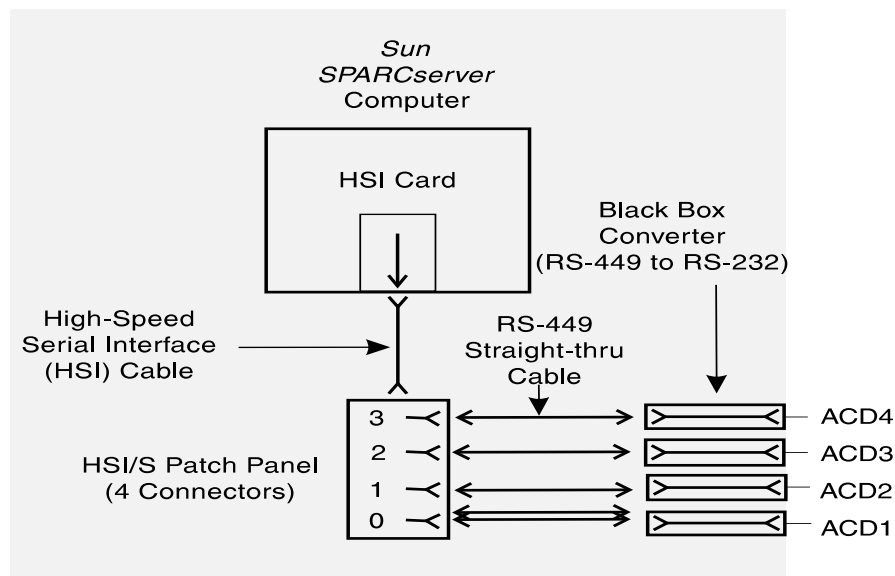


Figure 5-1: *SunLink* HSI/S Patch Panel

Note The Black Box converter is connected to the *Sun SPARCserver* computer via the HSI/S (High-Speed Serial Interface/SBus) controller card and patch panel.

Warning Use the Black Box converter when connecting the computer to the switch.

Bypassing the Black Box and connecting the HSI/S patch panel port directly to the switch will cause electrical damage to the *Sun SPARCserver* computer or switch components.

Verify that the *Sun SPARCserver* computer, HSI/S patch panel, and Black Box converter are connected properly. See the shaded portion of Figure 5-1 on page 5-2.

Note These connections should have been done when the HSI/S controller card was installed in the *Sun SPARCserver* computer.

If these connections have not been made, see Chapter 3, "Installing the Sun SPARCserver Computer".

***Sun SPARCserver* Serial Port B**

The *Sun SPARCserver* B port is used only on the *Sun SPARCserver* 5. It is used on the *Sun SPARCserver* 5 for single ACD systems. (See Figure 5-2). It cannot be used when an HSI/S card is installed in the *Sun SPARCserver* 5. The B port cannot be used for a switch connection with the *Sun SPARCserver* 10 and 20. Refer to Figure 3-1 in Chapter 3 for a detailed view of the *Sun SPARCserver* 5 Serial B port.

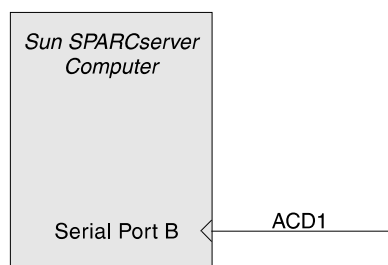


Figure 5-2: Serial Port B

Connecting the CMS to the Generic 3r

To connect the CMS to the Generic 3r, you will need to connect the DTE (RS-232) port on the *Sun SPARCserver* to the Packet Gateway board (TN577) on the Generic 3r. This connection uses the RS-232C protocol.

You can connect the CMS to the Generic 3r using one of the following methods:

- IDI (Isolating Data Interface)

With this method, the maximum distance between the DTE (RS-232) output port of the Sun SPARCserver and the Generic 3r is 200 feet.

- MPDM (Modular Processor Data Module)

With this method, the maximum distance between the DTE (RS-232) output port of the *Sun SPARCserver* and the MPDM is 50 feet. The maximum distance between the MPDM and the Generic 3r is 5000 feet with 24-gauge wire and 4000 feet with 26-gauge wire.

- Private Line

This method uses two DATAPHONE II modems in addition to the MPDM and is required when the customer's configuration exceeds the MPDM distance limitations.

Isolating Data Interface

This section describes how to connect the DTE (RS-232) port on the *Sun SPARCserver* to the Packet Gateway board on the Generic 3r via an IDI (see Figure 5-3).

With this method, the maximum allowable distance between the DTE (RS-232) output port of the *Sun SPARCserver* and the Generic 3r switch is 200 feet.

Required Parts

Obtain the following parts:

- DB25 M/M Direct Connect Link adapter
- H600-210, Group 1 (RS-232C to RS-449) cable
- IDI unit
- H600-210, Group 1, 2, 3, 4, or 5 (RS-232C to RS-449) cable

Note

The Group number determines the length of the cable.

Group 1 - 10 feet
Group 2 - 25 feet
Group 3 - 50 feet
Group 4 - 100 feet
Group 5 - 200 feet.

- H600-347, Group 1 (RS-232C) cable.

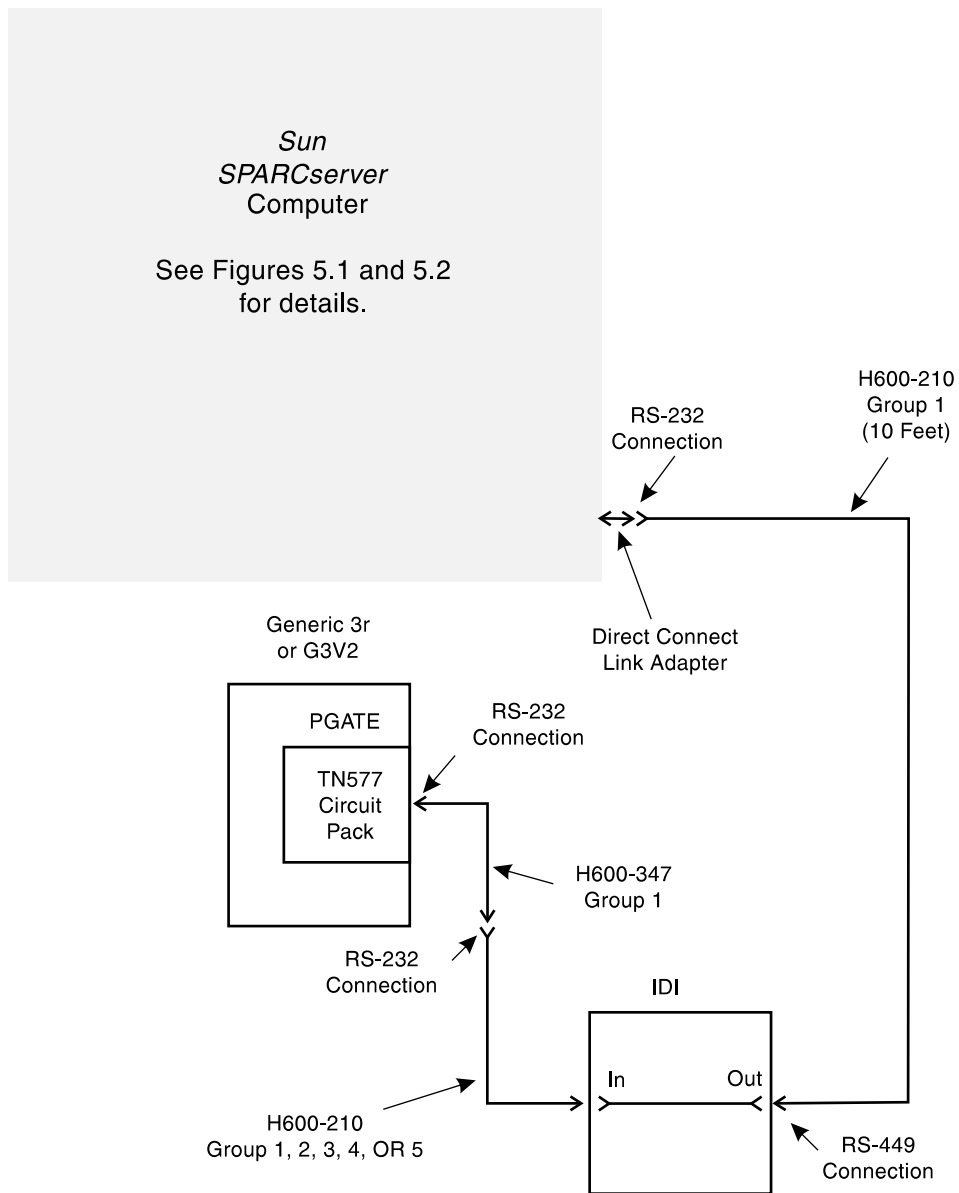


Figure 5-3: Sun SPARCserver Computer to Generic 3r Via the IDI

Procedure

Do these steps to connect the *Sun SPARCserver* computer to the Packet Gateway of a Generic 3r switch via an IDI unit (refer to Figure 5-3):

1. If an HSI/S card is installed, connect the direct-connect link adapter to the DTE (RS-232) output port on the Black Box converter. If **no** HSI/S card is installed connect the direct-connect link adapter to the B serial port (*Sun SPARCserver* 5 only).
2. Connect the female end of the H600-210, Group 1 cable to the direct-connect link adapter.
3. Connect the male end of the H600-210, Group 1 cable to the **Out** connector on the IDI unit.
4. Connect the male end of the H600-210, Group 1 cable to the **In** connector on the IDI unit.
5. Connect the female end of the H600-210, Group 1 cable to the male end of the H600-347, Group 1 cable.

In the next step, the switch technician should make the final connection to the Packet Gateway board.

6. Connect the male end of the H600-347, Group 1 cable to the Packet Gateway board.
7. Verify with the switch technician that the ACD/CMS feature is administered on the switch.

Modular Processor Data Module

This section describes how to connect the DTE (RS-232) port on the *Sun SPARCserver* to the Packet Gateway board on the Generic 3r using MPDMs (see Figure 5-4).

With this method, the maximum allowable distance between the DTE (RS-232) output port of the *Sun SPARCserver* and the MPDM is 50 feet. The maximum allowable distance between the MPDM and the Generic 3r is 5000 feet with 24-gauge wire and 4000 feet with 26-gauge wire.

Required Parts

Obtain the following parts:

- DB25 M/M Gender Changer



If the M25A cable is not long enough to reach the MPDM, obtain an ED-1E434-11, Group 309 (RS-232C) cable to make the connection between the gender changer and the MPDM.

- Two MPDMs with a stand-alone housing
- Two D8W-87 modular plug telephone cords (7 feet) (included with the stand-alone housing)
- H600-347, Group 1 (RS-232C) cable
- Two M25A (RS-232C) cables
- Two B25A (RS-232C) cables.

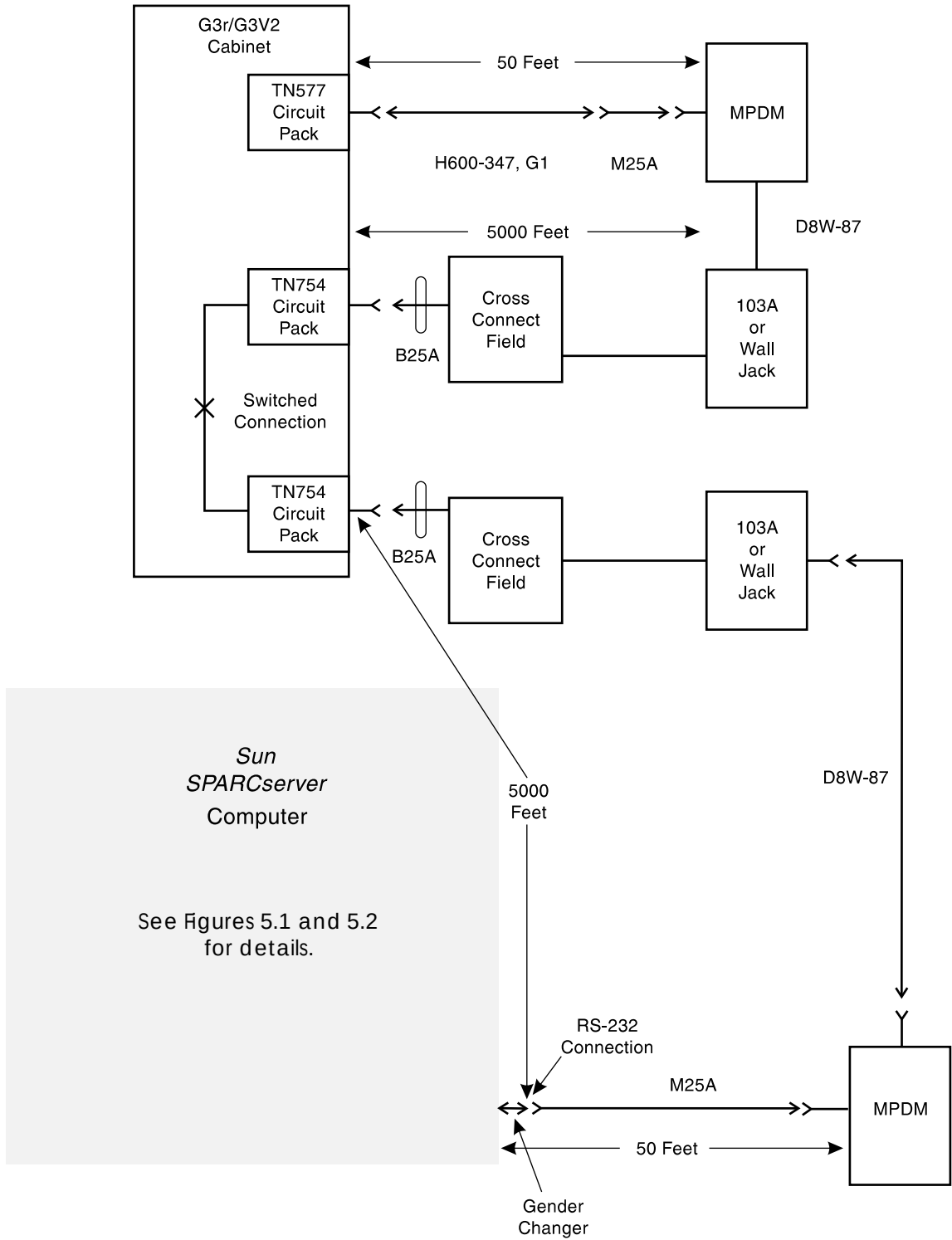


Figure 5-4: Sun SPARCserver Computer to Generic 3r Cabling with an MPDM

Procedure

Do these steps to connect the *Sun SPARCserver* computer to a Packet Gateway board on the Generic 3r switch (see Figure 5-4):

1. Connect the male end of the H600-347, Group 1 cable to the Packet Gateway. (Record the connector number on the cable for later use.)
2. Connect the other male end of the H600-347, Group 1 cable to the female end of the M25A cable.
3. Connect the male end of the M25A cable to the RS-232 connector on the MPDM.
4. Set all switches on the MPDM to the OFF position except for the following:
 - SPEED set to 9600 or 19200 bps

Note

The baud rate must be the same for all components used in the link.

- SYNC
 - INT
 - SIGLS
 - AANS.
5. Connect one end of a D8W-87 modular plug telephone cord into the modular telephone cord jack of the MPDM.
 6. Connect the other end of the D8W-87 cord to the Generic 3r cross-connect.

Note

If the D8W-87 cord is not long enough, you will have to locally engineer the cable between the MPDM and the cross-connect. This cable must have a modular plug on each end.

7. Plug the MPDM into an AC power source.

Note

In the next step, the switch technician should make the final connection to the digital port.

8. Run a locally engineered cable from the cross-connect to a TN754 circuit pack on the Generic 3r. This cable also requires a modular plug on each end.
9. Run another locally engineered cable from the cross-connect to a TN754 circuit pack on the Generic 3r. This cable also requires a modular plug on each end.

10. Connect one end of the D8W-87 cord to the Generic 3r cross-connect.
11. Connect the other end of a D8W-87 modular plug telephone cord into the modular telephone cord jack of the MPDM.

Note

If the D8W-87 cord is not long enough, you will have to locally engineer the cable between the MPDM and the cross-connect. This cable must have a modular plug on each end.

12. Set all switches on the MPDM to the OFF position except for the following:

- SPEED set to 9600 or 19200 bps

Note

The baud rate must be the same for all components used in the link.

- SYNC
- INT
- SIGLS
- AANS.

13. Plug the MPDM into an AC power source.
14. Connect the male end of the M25A cable to the RS-232 connector on the MPDM.
15. Connect the female end of the M25A cable to the gender changer.
16. If an HSI/S card is installed, connect the gender changer to the DTE (RS-232) output port on the Black Box converter. If **no** HSI/S card is installed connect the gender changer to the B serial port (*Sun SPARCserver 5* only).
17. Verify with the switch technician that the ACD/CMS feature on the switch is administered.

Private Line

This section describes how to connect the Generic 3r to a private line that connects to the DTE (RS-232) port on the *Sun SPARCserver* (see Figure 5-5).

This method uses two DATAPHONE II modems in addition to the MPDM and is required when the customer's configuration exceeds the MPDM distance limitations.

Required Parts

Obtain these parts to connect the *Sun SPARCserver* computer to a private line:

- 110-type cross-connect hardware
- 829 Channel Interface unit

Note If the channel interface unit is not available on the customer's premises, order PEC 9200-030 which is a stand-alone replacement unit. You must order this unit through the Custom Systems organization via the CSAP (Custom Systems Automation Program).

- DB25 M/M Gender Changer
- M25A cable
- One 2096C DATAPHONE II modem.

Also, obtain these parts to connect the Generic 3r to a private line:

- 110-type cross-connect hardware
- 829 Channel Interface unit

Note If the channel interface unit is not available on the customer's premises, order PEC 9200-030 which is a stand-alone replacement unit. You must order this unit through the Custom Systems organization via the CSAP.

- M25A cable
- One 2096C DATAPHONE II modem.

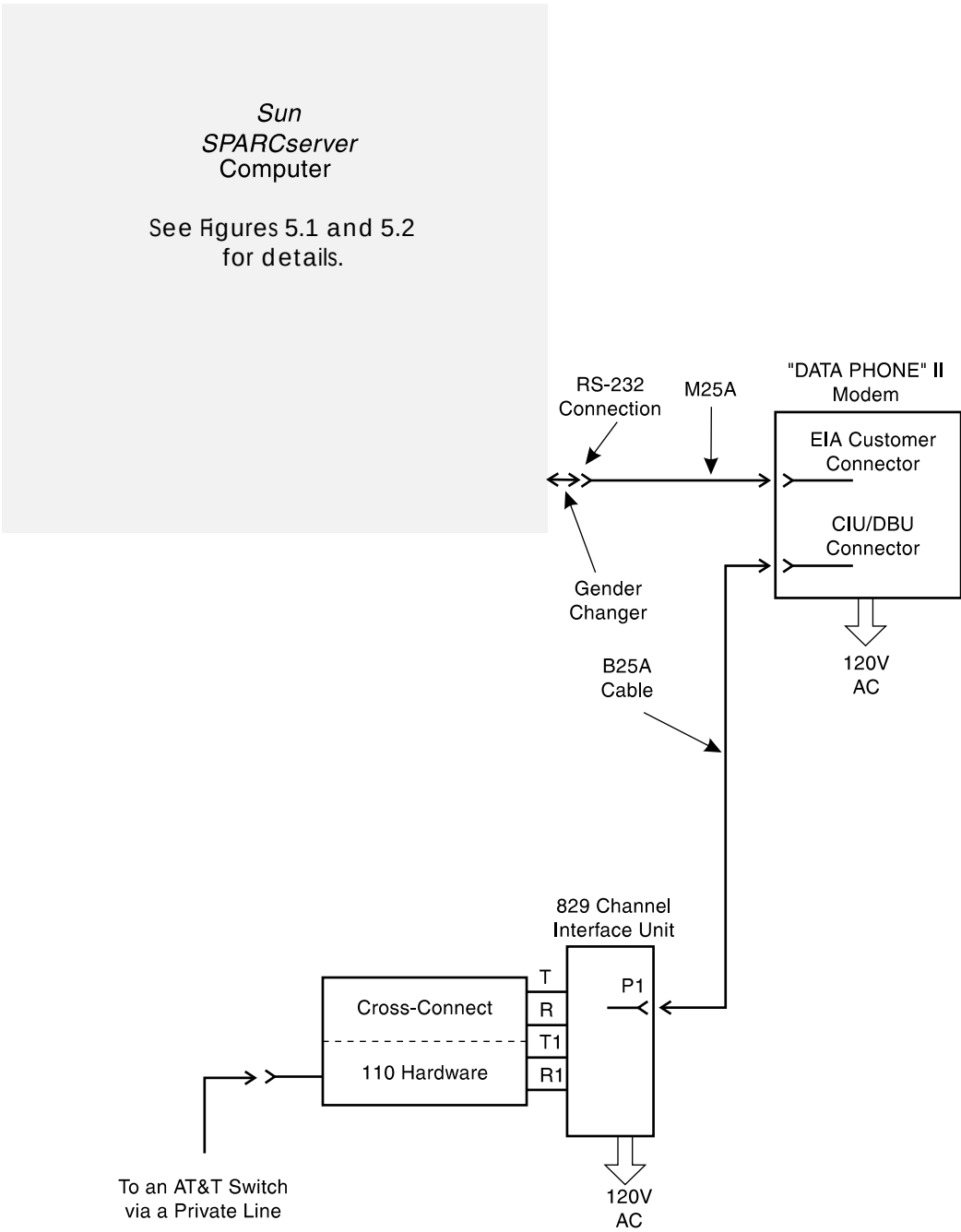


Figure 5-5: Sun SPARCserver Computer Cabling to a Private Line

Procedure for Connecting the *Sun* *SPARCserver* Computer to a Private Line

Do these steps to connect the *Sun SPARCserver* computer to a private line (see Figure 5-5):

1. If an HSI/S card is installed, connect the gender changer to the DTE (RS-232) output port on the Black Box converter. If **no** HSI/S card is installed connect the gender changer to the B serial port (*Sun SPARCserver* 5 only).
2. Connect the female end of the M25A cable to the gender changer.
3. Connect male end of the M25A cable to the **EIA Customer Connector** receptacle on the DATAPHONE II modem.
4. Connect male end of the B25A cable to the **CIU/DBU Connector** receptacle on the DATAPHONE II modem.
5. Connect the other end of the B25A cable to the **P1** receptacle on the 829 Channel Interface unit.
6. Plug the DATAPHONE II modem into an AC power source.
7. Plug the 829 Channel Interface unit into an AC power source.
8. Connect the tip and ring from the 829 Channel Interface unit to the cross-connect hardware.

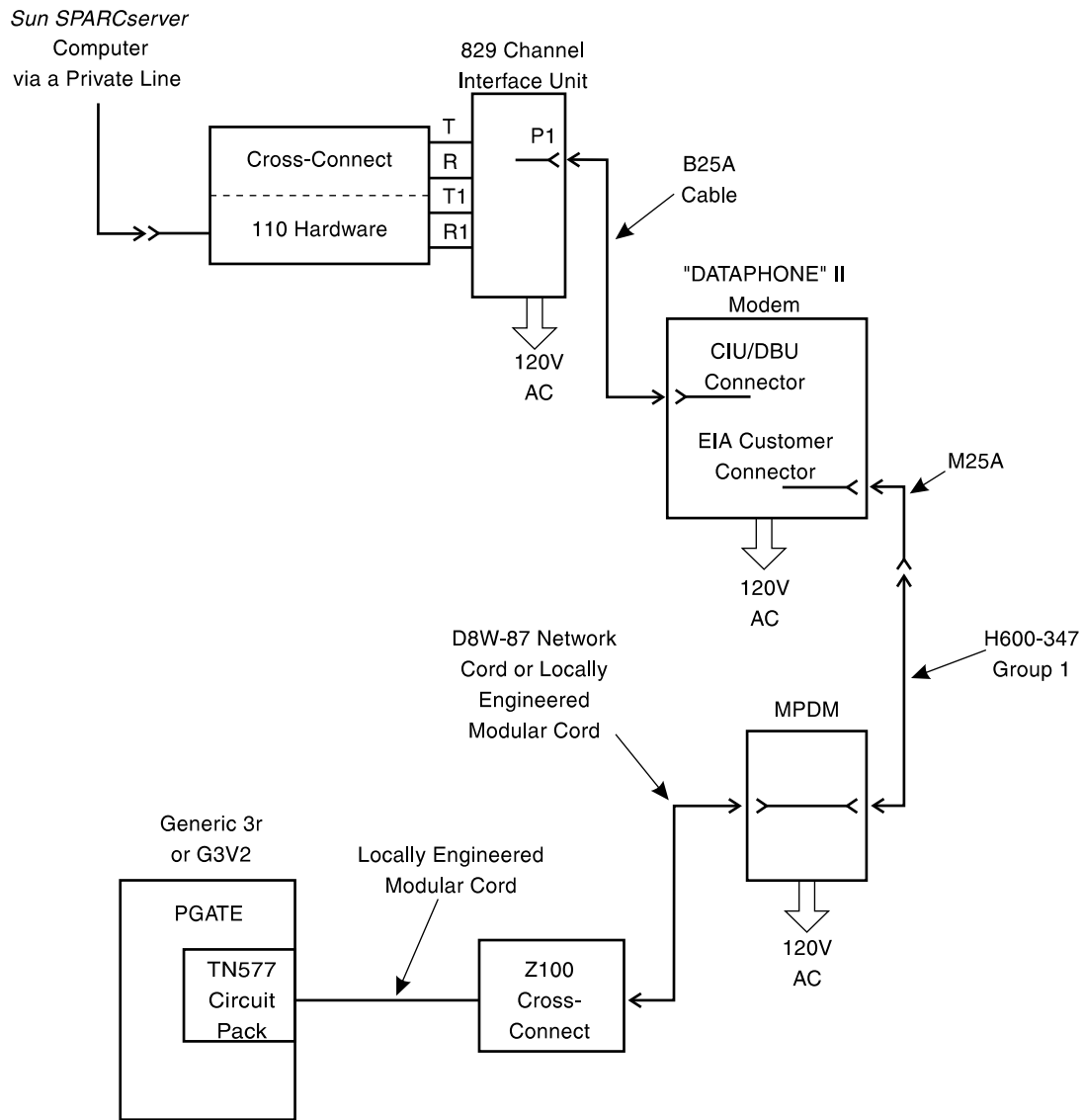


Figure 5-6: Generic 3r Cabling to a Private Line

Procedure for Connecting a Generic 3r to a Private Line

Do these steps to connect the Generic 3r to a private line (refer to Figure 5-6):

1. Connect the tip and ring from the 829 Channel Interface unit to the cross-connect hardware.
2. Plug the 829 Channel Interface unit into an AC power source.
3. Connect the other end of the B25A cable to the **P1** receptacle on the 829 Channel Interface unit.
4. Connect the other end of the M25A cable to the **CIU/DBU Connector** receptacle on the DATAPHONE II modem.
5. Plug the DATAPHONE II modem into an AC power source.
6. Connect the male end of the M25A cable to the **EIA Customer Connector** receptacle on the DATAPHONE II modem.
7. Connect the female end of the M25A cable to the male end of the H600-347, Group 1 cable.
8. Connect the other male end of the H600-347, Group 1 cable to the Packet Gateway fanout cable.
9. Verify with the switch technician that the ACD/CMS feature on the switch is administered.

Connecting the CMS to the Generic 2 or System 85

To connect the *Sun SPARCserver* computer to the System 85 or Generic 2, you will need to connect the DTE (RS-232C) port on the *Sun SPARCserver* to the Data Communications Interface Unit (DCIU) on the Generic 2 or System 85. This connection uses the RS-232C protocol.

You can connect the *Sun SPARCserver* computer to the Generic 2 or System 85 switch by using one of the following methods:

- IDI (Isolating Data Interface)

With this method, the maximum allowable distance between the DTE (RS-232) output port of the *Sun SPARCserver* and the Generic 2 or System 85 is 400 feet.

- DSUs (Data Service Units)

With this method, the maximum allowable distance between the DTE (RS-232) output port of the *Sun SPARCserver* and the Generic 2 or System 85 is 100 feet.

- DSUs (Remote Data Service Units)

Use this method when the distance between the DTE (RS-232C) output port of the *Sun SPARCserver* and the Generic 2 or System 85 is over 100 feet.

Note

For this method, 4-wire nonloaded metallic lines are required to interconnect the DSUs. When provided by the telephone company, these 4-wire nonloaded metallic lines are called LADCs (Local Area Data Channels).

- Analog Private Line.

Use this method when the distance of the DSUs has been exceeded.

Check the equipment and parts delivered to the customer's site to determine which method to use.

Isolating Data Interface

With this method, the maximum allowable distance between the DTE (RS-232) output port of the *Sun SPARCserver* and Generic 2 or System 85 switch is 400 feet (see Figure 5-7).

Required Parts

Obtain the following parts:

- DB25 M/M Direct-Connect Link adapter
- ED-1E434-11, Group 175 cable (RS-232C to RS-449 transition cable)
- IDI unit
- ED-1E434-11, Group 304 (RS-449) cable (up to 400 feet long).

If the switch is equipped with duplicated common controls, obtain an ED-1E434-11, Group 342 Y-cable.

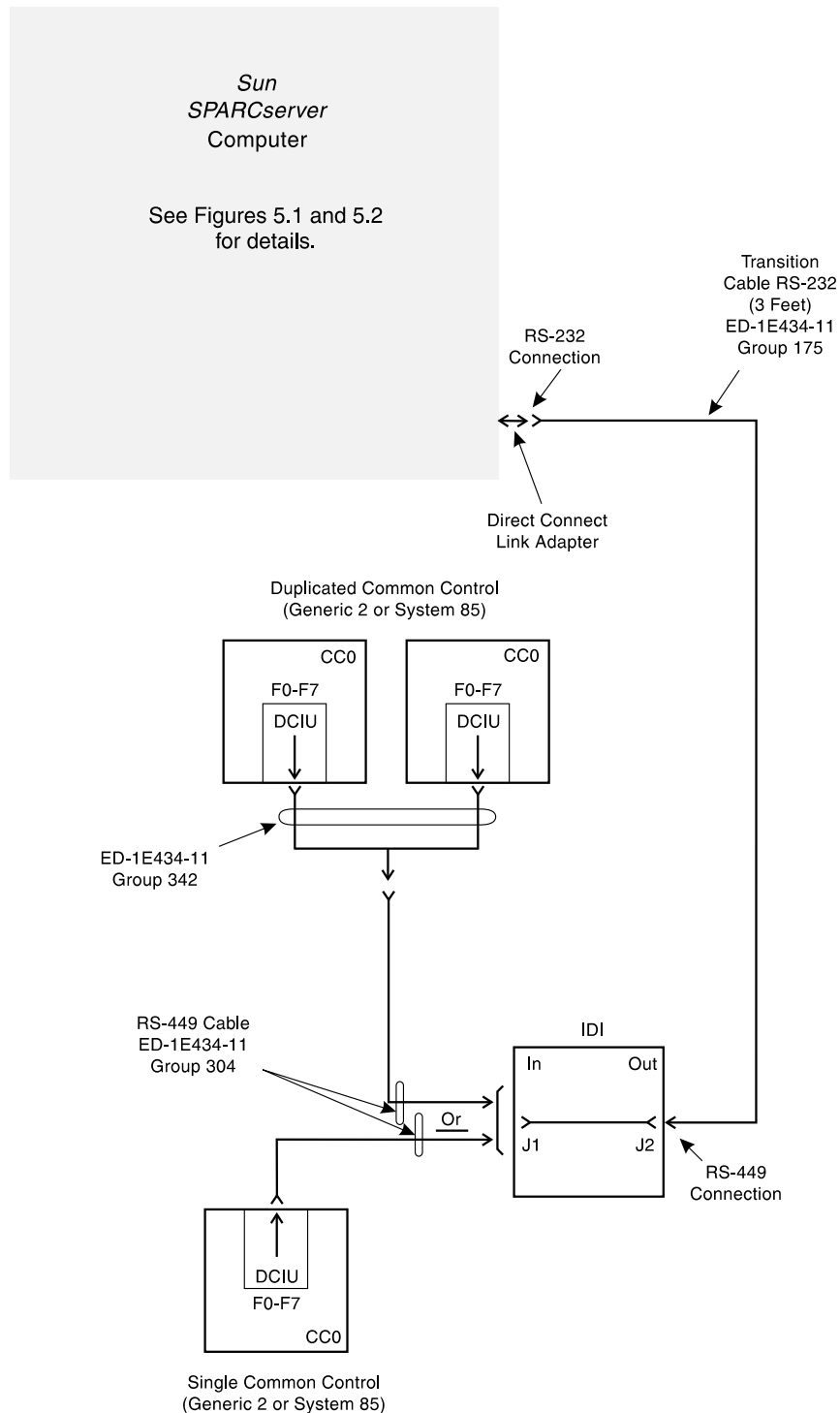


Figure 5-7: Sun SPARCserver Computer to Generic 2 or System 85 Cabling Via the IDI

Procedure

Do these steps to connect the *Sun SPARCserver* computer to the DCIU on the Generic 2 or System 85 via an IDI (refer to Figure 5-7):

1. If an HSI/S card is installed, connect the direct-connect link adapter to the DTE (RS-232) output port on the Black Box converter. If **no** HSI/S card is installed connect the direct-connect link adapter to the B serial port (*Sun SPARCserver* 5 only).
2. Connect the female end of the ED-1E434-11, Group 175 cable to the direct-connect link adapter.
3. Connect the plug end of the ED-1E434-11, Group 304 cable to the **IN** connector on the IDI.

Note

In the next step, the switch technician should make the final connection to the DCIU port.

4. If the Generic 2 or System 85 is equipped with a single common control, connect the receptacle end of the ED-1E434-11, Group 304 cable to the switch at ports F0 through F7. Record the port number that you use, because it will be needed during switch administration.

If the Generic 2 or System 85 is equipped with duplicated common controls, connect the receptacle end of the ED-1E434-11, Group 304 cable to the plug end of the ED-1E434-11, Group 342 cable. Next, connect the receptacle ends of the ED-1E434-11, Group 342 cable to the duplicated common controls at ports F0 through F7. You must select the same port on each of the common controls. Record the port number that you use, because it will be needed during switch administration.

5. Verify with the switch technician that the ACD/CMS feature on the switch is administered.

Local Data Service Units

This section describes how to connect the DTE (RS-232) port on the *Sun SPARCserver* to the DCIU on the Generic 2 or System 85 using LDSUs (Local Data Service Units). See Figure 5-8 for details.

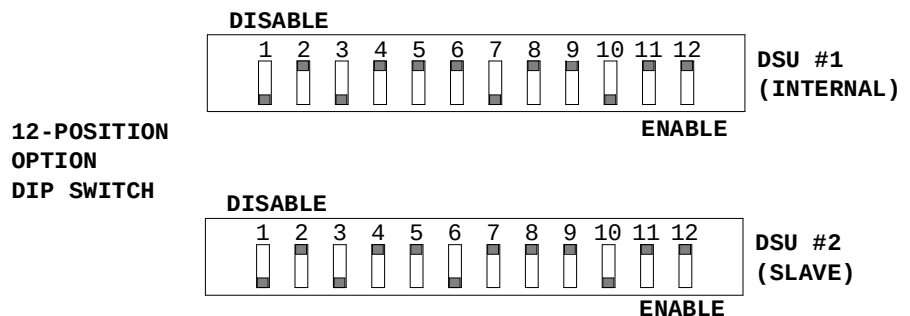
With this method, the maximum allowable distance between the DTE (RS-232C) output port of the *Sun SPARCserver* and the Generic 2 or System 85 switch is 100 feet.

Required Parts

Obtain the following parts:

- DB25 M/M Gender Changer
- One ED-1E434-11, Group 309 (RS-232) cable
- Two DSUs (Data Service Units)
- One D8W-87 Network cord (25 feet) — one cord is provided with each DSU
- ED-1E434-11, Group 13 transition (RS-449 to RS-232C) cable (3 inches)
- ED-1E434-11, Group 304 cable (RS-449) — for single or duplicated common controls
- ED-1E434-11, Group 342 Y-cable (9 feet) — for duplicated common controls only.

Refer to the *DATAPHONE II 2500-Series Data Service Units User's Manual* (999-100-188) to set the timing options and speed of operation (9.6 kbps) for the DSUs. One DSU must be set for "internal" timing, and the other DSU must be set for "slave" timing. You do this by setting the 12-position option dip switch located on the circuit pack inside the DSU (see example below). You can also use this document as a reference when doing the installation steps in this section.



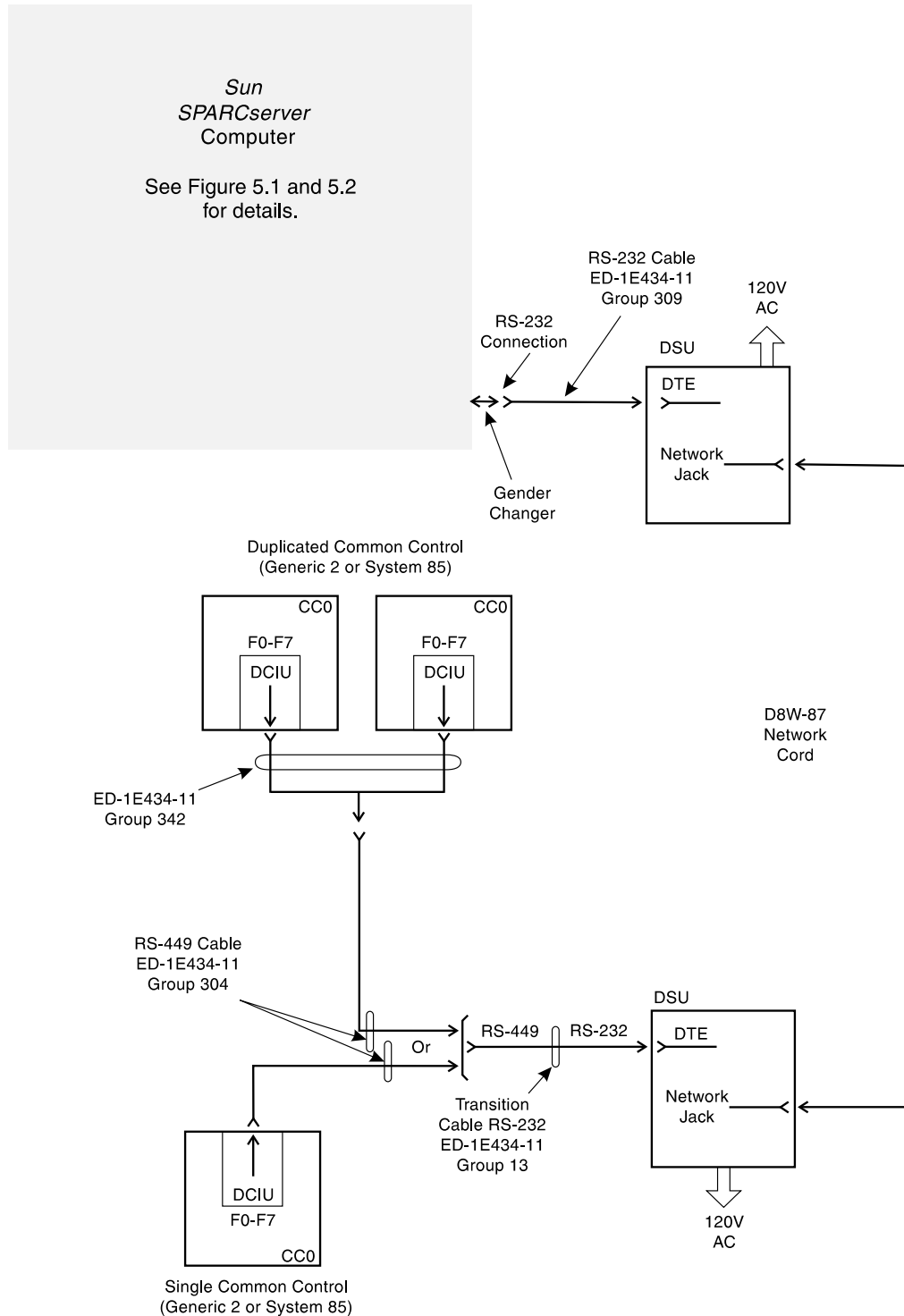


Figure 5-8: Sun SPARCserver Computer to Generic 2 or System 85 Cabling with Local DSUs

Procedure

Do these steps to connect the *Sun SPARCserver* computer to the DCIU on the Generic 2 or System 85 using LDSUs (refer to Figure 5-8):

1. If an HSI/S card is installed, connect the gender changer to the DTE (RS-232) output port on the Black Box converter. If **no** HSI/S card is installed connect the gender changer to the B serial port (*Sun SPARCserver* 5 only).
2. Connect the female end of ED-1E434-11, Group 309 (RS-232) cable to the gender changer.
3. Connect the male end of the ED-1E434-11, Group 309 (RS-232) cable to the receptacle labeled **DTE** on the back of the DSU.
4. Connect the two DSUs together by using a 25-foot D8W-87 network cord and connecting each end of the cord to the network jacks on the DSUs.
5. Connect each DSU to an AC power source by using the DSU power packs.
6. Connect the plug end of the Group 13 transition cable to the receptacle labeled **DTE** on the back of the DSU that will be used to connect to the switch. Then, connect the receptacle end of the Group 13 transition cable to the plug end of the ED-1E434-11, Group 304 cable.

Note

In the next step, the switch technician should make the final connection to the DCIU port.

7. If the Generic 2 or System 85 is equipped with single common control, connect the receptacle end of the Group 304 cable to the single common control at ports F0 through F7. Record the port number that you use, because it will be needed during switch administration.

If the Generic 2 or System 85 is equipped with duplicated common controls, connect the receptacle end of the Group 304 cable to the plug end of the ED-1E434-11, Group 342 Y-cable. Connect the receptacle ends of the Y-cable to the duplicated common controls at ports F0 through F7. You must select the same ports on both common controls. Record the port number that you use, because it will be needed during switch administration.

8. Verify with the switch technician that the ACD/CMS feature on the switch is administered.

Remote Data Service Units

This section describes how to connect the DTE (RS-232) port on the *Sun SPARCserver* to the DCIU on the Generic 2 or System 85 using RDSUs (Remote Data Service Units) (see Figure 5-9).

Use this method when the distance between the DTE (RS-232) output port of the *Sun SPARCserver* and the Generic 2 or System 85 switch is over 100 feet.

Required Parts

Obtain the following parts:

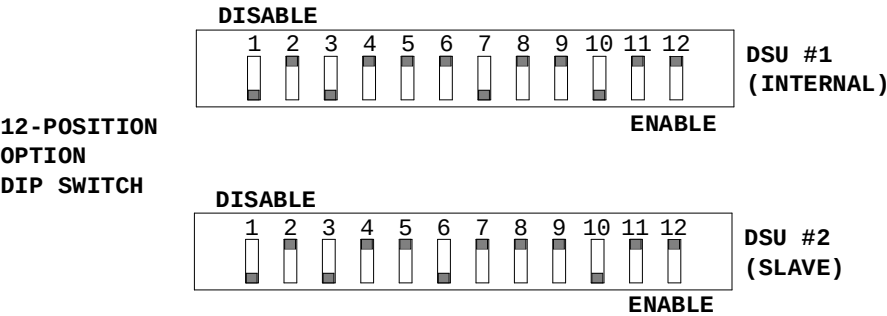
- DB25 M/M Gender Changer
- One ED-1E434-11, Group 309 (RS-232) cable
- Two DSUs
- Two D8W-87 network cords (25 feet) — one cord is provided with each DSU
- Two Network Interface adapters — one adapter is provided with each DSU
- ED-1E434-11, Group 13 transition (RS-449 to RS-232C) cable (3 inches)
- ED-1E434-11, Group 304 cable (RS-449) — for single or duplicated common controls
- ED-1E434-11, Group 342 Y-cable (9 feet) — for duplicated common controls only
- 110- or 66-type cross-connect hardware
- 4-wire nonloaded metallic lines (LADC equivalent)—use lengths as needed.

Table 5-1 shows the maximum allowable distances between the DSUs based on various wire sizes and a speed of 9.6 kbps.

Table 5-1: LADC Ranges

Wire Gauge (AWG)	DSU Speed (kbps)	Miles
19	9.6	15.2
22	9.6	9.7
24	9.6	7.3
26	9.6	5.6

Refer to the *DATAPHONE II 2500-Series Data Service Units User's Manual* (999-100-188) to set the timing options and speed of operation (9.6 kbps) for the DSUs. One DSU must be set for "internal" timing, and the other DSU must be set for "slave" timing. You do this by setting the 12-position option dip switch located on the circuit pack inside the DSU (see example below). You can also use this document as a reference when doing the installation steps in this section.



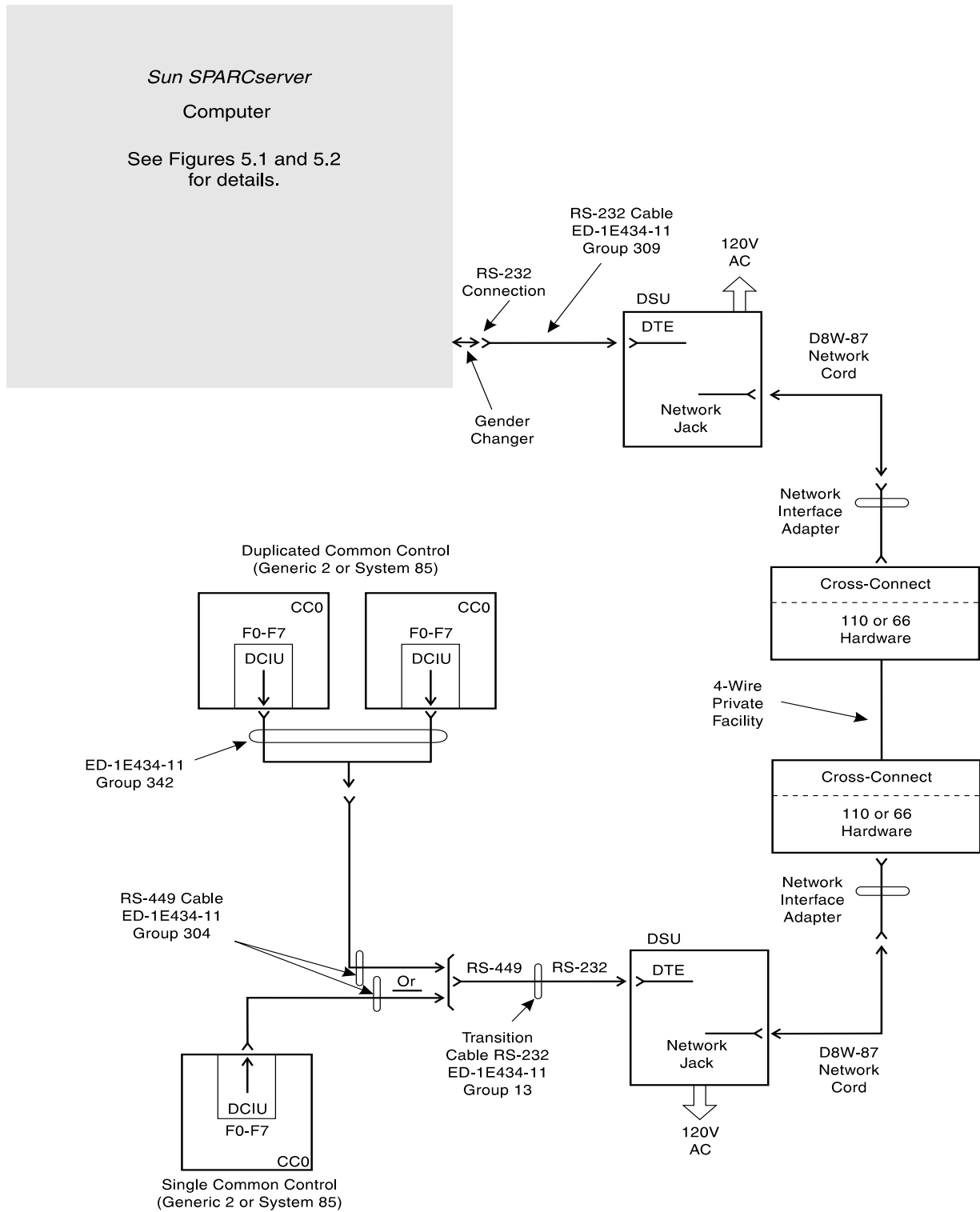


Figure 5-9: *Sun SPARCserver* Computer to Generic 2 or System 85 Cabling with Remote DSUs

Procedure

Do these steps to connect the *Sun SPARCserver* computer to the DCIU on the Generic 2 or System 85 using RSDUs (refer to Figure 5-9):

1. If an HSI/S card is installed, connect the gender changer to the DTE (RS-232) output port on the Black Box converter. If **no** HSI/S card is installed connect the gender changer to the B serial port (*Sun SPARCserver* 5 only).
2. Connect the female end of ED-1E434-11, Group 309 (RS-232) cable to the gender changer.
3. Connect the male end of the ED-1E434-11, Group 309 (RS-232) cable to the receptacle labeled **DTE** on the back of the DSU.
4. Connect one end of a D8W-87 network cord to the network jack on the DSU.
5. Connect the other end of the D8W-87 network cord to the receptacle end of a network interface adapter.
6. Punch down the spade-tipped leads of the network Interface adapter to the *Sun SPARCserver* computer's cross-connect hardware.
7. Use 4-wire nonloaded metallic lines (LADC equivalent) to interconnect the cross-connect hardware.
8. Obtain another network interface adapter.
9. Punch down the spade-tipped leads of the network interface adapter to the switch's cross-connect hardware.
10. Connect the receptacle of the network interface adapter to one end of another D8W-87 network cord.
11. Connect the other end of a D8W-87 network cord to the network jack on the DSU that will be connected to the switch.
12. Connect each DSU to a 120-volt AC power source by using the DSU power packs.
13. Connect the plug end of the Group 13 transition cable to the receptacle labeled **DTE** or **Port B** on the DSU that will be connected to the switch. Then connect the receptacle end of the Group 13 transition cable to the plug end of the ED-1E434-11, Group 304 cable.

In the next step, the switch technician should make the final connection to the DCIU port.

14. If the Generic 2 or System 85 is equipped with single common control, connect the receptacle end of the Group 304 cable to the single common control at ports F0 through F7. Record the port

number that you use, because it will be needed during switch administration.

If the Generic 2 or System 85 is equipped with duplicated common controls, connect the receptacle end of the Group 304 cable to the plug end of the ED-1E434-11, Group 342 Y-cable. Connect the receptacle ends of the Y-cable to the duplicated common controls at ports F0 through F7. You must select the same ports on both common controls. Record the port number that you use, because it will be needed during switch administration.

15. Verify with the switch technician that the ACD/CMS feature on the switch is administered.

Analog Private Line

This section describes how to connect the Generic 2 or System 85 to the DTE (RS-232) port on the *Sun SPARCserver* using an analog private line.

This method is used when the distance of the DSUs has been exceeded.

Note To connect the *Sun SPARCserver* computer to an analog private line, refer to the previous section in this chapter entitled *Connect the CMS to an Analog Private Line*.

Required Parts

Obtain the following parts to connect the System 85 to an analog private line:

- One ED-1E434-11, Group 304 (RS-232C) cable (50 feet) — for single and duplicated common controls
- One ED-1E434-11, Group 342 Y-cable — for duplicated common controls only
- One 2096C DATAPHONE II modem
- B25A cable
- 829 Channel Interface unit.

Note If the channel interface unit is not available on the customer's premises, order PEC 9200-030 which is a stand-alone replacement unit. You order this unit through the Custom Systems organization via the CSAP (Custom Systems Automation Program).

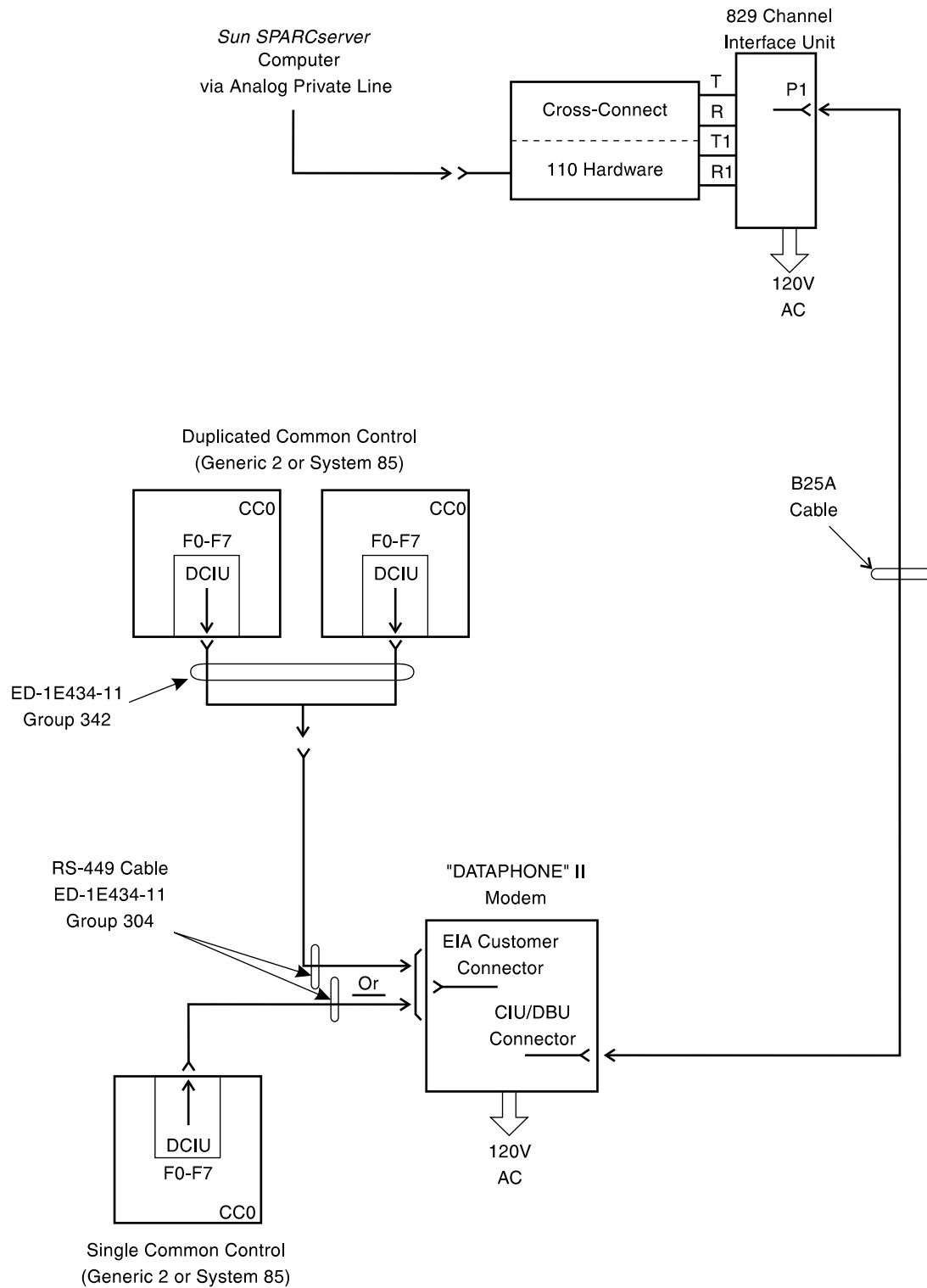


Figure 5-10: Generic 2 or System 85 Cabling to an Analog Private Line

Procedure

Do these steps to connect the Generic 2 or System 85 to an analog private line (refer to Figure 5-10):

1. Connect the tip and ring from the 829 Channel Interface unit to the cross-connect hardware.
2. Plug the 829 Channel Interface unit into a 120-volt AC power source.
3. Connect one end of the B25A cable to the **CIU/DBU Connector** receptacle on the DATAPHONE II modem. Connect the other end of the B25A cable to the **P1** receptacle on the 829 Channel Interface unit.
4. Plug the DATAPHONE II modem into a 120-volt AC power source.
5. Connect the plug end of the ED-1E434-11, Group 304 cable to the **EIA Customer Connector** receptacle on the DATAPHONE II modem.

In the next step, the switch technician should make the final connection to the DCIU port.

6. If the Generic 2 or System 85 is equipped with single common control, connect the receptacle end of the Group 304 cable to the single common control at ports F0 through F7. Record the port number that you use, because it will be needed during switch administration.

If the Generic 2 or System 85 is equipped with duplicated common controls, connect the receptacle end of the Group 304 cable to the plug end of the ED-1E434-11, Group 342 Y-cable. Connect the receptacle ends of the Y-cable to the duplicated common controls at ports F0 through F7. You must select the same ports on both common controls. Record the port number that you use, because it will be needed during switch administration.

7. Verify with the switch technician that the ACD/CMS feature on the switch is administered.

Connecting the CMS to the Generic 3i or Generic 1

To connect the *Sun SPARCserver* computer to the Generic 3i or Generic 1, you will need to connect the DTE (RS-232) port on the *Sun SPARCserver* to a digital port on the Generic 3i or Generic 1 switch. This connection uses the RS-232C protocol.

You can connect the *Sun SPARCserver* computer to the Generic 3i or Generic 1 switch by using one of the following methods:

- EIA Connector on the Processor Interface

With this method, the maximum allowable distance between the DTE (RS-232) output port of the *Sun SPARCserver* and the Generic 3i or Generic 1 is 50 feet.

- MPDM (Modular Processor Data Module)

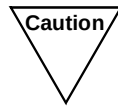
With this method, the maximum allowable distance between the DTE (RS-232) output port of the *Sun SPARCserver* and the MPDM is 50 feet. The maximum allowable distance between the MPDM and the Generic 3i or Generic 1 is 5000 feet with 24-gauge wire and 4000 feet with 26-gauge wire.

- Analog Private Line.

This method uses two DATAPHONE II modems in addition to the MPDM and is required when the customer's configuration exceeds the MPDM distance limitations.

EIA Connector on the Processor Interface

This section describes how to connect the DTE (RS-232) port on the *Sun SPARCserver* to the EIA connector of a Processor Interface on the Generic 3i or Generic 1.



If the Generic 3i or Generic 1 has duplicated common controls, the EIA port on the Processor Interface cannot be used.

With this method, the maximum allowable distance between the DTE (RS-232) output port of the *Sun SPARCserver* and the Generic 3i or Generic 1 switch is 50 feet.



If the Generic 3i or Generic 1 switch and the DTE (RS-232) output port of the *Sun SPARCserver* are over 50 feet apart, refer to the section *Connecting the CMS to the Generic 3i or Generic 1* for the proper cabling configuration.

Required Parts

Obtain the following parts:

- DB25 M/M Direct Connect Link adapter
- ED-1E434-11, Group 175 (RS-232C to RS-449) cable
- ED-1E434-11, Group 304 (RS-449) cable
- ED-H600-362, Group 1 (RS-232C to RS-449) cable.



The Group number determines the length of the cable.

Group 1 - 10 feet
Group 2 - 25 feet
Group 3 - 50 feet
Group 4 - 100 feet
Group 5 - 200 feet.

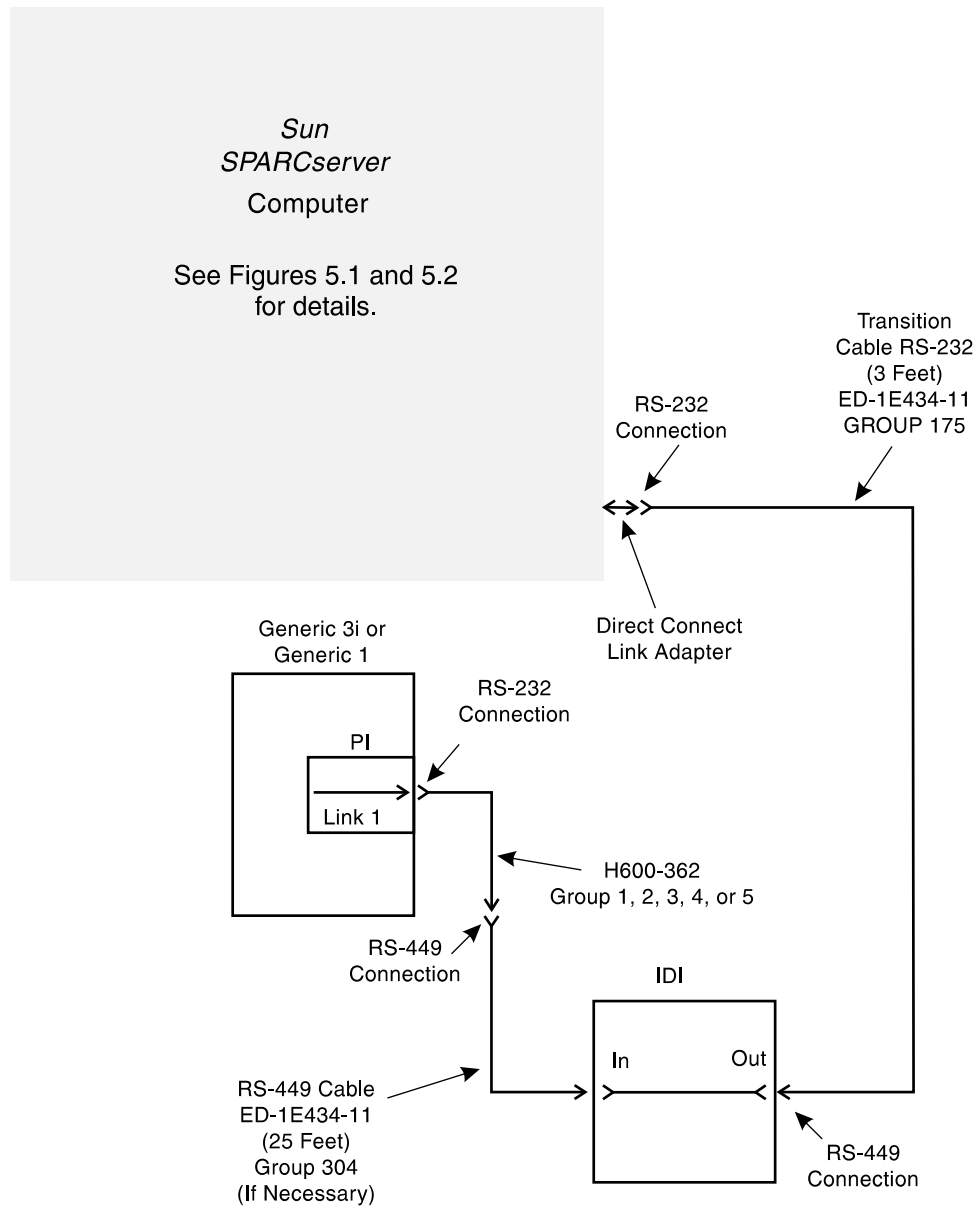


Figure 5-11: Sun SPARCserver Computer to Generic 3i or Generic 1 Cabling Via the IDI

Procedure

Do these steps to connect the *Sun SPARCserver* computer to the Processor Interface of a Generic 3i or Generic 1 switch (refer to Figure 5-11):

1. If an HSI/S card is installed, connect the direct-connect link adapter to the DTE (RS-232) output port on the Black Box converter. If **no** HSI/S card is installed connect the direct-connect link adapter to the B serial port (*Sun SPARCserver* 5 only).
2. Connect the female end of the ED-1E434-11, Group 175 cable to the direct-connect link adapter.
3. Connect the male end of the ED-1E434-11, Group 175 cable to the **Out** connector on the Isolating Data Interface unit.
4. Connect the male end of the ED-1E434-11, Group 304 cable to the **In** connector on the Isolating Data Interface unit.
5. Connect the female end of the ED-1E434-11, Group 304 cable to the male end of the ED-H600-362 cable.

In the next step, the switch technician should make the final connection to Link 1 (EIA connector) of the Processor Interface.

6. Connect the female end of the ED-H600-362 cable to Link 1 (EIA connector) of the Processor Interface.
7. Ask the switch technician to verify that the ACD/CMS feature on the switch has been administered.

Modular Processor Data Module

This section describes how to connect the DTE (RS-232) port on the *Sun SPARCserver* to the Packet Gateway board on the Generic 3i or Generic 1 using MPDMs (Modular Processor Data Modules).

With this method, the maximum allowable distance between the *Sun SPARCserver* computer and the MPDM is 50 feet. The maximum allowable distance between the MPDM and the Generic 3i or Generic 1 is 5000 feet with 24-gauge wire and 4000 feet with 26-gauge wire.

Required Parts

Obtain the following parts:

- DB25 M/M Gender Changer
- ED-1E434-11, Group 309 (RS-232C) cable
- MPDM with a stand-alone housing
- D8W-87 modular plug telephone cord (7 feet) (included with the stand-alone housing).

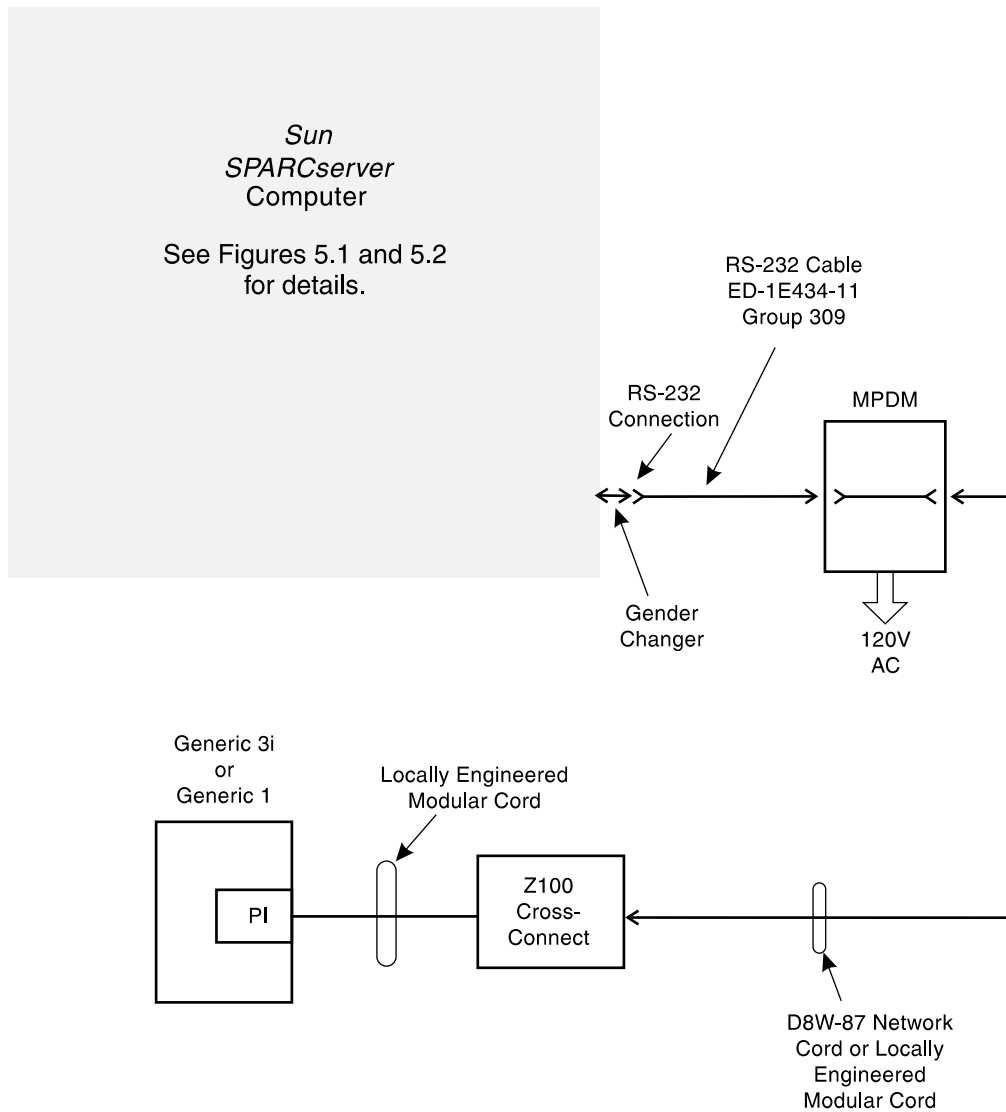


Figure 5-12: Sun SPARCserver Computer to Generic 3i or Generic 1 Cabling with an MPDM

Procedure

Do these steps to connect the *Sun SPARCserver* computer to a digital port on the Generic 3i or Generic 1 switch (refer to Figure 5-12):

1. If an HSI/S card is installed, connect the gender changer to the DTE (RS-232) output port on the Black Box converter. If **no** HSI/S card is installed connect the gender changer to the B serial port (*Sun SPARCserver* 5 only).
2. Connect the female end of the ED-1E434-11, Group 309 (RS-232) cable to the gender changer.
3. Set all switches on the MPDM to the OFF position except for the following:
 - SPEED set to 9600 or 19200 bps

Note

The baud rate must be the same for all components used in the link.

- SYNC
 - INT
 - SIGLS
 - AANS.
4. Connect one end of a D8W-87 modular plug telephone cord to the modular telephone cord jack of the MPDM.

Connect the other end of the D8W-87 cord to the Generic 3i or Generic 1 cross-connect (Z100).

Note

If the D8W-87 cord is not long enough, you will have to locally engineer the cable between the MPDM and the cross-connect (Z100). This cable must have a modular plug on each end.

5. Plug the MPDM into a 120-volt AC power source.
In the next step, the switch technician should make the final connection to the digital port.
6. Run a locally engineered cable from the Z100 cross-connect to the digital port on the Generic 3i or Generic 1. This cable also requires a modular plug on each end.
7. Ask the switch technician to verify that the ACD/CMS feature on the switch has been administered.

Analog Private Line

This section describes how to connect the Generic 3i or Generic 1 to an analog private line that connects to a *Sun SPARCserver* computer.

This method uses two DATAPHONE II modems in addition to the MPDM and is required when the MPDM distance limitations have been exceeded.

Required Parts

Obtain the following parts to connect the *Sun SPARCserver* computer to an analog private line:

- DB25 M/M Gender Changer



If the M25A cable is not long enough to reach the DATAPHONE II modem, obtain an ED-1E434-11, Group 309 (RS-232C) cable to make the connection.

- One 2096C DATAPHONE II modem
- B25A cable
- 829 Channel Interface unit.



If the channel interface unit is not available on the customer's premises, order PEC 9200-030 which is a stand-alone replacement unit. You order this unit through the Custom Systems organization via the CSAP (Custom Systems Automation Program).

Also, obtain the following parts to connect the Generic 3i or Generic 1 to an analog private line:

- 110-type cross-connect hardware
- 829 Channel Interface unit



If the channel interface unit is not available on the customer's premises, order PEC 9200-030 which is a stand-alone replacement unit. You order this unit through the Custom Systems organization via the CSAP (Custom Systems Automation Program).

- B25A cable
- One 2096C DATAPHONE II modem
- RS-232C cable

- One MPDM
- D8W-87 cord.

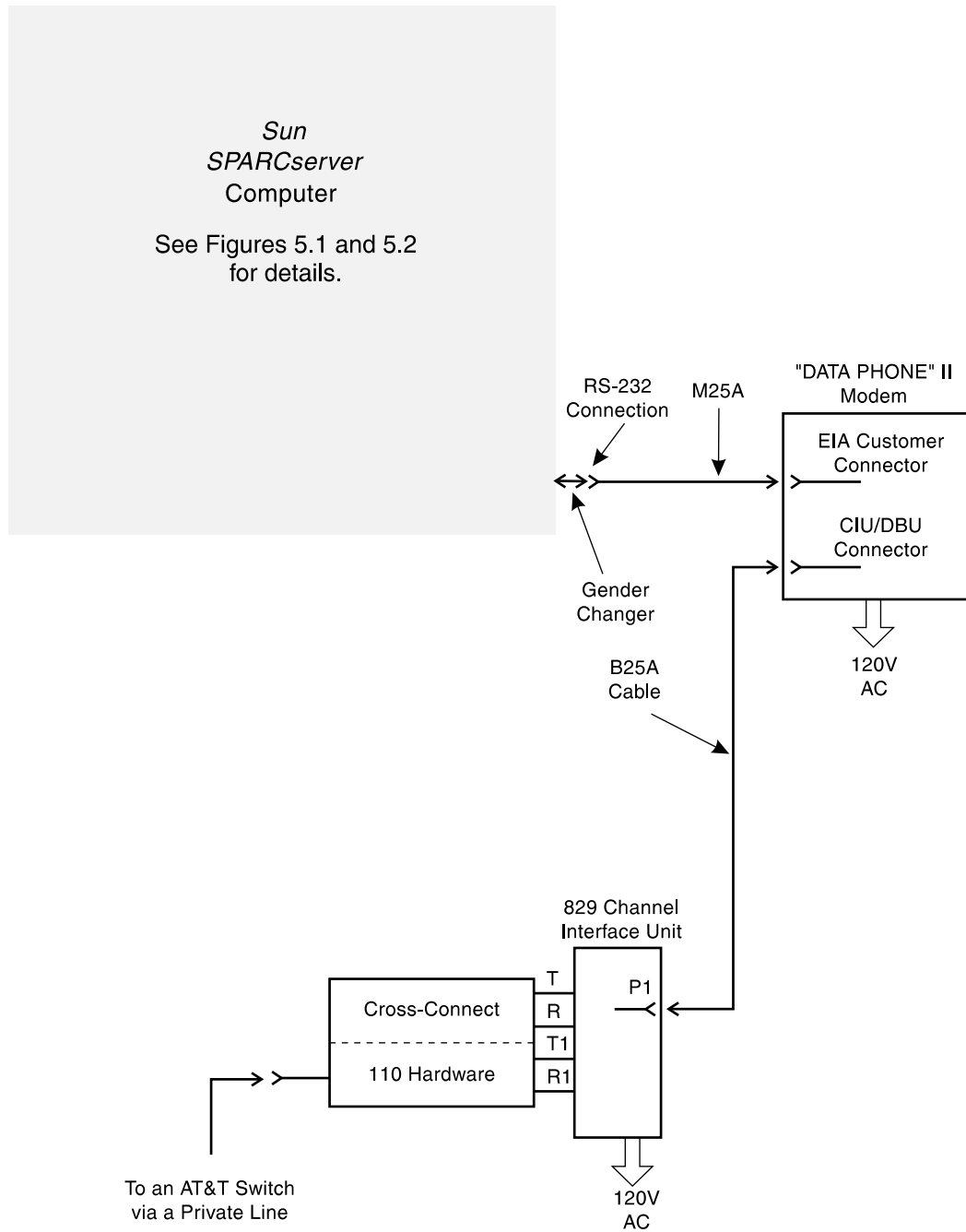


Figure 5-13: *Sun SPARCserver* Computer Cabling to an Analog Private Line

Procedure for *Sun SPARCserver* Computer to an Analog Private Line

Do these steps to connect the *Sun SPARCserver* computer to an analog private line (refer to Figure 5-13):

1. If an HSI/S card is installed, connect the gender changer to the DTE (RS-232) output port on the Black Box converter. If **no** HSI/S card is installed connect the gender changer to the B serial port (*Sun SPARCserver* 5 only).
2. Connect the female end of the M25A cable to the gender changer.
3. Connect the male end of the M25A cable to the **EIA Customer Connector** receptacle on the DATAPHONE II modem.



If the M25A cable is not long enough to reach the DATAPHONE II modem, obtain an ED-1E434-11, Group 309 cable to make the connection.

4. Plug the DATAPHONE II modem into a 120-volt AC power source.
5. Connect one end of the B25A cable to the **CIU/DBU Connector** receptacle on the DATAPHONE II modem. Connect the other end of the B25A cable to the **P1** receptacle on the 829 Channel Interface unit.
6. Plug the 829 Channel Interface unit into a 120-volt AC power source.
7. Connect the tip and ring from the 829 Channel Interface unit to the cross-connect hardware.

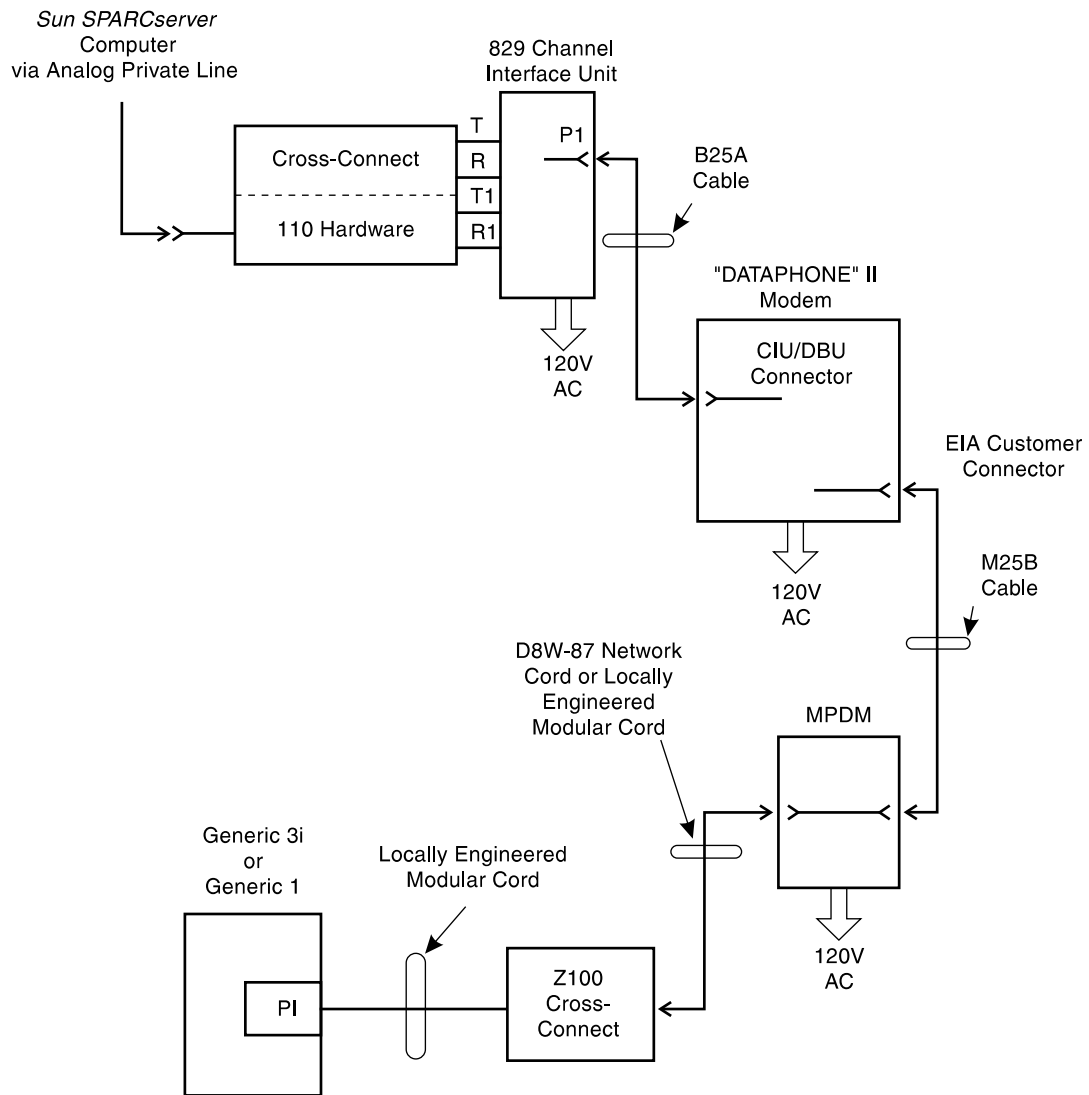


Figure 5-14: Generic 3i or Generic 1 Cabling to an Analog Private Line

Procedure for the Generic 3i or Generic 1 to an Analog Private Line

Do these steps to connect the Generic 3i or Generic 1 to an analog private line (refer to Figure 5-14):

1. Connect the tip and ring from the 829 Channel Interface unit to the cross-connect hardware.
2. Plug the 829 Channel Interface unit into a 120-volt AC power source.
3. Connect one end of the B25A cable to the **CIU/DBU Connector** receptacle on the DATAPHONE II modem. Connect the other end of the B25A cable to the **P1** receptacle on the 829 Channel Interface unit.
4. Plug the DATAPHONE II modem into a 120-volt AC power source.
5. Connect the plug end of the M25B cable to the **EIA Customer Connector** receptacle on the DATAPHONE II modem.
6. Connect the other plug end of the M25B (RS-232C) cable to the receptacle on the MPDM.
7. Set all switches on the MPDM to the OFF position except for the following:
 - SPEED set to 9600 or 19200 bps

Note

The baud rate must be the same for all components used in the link.

- SYNC
 - INT
 - SIGLS
 - AANS.
8. Connect one end of the D8W-87 modular plug telephone cord into the modular telephone cord jack on the MPDM.
 9. Connect the other end of the D8W-87 cord to the Generic 3i or Generic 1 cross-connect (Z100).

Note

If the D8W-87 cord is not long enough, you will have to locally engineer the cable between the MPDM and the cross-connect (Z100). This cable must have a modular plug on each end.

10. Plug the MPDM into a 120-volt AC power source.

In the next step, the switch technician should make the final connection to the digital port.

11. Run a locally engineered cable from the Z100 cross-connect to the digital port on the Generic 3i or Generic 1. This cable also requires a modular plug on each end.
12. Ask the switch technician to verify that the ACD/CMS feature on the switch has been administered.

Multiple ACD Connectivity

Adding an ACD

This section describes how to add an additional ACD to the R3V2 CMS. The R3V2 CMS can support up to four ACDs.

Note An ACD can be added only if it has been purchased.

Before you begin the procedures in this section, do a CMSADM file system backup. See the "Performing a CMSADM File System Backup" section in Chapter 8, "Maintenance."

In addition, confer with the customer's CMS administrator. The CMS administrator may want the new ACD added to the system after regular working hours.

Adding an ACD to the R3V2 CMS consists of these tasks:

- Prepare for adding the ACD.
- Turn off CMS.
- Execute the `acd_create` option.
- Perform tasks for adding a third ACD (if necessary).
- Connect the link.
- Turn on CMS.

Prepare for Adding the ACD

You need to furnish certain information about the switch and the CMS.

1. Make a copy of Table 5-2.

Table 5-2: Form for Adding a New ACD

ACD Entities	ACD 1	ACD 2	ACD 3	ACD 4	Sum of ACD Entities	CMS-Supported Maximum Values
Switch name					n/a	n/a
Switch release					n/a	n/a
Local port number					n/a	n/a
Remote port number					n/a	n/a
Link number					n/a	n/a
Number of splits/skills						600
Total split/skill members, summed over all splits/skills						5200
Number of shifts					n/a	n/a
1st shift start/stop times					n/a	n/a
2nd shift start/stop times					n/a	n/a
3rd shift start/stop times					n/a	n/a
4th shift start/stop times					n/a	n/a
Number of agents logged into all splits/skills during any shift						5200
Number of trunk groups						665
Number of trunks						4000 (see note)
Number of unmeasured trunk facilities						400 minimum (4 X 100)
Number of vectors						2048
Number of VDNs						2000

Note

For Table 5-2, the sum of the ACD1, ACD2, ACD3, and ACD4 entities (splits, agents, trunk groups, trunks, vectors, and VDNs) cannot exceed the CMS-supported maximum values.

A minimum of 100 unmeasured trunks is required by each ACD. If more than 100 unmeasured trunks are required, and the ACD is currently using the maximum number of trunks, then the measured trunks must be reduced accordingly.

You use the `swinfo` option on the CMS Services menu to obtain information about existing ACDs.

2. Log in as *root*.
3. Access the CMS Services menu by entering `cmssvc` at the `#` prompt. The CMS Services menu appears:

Commands for CMS Services Personnel

Select a command from the list below.

- 1) `auth_display` Display feature authorizations
 - 2) `auth_set` Authorize CMS capabilities/ capacities
 - 3) `backup` Single-tape filesystem backup (in background)
 - 4) `run_cms` Turn CMS on or off
 - 5) `setup` Set up the initial CMS configuration
 - 6) `swinfo` Display switch information
 - 7) `swsetup` Change switch information
 - 8) `upd_install` Install update from disk files
 - 9) `upd_remove` Back out the currently installed update
 - 10) `upd_save` Save update on disk for later installation
- Enter choice (1-10) or `q` to quit:

4. Enter 6 to select the `swinfo` option.

The following switch information is displayed:

- Switch name
- Switch release
- Local port number
- Remote port number
- Link number.

5. Enter the above entities into Table 5-2.
6. Log onto CMS and access the Data Storage Allocation window. See the “Data Storage Allocation” section in Chapter 11, “System Setup,” of the *CMS Administration* (AT&T 585-215-521) document.
7. Use the **Commands** SLK to print the Data Storage Allocation window.
8. From the Data Storage Allocation printout, enter the values for the following entities into Table 5-2:
 - Number of splits/skills
 - Total split/skill members summed over all splits/skills
 - Number of shifts
 - Shift start and stop times
 - Number of agents logged into all splits/skills during all shifts
 - Number of trunk groups
 - Number of trunks
 - Number of unmeasured trunk facilities
 - Number of vectors
 - Number of VDNs.
9. Repeat Steps 3 through 8 for each existing ACD.
10. Enter the values for the entities associated with the new ACD into Table 5-2.
11. Sum the values for each appropriate entity (for example, ACD1 + ACD2 + ACD3 etc.), and enter that value into the Sum of ACD Entities column of Table 5-2.
12. Make sure that the summed value does not exceed the CMS-supported maximum value. If a summed value exceeds a maximum value, you will have to change the value of that entity for either the existing ACDs or the new ACD.

Preparation for adding the new ACD is complete.

Turn Off CMS

Access the CMSADM menu and turn off CMS. See Chapter 2, “run_cms.”

Execute the “acd_create” Option

You execute the `acd_create` option on the CMSADM menu to add the new ACD to the R3V2 CMS.

Note The ACD must be authorized before it can be added to the CMS. See Chapter 6, “Setting Authorizations.”

1. Log in as *root*.
2. Access the CMS Administration menu by entering `cmsadm` at the `#` prompt. The CMSADM menu appears:

```
Call Management System Administration Menu
Select a command from the list below.
 1) acd_create  Define a new ACD
 2) acd_remove  Remove all administration and data for an ACD
 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 CMS on or off
Enter choice (1-9) or q to quit:
```

3. Enter `1` to choose the `acd_create` option.
4. At the prompts, enter the information for the new ACD from Table 5-2.

After you have entered all the required information, the message `Updating` appears, followed by `ACD created successfully`.

Connect the Link

AT&T field technicians connect the link from the switch where the new ACD resides to the *Sun SPARCserver* computer.

Each HSI/S supports four RS-232C ports.

Turn On CMS

Access the CMSADM menu and turn on CMS application.

See the “run_cms” section in Chapter 2, “CMSADM and CMSSVC Menus.”

Overview

Once the on-site technicians have finished the hardware installation, TSC (Technical Service Center) engineers set up the CMS application to work with the customer's configuration. If the customer ordered additional CMS feature packages, these need to be installed as well.

This chapter describes:

- Setting Authorizations
- Setting Up Data Storage Parameters
- Setting Up the CMS Application
- Installing the Forecasting Feature Package
- Installing the External Call History Package

TSC engineers verify authorizations, set up data storage parameters, and set up the CMS application remotely. On-site technicians should call the TSC to coordinate this process. Customers can install additional CMS feature packages if these packages have been authorized.

Things to Do Before You Start

The TSC should check that the on-site technicians have completed the following tasks:

- Connected the console terminal to the *Sun SPARCserver* computer
- Connected the *Sun SPARCserver* computer to the TSC's Remote Maintenance Center (remote console)
- Connected additional terminals and printers to the Network Terminal Server(s)
- Connected the link between the *Sun SPARCserver* computer and the switch

Note

If the hardware link or the ACD/CMS feature is not properly administered, the CMS software cannot communicate with the switch. Refer to the appropriate appendix for switch administration procedures.

- Connected the Network Terminal Server(s) and the *Sun SPARCserver* computer to the network hub.

Things to Know Before You Start

Throughout the setup, you will be prompted to enter values specific to the system being installed. For each question, an appropriate range is displayed in the format of (XX-XX.) The individual values represented by XX specify the limits of each range.

The CMS application must be installed before you can install the Forecasting or External Call History feature packages.

Setting Authorizations

Before TSC engineers can set up CMS, they need to set authorizations for CMS features purchased by the customer. Authorizations apply to all administered ACDs.

You can use the `auth_set` option in the CMS Services (`cmssvc`) menu to:

- Add authorizations to features.
- Increase the number of agents or ACDs.
- Remove authorizations from:
 - Vectoring (if no administered ACDs use Vectoring)
 - Graphics
 - External Call History (if the package is not installed)
 - Expert Agent Selection (if no administered ACDs use Expert Agent Selection).
- Reduce the maximum number of agents provided the total number of agents across all administered ACDs does not exceed the reduced number.
- Reduce the maximum number of ACDs provided the total number of all administered ACDs does not exceed the reduced number.

Do the following steps to run the `auth_set` option:

1. Access the CMS Services menu by entering

```
# cmssvc
```

The program responds:

Commands for CMS Services Personnel

Select a command from the list below.

- 1) `auth_display` Display feature authorizations
 - 2) `auth_set` Authorize CMS capabilities/capacities
 - 3) `backup` Single-tape filesystem backup (in background)
 - 4) `run_cms` Turn CMS on or off
 - 5) `setup` Set up the initial CMS configuration
 - 6) `swinfo` Display switch information
 - 7) `swsetup` Change switch information
 - 8) `upd_install` Install update from disk files
 - 9) `upd_remove` Back out the currently installed update
 - 10) `upd_save` Save update on disk for later installation
- Enter choice (1-10) or q to quit:

2. Enter 2 to select the `auth_set` option. The program responds:

Password:

3. Enter the appropriate password.

Note

Some of the following questions may not appear if the authorization cannot be changed at this time.

The program responds:

Is this an upgrade from R3V1? (y/n):
(default n)

Note

This response only occurs the first time you run `auth_set` on the machine.

