

HP NonStop S-Series Operations Guide

Abstract

This guide describes how to perform routine system hardware operations for HP NonStop™ S-series servers. These tasks include monitoring the system, performing common operations tasks, and performing routine hardware maintenance. This guide is written for system operators.

Product Version

N.A.

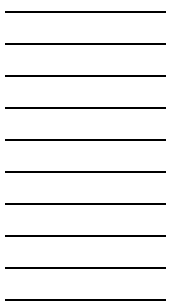
Supported Release Version Updates (RVUs)

This guide supports G06.24 and all subsequent G-series RVUs until otherwise indicated by its replacement publication.

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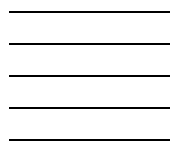
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What's New in This Guide

Guide Information

Abstract

This guide describes how to perform routine system hardware operations for HP NonStop™ S-series servers. These tasks include monitoring the system, performing common operations tasks, and performing routine hardware maintenance. This guide is written for system operators.

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New and Changed Information

This publication has been updated to include information for these new products:

- I/O adapter module (IOAM) enclosure
- Fibre Channel ServerNet adapter (FCSA)
- Enterprise Storage System (ESS)
- Gigabit Ethernet 4-port ServerNet adapter (G4SA)

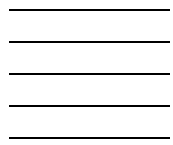
The main technical changes to this manual are:

- A new section, [Section 8, Fibre Channel ServerNet Adapter: Monitoring and Recovery](#), has been inserted following Section 7, thus incrementing section numbers that follow these two sections. This new section provides operator information for the FCSA.
- References to this new section occur in various places, such as [Table 3-1, Monitoring System Components](#), on page 3-4 and [Overview of Disk Drives](#) on page 9-2.
- Overview information about the IOAM enclosure in the overall system organization is included in the first four pages of Section 2, under the heading [System Organization](#). An illustration showing the IOAM enclosure organization appears in [NonStop IOAM Enclosure Organization](#) on page 2-11.
- Status LED information for the FCSA, for the Gigabit Ethernet 4-port Servernet Adapter (G4SA), and for the ServerNet switch board has been added to [Table 3-5](#) on page 3-30.
- In [Section 15, Power Failures: Preparation and Recovery](#), a statement has been included in [How an Enclosure Responds to Power Failures](#) on page 15-1 to clarify the fact that the IOAM enclosure does not have battery backup.

In addition, these minor changes have been made:

- The current method of access for the guided procedures has been updated in [Guided Procedures](#) on page 1-13.
- OSM information for monitoring batteries, inadvertently omitted in the previous edition of this manual, is now been included in [Maintaining Batteries](#) on page 15-3.

Product names in graphic representations are consistent with the current product interface.



About This Guide

This guide describes how to perform routine system hardware operations for NonStop S-series servers. This guide describes information for NonStop S-series servers on G06.24 and subsequent G-series release version updates.

Note. *S-series* refers to the hardware that makes up the server. *G-series* refers to the software that runs on the server.

The term *NonStop Sxx000* represents the NonStop S70000, NonStop S72000, NonStop S74000, NonStop S76000, and NonStop S86000 servers.

The term *NonStop S7x00* represents the NonStop S7400 and higher numbered servers. Thus it does not include the NonStop S7000, which is usually designated separately.

Use this guide along with the *Guardian User's Guide* and the written policies and procedures of your company regarding:

- General operations
- Security
- System backups
- Starting and stopping applications

Who Should Use This Guide

This guide is written for operators who perform system hardware operations. It provides an overview of the routine tasks of monitoring the system and guides the operator through the infrequent tasks of starting and stopping the system and performing online recovery on the system.

What Is in This Guide

Section or Appendix	Section and Appendix Titles
Section 1	<u>Introduction to NonStop S-Series Operations</u>
Section 2	<u>Determining Your System Configuration</u>
Section 3	<u>Overview of Monitoring and Recovery</u>
Section 4	<u>Monitoring EMS Event Messages</u>
Section 5	<u>Processes: Monitoring and Recovery</u>
Section 6	<u>Communications Subsystems: Monitoring and Recovery</u>
Section 7	<u>ServerNet/DA: Monitoring and Recovery</u>
Section 8	<u>Fibre Channel ServerNet Adapter: Monitoring and Recovery</u>
Section 9	<u>Disk Drives: Monitoring and Recovery</u>
Section 10	<u>Tape Drives: Monitoring and Recovery</u>
Section 11	<u>Processors: Monitoring and Recovery</u>
Section 12	<u>ServerNet Fabrics: Monitoring and Recovery</u>
Section 13	<u>Applications: Monitoring and Recovery</u>
Section 14	<u>Printers and Terminals: Monitoring and Recovery</u>
Section 15	<u>Power Failures: Preparation and Recovery</u>
Section 16	<u>Starting and Stopping the System</u>
Section 17	<u>Preventive Maintenance</u>
Appendix A	<u>Operational Differences Between Systems Running D-Series and G-Series RVUs</u>
Appendix B	<u>Tools and Utilities for Operations</u>
Appendix C	<u>Related Reading</u>
Appendix D	<u>Converting Numbers</u>

Where to Get More Information

Operations planning and operations management practices appear in these manuals:

- *Introduction to NonStop Operations Management*
- *Availability Guide for Application Design*
- *Availability Guide for Change Management*
- *Availability Guide for Problem Management*

For comprehensive information about performing operations tasks for a NonStop S-series server, you need both this guide and the *Guardian User's Guide*. The *Guardian User's Guide* describes some tasks not covered in this guide, such as supporting users of the system.

The *Guardian User's Guide* describes routine tasks common to system operations on all NonStop servers. Instructions and examples show how to support users of the system, how to monitor operator messages, how to control the spooler, and how to manage disks and tapes. Numerous tools that support these functions are also documented. Some monitoring procedures in the *Guardian User's Guide* have information about using only the Subsystem Control Facility (SCF). That guide does not generally describe any monitoring procedures using the OSM or TSM packages.

Information about the use of OSM, such as how to migrate from TSM to OSM, how to install and configure OSM server and client components, and how to use the OSM Service Connection, appear in these manuals:

- *OSM Migration Guide*
- *NonStop System Console Installer Guide*
- *OSM User's Guide*

Information about the use of TSM appear in online user guides.

Servers that are connected in ServerNet clusters require special installation and operating procedures that are not documented in this manual. Such information is instead provided with the appropriate cluster documentation. In the 6780 ServerNet cluster environment, installation and operating procedures are documented in these manuals:

- *ServerNet Cluster 6780 Planning and Installation Guide*
- *ServerNet Cluster 6780 Operations Guide*

Installation and operating procedures for earlier server clusters (those using 6770 switches) are documented in:

- *ServerNet Cluster Manual*

OSM is the required system management tool for servers that use 6780 switches in ServerNet clusters, but OSM also provides system management for earlier versions of ServerNet clusters.

For other documentation related to operations tasks, refer to [Appendix C, Related Reading](#).

Notation Conventions

Hypertext Links

Blue underline is used to indicate a hypertext link within text. By clicking a passage of text with a blue underline, you are taken to the location described. For example:

This requirement is described under [Backup DAM Volumes and Physical Disk Drives](#) on page 3-2.

General Syntax Notation

The following list summarizes the notation conventions for syntax presentation in this manual.

UPPERCASE LETTERS. Uppercase letters indicate keywords and reserved words; enter these items exactly as shown. Items not enclosed in brackets are required. For example:

MAXATTACH

lowercase italic letters. Lowercase italic letters indicate variable items that you supply. Items not enclosed in brackets are required. For example:

file-name

computer type. Computer type letters within text indicate C and Open System Services (OSS) keywords and reserved words; enter these items exactly as shown. Items not enclosed in brackets are required. For example:

myfile.c

italic computer type. *Italic computer type* letters within text indicate C and Open System Services (OSS) variable items that you supply. Items not enclosed in brackets are required. For example:

pathname

[] Brackets. Brackets enclose optional syntax items. For example:

TERM [*\system-name.*]*\$terminal-name*

INT[ERRUPTS]

A group of items enclosed in brackets is a list from which you can choose one item or none. The items in the list may be arranged either vertically, with aligned brackets on each side of the list, or horizontally, enclosed in a pair of brackets and separated by vertical lines. For example:

```
FC [  num  ]
   [ -num  ]
   [ text  ]

K [ X | D ] address
```

{ } Braces. A group of items enclosed in braces is a list from which you are required to choose one item. The items in the list may be arranged either vertically, with aligned braces on each side of the list, or horizontally, enclosed in a pair of braces and separated by vertical lines. For example:

```
LISTOPENS PROCESS { $appl-mgr-name }
                  { $process-name  }

ALLOWSU { ON | OFF }
```

| Vertical Line. A vertical line separates alternatives in a horizontal list that is enclosed in brackets or braces. For example:

```
INSPECT { OFF | ON | SAVEABEND }
```

... Ellipsis. An ellipsis immediately following a pair of brackets or braces indicates that you can repeat the enclosed sequence of syntax items any number of times. For example:

```
M address [ , new-value ]...
[ - ] { 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 }...
```

An ellipsis immediately following a single syntax item indicates that you can repeat that syntax item any number of times. For example:

```
"s-char..."
```

Punctuation. Parentheses, commas, semicolons, and other symbols not previously described must be entered as shown. For example:

```
error := NEXTFILENAME ( file-name ) ;

LISTOPENS SU $process-name.#su-name
```

Quotation marks around a symbol such as a bracket or brace indicate the symbol is a required character that you must enter as shown. For example:

```
"[ repetition-constant-list ]"
```

Item Spacing. Spaces shown between items are required unless one of the items is a punctuation symbol such as a parenthesis or a comma. For example:

```
CALL STEPMOM ( process-id ) ;
```

If there is no space between two items, spaces are not permitted. In the following example, there are no spaces permitted between the period and any other items:

```
$process-name.#su-name
```

Line Spacing. If the syntax of a command is too long to fit on a single line, each continuation line is indented three spaces and is separated from the preceding line by a blank line. This spacing distinguishes items in a continuation line from items in a vertical list of selections. For example:

```
ALTER [ / OUT file-spec / ] LINE
      [ , attribute-spec ]...
```

Notation for Messages

The following list summarizes the notation conventions for the presentation of displayed messages in this manual.

Bold Text. Bold text in an example indicates user input entered at the terminal. For example:

```
ENTER RUN CODE
?123
CODE RECEIVED:      123.00
```

The user must press the Return key after typing the input.

Nonitalic text. Nonitalic letters, numbers, and punctuation indicate text that is displayed or returned exactly as shown. For example:

```
Backup Up.
```

lowercase italic letters. Lowercase italic letters indicate variable items whose values are displayed or returned. For example:

```
p-register
process-name
```

[] Brackets. Brackets enclose items that are sometimes, but not always, displayed. For example:

```
Event number = number [ Subject = first-subject-value ]
```

A group of items enclosed in brackets is a list of all possible items that can be displayed, of which one or none might actually be displayed. The items in the list might be arranged either vertically, with aligned brackets on each side of the list, or horizontally, enclosed in a pair of brackets and separated by vertical lines. For example:

```
proc-name trapped [ in SQL | in SQL file system ]
```

{ } Braces. A group of items enclosed in braces is a list of all possible items that can be displayed, of which one is actually displayed. The items in the list might be arranged either vertically, with aligned braces on each side of the list, or horizontally, enclosed in a pair of braces and separated by vertical lines. For example:

```
obj-type obj-name state changed to state, caused by
{ Object | Operator | Service }

process-name State changed from old-objstate to objstate
{ Operator Request. }
{ Unknown. }
```

| Vertical Line. A vertical line separates alternatives in a horizontal list that is enclosed in brackets or braces. For example:

```
Transfer status: { OK | Failed }
```

% Percent Sign. A percent sign precedes a number that is not in decimal notation. The % notation precedes an octal number. The %B notation precedes a binary number. The %H notation precedes a hexadecimal number. For example:

```
%005400
%B101111
%H2F

P=%p-register E=%e-register
```

Change Bar Notation

Change bars are used to indicate substantive differences between this edition of the manual and the preceding edition. Change bars are vertical rules placed in the right margin of changed portions of text, figures, tables, examples, and so on. Change bars highlight new or revised information. For example:

The message types specified in the REPORT clause are different in the COBOL85 environment and the Common Run-Time Environment (CRE).

The CRE has many new message types and some new message type codes for old message types. In the CRE, the message type SYSTEM includes all messages except LOGICAL-CLOSE and LOGICAL-OPEN.

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When to Use This Section

This section introduces system hardware operations for NonStop S-series servers. It provides an introduction to the other sections in this guide.

Understanding the Operational Environment

To understand the operational environment:

- If you are already familiar with other NonStop systems, see [Appendix A, Operational Differences Between Systems Running D-Series and G-Series RVUs](#).

- For a brief introduction to the system organization and the location of system components in a NonStop S-series server, see [Section 2, Determining Your System Configuration](#).
- For information about various software tools and utilities you can use to perform system operations on a NonStop S-series server, see [Appendix B, Tools and Utilities for Operations](#).

What Are the Operator Tasks?

The system operations described in this guide include:

- Monitoring the system
- Performing recovery operations on the system or a system component
- Stopping and powering off the system
- Powering on and starting the system
- Operating disk drives and tape drives
- Performing preventative maintenance

Monitoring the System and Performing Recovery Operations

Checking for indications of potential system problems by monitoring the system is part of the normal system operations routine. You perform recovery operations to restore a malfunctioning system component to normal use. Most recovery procedures for NonStop S-series servers can be performed online. Monitoring the status of all system components and performing recovery operations are described in:

- [Section 3, Overview of Monitoring and Recovery](#)
- [Section 4, Monitoring EMS Event Messages](#)
- [Section 5, Processes: Monitoring and Recovery](#)
- [Section 6, Communications Subsystems: Monitoring and Recovery](#)
- [Section 7, ServerNet/DA: Monitoring and Recovery](#)
- [Section 8, Fibre Channel ServerNet Adapter: Monitoring and Recovery](#)
- [Section 9, Disk Drives: Monitoring and Recovery](#)
- [Section 10, Tape Drives: Monitoring and Recovery](#)
- [Section 11, Processors: Monitoring and Recovery](#)
- [Section 12, ServerNet Fabrics: Monitoring and Recovery](#)
- [Section 13, Applications: Monitoring and Recovery](#)
- [Section 14, Printers and Terminals: Monitoring and Recovery](#)

Recovery operations for a system console are not discussed in this guide. For recovery procedures for a system console and the applications installed on the system console, see the *NonStop S-Series Hardware Installation and FastPath Guide*.

Preparation and Recovery for Power Failures

You can minimize unplanned outage time by having procedures to prepare and recover quickly from power failures, as described in [Section 15, Power Failures: Preparation and Recovery](#).

Stopping and Powering Off the System

HP recommends a specific set of procedures for stopping and powering off a NonStop S-series server or its components, as described in [Section 16, Starting and Stopping the System](#).

Powering On and Starting the System

HP recommends a specific set of procedures for powering on and starting a NonStop S-series server or its components, as described in [Section 16, Starting and Stopping the System](#).

Performing Preventive Maintenance

Routine preventive maintenance consists of:

- Dusting or cleaning enclosures as needed
- Cleaning tape drives regularly
- Evaluating tape condition regularly
- Cleaning and reverifying tapes as needed

Routine hardware maintenance procedures are described in [Section 17, Preventive Maintenance](#).

Operating Tape Drives

Refer to the documentation shipped with the tape drive.

Responding to Spooler Problems

Refer to the *Spooler Utilities Reference Manual*.

Determining the Cause of a Problem: A Systematic Approach

Continuous availability of your NonStop system is important to system users, and your problem-solving processes can help make such availability a reality. To determine the cause of a problem on your system, start by trying the easiest, least expensive possibilities. Move to more complex, expensive possibilities only if the easier solutions fail.

This subsection presents an approach you can use in your operations environment to:

- Determine the possible causes of problems
- Systematically fix or escalate such problems
- Develop ways of preventing the same problems from recurring

The four basic steps in systematic problem solving are:

Task	Page
Task 1: Get the Facts	1-6
Task 2: Find and Eliminate the Cause of the Problem	1-7
Task 3: Escalate the Problem If Necessary	1-8
Task 4: Prevent Future Problems	1-9

A Problem-Solving Worksheet

[Table 1-1](#) is a worksheet that you can use to help you through the problem-solving process. Use this worksheet to:

- Get the facts about a problem
- Find and eliminate the cause of the problem
- Make any appropriate escalation decisions
- Prevent future problems

Make copies of this worksheet and use it to collect and analyze facts regarding a problem you are experiencing. The results might not tell you exactly what is occurring, but they will narrow down the number of possible causes.

You are authorized by HP to reproduce this worksheet only for the purpose of operating your system.

Table 1-1. Problem-Solving Worksheet

Problem Facts	Possible Causes
What?	
Where?	
When?	
Magnitude?	
Situation Facts	Escalation Decision
Plan to Verify/Fix	
Plan to Prevent and Control Damage	

Task 1: Get the Facts

The first step in solving any problem is to get the facts. Although it is tempting to speculate about causes, your time is better spent in first understanding the symptoms of the problem.

Task 1a: Determine the Facts About the Problem

To get a clear, complete description of problem symptoms, ask questions to determine the facts about the problem. For example:

Category	Questions to Ask
What?	What are you having trouble with? What specifically is wrong?
Where?	Where did you first notice the problem? Where has it occurred since you first noticed it? Which applications, components, devices, and people are affected?
When?	When did the problem occur? What is the frequency of the problem? Has this problem occurred before this time?
Magnitude?	Is the problem quantifiable in any way? (That is, can it be measured?) For example, how many people are affected? Is this problem getting worse?

Task 1b: Determine the Facts About the Situation

Collect facts about the situation in which the problem arose. A clear description of the situation that led to the problem could indicate a simple solution. Examples of questions to ask are:

- Who reported the problem and how can this person be contacted?
- How critical is the situation?
- What events led to the problem?
- Has anything changed recently that might have caused the problem?
- What event messages have you received?
- What is the current configuration of the hardware and software products affected?

An example of information you might obtain from asking questions:

Question	Answer
What is happening that indicates a problem?	A terminal is hung.
Where is this problem occurring?	In the office of USER.BONNIE. The affected terminal is named \$JT1.#C02.
When is this problem occurring?	At 8:30 this morning and also at the same time two days ago. Both times, this problem occurred after three unsuccessful attempts to log on.
What is the magnitude of this problem?	Intermittent; the problem seemed to disappear on its own when it first occurred two days ago.

Task 2: Find and Eliminate the Cause of the Problem

After you collect the facts, you are ready to begin considering the possible causes of a problem. Using these facts and relying on your knowledge and experience, begin to list possible causes of the problem.

Task 2a: Identify the Most Likely Cause

To evaluate the possible causes of any problem, you must compare each cause with the problem symptoms. The problem-solving worksheet gives you a guide for accomplishing this task. In the following example:

- Possible causes become column headings
- Entries made in the worksheet's rows indicate whether the cause in that column could have produced the problem symptoms you listed in that row.
 - Write *yes* in the appropriate box if that cause could explain that symptom.
 - Write *no* in the appropriate box if a possible cause does not explain a fact.

The most likely cause is the one that best explains all the facts; that is, the cause that contains the most *yes* answers.

For example, possible causes of a hung terminal problem could be:

- A terminal hardware problem
- A stopped or suspended TACL process
- System security, which locks a user out after three unsuccessful logon attempts

This worksheet lists some possible causes a hung terminal and illustrates further how to evaluate the possible causes:

Problem Facts	Possible Causes		
	Terminal hardware	TACL process	Security
What? Terminal \$JT1.#C02 is hung	Yes	Yes	Yes
Where? Office of USER.BONNIE	Yes	Yes	Yes
When? 8:30 a.m. today Two days ago at 8:30 a.m. After 3 failed logon attempts	Yes Yes No	Yes Yes No	Yes Yes Yes
Magnitude? Intermittent Goes away on its own	? ?	Yes Yes	Yes Yes

Task 2b: Fix the Most Probable Cause of the Problem

For the example in the worksheet, the most likely cause of the hung terminal is a security problem. Ask yourself what would be the fastest, least expensive, safest, and surest way of verifying that this is the most probable cause of the problem.

Once you have determined the most likely cause, try to fix it. Follow through and implement the appropriate solution. If this solution does not fix the problem, continue trying other possible solutions that are reasonable considering time, expense, and safety.

Task 3: Escalate the Problem If Necessary

If the solutions you tried in the previous tasks do not solve the problem, you might consider escalating the problem to get additional help.

Task 3a: Determine Whether You Need to Escalate the Problem

After you complete each task in the problem-solving process, you must decide whether you can continue by yourself or if you must ask for help. Ask yourself these questions:

- Do I have the authority to resolve this problem?
- Do I have the necessary knowledge?
- Do I have the skill?
- Do I have the time?
- What other people need to become involved, if any?
- Who needs to be informed about the problem's status?

Task 3b: Provide Documentation

If you decide to escalate the problem, you might be required to document the problem by providing:

- A problem identification number
- A problem classification
- A complete description and history of the problem
- Diagnostic information such as copies of the event log, results of memory dumps, and so on

You might also have procedures at your site for logging problems. If you have a shift log or problem log, make timely entries in the log.

Task 4: Prevent Future Problems

Solving problems that occur with your system can be exciting because it is active and stimulating. Preventing problems is often less dramatic. But in the end, prevention is more productive than solving problems. The more work you do to prevent problems before they arise, the fewer problems that will arise at potentially critical times.

These questions provide a framework for your problem-prevention efforts:

- Why did this problem occur? What was the root cause? Were there any contributing causes?
- How serious was the problem?
- What is the likelihood that it will occur again?
- Is it possible to eliminate the causes of this problem?
- Is it possible to reduce the likelihood that this problem will occur in the future?
- Can automation tools be used to detect and respond to preliminary symptoms of this problem?
- Can anything be done now to minimize the damage that would result from a reoccurrence of this problem?
- Can the problem resolution process be improved in any way?

Logging On to a NonStop S-Series Server

Many operations and troubleshooting tasks are performed using the TACL command interpreter or one of the OSM or TSM applications. For example, the TACL command interpreter allows you to access SCF, which you use to configure, control, and collect information about objects within subsystems.

You use the OSM or TSM applications to perform such functions as starting the NonStop S-series server, identifying system components, and monitoring the status of system components and resources.

For more details on the functions of the TACL command interpreter and the OSM and TSM applications, see [Appendix B, Tools and Utilities for Operations](#).

This subsection provides basic information about accessing the TACL command interpreter and the OSM and TSM applications.

System Consoles

A system console is a personal computer approved by HP to run maintenance and diagnostic software for NonStop S-series servers. New system consoles are preconfigured with the required HP and third-party software. When upgrading to the latest RVU, software upgrades can be installed from the HP NonStop System Console Installer CD.

System consoles communicate with NonStop S-series servers over a dedicated local area network (LAN) or a nondedicated (public) LAN. System consoles configured as the primary and backup dial-out points are referred to as the primary and backup system consoles, respectively.

When used with the TSM application, system consoles provide certain functionality using the keyboard's function keys. The OSM Service Connection does not use the function keys but provides equivalent functionality through an Internet Explorer browser window.

Opening a TACL Window

On a system console, you must open a TACL window before you can log on to the TACL command interpreter. For information about logging on to a TACL command interpreter, see the *Guardian User's Guide*.

You can use any of the following three methods to open a TACL window.

Opening a TACL Window Using the TSM Service Application

1. Log on to the TSM Service Application. The Management window appears.
2. From the **File** menu, select **Start Terminal Emulator>For TACL**. A TACL window appears.
3. Log on to the TACL prompt.

Opening a TACL Window Directly From OutsideView

If you know the IP address of the NonStop server (not those of OSM or TSM), use this method:

1. Select **Start>Programs>OutsideView32 7.1**.
2. From the **Session** menu, select **New**. The New Session Properties dialog box appears.
3. From the New Session Properties dialog box, Session tab, click **IO Properties**. The TCP/IP Properties dialog box appears.
4. In the TCP/IP Properties dialog box:
 - a. In the Host name or IP address and port box, type the IP address, followed by a space and the port number. For example:

172.17.22.187 23

The port number is 23 for a TACL prompt and 301 for a Startup TACL prompt. In general, you should use port number 23 to perform operations tasks.
 - b. Click **OK**.
5. From the New Session Properties dialog box, click **OK**. A TACL window appears.
6. Log on to the TACL prompt.

Opening a TACL Window Using the Low-Level Link

You can also open a TACL window using either the OSM or TSM Low-Level Link applications as described in the Troubleshooting section in [Startup Event Stream and Startup TACL Windows Do Not Appear](#) on page 16-12.

Launching OSM and TSM Applications

Several operations tasks in this guide require you to log on to one of the OSM or TSM applications. Assuming that the OSM or TSM client components have been installed on the system console, launch the desired application as directed, then see the online help for log on instructions (and alternate methods of starting the applications).

To launch OSM applications: **Start>Programs>HP OSM**. Then select the name of the application to launch:

- OSM Service Connection
- OSM Low-Level Link Application
- OSM Notification Director>Start/Stop
- OSM Event Viewer

The OSM Service Connection and the OSM Event Viewer are browser-based applications. These two applications launch a web page. From that page, you can

select the system of your choice from the list of bookmarks displayed in the left column of the page (available bookmarks include those that were user-created during previous sessions and those converted automatically from an existing TSM system list). If no bookmarks are available, the web page also contains instructions on how to access these applications by entering a system URL as an Internet Explorer address.

To launch TSM applications: **Start>Programs>Compaq TSM**. Then select the name of the application to launch:

- TSM Service Application
- TSM Low-Level Link Application
- TSM Notification Director
- TSM Event Viewer

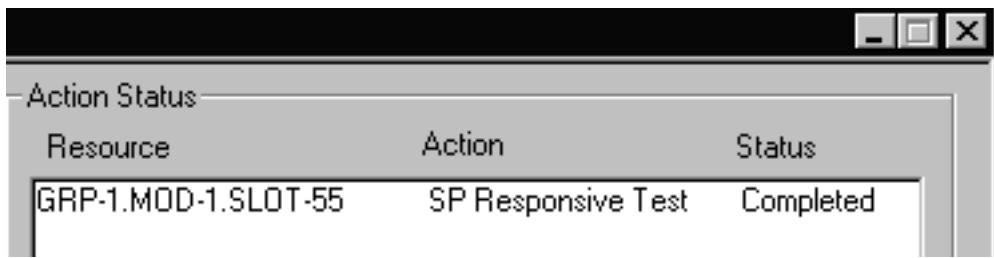
Troubleshooting OSM and TSM Sessions

A message is usually sent if you lose a TSM session. If you experience problems or errors during a TSM session, use the following procedures to help determine the problem.

Verifying the State of the TSM Connection

To use the TSM package to monitor system components, you must have a TSM session that connects the system console to a NonStop S-series server. The system console communicates with a NonStop S-series server through the master service processors (MSPs), which are components of the processor multifunction (PMF) customer replaceable units (CRUs) in group 01. To verify the state of the TSM connection:

1. Log on to the TSM Low-Level Link.
2. On the toolbar, click **SP Actions**.
3. In the SP Actions dialog box, select:
 - a. The service processor in Grp-1.Mod-1.Slot-50
 - b. SP Responsive Test
4. Click **Perform Action**.
5. Wait for the display to indicate that the status for the SP responsive test is completed. See [Figure 1-1](#).
6. Repeat Steps 3 through 5 for the service processor in Grp-1.Mod-1.Slot-55.

Figure 1-1. Completed SP Responsive Test


Action Status		
Resource	Action	Status
GRP-1.MOD-1.SLOT-55	SP Responsive Test	Completed

Checking Windows Event Log for Error Messages

If error messages occur during a TSM Service Application or TSM Low-Level Link session, check the Windows Event Viewer. The Windows Event Viewer logs events from the TSM client software and the Windows environment.

There are three different ways that you can access the Windows Event Viewer. None of these procedures require you to be logged on to a system:

- Perform these steps:
 1. Launch the TSM Low-Level Link. (You can cancel the logon dialog and proceed from a blank Management window.)
 2. In the toolbar, click **Status Log**.
 3. The Windows Event Viewer appears.
- From the **Summary** menu of the TSM Service Application, select **Status Log**.
- Select **Start>Programs>Administrative Tools>Event Viewer**.

If error messages occur during an OSM Low-Level Link session, you can check the Windows Event Viewer for events by the same method described for the TSM Low-Level Link. However, since the OSM Service Connection is a browser-based application that resides on the server, the Windows Event Viewer will not display related events. For troubleshooting information regarding the OSM Service Connection, see the *OSM Migration Guide*.

Guided Procedures

For OSM, guided procedures are launched by specific actions in the OSM Service Connection. These procedures automate many of the repetitive subtasks involved in CRU configuration or replacement. They also do some verification and assist you in performing manual subtasks.

Guided procedures for TSM, unlike those for OSM, are accessible from the Start menu on your system console.

For a list of guided procedures, refer to the CSSI Web.

Determining Your System Configuration

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[System Organization](#) 2-1

[Terms Used to Describe System Hardware Components](#) 2-2

[Identifying System Enclosures in a NonStop S-Series Server](#) 2-3

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[Displaying Configuration Information—Examples](#) 2-37

When to Use This Section

This section describes the system enclosures, the system organization, numbering and labeling, and how to identify components in a NonStop S-series server. For detailed information on system hardware organization, refer to the *NonStop S-Series Planning and Configuration Guide*.

System Organization

Hardware in a NonStop S-series server is organized according to a system, group, module, and slot hierarchy:

System	A set of groups and external hardware components that are directly connected together, managed by a single operating system image, and operated as one computer. A system can consist of one or more processor enclosures and optionally one or more I/O enclosures and one or more IOAM enclosures.
Group	All objects accessible to a pair of service processors (SPs) in a system enclosure. A group includes all the components in a system enclosure or in an IOAM enclosure.
Module	A set of components sharing a common hardware interconnection in a system enclosure. A module contains one or more slots. In a processor enclosure and an I/O enclosure, there is only one module in a group. In an IOAM enclosure, there are two modules in a group.
Slot	A physical, labeled space in a module.

Terms Used to Describe System Hardware Components

The terms used to describe system-hardware components vary. These terms include:

- Device
- Resource
- Customer-replaceable unit (CRU)
- Field-replaceable unit (FRU)

Device

A device can be a physical device or a logical device. A physical device is a physical component of a computer system that is used to communicate with the outside world or to acquire or store data. A logical device is a process used to conduct input or output with a physical device.

Resource

The term resource is commonly used in OSM and TSM documentation to refer to NonStop S-series server components that OSM and TSM software recognizes, monitors, and controls. Besides hardware components, such as processors, power supplies, ServerNet adapters, and disk and tape drives, resources also include objects such as processes and ServerNet fabrics.

Customer-Replaceable Unit (CRU)

A CRU is a system-hardware component that usually can be installed and serviced (replaced) by customers without using special tools. CRUs typically can be replaced while the system is running.

CRUs are classified into three categories based on the risk of causing a system outage if the documented replacement procedure is not followed correctly and on how much related experience or training a customer should have. For a CRU replacement that is likely to cause a system outage if not performed correctly (Class 3), HP recommends replacement by a trained service provider.

Field-Replaceable Unit (FRU)

A FRU is a system-hardware component that can be replaced in the field only by qualified personnel trained by HP.

Identifying System Enclosures in a NonStop S-Series Server

The three types of system enclosures:

- Processor enclosures contain processors and other system components.
- I/O enclosures are similar to processor enclosures but do not contain processors.
- IOAM enclosures contain I/O adapter modules.

For the specific types of system enclosures and the locations of system components, see [Table 2-1](#).

Table 2-1. Figures Showing System Enclosures

Enclosure Type	Refer to
NonStop S7000 processor enclosure	Figure 2-2 on page 2-7
NonStop Sxx000 or S7x00 processor enclosure	Figure 2-3 on page 2-8
NonStop S-series I/O enclosure	Figure 2-4 on page 2-10
NonStop IOAM enclosure	Figure 2-5 on page 2-11

Group Numbers

System enclosures are identified by their group number. Group ID labels on the faceplate of the appearance-side enclosure door and on a cable support on the service side of the enclosure let you easily see the group ID from outside the enclosure.

- The group numbers for the processor enclosures are 01 through 08.
- The group number of an I/O enclosure or IOAM enclosure is based on the processor enclosure to which it connects. For example, the first I/O enclosure or IOAM enclosure that connects to processor enclosure 01 is group 11. Group 52 is the second I/O enclosure or IOAM enclosure that connects to processor enclosure 05, and so on.

This table lists the group numbers for the processor enclosures and the I/O enclosures:

Processor enclosure group	Connects to I/O enclosure or IOAM enclosure group
01	11, 12, 13, and so on
02	21, 22, 23, and so on
03	31, 32, 33, and so on
04	41, 42, 43, and so on
05	51, 52, 53, and so on
06	61, 62, 63, and so on
07	71, 72, 73, and so on
08	81, 82, 83, and so on

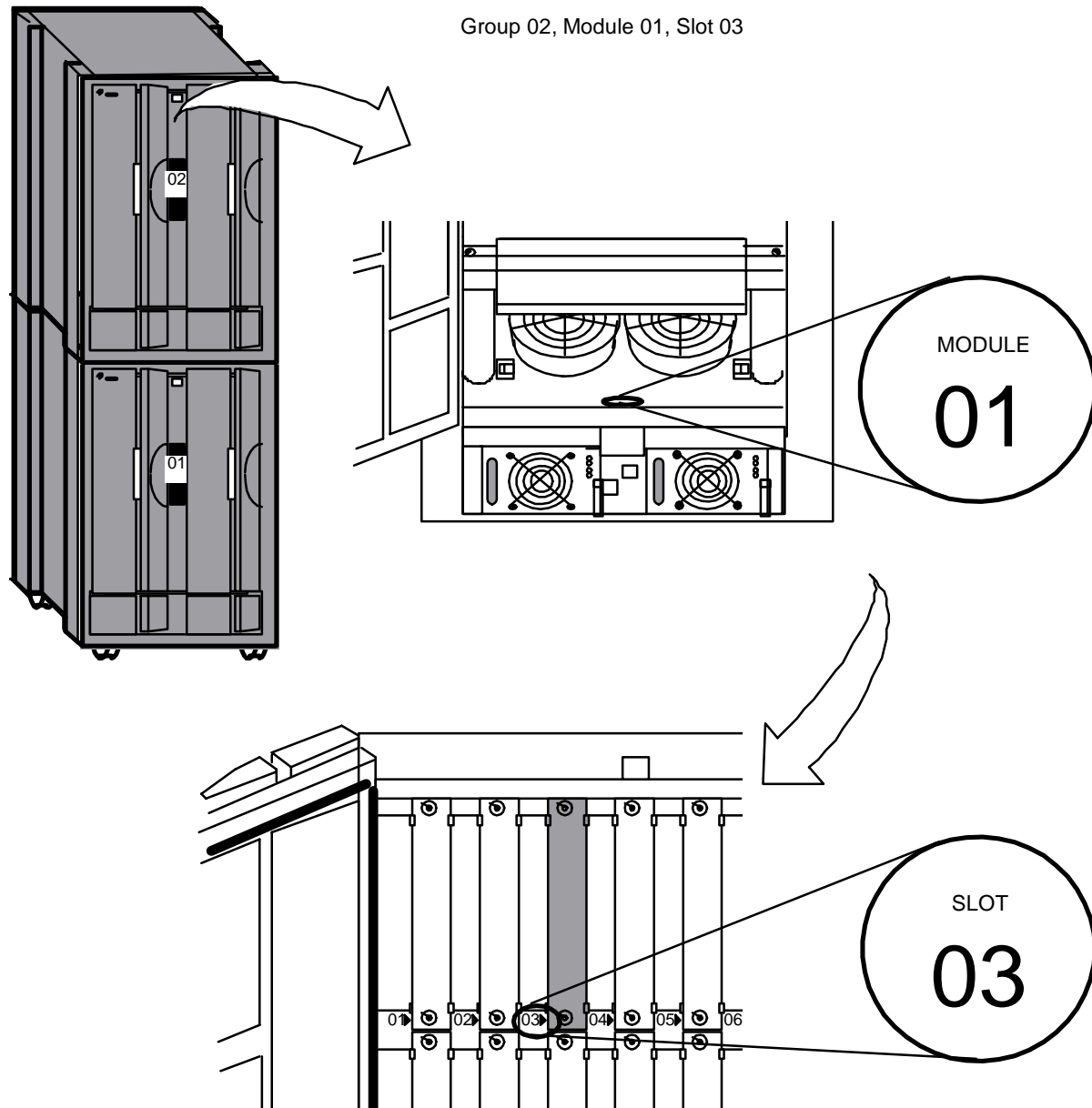
Locating System Components in an Enclosure

System components within an enclosure are identified by their physical location. To identify the location of a system component within an enclosure, you need to know:

Group number	The group number identifies the enclosure in which a system component is located. The group number of an enclosure is indicated by the group ID label on the enclosure. (See Identifying System Enclosures in a NonStop S-Series Server on page 2-3.)
Module number	The module number in a system enclosure is always 01. An IOAM enclosure contains module 02 and module 03.
Slot number	The slot number identifies the position of the system component within the enclosure. The slot number is indicated by a label near the slot.

For example, [Figure 2-1](#) shows how to locate a disk drive by its group, module, and slot numbers. The group number is shown on a label on the faceplate of the appearance-side enclosure door. The slot number appears on a label near the slot.

Note. The two-digit number on the group ID labels of an enclosure must match the number shown by the group ID switches inside the enclosure.

Figure 2-1. Identification Numbers and Labels

CDT 602CDD

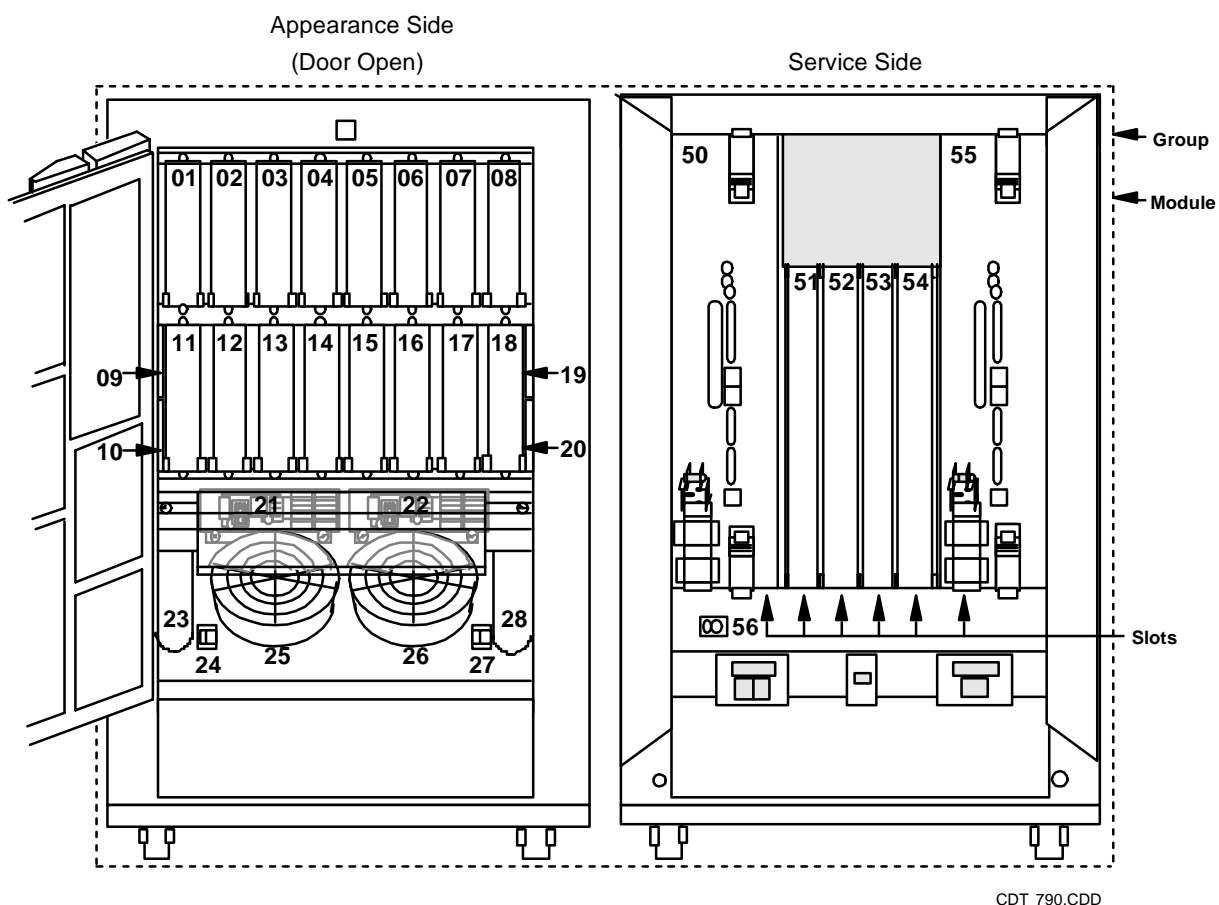
[Table 2-2](#) lists slot numbers for each system component in a processor enclosure.

Table 2-2. Slot Numbers of System Components in a Processor Enclosure

Slot	System Component
01-08	Disks
09-10	SCSI terminators
11-18	Disks
19-20	SCSI terminators
21-22	Power monitor and control unit (PMCU)
23	Battery
24	Group ID switch
25-26	Fans
27	Group ID switch
28	Battery
29-30	Reserved (Sxx000 and S7x00 servers only)
31-32	Power supply in NonStop Sxx000 and S7x00 servers. These slots are not used in NonStop S7000 servers.
33-49	These slots do not exist.
50	Processor multifunction (PMF) CRU or PMF 2 CRU
51-52	Usually, these slots are reserved for ServerNet expansion boards (SEBs) or for modular ServerNet expansion boards (MSEBs). Depending on the topology of your system, however, other adapters might be located in one of these slots.
53-54	ServerNet adapters. SEBs or MSEBs might be located in these slots, depending on the topology of your system.
55	PMF CRU or PMF 2 CRU
56	Emergency power-off (EPO) connector

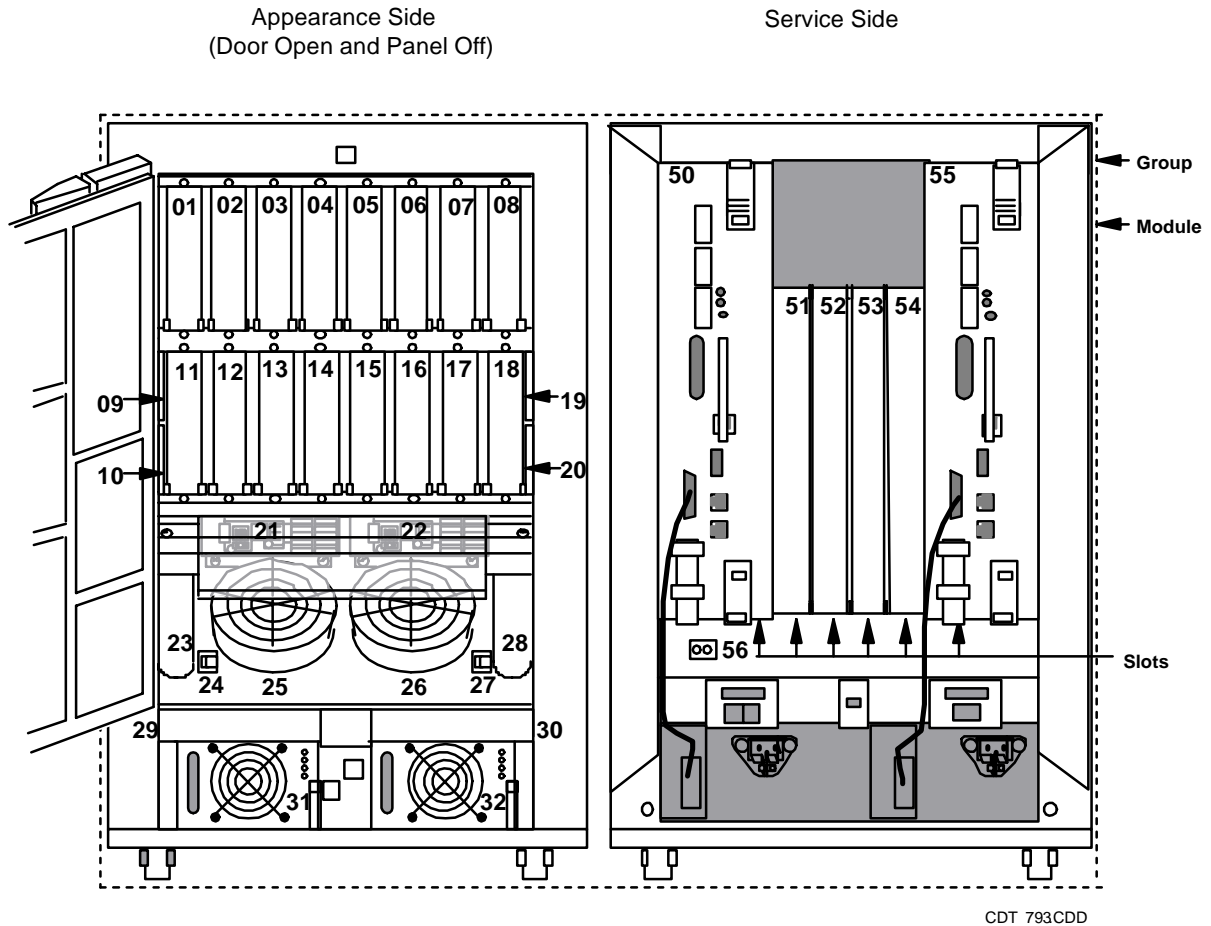
[Figure 2-2](#) shows a diagram of a NonStop S7000 processor enclosure.

Figure 2-2. NonStop S7000 Processor Enclosure Organization



[Figure 2-3](#) shows a diagram of a NonStop Sxx000 or S7x00 processor enclosure. Some PMF CRUs look slightly different from those shown in the figure.

Figure 2-3. NonStop Sxx000 or S7x00 Processor Enclosure Organization



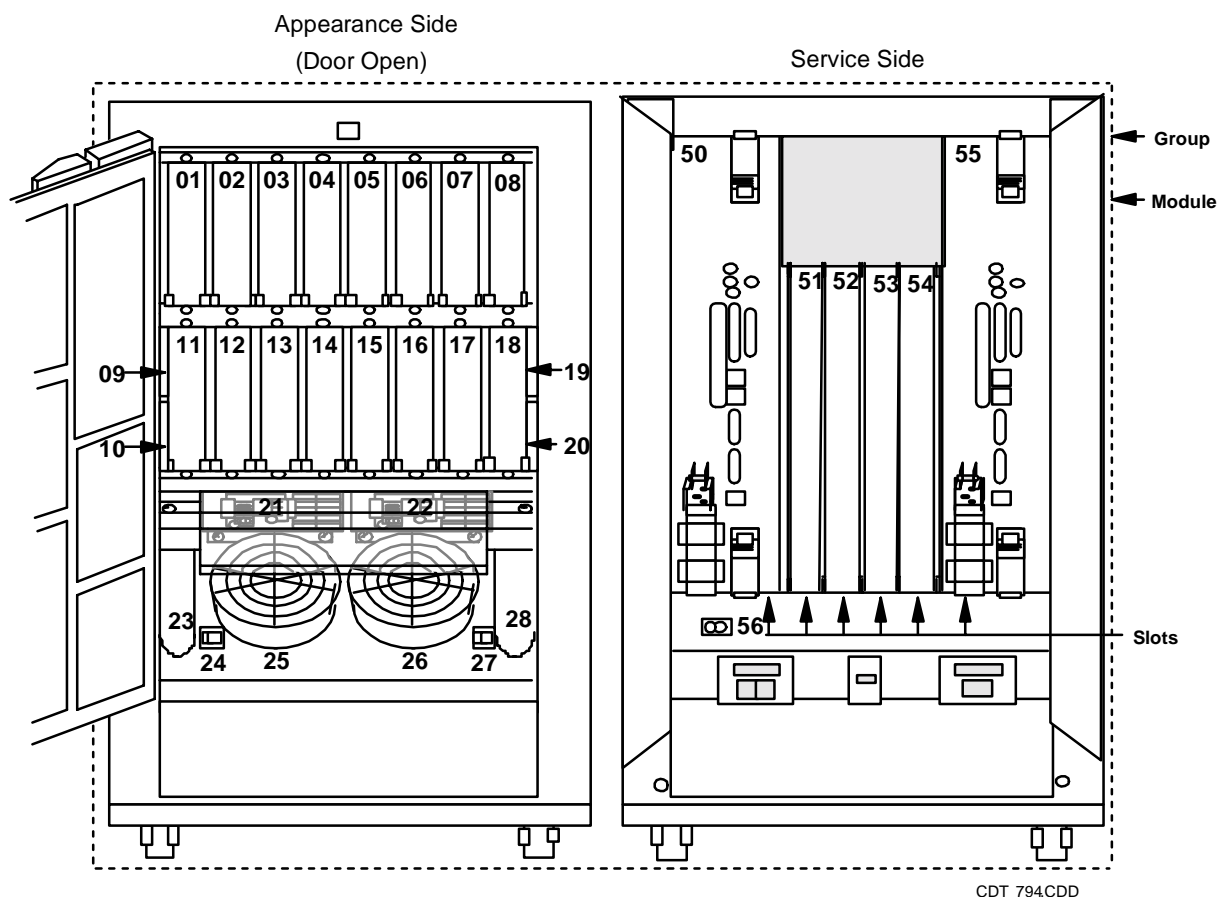
[Table 2-3](#) lists the slot numbers for each system component in an I/O enclosure.

Table 2-3. Slot Numbers of System Components in an I/O Enclosure

Slot	System Component
01-08	Disks
09-10	SCSI terminators
11-18	Disks
19-20	SCSI terminators
21-22	Power monitor and control unit (PMCU)
23	Battery
24	Group ID switch
25-26	Fans
27	Group ID switch
28	Battery
29-30	Reserved (only if IOMF 2 CRUs are present)
31-32	Power supplies if IOMF 2 CRUs are present; otherwise not used
33-49	These slots do not exist.
50	IOMF CRU or IOMF 2 CRU
51-54	ServerNet adapters
55	I/O multifunction (IOMF) CRU or IOMF 2 CRU
56	Emergency power-off (EPO) connector

[Figure 2-4](#) shows an example of a NonStop S-series I/O enclosure. IOMF 2 CRUs look slightly different from the IOMF CRUs shown installed in slots 50 and 55 in the figure. Also, if IOMF 2 CRUs are present, power supplies are installed at the bottom of the enclosure in slots 31 and 32, below the fans. See [Figure 2-3](#) on page 2-8.

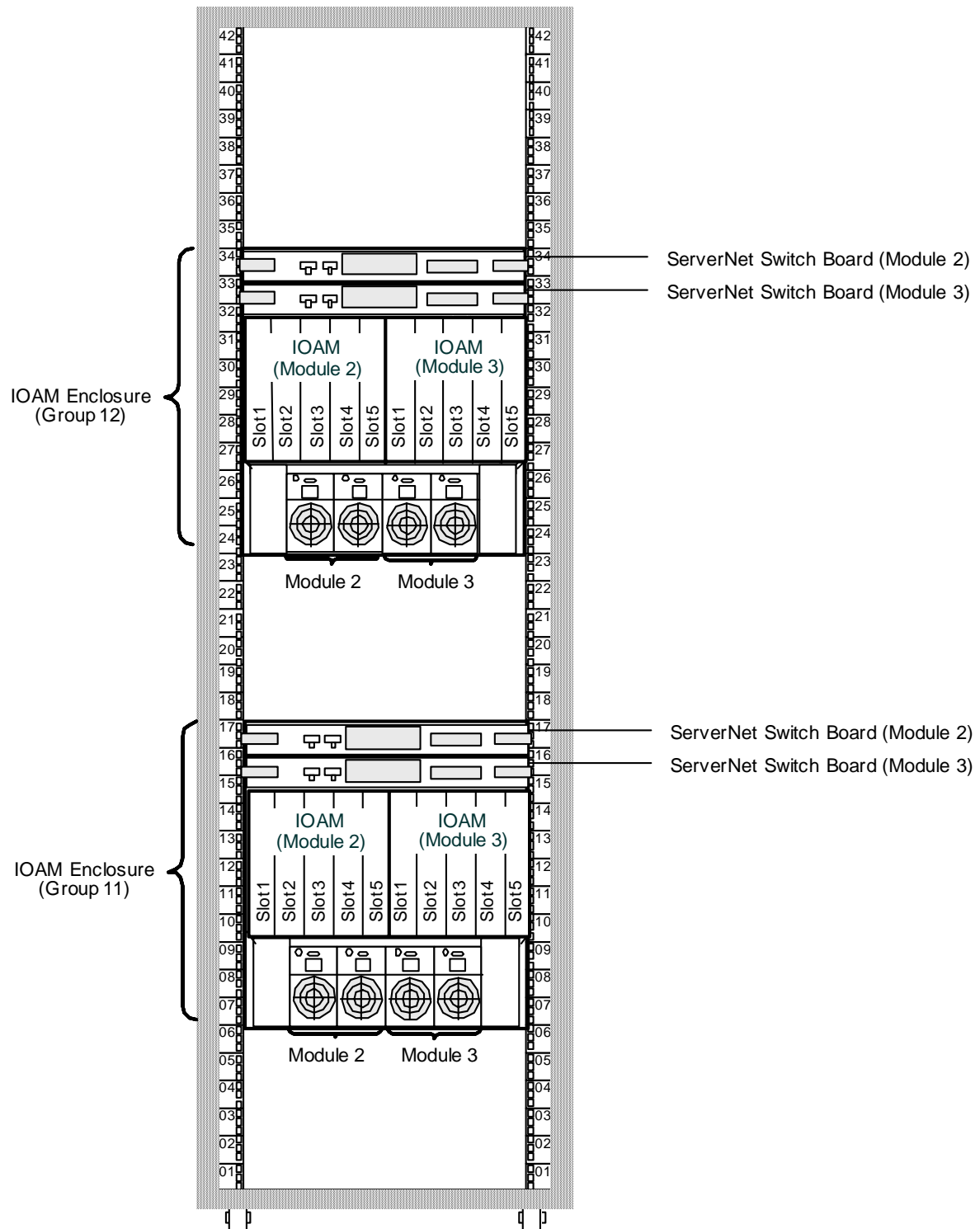
Figure 2-4. NonStop S-Series I/O Enclosure Organization



[Figure 2-5](#) shows an example of NonStop IOAM enclosures in a system rack. Note that each IOAM enclosure contains two I/O adapter modules (IOAMs), two ServerNet switch boards, and slots for up to 10 Fibre Channel ServerNet adapters (FCSAs) or 10 Gigabit Ethernet 4-port ServerNet adapters (G4SAs).

The form factor of this type of enclosure differs radically from that of the processor and I/O enclosures. IOAM enclosures contain no CRUs. None of the components are replaceable by customers and are therefore FRUs.

