

adic

Intelligent Storage™

ADIC SNC[®] 4000 User's Guide

ADVANCED DIGITAL INFORMATION CORPORATION

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1

SNC 4000 Introduction

This manual contains information and instructions necessary for the operation of the SNC 4000.

Intended Audience

This guide is intended for general use by anyone interested in learning about or using the SNC 4000.

Document Organization

The section topics in this guide include:

- *Introduction* - Provides an overview of the contents of the manual.
- *Description* - Provides general information about the SNC 4000 and its components.
- *Getting Started* - Describes the basic set-up procedures for your SNC 4000.
- *Connecting to the Service Port* - Describes how to connect to the service port on the SNC 4000.
- *Removal and Replacement Procedures* - Describes how to remove and replace the customer-replaceable components of the SNC.
- *Appendix A: Maintenance Action Plans* - Describes how to troubleshoot and maintenance the SNC 4000.
- *Appendix B: Service Port Command Reference* - Provides a list of service port commands and descriptions of each.
- *Appendix C: Diagnostic Command Reference* - Provides a list of the diagnostic commands and a description of each.
- *Appendix D: POST Error Codes* - Describes the power-on self test process.
- *Appendix E: Startup Message Reference* - Describes the licensed internal code boot loader process.
- *Appendix F: Warranty and EULA* - Provides warranty and licensing information for the SNC 4000.
- *Appendix G: Acronyms* - Describes acronyms used in SNC4000 documentation.

Associated Documents

The following documents are associated with this guide:

- *Scalar 24 Installation and Operation Guide (62-2301-01 Rev. A)*
- *ADIC Management Console 3.2 User's Guide (6-00064-01 Rev. B)*

Explanation of Symbols and Notes

The following symbols and highlighted passages note important information:

Symbol	Damage to ...	Signal Word	Definition	Consequence
	Person	WARNING:	Imminent hazardous electrical situation	Death or serious injury
	Material	CAUTION:	Potential damaging situation	Possible damage to the product, data, or environment
		NOTE:	Indicates important information that helps make better use of the system	No hazardous or damaging consequences

Environmental Notices and Statements

The following are the environmental notices and statements for the SNC 4000.

Product Recycling

This unit contains recyclable materials. These materials should be recycled where processing sites are available and according to local regulations.

Lithium Battery



WARNING

RISK OF FIRE, EXPLOSION, OR BURNS. DO NOT SHORT CIRCUIT, CRUSH, HEAT ABOVE 100°C, INCINERATE, OR DISASSEMBLE THE BATTERY.

Laser Safety

This unit may contain a single-mode or multi-mode transceiver, both of which are Class 1 laser products. The transceiver complies with IEC 825-1 and FDA 21 CFR 1040.10 and 1040.11. The transceiver must be operated under the recommended operating conditions.

Usage Restrictions

The optical ports of the modules must be terminated with an optical connector or with a dust plug.

Technical Assistance

If problems cannot be solved with the aid of this document or if training is desired, contact the ADIC Technical Assistance Center (ATAC).

In the USA:	800.827.3822
Outside the USA, toll free:	00.800.9999.3822
Internet:	www.adic.com

2

Description

This chapter describes the SNC (Storage Networking Controller) 4000.

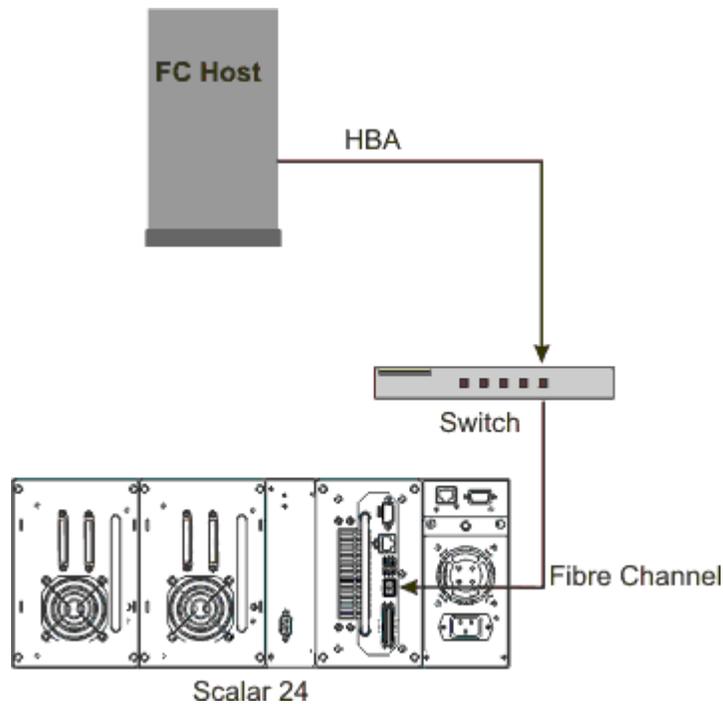
Overview

The Scalar 24 enables customers to use and manage the library in a storage area network, via an integrated SNC 4000. When configured as a storage networking library, the Scalar 24 delivers the following functionality:

- The ability to create separate data paths between heterogeneous hosts library and components (drives and/or media changer) using Scalar Firewall Manager (SFM). SFM allows the zoning of resources so that hosts are restricted to seeing only storage they need. This endpoint security is standard in ADIC storage networking libraries and is OS, HBA, and switch/hub independent. Heterogeneous support also enables multiple hosts with varying OSs and backup applications to access the same library.
- End-to-end path verification between the library and open system host interfaces that enables administrators to discover and remedy path failures before the library is needed for backup applications.
- Drive performance optimization to eliminate protocol bridging latencies and keep drives streaming by pre-fetching data and overlapping commands via an ADIC patent-pending technique.
- Serverless backup via an integrated Data Mover Module.

One possible configuration of the of the SNC 4000 is illustrated in [Figure 1](#).

Figure 1 Configuration Overview



Configuration Support

The SNC provides one FC interface. The FC interface is configured with a small form factor pluggable transceiver (SFP). In addition, the SNC has two Ultra2 SCSI interfaces.

Address Mapping

The SNC maps addresses across and between these different interfaces and preserves the persistency of the address maps across power ups of systems, devices, and the SNC.

Interface Protocol Awareness

The SNC processes SCSI-3 and SCSI-2 protocols for disk, tape, and tape medium changer devices. It can report the host and devices that are attached to its interfaces. The SNC has the capability to manage the access security between end points on the FC interface and the SCSI channels.

FC Interface

Interfaces for host and device attachment include one, 1- and 2-Gb/s bi-directional Short Wave connection.

The SFP can interoperate with both 2 Gb/s and 1 Gb/s data links. The SFP is hot-swappable and is the only component, except for the SNC module itself that is a field replaceable unit (FRU). Refer to [Removing and Replacing the SFP](#) on page 27.

Cables should have a duplex LC connector on the SFP end and a connector appropriate to the HBA in use on the host end.

The FC interface supports the following Public and Private Loop modes:

- Target

- Initiator
- Target and Initiator

The FC Interface also supports the following connection options:

- Loop
- Point-to-Point
- Loop Preferred

The FC interface controller is in compliance with the following standards and specifications:

- Fibre Channel Arbitrated Loop (FC-AL-2) working draft, rev 6.4, August 28, 1998
- Fibre Channel Fabric Loop Attachment (FC-FLA) working draft, rev 2.7, August 12, 1997
- Fibre Channel Private Loop SCSI Direct Attach (FC-PLDA) working draft, rev 2.1, September 22, 1997
- Fibre Channel Tape (FC-TAPE) profile, T11/98-124vD, rev 1.13, February 3, 1999
- Fibre Channel protocol SCSI (FCP-SCSI)
- Fibre Channel internet protocol (IP)
- Fibre Channel virtual interface (FC-VI)

SCSI I/O Interfaces

The Scalar 24's SNC supports SCSI-3 commands over an Ultra2 bus. The SNC is Ultra160 hardware compatible and will support Ultra160 bus speeds via a planned firmware upgrade. The SNC contains two Low Voltage Differential/Single-Ended (LVD/SE) Ultra2 SCSI channels with internal termination. The SCSI channels have automatic speed and width negotiation capability for wide or narrow bus widths and Standard, Fast, Ultra or Ultra2 speeds. These parameters can be viewed from the ADIC Management Console.

The SCSI interfaces are compliant with the following SCSI specifications:

- ANSI T10/1071D Rev. 6, SCSI-3 Fast-20
- ANSI T10/375D Rev. 10t, SCSI-2
- ANSI T10/1142D Rev 20b, SCSI-3 Parallel Interface-2

Ethernet

The 10/100 Base-T Ethernet port has an RJ-45 connector for out-of-band management. It can be connected to a network hub, switch, or router using an unshielded twisted-pair Ethernet cable. The Ethernet port complies with the IEEE 802.3 specification.

Service Port

The service port is an RS-232 connection with a 9-pin D-shell connector. It connects to the host serial port with a 9-pin to 9-pin straight through cable. It is compatible with serial ports on personal computers.

The service port is used for local service and diagnostics when you use a terminal session to access the shell interface.

The service port is configured at:

- VT100 or ANSIW terminal emulation
- 19,200 Baud

- 8 data bits
- No parity
- One stop-bit
- Hardware Flow Control or Xon/Xoff

LED Indicators

The interface panel of the SNC provides LEDs that indicate the status and activity of the SNC and its interfaces.

Figure 2 LEDs



When the SNC is first turned on, some of the LEDs will be on and others will flash while it is booting.

The following list briefly describes how to interpret the LED signals. See also [POST Error Codes](#) on page 143.

FC

- For the FC channel, the LED will be OFF when the channel is not connected. It will be ON when the channel is connected to a live FC device. It will flash when there is activity on the channel.