The program responds:

```
Authorize installation of forecasting package? (y/n):  
                                                    (default: n)
```

4. Enter y if the customer purchased Forecasting; otherwise, press **Return**.

The program responds:

```
Authorize installation of vectoring package? (y/n): (default: n)
```

5. Enter y if the customer purchased Vectoring; otherwise, press **Return**. The program responds:

```
Authorize use of graphics feature? (y/n): (default: n)
```

6. Enter y if the customer purchased Graphics; otherwise, press **Return**. The program responds:

```
Authorize use of external call history feature? (y/n):  
                                                    (default: n)
```

7. Enter y if the customer purchased the External Call History feature; otherwise, press **Return**. The program responds:

```
Authorize use of expert agent selection feature? (y/n):  
                                                    (default: n)
```

8. Enter y if the customer purchased the Expert Agent Selection feature; otherwise, press **Return**. The program responds:

```
Authorize use of external application feature? (y/n):  
                                         (default: n)
```

9. Enter y if the customer purchased the External Application feature; otherwise, press **Return**.
10. The program responds:

```
Enter the maximum number of agents that can be administered  
(1-5200):
```

11. Enter the number of agents the customer purchased for this system. The program responds:

```
Enter the maximum number of ACDs that can be installed (1-4):  
(default: 1)
```

12. Enter the number of ACDs the customer purchased.
13. Verify that authorizations were set by entering:

```
# tail /cms/install/logdir/admin.log
```

The *admin.log* file contains information relating to CMS administration procedures. The file should display the following message:

```
Capabilities/capacities authorized <date/time>
```

Setting Up Data Storage Parameters

TSC engineers modify specific data storage parameters on the *Sun SPARCserver* computer so the R3V2 CMS application can operate properly. The *storage.def* file contains these data storage parameters which are default values.

The default values may not correspond to the system you are installing. Use the values determined by the Account Executive, System Consultant, and Design Center based on the customer configuration.

Do the following steps to set up the data storage parameters in the *storage.def* file:

1. Change to the */cms/install/cms_install* directory by entering:

```
cd /cms/install/cms_install
```

Note

If you delete or damage the *storage.def* file, you can find a copy of this file (*storage.skf*) in the same directory.

2. Edit the *storage.def* file, and enter the appropriate values for each question. Place the answer to each question on the line below the question.

The *storage.def* file looks like the following screens:

```
# Information for ACD 1 and any ACDs created using acd_create
# command
# Intrahour interval (15, 30, 60 minutes):
30
# Week start day (Sunday, Monday, Tuesday, Wednesday, Thursday,
  Friday, Saturday):
Sunday
# Week end day (Sunday, Monday, Tuesday, Wednesday, Thursday,
  Friday, Saturday):
Saturday
# Daily start time (regular time):
12:00 AM
# Daily stop time (data will be collected for seconds of last
  minute):
11:59 PM
# Number of agent login/logout records (0-999999):
10000
# Number of agent trace records:
10000
# Number of call records (0-5000 internal or 0-99999 external):
0
# Number of exceptions records (1-2000):
500
# Days of intrahour for splits (1-62):
31
# Days of daily splits (1-1825):
387
# Weeks of weekly splits (1-520):
0
# Months of monthly splits (1-120):
0
# Days of intrahour for agents (1-62):
31
# Days of daily agents (1-1825):
387
# Weeks of weekly agents (1-520):
0
# Months of monthly agents (1-120):
0
# Days of intrahour for trunk groups (1-62):
31
# Days of daily trunk groups (1-1825):
387
```

```
# Weeks of weekly trunk groups (1-520):  
0  
# Months of monthly trunk groups (1-120):  
0  
# Days of intrahour for trunks (1-62):  
31  
# Days of daily trunks (1-1825):  
387  
# Weeks of weekly trunks (1-520):  
0  
# Months of monthly trunks (1-120):  
0  
# Days of intrahour for call work codes (1-62):  
0  
# Days of daily call work codes (1-1825):  
0  
# Weeks of weekly call work codes (1-520):  
0  
# Months of monthly call work codes (1-120):  
0  
# Days of intrahour for vectors (1-62):  
31  
# Days of daily vectors (1-1825):  
387  
# Weeks of weekly vectors (1-520):  
0  
# Months of monthly vectors (1-120):  
0  
# Days of intrahour for VDNs (1-62):  
31  
# Days of daily VDNs (1-1825):  
387  
# Weeks of weekly VDNs (1-520):  
0  
# Months of monthly VDNs (1-120):  
0  
# Information for ACD 2  
.  
.  
.
```

The file repeats the previous statements for ACDs 2 through 4.

3. After entering the appropriate values, write and quit the file.

After the CMS application is running, the System Administrator can change the data storage parameters using the Data Storage Allocation window in the System Setup subsystem. See Chapter 11 in the *AT&T CMS Administration* (AT&T 585-215-521) document.

Setting Up the CMS Application

Prerequisites: You must be logged in as *root*, the computer must be in run-level 2 or 3, and all file systems must be mounted.

You can set up the CMS feature package using one of two methods:

- a. **Interactively from a Terminal** — Using the interactive option, the program prompts you for the necessary information to set up the CMS application (for example, system type, number of agents, trunks, vectors, VDNs, etc.).

To set up the CMS application using this option, see the "Setting Up CMS Interactively from a Terminal" section in this chapter.

- b. **UNIX System Flat File** — Using the flat file option, you edit a UNIX System flat file which contains the necessary information (for example, system type, number of agents, trunks, vectors, VDNs, etc.) to set up the CMS application. When you execute the program, it runs in the background and uses the UNIX System flat file data to set up the CMS application.

To set up the CMS application using this option, see the "Setting Up CMS Using a UNIX System Flat File" section in this chapter.

Setting Up CMS Interactively from a Terminal

Do these steps to set up CMS interactively from a terminal:

1. Access the CMS Services menu by entering:

```
# cmssvc
```

The program responds:

```
Commands for CMS Services Personnel
```

```
Select a command from the list below.
```

- 1) auth_display Display feature authorizations
- 2) auth_set Authorize CMS capabilities/capacities
- 3) backup Single-tape filesystem backup (in background)
- 4) run_cms Turn CMS on or off
- 5) setup Set up the initial CMS configuration
- 6) swinfo Display switch information
- 7) swsetup Change switch information
- 8) upd_install Install update from disk files
- 9) upd_remove Back out the currently installed update
- 10) upd_save Save update on disk for later installation

```
Enter choice (1-10) or q to quit:
```

2. Enter 5 to select the *setup* option.

The program responds:

```
Enter a name for this UNIX system (up to 256 characters):  
(default: XXXXXX)
```

3. Enter the host name of the computer. This name was assigned during the factory installation procedures and is used by the TSC to maintain and identify this specific CMS. The program responds:

```
Select the type of backup device you are using
1) SCSI QIC-150 cartridge tape - 150MB tape
2) SCSI QIC-60 cartridge tape - 60MB tape
3) 14.0 Gbyte 8mm tape
4) 5.0 Gbyte 8mm tape
Enter choice (1-4):
```

4. Enter the appropriate number to specify the type of cartridge tape you are using as the backup device. The program responds:

```
Enter the default backup device path:
                                (default: /dev/rmt/0)
```

5. Press **Return** to select the default or enter the backup device path of choice.

Note

All systems are shipped with one or more tape drives (QIC-150, 5-GB, and/or a 14-GB). For systems with multiple tape drives, the QIC-150 is the first drive on the SCSI chain. For quicker backups (1 hour versus several hours), we recommend using the 5- or 14-GB tape drive.

`/dev/rmt/0` indicates the first tape drive in the SCSI chain

`/dev/rmt/1` indicates the second tape drive in the SCSI chain

`/dev/rmt/0c` indicates the first tape drive in the SCSI chain in compressed mode (only the 14-GB tape drive can support compressed mode)

`/dev/rmt/1c` indicates the second tape drive in the SCSI chain in compressed mode

6. The program responds:

```
Enter number of ACDs being administered (1-4):
```

7. Enter the number of ACDs to be administered. (This number may be less than the number of ACDs authorized.)

The program responds:

```
Information for ACD 1
```

```
Enter switch name (up to 20 characters):
```

8. Enter the name for the switch connected to ACD1. Include "R3" in the name to indicate R3 CMS. The program responds:

```
Select the model of switch for this ACD
```

- 1) System85-R2V4
- 2) Definity-G1.1
- 3) Definity-G2.1
- 4) Definity-G2.2
- 5) Definity-G3i
- 6) Definity-G3r
- 7) Definity-G3V2
- 8) Definity-G3V3

```
Enter choice (1-8):
```

9. Enter the number that represents the switch model to which the ACD is connected.

If the switch supports vectoring and vectoring is authorized, this message appears; otherwise, go to Step 11.

```
Is Vectoring enabled on the switch? (y/n):
```

10. Enter y if Vectoring is enabled on this switch; otherwise, enter n.

The following message appears if vectoring is enabled, the switch supports EAS, and EAS is authorized. If the message does not appear, go to Step 11.

Is Expert Agent Selection enabled on the switch? (y/n):

11. Enter y if Expert Agent Selection is enabled on this switch; otherwise, enter n. The program responds:

Enter the local port assigned to the switch? (1-XX):

12. Enter the local port or channel number on the switch. The program responds:

Enter the remote port assigned to switch (1-XX):

13. Enter the remote port or channel number on the switch. The program responds:

Select the device used for x.25 connectivity to the switch:

- 1) Serial Port B
- 2) HSI link 0
- 3) HSI link 1
- 4) HSI link 2
- 5) HSI link 3
- 6) Software loopback link 0
- 7) Software loopback link 1

Enter choice (1-7):

The link number represents the port that is connected to the switch.

Note

- 1) Serial Port B
- 2) Corresponds to HSI/S Port 0
- 3) Corresponds to HSI/S Port 1
- 4) Corresponds to HSI/S Port 2
- 5) Corresponds to HSI/S Port 3
- 6) Software loopback link 0
- 7) Software loopback link 1

14. Enter the link number. The program responds:

```
Number of splits/skills (0-XXX):
```

15. Enter the number of splits/skills in this ACD. The program responds:

```
Total split/skill members, summed over all splits/skills  
                                (0-XXXX):
```

16. Enter the maximum number of agents that can be logged into this ACD simultaneously. The program responds:

```
Number of shifts (1-4):
```

17. Enter the number of shifts. The program responds:

```
Enter the start time for shift 1 (hh:mmXM):
```

18. Enter the start time for shift 1; for example, 08:00AM. The program responds:

Enter the stop time for shift 1 (hh:mmXM):

19. Enter the stop time for shift 1; for example, 05:00PM.

The program responds:

Number of agents logged into all splits/skills during shift 1
(0-XXX):

20. Enter the number of agents logged in during the shift.

Note

Steps 18 through 20 will repeat for the number of shifts entered in Step 17.

The program continues:

Number of trunk groups (0-XXX):

21. Enter the number of trunk groups associated with this ACD. The program responds:

Number of trunks (0-XXXX):

22. Enter the number of trunks associated with this ACD. The program responds:

Number of unmeasured facilities (0-3960):

23. Enter the number of unmeasured facilities associated with this ACD.

- If the switch supports call work codes, you will see a message to enter the number of codes.
- If vectoring is enabled on the switch (you entered y for Step 9), you will see this message:

Creating database tables.

Then, you will be prompted to enter the number of vectors and VDNs.

- The program repeats Steps 8 through 23 for each ACD entered in Step 6. After you define the last ACD, the program continues:

Updating database

Computing space requirements and file system space availability.

Setup completed successfully.

If the setup does not complete successfully, you probably do not have enough disk space.

If this occurred, you need to complete the setup process again and do one or both of the following:

- Decrease the value on the storage parameters (use less disk space).
- Add a disk to your system (add disk space).

24. Verify the installation completed successfully by entering:

```
# tail /cms/install/logdir/admin.log
```


The CMS software is successfully set up when you see a message similar to the following:

```
File systems/space available:
/cms XXXXXXXX

File systems/current blocks free:
/cms XXXXXXXX
/cms: AGENT, SPLIT, VDN, TRUNK, TKGRP, VECTOR, AGENT_LOG_REC,
      AGENT_ TRACE_REC, EXCEPTIONS_REC, WORKCODE, CALL_REC,
Setup completed successfully <date/time>
```

You may edit this file for additional information.

If you need to install additional CMS-related feature packages (Forecasting or External Call History), go to the appropriate section and follow the procedures.

Now, you can turn on the CMS software. See the "run_cms" section in Chapter 2, "CMSADM and CMSSVC Menus," for details.

Setting Up CMS Using a UNIX System Flat File

Setting up the CMS feature package using a UNIX System flat file consists of editing the *cms.inst.skl* file (the flat file) and starting the install program.

1. Change to the following directory by entering:

```
# cd /cms/install/cms_install
```

2. Copy the *cms.inst.skl* file by entering:

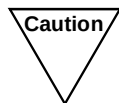
```
# cp cms.inst.skl cms.install
```

3. Edit the *cms.install* (flat) file by entering:

```
# vi cms.install
```

The flat file contains a series of questions and value ranges that pertain to the ACD/switch configuration.

4. Enter the appropriate values for your configuration.



Make sure you use the computer's host name for the UNIX system name. The computer's host name should have been assigned during the factory installation.

A sample flat file with values entered might look like this:

```

# Enter a name for this UNIX system (up to 256 characters):

# Select the type of backup device you are using
# 1) SCSI QIC-150 cartridge tape - 150MB tape
# 2) SCSI QIC-60 cartridge tape - 60MB tape
# 3) 14.0 Gbyte 8mm tape
# 4) 5.0 Gbyte 8mm tape
# Enter choice (1-4):

# Default backup device paths based on device type:
# Device                                Default backup path
# SCSI QIC-150 cartridge tape - 150MB tape /dev/rmt/0
# SCSI QIC-60 cartridge tape - 60MB tape   /dev/rmt/0
# 14.0 Gbyte 8mm tape                      /dev/rmt/0c
# 5.0 Gbyte 8mm tape                       /dev/rmt/0
# Enter the default backup device path:

# Enter number of ACDs being administered (1-4):

# The following information is required per ACD:
# Information for ACD 1:
# Enter switch name (up to 20 characters):

# Select the model of switch for this ACD
# 1) System85-R2V4
# 2) Definity-G1.1
# 3) Definity-G2.1
# 4) Definity-G2.2
# 5) Definity-G3i
# 6) Definity-G3r
# 7) Definity-G3V2
# 8) Definity-G3V3
# Enter choice (1-8):

# Is Vectoring enabled on the switch? (y/n):

# Is Expert Agent Selection enabled on the switch? (y/n):

# Enter the local port assigned to switch (1-64):

# Enter the remote port assigned to switch (1-64):

# Enter link number (0-3):

# Maximum number of splits/skills based on switch type:
# Release(s)                                Value
# System85-R2V4/Definity-G2.1/Definity-G2.2    60
# Definity-G1.1/Definity-G3i/Definity-G3r      99
# Definity-G3V2/Definity-G3V3                  255
# Definity-G2.2(EAS)                           600
# Number of splits/skills (0-Maximum):

```

```
# Maximum number of split/skill members based on switch type:
# Release(s)                                     Value
# Definity-G1.1/Definity-G3i                     400
# System85-R2V4/Definity-G2.1/Definity-G2.2/Definity-G3r 1023
# Definity-G2.2(EAS)                             5115
# Definity-G3V2/Definity-G3V3                     5200
# Total split/skill members, summed over all splits/skills (0-Maximum):

# Number of shifts (0-4):
# Enter the start time for shift 1 (hh:mmXM):

# Enter the stop time for shift 1 (hh:mmXM):

# Number of agents logged into all splits/skills during shift 1 (1-Maximum):

# Enter the start time for shift 2 (hh:mmXM):

# Enter the stop time for shift 2 (hh:mmXM):

# Number of agents logged into all splits/skills during shift 2 (1-Maximum):

# Enter the start time for shift 3 (hh:mmXM):

# Enter the stop time for shift 3 (hh:mmXM):

# Number of agents logged into all splits/skills during shift 3 (1-Maximum):

# Enter the start time for shift 4 (hh:mmXM):

# Enter the stop time for shift 4 (hh:mmXM):

# Number of agents logged into all splits/skills during shift 4 (1-Maximum):

# Maximum number of trunk groups based on switch type:
# Release(s)                                     Value
# Definity-G1.1/Definity-G3i                     99
# System85-R2V4/Definity-G2.1/Definity-G2.2/Definity-G3r 255
# Definity-G3V2/Definity-G3V3                     666
# Number of trunk groups (0-Maximum):

# Maximum number of trunks based on switch type:
# Release(s)                                     Value
# Definity-G1.1/Definity-G3i                     400
# System85-R2V4/Definity-G2.1/Definity-G2.2/Definity-G3r/Definity-G3V2/Definity-
G3V3 4000
# Number of trunks (0-Maximum):
```

```

# Maximum number of trunks based on switch type:
# Release(s)
    Value
# Definity-G1.1/Definity-G3i
    400
# System85-R2V4/Definity-G2.1/Definity-G2.2/Definity-G3r/Definity-G3V2/Definity-
G3V3    4000
# Number of trunks (0-Maximum):

# Number of unmeasured facilities (0 to (Maximum trunks - Number of trunks)):

# Minimum number of call work codes based on switch type:
# Release(s)
    Value
# System85-R2V4/Definity-G1.1/Definity-G2.1
    0
# Definity-G2.2/Definity-G3i/Definity-G3r/Definity-G3V2/
# Definity-G3V31
# Maximum number of call work codes based on switch type:
# Release(s)
    Value
# System85-R2V4/Definity-G1.1/Definity-G2.1
    0
# Definity-G2.2/Definity-G3i/Definity-G3r/Definity-G3V2/
# Definity-G3V3
    1999
# Number of call work codes (Minimum-Maximum):
# Information for ACD 2:

```

The flat file repeats the previous statements for ACDs 2 through 4.

5. After you have entered all the appropriate values, write and quit the file.
6. Change to the root directory by entering:

```
# cd /
```

7. Access the CMS Services menu by entering:

```
# cmssvc
```

The program responds:

Commands for CMS Services Personnel

Select a command from the list below.

- 1) auth_display Display feature authorizations
 - 2) auth_set Authorize CMS capabilities/capacities
 - 3) backup Single-tape filesystem backup (in background)
 - 4) run_cms Turn CMS on or off
 - 5) setup Set up the initial CMS configuration
 - 6) swinfo Display switch information
 - 7) swsetup Change switch information
 - 8) upd_install Install update from disk files
 - 9) upd_remove Back out the currently installed update
 - 10) upd_save Save update on disk for later installation
- Enter choice (1-10) or q to quit:

8. Enter 5 to select the *setup* option. The program responds:

The input will be read from

- 1) the terminal
 - 2) a flat file
- Enter choice (1-2):

9. Enter 2 to specify that the setup will use the flat file. The program responds:

*** The rest of this command is running in the background ***

10. Verify that the installation completed successfully by entering:

```
# tail -f /cms/install/logdir/admin.log
```

The `-f` option in the previous command updates the console terminal as messages are written to the `admin.log` file.

The CMS software is successfully set up when you see a message similar to the following:

```
File systems/space available:
/cms      XXXXXXXXX

File systems/current block free:
/cms      XXXXXXXXX
/cms: AGENT, SPLIT, VDN, TRUNK, TKGRP, VECTOR, AGENT_LOG_REC,
      AGENT_TRACE_REC, EXCEPTIONS_REC, WORKCODE, CALL_REC,
Setup completed successfully <date/time>
```

Press **Del** to break out of the `tail -f` command.

Installing the Forecasting Feature Package

Prerequisites: You must be logged in as *root*, the computer must be in run-level 2 or 3, and all file systems must be mounted.

Do these steps to install the Forecasting feature package:

1. Access the CMS Services menu by entering:

```
# cmssvc
```

The program responds:

```
Commands for CMS Services Personnel
```

```
Select a command from the list below.
```

```
1) auth_display Display feature authorizations
2) auth_set     Authorize CMS capabilities/capacities
3) backup      Single-tape filesystem backup (in background)
4) run_cms     Turn CMS on or off
5) setup       Set up the initial CMS configuration
6) swinfo      Display switch information
7) swsetup     Change switch information
8) upd_install Install update from disk files
9) upd_remove  Back out the currently installed update
10) upd_save   Save update on disk for later installation
Enter choice (1-10) or q to quit:
```

2. Enter 1 to select *auth_display*, and verify that the system is authorized to install the Forecasting package.

Sample response:

Capability/Capacity	Authorization
-----	-----
vectoring	authorized
forecasting	authorized
graphic	not authorized
external call history	authorized
expert agent selection	authorized
Maximum number of agents	xxxx
Maximum number of ACDs	x

Note

If Forecasting has not been authorized but should be, go to the “Setting Authorizations” section and follow the procedures outlined in that section.

3. Access the CMS Administration menu by entering:

```
# cmsadm
```

The program responds:

```
Call Management System Administration Menu
Select a command from the list below.
1) acd_create   Define a new ACD
2) acd_remove  Remove all administration and data for an ACD
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 CMS on or off
Enter choice (1-9) or q to quit:
```

4. Enter 7 to select the *pkg_install* option.

The program responds:

```
The CMS Features that can be installed are
1) forecasting
2) external call history
Enter choice (1-2) or q to quit:
```

Note

The program displays only feature packages that are authorized and not yet installed.

5. Enter the number that corresponds to Forecasting. The program responds:

```
Creating database tables . . . . .
```

The dots continue to appear as the program sets up the Forecasting tables. After the Forecasting tables are completed, these messages appear:

```
Computing space requirements and file system space availability.
```

```
Forecasting package installed
```

6. Verify that the installation completed successfully by entering:

```
# tail /cms/install/logdir/admin.log
```

The Forecasting package is successfully installed when you see this message:

```
.  
.   
.   
  
Forecasting package installed <date/time>
```

You may edit this file for additional information.

If you need to install the External Call History package, go to the next section and follow the procedures.

Installing the External Call History Package

Prerequisites: The customer must have a separate computer for the storage and reporting of call records. Both the storage machine and the CMS machine must be administered in *uucp*. If the storage machine is not running the UNIX System, a DOS version of *uucp* must be used.

You must be logged in as *root*, the computer must be in run-level 2 or 3, and all file systems must be mounted.

Note

Once the External Call History package is installed, you will no longer be able to access any call record data from CMS. For more information see the *Call Management Center External Call History Interface Document* (AT&T 585-215-125). It explains how to administer the UUCP link port on Network Terminal Servers.

Do these steps to install the External Call History feature package:

1. Access the CMS Services menu by entering:

```
# cmssvc
```

The program responds:

```
Commands for CMS Services Personnel
```

```
Select a command from the list below.
```

```
1) auth_display  Display feature authorizations
2) auth_set      Authorize CMS capabilities/capacities
3) backup        Single-tape filesystem backup (in background)
4) run_cms       Turn CMS on or off
5) setup         Set up the initial CMS configuration
6) swinfo        Display switch information
7) swsetup       Change switch information
8) upd_install   Install update from disk files
9) upd_remove    Back out the currently installed update
10) upd_save     Save update on disk for later installation
Enter choice (1-10) or q to quit:
```

2. Enter 1 to select *auth_display*, and verify that the system is authorized to install the External Call History package.

Sample response:

Capability/Capacity	Authorization
-----	-----
vectoring	authorized
forecasting	authorized
graphic	not authorized
external call history	authorized
expert agent selection	authorized
Maximum number of agents	xxxx
Maximum number of ACDs	x

Note

If External Call History is not authorized but should be, go to the "Setting Authorizations" section in this chapter and follow the procedures.

3. Access the CMS Administration menu by entering:

```
# cmsadm
```

The program responds:

```
Call Management System Administration Menu
Select a command from the list below.
1) acd_create   Define a new ACD
2) acd_remove  Remove all administration and data for an ACD
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 CMS on or off
Enter choice (1-9) or q to quit:
```

4. Enter 7 to select the *pkg_install* option.

The program responds:

The CMS Features that can be installed are

- 1) forecasting
- 2) external call history

Enter choice (1-2) or q to quit:

Note

The system displays only feature packages that are authorized and not yet installed.

5. Enter the number that corresponds to External Call History. The program responds:

Enter the name of computer to which to send call records
(up to 256 characters):

6. Enter the name of the Call History Reporting machine that was administered in *uucp*. The program responds:

Enter password for nuucp login on xxxxxxxx (up to 8 characters)

7. Enter the password for *nuucp* of the Call History Reporting machine that was administered in *uucp*. The program responds:

Enter CMS port for connection to xxxxxxxx (s_pdevxxx):

8. Enter the CMS port administered for the Call History Reporting machine. This port can either be on one of the NTS patch panels or on one of the 8-or 16-port NTSS. For more information on administering the ports on the NTS, see Chapter 4, "Installing Terminals, Printers, and Modems".

The program responds:

```
Select a speed for this connection
1) 19200
2) 38400
```

9. Enter the speed that the connection between the CMS and Call History Reporting machine will be using. The program responds:

```
Number of call segments to buffer for ACD xxxxxxxx (0-99999):
```

10. Enter the number of call records to be held in the buffer if the Call History machine cannot accept the data. (This step reserves disk space; therefore, sufficient disk space must be available.)

Note

Step 10 is repeated for each administered ACD.

The program responds:

```
Computing space requirements and file system space availability.
```

```
External Call History package installed
```

11. Verify that the installation completed successfully by entering:

```
# tail /cms/install/logdir/admin.log
```

The External Call History package installed successfully when you see this message:

```
. . . . .  
. . . . .  
External Call History package installed <date/time>
```

You may edit this file for additional information on packages which were installed or authorized.

Overview

This chapter describes how to test the R3V2 CMS (Release 3 Version 2 Call Management System) software to ensure that the application is working properly. In addition, a worksheet is provided at the end of this chapter for turning the system over to the customer. You should do these tests after:

- Completing the initial *Sun SPARCserver* computer installation and CMS setup
- Completing a CMS software package upgrade
- Completing a CMS software package update.

Before you begin the procedures described in this chapter, the switch technicians must complete the following:

- Connect the *Sun SPARCserver* computer to the switch.
- Translate the switch with the CMS feature enabled.
- Connect the switch to an active link.

The procedures in this chapter test the following:

- The operating system parameters
- The connection between the *Sun SPARCserver* computer and the TSC (Technical Service Center)

Note

You do this test only after initially installing the R3V2 CMS software, not after installing a new base load or field update.

- The sanity of the CMS feature package

Note

You do this sanity test after initially installing or upgrading the R3V2 CMS software.

- The sanity of any CMS-related feature packages (Vectoring, Graphics, and Forecasting)



You do this sanity test after initially installing or upgrading the R3V2 CMS software.

- The link configuration between the *Sun SPARCserver* computer and the switch.

If you encounter a problem that you cannot solve, escalate the problem through normal procedures.

Verifying the System Date and Time

This section describes how to verify that the *Solaris* 2.4 system time and the current local time are the same.

Checking the *Solaris* System Date and Time

Verify that the system time is correct by entering:

```
# date
```

If the system time is correct, go to the "Testing the Connection to the Technical Support Center" section in this chapter.

If the system time is incorrect, go to the "Setting the System Date and Time" section in this chapter.

Setting the System Date and Time

Do these steps to set the system time:

1. Log in as *root*.
2. Change to a single-user state with the following command:

```
# shutdown -i0 -g0 -y
```

Note

The `-i0` portion of the shutdown command string changes the system to a single-user state.

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

```
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 type of terminal, and press **Return**.

6. As *root*, enter the date command to set the time and date:

```
# date mmddhhmm[yy]
```

- **Month (mm):** Enter the appropriate month (For example, 01-12).
- **Day (dd):** Enter the appropriate day (For example, 01-31).
- **Hour (hh):** Enter the appropriate system time (For example, 01-24).
- **Minute (mm):** Enter the appropriate minutes (For example, 01-60).
- **Year [yy]:** Enter the appropriate year (For example, 94).

7. Set the time zone environment variable in the */etc/default/init* file:
- a. Examine the */usr/share/lib/zoneinfo* directory for time zones. For more information about time zones, see the next section "Setting 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.

Note

For additional information, enter the `man date` command at the system prompt, or see *AnswerBook* on-line software package.

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

```
# shutdown -i6 -g0 -y
```

Note

The `-i6` portion of the shutdown command string changes the system to multi-user state.

Setting the System Country and Time Zones

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

1. At the console, exit *OpenWindows* interface, if currently running.
2. To initiate a single-user state, enter the following command:

```
# shutdown -i0 -g0 -y
```

Note

The `-i0` portion of the shutdown command string changes the system to a single-user state.

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

```
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 type of terminal, and press **Return**.
6. Modify the */etc/default/init* file with an appropriate value from the */usr/share/lib/zoneinfo* directory.

Note

The entry in the *init* file is essentially a relative path name from the */usr/share/lib/zoneinfo* directory.

7. Specify the relative path name.

For example, for Colorado, the contents of */etc/default/init* could be *TZ=MST* or *TZ=US/Mountain*. In this example, *MST* (Mountain Standard Time) is a file in */usr/share/lib/zoneinfo*, and *Mountain* is a file in */usr/share/lib/zoneinfo/US*.

8. Reboot the machine using the following command:

```
init 6
```

Note

For additional information, enter the `man date` command at the system prompt, or see *AnswerBook* on-line software package.

Testing the Connection to the Technical Support Center

The information in this section is used to verify that the TSC is properly connected to the *Sun SPARCserver* computer. This connection allows the TSC to do remote maintenance.

Testing the Remote Access Port

Use the information in this section to verify that the TSC can dial in remotely and perform routine maintenance procedures on the *Sun SPARCserver* computer.

This section describes how to redirect port A (remote console port) on the *Sun SPARCserver* computer using the *Solaris* software package. Redirecting the console allows the TSC to dial in and do remote maintenance.

Test port A on the back of the *Sun SPARCserver* computer by redirecting the console to the remote terminal and then redirecting the console back to the *Sun* monitor.

How to Remote the Console

To test the connection between the TSC and the remote console, 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/abcmadm -r ttya
```

The program responds:

```
ttya is currently set to incoming
Are you sure you want to remove it? [y,n,?]
```

3. Enter y. The program responds:


```
ttya administration removed
```

4. To check the speed of the modem, enter the following command:

```
# abcdm -k
```

Note

All remote access ports have a default baud rate of 9600.

5. Redirect the console to the A port (remote console) by entering the following commands:

```
# /cms/install/bin/abcdm -c -b <9600> ttya
```

The program responds:

```
This change requires a reboot to take affect
```

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

6. Enter y.

```
Starting port monitor.  
Setting console parameters.  
Proceeding to reboot.
```

The system automatically reboots.

As the system reboots, the shutting down, reset, and rebooting messages will appear on the *Sun* monitor. When the system starts to come back up, the *Sun* 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. The XDM login appears on the local monitor.

7. Log in to the remote console as *root*.

Note

At this time, an XDM login window for the *OpenWindows* interface appears on the *Sun SPARCserver* monitor.

How to Redirect Back to Local

1. Redirect the console back to the local console by entering the following command:

```
# /cms/install/bin/abcmadm -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. Enter *y*. The system will automatically reboot, and the A port will come up as the console.

As the system reboots, the shutting down 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* monitor. After the system reboots, a console `login:` prompt should appear on the *Sun* monitor. A `login:` prompt should appear on the dial-in terminal.

3. Log in to the local console as *root*.
4. Log in to the dial-in terminal as *root*.

The console has been redirected to the remote terminal and redirected back to the system console.

See Appendix D, "Sun SPARCserver Computer Factory Installation Procedures", for more information about setting the remote console modem options, connecting the remote console to the *Sun SPARCserver* computer, and administering the remote console ports.

Assigning Passwords

This section describes how to assign passwords to each login on the *Sun SPARCserver* computer. Prior to testing the R3V2 CMS software, you must assign passwords to each of the following logins:

- *root*
- *cms*
- *cmssvc*
- any other administration logins you add to the *Sun SPARCserver* computer.



Store the passwords for each login on the provided "Turning the System Over to the Customer" form at the end of this chapter.

To assign passwords, do the following procedures for each login:

1. Log in as *root*.
2. At the system prompt, enter the following command:

```
# passwd <login>
```

The system responds:

```
New password:
```

3. At the `new password:` prompt, enter the new password.
4. Enter the password again.

Testing the R3V2 CMS Software

The following procedure should be completed by the on-site technician after the R3V2 CMS software has been installed or upgraded to verify the sanity of R3V2 CMS software:

1. Start the *OpenWindows* interface.

If the *OpenWindows* interface is not displayed, do the following:

- a. Log off the system console.
- b. Log back on the system console.
- c. Answer yes to the question: open Windows? y/n:

Note

When in the *OpenWindows* interface, if you get a window that says "xterm" at the top of the screen, then the TERM should be set to xterm. If the window says "Sun command window," then the TERM should be set to sun-cmd.

2. In one of the windows at a console terminal, log in to the system by using a CMS administrator's login ID (su cms). Supply the correct password when prompted.

For information about starting the *OpenWindows* interface, see Chapter 1, "Introduction".

3. Access the R3V2 CMS main menu by typing cms and entering the correct terminal type.
4. Test the real-time reports subsystem by doing the following from the CMS Main Menu:
 - a. Select the Reports option.
 - b. Select the Real-time option.
 - c. Select the Split option.
 - d. Select the Status option.
 - e. Verify that the Split Status Report Input window appears.
 - f. Enter a valid split number in the Split: field.
 - g. Select the Run action list item, and run the report.
 - h. Verify that the Split Status Report window appears.
 - i. Press the **Commands** SLK.
 - j. Select the Print window option to send the report to the printer.

- k. Look at the message line near the bottom of the window, and verify that there is a confirmation message about sending the report to the printer.
 - l. Verify that the report printed by checking the printer for the report.
 - m. Return to the CMS Main Menu screen by pressing the **Exit** SLK twice.
5. Test the Historical Reports subsystem by doing the following from the CMS Main Menu:
- a. Select the Reports option.
 - b. Select the Historical option.
 - c. Select the Split option.
 - d. Select the Status option.
 - e. Verify that the Split Status Report Input window appears.
 - f. Enter a valid split number in the Split : field.
 - g. Enter -1 in the Date : field.
 - h. Select the Run action list item, and run the report.
 - i. Verify that the report window appears and information is displayed in the appropriate fields.

Note

If no historical data exists, the fields in the report window should be blank.

- j. Return to the CMS Main Menu by pressing the **Exit** SLK twice.
6. Test the Dictionary subsystem by doing the following from the CMS Main Menu:
- a. Select the Dictionary option.
 - b. Select the Login Identifications option.
 - c. Enter an * in the Login ID: field.
 - d. Select the List all action list item to list all the log in IDs.
 - e. Verify that the logins are displayed.
 - f. Return to the CMS Main Menu by pressing the **Exit** SLK twice.

7. Test the Exceptions subsystem by doing the following from the CMS Main Menu:

- a. Select the Exceptions option.
- b. Select the Real-time Exception Log option.
- c. Verify that the window is accessible.

Note

For a new installation, this window may be blank.

- d. Return to the CMS Main Menu by pressing the **Exit** SLK once.

8. Test the ACD Administration subsystem by doing the following from the CMS Main Menu:

- a. Select the ACD Administration option.
- b. Select the Move Extensions Between Splits option.
- c. Press the **Return** key.
- d. Select the List all action list item, and list all the extensions currently assigned to the split.
- e. Verify that the displayed information is correct.
- f. Return to the CMS Main Menu by pressing the **Exit** SLK once.

9. Test the Custom Reports subsystem by doing the following from the CMS Main Menu:

- a. Select the Custom Reports option.
- b. Select the Real-time option.
- c. Verify that the names of existing custom reports are listed.
- d. Return to the CMS Main Menu by pressing the **Exit** SLK once.

10. Test the User Permissions subsystem by doing the following from the CMS Main Menu:

- a. Select the User Permissions option.
- b. Select the User Data option.
- c. Verify that the User Data Input window appears.
- d. Return to the CMS Main Menu by pressing the **Exit** SLK once.

11. Test the System Setup subsystem by doing the following from the CMS Main Menu:
 - a. Select the System Setup option.
 - b. Select the CMS state option.
 - c. Verify that CMS is operating in the Multiuser mode.
 - d. Return to the CMS Main Menu by pressing the **Exit** SLK once.
12. Test the Maintenance subsystem by doing the following from the CMS Main Menu:
 - a. Select the Maintenance option.
 - b. Select the Printer Administration option.
 - c. Enter a valid printer name in the CMS printer name: field.
 - d. Select the List all action list item, and list the printer parameters.
 - e. Verify that the printer has been administered correctly.
 - f. Return to the CMS Main Menu by pressing the **Exit** SLK twice.
13. Test the Graphics subsystem by doing the following from the CMS Main Menu:
 - a. Select the Graphics option.
 - b. Verify that a Real-time Graphics screen can be accessed.
 - c. Return to the CMS Main Menu by pressing the **Exit** SLK once.
14. At each CMS terminal, log in as cms and choose the correct terminal to verify that the terminals are working properly. To log off, select the Logout option from the CMS Main Menu. Return to the system login prompt.
15. If you were able to complete each of the steps in the test successfully, do a CMSADM file system backup before you turn the R3V2 CMS application over to the customer. See Chapter 8, "Maintenance", for details.

Note If any of the steps in the test failed, refer to Chapter 9, "Troubleshooting", and try to solve the problem associated with the step that failed. If you encounter a problem that you cannot solve, escalate the problem through normal procedures.

To complete the test, do the following before you turn the R3V2 CMS application over to the customer:

1. If you have not already done so, back up the file systems by following the procedures outlined in the "Performing a CMSADM File System Backup" section in Chapter 8, "Maintenance."
2. If you have not already done so, back up the customer's historical data by doing a full maintenance backup from the Maintenance subsystem in CMS. See the "Back Up Data" section in Chapter 12, "Maintenance," of the *CMS Administration* (AT&T 585-215-521) document.
3. Log in at the console terminal. Start CMS (cmsadm). When the CMS Main Menu appears, look at the time in the upper right side of the screen. The time displayed should be current, and the link should be **UP** (for example, the link indicator is ^ per ACD or ^^^^ for 4 ACDs). To log off, select the Logout option on the CMS Main Menu. This completes the test. You can now turn the R3V2 CMS application over to the customer.

Turning the System Over to the Customer

After you complete the test procedures in this chapter, go to Chapter 8, "Maintenance" and perform the backup procedures. Then, complete the worksheet below and give it to the customer's CMS administrator.



For system security, the CMS administrator must store written passwords, INFORMIX serial number and key license information, and X.25 license information in a secure place.

The password for the *root* login ID.
(Also passwords for the system login IDs if they were assigned.)

1. _____

The CMS administrator login ID and password.
(This login ID is *cms*.)

2. _____

Additional CMS-administrator login IDs and passwords.

3. _____

The default CMS printer name.

4. _____

Additional system printer names.

5. _____

How many splits/skills were assigned?

6. _____

How many agents were assigned?

7. _____

How many trunk groups were assigned?

8. _____

How many trunks were assigned?

9. _____

How many VDNs were assigned?

10. _____

The CMS administrator will also need the printed output from the `df -t` command which contains disk partitioning information

Overview

This chapter explains how to maintain the R3V2 CMS (Release 3 Version 2 Call Management System) software. Refer to the *Sun SPARCserver* computer documentation for additional maintenance information.

This chapter discusses the following maintenance procedures:

- Performing Backups and Restores
- Recovering from Disk Corruption (One System Disk)
- Recovering from Disk Corruption (Two System Disks)
- Recovering from a Disk Crash (One System Disk)
- Recovering from a Disk Crash (Two System Disks)
- Installing Additional SCSI Hard Disk Drives - Disk 2 (One System Disk)
- Installing Additional SCSI Hard Disk Drives (Two System Disks)
- Recovering System Space
- Installing Additional Memory
- Changing the Date or Time
- Checking Installed Software Packages
- Auditing CMS Package
- Moving Back to a Previous Load
- Backing Out of a Solaris Patch
- Adding INFORMIX- SQL
- Adding Network Terminal Servers

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

Performing Backups and Restores

A backup copies the data stored on the R3V2 CMS hard disk to a removable tape. Regular backups provide a way to recover data that would otherwise be lost. CMS provides two different types of backups:

- CMSADM File System Backup
- CMS Maintenance Backup — Full and Incremental.

From backup tape(s) you can restore your system and data. For more information about backups and restores, see Chapter 12, “Maintenance,” in the *Call Management System R3V2 Administration* (AT&T 585-215-521) document.

Performing a CMSADM File System Backup

The CMSADM file system backup saves all the file systems on the machine onto a tape. This includes:

- *Solaris* 2.4 system files and programs
- CMS programs and data
- Non-CMS customer data placed on the computer (in addition to the CMS data).

The CMSADM file system backup should be done:

- At the factory
- After the CMS is provisioned

This backup is shipped with a new system and can be used during installation, if necessary.

This backup contains the *Solaris* system files and programs and CMS configuration data placed on the computer by TSC provisioning personnel.

Note

In addition, field technicians should perform a CMS full maintenance backup before they turn a new system over to the customer. See the “Back Up Data” section in Chapter 12, “Maintenance” of the *CMS Administration* (AT&T 585-215-521) document.

- After the CMS software is upgraded or updated
- Monthly.

See the “Backup Strategy” section in Chapter 12, “Maintenance,” of the *CMS Administration* (AT&T 585-215-521) document.

The number of cartridge tapes required to complete a CMSADM file system backup depends on the amount of data on the system and the capacity of the backup tape. The program estimates the number of tapes required and informs the user.

Before starting the backup procedures in this section, log in as *root*, and execute this command:

```
# lp /etc/vfstab
```

The output from the printer is necessary when doing a system restore.

Note

You should bundle the printout of the */etc/vfstab* file with the system backup tape(s) for future reference.

Do these steps to perform a CMSADM file system backup:

1. At the system console, log in as *root*, and verify that the computer is in a *Solaris* multi-user state (2 or 3).
2. To check if you are in the multi-user state, execute this command:

```
# who -r
```

Note

The `who -r` command gives you one line of output that describes the state of the terminal.

A sample response for the `who -r` command for a machine in run-level 3:

```
who -r  
  
. run-level 3 Feb 2 16:52 3 0 S
```

3. In multi-user state, execute the following command to access the CMS Administration menu:

```
# cmsadm
```

The CMS Administration menu displays:

```
Call Management System Administration Menu
```

```
Select a command from the list below.
```

```
1) acd_create   Define a new ACD
2) acd_remove   Remove all administration and data for an ACD
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 CMS on or off
Enter choice (1-9) or q to quit:
```

4. Enter 3 to select the backup option.

The system responds:

```
Select tape drive to use:
```

```
1) 150 MB cartridge tape
2) 60 MB cartridge tape
3) 14.0 Gbyte 8mm tape
4) 5.0 Gbyte 8mm tape
```

```
Enter choice (1-4):
```

Note

All systems are shipped with one or more tape drives (QIC-150, 5-GB, and/or a 14-GB). For systems with multiple tape drives, the QIC-150 is the first drive on the SCSI chain. For quicker backups (1 hour versus several hours), we recommend using the 5- or 14-GB tape drive.

`/dev/rmt/0` indicates the first tape drive in the SCSI chain

`/dev/rmt/1` indicates the second tape drive in the SCSI chain

`/dev/rmt/0c` indicates the first tape drive in the SCSI chain in compressed mode (only the 14-GB tape drive can support compressed mode)

`/dev/rmt/1c` indicates the second tape drive in the SCSI chain in compressed mode

5. Select the tape drive to use (for example, 1, 2, 3, or 4).

Note

If you have two tape drives and you choose 1, 2, or 4, the system responds:

Select the tape drive to use:

1) `/dev/rmt/0`

2) `/dev/rmt/1`

Enter choice (1-2):

If you have two tape drives and you choose 3 (14-GB), the system responds:

Select the tape drive to use:

1) `/dev/rmt/0c`

2) `/dev/rmt/1c`

Enter choice (1-2):

If you have only one tape drive, the system begins calculating the approximate number of tapes required. You are not prompted.

If the number of tapes required is one, the system responds:

The backup will need approximately 1 tape.

Please insert the first cartridge tape into `</dev/rmt/x>`.

Press ENTER when ready:

If the number of tapes required is more than one, the system responds:

The backup will need approximately `<X>` tapes.

You will be prompted for additional tapes.

Be sure to number the cartridge tapes consecutively in the order they will be inserted.

Please insert the first cartridge tape into `</dev/rmt/x>`.

Press ENTER when ready:

6. To begin the backup, insert the cartridge tape(s) and press **Return**.

If CMS is turned on, the system responds:

The backup is about to begin, CMS is currently on. CMS will be turned off automatically during that portion of the backup which needs CMS off. Press ENTER to proceed or BREAK to quit.

7. To continue the backup, press **Return**.

If you are using one tape, the system responds:

Backing up files...

.....

XXXXXX Blocks

Tape Verification

Insert the first tape

Press return to proceed:(there is a delay as tape is verified)

Please insert tape number X and press return: (there is a delay as tape is verified)

Please label the backup tape(s) with the date and the current CMS version (<version>).

Note

Dots continue to appear as the system is being backed up.

If you are using more than one tape, a message prompts you when to enter the next tape:

Backing up files ...

.....

Please remove the current tape, number it, insert tape number X, and press ENTER.

8. If you are using more than one tape, press **Return** to continue.

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

XXXXXX Blocks

Tape Verification

Insert the first tape

Press return to proceed:(there is a delay as tape is verified)

Please insert tape number X and press return: (there is a delay as tape is verified)

Please label the backup tape(s) with the date and the current CMS version (<version>).

Note

When you insert another tape, you must allow the tape to rewind and reposition before you press **Return**.

You are returned to the system prompt.

9. Label the CMSADM backup tape(s) with the date and CMS version.

Restoring from a CMSADM File System Backup

If backups are available, the file systems on the *Sun SPARCserver* computer can be restored when an accidental loss of data occurs.

To restore the file systems from a CMSADM backup, do the following:

1. Obtain the cartridge tape(s) that contain the system backups.
2. Obtain the printout of the */etc/vfstab* file that was stored with the backup tapes.
3. Reference the restore procedures in the "Recovering from Disk Corruption (One System Disk)", "Recovering from a Disk Crash (Two System Disks)", "Recovering from a Disk Crash (One System Disk)" or "Recovering from a Disk Crash (Two System Disks)" sections of this chapter.

Checking Contents of CMSADM Backup Cartridge Tape

To list the content of the cartridge tape(s) used for a CMSADM backup, do the following:

1. Insert the first backup tape.
2. To list the files on the tape, enter the following command:

```
# cpio -ict -C 10240 -I <device name> -M "Please remove the  
current tape, insert tape number %d, and press ENTER"
```

The system displays a list of files.

Performing a CMS Maintenance Backup

CMS maintenance backups save only CMS data (administration and historical).

The CMS data for each ACD should be backed up as follows:

- After the CMS is provisioned
- After the CMS software is upgraded or updated
- Weekly.

You run these backups from the Maintenance: Back Up Data window. See “Back Up Data” and “Backup Strategy” sections in Chapter 12, “Maintenance,” of the *CMS Administration* (AT&T 585-215-521) document.

Performing a CMS Maintenance Restore

The R3V2 CMS software application allows you to restore CMS data lost due to system failure, disk crashes, etc. You can restore all CMS data that you previously backed up via a CMS maintenance backup.



You can execute a CMS maintenance restore from the console terminal; however, the console terminal must be powered on and CMS must be in the single-user mode. You can verify that you are in the single-user mode from the System Setup: CMS State window.

After the CMSADM restore is completed or after you have the system to an operable state, restore the CMS administration and historical data from available CMS maintenance backups.

Run a restore from the Maintenance: Restore Data window. See “Restore Data” section in Chapter 12, “Maintenance,” of the *CMS Administration* (AT&T 585-215-521) document.

CMS Maintenance Backups Available

The CMS maintenance restore loads the CMS data up to the time of the last CMS maintenance backup. See the “Restore Data” section in Chapter 12, “Maintenance,” of the *CMS Administration* (AT&T 585-215-521) document.

Only Full Maintenance Backups Available

If only full CMS maintenance backups are available, the following steps are the fastest way to get the system running:

1. Load the *most recent* full backup tape.
2. Do a manual restore of the ACD-specific data, system data, and non-CMS data by entering n in the Restore from last backup (y/n): field.

Note

When the CMS restore is complete, turn the CMS off and then back on so the CMS runs with the newly restored administration data. To turn CMS off and on, see the "run_cms" section in Chapter 2, "CMSADM and CMSSVC Menus," for details.

Combination Full and Incremental Maintenance Backups Available

If a combination of full and incremental CMS maintenance backups are available, the following steps are the fastest way to get the system running:

1. Load the *most recent* full backup tape.
2. Do a manual restore of the ACD-specific data, system data, and non-CMS data by entering n in the Restore from last backup (y/n): field.
3. Restore the historical data from the remaining backups. This restore can be done by selecting all of the historical data files (agent, split, vdn, vector, trunk, tkgrp, forecast data f_*) via "Select Tables" to restore only historical data.

Note

When the CMS restore is complete, turn the CMS off and then back on so the CMS runs with the newly restored administration data. To turn CMS off and on, see the "run_cms" section in Chapter 2, "CMSADM and CMSSVC menus" for details.

Disk Recovery Overview

CMS systems can have two different disk partitioning schemes. These schemes are:

- One system disk scheme
- Two system disks scheme.

To determine the partitioning scheme on your system, do the following:

1. Examine the paper copy of `/etc/vfstab` file that is stored with your cmsadm backup.
If you do not have a copy of the `/etc/vfstab` file, execute the following command at the system prompt:
`df`
2. Compare the results with Table 8-1 (one system disk), Table 8-2, and Table 8-3 (two system disks).

Table 8-1: First Internal Disk - Partitioning Information (One System Disk)

Device	Disk	Slice	File System	Cylinders	Usable Size (MB)
c0t3d0s0	1	0	/ (root)	41	17.3
c0t3d0s1	1	1	swap	390	191.9
c0t3d0s2	1	2	overlap	2036	-
c0t3d0s3	1	3	/dump	298	126.9
c0t3d0s4	1	4	/cms	406	172.9
c0t3d0s5	1	5	/opt	204	86.8
c0t3d0s6	1	6	/usr	305	129.6
c0t3d0s7	1	7	/var	392	167.0

Table 8-2: First Internal Disk - Partitioning Information (Two System Disks)

Device	Disk	Slice	File System	Size (MB)
c0t3d0s0	1	0	/	20
c0t3d0s1	1	1	swap	516
c0t3d0s5	1	5	/opt	100
c0t3d0s6	1	6	/usr	150
c0t3d0s7	1	7	/var	Remainder

Table 8-3: Second Internal Disk - Partitioning Information (Two System Disks)

Device	Disk	Slice	File System	Size (MB)
c0t1d0s0	2	0	/usr/dbtemp	100
c0t1d0s1	2	1	/export/home	100
c0t1d0s3	2	3	/dump	516
c0t1d0s4	2	4	/cms	Remainder

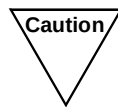
If you have the “one system disk” partitioning scheme (Table 8-1), follow the procedures described on page 8-14 through page 8-71.

If you have the “two system disk” partitioning scheme (Table 8-2 and Table 8-3), follow the procedures described on page 8-73 through page 8-121.

Recovering from Disk Corruption (One System Disk)

This section provides information about file system restore procedures and explains how to recover CMS databases after disk corruption occurs.

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.



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 a corruption on the first disk
 - Recovering from a corruption on the second disk
 - Recovering from a corruption on the third through twelfth disks.
- When the CMSADM backup is **not** available
 - Recovering from a corruption on the first disk
 - Recovering from a corruption on the second through twelfth disks.

Restoring Disk(s) — CMSADM Backup 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 CMS data from the latest 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 Table 8-4 to determine how the data is stored on the first disk.

If a CMSADM backup is available, do the following:

- Restore the file systems
- Restore the CMS data.

Table 8-4: First Internal Disk - Partitioning Information

Device	Disk	Slice	File System	Cylinders	Usable Size (MB)
c0t3d0s0	1	0	/ (root)	41	17.3
c0t3d0s1	1	1	swap	390	191.9
c0t3d0s2	1	2	overlap	2036	-
c0t3d0s3	1	3	/dump	298	126.9
c0t3d0s4	1	4	/cms	406	172.9
c0t3d0s5	1	5	/opt	204	86.8
c0t3d0s6	1	6	/usr	305	129.6
c0t3d0s7	1	7	/var	392	167.0

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"
<"/cms?/*"...>
```

Note

All systems are shipped with one or more tape drives (QIC-150, 5-GB, and/or a 14-GB). For systems with multiple tape drives, the QIC-150 is the first drive on the SCSI chain. For quicker backups (1 hour versus several hours), we recommend using the 5- or 14-GB tape drive.

`/dev/rmt/0` indicates the first tape drive in the SCSI chain

`/dev/rmt/1` indicates the second tape drive in the SCSI chain

`/dev/rmt/0c` indicates the first tape drive in the SCSI chain in compressed mode (only the 14-GB tape drive can support compressed mode)

`/dev/rmt/1c` indicates the second tape drive in the SCSI chain in compressed mode

You will likely get four error messages concerning the `/home` directory. The errors are printed when the directory is already present. If these errors are displayed, ignore them.

You must substitute the `<"/cms?/*"...>` portion of the `cpio` command with `"/cms1/*"`, `"/cms2/*"`, `"/cms3/*"` and so on for the second through twelfth disk. For example, use `"/cms1/*"` for disk 2, use `"/cms2/*"` for disk 3, etc. Refer to Table 8-5 and Table 8-6, "Internal Disk 2 (c0t1d0) - Partitioning Information" and "Additional External Disks — Partitioning Information" in the "Recovering from Disk Corruption (One System Disk)" section.

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 using the following system command:

```
# init 6
```

7. Restore the CMS from the latest CMS maintenance backups. See the "Performing a CMS Maintenance Restore" section in this chapter.

Second Disk

Use the procedures in this section to restore the second disk when a CMSADM backup is available. Refer to Table 8-5 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 CMS data.

Table 8-5: Internal Disk 2 (c0t1d0) - Partitioning Information

If equipped RAM (in MB) is:		Slice	Partition	Size (Cylinders)
more than	but less than or equal to			
0	96	0	/cms1	2036
		2	overlap	default
96	160	0	/cms1	1776
		1	swap	260
		2	overlap	default
160	224	0	/cms1	1516
		1	swap	520
		2	overlap	default
224	288	0	/cms1	1256
		1	swap	780
		2	overlap	default
288	352	0	/cms1	996
		1	swap	1040
		2	overlap	default
352	416	0	/cms1	736
		1	swap	1300
		2	overlap	default
416	512	0	/cms1	476
		1	swap	1560
		2	overlap	default

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 command at the system prompt:

```
# cpio -icmud -C 10240 -I <device name> -M "Please remove the  
current tape, insert tape number %d, and press ENTER"  
"/cms1/*"
```

Note

Enter the above `cpio` command all on one line. The `cpio` command for restoring the second disk uses the `-icmud` portion of the command string, instead of `-icmudf`.

4. Verify that the CMS data is accessible (via `cmsql`) and resolve any problems before proceeding.
5. Restore the CMS from the latest CMS maintenance backups. See "Performing a CMS Maintenance Restore" section in this chapter.

Third Through Twelfth Disks

Use the procedures in this section to restore data on the third through twelfth disk when a CMSADM backup is available. Refer to Table 8-6 to determine how the data is stored on the third through twelfth disk.

If a CMSADM backup is available, do the following:

- Restore the file system
- Restore the CMS data.

Table 8-6: Additional External Disks - Partitioning Information

Device	Disk	Slice	File System	Cylinders (2 Gbyte Disks)	Cylinders (1 Gbyte Disks)
c0t2d0s0	3	0	/cms2	2733	2036
c0t0d0s0	4	0	/cms3	2733	2036
c1t1d0s0	5	0	/cms4	2733	2036
c1t2d0s0	6	0	/cms5	2733	2036
c1t3d0s0	7	0	/cms6	2733	2036
c1t4d0s0	8	0	/cms7	2733	2036
c2t1d0s0	9	0	/cms8	2733	2036
c2t2d0s0	10	0	/cms9	2733	2036
c2t3d0s0	11	0	/cms10	2733	2036
c2t4d0s0	12	0	/cms11	2733	2036

Do these steps to restore the third through twelfth disk:

1. Log in as *root*.
2. Insert the first backup tape.
3. To restore the data, enter the following command at the system prompt:

```
# cpio -icmud -C 10240 -I <device name> -M "Please remove the
current tape, insert tape number %d, and press ENTER"
"/cms?/*"
```

Note

All systems are shipped with one or more tape drives (QIC-150, 5-GB, and/or a 14-GB). For systems with multiple tape drives, the QIC-150 is the first drive on the SCSI chain. For quicker backups (1 hour versus several hours), we recommend using the 5- or 14-GB tape drive.

`/dev/rmt/0` indicates the first tape drive in the SCSI chain

`/dev/rmt/1` indicates the second tape drive in the SCSI chain

`/dev/rmt/0c` indicates the first tape drive in the SCSI chain in compressed mode (only the 14-GB tape drive can support compressed mode)

`/dev/rmt/1c` indicates the second tape drive in the SCSI chain in compressed mode

You must substitute the "?" on the `cpio` command line for the number corresponding to the disk you are restoring. For example, disk 3 = `"/cms2/*"`, disk 4 = `"/cms3/*"` and so on for each disk. Refer to Table 8-6, "Additional External Disks - Partitioning Information" in the "Recovering from Disk Corruption (One System Disk) — Third Through Twelfth Disks" section.

4. Verify that the CMS data is accessible (via `cmsql`) and resolve any problems before proceeding.
5. Restore the CMS from the latest CMS maintenance backups. See "Performing a CMS Maintenance Restore" section in this chapter.

See Chapter 12, "Maintenance" in the *Call Management System R3V2 Administration* (AT&T 585-215-523) document for more information.

Restoring Disk(s) — No CMSADM Backup 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 CMS data.

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 Appendix D, "Sun SPARCserver Computer Factory Installation Procedures", for details.
2. Run setup. See Chapter 6, "Setting Up CMS and Installing Feature Packages", for details.
3. Restore CMS data from the CMS Maintenance backup. See the "Performing a CMS Maintenance Restore" section in this chapter.
4. Administer Terminals, Printers, Users, etc. as needed. See Chapter 4, "Installing Terminals, Printers, and Modems", for details.

Second Through Twelfth Disks

If the second through twelfth disks are destroyed and a backup is not available, do the following steps:

1. Run setup. See Chapter 6, "Setting Up CMS and Installing Feature Packages", for details.
2. Restore the CMS data from the CMS backup. See the "Performing a CMS Maintenance Restore" section in this chapter.

Restoring All Disks and File Systems

To do a complete file system restore, enter the following command at the system prompt:

```
# cpio -icmud -C 10240 -I <device name> -M "Please remove the  
current tape, insert tape number %d, and press ENTER"
```

Restoring Specific Files

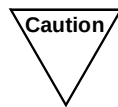
To restore specific files, enter the following command at the system prompt:

```
# cpio -icmud -C 10240 -I <device name> -M "Please remove the  
current tape, insert tape number %d, and press ENTER"  
<full_path_name>
```

Recovering from a Disk Crash (One System Disk)

This section provides information about file system restore procedures, and explains how to recover CMS databases after a disk crash occurs.

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.



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 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.

See the "Installing Additional SCSI Hard Disk Drives - Disk 2 (One System Disk)" section in this chapter or Appendix D, "Sun SPARCserver Computer Factory Installation Procedures", for details about partitioning disks and how to reinstall *Solaris* software packages.

Recovering Disk(s) — CMSADM Backup Available

If a CMSADM backup is available, then the number of tasks required to restore 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.
- Restore the file systems on the first disk.
- Restore the 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.
3. To stop the boot procedure, press the **Stop** and **A** keys simultaneously from the keyboard after the display console banner appears, but before the system starts booting the operating system (referred to as power-cycling the system). The system responds with the ok prompt.
4. At the ok prompt, enter the following command:

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

The system displays a list of all the SCSI devices.

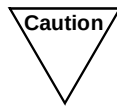
5. Verify that the first disk is displayed as c0t3d0.

Note

If the disk device number is not displayed, then it was not installed correctly.

6. Reinstall *Solaris* software package, but **only** configure the **first** disk:

- a. Boot from the CD-ROM (for example, use the `boot cdrom` command). See the "Booting from the Solaris 2.4 CD-ROM" section in Appendix D, "*Sun SPARCserver* Computer Factory Installation Procedures," for details.
- b. Follow the factory installation procedures for partitioning the first disk **only**. See the "Partitioning the Hard Disks" section in Appendix D, "*Sun SPARCserver* Computer Factory Installation Procedures," for details. After configuring the first disk, you are at the Customized Disks screen. From the Customized Disks screen, click on ok.



Do **not** configure the second and additional disks.

- c. Continue with the *Solaris* 2.4 operating system installation procedures in the "Installing the Solaris 2.4 Operating System" section in Appendix D, "*Sun SPARCserver* Computer Factory Installation Procedures."

7. After *Solaris* 2.4 operating system is booted, log in as *root*.

8. Eject the CD-ROM with the following command:

```
# eject cdrom
```

All the necessary factory installation procedures to recover the first disk are complete.



Stop after completing the "Installing the *Solaris* 2.4 Operating System" section — do **not** install the add-on packages, patches, or CMS.

9. Log in as *root*.
10. Insert the first backup tape.
11. To restore file systems on the first disk, enter the following command:

```
# cpio -icmudf -C 10240 -I <device name> -M "Please remove the
current tape, insert tape number %d, and press ENTER"
<"/cms?/*"...>
```

Note

All systems are shipped with one or more tape drives (QIC-150, 5-GB, and/or a 14-GB). For systems with multiple tape drives, the QIC-150 is the first drive on the SCSI chain. For quicker backups (1 hour versus several hours), we recommend using the 5- or 14-GB tape drive.

`/dev/rmt/0` indicates the first tape drive in the SCSI chain

`/dev/rmt/1` indicates the second tape drive in the SCSI chain

`/dev/rmt/0c` indicates the first tape drive in the SCSI chain in compressed mode (only the 14-GB tape drive can support compressed mode)

`/dev/rmt/1c` indicates the second tape drive in the SCSI chain in compressed mode

You will likely get four error messages concerning the `/home` directory. The errors are printed when the directory is already present. If these errors are displayed, ignore them.

You must substitute the `<"/cms?/*"...>` portion of the `cpio` command with `"/cms1/*"`, `"/cms2/*"`, `"/cms3/*"` and so on for the second through twelfth disk. For example, use `"/cms1/*"` for disk 2, use `"/cms2/*"` for disk 3, etc. Refer to Table 8-5 and Table 8-6, "Internal Disk 2 (c0t1d0) - Partitioning Information" and "Additional External Disks — Partitioning Information" in the "Recovering from Disk Corruption (One System Disk)" section of this chapter.

The `cpio` command restores all of the entries on the first disk that are needed for all the file systems to be mounted.

12. Because the *Solaris* operating system was installed only 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.

13. To verify all file systems mounted properly, check the displayed response and resolve any problems.
14. After you restore the first disk, sync the file systems by entering the following commands:

```
# sync
```

15. To reboot the machine, enter the following command:

```
# init 6
```

16. Log in as *root*.
17. Restore CMS data from the 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
- Recreate the file systems
- Restore the file systems
- Restore the 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.
3. To stop the boot procedure, press the **Stop** and **A** keys simultaneously from the keyboard after the display console banner appears, but before the system starts booting the operating system (referred to as power-cycling the system). The system responds with the ok prompt.
4. At the ok prompt, enter the following command:

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

The system displays a list of all the SCSI devices.

5. Verify that the second disk is displayed as c0t1d0.

Note

If the disk device number is not displayed, then it was not installed correctly.

6. Boot the system:

```
ok> boot
```

Note

The system displays one or two instructions/questions for each disk being replaced during the reboot. The instructions/questions concern running the `fsck` command on the missing file systems. This occurs because the system is configured to have one file system on the second through twelfth disks, and the system does not find the file systems.

7. At each prompt that asks you to enter the `fsck` command for the missing file systems, enter `exit` to continue booting.
8. After the machine is booted, log in as *root*.
9. 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 own records.
10. To format the disk, see the “Installing Additional SCSI Hard Disk Drives (One System Disk)—Formatting Disks” section in this chapter for procedures. The device name should be `c0t1d0`.

Note Formatting the disk takes approximately 1 hour to complete.

11. To partition the disk, see the “Installing Additional SCSI Hard Disk Drives (One System Disk)—Partitioning 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 partitions to match Table 8-5 on page 8-18.
- 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.

12. Use the “Installing Additional SCSI Hard Disk Drives (One System Disk) — Constructing a New File System” section in this chapter as a guideline, and do the following:

Make the file system for the partition by entering the following command:

```
# newfs /dev/rdisk/c0t1d0s0
```

The system responds with the following question:

```
news: construct a new file system /dev/rdisk/<device>:(y/n)?
```

13. To mount file system on the second disk, enter the following command:

```
# mountall
```

The system displays all the file systems mounted.

Note

Because the file system was not created when the boot occurred, the file system on the second disk is not mounted. Since the system was originally created with the file system, it is contained in the `/etc/vfstab` file.

14. To verify all file systems mounted properly, check the displayed response and resolve any problems.
15. To ensure that the system initializes cleanly, reboot the system:

```
# init 6
```

16. Log in as *root*.
17. To restore the file systems on the second disk, enter the following command:

```
# cpio -icmud -C 10240 -I <device name> -M "Please remove the  
current tape, insert tape number %d, and press ENTER"  
"/cms1/*"
```

18. Restore CMS data from the CMS backup.
19. 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.
- Recreate the file system.
- Restore the file system.
- Restore the 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.
3. To stop the boot procedure, press the **Stop** and **A** keys simultaneously from the keyboard after the display console banner appears, but before the system starts booting the operating system (referred to as power-cycling the system). The system responds with the ok prompt.
4. At the ok prompt, enter the following command:

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

The system displays a list of all the SCSI devices.

5. Verify that the replaced disk is displayed. See Table 8-6 on page 8-20.

Note

If the disk device number is not displayed, then it was not installed correctly.

6. Boot the system:

```
ok> boot
```

Note

The system displays one or two instructions/questions for each disk being replaced during the reboot. The instructions/questions concern running the `fsck` command on the missing file systems. This occurs because the system is configured to have one file system on the third through twelfth disks, and the system does not find the file systems.

7. At each prompt that asks you to enter the `fsck` command for the missing file systems, enter `exit` to continue booting.
8. Log in as *root*.
9. 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 own records.
10. To format the disk, see the “Installing Additional SCSI Hard Disk Drives (One System Disk) — Formatting Disks” section in this chapter for procedures. See Table 8-6 on page 8-20 for device names.

Note

Formatting the disk takes approximately 1 hour to complete.

11. To partition the disk, see the “Installing Additional SCSI Hard Disk Drives (One System Disk) — Partitioning 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. Default all values except for the size data entry field. For size, enter 2036c for a 1-Gbyte disk and 2733 for a 2-Gbyte disk.
- c. At the `partition>` prompt, enter the following command to verify 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`.
12. Use the “Installing Additional SCSI Hard Disk Drives (One System Disk) — Constructing a New File System” 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 /dev/rdisk/<device>
```

See Table 8-6 for the *<device>*. For each command you enter, the system responds with the following question:

```
news: construct a new file system /dev/rdisk/<device>:(y/n)?
```

- b. Each time the message prompt appears, enter ☐Y.

Note

Because the file system was not created when the boot occurred, the file system on the new disk is not mounted. Since the system was originally created with the file system, the file system entry is contained in the */etc/vfstab* file.

13. To mount the file system on the new disk, enter the following command:

```
# mountall
```

The system displays all the file systems mounted.

14. To verify all file systems mounted properly, check the displayed response and resolve any problems.
15. To ensure that the system initializes cleanly, reboot the system:

```
# init 6
```

16. Log in as *root*.
17. To restore the file systems on the new disk, enter the following command:

```
# cpio -icmud -C 10240 -I <device name> -M "Please remove the
current tape, insert tape number %d, and press ENTER"
"/cms?/*"
```

Note

All systems are shipped with one or more tape drives (QIC-150, 5-GB, and/or a 14-GB). For systems with multiple tape drives, the QIC-150 is the first drive on the SCSI chain. For quicker backups (1 hour versus several hours), we recommend using the 5- or 14-GB tape drive.

`/dev/rmt/0` indicates the first tape drive in the SCSI chain

`/dev/rmt/1` indicates the second tape drive in the SCSI chain

`/dev/rmt/0c` indicates the first tape drive in the SCSI chain in compressed mode (only the 14-GB tape drive can support compressed mode)

`/dev/rmt/1c` indicates the second tape drive in the SCSI chain in compressed mode

You must substitute the “?” on the `cpio` command line for the number corresponding to the disk you are restoring. For example, disk 3= “`/cms2/*`”, disk 4= “`/cms3/*`” and so on for each disk. Refer to Table 8-6, “Additional External Disks - Partitioning Information” in the “Recovering from Disk Corruption (One System Disk) — Third Through Twelfth Disks” section.

18. Restore CMS data from the CMS backup.
19. Restart any stopped jobs. See Step 8.

Recovering Disk(s) — No CMSADM Backup 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 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:

- Reinstall the *Solaris* software package.
- Reinstall all add-on packages (for example, X.25).
- Reinstall the CMS software.
- Run setup.
- Restore the 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.
3. To stop the boot procedure, press the **Stop** and **A** keys simultaneously from the keyboard after the display console banner appears, but before the system starts booting the operating system (referred to as power-cycling the system). The system responds with the ok prompt.
4. At the ok prompt, enter the following command:

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

The system displays a list of all SCSI devices.

5. Verify that the first disk is displayed as `c0t3d0`.

Note

If the disk device number is not displayed, then it was not installed correctly.

6. Reinstall *Solaris* operating system, all add-on packages, spatches, and CMS. See Appendix D, "Sun SPARCserver Computer Factory Installation Procedures", for details.
7. Run setup. See Chapter 6, "Setting Up CMS and Installing Feature Packages" for details.
8. Restore CMS data from the CMS backup. See the "Performing a CMS Maintenance Restore" in this chapter for details.
9. Administer Terminals, Printers, Users, etc. as needed. See Chapter 4, "Installing Terminals, Printers, and Modems", 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.
- Recreate the file systems.
- Remove the CMS package.
- Install the CMS software.
- Run setup.
- Restore the 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.
3. To stop the boot procedure, press the **Stop** and **A** keys simultaneously from the keyboard after the display console banner appears, but before the system starts booting the operating system (referred to as power-cycling the system). The system responds with the ok prompt.

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

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

The system displays a list of all the SCSI devices.

5. Verify that the second disk is displayed as c0t1d0.

Note

If the disk device number is not displayed, then it was not installed correctly.

6. Boot the system:

```
ok> boot
```

The system displays one or two instructions/questions for each disk being replaced during the reboot. The instructions/ questions concern running the `fsck` command on the missing file systems. This occurs because the system is configured to have one file system on the second through twelfth disks, and the system does not find the file systems.

7. At each prompt that asks you to enter the `fsck` command for the missing file systems, enter `exit` to continue booting.
8. 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 own records.
9. To format the disk, see the “Installing Additional SCSI Hard Disk Drives (One System Disk) — Formatting Disks” section in this chapter for procedures. The device name should be `c0t1d0`.

Note

Formatting the disk takes approximately 1 hour to complete.

10. To partition the disk, see the “Installing Additional SCSI Hard Disk Drives (One System Disk) — Partitioning 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 partitions to match Table 8-5 on page 8-18.
- c. At the `partition>` prompt, enter the following command to verify 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 “Installing Additional SCSI Hard Disk Drives (One System Disk) — Constructing a New File System” section in this chapter as a guideline, and do the following:
 - a. Make file systems for all partitions, by entering the following command:

```
# newfs /dev/rdisk/c0t1d0s0
```

The system responds with the following question:

```
news: construct a new file system /dev/rdisk/<device>:(y/n)?
```

- b. Enter .

Note

Because the file systems were not created when the boot occurred, the file systems on the second disk are not mounted. Since the system was originally created with the file systems, they are contained in the */etc/vfstab* file.

12. To mount the file system on the second disk, enter the following command:

```
# mountall
```

The system displays all the file systems mounted.

13. To verify all file systems mounted properly, check the displayed response and resolve any problems.
 14. To ensure that the system initializes cleanly, reboot the system:

```
# init 6
```

15. Log in as *root*.
16. Run setup.
17. Restore CMS data from the CMS backup. See "Performing a CMS Maintenance Restore" in this chapter for details.

Third Through Twelfth Disks

This section describes the procedures for replacing the third through twelfth disks:

- Reformat the disk.
- Repartition the disk.
- Recreate the file system.
- Rerun setup.
- Restore the 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.
3. To stop the boot procedure, press the **Stop** and **A** keys simultaneously from the keyboard after the display console banner appears, but before the system starts booting the operating system (referred to as power-cycling the system). The system responds with the ok prompt.
4. At the ok prompt, enter the following command:

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

The system displays a list of all the SCSI devices.

5. Verify that the replaced disk is displayed. See Table 8-6 on page 8-20.

Note

If the disk device number is not displayed, then it was not installed correctly.

6. Boot the system:

```
ok> boot
```

Note

The system displays one or two instructions/questions for each disk being replaced during the reboot. The instructions/questions concern running the `fsck` command on the missing file systems. This occurs because the system is configured to have one file system on the third through twelfth disks, and the system does not find the file systems.

7. At each prompt that asks you to enter the `fsck` command for the missing file systems, enter `exit` to continue booting.
8. After the machine is booted, log in as *root*.
9. 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 own records.
10. To format the disk, see the “Installing Additional SCSI Hard Disk Drives (One System Disk) — Formatting Disks” section in this chapter for procedures. See Table 8-6 on page 8-20 for device names.

Note

Formatting the disk takes approximately 1 hour to complete.

11. To partition the disk, see the “Installing Additional SCSI Hard Disk Drives (One System Disk) — Partitioning 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 following partitions: 0. Default all values except for the size data entry field. For size, enter the following values: 2036c for a 1-GB disk and 2733c for a 2-GB disk.
- c. At the `partition>` prompt, enter the following command to verify 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`.
12. Use the “Installing Additional SCSI Hard Disk Drives (One System Disk) — Constructing a New File System” 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 /dev/rdisk/<device>
```

See Table 8-6 on page 8-20 for *<device>*. For each command you enter, the system responds with the following question:

```
news: construct a new file system /dev/rdisk/<device>:(y/n)?
```

- b. Each time the message prompt appears, enter ☐Y.

Note

Because the file systems were not created when the boot occurred, the file systems on the new disk are not mounted. Since the system was originally created with the file systems, they are contained in the */etc/vfstab* file.

13. To mount all file systems on the new disk, enter the following command:

```
# mountall
```

The system displays all the file systems mounted.

14. To verify all file systems mounted properly, check the displayed response, and resolve any problems.
15. To ensure that the system initializes cleanly, reboot the system:

```
# init 6
```

16. Log in as *root*.
17. Run *setup*.
18. Restore CMS data from the CMS backup. See "Performing a CMS Maintenance Restore" in this chapter for details.

Recovering 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 CMS database:

1. Rerun the set up option on the CMSSVC menu. This reinitializes (removes and creates) all the CMS INFORMIX database tables. See Chapter 6, "Setting Up CMS and Installing Feature Packages", for information about setting up CMS.
2. Restore the CMS from the latest CMS maintenance backups. This restore loads the CMS data up to the time of the last CMS backup.

Installing Additional SCSI Hard Disk Drives - Disk 2 (One System Disk)

This section describes how you install additional SCSI Hard Disk Drives to expand the capacity of your *Sun SPARCserver* computer.

Adding 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. Power down your system using the following sequence:
 - a. *Sun SPARCserver* computer (system unit).
 - b. *Sun SBus Expansion Subsystem*.
 - c. System monitor.
 - d. Continue turning off each device moving away from the system unit.
 - e. External drive units, starting with the unit closest to the system unit.
3. Install disk 2 into the *Sun SPARCserver* computer.

See the "Installing the Internal Hard Disk Drives (Sun SPARCserver 5 and 20 only)" section in Appendix D, "*Sun SPARCserver* Computer Factory Installation Procedures."

4. Power the system up using the following sequence:
 - a. Devices connected to the SBus Expansion Subsystem

Note

Remember to power on the SCSI devices starting with the device at the end of the SCSI chain, and work your way down to the *Sun SPARCserver* computer.

- b. Devices attached to the *Sun SPARCserver*
- c. *Sun SBus Expansion Subsystem*
- d. *Sun SPARCserver* computer (system unit)
- e. Monitor.

5. Enter **Stop** **A**. The system responds:

```
<#0> ok
```

6. To verify that all of the devices are included, 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.

7. Enter the following command, and press **Return**:

```
<#0> 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/rdisk/c0t1d0s0: is clean
/dev/rdisk/c0t3d0s5: is clean
/dev/rdisk/c0t2d0s0: is clean    ***if c0t2d0 is already in system***
/dev/rdisk/c0t1d0s1: is clean
/dev/rdisk/c0t1d0s3: is clean
/dev/rdisk/c0t1d0s4: is clean
/dev/rdisk/c0t2d0s0 mounted    ***if c0t2d0 is already in system***
/dev/rdisk/c0t1d0s3 mounted
/dev/rdisk/c0t1d0s1 mounted
/dev/rdisk/c0t3d0s5 mounted
/dev/rdisk/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*, and press **Return**. 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
#
```

Formatting Disk 2

To format the disks, do the following steps:

1. At the system prompt, enter the following command, and press **Return**:

```
# 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):
```

2. Enter the disk number for disk c0t1d0 (for example, 0), and press **Return**:

```
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
24 minutes (estimated). Continue?
```

4. To continue formatting, enter y. The system responds:.

```
Beginning formatting. The current time is <date>.
Formatting...
```

5. Wait approximately 1 hour for a 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 = 0x6ab6db60  
Total of 0 defective blocks repaired.  
format>
```

You can now partition the disk.

Partitioning Disk 2

To partition the disks, do the following steps:

1. At the `format>` prompt, enter the command, and press **Return**:

```
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>
```

- At the `partition>` prompt, enter the print command to check the default partition table.

```
partition> print
```

The system displays the default partition table.

- Change the partitions to match Table 8-7.

Table 8-7: Internal Disk 2 (c0t1d0) - Partitioning Information

If equipped RAM (in MB) is:		Slice	Partition	Size (Cylinders)
more than	but less than or equal to			
0	96	0	/cms1	2036
		2	overlap	default
96	160	0	/cms1	1776
		1	swap	260
		2	overlap	default
160	224	0	/cms1	1516
		1	swap	520
		2	overlap	default
224	288	0	/cms1	1256
		1	swap	780
		2	overlap	default
288	352	0	/cms1	996
		1	swap	1040
		2	overlap	default
352	416	0	/cms1	736
		1	swap	1300
		2	overlap	default
416	512	0	/cms1	476
		1	swap	1560
		2	overlap	default

4. At the `partition>` prompt, enter the `print` command to verify that the partition table is accurate.

```
partition> print
```

5. At the `partition>` prompt, enter the `name` menu option, and press **Return**:

```
partition> name
```

6. Enter `"cms1"` as the `<table name>`, and press **Return**:

```
partition> name
Enter <table name> (remember quotes): "cms1"
```

7. At the `partition>` prompt, enter the `label` menu option, and press **Return**:

```
partition> label
```

8. To label the disk, enter **y** at the message prompt:

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

9. To exit the partition menu, enter **q** at the `partition>` prompt and **q** at the `format>` prompt. The program responds:

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

Constructing a New File System Disk 2

See the "Constructing a New File System" section on page 8-68 of this chapter.

Mounting the File System Disk 2

See the "Mounting the File System" section on page 8-69 of this chapter.

Setting Up the Swap Space Disk 2

After 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 the `/etc/vfstab` file is correct using 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
```

Installing Additional SCSI Hard Disk Drives - Disk 3 through 12 (One System Disk)

This section describes how you install additional SCSI Hard Disk Drives to expand the capacity of your *Sun SPARCserver* computer.

Adding 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 Chapter 3, "Installing the *Sun SPARCserver* Computer," for more information.

3. Power down your system using the following sequence:
 - a. *Sun SPARCserver* computer (system unit).
 - b. *Sun SBus Expansion Subsystem*.
 - c. System monitor.
 - d. Continue turning off each device moving away from the system unit.
 - e. External drive units, starting with the unit closest from the system unit.
4. Install the first additional FSBE/S card in the next available SBus slot. See Appendix D, "Sun SPARCserver Computer Factory Installation Procedures", for information on filling SBus slots.

Note

You only need to install additional FSBE/S cards when you have reached the CMS limit on the number of hard disks per SCSI controller. This limit is 4 for systems with one system disk and 3 for systems with two system disks. See the "Disk Recovery Overview" section of this chapter 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 "Connecting External SCSI Devices" section in Chapter 3, "Installing the *Sun SPARCserver* Computer," for details.
8. Connect a SCSI terminator to the last SCSI device in each chain.
See the "Connecting External SCSI Devices" in Chapter 3, "Installing the *Sun SPARCserver* Computer," for details.
9. Power the system up using the following sequence:

- a. Devices connected to the SBus Expansion Subsystem

Note

Remember to power on the SCSI devices starting with the device at the end of the SCSI chain, and work your way down to the *Sun SPARCserver* computer.

- b. Devices attached to the *Sun SPARCserver*
 - c. *Sun SBus Expansion Subsystem*
 - d. *Sun SPARCserver* computer (system unit)
 - e. Monitor.
10. Enter **Stop** **A**. The system responds:

```
<#0> ok
```

11. To verify that all of the devices are included, enter the following command:

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

The program responds:

```
/iommu@f,e00000000/sbus@f.e0001000/esp@3,200000
Target 6
  Unit 0 Disk Removable Read Only Device SONY CD-ROM CDU-8012

/iommu@f,e00000000/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.

12. Enter the following command, and press **Return**:

```
<#0> 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/rdisk/c0t1d0s0: is clean
/dev/rdisk/c0t3d0s5: is clean
/dev/rdisk/c0t2d0s0: is clean      ***if c0t2d0 is already in system***
/dev/rdisk/c0t1d0s1: is clean
/dev/rdisk/c0t1d0s3: is clean
/dev/rdisk/c0t1d0s4: is clean
/dev/rdisk/c0t2d0s0 mounted      ***if c0t2d0 is already in system***
/dev/rdisk/c0t1d0s3 mounted
/dev/rdisk/c0t1d0s1 mounted
/dev/rdisk/c0t3d0s5 mounted
/dev/rdisk/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:

```

13. Log in as *root*, and press **Return**. 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
#

```

Formatting Disks

To format the disks, do the following steps:

1. At the system prompt, enter the following command, and press

Return:

```
# 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 exact disk and associated number.

2. Enter the disk number you want to add (for example, 3), and press

Return:

```
Specify disk (enter its number): 3
```


See Table 8-8 for additional information:

Table 8-8: Formatting Disks - Partitioning Information

Device	Disk	Slice	File System	Cylinders (2 Gbyte Disk)	Cylinders (1 Gbyte Disk)
c0t2d0s0	3	0	/cms2	2733	2036
c0t0d0s0	4	0	/cms3	2733	2036
c1t1d0s0	5	0	/cms4	2733	2036
c1t2d0s0	6	0	/cms5	2733	2036
c1t3d0s0	7	0	/cms6	2733	2036
c1t4d0s0	8	0	/cms7	2733	2036
c2t1d0s0	9	0	/cms8	2733	2036
c2t2d0s0	10	0	/cms9	2733	2036
c2t3d0s0	11	0	/cms10	2733	2036
c2t4d0s0	12	0	/cms11	2733	2036

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
24 minutes (estimated). Continue?
```

4. To continue formatting, enter `y`. The system responds:.

```
Beginning formatting. The current time is <date>.
Formatting...
```

5. Wait approximately 1 hour for a 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 = 0x6ab6db60
Total of 0 defective blocks repaired.
format>
```

You can now partition the disk.

Partitioning Disks

To partition the disks, do the following steps:

1. At the `format>` prompt, enter the command, and press **Return**:

```
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 menu option 0, and press **Return**:

partition> 0

The system responds:

Enter partition id tag [usr]:

3. Press **Return**.

The system responds:

Enter partition permission flags [wm]:

4. Press **Return**.

The system responds:

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

5. Press **Return**.

For example, the system responds:

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

6. Enter the size of the partition, and press **Return**:

```
Enter partition size [205632b, 204c, 100.41mb]:  
2036c (1 gbyte disk)  
2733c (2 gbyte disk)
```

The system responds with the `partition>` prompt.

7. At the `partition>` prompt, enter the menu option 1, and press **Return**:

```
partition> 1
```

8. Default the id tag, permission flags, and starting cylinder value. See Steps 2-4 for an example.

9. Enter the size of the partition (0c), and press **Return**:

```
Enter size of partition '1' [133056, 132c, 64.9mb]: 0mb
```

10. At the `partition>` prompt, enter the name menu option, and press **Return**:

```
partition> name
```

11. Enter the `<table name>`, and press **Return**:

```
partition> name
Enter <table name> (remember quotes): "cms4"
```

Note

The file system name (for example, "cms4") will vary depending on which disk you are adding.

12. At the `partition>` prompt, enter the label menu option, and press **Return**:

```
partition> label
```

13. To label the disk, enter **y** at the message prompt:

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

14. Repeat the above partitioning procedure for each disk that you are adding. The system responds:

```
partition>
```

15. To exit the partition menu, enter **q** at the `partition>` prompt and **q** at the `format>` prompt. The program responds:

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

Constructing a New File System

To construct a new file system, do the following:

1. Enter the following command at the system prompt, and press

Return:

```
# newfs /dev/rdisk/c1t1d0s0
```

Note

The name of the device (for example, c1t1d0s0) will vary depending on the disk you added.

The system responds:

```
# newfs /dev/rdisk/c1t1d0s0
newfs: construct a new file system /dev/rdisk/c1t1d0s0: (y/n)?
```

2. At the message prompt, answer **Y**. The system responds:

```
/dev/rdisk/c1t1d0s0: ...
.
.
.
#
```

3. Repeat the above new file system procedure for each disk that you are adding; then, mount the file system.

Mounting the File System

To mount the file system, do the following steps:

1. To store the file system information into the `/etc/vfstab` file, at the system prompt use an editor (for example, `vi`) to enter the following command, and press **Return**:

```
#vi /etc/vfstab
```

The program responds:

```
<contents of the file is displayed>
```

```
.  
.
.
```

2. Edit the `/etc/vfstab` file:

- a. Add the following line to the `/etc/vfstab` file:

```
/dev/dsk/c1t1d0s0 /dev/rdisk/c1t1d0s0 /cms4  
ufs <nn> yes
```

Note

The above example is for `cms4` (5th disk). The string `/dev/dsk/c1t1d0s0 /dev/rdisk/c1t1d0s0 /cms4 ufs nn yes` - the entry will vary depending on the disk you added. `<nn>` represents the next numbers in the mount sequence. See Table 8-9 for mount sequence numbers.

- b. To exit the `/etc/vfstab` file, press **Shift**, **Z**, **Z**.

3. Make a new directory (`mkdir`) for each new disk added to the *Sun SPARCserver* computer. At the system prompt, enter the following command, and press **Return**:

```
# mkdir /cms4
```

Note

The above example is for `cms4` (5th disk). The `mkdir` command you enter will vary depending on the disk you added. To make a directory for other disks, see Table 8-9.

For example:

Table 8-9: Make Directory for SCSI Disks

Disk	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
/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

4. Enter the `mountall` command, and press **Return**:

```
# 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 8-10 for other disk possibilities.

For example, messages containing the following file system information are displayed:

Table 8-10: Mount File System for SCSI Disks

Disk	Description
/dev/dsk/c0t1d0s0 /cms1	***for 2nd disk on (c0)***
/dev/dsk/c0t2d0s0 /cms2	***for 3rd disk on (c0)***

Table 8-10: Mount File System for SCSI Disks (Contd)

Disk	Description
/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)***
/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 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/c1t1d0s0
or
# umount /cms4
```

- Repeat the mount procedures described in steps 1-4.
5. To display how the disks are allocated (in kilobytes) for a successful mount, enter the following command, and press **Return**:

```
# df -k
```

The system responds:

Filesystem	kbytes	used	avail	capacity	Mounted on
/dev/dsk/c0t3d0s0	17300	-	-	-	/
/dev/dsk/c0t3d0s6	129600	-	-	-	/usr
/proc	0	0	0	0%	/proc
fd	0	0	0	0%	/dev/fd
/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

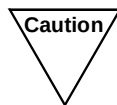
Note

Disk for /cms2 through /cms11 are only mounted if they are installed.

Recovering from Disk Corruption (Two System Disks)

This section provides information about file system restore procedures and explains how to recover CMS databases after disk corruption occurs.

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 (Two System Disks)" section in this chapter for details.



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 a corruption on the first disk
 - Recovering from a corruption on the second disk
 - Recovering from a corruption on the third through ninth disks.
- When the CMSADM backup is **not** available
 - Recovering from a corruption on the first disk
 - Recovering from a corruption on the second disk
 - Recovering from a corruption on the third through ninth disks.

Restoring Disk(s) — CMSADM Backup 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 CMS data from the latest 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 Table 8-11 to determine how the data is stored on the first disk

If a CMSADM backup is available, do the following:

- Restore the file systems
- Restore the CMS data.

Table 8-11: First Internal Disk - Partitioning Information

Device	Disk	Slice	File System	Size (MB)
c0t3d0s0	1	0	/	20
c0t3d0s1	1	1	swap	516
c0t3d0s5	1	5	/opt	100
c0t3d0s6	1	6	/usr	150
c0t3d0s7	1	7	/var	Remainder

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?/*"...>
```

Note

All systems are shipped with one or more tape drives (QIC-150, 5-GB, and/or a 14-GB). For systems with multiple tape drives, the QIC-150 is the first drive on the SCSI chain. For quicker backups (1 hour versus several hours), we recommend using the 5- or 14-GB tape drive.

`/dev/rmt/0` indicates the first tape drive in the SCSI chain

`/dev/rmt/1` indicates the second tape drive in the SCSI chain

`/dev/rmt/0c` indicates the first tape drive in the SCSI chain in compressed mode (only the 14-GB tape drive can support compressed mode)

`/dev/rmt/1c` indicates the second tape drive in the SCSI chain in compressed mode

You will likely get four error messages concerning the `/home` directory. The errors are printed when the directory is already present. If these errors are displayed, ignore them.

You must substitute the `<"/cms?/*"...>` portion of the `cpio` command with `"/cms1/*"`, `"/cms2/*"`, `"/cms3/*"` and so on for the third through ninth disk. For example, use `"/cms1/*"` for disk 3, use `"/cms2/*"` for disk 4, etc. Refer to Table 8-13 "Additional External Disks — Partitioning Information" in the "Recovering from Disk Corruption (Two System Disks) — Third Through Ninth Disks."

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. After the first disk is restored, you should reboot the system via the following system command:

```
# init 6
```

7. Restore the CMS from the latest CMS maintenance backups. See the "Performing a CMS Maintenance Restore" section in this chapter.

Second Disk

Use the procedures in this section to restore the second disk when a CMSADM backup is available. Refer to Table 8-12 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 CMS data.