Figure 2-5. NonStop IOAM Enclosure Organization



VST050.vsd

Identifying the Location of a Processor

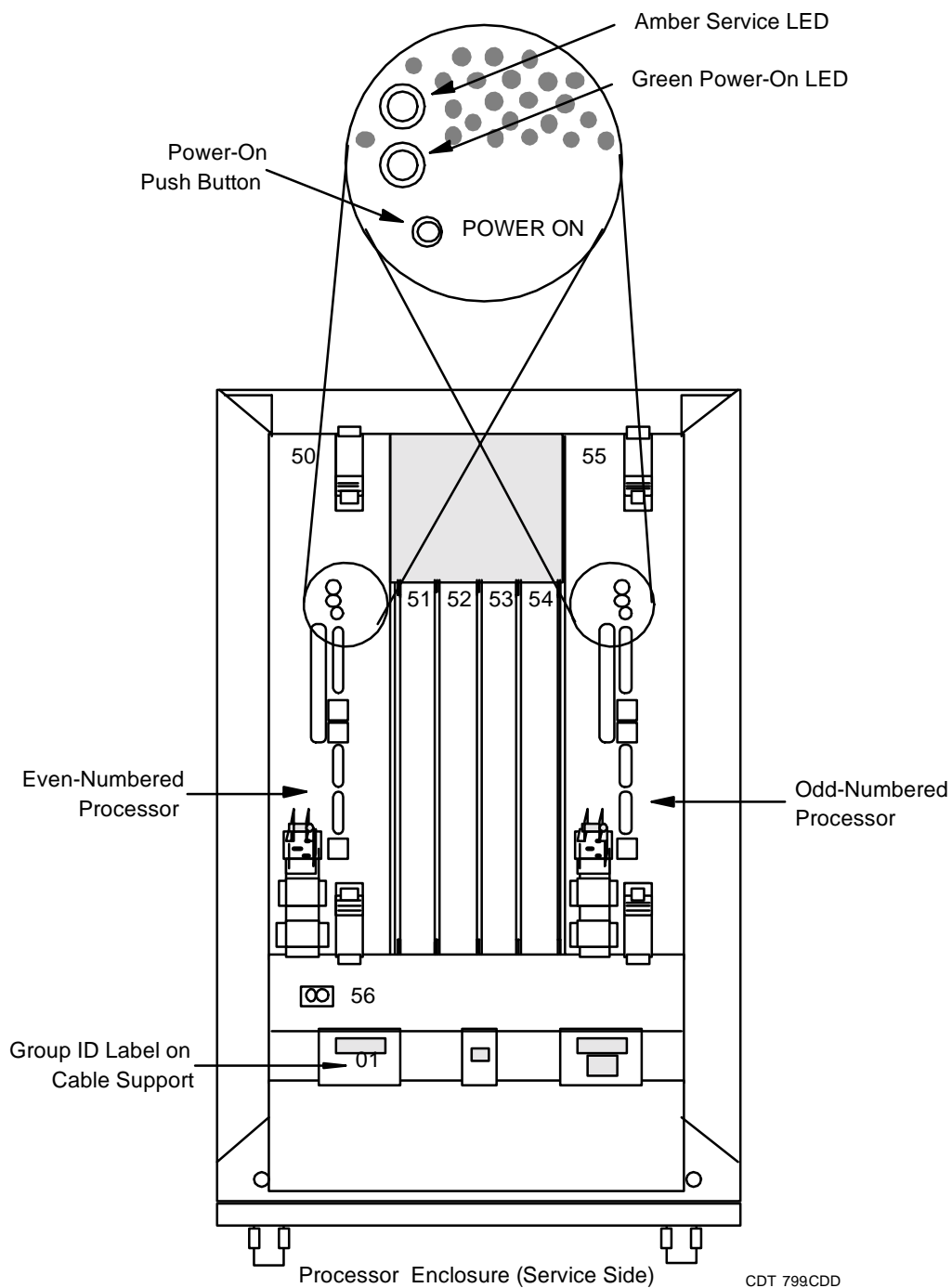
This table identifies the physical location of each processor:

Processor	Group Number	Module Number	Slot Number
0	01	01	50
1			55
2	02	01	50
3			55
4	03	01	50
5			55
6	04	01	50
7			55
8	05	01	50
9			55
10	06	01	50
11			55
12	07	01	50
13			55
14	08	01	50
15			55

Locating the Power-On Push Button

[Figure 2-6](#) illustrates where to find the power-on push button on some models of a PMF CRU.

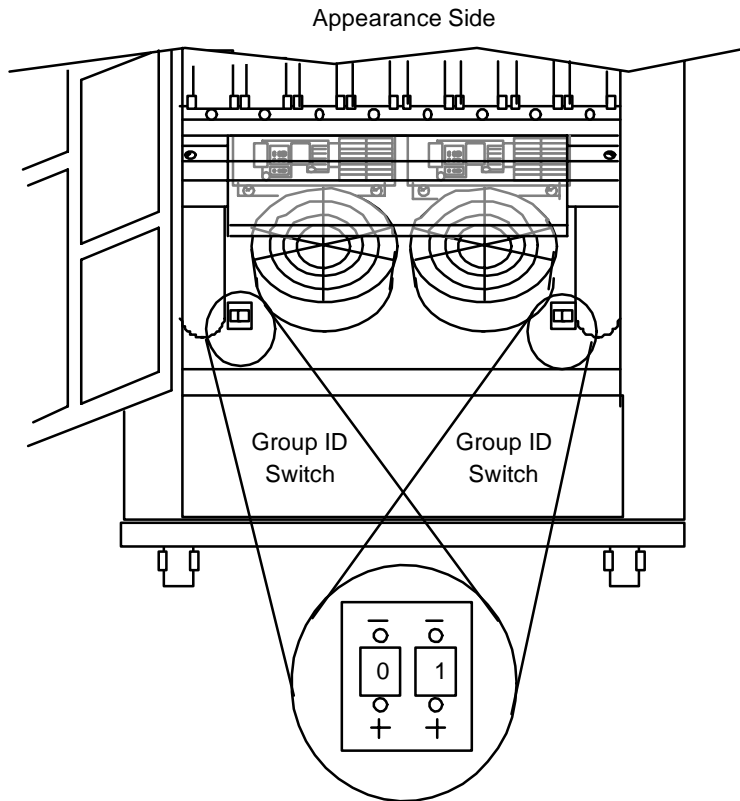
Figure 2-6. Locating the Power-On Push Button on a PMF CRU



Locating the Group ID Switches

Group identification for a system enclosure is set with two group ID switches, located on the inside of the enclosure, on the appearance side near the fans. See [Figure 2-7](#). Both group ID switches in an enclosure must display the same value. The service processors (SPs) read the switches when the enclosure is powered on and monitor them for changes.

Figure 2-7. Locating the Group ID Switches



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Recording Your System Configuration

As a system operator, you need to understand how your system is configured so you can confirm that the hardware and system software are operating normally. If problems do occur, knowing your configuration allows you to pinpoint problems more easily. If your system configuration is corrupted, documentation about your configuration is essential for recovery. You should be familiar with the system organization, system configuration, and naming conventions.

Several methods are available for researching and recording your system configuration:

- Maintaining records in hard-copy format
- Using the OSM or TSM applications to inventory your system
- Using SCF to list objects and devices and to display subsystem configuration information

Maintaining Hard-Copy Forms

If you have followed the recommendations in the *NonStop S-Series Planning and Configuration Guide*, you created a Document Packet for the system as part of the planning process. This packet contains all the planning configuration forms used in planning the system, and it enables you to keep on file complete hard-copy records of all devices and objects configured in the system.

The records in the Document Packet might be photocopied forms with blanks that are filled in by hand with information about each system enclosure, PMF CRU, adapter, disk, tape drive, and so on.

[Table 2-4](#) provides a partial list of published forms and their location. Sample forms appear in [Figure 2-8](#) on [page 2-18](#) through [Figure 2-13](#) on [page 2-23](#).

To get system configuration information to enter into the forms, you primarily use the OSM or TSM applications and SCF, described later in this subsection. It is highly recommended that you maintain your records by updating the forms when you make configuration changes.

Table 2-4. Documents for Recording Your System Configuration

Document	Blank Form in This Manual
Enclosure Arrangement Diagram	<i>NonStop S-Series Planning and Configuration Guide</i>
System Enclosure Checklist	<i>NonStop S-Series Planning and Configuration Guide</i>
PMF CRU Configuration Form, PMF 2 CRU Configuration Form, IOMF Configuration Form, and IOMF 2 CRU Configuration Form	<i>NonStop S-Series Planning and Configuration Guide</i>
System configuration diagram of your particular system	Your system planning and configuration staff
Listings of devices, access paths, and processes generated by the SCF INFO and STATUS commands	<i>SCF Reference Manual for G-Series RVUs</i>
Spooler configuration listing	<i>Spooler Utilities Reference Manual</i>
6760 Adapter and Modular Disk Subsystem Configuration Form	<i>6760 ServerNet/DA Manual</i>
6760 Adapter and Modular Tape Subsystem Configuration Form	<i>6760 ServerNet/DA Manual</i>
ATM3SA Adapter Configuration Form	<i>ATM Adapter Installation and Support Guide</i>
6763 Common Communication ServerNet Adapter Configuration Form	<i>6763 Common Communication ServerNet Adapter Installation and Support Guide</i>
Ethernet 4 ServerNet Adapter (E4SA) Configuration Form	<i>Ethernet Adapter Installation and Support Guide</i>
Token-Ring Adapter Configuration Form	<i>Token-Ring Adapter Installation and Support Guide</i>
Fast Ethernet Adapter Configuration Form	<i>Fast Ethernet Adapter Installation and Support Guide</i>
ServerNet Wide Area Network (SWAN) Concentrator Configuration Planning Form	<i>WAN Subsystem Configuration and Management Manual</i>
ServerNet Cluster Planning Work Sheet	<i>ServerNet Cluster Manual</i>

Sample Forms for Recording Your System Configuration

Examples of some of the forms available for recording your system configuration are listed next. You are authorized by HP to reproduce these forms only for use in documenting a NonStop S-series system:

- [Figure 2-8](#) on page 2-18 is a blank form for documenting a PMF CRU configuration.
- [Figure 2-9](#) on page 2-19 is a blank form for documenting a PMF 2 CRU configuration.
- [Figure 2-10](#) on page 2-20 is a blank form for documenting an IOMF CRU configuration.
- [Figure 2-11](#) on page 2-21 is a blank form for documenting an IOMF 2 CRU configuration.
- [Figure 2-12](#) on page 2-22 is a blank form for documenting an E4SA adapter configuration.
- [Figure 2-13](#) on page 2-23 is an example of a completed System Enclosure Checklist.

Figure 2-8. PMF CRU Configuration Form

PMF CRU Configuration Form

System Name _____ Date ____/____/____

Shaded areas indicate nonconfigurable components

Group _____ Module 01 Slot _____

SCSI Port

Product Number: _____

SCF Name: _____

SCSI Cable: _____

Ethernet Port

IP Address: _____

Adapter Name: _____

SAC Name: _____

SAC Access List: _____

PIF Name: _____

LIF Name: _____

VST304.

Figure 2-9. PMF 2 CRU Configuration Form

PMF 2 CRU Configuration Form

System Name _____ Date ____/____/____

Shaded areas indicate nonconfigurable components

Group _____ Module 01 Slot _____

SCFI Port

Product Number: _____

SCFI Name: _____

SCFI Cable: _____

Ethernet Port

IP Address: _____

Adapter Name: _____

SAC Name: _____

SAC Access List: _____

PIF Name: _____

LIF Name: _____

VST308.VSD

Figure 2-10. IOMF CRU Configuration Form

IOMF CRU Configuration Form		
System Name _____	Date ____/____/____	
Shaded areas indicate nonconfigurable components		
Group _____ Module <u>01</u> Slot _____		

POWER ON
 SERIAL CONSOLE
 ETHERNET
 MODEM
 AUX
 POWER-ON CABLE

ServerNet Connection

ServerNet Cable: _____

ServerNet Connector: _____

Group _____ Module 01 Slot _____

SCSI Port

Product Number: _____

SCF Name: _____

SCSI Cable: _____

Ethernet Port

IP Address: _____

Adapter Name: _____

SAC Name: _____

SAC Access List: _____

PIF Name: _____

LIF Name: _____

VST307.VSD

Figure 2-11. IOMF 2 CRU Configuration Form

IOMF 2 CRU Configuration Form

System Name _____ Date ____/____/____

Shaded areas indicate nonconfigurable components

Group _____ Module 01 Slot _____

Diagram labels: SERVERNET PIC 3, SERVERNET PIC 2, SERVERNET PIC 1, POWER ON, SCSI, SERIAL CONSOLE, AUX, ETHERNET, POWER-ON CABLE, DC Power.

ServerNet Connection

ServerNet Cable: _____

ServerNet Connector: _____

Group _____ Module 01 Slot _____

SCSI Port

Product Number: _____

SCF Name: _____

SCSI Cable: _____

Ethernet Port

IP Address: _____

Adapter Name: _____

SAC Name: _____

SAC Access List: _____

PIF Name: _____

LIF Name: _____

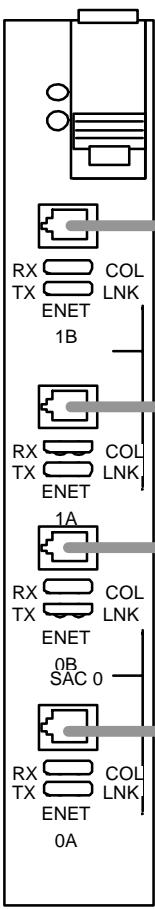
VST309.VSD

Figure 2-12. E4SA Configuration Form

Ethernet 4 ServerNet Adapter (E4SA) Configuration Form

System Name _____ Date ____/____/____

Group _____ Module 01 Slot _____



SAC 1 ENET 1B: IP Address: _____
 Adapter Name: _____
 SAC Name: _____ SAC Access List: _____
 PIF Name: _____ LIF Name: _____

SAC 1 ENET 1A: IP Address: _____
 Adapter Name: _____
 SAC Name: _____ SAC Access List: _____
 PIF Name: _____ LIF Name: _____

SAC 0 ENET 0B: IP Address: _____
 Adapter Name: _____
 SAC Name: _____ SAC Access List: _____
 PIF Name: _____ LIF Name: _____

SAC 0 ENET 0A: IP Address: _____
 Adapter Name: _____
 SAC Name: _____ SAC Access List: _____
 PIF Name: _____ LIF Name: _____

VST320.VSD

Figure 2-13. Completed System Enclosure Checklist

System Enclosure Checklist

Date07 / 21 / 02

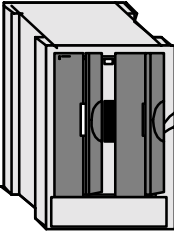
System Name \Case1

Group Number01

Module Number01

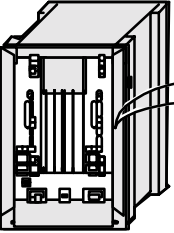
Shaded areas indicate nonconfigurable components

Appearance Side:



\$DATA04-M	4608	08	\$DATA00-M	4608	18
\$DATA04-P	4608	07	\$DATA00-P	4608	17
\$DATA03-M	4608	06	\$AUDIT-M	4608	16
\$DATA03-P	4608	05	\$AUDIT-P	4608	15
\$DATA02-M	4608	04	\$DSMSCM-M	4608	14
\$DATA02-P	4608	03	\$DSMSCM-P	4608	13
\$DATA01-M	4608	02	\$SYSTEM-M	4608	12
\$DATA01-P	4608	01	\$SYSTEM-P	4608	11

Service Side:



50	51	52	53	54	55
PMF					PMF
Processor 0	SEB	SEB	E4SA E0153	E4SA E0154	Processor 1

VST203.VSD

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2-23

Using OSM or TSM to Inventory Your System

Both the OSM Service Connection and the TSM Service Application provide you with hierarchical, physical (graphical representation), and inventory views of your system and cluster resources. System resources include logical elements such as groups, modules, and internal ServerNet fabrics, as well as hardware components such as batteries, fans, power supplies, PMF/IOMF CRUs, disk and tape drives, ServerNet adapters, ServerNet addressable controllers, plug-in cards, and so on. Cluster resources include external ServerNet fabrics, switches, local and remote nodes, and so on. You can sort the Inventory view by columns or save it to an Excel spreadsheet. The OSM or TSM Low-Level Link also provides an Inventory view. However, cluster resources and some externally mounted system resources are not visible in the Low-Level Link.

System Naming Conventions

SCF object names usually follow a consistent set of naming conventions defined for each installation.

[Table 2-5](#) lists some of the naming conventions that HP preconfigures to create the logical device names for many SCF objects. This information also appears in the \$SYSTEM.ZSYSCONF.SCF0000 file.

Table 2-5. Naming Conventions for SCF Objects

Object	Convention	Example	Description
Disk drives	\$D<cabid><slot>	\$D3217	I/O group 32, slot 17
Tape drives	\$T<cabid><slot>	\$T0150	Processor group 01, slot 50
E4SA	\$ZZLAN.E<cabid><slot>	\$ZZLAN.E8254	I/O group 82, slot 54
LIFs	\$ZZLAN.L<cabid><portid>	\$ZZLAN.L51A	I/O group 51, slot 53, ServerNet connector 2
TCP processes	\$ZB<cabid><portid>	\$ZB51A	TCP/IP process for the associated LIF
TELNET processes	\$ZN<cabid><portid>	\$ZN51A	TELNET process associated with TCP/IP
Listener processes	\$ZP<cabid><portid>	\$ZP51A	Listener process associated with TCP/IP
TFTP processes	\$ZTF<m><n>	\$ZTFA9	TFTP process associated with TCP/IP
Fast Ethernet adapter	\$ZZLAN.E<cabid><slot>	\$ZZLAN.E5154	I/O group 51, slot 54
Token Ring adapter	E<cabid><slot>	E5155	I/O group 51, slot 55 (slot 55 must be IOMF CRU)

Table 2-5. Naming Conventions for SCF Objects

Object	Convention	Example	Description
WANBoot processes	\$ZWB<m><n>	\$ZWBA9	WANBoot process associated with TCP/IP
SWAN concentrators	S<adapter>	S19	Twentieth SWAN concentrator
SS7 Telco	\$C<cabid><slot>	\$C	Telco process associated with SS7 protocol

where

<cabid>

is a 2-digit number that identifies the enclosure.

A <cabid> of...	...Indicates	Range of Values
0 <i>n</i>	The object is in processor enclosure <i>n</i> .	01-08
<i>n</i> 1	The object is in the first I/O enclosure attached to processor enclosure <i>n</i> .	11, 21, 31, 41, 51, and so on
<i>n</i> 2	The object is in the second I/O enclosure attached to processor enclosure <i>n</i> .	12, 22, 32, 42, 52, and so on
<i>n</i> 3	The object is in the third I/O enclosure attached to processor enclosure <i>n</i> .	13, 23, 33, 43, 53, and so on

<slot>

is the actual physical slot number in the enclosure.

Number	Description
1-8 or 11-18	A disk drive
50 or 55	A tape drive
51-54	A LAN adapter

<portid>

is the slot number and port number mapped as:

Slot Number	Port Number	<portid>	Slot Number	Port Number	<portid>
51	0	0	53	0	8
51	1	1	53	1	9
51	2	2	53	2	A
51	3	3	53	3	B
52	0	4	54	0	C
52	1	5	54	1	D
52	2	6	54	2	E
52	3	7	54	3	F

<adapter>

is a 2-digit number in the range 00 through 99.

System planning and configuration staff at your site likely will change or expand on the preconfigured file-naming conventions that HP provides, typically by establishing naming conventions for configuring such objects as storage devices, communication processes, and adapters. These conventions should simplify your monitoring tasks by making process or object functions intuitively obvious to someone looking at the object name. For example, in your environment, tape drives might be named \$TAPE n , where n is a sequential number. The *SCF Reference Manual for G-Series RVUs* lists HP reserved names that cannot be changed or used for other objects or processes in your environment.

Using SCF to Determine Your System Configuration

SCF is one of the most important tools available to you as a system operator. SCF commands configure and control the objects (lines, controllers, processes, and so on) belonging to each subsystem running on the NonStop S-series server. You also use SCF to display information about subsystems and their objects.

SCF accepts commands from a workstation, a disk file, or an application process. It sends display output to a workstation, a file, a process, or a printer. Some SCF commands are available only to some subsystems. An overall SCF reference is the *SCF Reference Manual for G-Series RVUs*. Subsystem-specific information appears in a separate for each subsystem. For a partial list of these manuals, refer to [Appendix C, Related Reading](#).

More details about the functions of SCF appear in [Subsystem Control Facility \(SCF\)](#) on [page B-5](#).

SCF Configuration Files

Your system is delivered with a standard set of configuration files:

- The `$SYSTEM.SYSnn.CONFBASE` file contains the minimal configuration required to load the system.
- The `$SYSTEM.ZSYSCONF.CONFIG` file contains a standard system configuration created by HP. This basic configuration includes such objects as disk drives, tape drives, ServerNet adapters, the local area network (LAN) and wide area network (WAN) subsystem manager processes, the OSM or TSM server processes, and so on. You typically use this file to load the system.
- The `$SYSTEM.ZSYSCONF.CONFIG` file is also saved on your system as the `ZSYSCONF.CONF0000` file.

All subsequent changes to the system configuration are made using SCF. The system saves configuration changes on an ongoing basis in the `ZSYSCONF.CONFIG` file.

You have the option to save a stable copy of your configuration at any time in `ZSYSCONF.CONFxxyy` using the SCF SAVE command. For example:

```
-> SAVE CONFIGURATION 01.02
```

You can save multiple system configurations by numbering them sequentially based on a meaningful convention that reflects, for example, different hardware configurations. Each time you load the system from `CONFBASE` or `CONFxxyy`, the system automatically saves in a file called `ZSYSCONF.CONFSAVE` a copy of the configuration file used for the system load.

For guidelines on how to recover if your system configuration files is corrupted, refer to [Troubleshooting and Recovery Operations When Starting the System](#) on page 16-12.

For certain SCF subsystems, configuration changes are persistent. The changes persist through processor and system loads unless you load the system with a different configuration file. Examples of these subsystems are the Kernel, ServerNet LAN Systems Access (SLSA), the storage subsystem, and WAN. For other SCF subsystems, the changes are not persistent. You must reimplement them after a system or processor load. Examples of these subsystems are General Device Support (GDS), Open System Services (OSS), and SQL communication subsystem (SCS).

Using SCF to Display Subsystem Configuration Information

SCF enables you to display, in varying levels of detail, the configuration of objects in each subsystem supported by SCF. For example, you can use the `LISTDEV` command to list all the devices on your system or to list the objects within a given subsystem. Then you can use the `INFO` command with a logical device name or device type to obtain information about a specific device or class of devices.

Another useful command when displaying information is the `ASSUME` command. Use the `ASSUME` command to define a current default object and fully qualified object name. Then you can use `INFO` to display information just for that object. For example,

if you type this command and then enter the INFO command without specifying an object, SCF displays only the information for the workstation called \$LI.#TERM1:

```
> SCF ASSUME WS $LI.#TERM1
```

SCF LISTDEV: Listing the Devices on Your System

To obtain listings for most devices and processes that have a device type known to SCF, at a TACL prompt type:

```
> SCF LISTDEV
```

In the example shown in [Figure 2-14](#), the SCF LISTDEV command lists all the physical and logical devices on the system \COMM.

Figure 2-14. SCF LISTDEV Output

```

$SYSTEM STARTUP 1> SCF LISTDEV
SCF - T9082G02 - (16JAN01) (08JAN01) - 07/09/2001 13:12:23 System \COMM
Copyright Compaq Computer Corporation 1986 - 2001

LDev Name      PPID      BPID      Type      RSize Pri Program
0 $0            0,5       1,5       ( 1,0 )   102 201 \COMM.$SYSTEM.SYS00.OSIMAGE
1 $NCP          0,32      1,78      (62,6 )   1 199 \COMM.$SYSTEM.SYS00.NCPOBJ
3 $YMIOP        0,256    1,256     ( 6,4 )   80 205 \COMM.$SYSTEM.SYS00.OSIMAGE
5 $Z0           0,7       1,7       ( 1,2 )   102 200 \COMM.$SYSTEM.SYS00.OSIMAGE
6 $SYSTEM       0,257    1,257     ( 3,42)  4096 220 \COMM.$SYSTEM.SYS00.OSIMAGE
7 $ZOPR         0,8       1,8       ( 1,0 )   102 201 \COMM.$SYSTEM.SYS00.OSIMAGE
63 $LJDEV        4,17     5,17      (63,1 )   0 199 \COMM.$SYSTEM.SYS00.LHOBJ
64 $ZZKRN        0,13     1,22      (66,0 )   132 180 \COMM.$SYSTEM.SYS00.OZKRN
65 $ZZWAN        0,277    1,294     (50,3 )   132 180 \COMM.$SYSTEM.SYS00.WANMGR
66 $ZZW05        5,264    0,0       (50,0 )   0 199 \COMM.$SYSTEM.SYS00.CONMGR
67 $ZZW04        4,264    0,0       (50,0 )   0 199 \COMM.$SYSTEM.SYS00.CONMGR
68 $ZZSTO        0,278    1,330     (65,0 )  4096 180 \COMM.$SYSTEM.SYS00.TZSTO
69 $ZZSMN        2,264    4,348     (64,1 )   132 180 \COMM.$SYSTEM.SYS00.SANMAN
70 $ZZSCL        2,308    4,352     (64,0 )   132 199 \COMM.$SYSTEM.SYS00.SNETMON
71 $ZZLAN        0,14     1,14      (43,0 )   132 180 \COMM.$SYSTEM.SYS00.LANMAN
72 $ZZFOX        6,321    7,318     (27,0 )   132 199 \COMM.$SYSTEM.SYS00.FOXMOM
79 $ZSNET        0,13     1,22      (66,0 )   132 180 \COMM.$SYSTEM.SYS00.OZKRN
80 $ZSMS         5,21     4,21      (52,0 )  4096 180 \COMM.$SYSTEM.SYS00.OMP
87 $ZQ09         9,9       0,0       (45,0 )   132 201 \COMM.$SYSTEM.SYS01.QIOMON
88 $ZQ08         8,9       0,0       (45,0 )   132 201 \COMM.$SYSTEM.SYS01.QIOMON
89 $ZQ07         7,9       0,0       (45,0 )   132 201 \COMM.$SYSTEM.SYS01.QIOMON
90 $ZQ06         6,9       0,0       (45,0 )   132 201 \COMM.$SYSTEM.SYS01.QIOMON
91 $ZQ05         5,14     0,0       (45,0 )   132 201 \COMM.$SYSTEM.SYS01.QIOMON
92 $ZQ04         4,14     0,0       (45,0 )   132 201 \COMM.$SYSTEM.SYS01.QIOMON
93 $ZQ03         3,21     0,0       (45,0 )   132 201 \COMM.$SYSTEM.SYS01.QIOMON
94 $ZQ02         2,9       0,0       (45,0 )   132 201 \COMM.$SYSTEM.SYS01.QIOMON
95 $ZQ01         1,25     0,0       (45,0 )   132 201 \COMM.$SYSTEM.SYS01.QIOMON
96 $ZQ00         0,29     0,0       (45,0 )   132 201 \COMM.$SYSTEM.SYS01.QIOMON
97 $ZNET         0,17     1,16      (50,63)  3900 175 \COMM.$SYSTEM.SYS00.SCP
104 $ZM09        9,7       0,0       (45,0 )   132 201 \COMM.$SYSTEM.SYS00.QIOMON
105 $ZM08        8,7       0,0       (45,0 )   132 201 \COMM.$SYSTEM.SYS00.QIOMON
106 $ZM07        7,7       0,0       (45,0 )   132 201 \COMM.$SYSTEM.SYS00.QIOMON
107 $ZM06        6,7       0,0       (45,0 )   132 201 \COMM.$SYSTEM.SYS00.QIOMON
108 $ZM05        5,7       0,0       (45,0 )   132 201 \COMM.$SYSTEM.SYS00.QIOMON
109 $ZM04        4,7       0,0       (45,0 )   132 201 \COMM.$SYSTEM.SYS00.QIOMON
110 $ZM03        3,7       0,0       (45,0 )   132 201 \COMM.$SYSTEM.SYS00.QIOMON
111 $ZM02        2,7       0,0       (45,0 )   132 201 \COMM.$SYSTEM.SYS00.QIOMON
.
.
.
443 $ALE         4,73     5,70      ( 3,36)  4096 219 \COMM.$SYSTEM.SYS00.OVDP
444 $ACC         4,72     5,71      ( 3,36)  4096 219 \COMM.$SYSTEM.SYS00.OVDP
451 $ZSLM        0,286    1,285     (67,0 )  1024 221 \COMM.$SYSTEM.SYS00.TZSLM
454 $ZTCP0       0,349    1,328     (48,0 )  32000 200 \COMM.$SYSTEM.SYS00.TCPIP
456 $ZTNP0       0,358    1,297     (46,0 )  6144 170 \COMM.$SYSTEM.SYS00.TELSERV
461 $Z04A        1,242    0,0       ( 1,30)   132 150 \COMM.$SYSTEM.SYSTEM.EMSDIST
466 $ZTCP1       1,314    0,365     (48,0 )  32000 200 \COMM.$SYSTEM.SYS00.TCPIP
468 $ZTNP1       1,334    0,366     (46,0 )  6144 170 \COMM.$SYSTEM.SYS00.TELSERV
534 $ZRD9        0,381    1,372     ( 1,30)   132 150 \COMM.$SYSTEM.SYS00.EMSDIST
538 $FXSVL       7,265    9,304     (63,3 )   1 199 \COMM.$SYSTEM.SYS00.LHOBJ
543 $BDC1        8,328    9,298     (63,0 )   4 199 \COMM.$SYSTEM.SYS00.LHOBJ
547 $Z046        0,47     0,0       ( 1,30)   132 150 \COMM.$SYSTEM.SYSTEM.EMSDIST
554 $FXTES       8,279    1,369     (63,3 )   1 199 \COMM.$SYSTEM.SYS00.LHOBJ
556 $FXTSI       2,265    4,283     (63,3 )   1 199 \COMM.$SYSTEM.SYS00.LHOBJ
585 $ZTNW0       4,103    5,95      (46,0 )  6144 170 \COMM.$SYSTEM.SYS00.TELSERV
591 $ZTC0        4,293    5,286     (48,0 )  32000 170 \COMM.$SYSTEM.SYS00.TCPIP

Total Errors = 0      Total Warnings = 0

```

The columns in [Figure 2-14](#) mean:

LDev	The logical device number
Name	The logical device name
PPID	The primary processor number and process identification number (PIN) of the specified device
BPID	The backup processor number and PIN of the specified device
Type	The device type and subtype
RSize	The record size the device is configured for
Pri	The priority level of the I/O process
Program	The fully qualified name of the program file for the process

[Table 2-6](#) gives the names of some subsystems that are common to most NonStop S-series systems and are routinely monitored by operations. These subsystems appear in the LISTDEV output in [Figure 2-14](#) on page 2-29.

Table 2-6. Key Subsystems and Their Logical Device Names and Device Types

Subsystem Name	Logical Name	Device Type	Description
TCP/IP	\$ZTCO	48	Transmission Control Protocol/Internet Protocol (TCP/IP)
Kernel	\$ZZKRN	66	NonStop Kernel operating system
Storage	\$ZZSTO	Disk: 3 Tape: 4 Open SCSI: 8 SMF pool: 25 SMF monitor: 52 \$ZZSTO: 65 \$ZSLM: 67	All storage devices; for example, disk and tape
SLSA	\$ZZLAN	43	All ServerNet LAN Systems Access (SLSA) connection and facilities
WAN	\$ZZWAN	50	All wide area network (WAN) connections

In [Table 2-6](#) the logical name for TCP/IP, \$ZTCO, is not preconfigured by HP. The name that is displayed on your system is the name that is configured for TCP/IP at your site.

Also, in [Figure 2-14](#) on [page 2-29](#), several disk drives and tape drives have been configured for VMS9. You can identify the subsystem that owns a device by looking up its device type in the *SCF Reference Manual for G-Series RVUs*.

To display information about a particular device:

```
> SCF LISTDEV TYPE n
```

where *n* is a number for the device type. For example, if *n* is 3, the device type is disks and tapes. For the VMS9 system, entering LISTDEV TYPE 3 would display information for \$DATA10, \$DATA04, \$DATA02, and \$DATA01.

To display information for a given subsystem:

```
> SCF LISTDEV subsysname
```

where *subsysname* is the logical name of a subsystem; for example, \$ZZKRN for the Kernel subsystem.

Displaying Configuration Information for Subsystems

The following tables give some of the SCF commands that display configuration information for objects controlled by subsystems that are common to most NonStop S-series systems. The examples use the SCF ASSUME command to make a given subsystem the current default object for gathering information.

TCP/IP Subsystem

These examples are based on a TCP/IP process named \$ZTCO. Before using the commands listed in [Table 2-7](#), type this command to make the TCP/IP subsystem the default object:

```
> SCF ASSUME PROCESS $ZTCO
```

Table 2-7. Displaying Information for the TCP/IP Subsystem (\$ZTCO)

To Display Information About These Configured Objects	Enter This Command
All TCP/IP devices	LISTDEV TCPIP
Detailed information about the TCP/IP subsystem manager	INFO, DETAIL
All SUBNET names	INFO SUBNET *
All ROUTE names	INFO ROUTE *

NonStop S-series servers support three versions of TCP/IP—NonStop TCP/IPv6, NonStop TCP/IP, and Parallel Library TCP/IP. When you use the SCF LISTDEV and INFO commands, all current TCP/IP processes are displayed. For more information, refer to the *TCP/IPv6 Configuration and Management Manual*, the *TCP/IP Configuration and Management Manual*, and the *TCP/IP (Parallel Library) Configuration and Management Manual*.

Kernel Subsystem

Before using commands listed in [Table 2-8](#), type this command to make the Kernel subsystem the default object:

```
> SCF ASSUME PROCESS $ZZKRN
```

Generic processes are part of the SCF Kernel subsystem. Generic processes can be created by the operating system or by a user. Examples of generic processes created by the operating system are the Kernel, SLSA, the storage subsystem, and WAN subsystem manager processes. Examples of generic processes created by a user are a Pathway program, a third-party program, or a user-written program that you configure to be controlled by the operating system. The \$ZPM persistence manager starts and monitors all generic processes.

Table 2-8. Displaying Information for the Kernel Subsystem (\$ZZKRN)

To Display Information About These Configured Objects	Enter This Command
The Kernel subsystem manager and ServerNet process names	LISTDEV KERNEL
All Kernel subsystem object and process names	NAMES \$ZZKRN
All generic processes	INFO *
Detailed information about a generic process	INFO <i>#generic-process</i> , DETAIL

Storage Subsystem

The storage subsystem manages disk and tape drives as well as SCSI and HP NonStop Storage Management Foundation (SMF) devices. Use the commands listed in [Table 2-9](#) to display desired information.

Table 2-9. Displaying Information for the Storage Subsystem (\$ZZST0)

To Display Information About These Configured Objects	Enter This Command
All disk and tape drives (list)	LISTDEV STORAGE
All storage subsystem objects and processes (by name)	NAMES \$ZZSTO
All disk drives (list)	LISTDEV TYPE 3
All disk drives (summary information)	INFO DISK \$*
A specific disk drive (detailed information)	INFO DISK <i>\$name</i> , DETAIL
All tape drives (list)	LISTDEV TYPE 4
All tape drives (summary information)	INFO TAPE \$*
A specific tape drive (detailed information)	INFO TAPE <i>\$name</i> , DETAIL

When displaying configuration files for disk and tape devices in the storage subsystem, you can use the OBEYFORM option with the INFO command to display currently defined attribute values in the format that you would use to set up a configuration file. Each attribute appears as a syntactically correct configuration command, as in:

```
ADD DISK $DATA14, SENDTO STORAGE, PRIMARYLOCATION (1,1,7)
```

Examples of the INFO command used with the OBEYFORM option are:

```
-> INFO DISK $*, OBEYFORM
```

```
-> INFO TAPE $*, OBEYFORM
```

ServerNet LAN Systems Access (SLSA) Subsystem

Before using commands listed in [Table 2-10](#), type this command to make the SLSA subsystem the default object:

```
> SCF ASSUME PROCESS $ZZLAN
```

The SLSA subsystem provides access to parallel LAN and WAN I/O for NonStop S-series servers. The SLSA subsystem provides access to Ethernet, token-ring, and multifunction I/O board Ethernet adapters and to the ServerNet wide area network (SWAN) concentrator.

Table 2-10. Displaying Information for the SLSA Subsystem (\$ZZLAN)

To Display Information About These Configured Objects	Enter This Command
The SLSA subsystem manager	LISTDEV SLSA
All SLSA subsystem object and process names	NAMES \$ZZLAN
All configured adapters, with group/module/slot and adapter type	INFO ADAPTER *
A specific adapter	INFO ADAPTER <i>adapter</i> , DETAIL
All logical interface (LIF) names, with associated MAC addresses, associated physical interface (PIF) names, and port types	INFO LIF *
A specific LIF	INFO LIF <i>lifname</i> , DETAIL
A specific PIF	INFO PIF <i>pifname</i> , DETAIL
All ServerNet addressable controller (SAC) names	INFO SAC *
A specific SAC	INFO SAC <i>sacname.n</i> , DETAIL

When displaying configuration files for adapter and LIF devices in the SLSA subsystem, you can use the OBEYFORM option with the INFO command to display currently defined attribute values in the format that you would use to set up a

configuration file. Each attribute appears as a syntactically correct system configuration command. For example:

```
ADD ADAPTER  $ZZLAN.E0154, &  
            LOCATION (1 , 1 , 54 ) , &  
            TYPE E4SA, &  
            ACCESSLIST (0, 1)
```

Examples of the INFO command used with the OBEYFORM option are:

```
-> INFO ADAPTER $*, OBEYFORM  
-> INFO LIF $*, OBEYFORM
```

WAN Subsystem

Before using commands listed in [Table 2-11](#), type this command to make the wide area network (WAN) subsystem the default object:

```
> SCF ASSUME PROCESS $ZZWAN
```

The WAN subsystem has responsibility for all WAN connections.

Table 2-11. Displaying Information for the WAN Subsystem (\$ZZWAN)

To Display Information About These Configured Objects	Enter This Command
The WAN subsystem manager	LISTDEV WAN
All WAN configuration managers, TCP/IP processes, and WANBoot processes	INFO *
All PATH names	INFO PATH *
The WAN adapters	INFO ADAPTER *
All DEVICE objects	INFO DEVICE *
All PROFILE objects	INFO PROFILE *

Additional Subsystems Controlled by SCF

[Table 2-12](#) lists the names associated with additional subsystems that can be controlled by SCF, along with its device types. You can use SCF commands to display the current attribute values for these objects.

Some SCF commands are available only to some subsystems. The objects that each command affects and the attributes of those objects are subsystem specific. This subsystem-specific information is presented in a separate manual for each subsystem. A partial list of these manuals appears in [Table 6-1](#) on page 6-15.

Table 2-12. Subsystem Objects Controlled by SCF (page 1 of 2)

Subsystem Acronym	Description	Device Type	Device Subtype
AM3270	AM3270 Access Method	60	0 or 10
ATM	Asynchronous Transfer Mode (ATM) protocol		
ATP6100	Asynchronous Terminal Process 6100	53	0
CP6100	Communications Process Subsystem	51	0
Envoy	Byte-synchronous and asynchronous communications data link-level interface	7	0
EnvoyACP/XF	Byte-synchronous communications data link-level interface		
Expand	Expand network control process (\$NCP) or line-handler process	62 or 63	2,3,5, or 6
GDS	General Device Support	57	
NonStop IPX/SPX	Nonstop Internet Packet Exchange/Sequenced Packet Exchange	19	0 or 1
OSIAPLMG	Open Systems Interconnection/Application Manager	55	20
OSIAS	Open Systems Interconnection/Application Services	55	1-5
OSICMIP	Open Systems Interconnection/Common Management Information Protocol	55	24
OSIFTAM	Open Systems Interconnection/File Transfer, Access, and Management	55	21 or 25
OSIMHS	Open Systems Interconnection/Message Handling System	55	11 or 12
OSITS	Open Systems Interconnection/Transport Services	55	55, 4
OSS	Open System Services	24	0
PAM	Port Access Method		

Table 2-12. Subsystem Objects Controlled by SCF (page 2 of 2)

Subsystem Acronym	Description	Device Type	Device Subtype
QIO	Queued I/O product	45	0
SCP	Subsystem Control Point	50	63
SCS	SQL Communications Subsystem	38	0
ServerNet/FX	ServerNet/FX	27	
SNAX/APN	SNAX Advanced Peer Networking	58 or 13	0
SNAX/XF	SNAX Extended Facility	58 or 13	
SNAXAPC	SNAX Advanced Program Communication	13	10
SNAXCRE	SNAX Creator-2	18	0
SNAXHLS	SNAX High-Level Support	13	5
SNMP	Simple Network Management Protocol agent	31	0
TELERV	TCP/IP TELNET product	46	0
TR3271	TR3271 Access Method	60	1 or 11
X.25AM	X.25 Access Method	61	0

Displaying Configuration Information—Examples

These examples show SCF commands that display subsystem configuration information, along with the information that is returned. These commands are not preceded by an ASSUME command.

To display all the processes running in the Kernel subsystem:

```
-> INFO PROC $ZZKRN.*
```

The system displays a listing similar to:

```
-> INFO PROC $ZZKRN.*

NONSTOP KERNEL - Info PROCESS \COMM.$ZZKRN

Symbolic Name      *Name  *Autorestart *Program
CEV-SERVER-MANAGER-P0  $ZCVP0  5      $SYSTEM.SYSTEM.CEVSMX
CEV-SERVER-MANAGER-P1  $ZCVP1  5      $SYSTEM.SYSTEM.CEVSMX
CLCI-TACL          $CLCI   10     $SYSTEM.SYSTEM.TACL
FOX                $ZZFOX   0      $SYSTEM.SYSTEM.FOXMON
MSGMON             $ZIMnn  10     $SYSTEM.SYSTEM.MSGMON
OSM-APPSRV         $ZOSM   10     $SYSTEM.SYSTEM.APPSRVR
OSM-CIMOM           $ZCMOM   5      $SYSTEM.SYSTEM.CIMOM
OSM-CONFLH-RD       $ZOLHI   0      $SYSTEM.SYSTEM.TACL
OSM-OEV            $ZOEV   10     $SYSTEM.SYSTEM.EVTMGR
QIOMON-0            $ZM00   10     $SYSTEM.SYSTEM.QIOMON
QIOMON-1            $ZM01   10     $SYSTEM.SYSTEM.QIOMON
QIOMON-10           $ZM10   10     $SYSTEM.SYSTEM.QIOMON
QIOMON-11           $ZM11   10     $SYSTEM.SYSTEM.QIOMON
QIOMON-12           $ZM12   10     $SYSTEM.SYSTEM.QIOMON
QIOMON-13           $ZM13   10     $SYSTEM.SYSTEM.QIOMON
QIOMON-14           $ZM14   10     $SYSTEM.SYSTEM.QIOMON
QIOMON-15           $ZM15   10     $SYSTEM.SYSTEM.QIOMON
QIOMON-2            $ZM02   10     $SYSTEM.SYSTEM.QIOMON
QIOMON-3            $ZM03   10     $SYSTEM.SYSTEM.QIOMON
QIOMON-4            $ZM04   10     $SYSTEM.SYSTEM.QIOMON
QIOMON-5            $ZM05   10     $SYSTEM.SYSTEM.QIOMON
QIOMON-6            $ZM06   10     $SYSTEM.SYSTEM.QIOMON
QIOMON-7            $ZM07   10     $SYSTEM.SYSTEM.QIOMON
QIOMON-8            $ZM08   10     $SYSTEM.SYSTEM.QIOMON
QIOMON-9            $ZM09   10     $SYSTEM.SYSTEM.QIOMON
ROUTING-DIST        $TSMRD   0      $SYSTEM.SYSTEM.TACL
SCP                 $ZNET   10     $SYSTEM.SYSTEM.SCP
SP-EVENT            $ZSPE   5      $SYSTEM.SYSTEM.ZSPE
TSM-SNMP            $ZTSMS   5      $SYSTEM.SYSTEM.SNMPAGT
TSM-SRM             $ZTSM   5      $SYSTEM.SYSTEM.SRM
ZEXP                $ZEXP   10     $SYSTEM.SYSTEM.OZEXP
ZHOME               $ZHOME  10     $SYSTEM.SYSTEM.ZHOME
ZLOG                $ZLOG   5      $SYSTEM.SYSTEM.EMSACOLL
ZSLM2               $ZSLM2  10     $SYSTEM.SYSTEM.TZSLM2
ZTCP0               $OSMM0   0      $SYSTEM.SYSTEM.TACL
ZTCP1               $OSMM1   0      $SYSTEM.SYSTEM.TACL
ZZKRN               $ZZKRN  10     $SYSTEM.SYSTEM.OZKRN
ZZLAN               $ZZLAN  10     $SYSTEM.SYSTEM.LANMAN
ZZSCL               $ZZSCL  10     $SYSTEM.SYSTEM.SNETMON
ZZSMN               $ZZSMN  10     $SYSTEM.SYSTEM.SANMAN
ZZSTO               $ZZSTO  10     $SYSTEM.SYSTEM.TZSTO
ZZWAN               $ZZWAN  10     $SYSTEM.SYSTEM.WANMGR
```

To display detailed information about the ATM subsystem manager:

```
-> INFO PROCESS $ZZKRN.#ZZATM, DETAIL
```

The system displays a listing similar to:

```
-> INFO PROC #ZZATM, DETAIL

NONSTOP KERNEL - Detailed Info PROCESS \COCO.$ZZKRN.#ZZATM

*AutoRestart.....10
*BackupCPU.....1
*CPU.....Not Specified
*DefaultVolume.....$SYSTEM.SYSTEM
*ExtSwap.....Not Specified
*Highpin.....ON
*HomeTerminal.....$ZHOME
*InFile.....$ZHOME
*Library.....Not Specified
*MemPages.....Not Specified
*Name.....$ZZATM
*OutFile.....$ZHOME
*PFSSize.....Not Specified
*PrimaryCPU.....0
*Priority.....180
*Program.....$SYSTEM.SYSTEM.ATMASM
*SaveAbend.....ON
*StartMode.....KERNEL
*StartupMessage.....<BCKP-CPU>
*StopMode.....STANDARD
*Type.....OTHER
*UserId.....SUPER.SUPER ( 255,255 )
```

To display detailed information about an ATM 3 ServerNet adapter:

```
-> INFO ADAPTER $ZZATM.$adapter-name, DETAIL
```

where *\$adapter-name* is the logical process name for the adapter.

The system displays a listing similar to this example for the adapter \$AM1:

```
-> info adapter $zzatm.$am1, detail

ATM Detailed Info ADAPTER \TAHITI.$AM1

LOCATION (grp,mod,slot).. 11 ,1 ,53
ACCESSLIST..... 0, 1, 2, 3
AMP Filename (in use).... \TAHITI.$SYSTEM.SYS45.AMP
*AMPFILENAME ..... $SYSTEM.SYS*.AMP
DownLd Filename (in use). \TAHITI.$SYSTEM.SYS45.C7838P00
*DLFILENAME .....$SYSTEM.SYS*.C7838P00
DownLd File Version.....T7838G06^04APR99^30Mar99
Dump Filename (in use)... \TAHITI.$SYSTEM.SYS45.C7838D00
*DUMPFILNAME ..... $SYSTEM.SYS*.C7838D00
Firmw Filename (in use).. \TAHITI.$SYSTEM.SYS45.C8158R00
*FIRMWFILENAME ..... $SYSTEM.SYS*.C8158R00
Firmw File Version.....

*AUTORELOAD..... ON                *AUTODUMP..... ON
*AUTOFIRMUP..... ON
*PROBECOUNT..... 10                *PROBEINTERVAL (0.01 sec) 300
MAC Address..... 08 00 8E 01 BB 77H
Product Id..... T3860              Adapter Type..... ATM
Part Number..... 108502
Serial Number..... V0L0U2          Hardware Revision..... B03-
08
Media Type..... MULTIMODE          Transmit Type..... SONET
*SYSDISC.....
*SYSOBJID.....
*SYSCONTACT.....
*SYSNAME.....
*SYSLOCATION.....
*SYSSERVICE..... 4
*DFC..... 1
*DFT (msec)..... 1
```

To display a list of all SAC names with their associated owners and access lists:

```
-> info sac $zzlan.*
```

The system displays a listing similar to:

```
-> INFO SAC $ZZLAN.*  
  
SLSA Info SAC  
  
Name                Owner  *Access List  
$ZZLAN.E0353.0      4      (4,5)  
$ZZLAN.E0353.1      4      (4,5)  
$ZZLAN.E0354.0      4      (5,4)  
$ZZLAN.E0354.1      4      (5,4)  
$ZZLAN.E0553.0      8      (9,8)  
$ZZLAN.E0553.1      8      (9,8)  
$ZZLAN.E0554.0      8      (8,9)  
$ZZLAN.E0554.1      8      (8,9)  
$ZZLAN.FE1154.0     0      (0,1)  
$ZZLAN.MIOE0.0      0      (0,1)  
$ZZLAN.MIOE1.0      1      (1,0)
```

To display configuration attribute values for all the WAN subsystem configuration managers, TCP/IP processes, and WANBoot processes:

```
-> INFO PROCESS $ZZWAN.*
```

The system displays a listing similar to:

```
-> INFO PROCESS $ZZWAN.*

WAN MANAGER Detailed Info Process \COMM.$ZZWAN.#5

RecSize..... 0                      *Type..... (50,00)
Preferred Cpu.... 5                  Alternate Cpu.... 65535
*IOBJECT..... \COMM.$SYSTEM.SYS00.CONMGR

WAN MANAGER Detailed Info Process \COMM.$ZZWAN.#4

RecSize..... 0                      *Type..... (50,00)
Preferred Cpu.... 4                  Alternate Cpu.... 65535
*IOBJECT..... \COMM.$SYSTEM.SYS00.CONMGR

WAN MANAGER Detailed Info Process \COMM.$ZZWAN.#ZTF00

RecSize..... 0                      *Type..... ( 0,48)
Preferred Cpu.... 4                  Alternate Cpu.... 5
*IOBJECT..... \COMM.$SYSTEM.ZTCPIP.TFTPSRV
TCPIP Name..... $ZTSW0
STARTUP String.... $SYSTEM.CSS00

WAN MANAGER Detailed Info Process \COMM.$ZZWAN.#SWB1

RecSize..... 0                      *Type..... ( 0,30)
Preferred Cpu.... 5                  Alternate Cpu.... 4
*IOBJECT..... \COMM.$SYSTEM.SYS00.WANBOOT
STARTUP String.... TCPIP $ZTSW1

WAN MANAGER Detailed Info Process \COMM.$ZZWAN.#ZTF01

RecSize..... 0                      *Type..... ( 0,48)
Preferred Cpu.... 5                  Alternate Cpu.... 4
*IOBJECT..... \COMM.$SYSTEM.ZTCPIP.TFTPSRV
TCPIP Name..... $ZTSW1
STARTUP String.... $SYSTEM.CSS00
```

To display detailed information about an Expand line-handler process:

```
->INFO LINE $line-name, DETAIL
```

where *\$line-name* is the logical line-handler process name.

The system displays a listing similar to this example for the line \$ATMBAT:

```
-> info line $atmbat, detail

EXPAND    Detailed Info  LINE  $ATMBAT    (LDEV  219)

  L2Protocol    Net^Atm  TimeFactor...  570K *SpeedK..      NOT_SET
  Framesize..... 132  -Rsize.....    3  -Speed.....
*LinePriority.... 1  StartUp.....  OFF  Delay.....0:00:00.10
*DownIfBadQuality  OFF *QualityThreshold 96 *QualityTimer.. 0:01:00.00
*Txwindow.....   7 *Maxreconnects.... 0 *AfterMaxRetries  PASSIVE
*Timerreconnect 0:00:30.00 *Retryprobe... 3 *Timerprobe.... 0:00:30.00
*Associateddev.  $AM1 *Associatesubdev  IP *Timerinactivity 0:00:00.00
  ConnEp....%H00000000 ListenEp.%H00000000 *CallType.....   PVC
*PvcName.....BAT01
```


Overview of Monitoring and Recovery

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When to Use This Section

This section provides an overview of monitoring a NonStop S-series server using various tools. It describes some common monitoring tasks. It also refers you to other sections or manuals for more information about monitoring specific system components, events, applications, or processes.

Importance of Monitoring

You must monitor a system to ensure that it is operating properly and to recognize when corrective action is required. By monitoring a system, you can:

- Verify whether components are currently up or down
- Be quickly notified of error conditions, state changes, and threshold conditions that have been exceeded or are reaching their limits
- View a chronological list of events that can help with problem diagnosis and resolution
- Determine how much of a particular resource is being used; for example, processor capacity, disk or file space, or communications line bandwidth
- Find performance problems that can affect the users of the system
- Make better use of existing resources
- Ensure that products such as HP NonStop SQL/MP, HP NonStop SQL/Mx, HP NonStop Transaction Management Facility (TMF), and Pathway are available
- Prevent many problems and outages from occurring

Monitoring Tasks

Regardless of the shift you work, certain areas of your hardware and software environment need to be checked on a regular basis. This subsection provides guidelines that will enable you to determine the general areas you should monitor.

Working With a Daily Checklist

A good method for ensuring that certain areas of your operations environment are monitored is to develop a checklist. Monitor these items on a system frequently. At least daily, monitor:

- Event messages
- Alarms
- Problem incident reports
- The status of all system components
- The status of processes
- The status of all applications
- The performance of processors, disks, and communications lines (Monitoring performance is not discussed in this guide.)

An example of a checklist you might use to standardize your routine daily monitoring tasks is:

Task	Operator's name	Date & time	Notes and questions
Check phone messages			
Check faxes			
Check e-mail			
Check shift log			
Check EMS event messages			
Check status of terminals			
Check comm. lines			
Check TMF status			
Check Pathway status			
Check disks			
Check tape drives			
Check processors			
Check printers			
Check spooler supervisor and collector processes			
Check ServerNet cluster status			

Tools for Checking the Status of System Hardware

Several tools are available to check the status of system components in a NonStop S-series server. The most frequently used tools are the OSM Service Connection, the TSM Service Application, and the Subsystem Control Facility (SCF).

[Table 3-1](#) lists the tools available to monitor system components.