S1 and S2

- For each SCSI channel, the LED will be OFF when no devices have been detected on the port. It will be ON when a target has been found on the channel. The LED will return to the OFF state if the channel is reset.

PWR

- The PWR (Power) LED will be ON when the SNC has power. It will flash if the on-board power sensors determine that any of the required supply voltages are out of range.

RDY

- The RDY (Ready) LED indicates status of Ready. Normally the RDY LED flashes when the SNC has finished booting. If the RDY LED remains ON or OFF for more than a few seconds, it means there is a problem.
- The RDY LED will flash rapidly, four times per second, when the SNC is running in diagnostic mode.

ERR

- The ERR (Error) LED indicates that an error condition exists. This may indicate such errors as over-temperature conditions, fan stalled or other internally detected error conditions. See [POST Error Codes](#) on page 143.

Firmware 4.40 Features

This chapter describes the functionality of the Storage Networking Controller (SNC) Firmware 4.40. The SNC interface between storage and host provides Fibre Channel to SCSI connectivity.

The SNC firmware enables you to map addresses across and between different interfaces, to configure private maps for security purposes, to condition the data path, and to preserve the persistency of the address maps when systems, devices, switches, and the SNC are turned on and off. The SNC supports up to 2048 unique storage devices across multiple interfaces.

Features highlighted with this release are described below.

Multi-path Mapping

Multi-path mapping enables an administrator to map a single Fibre Channel-attached storage device through all SCSI communication channels on the SNC to provide redundancy. Both manual and automatic versions of the multi-path feature are available. The automatic version of this feature is used by specialized, high-availability host software. Both versions require a license.

WWN Change Capability

The world wide name (WWN) change capability enables an administrator to change the WWN on the SNC. Text is posted during the procedure regarding the requirement to maintain a globally unique name. A password is required in order to complete the change. The world wide node name or just the world wide port name can be changed. This feature is being implemented to facilitate SNC replacement.

DHCP

DHCP enables an administrator to configure network parameters such as IP addresses and lease durations for a device from a common server. When DHCP is enabled, the SNC requests configuration data from the DHCP server and configures the Ethernet interface based on the results. DHCP can be activated in environments in which the SNC is attached to a private network and the AMC is not used for direct SNC control. DNS is used by target devices to determine the IP addresses of named hosts and is active whenever DHCP is enabled.

Supported Platforms

The SNC is a platform-independent product. You can connect a host to the SNC after you have installed the appropriate host bus adapter and drivers. You can also connect host systems with different operating systems to the SNC through the FC.

For a current list of supported platforms, configurations, and host bus adapters, see www.adic.com/scalar24.

Supported Devices

The SNC supports connections to the Scalar 24 and supports all tape drives available for that unit.

Operating Specifications

This section contains the physical, electrical, and environmental specifications for the product.

The SNC is integrated in the Scalar 24. The interface panel of the unit is visible from the back of the Scalar 24.

The external dimensions are:

- 3" high
- 7" deep
- 6" wide
- weight: 2.19 lbs.

In order to provide a safety margin and permit adequate cooling, the unit is fitted with a 12 VDC tach-output blower. Should temperatures exceed specifications, an environmental alarm violation is sent and logged, permitting environmental causes of failure to be determined. This information can be viewed using the ADIC Management Console.

Operating Environment

The operating environment is as follows:

- Operating Temperature: 5° C to 45° C (50° F to 113° F)
- Storage Temperature: -40° C to 70° C (-40° F to 158° F)
- Humidity: 10%-85% Operating, Non-Condensing
5%-95% Non-operating, Non-Condensing

Power Consumption

The SNC is powered by the Scalar 24. Maximum power consumption is 58 watts, in active mode. The power supply status is monitored and is reported by the PWR LED and to the ADIC Management Console.

ADIC Management Console

The ADIC Management Console (AMC) offers remote, centralized management of Scalar storage networking libraries. Features of the AMC include:

- Management and monitoring of multiple Scalar libraries at the same time
- Customizable graphical view of ADIC libraries
- Policy based event logging and email notification
- Device-level diagnostics, reporting, and configuration

All of these functions are embedded into a point and click interface designed to simplify management. The AMC receives information from Scalar storage networking libraries using the industry standard SNMP protocol. Because ADIC uses an industry standard protocol, information can be directed from ADIC libraries to framework applications. These framework applications can use SNMP Traps to generate reports and pager alerts as part of an enterprise management program. For more information, see the *ADIC Management Console User's Guide*.

3

Getting Started

This section describes how to install and set up the SNC 4000, SCSI devices, and the Host Bus Adapter. Installation is divided into four sections:

- Unpacking and Inspecting
- Pre-installation
- Installation
- Post-installation

Unpacking and Inspecting

Unpack the SNC from the carton. Check to make sure that the following items are included with your SNC and that none of them are damaged:

- One SFP
- Product documentation and software CD-ROM
- Two HD68/VHDCI SCSI cables
- One LVD terminator

 NOTE: Save the CD-ROM in a safe location for future reference.

Pre-Installation

It is important that the items in the steps below are verified before installation of the SNC begins. This ensures a successful installation of the product.

Required Tools	Required Software	Other Resources
RS-232 straight through cable	ADIC Management Console server/client software	IP information for the SNC
RJ-45 patch cable	SNC firmware	System with HyperTerminal
SC/LC fibre cables		Server to run ADIC Management Console

- 1 Install the ADIC Management Console server and client software. For installation instructions, see the *ADIC Management Console User's Guide*. It is recommended that you use this software to verify connections and during the post-installation process.
- 2 Check that you have the latest firmware for the SNC by going to www.adic.com/downloads/firmware.
- 3 Verify that host OS and service pack are up to date and supported by the library.
- 4 Verify that Host Bus Adapter (HBA) have been installed on SAN attached hosts and configured properly. HBA BIOS and device drivers should be at the most current level.
- 5 Install the Host Registration Service on hosts that will be connected to the library.
- 6 Ensure that all necessary FC cables are present.

**Note**

The Scalar 24 uses an LC high density connection. In environments where the library will attach to SC interfaces (GBIC, 1x9, etc.) make sure that SC to LC cables are available.

- 7 Label both ends of each SCSI cable with drive ID and SNC connector number.
- 8 If you are using the ADIC Management Console to manage the SNC 4000, configure an Ethernet environment. You will need to set the following network parameters:

Static IP address _____

Netmask _____

User-defined SNC name _____

Default Gateway _____

**CAUTION**

Use of incorrect network parameters can cause problems on the Ethernet network.

**Note**

The default network name is the unit's serial number. If you choose a different name, it becomes the prompt displayed on the service terminal. Choosing a different name may be useful if you have more than one SNC 4000. To change the name, use the `hostNameSet` command. For more information, see [hostNameSet](#) on page 89.

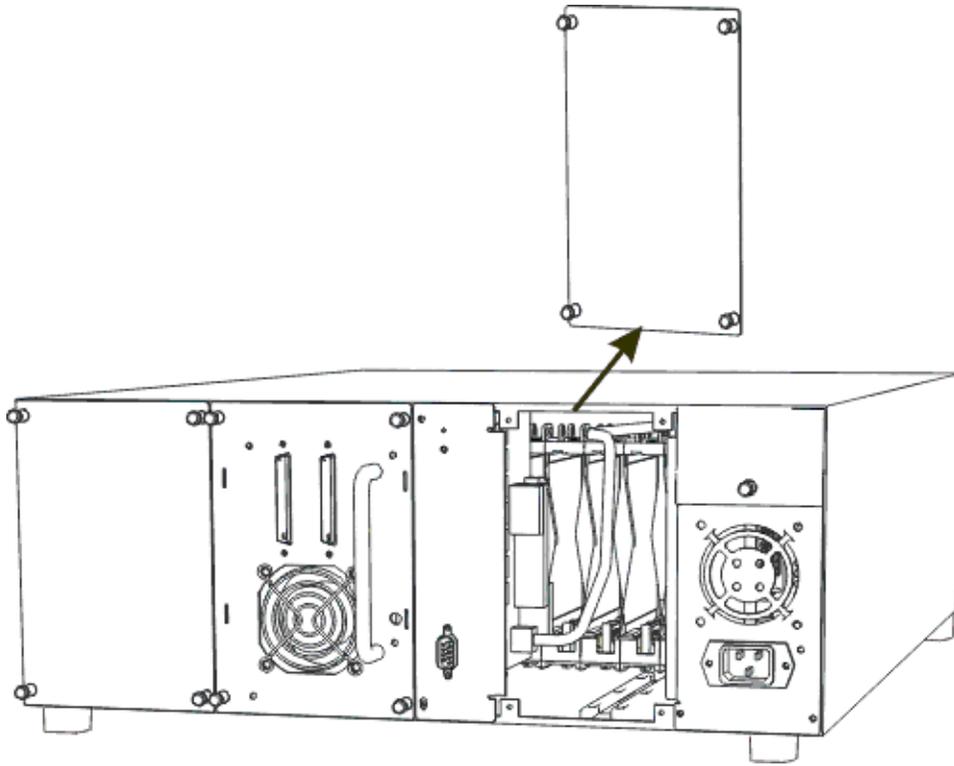
- 9 Connect the Ethernet port on the SNC to the LAN. Library connectivity and monitoring parameters can be managed from the ADIC Management Console.

Installation

Follow the instructions below to install the SNC with SCSI attached storage and FC attached hosts.