Table 8-12: Second Internal Disk - Partitioning Information

Device	Disk	Slice	File System	Size (MB)
c0t1d0s0	2	0	/usr/dbtemp	100
c0t1d0s1	2	1	/export/home	100
c0t1d0s3	2	3	/dump	516
c0t1d0s4	2	4	/cms	Remainder

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 command at the system prompt:

```
# 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

Enter the above `cpio` command all on one line. The `cpio` command for restoring the second disk uses the `-icmud` portion of the command string, instead of `-icmudf`.

4. Verify that the CMS data is accessible (via `cmsql`) and resolve any problems before proceeding.
5. Restore the CMS from the latest CMS maintenance backups. See "Performing a CMS Maintenance Restore" section in this chapter.

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 8-13 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 CMS data.

Table 8-13: Additional External Disks - Partitioning Information

Device	Disk	Slice	File System	Size (MB) 1-GB Disk	Size (MB) 2-GB Disks
c0t2d0s0	3	0	/cms1	1002	2028
c1t1d0s0	4	0	/cms2	1002	2028
c1t2d0s0	5	0	/cms3	1002	2028
c1t3d0s0	6	0	/cms4	1002	2028
c3t1d0s0	7	0	/cms5	1002	2028
c3t2d0s0	8	0	/cms6	1002	2028
c3t3d0s0	9	0	/cms7	1002	2028

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 command at the system prompt:

```
# cpio -icmud -C 10240 -I <device name> -M "Please remove the
current tape, insert tape number %d, and press ENTER"
"/cms?/*"
```

Note

All systems are shipped with one or more tape drives (QIC-150, 5-GB, and/or a 14-GB). For systems with multiple tape drives, the QIC-150 is the first drive on the SCSI chain. For quicker backups (1 hour versus several hours), we recommend using the 5- or 14-GB tape drive.

/dev/rmt/0 indicates the first tape drive in the SCSI chain

/dev/rmt/1 indicates the second tape drive in the SCSI chain

/dev/rmt/0c indicates the first tape drive in the SCSI chain in compressed mode (only the 14-GB tape drive can support compressed mode)

/dev/rmt/1c indicates the second tape drive in the SCSI chain in compressed mode

You must substitute the "?" on the cpio command line for the number corresponding to 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 8-13, "Additional External Disks - Partitioning Information" in the "Recovering from Disk Corruption (Two System Disks — Third Through Ninth Disks" section.

4. Verify that the CMS data is accessible (via cmsql) and resolve any problems before proceeding.
5. Restore the CMS from the latest CMS maintenance backups. See "Performing a CMS Maintenance Restore" section in this chapter.

See Chapter 12, "Maintenance," in the *Call Management System R3V2 Administration* (AT&T 585-215-523) document for more information.

Restoring Disk(s) — No CMSADM Backup 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 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 data base 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, 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 Appendix D, "Sun SPARCserver Computer Factory Installation Procedures", for details.

Note

When *Solaris* is reinstalled, your system will be partitioned to use one system disk.

2. Run setup. See Chapter 6, "Setting Up CMS and Installing Feature Packages", for details.
3. Restore CMS data from the CMS Maintenance backup. See the "Performing a CMS Maintenance Restore" section in this chapter.
4. Administer Terminals, Printers, Users, etc. as needed. See Chapter 4, "Installing Terminals, Printers, and Modems" for details.

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 `pkgrm cms` command. See Chapter 10, "Upgrading or Updating the CMS Software" for details.
2. Install the *cms* package using the `pkgadd cms` command. See Chapter 10, "Upgrading or Updating the CMS Software" for details.
3. Run setup. See Chapter 6, "Setting Up CMS and Installing Feature Packages" for details.
4. Restore CMS data from the CMS backup. See the "Performing a CMS Maintenance Restore" section in this chapter.

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 Chapter 6, "Setting Up CMS and Installing Feature Packages" for details.
2. Restore the CMS data from the CMS backup. See the "Performing a CMS Maintenance Restore" section in this chapter.

Restoring All Disks and File Systems

To do a complete file system restore, enter the following command at the system prompt:

```
# cpio -icmud -C 10240 -I <device name> -M "Please remove the  
current tape, insert tape number %d, and press ENTER"
```

Restoring Specific Files

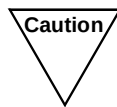
To restore specific files, enter the following command at the system prompt:

```
# cpio -icmud -C 10240 -I <device name> -M "Please remove the  
current tape, insert tape number %d, and press ENTER"  
<full_path_name>
```

Recovering from a Disk Crash (Two System Disks)

This section provides information about file system restore procedures, and explains how to recover CMS databases after a disk crash occurs.

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)" section in this chapter for details.



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 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.

See the "Installing Additional SCSI Hard Disk Drives (Two System Disks)" section in this chapter or Appendix D, "Sun SPARCserver Computer Factory Installation Procedures", for details about partitioning disks and how to reinstall *Solaris* software package.

Recovering Disk(s) — CMSADM Backup Available

If a CMSADM backup is available, then the number of tasks required to restore 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
- Restore the file systems
- Restore the 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.
3. To stop the boot procedure, press the **Stop** and **A** keys simultaneously from the keyboard after the display console banner appears, but before the system starts booting the operating system (referred to as power-cycling the system). The system responds with the ok prompt.
4. At the ok prompt, enter the following command:

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

The system displays a list of all the SCSI devices.

5. Verify that the first disk is displayed as `c0t3d0`.

Note

If the disk device number is not displayed, then it was not installed correctly.

6. Reinstall *Solaris* software package. See "Bootting from the Solaris 2.4 CD-ROM" section in Appendix D for details.

Note

When reinstalling *Solaris*, you must configure all disks. Your system will be partitioned to use one system disk.

7. After *Solaris* 2.4 operating system is installed and the system has rebooted, log in as *root*.
8. 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.

9. Log in as *root*.
10. Insert the first backup tape.
11. To restore file systems on all disks, enter the following command:

```
# cpio -icmudf -C 10240 -I <device name> -M "Please remove the
current tape, insert tape number %d, and press ENTER"
"/etc/vfstab" "/etc/mnttab" "/dev/dsk/*" "/dev/rdisk/*"
"/dev/sd*" "/dev/rsd*" "/devices/*esp*" "export/home"
"/usr/dbtemp"
```

Note

All systems are shipped with one or more tape drives (QIC-150, 5-GB, and/or a 14-GB). For systems with multiple tape drives, the QIC-150 is the first drive on the SCSI chain. For quicker backups (1 hour versus several hours), we recommend using the 5- or 14-GB tape drive.

`/dev/rmt/0` indicates the first tape drive in the SCSI chain

`/dev/rmt/1` indicates the second tape drive in the SCSI chain

`/dev/rmt/0c` indicates the first tape drive in the SCSI chain in compressed mode (only the 14-GB tape drive can support compressed mode)

`/dev/rmt/1c` indicates the second tape drive in the SCSI chain in compressed mode

You will likely get four error messages concerning the `/home` directory. The errors are printed when the directory is already present. If these errors are displayed, ignore them.

12. After you restore the first disk, sync the file systems by entering the following commands:

```
# sync
```

13. To shutdown the machine, enter the following command:

```
# init 0
```


14. To reboot the machine, enter the following command at the ok prompt:

```
ok> boot -r
```

15. Login as *root*.
16. Restore CMS data from the 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.
- Recreate the file systems.
- Restore the file systems.
- Restore the 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.
3. To stop the boot procedure, press the **Stop** and **A** keys simultaneously from the keyboard after the display console banner appears, but before the system starts booting the operating system (referred to as power-cycling the system). The system responds with the ok prompt.
4. At the ok prompt, enter the following command:

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

The system displays a list of all the SCSI devices.

5. Verify that the second disk is displayed as `c0t1d0`.

Note If the disk device number is not displayed, then it was not installed correctly.

6. Boot the system:

```
ok> boot
```

The system displays instructions/questions during reboot and prompts you to run the `fsck` command on the missing file systems. This occurs because the system is configured to have file systems on the second disk and the system does not find the file systems.

7. At each prompt that asks you to enter the `fsck` command for the missing file systems, enter `exit` to continue booting.
8. After the machine is booted, log in as *root*.
9. 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 own records.
10. To format the disk, see the “Installing Additional SCSI Hard Disk Drives (Two System Disks) — Formatting Disks” section in this chapter for procedures. The device name should be `c0t1d0`.

Note Formatting the disk takes approximately 1 hour to complete.

11. 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 the following partitions: 0, 1, 3, and 4. Default all values except for the size data entry field. For size, enter the following values: 100mb, 100mb, 516mb and 579c. See Table 8-12 on page 8-77 and the "Partitioning Disks" section in this chapter for examples.
- 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.

12. Use the "Installing Additional SCSI Hard Disk Drives (Two System Disks) — Constructing a New File System" 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/rdisk/c0t1d0s0
# newfs /dev/rdisk/c0t1d0s1
# newfs /dev/rdisk/c0t1d0s3
# newfs /dev/rdisk/c0t1d0s4
```

For each command you enter, the system responds with the following question:

```
news: construct a new file system /dev/rdisk/<device>:(y/n)?
```

- b. Each time the message prompt appears, enter ☐Y.
13. To mount all file systems on the second disk, enter the following command:

```
# mountall
```

The system displays all the file systems mounted.

Note

Because the file systems were not created when the boot occurred, the file systems on the second disk are not mounted. Since the system was originally created with the file systems, they are contained in the */etc/vfstab* file.

14. To verify all file systems mounted properly, check the displayed response and resolve any problems.
15. To set the permissions on */usr/dbtemp* directory, enter the following command:

```
# chmod 777 /usr/dbtemp
```

The system prompt is displayed.

16. To ensure that the system initializes cleanly, reboot the system:

```
# init 6
```

17. Log in as *root*.
18. To restore the file systems on the second disk, enter the following command:

```
# 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/*"
```

19. Restore CMS data from the CMS backup.
20. 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
- Recreate the file system
- Restore the file system
- Restore the CMS data.

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.
3. To stop the boot procedure, press the **Stop** and **A** keys simultaneously from the keyboard after the display console banner appears, but before the system starts booting the operating system (referred to as power-cycling the system). The system responds with the ok prompt.
4. At the ok prompt, enter the following command:

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

The system displays a list of all the SCSI devices.

5. Verify that the replaced disk is displayed. See Table 8-13 on page 8-78.

Note

If the disk device number is not displayed, then it was not installed correctly.

6. Boot the system:

```
ok> boot
```

Note

The system displays one or two instructions/questions for each disk being replaced during the reboot. The instructions/questions concern running the `fsck` command on the missing file systems. This occurs because the system is configured to have one file system on the third through ninth disks and the system does not find the file systems.

7. At each prompt that asks you to enter the `fsck` command for the missing file systems, enter `exit` to continue booting.
8. Log in as *root*.
9. 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 own records.
10. To format the disk, see the “Installing Additional SCSI Hard Disk Drives (Two System Disks) — Formatting Disks” section in this chapter for procedures. See Table 8-13 on page 8-78 for device names.

Note

Formatting the disk takes approximately 1 hour to complete.

11. 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 the 0 partition. Default all values except for the size data entry field. For size, enter `1002mb` (1-GB disk) or `2028mb` (2-GB disk).
 - c. At the `partition>` prompt, enter the following command to verify 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`.
12. To make a file system for the partition, enter the following command:

```
# newfs /dev/rdisk/<device>
```

See Table 8-13 on page 8-78 for the `<device>`. For each command you enter, the system responds with the following question:

```
news: construct a new file system /dev/rdisk/<device>:(y/n)?
```


Each time the message prompt appears, enter .

Note

Because the file system was not created when the boot occurred, the file system on the new disk is not mounted. Since the system was originally created with the file system, the file system entry is contained in the */etc/vfstab* file.

13. To mount the file system on the new disk, enter the following command:

```
# mountall
```

The system displays all the file systems mounted.

14. To verify all file systems mounted properly, check the displayed response and resolve any problems.
15. To ensure that the system initializes cleanly, reboot the system:

```
# init 6
```

16. Log in as *root*.
17. To restore the file systems on the new disk, enter the following command:

```
# cpio -icmud -C 10240 -I <device name> -M "Please remove the  
current tape, insert tape number %d, and press ENTER"  
"/cms?/*"
```

Note

All systems are shipped with one or more tape drives (QIC-150, 5-GB, and/or a 14-GB). For systems with multiple tape drives, the QIC-150 is the first drive on the SCSI chain. For quicker backups (1 hour versus several hours), we recommend using the 5- or 14-GB tape drive.

`/dev/rmt/0` indicates the first tape drive in the SCSI chain

`/dev/rmt/1` indicates the second tape drive in the SCSI chain

`/dev/rmt/0c` indicates the first tape drive in the SCSI chain in compressed mode (only the 14-GB tape drive can support compressed mode)

`/dev/rmt/1c` indicates the second tape drive in the SCSI chain in compressed mode

You must substitute the “?” on the `cpio` command line for the number corresponding to 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 8-13, “Additional External Disks - Partitioning Information” in the “Recovering from Disk Corruption (Two System Disks) — Third Through Ninth Disks” section.

18. Restore CMS data from the CMS backup.
19. Restart any stopped jobs. See Step 8.

Recovering Disk(s) — No CMSADM Backup 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 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 data base 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, 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 CMS software
- Run setup
- Restore the 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.
3. To stop the boot procedure, press the **Stop** and **A** keys simultaneously from the keyboard after the display console banner appears, but before the system starts booting the operating system (referred to as power-cycling the system). The system responds with the ok prompt.
4. At the ok prompt, enter the following command:

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

The system displays a list of all SCSI devices.

5. Verify that the first disk is displayed as `c0t3d0`.

Note If the disk device number is not displayed, then it was not installed correctly.

6. Reinstall *Solaris* operating system, all add-on packages, patches, and cms. See Appendix D, "Sun SPARCserver Computer Factory Installation Procedures", for details.

Note When you reinstall *Solaris*, your system will be partitioned to use one system disk.

7. Run setup. See Chapter 6, "Setting Up CMS and Installing Feature Packages" for details.
8. Restore CMS data from the CMS backup. See the "Performing a CMS Maintenance Restore" in this chapter for details.
9. Administer Terminals, Printers, Users, etc. as needed. See Chapter 4, "Installing Terminals, Printers, and Modems", 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
- Recreate the file systems
- Remove the CMS package
- Install the CMS software
- Run setup
- Restore the 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.
3. To stop the boot procedure, press the **Stop** and **A** keys simultaneously from the keyboard after the display console banner appears, but before the system starts booting the operating system (referred to as power-cycling the system). The system responds with the ok prompt.
4. At the ok prompt, enter the following command:

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

The system displays a list of all the SCSI devices.

5. Verify that the second disk is displayed as c0t1d0.

Note

If the disk device number is not displayed, then it was not installed correctly.

6. Boot the system:

```
ok> boot
```

The system displays five instructions/questions during reboot and prompts you to run the fsck command on the missing file systems. This occurs because the system is configured to have four file systems on the second disk, and the system does not find the file systems.

7. At each prompt that asks you to enter the fsck command for the missing file systems, enter exit to continue booting.
8. 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 own records.
9. To format the disk, see the “Installing Additional SCSI Hard Disk Drives (Two System Disks) — Formatting Disks” section in this chapter for procedures. The device name should be c0t1d0.

Note

Formatting the disk takes approximately 1 hour to complete.

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 the following partitions: 0, 1, 3, and 4. Default all values except for the size data entry field. For size, enter the following values: 100mb, 100mb, 516mb and 579c. See Table 8-12 on page 8-77 and the "Partitioning Disks" section in this chapter for examples.
- c. At the `partition>` prompt, enter the following command to verify 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 file systems for all partitions, enter the following commands:

```
# newfs /dev/rdisk/c0t1d0s0
# newfs /dev/rdisk/c0t1d0s1
# newfs /dev/rdisk/c0t1d0s3
# newfs /dev/rdisk/c0t1d0s4
```

For each command you enter, the system responds with the following question:

```
news: construct a new file system /dev/rdisk/<device>:(y/n)?
```

Each time the message prompt appears, enter ☐Y.

Note

Because the file systems were not created when the boot occurred, the file systems on the second disk are not mounted. Since the system was originally created with the file systems, they are contained 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 all file systems mounted properly, check the displayed response and resolve any problems.
14. Remove the *cms* package using the `pkgrm cms` command. See Chapter 10, "Upgrading or Updating the CMS Software", for details.
15. Install CMS using the `pkgadd cms` command. See the Chapter 10, "Upgrading or Updating the CMS Software", for procedure details.

16. Run setup. See Chapter 6, "Setting Up CMS and Installing Feature Packages", for details.
17. Restore CMS data from the CMS backup. See the "Performing a CMS Maintenance Restore" section in this chapter for details.

Third Through Ninth Disks

This section describes the procedures for replacing the third through ninth disks:

- Reformat the disk
- Repartition the disk
- Recreate the file system
- Rerun setup
- Restore the 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.
3. To stop the boot procedure, press the **Stop** and **A** keys simultaneously from the keyboard after the display console banner appears, but before the system starts booting the operating system (referred to as power-cycling the system). The system responds with the ok prompt.
4. At the ok prompt, enter the following command:

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

The system displays a list of all the SCSI devices.

5. Verify that the replaced disk is displayed. See Table 8-13 on page 8-78.

Note

If the disk device number is not displayed, then it was not installed correctly.

6. Boot the system:

```
ok> boot
```

Note

The system displays one or two instructions/questions for each disk being replaced during the reboot. The instructions/questions concern running the `fsck` command on the missing file systems. This occurs because the system is configured to have one file system on the third through ninth disks, and the system does not find the file systems,

7. At each prompt that asks you to enter the `fsck` command for the missing file systems, enter `exit` to continue booting.
8. After the machine is booted, log in as *root*.
9. 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 own records.
10. To format the disk, see the “Installing Additional SCSI Hard Disk Drives (Two System Disks) — Formatting Disks” section in this chapter for procedures. See Table 8-13 on page 8-78 for device names.

Note

Formatting the disk takes approximately 1 hour to complete.

11. 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 the following partitions: 0. Default all values except for the size data entry field. For size, enter the following values: `1002mb` (1-GB disk) or `2028mb` (2-GB disk).
- c. At the `partition>` prompt, enter the following command to verify 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 .
 - f. To quit the partition submenu, enter .
 - g. To quit the format program, enter .
12. To make a file system for the partition, enter the following command:

```
# newfs /dev/rdisk/<device>
```

See Table 8-13 on page 8-78 for `<device>`. For each command you enter, the system responds with the following question:

```
news: construct a new file system /dev/rdisk/<device>:(y/n)?
```

Each time the message prompt appears, enter .

Note

Because the file systems were not created when the boot occurred, the file systems on the new disk are not mounted. Since the system was originally created with the file systems, they are contained in the */etc/vfstab* file.

13. To mount all file systems on the new disk, enter the following command:

```
# mountall
```

The system displays all the file systems mounted.

14. To verify all file systems mounted properly, check the displayed response, and resolve any problems.
15. To ensure that the system initializes cleanly, reboot the system:

```
# init 6
```

16. Log in as *root*.
17. Run setup.
18. Restore CMS data from the CMS backup. See "Performing a CMS Maintenance Restore" in this chapter for details.

Recovering 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 CMS database:

1. Rerun the set up option on the CMSSVC menu. This reinitializes (removes and creates) all the CMS INFORMIX database tables. See Chapter 6, "Setting Up CMS and Installing Feature Packages", for information about setting up CMS.
2. Restore the CMS from the latest CMS maintenance backups. This restore loads the CMS data up to the time of the last CMS backup.

Installing Additional SCSI Hard Disk Drives (Two System Disks)

This section describes how you install additional SCSI Hard Disk Drives to expand the capacity of your *Sun SPARCserver* computer.

Adding 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. Refer to "Identifying Installed SBus Cards" section in Chapter 3, "Installing the *Sun SPARCserver* Computer," for more information.

3. Power down your system using the following sequence:
 - a. *Sun SPARCserver* computer (system unit).
 - b. *Sun SBus Expansion Subsystem*.
 - c. System monitor.
 - d. Continue turning off each device moving away from the system unit.
 - e. External drive units, starting with the unit closest from the system unit.
4. Install the first additional FSBE/S card in the next available SBus slot. See Appendix D, "Sun SPARCserver Computer Factory Installation Procedures", for information on filling SBus Slots.

Note

You only need to install additional FSBE/S cards when you have reached the CMS limit on the number of hard disks per SCSI controller. This limit is 4 for systems with one system disk and 3 for systems with two system disks. See the "Disk Recovery Overview" section of this chapter 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 "Connecting External SCSI Devices" section in Chapter 3, "Installing the *Sun SPARCserver* Computer," for details.
8. Connect a SCSI terminator to the last SCSI device in each chain.
See the "Connecting External SCSI Devices" in Chapter 3, "Installing the *Sun SPARCserver* Computer," for details.
9. Power the system up using the following sequence:
 - a. Devices connected to the SBus Expansion Subsystem

Note

Remember to power on the SCSI devices starting with the device at the end of the SCSI chain, and work your way down to the *Sun SPARCserver* computer.

- b. Devices attached to the *Sun SPARCserver* computer
 - c. *Sun SBus Expansion Subsystem*
 - d. *Sun SPARCserver* computer (system unit)
 - e. Monitor.
10. Enter **Stop** **A**. The system responds:

```
<#0> ok
```

11. To verify that all of the devices are included, 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.

12. Enter the following command, and press **Return**:

```
<#0> 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/rdisk/c0t1d0s0: is clean
/dev/rdisk/c0t3d0s5: is clean
/dev/rdisk/c0t2d0s0: is clean    ***if c0t2d0 is already in system***
/dev/rdisk/c0t1d0s1: is clean
/dev/rdisk/c0t1d0s3: is clean
/dev/rdisk/c0t1d0s4: is clean
/dev/rdisk/c0t2d0s0 mounted    ***if c0t2d0 is already in system***
/dev/rdisk/c0t1d0s3 mounted
/dev/rdisk/c0t1d0s1 mounted
/dev/rdisk/c0t3d0s5 mounted
/dev/rdisk/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:

```

13. Log in as *root*, and press **Return**. 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
#

```

Formatting Disks

To format the disks, do the following steps:

1. At the system prompt, enter the following command, and press

Return:

```
# 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 exact disk and associated number.

2. Enter the disk number you want to add (for example, 3), and press

Return:

```
Specify disk (enter its number): 3
```

See Table 8-14 for additional information:

Table 8-14: Formatting Disks - Partitioning Information

Device	Disk	Slice	File System	Size (MB)	
				1 GB Disk	2 GB Disk
c0t2d0s0	3	0	/cms1	1002	2028
c1t1d0s0	4	0	/cms2	1002	2028
c1t2d0s0	5	0	/cms3	1002	2028
c1t3d0s0	6	0	/cms4	1002	2028
c2t1d0s0	7	0	/cms5	1002	2028
c2t2d0s0	8	0	/cms6	1002	2028
c2t3d0s0	9	0	/cms7	1002	2028

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
24 minutes (estimated). Continue?
```

4. To continue formatting, enter `y`. The system responds:.

```
Beginning formatting. The current time is <date>.
Formatting...
```

5. Wait approximately 1 hour for a 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 = 0x6ab6db60
Total of 0 defective blocks repaired.
format>
```

You can now partition the disk.

Partitioning Disks

To partition the disks, do the following steps:

1. At the `format>` prompt, enter the command, and press **Return**:

```
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 menu option 0, and press **Return**:

partition> 0

The system responds:

Enter partition id tag [usr]:

3. Press **Return**.

The system responds:

Enter partition permission flags [wm]:

4. Press **Return**.

The system responds:

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

5. Press **Return**.

For example, the system responds:

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

6. Enter the size of the partition, and press **Return**:

```
Enter partition size [205632b, 204c, 100.41mb]: 1002mb 1-GB  
Disk) or 2028mb (2-GB Disk)
```

The system responds with the `partition>` prompt.

7. At the `partition>` prompt, enter the menu option 1, and press **Return**:

```
partition> 1
```

8. Default the id tag, permission flags, and starting cylinder value. See Steps 2-4 for an example.

9. Enter the size of the partition (0mb), and press **Return**:

```
Enter size of partition '1' [133056, 132c,64.9mb]: 0mb
```

10. At the `partition>` prompt, enter the name menu option, and press **Return**:

```
partition> name
```

11. Enter the `<table name>`, and press **Return**:

```
partition> name
Enter <table name> (remember quotes): "cms2"
```

Note

The file system name (for example, "cms2") will vary depending on which disk you are adding.

12. At the `partition>` prompt, enter the `label` menu option, and press **Return**:

```
partition> label
```

13. To label the disk, enter **y** at the message prompt:

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

14. Repeat the above partitioning procedure for each disk that you are adding. The system responds:

```
partition>
```

15. To exit the partition menu, enter **q** at the `partition>` prompt and **q** at the `format>` prompt. The program responds:

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

Constructing a New File System

To construct a new file system, do the following:

1. Enter the following command at the system prompt, and press

Return:

```
# newfs /dev/rdisk/c1t1d0s0
```

Note

The name of the device (for example, c1t1d0s0) will vary depending on the disk you added.

The system responds:

```
# newfs /dev/rdisk/c1t1d0s0
newfs: construct a new file system /dev/rdisk/c1t1d0s0: (y/n)?
```

2. At the message prompt, answer **Y**. The system responds:

```
/dev/rdisk/c1t1d0s0: ...
.
.
.
#
```

3. Repeat the above new file system procedure for each disk that you are adding; then, mount the file system.

Mounting the File System

To mount the file system, do the following steps:

1. To store the file system information into the `/etc/vfstab` file, at the system prompt use an editor (for example, vi) to enter the following command, and press **Return**:

```
#vi /etc/vfstab
```

The program responds:

```
<contents of the file is displayed>
```

```
.  
.
.
```

2. Edit the `/etc/vfstab` file:

- a. Add the following line to the `/etc/vfstab` file:

```
/dev/dsk/c1t1d0s0 /dev/rdisk/c1t1d0s0 /cms2  
ufs <nn> yes
```

Note

The above example is for `cms2` (4th disk). The string `/dev/dsk/c1t1d0s0 /dev/rdisk/c1t1d0s0 /cms2 ufs nn yes` - the entry will vary depending on the disk you added. `<nn>` represents the next numbers in the mount sequence. See Table 8-15 for mount sequence numbers.

- b. To exit the `/etc/vfstab` file, press **Shift**, **Z**, **Z**.

3. Make a new directory (`mkdir`) for each new disk added to the *Sun SPARCserver 20* computer. At the system prompt, enter the following command, and press **Return**:

```
# mkdir /cms2
```

Note

The above example is for `cms2` (4th disk). The `mkdir` command you enter will vary depending on the disk you added. To make a directory for other disks, see Table 8-15.

For example:

Table 8-15: Make Directory for SCSI Disks

Disk	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
/cms7	***for 3rd disk on (c2)***	16

4. Enter the `mountall` command, and press **Return**:

```
# 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 8-16 for other disk possibilities.

For example, messages containing the following file system information are displayed:

Table 8-16: Mount File System for SCSI Disks

Disk	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/c1t1d0s0
or
# umount /cms2
```

- Repeat the mount procedures described in steps 1-5.

5. To display how the disks are allocated (in kilobytes) for a successful mount, enter the following command, and press **Return**:

```
# 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/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

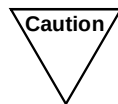
Disks for /cms2 through /cms7 are only mounted if they are installed.

Recovering System Space

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

Regaining System Space

When the amount of 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 recreated 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.



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

Reinitializing CMS

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

1. Reduce the amount of data saved.
 - a. Reduce the amount of historical data saved by making changes in the Data Storage Allocation window.
 - b. Reduce the amount of agent trace data saved by using the Agent Trace Record Contents screen.
2. Run the daily, weekly and/or monthly archiver for the following historical data:
 - Agent
 - Split
 - Trunk
 - Trunk Group
 - VDN
 - Vector
 - Call Work Codes.

The tables now contain the correct amount of data. When the archiver runs, it cleans up the data older than the new values you entered in Steps a and b. 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 week.

OR

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

3. Perform a full CMS Maintenance backup.
4. Note the current CMS configuration and run the CMSADM set up option to reinitialize the CMS database.
5. Restore the CMS from the *latest* CMS maintenance backups. This restore loads the CMS data up to the time of the last CMS backup. See the "Performing a CMS Maintenance Restore" section in this chapter.
6. Stop and start CMS when the CMS maintenance restore is finished. To start and stop the CMS, see the "run_cms" section in Chapter 2, "CMSADM and CMSSVC Menus," for details.

Recreating 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 “Reinitializing CMS.”
2. Perform a full 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 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 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 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/cmstable` directory. Historical data includes any of the following:

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

If historical data is stored in the `cms1` file system, then the database tables are located in the `/cms1/cmstable` directory.

Following is an example of the dtrunk schema edited for the *cms1* 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"/cms1/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 CMS off by using the `run_cms` option on either the CMSADM or CMSSVC menu. See Chapter 2, "CMSADM and CMSSVC Menus" for details.
6. Remove (drop) the database tables for which the administration changes were made by doing the following:
 - a. Enter the command:
`/cms/toolsbin/cmsql`
The cmsql 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 commands in cmsql.
7. Create the database tables in the correct directory as follows:
 - a. Select `Query - Language` from the cmsql main menu.
You will be 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 cmsql) when all the database tables have been created.
8. Turn CMS on by using the `run_cms` option on either the CMSADM or CMSSVC menu. See Chapter 2, "CMSADM and CMSSVC Menus" for details.

9. Perform a CMS restore for ACD-specific data to restore the historical data into the CMS database tables. If the CMS full maintenance backup uses more than one tape, an automatic 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 just 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.

Recovering CMS File System Space

When you log into the system as a CMS user, a program is executed that checks the free blocks available to `/`, `/usr`, and the various 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 just about out of free blocks and the 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 *CMS Administration* (AT&T 585-215-521) document for details. Make sure you read the “Things to Know Before You Start” and “Prerequisite System Administration” sections before changing any fields in the window.

Installing Additional Memory

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. Power down your system using the following sequence:
 - a. *Sun SPARCserver* computer (system unit).
 - b. *Sun SBus Expansion Subsystem*.
 - c. System monitor.
 - d. Continue turning off each device moving away from the system unit.
 - e. External drive units, starting with the unit closest to the system unit.
3. Install the DSIMM into the *Sun SPARCserver* computer using the procedures described in the "Installing the DSIMMs - Sun SPARCserver 5" and "Installing the DSIMMs - Sun SPARCserver 10 and 20" sections of Appendix D, "*Sun SPARCserver* Computer Factory Installation Procedures."
4. Power the system up using the following sequence:
 - a. Devices connected to the *Sun SBus Expansion Subsystem*.

Note

Remember to power on the SCSI devices starting with the device at the end of the SCSI chain, and work your way down to the *Sun SPARCserver* computer.

- b. Devices attached to the *Sun SPARCserver*
 - c. *Sun SBus Expansion Subsystem*
 - d. *Sun SPARCserver* computer
 - e. Monitor.
5. Boot the system using the following command:

```
ok> boot
```

6. After the machine is booted, log in as *root*.
7. Execute 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. Perform the following steps to configure additional swap space:

8. Determine if your system is partitioned with one system disk or two system disks. See the "Disk Recovery Overview" section of this chapter.

If your system is partitioned with two system disks or has 96-MB of memory or less, no additional swap space is needed. All the activities required to install the additional memory are complete.

If your system is partitioned with one system disk and your system has more than 96-MB of memory, additional swap space may be required on disk 2. Continue with the following steps if this is your scenario:

9. Determine the amount of swap space required for your machine.
See Table 8-17 to determine the required swap space for your new memory configuration. Record this information for later use.

Table 8-17: Internal Disk 2 (c0t1d0) - Partition Information

If equipped RAM (in MB) is:		Slice	Partition	Size (cylinders)	Approximate K-bytes
more than	but less than or equal to				
0	96	0	/cms1	2036	865300
		2	overlap	default	
96	160	0	/cms1	1776	754800
		1	swap	260	
		2	overlap	default	
160	224	0	/cms1	1516	644300
		1	swap	520	
		2	overlap	default	
224	288	0	/cms1	1256	533800
		1	swap	780	
		2	overlap	default	
288	352	0	/cms1	996	423300
		1	swap	1040	
		2	overlap	default	
352	416	0	/cms1	736	312800
		1	swap	1300	
		2	overlap	default	
416	512	0	/cms1	476	202300
		1	swap	1560	
		2	overlap	default	

10. If additional swap space is required on disk 2 but you do not have disk 2 installed, then install, format, and partition disk 2. You will also need to create and mount a /cms1 file system on disk 2.

See the "Installing Additional SCSI Hard Disk Drives - Disk 2 (One System Disk)" section of this chapter (page 8-48 through page 8-57).

11. Determine the amount of swap space configured on your machine using the format 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,8000000/sd@1
,0
1.  c0t2d0 <SUN1.05 cyl 2036 alt 2 hd 14 sec 727
    /iommu@f,e0000000/sbus@f,e0001000/espdma@f,8000000/sd@2
,0
2.  c0t3d0 <SUN1.05 cyl 2036 alt 2 hd 14 sec 727
    /iommu@f,e0000000/sbus@f,e0001000/espdma@f,8000000/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):
```

12. Select disk c0t1d0
13. At the format> prompt, enter the following:

```
format> partition
```

14. At the partition> prompt, enter the following:

```
partition> print
```

15. Compare the displayed cylinder values for partitions 0, 1, and 2 against the required values noted in Table 8-17 on page 8-132.
16. Enter quit at the `partition>` and `format>` prompts to return to the system prompt.

```
partition> quit
format> quit
#
```

If your current partitioning on disk 2 is correct (see step 15), all the activities required to install the additional memory are complete. If your current partitioning on disk 2 is not correct, continue.

17. Reduce the amount of data stored in `/cms1` so 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/c0t1d0s0	xxx	xxx	xxx	xxx	/cms1

18. If the number of K-bytes used in `/cms1` are larger than the “Approximate K-bytes” column in Table 8-17 on page 8-132 use the CMS Free Space Allocation interface to move data out of the `/cms1` file system. The K-bytes used as reported by the `df` command must be less than the “Approximate K-bytes” 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`.

19. Turn CMS off using the `cmssvc` command.

20. Perform a cmsadm file system backup. See "Performing Backups and Restores" section in this chapter. This backup will be needed to restore the /cms1 file system after the disk has been repartitioned.
21. Unmount the /cms1 file system with the following command:

```
# umount /cms1
```

22. You now need to partition disk 2 and create /cms1 file system. You also need to inform the *Solaris* operating system about the additional swap space.

See the "Partitioning the Hard Disks" section of Appendix D, "*Sun SPARCserver* Computer Factory Installation Procedures," for procedures on partitioning disk 2.

See the "Constructing a New File System Disk 2" and "Mounting the File System Disk 2" sections of this chapter for procedures on creating and mounting the /cms1 file system.

See the "Setting Up the Swap Space Disk 2" section of this chapter for procedures on informing *Solaris* about the additional swap space.

23. Use the mount command to verify that the /cms1 file system is mounted.

```
# mount | grep /cms1
```

The system responds:

```
/cms1 on /dev/dsk/c0t1d0s0...
```

24. Restore the contents of the /cms1 file system using the *cpio* command.

```
# cpio -icumd -C 10240 -I <device name> -M  
"Please ??? the current tape, insert tape number %d, and press  
Enter" /cms1
```

Note

All systems are shipped with one or more tape drives (QIC-150, 5-GB, and/or a 14-GB). For systems with multiple tape drives, the QIC-150 is the first drive on the SCSI chain. For quicker backups (1 hour versus several hours), we recommend using the 5- or 14-GB tape drive.

/dev/rmt/0 indicates the first tape drive in the SCSI chain

/dev/rmt/1 indicates the second tape drive in the SCSI chain

/dev/rmt/0c indicates the first tape drive in the SCSI chain in compressed mode (only the 14-GB tape drive can support compressed mode)

/dev/rmt/1c indicates the second tape drive in the SCSI chain in compressed mode

25. Turn CMS on using the `cmssvc` command.

Changing the Date or Time

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

Note

Changing the switch time may cause a small distortion in the 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.

Changing the System Date and Time

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

1. Log in as *root*.
2. Change to a single-user state with the following command:

```
# shutdown -i0 -g0 -y
.
.
.
```

3. At the *ok* prompt, execute the following command:

```
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 type of terminal, and press **Return**.

6. As *root*, enter the date command to set the time and date:

```
# date mmddhhmm[yy]
```

- **Month (mm):** Enter the appropriate month (for example, 01-12).
- **Day (dd):** Enter the appropriate day (for example, 01-31).
- **Hour (hh):** Enter the appropriate system time (for example, 01-24).
- **Minute (mm):** Enter the appropriate minutes (for example, 01-60).
- **Year [yy]:** Enter the appropriate year (for example, 94).

7. Set the time zone environment variable in the */etc/default/init* file:

- 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 over write the file.

Note

For additional information, enter the *man date* command at the system prompt, or see *AnswerBook** on-line software.

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

```
# shutdown -i6 -g0 -y
```

Note

The *-i6* portion of the shutdown command string changes the system to a multi-user state.

5. At the prompt, enter the type of terminal, and press **Return**.
6. Modify the */etc/default/init* file with an appropriate value from the */usr/share/lib/zoneinfo* directory.

Note The entry in the *init* file is essentially a relative path name from the */usr/share/lib/zoneinfo* directory.

7. Specify the relative path name.

For example, for Colorado, the contents of */etc/default/init* could be *TZ=MST* or *TZ=US/Mountain*. In this example, *MST* (Mountain Standard Time) is a file in */usr/share/lib/zoneinfo*, and *Mountain* is a file in */usr/share/lib/zoneinfo/US*.

8. Reboot the machine using the following command:

```
# shutdown -i6 -g0 -y
```

Note For additional information, enter the `man date` command at the system prompt, or see *AnswerBook* on-line software.

Checking Installed Software Packages

To verify that the correct software packages have been installed, do the following steps:

1. Enter the following command at the system prompt:

```
# pkginfo | more
```

The system responds:

```
# pkginfo |more
application  SUNWabe      Solaris 2.4 User AnswerBook
system       SUNWaccr     System Accounting, (Root)
system       SUNWaccu     System Accounting, (Usr)
.
.
.
```

2. Check that all the software packages are installed by comparing the list generated by the `pkginfo` command to Table 8-18.

See Chapter 8, "Maintenance", for more information about Installing CMS Software.

Figure 8-18 lists all of the basic *Solaris* and CMS software packages installed on a *Sun SPARCserver* computer.

Table 8-18: Installed *Solaris* and CMS Software Packages

Type of Package	Package Name	Description
application	SUNWadm	<i>Solaris 2.4 System Administrator AnswerBook</i>
application	SUNWabe	<i>Solaris 2.4 User AnswerBook</i>
system	SUNWaccr	System Accounting, (Root)
system	SUNWaccu	System Accounting, (Usr)
system	SUNWaccu.2	System Accounting, (Usr)
system	SUNWaccu.3	System Accounting, (Usr)
system	SUNWadmap	System & Network Administration Applications

Table 8-18: Installed *Solaris* and CMS Software Packages (Contd)

Type of Package	Package Name	Description
system	SUNWadmfw	System & Network Administration Framework
system	SUNWadmr	System & Network Administration Root
application	SUNWaman	<i>Solaris 2.4 Reference Manual AnswerBook</i>
system	SUNWaudio	Audio applications
application	SUNWax25x	<i>SunLink X.25 8.0.2 AnswerBook</i>
system	SUNWbcp	Binary Compatibility
system	SUNWbnur	Networking UUCP Utilities, (Root)
system	SUNWbnuu	Networking UUCP Utilities, (Usr)
system	SUNWbtool	CCS tools bundled with SunOS
system	SUNWcar	Core Architecture, (Root)
system	SUNWcar.2	Core Architecture, (Root)
system	SUNWcar.3	Core Architecture, (Root)
system	SUNWcar.4	Core Architecture, (Root)
system	SUNWcar.5	Core Architecture, (Root)
system	SUNWcar.6	Core Architecture, (Root)
system	SUNWcg6	GX (cg6) Device Driver
system	SUNWcg6.2	GX (cg6) Device Driver
system	SUNWcsd	Core <i>Solaris</i> Devices
system	SUNWcsr	Core <i>Solaris</i> , (Root)
system	SUNWcsr.10	Core <i>Solaris</i> , (Root)
system	SUNWcsr.11	Core <i>Solaris</i> , (Root)
system	SUNWcsr.12	Core <i>Solaris</i> , (Root)
system	SUNWcsr.13	Core <i>Solaris</i> , (Root)
system	SUNWcsr.2	Core <i>Solaris</i> , (Root)
system	SUNWcsr.3	Core <i>Solaris</i> , (Root)
system	SUNWcsr.4	Core <i>Solaris</i> , (Root)
system	SUNWcsr.5	Core <i>Solaris</i> , (Root)

Table 8-18: Installed *Solaris* and CMS Software Packages (Contd)

Type of Package	Package Name	Description
system	SUNWcsr.6	Core <i>Solaris</i> , (Root)
system	SUNWcsr.7	Core <i>Solaris</i> , (Root)
system	SUNWcsr.8	Core <i>Solaris</i> , (Root)
system	SUNWcsr.9	Core <i>Solaris</i> , (Root)
system	SUNWcsu	Core <i>Solaris</i> , (Usr)
system	SUNWcsu.10	Core <i>Solaris</i> , (Usr)
system	SUNWcsu.11	Core <i>Solaris</i> , (Usr)
system	SUNWcsu.12	Core <i>Solaris</i> , (Usr)
system	SUNWcsu.13	Core <i>Solaris</i> , (Usr)
system	SUNWcsu.14	Core <i>Solaris</i> , (Usr)
system	SUNWcsu.15	Core <i>Solaris</i> , (Usr)
system	SUNWcsu.16	Core <i>Solaris</i> , (Usr)
system	SUNWcsu.2	Core <i>Solaris</i> , (Usr)
system	SUNWcsu.3	Core <i>Solaris</i> , (Usr)
system	SUNWcsu.4	Core <i>Solaris</i> , (Usr)
system	SUNWcsu.5	Core <i>Solaris</i> , (Usr)
system	SUNWcsu.6	Core <i>Solaris</i> , (Usr)
system	SUNWcsu.7	Core <i>Solaris</i> , (Usr)
system	SUNWcsu.8	Core <i>Solaris</i> , (Usr)
system	SUNWcsu.9	Core <i>Solaris</i> , (Usr)
system	SUNWdfb	Dumb Frame Buffer Device Drivers
system	SUNWdiag	Online Diagnostics Tool
system	SUNWdiag.2	Online Diagnostics Tool
system	SUNWdoc	Documentation Tools
system	SUNWesu	Extended System Utilities
system	SUNWfac	Framed Access Command Environment
system	SUNWhsis	HSI/S Driver/Utilities 2.0 v1.6

Table 8-18: Installed *Solaris* and CMS Software Packages (Contd)

Type of Package	Package Name	Description
system	SUNWWhsis.2	HSI/S Driver/Utilities 2.0 Patch 101130-04 v1.37
system	SUNWinst	Install Software
system	SUNWipc	Interprocess Communications
system	SUNWkvm	Core Architecture, (Kvm)
system	SUNWkvm.2	Core Architecture, (Kvm)
system	SUNWlibC	SPARCompilers Bundled libC
system	SUNWlibCf	SPARCompilers Bundled libC (cfront version)
system	SUNWlibms	SPARCompilers Bundled shared libm
application	SUNWlicsw	FlexLM License System
application	SUNWlit	STE License Installation Tool
application	SUNWllc2a	LLC2 kernel modules and include files for <i>Solaris</i> /SPARC
application	SUNWllc2b	LLC2 user programs and man pages for <i>Solaris</i> /SPARC
system	SUNWloc	System Localization
system	SUNWlpmmsg	LP Alerts
system	SUNWlpr	LP Print Service, (Root)
system	SUNWlpr.2	LP Print Service, (Root)
system	SUNWlps	LP Print Service - Server, (Usr)
system	SUNWlps.2	LP Print Service - Server, (Usr)
system	SUNWlpu	LP Print Service - Client, (Usr)
system	SUNWlpu.2	LP Print Service - Client, (Usr)
system	SUNWman	On-Line Manual Pages
system	SUNWnlsr	Network Information System, (Root)
system	SUNWnlsu	Network Information System, (Usr)
system	SUNWolaud	<i>OpenLook</i> Audio applications
system	SUNWolbk	<i>OpenWindows</i> online handbooks
system	SUNWoldcv	<i>OpenLook</i> document and help viewer applications
system	SUNWoldst	<i>OpenLook</i> deskset tools

Table 8-18: Installed *Solaris* and CMS Software Packages (Contd)

Type of Package	Package Name	Description
system	SUNWoldte	<i>OpenLook</i> Desktop Environment
system	SUNWolimt	<i>OpenLook</i> imagetool
system	SUNWolman	<i>OpenLook</i> toolkit/desktop users man pages
system	SUNWolrte	<i>OpenLook</i> toolkits runtime environment
system	SUNWolrte.2	<i>OpenLook</i> toolkits runtime environment
system	SUNWowbcp	<i>OpenWindows</i> binary compatibility
system	SUNWowbcp.2	<i>OpenWindows</i> binary compatibility
system	SUNWowrqd	<i>OpenWindows</i> required core package
system	SUNWploc	European Partial Locales
system	SUNWscbcp	SPARCCompilers Binary Compatibility Libraries
system	SUNWscpr	Source Compatibility, (Root)
system	SUNWscpu	Source Compatibility, (Usr)
system	SUNWscpu.2	Source Compatibility, (Usr)
application	SUNWsx	<i>SPARCstation-10,SX</i> Sharable Library
application	SUNWsx.2	<i>SPARCstation-10,SX</i> Sharable Library
application	SUNWsxow	<i>SPARCstation-10,SX</i> OpenWindows Support
application	SUNWsxow.2	<i>SPARCstation-10,SX</i> OpenWindows Support
system	SUNWsxr	<i>SPARCstation-10,SX</i> OS drivers
system	SUNWsxr.2	<i>SPARCstation-10,SX</i> OS drivers
system	SUNWsxr.3	<i>SPARCstation-10,SX</i> OS drivers
application	SUNWsxogl	<i>SPARCstation-10,SX</i> XGL Support
application	SUNWsxogl.2	<i>SPARCstation-10,SX</i> XGL Support
application	SUNWsxxil	<i>SPARCstation-10,SX</i> XIL Support
application	SUNWsxxil.2	<i>SPARCstation-10,SX</i> XIL Support
system	SUNWter	Terminal Information
system	SUNWtltk	ToolTalk runtime
system	SUNWtoo	Programming Tools

Table 8-18: Installed *Solaris* and CMS Software Packages (Contd)

Type of Package	Package Name	Description
system	SUNWtoo.2	Programming Tools
system	SUNWuodte	American English Openlook desktop environment
system	SUNWuorte	American English OpenLook toolkits runtime environment
system	SUNWuxplt	American English X Windows platform software
system	SUNWvolg	Volume Management Graphical User Interface
system	SUNWvolr	Volume Management, (Root)
system	SUNWvolu	Volume Management, (Usr)
system	SUNWvolu.2	Volume Management, (Usr)
application	SUNWx25a	X.25kernelmodulesandincludefilesfor <i>Solaris/SPARC</i>
application	SUNWx25b	X.25 user programs and libraries for <i>Solaris/SPARC</i>
application	SUNWxgldg	XGL Generic Loadable Libraries
application	SUNWxgler	XGL English Localization
application	SUNWxglft	XGL Stroke Fonts
application	SUNWxglrt	XGL Runtime Environment
application	SUNWxildg	XIL Loadable Pipeline Libraries
application	SUNWxiler	XIL English Localization
application	SUNWxilow	XIL Deskset Loadable Pipeline Libraries
application	SUNWxilrt	XIL Runtime Environment
system	SUNWxwcft	X Windows common (not required) fonts
system	SUNWxwdv	XWindows Window Drivers
system	SUNWxwdv.2	XWindows Window Drivers
system	SUNWxwman	X Windows online user man pages
system	SUNWxwmod	OpenWindows kernel modules
system	SUNWxwmod.2	OpenWindows kernel modules
system	SUNWxwoft	X Windows optional fonts
system	SUNWxwopt	nonessential MIT core clients and server extensions
system	SUNWxwplt	X Windows platform software

Table 8-18: Installed *Solaris* and CMS Software Packages (Contd)

Type of Package	Package Name	Description
system	SUNWxwplt.2	X Windows platform software
system	SUNWxyl	1.0 Sun Network Terminal Server
application	cms	Call Management System
application	spatches	CMS Supplied <i>Solaris</i> Patches

Auditing CMS Package

Do these steps to audit a CMS Package:

1. To check the base package (cms), enter the following command:

```
# pkgchk -n cms
```

The system responds:

```
# pkgchk -n cms.*

ERROR: /cms/install/logdir/admin.log
      group name <root> expected <cms> actual
ERROR: /cms/install/logdir/install.log
      group name <root> expected <cms> actual
ERROR: /usr/lib/cms/Aname
      pathname does not exist
ERROR: /usr/lib/cms/Pname
      pathname does not exist
ERROR: /usr/lib/cms/Sname
      pathname does not exist
ERROR: /usr/lib/cms/pbxtrcflags
      group name <bin> expected <cms> actual
```

Note

The error messages listed above might print out after installing cms. The messages do **not** signal a problem and can be disregarded.

2. To check an update (cms . 2), enter the following command:

```
# pkgchk -n cms.2
```

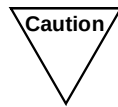
The system responds:

```
# pkgchk -n cms.2
```

```
WARNING: no pathname save associated with <cms.2>.
```

This warning message (listed above) indicates that there is no update present. If there is an update, this message will be different.

Moving Back to a Previous Load



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

If the installation of an upgrade fails, the upgrade has to be removed. If the upgrade fails, do the following:

1. Remove any currently installed updates. See "Removing Installed Field Updates" section in Chapter 10, "Upgrading or Updating the CMS Software."

2. Remove the CMS base package, and answer yes to the system prompt:

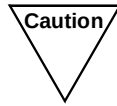
Do you want to preserve data?

See the "Removing Current CMS Base Package" section in Chapter 10, "Upgrading or updating the CMS Software" for procedures.

3. Install the previous CMS load. See the "Installing the CMS Software" section in Appendix D "*Sun SPARCserver* Computer Factory Installation Procedures."
4. Restore the CMS from the **most current** CMS maintenance backups. This restore loads the CMS data up to the time of the last CMS backup. See the "Performing a CMS Maintenance Restore" section in this chapter.

Backing Out of a *Solaris* Patch

If an update, upgrade, or new installation is administered, you may not need a specific patch.



You should perform the following procedures only when instructed by the TSC or upon receipt of a release letter.

To back out of a *Solaris* patch, do the following steps.

1. Enter the following command at the system prompt:

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

The system responds:

```
#
```

2. Enter the following command:

```
# <patch-id>/backout <patch-id>
```

Note

The <patch-id> will be identified by the TSC or in the release letter.

The system responds:

```
# 101122-07/backoutpatch 101122-07
@(#) backoutpatch 3.5 93/08/11
Doing pkgrm of SUNWcsr.8 package:

Removal of <SUNWcsr.8> was successful.
Doing pkgrm of SUNWcsu.9 package:

Removal of <SUNWcsu.9> was successful.
Restoring previous version of files
/.
/etc
/etc/device.tab
/usr
/usr/bin
/usr/bin/pkginfo
/usr/bin/pkgmk
/usr/bin/pkgparam
/usr/bin/pkgproto
/usr/bin/pkgtrans
.
.
.
XXXX blocks
Making the package database consistent with restored files:
backoutpatch finished.
#
```

3. After you back out of a patch, reboot to make sure the patches are activated correctly.

```
# shutdown -y -g0 -i6
```

Adding INFORMIX- SQL

This section describes how to install and set up INFORMIX on your system. INFORMIX-SQL is optional and you may or may not need to install it on your system.

Note If you received an INFORMIX ESQL tape, you do not need to install it on your system. **Only** INFORMIX-SQL and -SE need to be installed.

To add INFORMIX- SQL (Structured Query Language) to your current system, you must remove the current version of INFORMIX (if present). After you have removed the old INFORMIX version, use the procedures described in this section. See Appendix D, "Sun SPARCserver Computer Factory Installation Procedures", for more information.

Installing the INFORMIX Software

Prerequisites: The *Solaris* operating system should be installed, you should be logged in as *root* at the console terminal, and you must have the INFORMIX Serial Number and Serial Number Key (located on the license agreement or on the back of the tape).

This section describes how to install the INFORMIX software after the *Sun SPARCserver* computer has been installed at the customer's site. For this situation, installing the INFORMIX software consists of completing the following sequential tasks:

- Remove the current INFORMIX software
- Set the environment (remove the existing INFORMIX software)
- Install the INFORMIX-SQL 4.13 package (optional)
- Install the INFORMIX-SE (Standard Engine) 5.04 package.

Note Make sure you set the environment variables. If you log out prior to completing the above sequential tasks, you will lose the new environment variables that you set.

Removing the INFORMIX Software

Do these steps to remove the current INFORMIX software:

1. Turn off the CMS. Do the following steps:
 - a. At the system prompt, enter the following command:

```
# cmsadm
```

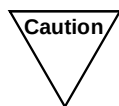
The system displays the CMSADM (Call Management System Administration Menu).

- b. From the CMS Administration Menu, press 9 to select the `run cms` option.
 - c. At the prompt, enter 2 to turn off the CMS. You are returned to the system prompt.
2. Enter the following command to move to the existing INFORMIX directory:

```
# cd /opt/informix
```

- -
3. Verify that you are in the `/opt/informix` directory by entering the following command:

```
# pwd
```



The following command removes every file and subdirectory under the current directory.

- -
 -
4. Remove the existing INFORMIX software by entering the following command:

```
# rm -fr *
```

The INFORMIX software is now removed.

Setting Up the INFORMIX Environment

Do the following steps to set up the INFORMIX environment:

1. Complete the INFORMIX removal procedures. See "Removing the INFORMIX Software" section in this chapter.
2. To set the environment variables, enter the following command:

```
# INFORMIXDIR=/opt/informix
# export INFORMIXDIR
# PATH=$PATH:$INFORMIXDIR/bin
# export PATH
```

3. Change to the */opt/informix* directory by entering:

```
# cd $INFORMIXDIR
```

4. Make sure you are in the */opt/informix* directory by entering:

```
# pwd
```

The INFORMIX installation environment is now set up.

Additional References

For additional information, refer to the following documentation:

INFORMIX UNIX Products Installation Guide Version 4.13

INFORMIX UNIX Products Installation Guide Version 5.04.

Installing the INFORMIX-SQL Package

After you have set the environment, you install the INFORMIX-SQL package. The INFORMIX-SQL software package should consist of only one tape.

Note

This software package is optional and is needed only if you are using custom reports. If you do not need this package, skip this section and install the INFORMIX-SE software package.

To install the INFORMIX-SQL software, do the following:

1. Complete the INFORMIX removal and set up procedures. See "Removing the INFORMIX Software" and "Setting Up the INFORMIX Environment" sections in this chapter.
2. Insert the "INFORMIX-SQL 4.13.UD1" tape into the tape drive.
3. Enter the following command to copy the INFORMIX-SQL files from the tape to the current directory:

```
# tar xvf /dev/rmt/0
```

The program responds:

```
x installsql, XXX bytes, XX tape blocks
x bin/isql, XXX bytes, XX tape blocks
. . . . .
. . . . .
. . . . .
x demo/sql2/stock.unl, XXX bytes, XX tape blocks
#
```

4. Enter the following command to start the installation of the INFORMIX-SQL software package:

```
# ./installsql
```

The program responds with the following screen:

```
INFORMIX-SQL Version 4.13.UD1
Copyright (C) 1984-1993 Informix Software, Inc.
```

Installation Script

```
This installation procedure must be run by root (super-user).
It will change the owner, group, and mode of all files of this
package in this directory. There must be a user "informix" and
a group "informix" known to this system.
```

```
Press RETURN to continue,
or the interrupt key (usually CTRL-C or DEL) to abort.
```

5. Press the **Return** key to continue with the installation procedure.

After a few minutes, your terminal displays the following message:

```
Enter your serial number (e.g., RDS#R999999) >
```

6. Enter the 11-character serial number located on the INFORMIX-SQL customer license. This number may also be located on the back of your tape. The program responds:

```
Enter your serial number KEY (uppercase letters only) >
```

7. Enter the 6-character serial number key located on your customer registration form. This number may also be located on the back of your tape. The program responds:

```
WARNING: This INFORMIX SOFTWARE, INC. SOFTWARE is licensed
for use by XX SIMULTANEOUS USER(S) on this computer system.
In the event you exceed XX simultaneous user(s), the End User
License Agreement, and the licenses granted to you thereunder
are subject to immediate termination by Informix.
```

```
Press RETURN to continue,
or the interrupt key (usually CTRL-C or DEL) to abort.
```

8. Press the **Return** key to continue with the installation procedure. The program responds:

```
Installing directory ...
```

```
Installation complete.
```

```
#
```

9. Remove the INFORMIX-SQL 4.13.UD1 tape from the tape drive.
The INFORMIX-SQL software is now installed.

Additional References

For additional information, refer to the following documentation:

INFORMIX UNIX Products Installation Guide Version 4.13.

Installing the INFORMIX-SE Package

After you have installed the INFORMIX-SQL package, you install the INFORMIX-SE package. The INFORMIX-SE software package is on the CMS CD-ROM.

To install the INFORMIX-SE software package, do the following:

1. Complete the INFORMIX removal, set up, and installing INFORMIX-SE package procedures. See "Removing the INFORMIX Software", "Setting Up the INFORMIX Environment", and "Installing the INFORMIX-SQL Package" sections in this chapter.
2. Remove the CMS CD-ROM from its case. If you have an external CD-ROM drive, follow the steps below. Otherwise, go to step 3.
 - a. Place the CMS CD-ROM in the CD-ROM caddy. When the CD-ROM is properly inserted in the caddy, the CD-ROM label is visible.
 - b. Insert the CD-ROM caddy into the CD-ROM drive slot.
 - c. Go to step 6.
3. Open the CD-ROM drive tray by pressing the eject button on the CD-ROM drive unit.
4. 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.
5. Push the CD-ROM drive tray in (towards the system unit) until it closes.
6. Enter the following command to copy the INFORMIX-SE files from the CD-ROM to the current directory.

```
# tar xvf /cdrom/cms/INFORMIX-SE.tar
```

The program responds:

```
x installse, XXX bytes, XX tape blocks
x bin/bcheck, XXX bytes, XX tape blocks
. . . . .
. . . . .
. . . . .
x demo/dbaccess/upd_table.sql, XXX bytes, XX tape blocks
#
```

7. Enter the following command to start the installation of the INFORMIX-SE software package:

```
# ./installse
```

The program responds with the following screen:

```
INFORMIX-SE Version 5.04.UC1
Copyright (C) 1984-1993 Informix Software, Inc.

Installation Script

This installation procedure must be run by root (super-user).
It will change the owner, group, and mode of all files of this
package in this directory. There must be a user "informix" and
a group "informix" known to this system.

Press RETURN to continue,
or the interrupt key (usually CTRL-C or DEL) to abort.
```

8. Press the **Return** key to continue with the installation procedure.

After a few minutes, your terminal displays the following message:

```
Enter your serial number (for example, RDS#R999999) >
```

9. Enter the 11-character serial number located on the INFORMIX-SE customer license. The program responds:

```
Enter your serial number KEY (uppercase letters only) >
```

10. Enter the 6-character serial number key located on your customer registration form. This number may also be located on the back of your tape. The program responds:

```
WARNING: This INFORMIX SOFTWARE, INC. SOFTWARE is licensed
for use by XX SIMULTANEOUS USER(S) on this computer system.
In the event you exceed XX simultaneous user(s), the End User
License Agreement, and the licenses granted to you thereunder
are subject to immediate termination by Informix.
```

```
Press RETURN to continue,
or the interrupt key (usually CTRL-C or DEL) to abort.
```

11. Press the **Return** key to continue with the installation procedure. The program responds:

```
Installing directory ...

Installation of INFORMIX-SE complete.

#
```

12. Eject the INFORMIX-SE 5.04.UC1 CD-ROM by entering the following command:

```
# eject cdrom
```

13. If you have an internal CD-ROM drive, 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.

If you have an external CD-ROM drive, remove the CD-ROM caddy from the CD-ROM drive, remove the CD-ROM from the caddy, and place the CD-ROM back in its case.

The INFORMIX-SE software is now installed.

Additional References For additional information, refer to the following documentation:

INFORMIX UNIX Products Installation Guide Version 5.04.

Adding, Removing, or Replacing Tape Drives

This section describes how you add, remove, or replace tape drives from an existing system.

Adding or Replacing 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:

```
# shutdown -i0 -g0 -y
```

3. Power down the system using the following sequence:
 - a. *Sun SPARCserver* computer (system unit).
 - b. *Sun SBus Expansion Subsystem* (if one is present).
 - c. System monitor.

- d. Each device moving away from the system unit.
- e. External drive units, starting with the unit closest to the system unit.

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 8-1).

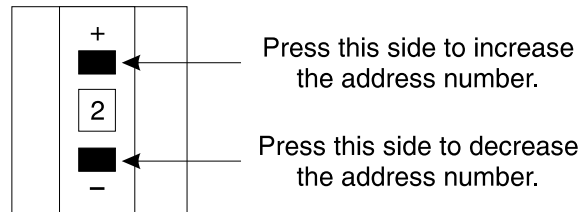


Figure 8-1: Setting the SCSI ID/Target Address

- b. Identify which SCSI ID will be associated with each of the devices on a specific SCSI bus (see Figure 8-19).
 - c. Press the top or bottom button of the switch until the appropriate SCSI ID number appears in the window.

Table 8-19: Internal SCSI Bus ID Map (c0)

Device	SCSI ID	Node	Location
Base Disk	3	c0t3	Internal
Disk #2	1	c0t1	Internal
QIC-150 SCSI 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

Note

All systems are shipped with one or more tape drives (QIC-150, 5-GB, and/or a 14-GB). For systems with multiple tape drives, the QIC-150 is the first drive on the SCSI chain.

`/dev/rmt/0` indicates the first tape drive in the SCSI chain

`/dev/rmt/1` indicates the second tape drive in the SCSI chain

`/dev/rmt/0c` indicates the first tape drive in the SCSI chain in compressed mode (only the 14-GB tape drive can support compressed mode)

`/dev/rmt/1c` indicates the second tape drive in the SCSI chain in compressed mode

5. Connect the tape drive to the other SCSI devices.

Note

A SCSI cable connects the SCSI port (c0) on the back of the *Sun SPARCserver* to one of the microminiature connectors on the back of the SCSI device. The next SCSI device is connected to the previous device using another SCSI cable. This process continues until all of the assigned devices have been connected to the SCSI bus. The last device in each chain must have a SCSI terminator attached to one of the microminiature connectors on the back of that device (see Figure 8-2 as an example).

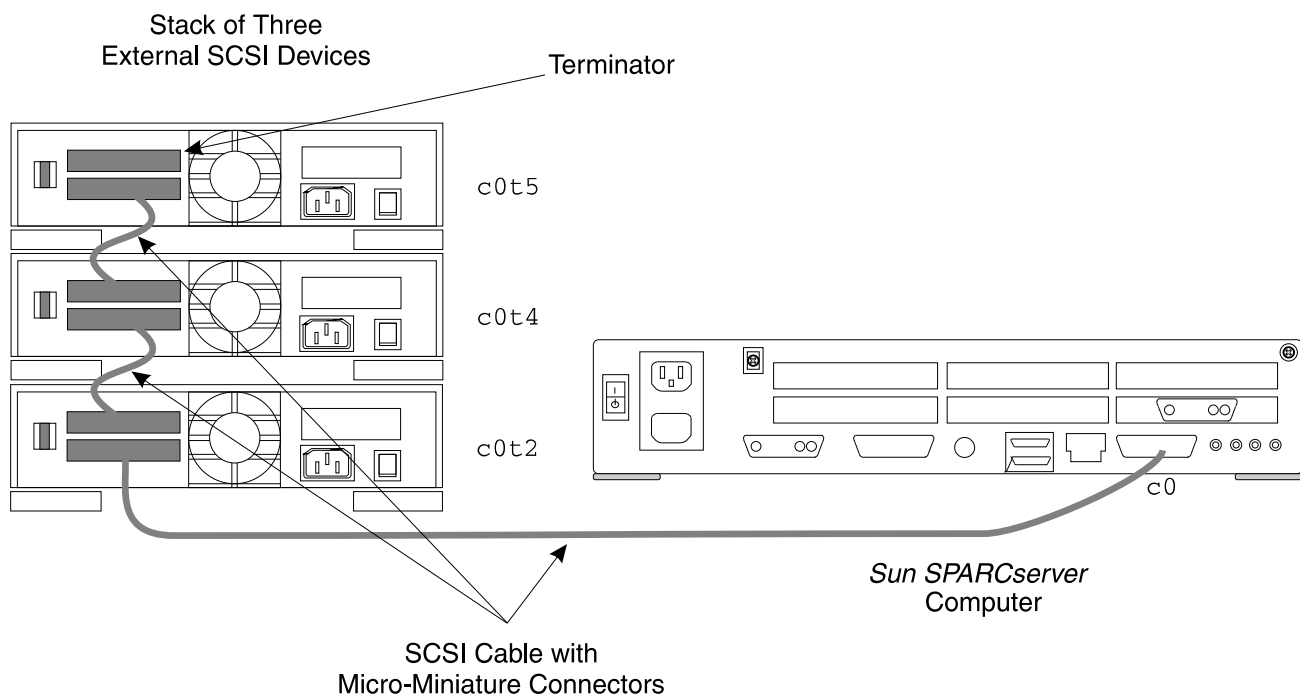


Figure 8-2: Sample Daisy Chaining of External SCSI Devices

6. Connect the power cord from the tape drive to a power source.
7. Power up the system using the following sequence:
 - a. Devices connected to the *Sun SBus Expansion Subsystem* (if an SBus Expansion Subsystem is present)

Note Remember to power on the SCSI devices starting with the device at the end of the SCSI chain, and work your way down to the computer.

- b. Devices attached to the *Sun SPARCserver*
- c. *Sun SBus Expansion Subsystem* (if one is present)
- d. *Sun SPARCserver* computer
- e. 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 on the keyboard 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 to verify that the system recognizes the SCSI devices:

```
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.

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

```
ok boot -r
```

Removing 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. Power down the system using the following sequence:
 - a. *Sun SPARCserver* computer (system unit).
 - b. *Sun SBus Expansion Subsystem* (if one is present).
 - c. System monitor.
 - d. Each device moving away from the system unit.
 - e. External drive units, starting with the unit closest to the system unit.
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 on page 8-166.
7. Power up the system using the following sequence:
 - a. Devices connected to the *Sun SBus Expansion Subsystem* (if an SBus Expansion Subsystem is present)

Note

Remember to power on the SCSI devices starting with the device at the end of the SCSI chain, and work your way down to the computer.

- b. Devices attached to the *Sun SPARCserver*
- c. *Sun SBus Expansion Subsystem* (if one is present)
- d. *Sun SPARCserver* computer
- e. 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 on the keyboard 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 to verify that the system recognizes the SCSI devices:

```
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.

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

```
ok boot -r
```

Adding Network Terminal Servers

To connect additional NTSs (Network Terminal Servers) to your current configuration, use the procedures in sections "Installing the Network Terminal Server (NTS) Driver" and "Administering the Network Terminal Servers" of Appendix D, "*Sun SPARCserver* Computer Factory Installation Procedures." You can connect a maximum of four NTSs per each *Sun SPARCserver* computer.

Changing Network Addresses

If you want to change the network address of your *Sun SPARCserver* computer and each NTS, see Chapter 3, "Installing the Sun SPARCserver Computer", for additional procedures.

Overview

This chapter contains troubleshooting information about the *Sun SPARCserver* computers and the R3V2 CMS (Release 3 Version 2 Call Management System) application. You should use the information to clear problems that may arise during and after the CMS software installation.

The following list outlines the troubleshooting sections in this chapter:

- Solving CMS-Related Problems
- Solving Hardware-Related Problems
- Solving Terminal-Related Problems
- Solving Printer-Related Problems
- Solving Modem-Related Problems
- Solving Power-Related Problems
- Solving Installation-Related Problems
- Checking Error Logs

Solving CMS-Related Problems

This section describes some of the problems that can arise when using the CMS software.

See the *Call Management System R3V2 Administration* (AT&T 585-215-511) document for information about restoring data, using backup strategies, accessing error logs, and using error messages.

Solving Hardware-Related Problems

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

Hardware Diagnostic Tools and Resources

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

- *OpenBoot* Diagnostics (requires console redirection)
- POST (power on self test) messages during a reboot (requires console redirection)
- *SunDiags* on-line system tool/exerciser (does not require console redirection)
- Error logs (does not require console redirection).

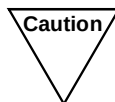
OpenBoot Diagnostics

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.

To use *OpenBoot* Diagnostics, do 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.



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 the **Stop** and **A** key combination as a last resort if the previous method fails.

- 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 methods fail to work.

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

```
<#0> ok
```

2. At the ok prompt, enter `help` for a list of available commands, or see Table 9-1 for a summary of some of the *OpenBoot* diagnostic test commands.

Additional information about the *OpenBoot* firmware is available on-line through *AnswerBook* on-line software or by contacting the TSC (Technical Service Center).

Table 9-1: Summary of *OpenBoot* Diagnostic Test Commands

Test Command	Description
probe-scsi	This command identifies the devices attached to the built-in SCSI bus.
probe-scsi-all [device-path]	This command performs the same as the probe-scsi test command but 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.

Table 9-1: Summary of *OpenBoot* Diagnostic Test Commands (Contd)

Test Command	Description		
test device-specifier	This command executes the specified device's self-test method. The possible values of device-specifier are listed in the Alias and Full Path columns below:		
	Alias	Full Path	Description
		<i>/memory</i>	memory*
	cdrom	<i>/sbut/esp/sd@6,0:c</i>	cdrom
	tape	<i>/sbut/esp/sd@4,0</i>	QIC-150
	tape1	<i>/sbut/esp/sd@4,0</i>	QIC-150
	tape2	<i>/sbut/esp/sd@5,0</i>	5 GB
	disk	<i>/sbut/esp/sd@3,0</i>	disk 1
	disk1	<i>/sbut/esp/sd@3,0</i>	disk 1
	disk2	<i>/sbut/esp/sd@1,0</i>	disk 2
		<i>/sbut/esp/sd@2,0</i>	disk 3
		<i>/sbut/esp/sd@1,1,0</i>	disk 4
		<i>/sbut/esp/sd@1,2,0</i>	disk 5
		<i>/sbut/esp/sd@1,3,0</i>	disk 6
		<i>/sbut/esp/sd@2,1,0</i>	disk 7
		<i>/sbut/esp/sd@2,2,0</i>	disk 8
		<i>/sbut/esp/sd@2,3,0</i>	disk 9
	floppy	<i>/fd</i>	floppy
	*for <i>/memory</i> , the default amount of memory to test is 1MB. You can specify the number of megabytes in the <selftest-#megs> NVRAM parameter or test all of the memory by setting <diag-switch?> to true.		
test-all [device-specifier]	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.		
watch-clock	This command tests the clock function.		
eject [device-specifier]	This command ejects either the floppy or cdrom devices.		

**POST Messages
Diagnostics**

To use the POST (power on self test) 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**

SunDiag exerciser is an on-line system tool (an exerciser) that runs diagnostic hardware tests.



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 — provides a nonscreen interface.

Table 9-2 provides an overview of the available tests:

Table 9-2: *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 ECC (error correction code) 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	fptest	Floating Point Unit Test—uses various subtests to check the floating point unit on the <i>Sun SPARCserver</i> 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.
	mpptest	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 <i>Solaris</i> 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 <code>cdtest</code> ’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 an SCSI tape, writes to the end of the tape). It rewinds the tape, reads, and compares the information just written.

Table 9-2: *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 <i>Solaris 2.4</i> .

For more information about the *SunDiag* exerciser, see any of the following resources:

- *SunDiag* on-line manual page (for example, the `man sundiag` command).
- *AnswerBook* on-line software (especially the content of *Solaris 2.4* on the *Sun Hardware AnswerBook* which contains *SunDiag 4.2 User's Guide*).
- *SunDiag 4.1 User's Guide*.

***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 *SunDiag* exerciser in TTY mode, set the terminal type **before** attempting to start the *SunDiag* exerciser.
3. Start *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 *SunDiag* on-line system tool, enter the following command:

```
# /opt/SUNWdiag/bin/sundiag <options>
```

The system brings up the *SunDiag* on-line system tool.



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:

- a. 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:

- a. 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 *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 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]
```

See the “*SunDiag*” 4.1 *User’s Guide* for more information about values for <testname> and <test-specific-arguments>.

The system prompt appears.

Checking Error Log Files

The `/var/adm/messages` files contain system messages that are often helpful in diagnosing problems. See the "Summary of Error Logs" section in this chapter for more 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.

Problem Solving Scenarios

Scenario 1:

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

Solutions:

- Check the port connectivity—see Figure 9-1. Refer to Chapter 3, "Installing the Sun SPARCserver Computer" and Appendix D, "Sun SPARCserver Computer Factory Installation Procedures", for details.
- Check modem setup—see Figure 9-1. Refer to Chapter 3, "Installing the Sun SPARCserver Computer" and Appendix D, "Sun SPARCserver Computer Factory Installation Procedures", for details.
- Check port A administration. Refer to Chapter 3, "Installing the Sun SPARCserver Computer" and Appendix D, "Sun SPARCserver Computer Factory Installation Procedures", for details

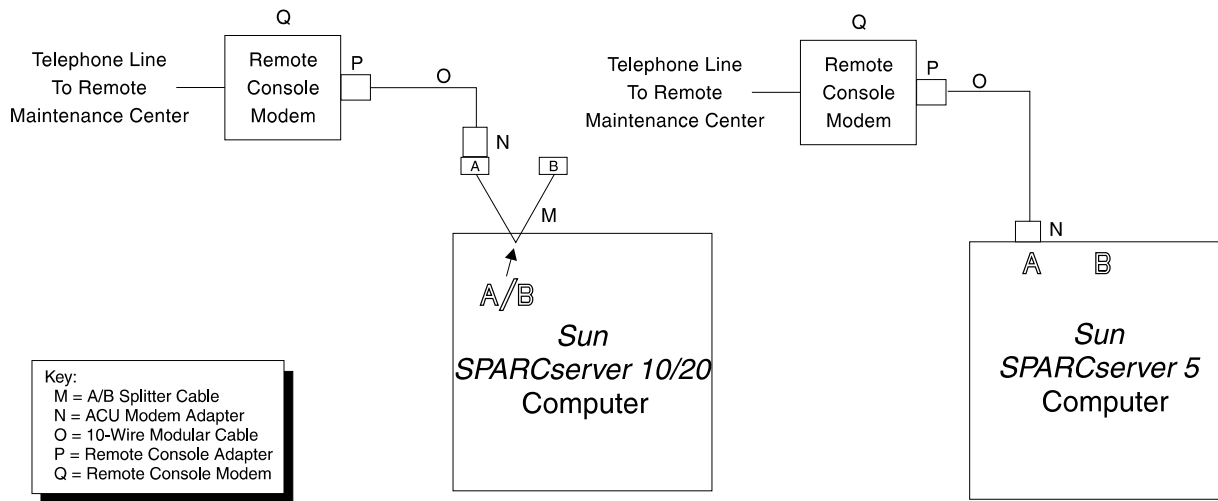


Figure 9-1: Remote Console Connectivity

Scenario 2:

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

Solutions:

- Check the dial-in parameters — see the following section "Diagnosing Dial-In Access Problems" 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 **Return** a few times:

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

If the console is not remoted, then remote the console.

Scenario 3:

When the dial-in gives you garbage characters instead of a *login*.

Solution:

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

Scenario 4:

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

Solution:

Check the baud rate of the remote console:

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

```
# /cms/install/bin/abcm -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:

```
# abcdm -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 the "Diagnosing Remote Console Problems" section in this chapter for details.

Scenario 6:

If you experience problems when trying to do the following:

- Set the console to remote.
- Create a command menu from XDM.
- 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.

Diagnosing Dial-In Access Problems

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

Scenario 1:

When 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:

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

Solution:

1. Use **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 with 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. Use the following commands:

```
# /cms/install/bin/abcmadm -r ttya  
    <and>  
# /cms/install/bin/abcmadm -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 with the following commands:

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

Scenario 3:

When 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 the *Sun SPARCserver* computer. To diagnose link problems, do the following:

- Check the status of LAPB (Link Access Protocol B) 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. (Only used with an HSI/S card).
- Check the HSI/S Card.
- Monitor the LAPB and X.25 protocol.

Checking 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/S 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 *spl.err* file contain messages about mismatched administration?

Starting and Stopping 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. 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 message displayed above 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 can not 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:

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

Checking Switch Administration

To verify that the switch link administration is correct, see the *CMS Installation and Maintenance* document. In general, the switch administration is the same for connecting to the Intel CMS platforms and the *Sun SPARCserver* platform. There is one exception in the G3r switch administration for the *Sun SPARCserver* computer.

Do the following required G3r switch administration changes:

1. Set the Number of Outstanding Frames(w) field on the data module for the CMS link to 4.



If the window size for the *Sun SPARCserver* computer is not 4, the link will reset under the heavy load. The Number of Outstanding Frames(w) field is commonly set to 2 for the Intel platforms.

See Chapter 5, "Connecting the Sun SPARCserver Computer to the Switch" and Appendix C, "Generic 3r Administration" in this manual for details.

Checking the Cabling

If the link is not operating reliably and does not operate at all 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 Chapter 5, "Connecting the Sun SPARCserver Computer to the Switch", Appendix A, "Generic 3i and Generic 1 Administration", Appendix B, "Generic 2 and System 85 Administration", and Appendix C, "Generic 3r Administration", in this manual for details.

Checking 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/S card to the RS-232 interface supported in existing switch connections. Each switch link which is connected to the HSI/S card uses one converter.



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

Checking Correct DTE/DCE Settings

The RS-232 to RS-422 converter described in the previous paragraph is shipped from the Black Box Corporation with the RS-422/RS-449 port configured as DTE and the RS-232 port configured as DCE. This is exactly opposite of what is required for the CMS X.25 switch link.

As part of the assembly process, each converter must be taken apart. The 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 9-3 for an example.

Table 9-3: 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.

For more information, see Chapter 3, "Installing the Sun SPARCserver Computer", Appendix D, "Sun SPARCserver Computer Factory Installation Procedures", or the *Installation and Operation Manual* shipped with each converter.

Checking LEDs

The Interface Converter has six LEDs (light indicators) on the front panel of the Black Box which help trouble shoot link problems. Three LEDs (DSR, CTS, and DATA) are located on the left side of the monitor. These LEDs are the *Sun SPARCserver* computer's HSI/S 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 9-2.

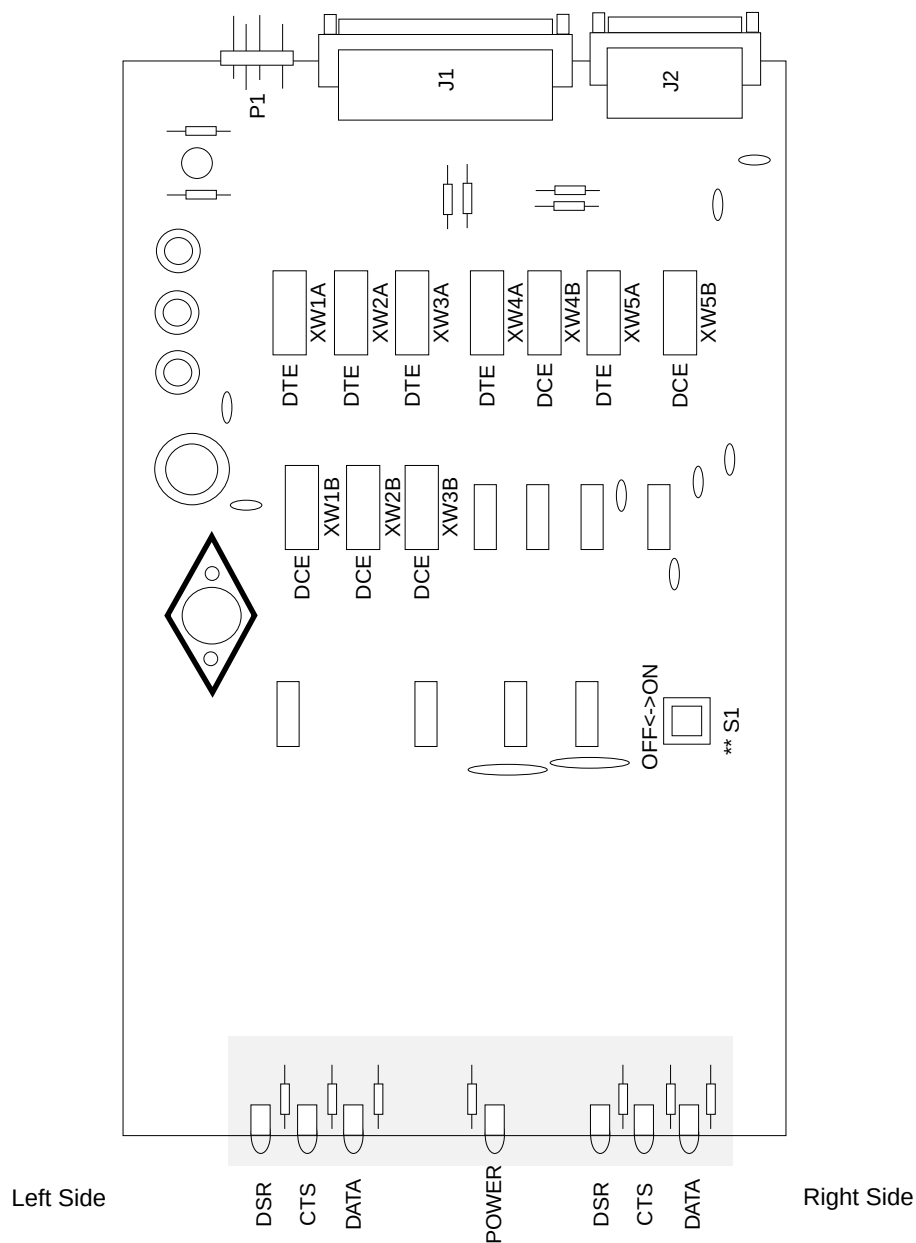


Figure 9-2: Black Box Component Layout — LEDs Location

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.

Testing HSI/S Card for Problems

The High-Speed Serial Interface/Sbus (HSI/S) card for the *Sun SPARCserver* computer provides a break-out for four separate female 37-pin RS-449 connections. CMS on the *Sun SPARCserver* hardware platform supports four physical switches connected to a single HSI/S card (ports 0-3).

To test an individual port on the HSI/S card for problems, execute the loopback test:

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/S card).

4. Run two loopback tests:

- Internal loopback test, and
- Loopback test using the loopback plug.

Note

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

Examples of running these tests on port 0 are:

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

```
# hsi_loop -t 1 hiho0
```

The system responds:

```
hih0: [ Using /dev/hiho0]
hih0: speed=9600, loopback=yes, nrzi=no, txc=baud, rxc=rx
.
.
.
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:

```
# hsi_loop -t 2 hiho0
```

The system responds:

```

hih0: [ Using /dev/hiho0]
hih0: speed=9600, loopback=yes, nrzi=no, txc=baud, rxc=rxrc
.
.
.
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/S hardware problems. Prior to replacing the HSI/S card, do the following:
 - a. Verify the loopback plug is in the correct HSI/S port.
 - b. Check the cabling to the HSI/S break-out module.
6. Remove the loopback plug.
7. Recable the link.
8. Restart X.25 after completing this test.

Monitoring 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
```

Bringing Up the Link

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

- Examine cms */usr/elog/elog* for messages
- Verify cms data collection is on, and examine *spi.err* 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 Chapter 4, "Installing Terminals, Printers, and Modems", in this manual 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.

NTS Port Problems

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 SPARCserver* computer to the first port on the network hub, and a second should run from one of the other ports on the network hub 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 power on the NTS and retry the command.

- 4. If the NTS is healthy, 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.
 - 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. If the addresses were not changed via user error, notify the 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.

Replacing 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 9-4 to readminister the ports.

Table 9-4: Configuration Information

Device	IP Address	NTS	File Name
<i>Sun SPARCserver</i> computers	129.200.9.1	host_computer	NA
NTS (#1)	129.200.9.11	cmsterm1	nts1info

Table 9-4: Configuration Information (Contd)

Device	IP Address	NTS	File Name
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):

1. Default to an NTS using the annex `cmsterm<1>` command. For details, see the "Administering Terminals" section in Chapter 4, "Installing Terminals, Printers, and Modems."
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, use the following command to reset the terminal ports:

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

The following appears:

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

Checking Port Connectivity

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

- For 8-, 16- and 64-port, check that the NTS is connected to each terminal, printer, or modem. See Chapter 4, "Installing Terminals, Printers, and Modems" for details.
- For 64-port only, check the three cables (A,B, and C) that run from the NTS to each NTS patch panel (see Figure 9-3). Check to see that the cables are correctly seated at each end.

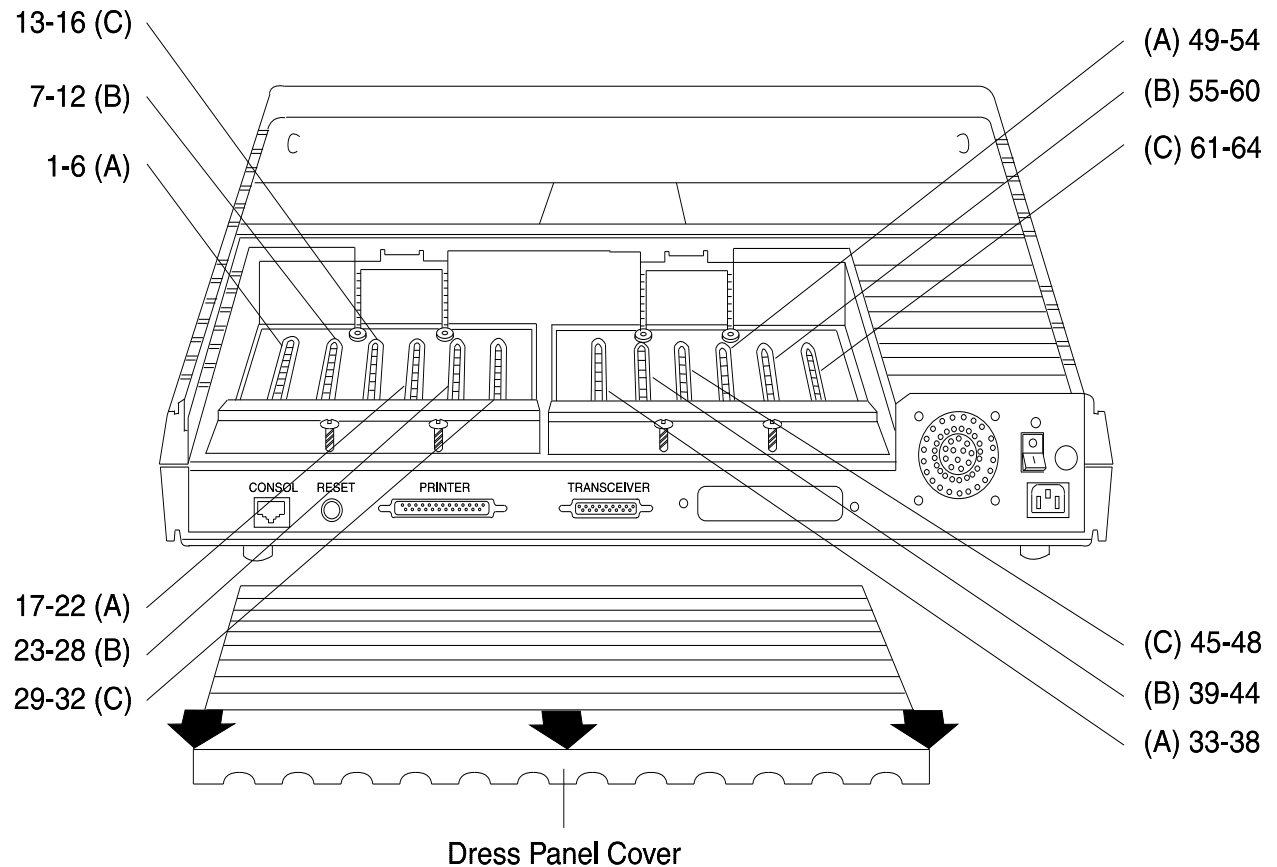


Figure 9-3: Network Terminal Server — PBX-Champ Connectors and Port Definitions

Resetting the Port

If the “na” port administration is questionable, reset the port to its default configuration. Do the following steps:

1. Check the port administration. See Chapter 4, "Installing Terminals, Printers, and Modems", 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.

4. To reset the port(s), do the following:
 - a. To reset one port (x), enter the following command:

```
# port x
```

- b. To reset multiple 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. Execute the following command to reset the parameters associated with the default port set. 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, do the following command:

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

7. To make any additional changes to the speed or parity, enter the following command (for example):

```
# 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:
```

9. Reset the port with the following command:

```
# reset x
```

10. To send a message to a port using CLI commands while logged in to the *Sun SPARCserver* computer, 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.

11. Press **Return**.

The system responds:

```
Rotaries defined:Cli
Enter the Annex port name or number
```

12. Enter the `cli` command.

The system responds:

```
annex:
```

13. To get into the super-user mode on the NTS, enter the following command:

```
annex: su
```

The system responds:

```
annex:
```

14. 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 haven't changed addresses, this is 129.200.9.11 for `cmsterm1`).
15. At the `annex:` prompt, enter your password. The default is the NTS internet address (if you have not changed addresses, this is 129.200.9.11 for `cmsterm1`).

The system responds:

```
annex#:
```

16. 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:

```
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.

17. 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.

18. 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.
19. To exit admin, type q at the admin : prompt.
20. To stop tapping the port, press the **Control** and **A** keys simultaneously.

21. Enter the `jobs` command:

```
annex: jobs
```

For example, the following appears:

```
+1 tap x
```

22. To stop the job, enter the `kill 1` command (where the job number is 1).

The system responds:

```
+1 tap x  
annex#
```

23. To exit the super-user mode, enter the `su` command at the `annex#` prompt:

```
annex# su
```

The system responds:

```
annex:
```

24. To exit the CLI mode, enter the `hangup` command at the `annex:` prompt:

annex: hangup

The system responds:

```
#
```

25. After verifying the port and the connectivity, you can now readminister a terminal, modem, or printer with the following `na` command:

```
# na
```

See Chapter 4, "Installing Terminals, Printers, and Modems", for information about administering a terminal, printer, or modem.