Table 3-1. Monitoring System Components (page 1 of 3)

Resource	Monitored Using These Tools	See...
Adapters for communications subsystems: ATM3SA CCSA E4SA FESA GESA G4SA (not TSM supported) ServerNet/FX ServerNet/FX 2 Token-Ring	OSM Service Connection or TSM Service Application SCF interface to various subsystems	Identifying Problems Using the OSM Service Connection or the TSM Service Application on page 3-10 Section 6, Communications Subsystems: Monitoring and Recovery
Adapters for the storage subsystem: ServerNet/DA Fibre Channel ServerNet adapter (FCSA)	OSM Service Connection or (excluding FCSA) TSM Service Application SCF interface to the storage subsystem	Identifying Problems Using the OSM Service Connection or the TSM Service Application on page 3-10 Section 7, ServerNet/DA: Monitoring and Recovery Section 8, Fibre Channel ServerNet Adapter: Monitoring and Recovery
AWAN access server	RAS management tool	<i>3886 AWAN Installation and Configuration Guide</i>
Batteries	OSM Service Connection or TSM Service Application	Identifying Problems Using the OSM Service Connection or the TSM Service Application on page 3-10 Monitoring Batteries on page 15-3
Communications lines	SCF interface to the various subsystems	Section 6, Communications Subsystems: Monitoring and Recovery
NonStop Cluster Switch	OSM Service Connection or TSM Service Application	<i>OSM User's Guide, NonStop Cluster Switch Hardware Installation and Support Guide, or ServerNet Cluster Manual</i>
NonStop ServerNet 6780 Switch	OSM Service Connection	<i>OSM User's Guide, ServerNet Cluster 6780 Operations Guide</i>
ServerNet switch board	OSM Service Connection	<i>OSM User's Guide</i>

Table 3-1. Monitoring System Components (page 2 of 3)

Resource	Monitored Using These Tools	See...
Disk drives, external, attached to ServerNet/DA or FCSA	OSM Service Connection or TSM Service Application SCF interface to the storage subsystem DSAP	Identifying Problems Using the OSM Service Connection or the TSM Service Application on page 3-10 Section 7, ServerNet/DA: Monitoring and Recovery Section 8, Fibre Channel ServerNet Adapter: Monitoring and Recovery Section 9, Disk Drives: Monitoring and Recovery <i>Guardian User's Guide.</i>
Disk drives, internal	OSM Service Connection or TSM Service Application SCF interface to the storage subsystem DSAP	Identifying Problems Using the OSM Service Connection or the TSM Service Application on page 3-10 Section 9, Disk Drives: Monitoring and Recovery <i>Guardian User's Guide</i>
Fans	OSM Service Connection or TSM Service Application	Identifying Problems Using the OSM Service Connection or the TSM Service Application on page 3-10
IOMF CRUs or IOMF 2 CRUs	OSM Service Connection or TSM Service Application	Identifying Problems Using the OSM Service Connection or the TSM Service Application on page 3-10
Power monitor and control unit (PMCU)	OSM Service Connection or TSM Service Application	Identifying Problems Using the OSM Service Connection or the TSM Service Application on page 3-10
Power supply FRU (PWRFRU)	OSM Service Connection or TSM Service Application	Identifying Problems Using the OSM Service Connection or the TSM Service Application on page 3-10
Printers	SCF SPOOLCOM	Section 14, Printers and Terminals: Monitoring and Recovery <i>Guardian User's Guide</i>

Table 3-1. Monitoring System Components (page 3 of 3)

Resource	Monitored Using These Tools	See...
ServerNet expansion boards (SEBs) or modular ServerNet expansion boards (MSEBs)	OSM Service Connection or TSM Service Application	Identifying Problems Using the OSM Service Connection or the TSM Service Application on page 3-10
ServerNet fabrics: processor-to-processor and processor-to-IOMF or IOMF 2 communication	OSM Service Connection or TSM Service Application SCF interface to the Kernel subsystem	Identifying Problems Using the OSM Service Connection or the TSM Service Application on page 3-10 Section 12, ServerNet Fabrics: Monitoring and Recovery
ServerNet fabrics: processor to I/O devices other than IOMF CRUs or IOMF 2 CRUs	None available	Not applicable
ServerNet wide area network (SWAN) concentrator	OSM Service Connection or TSM Service Application SCF interface to the WAN subsystem	Identifying Problems Using the OSM Service Connection or the TSM Service Application on page 3-10 Section 6, Communications Subsystems: Monitoring and Recovery
Tape drives, external	OSM Service Connection or TSM Service Application SCF interface to the storage subsystem MEDIACOM	Section 10, Tape Drives: Monitoring and Recovery Section 7, ServerNet/DA: Monitoring and Recovery <i>Guardian User's Guide</i>

Additional Monitoring Tasks

[Table 3-2](#) provides an example of additional areas you should monitor daily.

Table 3-2. Daily Tasks Checklist

General Tasks	Specific Tasks	For More Information, See
Monitor messages from system users	Check telephone, fax, electronic mail, and any other messages	<i>Guardian User's Guide</i>
Monitor operator messages		Section 4, Monitoring EMS Event Messages
	From the OSM Event Viewer	OSM Event Viewer online help
	From the TSM Event Viewer	TSM Event Viewer online help
	From the EMSDIST printing distributor	<i>Guardian User's Guide</i>
Monitor key applications	From ViewPoint	<i>ViewPoint Manual</i>
	Monitor Pathway and TMFCOM	Section 13, Applications: Monitoring and Recovery
Monitor system processes	Monitor SQL/MX, SQL/MP and other applications	The documentation specific to the application
	Use the SCF and TACL PPD commands	Section 5, Processes: Monitoring and Recovery

Monitoring and Resolving Problems—An Approach

A useful approach to identifying and resolving problems in your system is to first use OSM or TSM to locate the focal point of a hardware problem and then use SCF to gather all the related data from the subsystems that control or act on the hardware. In this way, you can develop a larger picture that encompasses the whole environment, including communications links and other objects and services that might be contributing to the problem or affected by it.

For example, the OSM Service Connection or the TSM Service Application might display an alarm for an Ethernet adapter. This information is valuable, but the problem might not actually be with the adapter. By using SCF to examine status information not only for the adapter but also for the SLSA subsystem, the WAN subsystem, Expand, NonStop TCP/IP, the ServerNet fabrics, and so forth, you can determine whether the adapter is, for example, simply generating errors because of a NonStop TCP/IP problem.

To get comprehensive online descriptions of all the available SCF commands, use the SCF HELP command.

The following subsections give instructions for using OSM or TSM and SCF to monitor and resolve problems.

Using OSM or TSM to Monitor the System

OSM and TSM are client/server applications that provide maintenance, service tools, and troubleshooting for your NonStop S-series server. Using OSM or TSM, you can perform these monitoring tasks and related tasks:

- Monitor the current status of system resources
- Browse event logs
- Send problem and configuration information to a service provider
- View the connections within a system enclosure
- View a system configuration in its physical arrangement, logical organization, or inventory catalog

Using the OSM Service Connection or TSM Service Application

Although they are arranged differently, the OSM Service Connection and the TSM Service Application provide the same basic views and functionality. For a comparison and description of the functional differences, see the *OSM Migration Guide*.

When you log on to the OSM Service Connection or the TSM Service Application, the primary interface is called the Management window. In both applications, it contains an overview pane, a tree pane, a view pane, and a details pane.

Overview Pane

Displays a high-level view of system objects, such as internal fabrics, groups, and external devices (external disks and tapes), and of ServerNet Cluster objects, such as external fabrics, local nodes, and remote nodes.

Tree Pane

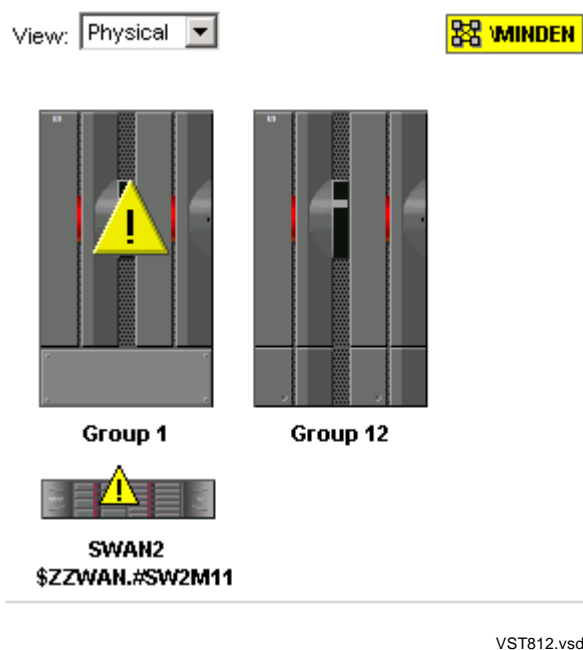
The tree pane and view pane work together to demonstrate the relationship between the physical location of a group, module, or resource and its position in the hierarchy of the NonStop S-series server.

View Pane

Within the view pane, you can choose the Physical view, Connection view (TSM only), or Inventory view of a NonStop S-series server. The Physical view displays a diagram of the system enclosures and any SWAN concentrators that are attached to the server. See [Figure 3-1](#).

Tape drives and external disk drives do not appear in the view pane.

Figure 3-1. Physical View of an Enclosure Showing an Abnormal Condition



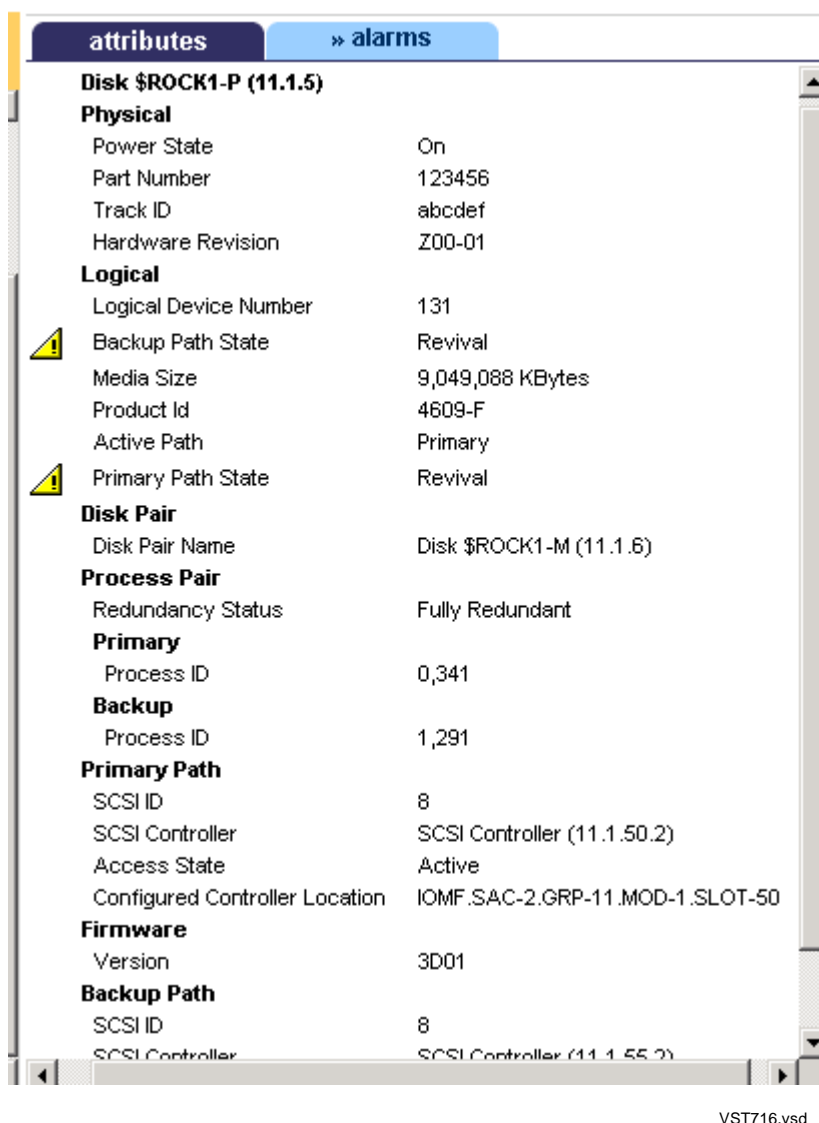
Details Pane

The details pane contains an Attributes tab and an Alarms tab:

- The Attributes tab lists the attribute names and values for the resource selected in either the tree or view pane. [Figure 3-2](#) shows an OSM example.

- The Alarms tab lists the alarms for the resource selected in the tree pane.

Figure 3-2. Attributes Tab of Management Window



Checking for Problems and Alarms

For most system components, you can use the OSM Service Connection or the TSM Service Application to quickly identify problems.

Identifying Problems Using the OSM Service Connection or the TSM Service Application

Use one of these applications to quickly check system components for problems needing service or operator intervention. See [Table 3-3](#).

In the details pane, if the Service State value is Service Required and shows a red triangle, the resource is not functioning. If the Service State value is Attention Required and shows a yellow triangle, the resource is not functioning normally.

Table 3-3. Identifying Conditions That Need Service or Operator Intervention

TSM Pane	Resource Is Not Functioning	Resource Is Not Functioning Normally	Normal Operation
View pane: Physical view	A red triangle appears over the enclosure (collapsed view), or the resource itself is red (expanded view).	A yellow triangle appears over the enclosure (collapsed view), or the resource itself is yellow (expanded view).	No colored icons are displayed, and no resources are colored.
View pane: Connection view	A red triangle appears over the enclosure (collapsed view), or the resource itself is red (expanded view).	A yellow triangle appears over the enclosure (collapsed view), or the resource itself is yellow (expanded view).	No colored icons are displayed, and no resources are colored.
Tree pane	A red triangle appears over the resource icon. A red bell to the left of the resource indicates an alarm condition.	A yellow triangle appears over the resource icon. A yellow bell to the left of the resource indicates an alarm condition.	No marks or other indications are displayed over any resource icons.
Details pane: Attributes tab	The value displayed for the Service State attribute is anything other than OK, and the problem attribute is highlighted with a red triangle to the left of the attribute name.	An unacceptable state such as down, degraded, disabled, fault, or unknown appears for the Service State attribute of the resource, and the problem attribute is highlighted with a yellow triangle to the left of the attribute name.	The Service State attribute is OK, and other attributes display acceptable states such as started or up.

In all the panes, if a resource is not functioning, it is red as indicated in [Table 3-3](#). However, the color propagated up through all objects that contain the nonfunctioning component (up to the system icon) is yellow. If you notice that the system, group, and module icons are yellow, they contain a resource that is either nonfunctioning (red) or needing attention (yellow). To help identify nonfunctioning objects, an alarm always occurs when an object is nonfunctioning (red).

All resources also have at least one other state attribute that provides further information about why the resource is down or degraded. TSM attributes include Battery State, Fan State, Processor State, and, for most adapters, SCF State. OSM attributes include Power State, Enabled State, Processor State, and Device State.

Monitoring Alarms

1. Log on to the OSM Service Connection or the TSM Service Application.
2. From the tree pane, locate and select the resource.
3. From the details pane, click the **Alarms** tab.
4. Double-click a specific alarm to display the Alarm Detail dialog box.

To get a summary of all outstanding alarms on the system:

1. In the OSM Management window, select **Summary>Alarm**. In the TSM Management window, click the **Alarm Summary** button (represented by a bell) on the toolbar. In both applications, the Alarm Summary dialog box appears. This dialog box lists all the alarms on the system and the resource associated with each alarm. Alarms are color-coded for severity, as listed in [Table 3-3](#) on page 3-11.
2. In the Alarm Summary dialog box, select a specific alarm and click **Detail** (OSM) or **Show Detail** (TSM). The Alarm Detail dialog box appears, with more detailed information about that alarm.

Monitoring Problem Incident Reports

The OSM or TSM Notification Director generates problem incident reports when changes occur that could directly affect the availability of resources on your NonStop S-series server. The Incident Report List tab on the Notification Director dialog box allows you to view, sort, authorize, and reject incident reports. The Notification Director allows you to forward notifications to your service provider if your system is configured for remote dial-out.

Recovery Operations for Problems Detected by OSM or TSM

After using the OSM Service Connection or the TSM Service Application to research a problem, you might be able to determine that the problem can be solved through operator intervention, or you might find that a service call is in order or even that a system component must be replaced.

Operator Intervention Is Required

In addition to checking the alarms for a given resource, refer to the section in this guide that covers that resource—for example, [Section 10, Tape Drives: Monitoring and Recovery](#)—for information on using the Subsystem Control Facility (SCF) and other tools to determine more details about the cause of a problem. Then follow the directions in the Recovery Operations subsection in the relevant section.

Service or Replacement Is Required

Replacing a system component that has malfunctioned is beyond the scope of this guide. Replacement procedures that customers can perform are limited to system

components called customer-replaceable units (CRUs). For more information, contact your service provider, or refer to the CSSI Web.

Using SCF to Monitor the System

Use the Subsystem Control Facility (SCF) to display information and current status for all the devices on your system known to SCF. Some SCF commands are available only to some subsystems. The objects that each command affects and the attributes of those objects are subsystem specific. This subsystem-specific information appears in a separate manual for each subsystem. A partial list of these manuals appears in [Appendix C, Related Reading](#).

Determining Device States

This subsection explains how to determine the state of devices on your system. For example, to monitor the current state of all tape devices on your system, at an SCF prompt:

```
-> STATUS TAPE $*
```

This example shows the results of the SCF STATUS TAPE \$* command:

```
1-> STATUS TAPE $*
STORAGE - Status TAPE \COMM.$TAPE0
LDev   State   Primary Backup   DeviceStatus
      PID      PID      PID
  156   STOPPED 2,268   3,288   NOT READY

STORAGE - Status TAPE \COMM.$DLT20
LDev   State   Primary Backup   DeviceStatus
      PID      PID      PID
  394   STARTED 2,267   3,295   NOT READY

STORAGE - Status TAPE \COMM.$DLT21
LDev   State   Primary Backup   DeviceStatus
      PID      PID      PID
  393   STARTED 1,289   0,299   NOT READY

STORAGE - Status TAPE \COMM.$DLT22
LDev   State   Primary Backup   DeviceStatus
      PID      PID      PID
  392   STARTED 0,300   1,288   NOT READY

STORAGE - Status TAPE \COMM.$DLT23
LDev   State   Primary Backup   DeviceStatus
      PID      PID      PID
  391   STARTED 1,287   0,301   NOT READY

STORAGE - Status TAPE \COMM.$DLT24
LDev   State   Primary Backup   DeviceStatus
      PID      PID      PID
  390   STARTED 6,265   7,298   NOT READY

STORAGE - Status TAPE \COMM.$DLT25
LDev   State   Primary Backup   DeviceStatus
      PID      PID      PID
  389   STARTED 4,265   5,285   NOT READY
```

Some other examples of the SCF STATUS command are:

```
-> STATUS LINE $LAM3
-> STATUS WS $LAM3.#WS1
-> STATUS WS $LAM3.*
-> STATUS WINDOW $LAM3.#WS1.*
-> STATUS WINDOW $LAM3.*, SEL STOPPED
```

The general format of the STATUS display follows. However, the format varies depending on the subsystem.

<i>subsystem STATUS object-type object-name</i>							
Name	State	PPID	BPID	attr1	attr2	attr3	...
<i>object-name1</i>	<i>state</i>	<i>nn,nnn</i>	<i>nn,nnn</i>	<i>val1</i>	<i>val2</i>	<i>val3</i>	...
<i>object-name2</i>	<i>state</i>	<i>nn,nnn</i>	<i>nn,nnn</i>	<i>val1</i>	<i>val2</i>	<i>val3</i>	...

where:

<i>subsystem</i>	The reporting subsystem name
<i>object-type</i>	The object, or device, type
<i>object-name</i> and Name	The fully qualified name of the object
State	One of the valid object states: ABORTING, DEFINED, DIAGNOSING, INITIALIZED, SERVICING, STARTED, STARTING, STOPPED, STOPPING, SUSPENDED, SUSPENDING, and UNKNOWN
PPID	The primary processor number and process identification number (PIN) of the object
BPID	The backup processor number and PIN of the object
<i>attrn</i>	The name of an attribute of the object
<i>valn</i>	The value of that object attribute

SCF Object States

[Table 3-4](#) lists and explains the possible object states that the SCF STATUS command can report.

Table 3-4. SCF Object States (page 1 of 2)

State	Substate	Explanation
ABORTING		The object is being aborted. The object is responding to an ABORT command or some type of malfunction. In this state, no new links are allowed, and drastic measures might be underway to reach the STOPPED state. This state is irrevocable.
DEFINED		One of the generally defined possible conditions of an object with respect to the management of that object.
DIAGNOSING		The object is in a subsystem-defined test mode entered through the DIAGNOSE command.
INITIALIZED		The system has created the process, but it is not yet in one of the operational states.
SERVICING	SPECIAL	The object is being serviced or used by a privileged process and is inaccessible to user processes.
	TEST	The object is reserved for exclusive testing.
STARTED		The object is logically accessible to user processes.
STARTING		The object is being initialized and is in transition to the STARTED state.
STOPPED	CONFIG-ERROR	The object is configured improperly.
	DOWN	The object is no longer logically accessible to user processes.
	HARDDOWN	The object is in the hard-down state or is physically inaccessible due to a hardware error.
	INACCESSIBLE	The object is inaccessible to user processes.
	PREMATURE-TAKEOVER	The backup input/output (I/O) process was asked to take over for the primary I/O process before it had the proper information.
	RESOURCE-UNAVAILABLE	The input/output (I/O) process could not obtain a necessary resource.
	UNKNOWN-REASON	The input/output (I/O) process is down for an unknown reason.

Table 3-4. SCF Object States (page 2 of 2)

State	Substate	Explanation
STOPPING		The object is in transition to the STOPPED state. No new links are allowed to or from the object. Existing links are in the process of being deleted.
SUSPENDED		The flow of information to and from the object is restricted. (It is typically prevented.) A subsystem must clearly distinguish between the type of information that is allowed to flow in the SUSPENDED state and that which normally flows in the STARTED or STOPPED state. In the SUSPENDED state, the object must complete any outstanding work defined by the subsystem.
SUSPENDING		The object is in transition to the SUSPENDED state. The subsystem must clearly define the nature of the restrictions that this state imposes on its objects.
UNKNOWN		The object's state cannot be determined because the object is inaccessible.

Monitoring and Recovery—Example

This subsection describes a hypothetical situation in which you use the system tools available—event log, TSM applications, and SCF—to identify, analyze, and solve a hardware problem.

Note. The cabling and topology diagrams in this subsection identify all ServerNet expansion boards as SEBs. Your system might instead have modular ServerNet expansion boards (MSEBs) in the slots designated for SEBs. SEBs and MSEBs are functionally equivalent, except that MSEBs are required for ServerNet cluster connectivity.

A Problem Occurs

You arrive for your shift and discover several users are having problems. Customer service is reporting complaints from Web-based shoppers who are losing their TCP/IP connections to system \2DIE4. \2DIE4 is an 8-processor system whose X fabric and Y fabric topologies appear in [Figure 3-3](#) and [Figure 3-4](#), respectively. The downtime is momentary. Customers are able to reconnect immediately by clicking Refresh or a hot link. But many have lost data in the middle of their purchase.

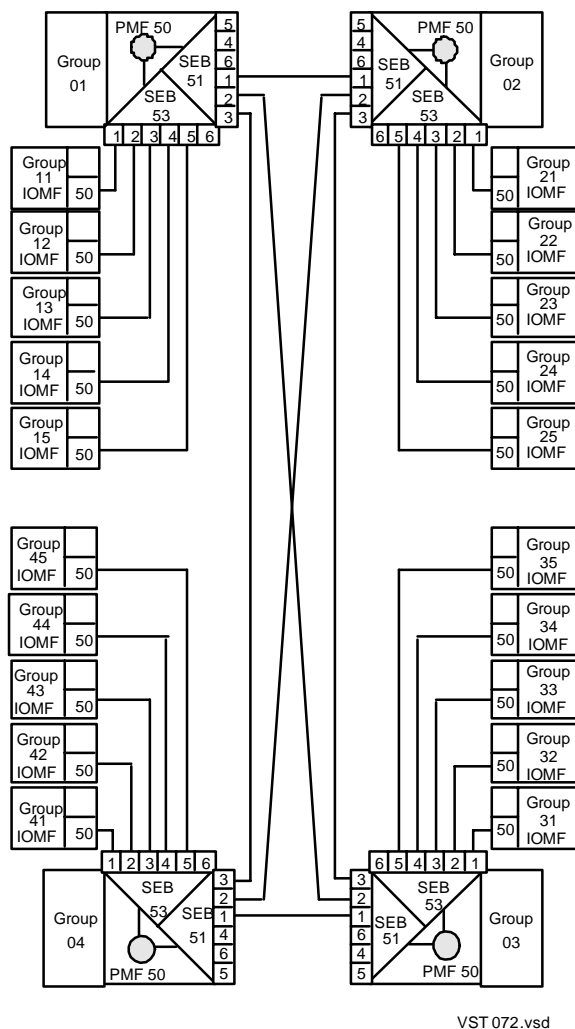
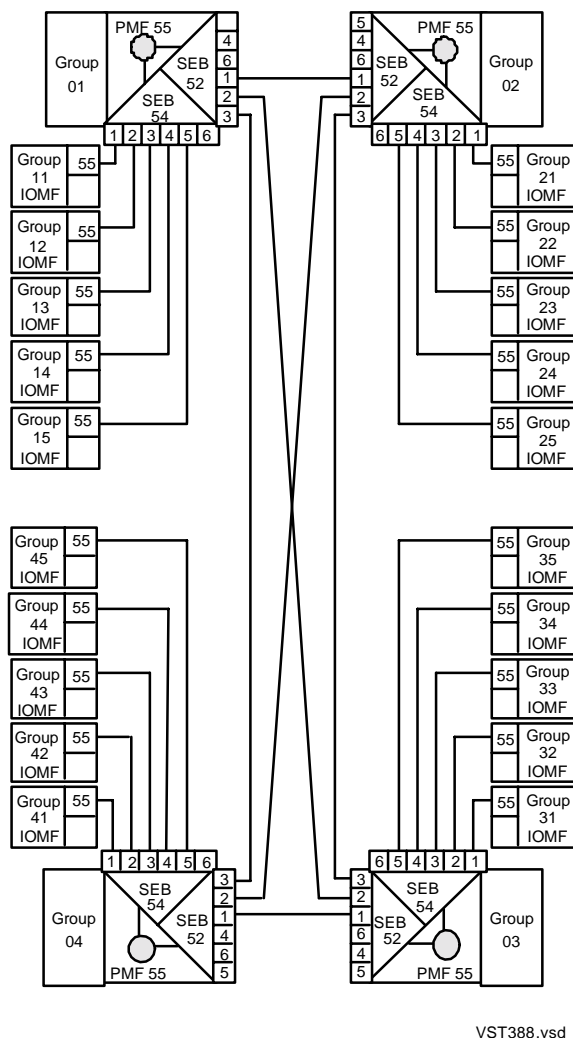
Figure 3-3. System \2DIE4, X Fabric

Figure 3-4. System \2DIE4, Y Fabric

You locate the Web application. It is running in a processor in processor enclosure 01. The Web application's TCP/IP connection is through an Ethernet adapter located in slot 53 in I/O enclosure 31—that is, the first I/O enclosure attached to processor enclosure 03.

At this point, you cannot tell whether the problem is an Internet issue outside the company firewall, a hardware failure in system \2DIE4, or a problem with one of the communications subsystems.

You check the event log for further clues and discover these multiple events:

- A total of eight “path down” error messages: four generated by processors 0 and 1 in group 01, and four generated by processors 4 and 5 in group 03
- Four “port error” messages from group 01: three from the PMF CRU in slot 55, and one from the SEB in slot 52

- Four “port error” messages from group 03: three from the PMF CRU in slot 55, and one from the SEB in slot 52
- Two “domain deletion” error messages from processor group 01, both from the SEB in slot 52
- A “Path change on device \$ZZLAN.E3153.0.A” error message from the Web application in group 01, indicating that the application had to switch paths to access the services of the adapter in group 31
- Fourteen error messages—including path-switch errors—from disk volume \$D3101, whose primary and mirror disks are located in slots 1 and 2 of group 31

You consider the messages and group them conceptually:

- Processors and applications in groups 01 and 03 are having trouble communicating with each other—there is a connection problem. As yet, it is unclear which group is originating the problem.
- All the port errors and domain deletion errors are from PMF CRUs in slot 55 and a SEB in slot 52—system components that communicate over the ServerNet Y fabric.
- The Web application in group 01 and the disk volume \$D3101 attached to group 03 both appear to have failed when attempting to use a primary communication path. Each was forced to use a secondary path. The path-switch errors from \$3101 are puzzling because the disk process would normally have performed this switch transparently.

Using OSM or TSM to Locate the Problem

You log onto the OSM Service Connection or the TSM Service Application to look at system \2DIE4. You see an alarm displayed next to the Y fabric icon in the overview pane or the tree pane. You select that icon and then select the Alarms tab in the details pane.

Only one alarm is listed for the Y fabric. You double-click that alarm to display the Alarm Detail dialog box. Under “Probable Cause,” you find:

- The PMF CRU in 01.1.55 might be down.
- The SEB in 01.1.52 might be down.
- The PMF CRU in 03.1.55 might be down.
- The SEB in 03.1.52 might be down.
- The cable connecting port 2 of the SEB in 01.1.52 to port 2 of the SEB in 03.1.52 might be loose or faulty.

Note. Beginning with the G06.11 RVU, TSM provides an additional field called Specific Problem that provides some additional information and a Repair Actions button that provides expanded information on the problem and repair actions.

You decide to do some more research, this time using SCF.

Using SCF to Locate the Problem

Because the error messages and the alarm detail indicate a problem with the Y fabric, you issue an SCF STATUS SERVERNET command:

```
> SCF STATUS SERVERNET $ZSNET
```

The system displays:

```
NONSTOP KERNEL - Status SERVERNET
X-FABRIC
  TO    0    1    2    3    4    5    6    7    8    9   10   11   12   13   14   15
FROM
  00     UP   UP   UP   UP   UP   UP   UP   UP   UNA  UNA  UNA  UNA  UNA  UNA  UNA  UNA
  01     UP   UP   UP   UP   UP   UP   UP   UP   UNA  UNA  UNA  UNA  UNA  UNA  UNA  UNA
  02     UP   UP   UP   UP   UP   UP   UP   UP   UNA  UNA  UNA  UNA  UNA  UNA  UNA  UNA
  03     UP   UP   UP   UP   UP   UP   UP   UP   UNA  UNA  UNA  UNA  UNA  UNA  UNA  UNA
  04     UP   UP   UP   UP   UP   UP   UP   UP   UNA  UNA  UNA  UNA  UNA  UNA  UNA  UNA
  05     UP   UP   UP   UP   UP   UP   UP   UP   UNA  UNA  UNA  UNA  UNA  UNA  UNA  UNA
  06     UP   UP   UP   UP   UP   UP   UP   UP   UNA  UNA  UNA  UNA  UNA  UNA  UNA  UNA
  07     UP   UP   UP   UP   UP   UP   UP   UP   UNA  UNA  UNA  UNA  UNA  UNA  UNA  UNA
  08  <- DOWN
  09  <- DOWN
  10  <- DOWN
  11  <- DOWN
  12  <- DOWN
  13  <- DOWN
  14  <- DOWN
  15  <- DOWN

Y-FABRIC
  TO    0    1    2    3    4    5    6    7    8    9   10   11   12   13   14   15
FROM
  00     UP   UP   UP   UP   DN DN  UP   UP   UNA  UNA  UNA  UNA  UNA  UNA  UNA  UNA
  01     UP   UP   UP   UP   DN DN  UP   UP   UNA  UNA  UNA  UNA  UNA  UNA  UNA  UNA
  02     UP   UP   UP   UP   UP   UP   UP   UP   UNA  UNA  UNA  UNA  UNA  UNA  UNA  UNA
  03     UP   UP   UP   UP   UP   UP   UP   UP   UNA  UNA  UNA  UNA  UNA  UNA  UNA  UNA
  04     DN DN  UP   UP   UP   UP   UP   UP   UNA  UNA  UNA  UNA  UNA  UNA  UNA  UNA
  05     DN DN  UP   UP   UP   UP   UP   UP   UNA  UNA  UNA  UNA  UNA  UNA  UNA  UNA
  06     UP   UP   UP   UP   UP   UP   UP   UP   UNA  UNA  UNA  UNA  UNA  UNA  UNA  UNA
  07     UP   UP   UP   UP   UP   UP   UP   UP   UNA  UNA  UNA  UNA  UNA  UNA  UNA  UNA
  08  <- DOWN
  09  <- DOWN
  10  <- DOWN
  11  <- DOWN
  12  <- DOWN
  13  <- DOWN
  14  <- DOWN
  15  <- DOWN
```

The boldface output in the display shows that the Y-fabric connection between the processors in group 01 (processors 0 and 1) and the processors in group 03 (processors 4 and 5) is down. The X fabric is functioning normally. Because the UP values in the display show that all the processors are able to communicate with other processors in the system, you conclude that all the PMF CRUs are functioning normally.

Next, to help eliminate more possibilities, check the physical cable between port 2 of the SEB in 01.5.52 and port 2 of the SEB in 03.1.52. and ensure that the new cable is attached securely. When you again issue the SCF STATUS SERVERNET command, the result is the same. Therefore, the cable is not causing the problem.

Next, because of the disk path-switch errors, you use SCF to check the current path configuration information for that disk. You assume that the disk's current primary path is the path to which it was switched as a result of the error. You are guessing that the disk was forced to switch paths because of a problem with the Y fabric. You type:

```
> SCF INFO $D3101, CONFIG
```

This partial listing shows some of the disk configuration information:

```

STORAGE - Configuration Information Magnetic DISK \GATE8.$D3101
Common Disk Configuration Information:
Primary Path Information:
  Adapter..... $ZZSTO.#IOMF.GRP-31.MOD-1.SLOT-50
  Disk Device ID..... 4
  Location (Group,Module,Slot)..... (31,1,1)
  SAC Name.....$ZZSTO.#IOMF.SAC-2.GRP-31.MOD-1.SLOT-50
  SAC ID..... 6
  SAC Sub Device..... 2

Backup Path Information:
  Adapter..... $ZZSTO.#IOMF.GRP-31.MOD-1.SLOT-55
  Disk Device ID..... 4
  Location (Group,Module,Slot)..... (31,1,1)
  SAC Name..... $ZZSTO.#IOMF.SAC-2.GRP-31.MOD-1.SLOT-55
  SAC ID..... 7
  SAC Sub Device..... 2

Mirror Path Information:
  Adapter..... $ZZSTO.#IOMF.GRP-31.MOD-1.SLOT-55
  Disk Device ID..... 4
  Location (Group,Module,Slot)..... (31,1,2)
  SAC Name.....$ZZSTO.#IOMF.SAC-1.GRP-31.MOD-1.SLOT-55
  SAC ID..... 7
  SAC Sub Device..... 1

Mirror Backup Path Information:
  Adapter..... $ZZSTO.#IOMF.GRP-31.MOD-1.SLOT-50
  Disk Device ID..... 4
  Location (Group,Module,Slot)..... (31,1,2)
  SAC Name.....$ZZSTO.#IOMF.SAC-1.GRP-31.MOD-1.SLOT-50
  SAC ID..... 6
  SAC Sub Device..... 1

```

The output shows that the primary path is currently configured for the X fabric (\$ZZSTO.#IOMF.GRP-31.MOD-1.SLOT-50), and the backup path is currently configured for the Y fabric (\$ZZSTO.#IOMF.GRP-31.MOD-1.SLOT-55). Next, you check which path is currently active:

```
> SCF STATUS $D3101-*
```

The system displays:

STORAGE - Status DISK \GATE8.\$D3101-*						
LDev	Path	Status	State	Substate	Primary PID	Backup PID
96	PRIMARY	ACTIVE	STARTED		4,263	5,263
96	BACKUP	INACTIVE	STARTED		4,263	5,263
96	MIRROR	INACTIVE	STARTED		4,263	5,263
96	MIRROR-BACKUP	ACTIVE	STARTED		4,263	5,263

The primary path is currently active. Because the primary path is configured for the X fabric, you conclude that the disk first tried to use the Y fabric and failed before switching to the X fabric. Now you want to find out why the path switch was not transparent.

At this point, you recall that if the storage subsystem's direct bulk I/O feature is set to ON, a disk can bypass the disk process and perform a direct transfer of bulk I/O over the preferred path. You execute an SCF INFO command to display attributes for the storage subsystem:

```
> SCF INFO SUBSYS $ZZSTO
```

The system displays:

```
1-> SCF INFO SUBSYS $ZZSTO
SCF - T9082G02 - (16JAN01) (08JAN01) - 07/09/2001 13:49:36 System \COMM
Copyright Compaq Computer Corporation 1986 - 2001
STORAGE - Info SUBSYS $ZZSTO
  AutoConfigure  AutoRevive  Autostart  BulkIO  LabelTape  UPS
  OFF            OFF        ON          ON      ON         OFF

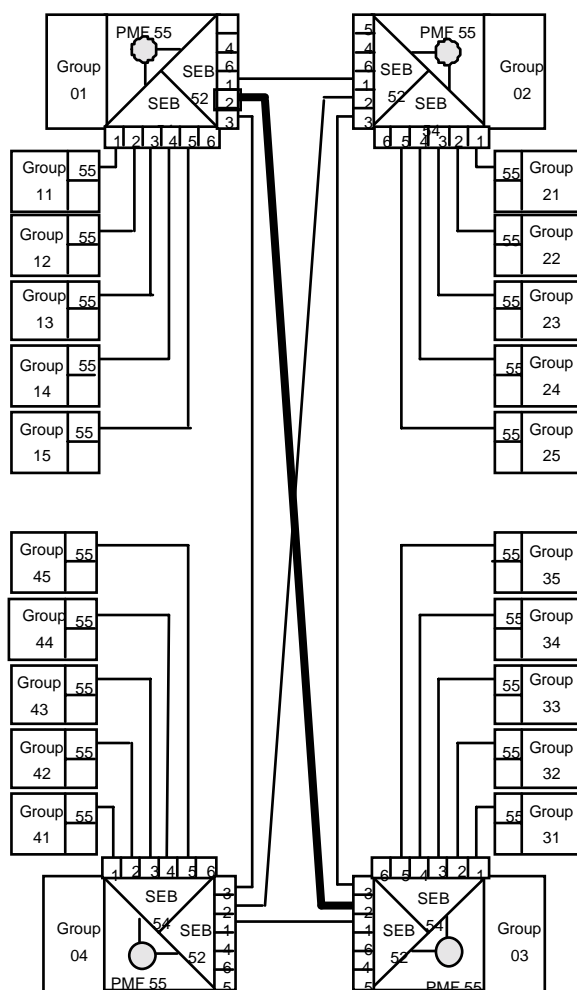
Total Errors = 0    Total Warnings = 0
```

The direct bulk I/O feature (BulkIO) is ON. You conclude that the disk attempted a direct bulk I/O transfer across its active path, which was initially configured through the Y fabric. Without the services of the disk process, the communications failure and subsequent path switch were not transparent, and the disk generated the 14 errors. You decide that the bulk I/O request probably came from a BACKUP/RESTORE process running in a processor in group 01.

From all this information about where the breakdowns occurred, you conclude that there is a hardware failure related to the Y fabric, in either group 01 or group 03—probably in port 2 of the SEB in slot 52.

[Figure 3-5](#) shows the affected communications path.

Figure 3-5. Failed Communications Path—System \2DIE4



Calling the Service Provider

You now call the service provider. When a field engineer arrives, that person first replaces the SEB in 01.1.52. The STATUS SERVERNET command shows no change. Then the field engineer replaces the SEB in 03.1.52. Another STATUS SERVERNET command shows all processor connections up and running. The failed connections have been reestablished. The problem was a failed SEB in system enclosure 03.

Automating Routine System Monitoring

You can automate many of the monitoring procedures. Automation saves you time and helps you to perform many routine tasks more efficiently.

Your operations environment might be using TACL macros, TACL routines, or command files to perform routine system monitoring and other tasks. These items allow you to run many procedures so that you can quickly determine system status, produce reports, or perform other common tasks. The *TACL Reference Manual* contains an example that you can adapt to automate system monitoring.

[Example 3-1](#) contains an example of a command file you can use or adapt to check many of the system elements:

1. To create a command file named SYSCHK that will automate system monitoring, type the text shown in [Example 3-1](#) into an EDIT file.

Example 3-1. System Monitoring Command File

```
COMMENT THIS IS THE FILE SYSCHK
COMMENT THIS CHECKS ALL DISKS:
SCF STATUS DISK $*
COMMENT THIS CHECKS ALL TAPE DRIVES:
SCF STATUS TAPE $*
COMMENT THIS CHECKS THE SPOOLER PRINT DEVICES:
SPOOLCOM DEV
COMMENT THIS CHECKS THE LINE HANDLERS:
SCF STATUS LINE $*
COMMENT THIS CHECKS THE STATUS OF TMF:
TMFCOM;STATUS TMF
COMMENT THIS CHECKS THE STATUS OF PATHWAY:
PATHCOM $ZVPT;STATUS PATHWAY;STATUS PATHMON
```

2. After you create this file, at a TACL prompt, type this command to execute the file and automatically monitor many elements of your system:

```
> OBEY SYSCHK
```

For an example of the output that is sent to your home terminal when you execute a command file such as SYSCHK, refer to [Example 3-2](#). This output shows that all elements of the system being monitored are up and running normally.

Example 3-2. System Monitoring Output File (page 1 of 3)

```

COMMENT  THIS IS THE FILE SYSCHK

COMMENT  THIS CHECKS ALL DISKS:
SCF STATUS DISK $*

STORAGE - Status DISK \SHARK.$DATA12
LDev    Primary    Backup    Mirror    MirrorBackup    Primary    Backup
              PID              PID
    52  *STARTED    STARTED    *STARTED    STARTED        3,262      2,263

STORAGE - Status DISK \SHARK.$DATA01
LDev    Primary    Backup    Mirror    MirrorBackup    Primary    Backup
              PID              PID
    63  *STARTED    STARTED    *STARTED    STARTED        0,267      1,266

STORAGE - Status DISK \SHARK.$DATA04
LDev    Primary    Backup    Mirror    MirrorBackup    Primary    Backup
              PID              PID
    60  *STARTED    STARTED    *STARTED    STARTED        0,270      1,263

STORAGE - Status DISK \SHARK.$SYSTEM
LDev    Primary    Backup    Mirror    MirrorBackup    Primary    Backup
              PID              PID
    6   *STARTED    STARTED    STOPPED    STOPPED        0,256      1,256

COMMENT  THIS CHECKS ALL TAPE DRIVES:
SCF STATUS TAPE $*

STORAGE - Status TAPE $TAPE1
LDev    State      SubState              Primary    Backup    DeviceStatus
              PID              PID
    48    STARTED              0,274

STORAGE - Status TAPE $TAPE0
LDev    State      SubState              Primary    Backup    DeviceStatus
              PID              PID
    49    STARTED              0,273

COMMENT  THIS CHECKS THE SPOOLER PRINT DEVICES:
SPOOLCOM DEV

DEVICE                                STATE      FLAGS    PROC      FORM
$LINE1                                WAITING    H        $SPLX
$LINE2                                WAITING    H        $SPLX
$LINE3                                WAITING    H        $SPLX
$LASER                                WAITING    H        $SPLP

```

Example 3-2. System Monitoring Output File (page 2 of 3)

```

COMMENT THIS CHECKS ALL SACS:
SCF STATUS SAC $*

SLSA Status SAC

Name                Owner      State
$ZZLAN.E4SA1.0      1        STARTED
$ZZLAN.E4SA1.1      0        STARTED
$ZZLAN.E4SA1.2      0        STARTED
$ZZLAN.E4SA1.3      1        STARTED

COMMENT THIS CHECKS ALL ADAPTERS
SCF STATUS ADAPTER $*

SLSA Status ADAPTER

Name                State
$ZZLAN.MIOE0        STARTED
$ZZLAN.E4SA0        STARTED
$ZZLAN.MIOE1        STARTED
$ZZLAN.E4SA2        STARTED

COMMENT THIS CHECKS ALL LIFS
SCF STATUS LIF $*

SLSA Status LIF

Name                State      Access State
$ZZLAN.LAN0        STARTED      UP
$ZZLAN.LAN3        STARTED      DOWN

COMMENT THIS CHECKS ALL PIFS
SCF STATUS PIF $*

SLSA Status PIF

Name                State
$ZZLAN.E4SA0.0.A    STARTED
$ZZLAN.E4SA0.0.B    STARTED
$ZZLAN.E4SA0.1.A    STOPPED
$ZZLAN.E4SA0.1.B    STARTED

COMMENT THIS CHECKS THE LINE HANDLERS:
SCF STATUS LINE $*

COMMENT THIS CHECKS THE STATUS OF TMF:
TMFCOM:STATUS TMF
TMF Status:
  System: \SAGE, Time: 12-Jul-1994  14:05:00
  State: Started
  Transaction Rate: 0.25 TPS
AuditTrail Status:
  Master:
    Active audit trail capacity used: 68%
    First pinned file: $TMF1.ZTMFAT.AA000044
    Reason: Active transactions(s).
    Current file: $TMF1.ZTMFAT.AA000045
AuditDump Status:
  Master: State: enabled, Status: active, Process $X545,
    File: $TMF2.ZTMFAT.AA000042
BeginTrans Status: Enabled
Catalog Status:
  Status: Up
Processes Status:
  Dump Files:
    #0: State: InProgress

```

Example 3-2. System Monitoring Output File (page 3 of 3)

```

COMMENT  THIS CHECKS THE STATUS OF PATHWAY:
PATHCOM $ZVPT;STATUS PATHWAY;STATUS PATHMON

PATHWAY -- STATE=RUNNING

                RUNNING
EXTERNALTCPS      0
LINKMONS          0
PATHCOMS          1
SPI               0

                                FREEZE
                RUNNING  STOPPED  THAWED    FROZEN  PENDING
SERVERCLASSES     17       0       17        0       0

                RUNNING  STOPPED  PENDING
SERVERPROCESSES    17      35       0
TCPS               1       0       0

                RUNNING  STOPPED  PENDING  SUSPENDED
TERMS              0       0       0        0
PATHMON \COMM.$ZVPT -- STATE=RUNNING          CPUS 0:1
  PATHCTL  (OPEN)    $OPER.VIEWPT.PATHCTL
  LOG1 SE  (OPEN)    $0
  LOG2     (CLOSED)

REQNUM  FILE      PID              PAID    WAIT
1       PATHCOM  $X0X7              1,254
2       TCP      $Z040

```

Using the Status LEDs to Monitor the System

Status LEDs on the various enclosures and system components light during certain operations, such as when the system performs a series of power-on self-tests (POSTs) when a server is first powered on. [Table 3-5](#) lists some of the status light-emitting diodes (LEDs) and their functions.

Table 3-5. Status LEDs and Their Functions (page 1 of 2)

Location	LED Name	Color	Function
Disk drive	Power-on	Green	Lights when the disk drive is receiving power.
	Activity	Yellow or amber	Lights when the disk drive is executing a read or write command.
I/O multifunction (IOMF) CRU	Power-on	Green	Lights when the IOMF CRU is receiving power.
	Service	Amber	Lights temporarily during the POSTs and continuously when the IOMF CRU is not in a fully functional state. Lights continuously if the POST for the IOMF CRU has failed or when the service processor (SP) detects an error in the transfer of ServerNet data.
Processor multifunction (PMF) CRU	Power-on	Green	Lights when the PMF CRU is receiving power.
	Service	Amber	Lights temporarily during the POSTs and continuously when the PMF CRU is not in a fully functional state. Lights continuously if the POST for the PMF CRU has failed. Flashes when the service processor (SP) image is being loaded from its peer.
ServerNet/DA adapter	Power-on	Green	Lights when the ServerNet adapter is receiving power.
	Service	Amber	Lights temporarily during the POSTs and continuously when the ServerNet adapter is not in a fully functional state or if the POST for the ServerNet adapter has failed.
Fibre Channel ServerNet adapter (FCSA)	Power-on	Green	Lights when the adapter is receiving power.
	Service	Amber	Lights to indicate internal failure or service action required.

Table 3-5. Status LEDs and Their Functions (page 2 of 2)

Location	LED Name	Color	Function
Gigabit Ethernet 4-port ServerNet adapter (G4SA)	Power-on	Green	Lights when the adapter is receiving power.
	Service	Amber	Lights to indicate internal failure or service action required.
ServerNet switch board	Power-on	Green	Lights when the adapter is receiving power.
	Service	Amber	Lights to indicate internal failure or service action required.
ServerNet expansion board (SEB) or modular ServerNet expansion board (MSEB)	Power-on	Green	Lights when the SEB or MSEB is receiving power.
	Fault	Amber	At initial power on, lights until the SEB or MSEB has been successfully configured by the service processor (SP). Then the LED goes off. Lights continuously to indicate that the SEB or MSEB is not in a fully functional state.
	ServerNet port:	Amber (6 on SEB)	Unused.
		Green (10 on MSEB)	Indicates state of the ServerNet link. Light on indicates that the port is receiving a valid link-alive signal from the remote port to which the PIC is connected. Light extinguishes on loss of the link-alive signal.
System enclosure	Group service (2 in each enclosure)	Amber	On or off in response to a group service LED command from OSM or TSM.

Related Reading

For more information about monitoring, see the documentation listed in [Table 3-6](#).

Table 3-6. Related Reading for Monitoring

Task	Tool	For information, see...
Monitoring system hardware, including locating failed or failing CRUs	OSM Service Connection	OSM online help <i>OSM User's Guide</i>
	TSM Service Application	TSM online help <i>TSM Online User Guide</i>
Using SCF, its commands and options, and device types and subtypes	SCF interface to subsystems	<i>SCF Reference Manual for G-Series RVUs</i> <i>SCF Reference Manual for the Storage Subsystem</i>
Monitoring clustered servers	OSM Service Connection or	<i>ServerNet Cluster 6780 Operations Guide</i>
	TSM Service Application	<i>ServerNet Cluster Manual</i>

4

Monitoring EMS Event Messages

[When to Use This Section](#) 4-1

[What Is the Event Management Service \(EMS\)?](#) 4-2

[Tools for Monitoring EMS Event Messages](#) 4-2

EMSDIST 4-2

OSM Event Viewer 4-2

TSM Event Viewer 4-2

ViewPoint 4-3

[Related Reading](#) 4-3

When to Use This Section

Use this section for a brief description of the Event Management Service (EMS) and the tools used to monitor EMS event messages.

What Is the Event Management Service (EMS)?

The Event Management Service (EMS) is a collection of processes, tools, and interfaces that support the reporting and retrieval of event information. Information retrieved from EMS can help you to:

- Monitor your system or network environment
- Analyze circumstances that led up to a problem
- Detect failure patterns
- Adjust for changes in the run-time environment
- Recognize and handle critical problems
- Perform many other tasks required to maintain a productive computing operation

Tools for Monitoring EMS Event Messages

To view EMS event messages for a NonStop S-series server, use one of these tools:

- EMSDIST
- OSM Event Viewer
- TSM Event Viewer
- ViewPoint

EMSDIST

The EMSDIST program is the object program for a printing, forwarding, or consumer distributor, any of which you can start with a TACL RUN command. This guide does not describe using EMSDIST. For more information, see the *Guardian User's Guide*.

OSM Event Viewer

The OSM Event Viewer is a browser-based event viewer, more like Web ViewPoint than the TSM Event Viewer. The OSM Event Viewer allows you to retrieve and view events from any EMS formatted log files (\$0, \$ZLOG, or an alternate collector) for rapid assessment of operating system problems.

To access the OSM Event Viewer, refer to [Launching OSM and TSM Applications](#) on page 1-11. For more about the OSM Event Viewer, including a comparison with TSM Event Viewer, see the *OSM Migration Guide*. For details on how to use the OSM Event Viewer, refer to the online help.

TSM Event Viewer

Use the TSM Event Viewer to view a chronological list of events generated by processors, processes, and subsystems.

The TSM Event Viewer allows you to view EMS log files using multiple views that you can customize. These various views permit rapid assessment of operating system

problems. You can view events from any EMS formatted log files (\$0, \$ZLOG, or an alternate collector), including event logs saved on the server.

To access the TSM Event Viewer, refer to [Launching OSM and TSM Applications](#) on page 1-11. This guide does not describe using the TSM Event Viewer. For more information, refer to online help for the TSM Event Viewer.

ViewPoint

Use the ViewPoint product to display event messages about current or past events occurring anywhere in the network on a set of block-mode events screens. The messages can be errors, failures, warnings, and requests for operator actions. The events screens allow operators to monitor significant occurrences or problems in the network as they occur. Critical events or events requiring immediate action are highlighted.

This guide does not describe using the ViewPoint product. For more information, see the *ViewPoint Manual*. In general, the *ViewPoint Manual* applies to both D-series RVUs and G-series RVUs. However, some information might apply only to D-series RVUs; for example, references to the Peripheral Utility Program (PUP).

Related Reading

For more information about monitoring EMS event messages, see the documentation in [Table 4-1](#).

Table 4-1. Related Reading for Monitoring EMS Event Messages

Task	Tool	For information, see...
Viewing event logs	EMSDIST	<i>Guardian User's Guide</i>
	TSM Event Viewer	TSM Event Viewer online help
	ViewPoint	<i>ViewPoint Manual</i>
	OSM Event Viewer	OSM Event Viewer online help

Processes: Monitoring and Recovery

[When to Use This Section](#) 5-1

[Types of Processes](#) 5-2

System Processes 5-2

I/O Processes (IOPs) 5-2

Generic Processes 5-2

[Monitoring Processes](#) 5-3

Monitoring System Processes 5-3

Monitoring IOPs 5-4

Monitoring Generic Processes 5-4

[Recovery Operations for Processes](#) 5-6

[Related Reading](#) 5-6

When to Use This Section

This section provides basic information about the different types of processes for NonStop S-series servers. It gives a brief example of monitoring each type of process and provides information about the commands available for recovery operations.

Types of Processes

Three types of processes are of major concern to a system operator of a NonStop S-series server:

- System processes
- I/O processes (IOPs)
- Generic processes

System Processes

A system process is a privileged process that is created during system load and exists continuously for a given configuration for as long as the processor remains operable. Examples of system processes include the memory manager, the monitor, and the I/O control processes.

I/O Processes (IOPs)

An I/O process (IOP) is a system process that manages communications between a processor and I/O devices. IOPs are often configured as fault-tolerant process pairs, and they typically control one or more I/O devices or communications lines. Each IOP is configured in a maximum of two processors, typically a primary processor and a backup processor.

An IOP provides an application program interface (API) that allows access to an I/O interface. A wide area network (WAN) communications line is an example of an I/O interface. IOPs configured using the SCF interface to the WAN subsystem manage the input and output functions for the ServerNet wide area network (SWAN) concentrator. Examples of IOPs include, but are not limited to, line-handler processes for Expand and other communications subsystems.

Generic Processes

Generic processes are configured by the SCF interface to the Kernel subsystem. They can be configured in one or more processors. Although sometimes called system-managed processes, generic processes can be either system processes or user-created processes. Any process that can be started from a TACL prompt can be configured as a generic process. Generic processes can be configured to have persistence; that is, to automatically restart if stopped abnormally.

Examples of generic processes:

- The \$ZZKRN Kernel subsystem manager process
- Other generic processes controlled by \$ZZKRN; for example:
 - The \$ZZSTO storage subsystem manager process
 - The \$ZZWAN wide area network (WAN) subsystem manager process
 - QIO processes

- OSM server processes
- TSM server processes
- The \$ZZLAN ServerNet LAN Systems Access (SLSA) subsystem manager process

Monitoring Processes

This subsection briefly provides examples of some of the tools available to monitor processes. For some processes, such as IOPs, monitoring is more fully discussed in other manuals. In general, use this method to monitor processes:

1. Develop a list of processes that are crucial to the operation of your system.
2. Determine how each of these processes is configured.
3. Use the appropriate tool to monitor the process.