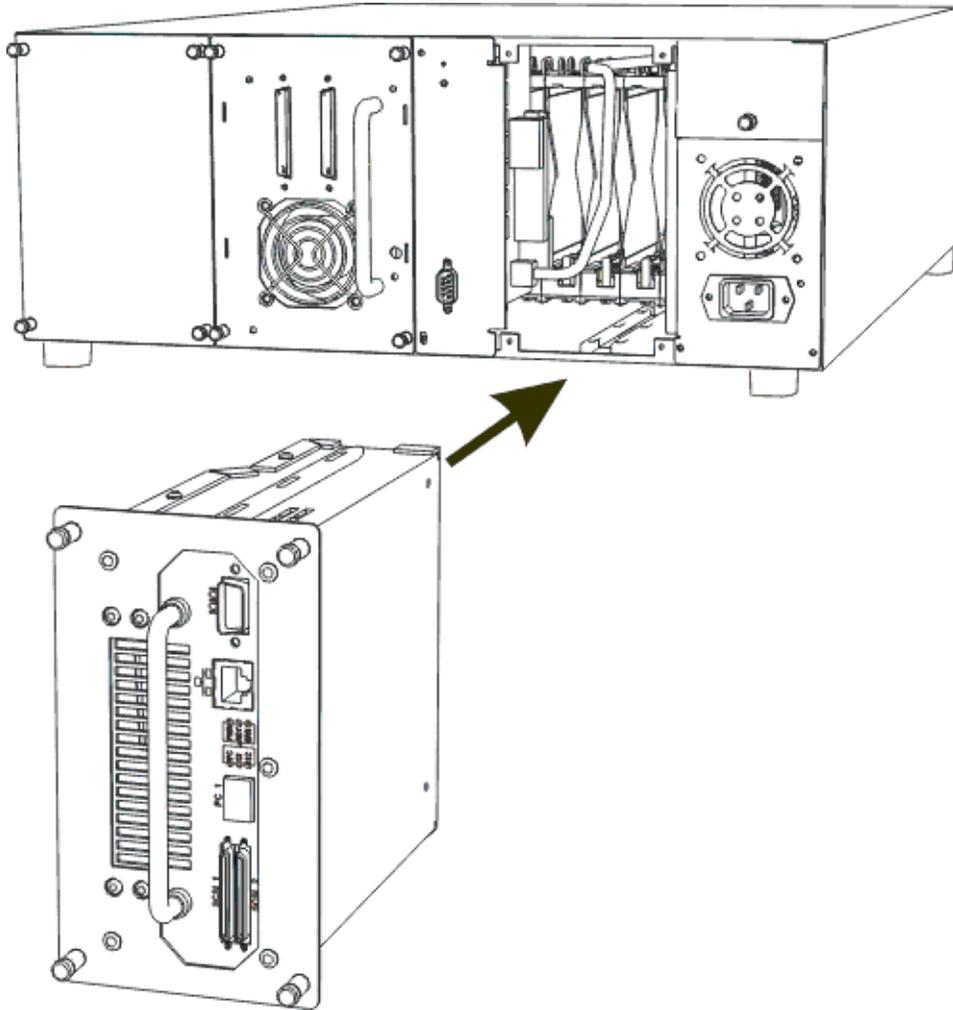
- 1 Power down your Scalar 24 and disconnect the AC line cord from the AC source outlet.
- 2 From the rear of the Scalar 24, locate the available SNC slot. Loosen the four thumbscrews on the cover plate and remove the cover plate. Store the cover plate in a convenient place. It is required for proper operation and cooling of the library if the SNC is ever removed.

Figure 3 Cover Plate Removal



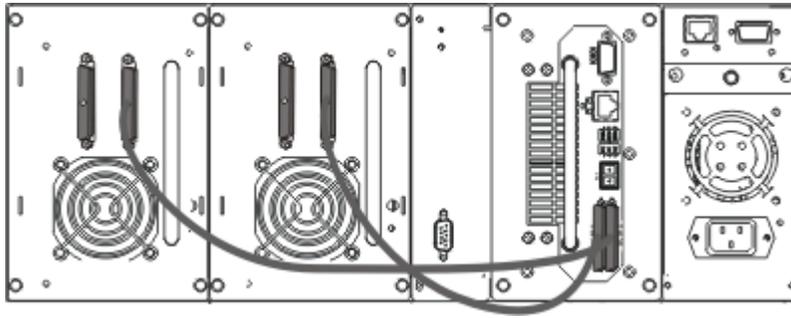
- 3 Slide the SNC into position until it mates with the connector then tighten the thumbscrews.

Figure 4 SNC Installation



- 4** Connect one end of the RS-232 cable to the service port on the SNC and the other end to a service terminal.
- 5** Start a terminal emulation session using HyperTerminal and the following settings:
 - VT100 or ANSW terminal emulation
 - 19,200 Baud
 - 8 data bits
 - No parity
 - One stop-bit
 - Hardware Flow Control or Xon/Xoff
- 6** Run the Ethernet cable from the network hub to the SNC.
- 7** Connect the SCSI cables to the library. An example of typical cabling for two drives connected to each of the SCSI channels on the SNC is shown below. Both drives must have the last device on the SCSI bus terminated, as shown.

Figure 5 SCSI Cabling for Two Drives



- 8 Turn on the Scalar 24.

Within one minute, the RDY LED on the SNC should start flashing once per second and the `Done executing startup script` message should be displayed on the service terminal.

- 9 Configure the network information by typing the following at the service terminal:

```
ethAddrSet "ip_address", "subnet_mask"
```

where "ip_address" and "subnet_mask" are replaced with actual values, for example:

```
ethAddrSet "172.16.32.12", "172.16.1.1"
```

Then enter:

```
gateAddrSet "default_gateway_ip"
```

where "default_gateway_ip" is replaced with the default gateway IP address.

Then enter:

```
hostNameSet "name"
```

where "name" is replaced with the name you would like displayed in the ADIC Management Console.

- 10 Configure the date and time. You can either set the real time clock manually, or use a timeserver. Refer to the procedures below to set the date and time.

Setting the Time and Date

Follow the procedure below to set the Real Time Clock (RTC). For more information on the commands used in this procedure, see [Commands Listed Alphabetically by Function](#) on page 63.

- 1 Use the `rtcDateSet` command to manually set the Real Time Clock. The `rtcDateSet` command takes the following arguments:

```
[year],[month],[day_of_month],[day_of_week],[hour],[minute],[second]
```

For example:

```
SNC4000 > rtcDateSet 2001,1,26,5,9,30,00
```

- 2 Use the `dateSetFromRTC` command to set the RTC as the source of date display:

```
SNC4000 > dateSetFromRTC  
value = 0 = 0x0
```

- 3 Use the `tzSet` command to set the time zone. EST is used in the example for Eastern Standard Time:

```
SNC4000> tzSet "EST"  
TZ Set TIMEZONE = EST:EDT:300:040202:101502  
value = 0 = 0x0
```

- 4 Use the `date` command to confirm.

```
SNC4000 > date
SNC4000 > FRI JAN 26 9:30:49 2001
```

**CAUTION**

Use 24 hour time when programming the real time clock. The time will be one hour off while Daylight Savings time is in effect.

Adding a Host System Running Timeserver

Follow the procedure below to configure the date to be automatically set. For more information on the commands used in this procedure, see [Commands Listed Alphabetically by Function](#) on page 63.

- 1 To enable the timeserver functionality use the `setNettime` command.

```
SNC4000 > setNettime 1
Nettime 1 value = 0 = 0x0
```

- 2 Add a host running timeserver to the SNC using the `setTimeHost` command.

```
SNC4000 > setTimeHost "butter"
Time Host butter value = 0 = 0x0
```

- 3 Set the remote system as the source of date/time display using the `rdate` command.

```
SNC4000 > rdate "butter"
Get time from butter using UDP/SNTP
value = 0 = 0x0
```

- 4 Use the `tzSet` command to set the timezone. In the following example, EST is used for Eastern Standard Time.

```
SNC4000 > tzSet "EST" TZ Set TIMEZONE = EST:EDT:300:040202:101502
value = 0 = 0x0
```

- 5 To confirm, use the `date` command.

```
SNC4000 > date WED JUL 18 14:51:59 2001 value = 0 = 0x0
```

Synchronizing the Real Time Clock with the Timeserver

Follow this procedure to synchronize the real time clock with the timeserver. For more information on the commands used in this procedure, see [Commands Listed Alphabetically by Function](#) on page 63.

- 1 Use the `setTimeHost` command to add a host running timeserver to the SNC.

```
SNC4000 > setTimeHost "butter"
Time Host butter value = 0 = 0x0
```

- 2 Synchronize the Real Time Clock with the timeserver using the `rtcSetCurrent` command.

```
SNC4000 > rtcSetCurrent
value = 0 = 0x0
```

Disabling the Timeserver Host

Follow the step below to disable a timeserver host.

- 1 To disable the timeserver functionality, use the `setNettime` command.

```
SNC4000 > setNettime 0
Nettime 0 value = 0 = 0x0
```

The time will revert to the time set on the Real Time Clock.

Post Installation

Perform the procedures below to verify connections, set up the FC port, SNMP traps, and email alerts. You will need to use the ADIC Management Console. For more information, see the *ADIC Management Console User's Guide*.

- 1 Using the ADIC Management Console, confirm that all attached devices are displayed under each channel.
- 2 Verify/set configuration for the FC Port. The speed and connectivity settings of the SNC default to auto detect and in most configurations no additional configuration should be necessary. However, if the install environment requires custom settings, the following should be confirmed:

Speed	1Gbps or 2Gbps
Connection Options	Point to Point (Fabric), Loop, or Loop Preferred
Loop ID:	Soft / Hard and specific ID
Port Mode	Target or Target & Initiator

For more information about configuring FC and the implications of each setting see the *ADIC Management Console User's Guide*.



CAUTION

Do not set Port Mode to Initiator for this library. Setting Mode to Initiator will prevent hosts from seeing library drives and media changer. Initiator mode makes the SNC appear as a host instead of a storage device.