System Fails to Boot Properly

This section discusses some common reasons why your system fails to boot properly and provides some correction 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 9-5 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 9-5: 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 Stop-D 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 with 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 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 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 power to the disk, and make sure the SCSI cable is connected to the disk and the system.

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:

```
/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. Fix any obvious errors.

Your system might have 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 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

This section addresses what to do when the local monitor is blank.

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** key sequence until something appears on the screen. Hold the key down for at least a minute. If the machine is sane, 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. Check 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, plug in the keyboard, and power on again.
 - b. 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.
 - c. Check to make sure the output-device is set to TTYA. This means 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. Then, turn it on, and immediately press the **Stop** and **N** key sequence. This sets all NVRAM parameters to their default values. As a result, the output-device parameter is set to screen.
- 

In addition, all previous nondefault settings are reset to their default values. You must restore the settings as needed. See "Method 2—From the 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.
- d. 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.

Diagnosing 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.

Redirecting 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.

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 computer), and log in as *root*.
2. Remove the port monitor by entering the following command:

```
# /cms/install/bin/abccadm -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. Enter 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 in to 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:

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. Enter 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 in to the local console (*Sun SPARCserver* system) as *root*.

See Appendix D, "Sun SPARCserver Computer Factory Installation Procedures" for more information about setting the remote console modem options, connecting the remote console to the *Sun SPARCserver* computer, and administering the remote console ports.

Redirecting Remote Console Using *OpenBoot* Diagnostics

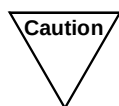
Use the *OpenBoot* mode to redirect port A (remote console port) on the *Sun SPARCserver* computer when the *Solaris* method does not work (typically because the system will not boot).

Set the Console to Remote:

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 *Solaris* environment, halt the operating system with the *Solaris* `halt` command.
- If in *Solaris* environment and the `halt` command does not work (for example, the system is hung up), press the **Stop** and **A** keys simultaneously.



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, power-cycle the system, and 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, and press **Return**:

```
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 `set env` command to set the configuration parameters. Set the parameters to the values specified. (See Table 9-6). For example:

```
ok>setenv output-device ttya
```

The system responds:

```
output device=ttya
```

Table 9-6: 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 either 2400 or 9600, and AT&T 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, and press **Return**:

```
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:

```
Welcome to Open Windows

login:
password:
```

Set the Console to Local:

To redirect the remote console to the local console, enter the *OpenBoot* environment (prompt is *ok>*) in the following way:

- If in *Solaris*, 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 through **one** of the following ways:

- If in *Solaris*, halt the operating system with the *Solaris* halt command.
 - Power-cycle the machine, and enter **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, and press **Return**:

```
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 9-7) via the `setenv` command at the `ok>` prompt, and press **Return**. For example:

```
ok> setenv output-device ttya
```

Table 9-7: 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, and press **Return**:

```
ok> reset
```

5. Log in to the system as *root* at the local monitor.
6. From the local monitor, enter the following command to check 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:

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

The system responds:

```
answer n to "Do you want to reboot?"
```

8. Enter `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. Hold down 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 in to 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/abccadm -k
```

5. Reset the default console parameters:

```
# /cms/install/bin/abccadm-c-b <baud>ttya
```

The system responds:

```
#
```

6. Enter `n` to the following message:

```
# answer n to "Do you want to reboot?"
```

7. Start a port monitor on `ttya`:

```
# abcdm -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:

```
# shutdown -y -is -g0
```

Note

The system will **not** successfully enter single-user mode if you execute the shut down 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). See Appendix D, "Sun SPARCserver Computer Factory Installation Procedures", for details.
- Output of the `prtconf -pv` (put the information in a file).
- Possibly output from the `/var/adm/messages` file.

Procedures

To put all the files on one tape, do the following procedures:

1. Log in as *root*.
2. Change to the dump directory with the following command:

```
# cd/dump
```

Note

The `/var/crash/<hostname>` file is linked to the `/dump` directory.

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 /dev/rmt/1 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, and press **Return**:

```
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 re-booted, instead of entering go, you may be prompted to use the `fsck` command to repair the *Solaris* file systems.

Solving Terminal-Related Problems

This section describes some of the day-to-day problems that may occur during the normal operation of the terminals supporting the 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 the "Supported Communications and Terminal/Printer Equipment" section in Chapter 4, "Installing Printers, Terminals, and Modems."

Note

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 symptom in this section and follow the corresponding solution step(s).

Symptom	Solution(s)
Several unexpected or "garbage" characters are displayed on the window.	1. Mismatches to speed, parity, and databits will cause gibberish on the terminal. Reset the terminal or use the na administration as needed. 2. Try holding down the Control key and pressing the L key. This should cause the screen to be repainted without the "garbage" characters.
The screen suddenly goes blank.	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 nonuse, 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.
The terminal "bell" is too loud or cannot be heard.	Adjust the volume control on the backside of the keyboard. (Refer to your terminal manual for details.)

Symptom	Solution(s)
Characters are not being displayed on the screen when the keys are pressed.	At the rear of the terminal, locate the power switch. Turn the terminal OFF. Wait a few seconds. Turn the terminal ON.
You turn the terminal ON, but nothing is being displayed on the screen.	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 at the rear of the terminal. 3. 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.
You turn the terminal ON, and it displays "garbage" characters.	1. Press the Return key once. Pause for a few seconds. Press the Return 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.
The terminal is "locked up." In other words, the terminal screen does not respond to keyboard input.	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.

Symptom	Solution(s)
You cannot find a symptom that relates to your terminal problem, or the solution step(s) corresponding to your terminal did not work.	The solution is 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. Hold the Control key down, and press the L key. 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: 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 computer, and check the connection at the computer end. d. If another terminal is available, try using it. e. See the CMS administrator, or escalate the problem through normal procedures.

Symptom	Solution(s)
The message "login incorrect" is displayed when you try to log in.	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 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 Chapter 3, "Installing the Sun SPARCserver Computer", for details.
- 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 symptom in this section and follow the corresponding solution step(s).

Problem	Solution(s)
Terminal does not display anything.	1. Make sure that the terminal has been turned <i>ON</i>. 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 prints "garbage" on the screen.	Mismatches to speed, parity, and databits will cause gibberish on the terminal. Reset the terminal or use the na administration as needed. The terminal baud rate and the computer baud rate may not match. Refer to Chapter 4, "Terminal Options" and "Administering Terminals" to verify that the terminal options have been properly set and that the terminal baud rate has been properly administered on the computer.

Problem	Solution(s)
"Trying 129.200.9.1" message displays but does not give you a login prompt afterwards.	You probably have an address mismatch for the <i>Sun SPARCserver</i> computer. Check the address in the <i>/etc/hosts</i> file on the <i>Sun SPARCserver</i> computer, and reset the <i>dedicated_address</i> parameter for ports using <i>na</i> administration.
Terminal screen displays "login:" but does not respond to keyboard input.	1. Check for a loose connection at the keyboard and at the terminal. 2. Turn the power to the terminal <i>OFF</i>, wait for a few seconds, and turn the terminal back <i>ON</i>. (Refer to your terminal manual if necessary.)

Diagnosing Network Terminal Server Problems

If you are experiencing terminal problems, the Network Terminal Server (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 "NTS Port Problems" section 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.

Using Network Administrator (NA) Utility

The *Solaris 2.4* 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 9-8 provides the na commands that are available.

Table 9-8: Network Administrator (NA) 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 9-8: Network Administrator (NA) 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.

Using CLI Tool

You can use the CLI tool to do the following:

- Check port or NTS statistics (see Example 1 on page 9-69).
- Check port or NTS statistics and administration (see Example 2 on page 9-69).
- Tap into any port to see the data being transmitted and received (see Example 3 on page 9-70).

To access CLI tool, do the following steps:

1. Log in to 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 **Return**. The system responds:

```
Rotaries defined: cli
Enter Annex port name or number:
```

3. Enter the `cli` command, and press **Return**:

```
$ cli
```

The system responds:

```
annex:
```

4. At the `annex:` prompt, enter a `cli` command.

Table 9-9 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 9-9: CLI Commands

Command	Description
<code>bg</code>	Puts the job in the background.
<code>connect</code>	Uses LAT to connect to an advertised LAT service.
<code>fg</code>	Returns to an established job.
<code>hangup</code>	Disconnects all jobs and resets user CLI connections.
<code>help</code>	Displays help info for commands.
<code>hosts</code>	Displays current <i>Sun SPARCserver</i> computer table.
<code>jobs</code>	Displays a list of current jobs.
<code>kill</code>	Terminates a job.

Table 9-9: CLI Commands (Contd)

Command	Description
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 <i>Sun SPARCserver</i> 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 <i>Sun SPARCserver</i> 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 statistics on the NTS as a whole. 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:

- 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** key sequence.
- 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** key sequence.

See the *Network Terminal Server Administrator User's Guide* for more in-depth information.

Using 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 status indicators are numbered one through eight.

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 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.

Solving Printer-Related Problems

This section provides solutions to problems that may occur during the normal operation of the printers supporting the CMS application.

If you are experiencing a printer problem, do the following:

- Check the cabling to the printer. See Chapter 4, "Installing Terminals, Printers, and Modems", for details.
- Check the cables from the NTS to the NTS patch panel to make sure you 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 `telnet` command did not appear, enter the `telnet` 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:

```
# 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 (for example).

```
# 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.

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. See Chapter 4, "Installing Terminals, Printers, and Modems", for more details.

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



If you are experiencing a printer problem that is not documented in this section or is not documented in your printer manual, see the UNIX manual pages in *AnswerBook* on-line software. If you cannot solve the printer problem, escalate the problem through normal procedures.

Some of the commands used in the following sections can be executed *only* while logged in as *lp* or *root*; the commands are as follows:

- `/usr/lib/accept`
- `/usr/lib/lpshut`
- `/usr/lib/lpsched`
- `/usr/lib/lpmove`
- `/usr/lib/lpadmin`.

Also, some other commands used in the following sections that can be executed while logged in as *cms*, *lp*, or *root* are as follows:

- `disable`
- `enable`
- `lpstat`
- `cancel`.

For more information on these commands and how to use them, see the UNIX manual pages in *AnswerBook* on-line software.

If you do not know the name(s) of the printer(s) connected to the computer, execute the following command:

```
$ lpstat -v
```

If you are currently in the CMS environment and you want to test the printer, press the **Commands** 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 execute 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:

```
$ 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 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 executing the following command:

```
$ disable <printer_name>
```

Replace the string `<printer_name>` with the real name of the printer.

3. Enable the printer by executing the following command:

```
$ enable <printer_name>
```

If the above method to get printers to print fails, do the following:

4. Execute the following command to disable the printer again:

```
$ disable <printer_name>
```

5. Turn the printer power off and on.
6. Enable the printer by executing 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 generalized 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 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 executing 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 executing 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 executing the following command:

```
$ exit
```

How to Stop and Discard Current Print Job

1. From the 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 executing 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 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 executing 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 executing the following command:

```
$ enable <printer_name>
```

The printer should start printing the print job over 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 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, execute the following command:

```
$ lpstat -t
```

From the output, determine if the scheduler is running.

3. If the scheduler is not running, execute 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, execute the following command to turn the scheduler on:

```
# /usr/lib/lpsched
```

6. Execute the next command to verify that the scheduler is running:

```
# lpstat -t
```

7. To return to the CMS environment, execute 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.

Note

For more information about resubmitting print jobs because of a power failure or terminal, printer or modem administration, see Chapter 4, "Installing Terminals, Printers, and Modems".

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 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 executing 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 executing 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 CMS environment, execute 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 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 executing the following command:

```
$ disable <printer_name>
```

3. Execute 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 executing the following command:

```
# /usr/lib/reject <printer_name>
```

6. If you want to cancel the print jobs already in the queue, execute 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 CMS environment, execute the following command:

```
# exit
```

9. Fix the printer as necessary. (Refer to your printer manual if necessary.)
10. If you are in the 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 executing the following command:

```
$ enable <printer_name>
```

Replace the string *<printer_name>* with the real name of the printer.

13. Execute 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 executing the following command:

```
# /usr/lib/accept <printer_name>
```

Note

A few seconds after you execute this command, the printer should start printing the first print job in the queue.

16. To return to the CMS environment, execute 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 Chapter 12, "Maintenance" in the *Call Management System Administration* (AT&T 585-215-521) document for details.
2. Enter the name of the broken printer in the CMS printer name: field, and press the **Return** key.
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 CMS printer name is now associated with another printer that is functional. The print jobs sent to the CMS printer_name will be redirected to the functional LP printer.

Note

After the printer is operational, do not forget to reassign the 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 CMS windows environment, move to the *Solaris* environment by pressing the **Commands** SLK and selecting the UNIX (r) system option.
2. Execute 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. Execute 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 CMS environment, execute 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 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 executing the following command:

```
$ disable <printer_name>
```

3. Execute 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 executing the following command:

```
# /usr/lib/reject <printer_name>
```

6. If you want to cancel the print jobs already in the queue, execute 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 CMS environment, execute the following command:

```
$ exit
```

9. Fix the printer as necessary. (Refer to your printer manual if necessary.)
10. If you are in the 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 executing the following command:

```
$ enable <printer_name>
```

Replace the string *<printer_name>* with the real name of the printer.

13. Execute 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 executing the following command:

```
# /usr/lib/accept <printer_name>
```

16. To return to the CMS environment, execute the following command:



```
$ exit
```

Solving Modem-Related Problems

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 the modem settings. See Chapter 3, "Installing the Sun SPARCserver Computer", for more information.



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.

Solving Power-Related Problems

This section provides some troubleshooting solutions to power-related problems (for example, when the 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.

To turn the power back *on*, use the following sequence:

1. External drive units, starting with the unit furthest to the system unit. This is generally the device that has the SCSI terminator connected to it.
2. Continue turning on each device moving towards the system unit.
3. System monitor.
4. *Sun SPARCserver* computer (system unit).

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
```

\$

It is recommended to turn the power *off* in the reverse sequence as described above.

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.

Solving Installation-Related Problems

This section provides some suggestions for solving problems that could arise during an installation. The following installation-related problems are described:

- When a Solaris Patch Installation Fails
- Pkgchk Errors
- Solving X.25 License Installation Problems
- When X.25 Install Hangs Up
- Details for Installing INFORMIX-SE
- Installing CMS.

When a *Solaris* Patch Installation Fails

When a *Solaris* patch installation fails (for example, during `/tmp/patches /install-patches`), you can attempt to fix the source of the error and rerun `/tmp/patches/install-patches`. As a last resort, you can comment out the lines relating to the bad patch and rerun the script. You must resolve the problem and install the patch before returning the system to service.

Pkgchk Errors

The `pkgchk -n cms` command lists some common error messages that do not signal a problem. The following error messages in Table 9-10 can be ignored:

Table 9-10: Error Messages to Ignore

Location	Error Message	Occurs
/cms/install/logdir/admin.log	group name <root> expected <cms> actual.	After the installation and before setup.
/usr/lib/cms/pbxtrcflags	path name does not exist.	After the installation and before setup.
/cms/env/cms_mon/State_tbl	group name <bin> expected <other>actual.	After the setup and before running cms.
/cms/install/logdir/admin.log	group name <root> expected <cms>actual.	After the setup and before running cms.
/usr/lib/cms/pbxtrcflags	path name does not exist.	After the setup and before running cms.
/cms/env/cms_mon/State_tbl	group name <bin> expected <cms> actual.	After running cms.
/cms/install/logdir/admin.log	group name <root> expected <cms> actual.	After running cms.
/usr/lib/cms/pbxtrcflags	group name <bin> expected <cms> actual.	After running cms.

Solving X.25 License Installation Problems

Error messages are generated by the license system if you have problems during the installation. The error messages are divided into three categories: informational, configuration, and daemon software errors. For example:

- Informational Error Message:
DEMO mode supports only one SERVER host!

Solution:
An attempt was made to configure a demo version of the software for more than one server *Sun SPARCserver* computer.
- Configuration Error Message:
hostname: Wrong hostid, exiting

Solution:
The hostid is wrong for the host name.
- Daemon Software Error Message:
hostname: Can't allocate server table space

Solution:
A malloc error. Check swap space.

See the "License Error Messages" section of the "*SunLink*" X.25 8.02 *Installation Guide* for a complete list of licensing error messages.

Details for Installing INFORMIX-SE

The serial numbers required to install INFORMIX-SE can be found on the back of the INFORMIX-SE cartridge tape or see Appendix D, "Sun SPARCserver Computer Factory Installation Procedures".

CMS Package Details

This section provides some CMS package-related details to help you solve problems that could occur during installation. For example:

- The wrong cms package instance is used.
- The system fails to remove a cms package.
- The system fails to update a cms package.

Identifying CMS Package Instances

You can have up to two CMS package instances:

- *cms*— the base package instance used for regular installs
- *cms.2*—the package instance used for updates.

To identify the version of CMS software you need, enter the `pkginfo -x cms.*` command at the system prompt.

Removing CMS Package Fails

If you are exited from the system when removing a CMS package (*cms* or */cms.2*), you may have done the following:

- Logged in as `cmssvc`
- Switched user—`su'd` to `root/root2`
- Ran `cmssvc`.

Solution:

- Log in directly as `root/root2`
- Remove package(s) as instructed by the system.

Checking Installed *Solaris* Patches

To verify that the correct *Solaris* patches are installed, do the following steps:

1. Enter the `showrev -p` command at the system prompt:

```
# showrev -p
```

The system responds:

```
# showrev -p
Patch: 100982-02 Obsoletes: Packages: SUNWcsr.2 11.5.0,
      REV=1.0.15.2, PATCH=15
Patch: 100992-03 Obsoletes: Packages: SUNWcsr.3 11.5.0,
      REV=1.0.15.2, PATCH=68
Patch: 100999-51 Obsoletes: 100985-06, 100998-02, 10108602,
      100998-02, 101086-02, 1011
Patch: 101014-05 Obsoletes: Packages: SUNWcsu.3 11.5.0,
      REV=      1.0.15.1, PATCH=85
.
.
.
```

2. Check the list to verify that all the *Solaris* Patches you need are installed.

See Chapter 8, "Maintenance", for more information about Installing *Solaris* Patches.

When an Update Fails

Do the following if the installation of an update fails:

1. At the system prompt, enter `pkgrm cms.2`.
2. From the information displayed, identify and correct the problem.
3. Reinstall the update. See Chapter 10, "Upgrading or Updating the CMS Software", for details.

When Installing an Update Fails

Table 9-11 provides a list of error messages that indicate when an update save (`upd_save`) fails during installation (`upd_inst`).

Table 9-11: Error Messages When an Save Update Fails

Error Message	Problem	Solution
"up_install: another update is already installed"	There is already an update installed.	Remove the Update (upd_remove), and then install an Update (upd_install).
"You must remove cms.2 before installing this update"	There is already an update installed.	Remove the Update (upd_remove), and then install an Update (upd_install).
"no update spooled run upd_save and then upd_install"	There is no update spooled.	Run the Save Update (upd_save), and then reinstall the Update (upd_install).
"<X> blocks and <Y> modes are required in the <Z> file system to install this package"	There is not enough space in /cms to install the update.	Remove the failed instance with an Update Remove (upd_remove) or a Package Remove (pkgrm). Reclaim the space in the file system, and attempt to install again.
"<M> free blocks and <N> free modes exist"	There is not enough space in /cms to install the update.	Remove the failed instance with an Update Remove (upd_remove) or a Package Remove (pkgrm). Reclaim the space in the file system and attempt to install the update again.

See Chapter 10, "Upgrading or Updating the CMS Software", for more information about installing an update.

When an Update Save Fails

Table 9-12 provides a list of error messages that indicate when saving an update fails (upd_save).

Table 9-12: Reasons Save Updates Fail

Error Message	Problem	Solution
"upd_save: pkgadd was unable to spool the package into the temporary directory."	The <i>/tmp</i> directory is out of space.	Clear out the <i>/tmp</i> directory, and attempt an upd_save again.
"upd_save: cannot determine if package is an update."	The update tape is not an update.	You might be using the wrong tape, or the tape is corrupted. You must get a new tape.
"upd_save: CMS version X is not an update."	The update tape is not an update.	You are using the wrong tape. Use the correct tape.
"upd_save: cannot determine version of update."	You cannot get the version number.	You are probably using the wrong tape, or the tape is corrupted. Use the correct tape.
"Failed to save installation files."	Not enough space in <i>/cms</i> to spool packages.	Check the amount of free space in CMS. If the space is low, try to remove or clear out unnecessary files.

See Chapter 10, "Upgrading or Updating the CMS Software", for more information about installing an update.

When an Update Remove Fails

The following list provides some possible reasons why removing an update (upd_remove) fails:

- The original install failed (most common).
- No updates are installed.
- The *pkgmap* file is not present (unlikely situation).

An update remove could fail if the *pkgmap* file in */var/sadm/pkg/cms.2/save/pkgmap* was removed or was never present. You can remove the update instance, but there is no way to determine if the files are in an update; therefore, the files cannot be restored. The *checksums* will not be updated and *pkgchk* could show errors.

See Chapter 10, "Upgrading or Updating the CMS Software", for more information about installing an update.

AnswerBook Package Details

If you get the following error message when you start *AnswerBook* on-line software package, you probably did not insert *Solaris 2.4 System AnswerBook* CD-ROM into the disk drive:

AnswerBook "Solaris 2.4 System AnswerBook" is not accessible.

Verify that the card catalog entry for this *AnswerBook* is correct.

Do the following to correct the problem:

1. Click on with the left mouse button.
2. Insert the *AnswerBook* CD-ROM.
3. Wait until the light stops flashing on the disk drive.
4. Click with the left mouse button.
5. Click with the left mouse button.
6. Click .

See the "AnswerBook Software Package" section in Chapter 1, "Introduction," for more information.

Checking Error Logs

This section describes some common log characteristics and covers specific information about each of the logs that are provided.

The following types of problems will generate an entry into the error log:

- Data conversion problems
- Start-up and shut-down problems
- Installation problems
- Set-up problems
- Critical or warning messages.

Wrapping Techniques

Many of the log files use a common, general purpose file wrapping technique to keep a controlled amount of historical log information. It keeps the current log in a file always named the name of the log. For example, the error log is named `eLog`, and there may be three older logs kept called `eLog.01`, `eLog.02`, and `eLog.03`.

When the current active log file becomes full, it rolls over and a new log file is started. At the time that the log rolls over, the oldest log is deleted, each of the other logs moves to its new name, and a new log file is started.

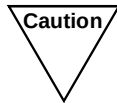
The size of the logs is controlled by the file size. If a specific number of hours of log information is needed, some monitoring will be needed to see how much time is covered by a log.

Each log file concludes with a message that the file size limit has been reached and that a new log will be started. This is particularly useful if using the *Solaris* 2.4 command `tail -f` to monitor ongoing activity in the log. When the message is displayed, a new `tail` command will need to be started. After you finish reviewing log activity, press **Del** to exit.

Administering Options

You can administer the following options:

- Location of the log files
- Number of historical log files
- Size of the Files.



Only qualified TSC personnel should administer these log files. Do not delete or change any information in these log files without first contacting your Technical Support Center.

Running Logs

The logs run under a variety of circumstances:

- Always running when CMS and/or *Solaris* are running and cannot be stopped
- Must be manually started and stopped
- Must be manually started and stopped; are also automatically stopped after a reboot and/or restarting CMS.

Contact the Technical Support Center for more information.

Contents of Error Logs

Each error log contains specific information about each log file, including defaults, administration information, a description of the contents and general information about how to interpret the contents of the logs:

- **Default Location**—the file name of the primary file where log information can be found if no administrative changes have been made.
- **Default Maximum File Size**—the approximate size of each of the log files (primary and historical) that will be saved if no administrative changes have been made.
- **Default Number of Older Files Retained**—the number of historical files that are kept, in addition to the primary file, if no administrative changes have been made.
- **Administration File**—if the log is controlled by the general purpose file wrapping technique, the location of the file where administrative changes can be made affecting the location of the log file, the size of the logs, and/or the number of historical log files.
- **Starting/Stopping**—describes the conditions for the log to be running, including any appropriate commands.
- **Writing Process**—indicates all processes that write into the log.
- **Intended Audience**—usually customer (for log information that is useful to the customer, easy to read, and documented) or services (for log information that is intended to aid troubleshooting).
- **First Implemented in Load**—indicates the first load when the log is available—an internal load numbering (such as 3.1z) is used.

Summary of Error Logs

Refer to Table 9-13 to identify which error log to use to resolve a problem.

Table 9-13: Types of Error Logs

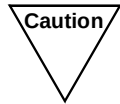
Type of Log	Name of Error Log	Default Location
General Error Logs	elog	/usr/elog/elog
	elog_elog	/usr/elog/elog
	elog_if	/user/elog/elog_if
	customer elog	INFORMIX database table customer_log
Link-Related Logs	spi.err	/cms/pbx/acd1/spi.err
	spi.lnk	/cms/pbx/acd1/sim.lnk
	spi.log	/cms/pbx/acd1/spi.log
	ag.log	/cms/pbx/acd1/ag.log
	sim.err	/cms/pbx/acd1/sim.err
	sim.lnk	/cms/pbx/acd1/sim.lnk
	xln.log	/cms/pbx/acd1/xln.log
Process-Related Logs	proc_log	/cms/env/cms_mon/proc_log
	mq_clean	/cms/env/cms_mon/mq_clean
	gem_log	/cms/env/gem/gem_log
	rt_gem	/cms/env/gem/rt_gem
<i>Solaris</i> Logs	messages	/var/adm/messages*

Table 9-13: Types of Error Logs (Contd)

Type of Log	Name of Error Log	Default Location
Special Task Logs	harch.log	/cms/db/LogAdmin/hachiver
	arch.log	/cms/dc/archive/arch.log
	ttlog	/cms/db/journal/timetable/ttlog
	r3mig.log	/cms/migrate/r3mig.log
	back.log	/cms/maint/backup/back.log
	rest.log	/cms/maint/restore/rest.log
	migrate.log	/cms/migrate/migrate.log
	mig.log	/cms/maint/r3mig/mig.log
Installation/Upgrade/cmsadm Logs	run_cms.log	/cms/install/logdir/install.log
	install.log	/cms/install/logdir/install.log
	db_upg.log	/cms/install/logdir/db_upg.log
	backup.log	/cms/install/logdir/backup.log (see also admin.log)
	swsetup.log	/cms/install/logdir/swsetup.log (see also admin.log)
	pkg.log	/cms/install/logdir/pkg.log (see also admin.log)
	setup.log	/cms/install/logdir/setup.log (see also admin.log)
	admin.log	/cms/install/logdir/admin.log
Miscellaneous Logs	log_msg	/lib/log_msg
	printer.errors	
	bp.uid	/cms/tmp/bp.uid

Upgrading the CMS Software

This chapter describes how to upgrade or update the R3V2 CMS software application.



To do an upgrade, you must have sufficient free space on your disk to accommodate all the data you want to collect. See the "Pre-Upgrade Procedures" section below for details.

If your current disk space allocation specifies more items to be measured for longer lengths of time than you actually have space for on your disks, you must do the following:

- Purchase additional disks.
- Change the length of time for which the data is stored.

Change the number of entities measured before you do an upgrade.

Pre-Upgrade Procedures

Prerequisites: You must be logged in as *root*, the computer must be in run-level 2 or 3, all file systems must be mounted, and CMS must be turned OFF.

Note

The upgrade process will take approximately 1 hour to complete.

Before you upgrade a system to a new base load or install a field update, do the following:

- Do a full file system backup. See the "Performing a CMSADM File System Backup" section in Chapter 8, "Maintenance," in the *CMS R3V2 High-Performance Platform, Installation and Maintenance* (AT&T 585-521-123) document.
- Make sure you have the CD-ROM that contains the new base load or the tape that contains the field update software.
- Verify you have sufficient space in */tmp* by entering the `df -l /tmp` command. Verify you have sufficient space in */cms* by doing the following:
 1. Determine the amount of available space by entering the `df -l /cms` command.

2. Determine the amount of space required by the current CMS package by entering the following command.

```
pkgparam cms IBSblocks IBSinodes
```

The number of blocks and modes are displayed.

Note

CMS requires 100,000 blocks and 1400 inodes for the new load. Follow the directions in this section to figure out how many blocks or inodes the current package is using.

3. Compute the difference between the old and new load for blocks and modes, and compare the amount of available space computed in Step 1.

To Upgrade CMS, use the following **required** procedures:

- Remove installed field updates (if present).
- Remove the current CMS base load.
- Install the new *Solaris* patches (if needed).
- Install the new CMS base package.

Removing Installed Field Updates

Do these steps to determine if a field update is installed.

1. Start the remove installed field update procedure by entering:

```
# pkginfo cms.*
```

The program responds:

```
application cms          Call Management System
application cms.x        Call Management System
```

(where x = the field update number)

Note

If more than one package is displayed (for example, application cms.2), you can determine that there is a field update installed.

2. Enter the following information:

```
# pkgrm cms.2

      (where x = the field update number)
```

The program responds:

```
The following package is currently installed:
      cms.x                Call Management System
                          (sparc) 3rxxx

Do you want to remove this package [y,n,?,q]
```

3. Answer y.

The program responds with a list of files that will be changed due to the removal of the update:

```
## Verifying package dependencies.
## Processing package information.
## Executing preremove script.
## Removing pathnames in class <ind>
/cms/install/bin/upd_save <shared pathname not removed>
/cms/install/bin/turn_on_cms <shared pathname not removed>
/cms/install/bin/turn_off_cms <shared pathname not removed>
/cms/install/autoconfig <shared pathname not removed>
/cms/install/auditmap <shared pathname not removed>
## Removing pathnames in class <edit>
>> Leaving sun patches installed.
## Removing pathnames in class <sun_fix>
>> Leaving sun patches installed.
## Removing pathnames in class <op_fix>
>> Leaving other package fix files installed.
## Removing pathnames in class <data>
>> Retaining customer files and directories.
## Executing postremove script.
```

If the removal is successful, this message displays:

```
Restoring old CMS software
/cms/install/auditmap
/cms/install/autoconfig
/cms/install/bin/turn_off_cms
/cms/install/bin/turn_on_cms

Updating installation software database.

Removal of Call Management System (3rxxx) is complete
## Updating system information.

Removal of <cms.x> was successful.
```

The system prompt returns to your screen.

The installed field updates (if present) are removed from the CMS software. You can now remove the current CMS base package.

Removing Current CMS Base Package

Do these steps to remove the current CMS base package:

1. Enter:

```
# pkgrm cms
```

The program responds:

```
The following package is currently installed:
cms                               Call Management System
                                (sparc) 3rxxx

Do you want to remove this package [y,n,q,?]
```

2. Answer y.

The system responds:

```
## Removing installed package instance <cms>

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,?]
```

3. Answer y. The system responds:

```
## Verifying package dependencies.
## Processing package information.
## Executing preremove script.

Do you want to preserve CMS data? [y,n,?]
```

4. Answer y . The system responds:

CMS will be removed from this machine; the data will be preserved.

Are you sure this is correct? [y,n,?]

5. Answer y . The system responds:

All file systems should be backed up before continuing.
See the maintenance chapter in the CMS Installation and Maintenance Manual for instructions.

Have you backed up the file systems? [y,n,?]

Note

If you have not backed up the file systems, answer n.
Back up your file systems, and start the upgrade process again.

6. Answer y . The system responds:

```
## Removing pathnames in class <ind>
/usr/lib/cms/trmaps
/usr/informix/etc/termcap
/usr/bin/cmssvc
.
.
.
```

If the removal is successful, this message displays:

Removal of <cms> was successful.

The system prompt returns to your screen.

After you remove the current CMS base package, you can now install *Solaris* patches.

Installing New *Solaris* Patches

Depending on the needs of your system, you may or may not need to install *Solaris* patches. If *Solaris* patches are available, you must install them on your system.

Do these steps to install new *Solaris* patches:

Note

The CD-ROM containing the new patches will be required in the CD-ROM drive.

1. Remove the “CMS” CD-ROM from its case. If you have an external CD-ROM drive, follow the steps below. Otherwise, go to step 2.
 - a. Place the “CMS” CD-ROM in the CD-ROM caddy. When the CD-ROM is properly inserted in the caddy, the CD-ROM label is visible.
 - b. Insert the CD-ROM caddy into the CD-ROM drive slot.
 - c. Go to step 5.
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:

```
# pkgadd -d /cdrom/cms
```

The system responds:

```
The following packages are available:
```

```
1 cms          Call Management System
                (sparc) S3racc
2 spatches     CMS Supplied Solaris Patches
                (sparc) 1.0
```

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

If the `spatches` package is displayed, you must install it.

6. Enter 2 to select *spatches*. The system responds:

```
Processing package instance <spatches> from </dev/rmt/0>
```

```
CMS Supplied Solaris Patches
(sparc) 1.0
AT&T
```

```
Installation of this package will cause CMS-required Solaris
patches to be spooled into /tmp/patches. After the patches are
spooled into /tmp/patches, one must install the patches by
running a script called /tmp/patches/install_patches. In
addition, the script will backout any patch that needs to be
removed prior to installing a required patch. Patches
currently installed are not affected by installing this
package.
```

```
Do you want to spool Solaris patches into /tmp/patches?
```

7. To spool Solaris patches into `/tmp/patches` file, enter y. The system responds:

```
## Processing package information.
## Processing system information.
## 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,?]
```

8. To continue with the installation of this package, enter `y`.
The system responds:

```
Installing CMS Supplied Solaris Patches as <spatches>

XX Installing part 1 or 1.
Spooling 100982-02
Spooling 100992-03
Spooling 100999-51
Spooling 101014-05
Spooling 101018-07
.
.
.

Patches successfully saved

Solaris patches were copied to /tmp/patches.
To install the solaris patches, run the following command:
/tmp/patches/install-patches
```

9. To install the *Solaris* patches, enter the following command:

```
# /tmp/patches/install_patches
```

Note

Once the *Solaris* patches are installed, a reboot is necessary. Be sure to run the `/tmp/patches/install_patches` command before rebooting.

The system responds:

```
# /tmp/patches/install_patches
@(#) installpatch 3.5 93/04/28

generating list of files to be patched
Save old versions of files to be patched
/var/sadm/patch/100982-02/save/kernel
/var/sadm/patch/100982-2/save/kernel/fs
/var/sadm/patch/100982-2/save/kernel/fs/fifofs
XXX blocks
Installing patch packages
Doing pkgadd of SUNWcsr package:
```

Response continues:

```
Patch installation finished
@(#) installation finished
generating list of files to be patched
Save old versions of files to be patched
/var/sadm/patch/100992-03/save/kernel
/var/sadm/patch/100992-03/save/kernel/drv
.
.
.
Installing patch packages
Doing pkgadd of SUNWcsr package:

Installation of <SUNWcsr.7> was successful.
Patch installation finished
To complete the solaris patch installation, one should reboot
with the following command: shutdown -y -i6 -g0
#
```

Note

Remember to reboot if instructed by the system.

10. To complete the *Solaris* patch installation, you must reboot your system using the following command:

```
# shutdown -y -i6 -g0
```

The installation of the new patches is now complete. The system prompt returns to your screen. You are now ready to install the new CMS base package software.

Installing New CMS Software

Do these steps to install the new CMS base package software:

Note

The CD-ROM containing the new CMS software load will be required in the CD-ROM drive.

1. Remove the "CMS" CD-ROM from its case. If you have an external CD-ROM drive, follow the steps below. Otherwise, go to step 2.
 - a. Place the "CMS" CD-ROM in the CD-ROM caddy. When the CD-ROM is properly inserted in the caddy, the CD-ROM label is visible.
 - b. Insert the CD-ROM caddy into the CD-ROM drive slot.
 - c. Go to step 5.
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. Start the upgrade procedure by entering:

```
# pkgadd -d /cdrom/cms
```

The program responds:

```
The following packages are available:
```

```
1 cms          Call Management System
               (sparc) 3rxxx
2 spatches     CMS Supplied Solaris Patches
               (sparc) 1.0
```

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

6. Enter 1. The system responds:

```
Processing package instance <cms> from </dev/rmt/0>

Call Management System
(sparc) 3rxxx

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All Rights Reserved

Using </cms> as the package base directory.

Installing the Call Management System (3rxxx).

## Processing package information.
## Processing system information.
    138 package pathnames are already properly installed.
## Verifying package dependencies.
## Verifying disk space requirements.
## Checking for conflicts with packages already installed.

The following files are already installed on the system and
are being used by another package:
    /cms/install/logdir/admin.log
    /etc/init.d/sysetup
    /etc/system
    .
    .
    .

Do you want to install these conflicting files? [y,n,q,?]
```

7. Answer y . The system responds:

```
## Checking for setuid/setgid programs.
```

The following files are being installed with setuid and/or setgid permissions or are overwriting files which are currently setuid/setgid:

```
/cms/bin/mqpeek <setuid root>  
/cms/bin/spi <setuid root>  
/cms/toolsbin/cmsu <setuid root>  
/cms/toolsbin/initSimConf <setuid root>  
/cms/toolsbin/initSimConf <setuid root>  
/cms/toolsbin/psx <setuid root>  
/cms/toolsbin/psx <setuid root>  
/cms/toolsbin/shmdump <setgid sys>
```

Do you want to install these setuid/setgid files [y,n,q,?]

8. Answer y . The system responds:

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,q,?]

9. Answer y .

The system responds:

```
Installing Call Management System as <cms>

## Executing preinstall script.

## Installing part 1 of 1.
[ verifying class <data> ]
[ verifying class <op_fix> ]
.
.
.
/etc/SUNWconn/x25/template/cms.spin1.wan
/etc/rc0.d/K92cms
/usr/bin/cms
/usr/bin/cmsadm
/usr/bin/cmssvc
/usr/informix/etc/termcap
/usr/lib/cms/trmaps
[ verifying class <ind> ]
## Executing postinstall script.

## Upgrading Customer CMS data . . .

Customer CMS data successfully upgraded.

Setting Solaris 2.4 system tunable parameters for CMS.
No changes to tunable parameters were required.

Installation of <cms> was successful.
#
```

Note

If you are instructed to run `shutdown`, use the displayed command. See the "Installing New Solaris Patches" section in this chapter for more information.

The installation of the new CMS base package is not complete. The system prompt returns to your screen.

10. Enter:

```
# eject cdrom
```

11. Remove the CMS CD-ROM from the CD-ROM drive.

Verifying CMS Software Installation

Do the following to verify the installation of the new CMS software:

1. Enter:

```
# pkgchk -n cms
```

If the software installation is successful, the system prompt returns to your screen.

If errors are detected, see Chapter 8, "Maintenance", for more information.

Installing Field Update for New CMS Load

Do these steps to install the field update for the new CMS load:

Note

A field update is put on a separate tape. You may have new patches as part of an update.

1. Start the install field updates for new load procedure by entering:

```
# pkgadd -d /dev/rmt/0 cms
```

The program responds:

```
Insert a tape into Tape Drive.  
Type [go] when ready,  
or [q] to quit:
```

Note

If a “Broken Pipe” message is displayed when using the `pkgadd -d /dev/rmt/0` command for a tape, ignore the message. This message has no effect on system operations.

2. Enter go. The system responds:

```
Processing package instance <cms> from </dev/rmt>

Call management System
(sparc) 3rxxx
AT&T
Using </cms> as the package base directory.

Installing the Call Management System (3rxxx).

## Processing package information.
## Processing system information.
## Verifying package dependencies.
## Verifying disk space requirements.
## Checking for conflicts with packages already installed.

The following files are already installed on the system and
are being used by another package:
    /cms/install/auditmap
    /cms/install/autoconfig
    /cms/install/bin/turn_off_cms
    /cms/install/turn_on_cms
    /cms/install/bin/upd_save
Do you want to install these conflicting files [y,n,q,?]
```

3. Answer y.

The system responds:

```
## Check 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,q,?]
```

Answer y. The system responds:

Installing Call Management System as <cms.2>

```
## Executing preinstall script.
Making backup copies of old files ...
/cms/install/update/file_bkup/cms/install/auditmap
/cms/install/update/file_bkup/cms/install/autoconfig
/cms/install/update/file_bkup/cms/install/bin/turn_off_cms
/cms/install/update/file_bkup/cms/install/bin/turn_on_cms
/cms/install/update/file_bkup/cms/install/bin/upd_save
165 blocks
## Installing part 1 of 1.
/cms/install/auditmap
/cms/install/autoconfig
/cms/install/autoconfig
/cms/install/bin/turn_off_cms
/cms/install/bin/turn_on_cms
/cms/install/bin/upd_save
[ verifying class <ind> ]
## Executing postinstall script.
```

Note

You may be instructed to run shutdown. If you are instructed to run shutdown, then use the command displayed.

If the installation of the field updates is successful, this message displays:

```
## Upgrading Customer CMS data . . .
```

```
Customer CMS data successfully upgraded.
```

```
Setting Solaris 2.4 system tunable parameters for CMS.
No changes to tunable parameters were required.
```

```
Installation of <cms.2> was successful.
```

Installation of the field update for the new base load is completed.
The system prompt returns to your screen.

4. Remove the cartridge tape after it finishes rewinding (drive light is not blinking).

Post Upgrade Procedures

Prerequisites: You must be logged in as *root*, the computer must be in run-level 2 or 3, all file systems must be mounted, and CMS must be turned OFF.

Upgrading CMS uses the following procedures:

- Verify the installation via `pkgchk`.
- Restart CMS.
- Back up upgraded CMS software.

Verifying Field Update of New Software Installation

Do the following to verify the installation of the field updates for the new base load software is complete:

1. Enter `pkgchk` command.

```
# pkgchk -n cms.*
```

The CMS software is verified and upgraded.

If errors are detected, see Chapter 8, "Checking Installed Software Packages" for more information.

Restarting CMS

Do the following to restart the CMS software:

1. Access the CMS Services menu by entering:

```
# cmssvc
```

The system responds:

Commands for CMS Services Personnel

Select a command from the list below.

- 1) `auth_display` Display feature authorizations
 - 2) `auth_set` Authorize CMS capabilities/capacities
 - 3) `backup` Single-tape filesystem backup (in background)
 - 4) `run_cms` Turn CMS on or off
 - 5) `setup` Set up the initial CMS configuration
 - 6) `swinfo` Display switch information
 - 7) `swsetup` Change switch information
 - 8) `upd_install` Install update from disk files
 - 9) `upd_remove` Back out the currently installed update
 - 10) `upd_save` Save update on disk for later installation
- Enter choice (1-10) or q to quit:

2. Enter 4 to select the `run_cms` option. The system responds:

Select one of the following

- 1) Turn on CMS
 - 2) Turn off CMS
- Enter choice (1-2):

3. Enter 1 to turn on CMS.

The system responds:

Turning on X25, please wait

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

Please wait for initialization.

CMS is now up

The system prompt returns to your screen.

Backing Up Upgraded CMS Software

Do a full CMS maintenance backup as soon as possible.

In the Back Up Data window, select y (yes) for the Verify volume can be read after backup field. In addition, the following fields should contain an x:

- All ACDs
- ACD-specific data
- System administration data
- Historical data

— Full.

See the “Back Up Data” section in Chapter 12, “Maintenance” of the *CMS Administration* (AT&T 585-215-521) document.

Note

CMS incremental maintenance backups will fail if a full backup is not done. See Chapter 8, "Maintenance", for file system and cmsadm backup procedures.

Updating the CMS Software

Updating the CMS software is a two part process. First, the CMS update files are downloaded from cartridge tape to hard disk. This allows the update files to be stored on the hard disk until a convenient time to do the update. *Solaris* patches (spat ches) may also be installed on an update tape. Downloading the CMS update files requires an on-site technician to insert the CMS update tape into the tape drive.

The second part of the process is installing the update from the hard disk files. This part of the process can be done remotely. Since CMS must be turned off to install the update from disk files, you should install the update when customer service is not interrupted.

Saving the CMS Update to Disk Files

Prerequisites: You must be logged in as *root*, the computer must be in run-level 2 or 3, and all file systems must be mounted.

To save the CMS software update to disk files, do the following steps:

1. Insert the CMS update cartridge tape into the tape drive.
2. Access the CMS Services menu by entering:

```
# cmssvc
```

The program responds:

Commands for CMS Services Personnel

Select a command from the list below.

- 1) `auth_display` Display feature authorizations
 - 2) `auth_set` Authorize CMS capabilities/capacities
 - 3) `backup` Single-tape filesystem backup (in background)
 - 4) `run_cms` Turn CMS on or off
 - 5) `setup` Set up the initial CMS configuration
 - 6) `swinfo` Display switch information
 - 7) `swsetup` Change switch information
 - 8) `upd_install` Install update from disk files
 - 9) `upd_remove` Back out the currently installed update
 - 10) `upd_save` Save update on disk for later installation
- Enter choice (1-10) or q to quit:

3. Enter 10 to select the *upd_save* option. The system responds:

Select tape drive to use:

- 1) `/dev/rmt/0`
 - 2) `/dev/rmt/0c`
- Enter choice 1-2:

Note

The example above is based on having only one tape drive. If you have more than one tape drive, the system responds differently.

4. Enter tape drive choice. The system responds:

Insert a tape into Tape drive.
Type `[go]` when ready,
or `[q]` to quit: `go`

5. Enter `go`. The system responds:

```
Transferring <spatches> package instance.  
  (Note: The previous message is displayed only if Solaris  
    patches are installed as part of an update.)  
Transferring <cms> package instance.  
#
```

The program begins downloading the CMS update files onto the hard disk as indicated by these messages:

```
Solaris Patch update contains the following patches: <patch #>  
  (Note: The previous message is displayed only if Solaris  
    patches are installed as part of an update.)  
Update contains the following files in /cms:  
.  
./install  
./install/auditmap  
./install/autoconfig  
./install/bin  
./install/bin/ins_proc  
  
Software saved in /cms/cms_updates/3rxxx for later  
installation.  
#
```

Note The number of file names on your screen may differ from above depending on the size of the update release.

The update files are downloaded from cartridge tape to hard disk.
The system prompt returns to your screen.

Removing the Currently Installed Update

Prerequisites: You must be logged in as *root*, the computer must be in run-level 2 or 3, all file systems must be mounted, and CMS must be turned OFF.

The CMS software provides an option that removes the currently installed update (if present) and restores the CMS software to the previous base load.

Do these steps to remove the CMS update:

1. Access the CMS Services menu by entering:

```
# cmssvc
```

The program responds:

```
Commands for CMS Services Personnel
```

```
Select a command from the list below.
```

```
1) auth_display Display feature authorizations
2) auth_set     Authorize CMS capabilities/capacities
3) backup       Single-tape filesystem backup (in background)
4) run_cms      Turn CMS on or off
5) setup        Set up the initial CMS configuration
6) swinfo       Display switch information
7) swsetup      Change switch information
8) upd_install  Install update from disk files
9) upd_remove   Back out the currently installed update
10) upd_save    Save update on disk for later installation
Enter choice (1-10) or q to quit:
```

2. Enter 9 to select the *upd_remove* option.

The system responds:

```
The following package is currently installed:  
cms.2          Call Management System  
                (sparc) 3rxxx
```

```
Do you want to remove this package [y,n,?,q]
```

3. Answer y. The system responds:

```
Removing installed package instance <cms.2>
```

```
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]
```

4. Answer y.

The program responds with a list of files that will be changed due to the removal of the update:

```
## Removing installed package instance <cms.2>
## Verifying package dependencies.
## Processing package information.
## Executing preremove script.
## Removing pathnames in class <ind>
/cms/install/bin/upd_save <shared pathname not removed>
/cms/install/bin/turn_on_cms <shared pathname not removed>
/cms/install/bin/turn_off_cms <shared pathname not removed>
/cms/install/autoconfig <shared pathname not removed>
/cms/install/auditmap <shared pathname not removed>
## Removing pathnames in class <edit>
>> Leaving sun patches installed.
## Removing pathnames in class <data2>
>> Retaining customer files and directories.
## Removing pathnames in class <op_fix>
>> Leaving other package fix files installed.
## Removing pathnames in class <data>
>> Retaining customer files and directories.
## Executing postremove script.
```

If the removal is successful, this message displays:

```
Restoring old CMS software
/cms/install/auditmap
/cms/install/autoconfig
/cms/install/bin/turn_off_cms
/cms/install/bin/turn_on_cms

Removal of Call Management System (3rxxx) is complete
## Updating system information.

Removal of <cms.2> was successful.

      (Note: The following messages are displayed only if
           Solaris patches were installed as part of an update.)

The following package is currently installed:
  spatches.2      CMS Supplied Solaris Patches
                  (sparc) 1.1
Do you want to remove this package [y,n,?,q] y
```

5. If a patch was included in the update, enter y.

```
## Removing installed package instance <spatches.2>
## Verifying package dependencies.
## Processing package information.
## Executing preremove script.
Generating script to backout the following patches:
101601-01
## Removing pathnames in class <sun_fix>
## Executing postremove script.
WARNING:
A Solaris patch removal script has been spooled into
/tmp/patches
To remove the Solaris patches, run the following command:
    /tmp/patches/backout_patches
Once the Solaris patches are removed, a reboot is necessary.
The reboot command will be provided by the backout_patches
script.
## Updating system information.
Removal of <spatches.2> was successful.
Proceeding to run /tmp/patches/backout_patches
Backoutpatch Version 3.7 1/24/94
Removing patch package for SUNWcsr.13:
Removal of <SUNWcsr.13> was successful.
Restoring previous version of files...
/kernel
/kernel/drv
/kernel/drv/iwscn
16 blocks
Making the package database consistent with restored files:
Patch 101601-01 has been backed out.
To complete the Solaris patch backout, one should reboot
with the following command: shutdown -y -i6 -g0
Solaris patches were backed out.
You will need to reboot before proceeding.
Reboot with the following command:
shutdown -y -g0 -s6
#
```

Note

You are instructed to run shutdown, use the displayed command. If *Solaris* patches are removed, you **must** reboot.

The system prompt returns to your screen. The update is removed from the CMS software.

Installing the CMS Update from Disk Files

Prerequisites: You must be logged in as *root*, the computer must be in run-level 2 or 3, all file systems must be mounted, and CMS must be turned OFF.

You install the CMS update from files stored on the hard disk. These files were created in the previous section. Installing an update from disk files can be done remotely.

Do these steps to install the CMS software update from disk files:

1. Access the CMS Services menu by entering:

```
# cmssvc
```

The program responds:

```
Commands for CMS Services Personnel
```

```
Select a command from the list below.
```

- 1) auth_display Display feature authorizations
- 2) auth_set Authorize CMS capabilities/capacities
- 3) backup Single-tape filesystem backup (in background)
- 4) run_cms Turn CMS on or off
- 5) setup Set up the initial CMS configuration
- 6) swinfo Display switch information
- 7) swsetup Change switch information
- 8) upd_install Install update from disk files
- 9) upd_remove Back out the currently installed update
- 10) upd_save Save update on disk for later installation

```
Enter choice (1-10) or q to quit:
```


2. Enter 4 to select the `run_cms` option.

The system responds:

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

3. Enter 2 to turn CMS off. The system responds:

```
*** Turning off CMS, Please wait ***
. . . .

***Turning off X25, Please wait***

*** CMS is now off ***
```

The system prompt returns to your screen.

4. Access the CMS Services menu by entering:

```
# cmssvc
```

The system responds:

```
Commands for CMS Services Personnel
```

```
Select a command from the list below.
```

```
1) auth_display Display feature authorizations
2) auth_set     Authorize CMS capabilities/capacities
3) backup       Single-tape filesystem backup (in background)
4) run_cms      Turn CMS on or off
5) setup        Set up the initial CMS configuration
6) swinfo       Display switch information
7) swsetup      Change switch information
8) upd_install  Install update from disk files
9) upd_remove   Back out the currently installed update
10) upd_save    Save update on disk for later installation
Enter choice (1-10) or q to quit:
```

5. Enter 8 to select the *upd_install* option. The system responds:

```
Select update to install:
```

```
1) 3rxxx.x
```

```
Enter choice (1-1):
```

6. Enter 1. If *Solaris* patches are installed as part of an update, the system responds:

```

This update contains Solaris patches.
Processing package instance <spatches> from
</cms/cms_updates/3raib.a/spatche
CMS Supplied Solaris Patches
(sparc) 1.1
AT&T
## Processing package information.
## Processing system information.
## Verifying package dependencies.
## Verifying disk space requirements.
Installing CMS Supplied Solaris Patches as <spatches.2>
## Installing part 1 of 1.
Spooling 101601-01
Patches successfully saved
[ verifying class <sun_fix> ]
## Executing postinstall script.
WARNING:
Solaris patches have been spooled into /tmp/patches. To install
the Solaris patches, run the following command:
    /tmp/patches/install_patches
Once the Solaris patches are installed, a reboot is necessary.
The reboot command will be provided by the install_patches
script.
Installation of <spatches.2> was successful.
Proceeding to run /tmp/patches/install_patches
Installpatch Version 3.8 1/24/94
Generating list of files to be patched...
Creating patch archive area...
Saving a copy of existing files to be patched...
    File compression being used
16 blocks
Installing patch packages...
Doing pkgadd of SUNWcsr package:
Installation of <SUNWcsr.13> was successful.
Patch packages installed:
    SUNWcsr
Patch installation completed.
See /var/sadm/patch/101601-01/log for more details.
To complete the Solaris patch installation, one should reboot
with the following command: shutdown -y -i6 -g0
Processing package instance <cms> from
</cms/cms_updates/3raib.a/cms>

```

The following is displayed with or without *Solaris* patches installed:

```
Processing package instance <cms>
from</cms/cms_updates/3rxxx/cms>

Call Management System
(sparc) 3rxxx
AT&T
Using </cms> as the package base directory.

Installing the Call Management System (3rxxx).

## Processing package information.
## Processing system information.
## Verifying package dependencies.
## Verifying disk space requirements.

The following files are already installed on the system and are
being used by another package:
    /cms/install/auditmap
    /cms/install/autoconfig
    /cms/install/bin/turn_off_cms
    /cms/install/bin/turn_on_cms
    /cms/install/bin/upd_save

Do you want to install these conflicting files [y,n,?,q]
```

7. If the previous message is displayed, answer y.

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

```
Do you want to install these conflicting files [y,n,?,q]
```

8. If the previous message is displayed, answer y.

The system responds:

```
Installing Call Management System as <cms.2>
## Executing preinstall script.
Making backup copies of old files...
/cms/install/update/file_bkup/cms/install/auditmap
/cms/install/update/file_bkup/cms/install/autoconfig
/cms/install/update/file_bkup/cms/install/bin/turn_off_cms
/cms/install/update/file_bkup/cms/install/bin/turn_on_cms
/cms/install/update/file_bkup/cms/install/bin/upd_save
165 blocks

[ verifying class <sun_fix> ]

/cms/install/auditmap
/cms/install/autoconfig
/cms/install/bin/turn_off_cms
/cms/install/bin/turn_on_cms
/cms/install/bin/upd_save
[ verifying class <ind> ]
## Executing postinstall script.

## Upgrading Customer CMS data . . .

Customer CMS data successfully upgraded

Setting Solaris 2.4 system tunable parameters for CMS.
No changes to tunable parameters were required.

Installation of <cms.2> was successful.
Update installation completed successfully

Remove saved disk files in /cms/cms_updates/3rxxx? (y/n):
```

9. Enter y.

```
Solaris patches were installed.
You will need to reboot before proceeding.
Reboot with the following command:
  shutdown -y -g0 -s6
```

Note

If you are instructed to run `shutdown`, use the displayed command. If Solaris patches are installed as part of the update, you **must** reboot.

The system prompt returns to your screen.

10. Access the CMS Services menu by entering:

```
# cmssvc
```

The system responds:

```
Commands for CMS Services Personnel
```

```
Select a command from the list below.
```

```
1) auth_display Display feature authorizations
2) auth_set     Authorize CMS capabilities/capacities
3) backup       Single-tape filesystem backup (in background)
4) run_cms      Turn CMS on or off
5) setup        Set up the initial CMS configuration
6) swinfo       Display switch information
7) swsetup      Change switch information
8) upd_install  Install update from disk files
9) upd_remove   Back out the currently installed update
10) upd_save    Save update on disk for later installation
Enter choice (1-10) or q to quit:
```

11. Enter 4 to select the *run_cms* option. The system responds:

```
Select one of the following
```

```
1) Turn on CMS
2) Turn off CMS
Enter choice (1-2):
```

12. Enter 1 to turn on CMS. The system responds:

Turning on X25, please wait

Starting the X.25 software – please wait

X.25 has found a valid license

The network has been brought up.

Please wait for initialization.

CMS is now up

The system prompt returns to your screen.

The CMS update is complete.

13. Remove the cartridge tape after it finishes rewinding (drive light is not lit).

Verifying CMS Update from Disk Files

Do the following to verify the CMS update from the disk to the files is complete:

1. Enter `pkgchk` command:

```
# pkgchk -n cms.*
```

The CMS software is verified and updated from the disk to the files.

Restarting CMS

Do the following to restart the CMS software:

1. Access the CMS Services menu by entering:

```
# cmssvc
```

The system responds:

```
Commands for CMS Services Personnel
```

```
Select a command from the list below.
```

- 1) auth_display Display feature authorizations
- 2) auth_set Authorize CMS capabilities/capacities
- 3) backup Single-tape filesystem backup (in background)
- 4) run_cms Turn CMS on or off
- 5) setup Set up the initial CMS configuration
- 6) swinfo Display switch information
- 7) swsetup Change switch information
- 8) upd_install Install update from disk files
- 9) upd_remove Back out the currently installed update
- 10) upd_save Save update on disk for later installation

```
Enter choice (1-10) or q to quit:
```

2. Enter 4 to select the *run_cms* option. The system responds:

```
Select one of the following
```

- 1) Turn on CMS
- 2) Turn off CMS

```
Enter choice (1-2):
```

3. Enter 1 to turn on CMS. The system responds:

```
Turning on X25, please wait
```

```
Starting the X.25 software – please wait
```

```
X.25 has found a valid license
```

```
The network has been brought up.
```

```
Please wait for initialization.
```

```
***CMS is now up***
```

The system prompt returns to your screen.

Backing Up Updated CMS Software

Do a full CMS maintenance backup as soon as possible.

In the Back-Up-Data window, select `y` (yes) for the `Verify volume can be read after backup` field. In addition, the following fields should contain an `X`:

- All ACDs
- ACD-specific data
- System administration data
- Full historical data.

See the “Back Up Data” section in Chapter 12, “Maintenance,” of the *CMS Administration* (AT&T 585-215-521) document.

Note

CMS incremental maintenance backups will fail if a full backup is not done.

Overview

The R3V2 CMS (Release 3 Version 2 Call Management System) application can collect and process ACD (Automatic Call Distribution) data from the DEFINITY Communications System Generic 3i and Generic 1 switches. However, before CMS can collect and process the ACD data, a special hardware interface on the switch must be properly administered. For the Generic 3i and Generic 1, the hardware interface is a Processor Interface. This hardware interface is sometimes called the CMS interface.

In addition to the CMS interface, the following CMS features on the switch must also be administered:

- Abandoned Call Search
- Agent Call Handling
- Hunt Groups
- Intraflow and Interflow
- Queue Status Indications
- Recorded Announcements
- Service Observing.

Note

For the screens to administer the EAS (Expert Agent Selection) feature, see Appendix E in the *R3V2 CMS Administration* (AT&T 585-215-521) document.

The following documents can be used by a qualified switch technician to implement the CMS interface and features:

- *AT&T DEFINITY Communications System Generic 1 Implementation Manual* (AT&T 555-204-654, Issue 1)
- *AT&T DEFINITY Communications System Generic 1 Installation and Test* (AT&T 555-204-104)
- *AT&T DEFINITY Communications System Generic 1 Wiring* (AT&T 555-204-111)
- *AT&T DEFINITY Communications System Generic 1 Maintenance* (AT&T 555-204-105).

For your convenience, the next section contains step-by-step procedures that can be used to implement the CMS interface. However, should you have any question about these procedures, refer to the appropriate switch documentation.

Note

Only a qualified switch technician or switch administrator should administer the CMS interface and features on the switch.

Administering CMS Interface on Generic 3i

This section contains the procedures required to establish a communications link between the *Sun SPARCserver* computer and the Generic 3i switch.

The Processor Interface on the Generic 3i has eight interface links (01 to 08) available on a multi-carrier cabinet system and four interface links (01 to 04) available on a single-carrier cabinet system. One of these interface links can be assigned to the *Sun SPARCserver* computer.

You assign the CMS interface by logging in on the SAT (System Access Terminal) as *craft* and filling out the following forms:

- Processor Interface Data Module form
- Data Module (MPDM/MTDM) form
- Processor Channel Assignment form
- Interface Links form.

Note

If the EIA port on the Processor Interface is used to make the connection to the *Sun SPARCserver* computer, you do not have to fill out the Data Module form.

Assigning the Processor Interface Data Module

The following procedures can be used to add the Processor Interface on the Generic 3i:

1. Verify System Access Terminal displays:

enter command:

2. Enter `add data-module 2005` where *2005* is the extension number assigned to the interface. The extension number you use will automatically appear in the Data Extension field of a Data Module form. Press the **Return** key.

The screen displays a Data Module form. (Use Figure A-1 for reference.)

3. In the field labeled Type, enter `procr-infc` for Generic 3i. After entering the appropriate Type, press the **Return** key.

The cursor is positioned on the Physical Channel field.

4. Enter the physical channel number (for example 01). The physical channel number becomes the interface link number that is used on the Interface Links and Processor Channel Assignment forms. For example, physical channel number 01 is interface link 1.



If the EIA port on the Processor Interface is used to make the connection to the *Sun SPARCserver* computer, physical channel number 01 must be used.

5. Press the **Return** key.

The cursor is positioned on the Name field.

6. Enter `R3 CMS`, and press the **Return** key.



If your switch is a G3V2 or a G3V3, enter `R3V2 CMS` in this field.

The cursor is positioned on the COS field.



The COS and COR fields are defaulted to 1.

7. Make no changes to the COS and COR fields; press the **Return** key.

Screen displays:

command successfully completed
enter command:

DATA MODULE

Data Extension: 2005

Type: procr-infrc

Physical Channel: 01

Name: R3 CMS

COS: 1

COR: 1

Maintenance Extension:

ABBREVIATED DIALING

List1:

HOT LINE DESTINATION

Abbreviated Dialing Dial Code (From above list):

ASSIGNED MEMBERS (Stations with a data extension button for this data module)

Ext	Name	Ext	Name
1:		3:	
2:		4:	

Figure A-1: Data Module Form for Generic 3i

Assigning a Data Module to the Sun SPARCserver Computer

After the Processor Interface has been assigned, the Data Module can be administered and connected to the *Sun SPARCserver* computer or to a modem for a CMS located at a remote location.

Note

If the EIA port on the Processor Interface is used to make the connection to the *Sun SPARCserver* computer, you do not have to fill out the Data Module form.

If the CMS is located at a remote location (with reference to the switch), a modem and MTDM will be used.

1. Verify System Access Terminal screen displays:

enter command:

2. Enter add data-module 2009 where 2009 is the extension number assigned to the Data Module. The extension number will automatically appear in the Data Extension field on the screen form. The extension number entered here is also used as the destination number on the Interface Links form. Press the **Return** key.

The screen displays a Data Module form. (Use Figure A-2 for reference.)

3. The cursor is positioned on the Type field. This field is defaulted to pdm. If the CMS is remotely connected, this field needs to be changed to tdm.
4. Press the **Return** key.

The cursor is positioned on the Port field.

5. Enter the port location to which the data module is connected.

For a Generic 3i, the first character identifies the network (1-2, default is 1 if no entry); the second character identifies the carrier (A-E); the third and fourth characters identify the slot number in the carrier (01-20 for multi-carrier cabinets or 01-18 for single-carrier cabinets); the last two characters identify the circuit number (01-24).

Press the **Return** key.

The cursor is positioned on the Name field.

6. Enter cms link pdm, or if CMS is remotely connected, enter cms

link tdm, and press the **Return** key.

The cursor is positioned on the COS field.

Note The COS and COR fields are defaulted to 1, and the Connected To field is defaulted to dte.

7. Move the cursor to the Remote Loop-Around Test field.
8. Enter y if the module supports a loopback at the EIA interface; otherwise, enter n.

Note If the CMS is remotely connected (using a modem and MTDM), enter n.

9. Press the **Return** key.

Screen displays:

command successfully completed

enter command:

DATA MODULE

Data Extension: 2009 BCC: Type: pdm Port: 1A0101

Name: cms link pdm COS: 1 COR: 1

Connected to: dte Remote Loop-Around Test? y

ABBREVIATED DIALING

List1:

HOT LINE DESTINATION

Abbreviated Dialing Dial Code (From above list):

ASSIGNED MEMBERS (Stations with a data extension button for this data module)

Ext	Name	Ext	Name
1:		3:	
2:		4:	

Figure A-2: Data Module Form for Generic 3i

After the Processor Interface and the data module have been assigned, the processor channel and interface link can be established. The processor channel is assigned using the Processor Channel Assignment form, and the interface link is enabled using the Interface Links form.

Assigning the Processor Channel

The Processor Channel form is used to assign one of the 64 local processor channels from the processor link to one of the 64 interface channels assigned to one interface link (1 to 4). Only one interface link is assigned for the *Sun SPARCserver* computer.

The following procedure can be used to assign processor channels on the Generic 3i:

1. Verify System Access Terminal displays:

enter command:

2. Enter change communications-interfaces processor-channels command, and press the **Return** key.

The screen displays the Processor Channel Assignment form. (Use Figure A-3 for reference.)

Note

The sample screen shown in Figure A-3 illustrates a configuration which assigns the Processor Channel 1 to the mis Application with a Remote Processor Channel of 1.

3. Select an available Processor Channel by using the up/down arrow keys to place the cursor in the Appl field of an available channel.

Note

The Processor Channel number should be the same number that was selected for the local port number when the CMS software was installed. For more information on changing the port/link number, see the "swsetup" section in Chapter 2, "CMSADM and CMSSVC Menus."

4. Enter mis in the Appl field, and press the **Return** key.

The cursor is positioned on the Interface Link field.

5. Enter 1 in the Interface Link field. (This is the interface link number assigned on the Processor Interface Data Module form.)

6. Press the **Return** key.

The cursor is positioned on the Interface Chan field.

7. Enter 1 in the Interface Chan field, and press the **Return** key.

The cursor is positioned on the Priority field.

8. Enter h in the Priority field, and press the **Return** key.

The cursor is positioned on the Remote Proc Chan field.

9. Enter 1 in the Remote Proc Chan, and press the **Return** key.
The cursor is positioned on the MACHINE - ID field.

10. Make no entry; press the **Return** key.
Screen displays:

command successfully completed,
enter command:

PROCESSOR CHANNEL ASSIGNMENT

Proc Chan	Appl.	Interface Link	Chan	Priority	Remote Proc Chan	Machine-ID
1:	mis	1	1	h	1	
2:						
3:						
4:						
5:						
6:						
7:						
8:						
9:						
10:						
11:						
12:						
13:						
14:						
15:						
16:						

Figure A-3: Processor Channel Assignment Form for Generic 3i.

Note

The R3V2 CMS software requires that the Interface Chan assignment be administered as 1. Priority on this channel must be set to h (high).

Enabling the Interface Link

The following steps are used to enable the CMS interface link on the Generic 3i:

1. Verify System Access Terminal displays:

enter command:

2. Enter change communications-interfaces links, and press the **Return** key.

The screen displays an Interface Links form. (Use Figure A-4 for reference.)

3. The cursor is positioned on the Enabled field.
4. Enter y beside the interface link number assigned on the Processor Channel form to enable the interface link. Press the **Return** key.

The cursor is positioned on the Est Conn field.

5. Enter y to establish a connection to the MPDM that connects to the *Sun SPARCserver* computer, and press the **Return** key.

The cursor skips the PI Ext field. The extension number assigned on the Processor Interface Data Module form is automatically displayed in this field.

The cursor is positioned on the Prot field.

6. Enter BX.25 in the Prot field.

The cursor is positioned on the Destination Digits field.

7. Enter the extension number for the MPDM that connects to the *Sun SPARCserver* computer, and press the **Return** key.

The cursor is positioned on the DTE/DCE field.

8. Enter DTE for the *Sun SPARCserver* computer, and press the **Return** key.

The cursor is positioned on the Identification field.

9. Enter a 15-character name for the link. This field may be left blank.

10. Press the **Return** key.

Screen displays:
command successfully completed,
enter command:

INTERFACE LINKS							
Link	Enable	Est Conn	PI Ext	Prot	Destination Digits Brd		DTE/ DCE
1:	y	y	2005	BX.25	2009		DTE
2:	y						
3:	y						
4:	y						

Identification

Figure A-4: Interface Links Form for Generic 3i

Enabling the EIA Port on the Processor Interface

If the EIA port on the Processor Interface of a Generic 3i is used to make the connection to the *Sun SPARCserver* computer, refer to Figure A-5.

INTERFACE LINKS

Link	Enabled	Establish Connection	Interface Extension	Destination Number	DTE/DCE Identification
1:	y	y	2005	eia	DTE
2:	n	n	2006		DTE
3:	n	n	2007		DTE
4:	n	n	2008		DTE

Link 1 [eia] - Connected to: DTE Clocking: internal

Figure A-5: Interface Links Form for EIA Port on Processor Interface for Generic 3i.

Note

For R3V2 CMS, the DTE/DCE field must be set to DTE.

Administering CMS Interface on the Generic 1 Switch

This section contains the procedures required to establish a communications link between the *Sun SPARCserver* computer and the Generic 1 switch.

The Processor Interface on the Generic 1 has eight interface links (01 to 08) available on a multi-carrier cabinet system and four interface links (01 to 04) available on a single-carrier cabinet system. One of these interface links can be assigned to the *Sun SPARCserver* computer.

You assign the CMS interface by logging in on the SAT (System Access Terminal) as *craft* and filling out the following forms:

- Processor Interface Data Module form
- Data Module (MPDM/MTDM) form
- Processor Channel Assignment form
- Interface Links form.

Note

If the EIA port on the Processor Interface is used to make the connection to the *Sun SPARCserver* computer, you do not have to fill out the Data Module form.

Assigning the Processor Interface Data Module

The following procedures can be used to add the Processor Interface on the Generic 1:

1. Verify System Access Terminal displays:

enter command:

2. Enter `add data-module 2005` where *2005* is the extension number assigned to the interface. The extension number you use will automatically appear in the Data Extension field of a Data Module form. Press the **Return** key.

The screen displays a Data Module form. (Use Figure A-6 for reference.)

3. In the field labeled Type, enter `procr-infc` for Generic 1. After entering the appropriate Type, press the **Return** key.

The cursor is positioned on the Physical Channel field.

4. Enter the physical channel number (for example 01). The physical channel number becomes the interface link number that is used on the Interface Links and Processor Channel Assignment forms. For example, physical channel number 01 is interface link 1.

Note

If the EIA port on the Processor Interface is used to make the connection to the *Sun SPARCserver* computer, physical channel number 01 must be used.

5. Press the **Return** key.

The cursor is positioned on the Name field.

6. Enter `R3 CMS`, and press the **Return** key.

Note

If your switch is a G3V2 or a G3V3, enter `R3V2 CMS` in this field.

The cursor is positioned on the COS field.

Note

The COS and COR fields are defaulted to 1.

7. Make no changes to the COS and COR fields, and press the **Return** key.

Screen displays:

command successfully completed,
enter command:

DATA MODULE

Data Extension: 2005

Type: procr-inf

Physical Channel: 01

Name: R3 CMS

COS: 1

COR: 1

Maintenance Extension:

ABBREVIATED DIALING

List1:

HOT LINE DESTINATION

Abbreviated Dialing Dial Code (From above list):

ASSIGNED MEMBERS (Stations with a data extension button for this data module)

Ext	Name	Ext	Name
1:		3:	
2:		4:	

Figure A-6: Data Module Form for Generic 1

Assigning a Data Module to the Sun SPARCserver Computer

After assigning the Processor Interface module, the Data Module can be administered and connected to the *Sun SPARCserver* computer or to a modem for a CMS located at a remote location.

Note

If the EIA port on the Processor Interface is used to make the connection to the *Sun SPARCserver* computer, you do not have to fill out the Data Module form.

If the CMS is located at a remote location (with reference to the switch), a modem and MTDM are used.

1. Verify System Access Terminal screen displays:

enter command:

2. Enter `add data-module 2009` where *2009* is the extension number assigned to the data module. Press the **Return** key.

The extension number will automatically appear in the Data Extension field on the screen form. The extension number entered here is also used as the destination number on the Interface Links form.

The screen displays a Data Module form. (Use Figure A-7 for reference.)

3. The cursor is positioned on the Type field. This field is defaulted to `pdm`. If the CMS is remotely connected, this field needs to be changed to `tdm`.
4. Press the **Return** key.

The cursor is positioned on the Port field.

5. Enter the port location to which the data module is connected. Press the **Return** key.

For a Generic 1, the first character identifies the network (1-2, default is 1 if no entry); the second character identifies the carrier (A-E); the third and fourth characters identify the slot number in the carrier (01-20 for multi-carrier cabinets or 01-18 for single-carrier cabinets); the last two characters identify the circuit number (01-24).

The cursor is positioned on the Name field.

6. Enter `cms link pdm`, or if CMS is remotely connected, enter `cms link tdm`, and press the **Return** key.

The cursor is positioned on the COS field.

Note

The COS and COR fields are defaulted to 1, and the Connected To field is defaulted to dte.

- 7. Move the cursor to the Remote Loop-Around Test field.
- 8. Enter y if the module supports a loopback at the EIA interface; otherwise, enter n.

Note

If the CMS is remotely connected (using a modem and MTDM), enter n.

- 9. Press the **Return** key.

Screen displays:

command successfully completed,
enter command:

DATA MODULE

Data Extension: 2009

BCC:

Type: pdm

Port: 1A0101

Name: cms link pdm

COS: 1

COR: 1

Connected to: dte

Remote Loop-Around Test? y

ABBREVIATED DIALING

List1:

HOT LINE DESTINATION

Abbreviated Dialing Dial Code (From above list):

ASSIGNED MEMBERS (Stations with a data extension button for this data module)

Ext	Name	Ext	Name
1:		3:	
2:		4:	

Figure A-7: Data Module Form for Generic 1

After assigning the Processor Interface and the data module, the processor channel and interface link can then be established. The processor channel is assigned using the Processor Channel Assignment form, and the interface link is enabled using the Interface Links form.

Assigning the Processor Channel

The Processor Channel form is used to assign one of the 64 local processor channels from the processor link to one of the 64 interface channels assigned to one interface link (1 to 4). Only one interface link is assigned for the *Sun SPARCserver* computer.

The following procedure can be used to assign processor channels on the Generic 1:

1. Verify System Access Terminal displays:

enter command:

2. Enter change communications-interfaces processor-channels command, and press the **Return** key.

The screen displays the Processor Channel Assignment form. (Use Figure A-8 for reference.)

Note The sample screen shown in Figure A-8 illustrates a configuration which assigns the Processor Channel 1 to the mis Application with a Remote Processor Channel of 1.

3. Select an available Processor Channel by using the up/down arrow keys to place the cursor in the Appl field of an available channel.

Note The Processor Channel number should be the same number that was selected for the port number when the CMS software was installed. For more information on changing the port/link number, see the "swsetup" section in Chapter 2, "CMSADM and CMSSVC Menus."

4. Enter mis in the Appl field, and press the **Return** key.

The cursor is positioned on the Interface Link field.

5. Enter 1 in the Interface Link field. (This is the interface link number assigned on the Processor Interface Data Module form.)

6. Press the **Return** key.

The cursor is positioned on the Interface Chan field.

7. Enter 1 in the Interface Chan field, and press the **Return** key.

The cursor is positioned on the Priority field.

8. Enter h in the Priority field, and press the **Return** key.

The cursor is positioned on the Remote Proc Chan field.

9. Enter 1 in the Remote Proc Chan, and press the **Return** key.

Cursor is positioned on the MACHINE-ID field.

10. Make no entry, and press the **Return** key.

Screen displays:

command successfully completed,
enter command:

PROCESSOR CHANNEL ASSIGNMENT						
Proc		Interface			Remote	
Chan	Appl.	Link	Chan	Priority	Proc Chan	Machine-ID
1:	mis	1	1	h	1	
2:						
3:						
4:						
5:						
6:						
7:						
8:						
9:						
10:						
11:						
12:						
13:						
14:						
15:						
16:						

Figure A-8: Processor Channel Assignment Form for Generic 1.

Note

The R3V2 CMS software requires that the Interface Chan assignment be administered as 1. Priority on this channel must be set to h (high).

Enabling the Interface Link

The following steps are used to enable the CMS interface link on the Generic 1:

1. Verify System Access Terminal displays:

enter command:

2. Enter change communications-interfaces links, and press the **Return** key.

The screen displays an Interface Links form. (Use Figure A-9 for reference.)

The cursor is positioned on the Enabled field.

3. Enter y beside the interface link number assigned on the Processor Channel form to enable the interface link. Press the **Return** key.

The cursor is positioned on the Est Conn field.

4. Enter y to establish a connection to the MPDM that connects to the *Sun SPARCserver* computer, and press the **Return** key.

The cursor skips the PI Ext field. The extension number assigned on the Processor Interface Data Module form is automatically displayed in this field.

The cursor is positioned on the Prot field.

5. Enter BX.25 in the Prot field.

The cursor is positioned on the Destination Digits field.

6. Enter the extension number for the MPDM that connects to the *Sun SPARCserver* computer, and press the **Return** key.

The cursor is positioned on the DTE/DCE field.

7. Enter DTE for the *Sun SPARCserver* computer, and press the **Return** key.

The cursor is positioned on the Identification field.

8. Enter a 15-character name for the link. This field may be left blank.

9. Press the **Return** key.

Screen displays:

command successfully completed,

enter command:

INTERFACE LINKS								Identification
Link	Enable	Est Conn	PI Ext	Prot	Destination Digits Brd		DTE/ DCE	
1:	y	y	2005	BX.25	2009		DTE	
2:	y							
3:	y							
4:	y							

Figure A-9: Interface Links Form for Generic 1

Enabling the EIA Port on the Processor Interface

If the EIA port on the Processor Interface on a Generic 1 is used to make the connection to the *Sun SPARCserver* computer, refer to Figure A-10.

Note

For R3V2 CMS, the DTE/DCE field must be set to DTE.

INTERFACE LINKS

Link	Enabled	Establish Connection	Interface Extension	Destination Number	DTE/DCE Identification
1:	y	y	2005	eia	DTE
2:	n	n	2006		DTE
3:	n	n	2007		DTE
4:	n	n	2008		DTE

Link 1 [eia] - Connected to: DTE Clocking: internal

Figure A-10: Interface Links Form for EIA Port on Processor Interface for Generic 1

Overview

The R3V2 CMS (Release 3 Version 2 Call Management System) application can collect and process ACD (Automatic Call Distribution) data from the DEFINITY Communications System Generic 2 and System 85 R2V4 switches. See Chapter 1, "Introduction", to verify that the switch software release supports the R3V2 CMS application.

Before the R3V2 CMS can collect and process the ACD data, the CMS feature, the DCIU (Data Communications Interface Unit), and the ACD feature on the switch must be properly administered.

The following documents can be used by a qualified switch technician to administer the CMS and ACD features:

- *AT&T DEFINITY Communications System Generic 2 Administration of Features and Hardware* (AT&T 555-104-507, Issue 1)
- *AT&T System 85 Feature Translation Service Manual Release 2, Version 4*, Issue 1 (AT&T 555-103-107).

Use this appendix to do the following:

- Administering the CMS Feature on the DEFINITY Generic 2.1 and System 85 R2V4.
- Administering the CMS Feature on the DEFINITY Generic 2.2.
- Administering a Dedicated Switch Connection on the System 85 R2V4.
- Administering a Dedicated Switch Connection on the DEFINITY Generic 2.

Note

Any changes to the switch translations should only be made by a skilled switch technician.

Note

For the procedures to administer the EAS (Expert Agent Selection) feature, see Appendix E, "CMS and Expert Agent Selection" in the *R3V2 CMS Administration* (AT&T 585-215-521) document.

Administering the CMS Feature on the DEFINITY Generic 2.1 and System 85 R2V4

On a Generic 2.1, use the Manager II to administer the CMS feature. On a System 85 R2V4, use the VMAAP or MAAP panel.

275 Word 1 Activates the DCIU.

Field 17 Enter the DCIU assignment:

1 Enable

275 Word 4 Enables or disables CMS for the system.

Field 13 Enter the CMS assignment:

1 Enable

258 Word 2 Copies the DCIU machine-read memory values to the scratch-pad table. Use this procedure *before* making any DCIU changes.

Field 1 Enter a 1 to make a copy of DCIU tables.



This procedure overwrites the contents of the scratch-pad table.

- 256 Word 1** Administers the major characteristics of the data link. Included are the link number, status, baud rate, DTE/DCE, type of link, protocol, destination machine type, and the destination machine number.
- | | |
|---------|---|
| Field 1 | Enter the DCIU physical link number (1-8). This is the link number of the physical port on the DCIU that is connected to the <i>Sun SPARCserver</i> computer. |
| Field 2 | Enter the assigned status:
1 Assigned |
| Field 3 | Enter the baud rate:
6 9600 Baud
7 19200 Baud |
| Field 4 | Enter the local DTE/DCE assignments:
0 Local end of DCIU link is functioning as a DTE |
| Field 5 | Enter the dial up capabilities:
0 Link is not a dial up link |
| Field 6 | Enter a 1 to specify the BX.25 protocol. |
| Field 7 | Enter the type of machine interface:
8 3B2 |
| Field 8 | Enter the destination machine number:
1-7 For APs, the AP number
If this is the first "AP," enter 1. |
- 256 Word 2** Administers the BX.25 level-2 characteristics. Included are the link number, the retransmission timer, the idle timer, the maximum number of retransmissions, and the maximum number of unacknowledged frames allowed on the link.
- | | |
|---------|---|
| Field 1 | Enter the DCIU physical link number (1-8). |
| Field 2 | Enter the time in seconds before retransmitting unacknowledged frames (1-255). For CMS, the value is 1. |
| Field 3 | Enter the time in seconds before frames are exchanged on a link (1-255). For CMS, the value is 10. |
| Field 4 | Enter the maximum number of retransmissions of an acknowledged frame (1-15). For CMS, the value is 2. |
| Field 5 | Enter the maximum number of frames transmitted on a link without acknowledgment (1-7). For CMS, the value is 7. |

256 Word 3 Administers the BX.25 level-3 characteristics. Included are the link number, the activity timer, the acknowledgment timer, the interrupt timer, the restart timer, and the maximum number of unacknowledged packets.

Field 1	Enter the DCIU physical link number (1-8).
Field 2	Enter the time, in seconds, before sending a window advancement packet to indicate the present condition of a logical channel (1-255). For CMS, the value is 180.
Field 3	Enter the time, in seconds, waited for acknowledgment of data packet before resetting a logical channel (1-255). For CMS, the value is 20.
Field 4	Enter the time, in seconds, waited for confirmation of an interrupt packet before resetting a logical channel (1-255). For CMS, the value is 180.
Field 5	Enter the time, in seconds, waited before retransmitting an unconfirmed reset request package (1-255). For CMS, the value is 8.
Field 6	Enter the time, in seconds, waited before retransmitting an unconfirmed restart request package (1-255). For CMS, the value is 8.
Field 10	Enter the maximum number of times an unacknowledged data packet can be transmitted (1-7). For CMS, the value is 4.

Local/Remote Setup for CMS

257 Word 5 Reserves ports for CMS usage including the port number, the application type, and the application instance number.

Field 1 Enter 64 for the number of the local port.

Field 2 Enter 11 to specify the application type as CMS.

Field 3 Enter 1 for the application instance number.

257 Word 2 Administers the port characteristics including the local port, the remote port/destination, the alternate routing destination routing code, and the alternate routing postage.

Field 1 Enter 64 for the local port number.

Field 2 Enter 1 for the remote port/destination.

CMS Channel

257 Word 1 Administers the network channel for CMS applications. Included are the switch link, the logical channel on the local port, the hardware link, the logical channel, the priority, and the alternate routing flag.

Field 1 Enter 0 for the local link number (Component A).

Field 2 Enter 64 for the logical channel number on the local link/switch.

Field 3 Enter the link number (Component B):

1-8 Hardware links (this link is connected to the link specified in Field 1)

Field 4 Enter 1 for the logical channel number on the link.

Field 5 Enter 1 for the priority level (high).

Field 6 Enter 0 for the alternate routing flag status.

Local/Remote Setup for Maintenance Channel

257 Word 5 Reserves ports for CMS usage including the port number, the application type, and the application instance number.

Field 1 Enter 6 for the number of the local port.

Field 2 Enter 10 to specify the DCIU test (TEST).

Field 3 Enter 1 for the application instance number.

257 Word 5 Reserves ports for CMS usage including the port number, the application type, and the application instance number.

Field 1 Enter 20 for the number of the local port.

Field 2 Enter 10 to specify the DCIU test (TEST).

Field 3 Enter 2 for the application instance number.

257 Word 2 Administers the port characteristics including the local port, the remote port/destination, the alternate routing destination routing code, and the alternate routing postage.

Field 1 Enter 6 for the local port number.

Field 2 Enter 20 for the remote port/destination.

257 Word 2 Administers the port characteristics including the local port, the remote port/destination, the alternate routing destination routing code, and the alternate routing postage.

Field 1 Enter 20 for the local port number.

Field 2 Enter 6 for the remote port/destination.

Maintenance Channel

257 Word 1 Administers the network channel for CMS applications. Included are the switch link, the logical channel on the local port, the hardware link, the logical channel, the priority, and the alternate routing flag.

- Field 1 Enter 0 for the local link number (Component A).
- Field 2 Enter 6 for the logical channel number on the local link/switch.
- Field 3 Enter 0 for the link number (Component B).
- Field 4 Enter 20 for the logical channel number on the link.
- Field 5 Enter 0 for the priority level (low).
- Field 6 Enter 0 for the alternate routing flag status.

Initialize the Changes

258 Word 1 Swaps the changes made to the DCIU scratch-pad table with the machine-read memory. Use this procedure *after* making any DCIU changes.

- Field 1 Enter a 1 to swap the tables and reboot DCIU.

028 Word 2 This procedure is used to busy out CMS while translation changes are made. After making the translation changes, the CMS busy out must be released.

- Field 1 Enter the CMS busy out specifications:
 - 1 Busied out

115 Word 1 Administers the termination point of CMS trunk groups to ACD splits, ACD priority, and CMS measurement types.

Field 1 Enter the trunk group number (18-999).

Field 2 Enter the termination point:

– Trunk group does not terminate at a CAS or SS attendant.

Field 3 Enter the split number (1-60) to which the trunk group terminates. Enter a - (dash) if the trunk group terminates to a VDN.

Field 5 Enter CMS measurement type (–, or 1 to 3). The applicable encodes are:

– Trunk group not measured by CMS

1 Trunk group measured for outgoing calls

2 Trunk group measured for incoming calls

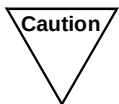
3 Trunk group measured for outgoing and incoming calls.

Note Only the trunk groups numbered from 18 to 255 can be measured.

028 Word 1 Administers the CMS (Call Management System) to an extension or group of extensions.

Field 2 Enter the CMS extension low (000-99999).

Field 3 Enter the CMS extension high (000-99999).



Before using Procedure 028 Word 1, Procedure 350 Word 2 should be used to administer the login/logout codes. After the extension is assigned in Procedure 028 Word 1, the agent cannot use the “staffed” button.

031 Word 1 Administers a vector directory number, a VDN (vector number), measuring the ICI message, and the return call assignment. The machine number of the adjunct is displayed in Field 9.

Field 1 Enter the VDN (000-99999).

Field 2 Enter the vector number (–, 1-128).

Field 3 Enter the CMS measurement capabilities:

0 VDN is not measured

1 VDN is measured

Field 4 Enter the first console message character (–, 0-37).

0 = 0	A = 11	K = 21	U = 31
1 = 1	B = 12	L = 22	V = 32
2 = 2	C = 13	M = 23	W = 33
3 = 3	D = 14	N = 24	X = 34
4 = 4	E = 15	O = 25	Y = 35
5 = 5	F = 16	P = 26	Z = 36
6 = 6	G = 17	Q = 27	- = 37
7 = 7	H = 18	R = 28	blank = 10
8 = 8	I = 19	S = 29	
9 = 9	J = 20	T = 30	

Field 5 Enter the second console message character (–, 0-37).

Field 6 Enter the third console message character (–, 0-37).

Field 7 Enter the fourth console message character (–, 0-37).

Field 8 Enter the return call indicator:

–, 0 Not a return call VDN

1 MCS return call VDN

2 AUDIX return call VDN

028 Word 2 This procedure is used to busy out CMS while translation changes are made. After making the translation changes, the CMS busy out must be released.

Field 1 Enter the CMS busy out specifications:

0 Not busied out

Administering the CMS Feature on the DEFINITY Generic 2.2

On a Generic 2.2, use the Manager II to administer the CMS feature.

275 Word 1 Activates the DCIU.

Field 17 Enter the DCIU assignment:
 1 Enable

275 Word 4 Enables or disables CMS for the system.

Field 13 Enter the CMS assignment:
 1 Enable

258 Word 2 Copies the DCIU machine-read memory values to the scratch-pad table. Use this procedure *before* making any DCIU changes.

Field 1 Enter a 1 to make a copy of DCIU tables.

Note

This procedure overwrites the contents of the scratch-pad table.

- 256 Word 1** Administers the major characteristics of the data link. Included are the link number, status, baud rate, DTE/DCE, type of link, protocol, destination machine type, and the destination machine number.
- | | |
|---------|---|
| Field 1 | Enter the DCIU physical link number (1-8). This is the link number of the physical port on the DCIU that is connected to the <i>Sun SPARCserver 5</i> computer. |
| Field 2 | Enter the assigned status:
1 Assigned |
| Field 3 | Enter the baud rate:
6 9600 Baud
7 19200 Baud |
| Field 4 | Enter the local DTE/DCE assignments:
0 Local end of DCIU link is functioning as a DTE |
| Field 5 | Enter the dial up capabilities:
0 Link is not a dial up link |
| Field 6 | Enter a "1" to specify the BX.25 protocol. |
| Field 7 | Enter the type of machine interface:
8 3B2 |
| Field 8 | Enter the destination machine number:
1-7 For APs, the AP number
If this is the first "AP," enter 1. |
- 256 Word 2** Administers the BX.25 level-2 characteristics. Included are the link number, the retransmission timer, the idle timer, the maximum number of retransmissions, and the maximum number of unacknowledged frames allowed on the link.
- | | |
|---------|---|
| Field 1 | Enter the DCIU physical link number (1-8). |
| Field 2 | Enter the time in seconds before retransmitting unacknowledged frames (1-255). For CMS, the value is 1. |
| Field 3 | Enter the time in seconds before frames are exchanged on a link (1-255). For CMS, the value is 10. |
| Field 4 | Enter the maximum number of retransmissions of an acknowledged frame (1-15). For CMS, the value is 2. |
| Field 5 | Enter the maximum number of frames transmitted on a link without acknowledgment (1-7). For CMS, the value is 7. |

256 Word 3 Administers the BX.25 level-3 characteristics. Included are the link number, the activity timer, the acknowledgment timer, the interrupt timer, the restart timer, and the maximum number of unacknowledged packets.