Monitoring System Processes

Check that the system processes are up and running in the processors as you intended. At a TACL prompt:

```
> STATUS *
```

This example shows output produced by the TACL STATUS * command:

```
$SYSTEM STARTUP 2> status *
Process          Pri PFR %WT Userid  Program file                                Hometerm
0,0              201 P R 000 255,255 $SYSTEM.SYS00.OSIMAGE $YMIOP.#CLCI
0,1              210 P   040 255,255 $SYSTEM.SYS00.OSIMAGE $YMIOP.#CLCI
0,2              210 P   051 255,255 $SYSTEM.SYS00.OSIMAGE $YMIOP.#CLCI
0,4              211 P   017 255,255 $SYSTEM.SYS00.OSIMAGE $YMIOP.#CLCI
$0               0,5      201 P   011 255,255 $SYSTEM.SYS00.OSIMAGE $YMIOP.#CLCI
$ZNUF            0,6      200 P   015 255,255 $SYSTEM.SYS00.OSIMAGE $YMIOP.#CLCI
$Z0              0,7      200 P   015 255,255 $SYSTEM.SYS00.OSIMAGE $YMIOP.#CLCI
$ZOPR            0,8      201 P   011 255,255 $SYSTEM.SYS00.OSIMAGE $YMIOP.#CLCI
$ZRM00           0,9      200 P   001 255,255 $SYSTEM.SYS00.OSIMAGE $YMIOP.#CLCI
$ZTM00           0,10     180 P   017 255,255 $SYSTEM.SYS00.TMFMON2 $YMIOP.#CLCI
$TMP             0,12     204 P   005 255,255 $SYSTEM.SYS00.TMFTMP  $YMIOP.#CLCI
$DM00            0,14     148 P   025 255,255 $SYSTEM.SYS00.DMON   $YMIOP.#CLCI
$ZM00            0,20     201 P   015 255,255 $SYSTEM.SYS00.QIOMON  $ZHOME
$ZZLAN           0,21     180 P   015 255,255 $SYSTEM.SYS00.LANMAN  $ZHOME
$ZZKRN           0,22     180 P   001 255,255 $SYSTEM.SYS00.OZKRN   $ZHOME
$ZNET            0,55     165 P   011 255,255 $SYSTEM.SYS00.SCP     $ZHOME
$ZSVR            0,67     195 P   015 255,255 $SYSTEM.SYS00.ZSERVER $ZHOME
$ZZPAM           0,69     201 P   015 255,255 $SYSTEM.SYS00.PAMMAN  $YMIOP.#CLCI
$CLCI            0,73     199   R 000 255,255 $SYSTEM.SYS00.TACL    $YMIOP.#CLCI
$YMIOP           0,256    205 P   251 255,255 $SYSTEM.SYS00.OSIMAGE $YMIOP.#CLCI
$SYSTEM          0,257    220 P   317 255,255 $SYSTEM.SYS00.OSIMAGE $YMIOP.#CLCI
$SYSTEM          0,262    220 P   317 255,255 $SYSTEM.SYS00.TSYSDP2 $YMIOP.#CLCI
$ZPM             0,263    199 P   011 255,255 $SYSTEM.SYS00.ZPM     $YMIOP.#CLCI
$AUDIT           0,281    220 P   317 255,255 $SYSTEM.SYS00.TSYSDP2 $ZHOME
$DATA00          0,283    220 P   317 255,255 $SYSTEM.SYS00.TSYSDP2 $ZHOME
$DATA19          0,284    220 P   317 255,255 $SYSTEM.SYS00.TSYSDP2 $ZHOME
$DATA20          0,285    220 P   317 255,255 $SYSTEM.SYS00.TSYSDP2 $ZHOME
$DATA21          0,286    220 P   317 255,255 $SYSTEM.SYS00.TSYSDP2 $ZHOME
$ZZFOX           0,287    167 P   251 255,255 $SYSTEM.SYS00.FOXMON  $YMIOP.#CLCI
$ZLOG            0,288    150   011 255,255 $SYSTEM.SYS00.EMSACOLL $ZHOME
$ZSPE            0,289    150   001 255,255 $SYSTEM.SYS00.ZSPE    $ZHOME
```

Monitoring IOPs

For a list of manuals that provide more information about monitoring I/O processes (IOPs), refer to [Section 6, Communications Subsystems: Monitoring and Recovery](#).

Monitoring Generic Processes

Because generic processes are configured using the SCF interface to the Kernel subsystem, you specify the \$ZZKRN Kernel subsystem manager process when monitoring a generic process. These SCF commands are available for monitoring \$ZZKRN and other generic processes:

INFO	Displays configuration information for the specified objects
NAMES	Displays a list of subordinate object types and names for the specified objects
STATUS	Displays current status information about the specified objects

Monitoring the Status of \$ZZKRN

To monitor the status of the \$ZZKRN Kernel subsystem manager process, at a TACL prompt:

```
> STATUS SUBSYS $ZZKRN
```

This example shows the output produced by this command:

```
1 -> STATUS SUBSYS $ZZKRN
NONSTOP KERNEL - Status SUBSYS \COMM.$ZZKRN
Name           State      Processes
                (conf/strd)
\COMM.$ZZKRN   STARTED   ( 25/22 )
```

Monitoring the Status of All Generic Processes

To monitor the status of all generic processes controlled by \$ZZKRN, at a TACL prompt:

```
> STATUS PROCESS $ZZKRN.*
```


This example shows the output produced by this command:

```
1-> STATUS PROCESS $ZZKRN.*
NONSTOP KERNEL - Status PROCESS \BACH.$ZZKRN
```

Symbolic Name	Name	State	Sub PID	Primary PID	Backup PID	Owner ID
CEV-SERVER-MANAGER-P0	\$ZCVP0	STARTED	0	,337	None	255,255
CEV-SERVER-MANAGER-P1	\$ZCVP1	STARTED	0	,349	None	255,255
CLCI-TACL	\$CLCI	STARTED	0	,87	None	0,0
FOX	\$ZZFOX	STARTED	0	,297	1,292	255,255
MSGMON	\$ZIM00	STARTED	0	,295	None	255,255
MSGMON	\$ZIM01	STARTED	1	,278	None	255,255
MSGMON	\$ZIM02	STARTED	2	,271	None	255,255
MSGMON	\$ZIM03	STARTED	3	,277	None	255,255
MSGMON	\$ZIM04	STARTED	4	,270	None	255,255
MSGMON	\$ZIM05	STARTED	5	,279	None	255,255
MSGMON	\$ZIM06	STARTED	6	,269	None	255,255
MSGMON	\$ZIM07	STARTED	7	,269	None	255,255
MSGMON	\$ZIM08	STARTED	8	,268	None	255,255
MSGMON	\$ZIM09	STARTED	9	,268	None	255,255
MSGMON	\$ZIM10	STARTED	10	,266	None	255,255
MSGMON	\$ZIM11	STARTED	11	,266	None	255,255
MSGMON	\$ZIM12	STARTED	12	,266	None	255,255
MSGMON	\$ZIM13	STARTED	13	,269	None	255,255
MSGMON	\$ZIM14	STARTED	14	,266	None	255,255
MSGMON	\$ZIM15	STARTED	15	,266	None	255,255
OSM-APPSRVR	\$ZOSM	STARTED	2	,277	None	255,255
OSM-CIMOM	\$ZCMOM	STARTED	2	,275	None	255,255
OSM-CONFLH-RD	\$ZOLHI	STOPPED	None		None	
OSM-OEV	\$ZOEV	STARTED	2	,276	None	255,255
QIOMON-0	\$ZM00	STARTED	0	,14	None	255,255
QIOMON-1	\$ZM01	STARTED	1	,12	None	255,255
QIOMON-10	\$ZM10	STARTED	10	,7	None	255,255
QIOMON-11	\$ZM11	STARTED	11	,7	None	255,255
QIOMON-12	\$ZM12	STARTED	12	,7	None	255,255
.						
.						
.						
QIOMON-7	\$ZM07	STARTED	7	,7	None	255,255
QIOMON-8	\$ZM08	STARTED	8	,7	None	255,255
QIOMON-9	\$ZM09	STARTED	9	,7	None	255,255
ROUTING-DIST	\$TSMRD	STOPPED	None		None	
SCP	\$ZNET	STARTED	0	,18	1,19	255,255
SP-EVENT	\$ZSPE	STARTED	0	,346	None	255,255
TSM-SNMP*	\$ZTSMS	STARTED	0	,298	None	255,255
TSM-SRM*	\$ZTSM	STARTED	0	,342	None	255,255
ZEXP	\$ZEXP	STARTED	0	,17	1,171	255,255
ZHOME	\$ZHOME	STARTED	0	,275	2,303	255,255
ZLOG	\$ZLOG	STARTED	0	,323	1,320	255,255
ZSLM2	\$ZSLM2	STARTED	0	,274	1,271	255,255
ZTCP0	\$OSMM0	STOPPED	None		None	
ZTCP1	\$OSMM1	STOPPED	None		None	
ZZKRN	\$ZZKRN	STARTED	0	,13	1,31	255,255
ZZLAN	\$ZZLAN	STARTED	0	,15	1,17	255,255
ZZSCL	\$ZZSCL	STARTED	2	,270	3,279	255,255
ZZSMN	\$ZZSMN	STARTED	2	,304	5,302	255,255
ZZSTO	\$ZZSTO	STARTED	0	,278	1,324	255,255
ZZWAN	\$ZZWAN	STARTED	0	,277	1,301	255,255

The items in boldface in the output are essential to system operations and must be running at all times. In nearly all circumstances, they restart automatically if they are stopped for any reason while the NonStop Kernel operating system is running.

The asterisks (*) indicate files that do not appear if only OSM (and not TSM) is installed.

OSM renames some TSM-related files for use by both applications. For example, \$TSMM0 and \$TSMM1 become \$OSMM0 and \$OSMM1 after OSM is installed. You can still run TSM even though \$TSMM0 and \$TSMM1 no longer appear by those names. \$ZLOG is another file that is used by both OSM and TSM. (The symbolic name no longer contains *TSM*.)

Some OSM and TSM processes stop after executing a macro that runs during system load or during the reload of processor 0 or 1. Those processes include \$TSMRD, TSMM0, and \$TSMM1 (if OSM is not installed), and \$ZOLHI, \$OSMM0, and \$OSMM1 (if OSM is installed).

Optionally, you can also configure other processes such as the Expand subsystem manager process, \$ZEXP, and the Safeguard monitor process, \$ZSMP, as generic processes.

Recovery Operations for Processes

For recovery operations on generic processes, use the SCF interface to the Kernel subsystem and specify the PROCESS object. These SCF commands are available for controlling generic processes:

ABORT	Terminates operation of a generic process. This command is not supported for the subsystem manager processes.
START	Initiates the operation of a generic process.

Generic processes that are configured to be persistent usually do not require operator intervention for recovery. In most circumstances, persistent generic processes restart automatically.

For recovery operations on IOPs, refer to the manuals listed in [Section 6, Communications Subsystems: Monitoring and Recovery](#).

For recovery operations on system processes, refer to the *Guardian User's Guide*.

Related Reading

For more information about generic processes and the SCF interface to the Kernel subsystem, refer to the *SCF Reference Manual for the Kernel Subsystem*.

For more information about IOPs, refer to the manuals listed in [Section 6, Communications Subsystems: Monitoring and Recovery](#).

Communications Subsystems: Monitoring and Recovery

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When to Use This Section

Use this section to determine where to find more information about monitoring and recovery operations for communications devices such as ServerNet adapters, printers, and spoolers; communications lines; and communications processes such as WAN IOPs.

Communications Subsystems

The software that provides users of NonStop S-series systems with access to a set of communications services is called a communications subsystem. Because connectivity is an important part of online transaction processing (OLTP), HP offers a variety of communications products that support a wide range of applications.

Communication between specific devices or networks is typically achieved using several communications products or subsystems. These products are related as components in a layered structure. To accomplish the required connection, higher-level components—for example, NonStop TCP/IP processes—use the services of lower-level components such as the ServerNet LAN Systems Access (SLSA) subsystem. The same higher-level component can often use any of several lower-level components; thus, the Expand subsystem—which consists of multiple processes on a node—can use the NonStop TCP/IP subsystem, the X.25 Access Method (X.25 AM), or other communication interface options to provide data transmissions over local area networks (LANs) or wide area networks (WANs), respectively. Similarly, multiple higher-level components can use the services of a single lower-level component.

Local Area Networks (LANs) and Wide Area Networks (WANs)

Two important communications interfaces for LANs and WANs on NonStop S-series servers are the SLSA subsystem and the WAN subsystem.

The SLSA subsystem supports parallel LAN I/O operations, allowing NonStop S-series servers to communicate across the ServerNet fabrics and access Ethernet devices through various LAN protocols. SLSA also communicates with the appropriate adapter type over the ServerNet fabrics. Supported adapters include:

- ATM 3 ServerNet adapter (ATM3SA)
- Ethernet 4 ServerNet adapter (E4SA)
- Fast Ethernet ServerNet adapter (FESA)
- Gigabit Ethernet ServerNet adapter (GESA)
- Multifunction I/O board (MFIOB) in the processor multifunction (PMF) customer-replaceable unit (CRU) and I/O multifunction (IOMF) CRU
- Token-Ring ServerNet adapter (TRSA)

In addition to the adapters, the SLSA subsystem also supports these objects:

- Processes
- Monitors
- ServerNet addressable controllers (SACs)
- Logical interfaces (LIFs)
- Filters
- Physical interfaces (PIFs)

Processes that use the SLSA subsystem to send and receive data on a LAN attached to a NonStop S-series server are called LAN service providers. Three service providers—the NonStop TCP/IP subsystem and Parallel Library TCP/IP subsystem, the Port Access Method (PAM), and NonStop IPX/SPX—are currently supported. They provide access for these subsystems:

LAN Service Provider	Subsystems Supported
NonStop TCP/IP subsystem, Parallel Library TCP/IP subsystem, NonStop TCP/IPv6 subsystem	The Expand subsystem, which provides Expand-over-IP connections.
Port Access Method (PAM)	Ethernet and token-ring LANs. The OSI/AS, OSI/TS, SNAX/XF, and SNAX/APN subsystems communicate with SLSA through the PAM subsystem.
NonStop IPX/SPX	Novell NetWare LAN

Processes, user applications, and subsystems that use the SLSA subsystem and related LAN providers to connect to an Ethernet, a Fast Ethernet, a Gigabit Ethernet, a Gigabit 4-port Ethernet or a token-ring LAN attached to a NonStop S-series server are called LAN clients. For example, the WAN subsystem is a client of the SLSA subsystem because the SLSA subsystem provides the WAN subsystem access to the ServerNet wide area network (SWAN) concentrator through the LAN.

The WAN subsystem is used to control access to the SWAN concentrator. Depending on your configuration, it can be used to configure and manage both WAN and LAN connectivity for these communication subsystem objects:

Object	Connectivity By
AM3270	Line-handler processes
Asynchronous Terminal Process 6100 (ATP6100)	Line-handler processes
ServerNet/FX	Line-handler processes
Communications Process subsystem (CP6100)	Line-handler processes
SNAX/APN	Subsystem service manager process and line-handler processes
Envoy subsystem	Line-handler processes
SNAX/XF	Subsystem service manager process and line-handler processes
EnvoyACP/XF	Line-handler processes
TR3271	Line-handler processes

Object	Connectivity By
Expand	Subsystem network control process and line-handler processes
X25AM	Line-handler processes
ServerNet cluster (Expand-over-ServerNet)	Line-handler processes

You can define these communications subsystem objects as WAN subsystem devices.

Monitoring Communications Subsystems and Their Objects

Monitoring and recovery operations for communications subsystems can be complex. An error in any of the components—service providers, clients, objects, adapters, processes, and so on—can generate multiple error messages from many interdependent subsystems and processes. Analyzing and solving an error that originates in an object controlled by a LAN or a WAN often requires that you methodically gather status information about the affected services and then eliminate objects that are working normally.

Detailed monitoring and recovery techniques for devices and processes related to communications subsystems are discussed in detail in the manuals for each subsystem. For more information, refer to [Related Reading](#) on page 6-15.

This guide provides some basic commands you can use to identify and resolve common problems. Your most powerful tool for monitoring and collecting information about subsystem objects is the SCF facility. You can use SCF commands to get information and status for subsystem objects by name, device type, or device subtype.

Subdevices are defined if a subsystem potentially operates on numerous, separately addressable objects, such as stations on a multipoint line; the line is a device, and the stations are subdevices.

For a list of subsystems with their device type numbers and device subtypes, see [Using SCF to Determine Your System Configuration](#) on page 2-26.

Monitoring the SLSA Subsystem

This subsection describes how to obtain the status of adapters, SACs, LIFs, and PIFs. For more information on the SLSA subsystem, refer to the *LAN Configuration and Management Manual*.

Monitoring the Status of an Adapter and Its Components

1. To monitor the status of an adapter:

```
> SCF STATUS ADAPTER adapter-name
```

A listing similar to this example is sent to your home terminal:

```
->STATUS ADAPTER $ZZLAN.E0353

SLSA Status ADAPTER

Name                State
$ZZLAN.E0353        STARTED
```

This example shows the listing displayed when checking all adapters on \$ZZLAN:

```
> SCF STATUS ADAPTER $ZZLAN.*
```

```
1->STATUS ADAPTER $ZZLAN.*

SLSA Status ADAPTER

Name                State
$ZZLAN.E0353        STARTED
$ZZLAN.E0354        STARTED
$ZZLAN.E0553        STARTED
$ZZLAN.E0554        STARTED
$ZZLAN.FE1154       STARTED
$ZZLAN.MIOE0        STARTED
$ZZLAN.MIOE1        STARTED
```

- The SAC object corresponds directly to the hardware on an adapter. A SAC is a component of an adapter and can support one or more PIFs. To monitor the status of a SAC:

```
> SCF STATUS SAC sac-name
```

A listing similar to this example is sent to your home terminal:

```
1->STATUS SAC $ZZLAN.E0353.0

SLSA Status SAC

Name                Owner    State
$ZZLAN.E0353.0      1      STARTED
```

This example shows a listing of the status of all SACs on \$ZZLAN.E0353:

```
> SCF STATUS SAC $ZZLAN.E0353*
```

```
->STATUS SAC $ZZLAN.E0353*

SLSA Status SAC

Name                Owner    State
$ZZLAN.E4SA1.0      1      STARTED
$ZZLAN.E4SA1.1      0      STARTED
```

- The PIF object corresponds directly to hardware on the adapter. A PIF is the physical connection to the LAN. To monitor the status of a PIF:

```
> SCF STATUS PIF pif-name
```

A listing similar to this example is sent to your home terminal:

```
->STATUS PIF $ZZLAN.E0353.0

SLSA Status PIF

Name                State
$ZZLAN.E0353.0.A    STARTED
```

This example shows a listing of the status of all PIFs on \$ZZLAN.E0353:

```
> SCF STATUS PIF $ZZLAN.E0353.*
```

```
->STATUS PIF $ZZLAN.E0353.*

SLSA Status PIF

Name                State
$ZZLAN.E0353.0.A    STARTED
$ZZLAN.E0353.0.B    STARTED
$ZZLAN.E0353.1.A    STOPPED
$ZZLAN.E0353.1.B    STARTED
```

4. The LIF provides an interface to the PIF. The LIF object corresponds to logical processes that handle data transferred between the LAN and a system using the ServerNet architecture. To monitor the status of a LIF:

```
> SCF STATUS LIF lif-name
```

A listing similar to this example is sent to your home terminal:

```
->STATUS LIF $ZZLAN.L038

SLSA Status LIF

Name                State      Access State
$ZZLAN.L038         STARTED    UP
```

This example shows a detailed listing of the status of the LIF on \$ZZLAN.L038:

```
> SCF STATUS LIF $ZZLAN.L038 , DETAIL
```

```
->STATUS LIF $ZZLAN.L038 , DETAIL

SLSA Detailed Status LIF \SYS.$ZZLAN.L038

Access State..... UP
CPUs with Data Path..... ( 0 )
Potential Access CPUs.... ( 0, 1 )
State..... STARTED
Trace Filename.....
Trace Status.....
```


Monitoring the WAN Subsystem

This subsection describes how to obtain the status of SWAN concentrators, data communications devices, processes, and CLIPs. For more information on the WAN subsystem, see the *WAN Subsystem Configuration and Management Manual*.

Monitoring Status for a SWAN Concentrator

To display the current status for a SWAN concentrator:

```
> SCF STATUS ADAPTER $ZZWAN.#concentrator-name
```

The system displays a listing similar to:

```
-> status adapter $zzwan.#s01

WAN Manager STATUS ADAPTER for ADAPTER  \TAHITI.$ZZWAN.#S01
STATE .....STARTED

Number of clips, 3

Clip 1 status : CONFIGURED
Clip 2 status : CONFIGURED
Clip 3 status : CONFIGURED
```

To display the status for all SWAN concentrators configured for your system:

```
> SCF STATUS ADAPTER $ZZWAN.*
```

The system displays a listing similar to:

```
1-> STATUS ADAPTER $ZZWAN.*

WAN Manager STATUS ADAPTER for ADAPTER  \COMM.$ZZWAN.#SWAN1
State..... STARTED

Number of clips. 3

Clip 1 status : CONFIGURED
Clip 2 status : CONFIGURED
Clip 3 status : CONFIGURED

WAN Manager STATUS ADAPTER for ADAPTER  \COMM.$ZZWAN.#SWAN2
State..... STARTED

Number of clips. 3

Clip 1 status : CONFIGURED
Clip 2 status : CONFIGURED
Clip 3 status : CONFIGURED
```

Monitoring Status for a Data Communications Device

To verify that a WAN subsystem device is in the STARTED state:

```
> SCF STATUS DEVICE $ZZWAN.#device-name
```

The system displays a listing similar to:

```
-> status DEVICE $zzwan.#IP01

WAN Manager STATUS DEVICE for DEVICE  \COWBOY.$ZZWAN.#IP01
STATE .....STARTED

LDEV number....173

PPIN.....2, 13  BPIN.....3, 11
```

Monitoring WAN Processes

To display the status of all WAN subsystem processes—configuration managers, TCP/IP processes, WANBoot processes:

```
> SCF STATUS PROCESS $ZZWAN.*
```

The system displays a listing similar to:

```
-> STATUS PROCESS $ZZWAN.*

WAN Manager STATUS PROCESS for PROCESS  \COMM.$ZZWAN.#5
State :..... STARTED

LDEV Number..... 66
PPIN..... 5      ,264                Process traced.. NO

WAN Manager STATUS PROCESS for PROCESS  \COMM.$ZZWAN.#4
State :..... STARTED

LDEV Number..... 67
PPIN..... 4      ,264                Process traced.. NO

WAN Manager STATUS PROCESS for PROCESS  \COMM.$ZZWAN.#ZTF00
State :..... STARTED

PPIN..... 4      ,342

WAN Manager STATUS PROCESS for PROCESS  \COMM.$ZZWAN.#SWB1
State :..... STARTED

PPIN..... 4      ,275                BPIN..... 5      ,302

WAN Manager STATUS PROCESS for PROCESS  \COMM.$ZZWAN.#ZTF01
State :..... STARTED

PPIN..... 5      ,340

WAN Manager STATUS PROCESS for PROCESS  \COMM.$ZZWAN.#SWB0
State :..... STARTED

PPIN..... 4      ,274                BPIN..... 5      ,303
```

To monitor a single WANBoot process, type:

```
> SCF STATUS PROCESS $ZZWAN.#boot-process
```

The system displays a listing similar to:

```
-> status PROCESS $ZZWAN.#ZB017

WAN Manager STATUS PROCESS for PROCESS \ICEBAT.$ZZWAN.#ZB017
STATE:.....STARTED

PPIN.....0 ,278      BPIN.....0, 282
```

Monitoring CLIPs

To display the current status for a CLIP:

```
> SCF STATUS SERVER $ZZWAN.#concentrator-name.clip-num
```

Values for the CLIP number are 1, 2, or 3.

The system displays a listing similar to:

```
-> status server $zzwan.#s01.1

WAN Manager STATUS SERVER for CLIP \COWBOY.$ZZWAN.#S01.1
STATE :.....STARTED

PATH A.....: CONFIUGRED
PATH B.....: CONFIGURED

NUMBER of lines. 2

Line.....0      : $SAT23A
Line.....1      : $SAT23B
```

Monitoring the NonStop TCP/IP Subsystem

This subsection describes how to obtain the status for NonStop TCP/IP processes, routes, and subnets. For additional information, refer to the *TCP/IP Configuration and Management Manual*. For NonStop TCP/IPv6, refer to the *TCP/IPv6 Configuration and Management Manual*, and the *SCF Reference Manual for G-Series RVUs*.

Monitoring the NonStop TCP/IP Process

To display the dynamic state of a NonStop TCP/IP process, first list the names of all NonStop TCP/IP processes:

```
-> SCF LISTDEV TCPIP
```

Then type:

```
> SCF STATUS PROCESS tcp/ip-process-name
```

where *tcp/ip-process-name* is the name of the process you want information about.

The system displays a listing similar to this output, which is for process \$ZTCO:

```
-> Status Process $ZTCO

TCPIP Status PROCESS \SYSA.$ZTCO

Status: STARTED
PPID.....( 0,107)          BPID..... ( 1. 98)

Proto State      Laddr      Lport      Faddr      Fport      SendQ      RecvQ
TCP    TIME-WAIT    130.252.12.3 ftp-data    130.252.12.152 11089      0          0
TCP    TIME-WAIT    130.252.12.3 ftp-data    130.252.12.152 63105      0          0
TCP    ESTAB        130.252.12.3 ftp         130.252.12.152 57441      0          0
TCP    TIME-WAIT    130.252.12.3 smtp        130.252.12.8   3309       0          0
```

Monitoring NonStop TCP/IP Routes

To display status information for all NonStop TCP/IP routes:

```
> SCF STATUS ROUTE $ZTCO.*
```

The system displays a listing similar to:

```
1-> Status Route $ZTCO.*

TCPIP Status ROUTE \SYSA.$ZTCO.*

Name              Status              RefCnt
#ROU11            STARTED              0
#ROU9             STARTED              0
#ROU12            STARTED              0
#ROU8             STARTED              1
#ROU3             STOPPED              0
```

Monitoring NonStop TCP/IP Subnets

To obtain the status of a NonStop TCP/IP subnet:

```
> SCF STATUS SUBNET #SN2
```

The system displays a listing similar to:

```
1-> STATUS SUBNET #SN2

TCPIP Status SUBNET \SYSA.$ZTCO.*

Name              Status
#LOOP0            STARTED
#EN1              STARTED
```

Monitoring Other Communications Subsystems

Depending how your system is configured, you might need to monitor additional key subsystems such as the ServerNet/FX adapter subsystem and the Asynchronous Transfer Mode (ATM) subsystem. Examples of commands for these follow.

ServerNet/FX Adapter Subsystem

This command checks the status of a ServerNet/FX LBU object, the logical interface associated with a ServerNet/FX adapter:

```
> SCF STATUS LBU $ZZFOX.#lbu-name
```

The system displays a listing similar to:

```
1-> STATUS LBU $ZZFOX.#Y
FOX Status LBU On \COMM
Name          State      Controller Type
$ZZFOX.#Y     STARTED   FXSA
```

This status command includes the DETAIL option:

```
> SCF STATUS LBU $ZZFOX.#lbu-name, DETAIL
```

The system displays a listing similar to:

```
1-> STATUS LBU $ZZFOX.#X,D
FOX Detailed Status LBU \COMM.$ZZFOX.#X At 09 Jul 2001, 19:24:27.959

Summary State..... STARTED          Logical State..... STARTED
Physical State.... LOADED             System Number..... 116
Controller Type... FXSA               Cluster Number.... 7
Serial Links:    Quality  Phy-Neighbor  Log-Neighbor  Status
      Left:      1.0000      8          8          Link OK
      Right:     1.0000     12         12         Link OK

Bootcode ID:  T0059G05^19MAR98^04MAR98
Firmware ID:  T0060G05^22JAN99^20JAN99

Server Net Aging Interval      0  microseconds
Server Net Packet Timeout 4980  microseconds
Barrier Packet Timeout 9960  microseconds

Time Since LBU Start:  16  Days, 08:27:12.851869

Last Used Download Program File:  $SYSTEM.SYS00.M6740
                                Module:  STANDARD
```

ATM Subsystem

The next command displays detailed status for the ATM subsystem manager process. (The ATM subsystem manager process is defined as a generic process in the NonStop Kernel.)

```
> SCF STATUS PROCESS $ZZKRN.#ZZATM, DETAIL
```

The system displays a listing similar to:

```
1-> STATUS PROC $ZZKRN.#ZZATM,D

NONSTOP KERNEL - Detailed Status PROCESS \COCO.$ZZKRN.#ZZATM
Backup PID..... 0 , 21
Creation Time..... JAN 28,2000 09:13:31
Name..... $ZZATM
OwnerID..... 255, 255
Primary PID..... 1 , 19
Priority..... 180
State..... STARTED
Substate.....
```

Monitoring Line-Handler Process Status

A line-handler process is a component of a data communications subsystem. It is an I/O process that transmits and receives data on a communications line, either directly or by communicating with another I/O process. This subsection explains how to monitor the status of a line-handler process on your system or on another system in your network to which you have remote access.

To check the status of a line-handler process on your system:

```
> SCF STATUS LINE $line
```

A listing similar to this example is sent to your home terminal:

```
1-> STATUS LINE $LHPLIN1

EXPAND Status LINE

Name           State      PPID      BPID      ConMgr-LDEV
$LHCS6S        STARTED    1, 20     2,25     49
```

This listing shows that the Expand line-handler process being monitored is up and functioning normally.

The data shown in the report means:

Name	Specifies the name of the object
State	Indicates the summary state of the object, which is either STARTED, STARTING, DIAGNOSING (for SWAN concentrators only), or STOPPED
PPID	Specifies the primary process ID
BPID	Specifies the backup process ID
ConMgr-LDEV	Contains the LDEV of the concentrator manager process. This field applies only to SWAN concentrator lines.

If any state other than STARTED appears, check the meaning of the state in [SCF Object States](#) on page 3-15. Depending upon the type of problem, follow your established procedures for problem reporting and escalation.

Examples

To check the detailed status of line \$LHCS6S:

```
> SCF STATUS LINE $LHCS6S, DETAIL
```

A listing such as this output is sent to your home terminal:

```
-> STATUS LINE $LHCS6S, DETAIL

PPID..... ( 3, 24) BPID..... ( 2, 24)
State..... STOPPED Path LDEV..... 50
Trace Status..... OFF Clip Status..... UNLOADED
ConMgr-LDEV..... 49
Path-prim
Path-alter
```

To display the status of all the Expand lines that are currently active on your system, enter this INFO PROCESS command for the Expand manager process \$NCP:

```
-> INFO PROCESS $NCP, LINESET
```

The system displays a listing similar to this output. The NEIGHBOR field displays the system to which a given line connects, and the STATUS field indicates whether the line is up:

1-> INFO PROCESS \$NCP, LINESET									
EXPAND	Info	PROCESS	\$NCP		, LINESET				
LINESETS AT \COMM (116) #LINESETS=35 TIME: JUL 9,2001 19:28:04									
LINESET	NEIGHBOR	LDEV	TF	PID	LINE	LDEV	STATUS		
FileErr#									
1	\CYCLONE	(206)	363	200K (0,	287)	1	363	READY	
2	\SNAX	(118)	353	200K (5,	333)	1	353	READY	
3	\TESS	(194)	554	200K (8,	279)	1	554	READY	
4	\TSII	(099)	556	200K (2,	265)	1	556	READY	
5	\ESP	(163)	365	200K (1,	274)	1	365	READY	
6	\SVLDEV	(077)	538	200K (7,	265)	1	538	READY	
7	\FOXII	(147)	358	200K (4,	284)	1	358	READY	
.									
.									
.									
27	\SIERRA	(012)	183	10K (4,	290)	1	183	READY	
28	\PRUNE	(175)	677	200K (5,	334)	1	677	READY	
29	\OPMAN	(252)	276	790K (5,	294)	NPT	276	READY	
30	\SOCIAL	(045)	165	790K (8,	280)	1	165	READY	
31	\NCCORP2	(080)	295	790K (8,	264)	1	295	READY	
32	\CS8	(152)	323	-- --	-----	1	323	NOT READY (124)	
33	\CORE	(241)	324	-- --	-----	1	324	NOT READY (124)	
34	\SUNTEC	(062)	367	790K (5,	293)	NPT	367	READY	
35	\CS8	(152)	368	-- --	-----	1	368	NOT READY (124)	

Tracing a Communications Line

Use the SCF TRACE command to trace the operation of a communications line. The line continues normal operation while being traced, but it passes all its message traffic to a trace procedure. Tracing enables you to see the history of a communications line, including its internal processing.

You can display trace files by using the commands available in the PTrace program. For information about PTrace, refer to the *PTrace Reference Manual*. For information about configuring a trace by using the SCF TRACE command, refer to the configuration and management manual for the communications subsystem you want to trace.

Recovery Operations for Communications Subsystems

Some general troubleshooting guidelines are:

- Examine the contents of the event message log for the subsystem. For example, the WAN subsystem or Kernel subsystem might have been issued an event message that provides information about the process failure. Event messages returned by the WAN subsystem and SWAN concentrator are described in the WANMGR and TRAPMUX sections of the *Operator Messages Manual*, respectively.
- HP provides a comprehensive library of troubleshooting guides for the communications subsystems. Attempt to analyze the problems and restart the process or object using the commands described in the appropriate manual listed in [Related Reading](#) on page 6-15. If you are unable to start a required process or object, contact your service provider.

Related Reading

For more information about monitoring and performing recovery operations for communications subsystems, see the manuals listed in [Table 6-1](#). The appropriate manual to use depends on how your system is configured.

For example, if a process is configured using the SCF interface to the WAN subsystem and then reconfigured with the SCF interface to another subsystem, only the SCF interface to the other subsystem would provide current information about the configuration. The SCF interface to the WAN subsystem would provide only information about the configuration before it changed.

Table 6-1. Related Reading for Communications Lines and Devices (page 1 of 2)

For Information About...	Refer to...
General information about communications subsystems	<i>Introduction to Networking for HP NonStop S-Series Servers</i>
Using SCF to monitor generic processes	<i>SCF Reference Manual for the Kernel Subsystem</i>

Table 6-1. Related Reading for Communications Lines and Devices (page 2 of 2)

For Information About...	Refer to...
Using SCF to monitor the SLSA subsystem as well as Ethernet addressable devices, such as ServerNet adapters	<i>LAN Configuration and Management Manual</i>
Using SCF to monitor WAN communications lines for devices and intersystem communications protocols	<i>WAN Subsystem Configuration and Management Manual</i>
Using SCF to monitor a specific device or communications protocol product; troubleshooting specific communications subsystems and protocols	<i>Asynchronous Terminals and Printer Processes Configuration and Management Manual</i> <i>ATM Adapter Installation and Support Guide</i> <i>CP6100 Configuration and Management Manual</i> <i>EnvoyACP/XF Configuration and Management Manual</i> <i>Expand Configuration and Management Manual</i> <i>Expand Network Management and Troubleshooting Guide</i> <i>Ethernet Adapter Installation and Support Guide</i> <i>Fast Ethernet Adapter Installation and Support Guide</i> <i>Gigabit Ethernet Adapter Installation and Support Guide</i> <i>IPX/SPX Configuration and Management Manual</i> <i>PAM Configuration and Management Manual</i> <i>QIO Configuration and Management Manual</i> <i>SCF Reference Manual for G-Series RVUs</i> <i>ServerNet Cluster Manual</i> <i>ServerNet/FX Adapter Configuration and Management Manual</i> <i>SNAX/XF and SNAX/APN Configuration and Management Manual</i> <i>SWAN Concentrator and WAN Subsystem Troubleshooting Guide</i> <i>TCP/IPv6 Configuration and Management Manual</i> <i>TCP/IP Configuration and Management Manual</i> <i>Token-Ring Adapter Installation and Support Guide</i> <i>X25AM Configuration and Management Manual</i>

ServerNet/DA: Monitoring and Recovery

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When to Use This Section

Use this section for monitoring and recovery information for the 6760 ServerNet device adapter (ServerNet/DA).

Overview of the ServerNet/DA

The 6760 ServerNet device adapter controls these devices:

- External disk drives and 519x tape drives using a fiber-optic interface (F-SAC)
- External tape drives using a SCSI interface (S-SAC)

A ServerNet/DA can be located in slots 51 through 54 of an I/O enclosure, slots 53 and 54 of a processor enclosure, and sometimes in slots 51 and 52 of a processor enclosure depending on the configuration of your system. For information about the disk drives or tape drives supported on a ServerNet/DA for your G-series RVU, refer to the *G-Series Highlights and Migration Planning Guide*.

Monitoring the ServerNet/DA

Use the Subsystem Control Facility (SCF), OSM Service Connection, or TSM Service Application to monitor the ServerNet/DA.

To monitor the ServerNet/DA using OSM or TSM, refer to [Using OSM or TSM to Monitor the System](#) on page 3-8.

When monitoring with SCF, use the SCF INFO and STATUS commands to monitor the ServerNet/DA and its attached devices.

To monitor all ServerNet/DAs using SCF:

```
> SCF STATUS ADAPTER $ZZSTO.#SNDA*, DETAIL
```

Identifying Problems With the ServerNet/DA

When monitoring the ServerNet/DA using the OSM Service Connection or the TSM Service Application, the Power State and the Subcomponent State of the ServerNet/DA should indicate normal operation. [Table 7-1](#) lists the possible states for the ServerNet/DA.

Table 7-1. Power, Service, and Subcomponent States for the ServerNet/DA

State	Description
Power State: Off	The ServerNet/DA is not operational.
Power State: OK	The ServerNet/DA is available and operational.
Power State: Possible Redundant Power Problem	Possible problem exists with the backup power supply. (The power supply might not be fault tolerant.)
Power State: Redundant Power Problem	The system cannot access the backup power supply. (The power supply is not fault tolerant.)
Power State: Unknown	One or more components of the ServerNet/DA are not operational.
Service State: Attention Required	The ServerNet/DA requires operator attention.
Service State: OK	The ServerNet/DA is functioning normally and does not require attention or service.
Service State: Service Required	The ServerNet/DA has a problem that requires service.
Subcomponent State: OK	The subcomponents of the ServerNet/DA are available and operational.
Subcomponent State: Problem	One or more subcomponents of the ServerNet/DA are not operational.

Recovery Operations for the ServerNet/DA

Refer to the *6760 ServerNet/DA Manual*.

Related Reading

For more information about monitoring and performing recovery operations for the ServerNet/DA:

- *6760 ServerNet/DA Manual*
- *SCF Reference Manual for the Storage Subsystem*
- TSM online help
- OSM online help

Fibre Channel ServerNet Adapter: Monitoring and Recovery

[When to Use This Section](#) 8-1

[Overview of the FCSA](#) 8-1

[Monitoring the FCSAs](#) 8-1

[Identifying Problems With FCSAs](#) 8-2

[Recovery Operations for the FCSA](#) 8-2

[Related Reading](#) 8-2

When to Use This Section

Use this section for monitoring and recovery information for the Fibre Channel ServerNet adapters (FCSAs).

Overview of the FCSA

The FCSA provides Fibre Channel connectivity to certain external devices such as disk drives contained in an Enterprise Storage System (ESS). Up to 10 FCSAs are housed in an I/O adapter module (IOAM), which is mounted in an IOAM enclosure. The form factor and connection technology of IOAM enclosures differ from the standard I/O enclosures that provide direct ServerNet access to external I/O devices.

A pair of ServerNet switch boards, also located in the IOAM enclosure, provide connectivity between the processors and the FCSAs. All IOAM hardware can be monitored by OSM, but not TSM.

For information about the disk drives or tape drives supported through FCSAs for your G-series RVU, refer to the *G06.nn Release Version Update*.

Monitoring the FCSAs

Use the Subsystem Control Facility (SCF) or the OSM Service Connection to monitor the FCSAs.

To monitor the FCSAs using OSM, refer to [Using OSM or TSM to Monitor the System](#) on page 3-8.

To monitor the FCSA and its attached devices with SCF, use the SCF INFO and SCF STATUS commands.

For example, to monitor all FCSAs using SCF:

```
> SCF STATUS ADAPTER $ZZSTO.#FCSA*, DETAIL
```

The *SCF Reference Manual for the Storage Subsystem* provides reference details and examples for using the SCF INFO and SCF STATUS commands.

Identifying Problems With FCSAs

When monitoring FCSAs using the OSM Service Connection, the Service State and the Subcomponent State of the FCSAs should indicate normal operation. For a complete listing of these states for an FCSA, see the *SCF Reference Manual for the Storage Subsystem*.

Recovery Operations for the FCSA

Depending on the application used for monitoring and recovery, refer to the documents listed in the following topic, [Related Reading](#).

Related Reading

For more information about monitoring and performing recovery operations for the FCSAs:

- *SCF Reference Manual for the Storage Subsystem*
- OSM online help

Disk Drives: Monitoring and Recovery

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When to Use This Section

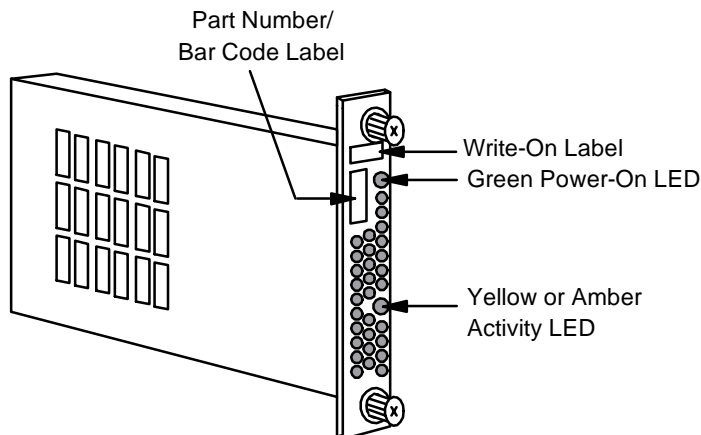
Use this section to monitor disk drives and to recover from common disk problems.

Overview of Disk Drives

The NonStop S-series server supports both internal and external disk drives. A system enclosure can contain different types of disk drives. However, both disk drives in a mirrored volume must always be the same type of drive.

- External disk drives connect to a NonStop S-series server using fiber-optic connections provided either by a 6760 ServerNet device adapter (ServerNet/DA) or by a Fibre Channel ServerNet adapter (FCSA). For more information about ServerNet/DA, refer to [Section 7, ServerNet/DA: Monitoring and Recovery](#). For more information about FCSA, refer to [Section 8, Fibre Channel ServerNet Adapter: Monitoring and Recovery](#). Enterprise Storage Systems (ESS) are supported externally through FCSAs.
- Internal disk drives are housed in disk drive CRUs installed behind the door on the appearance side of a system enclosure. (See [Figure 9-1](#).) Each system enclosure contains slots for up to 16 internal disk drive CRUs, arranged in two rows. The slots are numbered 01 through 08 in the upper row and 11 through 18 in the lower row.

Figure 9-1. Disk Drive CRU



CDT 106CDD

Each disk drive CRU has a part number/bar code label, a write-on label (for the logical device name), and these indicator light-emitting diodes (LEDs):

- Green power-on LED
When lit, the green power-on LED indicates that the disk drive is receiving power.
- Yellow or amber activity LED
When lit, the yellow or amber activity LED indicates that the disk drive is executing a read or write command.

Monitoring Disk Drives

Several tools are available to monitor the current status, space usage, configuration, and performance of disk drives. For a description of the tools mentioned in this section, refer to [Appendix B, Tools and Utilities for Operations](#).

Monitoring Event Messages

For information about displaying EMS events generated by storage devices and subsystems, refer to [Section 4, Monitoring EMS Event Messages](#).

Monitoring the Status of Disk Drives Using SCF

This subsection explains how to list the disk volumes on your system and determine their current status. You use the SCF STATUS DISK command to check current status information about disk devices.

1. To list the status of all the disk volumes on your system, at a TACL prompt:

```
> SCF STATUS DISK $*, SUB MAGNETIC
```

1-> STATUS DISK \$*, SUB MAGNETIC						
STORAGE - Status DISK \COMM.\$SYSTEM						
LDev	Primary	Backup	Mirror	MirrorBackup	Primary PID	Backup PID
6	*STARTED	STARTED	*STARTED	STARTED	0,257	1,257
STORAGE - Status DISK \COMM.\$VIRCFG						
LDev	Primary	Backup	Mirror	MirrorBackup	Primary PID	Backup PID
146	*STARTED	STARTED	*STARTED	STARTED	2,288	3,267
STORAGE - Status DISK \COMM.\$WORK2						
LDev	Primary	Backup	Mirror	MirrorBackup	Primary PID	Backup PID
140	*STARTED	STARTED	*STARTED	STARTED	5,278	4,273
STORAGE - Status DISK \COMM.\$WEB02						
LDev	Primary	Backup	Mirror	MirrorBackup	Primary PID	Backup PID
143	*STARTED	STARTED	*STARTED	STARTED	2,289	3,266
STORAGE - Status DISK \COMM.\$ROOT						
LDev	Primary	Backup	Mirror	MirrorBackup	Primary PID	Backup PID
190	*STARTED	STARTED	*STARTED	STARTED	3,268	2,287
STORAGE - Status DISK \COMM.\$P1D02						
LDev	Primary	Backup	Mirror	MirrorBackup	Primary PID	Backup PID
247	*STARTED	STARTED	*STARTED	STARTED	4,268	5,276
STORAGE - Status DISK \COMM.\$P1D03						
LDev	Primary	Backup	Mirror	MirrorBackup	Primary PID	Backup PID
246	*STARTED	STARTED	*STARTED	STARTED	4,269	5,282
.						
.						
.						

- To get more information about a specific disk, use the SCF STATUS DISK, DETAIL command. For example:

-> STATUS DISK \$DATA09, DETAIL

The output from this example shows that \$DATA09 is stopped in the STOPPED state, HARDDOWN substate.

```
65-> SCF STATUS DISK $DATA09, DETAIL
SCF - T9082G02 - (30JUN97) (14MAY97) - 11/05/98 13:24:10 System \SHARK

STORAGE - Detailed Status DISK \SHARK.$DATA09
Disk Path Information:
  LDev  Path                Status      State      Substate    Primary  Backup
                                PID        PID
  92    PRIMARY              INACTIVE   STOPPED    HARDDOWN    2,266    3,266
  92    BACKUP                INACTIVE   STOPPED    HARDDOWN    2,266    3,266
  92    MIRROR                INACTIVE   STOPPED    HARDDOWN    2,266    3,266
  92    MIRROR-BACKUP         INACTIVE   STOPPED    HARDDOWN    2,266    3,266

General Disk Information:
  Device Type..... 3                Device Subtype..... 40
  Primary Drive Type....             Mirror Drive Type.....
  Physical Record Size.. 4096         Priority..... 220
  Library File.....
  Program File..... $SYSTEM.SYS00.TSYS2P2
  Protection..... MIRRORED

Hardware Information:
  Path                Location      Power      Physical Status
  (group,module,slot)
  PRIMARY             (2,1,1)      DUAL       PRESENT
  MIRROR              (2,1,2)      NONE       ABSENT
Total Errors = 0      Total Warnings = 0
```

- For information on recovery operations, refer to [Recovery Operations for a Down Disk or Down Disk Path](#) on page 9-13.

Examples

- To display the summary status of the disk \$DATA01:

-> STATUS \$DATA01

```
34-> STATUS $DATA01
STORAGE - Status DISK \SHARK.$DATA01
LDev  Primary  Backup  Mirror  MirrorBackup  Primary  Backup
                                PID        PID
  63    *STARTED  STARTED  *STARTED  STARTED        0,267    1,266
```

- To display the summary status of the mirror disk of the volume \$DATA02:

-> STATUS \$DATA02-M

```
47-> STATUS DISK $DATA02-M
STORAGE - Status DISK \SHARK.$DATA02-M
LDev  Path                PathStatus  State      SubState    Primary  Backup
                                PID        PID
  62    MIRROR              INACTIVE   STOPPED    HARDDOWN    0,268    1,265
```

- To display the status of all disks:

-> STATUS DISK \$*

```

1-> STATUS DISK $*
STORAGE - Status DISK \COMM.$SYSTEM
LDev   Primary   Backup   Mirror   MirrorBackup   Primary   Backup
        PID      PID      PID      PID            PID      PID
    6   *STARTED   STARTED   *STARTED   STARTED        0,257    1,257

STORAGE - Status VIRTUAL DISK \COMM.$VIEWPT
LDev   State     Primary   Backup   Type   Subtype
        PID      PID      PID
    147  STARTED    9,22     8,53     3      36

STORAGE - Status VIRTUAL DISK \COMM.$WANA
LDev   State     Primary   Backup   Type   Subtype
        PID      PID      PID
    145  STARTED    8,77     9,56     3      36

STORAGE - Status VIRTUAL DISK \COMM.$WEB
LDev   State     Primary   Backup   Type   Subtype
        PID      PID      PID
    144  STARTED    9,29     8,48     3      36

STORAGE - Status VIRTUAL DISK \COMM.$WEBVPT
LDev   State     Primary   Backup   Type   Subtype
        PID      PID      PID
    142  STARTED    9,26     8,47     3      36

STORAGE - Status VIRTUAL DISK \COMM.$WIPRO
LDev   State     Primary   Backup   Type   Subtype
        PID      PID      PID
    141  STARTED    9,27     8,51     3      36

STORAGE - Status VIRTUAL DISK \COMM.$ZERO
LDev   State     Primary   Backup   Type   Subtype
        PID      PID      PID
    133  STARTED    8,78     9,57     3      36

STORAGE - Status VIRTUAL DISK \COMM.$ZIMBU
LDev   State     Primary   Backup   Type   Subtype
        PID      PID      PID
    115  STARTED    9,28     8,52     3      36

STORAGE - Status DISK \COMM.$VIRCFG
LDev   Primary   Backup   Mirror   MirrorBackup   Primary   Backup
        PID      PID      PID      PID            PID      PID
    146  *STARTED   STARTED   *STARTED   STARTED        2,288    3,267
.
.
.

```

- To display the detailed status of the disk \$DATA01:

-> STATUS \$DATA01, DETAIL

```

35-> STATUS $DATA01, DETAIL
STORAGE - Detailed Status DISK \SHARK.$DATA01

```

Disk Path Information:						
LDev	Path	PathStatus	State	SubState	Primary PID	Backup PID
63	PRIMARY	ACTIVE	STARTED		0,267	1,266
63	BACKUP	INACTIVE	STARTED		0,267	1,266
63	MIRROR	ACTIVE	STARTED		0,267	1,266
63	MIRROR-BACKUP	INACTIVE	STARTED		0,267	1,266

```

General Disk Information:
Device Type..... 3                Device Subtype..... 40
Primary Drive Type.... 4565-1      Mirror Drive Type..... 4565-1
Physical Record Size.. 4096        Priority..... 220
Library File.....
Program File..... \SHARK.$SYSTEM.SYS00.TSYSDP2
Protection..... MIRRORED

```

```

Usage Information:
Capacity (MB)..... 2000.09      Free Space (MB)..... 290.76 (14.53%)
Free Extents..... 16            Largest Free Extent (MB). 172.42

```

Hardware Information:			
Path	Location (group,module,slot)	Power	Physical Status
PRIMARY	(1,1,3)	DUAL	PRESENT
MIRROR	(1,1,4)	DUAL	PRESENT

- To display status of all paths for \$DATA00:

-> STATUS DISK \$DATA00-*

```

STORAGE - Status DISK \ALM171.$DATA00-*

```

LDev	Path	PathStatus	State	SubState	Primary PID	Backup PID
6	PRIMARY	ACTIVE	STARTED		0,10	1,10
6	BACKUP	INACTIVE	STARTED		0,10	1,10
6	MIRROR	ACTIVE	STARTING	REVIVE	0,10	1,10
6	MIRROR-BACKUP	INACTIVE	STARTING	REVIVE	0,10	1,10

The output from this example indicates that \$DATA00:

- Is a mirrored volume (primary and mirror paths)
- Has a mirror disk that is being revived (SubState REVIVE)

The data shown in the output means:

LDev	The logical device number
Path	The disk path assignment
PathStatus	The status of the disk path; whether the disk path is the current path (ACTIVE) or not (INACTIVE)
State	The current SCF state of the disk path
SubState	The current SCF substate of the disk path
Primary PID	The primary processor number and process identification number (PIN) of the specified device
Backup PID	The backup processor number and PIN of the specified device

Monitoring Disk Drives Using the TSM Service Application or the OSM Service Connection

You can also monitor the status of disk drives using the OSM Service Connection or the TSM Service Application:

- [Using OSM or TSM to Monitor the System](#) on page 3-8, describes how to determine the service state and the primary and secondary path states of disk drives.
- [Monitoring the State of Disk Drives](#) on page 9-8, describes the possible values of the primary and backup state attributes for disk drives and disk paths.

Monitoring the State of Disk Drives

Each disk drive is configured to have two paths, the primary path and the backup path. Thus, for a disk drive, the states of the two disk paths are represented separately.

[Table 9-1](#) lists possible values for the current state of a disk path.

Table 9-1. States for Disk Drive Paths

Primary Path State or Backup Path State	Description
Degraded	This path of this disk drive has a state other than Up.
Down	The disk volume or disk path is not logically accessible.
Exclusive	Exclusive ownership has been declared for this disk volume, and the disk is not accessible to other users.
Executing Diagnostics	The processor is performing diagnostics.
Format in Progress	A disk-format operation is in progress.
Hard Down	The disk volume or disk path was put in this state by the SCF ABORT DISK command or is physically inaccessible because of a hardware error.
Inaccessible	The disk cannot be accessed.
Not Configured	The component is not configured.
Revive	A mirrored disk is being updated.
Special	Only maintenance-type I/O operations can be performed on the disk.
Unknown	The path state is unknown. The disk might not be responding.
Up	The disk volume or disk path is logically accessible.

Monitoring the Use of Space on a Disk Volume

The Disk Space Analysis Program (DSAP) provides information on disk capacity, free-space fragments, and page allocation. To check for bad sectors, use DSAP or SCF.

To check for unspared defective sectors using SCF:

```
-> INFO DISK $*, BAD, SEL started, sub magnetic
```

```
Bad Sectors Information $DATA14 Primary:  
No bad sectors found.
```

To check for unspared defective sectors using DSAP, at a TACL prompt:

```
> DSAP $*
```


Monitoring the Size of Database Files

This subsection explains how to monitor the size of critical database files to prevent a “file full” error (error 45) from occurring.

To check the size of any file on your system:

```
> FUP INFO filename, DETAIL
```

A report similar to this one is sent to your home terminal:

```
$DATA.FILES.FILEA    10 Jul 1993, 14:05
  ENSCRIBE
  TYPE U
  CODE 100
  EXT ( 224 PAGES, 14 PAGES )
  ODDUNSTR
  MAXEXTENTS 370
  BUFFERSIZE 4096
  OWNER 8,255
  SECURITY (RWE): NUNU, LICENSED
  DATA MODIF: 10 Jul 1994, 14:04
  CREATION DATE: 10 Jan 1994, 14:04
  LAST OPEN: 10 Jul 1994, 14:04
  EOF 267022 (58.2% USED)
  FILE LABEL: 822 (20.2% USED)
  EXTENTS ALLOCATED: 10
```

This report shows that FILEA is 58.2 percent full. If a database file is 90 percent full or more, refer to [Recovery Operations for a Nearly Full Database File](#) on page 9-15.