- 3 Configure all SNMP Traps. For more information, see the *ADIC Management Console User's Guide*.
- 4 Save your current configuration in case you need to restore it in the future. For more information, see [Configuration Files](#).
- 5 If you are not running the most current level of SNC firmware, update your firmware. For more information, see [Updating Firmware](#).
- 6 Configure email alerts. For more information, see the *ADIC Management Console User's Guide*.

Configuration Files

It is recommended that you save a copy of your configuration in case you need to restore it at a future date. The ADIC Management Console is the simplest and most efficient tool for saving/loading configurations. For more information, see the *ADIC Management Console User's Guide*. You can also use the service terminal as an alternate method to perform these operations. The procedures below explain how to save and load configuration files using the service terminal.

Saving a Configuration File

Follow the procedure below to save your configuration.

- 1 From the HyperTerminal window type `sz "config.cfg"` and press **Enter**.

"config.cfg" is an example of a name. You can specify a different filename but it must be in quotes, it must be eight characters or less, and it must end in `.cfg`.

- 2 From the HyperTerminal window, select **Transfer and Receive File**.
- 3 From the **Receive File** dialog enter the path to the folder where you want to save the file or click the **Browse** button and navigate to it.
- 4 For the **Receiving protocol** select **Zmodem** and press the **Receive** button.
- 5 Wait for the `Configuration Download Complete` status message to be displayed on the service terminal indicating successful completion.
- 6 If HyperTerminal reports an error, try to receive the file again.

Loading a Configuration File

Follow the steps below to load a saved configuration file.

- 1 From the HyperTerminal window, at the `SNC4000>` command prompt, type `rz` and press **Enter**.
- 2 From the HyperTerminal window select **Transfer and Send File**.
- 3 From the **Send File** dialog enter the path and file name where the firmware file is located or click the **Browse** button and navigate to it. In the **Protocol** field, select **Zmodem** and click the **Send** button.
- 4 Wait for the `Configuration Update Complete` status message to be displayed on the service terminal indicating successful completion.
- 5 Reboot the SNC for the update to take effect.
- 6 If HyperTerminal reports an error, try to send the file again.

Updating Firmware

You can upgrade the firmware on the SNC 4000 using the ADIC Management Console. For more information, see the *ADIC Management Console User's Guide*.

4

Scalar Firewall Manager

Scalar Firewall Manager (SFM) is a software feature that collects all host and target information and manages the end-to-end access control in the SAN. It allows the system administrator to control access privileges between individual Host Bus Adapters (HBAs) and target devices connected to the SNC's SCSI and Fibre Channels. The system administrator uses the ADIC Management Console to administrate SFM.

- SFM technology enables Storage Area Networks with multiple users to share the same connectivity channels or pipes to access the same or different storage elements or resources. Therefore, multiple virtual private connections can be created on the same Storage Networking infrastructure.
- SFM is completely host independent and requires no software components on the host (an optional automatic Host Registration Service that provides periodic host status information is included). It has no interface dependencies and supports Fibre Channel, SCSI, or any other SAN interface. It is also independent of the storage elements and requires no change in legacy or new storage devices.
- SFM keeps track of Fibre Channel HBAs by their unique World Wide Name (WWN). Because Fibre Channel switches also have a WWN, SFM can see FC switches connected to the SNC and control their access.
- SFM manages access for hosts connected through FC switches and hubs to the SNC. The SNC supports up to 2048 LUNs across all of its interfaces. It has a virtual limit for how many hosts (HBAs or Initiators) are connected to each port. The default setting allows 64 initiators per port. Consequently, with the default setting, an SNC with its two Fibre Channel ports can support up to 128 host connections.
- SFM creates and maintains a database in non-volatile memory to hold persistent information about each HBA (or Initiator) and its LUN access privileges.
- When you perform a **Save Configuration** from the ADIC Management Console, it saves both the persistent device map and the SFM database to a file. This allows all configuration settings to be loaded onto another SNC in the event that the SNC needs to be replaced.
- When SFM is enabled for the first time, it takes a “snapshot” of the existing configuration. SFM automatically assigns access between HBAs and the storage elements that they currently have access to so that an existing configuration will not be affected. Consequently, online hosts attached to an SNC will continue to retain their current access permissions to storage elements.
- Any HBA (or Initiator) that is added to a SAN connection at a later time will only have access to the SNC Command and Control LUN. In this case, the system administrator must explicitly set access privileges to the desired storage element for each host connection.

Host Registration Service

The Host Registration Service (HRS) is a small service/daemon installed on hosts which access the library. HRS simplifies security configuration and allows administrators to monitor host connections to the library. To accomplish this, HRS sends a periodic data pulse through the host's Fibre channel HBA to the library. The pulse consists of the host's WWN, network name, HBA type, and HBA driver level. The SNC records this information and displays it in the AMC.

This information is used to simplify configuration of the embedded firewall, SFM. Instead of manually associating an HBA WWN with a specific host, the Scalar Firewall Manager, SFM, is configured using well known host names. HRS is also used to monitor the status of hosts connected to the library. When the SNC receives a HRS pulse from a host, the host is displayed in the AMC as online. If the SNC does not receive two consecutive HRS pulses, the host will be listed as offline.



Note

The AMC view must be refreshed to see status changes for hosts.



CAUTION

If SFM is not enabled, hosts will not appear in the AMC.

The SFM database contains separate fields to store the WWN, host name, host type, connection, host status and a LUN Access field that holds information about LUNs assigned to it.

When the SNC is first booted, SFM initially treats all hosts as “offline” until a host sends an I/O request to the SNC. SFM detects the I/O and obtains the WWN of the HBA or Initiator. If the WWN is already in the database (already registered), SFM stores the value “online” in the status field.

If the WWN is not in the database, SFM adds it and stores the value “online” in the status field. SFM sets the default value for each of the other parameter fields to “unknown”.

At this point, SFM has registered the HBA or Initiator but has minimal information about it. The system administrator can proceed to complete the registration by using the SNC to manually enter the “unknown” host information and assign access privileges to LUNs.

Installing the Host Registration Service

The Host Registration Service software is included on the CD that shipped with the SNC.

- 1 Insert the SNC software CD into the host.
- 2 Browse to the client software directory.
- 3 Open the directory for your Operating System and open the readme. This file lists specific instructions for installing the package.
- 4 Install the package.
- 5 Reboot the server.
- 6 (Optional) Configure security for the SNC, channel zoning, and/or the Scalar Firewall Manager. For definitions and specific instructions, see the *ADIC Management Console User's Guide*.

Once installed, the service runs automatically and does not require further system administrator interaction. From the ADIC Management Console, you can see the Fibre Channel that the host is connected to and you can tell whether the host is online or offline. For software updates, visit “Service and Support” at www.adic.com.

**Note**

You have to refresh the SNC from the ADIC Management Console to see host status changes.

After SFM is enabled, you may want to add a Host (or Initiator) to the SAN configuration or remove it from the SAN configuration. This section describes how to add and remove hosts.

Adding a Host to the SAN Configuration

You can connect a new host to the SAN at any time. SFM automatically adds the new host to the database as soon as the host is attached to the SAN. If you want to attach a new host at this time, see [Attaching a New Host to the SAN](#). Otherwise, if you want to configure SFM before attaching the host, see [Adding a Host Before Attaching it to the SAN](#).

Attaching a New Host to the SAN

When you attach a new host to the SAN, SFM automatically detects the host and adds it to the SFM database. When you connect or refresh the SNC from the ADIC Management Console, you can see the new host in the SFM Access Settings window. If the Host Registration Service is running on the host, SFM automatically obtains the host parameters. If the Host Registration Service is not running on the host, SFM only knows the WWN of the HBA. In this case, you can manually enter the other host parameters.

Follow these steps to add a new host to the SAN configuration:

- 1 Connect the host to the SAN.
- 2 If you need to install the Host Registration Service, see [Installing the Host Registration Service](#) on page 20.
- 3 If you need to determine LUN assignments for the devices you want to assign to the new host, see the *ADIC Management Console User's Guide*.
- 4 For further information about entering host parameters, see the *ADIC Management Console User's Guide*.
- 5 Refer to the see the *ADIC Management Console User's Guide* to assign access permissions for the new host.
- 6 Verify that the new host has access to the assigned devices.
- 7 Save your configuration, as explained in [Saving a Configuration File](#) on page 17.

Adding a Host Before Attaching it to the SAN

You can add a host that has not yet been attached to the SAN and configure its access permissions beforehand. For more information, see the “Add VPS/SFM Hosts” section of the *ADIC Management Console User's Guide*.

After the new host has been added you can assign its access permissions.

Removing a Host from the SAN Configuration

You may want to remove a host from the SFM database. SFM will prevent you from removing a host that is online. For more information, see the “Deleting VPS/SFM Hosts” section of the *ADIC Management Console User's Guide*.

Combining SFM with Channel Zoning

Although it is possible to combine SFM and Channel Zoning, it is not recommended. SFM cannot assign access to LUNs on channels rendered inaccessible by Channel Zoning. If you do have a legacy Channel Zoning configuration, it is recommended that you edit the zones to permit all SAN Connections to have access to all SCSI channels, or you may end up with inaccessible devices that you had intended to be accessible.

5

Connecting to the Service Port

The service port on the SNC is an RS-232C port, configured at 19200 Baud, with 8 data bits, 1 stop bit, no parity and either hardware flow control or Xon/Xoff flow control.

To connect the SNC service port, a service terminal will be required. The service terminal can be any standard personal computer that contains a serial (COM) port. Connection between the SNC and the service terminal is established using a 9-pin to 9-pin straight through cable.