Field 1	Enter the DCIU physical link number (1-8).
Field 2	Enter the time, in seconds, before sending a window advancement packet to indicate the present condition of a logical channel (1-255). For CMS, the value is 180.
Field 3	Enter the time, in seconds, waited for acknowledgment of data packet before resetting a logical channel (1-255). For CMS, the value is 20.
Field 4	Enter the time, in seconds, waited for confirmation of an interrupt packet before resetting a logical channel (1-255). For CMS, the value is 180.
Field 5	Enter the time, in seconds, waited before retransmitting an unconfirmed reset request package (1-255). For CMS, the value is 8.
Field 6	Enter the time, in seconds, waited before retransmitting an unconfirmed restart request package (1-255). For CMS, the value is 8.
Field 10	Enter the maximum number of times an unacknowledged data packet can be transmitted (1-7). For CMS, the value is 4.

Local/Remote Setup for CMS

257 Word 5 Reserves ports for CMS usage including the port number, the application type, and the application instance number.

Field 1 Enter 64 for the number of the local port.

Field 2 Enter 11 to specify the application type as CMS.

Field 3 Enter 1 for the application instance number.

257 Word 2 Administers the port characteristics including the local port, the remote port/destination, the alternate routing destination routing code, and the alternate routing postage.

Field 1 Enter 64 for the local port number.

Field 2 Enter 1 for the remote port/destination.

CMS Channel

257 Word 1 Administers the network channel for CMS applications. Included are the switch link, the logical channel on the local port, the hardware link, the logical channel, the priority, and the alternate routing flag.

Field 1 Enter 0 for the local link number (Component A).

Field 2 Enter 64 for the logical channel number on the local link/switch.

Field 3 Enter the link number (Component B):

1-8 Hardware links (this link is connected to the link specified in Field 1)

Field 4 Enter 1 for the logical channel number on the link.

Field 5 Enter 1 for the priority level (high).

Field 6 Enter 0 for the alternate routing flag status.

Local/Remote Setup for Maintenance Channel

257 Word 5 Reserves ports for CMS usage including the port number, the application type, and the application instance number.

Field 1 Enter 6 for the number of the local port.

Field 2 Enter 10 to specify the DCIU test (TEST).

Field 3 Enter 1 for the application instance number.

257 Word 5 Reserves ports for CMS usage including the port number, the application type, and the application instance number.

Field 1 Enter 20 for the number of the local port.

Field 2 Enter 10 to specify the DCIU test (TEST).

Field 3 Enter 2 for the application instance number.

257 Word 2 Administers the port characteristics including the local port, the remote port/destination, the alternate routing destination routing code, and the alternate routing postage.

Field 1 Enter 6 for the local port number.

Field 2 Enter 20 for the remote port/destination.

257 Word 2 Administers the port characteristics including the local port, the remote port/destination, the alternate routing destination routing code, and the alternate routing postage.

Field 1 Enter 20 for the local port number.

Field 2 Enter 6 for the remote port/destination.

Maintenance Channel

257 Word 1 Administers the network channel for CMS applications. Included are the switch link, the logical channel on the local port, the hardware link, the logical channel, the priority, and the alternate routing flag.

- Field 1 Enter 0 for the local link number (Component A).
- Field 2 Enter 6 for the logical channel number on the local link/switch.
- Field 3 Enter 0 for the link number (Component B).
- Field 4 Enter 20 for the logical channel number on the link
- Field 5 Enter 0 for the priority level (low).
- Field 6 Enter 0 for the alternate routing flag status.

Initialize the Changes

258 Word 1 Swaps the changes made to the DCIU scratch-pad table with the machine-read memory. Use this procedure *after* making any DCIU changes.

- Field 1 Enter a 1 to swap the tables and reboot DCIU.

028 Word 1 This procedure is used to busy out CMS while translation changes are made. After making the translation changes, the CMS busy out must be released.

- Field 1 Enter the CMS busy out specifications:
 - 1 Busied out

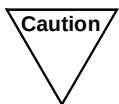
115 Word 1 Administers the termination point of CMS trunk groups to ACD splits, ACD priority, and CMS measurement types.

- Field 1 Enter the trunk group number (18-999).
- Field 2 Enter the termination point:
- Trunk group does not terminate at a CAS or SS attendant.
- Field 3 Enter the split number (1-60) to which the trunk group terminates. Enter a - (dash) if the trunk group terminates to a VDN.
- Field 5 Enter CMS measurement type (–, or 1 to 3). The applicable encodes are:
- Trunk group not measured by CMS
 - 1 Trunk group measured for outgoing calls
 - 2 Trunk group measured for incoming calls
 - 3 Trunk group measured for outgoing and incoming calls.

Note	Only the trunk groups numbered from 18 to 255 can be measured.

026 Word 2 Administers an ACD split and whether the split is measured.

- Field 8 Enter the CMS split measurement status. The applicable encodes are:
- 0 Split is not measured by CMS
 - 1 Split is measured by CMS.



Before using Procedure 026 Word 2, Procedure 350 Word 2 should be used to administer the login/logout codes. After the extension is assigned in Procedure 028 Word 1, the agent cannot use the “staffed” button.

031 Word 1 Administers a vector directory number, a VDN (vector number), measuring the ICI message, and the return call assignment. The machine number of the adjunct is displayed in Field 9.

Field 1 Enter the VDN (000-99999).

Field 2 Enter the vector number (–, 1-128).

Field 3 Enter the CMS measurement capabilities:

0 VDN is not measured

1 VDN is measured.

Field 4 Enter the first console message character (–, 0-37).

0 = 0	A = 11	K = 21	U = 31
1 = 1	B = 12	L = 22	V = 32
2 = 2	C = 13	M = 23	W = 33
3 = 3	D = 14	N = 24	X = 34
4 = 4	E = 15	O = 25	Y = 35
5 = 5	F = 16	P = 26	Z = 36
6 = 6	G = 17	Q = 27	- = 37
7 = 7	H = 18	R = 28	blank = 10
8 = 8	I = 19	S = 29	
9 = 9	J = 20	T = 30	

Field 5 Enter the second console message character (–, 0-37).

Field 6 Enter the third console message character (–, 0-37).

Field 7 Enter the fourth console message character (–, 0-37).

Field 8 Enter the return call indicator:

–, 0 Not a return call VDN

1 MCS return call VDN

2 AUDIX return call VDN.

028 Word 2 This procedure is used to busy out CMS while translation changes are made. After making the translation changes, the CMS busy out must be released.

Field 1 Enter the CMS busy out specifications:

0 Not busied out

Administering a Dedicated Switch Connection on the System 85 R2V4

On a System 85 R2V4, use the VMAAP or MAAP panel to administer the DSC (Dedicated Switch Connection) feature.

Note

The System 85 R2V4 must have tape issue 1.1 (with patches 946, 947, and 954) to establish a connection between the switch and R3V2 CMS.

The translations should be done at both the local and distant end switches. If one of the switches is a DEFINITY Generic 2, follow the administration procedures in the "Administering a Dedicated Switch Connection on the DEFINITY Generic 2" section in this appendix.

- 000 Word 1

Administers the extension number and class of service.

Field 1

Enter the extension number of the distant end.

Field 7

Enter the class of service associated with the extension.

- 051 Word 1

Administers the characteristics of the data module.

Fields 1-5

Enter the terminal equipment location of the MPDM.

Field 6

Enter 4 to specify "PDM" as the type of data module.

Field 10

Enter 2 to set the extension origination preference as the "Prime Appearance."

Field 11

Enter 0 to set the extension termination preference to "None."

Field 13

Enter 0 to disable keyboard dialing feature.

052 Word 1 Administers the characteristics of the data module.

- Fields 1-5 Enter the terminal equipment location of the MPDM.
- Field 6 Enter 0 to specify the device type as a basic set.
- Field 7 Enter 0 to specify the button number.
- Field 8 Enter the extension number of the MPDM.
- Field 9 Enter 1 to specify the line appearance number.
- Field 10 Enter 1 to specify the line type.
- Field 11 Enter 1 to set ringing type.
- Field 12 Enter 1 to specify that it is the home terminal.
- Field 13 Enter 0 to specify that the terminal is not an originating only terminal.
- Field 14 Enter 0 to specify that this terminal is not in a SAC group.

Activate the Dedicated Switch Connection Feature

360 Word 1 Administers the Dedicated Switch Connection (DSC) between the MPDM and the DS1 circuit.

- Field 1 Enter 1 to activate the DSC feature.
- Field 2 Enter an unused DSC number (0-1023).
- Fields 3-7 Enter the equipment location for the MPDM.
- Field 8 Enter 1 to set the "I" channel to voice.
- Fields 10-14 Enter the equipment location for the DS1 channel.
- Field 15 Enter – to specify the port is not a GPP.

Note

When using the DSC feature, Procedure 260, Word 1, Field 8 should be set to 0 to specify 24th Channel Signaling. Also, Procedure 116, Word 1, Field 8 should be set to 1 to disable signaling.

Administering a Dedicated Switch Connection on the DEFINITY Generic 2

On a DEFINITY Generic 2.1, administer the DSC (Dedicated Switch Connection) feature.

The translations should be done at both the local and distant end switches. If one of the switches is a System 85 R2V4, follow the administration procedures in the "Administering a Dedicated Switch Connection on the System 85 R2V4" section in this appendix.

000 Word 1 Administers the extension number and class of service.

Field 1 Enter the extension number of the distant end.

Field 7 Enter the class of service associated with the extension.

051 Word 1 Administers the characteristics of the data module.

Fields 1-5 Enter the terminal equipment location of the MPDM.

Field 6 Enter 1 to specify "PDM" as the type of data module.

Field 7 Enter 0 to specify terminal options as "Data Only."

Field 8 Enter 1 to specify that it is a DTDM (data stand or ADM-T).

Field 9 Enter - to specify that the display is not assigned.

Field 10 Enter 2 to set the extension origination preference as the "Prime Appearance."

Field 11 Enter 0 to set the extension termination preference to "None."

Field 13 Enter 0 to disable keyboard dialing feature.

Field 15 Enter a - (dash) to specify that Terminal Alarming does not apply.

052 Word 1 Administers the characteristics of the data module.

- Fields 1-5 Enter the terminal equipment location of the MPDM.
- Field 6 Enter 0 to specify the device type as a basic set.
- Field 7 Enter 0 to specify the button number.
- Field 8 Enter the extension number of the MPDM.
- Field 9 Enter 1 to specify the line appearance number.
- Field 10 Enter 1 to specify the line type.
- Field 11 Enter 1 to set ringing type.
- Field 12 Enter 1 to specify that it is the home terminal.
- Field 13 Enter 0 to specify that the terminal is not an originating only terminal.
- Field 14 Enter 0 to specify that this terminal is not in a SAC group.

*Activate the Dedicated Switch Connection Feature***360 Word 1** Administers the DSC (Dedicated Switch Connection) between the MPDM and the DS1 circuit.

- Field 1 Enter 1 to activate the DSC feature.
- Field 2 Enter an unused DSC number (0-1023).
- Fields 3-7 Enter the equipment location for the MPDM.
- Field 8 Enter 1 to set the "I" channel to voice.
- Fields 10-14 Enter the equipment location for the DS1 channel.
- Field 15 Enter - to specify the port is not a GPP.

Note

When using the DSC feature, Procedure 260, Word 1, Field 8 should be set to 0 to specify 24th Channel Signaling. Also, Procedure 116, Word 1, Field 8 should be set to 1 to disable signaling.

Overview

The R3V2 CMS (Release 3 Version 2 Call Management System) application can collect and process ACD (Automatic Call Distribution) data from the DEFINITY Communications System Generic 3r switch. However, before CMS can collect and process the ACD data, a special hardware interface on the switch must be properly administered. For the Generic 3r switch, the hardware interface is a Packet Gateway (TN577) board. This hardware interface is sometimes called the CMS interface.

In addition to the CMS interface, the following CMS features on the switch must also be administered:

- Abandoned Call Search
- Agent Call Handling
- Hunt Groups
- Intraflow and Interflow
- Queue Status Indications
- Recorded Announcements
- Service Observing.

Note

For the screens to administer the EAS (Expert Agent Selection) feature, see Appendix E, "CMS and Expert Agent Selection" in the *R3V2 CMS Administration* (AT&T 585-215-521) document.

The following documents can be used by a qualified switch technician to implement the CMS interface and features:

- *AT&T DEFINITY Communications System Generic 3 Version 2 Implementation Manual* (AT&T 555-230-653, Issue 1)
- *AT&T DEFINITY Communications System Generic 1 and Generic 3 Installation and Test* (AT&T 555-230-104, Issue 4)
- *AT&T DEFINITY Communications System Generic 3r Maintenance* (AT&T 555-230-105).

For your convenience, the next section contains step-by-step procedures that can be used to implement the CMS interface. However, should you have any questions about these procedures, you should refer to the appropriate switch documentation.

Note

Only a qualified switch technician or switch administrator should administer the CMS interface and features on the switch.

Administering CMS Interface on Generic 3r

This section contains the procedures required to establish a communications link between the *Sun SPARCserver* computer and the Generic 3r switch.

The Packet Gateway (TN577) board on the Generic 3r has four interface links (01 to 04). One of these interface links can be assigned to the *Sun SPARCserver* computer.

You assign the CMS interface by logging in on SAT (System Access Terminal) as *craft* and filling out the following forms:

- Feature-Related System Parameters form
- Pgate (Packet Gateway) Board form
- Data Module (MPDM/MTDM) form
- Processor Channel Assignment form
- Interface Links form
- Administered Connection form.

Note

If the Isolating Data Interface is used to make the connection to the *Sun SPARCserver* computer, you do not have to fill out the Data Module form and the Administered Connection form.

Changing Feature-Related System Parameters

Use the following procedures to change the CMS parameters on the Generic 3r:

1. Verify System Access Terminal displays:

enter command:

2. Enter change system-parameters features. Press the **Return** key.

The screen displays a Data Module form. (See Figure C-1 for reference.)

3. In the field labeled Adjunct CMS Release, enter R3V2 CMS for Generic 3r. Press the **Return** key.
4. In the Automatic Call Distribution (ACD) Log-in Identification Length field, enter the length of the agent login IDs. The length of the agent login IDs for the Generic 3r is 0-9. Press the **Return** key.

Screen displays:

command successfully completed,

enter command:

```

                                FEATURE-RELATED SYSTEM PARAMETERS

SYSTEM PRINTER PARAMETERS

      System Printer Type: _____

      Printer Speed:      _____

SYSTEM-WIDE PARAMETERS

      Switch Name:        _____

CALL MANAGEMENT SYSTEM PARAMETERS

                                BCMS Measurement Interval: _____
                                Adjunct CMS Release: R2_
Automatic Call Distribution (ACD) Log-in Identification Length: X_

MALICIOUS CALL TRACE PARAMETERS

                                Apply MCT Warning Tone? _
                                MCT Voice Recorder Trunk Group: ____

```

Figure C-1: Feature-Related System Parameters Form

Assigning the Packet Gateway Board

Use the following procedures to assign the Packet Gateway board on the Generic 3r:

1. Verify System Access Terminal displays:

enter command:

2. Enter add pgate 1c03 where 1c03 is the physical Packet Gateway (TN577) board location. Press the **Return** key.

The first character identifies the network (1-2, default is 1 if no entry); the second character identifies the carrier (A-E); the third and fourth characters identify the slot number in the carrier (01-20 for multi-carrier cabinets or 01-18 for single-carrier cabinets). The physical board location you use will automatically appear in the Board Location field of a Pgate Board form.

The screen displays a Pgate Board form. (See Figure C-2 for reference.)

3. In the External Cable Type field, enter rs232 for Generic 3r. Press the **Return** key.

Screen displays:

command successfully completed,

enter command:

PGATE BOARD

Board Location: 01C03	Name: PGATE Board
Application: x.25	
External Cable Type: rs232	
Port Configuration: 1) RS232 2) RS232 3) RS232 4) RS232	

Figure C-2: Pgate Board Form

Assigning the Packet Gateway Port

Use the following procedures to assign the Packet Gateway port on the Generic 3r:

1. Verify System Access Terminal displays:

enter command:

2. Enter add data-module 2005 where 2005 is the extension number assigned to the interface. The extension number you use will automatically appear in the Data Extension field of a Data Module form. Press the **Return** key.

The screen displays a Data Module form. (See Figure C-3 and Figure C-4 for reference.)

3. In the field labeled Type, enter x.25. Press the **Return** key.

The cursor is positioned on the Port field.

4. Enter the port number, for example 01C0302. The port number identifies the physical equipment location of the circuit pack (packet gateway) being used. Press the **Return** key.

The cursor is positioned on the Name field.

5. Enter Pgate 1C0302 where 1C0302 is the physical equipment location of the Pgate board. Press the **Return** key.

6. Enter 9600 or 19200 in the Baud Rate field.

Note

The baud rate must be the same for all components used in the link.

The cursor is positioned on

7. Enter y in the Error Logging field.

Note

To maximize call capacity, the Number of Outstanding Packets field on page 2 of the Data Module form should be increased from the default values of 2 to 3.

It is also recommended that the Baud Rate field be set to 19200 whenever the physical connection can support it. For example, if the switch is connected to the *Sun SPARCserver* computer via the Isolating Data Interface, the physical connection can support a baud rate of 19200.

Screen displays:

command successfully completed,
enter command:

DATA MODULE

Data Extension: 2005	Type: x.25	Port: 01C0302
Name: pgate 1C0302	COR: 1	
Endpoint Type: adjunct	DTE/DCE: dte	Baud Rate: 19.2
Error Logging? n	Remote Loop-Around Test? n	

Permanent Virtual Circuit? y Highest PVC Logical Level: 64
Switched Virtual Circuit? n

Figure C-3: Data Module Form (Page 1)

DATA MODULE

LAYER 2 PARAMETERS

Number of Outstanding Frames (w) : 4
Retry Attempt Counter (N2) : 2
Frame Size (N1) : 135
Retransmission (T1) Timer (1/10 seconds) : 10
Idle (T4) Timer (1/10 seconds) : 30

LAYER 3 PARAMETERS

Number of Outstanding Packets : 2
Restart (T20) Timer (seconds) : 8
Reset (T22) Timer (seconds) : 180

Figure C-4: Data Module Form (Page 2)

Note The Number of Outstanding Frames (w) : field must be set to 4 for proper communication between the switch and the *Sun SPARCserver* computer. The value in this field may have been previously set at 2 or 4 if the customer is upgrading from a 386- or 486-based machine.

Assigning a Data Module to the Switch

After assigning the interface on the Packet Gateway board, the data module can be administered and connected to the switch.

Note

If the CMS is located at a remote location (with reference to the switch), a modem and MTDM will be used.

1. Verify System Access Terminal screen displays:

enter command:

2. Enter add data-module 2007 where 2007 is the extension number assigned to the data module. Press the **Return** key.

The extension number will automatically appear in the Data Extension field on the screen form. The extension number entered here is also used as the destination number on the Interface Links form.

The screen displays a Data Module form. (See Figure C-5 for reference.)

3. The cursor is positioned on the Type field. This field is defaulted to pdm. If the CMS is remotely connected, this field needs to be changed to tdm.
4. Press the **Return** key.

The cursor is positioned on the Port field.

5. Enter the port location to which the data module is connected. Press the **Return** key.

For a Generic 3r, the first character identifies the network (1-2, default is 1 if no entry); the second character identifies the carrier (A-E); the third and fourth characters identify the slot number in the carrier (01-20 for multi-carrier cabinets or 01-18 for single-carrier cabinets); the last two characters identify the circuit number (01-24).

The cursor is positioned on the Name field.

6. Enter switch pdm, or if CMS is remotely connected, enter switch tdm and press the **Return** key.

The cursor is positioned on the COS field.

Note

The COS and COR fields are defaulted to 1, and the Connected To field is defaulted to dte.

7. Press the **Return** key.

Screen displays:

command successfully completed,
enter command:

```

DATA MODULE

Data Extension: 2009   BCC:   Type: pdm   Port: 1C0402
      Name: cms link pdm   COS: 1   COR: 1
      Connected to: dte           ITC: restricted
                                   Remote Loop-Around Test? y

ABBREVIATED DIALING
List1:

SPECIAL DIALING OPTION: _____

ASSIGNED MEMBERS (Station with a data extension button for this data module)
  Ext      Name
  1:
  
```

Figure C-5: Data Module Form

After the Pgate board and the data module have been assigned, the processor channel and interface link can then be established. The processor channel is assigned using the Processor Channel Assignment form, and the interface link is enabled using the Interface Links form.

Assigning a Data Module to the Sun SPARCserver Computer

After assigning the interface on Packet Gateway board, the data module can be administered and connected to the *Sun SPARCserver* computer or to a modem for a CMS located at a remote location.

Note If the CMS is located at a remote location (with reference to the switch), a modem and MTDM will be used.

1. Verify System Access Terminal screen displays:

enter command:

2. Enter `add data-module 2009` where *2009* is the extension number assigned to the data module. Press the **Return** key.

The extension number will automatically appear in the `Data Extension` field on the screen form. The extension number entered here is also used as the destination number on the `Interface Links` form.

The screen displays a `Data Module` form. (See Figure C-6 for reference.)

3. The cursor is positioned on the `Type` field. This field is defaulted to `pdm`. If the CMS is remotely connected, this field needs to be changed to `tdm`.
4. Press the **Return** key.

The cursor is positioned on the `Port` field.

5. Enter the port location to which the data module is connected. Press the **Return** key.

6. For a Generic 3r, the first character identifies the network (1-2, default is 1 if no entry); the second character identifies the carrier (A-E); the third and fourth characters identify the slot number in the carrier (01-20 for multi-carrier cabinets or 01-18 for single-carrier cabinets); the last two characters identify the circuit number (01-24).

The cursor is positioned on the `Name` field.

7. Enter `cms link pdm`, or if CMS is remotely connected, enter `cms link tdm`, and press the **Return** key.

The cursor is positioned on the `COS` field.

Note

The COS and COR fields are defaulted to 1, and the Connected To field is defaulted to dte.

8. Press the **Return** key.

9. Screen displays:

command successfully completed,
enter command:

DATA MODULE

Data Extension: 2009 BCC: Type: pdm Port: 1c0401

Name: cms link pdm COS: 1 COR: 1

Connected to: dte ITC: restricted

Remote Loop-Around Test? y

ABBREVIATED DIALING

List1:

SPECIAL DIALING OPTION: _____

ASSIGNED MEMBERS (Station with a data extension button for this data module)

Ext	Name
1:	

Figure C-6: Data Module Form

After the Pgate board and the data module have been assigned, the processor channel and interface link can then be established. The processor channel is assigned using the Processor Channel Assignment form, and the interface link is enabled using the Interface Links form.

Enabling the Interface Link on the Generic 3r

Use the following steps to enable the CMS interface link on the Generic 3r:

1. Verify System Access Terminal displays:

enter command:

2. Enter change communications-interfaces links, and press the **Return** key.

The screen displays an Interface Links form. (See Figure C-7 for reference.)

The cursor is positioned on the Enabled field.

3. Enter y beside the interface link number assigned on the Processor Channel form to enable the interface link. Press the **Return** key.

The cursor is positioned on the X.25 Extension field.

4. Enter the extension number assigned to establish a connection to the MPDM that connects to the *Sun SPARCserver* computer, and press the **Return** key.

The cursor skips the Destination Number field. The extension number assigned on the Processor Interface Data Module form is automatically displayed in this field.

The cursor is positioned on the Identification field.

5. Enter a 15-character name for the link. This field may be left blank.

6. Press the **Return** key.

Screen displays:

command successfully completed,
enter command:

INTERFACE LINKS						
Link	Enabled	X.25 Extension	Destination Number	Establish Connection	Connected Data Module	Identification
1:	y	2005	external			cms link
2:	n	n	2006			
3:	n	n	2007			
4:	n	n	2008			

Figure C-7: Interface Links Form for EIA Port on Processor Interface

Assigning the Processor Channel

Use the Processor Channel form to assign one of the 64 local processor channels from the processor link to one of the 64 interface channels assigned to one interface link (1 to 4). Only one interface link is assigned for the *Sun SPARCserver* computer.

The interface link number used on this form is the same number assigned to the Physical Channel field on the Interface-3 Data Module form.

The following procedure can be used to assign processor channels on the Generic 3r:

1. Verify System Access Terminal displays:

enter command:

2. Enter change communication-interface processor-channels command, and press the **Return** key.

The screen displays the Processor Channel Assignment form. (See Figure C-8 for reference.)



The sample screen shown in Figure C-8 illustrates a configuration which assigns the Processor Channel 1 to the mis Application with a Local and Remote Port of 1.

3. Select an available processor channel by using the up/down arrow keys to place the cursor in the Appl field of an available channel.



The Processor Channel number should be the same number that was selected for the local port number when the CMS software was installed. For more information on changing the port/link number, refer to the "swsetup" section in Chapter 2, "CMSADM and CMSSVC Menus."

4. Enter mis in the Appl field, and press the **Return** key.

The cursor is positioned on the Interface Link field.

5. Enter 1 in the Interface Link field. (This is the interface link number assigned on the Processor Interface Data Module form.)

6. Press the **Return** key.

The cursor is positioned on the Interface Chan field.

7. Enter 1 in the Interface Chan field, and press the **Return** key.

Note

The R3V2 CMS software requires that the Interface Chan assignment be administered as 1.

The cursor is positioned on the Local Port field.

8. Enter 1 in the Local Port field, and press the **Return** key.

The cursor is positioned on the Remote Port field.

9. Enter 1 in the Remote Port field, and press the **Return** key.

Cursor is positioned on the MACHINE-ID field.

10. Make no entry; press the **Return** key.

Screen displays:

command successfully completed,
enter command:

PROCESSOR CHANNEL ASSIGNMENT

Proc Chan	Appl.	Interface Link	Chan	Local Port	Remote Port	Adjunct Name	Machine-ID
1:	mis	1	1	1	1		
2:							
3:							
4:							
5:							
6:							
7:							
8:							
9:							
10:							
11:							
12:							
13:							
14:							
15:							
16:							

Figure C-8: Processor Channel Assignment Form

Setting Up an Administered Connection

The following procedures can be used to set up an administered connection on the Generic 3r:

1. Verify System Access Terminal displays:

enter command:

2. Enter add administered-connection 1. Press the **Return** key.

The screen displays an Administered Connection form.
(See Figure C-9 for reference.)

3. In the field labeled Originator, enter the extension number assigned to the modem being connected to the pgate connection. Press the **Return** key.

4. In the field labeled Destination, enter the extension number assigned to the modem being connected to the *Sun SPARCserver* computer. Press the **Return** key.

Screen displays:

command successfully completed,

enter command:

```
ADMINISTERED CONNECTION
Connection Number: 1 Enable? y
Originator: 2007
Destination: 2009
Name:
AUTHORIZED TIME OF DAY
Continuous? y
MISCELLANEOUS PARAMETERS
Alarm Type: warning Alarm Threshold: 5
Retry Interval: 2 Auto Restoration? y
Priority: 5
```

Figure C-9: Administered Connection Form

Overview

This appendix outlines the hardware and software installation procedures performed by the factory for the *Sun SPARCserver* computers. You can use these procedures to bring a *Sun SPARCserver* computer in the field up to factory standard. The factory performs the following installation procedures:

A. Hardware Procedures:

1. Unpack the system.
2. Install the DSIMMs (Dynamic Single In-line Memory Modules).
3. Install the VSIMMs (Video Single In-line Memory Modules).
4. Install SBus cards.
5. Connect SBus Expansion Subsystem.
6. Install the internal hard disk drives.
7. Install the internal floppy drive.
8. Install the internal CD-ROM drive.
9. Set the Black Box DTE/DCE DIP shunts.
10. Connect system console peripherals.
11. Connect external disks.
12. Connect network hub unit and network terminal servers.
13. Power up computer and verify sanity.
14. Connect the remote console.

B. Software Procedures:

1. Install the *Sun Solaris 2.4* operating system.
2. Install the *Solaris 2.4 AnswerBook* software.
3. Install the *SunLink* HSI/S Version 2.0 software.
4. Install the *Sun 1.0* NTS (Network Terminal Server) package.
5. Install the *SunLink* X.25 Network Interface Version 8.0.2 software.
6. Install the INFORMIX software.
7. Install the *Sun Solaris* patches.

8. Install the CMS (Call Management System) application.
9. Set authorizations.
10. Set up the remote console.
11. Administer the NTS.

Additional Documents

You need to reference the following documents while installing the *Sun SPARCserver* computer hardware:

- *“Sun” “SPARCstation” Installation Guide (5, 10, and 20)*
(“Sun” Part Numbers 801-6390-10 and 801-6424-11)
- *“SPARCstation” DSIMM/VSIMM Installation Guide (5, 10, and 20)*
(“Sun” Part Numbers 801-6394-10 and 801-6185-10)
- *1.05 Gbyte Single Connector Disk Drive Installation Manual*
(“Sun” Part Number 801-6560-10)
- *“SunCD” 2Plus Installation and User’s Manual*
(“Sun” Part Number 801-5963-10)
- *Diskette Drive Installation and User’s Manual*
(“Sun” Part Number 801-6397-11)
- *Installing SBus Cards in Desktop “SPARCstations”*
(“Sun” Part Number 800-6635-11)
- *Desktop Storage Pack Installation and Operation Manual*
(“Sun” Part Number 800-6316-11)
- *“Solaris” 2.x Handbook for SMCC Peripherals*
(“Sun” Part Number 801-2425-10)
- *FSBE/S SBus Card Manual*
(“Sun” Part Number 800-7508-10)
- *“SunLink” HSI/S 2.0 Installation and Administration Guide*
(“Sun” Part Number 801-3931-10)

- *“SunLink” X.25 8.0.2 CD-ROM Booklet/Manual*
(“Sun” Part Number 804-4059-10)
- *“Sun” Network Terminal Server (1.0) Guide*
(“Sun” Part Number 801-3990-11)
- *“Sun” Network Terminal Server (1.0) Guide - Quick Installation Leaflet*
(“Sun” Part Number 801-4791-10 Rev A)
- *“Solaris” 2.4 System Configuration and Installation Guide*
(“Sun” Part Number 801-5277-10)
- *“Solaris” 2.4 Basic Installation Guide*
(“Sun” Part Number 801-5278-10)
- *“Solaris” 2.4 Open Issues and Late-Breaking News for Users*
- *Introduction to “Solaris” 2.4 for Users*
(“Sun” Part Number 801-5382-10)
- *“Solaris” 2.4 System Administrator’s Guide to “AnswerBook” Installation and Administration*
(“Sun” Part Number 801-5273-10)
- *INFORMIX Installation Guide Version 5.01*
- *INFORMIX Installation Guide Version 5.01*
- *Black Box RS-232 ↔ RS-422 Interface Converter Installation and Operation Manual.*
- *“Sun” SBUs Expansion Subsystem Installation and Troubleshooting Guide*
(“Sun” Part Number 801-5132-10)
- *“Xylogics” Micro Annex Communications Server Hardware Installation Guide*
(“Xylogics” Part Number 166-024-135).

Manufacturing Information

Table D-1 through Table D-14 provides the PECs (Price Element Codes) for CMS configurations on *Sun SPARCserver* computers. These tables also include the PECs for upgrading from a 3B2 or an Intel-based configuration. You can use this information when ordering a part that is missing or DOA (defective on arrival).

Table D-1: CMS Large Agent Package- *Sun SPARCserver 20*

PEC	Attribute	Description	Comcode	Quantity
1208-6RL		<i>SPARCserver 20</i> Model 61 Processor	107490245	1
		17" monitor (x322A, 365-1316-01)	407272574	1
		XOPT - VSIMM (X327A, 595-3342-01)	407286665	1
		Power Cord (X327A, F180-1179-101)	407272541	1
		1.05-GB internal disk (X649A)	407312719	1
		2.1-GB external disk (X567A)	407195585	1
		64-MB 60ns SIMM memory expansion (X164P)	407227651	1
		<i>SunLink X.25 8.0.2</i> (X25-8.0.2-P) Server	407357599	1
		<i>Solaris 2.4</i> Media and <i>AnswerBook</i> (SOLS-C-2.4)	407357615	1
		<i>Solaris 2.4</i> Hardcopy Documentation (SOL-D-2.4)	407366822	1
		Internal 1.44 MB Floppy (X560A)	407283357	1
		14GB 8mm tape desktop storage system (X844A)	407294933	1
		150-MB 1/4-inch tape desktop backup pack (X660A)	407067719	1
		Type 5 Country Kit for U.S. and Canada only (X3500A)	407283415	1
		High speed serial interface/SBus (HSI/S) (X1019A)	407066794	1
		RS232-RS422/RS449 Protocol converter (TM-IC456A-R2, <i>Black Box</i>)	407076330	1
		DB25 M/M Gender Changer - X.25 (RJ-FA402, <i>Black Box</i>)	407086800	1
		Direct connect link adapter - X.25 (901890, Data Product Services)	407122068	1
		DB 37 10' RJ449 cable (RJ-EDN37J, <i>Black Box</i>)	407086818	1
		<i>Sun</i> Diagnostics (SUN DIAG 80-3935-10)	407075548	1
		A/B splitter cable (X985A)	407086594	1
		Adapter RJ45 DCE, 10 Pin for Remote Console	846362754	1
		Remote Console Adapter DTE RJ45	846362770	1
		10 foot, shielded cable for Remote Console	846983039	1
		Network Hub IBM 8222	407086735	1
		64-port NTS Kit (X2064A)	407066778	1
		Serial Fan-out Module (X974A)	407068329	4

Table D-1: CMS Large Agent Package- *Sun SPARCserver 20* (Contd)

PEC	Attribute	Description	Comcode	Quantity
1208-6RL		LDI 10T Transceiver	407086859	1
		UTP Cable 10' 143987	407086826	2
	SFT02(D)	CMS R3V2 Administration Manual, Vols. 1 and 2 (585-215-521)	107024929	1
	SFT02(D)	CMS R3V2 Custom Reports Manual (585-215-523)	107024937	1
	SFT02(D)	<i>Sun SPARCserver</i> Computers I&M Manual (585-215-129)	107539322	1
		Job Aid #B09100J (from Training and Education)	107562944	1
		Connectivity Document (585-215-130)	107548976	1
		<i>Sun</i> Hardware Inventory Form	847554169	1
	SFT02	CMS R3V2 Software	107191090	1
	SFT02	CMS R3V2 5200 Agent RTU	107061756	1
	SFT02	INFORMIX 5.04.UC1 SE Class D, <i>Solaris</i> 2.4, 9-16 user band (<64 simultaneous users)	407354364	1
	SFT02	INFORMIX 5.04.UC1 ESQL/C Class D, <i>Solaris</i> 2.4, 9-16 user band (<64 simultaneous users)	407354372	1

Table D-2: CMS Extra- Large Agent Package - Sun SPARCserver 20

PEC	Attribute	Description	Comcode	Quantity
1208-6RX		SPARCserver 20 Model 612 Processor	107490237	1
		17" monitor (x322A, 365-1316-01)	407272574	1
		XOPT - VSIMM (X327A, 595-3342-01)	407286665	1
		Power Cord (X327A, F180-1179-101)	407272541	1
		2.1-GB external disk (X567A)	407195585	1
		64-MB 60ns SIMM memory expansion (X164P)	407227651	1
		SunLink X.25 8.0.2 (X25-8.0.2-P) Server	407357599	1
		Solaris 2.4 Media and AnswerBook (SOLS-C-2.4)	407357615	1
		Solaris 2.4 Hardcopy Documentation (SOL-D-2.4)	407366822	1
		Internal 1.44 MB Floppy (X560A)	407283357	1
		14GB 8mm tape desktop storage system (X844A)	407294933	1
		150-MB 1/4-inch tape desktop backup pack (X660A)	407067719	1
		Type 5 Country Kit for U.S. and Canada only (X3500A)	407283415	1
		High speed serial interface/SBus (HSI/S) (X1019A)	407066794	1
		RS232-RS422/RS449 Protocol converter (TM-IC456A-R2, Black Box)	407076330	1
		DB25 M/M Gender Changer - X.25 (RJ-FA402, Black Box)	407086800	1
		Direct connect link adapter - X.25 (901890, Data Product Services)	407122068	1
		DB 37 10' RJ449 cable (RJ-EDN37J, Black Box)	407086818	1
		Sun Diagnostics (SUN DIAG 80-3935-10)	407075548	1
		A/B splitter cable (X985A)	407086594	1
		Adapter RJ45 DCE, 10 Pin for Remote Console	846362754	1
		Remote Console Adapter DTE RJ45	846362770	1
		10 foot, shielded cable for Remote Console	846983039	1
		Network Hub IBM 8222	407086735	1
		64-port NTS Kit (X2064A)	407066778	2
		Serial Fan-out Module (X974A)	407068329	8
		LDI 10T Transceiver	407086859	1

Table D-2: CMS Extra- Large Agent Package - *Sun SPARCserver 20* (Contd)

PEC	Attribute	Description	Comcode	Quantity
1208-6RX		UTP Cable 10' 143987	407086826	3
	SFT02(D)	CMS R3V2 Administration Manual, Vols. 1 and 2 (585-215-521)	107024929	1
	SFT02(D)	CMS R3V2 Custom Reports Manual (585-215-523)	107024937	1
	SFT02(D)	<i>Sun SPARCserver</i> Computers I&M Manual (585-215-129)	107539322	1
		Job Aid #B09100J (from Training and Education)	107562944	1
		Connectivity Document (585-215-130)	107548976	1
		<i>Sun</i> Hardware Inventory Form	847554169	1
	SFT02	CMS R3V2 Software	107191090	1
	SFT02	CMS R3V2 5200 Agent RTU	107061756	1
	SFT02	INFORMIX 5.04.UC1 SE Class E, <i>Solaris</i> 2.4, 33-64 user band (>=64 simultaneous users)	407354380	1
	SFT02	INFORMIX 5.04.UC1 ESQ/C Class E, <i>Solaris</i> 2.4, 33-64 user band (>=64 simultaneous users)	407354406	1

Table D-3: CMS Large Agent Package - 3B2 Upgrade Package

PEC	Attribute	Description	Comcode	Quantity
1208-6RA		SPARCserver 20 Model 61 Processor	107490245	1
		17" monitor (x322A, 365-1316-01)	407272574	1
		XOPT - VSIMM (X327A, 595-3342-01)	407286665	1
		Power Cord (X327A, F180-1179-101)	407272541	1
		1.05-GB internal disk (X649A)	407312719	1
		2.1-GB external disk (X567A)	407195585	1
		64-MB 60ns SIMM memory expansion (X164P)	407227651	1
		SunLink X.25 8.0.2 (X25-8.0.2-P) Server	407357599	1
		Solaris 2.4 Media and AnswerBook (SOLS-C-2.4)	407357615	1
		Solaris 2.4 Hardcopy Documentation (SOL-D-2.4)	407366822	1
		Internal 1.44 MB Floppy (X560A)	407283357	1
		14GB 8mm tape desktop storage system (X844A)	407294933	1
		150-MB 1/4-inch tape desktop backup pack (X660A)	407067719	1
		Type 5 Country Kit for U.S. and Canada only (X3500A)	407283415	1
		High speed serial interface/SBus (HSI/S) (X1019A)	407066794	1
		RS232-RS422/RS449 Protocol converter (TM-IC456A-R2, Black Box)	407076330	1
		DB25 M/M Gender Changer - X.25 (RJ-FA402, Black Box)	407086800	1
		Direct connect link adapter - X.25 (901890, Data Product Services)	407122068	1
		DB 37 10' RJ449 cable (RJ-EDN37J, Black Box)	407086818	1
		Sun Diagnostics (SUN DIAG 80-3935-10)	407075548	1
		A/B splitter cable (X985A)	407086594	1
		Adapter RJ45 DCE, 10 Pin for Remote Console	846362754	1
		Remote Console Adapter DTE RJ45	846362770	1
		10 foot, shielded cable for Remote Console	846983039	1
		Network Hub IBM 8222	407086735	1
		64-port NTS Kit (X2064A)	407066778	1
		Serial Fan-out Module (X974A)	407068329	4

Table D-3: CMS Large Agent Package - 3B2 Upgrade Package (Contd)

PEC	Attribute	Description	Comcode	Quantity
1208-6RA		LDI 10T Transceiver	407086859	1
		UTP Cable 10' 143987	407086826	2
	SFT02(D)	CMS R3V2 Administration Manual, Vols. 1 and 2 (585-215-521)	107024929	1
	SFT02(D)	CMS R3V2 Custom Reports Manual (585-215-523)	107024937	1
	SFT02(D)	<i>Sun SPARCserver</i> Computers I&M Manual (585-215-129)	107539322	1
		Job Aid #B09100J (from Training and Education)	107562944	1
		Connectivity Document (585-215-130)	107548976	1
		<i>Sun</i> Hardware Inventory Form	847554169	1
	SFT03(D)	R2 to R3 Migration Floppy	106791940	1
	SFT03(D)	Change Description (585-215-421)	107024895	1
	SFT03(D)	R2 to R3 Migration Document	107217325	1
	SFT02 (D)	CMS R3V2 Software (585-215-124)	107191090	1
	SFT02(D)	CMS R3V2 5200 Agent RTU	107061756	1
	SFT02(D)	INFORMIX 5.04.UC1 SE Class D, <i>Solaris</i> 2.4, 9-16 user band (<64 simultaneous users)	407354364	1
	SFT02(D)	INFORMIX 5.04.UC1 ESQL/C Class D, <i>Solaris</i> 2.4, 9-16 user band (<64 simultaneous users)	407354372	1

Table D-4: CMS Extra-Large Agent Package - 3B2 Upgrade Package

PEC	Attribute	Description	Comcode	Quantity
1208-6RB		SPARCserver 20 Model 612 Processor	107490237	1
		17" monitor (x322A, 365-1316-01)	407272574	1
		XOPT - VSIMM (X327A, 595-3342-01)	407286665	1
		Power Cord (X327A, F180-1179-101)	407272541	1
		2.1-GB external disk (X567A)	407195585	1
		64-MB 60ns SIMM memory expansion (X164P)	407227651	1
		SunLink X.25 8.0.2 (X25-8.0.2-P) Server	407357599	1
		Solaris 2.4 Media and AnswerBook (SOLS-C-2.4)	407357615	1
		Solaris 2.4 Hardcopy Documentation (SOL-D-2.4)	407366822	1
		Internal 1.44 MB Floppy (X560A)	407283357	1
		14GB 8mm tape desktop storage system (X844A)	407294933	1
		150-MB 1/4-inch tape desktop backup pack (X660A)	407067719	1
		Type 5 Country Kit for U.S. and Canada only (X3500A)	407283415	1
		High speed serial interface/SBus (HSI/S) (X1019A)	407066794	1
		RS232-RS422/RS449 Protocol converter (TM-IC456A-R2, <i>Black Box</i>)	407076330	1
		DB25 M/M Gender Changer - X.25 (RJ-FA402, <i>Black Box</i>)	407086800	1
		Direct connect link adapter - X.25 (901890, Data Product Services)	407122068	1
		DB 37 10' RJ449 cable (RJ-EDN37J, <i>Black Box</i>)	407086818	1
		Sun Diagnostics (SUN DIAG 80-3935-10)	407075548	1
		A/B splitter cable (X985A)	407086594	1
		Adapter RJ45 DCE, 10 Pin for Remote Console	846362754	1
		Remote Console Adapter DTE RJ45	846362770	1
		10 foot, shielded cable for Remote Console	846983039	1
		Network Hub IBM 8222	407086735	1
		64-port NTS Kit (X2064A)	407066778	2
		Serial Fan-out Module (X974A)	407068329	8
		LDI 10T Transceiver	407086859	1

Table D-4: CMS Extra-Large Agent Package - 3B2 Upgrade Package (Contd)

PEC	Attribute	Description	Comcode	Quantity
1208-6RB		UTP Cable 10' 143987	407086826	3
	SFT02(D)	CMS R3V2 Administration Manual, Vols. 1 and 2 (585-215-521)	107024929	1
	SFT02(D)	CMS R3V2 Custom Reports Manual (585-215-523)	107024937	1
	SFT02(D)	<i>Sun SPARCserver</i> Computers I&M Manual (585-215-129)	107539322	1
		Job Aid #B09100J (from Training and Education)	107562944	1
		Connectivity Document (585-215-130)	107548976	1
		<i>Sun</i> Hardware Inventory Form	847554169	1
	SFT02	CMS R3V2 Software	107191090	1
	SFT03(D)	R2 to R3 Migration Floppy	106791940	1
	SFT03(D)	Change Description (585-215-421)	107024895	1
	SFT03(D)	R2 to R3 Migration Document	107217325	1
	SFT02(D)	CMS R3V2 5200 Agent RTU	107061756	1
	SFT02(D)	INFORMIX 5.04.UC1 SE Class E, <i>Solaris</i> 2.4, 33-64 user band (>=64 simultaneous users)	407354380	1
	SFT02(D)	INFORMIX 5.04.UC1 ESQ/LC Class E, <i>Solaris</i> 2.4, 33-64 user band (>=64 simultaneous users)	407354406	1

Table D-5: CMS Large Agent Package - Intel Upgrade Package

PEC	Attribute	Description	Comcode	Quantity
1208-6RC		SPARCserver 20 Model 61 Processor	107490245	1
		17" monitor (x322A, 365-1316-01)	407272574	1
		XOPT - VSIMM (X327A, 595-3342-01)	407286665	1
		Power Cord (X327A, F180-1179-101)	407272541	1
		1.05-GB internal disk (X649A)	407312719	1
		2.1-GB external disk (X567A)	407195585	1
		64-MB 60ns SIMM memory expansion (X164P)	407227651	1
		SunLink X.25 8.0.2 (X25-8.0.2-P) Server	407357599	1
		Solaris 2.4 Media and AnswerBook (SOLS-C-2.4)	407357615	1
		Solaris 2.4 Hardcopy Documentation (SOL-D-2.4)	407366822	1
		Internal 1.44 MB Floppy (X560A)	407283357	1
		14GB 8mm tape desktop storage system (X844A)	407294933	1
		150-MB 1/4-inch tape desktop backup pack (X660A)	407067719	1
		Type 5 Country Kit for U.S. and Canada only (X3500A)	407283415	1
		High speed serial interface/SBus (HSI/S) (X1019A)	407066794	1
		RS232-RS422/RS449 Protocol converter (TM-IC456A-R2, <i>Black Box</i>)	407076330	1
		DB25 M/M Gender Changer - X.25 (RJ-FA402, <i>Black Box</i>)	407086800	1
		Direct connect link adapter - X.25 (901890, Data Product Services)	407122068	1
		DB 37 10' RJ449 cable (RJ-EDN37J, <i>Black Box</i>)	407086818	1
		Sun Diagnostics (SUN DIAG 80-3935-10)	407075548	1
		A/B splitter cable (X985A)	407086594	1
		Adapter RJ45 DCE, 10 Pin for Remote Console	846362754	1
		Remote Console Adapter DTE RJ45	846362770	1
		10 foot, shielded cable for Remote Console	846983039	1
		Network Hub IBM 8222	407086735	1
		64-port NTS Kit (X2064A)	407066778	1
		Serial Fan-out Module (X974A)	407068329	4

Table D-5: CMS Large Agent Package - Intel Upgrade Package (Contd)

PEC	Attribute	Description	Comcode	Quantity
1208-6RC		LDI 10T Transceiver	407086859	1
		UTP Cable 10' 143987	407086826	2
	SFT02(D)	CMS R3V2 Administration Manual, Vols. 1 and 2 (585-215-521)	107024929	1
	SFT02(D)	CMS R3V2 Custom Reports Manual (585-215-523)	107024937	1
	SFT02(D)	<i>Sun SPARCserver</i> Computers I&M Manual (585-215-129)	107539322	1
		Job Aid #B09100J (from Training and Education)	107562944	1
		Connectivity Document (585-215-130)	107548976	1
		<i>Sun</i> Hardware Inventory Form	847554169	1
	SFT02	CMS R3V2 Software	107191090	1
	SFT03(D)	Change Description (585-215-421)	107024895	1
	SFT03(D)	R2 to R3 Migration Document	107217325	1
	SFT02(D)	INFORMIX 5.04.UC1 SE Class E, <i>Solaris</i> 2.4, 33-64 user band (>=64 simultaneous users)	407354380	1
	SFT02(D)	INFORMIX 5.04.UC1 ESQ/L/C Class E, <i>Solaris</i> 2.4, 33-64 user band (>=64 simultaneous users)	407354406	1

Table D-6: CMS Extra-Large Agent Package - Intel Upgrade Package

PEC	Attribute	Description	Comcode	Quantity
1208-6RD		SPARCserver 20 Model 612 Processor	107490237	1
		17" monitor (x322A, 365-1316-01)	407272574	1
		XOPT - VSIMM (X327A, 595-3342-01)	407286665	1
		Power Cord (X327A, F180-1179-101)	407272541	1
		2.1-GB external disk (X567A)	407195585	1
		64-MB 60ns SIMM memory expansion (X164P)	407227651	1
		SunLink X.25 8.0.2 (X25-8.0.2-P) Server	407357599	1
		Solaris 2.4 Media and AnswerBook (SOLS-C-2.4)	407357615	1
		Solaris 2.4 Hardcopy Documentation (SOL-D-2.4)	407366822	1
		Internal 1.44 MB Floppy (X560A)	407283357	1
		14GB 8mm tape desktop storage system (X844A)	407294933	1
		150-MB 1/4-inch tape desktop backup pack (X660A)	407067719	1
		Type 5 Country Kit for U.S. and Canada only (X3500A)	407283415	1
		High speed serial interface/SBus (HSI/S) (X1019A)	407066794	1
		RS232-RS422/RS449 Protocol converter (TM-IC456A-R2, <i>Black Box</i>)	407076330	1
		DB25 M/M Gender Changer - X.25 (RJ-FA402, <i>Black Box</i>)	407086800	1
		Direct connect link adapter - X.25 (901890, Data Product Services)	407122068	1
		DB 37 10' RJ449 cable (RJ-EDN37J, <i>Black Box</i>)	407086818	1
		Sun Diagnostics (SUN DIAG 80-3935-10)	407075548	1
		A/B splitter cable (X985A)	407086594	1
		Adapter RJ45 DCE, 10 Pin for Remote Console	846362754	1
		Remote Console Adapter DTE RJ45	846362770	1
		10 foot, shielded cable for Remote Console	846983039	1
		Network Hub IBM 8222	407086735	1
		64-port NTS Kit (X2064A)	407066778	2
		Serial Fan-out Module (X974A)	407068329	8
		LDI 10T Transceiver	407086859	1

Table D-6: CMS Extra-Large Agent Package - Intel Upgrade Package (Contd)

PEC	Attribute	Description	Comcode	Quantity
1208-6RD		UTP Cable 10' 143987	407086826	3
	SFT02(D)	CMS R3V2 Administration Manual, Vols. 1 and 2 (585-215-521)	107024929	1
	SFT02(D)	CMS R3V2 Custom Reports Manual (585-215-523)	107024937	1
	SFT02(D)	<i>Sun SPARCserver</i> Computers I&M Manual (585-215-129)	107539322	1
		Job Aid #B09100J (from Training and Education)	107562944	1
		Connectivity Document (585-215-130)	107548976	1
		<i>Sun</i> Hardware Inventory Form	847554169	1
	SFT02	CMS R3V2 Software	107191090	1
	SFT03(D)	Change Description (585-215-421)	107024895	1
	SFT03(D)	R2 to R3 Migration Document	107217325	1
	SFT02(D)	INFORMIX 5.04.UC1 SE Class E, <i>Solaris</i> 2.4, 33-64 user band (>=64 simultaneous users)	407354380	1
	SFT02(D)	INFORMIX 5.04.UC1 ESQL/C Class E, <i>Solaris</i> 2.4, 33-64 user band (>=64 simultaneous users)	407354406	1

Table D-7: CMS Small Agent Package - Sun SPARCstation 5

PEC	Attribute	Description	Comcode	Quantity
1208-6SM		SPARCstation 5 Model 85 Processor	407338334	1
		SPARCstation 5 17" Color Monitor (365-1316-01)	407272574	1
		32-MB 60ns SIMM memory expansion (X132M)	407344118	1
		SunLink X.25 8.0.2 (X25-8.0.2-P) SPARCstation 5	407357607	1
		Solaris 2.4 Media and AnswerBook (SOLS-C-2.4)	407357615	1
		Solaris Desktop to Server License for Solaris 2.4 (SOLD-S-LU)	407377290	1
		644-MB internal Slim SunCD Plus (X578A)	407344100	1
		150-MB 1/4-inch tape desktop backup pack (X660A)	407067719	1
		Type 5 Country Kit for U.S. and Canada Only (X3500A)	407283415	1
		DB25 M/M Gender Changer - X.25 (RJ-FA402, Black Box)	407086800	1
		Direct connect link adapter - X.25 (901890. Data Product Services)	407122068	1
		Sun Diagnostics (SUN DIAG 80-3935-10)	407075548	1
		Adapter RJ45 DCE, 10 pin for Remote Console	846362754	1
		Remote Console Adapter DTE RJ45	846362770	1
		10 foot, Shielded cable for Remote Console	846983039	1
		Network Hub IBM 8222	407086735	1
		NTS with 8 serial ports (370-1434)	407345131	1
		LDI 10T Transceiver	407086859	1
		UTP Cable 10' 143987	407086826	1
		NTS 1.0 CD-ROM Software	407381482	1
	SFT02 (D)	CMS R3V2 Administration Manual, Vols. 1 and 2 (585-215-521)	107024929	1
	SFT02 (D)	CMS R3V2 Custom Reports Manual (585-215-523)	107024937	1
	SFT02 (D)	Sun SPARCserver Computers I&M Manual (585-215-129)	107539322	1
		Job Aid #B09100J (from Training and Education)	107562944	1

Table D-7: CMS Small Agent Package - Sun SPARCstation 5 (Contd)

PEC	Attribute	Description	Comcode	Quantity
1208-6SM		Connectivity Diagram (585-215-130)	107548976	1
		Sun Hardware Inventory Form	847554169	1
	SFT02 (D)	CMS R3V2 Software	107191090	1
	SFT02 (D)	CMS R3V2 100 Agent RTU	107061715	1
	SFT02 (D)	INFORMIX 5.04 UC1 SE Class D, Solaris 2.4, 9-16 user band (<64 simultaneous users)	407354364	1
	SFT02 (D)	INFORMIX 5.04 UC1 ESQL/C Class D, Solaris 2.4, 9-16 user band (<64 simultaneous users)	407354372	1

Table D-8: CMS Medium Agent Package - Sun SPARCstation 5

PEC	Attribute	Description	Comcode	Quantity
1208-6MD		SPARCstation 5 Model 85 Processor	407338334	1
		SPARCstation 5 17" Color Monitor (365-1316-01)	407272574	1
		1.05-GB internal disk (X649A)	407312719	1
		32-MB 60ns SIMM memory expansion (X132M)	407344118	1
		SunLink X.25 8.0.2 (X25-8.0.2-P) SPARCstation 5	407357607	1
		Solaris 2.4 Media and AnswerBook (SOLS-C-2.4)	407357615	1
		Solaris Desktop to Server License for Solaris 2.4 (SOLD-S-LU)	407377290	1
		644-MB internal Slim SunCD Plus (X578A)	407344100	1
		150-MB 1/4-inch tape desktop backup pack (X660A)	407067719	1
		Type 5 Country Kit for U.S. and Canada Only (X3500A)	407283415	1
		DB25 M/M Gender Changer - X.25 (RJ-FA402, Black Box)	407086800	1
		Direct connect link adapter -X.25 (901890. Data Product Services)	407122068	1
		Sun Diagnostics (SUN DIAG 80-3935-10)	407075548	1
		Adapter RJ45 DCE, 10 pin for Remote Console	846362754	1
		Remote Console Adapter DTE RJ45	846362770	1
		10 foot, Shielded cable for Remote Console	846983039	1
		Network Hub IBM 8222	407086735	1
		NTS with 8 serial ports (370-1434)	407345131	1
		LDI 10T Transceiver	407086859	1
		UTP Cable 10' 143987	407086826	1
		NTS 1.0 CD-ROM Software	407381482	1
	SFT02(D)	CMS R3V2 Administration Manual, Vols. 1 and 2 (585-215-521)	107024929	1
	SFT02(D)	CMS R3V2 Custom Reports Manual (585-215-523)	107024937	1
	SFT02(D)	Sun SPARCserver Computers I&M Manual (585-215-129)	107539322	1

Table D-8: CMS Medium Agent Package - *Sun SPARCstation 5* (Contd)

PEC	Attribute	Description	Comcode	Quantity
1208-6MD		Job Aid #B09100J (from Training and Education)	107562944	1
		Connectivity Diagram (585-215-130)	107548976	1
		Sun Hardware Inventory Form	847554169	1
	SFT02 (D)	CMS R3V2 Software	107191090	1
	SFT02 (D)	CMS R3V2 300 Agent RTU	107061723	1
	SFT02 (D)	INFORMIX 5.04 UC1 SE Class D, Solaris 2.4, 9-16 user band (<64 simultaneous users)	407354364	1
	SFT02 (D)	INFORMIX 5.04 UC1 ESQL/C Class D, Solaris 2.4, 9-16 user band (<64 simultaneous users)	407354372	1

Table D-9: CMS Large Agent Package - Sun SPARCserver 5

PEC	Attribute	Description	Comcode	Quantity
1208-6LG		SPARCstation 5 Model 85 Processor	407338334	1
		SPARCstation 5 17" Color Monitor (365-1316-01)	407272574	1
		1.05-GB internal disk (X649A)	407312719	1
		32-MB 60ns SIMM memory expansion (X132M)	407344118	1
		SunLink X.25 8.0.2 (X25-8.0.2-P) SPARCstation 5	407357607	1
		Solaris 2.4 Media and AnswerBook (SOLS-C-2.4)	407357615	1
		Solaris Desktop to Server License for Solaris 2.4 (SOLD-S-LU)	407377290	1
		644-MB internal Slim SunCD Plus (X578A)	407344100	1
		150-MB 1/4-inch tape desktop backup pack (X660A)	407067719	1
		Type 5 Country Kit for U.S. and Canada Only (X3500A)	407283415	1
		DB25 M/M Gender Changer - X.25 (RJ-FA402, Black Box)	407086800	1
		Direct connect link adapter -X.25 (901890. Data Product Services)	407122068	1
		Sun Diagnostics (SUN DIAG 80-3935-10)	407075548	1
		Adapter RJ45 DCE, 10 pin for Remote Console	846362754	1
		Remote Console Adapter DTE RJ45	846362770	1
		10 foot, Shielded cable for Remote Console	846983039	1
		Network Hub IBM 8222	407086735	1
		NTS with 8 serial ports (370-1434)	407345131	1
		LDI 10T Transceiver	407086859	1
		UTP Cable 10' 143987	407086826	1
		NTS 1.0 CD-ROM Software	407381482	1
	SFT02(D)	CMS R3V2 Administration Manual, Vols. 1 and 2 (585-215-521)	107024929	1
	SFT02(D)	CMS R3V2 Custom Reports Manual (585-215-523)	107024937	1
	SFT02(D)	Sun SPARCserver Computers I&M Manual (585-215-129)	107539322	1

Table D-9: CMS Large Agent Package - Sun SPARCserver 5 (Contd)

PEC	Attribute	Description	Comcode	Quantity
1208-6LG		Job Aid #B09100J (from Training and Education)	107562944	1
		Connectivity Diagram (585-215-130)	107548976	1
		Sun Hardware Inventory Form	847554169	1
	SFT02 (D)	CMS R3V2 Software	107191090	1
	SFT02 (D)	CMS R3V2 600 Agent RTU	107061749	1
	SFT02 (D)	INFORMIX 5.04 UC1 SE Class D, Solaris 2.4, 9-16 user band (<64 simultaneous users)	407354364	1
	SFT02 (D)	INFORMIX 5.04 UC1 ESQL/C Class D, Solaris 2.4, 9-16 user band (<64 simultaneous users)	407354372	1

Table D-10: CMS Small Agent - 3B2 Upgrade Package

PEC	Attribute	Description	Comcode	Quantity
1208-6US		SPARCstation 5 Model 85 Processor	407338334	1
		SPARCstation 5 17" Color Monitor (365-1316-01)	407272574	1
		32-MB 60ns SIMM memory expansion (X132M)	407344118	1
		SunLink X.25 8.0.2 (X25-8.0.2-P) SPARCstation 5	407357607	1
		Solaris 2.4 Media and AnswerBook (SOLS-C-2.4)	407357615	1
		Solaris Desktop to Server License for Solaris 2.4 (SOLD-S-LU)	407377290	1
		644-MB internal Slim SunCD Plus (X578A)	407344100	1
		150-MB 1/4-inch tape desktop backup pack (X660A)	407067719	1
		Type 5 Country Kit for U.S. and Canada Only (X3500A)	407283415	1
		DB25 M/M Gender Changer - X.25 (RJ-FA402, Black Box)	407086800	1
		Direct connect link adapter - X.25 (901890. Data Product Services)	407122068	1
		Sun Diagnostics (SUN DIAG 80-3935-10)	407075548	1
		Adapter RJ45 DCE, 10 pin for Remote Console	846362754	1
		Remote Console Adapter DTE RJ45	846362770	1
		NTS 1.0 CD-ROM Software	407381482	1
		10 foot, Shielded cable for Remote Console	846983039	1
		Network Hub IBM 8222	407086735	1
		NTS with 8 serial ports (370-1434)	407345131	1
		LDI 10T Transceiver	407086859	1
		UTP Cable 10' 143987	407086826	1
		Job Aid #B09100J (from training and education)	107562944	1
		Sun HW Inventory Form	847554169	1
	SFT03(D)	CMS R2 to R3 Migration Software	106791940	1
	SFT03(D)	Change Description Document (585-215-421)	107024895	1
	SFT03(D)	CMS Sun Migration Document (585-215-124)	107217325	
	SFT02(D)	CMS R3V2 Administration Manual, Vols. 1 and 2 (585-215-521)	107024929	1

Table D-10: CMS Small Agent - 3B2 Upgrade Package (Contd)

PEC	Attribute	Description	Comcode	Quantity
1208-6US	SFT02(D)	CMS R3V2 Custom Reports Manual (585-215-523)	107024937	1
	SFT02(D)	Sun SPARCserver Computers I&M Manual (585-215-129)	107539322	1
		Connectivity Diagram (585-215-130)	107548976	1
	SFT02 (D)	CMS R3V2 Software	107191090	1
	SFT02 (D)	CMS R3V2 100 Agent RTU	107061715	1
	SFT02 (D)	INFORMIX 5.04 UC1 SE Class D, Solaris 2.4, 9-16 user band (<64 simultaneous users)	407354364	1
	SFT02 (D)	INFORMIX 5.04 UC1 ESQL/C Class D, Solaris 2.4, 9-16 user band (<64 simultaneous users)	407354372	1

Table D-11: CMS Medium Agent - 3B2 Upgrade Package

PEC	Attribute	Description	Comcode	Quantity
1208-6UM		SPARCstation 5 Model 85 Processor	407338334	1
		SPARCstation 5 17" Color Monitor (365-1316-01)	407272574	1
		32-MB 60ns SIMM memory expansion (X132M)	407344118	2
		SunLink X.25 8.0.2 (X25-8.0.2-P) SPARCstation 5	407357607	1
		Solaris 2.4 Media and AnswerBook (SOLS-C-2.4)	407357615	1
		644-MB internal Slim SunCD Plus (X578A)	407344100	1
		1.05-GB internal disk (X649A)	407312719	1
		150-MB 1/4-inch tape desktop backup pack (X660A)	407067719	1
		Type 5 Country Kit for U.S. and Canada Only (X3500A)	407283415	1
		DB25 M/M Gender Changer - X.25 (RJ-FA402, Black Box)	407086800	1
		Direct connect link adapter - X.25 (901890. Data Product Services)	407122068	1
		Sun Diagnostics (SUN DIAG 80-3935-10)	407075548	1
		Adapter RJ45 DCE, 10 pin for Remote Console	846362754	1
		Remote Console Adapter DTE RJ45	846362770	1
		10 foot, Shielded cable for Remote Console	846983039	1
		Network Hub IBM 8222	407086735	1
		NTS with 8 serial ports (370-1434)	407345131	1
		NTS 1.0 CD-ROM Software	407381482	1
		Job Aid #B09100J (from training and education)	107562944	1
		Sun Hardware Inventory Form	847554169	1
		Solaris Desktop to Server License for Solaris 2.4 (SOLD-S-LU)	407377290	1
		LDI 10T Transceiver	407086859	1
		UTP Cable 10' 143987	407086826	1
	SFT03(D)	CMS R2 to R3 Migration Software	106791940	1
	SFT03(D)	Change Description Document (585-215-421)	107024895	1
	SFT03(D)	CMS Sun Migration Document (585-215-124)	107217325	

Table D-11: CMS Medium Agent - 3B2 Upgrade Package (Contd)

PEC	Attribute	Description	Comcode	Quantity
1208-6UM	SFT02(D)	CMS R3V2 Administration Manual, Vols. 1 and 2 (585-215-521)	107024929	1
	SFT02(D)	CMS R3V2 Custom Reports Manual (585-215-523)	107024937	1
	SFT02(D)	Sun SPARCserver Computers I&M Manual (585-215-129)	107539322	1
		Connectivity Diagram (585-215-130)	107548976	1
	SFT02 (D)	CMS R3V2 Software	107191090	1
	SFT02 (D)	CMS R3V2 300 Agent RTU	107061723	1
	SFT02 (D)	INFORMIX 5.04 UC1 SE Class D, Solaris 2.4, 9-16 user band (<64 simultaneous users)	407354364	1
	SFT02 (D)	INFORMIX 5.04 UC1 ESQ/C Class D, Solaris 2.4, 9-16 user band (<64 simultaneous users)	407354372	1

Table D-12: CMS Large Agent - 3B2 Upgrade Package

PEC	Attribute	Description	Comcode	Quantity
1208-6UL		SPARCstation 5 Model 85 Processor	407338334	1
		SPARCstation 5 17" Color Monitor (365-1316-01)	407272574	1
		32-MB 60ns SIMM memory expansion (X132M)	407344118	2
		SunLink X.25 8.0.2 (X25-8.0.2-P) SPARCstation 5	407357607	1
		Solaris 2.4 Media and AnswerBook (SOLS-C-2.4)	407357615	1
		644-MB internal Slim SunCD Plus (X578A)	407344100	1
		1.05-GB internal disk (X649A)	407312719	1
		150-MB 1/4-inch tape desktop backup pack (X660A)	407067719	1
		Type 5 Country Kit for U.S. and Canada Only (X3500A)	407283415	1
		DB25 M/M Gender Changer - X.25 (RJ-FA402, Black Box)	407086800	1
		Direct connect link adapter - X.25 (901890. Data Product Services)	407122068	1
		Sun Diagnostics (SUN DIAG 80-3935-10)	407075548	1
		Adapter RJ45 DCE, 10 pin for Remote Console	846362754	1
		Remote Console Adapter DTE RJ45	846362770	1
		10 foot, Shielded cable for Remote Console	846983039	1
		Network Hub IBM 8222	407086735	1
		NTS with 8 serial ports (370-1434)	407345131	1
		NTS 1.0 CD-ROM Software	407381482	1
		Job Aid #B09100J (from training and education)	107562944	1
		Sun Hardware Inventory Form	847554169	1
		Solaris Desktop to Server for Solaris 2.4 (SOLD-S-LU)	407377290	1
		LDI 10T Transceiver	407086859	1
		UTP Cable 10' 143987	407086826	1
	SFT03(D)	CMS R2 to R3 Migration Software	106791940	1
	SFT03(D)	Change Description Document (585-215-421)	107024895	1
	SFT03(D)	CMS Sun Migration Document (585-215-124)	107217325	

Table D-12: CMS Large Agent - 3B2 Upgrade Package (Contd)

PEC	Attribute	Description	Comcode	Quantity
1208-6UL	SFT02(D)	CMS R3V2 Administration Manual, Vols. 1 and 2 (585-215-521)	107024929	1
	SFT02(D)	CMS R3V2 Custom Reports Manual (585-215-523)	107024937	1
	SFT02(D)	Sun SPARCserver Computers I&M Manual (585-215-129)	107539322	1
		Connectivity Diagram (585-215-130)	107548976	1
	SFT02 (D)	CMS R3V2 Software	107191090	1
	SFT02 (D)	CMS R3V2 600 Agent RTU	107061749	1
	SFT02 (D)	INFORMIX 5.04 UC1 SE Class D, Solaris 2.4, 9-16 user band (<64 simultaneous users)	407354364	1
	SFT02 (D)	INFORMIX 5.04 UC1 ESQL/C Class D, Solaris 2.4, 9-16 user band (<64 simultaneous users)	407354372	1

Table D-13: R3V2 CMS Hardware Upgrade Package

PEC	Attribute	Description	Comcode	Quantity
1208-6HU		SPARCstation 5 Model 85 Processor	407338334	1
		SPARCstation 5 17" Color Monitor (365-1316-01)	407272574	1
		32-MB 60ns SIMM memory expansion (X132M)	407344118	1
		SunLink X.25 8.0.2 (X25-8.0.2-P) SPARCstation 5	407357607	1
		Solaris 2.4 Media and AnswerBook (SOLS-C-2.4)	407357615	1
		644-MB internal Slim SunCD Plus (X578A)	407344100	1
		1.05-GB internal disk (X649A)	407312719	1
		150-MB 1/4-inch tape desktop backup pack (X660A)	407067719	1
		Type 5 Country Kit for U.S. and Canada Only (X3500A)	407283415	1
		DB25 M/M Gender Changer - X.25 (RJ-FA402, Black Box)	407086800	1
		Direct connect link adapter - X.25 (901890. Data Product Services)	407122068	1
		Sun Diagnostics (SUN DIAG 80-3935-10)	407075548	1
		Adapter RJ45 DCE, 10 pin for Remote Console	846362754	1
		Remote Console Adapter DTE RJ45	846362770	1
		10 foot, Shielded cable for Remote Console	846983039	1
		Network Hub IBM 8222	407086735	1
		NTS with 8 serial ports (370-1434)	407345131	1
		NTS 1.0 CD-ROM Software	407381482	1
		Job Aid #B09100J (from training and education)	107562944	1
		Sun Hardware Inventory Form	847554169	1
		LDI 10T Transceiver	407086859	1
		UTP Cable 10' 143987	407086826	1
	SFT02(D)	CMS R3 Change Description (585-215-411)	106972039	1
	SFT02(D)	CMS R3V2 Change Description (585-215-421)	107024895	1
	SFT02(D)	Change Description	107024895	1
	SFT02(D)	CMS R3V2 Administration Manual, Vols. 1 and 2 (585-215-521)	107024929	1

Table D-13: R3V2 CMS Hardware Upgrade Package (Contd)

PEC	Attribute	Description	Comcode	Quantity
1208-6HU	SFT02(D)	CMS R3V2 Custom Reports Manual (585-215-523)	107024937	1
	SFT02(D)	Sun SPARCserver Computers I&M Manual (585-215-129)	107539322	1
		Connectivity Diagram (585-215-130)	107548976	1
	SFT02 (D)	CMS R3V2 Software	107191090	1
	SFT02 (D)	INFORMIX 5.04 UC1 SE Class D, Solaris 2.4, 9-16 user band (<64 simultaneous users)	407354364	1
	SFT02 (D)	INFORMIX 5.04 UC1 ESQL/C Class D, Solaris 2.4, 9-16 user band (<64 simultaneous users)	407354372	1

Table D-14: *Sun SPARCserver* - Additional Items

PEC	Attribute	Description	Comcode	Quantity
12080		RS232-RS422/RS499 Black Box converter TM-IC456A-R2	407076330	1
		DB25 M/M Gender Matcher RJ-FA402	407086800	1
		Direct Connect Link Adapter 901890	407122068	1
		DB 37 10' RJ 499 Cable RJ-EDN37J	407086818	1
12083		Network Terminal Server Kit Z2064A	407066778	1
		Serial Fan-out module Kit X974A	407068329	4
		LDI 10T Transceiver	407086859	1
		UTP Cable 10' 143987	407086826	1
12084		Hub 127816 10 Fiber (for fiber rather than copper)	407144229	1
12085		64-MB SIMM Memory	407227651	
12086		NTS UTP Cable 143992 25'	407086842	1
12087		NTS UTP Cable 143992 50'	407086834	1
12088		Kit - X2064A - Network Terminal Server	407066778	1
		Kit - X974A - Serial Asynchronous NC	407068329	1
		LDI 10T Transceiver	407086859	1
		UTP Cable 10' 143987	407086826	1
		Kit - X164P 64-MB DSIMM	407227651	1
12089		10Base-T Hub	407086859	
		PWR51	407086735	1
		PWR51	407220144	1
		PWR56(D)	407086735	1
12090		FSBE/S SBus Ethernet Card	407068337	1
12091		112-meter, 8mm blank tape and cleaning tapes		
12092		LDI 10FL Transceiver	407144203	1
12093		15 foot Keyboard Extension Cable	407361815	1

Table D-14: *Sun SPARCserver* - Additional Items (Contd)

PEC	Attribute	Description	Comcode	Quantity
		4 meter Monitor Extension Cable	407361807	1
12094		2.1-GB External hard disk (X567A)	407195585	1
12095		Token-Ring interface/SBus (TRI/S) - X1014A	407220169	1
12096		14-GB 8mm tape desktop storage system (X844A)	407294933	1
12098		NTS 8 Serial Ports (370-1434)	407345131	
		10' UTP Cable Assembly	407086826	1
		LDI 10T Voice/Data Transceiver	407086859	1
		NTS 1.0 CD-ROM Software	407381482	1
12099		NTS 8 Serial Ports plus 2 parallel ports (AXM-A-16-N-100)	407350701	1
		LDI 10T Transceiver	407086859	1
		UTP Cable 10' 143987	407086826	1
		NTS 1.0 CD-ROM Software	407381482	1
12100		NTS 16 Serial Ports (AXM-A-16-N-100)	407350719	1
		LDI 10T Transceiver	407086859	1
		UTP Cable 10' 143987	407086826	1
		NTS 1.0 CD-ROM Software	407381482	1
12101		Sun SBus Expansion Cabinet	407350222	1
12102		High Speed Serial Interface/SBus (HSI/S) (X1019A) includes card, patch panel, software, cable, brackets	407066794	1
		RS232-RS422/RS449 Black Box converter TM-IC456A-R2	407076330	2
		DB25 M/M Gender Matcher RJ-FA402	407086800	1
		Direct connect link adapter 901890	407122068	1
		DB 37 10' RJ449 Cable RJ-EDN37J	407086818	2
12104		1.05-GB internal disk (X649A)	407312719)	1
12105		Centronics Parallel Printer Cable	407361856	1

Table D-14: Sun SPARCserver - Additional Items (Contd)

PEC	Attribute	Description	Comcode	Quantity
12106		IBM Parallel Printer Cable	407361831	1
12107		32-MB SIMM Memory	407344118	1
12108		<i>Solaris</i> 2.4 Hardcopy Documentation (S)L-D-2.4)	407366822	1
69772		INFORMIX 4.13. UD1 SQL Class D for SS5 and SS20, <i>Solaris</i> 2.4, 1-16 users	407354414	1

Factory Hardware Installation Procedures

The following steps outline the factory hardware installation procedures and include:

- Installation procedures
- Documentation references
- SCSI ID and option settings, board locations, etc.



Before you begin the hardware installation, make sure that the computer is plugged in, the power is off, and you are wearing an ESD (Electro-Static Discharge) ground strap.

Opening the Machine

To open your *Sun SPARCserver* computer, do the following:

1. Shut down your system.
2. When the system has finished its shutdown, turn off the power to *all* the peripherals, the monitor, and the computer system.
3. Remove the cover screws located on the top right rear of the back panel (see Figure D-1).

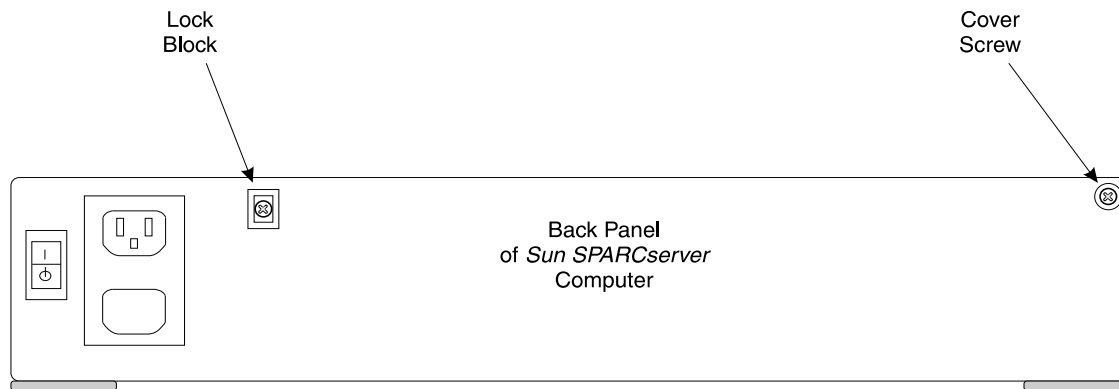


Figure D-1: Rear Panel of a *Sun SPARCserver* Computer

4. Find the lock block located towards the top left corner of the back panel (see Figure D-1).

5. Face the back panel, and grasp the sides of the cover. Carefully lift the back of the cover up and away from the back panel (see Figure D-2). The cover should start to swing up towards the front of the machine.

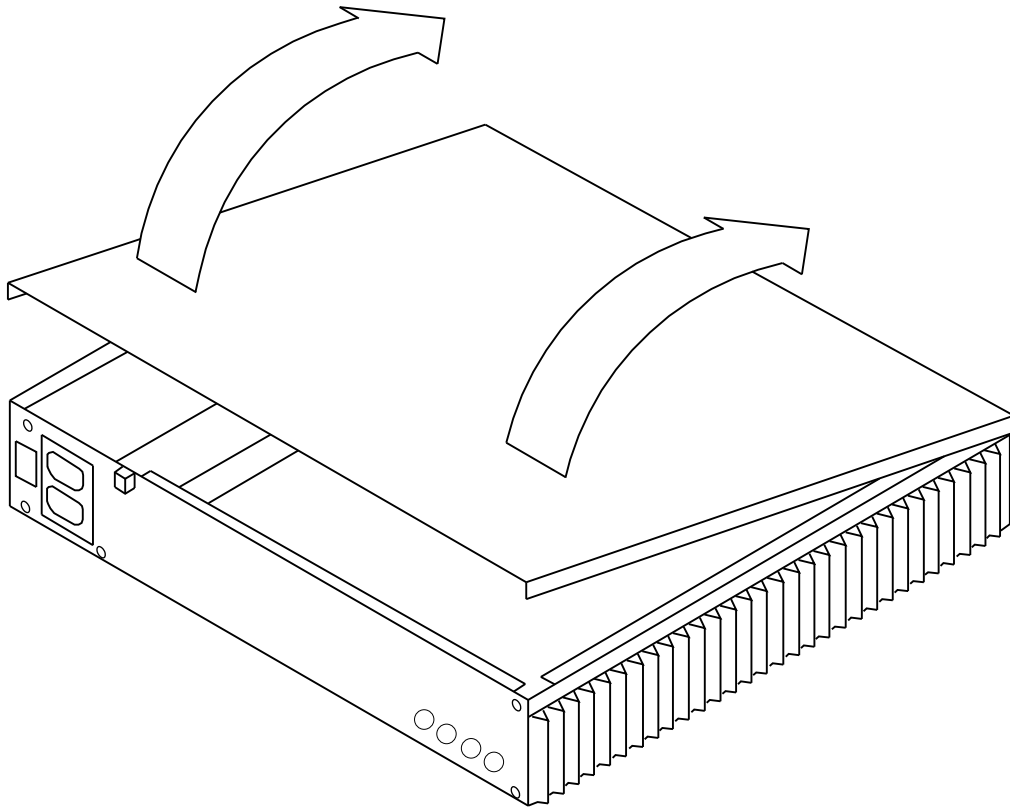


Figure D-2: Removing the Cover from a *Sun SPARCserver* Computer

6. When the cover is approximately at a 60-degree angle (relative to the system unit), push the cover forward until the cover's hinge tabs are free of the system unit.

Additional References For additional information, refer to the following documentation:

“Sun” “SPARCstation” Installation Guides (5, 10, and 20),
Chapter 4: “Opening the System Unit”

Installing SBus Cards in Desktop “SPARCstations,”
(Use “4SBus and 3SBus slot *SPARCstation*” references).

Identifying Internal Hardware Components

Identify the following components in your *Sun SPARCserver* computer (see Figure D-3, Figure D-4, and Figure D-5):

- Internal CD-ROM Drive
- Internal Hard Disk Drives
- DSIMM Slots/Receptacles
- VSIMM Slots/Receptacles (*Sun SPARCserver 20* only)
- SBus Slots
- MBus Slots (*Sun SPARCserver 10 and 20* only)
- Power Supply.

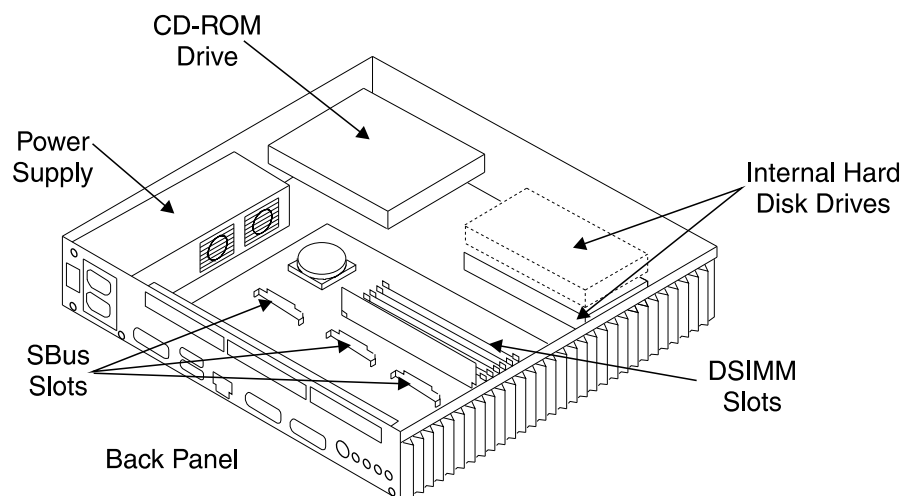


Figure D-3: *Sun SPARCserver 5* Computer Internal Hardware Components

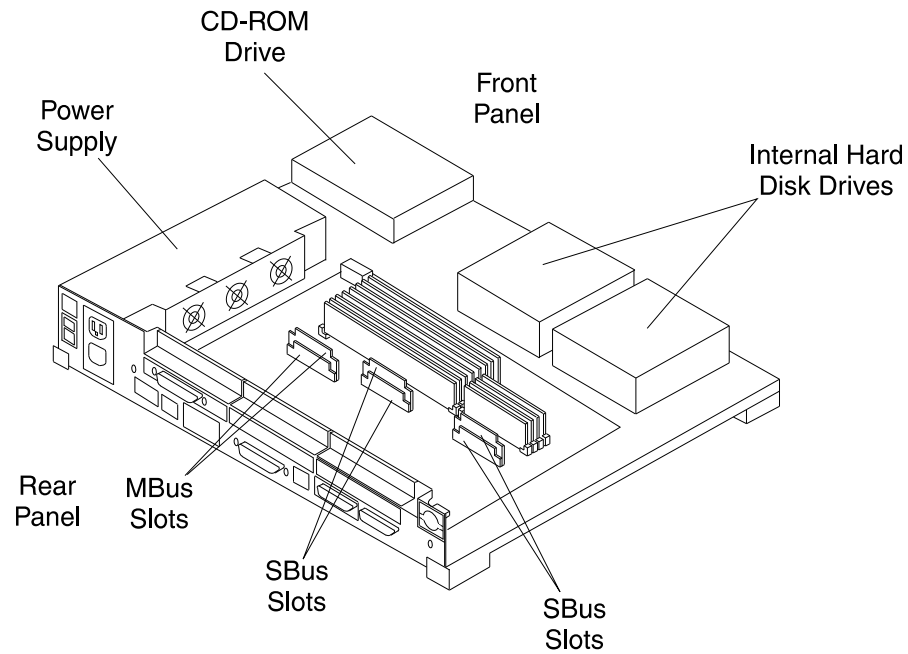


Figure D-4: Sun SPARCserver 10 Computer Internal Hardware Components

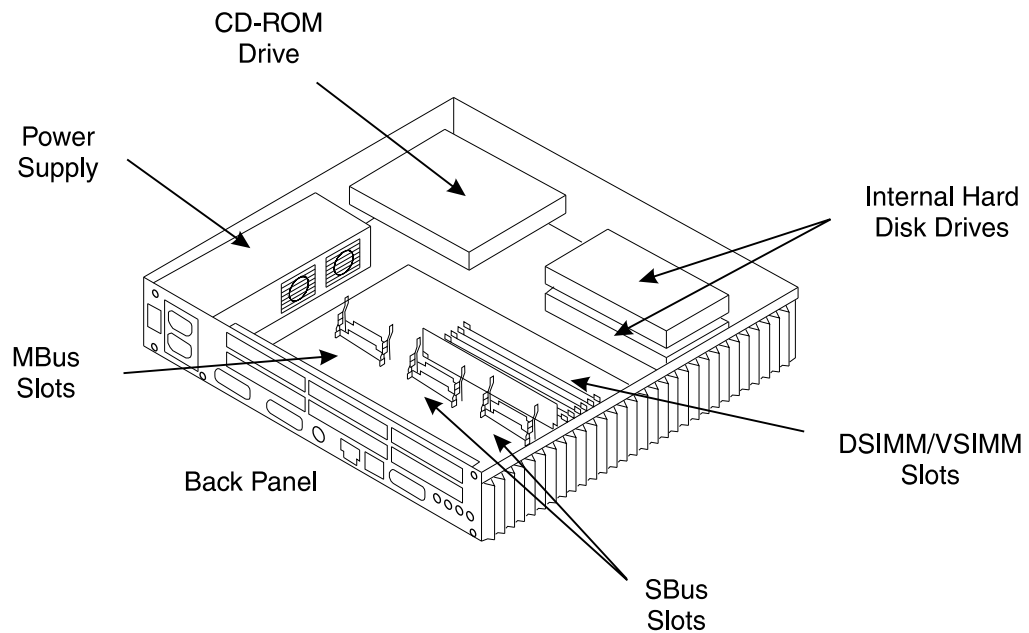


Figure D-5: Sun SPARCserver 20 Computer Internal Hardware Components

Additional References For additional information, refer to the following documentation:

Installing SBus Cards in Desktop "SPARCstations,"
(Use "4 and 3 SBus slot *SPARCstation*" references).

Installing the DSIMMs - *Sun SPARCserver 5*

The *Sun SPARCserver 5* computer comes equipped with a 32-MB DSIMMs installed. You may have to install additional DSIMMs to support the CMS configurations.

To properly install the DSIMMs, you need to identify the front and back of the DSIMM and be able to align it properly with the DSIMM slots (located on the Main Logic board inside the computer). Figure D-6 and Figure D-7 show the back and front of a 32-MB DSIMM chip.

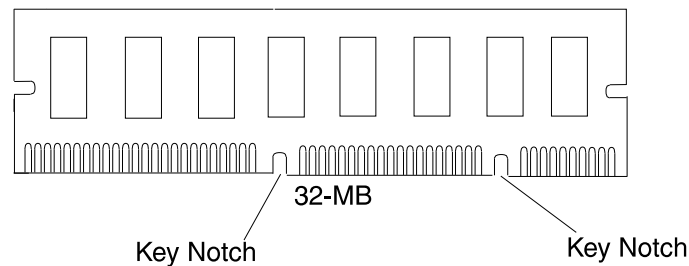


Figure D-6: 32-MB DSIMM Chip - Back Panel View

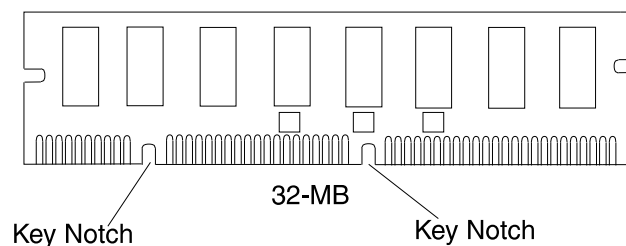


Figure D-7: 32-MB DSIMM Chip - Front Panel View

In addition to identifying the front and back of a DSIMMs chip, you must also locate the DSIMM slots on the main logic board of the computer (see Figure D-8).