Example

To check the size of the file DATA1.MEMOS:

```
> FUP INFO DATA1.MEMOS, DETAIL
```

A report such as this one is sent to your home terminal:

```
$DATA.DATA1.MEMOS    12 Jul 1994, 14:05
  ENSCRIBE
  TYPE U
  CODE 101
  EXT ( 2 PAGES, 2 PAGES )
  ODDUNSTR
  MAXEXTENTS 16
  BUFFERSIZE 4096
  OWNER 8,255
  SECURITY (RWE): NUNU
  DATA MODIF: 12 Jul 1994, 14:04
  CREATION DATE: 12 Jan 1994, 14:04
  LAST OPEN: 12 Jul 1994, 14:04
  EOF 567022 (88.2% USED)
  FILE LABEL: 775 (31.6% USED)
  EXTENTS ALLOCATED: 10
```

Monitoring Disk Performance

Monitoring disk performance is not discussed in this guide. See these manuals:

- *SCF Reference Manual for the Storage Subsystem* provides information about monitoring disk block and cache statistical information.
- The *Measure User's Guide* is written for system analysts and system managers and describes how to use the Measure performance monitor to collect and examine system performance data.

Monitoring Disk Configuration Information

For information about checking configuration information for disk devices, refer to the *SCF Reference Manual for the Storage Subsystem*.

Identifying Disk Drive Problems

The most common disk drive problems on a NonStop S-series server include:

- Space problems such as full disks or free-space fragmentation
- Stopped disks
- Performance problems
- Defective tracks or sectors

[Table 9-2](#) lists the most common disk drive problems and their possible symptoms. For recovery operations, refer to [Recovery Operations for Disk Drives](#) on page 9-12.

Table 9-2. Possible Causes of Common Disk Drive Problems

Problems	Possible Symptoms
A disk is full. A disk does not have the amount of space requested.	Error 43 (unable to obtain disk space for file extent) occurs. If the disk is full, an application might go down.
Disk free-space fragmentation has occurred.	Error 43 (unable to obtain disk space for file extent) occurs.
One disk in a mirrored pair is down.	A related event message from the storage subsystem is generated, but the application continues to run.
An unmirrored disk is down, or both disks in a mirrored pair are down.	Users report access problems, an application goes down, and related event messages from the storage subsystem are generated.
Performance problems are occurring due to path switches. Performance problems are occurring due to a cache size that is too small.	Users report poor application performance.
There are defective tracks or sectors.	The output from the SCF INFO DISK, BAD command indicates unspared defective sectors.

Recovery Operations for Disk Drives

These SCF commands are available for controlling DISK objects:

SCF Command	Description
ABORT	Terminates the operation of a disk drive immediately, leaving it in the STOPPED state, HARDDOWN substate.
ALTER	Changes attribute values for a storage device.
CONTROL	Issues disk-specific commands.
PRIMARY	Causes the backup processor of a disk drive to become the primary processor and the primary processor of the drive to become the backup processor.
RENAME	Changes the name of a disk drive.
RESET	Puts a disk drive in a state from which it can be restarted.
START	Initiates the operation of a disk drive.
STOP	Terminates the operation of a disk drive in a normal manner.
SWITCH	Switches paths to a disk drive.

The *SCF Reference Manual for the Storage Subsystem* describes these commands. For information about recovery for a specific disk drive problem, see this guide:

- [Recovery Operations for Free-Space Fragmentation of a Disk](#) on page 9-13
- [Recovery Operations for a Full Disk](#) on page 9-13
- [Recovery Operations for a Down Disk or Down Disk Path](#) on page 9-13
- [Recovery Operations for Defective Sectors](#) on page 9-14
- [Recovery Operations for a Nearly Full Database File](#) on page 9-15
- [Recovery Operations for Performance Problems](#) on page 9-15
- [Recovery Operations for a Corrupt \\$SYSTEM Disk](#) on page 9-15
- [Recovery Operations for Failed Disk Drives](#) on page 9-16

Recovery Operations for Free-Space Fragmentation of a Disk

Use the Disk Compression Program (DCOM) to consolidate disk space usage. For a description of DCOM, refer to [Disk Compression Program \(DCOM\)](#) on page B-2.

Recovery Operations for a Full Disk

To prevent or recover from problems caused by a full disk:

1. Use the Disk Space Analysis Program (DSAP) utility to identify large, old, and little used files.
2. If you are authorized:
 - Use the BACKUP utility to back up these disk files to tape and then purge them from the disk. Make sure that you do not purge important system files.
 - Move files to another disk. If you are not authorized, notify your management. Make sure that you do not move important system files.
 - Ask users to purge files.

For more information about these utilities, refer to [BACKUP](#) on page B-2 and [Disk Space Analysis Program \(DSAP\)](#) on page B-2.

Recovery Operations for a Down Disk or Down Disk Path

To restart a disk or disk path:

1. If a disk path is down due to a ServerNet fabric failure, determine which paths are affected:
 - a. At a TACL prompt:

```
> SCF
```
 - b. At the SCF prompt:

```
-> STATUS DISK $*-* , SUB MAGNETIC
```

The output indicates:

- \$DATA06-M and \$DATA06-MB are stopped in the DOWN substate.
- \$WD8-M and \$WD8-MB are stopped in the HARDOWN substate.
- \$DATA00-P and \$DATA00-B are stopped in the HARDDOWN substate.

```

$SYSTEM SYS00 6> SCF STATUS DISK $*-*
SCF - T9082G02 - (29JUN98) (27MAY98) - 10/22/98 15:12:51 System \ALPHA12

STORAGE - Status DISK \ALPHA12.$DATA06-*
LDev  Path          Status      State      Substate    Primary  Backup
      Path          Status      State      Substate    PID      PID
116   PRIMARY       ACTIVE     STARTED
116   BACKUP        INACTIVE   STARTED
116   MIRROR        INACTIVE   STOPPED    DOWN       0,285    1,268
116   MIRROR-BACKUP INACTIVE   STOPPED    DOWN       0,285    1,268

STORAGE - Status DISK \ALPHA12.$WD8-*
LDev  Path          Status      State      Substate    Primary  Backup
      Path          Status      State      Substate    PID      PID
96    PRIMARY       ACTIVE     STARTED
96    BACKUP        INACTIVE   STARTED
96    MIRROR        INACTIVE   STOPPED    HARDDOWN   0,23     1,12
96    MIRROR-BACKUP INACTIVE   STOPPED    HARDDOWN   0,23     1,12

STORAGE - Status DISK \ALPHA12.$DATA00-*
LDev  Path          Status      State      Substate    Primary  Backup
      Path          Status      State      Substate    PID      PID
121   PRIMARY       INACTIVE   STOPPED    HARDDOWN   0,284    1,267
121   BACKUP        INACTIVE   STOPPED    HARDDOWN   0,284    1,267
121   MIRROR        ACTIVE     STARTED
121   MIRROR-BACKUP INACTIVE   STARTED
                        0,284    1,267

Total Errors = 0    Total Warnings = 9

```

2. Reset disk drives that are in the HARDDOWN substate. At an SCF prompt:

-> RESET DISK \$volume

For example:

-> RESET DISK \$WD8

Resetting a disk in the HARDDOWN substate places it in the DOWN substate.

3. Restart the disk. At an SCF prompt:

-> START DISK \$volume

If you cannot start a disk drive, escalate the problem. Disk replacement might be required. Database recovery might be required if you cannot restart either volume of a mirrored volume. Contact your service provider.

Recovery Operations for Defective Sectors

If you are authorized, use the SCF CONTROL DISK, SPARE command to spare defective sectors. For information on reinitializing the disk drive, refer to the *SCF Reference Manual for the Storage Subsystem*.

Note. Disk drives come from HP already formatted. No disk-drive format utility is available, so you must return any disk drive that requires formatting to HP.

Recovery Operations for a Nearly Full Database File

When a database file is 90 percent full or more, you can modify the file extents dynamically with FUP or perform other procedures as determined by your local system policies.

Note. The allocation of additional extents to any file causes that file to take up more disk space. Before you change the maximum allowable extents for any file, as shown in the next example, check your local procedures to determine whether this is the appropriate action for you to take.

To allocate additional extents to the file MEMOS:

- ```
> FUP
- ALTER MEMOS, MAXEXTENTS 20
- INFO MEMOS, DETAIL
```

A report such as this one is sent to your home terminal:

```
$DATA.DATA1.MEMOS 12 Jul 1993, 14:05
 ENSCRIBE
 TYPE U
 CODE 101
 EXT (2 PAGES, 2 PAGES)
 ODDUNSTR
 MAXEXTENTS 20
 BUFFERSIZE 4096
 OWNER 8,255
 SECURITY (RWEPR): NUNU
 DATA MODIF: 12 Jul 1993, 14:04
 CREATION DATE: 12 Jan 1993, 14:04
 LAST OPEN: 12 Jul 1993, 14:24
 EOF 567022 (78.5% USED)
 FILE LABEL: 649 (22.8% USED)
 EXTENTS ALLOCATED: 10
```

This report shows that the maximum number of extents allocated to this file has been increased to 20 and that the file MEMOS is now only 78.5 percent full.

For more information about setting file extents, see the *File Utility Program (FUP) Reference Manual*.

## Recovery Operations for Performance Problems

Performance problems can have various causes, including path switches or a too small cache size. For information about disk load balancing and increasing cache size, refer to the *SCF Reference Manual for the Storage Subsystem*.

## Recovery Operations for a Corrupt \$SYSTEM Disk

If both disks of your mirrored system disk volume become corrupted, use an alternate system disk if one is available. For information about how an alternate (emergency) system disk is created, refer to the *NonStop S-Series Planning and Configuration*

*Guide.* If you have an alternate system disk for emergency backup, you can minimize unplanned outage minutes.

If an alternate system disk is not available and you are unable to load from the CONFBASE file, you might be able to perform a tape load from a system image tape (SIT) to restore the system image files to the \$SYSTEM disk (SYS<sub>nn</sub> and CSS<sub>nn</sub> subvolumes) and then load that image into either processor 0 or 1. **Perform a tape load only with the advice of the Global Customer Support Center (GCSC) or your service provider.** A tape load reinitializes the disk directory. In every case, the disk directory is overlaid with the directory from the tape and all files that were on the disk are destroyed.

## Recovery Operations for Failed Disk Drives

The CSSI Web describes replacement procedures for failed disk drives.

## Related Reading

For more information about disk drives:

- The *SCF Reference Manual for the Storage Subsystem* for complete syntax, examples, and considerations for the SCF commands used in this section
- The *Guardian Disk and Tape Utilities Reference Manual* for information regarding utilities, such as the Disk Compression Program (DCOM), the Disk Space Analysis Program (DSAP), BACKUP, and RESTORE
- The CSSI Web for procedures to replace disk drives
- The *Guardian User's Guide* for more operations procedures involving disk drives



# 10

## Tape Drives: Monitoring and Recovery

|                                                                       |       |
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| <a href="#">When to Use This Section</a>                              | 10-1  |
| <a href="#">Overview of Tape Drives</a>                               | 10-2  |
| <a href="#">Monitoring Tape Drives</a>                                | 10-3  |
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| <a href="#">Identifying Tape Drive Problems</a>                       | 10-9  |
| <a href="#">Recovery Operations for Tape Drives</a>                   | 10-10 |
| <a href="#">Recovery Operations Using SCF</a>                         | 10-10 |
| <a href="#">Recovery Operations Using the OSM Service Connection</a>  | 10-10 |
| <a href="#">Recovery Operations Using the TSM Service Application</a> | 10-10 |
| <a href="#">Related Reading</a>                                       | 10-11 |

### When to Use This Section

This section provides an overview of operating, monitoring, and performing recovery operations on tape drives attached to NonStop S-series servers.

# Overview of Tape Drives

Tape drives are external devices that connect to a NonStop S-series server using one of these methods:

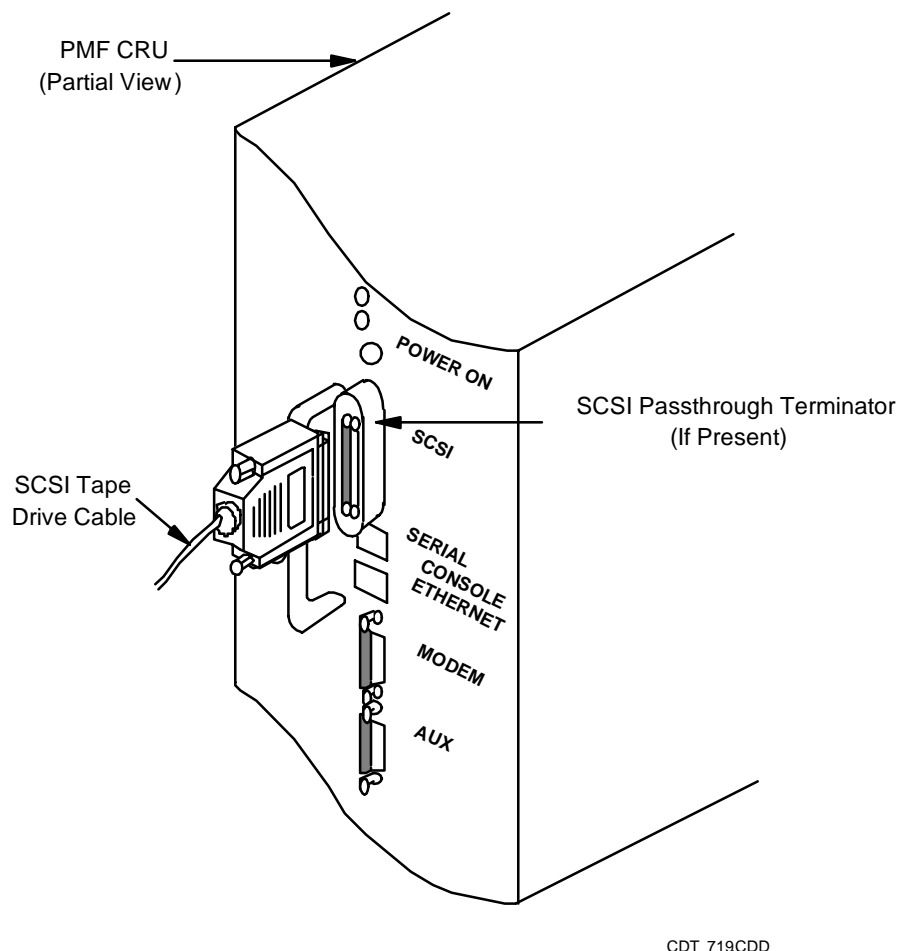
- Through a 6760 ServerNet device adapter (ServerNet/DA) for G06.01 and subsequent G-series RVUs. For more information about ServerNet/DA, refer to [Section 7, ServerNet/DA: Monitoring and Recovery](#).
- Through the SCSI passthrough terminator ([Figure 10-1](#)) on the differential SCSI port of an I/O multifunction (IOMF) CRU or processor multifunction (PMF) CRU.

---

**Note.** On currently manufactured PMF CRUs, the SCSI terminator is located inside the differential SCSI port of the PMF CRU and is not visible.

---

**Figure 10-1. SCSI Passthrough Terminator on PMF CRU**



# Monitoring Tape Drives

These tools are available to monitor tape drives:

- Use the SCF interface to the storage subsystem, the OSM Service Connection, or the TSM Service Application to monitor and get status information about tape drives.
- Use MEDIACOM to monitor the use of tape drives and to write tape labels.

## Monitoring Tape Drive Status

This subsection explains how to list the tape drives on your system and determine their status.

---

**Note.** Tape drives are not visible in the view pane.

---

### Monitoring Tape Drive Status With OSM

To check the status of all tape drives on your system:

1. Log on to the OSM Service Connection.
2. In the tree pane, double-click **Tape Collection** and select the tape drive whose status you want to check. (See [Figure 10-2](#).)
3. From the Attributes tab in the details pane:
  - a. Check that the Service State is OK. If the Service State is anything other than OK, the tape drive might need replacement. Contact your service provider and refer to the CSSI Web for the replacement procedure.
  - b. Check that the Device State is Up. If the attribute value is not Up, operator intervention might be required. For more information, refer to [Recovery Operations for Tape Drives](#) on page 10-10.

**Figure 10-2. Monitoring Tape Drives With OSM**

**OSM Service Connection**

- ServerNet Cluster
  - System VSTAR2
    - Internal ServerNet X Fabric
    - Internal ServerNet Y Fabric
    - Group 1
    - Group 2
    - SWAN Collection
    - Tape Collection
      - Tape Drive \$TAPE1**

**attributes** **» alarms**

**Tape Drive \$TAPE1**

**Logical**

|                       |           |
|-----------------------|-----------|
| Ready Status          | Not Ready |
| Logical Device Number | 127       |
| Tape Type             | Unknown   |
| Product Id            | Unknown   |
| Device State          | Hard Down |
| Firmware Version      |           |

**Controller Path**

|                                |                 |
|--------------------------------|-----------------|
| SCSI ID                        | 5               |
| SCSI Controller                | SSAC (1.1.50.3) |
| Configured Controller Location | PMF.SAC-3.GRP-1 |

**Process Pair**

|                   |                 |
|-------------------|-----------------|
| Redundancy Status | Fully Redundant |
|-------------------|-----------------|

**Primary**

|            |       |
|------------|-------|
| Process ID | 0,296 |
|------------|-------|

**Backup**

|            |       |
|------------|-------|
| Process ID | 1,282 |
|------------|-------|

**Physical**

|             |         |
|-------------|---------|
| Part Number | Unknown |
|-------------|---------|

VST811.vsd

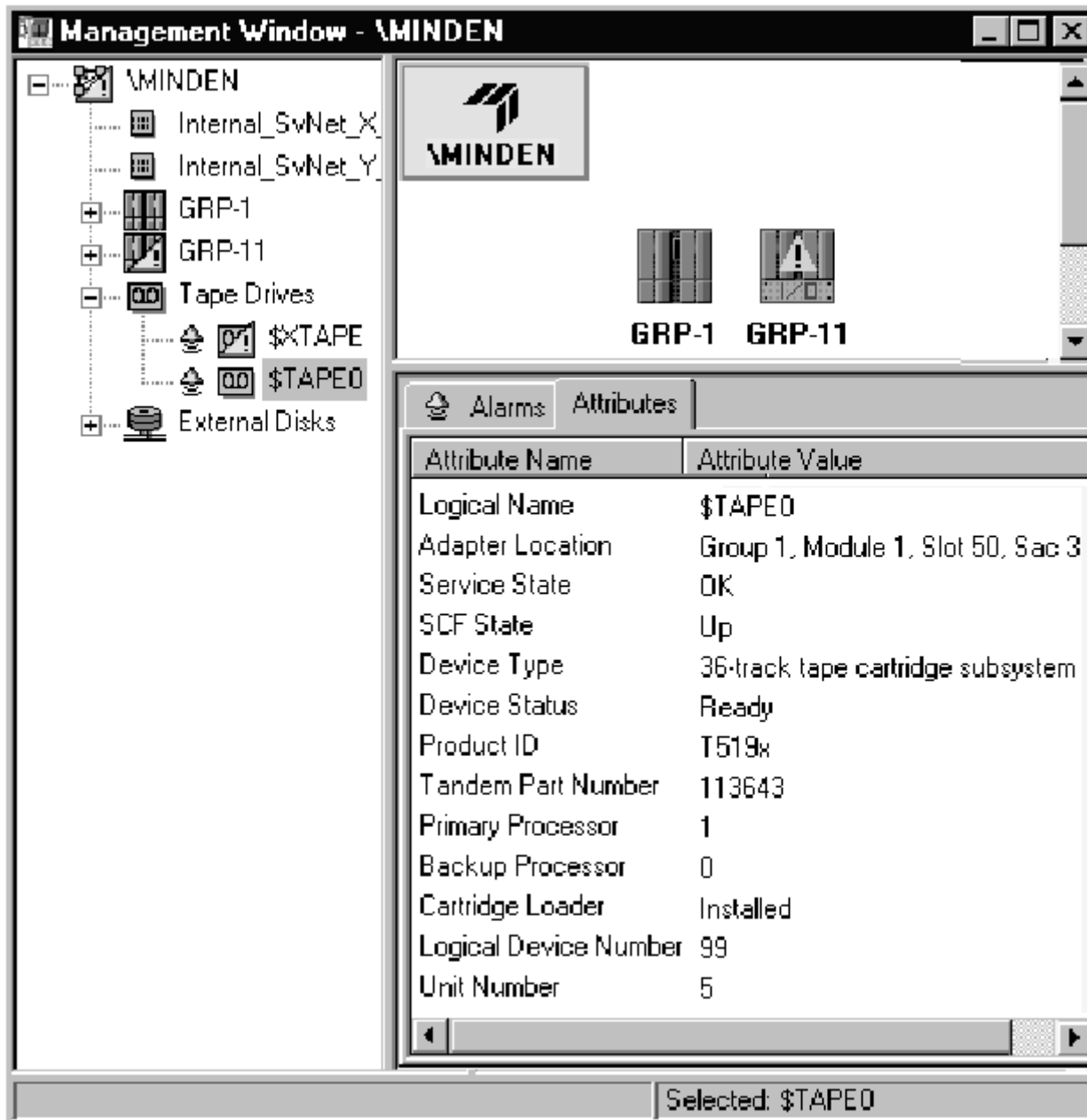
## Monitoring Tape Drive Status With TSM

To check the status of all tape drives on your system with the TSM Service Application:

1. Log on to the TSM Service Application.
2. From the tree pane ([Figure 10-3](#)):
  - a. Double-click **Tape Drives**.
  - b. Click the tape drive whose status you want to check.
3. From the Attributes tab in the details pane:
  - a. Check that the Service State is OK. If the Service State is anything other than OK, the tape drive might need replacement. Contact your service provider and refer to the CSSI Web for the replacement procedure.
  - b. In TSM, check that the SCF State is Up.

If either of these attributes is not Up, operator intervention might be required. For more information, refer to [Recovery Operations for Tape Drives](#) on page 10-10.

Figure 10-3. Monitoring Tape Drives With TSM



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## Monitoring Tape Drive Status With SCF

To check the status of all tape drives on your system with SCF:

```
> SCF STATUS TAPE $*
```

A listing similar to this one is sent to your home terminal:

| STORAGE - Status TAPE \MINDEN.\$XTAPE |         |                |               |              |
|---------------------------------------|---------|----------------|---------------|--------------|
| LDev                                  | State   | Primary<br>PID | Backup<br>PID | DeviceStatus |
| 93                                    | STOPPED | 1,287          | 0,279         | NOT READY    |

| STORAGE - Status TAPE \MINDEN.\$TAPE0 |         |                |               |              |
|---------------------------------------|---------|----------------|---------------|--------------|
| LDev                                  | State   | Primary<br>PID | Backup<br>PID | DeviceStatus |
| 99                                    | STARTED | 1,289          | 0,278         | NOT READY    |

The data shown in the report means:

|              |                                                                                              |
|--------------|----------------------------------------------------------------------------------------------|
| LDev         | The logical device number                                                                    |
| State        | The current SCF state of the tape path                                                       |
| SubState     | The current SCF substate of the tape path                                                    |
| Primary PID  | The primary processor number and process identification number (PIN) of the specified device |
| Backup PID   | The backup processor number and PIN of the specified device                                  |
| DeviceStatus | The status of the device path                                                                |

For more information:

- [SCF Object States](#) on page 3-15, describes the possible SCF states of tape drives and other devices.
- The *Guardian User's Guide* provides additional information about tape operations and the tasks you can perform.

### Example

To obtain status information about the tape drive \$TAPE0 by using SCF:

```
> SCF STATUS TAPE $TAPE0
```

A listing such as this one is sent to your home terminal:

| STORAGE - Status TAPE \MINDEN.\$TAPE0 |         |                |               |              |
|---------------------------------------|---------|----------------|---------------|--------------|
| LDev                                  | State   | Primary<br>PID | Backup<br>PID | DeviceStatus |
| 99                                    | STARTED | 1,289          | 0,278         | NOT READY    |

## Monitoring Tape Drive Status With MEDIACOM

The MEDIACOM command STATUS TAPEDRIVE displays the current status of a tape drive. Among other things, this command tells you whether a tape is mounted on the drive, the name of the DEFINE associated with the tape, and which volume catalog and pool owns it.

**Note.** Manual unloading of a tape is not detected by a tape drive, so information from STATUS TAPEDRIVE can be out of date. For example, STATUS TAPEDRIVE could report that a drive currently has a tape mounted when the tape was removed from the drive by the operator before the command executed.

To check the status of all tape drives on your system with MEDIACOM:

```
> MEDIACOM STATUS TAPEDRIVE
```

A listing similar to this one is sent to your home terminal:

```
MEDIACOM - T6028D42 (18DEC98)
```

```
Creating default server.
```

| Tape Drive | Drive Status | Tape Name | Tape Status | Label Type | Open Mode | Process Name |
|------------|--------------|-----------|-------------|------------|-----------|--------------|
| \$XTAPE    | DOWN         |           |             |            |           |              |
| \$TAPE0    | FREE         |           |             |            |           |              |

```
2 tape drives returned.
```

The *DSM/Tape Catalog Operator Interface (MEDIACOM) Manual* explains the fields in this output.

### Example

To obtain status information about the tape drive \$TAPE0 by using MEDIACOM:

```
> MEDIACOM STATUS TAPEDRIVE $TAPE0
```

A listing such as this one is sent to your home terminal:

```
MEDIACOM - T6028D42 (18DEC98)
```

| Tape Drive | Drive Status | Tape Name | Tape Status | Label Type | Open Mode | Process Name |
|------------|--------------|-----------|-------------|------------|-----------|--------------|
| \$TAPE0    | FREE         |           |             |            |           |              |

```
1 tape drive returned.
```



## Monitoring the Status of Labeled-Tape Operations

Use the MEDIACOM STATUS TAPEDRIVE and STATUS TAPEMOUNT commands to determine the current status of labeled-tape operations on your system.

For additional information about MEDIACOM, the listings it generates, and the tasks it enables you to perform:

- *DSM/Tape Catalog Operator Interface (MEDIACOM) Manual*
- *DSM/Tape Catalog User's Guide*
- *Guardian User's Guide*

## Identifying Tape Drive Problems

[Table 10-1](#) lists some of the most common tape drive problems and their possible causes.

**Table 10-1. Common Tape Drive Problems**

| Symptom               | Problem                                                                                    | Possible Causes                                                                     |
|-----------------------|--------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| File-system error 48  | A security violation has occurred.                                                         | An attempted operation was not allowed.                                             |
| File-system error 49  | Various                                                                                    | An unexpired labeled tape was used.                                                 |
| File-system error 51  | A runaway tape has been detected.                                                          | The system has tried to read a blank tape.                                          |
| File-system error 66  | Various                                                                                    | A hardware failure has occurred, or the tape drive has been purposely brought down. |
| File-system error 100 | A device is not ready.                                                                     | A tape drive has been brought down, or the drive is not online.                     |
| File-system error 195 | An operation requires use of \$ZSVR, but it is not running. Tape operation is not allowed. | \$ZSVR has been purposely stopped.                                                  |
| File-system error 218 | An interrupt timeout occurs. An I/O process cannot communicate with a tape drive.          | A ServerNet addressable controller (SAC) has failed.                                |
| No error              | A tape label record is missing or incorrect.                                               | An attempt was made to access a tape with a missing or incorrect label.             |
| No error              | A tape fails to respond to a BACKUP command.                                               | A tape with an inappropriate label type was mounted in error.                       |
| No error              | A tape continues to spin beyond the load point.                                            | The load point has fallen off.                                                      |
| No error              | Every time a tape is mounted, it is unloaded.                                              | A labeled tape is being mounted in a drive that is open for unlabeled use.          |

# Recovery Operations for Tape Drives

You can perform recovery operations on tape drives using either the SCF interface to the storage subsystem, the OSM Service Connection, or the TSM Service Application.

## Recovery Operations Using SCF

These SCF commands are available for controlling TAPE objects:

| SCF Command | Description                                                                                                                                        |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| PRIMARY     | Causes the backup processor of a tape drive to become the primary processor and the primary processor of the drive to become the backup processor. |
| RESET       | Puts a tape drive in a state from which it can be restarted.                                                                                       |
| START       | Initiates the operation of a tape drive.                                                                                                           |
| STATUS      | Displays current status information about a tape drive.                                                                                            |
| STOP        | Terminates the operation of a tape drive in a normal manner.                                                                                       |

The *SCF Reference Manual for the Storage Subsystem* describes these commands.

## Recovery Operations Using the OSM Service Connection

To control tape drives using the OSM Service Connection:

1. Log on to the OSM Service Connection.
2. From the tree pane ([Figure 10-2](#) on page 10-4):
  - a. Double-click **Tape Collection**.
  - b. Right-click the tape drive.
  - c. Select **Actions** from the menu. The Actions dialog box appears.
  - d. You can select Start or Stop, which correspond to the SCF commands START and STOP, or select various tests to perform on the tape drive.

For information on recovery operations, refer to the OSM online help or suggested Repair Actions text (listed under Alarm Details) for specific tape-related alarms in the OSM Service Connection.

## Recovery Operations Using the TSM Service Application

To control tape drives using the TSM Service Application:

1. Log on to the TSM Service Application.
2. From the tree pane ([Figure 10-3](#) on page 10-6):
  - a. Double-click **Tape Drives**.

- b. Right-click the tape drive.
- c. Select **Actions** from the menu. The Actions dialog box appears.
- d. You can select **up** or **down**, which correspond to the SCF commands START and STOP, or select various tests to perform on the tape drive.

For information on recovery operations, refer to the TSM online help or suggested Repair Actions text (listed under Alarm Details) for specific tape-related alarms in the TSM Service Application.

## Related Reading

For more information about tapes and tape drives, refer to the documentation listed in [Table 10-2](#).

**Table 10-2. Related Reading for Tapes and Tape Drives** (page 1 of 2)

| For Information About...                                    | Refer to...                                                                                                                                                     |
|-------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Operating tape drives:                                      |                                                                                                                                                                 |
| 5142 external digital audio tape (DAT) drives               | <i>5142-xSE Rackmount Tape Subsystem User Guide</i>                                                                                                             |
| 515x tape drives in a 9710 automated cartridge system (ACS) | <i>Addendum to the StorageTek 9710 for the Tandem Environment</i>                                                                                               |
| 515x tape drives stand-alone                                | <i>5157/5157 ACL S-Series Digital Linear Tape Subsystems Installation/Users Guide</i><br><i>5158 ACL Digital Linear Tape Subsystem Installation/Users Guide</i> |
| 5190 and 5194 tape drives                                   | <i>5190/5194 Modular Tape Subsystem Manual</i>                                                                                                                  |
| 5242 and 5242ACL tape drives                                | <i>DAT 72 (Models 5242 and 5242ACL Tape Drive User's Guide)</i>                                                                                                 |
| 5257 tape drives                                            | <i>5257/5257ACL Installation and User's Guide for Himalaya S-Series Tape Enclosures</i>                                                                         |
| 5258 tape drives                                            | <i>5258ACL Installation and User's Guide</i>                                                                                                                    |
| 5259 tape drives                                            | <i>5259 L700 (CTL700) Installation and Operations Guide</i>                                                                                                     |
| 9490 tape drives                                            | The documentation shipped with your tape drive                                                                                                                  |
| Performing system operations involving tape drives          | <i>Guardian User's Guide</i>                                                                                                                                    |
| Replacing tape drives                                       | <i>CSSI Web</i>                                                                                                                                                 |
| Recovery operations for generic tape processes              | <i>SCF Reference Manual for the Kernel Subsystem</i>                                                                                                            |
| Recovery operations for tape drives                         | <i>SCF Reference Manual for the Storage Subsystem</i><br><i>TSM Online User Guide</i>                                                                           |

**Table 10-2. Related Reading for Tapes and Tape Drives** (page 2 of 2)

| <b>For Information About...</b>                               | <b>Refer to...</b>                                                                                                                   |
|---------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| Configuring tape drives                                       | <i>SCF Reference Manual for the Storage Subsystem</i>                                                                                |
| Starting and stopping tape drives                             | <i>SCF Reference Manual for the Storage Subsystem</i><br><i>TSM Online User Guide</i>                                                |
| Using the MEDIACOM utility                                    | <i>DSM/Tape Catalog User's Guide</i><br><i>DSM/Tape Catalog Operator Interface (MEDIACOM) Manual</i><br><i>Guardian User's Guide</i> |
| Using the BACKCOPY utility to duplicate backup tapes          | <i>Guardian Disk and Tape Utilities Reference Manual</i>                                                                             |
| Using the BACKUP utility to save a copy of disk files on tape | <i>Guardian Disk and Tape Utilities Reference Manual</i>                                                                             |
| Using the RESTORE utility to copy saved tape files to disk    | <i>Guardian Disk and Tape Utilities Reference Manual</i>                                                                             |

## Processors: Monitoring and Recovery

|                                                                       |       |
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| <a href="#">When to Use This Section</a>                              | 11-1  |
| <a href="#">Monitoring and Maintaining Processors</a>                 | 11-2  |
| <a href="#">Monitoring Processor Status Using OSM or TSM</a>          | 11-2  |
| <a href="#">Monitoring Event Messages</a>                             | 11-3  |
| <a href="#">Monitoring the State of PMF CRUs</a>                      | 11-3  |
| <a href="#">Monitoring Processor Performance Using ViewSys</a>        | 11-4  |
| <a href="#">Identifying Processor Problems</a>                        | 11-5  |
| <a href="#">Hardware Error Freezes</a>                                | 11-5  |
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| <a href="#">Recovery Operations for Processors</a>                    | 11-6  |
| <a href="#">Halting One or More Processors</a>                        | 11-7  |
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| <a href="#">Dumping a Processor to Disk</a>                           | 11-10 |
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| <a href="#">Reloading a Single Processor on a Running Server</a>      | 11-23 |
| <a href="#">Loading a Processor From Disk</a>                         | 11-24 |
| <a href="#">Copying a Dump File From Tape to Disk</a>                 | 11-26 |
| <a href="#">Backing Up a Processor Dump to Tape</a>                   | 11-26 |
| <a href="#">Replacing Processor Memory or a PMF CRU</a>               | 11-27 |
| <a href="#">Submitting Information to Your Service Provider</a>       | 11-27 |
| <a href="#">Related Reading</a>                                       | 11-30 |

## When to Use This Section

Use this section to monitor processors and to perform recovery operations such as processor dumps.

# Monitoring and Maintaining Processors

Use OSM, TSM, the ViewSys product, and other tools to monitor processors. Monitoring and maintaining processors includes:

- [Monitoring Processor Status Using OSM or TSM](#) on page 11-2
- [Monitoring Event Messages](#) on page 11-3
- [Monitoring the State of PMF CRUs](#) on page 11-3
- [Monitoring Processor Performance Using ViewSys](#) on page 11-4

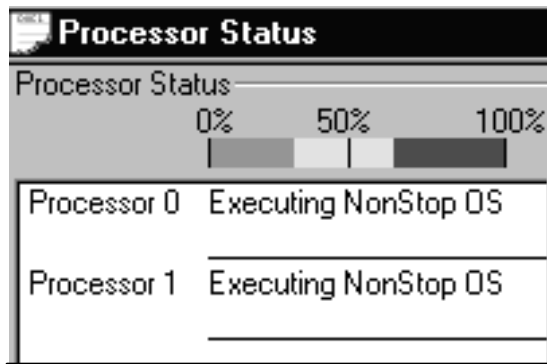
## Monitoring Processor Status Using OSM or TSM

From the OSM or TSM Low-Level Link, use the Processor Status dialog box to determine if the processors are running:

1. Log on to the OSM or TSM Low-Level Link.
2. On the toolbar, click **Processor Status**.
3. The status for all processors should be “Executing NonStop OS.” (See [Figure 11-1](#).) If not, refer to [Identifying Processor Problems](#) on page 11-5.

---

**Figure 11-1. Processor Status Display**



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---

In the Processor Status list, a colored bar next to each processor name indicates the current busy percentage for that processor. The color of the bar is determined by the yellow and red sliders in the Processor Busy Options box.

A graph next to each processor name also shows the recent history of busy levels for that processor. You can save a history of processor busy percentages with the Save History to file button. The history period is determined in the Time Frame slider in the Processor History Options box.

## Monitoring Event Messages

For more information, refer to [Monitoring EMS Event Messages](#) on page 4-1.

## Monitoring the State of PMF CRUs

Use the OSM Service Connection or the TSM Service Application to monitor the state of each processor multifunction (PMF) customer-replaceable unit (CRU). To monitor a PMF CRU and determine the cause of a problem:

1. In the Management window, check the Physical view of the PMF CRU. The processor or other system components in the PMF CRU might require service or operator intervention if the display color of a PMF CRU in the Physical view of the Management window is red or yellow. Normally, the display for the PMF CRUs is gray.
2. Check any alarms generated as a result of the problem. See [Checking for Problems and Alarms](#) on page 3-11.
3. Check the state of the processor as described in [Identifying Problems Using the TSM Service Application](#) on page 3-11. The normal state value for processors is "Running NSK." Other values specify a detected abnormal condition.
4. Check the Processor Status dialog box in the OSM or TSM Low-Level Link to determine if the processor is halted or frozen.
5. Check the Service State attribute of the PMF CRU as described in [Identifying Problems Using the TSM Service Application](#) on page 3-11. The possible service states for PMF CRUs are:

| Service State      | Description                                                                                                                                                                                                      |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| OK                 | Component does not report a need for service.<br><b>Note.</b> In the OSM Service Connection, the Service State attribute is not displayed if it is OK. It is displayed only if attention or service is required. |
| Service Required   | Service is required for the component or one or more of its subcomponents.                                                                                                                                       |
| Attention Required | Service needs are unknown. The component might not be responding.                                                                                                                                                |

The service state of the PMF CRU should be OK. If not, refer to [Replacing Processor Memory or a PMF CRU](#) on page 11-27.

# Monitoring Processor Performance Using ViewSys

Use the ViewSys product to view system resources online and to see information on system performance. ViewSys provides information about processor activity. Using ViewSys, you can list the processors on your system and determine their status. For more information, refer to [ViewSys on page B-7](#).

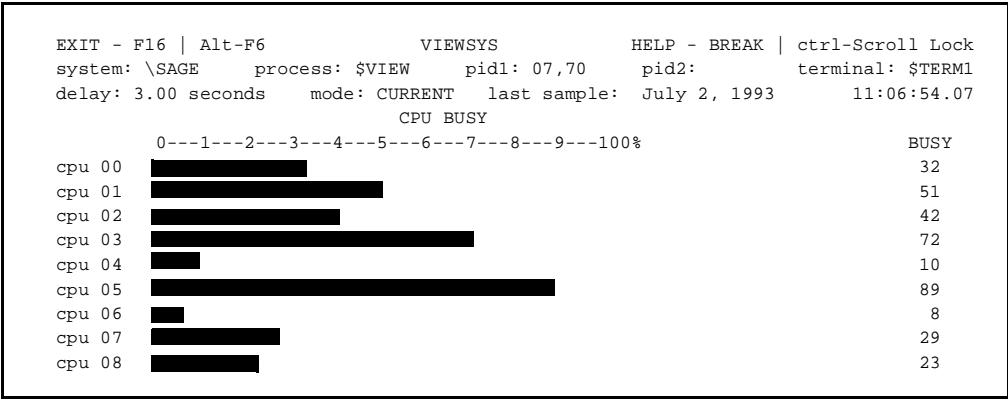
To use ViewSys to obtain information about processor activity, at a TACL prompt:

> VIEWSYS

A series of bar graphs that summarize processor performance statistics appears on your terminal.

**Note.** The Measure utility also collects and displays statistics about system performance and the performance of processors and other system components. Operations management personnel often use this utility to help fine-tune and balance a system. For instructions on using this utility, refer to the *Measure User's Guide* and the *Measure Reference Manual*.

After the first ViewSys screen appears, press F1 to view processor busy statistics:



To exit ViewSys, press F16.



# Identifying Processor Problems

Abnormal processor states include hardware error freezes, system hangs, and processor halts.

## Hardware Error Freezes

A hardware error freeze occurs when a processor cannot continue processing due to the risk of using corrupt data from a hardware error. Contact your service provider before dumping a frozen processor. The PMF CRU containing the frozen processor, including its memory units, might need to be replaced.

## Processor Hangs

A processor hang occurs when system components wait for an event that is not going to happen. An unexpected event such as a deadlock (two or more processors waiting for each other) might have occurred.

## Processor Halts

When certain errors occur (such as when data integrity is at risk), the operating system cannot correct the problem and must halt all application and system processes running in the associated processor. The remaining running processors in the system each send a message, reporting the halted processor as down. The other processors in the system, including the backup to the halted processor, are not affected by the errors that caused the processor to halt unless they are freeze-enabled.

Two types of processor halts display a processor halt code in the Processor Status dialog box:

- A halt instruction results in a processor halt.

When the operating system detects a millicode or software error that it cannot correct, it can execute a halt instruction to suspend all application and system processes running in the associated processor. The status of the halted processor becomes:

`Halt code = %nnnnnn`

Unlike a freeze instruction, a halt instruction affects only one processor.

- A processor can be halted by a freeze instruction.

A freeze-enabled processor can be frozen by another frozen processor. When a freeze instruction is executed, any processors that are freeze-enabled also freeze immediately. When the operating system detects a software error that it cannot correct, it can execute a freeze instruction to suspend all application and system processes running in the associated processor. The status of the frozen processor becomes:

`Freeze code = %nnnnnn`

If system freeze is enabled, the status for all other freeze-enabled processors becomes:

Frozen by other processor

The *Processor Halt Codes Manual* documents processor halt codes.

---

**Note.** Do not freeze-enable a processor unless instructed to do so by your service provider.

---

## Recovery Operations for Processors

Processor halts can sometimes be confused with other types of errors. Determine whether a processor halt, hardware error freeze, or system hang has occurred. See [Identifying Processor Problems](#) on page 11-5.

Recovery operations for processors includes:

- [Halting One or More Processors](#) on page 11-7
- [Recovery Operations for a System Hang](#) on page 11-7
- [Recovery Operations for a Hardware Error Freeze](#) on page 11-8
- [Recovery Operations for an Unacceptable Service State](#) on page 11-8
- [Recovery Operations for a Processor Halt](#) on page 11-8
- [Dumping a Processor to Disk](#) on page 11-10
- [Enabling or Disabling System Freeze](#) on page 11-12
- [Enabling or Disabling Freeze on a Processor](#) on page 11-13
- [Freezing the System or Processor](#) on page 11-15
- [Dumping a Processor to Tape \(Down System Only\)](#) on page 11-17
- [Dumping All Processors in a System](#) on page 11-22
- [Reloading a Single Processor on a Running Server](#) on page 11-23
- [Loading a Processor From Disk](#) on page 11-24
- [Copying a Dump File From Tape to Disk](#) on page 11-26
- [Backing Up a Processor Dump to Tape](#) on page 11-26
- [Replacing Processor Memory or a PMF CRU](#) on page 11-27

## Halting One or More Processors

To place a selected processor or processors in a halt state and set the status and registers of the processor or processors to an initial state:

1. Log on to the OSM or TSM Low-Level Link.
2. On the toolbar, click **Processor Status**.
3. In the Processor Status dialog box, select the processor to be halted or select all the processors to halt all of them.
4. Select **Processor Actions>Halt**.
5. Click **Perform action**.
6. A message box appears and asks whether you are sure you want to perform a halt on the selected processor or processors. Click **OK**.

## Recovery Operations for a System Hang

When a system hang occurs, you must decide whether or not to dump the system. Your decision might be based on these factors:

- If the system hang occurs during a critical time period, you might decide not to dump the system.

---

**Note.** If you decide not to dump the system, do a system load instead.

---

- If the system hang occurs during a noncritical time period, you might decide to dump the system.

---

**Note.** If you decide to dump the system, proceed with [Procedure for Dumping the System](#) on page 11-7.

---

## Procedure for Dumping the System

If you dump the system after a system hang, your service provider can examine the dumps, possibly leading to a diagnosis of the problem. After the system hangs:

1. Enable System Freeze, including all processors.
2. Freeze processor 0. This action will freeze the rest of the processors.
3. Perform tape dump on processor 0.
4. Perform disk boot on processor 0 with CIIN disabled.
5. Perform bus dump on the remainder of the processors.
6. Disable System Freeze (system wide).

7. Reload the remaining processors.

---

**Note.** After reloading the remaining processors, run your startup scripts if any.

---

Send the dumps to your service provider.

## Recovery Operations for a Hardware Error Freeze

Contact your service provider. Depending on the circumstances, a hardware error freeze might require the PMF CRU or a memory unit to be replaced. See [Replacing Processor Memory or a PMF CRU](#) on page 11-27.

When a hardware error freeze occurs, scan strings are automatically saved to \$SYSTEM.ZSERVICE. In OSM, the default file name is ZZPS<sub>nnnn</sub>. In TSM, the default file name is ZZSS<sub>nnnn</sub>. If the PMF CRU or memory unit is replaced due to a hardware error freeze, back up the ZZPS<sub>nnnn</sub> or ZZSS<sub>nnnn</sub> file to tape and submit it along with the CRU or memory unit being replaced.

If the processors in your system use a NonStop S7000 PMF CRU, S72000 PMF CRU, or S7400 PMF CRU, you should also submit a memory dump to the Global Customer Support Center (GCSC) for concurrent analysis. When a hardware error freeze occurs for a NonStop S70000 PMF CRU, however, dumping memory after the scan string file is constructed does not provide any useful information.

If you want to suppress the scan string save function for a NonStop S70000 PMF CRU to enable memory dumps, contact your service provider.

- 
- △ **Caution.** If an error message alerts you that the freeze is due to an uncorrectable memory error (UCME), do not take a memory dump. The dump will cause another hardware error freeze.
- 

## Recovery Operations for an Unacceptable Service State

Contact your service provider. When the service state reported by the OSM Service Connection or the TSM Service Application is not acceptable, the PMF CRU or a memory unit might need to be replaced. Refer to [Replacing Processor Memory or a PMF CRU](#) on page 11-27.

## Recovery Operations for a Processor Halt

When a processor halts unexpectedly or shows signs of abnormal behavior:

1. Review [Identifying Processor Problems](#) on page 11-5.
2. Make sure that a processor dump is the best course of action. Although a processor dump is useful for most processor or system failures, contact your service provider before attempting a processor dump if a processor is in a hardware error freeze state.

3. Dump (copy) the contents of its memory to disk or tape unless otherwise indicated. Dumping the contents of a halted processor (its registers and entire memory contents) can be a useful diagnostic tool for analyzing and resolving the problem.

If you do not have failure-recovery software, such as the HP Tandem Failure Data System (TFDS), installed on your system, perform a processor dump:

- To perform a memory dump of a processor on a running system, follow the directions in [Dumping a Processor to Disk](#) on page 11-10.
  - If the entire system is down (all processors are halted), you can perform a tape dump on one processor as described in [Dumping a Processor to Tape \(Down System Only\)](#) on page 11-17. Tape dumps must not be performed on a running system.
  - If you are advised to perform a memory dump for all processors, refer to [Dumping All Processors in a System](#) on page 11-22.
4. Submit a tape containing the processor dump to your service provider for analysis.
  5. Load the operating system into the processor or processors that halted.
    - To reload individual processors, use the TACL RELOAD *nn* command, where *nn* is the processor number of the processor you want to load.
      - a. From the Startup TACL window, log on to the system as a super-group user (255,*n*).
      - b. At the TACL prompt:  

```
> RELOAD nn, prime
```

where *nn* is the number of the processor to reload.
      - c. Wait until the Processor Status dialog box shows the status for all processors to be "Executing NonStop OS."
    - If all processors are halted, you must start the system as described in [Section 16, Starting and Stopping the System](#).
  6. Restart processes that were running in the affected processors without a backup process. Generic processes and processes that were running with a backup process are restarted automatically by the system.

## Dumping a Processor to Disk

A processor dump to disk occurs while the system is running. The dump occurs over either the X or Y ServerNet fabric. When a processor is dumped to disk, the RCVDUMP utility begins copying the dump in a compressed format from the specified processor into a disk file called *dumpfile*. If *dumpfile* does not exist, the RCVDUMP utility creates it. As the dump proceeds, the status of the processor being dumped changes in the Processor Status dialog box to indicate that a dump is in progress. When the dump is finished:

- The status of the selected processor in the Processor Status dialog box changes to indicate the completion of the dump.
- RCVDUMP sends this informational message to the terminal-emulation window from which it was run:

```
CPU n has been dumped to dumpfile.
```

## Alerts

Before you perform a processor dump to disk:

- You must have a second processor connected to a terminal or workstation with a running command interpreter. The processor in which the TACL command interpreter is running performs the dump.
- If *dumpfile* already exists, it must be empty. (Its end-of-file pointer, or EOF, must be zero.)
- You must not prime or reset the processor before performing a processor dump.

## Before You Begin

To prepare for a disk dump:

1. Verify that a disk is available with enough space to store the dump.

A processor dump requires 256 extents. Each extent should equal slightly more than 1/256 the size of the processor memory. For example, for a processor with 256 megabytes of main memory, you need 256 extents of at least 512 pages each.

2. To empty an existing *dumpfile*:

```
> FUP PURGEDATA dumpfile
```

3. Collect information about the reason for the halt:

- a. Log on to the OSM or TSM Low-Level Link.
- b. On the toolbar, click **Processor Status**. The Processor Status dialog box appears.
- c. Write down the halt code and the status message displayed in the Processor Status dialog box for the processor that is halted.

You will need this information when you notify your system manager or service provider about this dump.

## Procedure to Dump a Processor to Disk

Complete syntax and considerations for RECEIVEDUMP and RCVDUMP, as well as the error and informational messages that they generate, are described in the *Guardian User's Guide*. For an explanation of the messages generated by RCVDUMP, refer to the *TACL Reference Manual*.

To dump a processor to disk on a running system:

1. Log on to a TACL session as the super ID (255,255).
2. Dump the memory of the processor to a disk file. Either:
  - Use the TACL RECEIVEDUMP command, which runs the RCVDUMP utility. At a TACL prompt:  

```
> RECEIVEDUMP / OUT dumpfile / cpu , { 0 | 1 }
```

The 0 and 1 options specify the X fabric or Y fabric, respectively.
  - Run the RCVDUMP utility directly. At a TACL prompt, type:  

```
> RCVDUMP dumpfile , cpu , { X | Y }
```
3. Monitor the dump to make sure that it finishes successfully:
  - a. Wait for this message to appear:  

```
CPU n has been dumped to dumpfile
```
  - b. Check the size of *dumpfile* to verify that the end-of-file pointer (EOF) is not equal to zero.  

```
> FUP INFO dumpfile
```
4. Reload the processor by issuing the TACL RELOAD *nn*, PRIME command.
5. Log off of the OSM or TSM Low-Level Link and the TACL session.

## Troubleshooting and Recovery Operations for Disk Dumps

If a message indicates that the dump was not successful, repeat [Dumping a Processor to Disk](#) on page 11-10 using the other ServerNet fabric.

If a halt code for the selected processor appears in the Processor Status dialog box of the OSM or TSM Low-Level Link, look it up in the *Processor Halt Codes Manual* for further information about the cause of failure and the appropriate recovery procedure.

## Enabling or Disabling System Freeze

The Enable System Freeze tool is for debugging purposes only. Its intent is for use only under the direction of a service provider. Upon activation of Enable System Freeze, when one freeze-enabled processor halts, all other freeze-enabled processors also halt. The default setting is Disable System Freeze.

- 
- △ **Caution.** Do not Enable System Freeze if you are using the server in a production environment. When Enable System Freeze is active, any ServerNet disruptions such as cable replacement or CRU insertion can generate a system freeze. If Enable System Freeze is active, Disable System Freeze before performing a service operation. Perform this operation only if instructed to do so by your service provider.
- 

Freeze-disabled processors are not affected by any System Freeze action. When Disable System Freeze is active and one freeze-disabled or freeze-enabled processor halts, the halt is not propagated to other processors.

Use the OSM or TSM Low-Level Link to perform the Enable System Freeze and Disable System Freeze actions. To check the System Freeze attribute, use the TSM Service Application or the OSM or TSM Low-Level Link.

### Checking if System Freeze Is Enabled or Disabled Before System Discovery

1. Log on to the OSM or TSM Low-Level Link.
2. On the toolbar, click **System Actions**.

The Attributes dialog box appears.

3. In the Attributes dialog box, check the System Freeze attributes.

### Checking if System Freeze Is Enabled or Disabled Using the TSM Service Application or OSM or TSM Low-Level Link (After System Discovery)

1. In the tree pane or view pane of the Management window, select the system.
2. On the Attributes tab of the details pane, check the System Freeze attribute.

### Enabling or Disabling System Freeze Using the OSM or TSM Low-Level Link (Before System Discovery)

1. On the toolbar, click **System Actions**.

The Attributes dialog box appears.

2. Click **Show Actions**.

The Actions dialog box appears.

3. In the Actions dialog box, select **Enable System Freeze** or **Disable System Freeze**.



4. Click **Perform Action**.

If you selected Disable System Freeze, the action begins immediately. If you selected Enable System Freeze, a message prompts you to confirm the action.

5. If you selected Enable System Freeze, click **OK** or **Cancel**.

If you clicked OK, the status of the action appears in the Action Status box.

## Enabling or Disabling System Freeze After System Discovery

1. In the view pane of the Management window, select the system.

2. In the view pane, right-click the system and select **Actions**.

The Actions dialog box appears.

3. In the Actions dialog box, select **Enable System Freeze** or **Disable System Freeze**.

4. Click **Perform Action**.

If you selected Disable System Freeze, the action begins immediately. If you selected Enable System Freeze, a message prompts you to confirm the action.

5. If you selected Enable System Freeze, click **OK** or **Cancel**.

If you clicked OK, the status of the action appears in the Action Status box.

If the Enable System Freeze or Disable System Freeze fails, retry the action. If the Enable System Freeze or Disable System Freeze fails a second time, contact your service provider.

## Enabling or Disabling Freeze on a Processor

Enabling freeze on a processor, as long as system freeze is also enabled, ensures that the processor halts when another freeze-enabled processor halts. Enabling freeze on a processor also ensures that it halts when the System Freeze action is performed.

Disabling freeze on a processor ensures that the only time the processor halts is when it initiates the halt itself. However, if system freeze is disabled, when one processor halts, other processors in the server do not halt regardless of whether they are freeze-enabled or freeze-disabled.

---

△ **Caution.** Enabling and disabling freeze on a processor is used primarily for troubleshooting server problems and is not a normal server operation. Perform this operation only if instructed to do so by your service provider.

---

You can check the Processor Freeze attribute using the TSM Service Application or the OSM or TSM Low-Level Link. However, you can perform the Processor Freeze Enable and Processor Freeze Disable actions using only the OSM or TSM Low-Level Link.

## Checking If Freeze Is Enabled or Disabled on One or More Processors Using the Processor Status Dialog Box

1. Log on to the OSM or TSM Low-Level Link.
2. Do one of the following:
  - From the Summary menu, choose **Processor Status**.
  - On the toolbar, click **Processor Status**.

The Processor Status dialog box appears. If “F” appears next to a processor, freeze is enabled on that processor. If nothing appears next to a processor, freeze is disabled on that processor.

## Checking If Freeze Is Enabled or Disabled on One or More Processors Using the Management Window

1. Log on to the TSM Service Application or the OSM or TSM Low-Level Link (and click **System Discovery**).
2. In the tree pane or view pane, click the processor.
3. In the Attributes tab of the details pane, check the Processor Freeze attribute.

## Enabling or Disabling Freeze on One or More Processors

1. Log on to the OSM or TSM Low-Level Link.
2. Either:
  - From the Summary menu, choose **Processor Status**.
  - On the toolbar, click **Processor Status**.The Processor Status dialog box appears.
3. Select the processors for which you want to enable freeze.
4. In the Processor Actions list, select **Enable Freeze** or **Disable Freeze**.
5. Click **Perform Action**.
  - If you selected the Enable Freeze action, a warning indicates that if you enable freeze on this processor, it will be halted when a system freeze is performed. You are also warned that this action has no effect unless System Freeze is enabled. If you want to enable freeze on this processor, click **OK**. If you do not want to perform this action, click **Cancel**.
  - If you selected the Disable Freeze action, the action starts immediately.