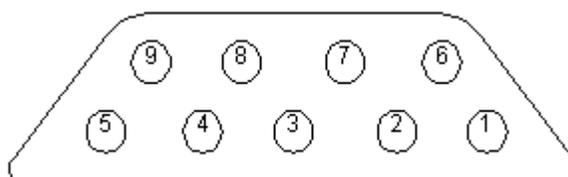
Note

Some systems, such as Unix workstations, may require a different cable or adapter to connect to the SNC service port.

Service Port Connections

The figure below shows the service port connections.

Figure 6 Service Port Pinout



Connections are listed in the following table.

Table 1 DB-9 RS-232 Connector Pin Assignments

Pin Number	Signal Name	Abbreviation	Direction relative to SNC 4000
1	Carrier Detect	CD	In
2	Transmit Data	TD	Out
3	Receive Data	RD	In
4	Data Terminal Ready	DTR	Out
5	Signal Ground	SG	-

Table 1 DB-9 RS-232 Connector Pin Assignments

6	Data Set Ready	DSR	In
7	Clear to Send	CTS	In
8	Request to Send	RTS	Out
9	Ring Indicator	RI	In

Connecting the Service Terminal

Once the service terminal has been attached to the SNC service port, a terminal emulation program will be required to access the SNC's command line interface. Most operating systems come with HyperTerminal or some other form of terminal emulation program by default. If a terminal emulation program is not present, one should be available (or at least recommended) by your operating system provider.

Hardware Required

- RS-232 DB9F straight through cable
- RS-232 DTE terminal or desktop/laptop computer running terminal emulation software

Connecting using HyperTerminal

This section shows the steps to setup use the HyperTerminal program. Other terminal emulation programs operate in a similar fashion.

- 1 Connect the straight through cable (and the 9- to 25-pin adapter if applicable) from the computer serial (COM) port to the SNC service port.
- 2 On the service terminal, select the HyperTerminal icon and double-click on it.
- 3 In the **New Connection** dialog box enter `SNC4000` for the name and click **OK**.
- 4 In the **Connect To** dialog box, for the **Connect using** field select the COM port number that you have chosen and click **OK**.

In the **COM Properties** dialog box select the following:

- Bits per second:19200
 - Data bits:8
 - Parity:None
 - Stop bits:1
 - Flow Control: Hardware or Xon/Xoff
- 5 Click **OK**.

Connecting using Telnet

In instances where command line access to the SNC is required and local access is not permissible, it is possible to Telnet into the SNC. Telnet access should be reserved for remote update of the SNC clock, IP information, or collection of a supportdump. For all other management tasks, the ADIC Management Console is the preferred method of updating information.

**CAUTION**

Modifications made to the SNC while using Telnet are permanent. There is no Cancel key to back out of changes.

Before users can obtain remote access to the SNC, there are several configuration steps that must be performed.

Create User Accounts for Telnet Access

Telnet user accounts are separate from those created in the AMC. Each SNC maintains its own list of user accounts and passwords. To create a user, establish a serial connection to the SNC and enter the following command:

```
addUser "xxxx" ,"yyyy"
```

where `xxxx` is the user name and `yyyy` is the password.

Create additional users as necessary.

Unlock the Shell

The SNC uses a command called `shellLock` to prevent Telnet access to the SNC. This command is used to guarantee that an administrator can always access the SNC through the serial port and perform diagnostic/troubleshooting tasks. `shellLock` was implemented because VxWorks (the underlying OS of the SNC and most SAN devices) only allows one command line session at a time. Allowing only a single diagnostic connection (telnet or serial) is beneficial because it prevents administrators from making simultaneous changes which might destabilize the device. Since only one user can access the command line at a time, it is possible for a Telnet user to open a session and lock out all other administrators. The only way to clear this lock is through a reboot of the SNC.

**Note**

Even when the shell is locked, the ADIC Management Console will be able to manage the SNC.

To prevent a Telnet user from locking the command line shell, make a command line connection to the SNC and enter:

```
shellLock 1
```

To unlock the shell enter:

```
shellLock 0
```

Using Telnet

When opening a Telnet connection to the SNC, the following must be true:

- A valid user account and password must exist
- `shellLock` is set to 0
- No other administrator is accessing the SNC through Telnet

To open a session to the SNC, start telnet and enter `open x.x.x.x` where `x.x.x.x` is the IP address of the SNC. Alternatively you could just type `telnet x.x.x.x`.

Once a session is opened the connection will remain locked until the telnet session is closed or the SNC is rebooted.

**CAUTION**

Once a telnet session is open, no other users may administer the SNC from the command line. This includes both telnet and serial port connections. This is a function of the VxWorks operating system to prevent simultaneous updates by multiple users.

**Note**

Even when the shell is locked, the ADIC Management Console will be able to manage the SNC

Verifying the Connection

If the SNC is already on, characters typed in the terminal should be visible to the operator. The simplest test is to press **Enter**. The SNC responds by displaying a command prompt:

```
SNC4000 >
```

When the SNC is rebooting, several messages are displayed on the service terminal. A successful boot is indicated by the last message: `Done executing startup script.`

6

Removal and Replacement Procedures

This section describes the removal and replacement procedures for the SNC in its entirety or for its SFP.

Handling Electrostatic Discharge-Sensitive Parts

When handling the SFP, it is highly recommended that you follow the guidelines below:

- Keep the ESD-sensitive part in a static-protective bag until you are ready to install the part into the machine.
- Make the fewest possible movements with your body to prevent an increase of static electricity from clothing, fibers, carpets, and furniture.
- If instructed to do so, switch off the machine power before you remove ESD-sensitive parts.
- Just before touching the ESD-sensitive part, discharge to the machine any static electricity in your body by touching the metal frame or cover of the machine. If possible, keep one hand on the frame when you install or remove an ESD-sensitive part.
- Wear an ESD wrist strap.
- Do not place any ESD-sensitive parts on the machine cover or on a metal table because large metal objects can become discharge paths if they are not grounded. If you must set aside an ESD-sensitive part, first place it into the ESD static-protective bag.
- Prevent ESD-sensitive parts from being accidentally touched by other personnel.
- If possible, keep all ESD-sensitive parts in a grounded metal case.
- Be very careful when you work with ESD-sensitive parts in cold weather. Low humidity and heating increase static electricity.

Removing and Replacing the SFP

Follow the procedures below to remove and replace the SFP.



CAUTION

Before performing these procedures, shutdown the host systems to ensure that all I/O through the SNC has stopped.

Removing the SFP

- 1 Unplug the FC cable.
- 2 Slide the SFP out of the slot.
- 3 Place the SFP in a static-protective bag.

Replacing the SFP

- 1 Insert the known good SFP into the slot.
- 2 Remove the dust caps from a known good SFP.
- 3 Plug the FC cables back in, being sure to use the correct polarity.
- 4 If you were sent here by another MAP, return to it.

Before Removing or Replacing the SNC

These steps are performed if a repair action is required for any component of the SNC, except for a SFP.



CAUTION

Shut down the host systems to ensure that all I/O through the SNC has stopped.

- 1 Verify that the latest configuration has been saved. For more information on saving the configuration, see [Saving a Configuration File](#) on page 17 or the *ADIC Management Console User's Guide*.
- 2 Shutdown the Scalar 24 and disconnect the power cord.
- 3 For each cable attached to the SNC, repeat the following:
 - Remove the cable.
 - Mark what the cable was connected to (for example, SNC number 3, SCSI channel 1).
 - If the final cable has been removed, then return to the MAP that sent you here.

Removing and Replacing the SNC

This procedure describes how to remove and replace the SNC.



CAUTION

Follow all ESD-sensitive parts procedures while performing this procedure. For ESD information, see [Handling Electrostatic Discharge-Sensitive Parts](#) on page 27

Removing the SNC

- 1 Complete all steps in [Before Removing or Replacing the SNC](#) on page 28.
- 2 Loosen the four thumbscrews on the back of the SNC.
- 3 Slide the SNC out of the Scalar 24.

Replacing the SNC

- 1 Remove the SNC from the protective bag.

- 2 Install the new SNC in the Scalar 24. For more information, see [Installation](#) on page 12.
- 3 Complete the [Final Diagnostic Tests](#) on page 29.

Final Diagnostic Tests

After the unit has been replaced, a complete diagnostic check must be performed to ensure that no new problems have been introduced.

For further information about the procedures and commands used in this section, see [Connecting to the Service Port](#) on page 23 and [Diagnostic Command Reference](#) on page 135.

Final Test Preparation

- 1 Connect a service terminal to the SNC. For information about how to do this, see [Connecting to the Service Port](#) on page 23.
- 2 Turn on the Scalar 24 and wait until the SNC finishes booting.
- 3 Press the **Enter** key on the service terminal.
If the prompt is not displayed, go to [Service Port MAP](#) on page 60.
- 4 From the Service Terminal, enter the `diagBoot` command.
- 5 Wait until the SNC has finished booting into diagnostic mode.
- 6 From the Service Terminal, enter the `showBox` command.
- 7 Verify that the SNC accurately displays the channel information. If the `showBox` display is accurate, go to [Fibre Channel Tests](#) on page 29. If not, go to [Start MAP](#) on page 42.

Fibre Channel Tests

For further information about the procedures and commands used in this section, see [Connecting to the Service Port](#) on page 23 and [Diagnostic Command Reference](#) on page 135.

Test Fibre Channel Port

- 1 Attach the FC loop back plug to the FC in FC 1.
- 2 From the service terminal, enter the `fcSlotTest 1` command. For more information, see the [fcSlotTest \[x\]](#) on page 138.
- 3 If the test passes, remove the loop back plug and go to [Test SCSI Port 1 and 2](#) on page 29. If the test does not pass, go to [Start MAP](#) on page 42.

Test SCSI Port 1 and 2

- 1 Attach the appropriate VHDCI cable between SCSI 1 and 2.
- 2 From the service terminal, enter the `scsiChannelTest 1,2` command. For more information, see the [scsiChannelTest \(x,y\)](#) on page 139.
- 3 If the test passes, remove the loop back cable and go to [Ethernet Test](#) on page 30. If the test does not pass, go to [Start MAP](#) on page 42.