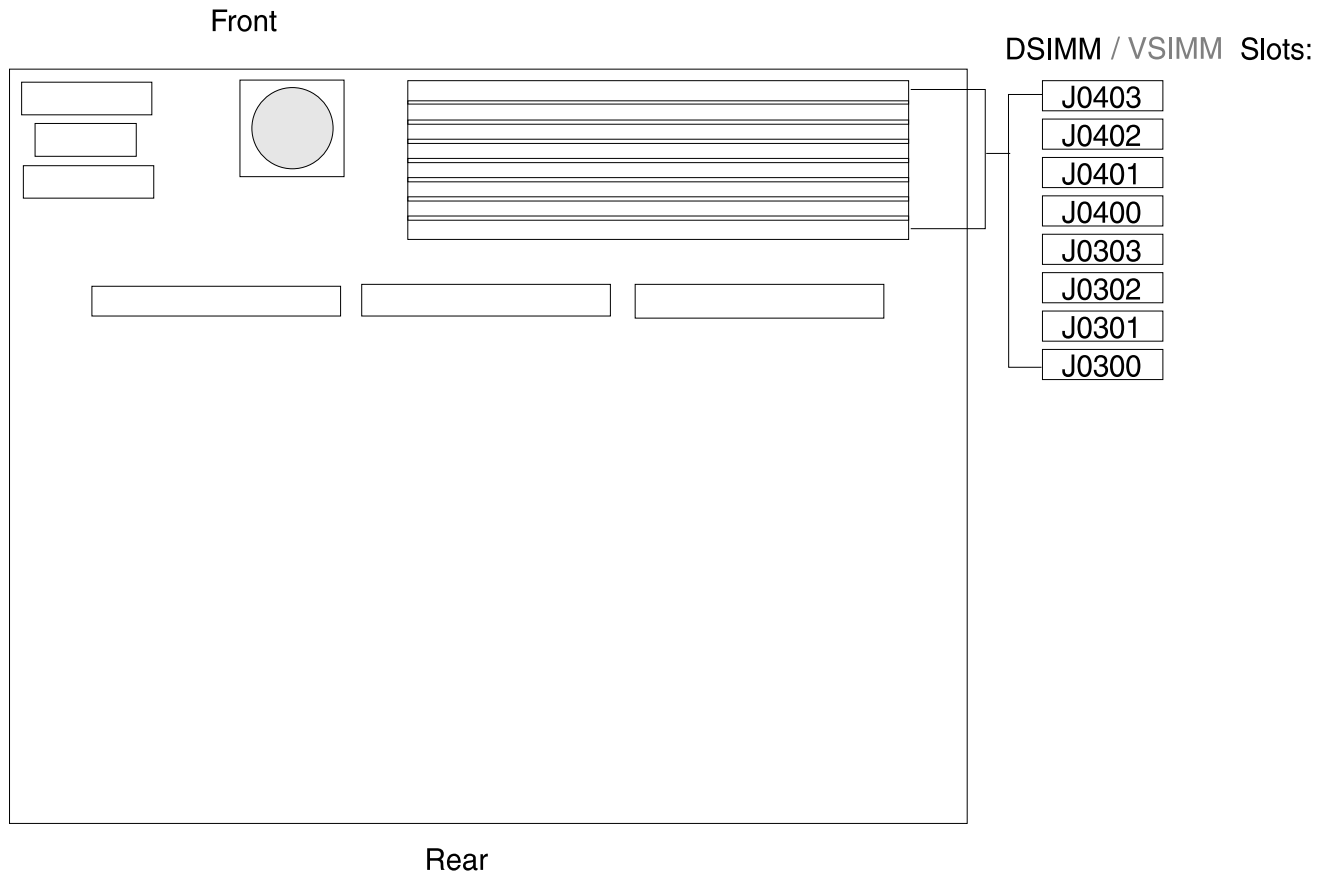


Figure D-8: Sun SPARCserver 5 Computer DSIMM Slot Locations (Main Logic Board)

To install a DSIMM, do the following:

1. Carefully remove the new DSIMM from its protective packaging and place it on an antistatic surface. The bag that the DSIMM came packed in is a good antistatic surface.

2. Choose the next available slot. Refer to Table D-15 for DSIMM installation order.

Table D-15: DSIMM Installation Sequence

Installation Sequence <i>Sun SPARCserver 5</i>	Slot Number
1 (DSIMM)	J0300
2 (DSIMM)	J0301
3 (DSIMM)	J0302
4 (DSIMM)	J0303
5 (DSIMM)	J0400
6 (DSIMM)	J0401
7 (DSIMM)	J0402
8 (DSIMM)	J0403

Note

Slot J0300 (on the *Sun SPARCserver 5*'s main logic board) must have a DSIMM installed. Also, the largest (memory capacity) DSIMM must be installed in slot J0300.

3. Unlock (press down) the ejector levers at both ends of the connectors (see Figure D-9).

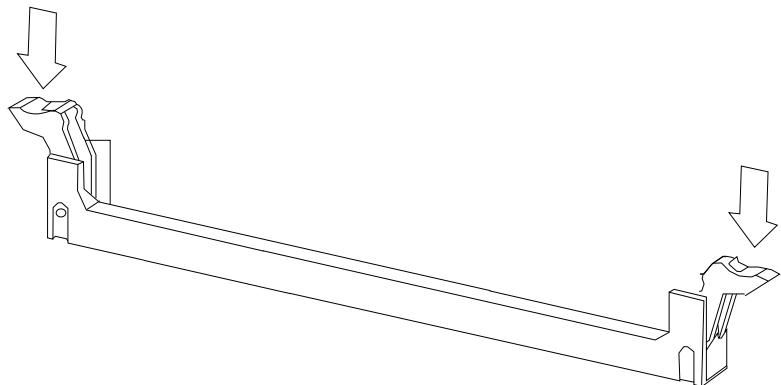


Figure D-9: Installing 32-MB DSIMM Chip in *Sun SPARCserver 5*

4. Align the DSIMM with the slot. Hold the DSIMM by its edges and orient it so that the two notches at the bottom of the DSIMM line up with the two tabs in the DSIMM connector (see Figure D-10).

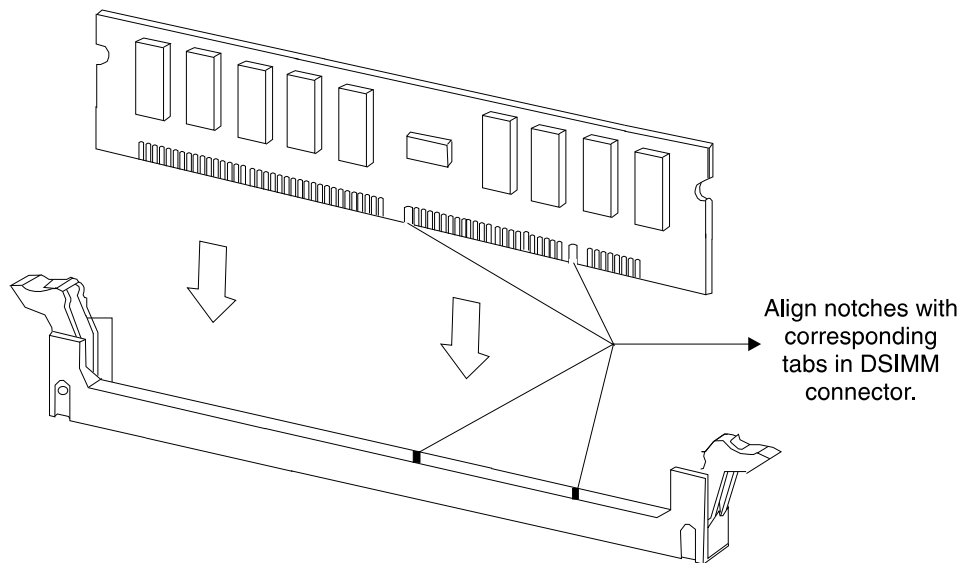


Figure D-10: Orienting a DSIMM

5. Place your thumbs on the top of the DSIMM and push it firmly into its connectors.
6. To lock the DSIMM in place, push both ejector levers into the upright position (see Figure D-11).

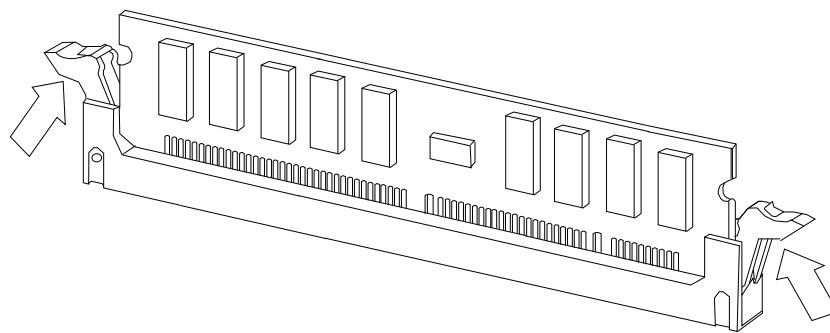


Figure D-11: Locking DSIMMs in Place

Additional References For additional information, refer to the following documentation:

“SPARCstation” DSIMM/VSIMM Installation,
Chapter 1: “General Installation Instructions”
Chapter 2: “Installing DSIMMs”
Chapter 4: “Removing DSIMMs/VSIMMs/AVB.”

Installing the DSIMMs - *Sun SPARCserver 10 and 20*

The *Sun SPARCserver 10* and *20* computers come equipped with a 64-MB DSIMMs installed. You may have to install additional memory to support the CMS configurations.

To properly install the DSIMMs, you need to identify the front and back of the DSIMM and be able to align it properly with the DSIMM slots (located on the Main Logic board inside the computer). Figure D-12 and Figure D-13 show the back and front of a 64-MB DSIMM chip.

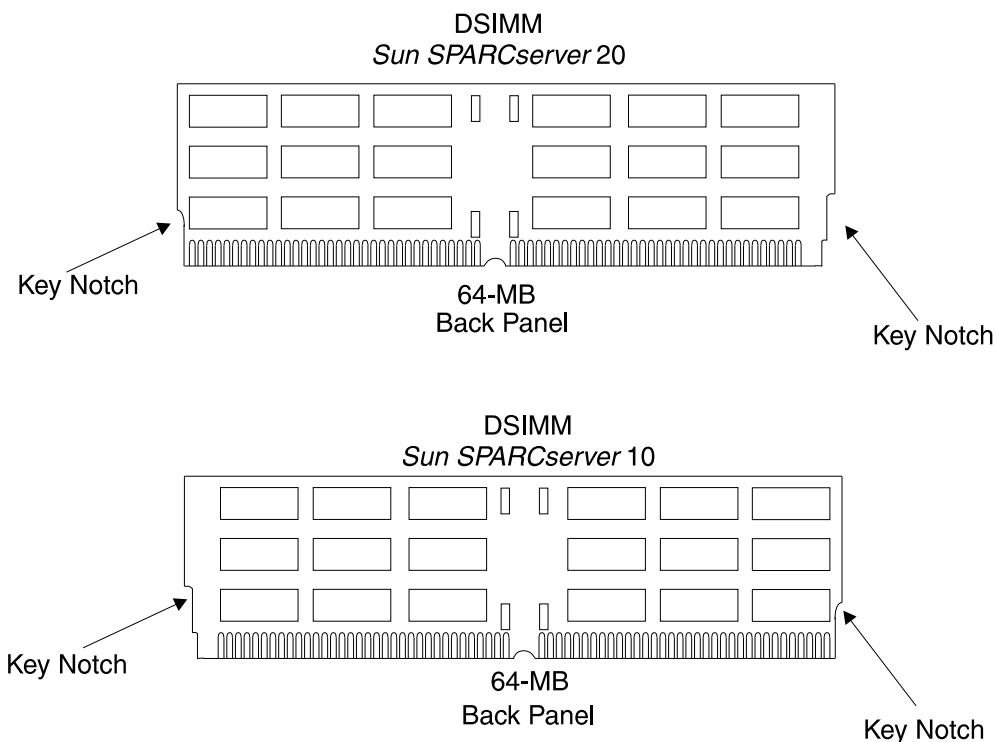


Figure D-12: 64-MB DSIMM Chip *Sun SPARCserver 20*- Back Panel View

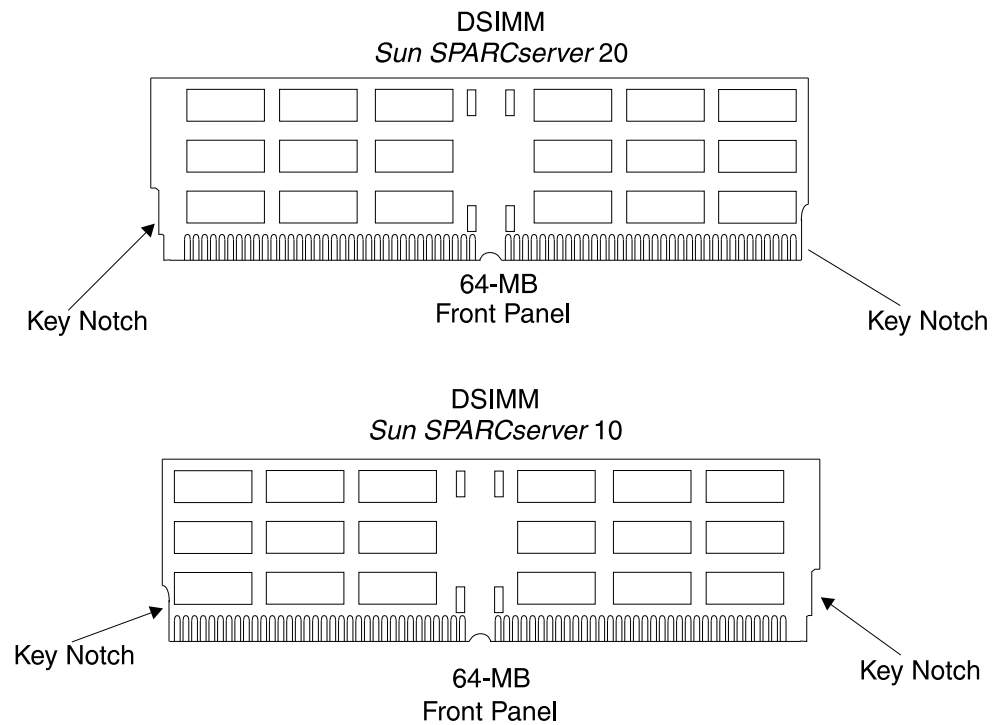


Figure D-13: 64-MB DSIMM Chip *Sun SPARCserver 10*- Front Panel View

In addition to identifying the front and back of a DSIMMs chip, you must also locate the DSIMM slots on the main logic board of the computer (see Figure D-14 and Figure D-15).

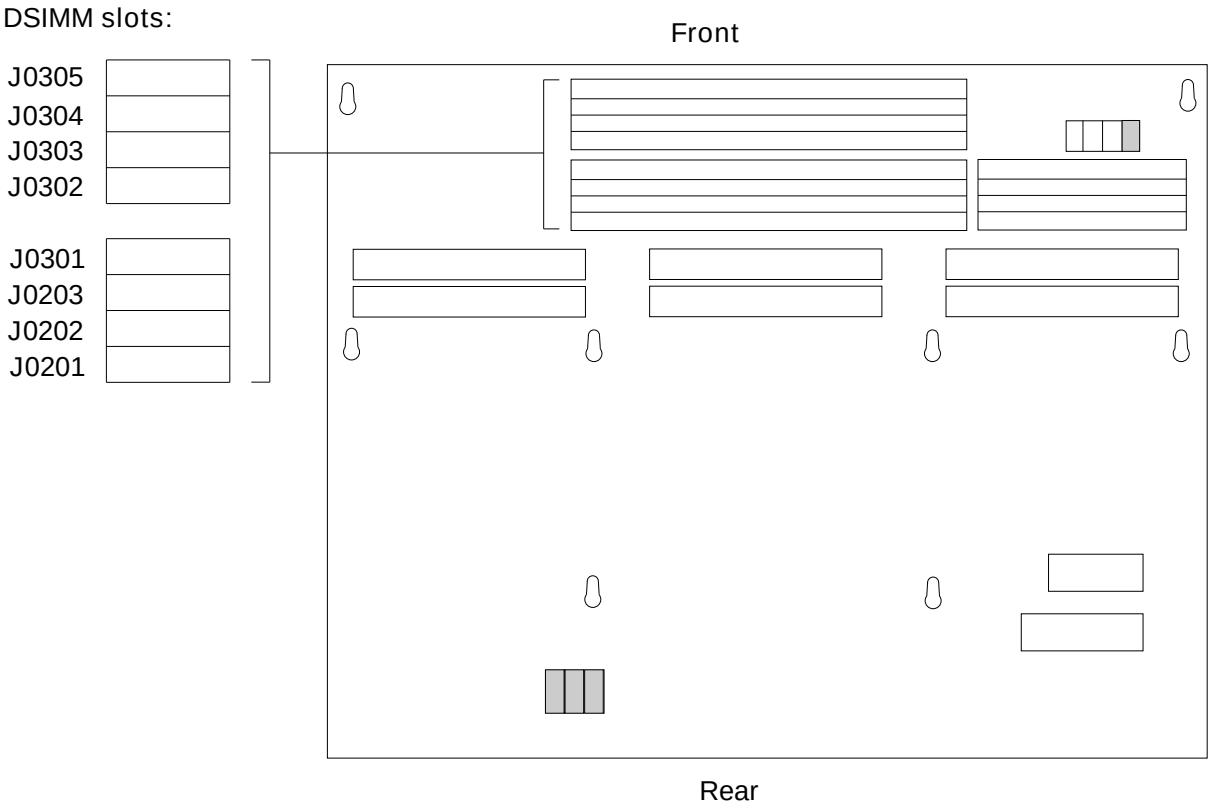


Figure D-14: Sun SPARCserver 10 Computer DSIMM Slot Location (Main Logic Board)

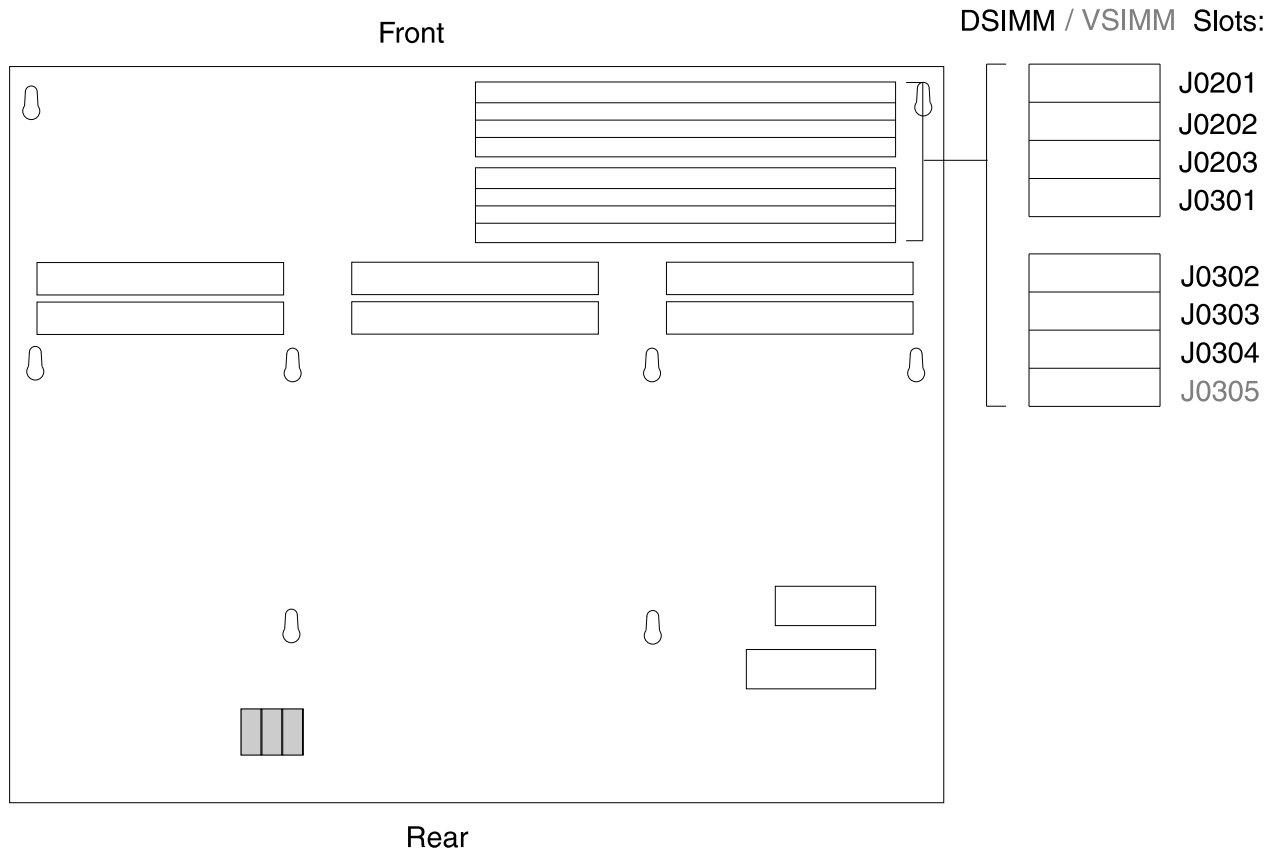


Figure D-15: Sun SPARCserver 20 Computer DSIMM Slot Locations (Main Logic Board)

To install a DSIMM, do the following:

1. Carefully remove the new DSIMM from its protective packaging and place it on an antistatic surface. The bag that the DSIMM came packed in is a good antistatic surface.

2. Choose the next available slot. Refer to Table D-16 for DSIMM installation order.

Table D-16: DSIMM Installation Sequence

Installation Sequence <i>Sun SPARCserver 10</i>	Slot Number	Installation Sequence <i>Sun SPARCserver 20</i>	Slot Number
1 (DSIMM)	J0201	1 (DSIMM)	J0201
2 (DSIMM)	J0304	2 (DSIMM)	J0202
3 (DSIMM)	J0203	3 (DSIMM)	J0203
4 (DSIMM)	J0302	4 (DSIMM)	J0301
5 (DSIMM)	J0303	5 (DSIMM)	J0302
6 (DSIMM)	J0301	6 (DSIMM)	J0303
7 (DSIMM)	J0305	7 (VSIMM)	J0304
8 (DSIMM)	J0202	8 (DSIMM or VSIMM)	J0305

Note Slot J0201 (on the *Sun SPARCserver 10* and 20's main logic board) must have a DSIMM installed. Also, the largest (memory capacity) DSIMM must be installed in slot J0201.

3. Holding the DSIMM by the edges, carefully slide the DSIMM into the plastic guides and push straight down to seat it.

When you insert a DSIMM into a socket, make sure the chip's key notch and the socket orientation correspond. The center vertical chip on the 64-MB DSIMM should face the front of the computer when it is installed.

Additional References For additional information, refer to the following documentation:

"SPARCstation" DSIMM/VSIMM Installation,
 Chapter 1: "General Installation Instructions"
 Chapter 2: "Installing DSIMMs"
 Chapter 4: "Removing DSIMMs/VSIMMs/AVB."

Installing the VSIMMs - *Sun SPARCserver 20*

The *Sun SPARCserver 20* computer is not shipped to the AT&T factory with VSIMMs installed.

To properly install the VSIMM chip, you need to identify the front and back, and align it properly with the VSIMM slots (located on the Main Logic board inside the computer). Figure D-16 and Figure D-17 show the back and front of a VSIMM chip.

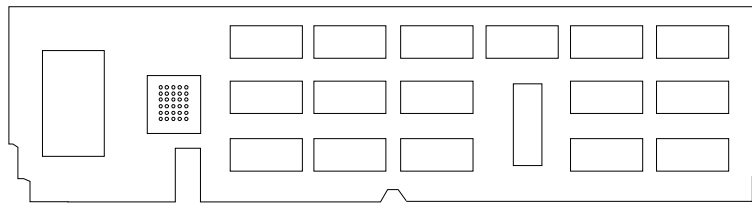


Figure D-16: VSIMM Chip — Back Panel View

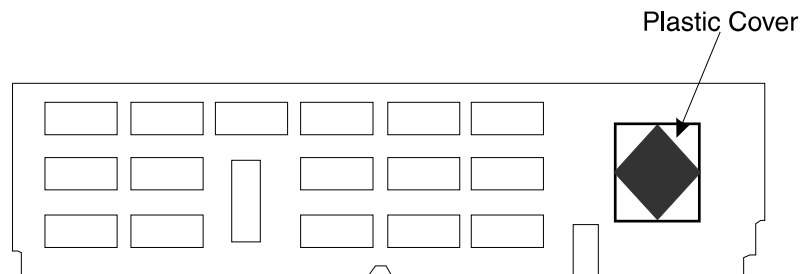


Figure D-17: VSIMM Chip — Front Panel View

Note

When you insert a VSIMM into a socket, make sure the chip's key notch and the socket orientation correspond.

The side with the plastic cover (on the VSIMM chip) must face the front panel of the computer (when the VSIMM is properly installed).

In addition to identifying the front and back of a VSIMM chip, you must also locate the VSIMM slots on the main logic board of the computer (see Figure D-18).

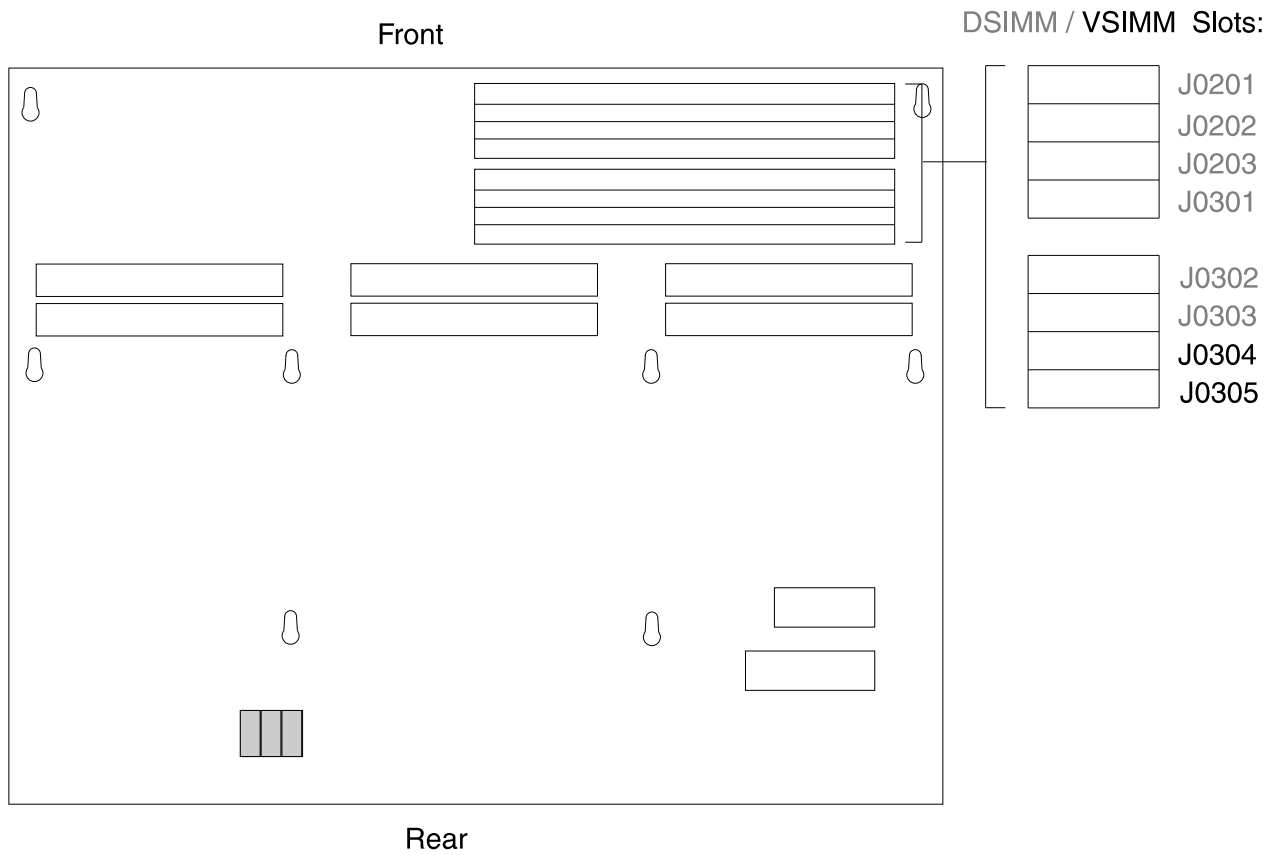


Figure D-18: Sun SPARCserver 20 Computer VSIMM Slot Locations (Main Logic Board)

To install the proper amount of memory in the system (using VSIMMs), do the following:

1. Carefully remove the new VSIMM from its protective packaging and place it on an antistatic surface. The bag that the VSIMM came packed in is a good antistatic surface.

2. Install the proper VSIMMs in the slots for the CMS configuration you are currently building. Refer to Table D-17 for memory configurations and VSIMM installation order.

Table D-17: VSIMM Installation Sequence

Installation Sequence	Slot Number
1	J0304
2	J0305

3. Remove any additional VSIMMs from the protective packaging, and lay them on the static shielding bag.
4. Holding the VSIMM by the edges, carefully slide the VSIMM into the plastic guides and push straight down to seat it.

Note

When you insert a VSIMM into a socket, make sure the chip's key notch and the socket orientation correspond. The side with the plastic cover (on the VSIMM chip) must face the front panel of the computer (when the VSIMM is properly installed).

Additional References For additional information, refer to the following documentation:

"SPARCstation" DSIMM/VSIMM Installation,
Chapter 1: "General Installation Instructions"
Chapter 3: "Installing VSIMMs"
Chapter 4: "Removing DSIMMs/VSIMMs/AVB."

SBus Slots in the Sun Hardware Platforms

The number of available SBus slots on the *Sun SPARCserver* computer varies depending on your hardware configuration (see Table D-18). Installing a *Sun SBus Expansion Subsystem* provides you with a net gain of two SBus slots. You only gain two SBus slots because an SBus Expansion Adapter card is used in the *SPARCserver* computer to connect the SBus Expansion Subsystem (see "Connecting the Sun SBus Expansion Subsystem" later in this chapter).

Table D-18: SBus Slot Combinations for *Sun SPARCserver* Computers

<i>Sun SPARCserver 5 Computer</i>	<i>Sun SPARCserver 10 and 20 Computer (one or two CPUs)</i>	<i>Sun SBus Expansion Subsystem</i>
Three SBus slots available	Four SBus slots available	Three SBus slots available
Slots 1, 2, and 3	Slots 0, 1, 2, and 3	Slots 0, 1, and 2

Selecting SBus Slots

- The SBus slots should be filled as follows:
- The SBus slots in the *Sun SPARCserver* computer should be filled first and filled in the following order:
 - Fill slot 1, 2, and then 3 (for *Sun SPARCserver 5*)
 - Fill slot 0, 1, 2, and then 3 (for *Sun SPARCserver 10 and 20*)
 - The SBus slots in the *Sun SBus Expansion Subsystem* should be filled after the SBus slots in the *Sun SPARCserver* computer have been filled. The following order applies:
 - Fill slot 0,1, and then 2

Table D-19 lists the different SBus cards. These cards should be assigned to SBus slots in the order listed below.

Table D-19: SBus Cards and Required SBus Slots

SBus Card	SBus Slot	Required/Optional
Turbo GX Video Card	First available slot (must be an SBus slot in the <i>Sun SPARCserver</i>) SBus Slot 1 for the <i>SPARC 5</i> SBus Slot 0 for the <i>SPARC 10</i>	Required <i>for Sun SPARCserver 5</i> and 10 only
SBus Expansion Adapter Card	Next available SBus slot (must be an SBus slot in the <i>Sun SPARCserver</i>)	Optional
HSI/S Card	Next available SBus slot	Required for <i>Sun SPARCserver 10</i> and 20
FSBE/S Card (Fast SCSI and Ethernet SBus card)	Next available SBus slot	Optional
TRI Card (Token Ring Interface card)	Next available SBus slot	Optional

Use Table D-20 to record SBus cards and associated SBus slots that you will install in the system. The customer will use this information to reassemble their hardware.

Table D-20: SBus Card Installation Information

<i>Sun SPARCserver 5 Computer</i>	
Slot #	SBus Card
1	
2	
3	
<i>Sun SBus Expansion Subsystem</i>	
Slot #	SBus Card
0	
1	
2	

<i>Sun SPARCserver 10 or 20 Computer</i>	
Slot #	SBus Card
0	
1	
2	
3	
<i>Sun SBus Expansion Subsystem</i>	
Slot #	SBus Card
0	
1	
2	

Installing SBus Cards

Figure D-19 shows the SBus slot locations on the *Sun SPARCserver 5*, *Sun SPARCserver 10/20*, and the *Sun SBus Expansion Subsystem*.

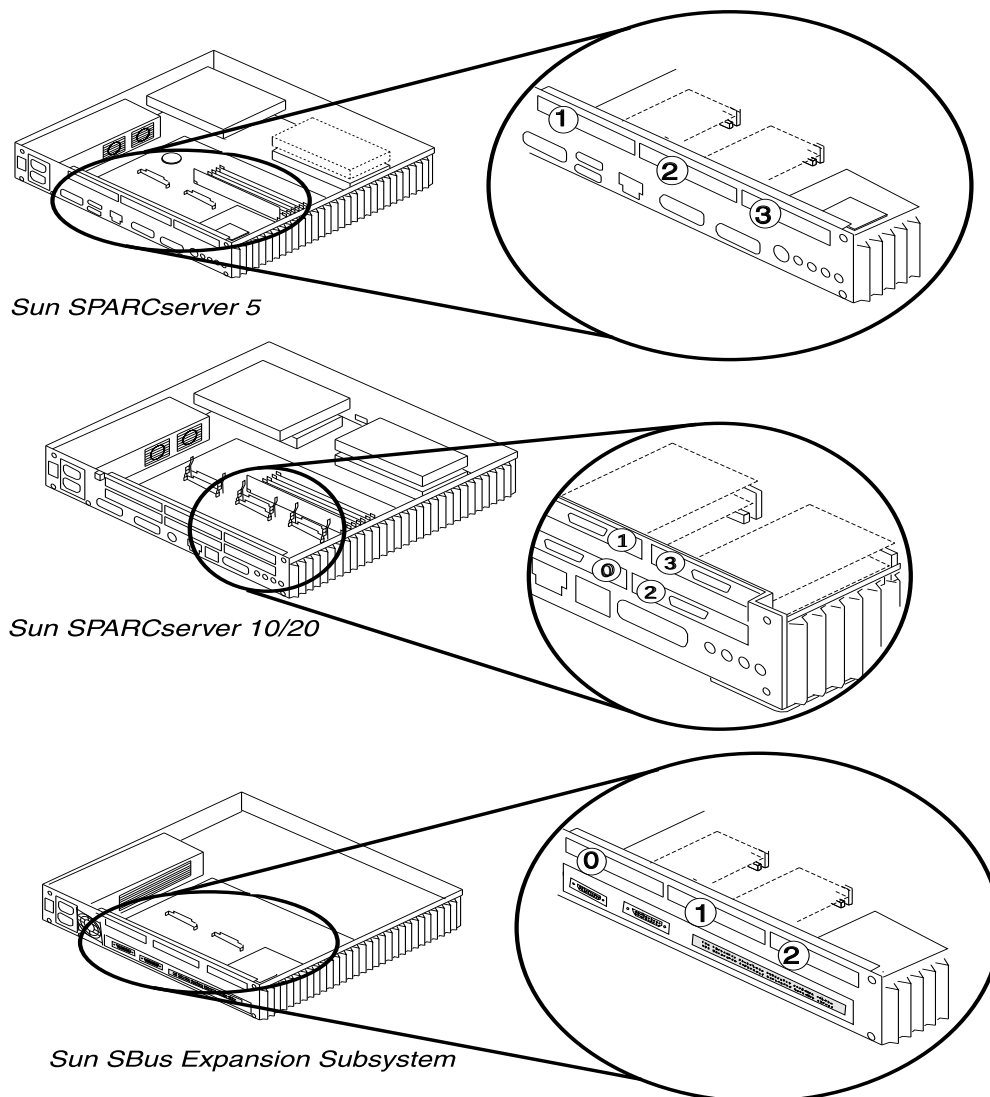


Figure D-19: SBus Slot Locations on the *Sun SPARCserver* Computers and the *Sun SBus Expansion Subsystem*

Install each SBus card listed in Table D-20 by doing the following:

1. Make sure your ESD wrist strap is securely attached.
2. Look at the back of your system unit to identify how the filler panel is attached. The filler panel can be attached either by screws and washers (visible from the back of the unit) or by plastic tabs (visible from inside the system unit).
3. Remove the filler panel from the SBus slot where the card will be installed.
 - If the filler panel is held in place by screws and washers, do the following:
 - a. Remove the screws and washers from the outside of the filler panel. Save the screws and washers because you will need them later.
 - b. Press in on the outside of the filler panel to release it.
 - c. Carefully remove and save the filler panel. You will need the filler panel if you ever remove an SBus card from the computer.
 - If the filler panel is held in place by plastic tabs, do the following:
 - a. From inside the machine, use both hands to grasp the tabs at the base of the filler panel.
 - b. Firmly squeeze both tabs until they are disengaged from the system chassis/unit, and swing the base of the filler panel towards you.
 - c. Carefully remove and save the filler panel. You will need the filler panel if you ever remove an SBus card from the computer.

4. Remove the adapter bracket (see Figure D-20) from the SBus card (if necessary) by doing the following:

Note

When installing SBus cards on either the *Sun SPARCserver 5* or the *Sun SBus Expansion Subsystem*, do not remove the adapter brackets.

- a. Remove the screws that attach the adapter plate to the backplate of the SBus card.
- b. Save the adapter bracket and screws in case you need to install this card in a computer that requires the adapter bracket.

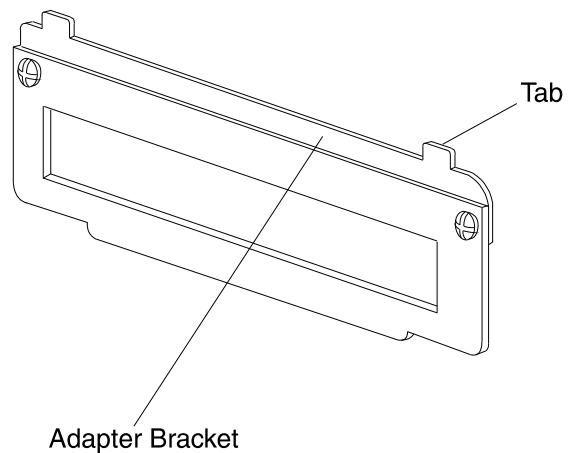


Figure D-20: SBus Card Adapter Bracket

5. Place the SBus card at an angle (see Figure D-21) in the opening of the back panel.

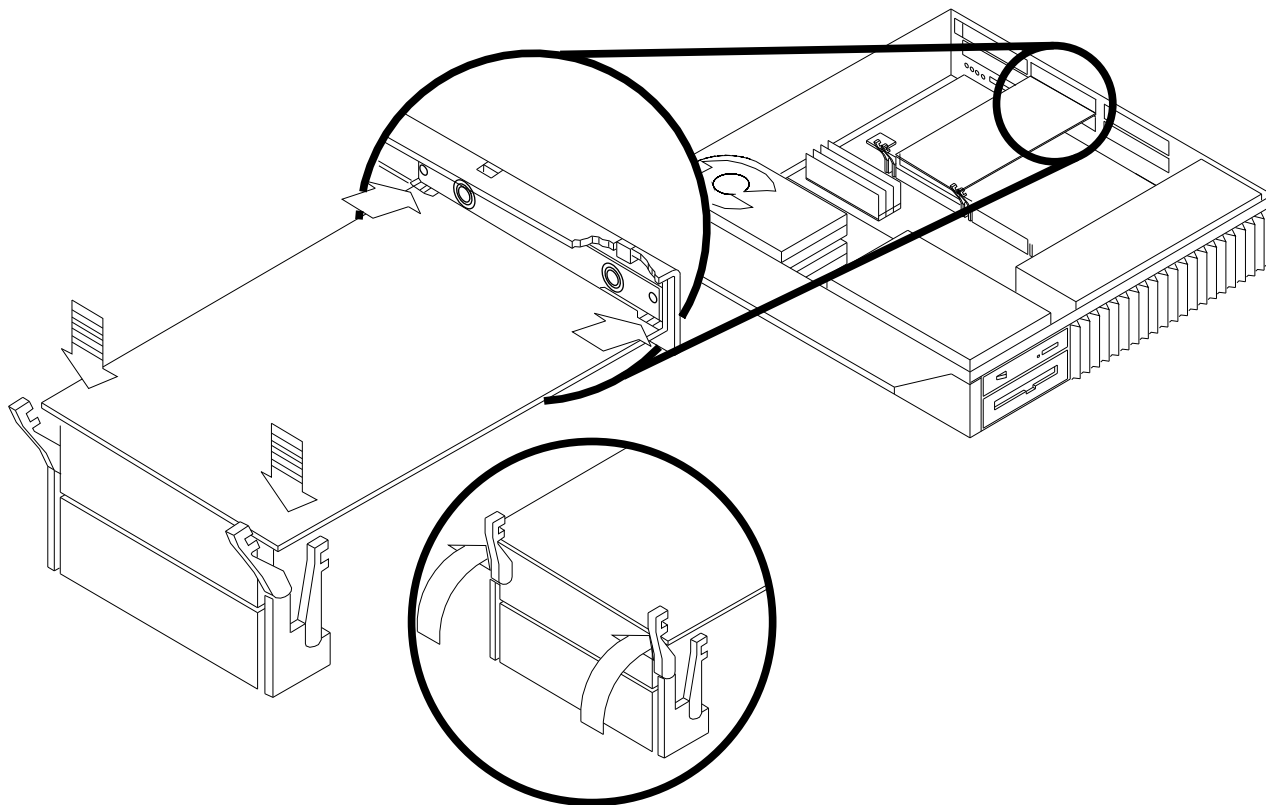


Figure D-21: Positioning the SBus Card

6. Hook the card in the mounting slot located above the rectangular openings in the back panel. Figure D-22 shows a side view of how the card should hook in the mounting slot.

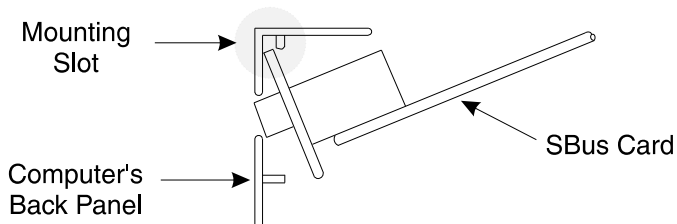


Figure D-22: SBus Card Mounting Slot — Side View

7. Align the card's connector to the socket on the main-logic board.
8. Gently press the card into the socket. Do not force the card or you may damage the pins on the card.
9. Push the rear card retainers forward over the rear edge of the SBus card (see Figure D-21).
10. Replace the washers and screws (removed earlier). Tighten the screws to secure the SBus board to the back panel of the computer.

Additional References For additional information, refer to the following documentation:

"Sun" "SPARCstation" Installation Guides (5, 10, and 20),
Chapter 7: "Installing SBus Cards"

"SunLink" HSI/S 2.0 Installation and Administration Guide,
Chapter 2: "Installing the HSI/S Controller Card and Patch Panel"

FSBE/S SBus Card Manual,
Chapter 1: "Introducing the FSBE/S SBus Card"

Installing SBus Cards in Desktop "SPARCstations,"
(Use "4SBus and 3SBus slot SPARCstation" references).

"Sun" "SBus Expansion Subsystem" Installation and Troubleshooting Guide
Chapter 3: "Installing the Hardware"

Connecting the *Sun SBus Expansion Subsystem*

To increase the number of available SBus slots, you can install one *Sun SBus Expansion Subsystem* to your *Sun SPARCserver* computer. By installing the *Sun SBus Expansion Subsystem* you gain two additional SBus slots. This section describes how to connect the *Sun SBus Expansion Subsystem* to the *Sun SPARCserver* computer (see Figure D-23).

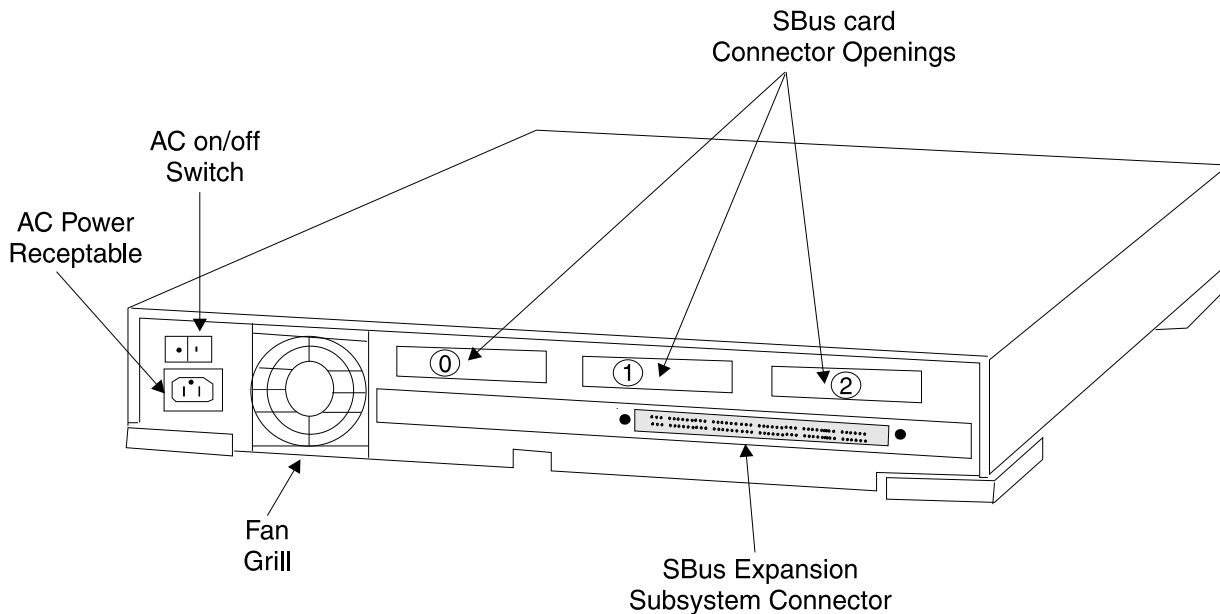


Figure D-23: SBus Expansion Subsystem Back Panel

To connect the *Sun SBus Expansion Subsystem* to the *Sun SPARCserver* computer, do the following:

1. Position the SBus Expansion Subsystem in the location selected by the customer. You can stack the SBus Expansion Subsystem on top of the *Sun SPARCserver* computer.

Note

Make sure the SBus Expansion Adapter card is installed in the computer system. The procedures for installing the SBus Expansion Adapter Card can be found in this section under "Installing SBus Cards."

2. Attach one end of the SBus expansion subsystem cable to the SBus expansion connector on the Expansion Adapter card.

3. Attach the other end of the SBus Expansion Subsystem cable to the SBus Expansion connector (labeled SBus EXP) on the rear of the SBus Expansion Subsystem (see Figure D-24).

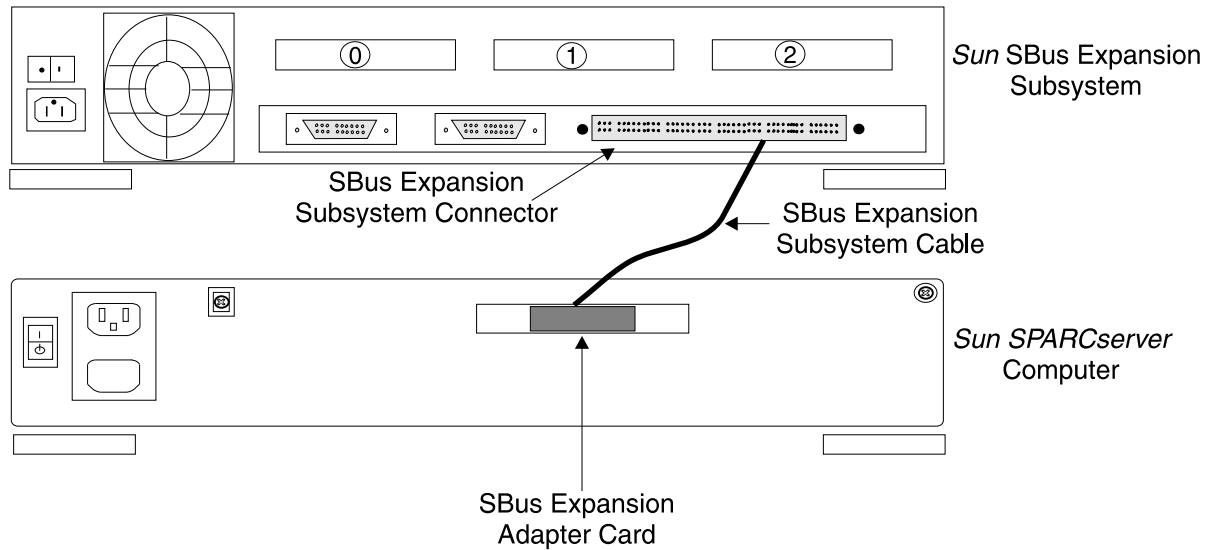


Figure D-24: SBus Expansion Subsystem Connected to a *Sun SPARCserver* Computer

4. Connect the power cord(s) to the power outlet on the SBus Expansion Subsystem and to the wall outlet.

5. In order for the *Sun SPARCserver* computer to recognize the various components of the system, you must turn the power on in the following sequence:

- a. Devices connected to the *Sun SBus Expansion Subsystem*



Remember to power on the SCSI devices starting with the device at the end of the SCSI chain, and work your way down to the computer.

- b. Devices attached to the *Sun SPARCserver*
- c. *Sun SBus Expansion Subsystem*
- d. *Sun SPARCserver* computer
- e. Monitor.

Additional References

For additional information, refer to the following documentation:

“Sun” “SBus Expansion Subsystem Installation and Troubleshooting Guide,
Chapter 3: “Installing the Hardware”

Installing the Internal Hard Disk Drives (*Sun SPARCserver 5 and 20 only*)

The internal hard disk drives (maximum of two) are installed in the left-front corner of the system (see Figure D-25).

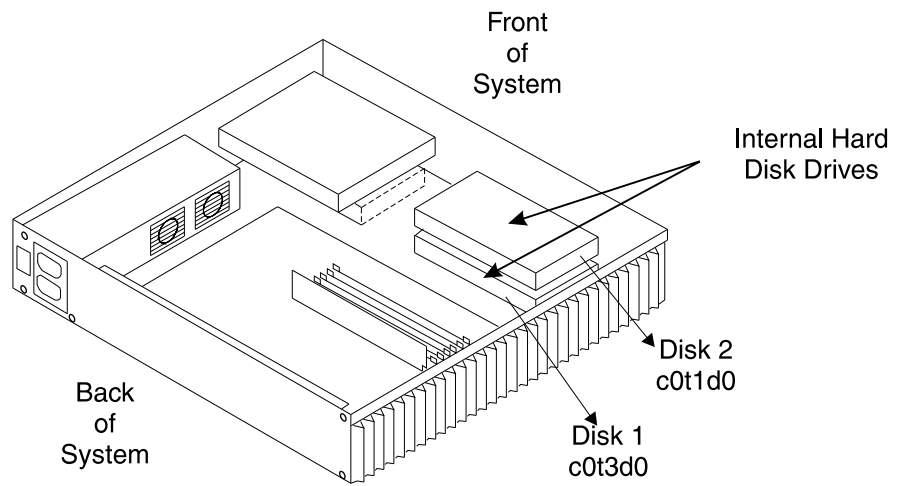


Figure D-25: *Sun SPARCserver 5 and 20* Computer Internal Hard Disk Drive Locations

To install the internal hard disk drives, do the following:



You do not need to set the SCSI IDs on the internal hard drives.

1. Make sure your ESD wrist strap is securely attached to the power supply.
2. Unpack the disk drive from the shipping box.

3. Remove the disk drive from the antistatic bag, lay the bag on a flat surface, and place the disk drive (PCB-side up) on top of the antistatic bag (see Figure D-26).

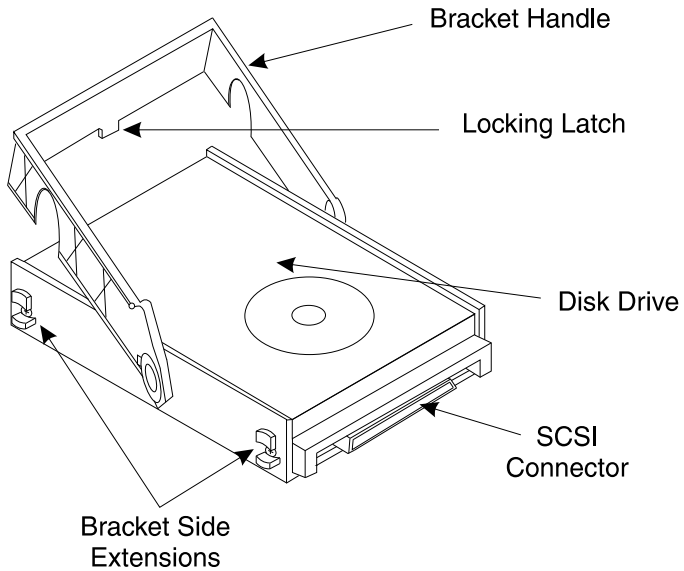


Figure D-26: Single Connector Drive — Handle, Latch, Bracket Side-Extensions, and SCSI Connector Components

4. Check the drive for any problems/damage that may have occurred during shipment. For example, see if any of the components were broken during shipment.
5. Raise the plastic handle to a vertical position by pressing the handle-locking latch and pulling the handle up (see Figure D-26).
6. Pick the drive up with one hand and steady it with the other hand so that the drive is in a horizontal position.

7. Lower the drive into the chassis (connector end of the drive towards the side of the system case) and align the bracket side extensions of the drive casing with the holes in the rails of the chassis (see Figure D-27).

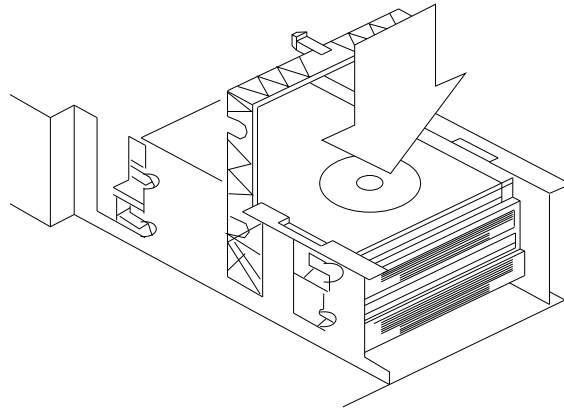
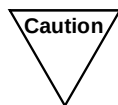


Figure D-27: Internal Hard Disk Drive — Alignment and Placement



You may have to “wiggle” the drive to make sure it is aligned properly.

8. Push the handle down towards the back of the drive (opposite of the SCSI connector) See Figure D-28. As you lower the handle, the drive will slide slowly towards the connector.



Do not use excessive force to push the handle down or seat the connector.

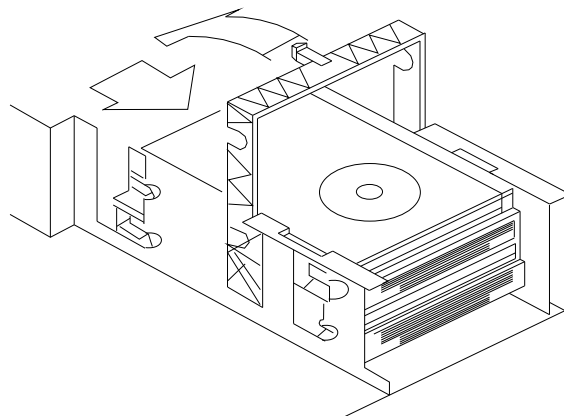


Figure D-28: Internal Hard Disk Drive — Bracket Handle Motion

Continue lowering the handle until the connector is properly seated and the drive handle locks into the locking latch on the back of the drive.

9. Make sure the handle is locked in position with the locking latch on the back of the drive (see Figure D-29).

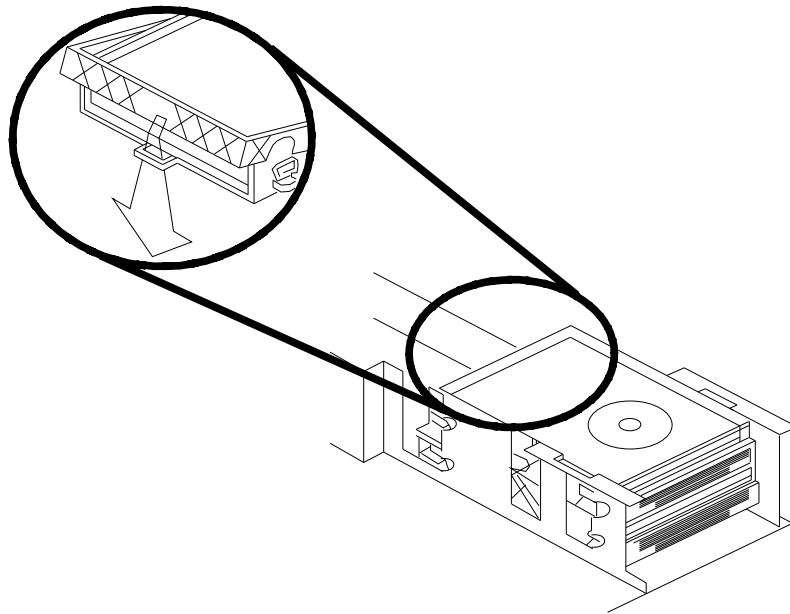


Figure D-29: Internal Hard Disk Drive — Locking Latch Position

10. Repeat the steps outlined in this section when installing any additional internal disk drives.

Additional References

For additional information, refer to the following documentation:

1.05 GByte Single Connector Disk Drive Installation Manual,
Chapter 1: "Before You Start"
Chapter 2: "Installing Disk Drives."

Installing the Internal CD-ROM Drive (*Sun SPARCserver 5 and 20 only*)

The internal CD-ROM drive should be installed in the right-front corner of the system (see Figure D-30).

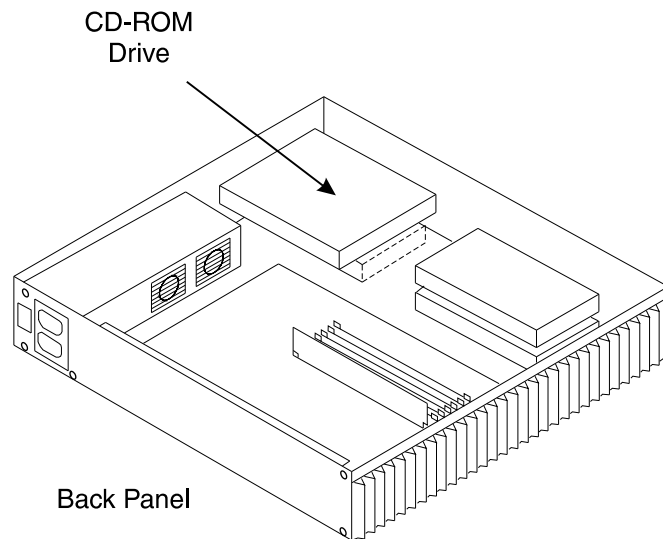


Figure D-30: Sun SPARCserver Computer Internal CD-ROM Location

To install the internal CD-ROM drive, do the following:

1. Make sure your ESD wrist strap is securely attached.
2. Remove the top filler panel from the system chassis (see Figure D-31). Press the tabs toward the center of the filler panel, and push the panel towards the outside of the system chassis.

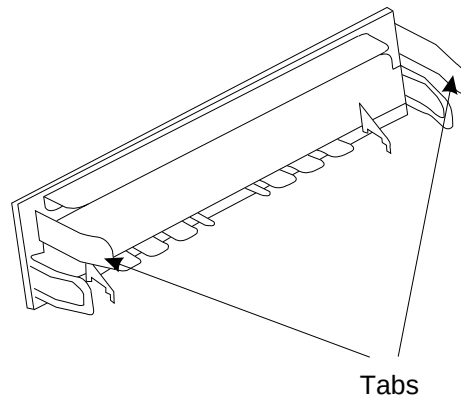


Figure D-31: CD-ROM Filler Panel

3. Remove the drive from the shipping package.
4. Verify that the jumpers (located on the rear of the drive) are set to the factory defaults. This includes jumpers to set the SCSI ID to 6 (jumpers 2 and 4 are set) and all other jumpers except the Term Power should be removed (see Figure D-32). If you are installing a CD-ROM in a *Sun SPARCserver 5*, go to step 5. If you are installing a CD-ROM in a *Sun SPARCserver 20*, go to step 6.

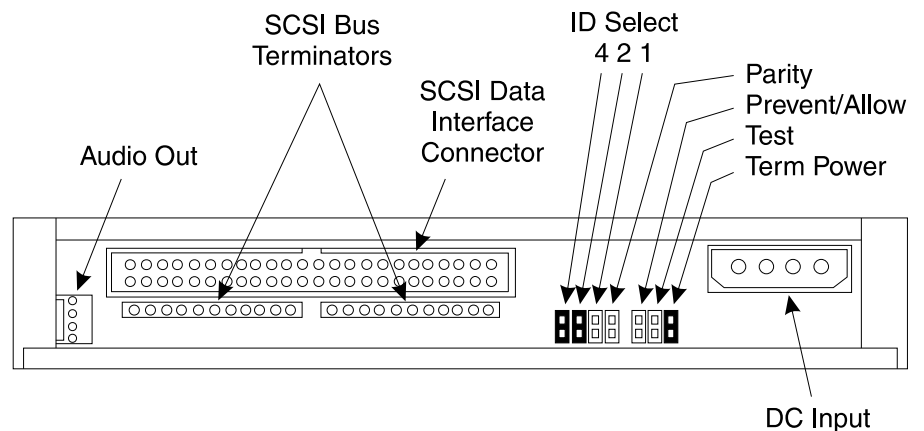


Figure D-32: Internal CD-ROM — Factory Default Jumper Settings

5. *Sun SPARCserver 5* only. Plug one end of the audio cable into the Audio Out Port on the rear of the drive. Plug the other end of the Audio cable into J0600 on the main logic board (see Figure D-33). Go to step 6.

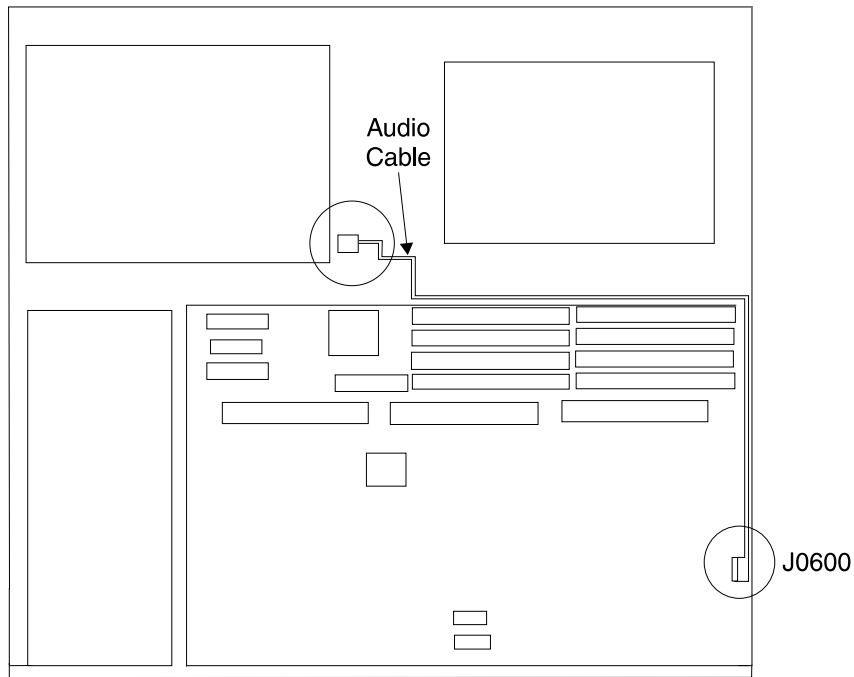


Figure D-33: Installing the *Sun SPARCserver 5* Audio Cable

6. Insert the drive in the system, and push the drive towards the center of the system (see Figure D-34)

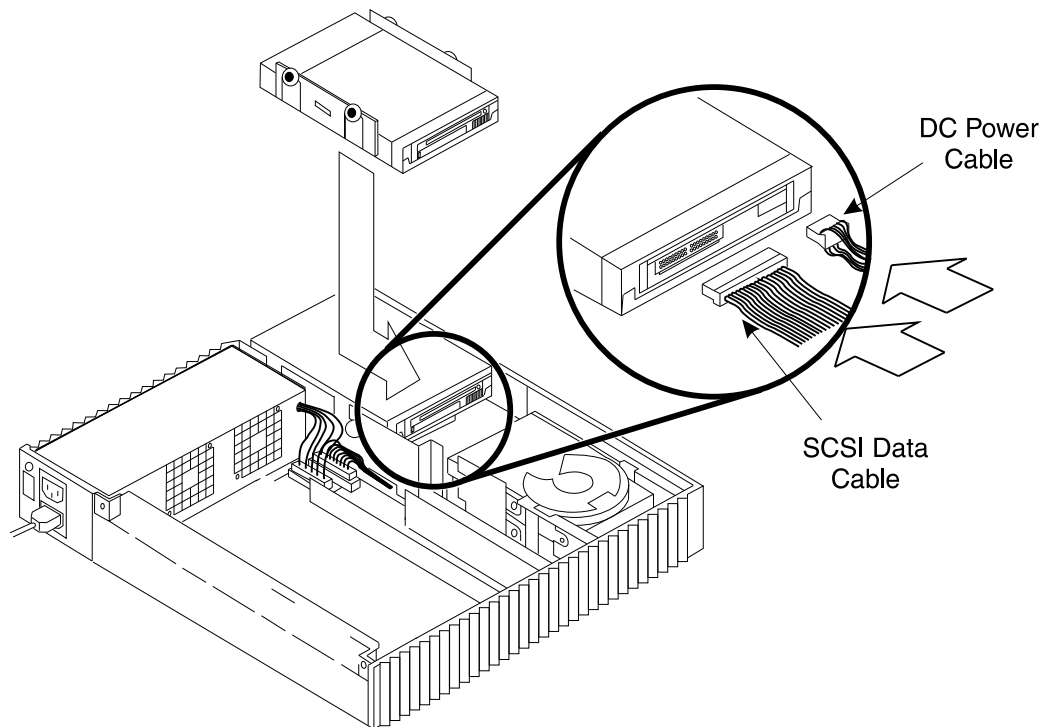


Figure D-34: Inserting the Internal CD-ROM Drive

7. Connect the power cable to the back of the CD-ROM drive (see Figure D-34).

8. Attach one end of the SCSI data cable to the connector on the back of the CD-ROM drive (see Figure D-34), and the other end of the SCSI data cable to the connector on the system board (see Figure D-35).

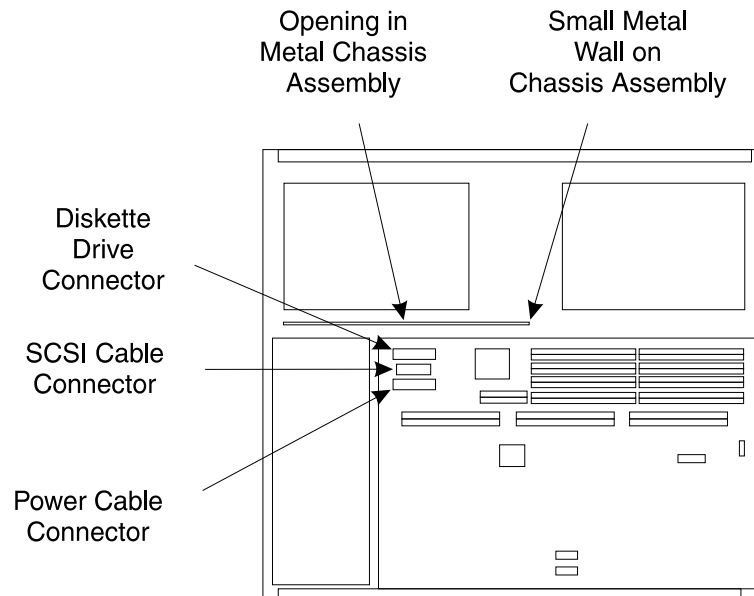


Figure D-35: Internal CD-ROM Drive — SCSI Cable Connector Location

Additional References For additional information, refer to the following documentation:

SunCD 2Plus Installation and User's Manual,
Chapter 9: "Installing a *SunCD 2Plus* Drive in
SPARCstation 20 and *SPARCstation 5* Systems."

Closing the Machine

To close your *Sun SPARCserver* computer, do the following (see Figure D-36 and Figure D-37):

1. Hold the cover at a 60-degree angle to the system unit.
2. Gently guide the cover's hinge hooks into the tab slots located on the front of the system unit (see Figure D-36).

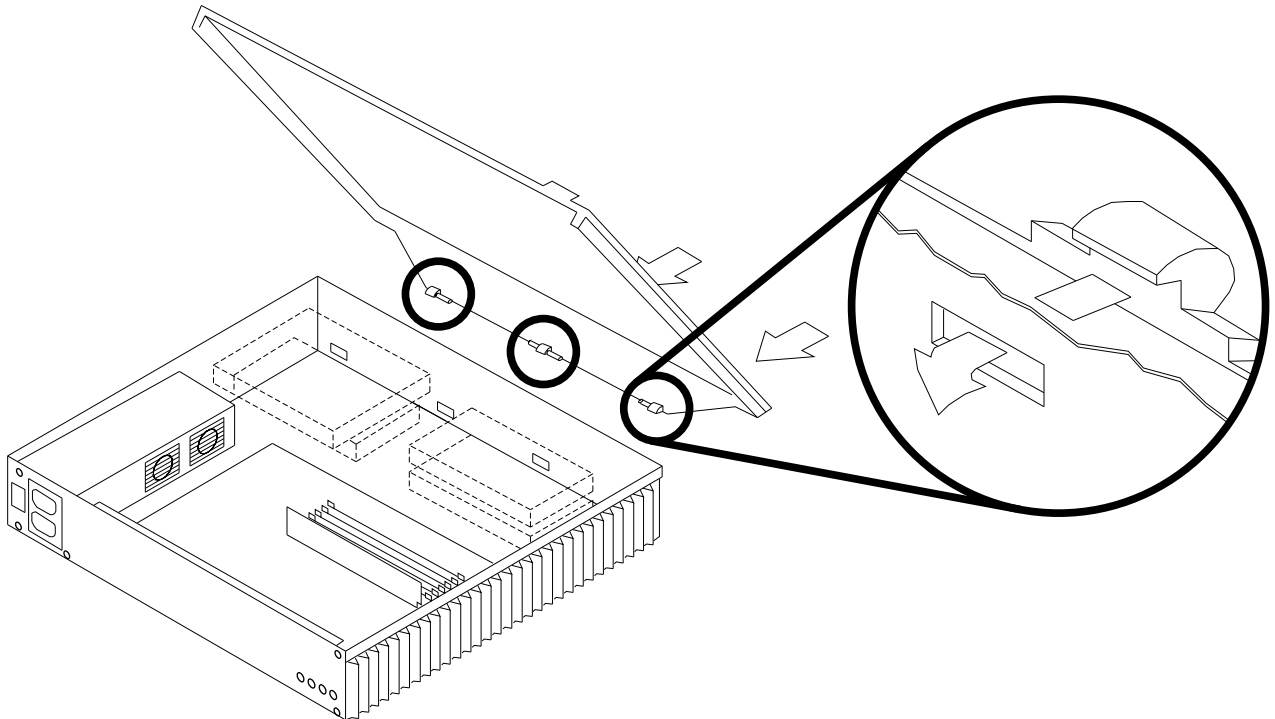


Figure D-36: Aligning System-Cover Tabs on the *Sun SPARCserver* Computer

3. Gently lower the cover onto the system unit.

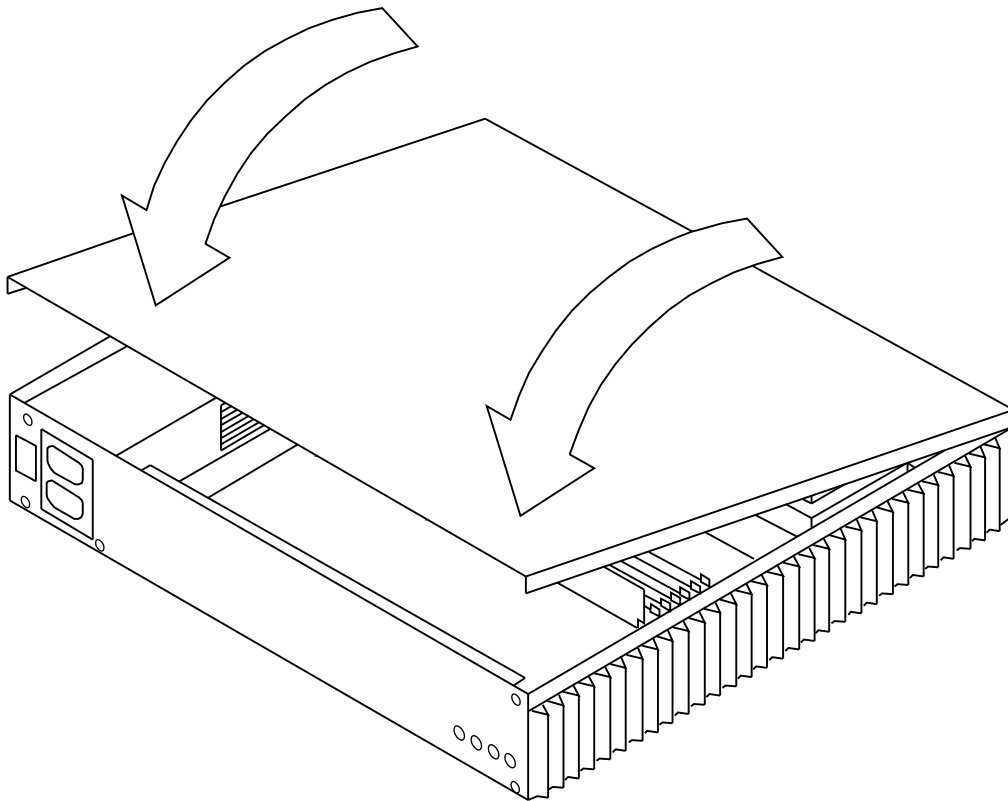


Figure D-37: Replacing the Cover on the *Sun SPARCserver* Computer

4. Insert and tighten the cover screw on the top right side of the rear panel using a Phillips screwdriver.
5. Insert and tighten the lock block towards the top left side of the rear panel using a Phillips screwdriver.
6. Reconnect all peripherals/cables to the computer.

Additional References For additional information, refer to the following documentation:

"Sun" "SPARCstation" Installation Guide (5 and 20),
Chapter 5: "Closing the System Unit"

Installing SBus Cards in Desktop "SPARCstations,"
(Use "4SBus and 3SBus slot SPARCstation" references).

Connecting the *SunLink* HSI/S Patch Panel

This section describes how to connect the HSI/S patch panel to the HSI/S controller card (previously installed in the *Sun SPARCserver* computers) using a 96-pin cable (see Figure D-38, shaded portion).

Note

The *Sun SPARCserver* 5 needs a *SunLink* HSI/S Patch Panel only if you have multiple ACDs.

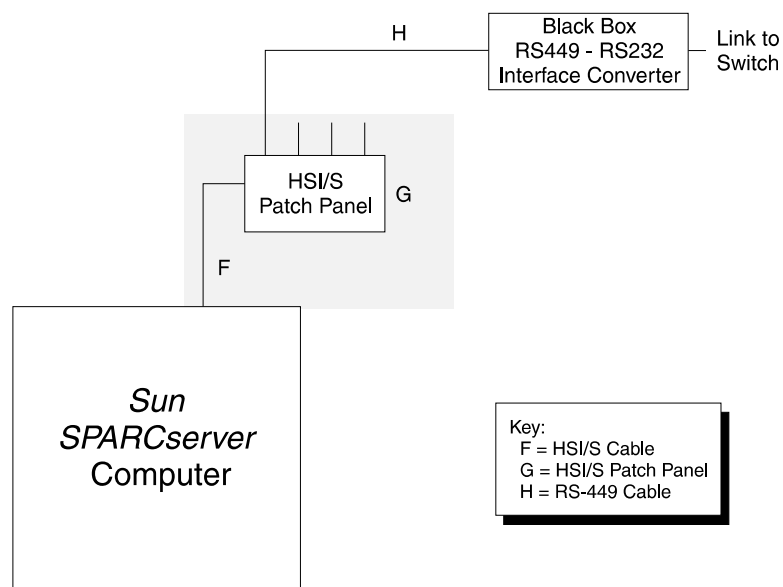


Figure D-38: *SunLink* HSI/S Patch Panel Connectivity

To connect the HSI/S patch panel to the HSI/S controller card, do the following:

1. Connect one end of the 96-pin cable to the 96-pin connector on the HSI/S patch panel.
2. Connect the other end of the 96-pin cable to the 96-pin connector on the HSI/S controller card.
3. Make sure the locking mechanisms on each end of the 96-pin cable click closed.

Additional References For additional information, refer to the following documentation:

“SunLink” HSI/S 2.0 Installation and Administration Guide,
Chapter 2: “Installing the HSI/S Controller Card and
Patch Panel” (Sections 2.11 and 2.12).

Setting the Black Box DTE/DCE DIP Shunts

This section describes how to set the DIP shunts inside the interface converter to assign the RS-422/RS-449 input port for DCE operation and the RS-232 output port for DTE operation (see Table D-21 and Figure D-39).

Note

This section only applies to *Sun SPARCserver* computers that have an HSI/S card installed.

Table D-21: DTE/DCE DIP-Shunt Settings

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

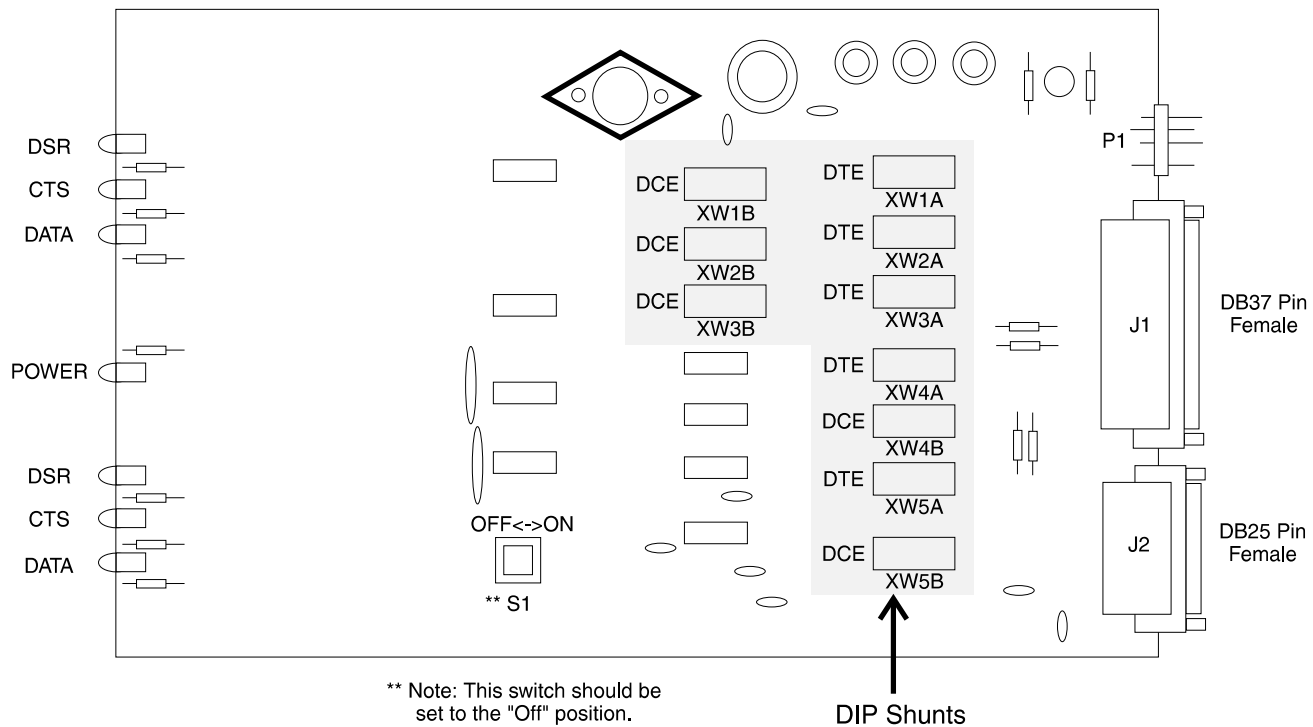
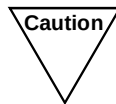


Figure D-39: Black Box Component Layout — DTE/DCE DIP-Shunt Locations

To reassign these ports:

1. Disconnect all power and cables from the Black Box converter.
2. Open the interface converter.
3. Move the DIP shunts to the appropriate DIP-shunt sockets by doing the following:
 - a. Carefully slide the tip of a common screwdriver between the DIP-shunt jumper and the DIP-shunt socket.



Be very careful when moving the DIP shunts. The DIP-shunt pins are very fragile and could easily be bent or broken.

- b. Gently pry/wiggle the DIP-shunt jumper free from the socket.
- c. Move the DIP-shunt jumper to the appropriate socket (see Table D-21).
- d. Carefully align the pins, and gently press the DIP-shunt jumper into place.

Additional References For additional information, refer to the following documentation:

*RS-232 ↔ RS-422 Interface Converter
Installation and Operation Manual,*
Section 2.0: "Introduction"
Section 3.0: "Installation"
Section 4.0: "Configuration."

Connecting System Console Peripherals

This section describes how to connect the system console peripherals to the *Sun SPARCserver* computer (see Figure D-40).

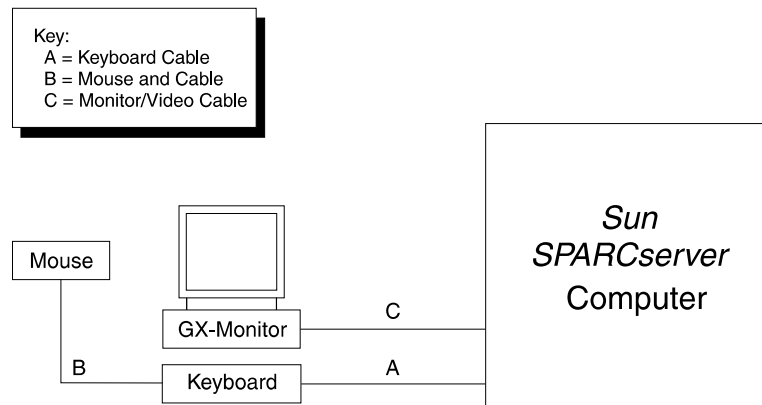


Figure D-40: System Console Connections

To assemble the *Sun SPARCserver* computer and system console, do the following (refer to Figure D-40):

- Position the computer in the location selected by the customer. Make sure the power switch is set to *Off*.
- Connect the following components:
 - Keyboard
 - Mouse
 - Monitor
 - Power cord (to a wall outlet or to an Uninterruptible Power Supply [UPS], if equipped).

This basic configuration represents the CMS console terminal.

Additional References

For additional information, refer to the following documentation:

“Sun” Desktop “SPARC” Hardware Owner’s Guide,
 Chapter 1: “Getting Started”
 Chapter 2: “Installing Your System.”

Installing the External SCSI Devices

Each system can be configured to have various SCSI peripherals/devices. You can install SCSI devices to either the *Sun SPARCserver* computer or the *Sun SBus Expansion Subsystem*.

Note

Do **not** use the two SCSI connectors located on the back of the SBus Expansion Subsystem to connect SCSI devices. Use an FSBE/S card to connect SCSI devices to the SBus Expansion Subsystem.

This section describes how to connect the SCSI devices (tape drives, CD-ROM drives, and external hard disks) to the computer or the SBus Expansion Subsystem. The procedures outlined include:

- Setting the SCSI device IDs
- Connecting the SCSI devices to the computer or the SBus Expansion Subsystem.

Note

The SCSI hard disks will be configured/partitioned during the installation of the *Solaris 2.4* operating system.

Additional References

For additional information, refer to the following documentation:

“Sun” “Solaris” 2.x Handbook for SMCC Peripherals,
Chapter 2: “Setting Up Disk Drives”
Chapter 3: “Setting Up Tape Drives”
Chapter 4: “Setting Up CD-ROM Drives”

Desktop Storage Pack Installation and Operation Manual,
Appendix B: “Small Computer Serial Interface Information.”

Setting the SCSI IDs and Labeling the Devices

Each SCSI device on the SCSI bus must have a unique address or SCSI ID. Also, after you partition the disk drives and they are shipped to the customer site, the SCSI devices must be connected in the same way they were connected at the factory. To ensure that this occurs, you need to set the SCSI ID and label the drives appropriately.

To set the SCSI IDs, do the following:

1. Locate the target address switch on the rear panel of the SCSI device (see Figure D-41).

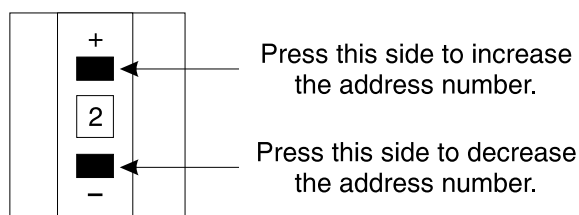


Figure D-41: Setting the SCSI ID/Target Address

2. Identify which SCSI IDs will be associated with each of the devices on a specific SCSI bus (see Table D-22, Table D-23, and Table D-24).
3. Press the top or bottom button of the switch until the appropriate SCSI ID number appears in the window.

Table D-22: Internal SCSI Bus ID Map(c0)

Device	SCSI ID	Node	Location
Base Disk	3	c0t3	Internal
Disk #2	1	c0t1	Internal
QIC-150 SCSI 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

Table D-23: FSBE/E SCSI Interface Card Bus ID Map (c1)

Device	SCSI ID	Node	Location
Disk #5	1	c1t1	External
Disk #6	2	c1t2	External
Disk #7	3	c1t3	External
Disk #8	4	c1t4	External
SCSI Controller	7	N/A	Internal

Table D-24: Second FSBE/E SCSI Interface Card Bus ID Map (c2)

Device	SCSI ID	Node	Location
Disk #9	1	c2t1	External
Disk #10	2	c2t2	External
Disk #11	3	c2t3	External
Disk #12	4	c2t4	External
SCSI Controller	7	N/A	Internal

Additional References

For additional information, refer to the following documentation:

“Sun” “Solaris” 2.x Handbook for SMCC Peripherals,
Chapter 2: “Setting Up Disk Drives”
Chapter 3: “Setting Up Tape Drives”
Chapter 4: “Setting Up CD-ROM Drives”

Desktop Storage Pack Installation and Operation Manual,
Appendix B: “Small Computer Serial Interface Information.”

Connecting External Hard Disks

This section describes how to connect the SCSI peripherals/devices (tape drives, CD-ROM drives, and hard disks) to the *Sun SPARCserver* computer or the *Sun SBus Expansion Subsystem*.

The SCSI devices are daisy-chained together which allows a single FSBE/S controller card to support more than one device on a single SCSI bus (see Figure D-42). For example, a SCSI cable connects the controller card port to one of the micro-miniature connectors on the back of the SCSI device. The next SCSI device is connected to the previous device using another SCSI cable. This process continues until all of the assigned devices have been connected to the SCSI bus. The last device in each chain must have a SCSI terminator attached to one of the micro-miniature connectors on the back of that device.

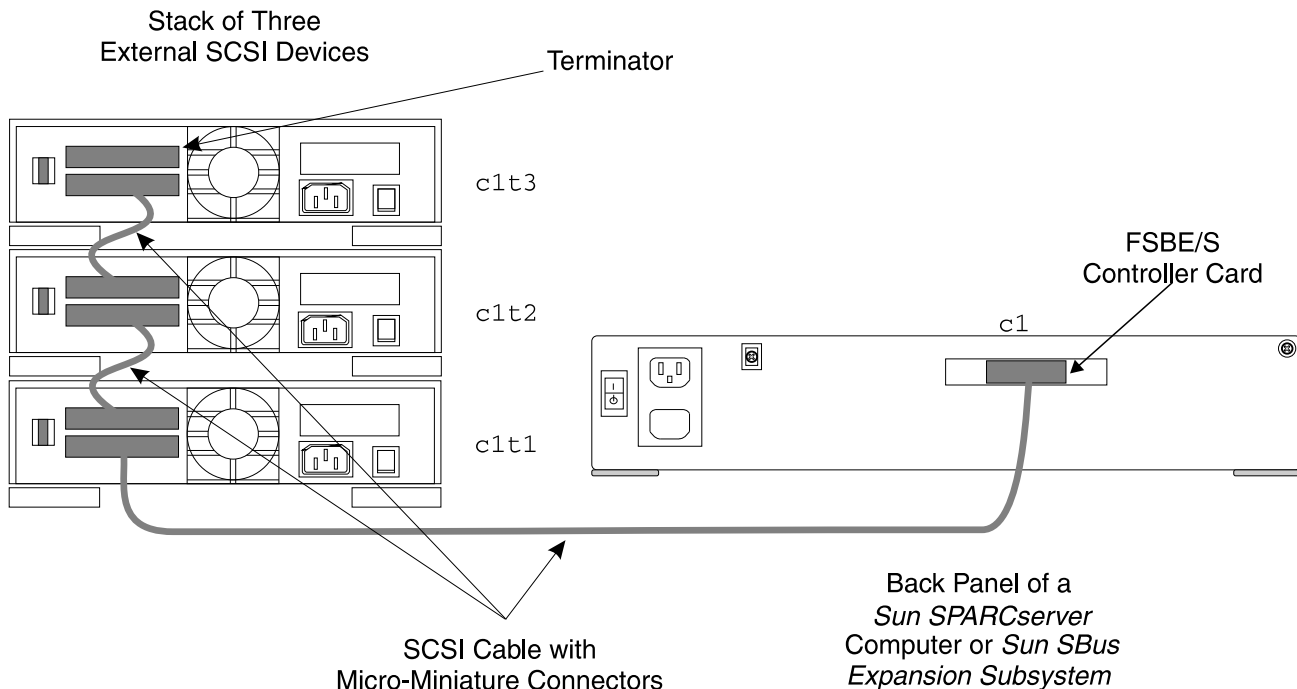


Figure D-42: Sample Daisy Chaining of External SCSI Devices

Figure D-42 shows an example of three external disks connected to the FSBE/S controller card c1. Therefore, the external disks are labeled c1t1, c1t2, and c1t3, respectively.

You can have up to three SCSI controllers on your system. One is built into the *Sun SPARCserver* computer and the other two are provided through FSBE/S controller cards (see Table D-25). Controller c1 is the first FSBE/S card and controller c2 is the second. The system determines which FSBE/S card is first (c1) by searching the SBus slots. See Table 3-4 (page 3-14) in Chapter 3, "Installing the *Sun SPARCserver* Computer," for an example.

Table D-25: SCSI Controllers

SCSI C0	SCSI C1	SCSI C2
Built into the <i>Sun SPARCserver</i> Computer	1st FSBE/S card	2nd FSBE/S card

Connect any external SCSI devices to the computer. Figure D-43 shows how to daisy chain the SCSI bus through these devices. In addition, you need to make the power connections for the drives. Make sure that the last device in each chain has a SCSI terminator attached to one of the micro-miniature connectors.

Figure D-43 shows the maximum number of external drives configured for the *Sun SPARCserver* computer. If the customer's external configuration is less than maximum, the number of devices in each daisy-chain may vary. The terminator must be placed on the last device in the chain.