6. In the Action status box, monitor the status of the Enable Freeze or Disable Freeze action:
  - After the Enable Freeze action has successfully finished, a completed message appears, and an “F” appears next to the processor in the Processor Status dialog box.
  - After the Disable Freeze action has successfully finished, a completed message appears, and an “F” next to the processor disappears from the Processor Status dialog box.

If the Enable Freeze or Disable Freeze on the processor fails, retry the action. If the action fails a second time, contact your service provider.

## Freezing the System or Processor

The system freeze and processor freeze actions are used primarily for diagnostic purposes. You must be logged on to the OSM or TSM Low-Level Application to perform these actions.

---

△ **Caution.** You should not invoke a system freeze on a production system. Invoke the system freeze action only when instructed to do so by your service provider.

---

## Freezing the System

System freeze occurs one of two ways:

- You use the system freeze action to invoke a system freeze.
- When the operating system detects a software error that it cannot correct, it executes a freeze instruction to suspend all application and system processes running in the associated processor. If system freeze is invoked, all other processors running with freeze enabled are frozen.

You can then dump the memory contents of the processors participating in the freeze for examination by your service provider. Before invoking a system freeze, you must check to see if freeze is enabled for the processors.

---

**Note.** The system freeze action automatically enables system freeze for the duration of the action. After the freeze action completes, system freeze is disabled. After system freeze is disabled, dump the system. For more information, see [Dumping All Processors in a System](#) on page 11-22.

---

## Freezing a Processor

1. Check the Processor Freeze attribute for each processor in the system:
  - a. In the tree pane, click the system tab.
  - b. Select the processor.
  - c. Click the Attributes tab in the details pane and check the value of the Processor Freeze attribute. If you want a processor to freeze, make sure its Processor Freeze attribute is Enabled. If you do not want a processor to freeze, make sure its Processor Freeze attribute is Disabled.

For more information, see [Enabling or Disabling Freeze on a Processor](#) on page 11-13.

2. Click **System Actions**.

The Attributes dialog box appears.

3. Click **Show Actions**.

The Actions dialog box appears.

4. In the Actions list, select **Freeze**.
5. Click **Perform Action**.

## Freezing the Processor After System Discovery

1. In the tree pane of the Management window, click the system tab.
2. Right-click the system name.
3. From the menu, select **Actions**.

The Actions dialog box appears.
4. In the Actions list, select **Freeze**.
5. Click **Perform Action**.

## Monitoring Status of the Freeze Action

On the toolbar, click **Action Status**. The Action Summary dialog box appears. The Action Summary dialog box displays status for actions in progress and finished actions.

## Dumping a Processor to Tape (Down System Only)

If the entire system is down (all processors are halted), you can perform a tape dump using the OSM or TSM Low-Level Link. Your service provider can use the memory dump to troubleshoot your system. For more information on determining processor problems, see [Monitoring Processor Status Using OSM or TSM](#) on page 11-2.

You dump processor memory to disk or tape, depending on the following circumstances:

- When the server is running, dump processor memory to disk using the TACL RECEIVEDUMP utility. The server is running when any processor is executing the NonStop Kernel operating system.
- When the entire system is down (all processors halted) dump processor memory to tape. You can use the OSM or TSM Low-Level Link to dump processor memory to tape. You can perform this action either before or after system discovery.

---

△ **Caution.** The OSM or TSM Low-Level Link does not let you perform a tape dump while the server is running. When the server is running, you need to use the TACL RECEIVEDUMP utility to dump the processor to disk.

---

---

**Note.** If the processor is not already halted, you must halt it before dumping its memory.

---

The tape dump is performed over either the X or Y ServerNet fabric. Status messages in the Processor Status dialog box of the OSM or TSM Low-Level Link indicate the progress of the tape dump. When the tape dump finishes successfully, halt code %1154 appears in the Processor Status dialog box for the processor that was dumped to tape.

## Alerts

Before performing a tape dump:

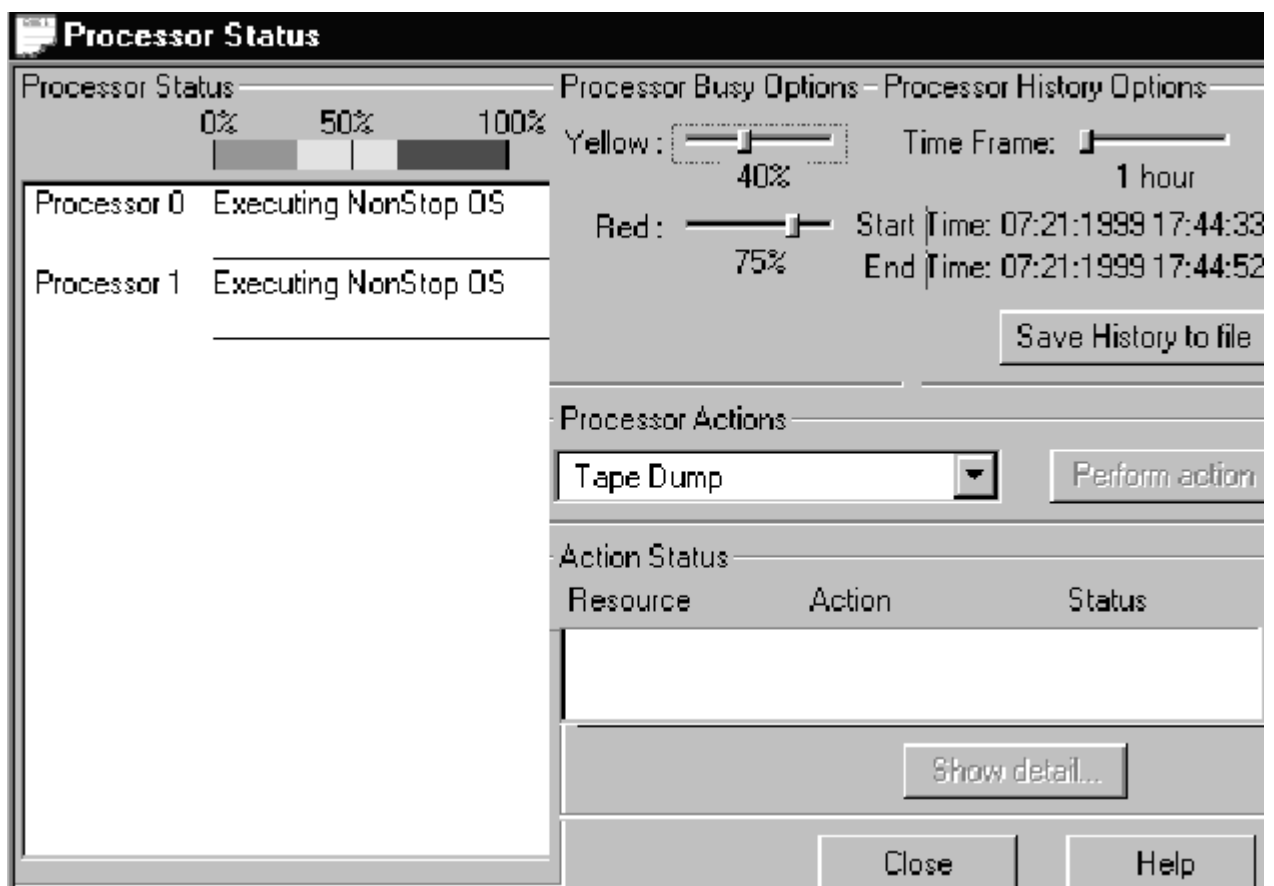
- The G03.00 and subsequent G-series RVUs support tape dumps only on down systems. All processors in the system must be halted.
- A tape drive must be connected to a PMF CRU in group 01. Tape drives connected through a ServerNet/DA or to any other PMF CRUs or IOMF CRUs cannot be used for tape dumps.
- Make sure the tape is at the load point. If a tape dump is attempted and the tape is not at the load point, the cause of failure is not indicated.
- [Troubleshooting and Recovery Operations for Tape Dumps](#) on page 11-21 lists the common errors that could occur during tape dumps and the corresponding recovery actions.

## Before You Begin

To prepare for a tape dump:

1. Log on to the OSM or TSM Low-Level Link.
2. On the toolbar, click **Processor Status**. The Processor Status dialog box appears.
3. Write down the status message displayed in the Processor Status dialog box ([Figure 11-2](#)) for the processor to be dumped. You will need this information when you notify your system manager or service provider about this dump.

**Figure 11-2. Processor Status Dialog Box**



CDT 808.CDD

4. Halt all processors that are still running (that have the status “Executing NonStop OS”) by performing these steps in the Processor Status dialog box:
  - a. Select all processors to be halted. To select processors, scroll down the list and select a processor using the left mouse button. You can use the Shift key to select multiple processors. However, they must be in numerical order. For

example, you can select processors 2, 3, and 4, but not 2 and 4. To select processors 2 and 4, use the Ctrl key with the left mouse button.

- b. In the Processor Action menu, scroll to **Halt**.
- c. Click **Perform action**.
5. Verify that a tape drive is connected to a PMF CRU in group 01.
6. Mount a tape that is not write-protected into that tape drive. For open-reel tapes, check that the write-enable ring is present.
7. Position the tape at the load point and put the tape drive online.

## Procedure to Dump a Processor to Tape

To dump processor memory to tape:

1. In the Processor Status dialog box:
  - a. Verify that all processors have been halted.
  - b. Select the processor you want to dump to tape.
  - c. In the Processor Action menu, scroll to **Tape Dump**. (See [Figure 11-2](#) on page 11-18.)
  - d. Click **Perform action**. The Dump Processor-*n* to Tape dialog box appears, where *n* is the processor number of the selected processor. (See [Figure 11-3](#).)

**Figure 11-3. Dump Processor-*n* to Tape Dialog Box**



CDT 806CDD

2. In the Dump Processor-*n* to Tape dialog box, type:
  - a. The SCSI ID of the tape drive. The default value is 4 or 5, which is the current software requirement.
  - b. The location of the PMF CRU to which the tape drive is connected. Tape drives are connected to SCSI controllers on PMF CRUs. You can dump only to a tape drive that is connected to processor 0 or 1:
    - Processor 0 is located in the PMF CRU in group 01, module 01, slot 50, ServerNet X fabric.
    - Processor 1 is located in the PMF CRU in group 01, module 01, slot 55, ServerNet Y fabric.
3. Click **Dump**.
4. Monitor the tape dump. In the Processor Status dialog box, verify that the processor that was dumped to tape shows halt code %1154.
5. If you need to dump the memory of additional processors, refer to the procedure in [Dumping All Processors in a System](#) on page 11-22.

If no other processors require a memory dump, you can start the system normally using the System Startup dialog box. Start the system using the OSM or TSM Low-Level Link. For more information, see [The System Startup Dialog Box](#) on page 15-8.



## Troubleshooting and Recovery Operations for Tape Dumps

[Table 10-1](#) lists the errors that can occur during a tape dump. Perform the recommended recovery operation.

---

**Table 11-1. Common Errors That Occur During Tape Dumps**

---

| Status Message            | Cause                                                                              | Recovery                                                                                                                                                                                     |
|---------------------------|------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Dump operation failed     | Various.                                                                           | Check with your system manager or service provider.                                                                                                                                          |
| Error during tape dump    | Various.                                                                           | If it is a tape error, try a new tape. Otherwise, check with your system manager or service provider.                                                                                        |
| Halt code = %nn           | Informational message.                                                             | If the message is informational only, no action is required.                                                                                                                                 |
|                           | The processor has halted again.                                                    | If the processor has halted again, look up the halt code in the <i>Processor Halt Code Manual</i> for further information about the cause of failure and the appropriate recovery procedure. |
| Tape dump handshake error | You have entered the wrong path parameters.                                        | Reenter the path parameters and retry the operation. If this attempt fails, notify your service provider.                                                                                    |
| Tape not ready for dump   | The tape is not at the load point, or the tape drive is not powered on and online. | Set the tape at the load point, make sure that the tape drive is powered on and online, and then try the dump again.                                                                         |

---

## Dumping All Processors in a System

Dump an entire server when you want to examine the contents of all processors on a frozen server. You must be logged on to the OSM or TSM Low-Level Link to perform this task.

---

**Note.** Normally you do not perform system dumps. System dumps are performed primarily in development environments.

---

### Dumping an Entire Server

1. Enable system freeze. See [Enabling or Disabling System Freeze](#) on page 11-12.
2. Enable freeze for each processor. See [Enabling or Disabling Freeze on a Processor](#) on page 11-13.

---

△ **Caution.** Be sure that system freeze is not enabled when a service operation is performed. For example, if system freeze is enabled, ServerNet disruptions such as cable replacement or CRU insertion can generate a system freeze.

---

3. Either:
  - To dump the entire system immediately, perform a system freeze action.
  - Wait for a freeze instruction from the system.

---

**Note.** When the operating system detects a software error it cannot correct, it can execute a freeze instruction to suspend all application and server processes running in the associated processor. If system freeze is enabled, all other processors running with freeze enabled are frozen.

---

4. Dump one processor to tape (down system only). See [Dumping a Processor to Tape \(Down System Only\)](#) on page 11-17.
5. Load this processor with CIIN disabled. See [Loading a Processor From Disk](#) on page 11-24.
6. Dump each of the remaining processors to disk using the TACL RECEIVEDUMP utility. See [Procedure to Dump a Processor to Disk](#) on page 11-11.
7. Start the system. See [Starting the System](#) on page 16-6.
8. Reload each of the processors that were dumped to disk. For more information, see [Reloading a Single Processor on a Running Server](#) on page 11-23.

## Reloading a Single Processor on a Running Server

Sometimes one or more processors in a running server are not operating. For information on how to determine whether a processor is operating, see [Monitoring Processor Status Using OSM or TSM](#) on page 11-2.

After you have determined that a processor is not operating, check that the processor is halted. Dump (copy) its memory to disk. (See [Copying a Dump File From Tape to Disk](#) on page 11-26.) Then back up the file to tape. For more information, see [Dumping a Processor to Tape \(Down System Only\)](#) on page 11-17.

You can use the OSM or TSM Low-Level Link (after system discovery) to reload the NonStop Kernel operating system on the stopped processor:

1. On the toolbar, click **Processor Status**.

The Processor Status dialog box appears.

2. Select the processor (or processors) that you want to reload.
3. In the Processor Actions list, select **Reset** or **Prime for Reload**.
4. Click **Perform Action**.
5. In the Action Status box, monitor the status of the action.

The Reset or Prime for Reload action takes approximately 1.5 minutes to finish. After the action has successfully finished, a “completed” message appears.

If the action fails, retry it. If the action fails the second time, contact your service provider.

6. Select **File>Start Terminal Emulator**.
7. From the menu, select **For Startup TACL**.

Two OutsideView windows appear.

8. In the Enter Telnet IP Address box, type the IP address that is currently configured for your primary service connection. If the processor for the primary service connection IP address is down, type the IP address that is currently configured for your backup service connection.
9. Click **OK**.

The OutsideView window is active, and the TACL1> prompt appears.

10. Type a super-group user ID (255, *n*) and press Enter.
11. Type the password for the super-group user and press Enter.

A \$SYSTEM STARTUP 1> prompt appears.

12. Either:

- If you selected Reset, type `reload n,prime`.
- If you selected Prime for Reload, type `reload n`.

---

**Note.** *n* is the number of the processor you want to reload.

---

13. Check the OutsideView window for status messages, which will report successes or errors during the load. Monitor the state of the processor you are loading until it is executing the NonStop Kernel operating system.
14. If the load fails, check the parameters and reload the processor. If the load fails again, contact your service provider.

## Loading a Processor From Disk

You can use the Load action to load an operating system image into a selected processor from a disk.

You must be logged on to the OSM or TSM Low-Level Link to perform this action. You can perform this action either before or after system discovery.

This action is used primarily for troubleshooting server load problems. Use this action to initiate a load from disk using a specific load path. Perform this operation only when the server is stopped and you want to load only a single processor using a specific load path. (Use the OSM or TSM Low-Level Link to perform normal server startup. For more information, see [Starting the System](#) on page 16-6.)

- 
- △ **Caution.** If your server is currently running, halt all of the processors before you load a single processor from disk. Failure to halt all running processors before you initiate the Load action can cause unpredictable results.
- 

## Loading the Processor

1. On the toolbar, click **Processor Status**.

The Processor Status dialog box appears.

2. Verify that all processors are stopped. To stop a processor, use either the Reset or the Halt action on each processor that is running. Do not prime the processor for reload.
3. Select a processor on which you want to load the operating system image.
4. In the Processor Actions list, select **Load**.
5. Click **Perform Action**.

The Load Processor From Disk dialog box appears.

---

**Note.** You cannot use this dialog box to cancel a load that is in progress. You can click **Cancel** to cancel the system load before you have started it.

---

6. Type the RVU of the software you want to load in the SYS<sub>nn</sub> edit box.
7. Select the configuration file using the option buttons.
8. Click the CIIN disabled check box if you want to disable the CIIN file.
9. Type the disk information in the group, module, and slot boxes.

The \$SYSTEM-P disk is located in group 1, module 1, slot 11. The \$SYSTEM-M disk is located in group 1, module 1, slot 12.

10. Select the ServerNet fabric, either fabric-X or fabric-Y, using the option buttons.
11. Click **Load**.

A warning dialog box appears if any processors are currently running, asking if you want to continue with the operation. Otherwise, the system load begins, and this dialog box is closed.

---

△ **Caution.** You cannot cancel a system startup from this dialog box once you initiate it.

---

---

**Note.** After you click **Load**, the load configuration is retained. The next time the Load Processor From Disk dialog box is opened, the current load configuration data is automatically filled in.

---

12. Select **File>Start Terminal Emulator>For Startup TACL**.
13. Select **File>Start Terminal Emulator>For Event Streams**.

---

**Note.** To receive the startup TACL and startup events at a workstation, the workstation must be authorized to receive the startup TACL and startup events using the OSM or TSM Low-Level Link.

---

## Copying a Dump File From Tape to Disk

To copy a dump file from tape to a disk file in compressed format, use the COPYDUMP utility. COPYDUMP automatically determines the size of the dump file. To make a compressed disk copy of a dump file:

1. At a TACL prompt:

```
COPYDUMP { $tape | dumpfile }, destfile
```

where:

- *\$tape* is the name of the tape drive where the tape dump file is located.
- *dumpfile* is the name of the disk dump file specified in the RECEIVEDUMP or RCVDUMP command.
- *destfile* is the destination disk file.

2. Wait until this message appears in the terminal-emulation window:

```
{ $tape# | dumpfile } HAS BEEN COPIED (COMPRESSED) TO
destfile
```

For more information, refer to the *Guardian User's Guide*.

## Backing Up a Processor Dump to Tape

To back up a processor dump to tape, either:

- Back up a processor dump to tape from the compressed disk file generated by the TACL RECEIVEDUMP command (or the RCVDUMP utility):
  1. Follow the instructions in [Dumping a Processor to Disk](#) on page 11-10.
  2. Use the BACKUP utility to copy the processor dump to tape.
- Copy a processor dump from a dump tape to a compressed disk file with the COPYDUMP utility and then back up the disk file to tape:
  1. Follow the instructions in [Dumping a Processor to Tape \(Down System Only\)](#) on page 11-17.
  2. Follow the instructions in [Copying a Dump File From Tape to Disk](#) on page 11-26.
  3. Use the BACKUP utility to copy the processor dump to tape.

## Replacing Processor Memory or a PMF CRU

Processor memory is field-replaceable only in Nonstop S7000 and NonStop S70000 servers, depending on your service area. Check with your service provider on the procedure for your area. If memory units cannot be replaced, the entire PMF CRU must be replaced.

If the Service State attribute of a PMF CRU is not OK (see [Monitoring the State of PMF CRUs](#) on page 11-3) or if a hardware error freeze occurs, the PMF CRU might need to be replaced. Contact your service provider. For information, refer to the CSSI Web.

## Submitting Information to Your Service Provider

To help with the analysis of a processor dump, submit a separate tape for each processor dump, a backup tape of other system configuration and operations files, and some additional information.

- [Submitting Tapes of Processor Dumps](#) on page 11-27
- [Submitting Tapes of Configuration and Operations Files](#) on page 11-27
- [Additional Information Required by Your Service Provider](#) on page 11-29

## Submitting Tapes of Processor Dumps

Use a separate tape for each processor dump. For each tape you submit, record:

- The notation TAPEDUMP if the tape contains a direct tape dump
- The notation BACKUP to indicate either a disk dump that has been backed up to tape or a tape dump that has been copied to disk and then backed up
- The file names of the files on tape (if the BACKUP, LISTALL command has been used)
- For open-reel tapes, the density at which the dump was recorded to tape

## Submitting Tapes of Configuration and Operations Files

To ensure that a processor dump is usable by your service provider, place the files listed in [Table 11-2](#) on one backup tape using the BACKUP utility. Contact your service provider for information about any other files they might need.

---

**Table 11-2. Other Files to Submit to Your Service Provider**

| File                      | Description                   |
|---------------------------|-------------------------------|
| \$SYSTEM.ZSYSCONF. CONFIG | System configuration database |
| \$SYSTEM.SYSnn.CONFTEXT   | System configuration file     |

---

**Table 11-2. Other Files to Submit to Your Service Provider**

| File                                                 | Description                            |
|------------------------------------------------------|----------------------------------------|
| \$SYSTEM.SYS <sub>nn</sub> .CONFLIST                 | SYSGENR output file                    |
| \$SYSTEM.ZLOG <sub>nn</sub>                          | EMS event log (\$0 operator log files) |
| All files located in the \$SYSTEM.ZSERVICE subvolume | Service event log (\$ZLOG files)       |

To back up configuration and operations files:

1. For this backup operation, use any tape drive that is in a STARTED state and a READY substate. To determine the names and current states of the tape drives on a system:

```
> SCF STATUS TAPE $*
```

2. To back up all the configuration and operations files to tape, use the BACKUP utility. For example:

```
>BACKUP $tape, (CPU0,$SYSTEM.SYS00.CONFTEXT,&
$SYSTEM.SYS00.CONFLIST,$SYSTEM.ZSYSCONF.CONFIG,&
$SYSTEM.ZLOG00.*, $SYSTEM.ZSERVICE.*), LISTALL, OPEN, VERIFYREEL
```

For more information on the BACKUP command and options, see the *Guardian Disk and Tape Utilities Reference Manual*.

During backup, the \$SYSTEM.ZSERVICE.ZZUSERS file is never backed up. Instead, the \$SYSTEM.ZSERVICE.ZZUSERS2 file (a security log for TSM logons), which contains the same information as ZZUSERS, is backed up.



## Additional Information Required by Your Service Provider

In addition to the tapes previously discussed, submit the information listed in [Table 10-3](#) to your service provider.

---

**Table 11-3. Additional Processor Dump Information for Your Service Provider**

|                                                          |       |
|----------------------------------------------------------|-------|
| Name of HP branch office                                 | _____ |
| Your company name                                        | _____ |
| System number                                            | _____ |
| The processor numbers of the processors that were dumped | _____ |
| The date that the processor dump was done                | _____ |
| The RVU you are using                                    | _____ |

You should also provide:

- A list of any software product revisions (SPRs) you have installed since installing the RVU.
  - A list of any customer-written privileged programs running on your system and explanations of what they do.
  - The reason for the processor dump. If you performed a processor dump because a processor halted, include the halt code and the frequency of the halts. The halt code and other information is displayed in the Processor Status dialog box of the OSM or TSM Low-Level Link.
  - Any particular circumstances that you think contributed to the problem. A brief description of the problem in an EDIT file and a short program that duplicates or illustrates the problem (if possible) would be helpful.
  - Any OSM or TSM status messages reported.
-

## Related Reading

For more information about tools used to monitor and perform recovery operations on processors, refer to the documentation listed in [Table 10-4](#).

**Table 11-4. Related Reading for Monitoring and Recovery Operations on Processors**

| For Information About                           | Tool                              | See                                                            |
|-------------------------------------------------|-----------------------------------|----------------------------------------------------------------|
| Recovery operations for processes               | TACL                              | <i>Guardian User's Guide</i>                                   |
| Monitoring or recovery operations on processors | TSM                               | TSM online help<br><i>TSM Online User Guide</i>                |
|                                                 | OSM                               | OSM online help<br><i>OSM User's Guide</i>                     |
| Replacing a memory unit                         | Usually requires service provider | Online help for the Replace PMF guided procedure (or CSSI Web) |
| Monitoring processor performance                | ViewSys                           | <i>ViewSys User's Guide</i>                                    |
| Recovery operations for processor halt          | TFDS                              | <i>TFDS Manual</i>                                             |

# ServerNet Fabrics: Monitoring and Recovery

|                                                                             |      |
|-----------------------------------------------------------------------------|------|
| <a href="#">When to Use This Section</a>                                    | 12-1 |
| <a href="#">Monitoring the Status of the ServerNet Fabrics</a>              | 12-2 |
| <a href="#">Monitoring the ServerNet Fabrics Using OSM or TSM</a>           | 12-2 |
| <a href="#">Monitoring the ServerNet Fabrics Using SCF</a>                  | 12-3 |
| <a href="#">Identifying ServerNet Fabric Problems</a>                       | 12-5 |
| <a href="#">Recovery Operations for the ServerNet Fabrics</a>               | 12-6 |
| <a href="#">Recovery Operations for a Down Disk Due to a Fabric Failure</a> | 12-6 |
| <a href="#">Recovery Operations for a Down Path Between Processors</a>      | 12-6 |
| <a href="#">Recovery Operations for a Down Processor</a>                    | 12-6 |
| <a href="#">Recovery Operations for a File-System Error</a>                 | 12-6 |
| <a href="#">Related Reading</a>                                             | 12-6 |

## When to Use This Section

The ServerNet fabrics provide the communication paths used for interprocessor messages, for communication between processors and I/O devices, and (in the case of ServerNet clusters) for communication between systems. The ServerNet fabrics consist of two entirely separate communication paths—the X fabric and the Y fabric.

Use this section to learn more about monitoring and performing recovery operations for the internal and external ServerNet fabrics. Monitoring and performing recovery operations for communication between processors and I/O devices other than IOMF CRUs are not discussed in this guide.

---

**Note.** If the system is a member of a ServerNet cluster, ServerNet connections to other members are accomplished by extending the ServerNet fabrics outside the system. Such external connections make up the external ServerNet fabrics. The *ServerNet Cluster Manual* provides additional information about monitoring the external ServerNet fabrics.

---

# Monitoring the Status of the ServerNet Fabrics

To monitor the status of the ServerNet fabrics:

- Use the OSM Service Connection or the TSM Service Application to check the communication between processor enclosures, I/O enclosures, and systems.
- Use the Subsystem Control Facility (SCF) to check the status of interprocessor communication on the X and Y fabrics.

## Monitoring the ServerNet Fabrics Using OSM or TSM

To check the ServerNet fabrics:

1. Log on.
2. Expand the tree pane to locate and select the internal or external ServerNet fabric objects:
  - a. The X and Y internal ServerNet fabric objects are located under the System object.
  - b. The X and Y external ServerNet fabric objects are located under the ServerNet Cluster object.
3. From the Attributes tab in the details pane:
  - a. For the internal ServerNet fabrics, verify that the Service State attribute is OK.
  - b. For the external ServerNet fabrics, verify that the Service State and Subcomponent State attributes are OK.

## Monitoring the ServerNet Fabrics Using SCF

The SCF STATUS SERVERNET command displays a matrix for the ServerNet X fabric and a matrix for the ServerNet Y fabric. Each matrix shows the status of the paths between all pairs of processors.

Use the SCF STATUS SERVERNET command to display current information about the ServerNet fabric. At a TACL prompt:

```
> SCF STATUS SERVERNET $ZSNET
```

```
1-> status servernet $zsnet
NONSTOP KERNEL - Status SERVERNET
X-FABRIC
 TO 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
FROM
 00 UP UP UNA UNA UNA UNA UNA UNA UNA UNA UNA UNA UNA UNA UNA UNA
 01 UP UP UNA UNA UNA UNA UNA UNA UNA UNA UNA UNA UNA UNA UNA UNA
 02 <- DOWN
 03 <- DOWN
 04 <- DOWN
 05 <- DOWN
 06 <- DOWN
 07 <- DOWN
 08 <- DOWN
 09 <- DOWN
 10 <- DOWN
 11 <- DOWN
 12 <- DOWN
 13 <- DOWN
 14 <- DOWN
 15 <- DOWN

Y-FABRIC
 TO 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
FROM
 00 UP UP UNA UNA UNA UNA UNA UNA UNA UNA UNA UNA UNA UNA UNA UNA
 01 UP UP UNA UNA UNA UNA UNA UNA UNA UNA UNA UNA UNA UNA UNA UNA
 02 <- DOWN
 03 <- DOWN
 04 <- DOWN
 05 <- DOWN
 06 <- DOWN
 07 <- DOWN
 08 <- DOWN
 09 <- DOWN
 10 <- DOWN
 11 <- DOWN
 12 <- DOWN
 13 <- DOWN
 14 <- DOWN
 15 <- DOWN
```

In the preceding example of a 2-processor system:

- All ServerNet connections between processors 0 and 1 are up.
- Processors 2 through 15 do not exist on this system. As a result:
  - The status from processors 0 and 1 to processors 2 through 15 is displayed as unavailable (UNA) in both fabrics.

- The status from processors 2 through 15 is displayed as down.

## Normal ServerNet Fabric States

Normal states for a path on the ServerNet fabrics can be one of:

- UP

The path from the processor in the FROM row to the processor in the TO column is up. The status for all ServerNet connections between existing processors in a system should be UP.

- <-DOWN (for an entire row)

The processor in the FROM row is down or nonexistent. If the processor in the FROM row does not exist on your system, this status is normal. Otherwise, refer to [Identifying ServerNet Fabric Problems](#) on page 12-5.

- UNA (unavailable)

The processor in the TO column is down or nonexistent. Therefore, the path from the processor in the FROM row to the processor in the TO column is down. If the processor in the TO column does not exist on your system, this status is normal. Otherwise, refer to [Identifying ServerNet Fabric Problems](#) on page 12-5.

# Identifying ServerNet Fabric Problems

Depending on how your system is configured, these states for a path on the ServerNet fabrics might indicate a problem:

- DIS (disabled)

The ServerNet fabric is down at the TO location. As a result, the path from the processor in the FROM row to the processor in the TO column is down for receiving; that is, the processor in the TO column cannot receive from any other processor or from I/O devices. DIS overrides both UP and DN.

- DN (down)

The path from the processor in the FROM row to the processor in the TO column is down because the path is failing. The processor in the FROM row cannot send to the processor in the TO column.

- <- DOWN (for an entire row)

The processor in the FROM row is down or nonexistent. For a processor that does exist on your system, this status is abnormal.

- ERROR *nnn* (for an entire row)

The processor in the FROM row unexpectedly returned a file-system error to that ServerNet fabric.

- UNA (unavailable)

The path from the processor in the FROM row to the processor in the TO column is down because the processor in the TO column is down. For a processor that does exist on your system, this status is abnormal. UNA overrides all other states.

# Recovery Operations for the ServerNet Fabrics

For most recovery operations, refer to the *SCF Reference Manual for the Kernel Subsystem*.

## Recovery Operations for a Down Disk Due to a Fabric Failure

When a path to a disk drive goes down due to a ServerNet fabric failure (either the ServerNet X or Y fabric is down), the storage subsystem automatically switches the paths of the disk drive if possible, so that the disk drive remains operational. This switching might result in a disk drive being placed in the STOPPED state with a substate of HARDDOWN.

You must restart any disk path that was using the fabric that went down. Otherwise the storage subsystem never attempts to use that path, which creates a potential single point of failure. For more information, refer to [Recovery Operations for a Down Disk or Down Disk Path](#) on page 9-13.

## Recovery Operations for a Down Path Between Processors

When the status is either DIS (disabled) or DN (down), you can restart all paths between processors on the X fabric or Y fabric:

```
> SCF START SERVERNET $ZSNET.{X|Y}.*
```

Refer to the *SCF Reference Manual for the Kernel Subsystem*.

## Recovery Operations for a Down Processor

If the status for an existing processor is <- DOWN or UNA, refer to [Recovery Operations for a Processor Halt](#) on page 11-8 for more information about recovery operations.

## Recovery Operations for a File-System Error

For information about file-system errors, refer to the *Guardian Procedure Errors and Messages Manual*.

## Related Reading

For more information about the ServerNet fabrics, see the *SCF Reference Manual for the Kernel Subsystem*.



## Applications: Monitoring and Recovery

[When to Use This Section](#) 13-1

[Monitoring TMF](#) 13-1

Monitoring the Status of TMF 13-2

Monitoring Data Volumes 13-2

TMF States 13-4

[Monitoring the Status of Pathway](#) 13-5

PATHMON States 13-6

[Related Reading](#) 13-6

### When to Use This Section

This section explains how to monitor the status of the HP NonStop Transaction Transaction Management Facility (TMF) and Pathway transaction processing applications. For other applications, such as SQL/MP or SQL/MX, see the appropriate documentation.

### Monitoring TMF

This subsection explains how to check the status of TMF and the data volumes it protects. As a system operator, you might check TMF status in your routine system monitoring. You use the TMFCOM command interface to manage and operate TMF.

## Monitoring the Status of TMF

To monitor TMF using TMFCOM:

1. At a TACL prompt:

```
> TMFCOM
```

2. At the TMFCOM prompt:

```
~ STATUS TMF
```

---

**Note.** The STATUS TMF command presents status information about the audit dump, audit trail, and catalog processes. Thus, in addition to the general TMF information, the STATUS TMF command combines information from the STATUS AUDITDUMP, STATUS AUDITTRAIL, and STATUS BEGINTRANS commands. However, information from the other STATUS commands (STATUS DATAVOLS, STATUS OPERATIONS, STATUS SERVER, and STATUS TRANSACTION) does not appear in the STATUS TMF display.

---

A TMFCOM report summarizing the current activity of the TMF subsystem, audit trails, and the audit dump and catalog processes is displayed. For example:

```
TMF Status:
System: \SAGE, Time: 6-Jul-1994 11:08:06
State: Started
Transaction Rate: 0.10 TPS
AuditTrail Status:
Master:
 Active audit trail capacity used: 55%
 First pinned file: $MAT1.ZTMFAT.AA000044
 Reason: Active transaction(s).
 Current file: $MAT1.ZTMFAT.AA000045
AuditDump Status:
 Master: State: enabled, Status: active, Process $X545,
 File: $MAT2.ZTMFAT.AA000042
BeginTrans Status: Enabled
Catalog Status:
 Status: Up
```

For an explanation of the TMF state in this display, see [TMF States](#) on page 13-4.

## Monitoring Data Volumes

To display information about the data volumes for which the TMF subsystem generates audit records on behalf of transactions performed on those volumes, at a TMFCOM prompt, type:

```
~ STATUS DATAVOLS
```

To control which volumes are displayed, use the STATE, AUDITTRAIL, and RECOVERYMODE parameters.

The normal operating state for a data volume is STARTED, which indicates that the volume is ready to process TMF transactions. Audited requests are allowed for data volumes in this state only where transaction processing is enabled within the subsystem.

For example, to check the status of all data volumes, at a TMFCOM prompt type:

~ STATUS DATAVOLS

TMFCOM responds with output similar to:

| Volume  | Audit Trail | Recovery Mode | State      |
|---------|-------------|---------------|------------|
| \$DATA1 | MAT         | Online        | Started    |
| \$DATA2 | MAT         | Online        | Started    |
| \$DATA3 | MAT         | Online        | Recovering |
| \$DATA4 | MAT         | Archive       | Recovering |
| \$DATA5 | AUX01       | Online        | Started    |
| \$DATA6 | AUX01       | Online        | Started    |
| \$DATA6 | AUX01       | Archive       | Recovering |

## TMF States

The TMF subsystem can be in any of the states listed in [Table 13-1](#).

---

**Table 13-1. TMF States**

| State                                           | Meaning                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                    |                                                                   |                                                 |                                                                       |                 |                                                                                         |                 |                                                                   |
|-------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|-------------------------------------------------------------------|-------------------------------------------------|-----------------------------------------------------------------------|-----------------|-----------------------------------------------------------------------------------------|-----------------|-------------------------------------------------------------------|
| Configuring New Audit Trails                    | The TMF subsystem has not yet been started with this configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                    |                                                                   |                                                 |                                                                       |                 |                                                                                         |                 |                                                                   |
| Deleting                                        | The TMF subsystem is purging its current configuration, audit trails, and volume and file recovery information for the database in response to a DELETE TMF command.                                                                                                                                                                                                                                                                                                                                                                    |                                    |                                                                   |                                                 |                                                                       |                 |                                                                                         |                 |                                                                   |
| Empty Audit Trail Configuration                 | The TMF subsystem has been brought up for the first time on this node and thus no configuration exists for it, or a DELETE TMF command was executed.                                                                                                                                                                                                                                                                                                                                                                                    |                                    |                                                                   |                                                 |                                                                       |                 |                                                                                         |                 |                                                                   |
| Starting                                        | The TMF subsystem is starting and is in one of these conditions: <table> <tr> <td>Services</td><td>The subsystem is starting audit-trail service and other services.</td></tr> <tr> <td>Waiting for Network Transactions to be Resolved</td><td>The subsystem is waiting for all network transactions to be resolved.</td></tr> <tr> <td>Data Volumes</td><td>The TMF subsystem is starting data volumes.</td></tr> <tr> <td>Running Backout</td><td>The subsystem is backing out transactions that must be aborted.</td></tr> </table> | Services                           | The subsystem is starting audit-trail service and other services. | Waiting for Network Transactions to be Resolved | The subsystem is waiting for all network transactions to be resolved. | Data Volumes    | The TMF subsystem is starting data volumes.                                             | Running Backout | The subsystem is backing out transactions that must be aborted.   |
| Services                                        | The subsystem is starting audit-trail service and other services.                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                    |                                                                   |                                                 |                                                                       |                 |                                                                                         |                 |                                                                   |
| Waiting for Network Transactions to be Resolved | The subsystem is waiting for all network transactions to be resolved.                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                    |                                                                   |                                                 |                                                                       |                 |                                                                                         |                 |                                                                   |
| Data Volumes                                    | The TMF subsystem is starting data volumes.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                    |                                                                   |                                                 |                                                                       |                 |                                                                                         |                 |                                                                   |
| Running Backout                                 | The subsystem is backing out transactions that must be aborted.                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                    |                                                                   |                                                 |                                                                       |                 |                                                                                         |                 |                                                                   |
| Started                                         | The TMF subsystem has started.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                    |                                                                   |                                                 |                                                                       |                 |                                                                                         |                 |                                                                   |
| Stopped                                         | The TMF subsystem is stopped.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                    |                                                                   |                                                 |                                                                       |                 |                                                                                         |                 |                                                                   |
| Stopping                                        | The TMF subsystem is stopping and is in one of these conditions: <table> <tr> <td>Waiting for Transactions to Finish</td><td>The subsystem is waiting for all transactions to be finished.</td></tr> <tr> <td>Data Volumes</td><td>The subsystem is stopping data volumes.</td></tr> <tr> <td>Waiting for RDF</td><td>The subsystem is waiting for the Remote Duplicate Database Facility (RDF) to shut down.</td></tr> <tr> <td>Services</td><td>The subsystem is stopping audit-trail service and other services.</td></tr> </table>  | Waiting for Transactions to Finish | The subsystem is waiting for all transactions to be finished.     | Data Volumes                                    | The subsystem is stopping data volumes.                               | Waiting for RDF | The subsystem is waiting for the Remote Duplicate Database Facility (RDF) to shut down. | Services        | The subsystem is stopping audit-trail service and other services. |
| Waiting for Transactions to Finish              | The subsystem is waiting for all transactions to be finished.                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                    |                                                                   |                                                 |                                                                       |                 |                                                                                         |                 |                                                                   |
| Data Volumes                                    | The subsystem is stopping data volumes.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                    |                                                                   |                                                 |                                                                       |                 |                                                                                         |                 |                                                                   |
| Waiting for RDF                                 | The subsystem is waiting for the Remote Duplicate Database Facility (RDF) to shut down.                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                    |                                                                   |                                                 |                                                                       |                 |                                                                                         |                 |                                                                   |
| Services                                        | The subsystem is stopping audit-trail service and other services.                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                    |                                                                   |                                                 |                                                                       |                 |                                                                                         |                 |                                                                   |

---

# Monitoring the Status of Pathway

Pathway is a group of related software tools that enables businesses to develop, install, and manage online transaction processing applications. Several Pathway environments can exist for a system. As a system operator, you might check the status of Pathway in your routine system monitoring. This subsection explains how to check the status of the Pathway transaction processing applications.

1. To determine the names of the Pathway processes running on your system:

```
> STATUS *, PROG $*.*.PATHMON
```

2. To access PATHCOM to communicate with one of the PATHMON processes:

```
> PATHCOM $pathmon-process-name
```

3. At the PATHCOM prompt:

```
= STATUS PATHWAY
```

For example, to check the status of the PATHMON process for the Pathway environment on your system:

```
> PATHCOM $ZVPT
```

```
$Y290: PATHCOM - T9153D20 - (01JUN93)
COPYRIGHT TANDEM COMPUTERS INCORPORATED 1980 - 1985, 1987 -
1992
```

```
= STATUS PATHWAY
```

PATHCOM responds with output such as:

|                 |         |         |         |           |         |
|-----------------|---------|---------|---------|-----------|---------|
|                 | RUNNING |         |         |           |         |
| EXTERNALTCPS    | 0       |         |         |           |         |
| LINKMONS        | 0       |         |         |           |         |
| PATHCOMS        | 1       |         |         |           |         |
| SPI             | 1       |         |         |           |         |
|                 | RUNNING | STOPPED | THAWED  | FROZEN    | FREEZE  |
| SERVERCLASSES   | 13      | 5       | 18      | 0         | PENDING |
|                 |         |         |         |           | 0       |
|                 | RUNNING | STOPPED | PENDING |           |         |
| SERVERPROCESSES | 13      | 40      | 0       |           |         |
| TCPS            | 1       | 0       | 0       |           |         |
|                 | RUNNING | STOPPED | PENDING | SUSPENDED |         |
| TERMS           | 1       | 0       | 0       | 0         |         |

This output provides information about the number of Pathway processes and servers that are running, stopped, and so forth.

4. To check the state of the PATHMON process within the Pathway environment:

```
= STATUS PATHMON
```

To check the status of the PATHMON process for your application:

```
= STATUS PATHMON
```

PATHCOM responds with a output such as:

```

PATHMON -- STATE=RUNNING CPUS 6:1
PATHCTL (OPEN) $GROG.VIEWPT.PATHCTL
LOG1 SE (OPEN) $0
LOG2 (CLOSED)

REQNUM FILE PID PAID WAIT
1 PATHCOM $Y622 8,001
2 TCP $Y898

```

## PATHMON States

The status of the PATHMON process can be either STARTING or RUNNING:

- STARTING indicates that a system load or cool start has not finished.
- RUNNING indicates that a system load or cool start has finished.

The other elements of the STATUS PATHMON output are:

- CPUS shows the number of the primary and backup processors in which the PATHMON process is running. If the backup PATHMON process is not running, the second number is blank.
- PATHCTL, LOG1, and LOG2 contain information about the PATHMON control file and the logging files.
- The REQNUM column contains the PATHMON internal identifiers of application requesters that are currently running in this environment.
- The FILE column identifies the type of requester.
- The WAIT column indicates whether the process is waiting, which can be caused by one of these conditions:

IO                      The request is waiting for an I/O operation to finish.

LOCK                    The request is waiting for an object that has been locked by another requester.

PROG-DONE              The request is waiting for a RUN PROGRAM to finish.

## Related Reading

For more information about Pathway or interpreting displays, refer to the *TS/MP System Management Manual*.

## Printers and Terminals: Monitoring and Recovery

|                                                                  |      |
|------------------------------------------------------------------|------|
| <a href="#">When to Use This Section</a>                         | 14-1 |
| <a href="#">Overview of Printers and Terminals</a>               | 14-1 |
| <a href="#">Monitoring Printer and Collector Process Status</a>  | 14-2 |
| <a href="#">Monitoring Printer Status</a>                        | 14-2 |
| <a href="#">Monitoring Collector Process Status</a>              | 14-2 |
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### When to Use This Section

This section provides a brief overview about monitoring and recovery for printers and terminals. Monitoring printers and terminals, and using the SPOOLCOM utility is discussed more fully in other manuals. Refer to [Related Reading](#) on page 14-3.

### Overview of Printers and Terminals

Printers and terminals are attached to the NonStop S-series server using one of these methods:

- An asynchronous connection provided by the asynchronous wide area network (AWAN) access server for either a terminal or a printer
- An asynchronous connection provided by the ServerNet wide area network (SWAN) concentrator for either a terminal or a printer
- A LAN connection provided by an Ethernet 4 ServerNet adapter (E4SA) for a printer

# Monitoring Printer and Collector Process Status

This subsection explains how to list the printers on your system and determine their status. It also explains how to check the status of the spooler subsystem collector processes, which accept output from applications and store the output on a disk.

## Monitoring Printer Status

To check the status of all printers on your system with the SPOOLCOM utility:

```
> SPOOLCOM DEV
```

A listing similar to this output is sent to your home terminal:

| DEVICE      | STATE   | FLAGS | PROC   | FORM |
|-------------|---------|-------|--------|------|
| \SAGE.\$S1  | WAITING | H     | \$SPLX |      |
| \SAGE.\$S2  | WAITING | H     | \$SPLX |      |
| \AMBER.\$S  | WAITING | H     | \$SPLP |      |
| \AMBER.\$S2 | WAITING | H     | \$SPLX |      |

The value WAITING in the STATE column indicates that the printer is available to print user jobs.

To check the status of the printer \$LASER with the SPOOLCOM DEV command:

```
> SPOOLCOM DEV $LASER
```

A listing such as the following is sent to your home terminal:

| DEVICE  | STATE   | FLAGS | PROC   | FORM |
|---------|---------|-------|--------|------|
| \$LASER | WAITING | H     | \$SPLP |      |

The output shows that the printer \$LASER is up and available to print user jobs.

## Monitoring Collector Process Status

Check that the collector processes on your spooler subsystem do not become more than about 90 percent full. To check their status:

```
> SPOOLCOM COLLECT
```

A listing similar to this output is sent to your home terminal:

| COLLECT | STATE  | FLAGS | CPU   | PRI | UNIT | DATA FILE         | %FULL |
|---------|--------|-------|-------|-----|------|-------------------|-------|
| \$S     | ACTIVE |       | 0 , 1 | 149 | 4    | \$SPOOL.SPL.DATA  | 40    |
| \$S1    | ACTIVE |       | 1 , 2 | 149 | 10   | \$SPOOL.SPL.DATA1 | 28    |
| \$S2    | ACTIVE |       | 2 , 3 | 149 | 8    | \$SPOOL.SPL.DATA2 | 0     |



This listing shows that the three collector processes, \$S, \$S1, and \$S2, are active and none is approaching a full state. The data shown in the report means:

|           |                                                                                                                          |
|-----------|--------------------------------------------------------------------------------------------------------------------------|
| COLLECT   | The name of the collector process                                                                                        |
| STATE     | The current state of the collector process, which can be ACTIVE, DORMANT, DRAIN, or ERROR                                |
| FLAGS     | The current SCF substate of the collector process                                                                        |
| CPU       | The processor number of the collector process                                                                            |
| PRI       | The execution priority of the collector process (The default value is 145.)                                              |
| UNIT      | The number of 512-word blocks requested by the collector process when it needs more disk space (The default value is 4.) |
| DATA FILE | The name of the disk file where the collector process stores jobs                                                        |
| %FULL     | The percentage of the disk directory that is full                                                                        |

## Recovery Operations for Printers and Terminals

For more information, refer to [Related Reading](#) on page 14-3.

### Recovery Operations for a Full Collector Process

If the SPOOLCOM COLLECT display shows any collector process approaching 90 percent capacity, jobs must be deleted from the collector in question.

## Related Reading

For more information about printers in your environment, refer to the vendor documentation.

For more information about printers and terminals connected to an AWAN access server, see the *TCP/IP (Parallel Library) Configuration and Management Manual*.

For more information about printers and terminals connected to a SWAN concentrator:

- *WAN Subsystem Configuration and Management Manual*
- *Asynchronous Terminals and Printer Processes Configuration and Management Manual*

For information about the spooler and SPOOLCOM:

- *Guardian User's Guide*
- *Spooler Utilities Reference Manual*

## Power Failures: Preparation and Recovery

|                                                                |      |
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### When to Use This Section

Use this section for information about how to prepare for power failures and how to recover if a power failure occurs.

### How an Enclosure Responds to Power Failures

Processor enclosures and I/O enclosures include a battery backup, whereas IOAM enclosures do not. IOAM enclosures depend on the presence of an uninterruptible power supply to accommodate power failures.

In the case of processor enclosures and I/O enclosures, the batteries in the enclosure continue to operate all the components in the enclosure for a short, configurable period of time, called the power-fail delay time. If the power failure lasts longer than the power-fail delay time, the batteries maintain power to just the memory for as long as they can, usually 45 minutes. The exact amount of time the batteries can maintain memory depends on:

- The power-fail delay time

The default power-fail delay time is 30 seconds, but this time can vary depending on how your system is configured. In some circumstances, the operating system might shorten the power-fail delay time. With a shorter power-fail delay time, the batteries might be able to provide power to the memory for longer than the normal 45 minutes.

- The system configuration of the enclosure

The larger the number of system components requiring power in an enclosure, the shorter amount of time the batteries can power all the components. The size of the system can therefore affect the configured power-fail delay time, which in turn affects how long the batteries can maintain memory.

- The charge state of the batteries

Properly maintaining the batteries in each enclosure and the spare batteries can prolong the amount of time that a NonStop S-series server is able to maintain memory during a power failure. Refer to [Preparing for Power Failure](#) on page 15-3.

## How External Devices Respond to Power Failures

External devices, such as tape drives, external disk drives, LAN routers, and SWAN concentrators, are not backed up by the batteries contained in an enclosure. How an external device responds to a power failure depends on whether the device is connected to an uninterruptible power supply.

### With an Uninterruptible Power Supply (UPS)

Power to external devices, such as modular disk and tape subsystems attached to a ServerNet/DA, continues uninterrupted during a power failure if there is a UPS for the modular disk and tape subsystems.

### Without an Uninterruptible Power Supply (UPS)

If a power failure occurs where the processors resume operations but one or more external devices fail, data integrity problems can occur without the proper precautions.

During a power failure, a ServerNet/DA remains operational during the power-fail delay time, but the external modular disk and tape subsystems attached to it do not. This situation could result in data-integrity problems if the system software continues processing data from an external disk drive or tape drive during a short power outage. To avoid any possibility of a data-integrity problem, any time that the system software detects a power outage, the device state for the external disk drives and tape drives is changed to DOWN.

# Preparing for Power Failure

To prepare for power failures, regularly monitor power supplies and batteries.

## Monitoring Power Supplies

Monitor power-generating equipment and run regular checks on any backup generators to make sure that you can handle extended power outages.

## Maintaining Batteries

Make sure that the batteries in each enclosure and all spare batteries are always fully charged. Correct any problems that are causing the batteries to become drained.

## Recharging Spare Batteries

Spare batteries require recharging every six months.

## Monitoring Batteries

To check the state of a battery in a system enclosure using OSM:

1. Log on to the OSM Service Connection.
2. In the tree pane, select the battery you want to check.
3. On the Attributes tab under Logical attributes, check that the Enabled State is Enabled and that the Charged State is Fully Charged.

To check the state of a battery in a system enclosure using TSM:

1. Log on to the TSM Service Application.
2. In the tree pane, select the battery you want to check.
3. On the Attributes tab of the details pane, check that the Battery State shows Enabled.

For more information on battery attributes and actions, see the OSM Service Connection online help or the TSM Service Application online help.

## Causes of Drained Batteries

These problems can cause battery discharge, which can drain a battery:

- Environmental problems:
  - An AC power failure has occurred.
  - The AC power cord has become disconnected.
  - A wall-panel circuit breaker has been tripped.

- Hardware problems:
  - A power monitor and control unit (PMCU) failure has occurred.
  - A battery failure has occurred.
  - A processor multifunction (PMF) CRU hardware failure has occurred.

The failed hardware component might need to be replaced. Refer to the CSSI Web.

## Recharging Drained Batteries

Batteries are automatically recharged when the system is running. [Table 15-1](#) lists the expected recharge time for a battery that has been fully discharged (drained).

---

**Table 15-1. Battery Recharge Times Following a Full Discharge**

| Time     | State of Charge |
|----------|-----------------|
| 1 hour   | 80% of charge   |
| 5 hours  | 90% of charge   |
| 48 hours | 100% of charge  |

Note: Partial discharges require less recharge time.

---

## Power Failure Recovery Operations

After a power failure, if AC power is restored to a NonStop S-series server while the batteries are still maintaining the contents of the memory, the server automatically resumes operation within minutes. The system begins processing at the point it was interrupted.

In rare cases, a power failure can last long enough to leave the system with some processors down because the batteries were drained to the point where they can no longer maintain processor memory, while other processors are able to resume operations. If the power failure lasts long enough to drain the batteries completely, the service processors (SPs) shut down the system. When power is restored, the operator must then restart the system.

## Procedure to Recover From a Power Failure

After power is restored:

1. Log on to the OSM or TSM Low-Level Link and then:
  - a. From the toolbar, click **Processor Status**.
  - b. If some but not all processors are running, halt the running processors.
  - c. Restart the system if necessary, using the OSM or TSM Low-Level Link to initiate a system load.

2. Log on to the OSM Service Connection or the TSM Service Application, and then:
  - a. Check the state of the batteries as described in [Monitoring Batteries](#) on page 15-3.
  - b. Check the status of all system components in the enclosures to make sure they are started.
3. Use SCF commands to check the status of external devices and, if necessary, to restart any external devices to bring them back online.

## Setting System Time

Setting the system time is not normally required following a power failure. System time is kept by a separate battery that is not affected by a power outage. If required, however, you can set the system time, either programmatically or by using the TACL command interpreter.

To set system time using the TACL command interpreter, log on to the system as a super-group user (255,n) and enter the SETTIME command. For example, to set the local standard time to 2:23 p.m. on March 19, 2002:

```
> SETTIME mar 19 2002, 14:23 LST
```

## Related Reading

For more information about preparing for and recovering from power failures:

- For more information on the effect of power failures on NonStop S-series servers, see the *NonStop S-Series Planning and Configuration Guide*.
- For more information on the TACL SETTIME command, see the *TACL Reference Manual*.
- For information on setting system time programmatically, see the *Guardian Procedure Calls Reference Manual*.
- For information on removing, installing, and recycling batteries, see the *NonStop S-Series Service Provider Supplement* in the Hardware Service and Maintenance Publications collection in the NonStop Technical Library (NTL).





# 16

## Starting and Stopping the System

|                                                                                     |       |
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## When to Use This Section

You normally leave a system running. Therefore, powering the system on and off, or starting (performing a system load) and stopping the system, are not part of the daily operations routine. However, you do have to perform these procedures as part of some system operations. For example, you stop and restart a system (without powering down) during these types of procedures:

- Powering on and starting a new NonStop S-series server for the first time. Follow the directions described in the *NonStop S-Series Installation and FastPath Guide*.
- Installing an updated RVU or a software product revision (SPR).
- Performing some major maintenance or repair operations.
- Performing some recovery operations.
- Restarting the system after the entire system has been shut down with the operating system images and files on disk still intact.
- Changing the system topology.