Ethernet Test

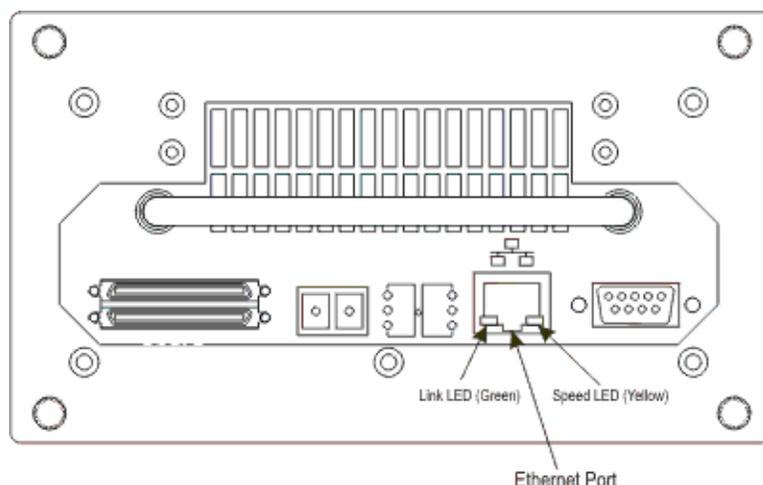
For further information about the procedures and commands used in this section, see [Connecting to the Service Port](#) on page 23 and [Diagnostic Command Reference](#) on page 135.

- 1 If you did not replace the SNC, go to [Step 4](#).
- 2 Obtain the SNC's Ethernet network parameters.
- 3 Configure the Ethernet port host name, address, routes, enable Ethernet. For more information, see [Network Setup for the SNC](#) on page 30.
- 4 Attach the Ethernet loop back plug to the Ethernet port.
- 5 From the service terminal, enter the `elTest` command.
- 6 If the test passes, go to [Step 7](#). If the test does not pass, go to [Start MAP](#) on page 42.
- 7 Remove the Ethernet loop back plug.
- 8 Proceed to [Updating the SNC](#) on page 31.

Network Setup for the SNC

The SNC must be connected to a 10/100-base-T Ethernet network for use with the ADIC Management Console software. An RJ-45 connector is located on the rear panel of the SNC for connection to the Ethernet. See [Ethernet](#) on page 7. You will need to connect a terminal or terminal emulator to the service port of the SNC in order to configure the IP address. For more information, see the *ADIC Management Console User's Guide*.

Figure 7 Ethernet Port



- 1 To configure the network, connect to the SNC service port. For more information, see [Connecting to the Service Port](#) on page 23.

In all of the subsequent steps, substitute the values you configured during installation. For more information on the commands used in this procedure, see [Commands Listed Alphabetically by Function](#) on page 63.

- 2 Enter the `hostNameSet` command to set the host name.

In the example shown, the host name of the SNC was “SNC4000” and is now being set to “foster.” The shell prompt will change to reflect the new name.

```
SNC4000 > hostNameSet "foster"  
Target hostname set to foster  
value = 0 = 0x0
```

- 3 Use the `ethAddrSet` command to set the host network address. The IP address is specified as four decimal numbers, separated by periods.

```
foster > ethAddrSet "192.168.1.54"  
Host Address set to 192.168.1.54 for Ethernet interface  
value = 0 = 0x0
```

If you need to set a netmask, specify it after the network address:

```
foster > ethAddrSet "10.0.0.2", "255.0.0.0"
```

If you need a network route and/or default gateway, you must specify it.

```
foster > gateAddrSet "192.168.1.1"  
value = 0 = 0x0
```

When more complicated routing is required, use the `route` command to specify the destination address, as a full address (single host) or as an abbreviated subnet address. Specify the address of the gateway that is reachable on the local subnet.

```
foster > route "add", "206.0.0", "192.168.1.1"  
value = 0 = 0x0
```

- 4 Optionally, add User account for Telnet

If you want to access the SNC’s command line interface through its Ethernet port using a Telnet session, you need to add a user account. The user name you specify must be three or more characters. The password you specify must be eight or more characters.

```
foster > userAdd "username", "password"  
value = 0 = 0x0
```

- 5 Enter the `reboot` command to reboot the SNC:

```
foster > reboot
```

Updating the SNC

Follow the steps below to update the SNC. For more information on the commands used in this procedure, see [Commands Listed Alphabetically by Function](#) on page 63.

- 1 From the service terminal, enter the `normalBoot` command.
- 2 Wait until the SNC has finished booting.
- 3 From the service terminal, enter the `version` command.
- 4 Write down the operating software version number.
- 5 Determine whether the SNC’s firmware version requires an update.

If an update is required, download the new file or files and the associated readme.

You will install the new firmware as you complete the [Post-Repair Checklist](#) on page 32.

- 6 If you replaced the SNC, enter the `ridTag` command and type the identifier.

**CAUTION****You must perform this step if you replaced the SNC.**

- 7 Shutdown the Scalar 24 and unplug the power cord.
- 8 Disconnect the RS-232 cable from the SNC.
- 9 Proceed to the [Post-Repair Checklist](#) on page 32.

Post-Repair Checklist

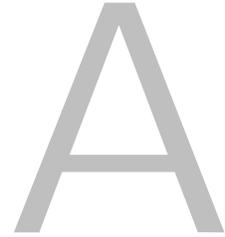
It is important that the items in this checklist are verified after you have completed a repair action. This ensures a successful reinstall of the product.

Table 2 Post-Repair Checklist

Step	Actions	Comments and References
1	Reinstall the SNC in its original location.	See Replacing the SNC on page 28.
2	Ensure that the FC hosts are turned off. If not, disconnect the FC cable now.	If you cannot turn off the FC hosts you must disconnect the FC hosts before turning on the SNC. This is a safety precaution that ensures that FC hosts cannot perform any I/O to the SCSI target devices prior to restoring the SNC configuration in Step 8 , below.
3	Attach the service terminal to the SNC	None.
4	Turn on the Scalar 24.	None.
5	Wait for the SNC to finish booting.	Within one minute, the RDY LED should start flashing once per second and the “Done executing startup script” message should be displayed on the service terminal. If not, go to Start MAP on page 42.
6	From the service terminal, enter the <code>targets</code> command.	See Service Port Command Reference on page 63. If all attached SCSI devices are not shown, go to Start MAP on page 42.
7	If you replaced the SNC, configure the network parameters.	Obtain the network parameters.

Table 2 Post-Repair Checklist

Step	Actions	Comments and References
8	<p>Perform the following:</p> <ul style="list-style-type: none"> • Start the ADIC Management Console Server and Client. • Log on with administrator privileges. • Connect to the SNC. • If you downloaded new operating software in Step 5 of Updating the SNC on page 31, update the firmware. • Load the configuration file you saved in Step 1 of Before Removing or Replacing the SNC on page 28 into the SNC. • Restart the SNC. 	<p>This step must be performed if you replaced the SNC.</p> <p>For more information, see the <i>ADIC Management Console User's Guide</i>.</p>
9	<p>Reconnect the FC cable or, if you turned off the FC hosts, turn them back on.</p>	<p>If the FC LED for the attached host is not on, check the FC cable.</p> <p>You may have to change the polarity of the FC cable. If the problem persists, go to Start MAP on page 42.</p>
10	<p>From the service terminal, enter the <code>fcShow</code> command to show the status of each FC interface that is installed and connected.</p> <p>From the service terminal, enter the <code>fcShowDevs</code> command to show the SCSI target devices that are connected as seen by the FC interface.</p>	<p>In the output of the <code>fcShow</code> command, look for the Firmware State column.</p> <p>If the word <code>Ready</code> does not appear, go to Fibre Channel MAP on page 52.</p> <p>Check to see that all SCSI target devices are seen by the FC interface.</p> <p>If not, go to SCSI Channel MAP on page 46.</p>
11	<p>Verify that all (or the designated) target devices are available to the host systems.</p>	<p>If the designated devices are NOT available, reboot the host and check again.</p> <p>If the problem persists, go to Start MAP on page 42.</p>
12	<p>Disconnect the RS-232 cable from the SNC and the service terminal.</p>	<p>None.</p>
13	<p>End of repair.</p>	



Maintenance Action Plans

This section describes the maintenance action plans (MAPs) for the SNC. MAPs exist for all of the SNC's component systems. If it is clear that a particular component system is at fault in a problem situation, go directly to the MAP for that component by consulting [Table 3](#) . If it is not clear which component system is at fault in a problem situation, choose one of the following options:

- Work through the event codes and Actions in [Event Codes and Actions](#) on page 35 in order to determine the appropriate MAP.
- Work through the [Database Full MAP](#) on page 45 in order to determine the appropriate MAP.

Table 3 Maintenance Action Plans Troubleshooting Table

Component Subsystem	Go To
If event code 42 has been reported	Database Full MAP on page 45
If you are unable to access SCSI or fibre devices	Device Access MAP on page 45
If SCSI I/O fails or errors on the SCSI bus are reported	SCSI Channel MAP on page 46
If the SAN connection LED is off or FC errors are reported	Fibre Channel MAP on page 52
If the SNC continually reboots or all LEDs are off	MAP for the SNC on page 55
If the temperature warning or alarm LEDs are on	Temperature MAP on page 55
If all LEDs are off or the SNC fails to respond to any method of management	Power MAP on page 56
If client and server cannot communicate or the Ethernet LED is off	Ethernet MAP on page 56
If the client is communicating with the server, but the service terminal does not respond	Service Port MAP on page 60

Event Codes and Actions

Review all visual observations and event codes against [Event Codes and Actions](#) on page 35.