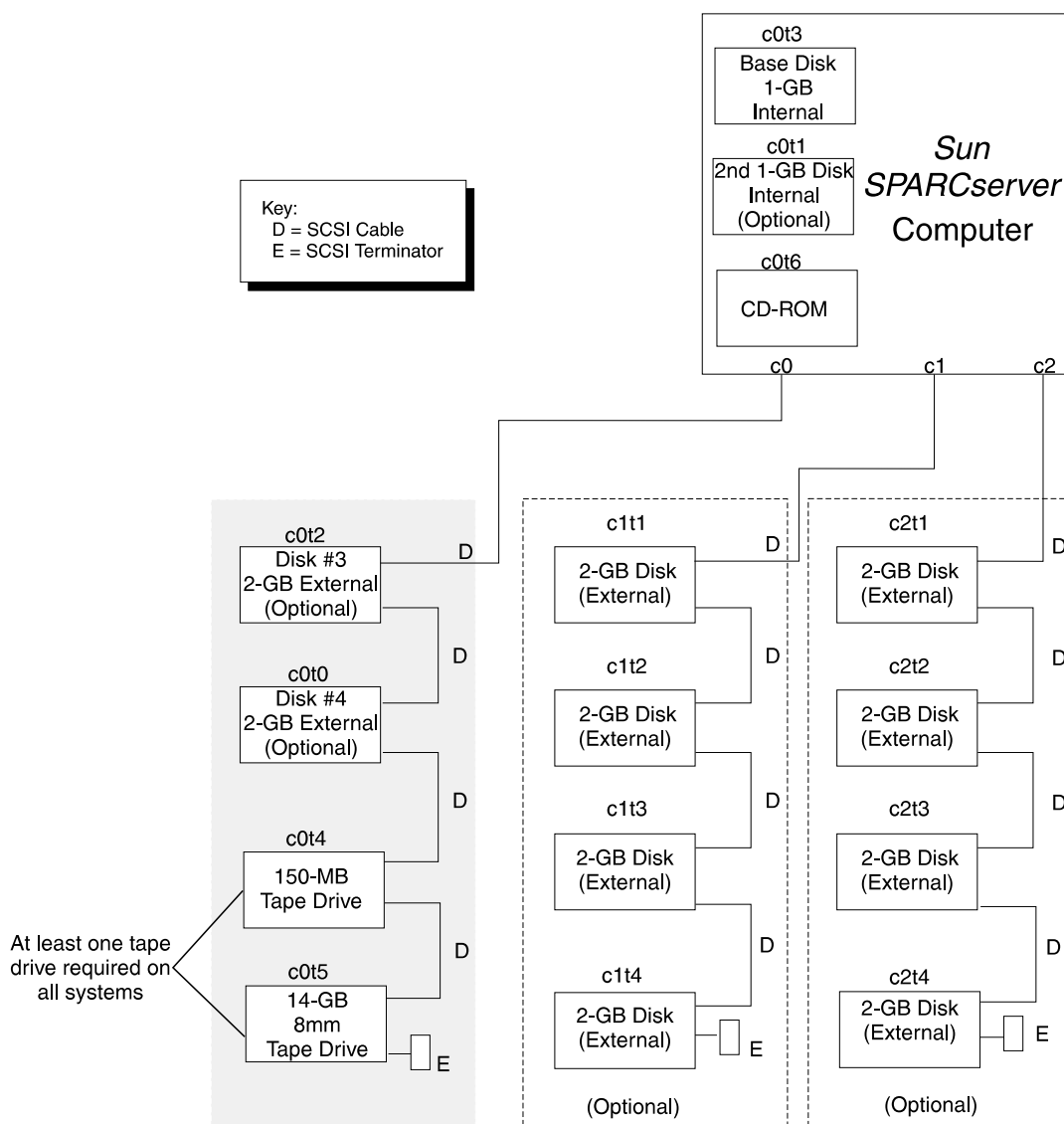


Figure D-43: External SCSI Device Connectivity

Additional References For additional information, refer to the following documentation:

“Sun” “Solaris” 2.x Handbook for SMCC Peripherals,

Chapter 2: “Setting Up Disk Drives”

Chapter 3: “Setting Up Tape Drives”

Chapter 4: “Setting Up CD-ROM Drives”

Desktop Storage Pack Installation and Operation Manual,

Appendix B: “Small Computer Serial Interface Information.”

Connecting Network Hub Unit

This section describes how to connect the network hub unit(s) to the *Sun SPARCserver* computer using UTP (Unshielded Twisted-Pair) cables in a TPE (Twisted-Pair Ethernet) configuration.

Note

Do **not** use telephone extension cables in 10Base-T networks. The telephone extension cable wire pairs are not twisted and do not meet the requirements for use in a 10Base-T network.

Three different types of network hub units can be used:

- IBM 8222 Network Hub unit (uses standard UTP network cables)
- Allied Telesis MR820T Network Hub unit (uses standard UTP network cables)
- StarLAN Fiber Optic Hub unit (uses fiber optic network cables).

The standard CMS configuration uses the IBM 8222 Network Hub unit or the Allied Telesis - MR820T Network Hub unit. The StarLAN Fiber Optic Hub can be used when you need more distance between the hub unit and the NTSs. Table D-26 outlines the maximum distances associated with each type of network cable being used.

Table D-26: Network Cable Distances

Type of Cable	Maximum Cable Distance
UTP (Unshielded Twisted Pair) (Category 3 or 5)	100 meters / 328 feet
15-pin AUI	100 meters / 328 feet
Fiber Optic cable (62.5mm dual strand cable)	3000 feet

If you need more distance between the network hub unit and the NTS(s), refer to the “Optional Fiber Optic Network Configurations” section that follows.

Optional Fiber Optic Network Configurations

This section briefly describes additional network configurations which can be used to increase the distance between the network hub and the NTS(s). These configurations use fiber optic cables and/or fiber optic hubs.

The configuration shown in Figure D-44 illustrates two network hubs connected through a fiber optic network hub. This configuration allows the network to be spread across multiple buildings. For example, this would be useful in a situation where the *Sun SPARCserver* computer, network hub, and one NTS were located in one building, the fiber hub and another NTS were located in an adjacent building, and another network hub with two additional NTSs were located in another adjacent building.

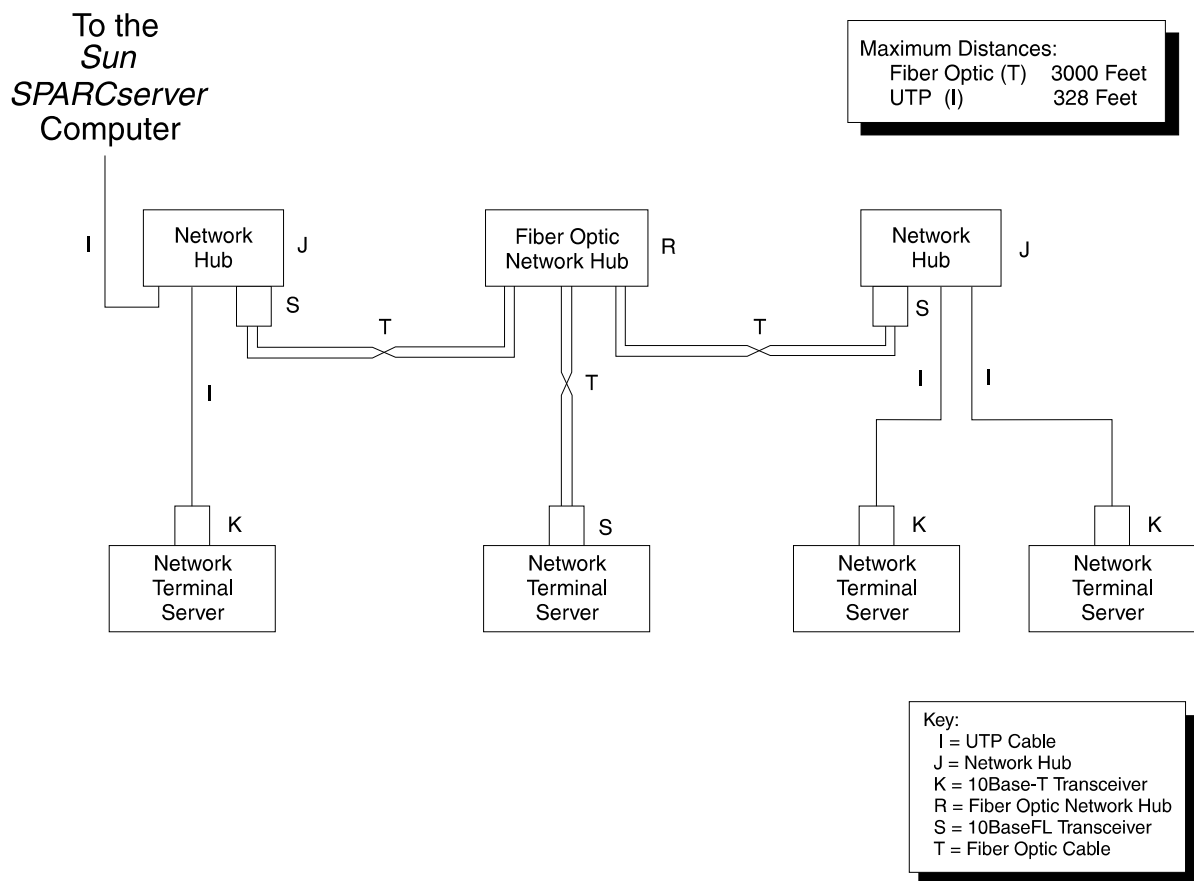


Figure D-44: Optional/Sample Fiber Optic Configuration

The configuration shown in Figure D-45 illustrates two network hubs connected with a fiber optic cable. This configuration allows the network to be spread across two adjacent buildings. For example, this would be useful in a situation where the *Sun SPARCserver* computer, network hub, and two NTSS were located in one building, while the other network hub and remaining two NTSS were located in an adjacent building.

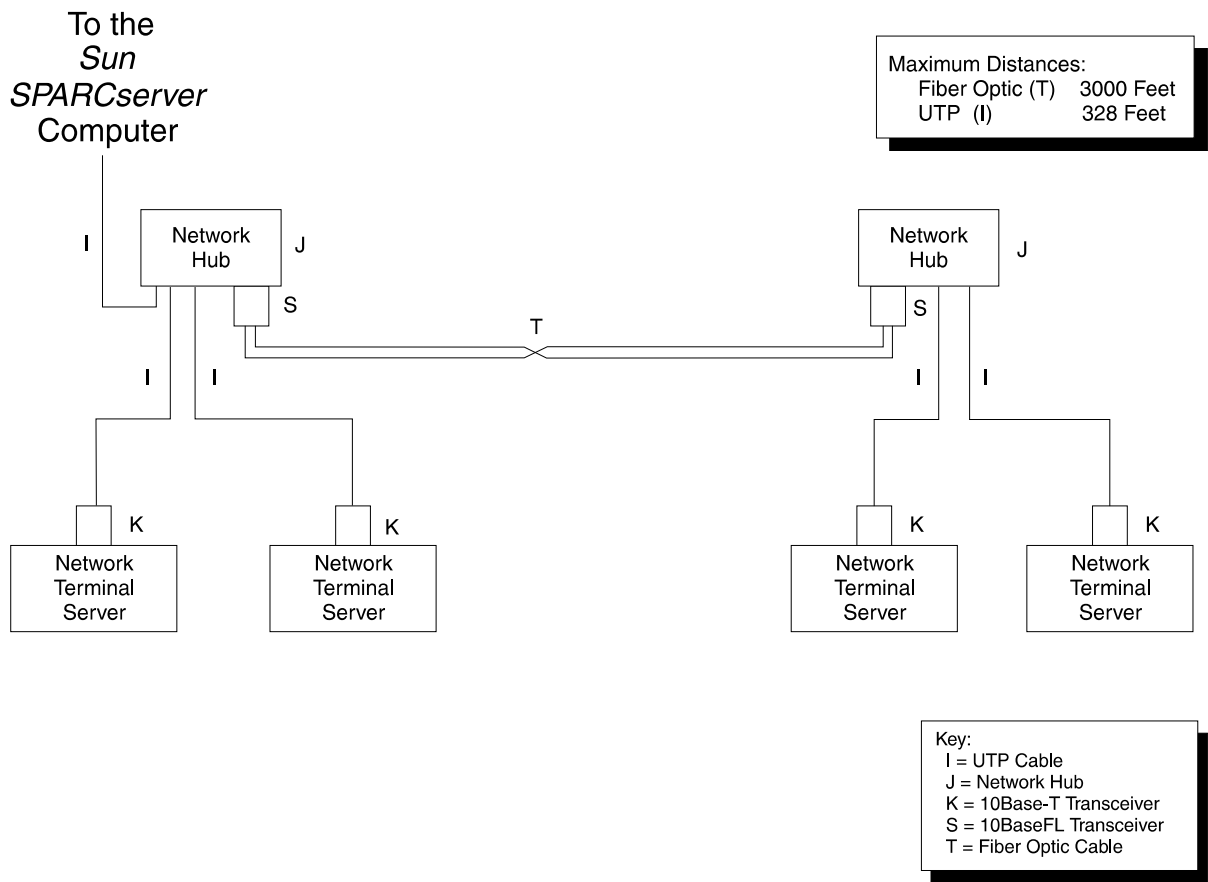


Figure D-45: Optional/Sample Fiber Optic Configuration

The configuration shown in Figure D-46 illustrates a network hub connected to four NTSSs. This configuration allows the network to be spread across multiple buildings. For example, this would be useful in a situation where the *Sun SPARCserver* computer, network hub, and three NTSSs were located in one building, while an additional NTS was located in an adjacent building.

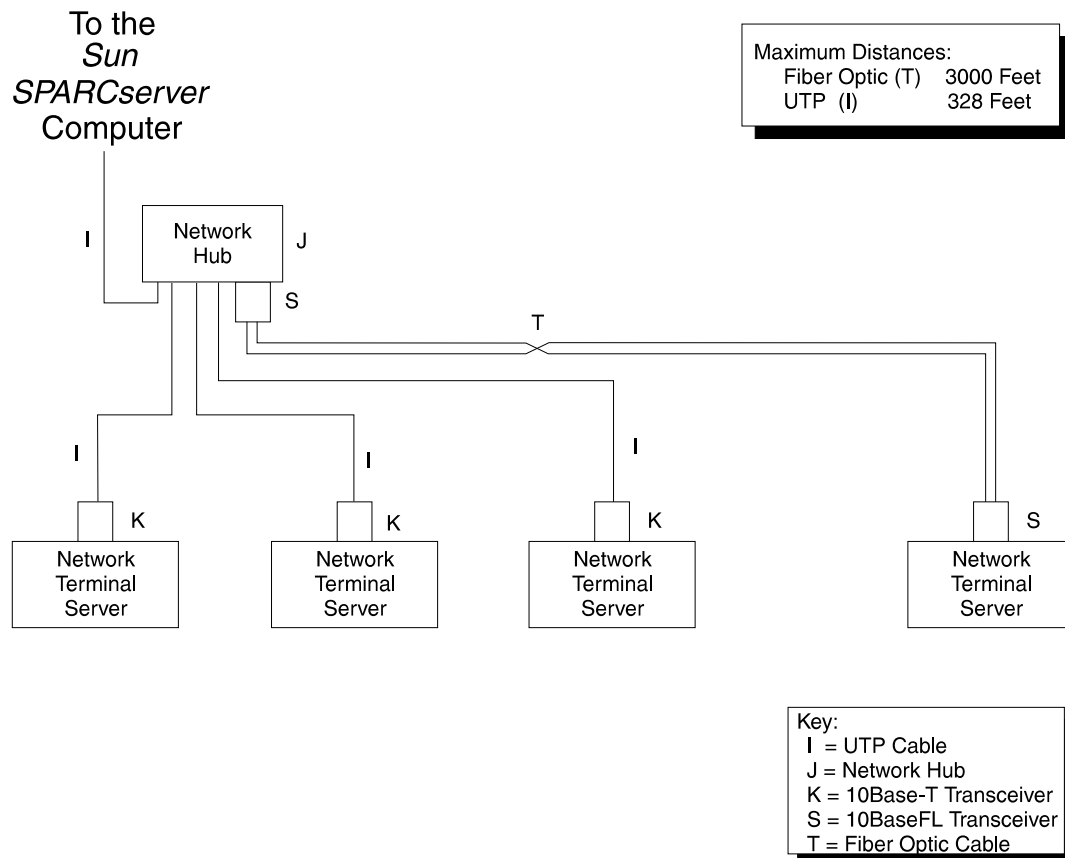


Figure D-46: Optional/Sample Fiber Optic Configuration

Installing the IBM 8222 or the Allied Telesis Network Hub Unit

This section describes how to connect the IBM 8222 or the Allied Telesis Network Hub unit to the *Sun SPARCserver* computer. These hub units may be used in conjunction with other network hub units.

To connect a Network Hub unit to the *Sun SPARCserver* computer, do the following (see Figure D-47):

1. Position the network hub unit in the location selected by the customer. Make sure the power switch is set to off.
2. Plug the power cord into a wall outlet or to a UPS (if equipped).
3. Plug one end of the UTP cable into the twisted-pair connector on the back of the *Sun SPARCserver* computer.

Use the UTP cable that came with your *Sun SPARCserver* computer (Part number 180-1529-01).

4. Plug the other end of the UTP cable into Port 1 of the 10Base-T ports on the Network Hub unit (see Figure D-47).

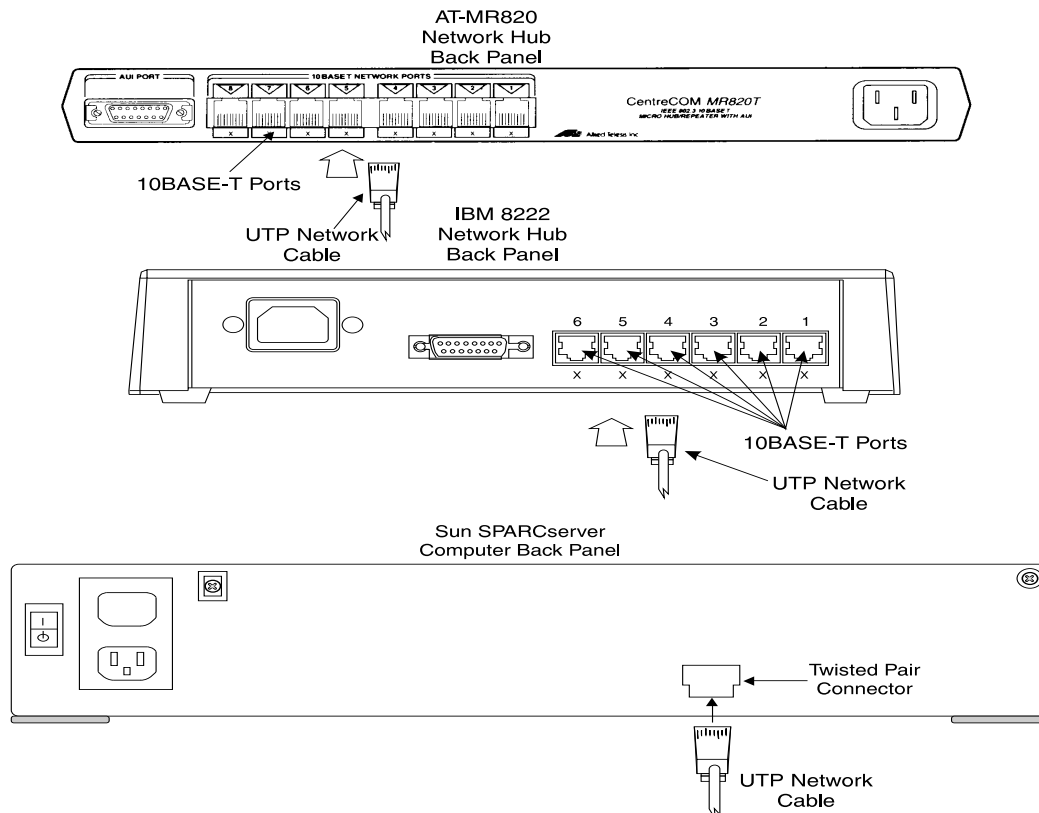


Figure D-47: Network Hub Units — Back Panel

Additional References For additional information, refer to the following documentation:

IBM 8222 6-Port 10Base-T Workgroup Hub Installation and Planning Guide,

Chapter 2: "Installing the IBM 8222."

Allied Telesis CentreCom AT-820T Multiport 10BASE-T Micro Repeaters Users Manual,

Chapter 2: "Installation."

Installing the StarLAN 10 Network Fiber Hub Unit

This section describes how to connect the StarLAN 10 Network Fiber Hub unit to the *Sun SPARCserver* computer. This hub unit may be used in conjunction with other network hub units.

To connect the Starlan 10 Network Fiber Hub unit to the network, do the following (see Figure D-48):

1. Position the network fiber hub unit in the location selected by the customer. Make sure the power switch is set to off.
2. Plug the power cord into a wall outlet or to a UPS (if equipped).
3. Plug one end of the fiber optic cable into the Tx (transmit) and Rx (receive) connectors on the front of the network fiber hub unit (see Figure D-48).

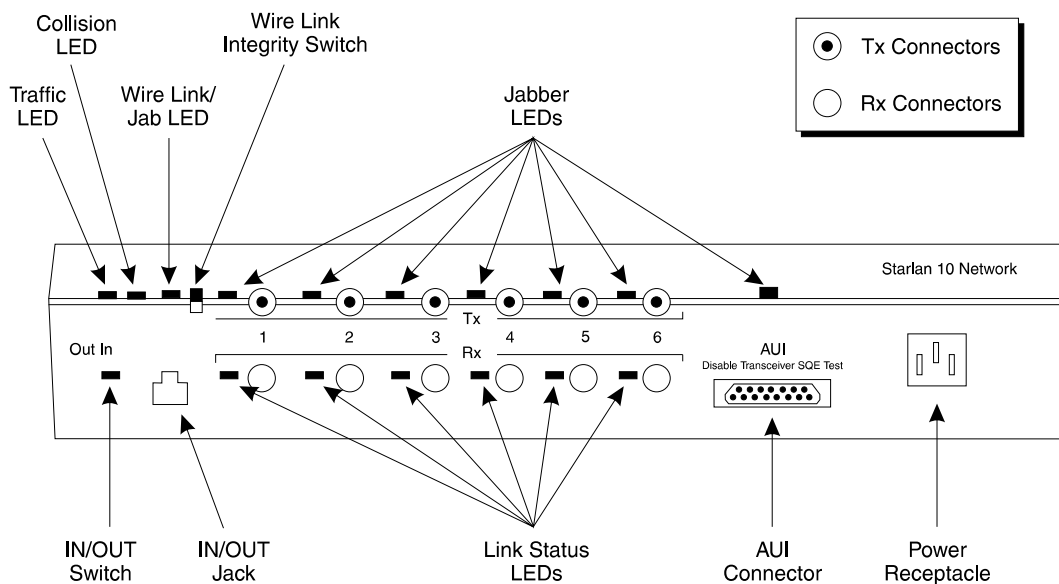


Figure D-48: StarLAN 10 Network Fiber Hub Unit

The fiber optic cable has two plugs on each end. Generally, the two plugs are color-coded or identified in some other manner. Note which plug was attached to the Tx and Rx ports on the hub unit.

4. Plug the other end of the fiber optic cable into the 10Base-FL transceiver connected to either the network hub or NTS.

Connect the plugs just opposite of how they were connected at the other end (i.e., the plug that was attached to the Tx port at the other end should be connected to the Rx port at this end and the plug that was attached to the Rx port at the other end should be connected to the Tx port at this end).

Additional References For additional information, refer to the following documentation:

AT&T StarLAN 10 Network Fiber Hub Installation Guide (999-100-458).

Connecting the NTS(s) to the Network Hub

This section describes how to connect the 8-, 16-, or 64-port NTS(s) to the network hub unit (see Figure D-49 and Figure D-50). Figure D-49 does not show the 8-Port (0-parallel port) NTS. This section also describes how to connect the four 16-port NTS patch panel(s) to the 64-port NTS.

Note Do **not** use telephone extension cables in 10Base-T networks. The telephone extension cable wire pairs are not twisted and do not meet the requirements for use in a 10Base-T network.

The 64-port NTS provides twelve 50-pin PBX-champ connectors used to attach 64 serial devices using the patch panel cables and patch panels. These serial devices are accessed via the local Ethernet network.

Note If the NTS needs to be administered (for example the NTS has not been administered or if you are adding an NTS to your system), follow the procedure outlined in the "Administering the Network Terminal Servers" section of Appendix D, "Sun SPARCserver Computer Installation Procedures."

Additional References

For additional information, refer to the following documentation:

Network Terminal Server: Hardware Installation Guide,
Chapter 2: "Installing the NTS."

"Xylogics" Micro Annex Communications Server Hardware
Installation Guide,

Chapter 2: "Installing the Micro Annex."

Figure D-49 and Figure D-50 shows NTS(s) and Network Hub connectivity.

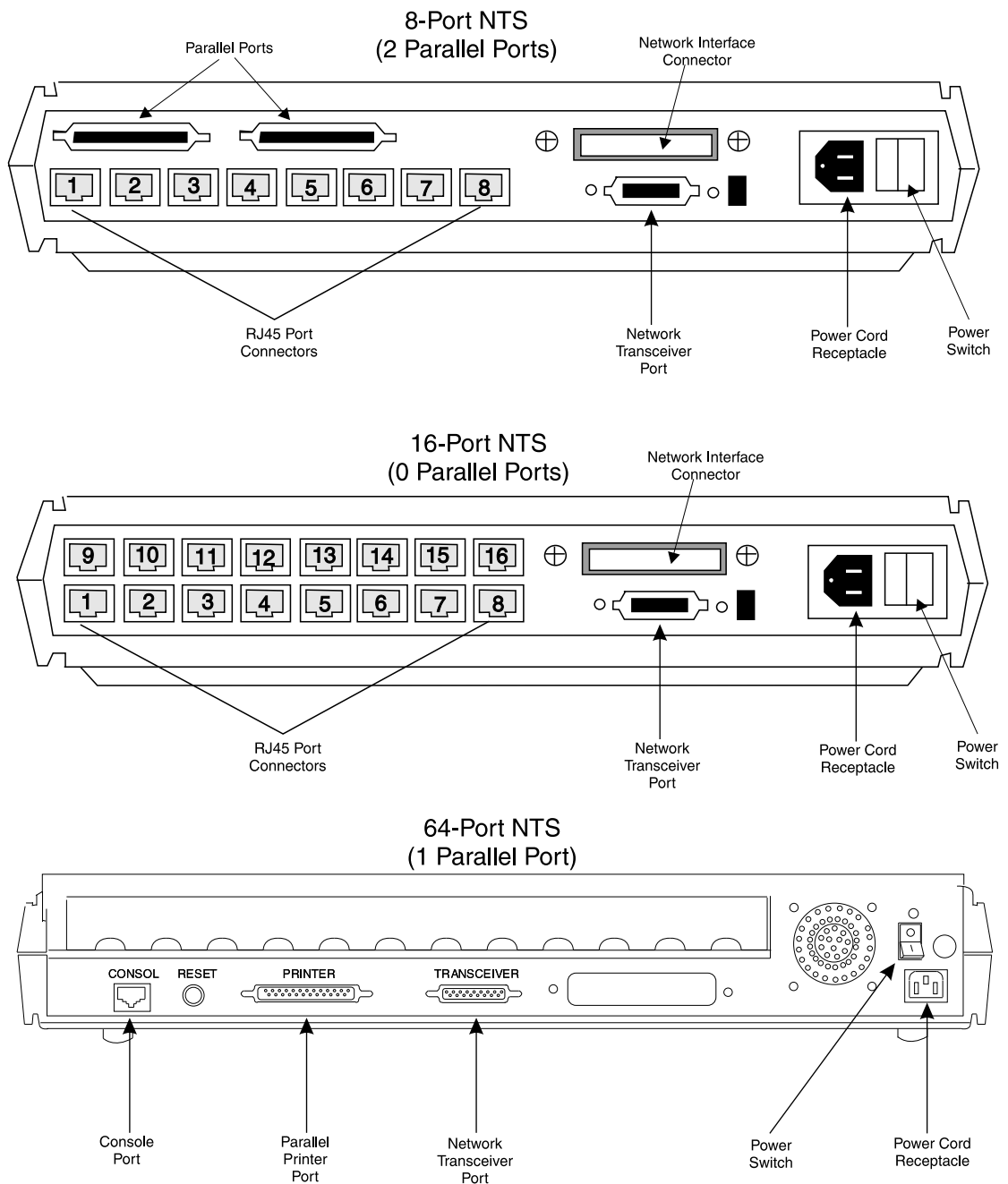


Figure D-49: 8-, 16-, and 64-Port NTS — Back Panels

To connect the NTS(s) to the network hub unit, do the following (see Figure D-50):

1. Position the NTS(s) in the location selected by the customer. Make sure each power switch is set to *Off*.
2. Plug each power cord into a wall outlet or to an UPS (if equipped).
3. Plug one end of the UTP cable into a port on the 10Base-T ports on the Network Hub unit.
4. Connect the 10Base-T transceiver to the transceiver port on the back of the NTS. Verify that the 10Base-T Transceiver switch setting is set to SQE = Off.

Note You may have an older version of a 10Base-T Transceiver which allows you to physically change three switch setting: SQE, Link, and LRT. If you have this older version, verify that the switch settings are set to the following:

- SQE = Off
 - Link = On
 - LRT = Off.
5. Plug the other end of the UTP cable into the transceiver connected to the back of the NTS.

Note The 8-port (0-parallel ports) NTS comes with two connectors that can be used to connect the NTS to the Network Hub:

- Transceiver connector (instructions above)
- Ethernet connector.

You can use either connector to connect the NTS to the Network Hub. To use the Ethernet connector, do the following:

1. Plug one end of the UTP cable into a port on the 10Base-T ports on the Network Hub unit.
2. Plug the other end of the UTP cable into the RJ45 jack located on the back of the NTS.

Figure D-50 shows the Network Hub and NTS connectivity.

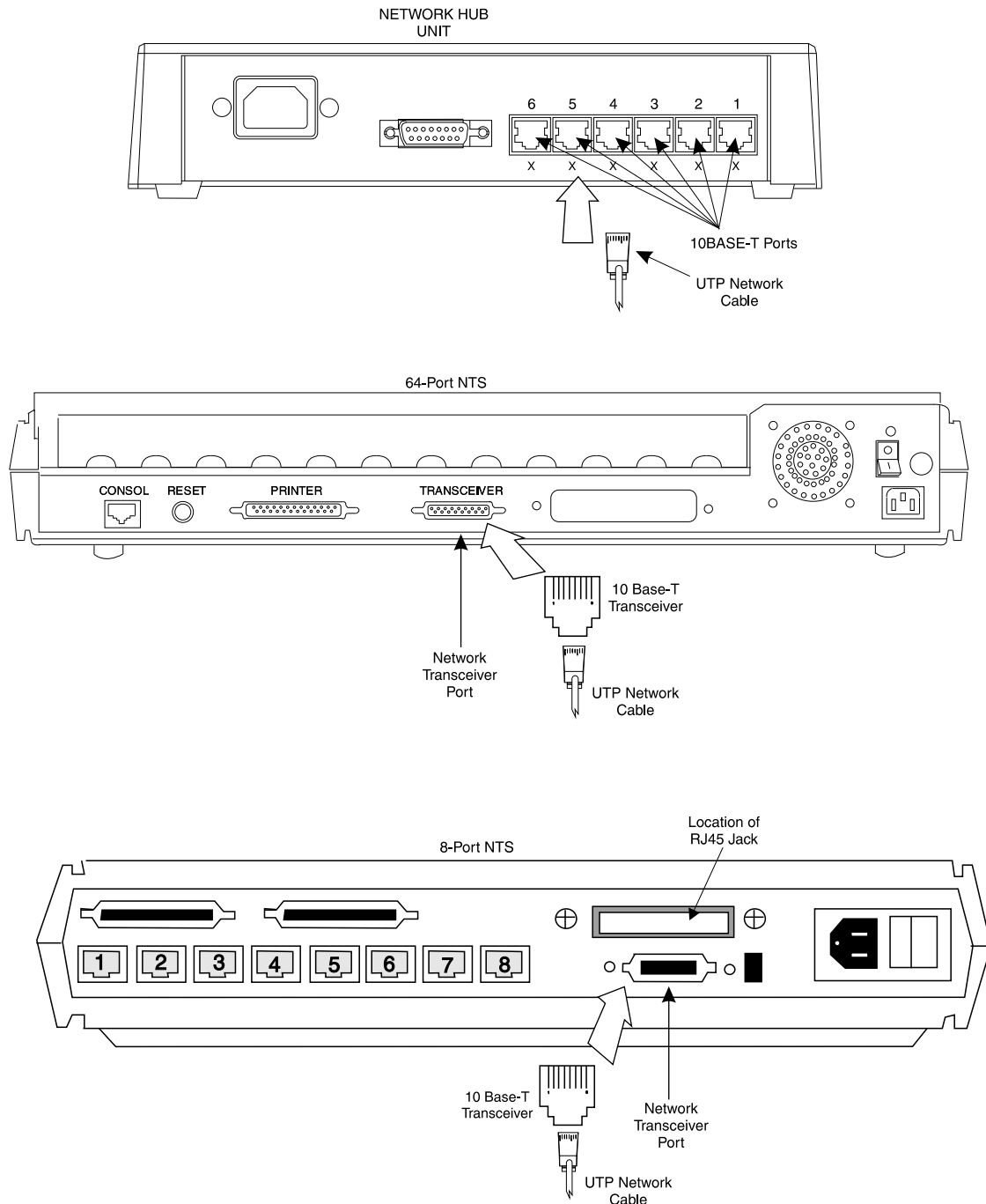


Figure D-50: NTS Connectivity to Network Hub Unit

Connecting NTS Patch Panel(s) to the 64- Port NTS

This section describes how to connect the 16-port patch panel(s) to the 64-port NTS (see Figure D-51 and Figure D-52).

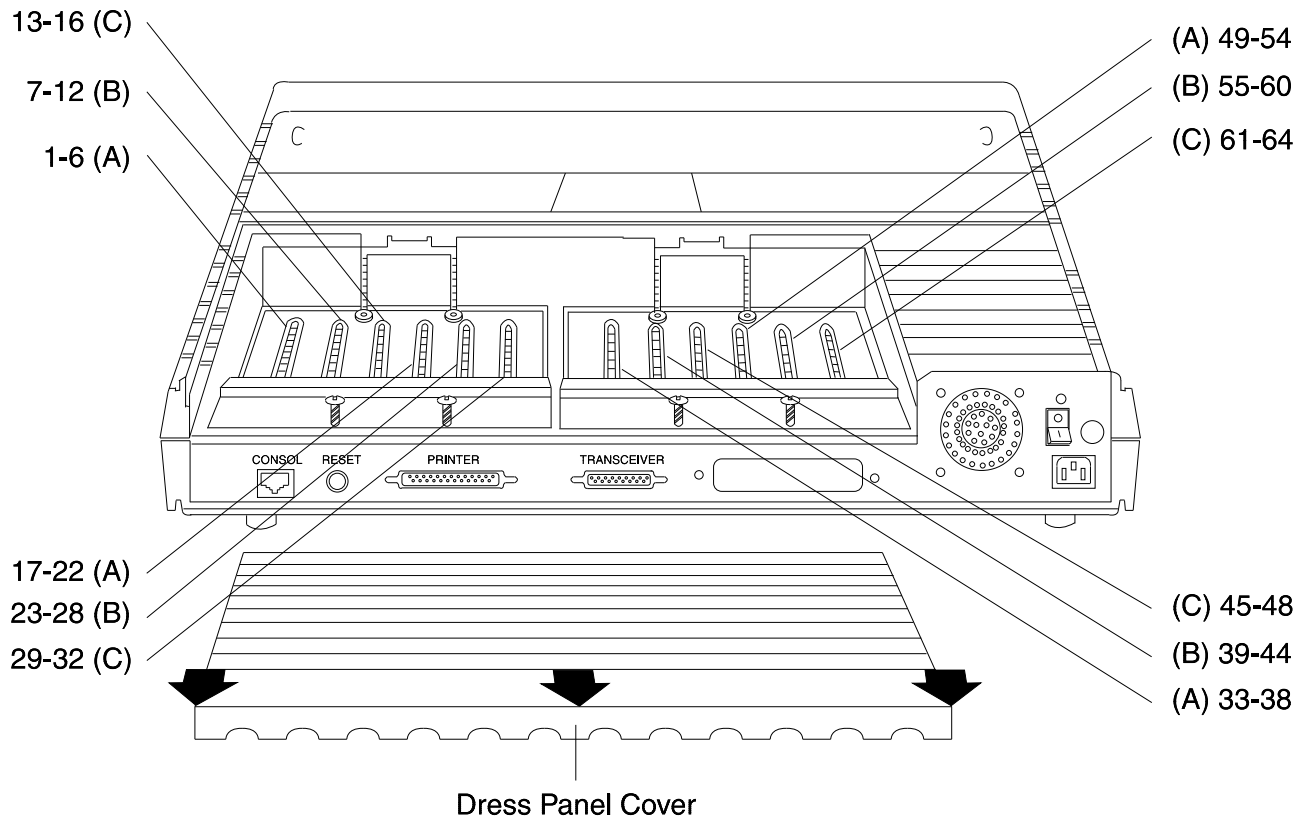


Figure D-51: 64-Port Network Terminal Server — PBX-Champ Connectors and Port Definitions

To connect a 16-port NTS patch panel (see Figure D-52) to the 64-Port NTS (see Figure D-51), do the following:

1. Remove the back panel of the NTS by sliding it toward the back of the NTS. (This cover is located on the top back corner of the NTS.)
2. Slide the cable retainer back to allow room for the cable(s).
3. Position the 16-port patch panel in the location selected by the customer.
4. Connect the PBX ends of the patch panel cable to the PBX-champ connector.

Each 16-port patch panel has three connectors (see Figure D-52) which connect to the PBX-champ connectors located inside the NTS (see Figure D-51). The PBX-champ connectors are also labeled A, B, and C, respectively.

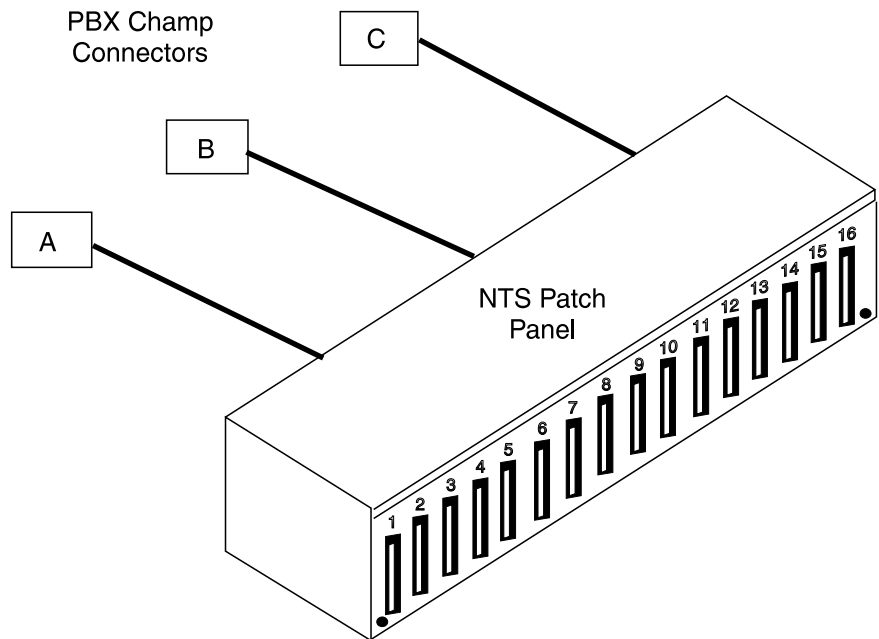


Figure D-52: NTS Patch Panel

5. Tighten the screw on the PBX end of the cable.
 6. Slide the cable retainer forward. Make sure that the lip of the retainer secures the connector.
- Repeat steps 3 through 6 for each NTS patch panel being installed.
7. Replace the back panel of the 64-Port NTS (to its original position) by sliding it toward the front of the NTS. See Figure D-53 for a graphical view of the Network Terminal Server connectivity.

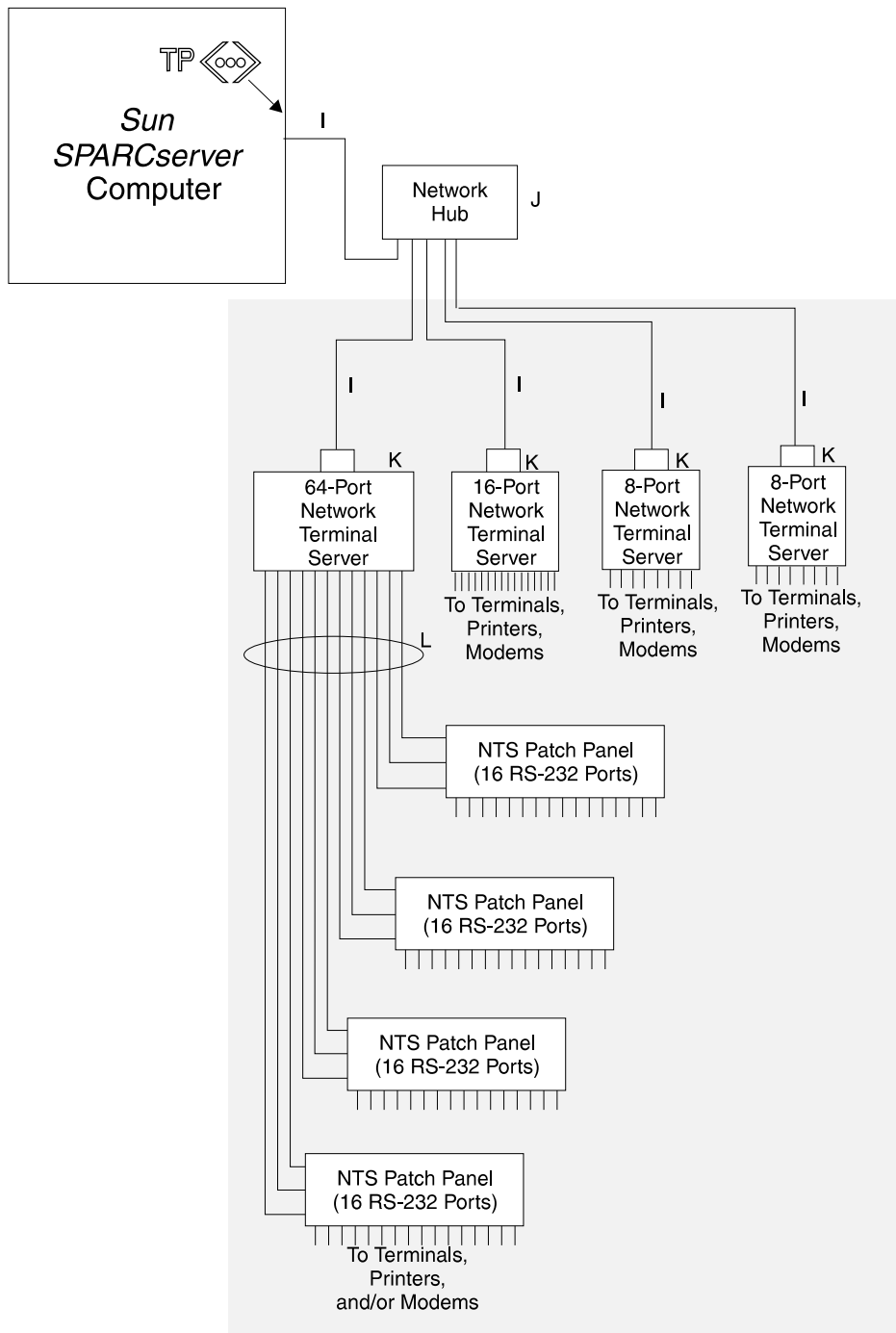


Figure D-53: Network Terminal Server Connectivity

Factory Software Installation Procedures

This section contains the factory software installation procedures.

The following list summarizes the software procedures in the order they should be performed:

1. Installing the *Solaris* 2.4 operating system.
2. Installing the *Solaris* 2.4 *AnswerBook* software.
3. Installing the HSI/S (High-Speed Serial Interface/SBus) software.
4. Installing the NTS (Network Terminal Server) software.
5. Installing the *SunLink* X.25 Network Interface software.
6. Installing the INFORMIX software.
7. Installing the *Sun Solaris* patches.
8. Installing the CMS application.
9. Setting authorizations.
10. Setting up the remote console.
11. Administering the NTS(s).

Installing the *Solaris 2.4* Operating System

Prerequisites: Make sure that your *Solaris* OS package is Release 2.4 and is dated 3/95.

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

Basic navigation through the *Solaris* installation program is with the mouse. Your keyboard, however, provides similar functionality. For example, you can use the **Tab** or arrow keys to move through fields and the **Return** key to initiate actions.

Installing the *Solaris 2.4* operating system on the *Sun SPARCserver* computer consists of the following tasks:

- Booting from the *Solaris 2.4* CD-ROM.
- Identifying the system.
- Setting the system date and time.
- Installing the *Solaris 2.4* system files.
- Partitioning the hard disks.

Things to Know Before You Start

You need the following information to install the *Solaris 2.4* operating system:

- The system's name [as designated by AT&T's Technical Service Center (TSC)]
- The system's IP address
- The number of disks equipped with the system
- The amount of Random Access Memory (RAM) equipped with the system.

Additional References

For additional information, refer to the following documentation:

“*Solaris 2.4 SPARC: Installing Solaris Software*”

Booting from the *Solaris 2.4* CD-ROM

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

1. Turn the system on.
2. Remove the “*Solaris 2.4* Hardware: 3/95” CD-ROM from its case. If you have an external CD-ROM drive, follow the steps below. Otherwise, go to step 3.
 - a. Place the “*Solaris 2.4* Hardware: 3/95” CD-ROM in the CD-ROM caddy. When the CD-ROM is properly inserted in the caddy, the CD-ROM label is visible.
 - b. Insert the CD-ROM caddy into the CD-ROM drive slot.
 - c. Go to step 6.
3. Open the CD-ROM drive tray by pressing the eject button on the CD-ROM drive unit.
4. 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.
5. Push the CD-ROM drive tray in (towards the system unit) until it closes.
6. Press the **Stop** and **A** keys simultaneously. The following prompt displays:

```
<#0> ok
```

7. Boot the system from the CD-ROM by entering:

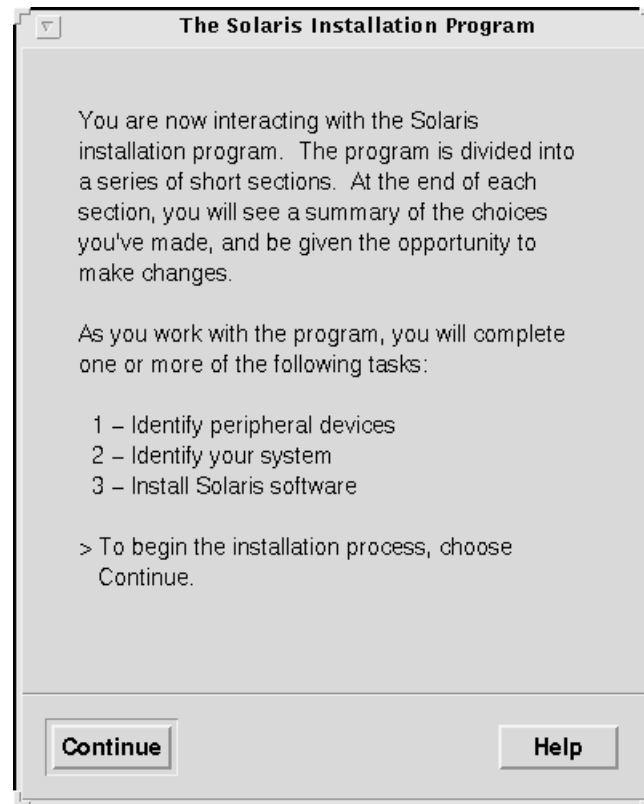
```
<#0> ok boot cdrom
```

The boot process takes approximately 5-10 minutes.

Note

At the start of the boot process, the system displays some parameters to the right of the *Sun* graphic. Note the amount the RAM equipped with the system (for example, 128-MB). You need this information later to partition the hard disks.

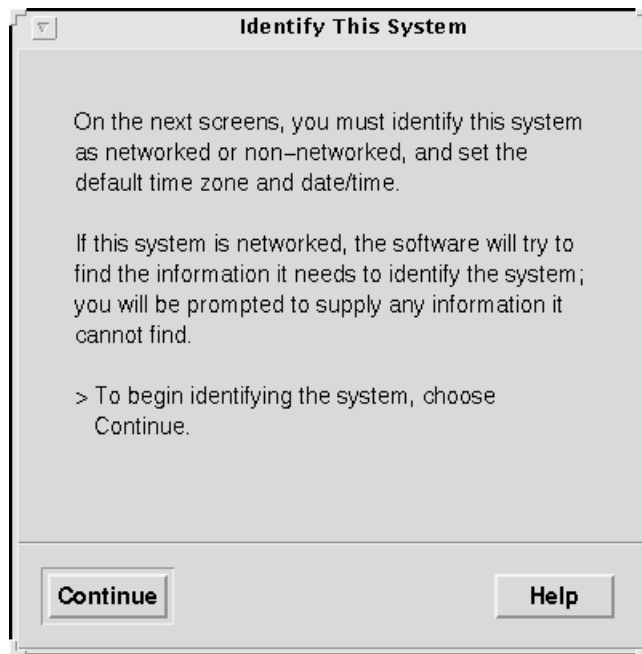
After the boot process, the system starts the Solaris Installation Program:



8. Click **Continue**.

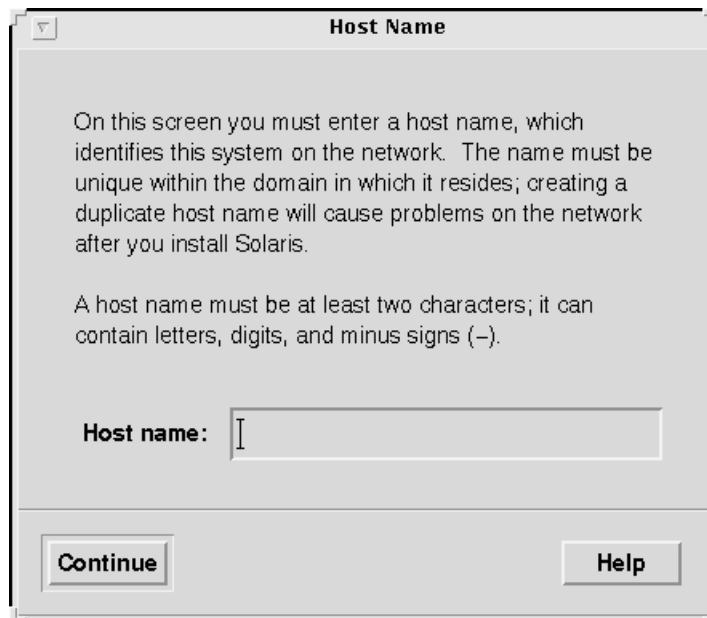
Identifying the System

The Identify This System screen displays:



9. Click **Continue**.

The Host Name screen displays:



10. Click the **Host name** box, type the host name for the workstation, then click **Continue**. The host name for a specific system was designated by the TSC Provisioning personnel.

The Network Connectivity screen displays:



11. Click **Yes**, then click **Continue**.

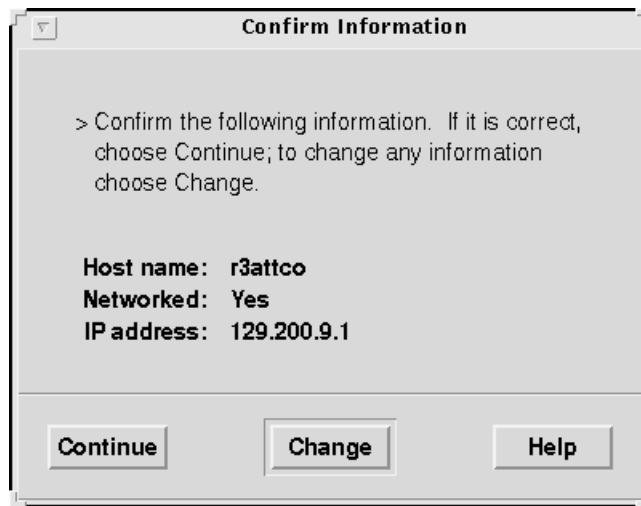
Note If the system is equipped with more than one network board, the Primary Network Interface screen displays. You should click **le0** and then **Continue**.

The IP Address screen displays:



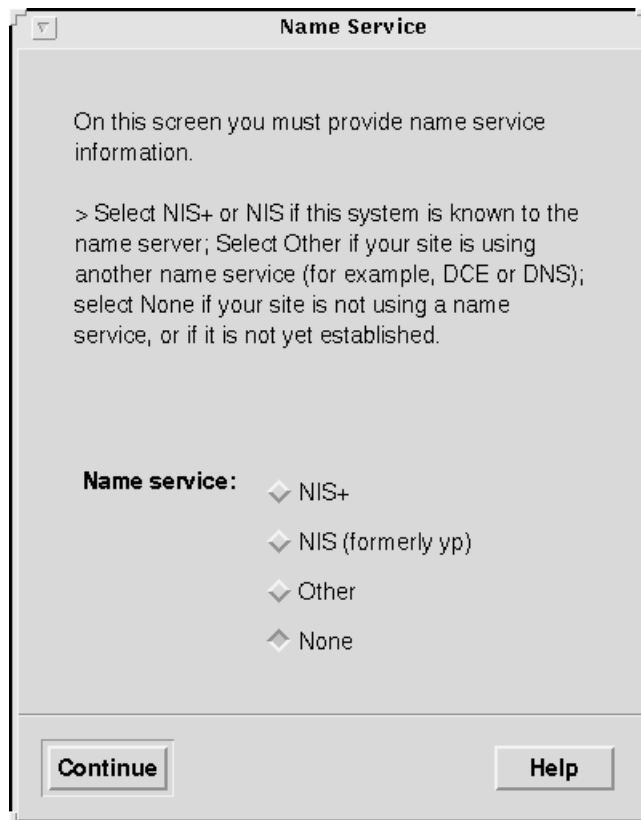
12. Click the **IP address** box, type the IP address (129.200.9.1 is recommended), then click **Continue**.

The Confirm Information screen displays:



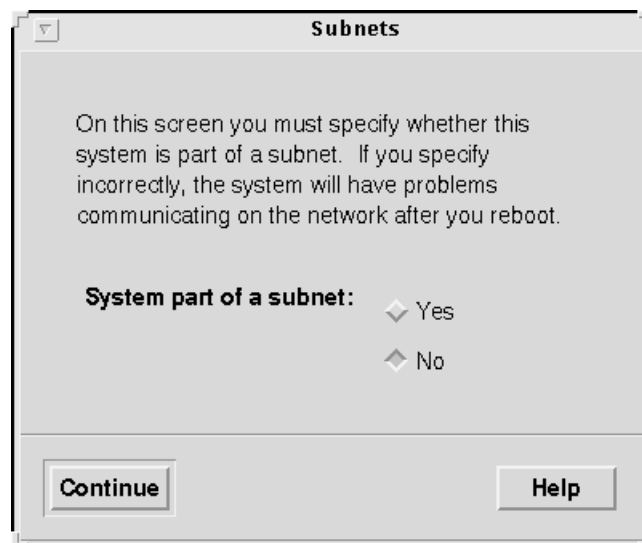
13. Click **Continue** if the displayed information is correct. If you click **Change**, the program returns to the Host Name screen.

The Name Service screen displays:



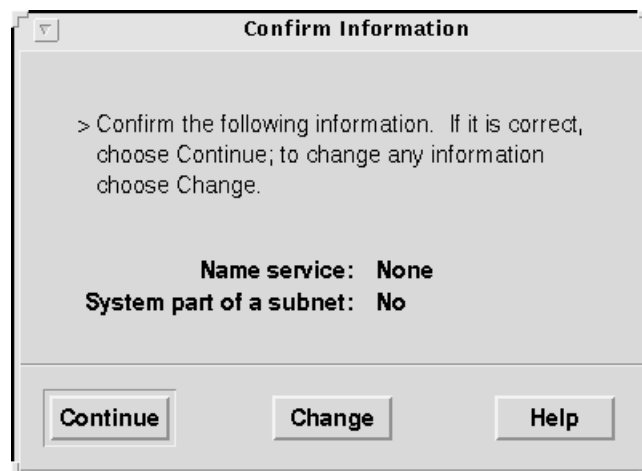
14. Click **None**, then click **Continue**.

The Subnets screen displays:



15. Click **No**, then click **Continue**.

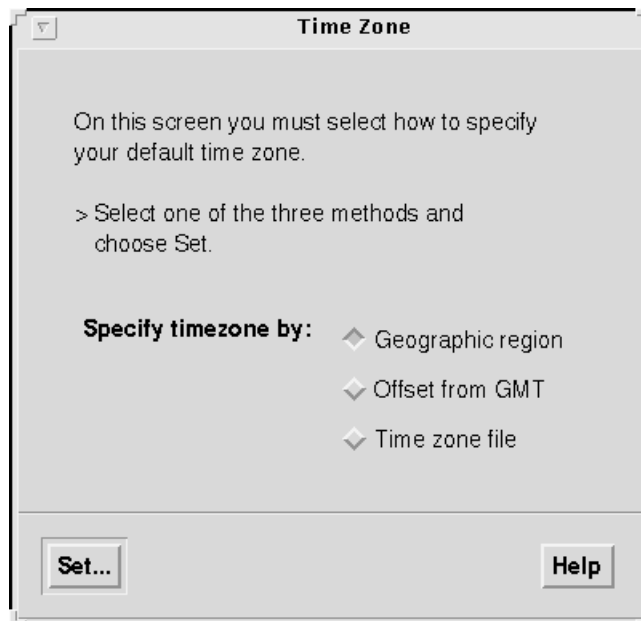
The Confirm Information screen displays:



16. Click **Continue** if the displayed information is correct. If you click **Change**, the program returns to the Name Service screen.

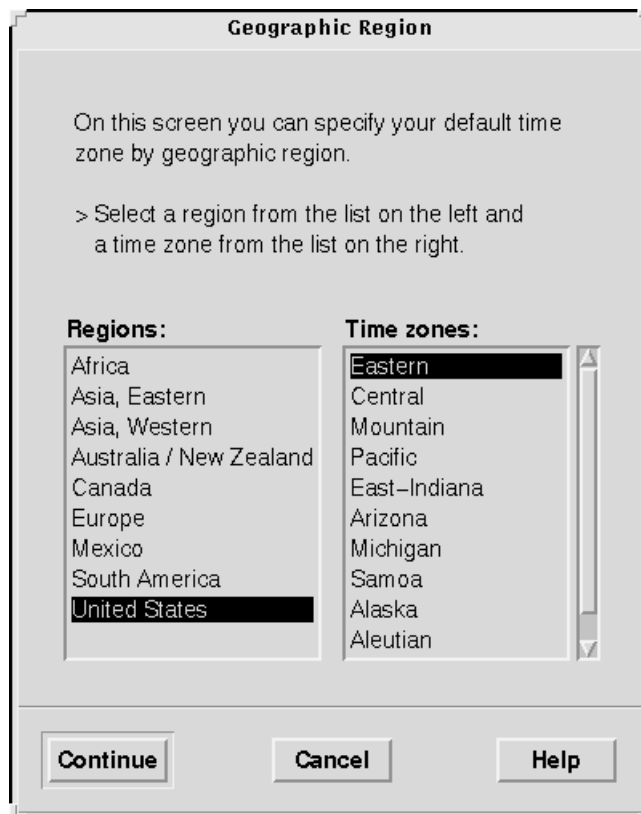
Setting the Date and Time

The Time Zone screen displays:



17. Click **Geographic region**, then click **Set**.

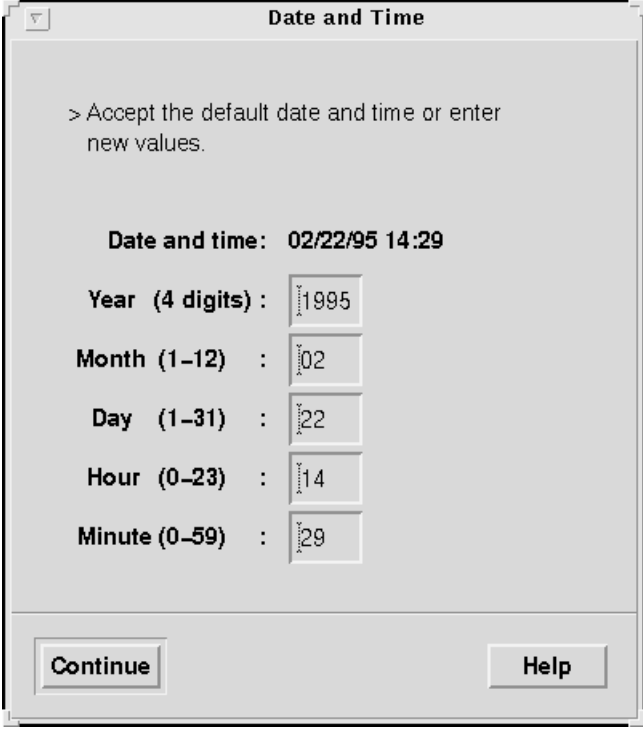
The Geographic Region screen displays:



18. Click to highlight the region and time zone where this system is

located, then click **Continue**.

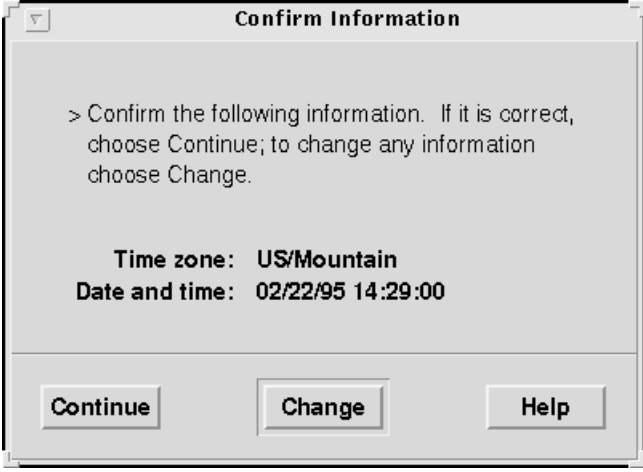
The Date and Time screen displays:



The 'Date and Time' window has a title bar with a close button. The main area contains the text: '> Accept the default date and time or enter new values.' Below this, it displays 'Date and time: 02/22/95 14:29'. There are six input fields: 'Year (4 digits):' with '1995', 'Month (1-12):' with '02', 'Day (1-31):' with '22', 'Hour (0-23):' with '14', and 'Minute (0-59):' with '29'. At the bottom are 'Continue' and 'Help' buttons.

19. Click **Continue** to accept the default date and time, or click and drag a value in a field you wish to change and enter the appropriate information. Click **Continue** when all the information is correct.

The Confirm Information screen displays:



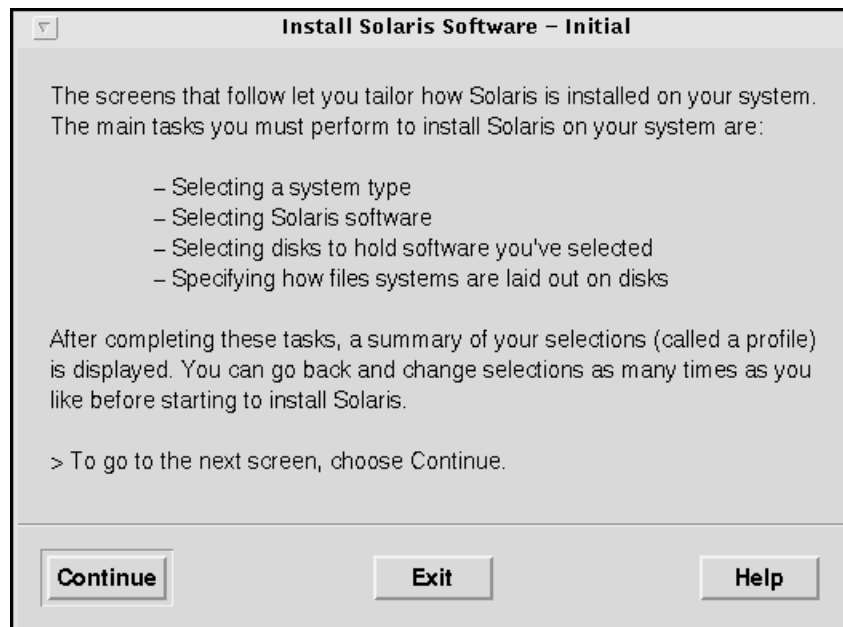
The 'Confirm Information' window has a title bar with a close button. The main area contains the text: '> Confirm the following information. If it is correct, choose Continue; to change any information choose Change.' Below this, it displays 'Time zone: US/Mountain' and 'Date and time: 02/22/95 14:29:00'. At the bottom are 'Continue', 'Change', and 'Help' buttons.

20. Click **Continue** if the displayed information is correct. If you click **Change**, the program returns to the Time Zone screen.

The system date and time are now set. The program continues with the installation of *Solaris* 2.4 system files.

Installing the *Solaris 2.4* System Files

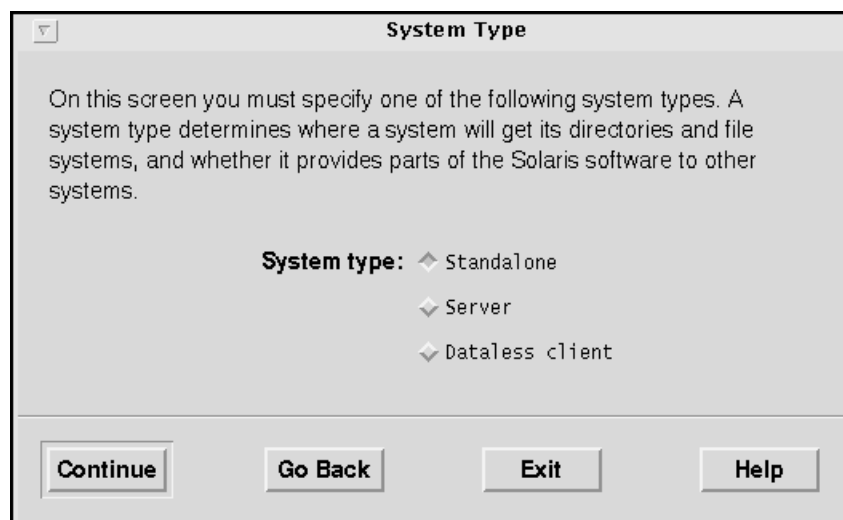
The Install Solaris Software screen displays:



21. Click **Continue**.

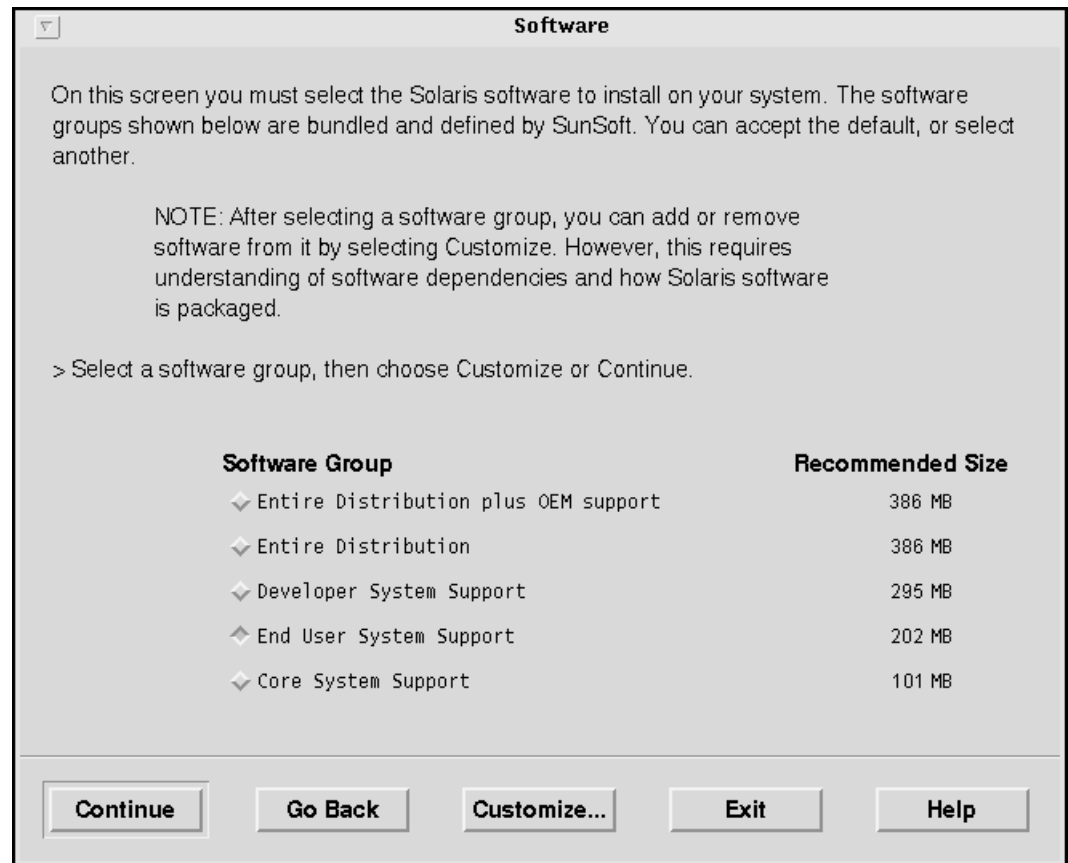
Note If *Solaris* is already installed on the machine, which is the case for machines in the field, the Upgrade screen displays.

The System Type screen displays:



22. Click **Standalone**, then click **Continue**.

The Software screen displays:

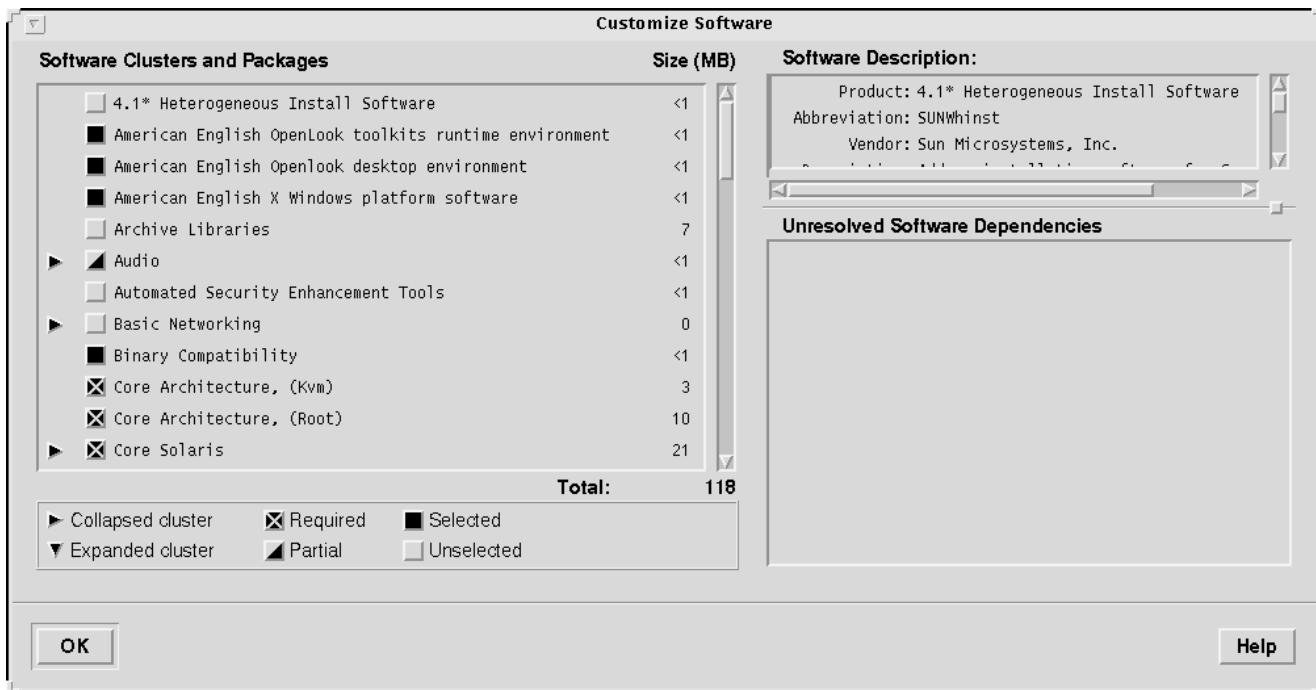


23. Click **End User System Support**, then click **Customize**.

Note

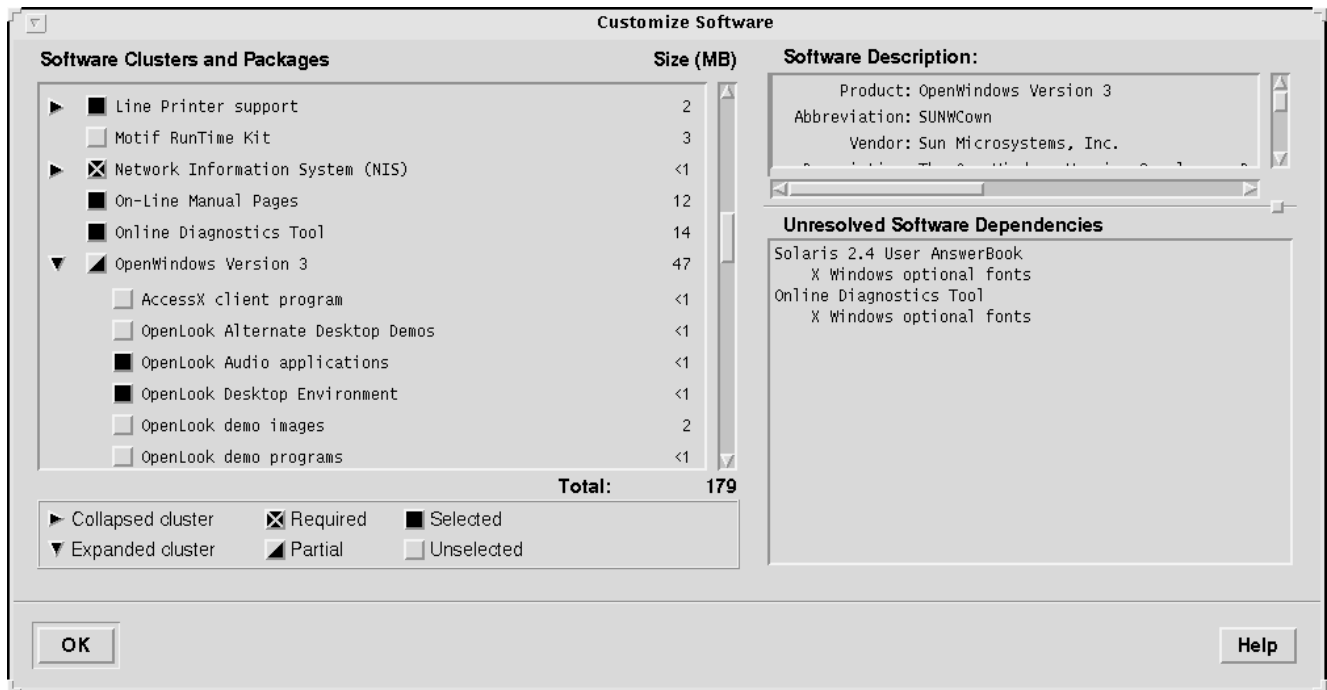
If you click **Continue** instead of **Customize**, the Disks screen on page -120 displays, which is incorrect. If this happens, click **Go Back** from the Disks screen.

The Customize Software screen displays:



24. Click to select the following packages using the scroll bar when necessary:
 - Basic Networking
 - Framed Access Command Environment
 - On-Line Manual Pages
 - On-Line Diagnostics Tool
 - SX API Support
 - *Solaris 2.4 User AnswerBook*
 - System Accounting.
25. Scroll up, then click the triangular icon to expand the *OpenWindows* Version 3 cluster.

The program responds:



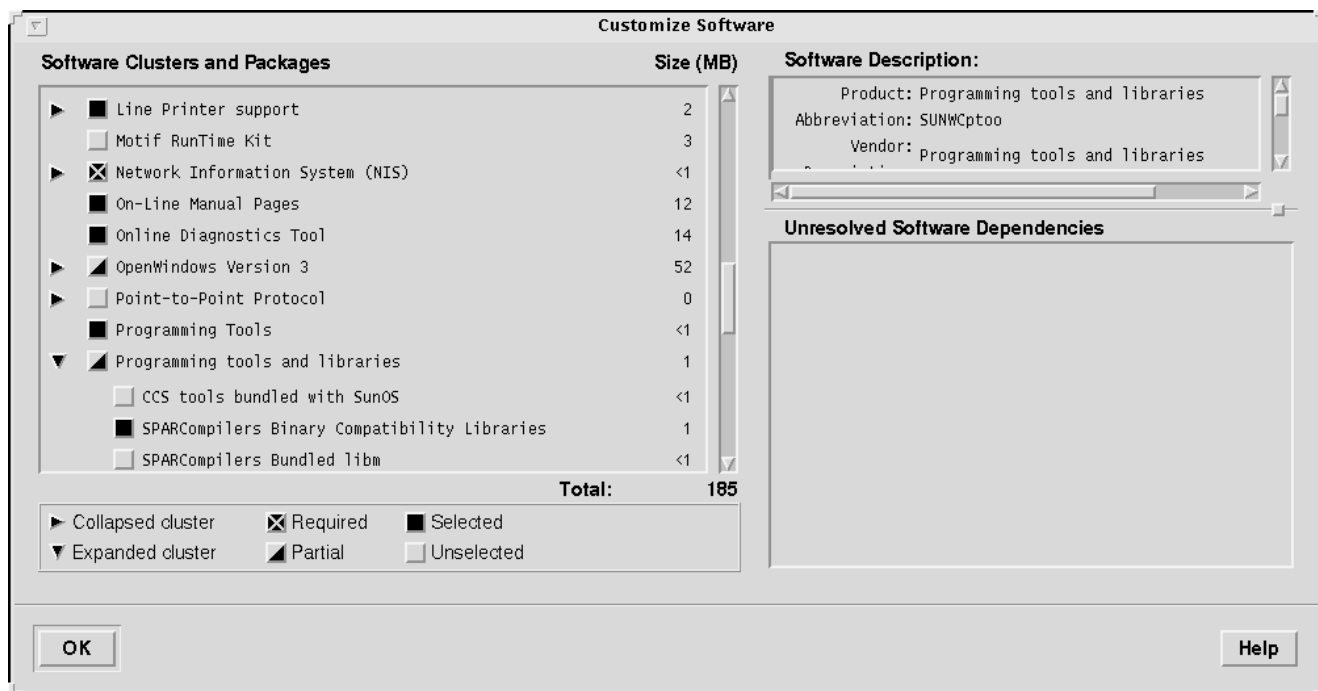
26. Scroll down, then click to select the following packages:

- X Windows online user man pages
- X Windows optional fonts.

27. Scroll up, then click the triangular icon to collapse the OpenWindows Version 3 cluster.

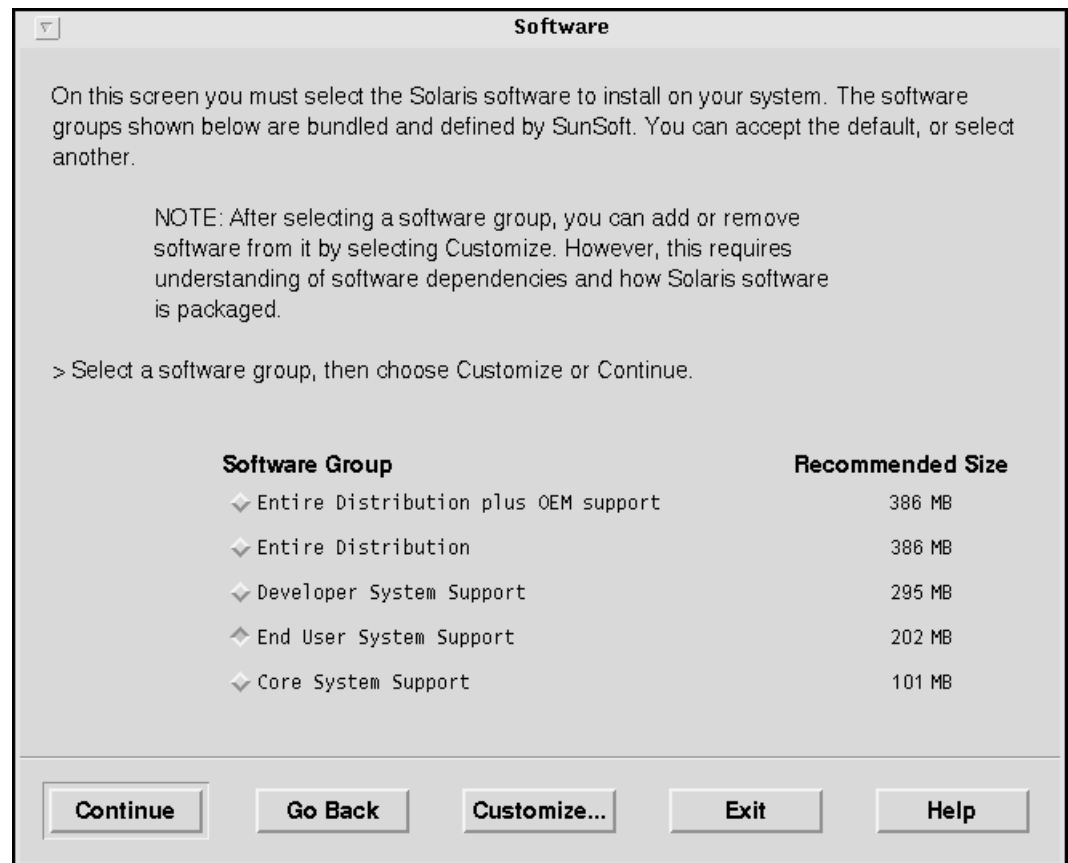
28. Click the triangular icon to expand the Programming tools and libraries cluster.

The program responds:



29. Click to select the CCS tools bundled with SunOS package.
30. Click the triangular icon to collapse the Programming tools and libraries cluster.
31. Click **OK**.

The program returns to the Software screen:

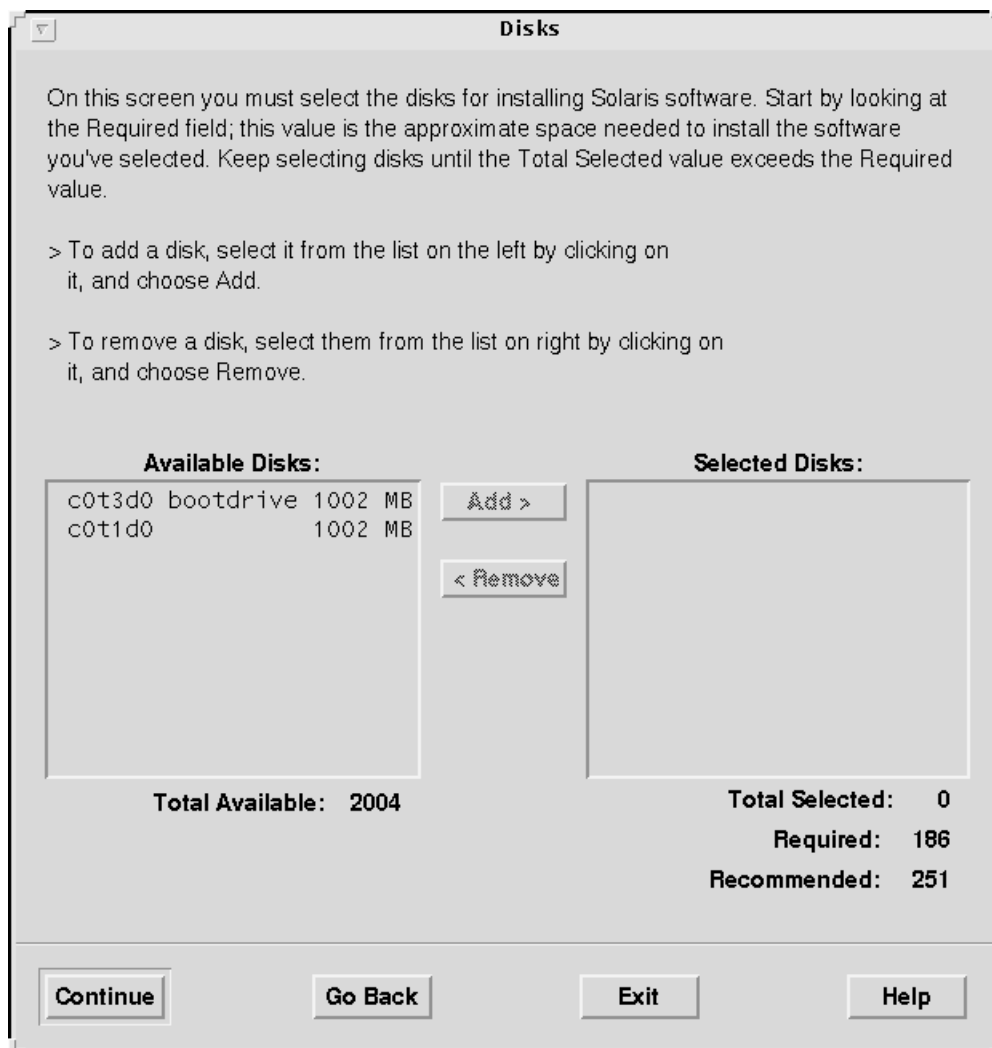


32. Click **Continue**.

The *Solaris 2.4* software packages are now selected and will be installed after the disks are partitioned.

Partitioning the Hard Disks

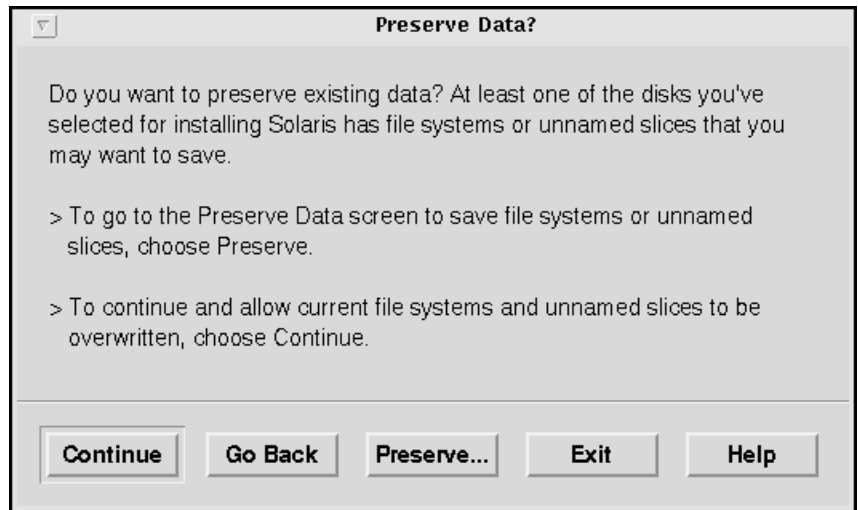
The Disks screen displays:



Note In the above screen, all the disks equipped with the system should be listed as available. If not, you may have a connectivity problem.

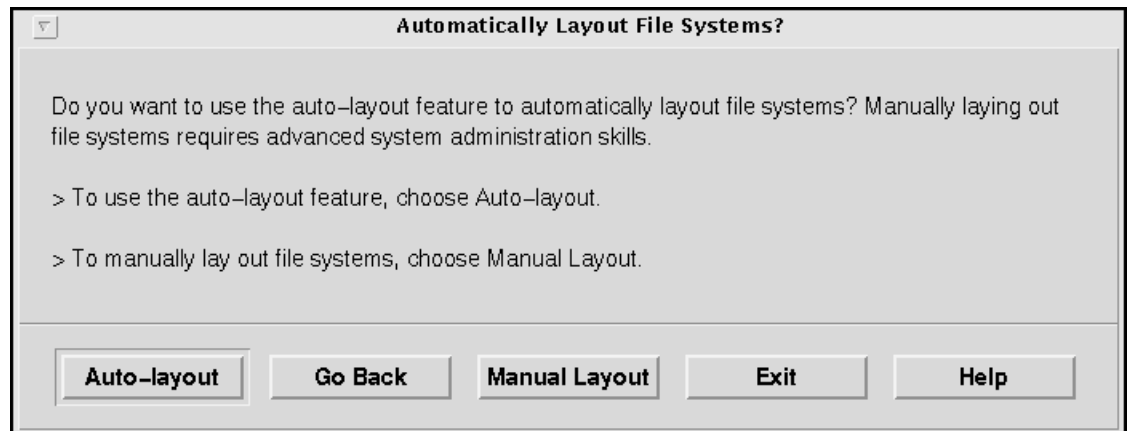
33. Click to highlight an available disk.
34. Click **Add** so the available disk becomes a selected disk.
35. Repeat steps 33 and 34 until all available disks become selected disks.
36. Click **Continue**.

The Preserve Data screen displays:



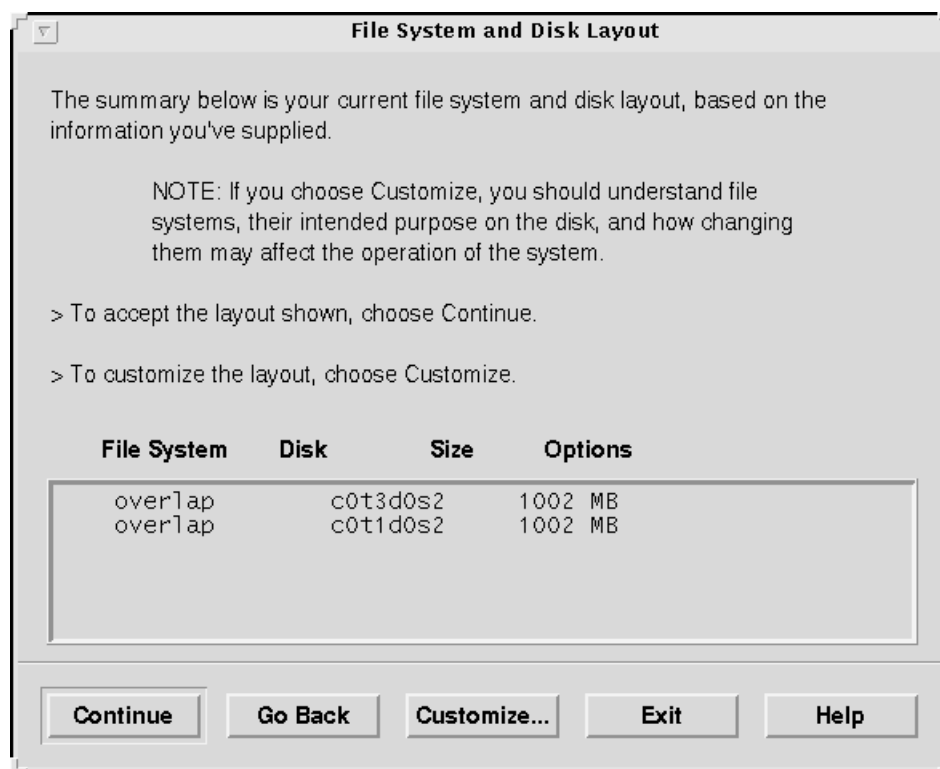
37. Click **Continue**.