You have to stop and power down the system prior to an extended planned power outage for your building or computer room.

## Minimizing the Frequency of Planned Outages

You can minimize the frequency of planned outages by:

- Anticipating and planning for change
- Performing changes online

### Anticipating and Planning for Change

Anticipating and planning for change is a key requirement for maintaining an enterprise-level, 24 x 7 operation. To avoid taking a NonStop S-series system down unnecessarily:

- Evaluate system performance and growth—Track system usage and anticipate system capacity and performance requirements as new applications are introduced. For guidelines and a list of tools provided by HP, refer to the *Availability Guide for Change Management*.
- Provide adequate computer room resources—Avoid unnecessary downtime by ensuring you have enough physical space and power and cooling capacity to handle future growth.
- Configure the system with change in mind—Configure the system in a way that easily accommodates future growth. One way to do this is to select limits that allow for growth. For example, by configuring enough objects to provide for the anticipated growth of your online transaction processing environment, you can

increase the maximum number of objects controlled by PATHMON objects without a system shutdown.

## Performing a Change Online

You can perform many changes to a NonStop S-series system online. For information on hardware changes, application changes, and communications subsystem changes you can perform without shutting the system down, refer to the *NonStop S-Series Planning and Configuration Guide* and the *Availability Guide for Change Management*.

## Powering On the System

When you power on a system, AC power is delivered to the system enclosures. The fans in each enclosure start turning and air begins to circulate. After the fans start to operate, the other system components begin to power on.

Status light-emitting diodes (LEDs) on the system components light during a series of power-on self-tests (POSTs). When all the POSTs finish successfully, which might take up to 10 minutes, the green power-on LED on each component in the system enclosures should be lit. All LEDs can light during the POSTs, but only the green power-on LEDs should remain lit after the POSTs finish. For more information about the LEDs, refer to [Using the Status LEDs to Monitor the System](#) on page 3-30.

## Before Powering On the System

If this is the first time you are powering on the system or if the server and system console are not installed as indicated in this list, refer to the procedure for powering on a system as described in the *NonStop S-Series Hardware Installation Guide*:

- You must install:
  - All power-on cables
  - The emergency power-off (EPO) cables if applicable
  - ServerNet cables if your system includes multiple enclosures
  - The tape subsystem used for processor memory dumps
  - The Ethernet hub
- The server must already be plugged in.
- A system console must be properly connected to the system, powered on, and running the OSM or TSM client software.

## System Power-On Procedure

To power on a system:

1. Locate the power-on push button above the handle on either processor multifunction (PMF) customer-replaceable unit (CRU) in group 01 (the group containing processors 0 and 1). Refer to [Section 2, Determining Your System Configuration](#).
2. Press and hold down the power-on push button for at least one second.
3. For each enclosure, check fan activity by placing your hand near the outlet grill located above slots 51 through 54 on the service side of the enclosure.
4. For each component in the system enclosures, check that the green LEDs are lit and that none of amber LEDs are lit.
5. You can now start your system as described in [Starting the System](#) on page [16-6](#).

## Troubleshooting and Recovery Operations When Powering On the System

Problems that might occur when you power on a system are listed next. For recovery information, see the appropriate subsection:

- [Fans Are Not Turning](#) on page 16-4
- [System Does Not Appear to Be Powered On](#) on page 16-4
- [Green LED Is Not Lit After POSTs Finish](#) on page 16-5
- [Yellow ServerNet Port LEDs on SEBs Do Not Light](#) on page 16-5
- [Amber LED on a Component Remains Lit After the POST Finishes](#) on page 16-5
- [Group Service LED on System Enclosure Is Flashing On and Off](#) on page 16-5

### Fans Are Not Turning

If the fans do not start turning a few seconds after you power on the server, check that the AC power cords and power-on cables are properly connected. If the green LED lights are lit, but the fans are not turning, power off the system immediately as described in [Powering Off the System](#) on page 16-22. Contact your service provider.

### System Does Not Appear to Be Powered On

Check that fans are turning and that the AC power cords and power-on cables are properly connected. If you know AC power is being supplied to the system, but the system still does not appear to be powered on, the system might be running internal tests. Wait several minutes. It can take as long as 10 minutes for the POSTs to finish. If the system is still not powered on after this time and you cannot determine the cause of the problem, contact your service provider.

## Green LED Is Not Lit After POSTs Finish

It can take several minutes for the green LEDs on all system components to light:

1. Check that fans are turning and that the AC power cords and power-on cables are properly connected.
2. Wait for the POSTs to finish. It might take as long as 10 minutes for all system components.
3. If the green LEDs still do not light:
  - a. Check that power-on cables are properly connected and repeat the power-on procedure.
  - b. If one green LED still does not light, a system component might have failed its POST.
4. If you cannot determine the cause of the problem, contact your service provider.

## Yellow ServerNet Port LEDs on SEBs Do Not Light

No corrective action is necessary. The yellow ServerNet port LEDs on the ServerNet expansion boards (SEBs) are not used.

## Amber LED on a Component Remains Lit After the POST Finishes

A fault might have been detected, or the component might not have been successfully initialized and configured. Contact your service provider.

## Group Service LED on System Enclosure Is Flashing On and Off

The group service LED was activated manually using OSM or TSM. To deactivate the LED:

1. Log on to the OSM Service Connection or the TSM Service Application.
2. In either the tree or view pane, locate and right-click the group for that system enclosure.
3. Select **Actions**. The Actions menu appears.
4. From the Actions dialog box:
  - a. In OSM, select **Set Service LED State**
  - b. In TSM, select **Clear Group Service LED**.
5. Click **Perform action**.

# Starting the System

Starting a system involves loading the NonStop Kernel operating system into the memory of each processor in the server. Use the OSM or TSM Low-Level Link to start a system by either:

- Using the System Startup dialog box is the normal method for most circumstances, if you are performing a system load from the system disks located in slots 1.1.11 and 1.1.12.
- Using the Load Processor-*n* From Disk dialog box to perform a system load from a specified disk along a specified path to a specific processor is a method that is used only in certain circumstances. For example:
  - If you are performing a system load from system disks that are located in any slots other than slots 1.1.11 and 1.1.12.
  - If you need to perform processor dumps for an entire system or for the processors in the group 01 system enclosure.

## The System Startup Dialog Box

You use the System Startup dialog box to load the operating system from disk into the memory of one processor. The remaining processors in the server are then reloaded.

If the system load fails along one load path, another load path is tried until the system load is successful. There are eight possible load paths. This table describes the order in which the load paths are tried:

| Processor | Disk Location | PMF CRU Location | Fabric |
|-----------|---------------|------------------|--------|
| 0         | 1.1.11        | 1.1.50           | X      |
| 0         | 1.1.11        | 1.1.50           | Y      |
| 0         | 1.1.12        | 1.1.50           | X      |
| 0         | 1.1.12        | 1.1.50           | Y      |
| 1         | 1.1.11        | 1.1.55           | X      |
| 1         | 1.1.11        | 1.1.55           | Y      |
| 1         | 1.1.12        | 1.1.55           | X      |
| 1         | 1.1.12        | 1.1.55           | Y      |

During system load, two startup event stream windows and two startup TACL windows are automatically launched on the system console configured to receive them.

Messages indicate the progress and completion of the system load (or device load) and the reload of any processors configured in the CIIN file to start. When the system load of the first processor is complete and the remaining processors are primed for reload, the System Status box on the System Startup dialog box displays a “System Startup Complete” message. The Processor Status dialog box shows the status for the

first processor to be “Executing NonStop OS” after the system load finishes successfully. If the system load fails along all eight paths, refer to [Troubleshooting and Recovery Operations When Starting the System](#) on page 16-12.

After the first processor is loaded, the initial TACL process automatically invokes the CIIN file unless the CIIN file is disabled. The CIIN file contains commands that establish the permanent TACL process pair for the system console. The CIIN file might also contain commands to reload all processors.

---

**Note.** The CIIN file is a TACL command (OBEY) file that, by default, is configured to reload all the processors in the system. However, HP recommends that the CIIN file include only the commands needed to start the (permanent) TACL process pair and to reload one processor; for example, processor 1 if system load occurred in processor 0. Do not place commands to prime the processors or other startup command files in the CIIN file.

---

If the CIIN file does not contain the commands to reload all processors, use the TACL command interpreter to reload the remaining processors in the system. When the reload has initiated successfully:

- This message appears in the TACL window:  
  
PROCESSOR RELOAD: *nn*
- The Processor Status dialog box shows the status for all processors to be “Executing NonStop OS.”

## Procedure to Use the System Startup Dialog Box

To start a system using the System Startup dialog box:

1. Log on to the OSM or TSM Low-Level Link.
2. On the toolbar, click **Start system**.
3. In the System Startup dialog box:
  - a. In the SYS*nn* field, enter the number of the system subvolume containing the version of the operating system that you want to load. The value *nn* must be a two-digit octal number in the range 00 through 77.
  - b. In the Configuration File box, select the configuration file for the operating system that you want to load. Select from these choices:
    - Current (CONFIG) is the default configuration and represents the configuration that is currently running or was last running.
    - Saved Version (CONF*xyy*) is a saved configuration. Use this option to switch to an alternate configuration; for example, if you use different configurations for day or night operations. You might also choose this option to recover from a configuration change that causes a problem such as a system freeze.

- Base (CONFBASE) is the most basic configuration required for system startup. You will probably never need to load the system from the CONFBASE file. However, if the current configuration file has become corrupted and there is no other configuration file from which you can load the system, use this option.
4. Make sure that the CIIN disabled check box is not selected if you want the command in the CIIN file to execute.
  5. Click **Start system**.
  6. Check for messages in these windows and dialog boxes:
    - System Startup dialog box
      - System Status box (initial high-level messages). These messages are not logged to a file.
      - Detailed Status box (low-level messages).
    - The primary startup event stream window (startup event stream messages)
    - The primary startup TACL window (startup messages)
  7. Click **Save to file** to save the messages in the Detailed Status box.
  8. Wait for the System Status box on the System Startup dialog box to display a "System Startup Complete" message.
  9. Close the System Startup dialog box.
  10. In the Processor Status dialog box, check the status of all processors. Processor 0 or 1 must be running. Determine whether you need to reload any remaining processors.
  11. If necessary, repeat these steps for each processor that must be reloaded:
    - a. From the Startup TACL window, log on to the system as a super-group user (255,n).
    - b. At the TACL prompt:

```
> RELOAD nn
```

where *nn* is the processor number of the processor to reload.
  12. Wait until the Processor Status dialog box shows the status for all processors to be "Executing NonStop OS."
  13. If you loaded the system from an earlier configuration—either a saved version (CONF<sub>xyy</sub>) or the CONFBASE file—enter INFO SUBSYS \$ZZKRN at the TACL prompt to verify that no pending changes to system attributes appear. Pending changes can appear (but are misleading) if the earlier configuration has different system name, number, or time attributes than the configuration you replaced.



For example, if you load the \EAST system from the CONFBASE file (which specifies \NONAME as the system name), an INFO SUBSYS \$ZZKRN command displays \EAST as the current system and \NONAME as a pending change. Enter an ALTER SUBSYS command to change the system name to \EAST and cause the pending change to disappear. It is not displayed when you enter INFO SUBSYS again.

## The Load Processor-*n* From Disk Dialog Box

Use the Load Processor-*n* From Disk dialog box to perform a system load from a specified disk along a specified path to a specified processor. This dialog box functions differently from the System Startup dialog. If the specified path fails, no other path is tried. Use this dialog box only in certain circumstances. For example:

- If you are performing a system load from system disks that are located in any slots other than slots 1.1.11 and 1.1.12.
- If you need to recover from a system freeze. This procedure allows you to perform processor dumps, if necessary, because the processors not being loaded are not primed.

Messages indicating the progress of the load appear in the Processor Status dialog box of the OSM or TSM Low-Level Link. The startup event stream windows and Startup TACL windows are not launched automatically when the CIIN file is disabled.

## Alerts

- All the processors in the system must be halted before you perform a system load using the Load Processor-*n* From Disk dialog box. If you initiate a system load while processors are running, a message appears asking whether you want to proceed. If you click Yes, the system load begins.
- You cannot cancel a system load from the Load Processor-*n* from Disk dialog box once the load has been initiated.
- The CIIN file must be disabled if you need to dump other processors before they are reloaded. Disabling the CIIN file prevents any processors configured to reload in that file from being reloaded.
- Do not prime or reset the processors.

## Before You Begin

Before you use the Load Processor-*n* From Disk dialog box:

1. Stop the system and verify that all processors are halted as described in [Stopping the System](#) on page 16-18.
2. Log on to the OSM or TSM Low-Level Link.
3. Select **File>Start Terminal Emulator>For Startup TACL**.

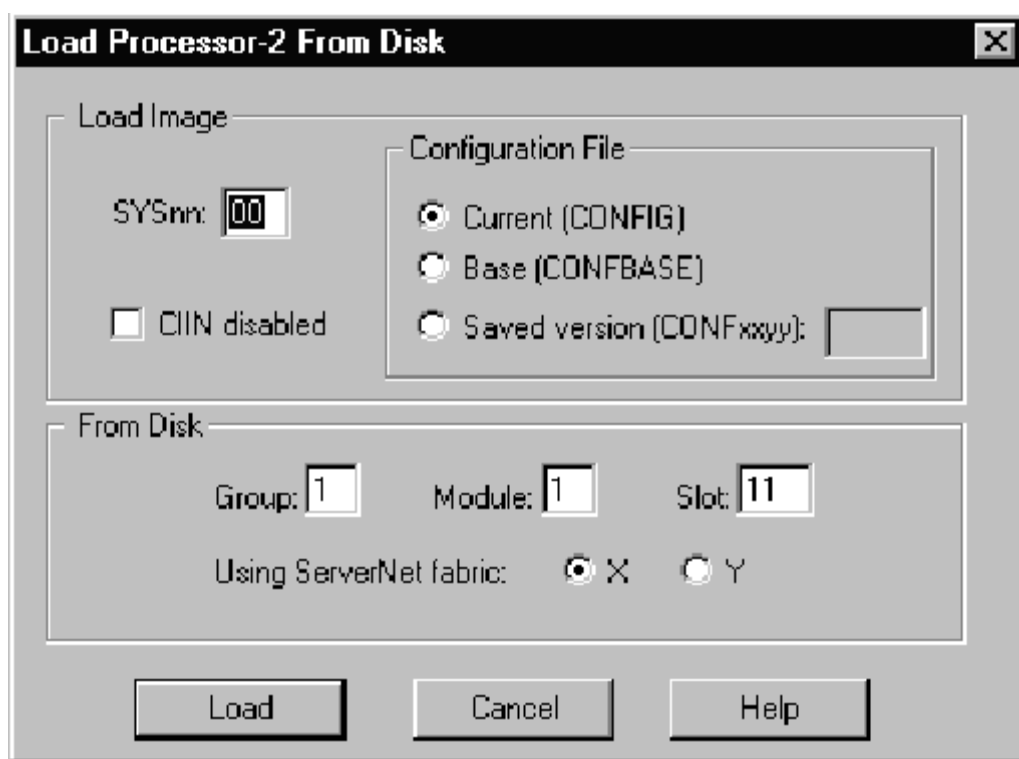
4. Select **File>Start Terminal Emulator>For Event Streams**.

## Procedure to Use the Load Processor-*n* From Disk Dialog Box

To perform a system load into a specified processor, perform these steps from the OSM or TSM Low-Level Link:

1. From the toolbar, click **Processor Status**. The Processor Status dialog box appears.
2. In the Processor Status dialog box:
  - a. Select the processor you want to load.
  - b. In the Processor Actions drop-down menu, scroll to **Load**.
  - c. Click **Perform action**. The Load Processor-*n* From Disk dialog box (see [Figure 16-1](#)) appears, where *n* is the processor number of the processor you selected.

**Figure 16-1. Load Processor-*n* From Disk Dialog Box**



CDT 805CDD

3. In the Load Processor-*n* From Disk dialog box:
  - a. Type the current SYS<sub>*nn*</sub>.
  - b. Select the current configuration file (CONFIG), or if you are unable to load using the CONFIG file, select a saved version (CONF<sub>*xyyy*</sub>).
  - c. Check the CIIN disabled option if you plan to dump processors.
  - d. Type the group, module, and slot numbers of the disk from which you want to load. Although other locations for the system disk are possible, the system disks are often in these slot locations:
    - The primary system disk (\$SYSTEM-P) is usually located in group 01, module 01, slot 11.
    - The mirror system disk (\$SYSTEM-M) is usually located in group 01, module 01, slot 12.

If you are using this procedure because the system disks are in another location, determine the group, module, and slot numbers for the system disks before proceeding.
  - e. Select the ServerNet fabric (X or Y) over which you want the load to take place.
4. After you have entered the required information into the Load Processor-*n* From Disk dialog box, click **Load**.
5. Monitor the system load in the Processor Status dialog box.
6. Log off of the OSM or TSM Low-Level Link.

## Troubleshooting and Recovery Operations When Starting the System

Problems that might occur when you start a system are listed next. For recovery information, refer to the appropriate subsection:

- [Startup Event Stream and Startup TACL Windows Do Not Appear](#) on page 16-12
- [CIIN File Is Not Invoked During System Startup](#) on page 16-14
- [Reload Fails](#) on page 16-14
- [System Load Fails](#) on page 16-15

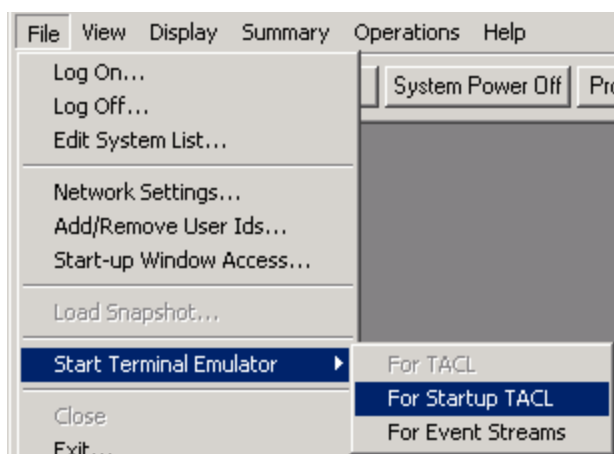
### Startup Event Stream and Startup TACL Windows Do Not Appear

Although these windows would probably not appear during system startup, you can use the OutsideView product to configure or open a startup event stream window or startup TACL window. To open startup event stream windows and startup TACL windows:

1. Log on to the OSM or TSM Low-Level Link. The Management window appears.
2. Select **File>Start Terminal Emulator>For Startup TACL**. (See [Figure 16-2](#).)

---

**Figure 16-2. Opening a Startup TACL Window**



VST813.vsd

3. Two OutsideView windows appear, but one launches on top of the other. If you do not see the TACL prompt in one OutsideView window, check the other OutsideView window by clicking the buttons on the Windows toolbar. (See [Figure 16-3](#).)

---

**Figure 16-3. OutsideView Buttons on the Windows Toolbar**

---



4. Select **File>Start Terminal Emulator>For Event Streams**.
5. Two OutsideView windows appear, but one launches on top of the other. If you do not see the TACL prompt in one OutsideView window, you can check the other OutsideView window (see [Figure 16-3](#)).

If any of the four windows do not appear using this method, you can also start them as follows:

1. Select **Start>OutsideView>OutsideView**. The OutsideView dialog box appears.
2. Select **Session>New**. The New Session Properties dialog box appears.
3. On the Session tab, in the Session Caption box, type a session caption name such as Startup Events or Startup TACL.
4. Click **IO Properties**. The TCP/IP Properties dialog box appears.
5. Type the IP address of MSP 0 or MSP 1 (depending on which is the primary MSP), followed by a space, the port number of the window type (303 for the startup event stream window, and 301 for the startup TACL window).

---

**Note.** If you do not know which MSP is the primary, try MSP 0. If there is no response, try MSP 1.

---

For example, for the startup event stream window:

```
192.231.36.2 303
```

Then, for the startup TACL window:

```
192.231.36.2 301
```

6. Click **OK**. The TCP/IP Properties dialog box closes, and you are returned to the New Session Properties dialog box.
7. Click **OK**. The startup event stream window or startup TACL window appears. A TACL prompt appears in the startup TACL window.

Consult the OSM or TSM Event Viewers for any important system startup messages logged to the EMS log that you might have missed while opening the terminal-emulation windows.

## CIIN File Is Not Invoked During System Startup

The initial TACL process invokes the CIIN file automatically after the first processor is loaded if all these conditions are true:

- The CONFTEXT configuration file located in the \$SYSTEM.SYS<sub>nn</sub> subvolume has an INITIAL\_COMMAND\_FILE entry for the CIIN file.
- The CIIN file is available in the specified location.
- The CIIN option is not disabled in the System Startup dialog box.

If the CIIN file is not invoked, you must use the initial TACL command interpreter to reload all the remaining processors in the system.

## Reload Fails

If a reload is not successful:

1. Check these locations for halt code or event messages:
  - The startup TACL window
  - The Processor Status dialog box of the OSM or TSM Low-Level Link
  - The System Status and Detailed Status boxes in the System Startup dialog box
  - OSM or TSM Event Viewer
2. Record any event messages or halt codes, and refer to the appropriate documentation for recovery information.
  - Look up event messages in the EMS logs (\$0 and \$ZLOG) and refer to the OSM or TSM Event Viewer online help or the *Operator Messages Manual* for further information about the cause, effect, and recovery for any event message.
  - Look up the halt code in the *Processor Halt Codes Manual* for further information about the cause of failure and the appropriate recovery procedure.
3. Perform a processor dump, if needed, as described in [Dumping a Processor to Disk](#) on page 11-10.
4. Correct the problem. If you cannot to correct the problem, contact your service provider.
5. Reload the processor or processors using one of these methods:
  - From the startup TACL prompt, issue these commands for each of the processors to be reloaded:  

```
> RELOAD (nn), PRIME
```
  - If the RELOAD command cannot prime or load a processor, as indicated by messages on the status line of the terminal-emulation window:
    - a. Log on to the OSM or TSM Low-Level Link.

- b. On the toolbar, select **Processor Status**.
  - c. In the Processor Status dialog box, select the processors to be reloaded.
  - d. Select **Actions>Prime for Reload**.
  - e. Click **Perform Action**.
  - f. Close the Processor Status dialog box.
  - g. Again try the RELOAD (*nn*) command at a TACL prompt.
6. If you continue to have problems, contact your service provider.

## System Load Fails

If a system load is not successful or if the system halts:

1. Check these locations for halt code or event messages:
  - The startup TACL window
  - The Processor Status dialog box of the OSM or TSM Low-Level Link
2. Record any event messages or halt codes, and refer to the appropriate documentation for recovery information:
  - If possible, look up event messages in the EMS logs (\$0 and \$ZLOG), and refer to the OSM or TSM Event Viewer online help or the *Operator Messages Manual* for further information about the cause, effect, and recovery procedure for this event. (If you configured your processor to print event messages to a hard-copy printer, you might be able to retrieve messages sent while the system was going down.)
  - Look up the halt code in the *Processor Halt Codes Manual* for further information about the cause of failure and the appropriate recovery procedure.
3. Correct the problem, and try loading the system again. If you cannot correct the problem, contact your service provider.

You can also try loading the system as follows:

1. Load the system from each disk path for both the primary and mirror \$SYSTEM drives. To load the system along a specified path, see [The Load Processor-n From Disk Dialog Box](#) on page 16-9.
2. If you still cannot load the system, try loading the system from a saved version of the system configuration database file, CONF<sub>xxyy</sub>. You can load the system from an earlier version of the system configuration database by specifying a saved version of the CONFIG file if one is available. Use this method to recover from a configuration change that caused a problem (such as a system freeze):
  - a. Load the system as described in [The System Startup Dialog Box](#) on page 16-6, specifying a saved version of the system configuration file in the form *xx.yy*. For example, the CONF0205 file would be specified as 02.05.
  - b. When the system starts and displays a TACL prompt, you can log on and start the rest of the system applications.

3. If you still cannot load the system or if a `CONFxyy` is not available, try one of these procedures:
  - Replace the current system disk with an alternate system disk if one is available:
    - a. Replace the \$SYSTEM disk. For replacement procedures, refer to the CSSI Web.
    - b. Load the system as described in [The System Startup Dialog Box](#) on page 16-6.
  - Load the system from the CONFBASE configuration file and restore a previously backed-up configuration file:
    - a. Load the system as described in [The System Startup Dialog Box](#) on page 16-6 from the CONFBASE configuration file. In the System Startup dialog box:
      1. In the `SYSnn` field, enter the number of the `SYSnn` subvolume (for example, **00**) containing the version of the software to be loaded.
      2. In the Configuration File box, select **Base (CONBASE)** as the configuration file.
      3. Click **Start system**.
    - b. From the startup TACL prompt, issue this command for each of the processors to be reloaded:
 

```
> RELOAD (nn) , PRIME
```
    - c. From the Startup TACL window, configure a tape drive.
    - d. Restore a previously backed-up configuration file.
    - e. Load the system as described in [The System Startup Dialog Box](#) on page 16-6 from the current configuration file (CONFIG). Check that the CIIN file is enabled.

As a last resort, you might be able to perform a tape load from a system image tape (SIT) to restore the system image files to the \$SYSTEM disk (`SYSnn` and `CSSnn` subvolumes) and then load that image into either processor 0 or 1.

---

△ **Caution.** Performing a tape load from a system image tape (SIT) to restore the system image files to the \$SYSTEM disk (`SYSnn` and `CSSnn` subvolumes) is generally not recommended. **Perform a tape load only with the advice of the GCSC or your service provider.** Loading from a tape reinitializes the disk directory. In every case, the disk directory is overlaid with the directory from the tape. All files that were on the disk are destroyed. The SIT does not contain all the files that were on the \$SYSTEM disk, including almost all important system configuration information. Many additional steps are required to restore your system to working order.

---



When you consider performing a tape load from a SIT:

- You must contact the GCSC for guidance in restoring your system disk from a SIT.
- You can configure the Distributed Systems Management/Software Configuration Manager (DSM/SCM) to create a SIT whenever a significant software update is performed, or you can request one each time a new `SYSnn` is created. For more information, see the *DSM/SCM User's Guide*.
- Keep a copy of the contents of your system disk on backup tape. Unlike an alternate system disk, the system image tape that DSM/SCM can create does not contain all the files that were on the `$SYSTEM` disk, including almost important system configuration information.
- **Do not perform a tape load to bring up a new software release under normal conditions.** The normal procedure for bringing up a new software release is to use the DSM/SCM to create a new configuration revision (including the system image) and then to load the system from the new `SYSnn` subvolume. For more information, see the *Gnn.nn Software Installation and Upgrade Guide*.

## Getting a Corrupt System Configuration File Analyzed

If the current system configuration file is corrupted, you can send it to your service provider for an analysis. Follow these steps:

1. Return to a saved, stable configuration file by following the procedure outlined in [Procedure to Use the System Startup Dialog Box](#) on page 16-7.
2. Once the system is up and stable, copy to a backup tape the corrupt `CONFSAVE` file. For example:

```
> BACKUP $TAPE, $SYSTEM.ZSYSCONF.CONFSAVE, LISTALL
```

Do this before you load the system a second time. Another system load operation will overwrite the `CONFSAVE` file you want analyzed.

3. Submit the tape to your service provider for analysis, along with a copy of any SCF command file or SCF log file of the commands that were part of the process that created the corrupt configuration.

## Starting Other System Components

Once the system is started, you must start individual devices, processes, applications, and communications lines. Procedures for starting objects differ depending on how the objects are configured to start. HP recommends that you bring your system up in stages, verifying each stage, to facilitate recovery if any step fails.

Some processes are started automatically by the `$ZPM` persistence monitor. These processes include the operating system, SLSA subsystem, storage subsystem, and WAN subsystem.

You use SCF to start many system components. Refer to the *SCF Reference Manual for G-Series RVUs* as an overall reference. You can also refer to SCF manuals that are specific to each peripheral device:

| <b>For instructions on starting</b>                                           | <b>Refer to</b>                                                                                                                                       |
|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| Storage devices such as disks and tape drives                                 | <i>SCF Reference Manual for the Storage Subsystem</i>                                                                                                 |
| Ethernet addressable devices, including terminals and printers                | <i>LAN Configuration and Management Manual</i>                                                                                                        |
| ServerNet fabrics                                                             | <i>SCF Reference Manual for the Kernel Subsystem</i>                                                                                                  |
| Generic processes                                                             | <i>SCF Reference Manual for the Kernel Subsystem</i>                                                                                                  |
| WAN communications lines for devices and intersystem communications protocols | <i>WAN Subsystem Configuration and Management Manual</i> , as well as the SCF manuals that apply to the specific devices and communications protocols |

You might be able to automate the startup of many processes, lines, devices, and applications. For example, you can use the SCF interface to the Kernel subsystem to add process names to the system configuration database—typically monitor or manager processes such as \$ZEXP, the Expand manager process; \$ZNET, the Subsystem Control Point (SCP) process; or \$ZPMON, the OSS monitor process. Refer to the *SCF Reference Manual for the Kernel Subsystem*.

You also can automate your startup procedures by including commands in startup command files that you invoke from a TACL prompt or another startup file. Startup files contain a series of commands that automatically execute when the file is executed. The *NonStop S-Series Planning and Configuration Guide* describes startup files. Refer also to the *SCF Reference Manual for G-Series RVUs*. For some techniques to make startup command files run as efficiently as possible, refer to [Reducing Shutdown Time](#) on page [16-24](#).

Follow your site's procedures for executing the system configuration and startup command files and for starting up your application software.

## Stopping the System

Stopping a system means halting each processor (terminating all processes running in each processor) on the system in an orderly fashion. To prepare a system for a planned outage and to stop the system, perform these tasks:

1. [Preparing to Stop the System](#) on page 16-19
2. [Procedure to Stop the System Using OSM or TSM](#) on page 16-21

## Alerts

Before stopping a system:

- Unless you stop a system in a careful and systematic manner, you can introduce abnormalities in the system state. Such abnormalities can affect disk file directories and can cause the processors to hang in an endless loop when you attempt to load your system.
- To maximize application availability, make stopping the system a planned event whenever possible.
- If you are planning to power off the system after stopping it, you must leave either processor 0 or processor 1 running and have a TACL process running to issue the SCF power-off command.
- The TACL SPOOLER DRAIN subcommand stops the spooler in an orderly manner. It is the only recommended way to stop the spooler.
- If the system is a member of a ServerNet cluster, HP recommends that you first remove the system from the cluster. For removal procedures, refer to the *ServerNet Cluster 6780 Operations Guide* or (for ServerNet II or earlier cluster configurations) the *ServerNet Cluster Manual*.

## Preparing to Stop the System

You must stop all applications, devices, and processes in an orderly fashion before you stop a system. You might be able to automate the shutdown of lines, devices, and applications by including commands in one or more shutdown command files that you invoke from either a TACL prompt or another shutdown file. Shutdown command files contain a series of commands that automatically execute when the file is executed. The *NonStop S-Series Planning and Configuration Guide* describes command files. For some techniques to make shutdown command files run as efficiently as possible, refer to [Reducing Shutdown Time](#) on page 16-24.

- When you stop Pathway applications, all TCP objects begin shutdown (shutting down TERM objects and then themselves) in parallel. New work is disallowed. The PATHMON process logs the start and completion of SHUTDOWN2. It does not log status messages during shutdown.
- When you stop DSM/SCM, the CNFGINFO server process, the Pathway environment for DSM/SCM, the alternate EMS collector \$ZPHI, and TCP/IP processes for DSM/SCM all stop, as this example shows:

```
STOP CNFGINFO server process $ZPHC
STOP DSM/SCM Pathway system $YPHI
PATHCOM $YPHI;SHUTDOWN !,WAIT
$Z02H: TCP TCP-H, STOPPED
$Z02H: TCP TCP-T, STOPPED
STOP DSM/SCM Alternate EMS Collector $ZPHI
```

- Following the SPOOLER DRAIN subcommand, the collectors allow current jobs to finish but reject new opens with a file-system error 66 (device downed). When you drain the spooler, each collector stops when it has no more open jobs. Each print process finishes printing any active jobs and then stops. After all collectors and print processes have stopped, the supervisor stops. The spooler enters the dormant state, ready to be warm started.
- Following the SCF CONTROL, DISK REFRESH command, all other disk I/O is suspended. The amount of time a refresh operation takes to finish depends on the amount of disk cache containing dirty pages in use at the time, and writing to disk can take several minutes.

Before stopping the system, stop all processes and applications in this order:

1. Whenever possible, schedule system shutdowns in advance so that system users are prepared. Send a display message alerting users of the shutdown.
2. Stop all user applications.
3. These applications must be stopped in this order:
  - a. If your system is equipped with Pathway, stop Pathway applications. At the Pathway prompt:
 

```
= SHUTDOWN2 , MODE ORDERLY
```
  - b. Stop Distributed Systems Management/Software Configuration Manager (DSM/SCM) if it is running. At a TACL prompt:
    1. Type this VOLUME command:
 

```
> VOLUME $DSMSCM.ZDSMSCM
```
    2. Stop DSM/SCM:
 

```
> RUN STOPSCM
```
4. Stop communications lines, such as Expand lines.
5. Identify and stop any remaining processes that should be stopped individually:
  - a. Use the TACL PPD and STATUS commands to help you identify running processes.
  - b. Use the TACL STOP command to stop running processes.

You must be aware of which processes must not be stopped. For example, some TCP processes must not be stopped. System processes must not be stopped. Generic processes configured to be persistent cannot be stopped.
6. Drain the spooler. At a TACL prompt:
 

```
> SPOOLCOM supervisor-name , SPOOLER , DRAIN
```
7. Stop the TMF subsystem. At the TACL prompt:
 

```
> TMFCOM STOP TMF
```

8. Refresh the disks to put them in an orderly state before shutdown. Use the SCF CONTROL DISK, REFRESH command:

```
> SCF CONTROL DISK $*,REFRESH
```

## Procedure to Stop the System Using OSM or TSM

To place all processors in a halt state and set the status and registers of the processors to an initial state:

1. Log on to the OSM or TSM Low-Level Link.
2. On the toolbar, click **Processor Status**.
3. In the Processor Status dialog box, select all processors to be halted. To select processors, scroll down the list and select a processor. You can use the Shift key to select multiple processors, but they must be in numerical order. For example, you can select processors 2, 3, and 4, but not 2 and 4. To select processors 2 and 4, use the Ctrl key with the left mouse button.
4. Select **Processors Actions>Halt**.
5. Click **Perform action**.
6. A message box asks whether you are sure you want to perform a halt on the selected processors. Click **OK**.

# Powering Off the System

The system powers off by powering off all system components and finally shutting down the power supplies. In this state, you can power up the system only by pressing the power-on push button on either PMF CRU in group 01.

The method you use to power off a system depends on the state of the system:

- Under normal circumstances, use SCF to power off a running system that has been brought to an orderly stop. (All processors except one have been halted.)

See [System Power-Off Procedure Using SCF](#) on page 16-22.

- If the system is down (all processors in the system have been halted, and no processor is left running to execute SCF commands), use the OSM or TSM Low-Level Link to power off the system.

See [System Power-Off Procedures Using OSM or TSM](#) on page 16-22.

- In emergency situations, you might need to quickly remove AC power from a system.

See [Emergency Power-Off Procedure](#) on page 16-23.

## System Power-Off Procedure Using SCF

For a system in which all the processors but one have been halted, use this procedure to power off the system:

1. Verify that either processor 0 or processor 1 is still running.
2. Log on to an available TACL command interpreter as the super ID (255,255) and issue the SCF power-off command:

```
> SCF CONTROL SUBSYS $ZZKRN, SHUTDOWN
```

3. Shut off AC power to all peripherals and subsystems.

## System Power-Off Procedures Using OSM or TSM

When all the processors in a system have been halted, use one of these two procedures to power off the system. The procedure you use depends on whether you have previously chosen the system discovery option.

- To power off a stopped system before system discovery:
  1. Log on to the OSM or TSM Low-Level Link.
  2. On the toolbar, click **System Power Off**.
  3. A message box prompts you to confirm the power off system action. To power off, click **OK**.
  4. Shut off AC power to all peripherals and subsystems.

The system is powered off, and you are automatically logged off of the Low-Level Link.

- To power off a stopped system after system discovery:
  1. Select **Display>Actions**.
  2. The Actions dialog box appears. In the Actions box, select **Power Off**.
  3. Click **Perform Action**.
  4. A message box prompts you to confirm the power off system action. To power off, click **OK**.
  5. Shut off AC power to all peripherals and subsystems.

## Emergency Power-Off Procedure

To prevent the batteries from being drained, power off the system using OSM, TSM, or SCF before unplugging the system from AC power or using the emergency power-off (EPO) switch.

If your site is not equipped with an EPO switch, unplug the enclosures and peripherals from the wall outlets. Unplugging a system without performing the power-off procedure causes the system to continue running and to draw current from the batteries. For more information, refer to [Section 15, Power Failures: Preparation and Recovery](#).

If your site is equipped with an EPO switch, you can use it to remove AC power from your entire system. For more information on the EPO system, see the *NonStop S-Series Planning and Configuration Guide*.

# Recovery Operations for Stopping or Powering Off the System

If all processors in the system have been halted and you are unable to log off, press Alt-F4 to exit the OSM or TSM Low-Level Link.

## Reducing Shutdown Time

An important component of a planned outage is the time required to start and stop your applications, devices, and processes. These general techniques can help reduce the time required to start up and shut down these objects:

- Write efficient startup and shutdown command files.
- Use parallel processing to distribute startup and shutdown processes across multiple processors.
- Investigate and use product-specific techniques for fast startup and shutdown.

## Write Efficient Startup and Shutdown Command Files

A good way to start and stop objects and processes in your system is to use startup and shutdown command files. Command files are supported by TACL and by many subsystems for NonStop S-series servers. You can improve the efficiency of your startup and shutdown command files by applying these techniques:

- Use command file syntax that executes quickly.
- Avoid manual intervention to ensure that command files execute quickly

## Command File Syntax

The syntax used in command files affects the time it takes for them to execute. To ensure that your command files execute quickly:

- Avoid using wild-card characters
- Use single-line commands instead of multiple-line commands

A wild card is a character—typically an asterisk (\*) or a question mark (?)—used to match any character or series of characters. When you use wild-card characters in your command files, execution time is increased because the system must look up names in a table. By using explicit names instead of wild-card characters, you can shorten execution time and allow for commands to execute in parallel.

This PATHCOM START command uses a wild-card character to start all of the TERM objects defined in the PATHMON configuration file:

```
= START TERM *
```



This PATHCOM START command uses explicit names to start all of the TERM objects defined in the PATHMON configuration file:

```
= START TERM (TERM1 , TERM2 , TERM3 , TERM4 , TERM5 , TERM6)
```

---

**Note.** When using explicit names, you must revise your command files whenever a configuration change occurs. Therefore, you should balance the time it takes to update configuration files against the savings in startup or shutdown time.

---

Multiple-line commands in a command file increase execution time. By using single-line commands, you can reduce the time required to execute a command file.

## Avoid Manual Intervention

Write startup and shutdown files so that they execute correctly without requiring manual intervention. Any time an operator must intervene, startup and shutdown time increase. In addition, operator intervention increases the possibility of human error that could further delay startup and shutdown.

## Use Parallel Processing

Using parallel processing can shorten the time required to start up or shut down your system or application because startup and shutdown processes are distributed throughout the processors in your system.

As an example, the following SCF command file uses parallel processing in four processors to start several communications lines. The files START0, START1, START2, and START3 contain the actual commands that start the communications lines.

This command file uses a special technique intended to ensure that each process gets started even if a given processor is out of service. The technique is to start each process in two processors. If the first processor is down, the command file continues to the next processor. If the first processor is up, and the process is started, the command file still continues to the next processor but fails because the process name (\$Sn) is in use by the process that was successfully started. As a result, a specified

process is started in whichever processor is running. Of course, if neither processor is up, the attempt to start the process fails.

```
SCF /IN START0, NOWAIT, CPU 0, NAME $S0/
```

```
SCF /IN START0, NOWAIT, CPU 2, NAME $S0/
```

```
SCF /IN START1, NOWAIT, CPU 1, NAME $S1/
```

```
SCF /IN START1, NOWAIT, CPU 3, NAME $S1/
```

```
SCF /IN START2, NOWAIT, CPU 2, NAME $S2/
```

```
SCF /IN START2, NOWAIT, CPU 0, NAME $S2/
```

```
SCF /IN START3, NOWAIT, CPU 3, NAME $S3/
```

```
SCF /IN START3, NOWAIT, CPU 1, NAME $S3/
```

When using the technique shown in this command file, make sure to spread the process workload across all available processors. If there are too many processes to start in processors 0 and 1, queuing and memory-contention problems can result. For additional suggestions on using parallel processing to enhance operational efficiency, refer to the *Availability Guide for Change Management*.

## Investigate Product-Specific Techniques

Certain products provide commands that can reduce the time required to start up or shut down their services. For example, the HP NonStop TS/MP product provides the COOL START option and the SHUTDOWN2 command to shorten startup and shutdown times, respectively. Using the COOL START option, rather than COLD START, to restart an existing transaction-processing system is much faster. The SHUTDOWN2 command is faster and more reliable than the SHUTDOWN command. Both of these techniques are described in the *TS/MP System Management Manual*.

Familiarize yourself with the products and applications that run on your system to identify time-saving techniques for speeding startup and shutdown operations. Refer to the relevant documentation.

# Related Reading

For more information about powering on and starting the system, refer to the documentation listed in [Table 16-1](#).

**Table 16-1. Related Reading for Starting and Stopping a System**

| For Information About                                                     | Refer to                                                                                                                                                                                                                                                                                                                 |
|---------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Using SCF, customizing your configuration                                 | <i>SCF Reference Manual for G-Series RVUs</i> provides an overall reference for SCF, as well as information on customizing your configuration using command files.                                                                                                                                                       |
| Using TACL                                                                | <i>TACL Reference Manual</i>                                                                                                                                                                                                                                                                                             |
| Using the Processor Status dialog box to start up or shut down the system | <i>TSM Online User Guide</i> or the TSM online help<br>OSM Low-Level Link online help                                                                                                                                                                                                                                    |
| Automating system startup and shutdown                                    | <i>NonStop S-Series Planning and Configuration Guide</i> and the <i>Introduction to NonStop Operations Management</i>                                                                                                                                                                                                    |
| Sample startup and shutdown files for NonStop S-series servers            | <i>NonStop S-Series Planning and Configuration Guide</i>                                                                                                                                                                                                                                                                 |
| Starting and stopping communications devices and communications lines     | SCF or configuration manual specific to each type of communications device or line                                                                                                                                                                                                                                       |
| Automating the startup of objects and devices using generic processes     | <i>SCF Reference Manual for the Kernel Subsystem</i>                                                                                                                                                                                                                                                                     |
| Configuring the CIIN file                                                 | <i>NonStop S-Series Planning and Configuration Guide</i> for information on the CIIN file and its contents<br><i>SCF Reference Manual for the Kernel Subsystem</i><br><i>SCF Reference Manual for G-Series RVUs</i><br><i>System Generation Manual for G-Series RVUs</i> for information on the CONFTEXT file CIIN entry |
| Shutting down DSM/SCM                                                     | <i>DSM/SCM User's Guide</i>                                                                                                                                                                                                                                                                                              |
| Starting up and shutting down TMF                                         | <i>TMF Operations and Recovery Guide</i>                                                                                                                                                                                                                                                                                 |
| Starting and shutting down the Pathway environment                        | <i>Pathway/iTS System Management Manual</i> and <i>TS/MP System Management Manual</i>                                                                                                                                                                                                                                    |
| Draining the spooler                                                      | <i>Spooler Utilities Reference Manual</i>                                                                                                                                                                                                                                                                                |



# **17 Preventive Maintenance**

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## **When to Use This Section**

This section describes routine maintenance tasks required for NonStop S-series servers.

# Monitoring Physical Facilities

This subsection explains how to check the physical environment of your computer facility. You might be asked to monitor these aspects of your physical facility:

- Air temperature and humidity
- Physical security
- Order and cleanliness
- Fire-protection systems

## Checking Air Temperature and Humidity

Check that the temperature and humidity are at the correct level established by management personnel. Monitor any sensors that control temperature and humidity. Your computer environment should have information posted that lists the names and telephone numbers of individuals that operators can call when a malfunction occurs with the heating, air conditioning, and humidity systems.

## Checking Physical Security

Your company's security policy will guide you in the kind of security monitoring you perform. You might be asked to check doors and windows at the beginning and end of your shift and report the presence of unauthorized persons. In some facilities, operations staff might be responsible for monitoring and maintaining electronic security systems.

## Maintaining Order and Cleanliness

Clutter and debris can cause accidents and fires. Dust, smoke, and spilled liquids can damage system hardware components. Depending on your company's policies, you might be asked to keep the computer room clean; inspect air filters; keep printer dust under control through periodic vacuuming; and enforce a ban on smoking, eating, and drinking in the computer room.

## Checking Fire-Protection Systems

You might also be asked to check the fire alarms and fire extinguisher systems in your facility.

# Cleaning System Components

This subsection contains basic information about cleaning enclosures, printers, and tape drives. Many companies have service-level agreements with HP that include regular preventive maintenance (PM) of their hardware components. If a Field Service Organization (FSO) representative handles cleaning and other preventive maintenance for your company, you need not be concerned with the cleaning tasks mentioned here.

## Cleaning an Enclosure

Cleaning an enclosure is an infrequent task that you perform as required by conditions at your site. Many installations require only occasional dusting. To dust an enclosure, use a lint-free, antistatic dust cloth.

---

△ **Caution.** Do not use solvents or spray products on any part of an enclosure.

---

If you need to clean an enclosure, use a cotton cloth and a cleaning product formulated for computer equipment. Or use a damp cotton cloth and a mild, nonabrasive soap.

## Cleaning and Maintaining Printers

Inspect all printers and replace the ribbons on line printers as needed. Replace the toner cartridges of laser printers that are shared by the user community when print quality lessens. To remove paper dust that can affect printer operation, vacuum printers periodically.

## Cleaning Tape Drives

Clean tape drive heads and sensors frequently. For detailed information on cleaning tape drives, refer to the documentation shipped with your tape drive. How often you clean a tape drive or the tape path depends on use, operating environment, and tape quality. Cleaning supplies are available from HP. Use these materials:

- Cleaning solvent: HP supports the use of **only** isopropyl alcohol (91 percent or greater) as a tape-path cleaning solvent. Isopropyl alcohol cuts oil and grease, evaporates quickly, leaves no residue, and does not damage the tape path.
- Nonabrasive, lint-free cloths and swabs.
- A cleaning cartridge, which provides a safe, convenient way to clean some types of tape drives.

For ordering information, see the operator's guide shipped with the tape subsystem.

---

△ **Caution.** These precautions are extremely important to prevent damage:

- **Do not use cleaner solutions that contain lubricants.** Lubricants deposit a film on the tape head and impair performance.
  - **Do not use aerosol cleaners, even if they contain isopropyl alcohol.** The spray is difficult to control and often contains metallic particles that damage the tape head.
  - **Do not use soap and water on a tape path.** Soap leaves a thick film, and water can damage electronic parts.
  - **Do not use facial tissues.** Facial tissues leave highly abrasive lint on the tape path.
  - **Do not dip your cloths and swabs into the solvent can.** These items contaminate the solvent.
  - **Discard the cloths and swabs after use.** Even if they appear clean, cloths and swabs are contaminated by use. Dispose of these materials in an approved container.
- 

## Handling and Storing Cartridge Tapes

Cartridge tapes are nested in a cartridge by a spring-loaded mechanism that exposes the tape only when the cartridge tape is loaded into the tape drive. The drive mechanism uses a leader block to wind the tape through the tape path to load data. Exposing the tape or handling the cartridge tapes improperly can result in loss of data.

When handling and storing cartridge tapes:

- Protect cartridge tapes from shock or vibration.
- Do not expose cartridge tapes to high temperatures by leaving them in a car or in direct sunlight.
- Do not store cartridge tapes near magnetic fields such as those generated by power cables or computer monitors.
- Do not remove the leader block, pull out the tape, or press the reel lock. If the leader block is detached from the tape, contact the tape supplier for a leader block repair kit.
- When transporting cartridge tapes, do not stack the cartridges more than six high. Pack them carefully with the reel sides upright. The leader block edges can crack if they engage with each other.
- To store or transport tape cartridges in an ACL cartridge magazine, follow the same guidelines as you would for storing or transporting individual cartridge tapes.



# Operational Differences Between Systems Running D-Series and G-Series RVUs

Users familiar with systems running D-series RVUs will find several major differences in the operational environment of systems running G-series RVUs. Although many of the operations to be performed remain the same, the tools you use to execute these operations might differ significantly. For G-series RVUs, these changes have been made:

- The TSM package replaced several of the maintenance and diagnostic tools with which you might be familiar. At G06.21, OSM was released as the system management tool of choice, although TSM is still supported.
- The Communications Management Interface (CMI), Peripheral Utility Program (PUP), and Configuration Utility Program (COUP) products are replaced by enhancements to the Subsystem Control Facility (SCF). Functions performed by these products on systems running D-series RVUs are performed by SCF on systems running G-series RVUs.
- The ServerNet fabrics replace interprocessor buses and I/O channels.
- Devices and most system processes are configured by SCF, not the SYSGENR system generation program. As a result, most CONFTEXT configuration file paragraphs have been removed.
- The system is started using the OSM or TSM Low-Level Link.
- Events and event logs can now be monitored by the OSM or TSM Event Viewer.
- Tape subsystems are managed by MEDIACOM and SCF, not TAPECOM.
- Disk subsystems are managed by the OSM Service Connection, the TSM Service Application, and SCF.
- Online monitoring of system resources is performed by the ViewSys product, OSM, and TSM.
- Processor halts are displayed by the Processor Status dialog box of the OSM or TSM Low-Level Link.
- Installation of the operating system and software product revisions (SPRs) is now performed only by the Distributed Systems Management/Software Configuration Manager (DSM/SCM), not the Install program.



# Tools and Utilities for Operations

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# When to Use This Appendix

This appendix briefly describes the tools and utilities that might be available on your system to assist you in performing the operations tasks for a NonStop S-series server. The use of some of these tools and utilities is discussed throughout this guide. For a list of other documentation that provides detailed information about these tools and utilities, refer to [Appendix C, Related Reading](#).

## BACKCOPY

Use the BACKCOPY utility to create one or two duplicate tapes for archive storage, distribution, or disaster recovery. You can also create one or two labeled (or unlabeled) tape sets from a labeled or unlabeled tape set. The BACKCOPY utility duplicates tapes that are made from a BACKUP utility file-mode operation, but it cannot duplicate tapes that are made from a BACKUP utility volume-mode operation.

## BACKUP

Use the BACKUP utility to copy files from disk to magnetic tape.

## Disk Compression Program (DCOM)

The Disk Compression Program (DCOM) moves disk-file extents to yield more usable space on a disk. Use the DCOM utility to analyze the current space allocation on a disk, relocate file extents on a disk, and reduce the number of free-space extents. You can also combine free space into larger extents so that files can be allocated with larger extents, which decreases the incidence of file-system error 43 (unable to obtain disk space for file extent).

## Disk Space Analysis Program (DSAP)

The Disk Space Analysis Program (DSAP) analyzes how disk space is used on a specified volume. The DSAP utility copies the disk directory and free-space table to the current work file. By specifying options, you can manipulate this data to produce several different reports about the use of the disk space for that volume. The free-space table is limited only by your primary (main) and secondary (contiguous disk space) memory requirements.

## EMSDIST

The EMSDIST program is the object program for a printing, forwarding, or consumer distributor, any of which you can start with a TACL RUN command.

# Event Management Service Analyzer (EMSA)

Use the Event Management Service Analyzer (EMSA) to extract specific types of event messages from EMS log files and to create an Enscribe database that you can query to analyze problem trends.

## File Utility Program (FUP)

The File Utility Program (FUP) is a component of the standard software package for the NonStop Kernel operating system. FUP software is designed to help you manage disk files, nondisk devices (printers, terminals, and tape drives), and processes (running programs) on the NonStop S-series system. You can use FUP to create, display, and duplicate files; load data into files; alter file characteristics; and purge files.

## Measure

Use the Measure program to collect and display system performance statistics about processors, processes, communication and network lines, files, disks, and terminals. Operations management personnel often use Measure to help fine-tune and balance a system.

## MEDIACOM

MEDIACOM is the operator interface to the Distributed Systems Management/Tape Catalog (DSM/TC). It allows you to perform routine tape and tape-drive management operations.

## NSKCOM and the Kernel-Managed Swap Facility (KMSF)

NSKCOM is the command interface to the Kernel-Managed Swap Facility (KMSF). NSKCOM allows you to configure and manage permanently allocated swap files.

## Object Monitoring Facility (OMF)

Use the Object Monitoring Facility (OMF) for problem identification and prevention. OMF monitors the same devices as an SCF STATUS command: processors, disks, files, processes, spooler components, audit trails, audit dumps, TMF transactions, and tape mount requests.

# OSM Package

The HP Open System Management (OSM) product replaces TSM as the system management tool of choice for NonStop S-series systems. OSM applications perform all of the same functions that TSM does. However, OSM offers a browser-based interface that improves scalability and performance and overcomes other limitations that exist in TSM. TSM is still supported, but OSM is required to support new functionality in G06.21 and later. For G06.21 and later, OSM is required to support 6780 switches in ServerNet clusters and Online Disk Remirroring.

For more information on the OSM package, including a description of the individual applications and how they differ from their TSM counterparts, see the *OSM Migration Guide* and the *OSM User's Guide*.

# PATHCOM

PATHCOM is the interactive interface to the PATHMON process, through which users enter commands to configure and manage Pathway applications.

# PEEK

Use the PEEK program to gather statistical information about processor activity, system storage pools, paging activity, message information, send instructions, and interrupt conditions.

# RESTORE

Use the RESTORE utility to copy files from magnetic tape to disk.

# SPOOLCOM

SPOOLCOM allows you to perform these tasks related to printing:

- Display the status of collectors, devices, print jobs, print processes, routing structures, and the spooler itself
- Change the location, state, or any attribute of your job
- Delete your print job from the spooler subsystem
- Restart a device that has gone offline with a device error

## Subsystem Control Facility (SCF)

SCF configures and manages several subsystems that control system processes and hardware, including communications paths, disks, tapes, terminals, printers, and communications lines. You can run SCF from any workstation or terminal on the system after you are logged on. Use SCF to:

- Configure and add an object
- Remove an object
- Begin or restore access to an object
- Stop access to an object
- Show static configuration information for an object
- Show dynamic information for an object
- Automate subsystem startup and shutdown procedures
- Power off the system

## HP Tandem Advanced Command Language (TACL)

The TACL product is the command interface to the NonStop Kernel operating system. In addition to providing full command-interpreter facilities, you can program the TACL interface to help you manage your system in these ways:

- Automate subsystem startup and shutdown procedures. For example, you can use TACL statements to initialize Pathway, the TMF subsystem, the TRANSFER system, and other subsystems.
- Run utilities and issue commands with either a fixed set of commands or a flexible set that you can tailor at run time.
- Create a customized environment that simplifies commonly performed tasks for users.

## TMFCOM

TMFCOM allows you to enter commands that initiate communication with TMF, request various TMF operations, and terminate communication with TMF.