Check Event Log

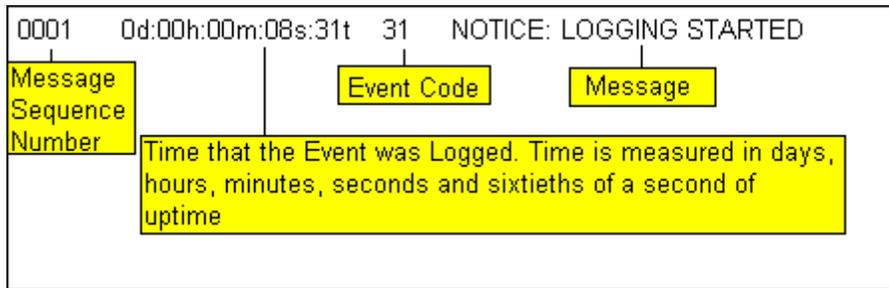
Follow this procedure to check the event log. For more information on the commands used in this procedure, see [Commands Listed Alphabetically by Function](#) on page 63.

- 1 To determine what events are in the event log, follow the procedures in the *ADIC Management Console User's Guide*.
- 2 If the ADIC Management Console application is not available, connect a service terminal to the SNC. For information about how to do this, see [Connecting to the Service Port](#) on page 23.
- 3 Press **Enter** on the service terminal.
- 4 If the prompt is not displayed, go to [Service Port MAP](#) on page 60.
- 5 Issue the `loggerDump` command from the service terminal.

An output similar to the following will be displayed:

```
SNC4000> loggerDump
*** Dumping 1535 (1 through 1535) of 1535 records ***
SEQUENCE  TIME                CODE  DESCRIPTION
0160      10248 day(s) 13:32:29  14    Debug 0: sntEnt:LU Comm Error:k/
c/q=0b/08/88
0161      10248 day(s) 13:32:32  14    Debug 0: sntEnt:LU Comm Error:k/
c/q=0b/08/88
0162      10248 day(s) 13:32:35  14    Debug 0: sntEnt:LU Comm Error:k/
c/q=0b/08/88
0163      10248 day(s) 13:32:43  14    Debug 0: sntEnt:LU Comm Error:k/
c/q=0b/08/88
0164      10248 day(s) 13:32:46  14    Debug 0: sntEnt:LU Comm Error:k/
c/q=0b/08/88
0165      10248 day(s) 13:32:49  14    Debug 0: sntEnt:LU Comm Error:k/
c/q=0b/08/88
0166      10248 day(s) 13:32:52  14    Debug 0: sntEnt:LU Comm Error:k/
c/q=0b/08/88
0167      10248 day(s) 13:32:55  14    Debug 0: sntEnt:LU Comm Error:k/
c/q=0b/08/88
0168      10248 day(s) 13:32:58  14    Debug 0: sntEnt:LU Comm Error:k/
c/q=0b/08/88
0169      10248 day(s) 13:33:01  14    Debug 0: sntEnt:LU Comm Error:k/
c/q=0b/08/88
0170      10248 day(s) 13:33:04  14    Debug 0: sntEnt:LU Comm Error:k/
c/q=0b/08/88
0171      10248 day(s) 13:33:07  14    Debug 0: sntEnt:LU Comm Error:k/
c/q=0b/08/88
0172      10248 day(s) 13:33:15  14    Debug 0: sntEnt:LU Comm Error:k/
c/q=0b/08/88
0173      10248 day(s) 13:33:18  14    Debug 0: sntEnt:LU Comm Error:k/
c/q=0b/08/88
0174      10248 day(s) 13:33:21  14    Debug 0: sntEnt:LU Comm Error:k/
c/q=0b/08/88
0175      10248 day(s) 13:33:24  14    Debug 0: sntEnt:LU Comm Error:k/
c/q=0b/08/88
0176      10248 day(s) 13:33:27  14    Debug 0: sntEnt:LU Comm Error:k/
c/q=0b/08/88
0177      10248 day(s) 13:33:30  14    Debug 0: sntEnt:LU Comm Error:k/
c/q=0b/08/88
0178      10248 day(s) 13:33:33  14    Debug 0: sntEnt:LU Comm Error:k/
c/q=0b/08/88
```

Figure 8 Detail of Event Log Listing From Service Port



- 6 Check the listed event codes against the **Event Code** column of [Table 4](#) . See [Figure 8](#) to interpret the log listing.
- 7 Read across [Table 4](#) to the **Action** column to see the associated Action number.
- 8 Find the Action number in the **Action** column of [Table 4](#) .
- 9 Complete the indicated MAP or action.
- 10 To see additional log messages, follow the procedure [Event Log Dump](#) on page 136.
- 11 If there are no abnormal events, go to [Perform Health Check](#) on page 44.

Table 4 Event Codes and Actions

Event Code	Viewing Level ¹	Default Trap Threshold	Description	Action ²
Visual Observations				
NA	NA	NA	All LEDs are off	5
NA	NA	NA	RDY LED not blinking once per second after power has been on for one minute	3
NA	NA	NA	Temperature warning LED on	4
NA	NA	NA	Temperature alarm LED on	4
NA	NA	NA	SNC not responding	3
NA	NA	NA	Persistent reboots	3
NA	NA	NA	Host application error message or host log entry indicates SCSI target error	12
NA	NA	NA	Host cannot access attached devices	12
NA	NA	NA	FC LED off although cables are attached and host systems are on and have booted	2
NA	NA	NA	Heartbeat failure	7
NA	NA	NA	fcShow command returns Firmware State = Sync Lost	2, 0

Table 4 Event Codes and Actions

Event Code	Viewing Level ¹	Default Trap Threshold	Description	Action ²
NA	NA	NA	ADIC Management Console failure	7
NA	NA	NA	Service terminal connection failure	8
Generic Event Descriptions				
8	2	0	Sense data recorded following a check condition  CAUTION: Normally, the host system will request and process send data and then perform error recovery.	0
9	1	0	LUN reports a “unit attention” condition on a non-removable media device	0
11	1	1	ADIC Management Console reports a temperature change (event message indicates the change to High, Very High, Reduced, to High, or OK)	4
13	1	1	SNC is shutting down as requested by the ADIC Management Console (a Restart was requested)	0
14	0	0	Additional status information used for diagnostics	0
16	1	1	A SCSI bus reports an unexpected interrupt	1
17	1	1	FC interface reports a LIP reset was received from a host	0, 2
18	1	1	FC interface reports a system error	2
19	1	1	FC interface reports an error processing a request	2
20	1	1	FC interface reports an error processing a response	2
21	1	1	SNC processor memory fault detected	1, 2, 3
22	1	10	FC interface detected a LIP	2
23	2	0	FC interface reports a loop up	0
24	2	0	FC interface reports a loop down	0
25	1	1	SNC PCI bus parity error detected	3, 2, 1
26	1	1	SNC PCI interface error detected	3, 2, 1
27	2	0	A device has been added to a SCSI bus	0
28	1	0	A SCSI bus reports a reset has been detected	0

Table 4 Event Codes and Actions

Event Code	Viewing Level ¹	Default Trap Threshold	Description	Action ²
29	1	1	SNC has added a device to its configuration table.  CAUTION: The trap is held off until the SNC has been up for 60 seconds	0
30	1	1	SNC has removed a device from its configuration	0, 1, 2
31	2	0	SNC logging service has started	0
33 ³	1	1	An interface has detected a bus fault (event message indicates the specific interface)	1, 2
34 ³	1	1	An interface has detected a device fault (event message indicates the specific interface)	1, 2
35	1	1	A SCSI interface reported an unexpected disconnect by a device	1
36	1	1	A parity error was detected on a SCSI bus	1
37	2	0	FC port database change detected	0
39	1	1	Directory server on Fabric has changed	0
40	1	1	Maximum LUN limit has been exceeded	10
41	1	0	FC transfer failure.  CAUTION: error recovery may have succeeded	0
42	1	1	Maximum device limit has been exceeded (persistent Address Map database is full)	10
43	1	1	FC interface driver reported debug file dump (event log contains further information)	13
58	1	1	Power has returned to Nominal from Warning or Alarm Stage	0
59	1	1	Power has entered Warning Range from Nominal Range (Power falling) or Alarm Range (Power improving)	5
60	1	1	Power has entered Alarm Range	5
61 ⁴	1	1	Inlet Air, Outlet Air, or I/O Processor temperatures have entered Nominal Range from a Warning or Alarm Range	0
62 ⁴	1	1	Inlet Air Temperature has entered Warning Range from Nominal Range (heating up) or Alarm Range (cooling down)	4
63	1	1	Inlet Air Temperature has entered Alarm Range	4

Table 4 Event Codes and Actions

Event Code	Viewing Level ¹	Default Trap Threshold	Description	Action ²
64 ⁴	1	1	Outlet Air Temperature or I/O Processor Temperature has entered Warning Range from Nominal or Alarm Ranges	4
65	1	1	Outlet Air Temperature or I/O Processor Temperature has entered Alarm Range	4
66	1	1	Fan is operating in Nominal Range after operating in a fault state	0
67	1	1	Fan speed has entered Warning Range (Tachometer fans only)	4
68	1	1	Fan speed has entered Alarm Range (Tachometer fans) or is stalled (rotor stall fans)	4
70 ⁵	1	1	Firmware upload completed	0
71 ⁵	1	1	SNC restart completed	0
72	1	1	Maximum number of initiators has been exceeded	0
75	1	1	Connectivity with the host has been lost.	2
76	1	1	Connectivity with the host has been established.	0
150	1	1	The event log is about to overwrite the earliest events	0
Health Check Event Descriptions				
100	1	1	Power supply is out of specification	5
102	1		Temperature change detected since the last report (event message indicates the change to High, Very High, Reduced to High, or OK)	4, 0
106	1	1	FC interface failed Health Check	2
107	1	1	SCSI interface failed Health Check	1
109	1	1	Target device failed Health Check	1
110	1	1	FC link status changed	0, 2
111	1	1	FC transfer failures detected since the last report  CAUTION: error recovery may have succeeded	0
112	1	1	Blower/Fan is running in Warning or Alarm Range	4
113	1	1	Power is running in Warning or Alarm Range	5