The Automatically Layout File Systems screen displays:



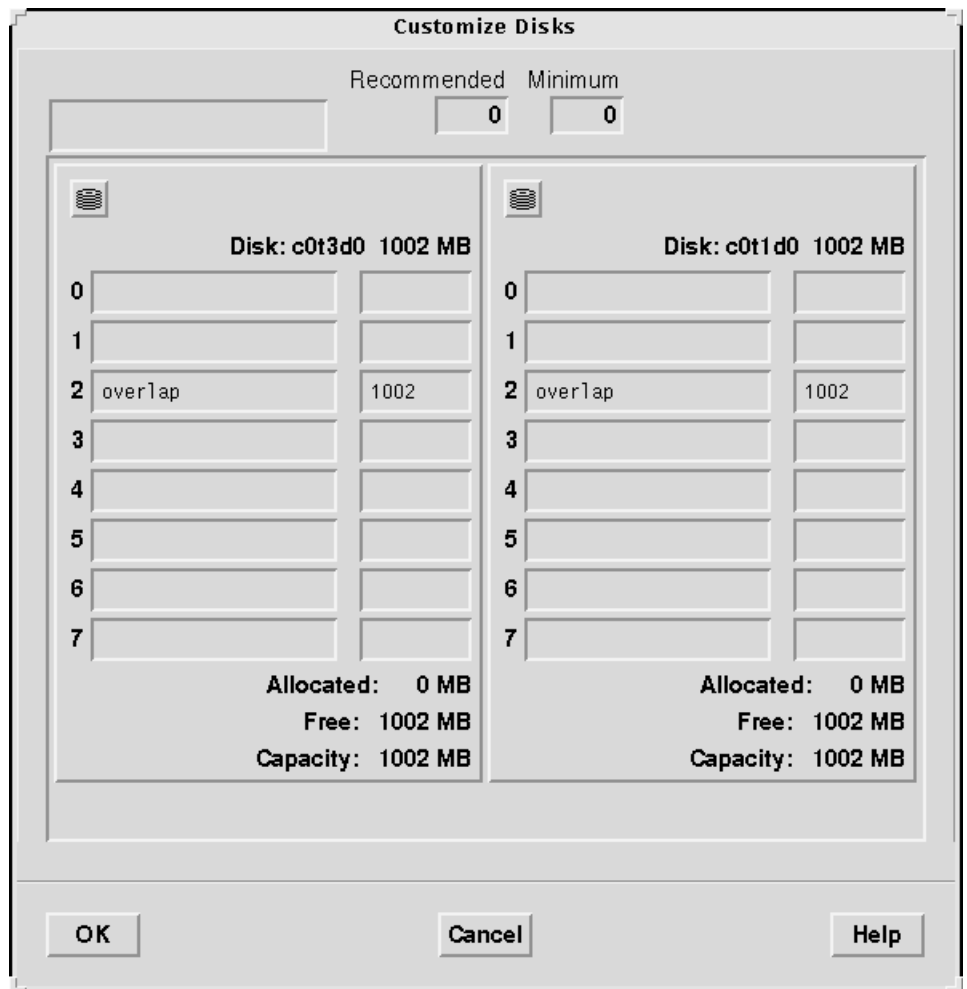
38. Click **Manual Layout**.

The File System and Disk Layout screen displays:



39. Click **Customize**.

The Customize Disks screen displays:



40. Click the cylinders icon in the upper left-hand corner of the disk 1 (c0t3d0) column.

The Customize Disks by Cylinders screen displays for disk 1:

Customize Disks by Cylinders

Recommended: 0 Minimum: 0

Disk: c0t3d0 2036 CYLS

	Size	Start	End
0			
1			
2	overlap	2036	0 2035
3			
4			
5			
6			
7			

Allocated: 0 CYLS
Free: 2036 CYLS
Capacity: 2036 CYLS

OK Load... Cancel Help

41. Partition disk 1 (c0t3d0) using the parameters in Table D-27.

Note The size of the overlap file system always defaults to the size of the entire disk. Do not change this value.

Table D-27: Internal Disk 1 (c0t3d0) - Partitioning Information

Slice	File System	Size (cylinders)
0	/	41
1	swap	390
2	overlap	default
3	/dump	298
4	/cms	406
5	/opt	204
6	/usr	305
7	/var	392

42. Click **OK** after setting up the partitions for disk 1.

The program returns to the Customize Disks screen:

The screenshot shows the 'Customize Disks' window with two disk configuration panels. At the top, there are input fields for 'Recommended' (192) and 'Minimum' (0). The left panel is for 'Disk: c0t3d0 1002 MB' and the right panel is for 'Disk: c0t1d0 1002 MB'. Each panel contains a table of partitions and summary statistics at the bottom.

Partition	Mount Point	Size (MB)
0	/	20
1	swap	191
2	overlap	1002
3	/dump	146
4	/cms	199
5	/opt	100
6	/usr	150
7	/var	192

Summary for Disk: c0t3d0:
 Allocated: 1002 MB
 Free: 0 MB
 Capacity: 1002 MB

Partition	Mount Point	Size (MB)
0		
1		
2	overlap	1002
3		
4		
5		
6		
7		

Summary for Disk: c0t1d0:
 Allocated: 0 MB
 Free: 1002 MB
 Capacity: 1002 MB

At the bottom of the window are buttons for **OK**, **Cancel**, and **Help**.

43. If the system is equipped with two or more disks, continue with step 44; otherwise, go to step 50.

44. Click the cylinders icon for disk 2 (c0t1d0).

The Customize Disks by Cylinders screen displays for disk 2:

Customize Disks by Cylinders

Recommended Minimum

0 0

Disk: c0t1d0 2036 CYLS

	Size	Start	End
0			
1			
2	overlap	2036	0
3			
4			
5			
6			
7			

Allocated: 0 CYLS
Free: 2036 CYLS
Capacity: 2036 CYLS

Setting Up Swap Space on Disk 2

If the system is equipped with more than 96 Megabytes (MB) of RAM, you need to set up a second swap partition. This second swap partition is placed on disk 2 on slice 1 and has the same name as the swap partition on disk 1. (The reuse of the name “swap” does not cause a problem.)

45. Partition disk 2 (c0t1d0) using the parameters in Table D-28.

Note that Table D-28 is divided into memory ranges, each range containing different partitioning information. Look up the appropriate memory range for the system, and use the information in that range to partition disk 2.

Table D-28: Internal Disk 2 (c0t1d0) - Partitioning Information

If equipped RAM (in MB) is:		Slice	Partition	Size (cylinders)
more than	but less than or equal to			
0	96	0	/cms1	2036
		2	overlap	default
96	160	0	/cms1	1776
		1	swap	260
		2	overlap	default
160	224	0	/cms1	1516
		1	swap	520
		2	overlap	default
224	288	0	/cms1	1256
		1	swap	780
		2	overlap	default
288	352	0	/cms1	996
		1	swap	1040
		2	overlap	default
352	416	0	/cms1	736
		1	swap	1300
		2	overlap	default
416	512	0	/cms1	476
		1	swap	1560
		2	overlap	default

46. Click **OK** after setting up the partitions for disk 2.

The program returns to the Customize Disks screen:

Customize Disks

Recommended Minimum

1002 0 0

Disk: c0t3d0 1002 MB			Disk: c0t1d0 1002 MB		
0	/	20	0	/cms1	1002
1	swap	191	1		
2	overlap	1002	2	overlap	1002
3	/dump	146	3		
4	/cms	199	4		
5	/opt	100	5		
6	/usr	150	6		
7	/var	192	7		
Allocated: 1002 MB Free: 0 MB Capacity: 1002 MB			Allocated: 1002 MB Free: 0 MB Capacity: 1002 MB		

47. If the system is equipped with three or more disks, continue with step 48; otherwise, go to step 50.
48. Use the scroll bar to select the next disk to partition and click the cylinders icon. Partition the remaining disk(s) using the parameters in Table D-29.

Table D-29: Additional External Disks - Partitioning Information

Device	Disk	Slice	Partition	Size (cylinders)	
				1 GB	2 GB
c0t2d0	3	0	/cms2	2036	2733
		2	overlap	default	default
c0t0d0	4	0	/cms3	2036	2733
		2	overlap	default	default
c1t1d0	5	0	/cms4	2036	2733
		2	overlap	default	default
c1t2d0	6	0	/cms5	2036	2733
		2	overlap	default	default
c1t3d0	7	0	/cms6	2036	2733
		2	overlap	default	default
c1t4d0	8	0	/cms7	2036	2733
		2	overlap	default	default
c2t1d0	9	0	/cms8	2036	2733
		2	overlap	default	default
c2t2d0	10	0	/cms9	2036	2733
		2	overlap	default	default
c2t3d0	11	0	/cms10	2036	2733
		2	overlap	default	default
c2t4d0	12	0	/cms11	2036	2733
		2	overlap	default	default

49. After setting up partitions for the last external disk, click **OK** on the Customize Disks by Cylinders screen for that disk.

The program returns to the Customize Disks screen:

Customize Disks

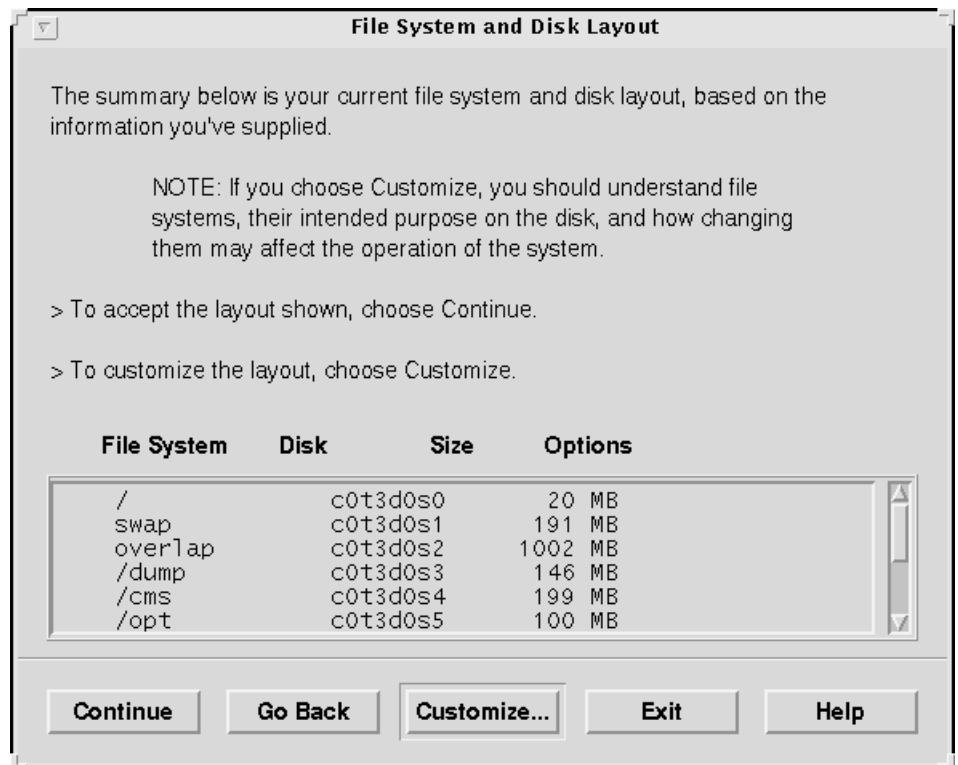
Recommended Minimum

/ 14 12

Disk: c0t3d0 1002 MB			Disk: c0t1d0 1002 MB		
0	/	20	0	/cms1	1002
1	swap	191	1		
2	overlap	1002	2	overlap	1002
3	/dump	146	3		
4	/cms	199	4		
5	/opt	100	5		
6	/usr	150	6		
7	/var	192	7		
Allocated: 1002 MB Free: 0 MB Capacity: 1002 MB			Allocated: 1002 MB Free: 0 MB Capacity: 1002 MB		

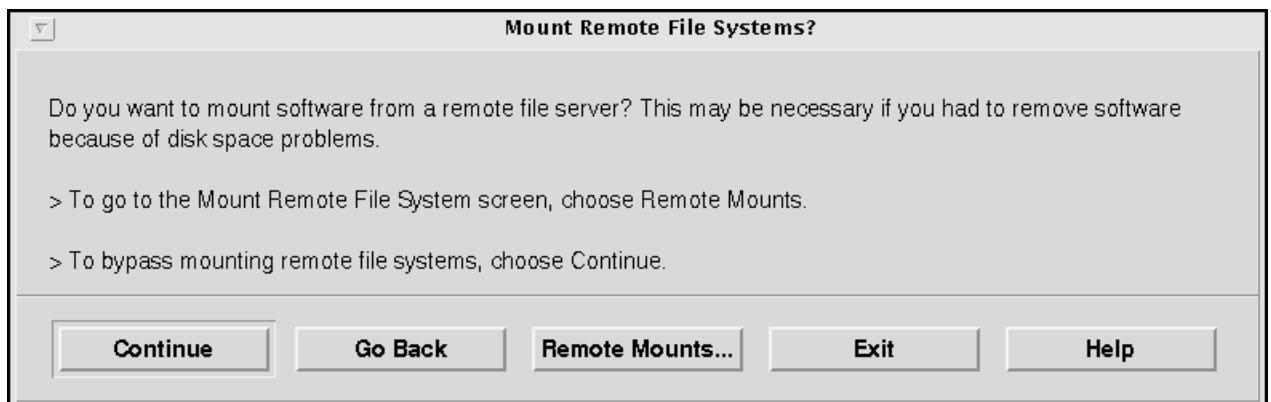
50. Click **OK**.

The File System and Disk Layout screen displays:



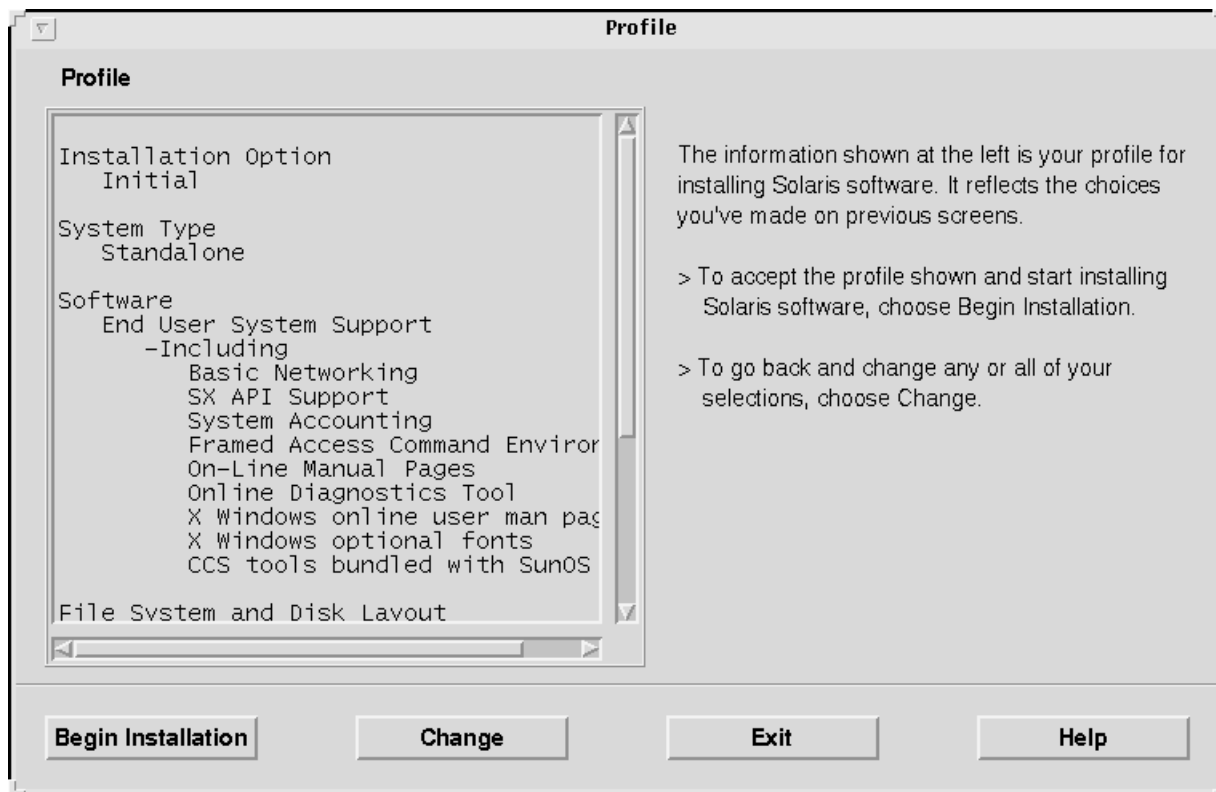
51. Click **Continue**.

The Mount Remote File Systems screen displays:



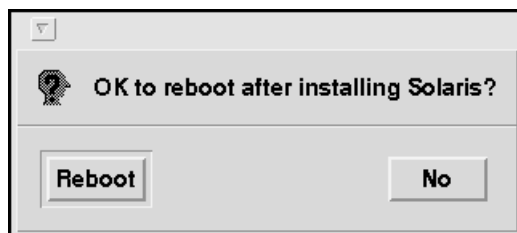
52. Click **Continue**.

The Profile screen displays:



53. Click **Begin Installation**.

The program responds:



54. Click **Reboot**.

The Installing Solaris - Progress screen displays:



The disk partitioning could take 40 minutes to 2 hours depending on the number of disks being partitioned. As the disks are partitioned and *Solaris* 2.4 system files are copied to the disk, a progress gauge is updated to indicate the progress of the installation.

When disk partitioning completes, the following 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.

55. Enter the *root* password. The program responds:

Please re-enter your root password?

Press Return to continue.

56. Reenter the *root* password. The program responds:

```
. . . . .  
. . . . .  
syslog services starting.  
Print services started.  
volume management starting.  
The system is ready.  
  
hostname console login:
```

57. Log in as *root*. The system prompt displays.

Next, you need to dissociate */tmp* and *swap* space and link several directories.

58. Edit the */etc/vfstab* file by entering:

```
# vi /etc/vfstab
```

The */etc/vfstab* file looks similar to the following:

#device #to mount #	device to fsck	mount point	FS type	fsck pass	mount at boot	mount options
/dev/dsk/c1d0s2	/dev/rdisk/c1d0s2	/usr	ufs	1	yes	-
/proc	-	/proc	proc	-	no	-
fd	-	/dev/fd	fd	-	no	-
swap	-	/tmp	tmpfs	-	yes	-
/dev/dsk/c0t3d0s0	/dev/rdisk/c0t3d0s0	/	ufs	1	no	
-						
/dev/dsk/c0t3d0s6	/dev/rdisk/c0t3d0s6	/usr	ufs	1	no	
-						
/dev/dsk/c0t3d0s7	/dev/rdisk/c0t3d0s7	/var	ufs	1	no	
-						
/dev/dsk/c0t3d0s4	/dev/rdisk/c0t3d0s4	/cms	ufs	2	yes	
-						
/dev/dsk/c0t1d0s0	/dev/rdisk/c0t1d0s0	/cms1	ufs	2	yes	
-						
/dev/dsk/c0t3d0s3	/dev/rdisk/c0t3d0s3	/dump	ufs	2	yes	
-						
/dev/dsk/c0t3d0s5	/dev/rdisk/c0t3d0s5	/opt	ufs	2	yes	
-						
/dev/dsk/c0t3d0s1	-	-	swap	-	no	-

59. Insert a # sign at the beginning of the line that begins with the word swap. The # sign comments-out this line.



There may be other lines in the */etc/vfstab* that contain the word swap, but not as the first word in the line. Do not comment-out these lines.

The resultant file should look like this:

```
#device      device      mount      FS      fsck      mount      mount
#to mount    to fsck     point      type     pass     at boot    options
#
#/dev/dsk/c1d0s2 /dev/rdisk/c1d0s2 /usr      ufs      1        yes       -
/proc        -            /proc     proc     -        no        -
fd           -            /dev/fd   fd       -        no        -
#swap        -            /tmp      tmpfs    -        yes       -

/dev/dsk/c0t3d0s0 /dev/rdisk/c0t3d0s0 /         ufs      1        no
-
/dev/dsk/c0t3d0s6 /dev/rdisk/c0t3d0s6 /usr      ufs      1        no
-
/dev/dsk/c0t3d0s7 /dev/rdisk/c0t3d0s7 /var      ufs      1        no
-
/dev/dsk/c0t3d0s4 /dev/rdisk/c0t3d0s4 /cms      ufs      2        yes
-
/dev/dsk/c0t1d0s0 /dev/rdisk/c0t1d0s0 /cms1     ufs      2        yes
-
/dev/dsk/c0t3d0s3 /dev/rdisk/c0t3d0s3 /dump     ufs      2        yes
-
/dev/dsk/c0t3d0s5 /dev/rdisk/c0t3d0s5 /opt      ufs      2        yes
-
/dev/dsk/c0t3d0s1 -            -         swap     -        no        -
```

60. Write and quit the file.
61. Reboot the system by entering:

```
# init 6
```

This system begins the reboot process.

62. When the system comes back up, log in as *root*. The system prompt displays.
63. Unmount the */dump* directory by entering:

```
# umount /dump
#
```

64. Create the */dump/tmp* directory by entering:

```
# mkdir /dump/tmp
#
```

65. Change the mode of the */dump/tmp* directory by entering:

```
# chmod 777 /dump/tmp
#
```

66. Mount the */dump* directory by entering:

```
# mount /dump
#
```

Note

You need to execute the next two steps even though they are identical to steps 64 and 65.

67. Create the */dump/tmp* directory by entering:

```
# mkdir /dump/tmp
#
```

68. Change the mode of the */dump/tmp* directory by entering:

```
# chmod 777 /dump/tmp
#
```

69. Change to the */tmp* directory by entering:

```
# cd /tmp
#
```

70. Move all directories and files under the */tmp* directory to the */dump/tmp* directory by entering:

```
# find . -depth -print | cpio -pdumv /dump/tmp
(list of moved directories and files displays)
#
```

71. Change to the root directory by entering:

```
# cd /
#
```

72. Remove the */tmp* directory by entering:

```
# rm -r /tmp
#
```

73. Link the */tmp* directory to the */dump/tmp* directory by entering:

```
# ln -s /dump/tmp /tmp
#
```

74. Link the */usr/dbtemp* directory to the */dump/tmp* directory by entering:

```
# ln -s /dump/tmp /usr/dbtemp
#
```

75. Create the */var/export* directory by entering:

```
# mkdir /var/export
#
```

76. Change the mode of the */var/export* directory by entering:

```
# chmod 775 /var/export
#
```

77. Create the */var/export/home* directory by entering:

```
# mkdir /var/export/home
#
```

78. Link the */export/home* directory to the */var/export/home* directory by entering:

```
# ln -s /var/export/home /export/home
#
```

79. Create the */var/crash* directory by entering:

```
# mkdir /var/crash
#
```

80. Enter the following command to link the */var/crash/hostname* directory to the */dump* directory where *hostname* is the system name:

```
# ln -s /dump /var/crash/hostname
#
```

81. Check that the directories are linked correctly by entering:

```
# ls -ld /tmp /usr/dbtemp /export/home /var/crash/hostname
```

The links display similar to the following:

```
lrwxrwxrwx 1 root  other   16 Apr 10 14:49 /export/home ->
/var/export/home
lrwxrwxrwx 1 root  other    9 Apr 10 14:47 /tmp -> /dump/tmp
lrwxrwxrwx 1 root  other    9 Apr 10 14:48 /usr/dbtemp -> /dump/tmp
lrwxrwxrwx 1 root  other    5 Apr 10 14:50 /var/crash/tramp -> /dump
#
```

82. Remove the CD-ROM from the drive by entering:

```
# eject cdrom
#
```

83. 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 *Solaris* 2.4 and the disk partitioning is now complete.

Installing the *Solaris 2.4* *AnswerBook* Software

Prerequisites: The *Solaris 2.4* operating system should be installed and you should be logged in as *root* at the console terminal.

Installing the *Solaris 2.4 AnswerBook* software on the *Sun SPARCserver* computer consists of installing only the drivers and programs necessary to start the *AnswerBook* programs.

Therefore, when you use *AnswerBook*, you will need to have the appropriate CD-ROM ("*Solaris 2.4 System AnswerBook*") in the CD-ROM drive.

To install the *Solaris 2.4 AnswerBook* software, do the following steps:

1. Open the CD-ROM drive tray by pressing the eject button on the CD-ROM drive unit.
2. Remove the "*Solaris 2.4 System AnswerBook*" CD-ROM from its case, and 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.
3. Push the CD-ROM drive tray in (towards the system unit) until it closes.
4. Enter the following command to verify the name of the CD-ROM:

```
# mount
```

5. The program responds with a list of devices/filesystems currently mounted. Locate the device which corresponds to the CD-ROM drive:

```
. . .  
. . .  
. . .  
/cdrom/solaris_2_4_ab on /vol/dev/dsk/c0t6/solaris_2_4_ab
```

6. Enter the following command to start the installation of the *AnswerBook* software:

```
# /usr/sbin/pkgadd -d /cdrom/solaris_2_4_ab
```

7. 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  SUNWadm      Solaris 2.4 System Administrator AnswerBook
      (all) 47.2.19
2  SUNWaman     Solaris 2.4 Reference Manual AnswerBook
      (all) 40.2.14
```

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

8. Enter all. The program responds by displaying the *Sun* licensing information:

```
Processing package instance <SUNWadm> from
</cdrom/solaris_2_4_ab>
```

Solaris 2.4 System Administration AnswerBook

```
Copyright 1994 Sun Microsystems, Inc. All Rights Reserved.
Printed in the United States of America.
2550 Garcia Avenue, Mountain View, California, 94043-1100 U.S.A.
```

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licensors, if any.
```

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

The licensing information finishes and the program responds.


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

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Using </opt> as the package base installation directory.

The installation options are as follows:

Option:	Description:
1.nil:	less than 1 Megabyte disk space required (slowest)
2.heavy:	42.78 Megabytes disk space required (best performance)

Enter the number of an installation option from the list above (1 or 2).

Select an installation option:

9. Enter 1 to select the nil option. The program responds:

Installation option: nil selected.

The next request for input asks you to specify the parent directory of AnswerBook

Make sure to choose a parent directory on a file system big enough to accommodate all the files to be moved for the INSTALL OPTION you selected.

Specify the parent directory of the AnswerBook home directory:

10. Enter /opt.

The program responds:

```
## 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,?]

11. Enter y. The program responds by displaying the *Sun* licensing information:

```
Copyright 1994 Sun Microsystems, Inc. All Rights Reserved.  
    Printed in the United States of America.  
2550 Garcia Avenue, Mountain View, California, 94043-1100 U.S.A.
```

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

The licensing information finishes and the program responds:

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

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Using `</opt>` as the package base installation directory.

The installation options are as follows:

Option:	Description:
1.nil:	less than 1 Megabyte disk space required (slowest)
2.heavy:	76.69 Megabytes disk space required (best performance)

Enter the number of an installation option from the list above (1 or 2).

Select an installation option:

12. Enter 1 to select the nil option. The program responds:

Installation option: nil selected.

The next request for input asks you to specify the parent directory of AnswerBook

Make sure to choose a parent directory on a file system big enough to accommodate all the files to be moved for the INSTALL OPTION you selected.

Specify the parent directory of the AnswerBook home directory:

13. Enter `/opt`.

The program responds:

```
## 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,?]
```

14. Enter y. The program responds:

```
Installing Solaris 2.4 AnswerBook as <SUNWaman>

## Installation of part 1 of 1 is complete.
## Executing postinstall script

Installation of <SUNWaman> was successful.
```

The Installation of <SUNWaman> was successful
message appears. The program continues:

```
The following packages are available:
1  SUNWadm      Solaris 2.4 System Administrator AnswerBook
      (all) 47.2.19
2  SUNWaman     Solaris 2.4 Reference Manual AnswerBook
      (all) 40.2.14

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

15. Enter q. The program returns to the system prompt.

16. Enter the following command to remove the CD-ROM from the drive:

```
# eject cdrom
```

17. 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 *Solaris 2.4 System AnswerBook* software is now complete.

Additional References

For additional information, refer to the following documentation:

“Solaris” 2.4 System “AnswerBook” Installation Guide.

Installing the HSI/S (High-Speed Serial Interface/SBus) Software

Prerequisites: The *Solaris* 2.4 operating system should be installed, and you should be logged in as root at the console terminal.

Note

Only install the HSI/S software if an HSI/S card is installed. The HSI/S card must be installed before the HSI/S software is installed.

To install the HSI/S software, do the following steps:

1. Remove the “*SunLink* HSI/S 2.0” CD-ROM from its case. If you have an external CD-ROM drive, follow the steps below. Otherwise, go to step 2.
 - a. Place the CD-ROM in the CD-ROM caddy. When the CD-ROM is properly inserted in the caddy, the CD-ROM label is visible.
 - b. Insert the CD-ROM caddy into the CD-ROM drive slot.
 - c. Go to step 5.
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/filesystems currently mounted. Locate the device which 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/S software:

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

8. 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/S 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]:
```

9. Enter `all`. The program responds by displaying the *Sun* licensing information:

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

HSI/S 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.

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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.


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

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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,?]

10. Enter y.

The program continues:

Installing HSI/S Driver/Utilities 2.0 v1.6 as <SUNWhsis>

```
## Installing part 1 of 1.
/opt/SUNWconn/hsis/drv/HSI
/opt/SUNWconn/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 will appear on the screen similar to the following:

```
hih0: reset
hih0: up and running baud ...
hih1: reset
hih1: up and running baud ...
hih2: reset
hih2: up and running baud ...
hih3: reset
hih3: up and running baud ...
```

NOTE: HSI driver will be loaded when it is referenced

Installation of <SUNWhsis> was successful.

The Installation of <SUNWhsis> was successful message appears.

The program continues:

```
The following packages are available:
```

```
1 SUNWhsis      HSI/S 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]:
```

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

```
# eject cdrom
```

13. If you have an internal CD-ROM drive, 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.

If you have an external CD-ROM drive, remove the CD-ROM caddy from the CD-ROM drive, remove the CD-ROM from the caddy, and place the CD-ROM back in its case.

The installation of the HSI/S software is now complete.

Additional References

For additional information, refer to the following documentation:

“SunLink” HSI/S 2.0 Installation and Administration Guide,
Chapter 3: “Installing the *SunLink* HSI/S 2.0 Software”
Chapter 4: “HSI/S Utilities and *SunDiag* Operation.”

Installing the Network Terminal Server (NTS) Driver

Prerequisites: The *Solaris* 2.4 operating system should be installed, and you should be logged in as root at the console terminal.

To install the NTS software, do the following steps:

1. Remove the “1.0 *Sun* Network Terminal Server” CD-ROM from its case. If you have an external CD-ROM drive, follow the steps below. Otherwise, go to step 2.
 - a. Place the CD-ROM in the CD-ROM caddy. When the CD-ROM is properly inserted in the caddy, the CD-ROM label is visible.
 - b. Insert the CD-ROM caddy into the CD-ROM drive slot.
 - c. Go to step 5.
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 and file systems currently mounted. Locate the device which corresponds to the CD-ROM drive:

```
. . .  
. . .  
. . .  
/cdrom/unnamed_cdrom#1 on /vol/dev/dsk/.....  
#
```

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

```
# /usr/sbin/pkgadd -d /cdrom/unnamed_cdrom#1/Solaris-2.x
```

8. 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  SUNWxyl      1.0 Sun Network Terminal Server
                        (sparc) 1.0
```

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

9. Enter all. The program responds:

```
Processing package instance <SUNWxyl> from
                        </cdrom/unnamed_cdrom#1/Solaris-2.x>
```

```
1.0 Sun Network Terminal Server
(sparc) 1.0
```

```
(C) 1992 Sun Microsystems, Inc.
Printed in the United States of America.
2550 Garcia Avenue, Mountain View, California, 94043-1100 U.S.A.
```

```
(C) 1992 Xylogics, Inc.
Printed in the United States of America.
53 Third Avenue, Burlington, MA, 01803 U.S.A
```

This software is licensed to Sun Microsystems, Inc. (Sun) by Xylogics, Inc.

The selected base directory </opt/SUNWxyl> must exist before installation is attempted.

Do you want this directory created now [y,n,?,q]

10. Enter y.

The program continues:

```
Using </opt/SUNWxyl> as the package base directory.
-----
This package will install a minimum list of binarys for the
Solaris host.
-----
## Processing package information.
## Processing system information.
## 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,?]
```

11. Enter y.

The program responds:

Installing 1.0 SUN Network Terminal Server as <SUNWxyl>

Executing preinstall script.

Installing part 1 of 1.

i.comm: 1.0 Sun Network Terminal Server file install started on
[/opt/SUNWxyl]

infile

[/cdrom/unnamed_cdrom#1/Solaris-2.x/SUNWxyl/reloc/1.0/etc/eserv
ices] outfile [/opt/SUNWxyl/1.0/etc/eservices]

. . .

. . .

. . .

infile

[/cdrom/unnamed_cdrom#1/Solaris-2.x/SUNWxyl/reloc/1.0/etc/init.
d/ntserv] outfile [/opt/SUNWxyl/1.0/etc/init.d/ntserv]

1.0 Sun Network Terminal Software file install finished on
[/opt/SUNWxyl]

[verifying class <comm>]

i.comman: Manpages install started on [/opt/SUNWxyl]

. . .

. . .

. . .

The program continues:

.

.

.

infile

[/cdrom/unnamed_cdrom#1/Solaris-2.x/SUNWxyl/reloc/1.0/src/src/t
imserver/timserver.c] outfile

[/opt/SUNWxyl/1.0/src/src/timserver/timserver.c]

i.commsrc: Src kit install finished on [/opt/SUNWxyl]

[verifying class <commsrc>]

Executing postinstall script.

Installation of <SUNWxyl> was successful.

The Installation of <SUNWxyl> was successful message appears.

The program continues:

```
The following packages are available:
```

```
1 SUNWxyl      1.0 Sun Network Terminal Server
                (sparc) 1.0
```

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

12. Enter q. The program returns to the system prompt.
13. Enter the following command to remove the CD-ROM from the drive:

```
# eject cdrom
```

14. If you have an internal CD-ROM drive; 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.

If you have an external CD-ROM drive; remove the CD-ROM caddy from the CD-ROM drive, remove the CD-ROM from the caddy, and place the CD-ROM back in its case.

The installation of the NTS software is now complete.

Additional References For additional information, refer to the following documentation:

Network Terminal Server Guide, Quick Installation Guide for the "Sun" Network Terminal Server Leaflet (Software Installation Notes section).

Installing the SunLink X.25 Driver

Prerequisites: The *Solaris* 2.4 operating system should be installed, you should be logged in as root at the console terminal, and you need to have the *hostname* and *hostid* for the system.

Retrieving System Information

To properly install the X.25 license, you will need to know the *hostname* and *hostid* of the system.

1. To determine the *hostname* and *hostid* of the system, enter the following command:

```
# showrev
```

The program displays something similar to the following:

```
Hostname: XXXXXXXX
Hostid: XXXXXXXX
Release: 5.4
Kernel architecture: sun4m
Application architecture: sparc
Hardware provider: Sun_Microsystems
Domain:
Kernel version: SunOS 5.4 Generic <Date>
```

2. Identify the *hostname* and *hostid* (similar to that shown in bold on the previous screen). Use Table D-30 to record this information.

Table D-30: System Information for X.25 License

Description	Information
System hostname	
System hostid	

Installing the *SunLink X.25* Software

To install the *SunLink X.25* software, do the following steps:

1. Remove the “*SunLink X.25 8.02*” CD-ROM from its case. If you have an external CD-ROM drive, follow the steps below. Otherwise, go to step 2.
 - a. Place the CD-ROM in the CD-ROM caddy. When the CD-ROM is properly inserted in the caddy, the CD-ROM label is visible.
 - b. Insert the CD-ROM caddy into the CD-ROM drive slot.
 - c. Go to step 5.
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/filesystems currently mounted. Locate the device which corresponds to the CD-ROM drive:

```
. . .
. . .
. . .
/cdrom/x25_8_0_2 on /vol/dev/dsk.....
#
```

7. Enter the following command to start the installation of the X.25 software:

```
# /usr/sbin/pkgadd -d /cdrom/x25_8_0_2/sparc
```

8. 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	SUNWabx25	SunLink X.25 8.0.2 AnswerBook (all) 20.1.6
2	SUNWlicsw	FlexLM License System (sparc) 2.0
3	SUNWlit	STE License Installation Tool (sparc) 2.0
4	SUNWllc2a	LLC2 kernel modules and include files for Solaris/SPARC (sparc) 1.20
5	SUNW11c2b	LLC2 user programs and man pages for Solaris/SPARC (sparc) 1.20
6	SUNWx25a	X.25 kernel modules and include files for Solaris/SPARC (sparc) 1.20
7	SUNWx25b	X.25 user programs and libraries for Solaris/SPARC (sparc) 1.20

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

9. Enter all. The program responds:

Processing package instance <SUNWabx25> from
</cdrom/x25_8_0_2/sparc>

SunLink X.25 8.0.2 AnswerBook
(all) 20.1.6

Copyright 1994 Sun Microsystems, Inc. All Rights Reserved.
Printed in the United States of America.
2550 Garcia Avenue, Mountain View, California, 94043-1100 U.S.A.

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. . .
. . .
. . .

The licensing information finishes and the program responds:

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

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 installation directory.

The installation options are as follows:

Option:	Description:

1.nil:	less than 1 Megabyte disk space required (slowest performance)

2.heavy:	8.41 Megabytes disk space required (best performance)

Enter the number of an installation option from the list above (1 or 2).

Select an installation option:

10. Enter 2 to select the heavy option. The program responds:

Installation option: heavy selected.

The next request for input asks you to specify the parent directory of AnswerBook

Make sure to choose a parent directory on a file system big enough to accommodate all the files to be moved for the INSTALL OPTION you selected.

Specify the parent directory of the AnswerBook home directory:

11. Enter `/opt`.

The program responds:

For the heavy option all files will be placed under
/opt/SUNWax25x.

```
## 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,?]

12. Enter y. The program responds:

Installing SunLink X.25 AnswerBook as <SUNWax25x>

```
## Installing part 1 of 1.
/opt/SUNWabx25/index
/opt/SUNWabx25/index/Keys
```

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

13. The program lists the files being downloaded, prints an Installation of <SUNWxxxx> was successful message, and continues with the licensing agreement for the next package to be installed.

The program continues:

```
. . .  
. . .  
. . .  
. . .  
## 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,?]
```

14. Enter y. The program responds:

```
Installing FlexLM License System as <SUNWlicsw>  
  
## Installing part 1 of 1.  
/etc/opt/licenses/....  
/etc/opt/licenses/....  
  
. . .  
. . .  
. . .
```

15. The program lists the files being downloaded, prints an
Installation of <SUNWxxxx> was successful message,
and continues with the licensing agreement for the next package to
install.

The program continues:

```
. . .  
. . .  
. . .  
. . .  
## 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,?]
```

16. Enter y. The program responds:

```
Installing STE License Installation Tool as <SUNWlit>  
  
. . .  
. . .  
## Installing part 1 of 1.  
/opt/SUNWste/....  
/opt/SUNWste/....  
  
. . .  
. . .  
. . .
```

17. The program lists the files being downloaded, prints an
Installation of <SUNWxxxx> was successful message,
and continues with the licensing agreement for the next package to
install.

The program continues:

```
. . .  
. . .  
. . .  
## 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,?]
```

18. Enter y. The program responds:

```
Installing LLC2 kernel modules and include files for  
Solaris/SPARC as <SUNWllc2a>  
  
## Installing part 1 of 1.  
/usr/include/netdlc....  
/usr/include/netdlc....  
  
. . .  
. . .  
. . .
```

19. The program lists the files being downloaded, prints an
Installation of <SUNWxxxx> was successful message,
and continues with the licensing agreement for the next package to
install.

The program continues:


```

. . .
. . .
. . .
## Verifying package dependencies.
## Verifying disk space requirements.
## Checking for conflicts with packages already installed.
## Checking for setuid/setgid programs.

The following files are already installed on the system and are
being used by another package:
    /opt/SUNWconn/man/man7 <attribute change only>

Do you want to install the conflicting files [y,n,?,q]
```

20. Enter y. The program responds:

```

## Checking for setuid/setgid programs.

Installing LLC2 user programs and man pages for Solaris/SPARC as
<SUNWllc2b>

## Installing part 1 of 1.
/opt/SUNWconn/llc2/....
/opt/SUNWconn/llc2/....
. . .
. . .
. . .
```

21. The program lists the files being downloaded, prints an Installation of <SUNWxxxx> was successful message, and continues with the licensing agreement for the next package to install.

The program continues:

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

## 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,?]
```

22. Enter y. The program responds:

```
Installing X.25 kernel modules and include files for
Solaris/SPARC as <SUNWx25a>

## Installing part 1 of 1.
/etc/SUNWconn/x25/....
/etc/SUNWconn/x25/....

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

23. The program lists the files being downloaded, prints an
Installation of <SUNWxxxx> was successful message,
and continues with the licensing agreement for the next package to
install.

The program continues:

```

. . .
. . .
. . .
## 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,?]

```

24. Enter y. The program responds:

```

Installing X.25 user programs and libraries for Solaris/SPARC as
<SUNWx25b>

/opt/SUNWconn/bin/....
/opt/SUNWconn/bin/....
. . .
. . .
. . .

```

25. The program lists the files being downloaded and prints an
Installation of <SUNWxxxx> was successful message
similar to the following:

```

. . .
. . .
. . .
## Executing postinstall script.
Make sure to run the license insertion tool or the license
configuration script on this machine.

Installation of <SUNWx25b> was successful.

```

The program continues:

The following packages are available:

1	SUNWabx25	SunLink X.25 8.0.2 AnswerBook (all) 20.1.6
2	SUNWlicsw	FlexLM License System (sparc) 2.0
3	SUNWlit	STE License Installation Tool (sparc) 2.0
4	SUNWllc2a	LLC2 kernel modules and include files for Solaris/SPARC (sparc) 1.20
5	SUNW11c2b	LLC2 user programs and man pages for Solaris/SPARC (sparc) 1.20 for
6	SUNWx25a	X.25 kernel modules and include files for Solaris/SPARC (sparc) 1.20
7	SUNWx25b	X.25 user programs and libraries for Solaris/SPARC (sparc) 1.20

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

26. Enter q. The programs returns to the system prompt.
27. Enter the following command to remove the CD-ROM from the
drive:

```
# eject cdrom
```

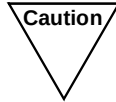
28. If you have an internal CD-ROM drive; remove the CD-ROM from
the disk tray, place the CD-ROM back in its case, and push the
CD-ROM tray in until it closes.

If you have an external CD-ROM drive; remove the CD-ROM caddy
from the CD-ROM drive, remove the CD-ROM from the caddy, and
place the CD-ROM back in its case.

The installation of the *SunLink* X.25 software is now complete.

Installing the *SunLink* X.25 License

Prerequisites: The *Solaris* 2.4 operating system should be installed, you should be logged in as root at the console terminal, and you must have the hostname and hostid (recorded during the booting of the system).



Do **not** change the host name of your computer after installing the *SunLink* X.25 license. Changing the system's host name disables the X.25 software license.

To install the *SunLink* X.25 license, do the following steps:

1. Enter the following command to start the license package:

```
# /etc/opt/licenses/lit_tty
```

The program displays the following screen:

```
SunLink X.25 8.0.2 for Solaris 2 SPARC
8.0.2

Servers: [ ]1 [ ]3 [ ]5 **x=select. Tab=next count.
                                         Return=server name**

SERVER NAME                                HOSTID
1:

Phone Number List [ ]   USA (+1) 800-USA-4786
Demo Exp Date:          Data Checksum: 65
Rights to Use:          Password Checksum: 77
Password:

Done Setting Up This License [ ]   Cancel This License[ ]
Exit - Save Licenses [ ]   Exit - Don't Save Licenses [ ]

** x=select/deselect item. Return=next field **
```

2. Type an x within the brackets for the Servers: [] 1 field. This represents the number of servers that this license supports. Press **Return**.
3. Enter the SERVER NAME (hostname) of the server (see Table D-30

on page -159), and press **Return**.

4. Enter the HOSTID of the server (see Table D-30), and press **Return**.

Note The hostname and hostid should have been recorded earlier when the showrev command was executed (see Table D-30 on page -159).

5. Position the cursor (by using the **Enter** key) on the Rights to Use: field and type a 1. Press **Return**.
6. Position the cursor on the Password: field, and enter the password from your license information. Press **Return**.
7. Type an x within the brackets for the [] Done Setting Up This License field. The program responds with a pop-up screen similar to the following:

```
License information successfully entered for
SunLink X.25 8.0.2 for Solaris 2 8.0.2
Type Any Key to Continue...
```

8. Press **Return**. The cursor should be on the [] Exit - Save Licenses field. Type an x in that field.

The program responds:

```
Licenses are being installed.
Please wait...
```

9. The program continues:

```
License Successfully Installed for:
SunLink X.25 8.0.2 for Solaris 2 8.0.2
Now Execute the Script /etc/opt/licenses/lit_tty script
on the product server.
```

Disregard the Now Execute the Script statement on the previous screen. This has already been done.

The licensing of the *SunLink* X.25 software is now complete.

Installing the *SunLink* X.25 Software Patch

To complete the installation of the *SunLink* X.25 software, you need to install a software patch.

To install the *SunLink* X.25 software patch, do the following:

1. Execute the following commands to patch the *SunLink* X.25 software:

```
# installf SUNWx25a /etc/ttysrch  
# installf -f SUNWx25a
```

Installing the INFORMIX Software

Prerequisites: The *Solaris* 2.4 operating system should be installed, you should be logged in as *root* at the console terminal, and you must have the INFORMIX Serial Number and Serial Number Key (located on the license agreement).

Installing the INFORMIX software consists of the following tasks:

- Set the Environment
- Install the INFORMIX-SQL 4.13 package (optional)
- Install the INFORMIX SE (Standard Engine) 5.04 package.

Note

You may have received an INFORMIX-ESQL software package. This package is not used and does not need to be installed.

Setting Up the INFORMIX Environment

Do these steps to set up the environment:

1. Enter the following commands:

```
# TERM=sun-cmd
# export TERM
```

2. Add a new group (for example, *informix*) to the system by entering the following command:

```
# groupadd -g 100 informix
#
```

3. Add a new user (***informix***) to the system by entering the following command:

```
# useradd -g informix -m -d /opt/informix informix
```

4. Set the environment variables by entering:


```
# INFORMIXDIR=/opt/informix
# export INFORMIXDIR
# PATH=$PATH:$INFORMIXDIR/bin
# export PATH
```

5. Change to the *informix* directory by entering:

```
# cd $INFORMIXDIR
```

6. Make sure you are in the */opt/informix* directory by entering:

```
# pwd
# /opt/informix
```

The INFORMIX installation environment is now set up.

Additional References

For additional information, refer to the following documentation:

INFORMIX UNIX Products Installation Guide Version 4.13

INFORMIX UNIX Products Installation Guide Version 5.04.

Installing the INFORMIX-SQL Package

After you have set the environment, you install the INFORMIX-SQL package. The INFORMIX-SQL software package should consist of one tape.

Note

This software package is optional and is needed only if you are using custom reports. If you do not need this package, skip this section and install the INFORMIX-SE software package.

To install the INFORMIX-SQL software, do the following:

1. Insert the "INFORMIX-SQL 4.13.UD1" tape into the tape drive.
2. Enter the following command to copy the INFORMIX-SQL files from the tape to the current directory:

```
# tar xvf /dev/rmt/0
```

The program responds:

```
x installsql, XXX bytes, XX tape blocks
x bin/isql, XXX bytes, XX tape blocks
. . . . .
. . . . .
. . . . .
x demo/sql2/stock.unl, XXX bytes, XX tape blocks
#
```

3. Enter the following command to start the installation of the INFORMIX-SQL software package:

```
# ./installsql
```

The program responds with the following screen:

INFORMIX-SQL Version 4.13.UD1
Copyright (C) 1984-1994 Informix Software, Inc.

Installation Script

This installation procedure must be run by root (super-user). It will change the owner, group, and mode of all files of this package in this directory. There must be a user "informix" and a group "informix" known to the system.

Press RETURN to continue,
or the interrupt key (usually CTRL-C or DEL) to abort.

4. Press the **Return** key to continue with the installation procedure.
After a few minutes, your terminal displays the following message:

Enter your serial number (e.g., INF#R9999999) >

5. Enter the 11-character serial number located on the INFORMIX-SQL customer license. This number may also be located on the back of your tape. The program responds:

Enter your serial number KEY (uppercase letters only) >

6. Enter the 6-character serial number key located on your customer registration form. The program responds:

```
WARNING: This INFORMIX SOFTWARE, INC. SOFTWARE is licensed
for use by XX SIMULTANEOUS USER(S) on this computer system.
In the event you exceed XX simultaneous user(s), the End User
License Agreement, and the licenses granted to you thereunder
are subject to immediate termination by Informix.
```

```
Press RETURN to continue,
or the interrupt key (usually CTRL-C or DEL) to abort.
```

7. Press the **Return** key to continue with the installation procedure. The program responds:

```
Installing directory ...
```

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

```
Installation complete.
```

```
#
```

8. Remove the "INFORMIX-SQL 4.13.UD1" tape from the tape drive.
The INFORMIX-SQL software is now installed.

Additional References For additional information, refer to the following documentation:

INFORMIX UNIX Products Installation Guide Version 4.13.

Installing the INFORMIX-SE Package

After you have installed the INFORMIX-SQL package (optional), you install the INFORMIX-SE package. The INFORMIX-SE software package is on the CMS CD-ROM.

To install the INFORMIX-SE software, do the following:

1. Remove the "CMS" CD-ROM from its case. If you have an external CD-ROM drive, follow the steps below. Otherwise, go to step 2.
 - a. Place the "CMS" CD-ROM in the CD-ROM caddy. When the CD-ROM is properly inserted in the caddy, the CD-ROM label is visible.
 - b. Insert the CD-ROM caddy into the CD-ROM drive slot.
 - c. Go to step 5.
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 copy the INFORMIX-SE files from the CD-ROM to the current directory:

```
# tar xvf /cdrom/cms/INFORMIX-SE.tar
```

The program responds:

```
x installse, XXX bytes, XX tape blocks
x bin/bcheck, XXX bytes, XX tape blocks
. . . . .
. . . . .
. . . . .
x demo/dbaccess/upd_table.sql, XXX bytes, XX tape blocks
#
```

6. Enter the following command to start the installation of the INFORMIX-SE software package:

```
# ./installse
```

The program responds with the following screen:

```
INFORMIX-SE Version 5.04.UD2
Copyright (C) 1984-1994 Informix Software, Inc.

Installation Script

This installation procedure must be run by root (super-user).
It will change the owner, group, and mode of all files of this
package in this directory. There must be a user "informix" and
a group "informix" known to the system.

Press RETURN to continue,
or the interrupt key (usually CTRL-C or DEL) to abort.
```

7. Press the **Return** key to continue with the installation procedure.

After a few minutes, your terminal displays the following message:

```
Enter your serial number (for example, INF#R999999) >
```

8. Enter the 11-character serial number located on the INFORMIX-SE customer license. This number may also be located on the back of your CMS CD-ROM. The program responds:

```
Enter your serial number KEY (uppercase letters only) >
```

9. Enter the 6-character serial number key located on your customer registration form. This number may also be located on the back of your CMS CD-ROM. The program responds:

```
WARNING: This Software, and its authorized use and number of
users, are subject to the applicable license agreement with
INFORMIX Software, Inc. If the number of users exceeds the
licensed number, the excess users may be prevented from using
the software. UNAUTHORIZED USE OR COPYING MAY SUBJECT YOU AND
YOUR COMPANY TO SEVERE CIVIL AND CRIMINAL LIABILITIES.
```

```
Press RETURN to continue,
or the interrupt key (usually CTRL-C or DEL) to abort.
```

10. Press the **Return** key to continue with the installation procedure. The program responds:

```
Installing directory ...
. . . . .
. . . . .
. . . . .

Installation of INFORMIX-SE complete.
#
```

11. Eject the CD-ROM by entering the following command:

```
# eject cdrom
```

12. If you have an internal CD-ROM drive, 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.

If you have an external CD-ROM drive, remove the CD-ROM caddy from the CD-ROM drive, remove the CD-ROM from the caddy, and place the CD-ROM back in its case.

The INFORMIX-SE software is now installed.

Additional References

For additional information, refer to the following documentation:

INFORMIX UNIX Products Installation Guide Version 5.04.

Installing the *Sun Solaris* Patches

Prerequisites: The *Solaris* 2.4 operating system should be installed, you should be logged in as *root* at the console terminal, and you should have the “CMS” CD-ROM.

To install the *Sun Solaris* patches, do the following:

1. Remove the “CMS” CD-ROM from its case. If you have an external CD-ROM drive, follow the steps below. Otherwise, go to step 2.
 - a. Place the “CMS” CD-ROM in the CD-ROM caddy. When the CD-ROM is properly inserted in the caddy, the CD-ROM label is visible.
 - b. Insert the CD-ROM caddy into the CD-ROM drive slot.
 - c. Go to step 5.
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. Start the installation of the *Solaris* patches by entering:

```
# pkgadd -d /cdrom/cms
```

The program responds:

The following packages are available:

1) CMS	Call Management System
	(sparc) 3xxxx
2) Spatches	CMS Supplied Solaris Patches
	(sparc) 1.0

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

6. Enter 2 to start the installation of *Solaris* patches. The program responds:

```
Processing package instance <spatches> from </cdrom/cms>
```

```
CMS Supplied Solaris Patches  
(sparc) 1.0
```

After a short period of time, the program continues:

```
AT&T
```

```
## Processing package information.  
## Processing system information.  
## 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,?]
```

7. Enter y to continue. The program responds:

```
Installing CMS Supplied Solaris Patches as <spatches>
```

```
## Installing part 1 of 1.  
Spooling XXXXXX-XX  
Spooling XXXXXX-XX  
Spooling XXXXXX-XX
```

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

The program continues:

```
. . . . .
. . . . .
Spooling XXXXXX-XX
Spooling XXXXXX-XX
Patches successfully saved

[ verifying class <SUN_fix> ]
## Executing postinstall script.

Solaris patches have been spooled into /tmp/patches.
To install the Solaris patches, run the following command:
    /tmp/patches/install_patches

Installation of <spatches> was successful.

The following packages are available:
  1) CMS          Call Management System
                        (sparc) 3xxxx
  2) Spatches     CMS Supplied Solaris Patches
                        (sparc) 1.0
Select package(s) you wish to process (or 'all' to process all
packages). (default :all) [?, ??, q]:
```

8. Enter q.

The program returns to the system prompt.

9. Enter the following command to continue installing the patches:

```
# /tmp/patches/install_patches
```

The program responds:

```
@(#) installpatch X.X XX/XX/XX
```

```
Generating list of files to be patched
/var/sadm/patch/xxxxxx-xx/...
/var/sadm/patch/xxxxxx-xx/...
/var/sadm/patch/xxxxxx-xx/...
101 blocks
Installing patch packages
. . . . .
. . . . .
```

The program generates various lists of files to be patched. This could take approximately 30-45 minutes to process.

The program continues:

```
. . . . .
. . . . .
@(#) installpatch 3.7 93/08/11
generating list of files to be patched
/var/sadm/patch/xxxxxx-xx/...
/var/sadm/patch/xxxxxx-xx/...
/var/sadm/patch/xxxxxx-xx/...
43 blocks
Installing patch packages
Doing pkgadd of SUNWxxx package:

Installation of <SUNWxxx.x> was successful.
Patch installation finished
To complete the solaris patch installation, one should reboot
with the following command: shutdown -y -i6 -g0
#
```

The program returns to the system prompt.

10. Execute the following commands to start the shutdown:

```
# cd
# shutdown -y -i6 -g0
```

11. The program starts the shutdown process:

```
Shutdown started. <date and time>  
<Broadcast Message>  
.  
.  
.  
.  
.  
.
```

12. Enter:

```
# eject cdrom
```

13. Remove the CMS CD-ROM from the CD-ROM drive.

14. Log in as *root* and enter the appropriate password.

The *Sun Solaris* patches have been successfully installed and the system kernel rebuilt. You can now install the CMS software.

Installing the CMS Software

Prerequisites: The *Solaris* 2.4 operating system should be installed, you should be logged in as *root* at the console terminal, and you should have the CMS CD-ROM.

This section describes how to download the R3V2 CMS software. To install the R3V2 CMS software, you download the CMS software from the CD-ROM to the hard disk.

Note All the preceding factory hardware and software installation requirements in this appendix must be completed before you begin the CMS download.

Do the following steps to download the CMS software:

1. Remove the “CMS” CD-ROM from its case. If you have an external CD-ROM drive, follow the steps below. Otherwise, go to step 2.
 - a. Place the “CMS” CD-ROM in the CD-ROM caddy. When the CD-ROM is properly inserted in the caddy, the CD-ROM label is visible.
 - b. Insert the CD-ROM caddy into the CD-ROM drive slot.
 - c. Go to step 5.
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 determine which state the computer is in:

```
# who -r
```

You should see a message similar to the following:

```
.      run-level 3 <date and time> 3    0 S
```

6. If the computer is **not** in run-level 3, enter this command:

```
# shutdown -g0 -y -i6
```

7. Start the installation of the R3V2 CMS software by entering:

```
# pkgadd -d /cdrom/cms
```

The program responds:

```
The following packages are available:
 1) CMS          Call Management System
                   (sparc) 3xxxx
 2) Spatches     CMS Supplied Solaris Patches
                   (sparc) 1.0
Select package(s) you wish to process (or 'all' to process all
packages). (default :all) [?, ??, q]:
```

8. Enter 1 to start the installation of the CMS software. The program responds:

```
Processing package instance <cms> from </cdrom/cmsr>

Call Management System
(sparc) XXXXX
```

The system takes a few minutes to search the CD, and verify the software packages being installed.

The program continues:

```
AT&T
Using </cms> as the package base directory

This is a new install

## Processing package information.
## Processing system information.
  xx package pathnames are already properly installed.
## Verifying package dependencies.
## Verifying disk space requirements.
## Checking for conflicts with packages already installed.

The following files are already installed on the system and
are being used by another package:
    /etc/init.d/sysetup

Do you want to install these conflicting files [y,n,?,q]
```

9. Enter y.

The program responds:

```
## Checking for setuid/setgid programs.

The following files are being installed with setuid and/or
setgid permissions or are overwriting files which are
currently setuid/setgid:
/cms/bin/mqpeek <setuid root>
/cms/bin/spi <setuid root>
/cms/toolsbin/cmsu <setuid root>
/cms/toolsbin/initSimConf <setuid root>
/cms/toolsbin/initSimConf <setuid root>
/cms/toolsbin/psx <setuid root>
/cms/toolsbin/psx <setuid root>
/cms/toolsbin/setSimLink <setuid root>
/cms/toolsbin/setSimLink <setuid root>
/cms/toolsbin/shmdump <setuid root>

Do you want to install these setuid/setgid files [y,n,?,q]
```

10. Enter y.

The program continues:

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,?]

11. Enter y. The program starts the preinstall script:

Installing Call Management System as <cms>

```
## Executing preinstall script.
Creating cms group id
Creating cms user id
Assigning a new password for cms.
New password:
```

12. Enter the password for the *cms* login. The program continues:

Re-enter new password

13. Reenter the password for *cms*. The program continues:

```
Creating cmssvc user id
Assigning a new password for cmssvc.
New password:
```

14. Enter the password for the *cmssvc* login. The program continues:

Re-enter new password

15. Reenter the password for *cmssvc*.

The program continues:

```
## Installing part 1 of 1.

/usr/elog <symbolic link>
[ verifying class <data> ]
[ verifying class <op_fix> ]
/cms/bin/Archiver
/cms/bin/Ed
. . . . .
. . . . .
. . . . .
```

The program takes approximately 5-10 minutes to download the R3V2 CMS software from CD-ROM to hard disk. A list of files is displayed as the software is downloaded.

When the download finishes, this message appears:

```
## Initializing Customer CMS data . . .
. . . . .
. . . . .
Customer CMS data successfully initialized.

Setting UNIX system tunable parameters for CMS.

Installation of <cms> was successful.

The following packages are available:
  1) CMS          Call Management System
                     (sparc) 3xxxx
  2) Spatches     CMS Supplied Solaris Patches
                     (sparc) 1.0
Select package(s) you wish to process (or 'all' to process all
packages). (default :all) [?, ??, q]:
```

16. Enter q.

The program returns to the prompt:

```
#
```

17. Remove the CMS CD-ROM by entering the following command.

```
# eject cdrom
```

Remove the CMS CD-ROM from the CD-ROM drive.

18. Execute the following command to start the shutdown:

```
# shutdown -y -i6 -g0
```

19. The program starts the shutdown process:

```
Shutdown started. <date and time>
<Broadcast Message>
. . . . .
. . . . .
. . . . .
```

Setting Authorizations

AT&T Production Associates set authorizations for the CMS features purchased by the customer. See the "Setting Authorizations" section in Chapter 6, "Setting Up and Installing Feature Packages."

Setting Up the Remote Console

This section describes how to set up the remote console which will allow the TSC to dial in and do remote maintenance. To set up the remote console, do the following:

- Set the remote console modem options.
- Connect the remote console modem to the A-port on the *Sun SPARCserver* computer.
- Administer the serial A-port on the *Sun SPARCserver* computer.
- Test/redirect the serial A-port on the *Sun SPARCserver* computer.

Setting the Remote Console Modem Options

This section describes how to set the remote console modem options.

Before you connect the remote console modem to the computer, you need to set the modem options. The *Sun SPARCserver* computer supports the following modems:

- AT&T Paradyne DataPort Express (Model 3715)
- AT&T Paradyne Comsphere 3830.

To set the modem options, see the appropriate section that follows.

AT&T Paradyne DataPort Express (Model 3715)

Do these steps to set the options for the AT&T Paradyne DataPort Express (Model 3715) modem:

1. Connect a dumb terminal to the 25-pin connector located at the back of the modem. For information on connecting the terminal to the modem, refer to the user documentation that came with the modem.

Note

The terminal speed must be set to 9600 baud before connecting the modem to the terminal.

2. Make the necessary power connections to the modem and the terminal.
3. Turn the modem and terminal *On*.
4. At the terminal, enter the following soft options (use only zeros and numerical ones in the commands):

```
AT&F      (factory default settings)
AT%B9600  (Modulation/Data Rate is set to
V.32bis/V.32-max.rate 9600bps)
AT&T5     (denies request for Remote Digital Loopback test)
AT&C2     (LSD Control forced on, but turns off momentarily when
disconnectd.)
AT&D2     (follows standard RS-232 operation)DEFAULT
ATE0Q1&W0 (disable echo, disable result codes, save to
profile 0)
```

If needed, reset the modem using the power switch on the back.

Note

It is not necessary to enter the AT&D2 option since it is the default. However, the AT&D3 option which was used for AT&T Modem 3710 should **not** be used for this modem.

**AT&T Paradyne
Comsphere 3830**

Do these steps to set the options for the AT&T Paradyne Comsphere 3830 modem:

1. Connect a dumb terminal to the 25-pin connector located at the back of the modem. For information on connecting the terminal to the modem, refer to the user documentation that came with the modem.

Note

The terminal speed must be set to 9600 baud before connecting the modem to the terminal.

2. Make the necessary power connections to the modem and the terminal.
3. Turn on the modem and terminal.
4. At the terminal, enter the following soft options (use only zeros and numerical ones in the commands):

```
AT&F3      (factory default settings)
ATS41=3    (9600 baud handshake)
AT&C1&D1&R0&S1\D1 (set up standard RS-232 handshaking)
AT&W0      (save to active profile)
```

If you are using a modem with 9600 baud speed, use ATS41=3 (<9600> baud handshake) instead of ATS41=6 (<2400> baud handshake).

If needed, reset the modem using the power switch on the back.

Connecting the Remote Console to the Sun SPARCserver Computer

This section describes how to connect the remote console modem to the *Sun SPARCserver* computers (see Figure D-54).

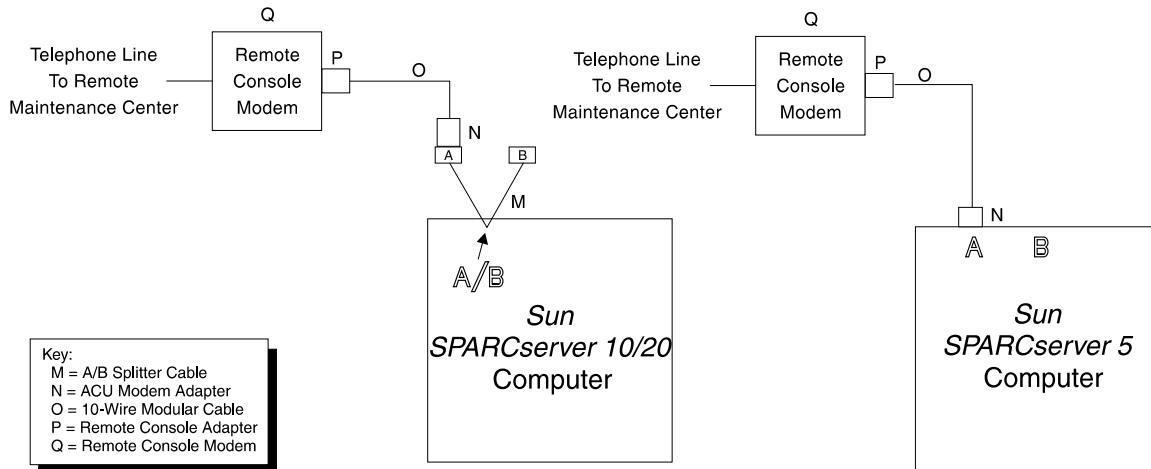


Figure D-54: Remote Console Connectivity to the Sun SPARCserver Computers

To connect to the remote console modem, do the following:

Note

If you have a *Sun SPARCserver* 10 or 20, use steps 1-6. For *Sun SPARCserver* 5, use steps 2-6.

1. Connect the male end of the serial interface (A/B splitter) cable to the serial connector on the back panel of the *Sun SPARCserver* CPU.
2. Connect the ACU Modem adapter to the “A” serial port interface.
3. Connect one end of a 10-conductor cable to the ACU/Modem adapter installed in the previous step.
4. Connect the other end of the 10-conductor cable to the remote console adapter.
5. Connect the remote console adapter to the RS-232C port on the modem.
6. Connect the telephone line to the jack labeled “LINE” on the modem.

Setting EEPROM Parameters — A&B Port

This section describes how to set the firmware eeprom values for the A and B ports on the *Sun SPARCserver* computer.

Enter the following commands to set the eeprom values for A port:

```
# eeprom ttya-rts-dtr-off=true
# eeprom ttya-ignore-cd=false
# eeprom ttya-mode=9600,8,n,l,-
```

Note

This sets the A port to 9600 baud.

Enter the following commands to set the eeprom values for B port:

```
# eeprom ttyb-rts-dtr-off=true
# eeprom ttyb-ignore-cd=false
# eeprom ttyb-mode=9600,8,n,l,-
```

Note

This sets the B port to 9600 baud.

You must reboot the system to activate these commands. Execute the following command to reboot:

```
# init 6
```

Administering the Remote Console Port on the *Sun SPARCserver* Computer

This section describes how to administer the A port (remote console port) on the *Sun SPARCserver* computer.

To administer the A port on the back of the *Sun SPARCserver* computer, do the following:

1. Enter the following command to remove the current A port administration:

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

The program responds:

```
ttya is currently set to incoming
Are you sure you want to remove it? [y,n,?]
```

2. Enter y.
3. Enter the following command to remove the current B port administration:

```
# /cms/install/bin/abcmadm -r ttyb
```

The program responds:

```
ttyb is currently set to incoming
Are you sure you want to remove it? [y,n,?]
```

4. Enter y.
5. Enter the following commands to administer the A port, and set the baud rate to 2400 or 9600 baud:

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

The program responds:

```
ttya set to incoming/console port <baud_rate> baud
#
```

The remote console port has been administered.

Testing the Remote Console Port

This section describes how to test the A port (remote console port) on the *Sun SPARCserver* computer.

Test the A port on the back of the *Sun SPARCserver* computer by redirecting the console to the remote terminal and then redirecting the console back to the *Sun* monitor. To redirect the console, do the following:

1. Dial in (from the remote terminal) to the remote console modem (that is, access the A port on the computer), and log in as *root*.
2. Remove the port monitor by entering the following command:

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

The program responds:

```
ttya is currently set to incoming
Are you sure you want to remove it? [y,n,?]
```

3. Enter y. The program responds:

```
ttya administration removed
```

4. Redirect the console to the A port (remote console) by entering the following commands:

```
# /cms/install/bin/abcmadm -c -b <baud_rate> ttya
```

The program responds:

This change requires a reboot to take affect

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

5. Enter y.

The system will automatically reboot, and the A port will come up as the console.

As the system reboots, the shutting down messages will appear on the *Sun* monitor. When the system starts to come back up, the *Sun* monitor should go blank, and the system boot diagnostics should appear on the remote console terminal. After the system reboots, a login prompt should appear on the remote console terminal.

6. Log in to the remote console as *root*.

Note

At this time, an *OpenWindows* login window will appear on the *Sun* monitor.

7. Redirect the console back to the local console by entering the following command:

```
# /cms/install/bin/abccadm -c local
```

The program responds:

Console set to local

This change requires a reboot to take affect

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

8. Enter y. The system will automatically reboot and the A port will come up as a regular dial-in port with the login: prompt displayed.

As the system reboots, the shutting-down 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* monitor. After the system reboots, a login prompt should appear on the *Sun* monitor.

9. Log in to the local console (*Sun* system) as *root*.

The console has been redirected to the remote terminal and redirected back to the system console.

Administering the Network Terminal Servers

Each Network Terminal Server (NTS) needs to be administered so it will be recognized on the network. The following networking items need to be administered on the NTS:

- Internet address
- Subnet mask
- Preferred load host internet address
- Broadcast address
- Type of IP packet encapsulation.

Note

The administration process needs to be completed on each NTS being installed.

If you administer more than one NTS for this system, the IP addresses must be unique (see Table D-31).

To administer the NTS network parameters, do the following:

1. Make sure you have the following information for each NTS you are administering:
 - *Sun SPARCserver* Computer IP address (see Table D-31)
 - NTS IP address for each NTS (see Table D-31).

Table D-31: CMS Standard Network IP Addresses

Device	Network Name	IP Address
<i>SPARCserver</i> Computer	<i>hostname</i>	129.200.9.1
First NTS	cmsterm1	129.200.9.11
Second NTS	cmsterm2	129.200.9.12
Third NTS	cmsterm3	129.200.9.13
Fourth NTS	cmsterm4	129.200.9.14
Fifth NTS	cmsterm5	129.200.9.15
Sixth NTS	cmsterm6	129.200.9.16
Seventh NTS	cmsterm7	129.200.9.17

2. Edit the */etc/hosts* file by entering:

```
# vi /etc/hosts
```

3. Add the address for the NTS (in the */etc/hosts* file) that correspond to the new addresses in Table D-31.
4. Write and quit the file.
5. Connect the power cord to the NTS (see Figure D-55).

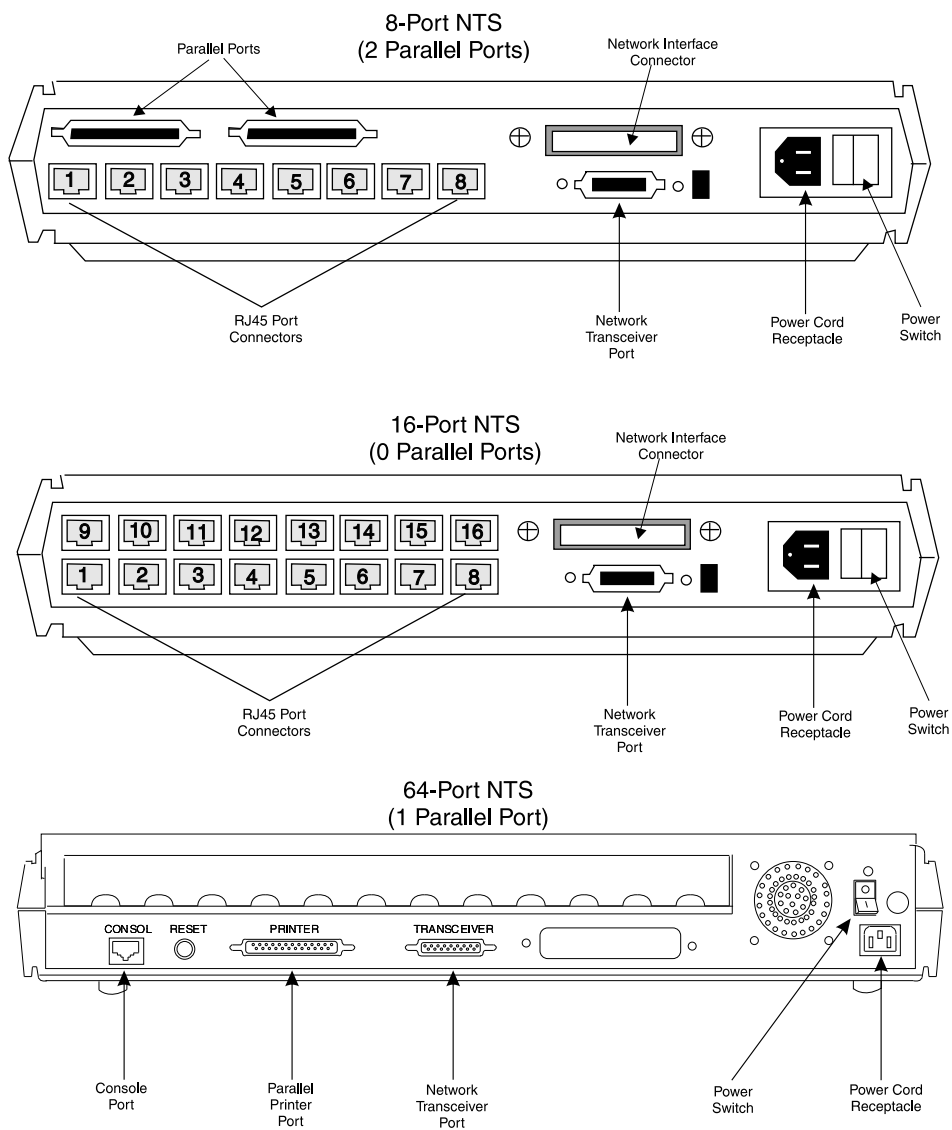


Figure D-55: Network Terminal Server — Back Panel

6. Connect the 10-T Transceiver to the Network Transceiver Port on the back panel of the NTS (see Figure D-55).
7. Connect the network hub unit to the NTS (10-T transceiver) using a UTP network cable.
8. Connect a dumb terminal to the **CONSOLE** port on the rear of the NTS using the console cable and adapter that came with the NTS. On the 8- and 16-port NTSSs, the **CONSOLE** port is port #1.

You will need the following for the 8- and 16-port NTSSs:

- Console Cable
- Adapter - comcode 407361823
- Null Modem - comcode 407122043.

You will need the following for the 64-port NTS(s):

- Console Cable
- Adapter - part number 06-988-260-20.

Note

The terminal options should be set to 9600 bps, 8 bits, no parity, and a stop bit.

9. Turn on the NTS, and within 15 seconds push the **TEST** button on the front of the NTS (see Figure D-56).

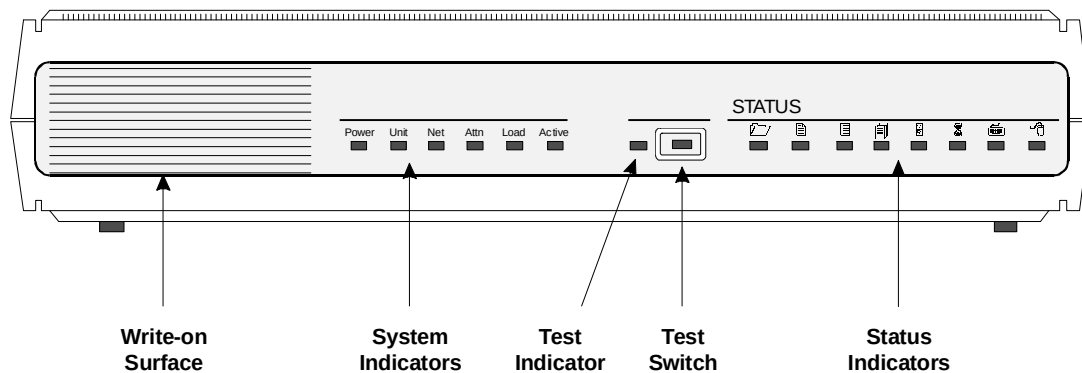


Figure D-56: Front Panel of the Network Terminal Server

10. The NTS goes through its hardware diagnostics, and the following prompt should appear:

```
Monitor::
```

11. Enter the following command at the `monitor::` prompt:

```
Monitor:: erase
```

Note

There are two types of information that can be erased:

- EEPROM (configuration information)
- FLASH (self boot image).

If just one type of information is present, the program begins to erase it. If there are two types of information, the program prompts you to select what you want to erase. Erase both the EEPROM and the FLASH information.

12. The program responds:

```
Erase
  1) EEPROM (i.e., Configuration Information)
  2) FLASH (i.e., Self Boot Image)
Enter 1 or 2::
```

13. Enter 1 to erase EEPROM. The program responds:

Erase all non-volatile EEPROM memory? (y/n) [n]::

14. Enter Y. The program responds:

```
Erasing xxxx bytes of non-volatile memory. Please wait....  
.....  
Erased xxxx bytes of non-volatile memory complete.
```

15. The program returns to the monitor:: prompt. Repeat steps 11-14 to erase the FLASH information.
16. After you have completed the erase command, enter the following command at the monitor prompt:

```
Monitor:: addr
```

17. The program responds:

```
Enter Internet address [<uninitialized>]::
```

18. Enter the IP address for this NTS. This should follow the IP address structure outlined in Table D-31 on page -205.

The program responds:

```
Internet address : XXX.XXX.XXX.XXX  
  
Enter Subnet mask [255.255.255.0.0]::
```

19. Press **Return** to accept the default subnet mask. The program responds:

```
Subnet mask: 255.255.255.0
```

```
Enter preferred load host Internet address [<any host>]::
```

20. Enter the IP address of the *Sun SPARCserver* computer.
The program responds:

```
Preferred load host address XXX.XXX.XXX.XXX
```

```
Enter Broadcast address [0.0.0.0]::
```

21. Press **Return** to accept the default broadcast message address. The program responds:

```
Enter Preferred dump address [0.0.0.0]::)
```

22. Enter the IP address of the *Sun SPARCserver* computer.
The program responds:

```
Preferred dump address: xxx.xx.x.x
```

```
Select type of IP packet encapsulation (ieee802/ethernet)
[<ethernet>] ::
```

23. Press **Return** to accept the default IP packet encapsulation. The program responds with the following question if you have an 8- or 16-port NTS. The program returns to the `monitor::` prompt if you have a 64-port NTS.

```
Type of IP packet encapsulation: <ethernet>
```

```
Load Broadcast Y/N [Y]::
```

24. Enter `N`. The program returns to the `monitor::` prompt.
25. Enter the following command at the monitor prompt to reinitialize the NTS with the new parameters:

```
monitor:: boot
```

The program responds:

```
Enter boot file name [oper.42.enet]::
```

Note The boot file name differs depending on the type of NTS. For the 8- and 16-port NTS, the boot file name is [(ip) "oper.52.enet", (mop) "OPER_52_ENET.SYS"]:: . For the 64- port NTS, the boot file name is oper.42.enet.

26. Press **Return** to accept the default boot file name. The program continues with:

```
Requesting boot file "oper.42.enet".
Unanswered requests shown as '?',
                               transmission errors as '*'.

Booting file: oper.42.enet from 129.200.9.1

Loading image from 129.200.9.1
.....
```

The periods (dots) continue to appear as the NTS is initialized and set up.

Note If the program displays "SELF" instead of the IP address (129.200.9.1), it means that you did not erase EEPROM. Go back to step 11 to erase EEPROM.

When the initialization finishes, the following appears:

annex::

27. Disconnect the dumb terminal from the NTS.

The NTS has been administered.

Additional References For additional information, refer to the following documentation:

*Network Terminal Server Guide,
Quick Installation Guide for the "Sun" Network Terminal Server
Leaflet.*

Technical Glossary

This Technical Glossary defines terms and acronyms used in this document that may not be familiar to you. The Technical Glossary is divided into Terminology and Acronyms.

Terminology

Access Permissions	Permissions assigned to a CMS user so that user can access different subsystems in CMS or administer specific elements (splits/skills, trunks, vectors, etc.) of the ACD. Access permissions are specified as read or write permission. Read permission means the CMS user can access and view data (for example, run reports or view the Dictionary subsystem). Write permission means the CMS user can add, modify, or delete data and execute processes.
ACD	Automatic Call Distribution—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).
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, etc.). The user selects an action after entering necessary data in the window.
Add Package	A <i>Solaris</i> operating system command (pkgadd) that allows you to add an additional software package.

ADU	Asynchronous Data Unit. A DCE (data communications equipment) type device that allows direct connection between RS-232 equipment and the digital switch.
Agent	A person who answers calls to an extension in an ACD split. Known to CMS by a login identification keyed into a voice terminal.
Agent Login ID	A 1- to 4-digit number (Generic 2/System 85) or a 1- to 9-digit number (Generic 1/Generic 3) entered by the agent at the ACD extension to activate the position. Agent logins are required for all CMS-measured ACD agents.
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 (characters typed at a keyboard).

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/connectors at each end and used to connect two or more hardware devices.
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 VDNs and vectors as processing points between trunk groups and splits/skills. Call vectoring permits treatment of calls that is independent of splits/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.
CMS	Call Management System. A software product used by business customers that have an AT&T telecommunications switch and receive a large volume of telephone calls that are processed through the ACD (Automatic Call Distribution) feature of the switch.

CMSADM Filesystem Backup	A backup that saves all the file systems on the machine which includes: <i>Solaris</i> 2.4 system and programs, CMS programs and data, and non-CMS data you place on the computer in addition to the CMS data. See “Backup” for more details.
Command	A command is an instruction used to tell the computer to perform a function or 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 scratch. See the <i>Call Management System Custom Reports</i> (AT&T 585-215-523) document for more information.
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, etc.) or statistical data on ACD performance (number of ACD calls, wait time for calls in queue, current states of individual agents, etc.).
Database Tables	CMS uses these tables to collect, store, and retrieve ACD data. Standard CMS items (database items) are names of columns in the CMS database tables.

DCE	Data Communications Equipment. Modems are a good example of DCE. Any equipment that connects to DTE (Data Terminal equipment) using an RS-232 standard interface.
DCIU	Data Communications Interface Unit. A hardware device on the Generic 2 and System 85 switches that prepares and sends architecture messages to other switches or application adjuncts.
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 LU (Logical Unit).
Disk	A round platter, or set of platters, coated with magnetic medium and organized into concentric tracks for storing data.
DSIMM	A small printed circuit card that contains DRAM (dynamic random access memory) chips. The acronym "DSIMM" stands for <i>dynamic random access memory single in-line memory module</i> .
DTE	Data Terminal Equipment. Typically, DTE includes terminals, personal computers, and workstations. Your <i>Sun SPARCserver</i> system is a DTE device.
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.
ECC	Error Correction Codes. Codes that protect 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 Desktop <i>Sun SPARCserver</i> 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/skills, VDNs, vectors, trunks, or trunk groups).
Expert Agent Selection	An optional feature that bases call distribution on agent skill. 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 a "External Connector.")
Forecast Reports	These reports display expected call traffic and agent/trunk group requirements for the customer's call center for a particular day or period in the future.
Gigabyte (GB)	One gigabyte equals 10^9 bytes (for example, 1,000,000,000).
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.

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/monthly records for up to 10 years for each CMS-measured agent, split/skill, trunk, trunk group, vector, and VDN.
Historical Reports	Display past ACD data for various agent, split/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 <i>Sun SPARCserver</i> computer system and the 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 <i>Sun SPARCserver</i> 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 <i>Solaris 2.4</i> operating system (and also to the network).
HSI/S 2.0	The High-Speed Serial Interface/SBus controller card is a 4-port serial communications SBus card. Each of the four ports is used for a single physical X.25 link. An add-on software package needed by CMS (for multiple ACDs) on the <i>Sun SPARCserver</i> computer.
INFORMIX	A relational database management system used to organize CMS's data. An add-on software package needed by CMS on the <i>Sun SPARCserver</i> computer.
Interface	A common boundary between two systems or pieces of equipment.

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).
Hung System	A system that does not respond to input from the keyboard or mouse.
Install	Involves the procedures used to set up the hardware and software of a computer, terminals, printers, and modems so that they can be used. Installing often includes customizing the system for a particular situation or user.
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	Input device for entering information by typing.
Keyboard Port	The port on your Desktop <i>Sun SPARCserver</i> system unit where the keyboard cable is connected.
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/skill, trunk, trunk group, vector, VDN) has been identified to CMS for collection of data.
Megabyte (MB)	One megabyte equals 10^6 bytes (for example, 1,000,000).
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.
Mirrored Disks	The mirroring feature allows one driver to write to two separate disk partitions at once, provided they are available on the same processor. In mirroring, the data is written not to a single disk but automatically to disks on each of two independent buses, making all data saved to disk available at two physical locations. When one disk or a bus goes down, system operation continues uninterrupted, and the faulty component can be replaced or repaired.
Mirrored Partitions	A pair of disk partitions that contain identical data to provide increased data integrity. Whenever data is written, it is written to both partitions. Whenever data is read, it is read from one partition of the pair, alternating partitions with each read.
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	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 IP (Internet Address).
Network Hub	Hardware that connects the <i>Sun SPARCserver</i> computer to the Network Terminal Server(s). See Chapter 3, "Installing the <i>Sun SPARCserver</i> Computer."
Network Terminal Server	A hardware terminal that connects to the Network Hub via cabling. The Network Terminal Server provides 50-pin switch champ connectors used to attach 64 serial devices using the patch panel cables and patch panels. See Chapter 3, "Installing the <i>Sun SPARCserver</i> Computer."
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 Network Terminal Server via PBX-Champ cabling. See Chapter 3, "Installing the <i>Sun SPARCserver</i> Computer" and Chapter 4, "Installing Terminals, Printers, and Modems."
Open Window	A window that remains open because the user has not yet closed it with the "Exit" 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	The software that controls and allocates the resources, such as memory, disk storage, and the screen display for the computer.
Partitions	A section of the hard disk that is 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 <i>Sun SPARCserver</i> systems require you to type a password when you log into the system, so that no unauthorized person can use your system.

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.
PI	Processor Interface. A hardware device on the Generic 1 and Generic 3i switches that prepares and sends architecture messages to other switches or application adjuncts.
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. See Chapter 4, "Installing Printers and Terminals" for more information.
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	The CMS user can 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	Consists of the current and previous intrahour data on each CMS-measured agent, split/skill, trunk, trunk group, vector, and Vector Directory Number (VDN).

Real-Time Reports	Display current ACD call activity on agents, splits/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 intrahour interval.
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	A 25-pin physical and electrical interface. The electrical portion of the interface is unbalanced (for example, RS-232 has a positive voltage and a ground).
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 <i>Sun SPARCserver</i> 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.

Scroll Cursor	INFORMIX provides two kinds of cursor when traversing select results. A scroll cursor allows relative movement backward or forward within the query results while a non-scroll cursor only allows forward movement, one record at a time.
SCSI Bus	An industry standard peripheral bus that is used to connect intelligent peripherals to a <i>Sun SPARCserver</i> 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 <i>Sun SPARCserver</i> computer uses a fast SCSI-2 implementation (unlike the NCR3332 platform).
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 the AT&T implementation, the Host Adapter card (with a SCSI ID of 7) is preset. The rest 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	Your Desktop <i>Sun SPARCserver</i> 10/20 computer system has two serial ports located on the two terminations of its optional serial interface Y-cable. Attaches to the A/B port on the back of the <i>Sun SPARCserver</i> 10/20 computer.

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	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/requirement or perhaps a business need of the call center.
SLK	Screen Labeled Key. 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.
Slot	An electronic connection designed to receive a module or a printed circuit board (such as a SIMM or a frame buffer board).
<i>Solaris</i>	The operating system package on the <i>Sun SPARCserver</i> computer. The <i>Solaris</i> is a version of the UNIX System V Release 4. CMS requires the <i>Solaris</i> to run on the <i>Sun SPARCserver</i> computer.
Split	A group of extensions that receive special-purpose calls in an efficient, cost-effective manner. Normally, calls to a split arrive primarily 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.
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, etc.), along with Timetable and Shortcut, is referred to as a subsystem of the Call Management System throughout this document.
<i>Sun SPARCserver</i> 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.
Superuser	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. Two types of tapes are used to back up and copy data for the High-Performance Platform— QIC-150, 5-GB, and 14-GB tape cartridges.
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, etc.) which, when executed, performs an operation (for example, running a report).

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 (Network Terminal Server). See Chapter 4, “Installing Printers and Terminals” for information. 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 CO (Central Office) 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 DID (Direct Inward Dialed) 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 <i>Solaris</i> 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.
VDN	Vector Directory Number. 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	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 music, disconnect calls, give calls a busy signal, or route calls to other destinations. Calls enter vector processing via 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 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	The CMS user can add, modify, or delete data and execute processes. Write permission is granted from the User Permissions subsystem.
X.25	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
CMS	— Call Management System
CMSADM	— Call Management System Administration
CMSSVC	— Call Management System Services
DCE	— Data Communications Equipment
DCIU	— Data Communications Interface Unit
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
ESQL/C	— Embedded SQL within 'C' language
IPC	— Intelligent Ports Card
NTS	— Network Terminal Server
PBX	— Public Broadcast Switch
PEC	— Price Element Code
SCSI	— Small Computer System Interface
SLK	— Screen Labeled Key
SQL	— Structured Query Language
TSC	— Technical Service Center
UPS	— Uninterrupted Power Supply
VDN	— Vector Directory Number

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