## TSM Package

If you are running a version of TSM earlier than version 2000B, see the online documentation included with that version for a description of the TSM package.

TSM provides troubleshooting, maintenance, and service tools for systems running G-series RVUs. It combines many of the system maintenance functions provided on systems running D-series RVUs by Syshealth, HP Tandem Maintenance and

Diagnostic System (TMDS), and the Remote Maintenance Interface (RMI). Use TSM to:

- Identify system components
- Display the current status of system components
- Perform recovery actions on specified components, such as processors
- Start the system
- Load a new software release
- Send problem information to a remote service provider
- View event logs
- Locate failed or failing system components
- Manage an HP NonStop ServerNet Cluster

TSM is a collection of these software products:

- TSM server software installed on NonStop S-series servers
- TSM client software installed on system consoles:
  - TSM Event Viewer
  - TSM Low-Level Link
  - TSM Notification Director
  - TSM Service Application

## **TSM Event Viewer**

The TSM Event Viewer allows you to set up criteria to view EMS log files (\$0 and \$ZLOG) in several ways, enabling you to rapidly assess system problems. You can search for and view log files and retrieve events based on start and end time, subsystem, source, and multiple or specific events.

## **TSM Low-Level Link**

The TSM Low-Level Link enables you to communicate with a NonStop S-series server even when the operating system is not running. The TSM Low-Level Link allows you to perform many service operations.

## **TSM Notification Director**

The TSM Notification Director receives and displays notifications and incident reports from NonStop S-series servers. If your system is configured for dial-out, you can authorize an incident report to be forwarded to your service provider. The TSM Notification Director also forwards information from NonStop S-series servers to the TSM Low-Level Link and the TSM Service Application to ensure that these applications display up-to-date information.

## **TSM Service Application**

The TSM Service Application allows you to communicate with a NonStop S-series server when the operating system is running. The TSM Service Application provides



you with the most complete view of the status of your NonStop S-series server and allows you to perform many service operations. You can perform these tasks using the TSM Service Application:

- View a list of outstanding alarms
- Power on or power off a disk
- Perform an up or down action on a disk
- Clear data on a disk
- Update firmware on a group of service processors or a single service processor
- Configure or update server information

The Management window of the TSM Service Application displays a tree pane, a view pane, and a details pane:

- The tree pane is located on the left side of the Management window and has two tabs: the system tab (displaying the actual system name) and the Cluster tab. The system tab depicts the NonStop S-series server and its groups, modules, and resources in a hierarchy. From the Cluster tab, you can expand the ServerNet Cluster icon to view information about the local system's connectivity to other nodes (systems) in the ServerNet cluster.
- The view pane is located on the top right of the Management window. The view pane includes a Physical view, Connection view, and Inventory view of a NonStop S-series server.
- The details pane is located on the bottom right of the window. It consists of an Attributes tab and an Alarms tab. The Attributes tab lists the attribute name and corresponding value of the group, module, or resource selected in the tree pane. The Alarms tab lists the alarms for the resource selected in the tree pane.

The tree pane and view pane work together to demonstrate the relationship between the physical location of a group, module, or resource, and its position in the hierarchy of the NonStop S-series server.

## ViewPoint

Use ViewPoint to display event messages about current or past events occurring anywhere in the network on a set of block-mode events screens. The messages can be errors, failures, warnings, and requests for operator actions. The events screens allow operators to monitor significant occurrences or problems in the network as they occur. Critical events or events requiring immediate action are highlighted.

## ViewSys

ViewSys is a system resource monitor that displays processor performance statistics and resource consumption for a set polling period. It updates the numbers automatically at the end of each polling period, which allows you to evaluate the effects of changes as those changes are made. ViewSys indicates the current allocation of a

given resource and the percentage of that resource used. Thus, possible resource contention problems can be detected before they become serious.

Viewing the resource allocations across processors on a running system allows you to balance the application load more evenly. It can help you decide when to move user processes to processors and disk files that are less busy or when to relocate partitions to disk volumes that are less busy.

## Windows Event Viewer

Use the Windows Event Viewer for monitoring events from the TSM client software and the Windows environment. See the Windows online help. The Windows Event Viewer is not used with the OSM client software.

# C Related Reading

For more information about tools and utilities used for system operations, refer to the documentation listed in [Table C-1](#).

**Table C-1. Related Reading for Tools and Utilities** (page 1 of 6)

| Tool                               | Documentation                                                                                            | Description                                                                                                                                                                                                                                                                                                                                                                                                                         |
|------------------------------------|----------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| BACKCOPY<br>BACKUP<br>DCOM<br>DSAP | <i>Guardian Disk and Tape Utilities Reference Manual</i>                                                 | This manual describes these disk and tape utilities: BACKCOPY, BACKUP, DCOM, DSAP, RESTORE, and TAPECOM. This manual supports both G-series and D-series RVUs; TAPECOM is not supported for G-series RVUs.                                                                                                                                                                                                                          |
| EMSA                               | <i>EMS Analyzer User's Guide and Reference Manual</i>                                                    | This manual describes how to specify parameters, such as subsystem ID, event number, text, start time and stop time, through the EMS conversational interface. The EMS Analyzer selects events from EMS log files.                                                                                                                                                                                                                  |
| EMSDIST                            | <i>Guardian User's Guide</i>                                                                             | This guide describes how to use EMSDIST to display operator messages with a printing distributor, direct messages to a disk file, and print messages.                                                                                                                                                                                                                                                                               |
| File Utility Program (FUP)         | <i>File Utility Program (FUP) Reference Manual</i><br><i>Guardian User's Guide</i>                       | This manual describes the command syntax and error messages for the File Utility Program (FUP).<br><br>This guide describes using FUP for basic and advanced file management.                                                                                                                                                                                                                                                       |
| Measure                            | <i>Measure User's Guide</i><br><i>Measure Reference Manual</i>                                           | This manual describes how to use the Measure performance monitor to collect and examine system performance data.<br><br>This manual describes the commands, callable procedures, and error messages of the Measure performance monitor.                                                                                                                                                                                             |
| MEDIACOM                           | <i>DSM/Tape Catalog User's Guide</i><br><br><i>DSM/Tape Catalog Operator Interface (MEDIACOM) Manual</i> | This guide describes the Distributed Systems Management/Tape Catalog (DSM/TC) software product, which allows users to organize, manage, and track tape volumes. It describes the components of DSM/TC and provides instructions and examples of how to configure, run, and maintain the DSM/TC system.<br><br>This manual explains how to run a MEDIACOM session and describes the purpose and the syntax of the MEDIACOM commands. |

**Table C-1. Related Reading for Tools and Utilities** (page 2 of 6)

| <b>Tool</b>                      | <b>Documentation</b>                                                                     | <b>Description</b>                                                                                                                                                                                                                                                                                   |
|----------------------------------|------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MEDIACOM<br>(continued)          | <i>Guardian User's Guide</i>                                                             | This guide contains information explaining how to perform routine operations relating to the tapes and tape drives on your system. The guide explains the MEDIACOM utility and provides examples for using it.                                                                                       |
| NSKCOM                           | <i>Kernel-Managed Swap Facility (KMSF) Manual</i>                                        | This manual describes the operation of and command syntax for NSKCOM, the command interface to KMSF.                                                                                                                                                                                                 |
| Object Monitoring Facility (OMF) | <i>Object Monitoring Facility (OMF) Manual</i>                                           | This manual describes using the Object Monitoring Facility (OMF), which supervises objects such as processors, disks, files, and processes within the system environment, and monitors objects for peripherals or subsystems, according to the object configuration stored in and maintained by OMF. |
| OSM package                      | <i>OSM User's Guide</i><br>(also available as online help within OSM Service Connection) | <p>This guide includes:</p> <ul style="list-style-type: none"> <li>● An overview of all OSM applications and components</li> <li>● How to use the OSM Service Connection (the primary OSM interface) to monitor and perform actions on system and cluster resources</li> </ul>                       |

**Table C-1. Related Reading for Tools and Utilities** (page 3 of 6)

| Tool                       | Documentation                                                                                             | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|----------------------------|-----------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| OSM package<br>(continued) | <p><i>OSM Migration Guide</i></p> <p><i>NonStop System Console Installer Guide</i></p> <p>Online help</p> | <p>This guide includes:</p> <ul style="list-style-type: none"> <li>● Comparison of OSM and TSM software</li> <li>● Hardware for which OSM is required</li> <li>● System console hardware and software requirements for using OSM</li> <li>● Coexistence and fallback issues</li> <li>● How to migrate an existing TSM system list for OSM use</li> <li>● How to configure and start OSM server-side processes</li> </ul> <p>This guide describes how to install OSM client-based components and other required system console software.</p> <p>Online help is also available from within each of these OSM applications:</p> <ul style="list-style-type: none"> <li>● OSM Low-Level Link</li> <li>● OSM Notification Director</li> <li>● OSM Event Viewer</li> <li>● Individual OSM guided procedures</li> </ul> |
| PATHCOM                    | <i>TS/MP System Management Manual</i>                                                                     | This manual describes the interactive management interface to the NonStop TS/MP product. It is intended for system managers and operators. It provides guidelines for configuring and controlling a NonStop TS/MP transaction processing system and its objects and for monitoring the status and performance of objects controlled by PATHMON in a Pathway environment. It also provides syntax for all relevant PATHCOM commands, as well as cause, effect, and recovery information for all PATHMON, PATHCOM, and LINKMON error messages.                                                                                                                                                                                                                                                                     |
| PEEK                       | <i>PEEK Reference Manual</i>                                                                              | This manual describes PEEK, a utility used to monitor statistical data about processors.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

**Table C-1. Related Reading for Tools and Utilities** (page 4 of 6)

| <b>Tool</b>                            | <b>Documentation</b>                                     | <b>Description</b>                                                                                                                                                                                                                                                                                                                                                                               |
|----------------------------------------|----------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RESTORE                                | <i>Guardian Disk and Tape Utilities Reference Manual</i> | This manual describes these disk and tape utilities: BACKCOPY, BACKUP, DCOM, DSAP, RESTORE, and TAPECOM. This manual supports both G-series and D-series RVUs; TAPECOM is not supported for G-series RVUs.                                                                                                                                                                                       |
| SPOOLCOM                               | <i>Spooler Utilities Reference Manual</i>                | This manual describes the spooler utilities—Peruse, SPOOLCOM, Font, and RPSetup— and presents the complete syntax for these utilities. It also presents a general introduction to the Spooler subsystem.                                                                                                                                                                                         |
| SPOOLCOM<br>(continued)                | <i>Guardian User's Guide</i>                             | This guide contains information explaining how to perform routine spooler operations. It provides background information on spooler components and tells you how to use SPOOLCOM to monitor and manage your system's spooler operations. It includes guidelines for identifying and solving some common problems that can occur with your spooler subsystem and the printers associated with it. |
| Startup and shutdown command files     | <i>NonStop S-Series Planning and Configuration Guide</i> | This guide describes how to automate startup and shutdown procedures.                                                                                                                                                                                                                                                                                                                            |
| Subsystem Control Facility (SCF)       | <i>SCF Reference Manual for G-Series RVUs</i>            | This manual describes the operation of SCF on G-series RVUs and how it is used to configure, control, and monitor subsystems supported by an SCF interface.                                                                                                                                                                                                                                      |
| SCF interface to the Kernel subsystem  | <i>SCF Reference Manual for the Kernel Subsystem</i>     | This manual describes the Kernel subsystem, and the configuration and management tasks you can perform using the SCF interface to the Kernel subsystem.                                                                                                                                                                                                                                          |
| SCF interface to the storage subsystem | <i>SCF Reference Manual for the Storage Subsystem</i>    | This manual describes how to use SCF to configure, control, and monitor storage devices.                                                                                                                                                                                                                                                                                                         |
| SCF interface to the SLSA subsystem    | <i>LAN Configuration and Management Manual</i>           | This manual describes how to configure, operate, and manage the ServerNet LAN Systems Access (SLSA) subsystem. This manual includes detailed descriptions of the SCF commands used with the SLSA subsystem and a quick-reference section showing SCF command syntax.                                                                                                                             |

**Table C-1. Related Reading for Tools and Utilities** (page 5 of 6)

| <b>Tool</b>                        | <b>Documentation</b>                                     | <b>Description</b>                                                                                                                                                                                                                                                                                                                         |
|------------------------------------|----------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SCF interface to the WAN subsystem | <i>WAN Subsystem Configuration and Management Manual</i> | This manual describes how to configure a ServerNet wide area network (SWAN) concentrator on a NonStop S-series server. It also describes how to monitor, modify, and control the WAN subsystem. It includes detailed descriptions of the SCF commands used with the WAN subsystem.                                                         |
| SCF interface to other subsystems  | Titles vary                                              | These documents describe how to use the SCF interface to other subsystems.                                                                                                                                                                                                                                                                 |
| TACL                               | <i>TACL Reference Manual</i>                             | This manual provides information on using the TACL interface.                                                                                                                                                                                                                                                                              |
| TSM package                        | TSM Online User Guide                                    | This guide describes how to use TSM on a TSM workstation. The guide contains conceptual, procedural, and task-oriented information, and provides overview information for all the TSM client software applications.<br><br>Detailed task-oriented information is provided only for the TSM Service Application and the TSM Low-Level Link. |
| TSM EMS Event Viewer               | TSM Event Viewer online help                             | This online help describes using the TSM Event Viewer to monitor events from the operating system.                                                                                                                                                                                                                                         |
| TSM Low-Level Link                 | TSM Low-Level Link online help                           | This online help provides information about performing tasks with the TSM Low-Level Link.                                                                                                                                                                                                                                                  |
| TSM Notification Director          | TSM Notification Director online help                    | This online help describes using the TSM Notification Director for monitoring and authorizing incident report dial-outs.                                                                                                                                                                                                                   |
| TSM Service Application            | TSM Service Application online help                      | This online help provides information about performing tasks with the TSM Service Application.                                                                                                                                                                                                                                             |
| TMFCOM                             | <i>TMF Operations and Recovery Guide</i>                 | This manual describes how to operate TMF and recover from error conditions. It is intended for those responsible for TMF system maintenance.                                                                                                                                                                                               |
|                                    | <i>TMF Reference Manual</i>                              | This manual describes how to use the TMFCOM command interface to TMF. This manual includes command syntax, semantics, and examples, and is intended for system managers and operators.                                                                                                                                                     |

**Table C-1. Related Reading for Tools and Utilities** (page 6 of 6)

| <b>Tool</b>          | <b>Documentation</b>        | <b>Description</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|----------------------|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ViewPoint            | <i>ViewPoint Manual</i>     | <p>This manual describes ViewPoint, a multifunction operations console application that allows the management of a network of systems. The manual contains information on installing, configuring, and starting ViewPoint for custom applications. It also describes the concepts underlying ViewPoint operation.</p> <p>Although the <i>ViewPoint Manual</i> applies to both D-series RVUs and G-series RVUs, some information might apply only to D-series RVUs. For example, information about the Peripheral Utility Program (PUP) and the Operations and Service Processor (OSP) does not apply to G-series RVUs.</p> |
| ViewSys              | <i>ViewSys User's Guide</i> | This guide describes the operation of ViewSys and interpretation of the program output.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Windows Event Viewer | None                        | This tool monitors events from the TSM (but not OSM) client software.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |



# **D** Converting Numbers

[When to Use This Appendix](#) D-1

[Overview of Numbering Systems](#) D-2

[Binary to Decimal](#) D-3

[Octal to Decimal](#) D-4

[Hexadecimal to Decimal](#) D-5

[Decimal to Binary](#) D-7

[Decimal to Octal](#) D-8

[Decimal to Hexadecimal](#) D-9

## **When to Use This Appendix**

Refer to this appendix if you need to convert numbers from one numbering system to another.

# Overview of Numbering Systems

Internally, a computer stores data as a series of off and on values represented symbolically by the binary digits, or bits, 0 and 1, respectively. Because numbers represented as strings of binary 0s and 1s are difficult to read, binary numbers are generally converted into octal, decimal, or hexadecimal form. [Table D-1](#) describes the binary, octal, decimal, and hexadecimal number systems.

---

**Table D-1. Descriptions of Number Systems**

| <b>Number System</b> | <b>Base</b> | <b>Description</b>                                                                                                   |
|----------------------|-------------|----------------------------------------------------------------------------------------------------------------------|
| Binary               | 2           | Binary numbers are made up of the digits 0 and 1.                                                                    |
| Octal                | 8           | Octal numbers are made up of the digits 0, 1, 2, 3, 4, 5, 6, and 7.                                                  |
| Decimal              | 10          | Decimal numbers are made up of the digits 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9                                           |
| Hexadecimal          | 16          | Hexadecimal numbers are made up of the digits 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9 and the letters A, B, C, D, E, and F. |

---

In manuals for the NonStop server, a percent sign precedes a number that is not in decimal form:

- The % notation precedes an octal number.
- The %B notation precedes a binary number.
- The %H notation precedes a hexadecimal number. On some system displays, hexadecimal numbers are preceded by the notation 0X instead of %H.

# Binary to Decimal

To convert a binary number to a decimal number:

1. Starting from the right, multiply the least significant (rightmost) binary digit by the first placeholder value. Moving towards the left, multiply each new binary digit by its corresponding placeholder value until the binary number is exhausted.

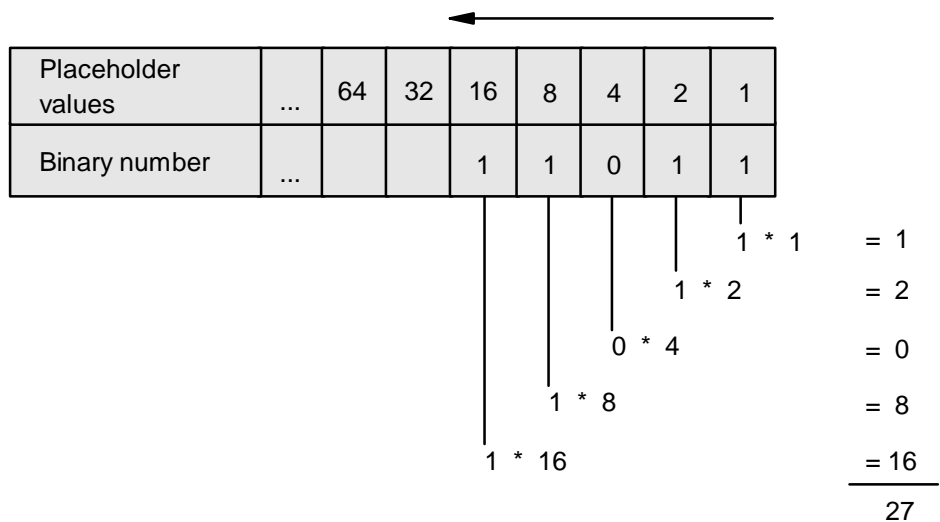
To establish placeholder values, the first placeholder value (on the far right) is 1. Then for each new placeholder value to the left, multiply the value to the right by 2.

2. Add the results of the multiplications in Step 1.

## Example

Convert the binary value 11011 to its decimal equivalent. (In this example, the symbol “\*” indicates multiplication.) Refer to [Figure D-1](#).

Figure D-1. Binary to Decimal Conversion



CDT 607:CDD

1. Take the rightmost binary digit and multiply it by the rightmost placeholder value.
2. Moving to the left, take the next binary digit and multiply it by the next placeholder value. Continue to do this until the binary number has been exhausted.
3. Add the multiplied values together. The result is:

| Binary Value | Decimal Value |
|--------------|---------------|
| %B11011      | 27            |

# Octal to Decimal

To convert an octal number to a decimal number:

- 1. Starting from the right, multiply the least significant (rightmost) octal digit by the first placeholder value. Moving towards the left, multiply each new octal digit by its corresponding placeholder value until the octal number is exhausted.

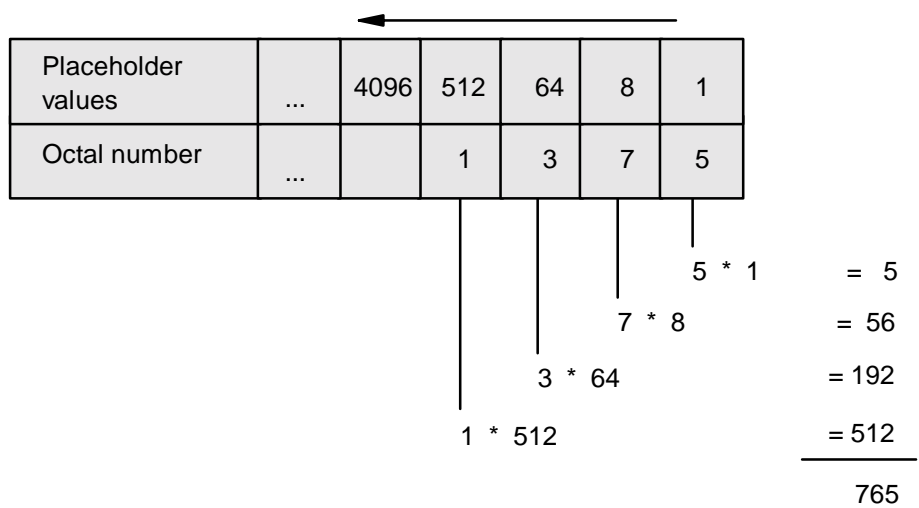
To establish placeholder values, the first placeholder value on the far right is 1. Then for each new placeholder value to the left, multiply the value to the right by 8.

- 2. Add the results of the multiplications in Step 1.

## Example

Convert the octal value 1375 to its decimal equivalent. (In this example, the symbol “\*” indicates multiplication.) Refer to [Figure D-2](#).

Figure D-2. Octal to Decimal Conversion



CDT 608CDD

- 1. Take the rightmost octal digit and multiply it by the rightmost placeholder value.
- 2. Moving to the left, take the next octal digit and multiply it by the next placeholder value. Continue to do this until the octal number has been exhausted.
- 3. Add the multiplied values together. The result is:

| Octal Value | Decimal Value |
|-------------|---------------|
| %1375       | 765           |

# Hexadecimal to Decimal

To convert a hexadecimal number to a decimal number:

1. Starting from the right, multiply the least significant (rightmost) hexadecimal digit by the first placeholder value. Moving towards the left, multiply each new hexadecimal digit by its corresponding placeholder value until the hexadecimal number is exhausted.

To establish placeholder values, the first placeholder value (on the far right) is 1. Then for each new placeholder value to the left, multiply the value to the right by 16.

Convert the letters of a hexadecimal number to decimal values before multiplying. Use this table for conversion:

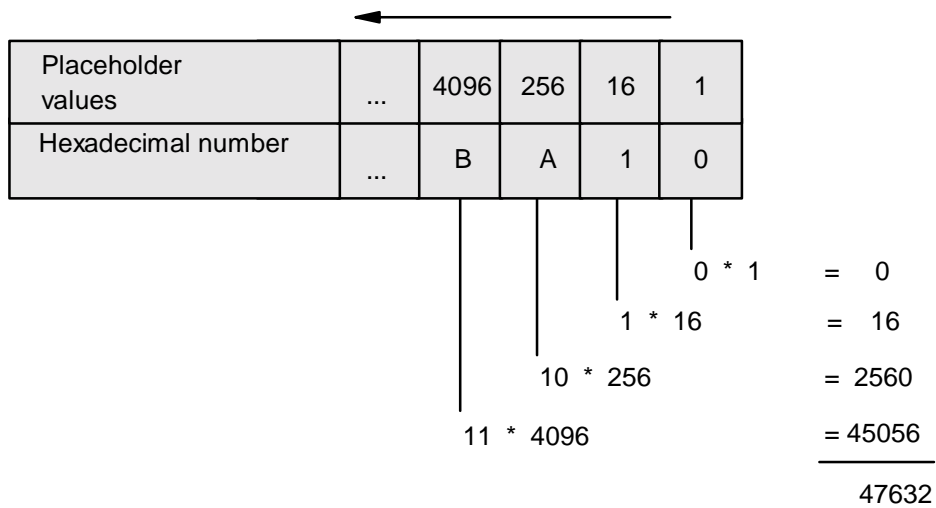
| Hexadecimal | Decimal |
|-------------|---------|
| A           | 10      |
| B           | 11      |
| C           | 12      |
| D           | 13      |
| E           | 14      |
| F           | 15      |

2. Add the results of the multiplications in Step 1.

## Example

Convert the hexadecimal value BA10 to its decimal equivalent. (In this example, the symbol “\*” indicates multiplication.) Refer to [Figure D-3](#).

Figure D-3. Hexadecimal to Decimal Conversion



CDT 609.CDD

1. Take the rightmost hexadecimal digit and multiply it by the rightmost placeholder value.
2. Moving to the left, take the next hexadecimal digit and multiply it by the next placeholder value. Continue to do this until the hexadecimal number has been exhausted. Convert the hexadecimal digits A and B to their decimal values 10 and 11 before multiplying.
3. Add the multiplied values together. The result is:

|                          |                      |
|--------------------------|----------------------|
| <b>Hexadecimal Value</b> | <b>Decimal Value</b> |
| %HBA10                   | 47632                |

# Decimal to Binary

To convert a decimal number to a binary number:

1. Divide the decimal number by 2. The remainder of this first division becomes the least significant (rightmost) digit of the binary value.
2. Divide the quotient from Step 1 by 2, and use the remainder of the next division as the next digit (to the left) of the binary value. Continue to divide the quotients by 2 until the decimal number is exhausted. The remainder from the last division is the most significant (leftmost) digit of the binary value.

## Example

Convert the decimal value 354 to its binary equivalent. (In this example, the symbol “/” indicates division.)

| Step | Division | Quotient | Remainder |                                                 |
|------|----------|----------|-----------|-------------------------------------------------|
| 1.   | 354/2    | = 177    | 0         | remainder = least significant (rightmost) digit |
| 2.   | 177/2    | = 88     | 1         |                                                 |
| 3.   | 88/2     | = 44     | 0         |                                                 |
| 4.   | 44/2     | = 22     | 0         |                                                 |
| 5.   | 22/2     | = 11     | 0         |                                                 |
| 6.   | 11/2     | = 5      | 1         |                                                 |
| 7.   | 5/2      | = 2      | 1         |                                                 |
| 8.   | 2/2      | = 1      | 0         |                                                 |
| 9.   | 1/2      | = 0      | 1         | remainder = most significant (leftmost) digit   |

The result is:

| Decimal Value | Binary Value |
|---------------|--------------|
| 354           | %B101100010  |

# Decimal to Octal

To convert a decimal number to an octal number:

1. Divide the decimal number by 8. The remainder of this first division becomes the least significant (rightmost) digit of the octal value.
2. Divide the quotient from Step 1 by 8, and use the remainder of the next division as the next digit (to the left) of the octal value. Continue to divide the quotients by 8 until the decimal number is exhausted. The remainder from the last division is the most significant (leftmost) digit of the octal value.

## Example

Convert the decimal value 358 to its octal equivalent. (In this example, the symbol “/” indicates division.)

| Step | Division | Quotient | Remainder |                                                 |
|------|----------|----------|-----------|-------------------------------------------------|
| 1.   | 358/8    | = 44     | 6         | remainder = least significant (rightmost) digit |
| 2.   | 44/8     | = 5      | 4         |                                                 |
| 3.   | 5/8      | = 0      | 5         | remainder = most significant (leftmost) digit   |

The result is:

| Decimal Value | Octal Value |
|---------------|-------------|
| 358           | %546        |



# Decimal to Hexadecimal

To convert a decimal number to a hexadecimal number:

1. Divide the decimal number by 16. The remainder of this first division becomes the least significant (rightmost) digit of the hexadecimal value. If the remainder exceeds 9, convert the 2-digit remainder to its hexadecimal letter equivalent. Use this table for conversion.

| Decimal | Hexadecimal |
|---------|-------------|
| 10      | A           |
| 11      | B           |
| 12      | C           |
| 13      | D           |
| 14      | E           |
| 15      | F           |

2. Divide the quotient from Step 1 by 16, and use the remainder of this next division as the next digit (to the left) of the hexadecimal value (converting 2-digit remainders as necessary). Continue to divide the quotients by 16 until the decimal number is exhausted. The remainder from the last division is the most significant (leftmost) digit of the hexadecimal value.

## Example

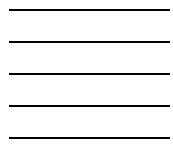
Convert the decimal value 47632 to its hexadecimal equivalent. (In this example, the symbol “/” indicates division.)

| Step | Division | Quotient | Remainder |                                                 |
|------|----------|----------|-----------|-------------------------------------------------|
| 1.   | 47632/16 | = 2977   | 0         | remainder = least significant (rightmost) digit |
| 2.   | 2977/16  | = 186    | 1         |                                                 |
| 3.   | 186/16   | = 11     | 10 = A    | remainder = most significant (leftmost) digit   |
| 4.   | 11/16    | = 0      | 11 = B    |                                                 |

The result is:

| Decimal Value | Hexadecimal Value |
|---------------|-------------------|
| 47632         | %HBA10            |





# Safety and Compliance

## Regulatory Compliance Statements

The following warning and regulatory compliance statements apply to the products documented by this manual.

### FCC Compliance

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio-frequency energy and, if not installed and used in accordance with the instruction manual, may cause interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Any changes or modifications not expressly approved by Hewlett Packard Computer Corporation could void the user's authority to operate this equipment.

### CISPR Compliance

This equipment complies with the requirements of CISPR 22 (EN 55 022) for Class A Information Technology Equipment (ITE). In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

### Canadian Compliance

This class A digital apparatus meets all the requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

## Korea MIC Compliance

### A급 기기 (업무용 정보통신기기)

이 기기는 업무용으로 전자파적합등록을 한 기기이오니 판매자 또는 사용자는 이 점을 주의하시기 바라며, 만약 잘못판매 또는 구입하였을 때에는 가정용으로 교환하시기 바랍니다.

## Taiwan (BSMI) Compliance

### 警告使用者:

這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策。

## Japan (VCCI) Compliance

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づくクラスA情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

This is a Class A product based on the standard of the Voluntary Control Council for Interference by Information Technology Equipment (VCCI). If this equipment is used in a domestic environment, radio disturbance may occur, in which case the user may be required to take corrective actions.



# DECLARATION OF CONFORMITY

Supplier Name: **HP COMPUTER CORPORATION**

Supplier Address: **HP Computer Corporation,  
NonStop Enterprise Division  
10333 Vallco Parkway  
Cupertino, CA 95014  
USA**

***Represented in the EU By:***  
**Hewlett Packard EMEA GmbH**  
P.O. Box 81 02 44  
81902 Munich  
Germany

Declares under our sole responsibility that the following product

Product Name: **NonStop S-series server**  
Regulatory Model: **CPTOF-0301**  
Product Model No: **S88000, S86000, S76000, S7600, S74000, S7400, S78000, S7800**

Conforms to the following normative European and International Standards.

|                                       |                                                                                        |                                                                                                                           |
|---------------------------------------|----------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| <b>Product Safety:</b>                | <b>EN60950:2003</b>                                                                    | <b>(IEC 60950-1 1st Edition)</b>                                                                                          |
| <b>Electromagnetic Compatibility:</b> | <b>EN 55022:1998<br/>EN 61000-3-2:2000<br/>EN 61000-3-3 +A1:2001<br/>EN 55024:1998</b> | <b>Radiated and Conducted Emission<br/>Harmonic Current Emission<br/>Voltage Fluctuation and Flicker<br/>EMC Immunity</b> |

Following the provisions of the normative European Council Directives:

**EMC Directive 89/336/EEC (including amendments)**  
**Low Voltage Directive 73/23/EEC (amended by 93/68/EEC)**

Supplementary Information:

**Safety:** **Protection Class I, Pollution Degree II**  
**Emissions:** **EMC Class A**  
**Year Assessed/First Production:** **2004**

Product conformance to cited product specifications is based on sample (type) testing, evaluation, or assessment at Hewlett Packard's compliance laboratories in Cupertino, California or at accredited laboratories accepted by European Union Notified and Competent Bodies.

**Charles Denning**  
**Manager, Hardware Product Assurance**  
**NonStop Enterprise Division**  
**Cupertino, California**

# Consumer Safety Statements

## Customer Installation and Servicing of Equipment

The following statements pertain to safety issues regarding customer installation and servicing of equipment described in this manual.

- Keep door closed for normal operation.
- Batteries must be disposed of in compliance with local ordinances.

---

△ **Caution.** After unplugging the fan's power cable from the PMCU, wait for the fan to stop spinning before performing the next servicing step.

---

---

△ **Caution.** Be careful not to drop the mounting screws into the fan unit.

---

---

▲ **WARNING.** Do not plug in the fan's power cable until after you have mounted the fan. The fan blades begin to rotate as soon as the fan's power cable is plugged into the PMCU.

---

---

▲ **WARNING.** Do not touch the DC power connector on the S7x00/Sxx000 PMF CRU after you have unplugged the DC power cable from the CRU. It is possible to incur a severe energy hazard for as long as fifteen (15) seconds after unplugging the cable. You can make sure the CRU is safe to remove by testing (by using a volt meter) before touching the pins on the DC power connector.

---

## Applicability of Procedures, Instructions, and Examples

---

▲ **WARNING.** The procedures and instructions and the examples of procedures and instructions found in this manual apply only to the system enclosures and components found in NonStop S-series servers which are described in the NonStop S-series server documentation. Do not attempt to use these instructions with any other NonStop system equipment. You can determine that your system is a NonStop S-series server by reading the label that appears inside each system enclosure on the CRU in slot 50 or 55. The label includes the product number 195x, 196x, or 197x. Read the label before proceeding with any procedure or instruction found in this manual.

---

# Consignes de sécurité à l'intention du client

## Installation et entretien du système par le client

Les consignes de sécurité qui suivent concernent l'installation et l'entretien par le client du système décrit dans le présent manuel.

- Garder la porte fermée pendant le fonctionnement normal du système.
- Jeter les piles usagées conformément au règlement local en vigueur.

---

△ **Attention.** Après avoir débranché le cordon d'alimentation du ventilateur de l'unité PMCU, attendre l'arrêt complet de l'hélice avant de passer à l'étape suivante.

---

---

△ **Attention.** Prendre soin de ne pas laisser tomber les vis de fixation dans le ventilateur.

---

---

▲ **MISE EN GARDE.** Attendre d'avoir remonté le ventilateur avant d'en rebrancher le cordon d'alimentation. En effet, l'hélice du ventilateur se met à tourner dès que l'on relie le ventilateur à l'unité PMCU.

---

---

▲ **MISE EN GARDE.** Ne pas toucher au connecteur d'alimentation C.C. de l'unité PMF remplaçable par le client du S7x00/Sxx000 après avoir débranché le cordon d'alimentation C.C. de cette unité. Des risques de chocs électriques dangereux peuvent subsister pendant quinze (15) secondes après le débranchement du câble. Lors de la dépose de l'unité, on pourra confirmer l'absence de danger avec un voltmètre avant de toucher les broches du connecteur d'alimentation C.C.

---

## Applicabilité des procédures, des directives et des exemples

---

▲ **MISE EN GARDE.** Les procédures et directives ainsi que les exemples y afférents contenus dans le présent manuel concernent uniquement les boîtiers et pièces des serveurs NonStop série S décrits dans la documentation connexe. Elles ne sont applicables à aucun autre système NonStop. Pour savoir si votre serveur est un NonStop de la série S, consultez l'étiquette figurant à l'intérieur du boîtier du système sur l'unité remplaçable par le client installée dans l'emplacement 50 ou 55. Cette étiquette indique le nombre de produit, 195x, 196x, ou 197x. Consultez cette étiquette avant d'exécuter l'une quelconque des procédures ou directives prescrites dans le présent manuel.

---

# Verbraucher-Sicherheitsangaben

## Geräteinstallation und -wartung durch den Kunden

Die folgenden Angaben betreffen Sicherheitsfragen in Hinsicht auf die Geräteinstallation und -wartung durch den Kunden, wie sie in diesem Handbuch beschrieben werden.

- Tür für normalen Betrieb geschlossen lassen.
- Batterien müssen in Übereinstimmung mit örtlichen Vorschriften beseitigt werden.

---

△ **Vorsicht.** Nach dem Trennen des Gebläse-Stromversorgungskabels von der PMCU, vor dem Durchführen des nächsten Wartungsschritts auf das Ende der Drehbewegung des Gebläses warten.

---

---

△ **Vorsicht.** Achten Sie bitte darauf, daß die Befestigungsschrauben nicht in die Gebläseeinheit fallen.

---

---

▲ **WARNUNG.** Stecken Sie das Gebläse-Stromversorgungskabel erst nach dem Befestigen des Gebläses ein. Die Gebläseflügel beginnen sich zu drehen, sobald das Gebläse-Stromversorgungskabel in die PMCU eingesteckt wird.

---

---

▲ **WARNUNG.** Den Gleichstrom-Steckverbinder an der vom Kunden austauschbaren PMF-Einheit des S7x00/Sxx000 nicht berühren, nachdem das Gleichstromkabel von der vom Kunden austauschbaren Einheit abgezogen wurde. Bis zu fünfzehn (15) Sekunden nach Abziehen des Kabels besteht starke Elektroschockgefahr. Durch Prüfen (mit einem Spannungsmesser) läßt sich vor Berührung der Stifte am Gleichstrom-Steckverbinder feststellen, ob die vom Kunden austauschbare Einheit gefahrlos entfernt werden kann.

---

## Anwendbarkeit von Verfahren, Anleitungen und Beispielen

---

▲ **WARNUNG.** Die in diesem Handbuch enthaltenen Verfahren und Anleitungen und die Beispiele von Verfahren und Anleitungen gelten nur für die in den NonStop S-Serie-Servern vorgefundenen Systemgehäuse und Komponenten, die in der Dokumentation der NonStop S-Serie-Server beschrieben werden. Versuchen Sie nicht, diese Anleitungen mit anderen NonStop-System-Geräten zu benutzen. Sie können feststellen, daß Ihr System ein NonStop S-Serie-Server ist, indem Sie den Aufkleber lesen, der sich im Innern eines jeden Systemgehäuses befindet in der vom Kunden austauschbaren Einheit in Steckplatz 50 oder 55. Der Aufkleber soll die Produktnummer 195x, 196x, oder 197x angeben. Lesen Sie den Aufkleber, bevor Sie mit irgendeiner der in diesem Handbuch enthaltenen Verfahren oder Anleitungen fortfahren.

---



# Declaraciones sobre la seguridad del consumidor

## Instalación y servicio al equipo por el consumidor

Las siguientes declaraciones tienen que ver con aspectos de seguridad relacionados con la instalación y servicio al equipo por el consumidor, y que se describen en este manual.

- Mantenga la puerta cerrada durante la operación normal del equipo.
- Las baterías (pilas) deben desecharse cumpliendo con los reglamentos locales.

---

△ **Precaución.** Después de desconectar el cable de alimentación del ventilador del PMCU, espere a que el ventilador deje de girar antes de realizar el siguiente paso de servicio.

---

---

△ **Precaución.** Tenga cuidado y no deje caer los tornillos de montaje dentro de la unidad del ventilador.

---

---

▲ **ADVERTENCIA.** No enchufe el cable de alimentación del ventilador sino hasta después de haber montado el ventilador. Las aspas del ventilador comienzan a girar tan pronto como se enchufe el cable de alimentación del ventilador en el PMCU.

---

---

▲ **ADVERTENCIA.** No toque el conector de alimentación de corriente directa en la unidad reemplazable por el cliente S7x00/Sxx000 PMF después de haber desenchufado el cable de alimentación de corriente directa de dicha unidad. Es posible incurrir en un peligro grave debido a la energía eléctrica hasta por unos quince (15) segundos después de haber desenchufado el cable. Usted puede asegurarse de que la unidad reemplazable por el cliente ya se pueda quitar sin problema alguno probándola (con un voltímetro) antes de tocar las clavijas del conector de alimentación de corriente directa.

---

# Forbrugersikkerhedsmeddelelser

## Installation og service af udstyr der udføres af kunden

De følgende meddelelser vedrører sikkerheden angående installation og service af udstyr, der udføres af kunden, som beskrives i denne brugerhåndbog.

- Hold lugen lukket under normal drift.
- Batterierne skal kasseres i overensstemmelse med lokale vedtægter.

---

△ **Forsigtig!** Når du har afbrudt ventilatorens netkabel fra PMCU'en, skal du vente til ventilatoren standser helt, før du udfører det næste servicetrin.

---

---

△ **Forsigtig!** Pas på, at du ikke taber monteringskruerne ned i ventilatoren.

---

---

▲ **ADVARSEL!** Tilslut ikke ventilatorens netkabel indtil efter, at du har monteret ventilatoren. Ventilatorvingerne begynder at dreje, så snart ventilatorens netkabel tilsluttes PMCU'en.

---

---

▲ **ADVARSEL!** Berør ikke jævnstrøms forbindelsesstikket på S7x00/Sxx000 PMF-enheden, der kan udskiftes af kunden, når du har afbrudt jævnstrøms netkablet fra enheden, der kan udskiftes af kunden. Der er risiko for alvorligt stød i op til 15 sekunder efter, at kablet afbrydes. Du kan sikre dig, at det er sikkert at fjerne enheden, der kan udskiftes af kunden, ved at teste den (med et voltmeter), før du berører stifterne på jævnstrøms forbindelsesstikket.

---

# Veiligheidsinstructies voor de consument

## Installatie en onderhoud van apparatuur door de klant

De volgende veiligheidsinstructies betreffen de installatie en het onderhoud door de klant van de in deze handleiding beschreven apparatuur.

- Houd bij normaal bedrijf de deur gesloten.
- Batterijen moeten overeenkomstig de plaatselijke voorschriften worden weggegooid.

---

△ **Opgelet.** Nadat de stroomkabel van de ventilator van de PMCU is losgekoppeld, moet u wachten tot de ventilator stilstaat voordat u de volgende onderhoudsstap uitvoert.

---

---

△ **Opgelet.** Pas op dat u de montageschroeven niet in de ventilator laat vallen.

---

---

▲ **WAARSCHUWING.** Sluit de stroomkabel van de ventilator pas aan nadat u de ventilator gemonteerd hebt. De ventilatorbladen beginnen te draaien zodra de stroomkabel van de ventilator op de PMCU wordt aangesloten.

---

---

▲ **WAARSCHUWING.** Raak de gelijkstroomconnector op het S7x00/Sxx000 PMF apparaat dat door de klant kan worden vervangen, niet aan nadat de gelijkstroomkabel is losgekoppeld van het door de klant vervangbare apparaat. Een ernstig energierisico kan nog wel vijftien (15) seconden nadat de kabel is losgekoppeld, aanwezig zijn. Controleer of het door de klant vervangbare apparaat veilig kan worden verwijderd door (met een spanningsmeter) een test uit te voeren voordat u de pennen op de gelijkstroomconnector aanraakt.

---

# Käyttöturvaa koskevia huomautuksia

## Asiakkaan suorittama laiteasennus ja huolto

Seuraavat huomautukset koskevat turvallisuuskohdista, jotka asiakkaan täytyy ottaa huomioon tässä käsikirjassa kuvattuja laiteasennuksia ja huoltotoimenpiteitä suoritettaessa.

- Kansi täytyy pitää suljettuna normaalin käytön aikana.
- Paristot täytyy hävittää paikallisten säädösten mukaisesti.

---

△ **Varoitus.** Kytettyäsi tuulettimen virtajohtoa irti PMCU:sta odota, että tuuletin lakkaa pyörimästä, ennen kuin suoritat seuraavan huoltovaiheen.

---

---

△ **Varoitus.** Varo pudottamasta kiinnitysruuveja tuulettimeen.

---

---

▲ **VAARA.** Älä yhdistä tuulettimen virtajohtoa ennen kuin olet asentanut tuulettimen paikoilleen. Tuulettimen siivet alkavat pyöriä heti, kun tuulettimen virtajohto on yhdistetty PMCU:hun.

---

---

▲ **VAARA.** Älä kosketa S7x00/Sxx000 PMF vaihto-osan virtaliitintä heti sen jälkeen kun olet irrottanut vaihto-osan tasavirtakaapelin. Vaarallista jännitettä voi olla jäljellä vielä viidentoista (15) sekunnin kuluttua kaapelin irrottamisesta. Jännitemittarilla on mahdollista testata, onko vaihto-osan tasavirtaliittimen pistokkeiden koskettaminen turvallista.

---

# Veiligheidsinstructies voor de consument

## Installatie en onderhoud van apparatuur door de klant

De volgende veiligheidsinstructies betreffen de installatie en het onderhoud door de klant van de in deze handleiding beschreven apparatuur.

- Houd bij normaal bedrijf de deur gesloten.
- Batterijen moeten overeenkomstig de plaatselijke voorschriften worden weggegooid.

---

△ **Opgelet.** Nadat de stroomkabel van de ventilator van de PMCU is losgekoppeld, moet u wachten tot de ventilator stilstaat voordat u de volgende onderhoudsstap uitvoert.

---

---

△ **Opgelet.** Pas op dat u de montageschroeven niet in de ventilator laat vallen.

---

---

▲ **WAARSCHUWING.** Sluit de stroomkabel van de ventilator pas aan nadat u de ventilator gemonteerd hebt. De ventilatorbladen beginnen te draaien zodra de stroomkabel van de ventilator op de PMCU wordt aangesloten.

---

---

▲ **WAARSCHUWING.** Raak de gelijkstroomconnector op het S7x00/Sxx000 PMF apparaat dat door de klant kan worden vervangen, niet aan nadat de gelijkstroomkabel is losgekoppeld van het door de klant vervangbare apparaat. Een ernstig energierisico kan nog wel vijftien (15) seconden nadat de kabel is losgekoppeld, aanwezig zijn. Controleer of het door de klant vervangbare apparaat veilig kan worden verwijderd door (met een spanningsmeter) een test uit te voeren voordat u de pennen op de gelijkstroomconnector aanraakt.

---

# Misure precauzionali per i clienti

## Installazione e manutenzione del sistema da parte del cliente

Le seguenti misure precauzionali riguardano l'installazione e la manutenzione da parte del cliente del sistema descritto nel presente manuale.

- Mantenere la porta chiusa durante il funzionamento normale del sistema.
- Lo smaltimento delle batterie usate deve essere effettuato secondo la normativa locale.

---

△ **Avvertenza.** Dopo aver scollegato il cavo di alimentazione del ventilatore dall'unità PMCU, attendere che il ventilatore smetta di girare prima di procedere con la manutenzione.

---

---

△ **Avvertenza.** Fare attenzione a non lasciar cadere le viti di montaggio nell'unità del ventilatore.

---

---

▲ **ATTENZIONE.** Inserire il cavo di alimentazione del ventilatore solamente dopo aver montato il ventilatore stesso. Le pale del ventilatore iniziano a ruotare non appena il cavo di alimentazione del ventilatore viene inserito nell'unità PMCU.

---

---

▲ **ATTENZIONE.** Non toccare il connettore di corrente continua sull'unità sostituibile dal cliente S7x00/Sxx000 PMF dopo aver disinserito il cavo di corrente continua dall'unità stessa. Un serio rischio elettrico può perdurare fino a 15 secondi dopo aver disinserito il cavo. È possibile controllare con un voltmetro che l'unità sostituibile dal cliente possa essere rimossa con sicurezza prima di toccare i piedini del connettore di corrente continua.

---

# Informações de segurança para os consumidores

## Instalação e manutenção do equipamento pelo cliente

As seguintes informações se referem a questões de segurança relacionadas à instalação e manutenção, pelo cliente, do equipamento descrito neste manual.

- Para garantir o funcionamento normal, mantenha a porta fechada.
- As pilhas usadas devem ser descartadas de acordo com as leis locais.

---

△ **Cuidado.** Após desligar o cabo de alimentação do ventilador do PMCU, espere o ventilador parar antes de prosseguir para a etapa seguinte da manutenção.

---

---

△ **Cuidado.** Tenha cuidado para não deixar que os parafusos de montagem caiam dentro do ventilador.

---

---

▲ **AVISO.** Só ligue o cabo de alimentação do ventilador após ter montado o ventilador. As lâminas do ventilador começam a girar logo que o cabo de alimentação do ventilador é ligado ao PMCU.

---

---

▲ **AVISO.** Não toque no conector de alimentação DC da Unidade Substituível pelo Cliente (USC) S7x00/Sxx000 PMF logo após ter desligado o cabo de alimentação DC da USC. Existe a possibilidade de ocorrer um acidente elétrico sério até quinze (15) segundos após o desligamento do cabo. Assegure-se de que é seguro remover a USC testando-a (ou usando um medidor de voltagem), antes de tocar nos pinos do conector de alimentação DC.

---

# Informações de segurança para os consumidores

## Instalação e manutenção do equipamento pelo cliente

As seguintes informações referem-se a questões de segurança relacionadas à instalação e manutenção, pelo cliente, do equipamento descrito neste manual.

- Para garantir o funcionamento normal, mantenha a porta fechada.
- As pilhas usadas devem ser descartadas de acordo com as leis locais.

---

△ **Cuidado.** Após desligar o cabo de alimentação do ventilador do PMCU, espere que o ventilador páre antes de prosseguir para a etapa seguinte da manutenção.

---

---

△ **Cuidado.** Tenha cuidado para não deixar que os parafusos de montagem caiam dentro do ventilador.

---

---

▲ **AVISO.** Ligue o cabo de alimentação do ventilador só depois ter montado o mesmo. As lâminas do ventilador começam a girar logo que o cabo de alimentação do ventilador é ligado ao PMCU.

---

---

▲ **AVISO.** Não toque no conector de alimentação DC da Unidade Substituível pelo Cliente (USC) S7x00/Sxx000 PMF logo após ter desligado o cabo de alimentação DC da USC. Existe a possibilidade de ocorrer um acidente eléctrico sério até quinze (15) segundos após o desligamento do cabo. Assegure-se de que é seguro remover a USC testando-a (ou usando um medidor de voltagem), antes de tocar nos pinos do conector de alimentação DC.

---



# Meddelanden beträffande konsumentsäkerhet

## Kundutförd installation och service

De följande meddelandena beskriver säkerhetsföreskrifter för kundutförd installation och service av utrustning som beskrivs i denna manual:

- Dörren skall vara stängd under normal drift.
- Batterier måste kasseras i enlighet med lokala förordningar.

---

△ **Observera!** När du kopplat ur nätsladden till fläkten från PMCU-enheten måste du vänta tills fläktbladen har stannat innan du utför nästa servicemoment.

---

---

△ **Observera!** Se till att du inte tappar monteringskruvarna in i fläkten.

---

---

▲ **WARNING!** Fläktbladen börjar snurra så snart fläktens nätsladd ansluts till PMCU-enheten. Du ansluter nätsladden till fläkten efter det att du har monterat fläkten.

---

---

▲ **WARNING!** Likströmskontakten som är placerad på S7x00/Sxx000 PMF-enheten är strömförande upp till femton (15) sekunder efter att elkablen till enheten har blivit urkopplad. Du skyddar dig från strömstötar genom att testa om likströmskontakten fortfarande är strömförande (med hjälp av en voltmätare).

---

### 機器のカスタマー・インストレーションおよび保守

次の記述は、このマニュアルに述べられた機器のカスタマー・インストレーションおよび保守に関する安全性の問題に適合するものです。

通常のオペレーションではドアを閉める。

バッテリーは定められた法規に適合するものであること。

注：PMCU からファンの電源ケーブルを抜いた後は、ファンの回転が止まるまで待ってから、次の保守ステップに進むこと。

注：ファン・ユニットの中に装填スクリューを落とさないように注意する。

警告：ファンを装填するまでは、ファンの電源ケーブルを差し込まないこと。ファンの羽根は、PMCU にファンの電源ケーブルを差し込むと、直ちに回転を始めるため。

警告：CRU から DC 電源ケーブルを抜いた後で、<sup>S7400/</sup><sub>S7x000</sub> の PMF CRU 上の DC 電源コネクタに触らないこと。ケーブルを抜いてから 15 秒間は、大きなエネルギー事故を引き起こす危険性があるため。CRU を安全に取り外すには、DC 電源コネクタのピンに触る前に（ボルト・メーターを使って）テストする。

# 用户安全使用说明

## 用户安装及使用

下列内容是手册中有关用户安装使用时的安全注意事项：

- 正常运行时请将门保持关闭。
- 设备电源线应与插座靠近，客户应容易接近插座。

---

△ 小心。从电源监控装置 (PMCU) 上拔下风扇电源插头进行下一步骤之前，应等待风扇完全停止转动。

---

---

△ 小心。不要把安装螺钉掉进风扇。

---

---

▲ 警惕。在风扇安装好之前，不要接通电源。电扇电源线一插上电源监控装置 (PMCU)，电扇叶片马上开始转动。

---

---

▲ 警惕。从用户替换电源 (CRU) 上拔下直流电源线之后，不要在 S7400/S7x000 PMF 用户替换电源 (CRU) 上触摸直流电源接线板。在拔下电源后的十五秒内，仍有可能造成严重的电力事故。在触摸直流电源接线板上的插头之前，请用电压表确认用户替换电源 (CRU) 已安全切断。

---

# Οδηγίες ασφαλείας του καταναλωτή

## Εγκατάσταση και συντήρηση του εξοπλισμού από τον πελάτη

Οι παρακάτω οδηγίες αφορούν την ασφάλεια του πελάτη σχετικά με την εγκατάσταση και συντήρηση του εξοπλισμού του από τον ίδιο όπως αναφέρεται στα εγχειρίδια.

- Η πόρτα πρέπει να είναι κλειστή για την κανονική λειτουργία του.
- Οι μπαταρίες πρέπει να αχρηστεύονται σύμφωνα με τους τοπικούς κανονισμούς.

⚠ **Προσοχή.** Αφότου αποσυνδέσετε το καλώδιο ρεύματος του ανεμιστήρα από τη Μονάδα Ελέγχου και Ενδεικτικό Τροφοδοσίας (PMCU), περιμένετε να σταματήσει να κυρίζει ο ανεμιστήρας πριν συνεχίσετε την συντήρηση.

⚠ **Προσοχή.** Προσεχετε να μην σας πέσουν οι βίδες στήριξης μέσα στη μονάδα του ανεμιστήρα.

▲ **ΠΡΟΣΟΧΗ.** Μην τροφοδοτείτε με ρεύμα τον ανεμιστήρα πριν τον εγκαταστήσετε. Τα πτερύγια του θα αρχίσουν να περιστρέφονται μόλις συνδέσετε το καλώδιο τροφοδοσίας του ανεμιστήρα στη Μονάδα Ελέγχου και Ενδεικτικό Τροφοδοσίας (PMCU).

▲ **ΠΡΟΣΟΧΗ.** Μην αγγίζετε το βύσμα συνεχούς ρεύματος του S7400/ S7x000 PMF (Επεξεργαστή Πολλαπλής Λειτουργίας) της Αντικαταστάσιμης από τον Πελάτη Μονάδας (CRU) αφότου έχετε αποσυνδέσει το καλώδιο τροφοδοσίας από την Αντικαταστάσιμη από τον Πελάτη Μονάδα (CRU). Υπάρχει σοβαρός κίνδυνος ηλεκτροπληξίας μέχρι και δεκαπέντε (15) δευτερόλεπτα αφότου αποσυνδέσετε το καλώδιο τροφοδοσίας. Μπορείτε να σιγουρευτείτε για την ασφαλή σφαίραση της Αντικαταστάσιμης από τον Πελάτη Μονάδας (CRU) δοκιμάζοντας την (με βολτόμετρο) πριν αγγίξετε τις ακίδες του βύσματος.

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