Table 4 Event Codes and Actions

Event Code	Viewing Level ¹	Default Trap Threshold	Description	Action ²
114	1	1	Temperature is running in Warning or Alarm Range	4
115	1	1	Network is running at 10 Mb/sec	7
Heartbeat Event Descriptions				
 CAUTION: These event codes are not logged in the Event Log. Notification of these events occurs from the ADIC Management Console. For more information on Heartbeat, see the <i>ADIC Management Console User's Guide</i> .				
200 ⁵	NA	NA	The server could not verify the connection to the SNC	7,3
201 ⁶	NA	NA	The client could not communicate with the server	7,9
202 ^{6,7}	NA	NA	The server could not communicate with the client	7,9
203 ^{6,8}	NA	NA	Heartbeat communication restored	0
Notes: ¹ See Table 6 on page 42. ² See Action Reference Table on page 41. ³ Default Trap Threshold settings are explained "Events" in the ADIC Management Console User's Guide. ⁴ Check the Event Log to find out which interface (FCAL or SCSI) caused this event. Then use the appropriate action number. ⁵ This trap signals a change in state. A string sent with the trap will indicate the nature of the previous state. ⁶ Events not logged in SNC Event Log. ⁷ Not Reported. View the Server Log. ⁸ Event reported only when ADIC Management Console 2.7 or above is running				

Action Reference Table

Numerical references from the Action column in [Event Codes and Actions](#) on page 37 are associated with the appropriate MAP in [Action Reference Table](#) on page 41.

Table 5 Action Reference Table

Action Number	Action
0	No action necessary
1	Go to SCSI Channel MAP on page 46
2	Go to Fibre Channel MAP on page 52
3	Go to MAP for the SNC on page 55
4	Go to Temperature MAP on page 55
5	Go to Power MAP on page 56
7	Go to Ethernet MAP on page 56

Table 5 Action Reference Table

Action Number	Action
8	Go to Service Port MAP on page 60
9	Contact your network administrator
10	Reduce the number of target devices attached to the SNC
11	Go to Start MAP on page 42
12	Go to Device Access MAP on page 45
13	Go to Retrieving the Code 43 Dump File on page 137.

Event Viewing Levels

Numerical equivalents for the event viewing levels from the Viewing Level column of [Table 5](#) are explained in [Table 6](#).

Table 6 Event Viewing Levels

Number	Level	Explanation
0	Notice	Events recorded in the Event Log but not displayed by the Event Viewer
1	Warning	Includes events that should always be reported, such as device removals, and changes to temperature or power systems
2	Information	Includes events that might result in later problems

Start MAP

Gather as much information as possible before performing a repair action. When gathering information, you may need to connect the service terminal to the service port. See [Connecting to the Service Port](#) on page 23.

Event Code or Obvious Symptom

Either an event code has been reported by the ADIC Management Console or an error has been observed by other means. For more information on events, see the *ADIC Management Console User's Guide*.

If the event code is known, go to [Table 4](#) on page 37 with that event code and perform the recommended action. If the symptom is obvious, go to [Table 3](#) on page 35.

If the event code or error symptom is not known, go to [Event Codes and Actions](#) on page 35.

Otherwise, proceed to [Visually Inspect LEDs](#) on page 42.

Visually Inspect LEDs

Use this procedure to visually inspect the LEDs.

- 1 Observe interface panel SNC LED status indicators.

For information about expected LED behavior, see [LED Indicators](#) on page 8.

- 2 If the RDY LED is flashing as expected but the SCSI, Ethernet, and FC Connection LEDs are off, the SNC may have been left in diagnostic mode.

The device drivers for SCSI, FC, and Ethernet interfaces are disabled when in diagnostic mode.

- 3 If the command prompt on the service terminal is `diagmode >`, return the SNC to normal mode by entering the `normalBoot` command on the service terminal.

For more information, see [Boot Modes](#) on page 135.

- 4 Check LED observation against [Table 4](#) on page 37.

The Visual Observations area at the beginning of the Table includes several descriptions of situations signalled by LED states.

- 5 Refer to [Table 5](#) on page 41 and complete the action.

- 6 If LED observations did not solve the problem, proceed to [Check for Problems on Attached Devices](#).

Check for Problems on Attached Devices

Check the following in order to find problems on attached devices:

- LEDs
- Display panels
- Firmware levels
- Operability

Check Host Versions

Check the following in order to find problems on attached hosts:

- Operating system version
- Service pack version
- Hot-fix version
- HBA hardware version
- HBA firmware version
- HBA device driver version

If an update is required, perform the update. For an updated list of supported SNC host platforms and FC HBAs, visit www.adic.com.

Check SNC Product Versions

For an current list of required updates, visit www.adic.com.

ADIC Management Console Version

Use this procedure to check the version level of the ADIC Management Console application.

- 1 Start the ADIC Management Console server and client. For installation and operating instructions, as well as access to version information, see the *ADIC Management Console User's Guide*.
- 2 If an update is needed, download the update from www.adic.com, and perform the update.

Firmware Version

Use this procedure to check the firmware version level. For more information on the commands used in this procedure, see [Commands Listed Alphabetically by Function](#) on page 63.

- 1 Connect a service terminal to the SNC.
- 2 Press **Enter** at the service terminal. If the prompt is not displayed, go to [Service Port MAP](#) on page 60.
- 3 Issue the `showVersions` command.
- 4 If an update is required, download the update from www.adic.com, and perform the update.

Hardware Version

Use this procedure to check the hardware version information.

- 1 Connect a service terminal to the SNC.
- 2 Press the **Enter** key on the service terminal. If the prompt is not displayed, go to [Service Port MAP](#) on page 60.
- 3 Issue the `sysVpdShow` command.
For more information, see the [sysVpdShow or sysVpdShowAll](#) on page 117.
- 4 Report this information to your service representative, if you are asked for it.

Quick Component Check

Use this procedure to check system components. For more information on the commands used in this procedure, see [Commands Listed Alphabetically by Function](#) on page 63.

- 1 Connect a service terminal to the SNC.
- 2 Press **Enter** at the service terminal. If the prompt is not displayed, go to [Service Port MAP](#) on page 60.
- 3 From the service terminal, enter the `showBox` command.
- 4 If an installed component does not show up in the display, go to the correct MAP.
For example, if a SCSI interface is missing, go to [SCSI Channel MAP](#) on page 46. If a FC is missing, go to [Fibre Channel MAP](#) on page 52.
- 5 If all components display properly, proceed to [Perform Health Check](#).

Perform Health Check

- 1 Stop all I/O.
- 2 Remove the Ethernet cable if installed.
- 3 Connect a service terminal to the SNC.
- 4 Press **Enter** at the service terminal. If the prompt is not displayed, go to [Service Port MAP](#) on page 60.
- 5 From the service terminal, issue the `hlthChkNow` command. For other commands associated with healthchecks, see terms beginning with the `hlthChk` prefix in [Service Port Command Reference](#) on page 63.
- 6 Check the results displayed on the service terminal to determine the status of the interfaces and attached devices. If a failure is indicated, perform the appropriate MAP.

Check the Host Event Log

Check the event log on the FC host. Look for the most recent entries and check to see if there are any FC HBA driver errors. If there are, go to [Fibre Channel MAP](#) on page 52.

Database Full MAP

Perform these steps if event code 42 is reported. Event code 42 indicates that the persistent address map database is full.

Use the following procedure to free up database entries that are no longer needed, and keep the devices that are currently attached at the same assigned LUNs. For more information on the commands used in this procedure, see [Commands Listed Alphabetically by Function](#) on page 63.



CAUTION

Use this procedure only when you are sure that the devices you are interested in are connected and available to the SNC. Devices that are not currently attached will be removed from the database. You must reboot the Scalar 24 after performing this procedure for the changes to take effect.

- 1 Connect a service terminal to the SNC.
- 2 Press **Enter** at the service terminal. If the prompt is not displayed, go to [Service Port MAP](#) on page 60.
- 3 From the service terminal, enter the `mapShowDatabase` command to display the contents of the database.
- 4 From the service terminal, enter the `mapShowDevs` command to display LUN assignments for the attached devices that have been mapped.
- 5 From the service terminal, enter the `mapWinnowDatabase` command to remove LUN assignments for devices that no longer need to be kept.
- 6 Reboot the SNC.
- 7 After the SNC has finished booting, repeat [Step 3](#) and [Step 4](#) to verify that all attached devices have been mapped.

Device Access MAP

Perform these steps if a host is not able to access SCSI or FC devices. For more information on the commands used in this procedure, see [Commands Listed Alphabetically by Function](#) on page 63.

- 1 Connect a service terminal to the SNC.
- 2 Press **Enter** at the service terminal. If the prompt is not displayed, go to [Service Port MAP](#) on page 60.

Check Fibre Channel Port Status

- 1 Enter the `fcShow` command from the service terminal.
If the `fcShow` command does not display a Firmware State of **Ready** for the attached FC SAN connection, go to [Fibre Channel MAP](#) on page 52.
- 2 If a FC host should have access to SCSI Channel devices, verify that the FC port mode is Target.
The SNC FC port is set by default to Target mode. If the port mode for the host connection was changed to "Initiator," the host will not be able to see the SCSI devices.

For more information on setting Channel modes, see the *ADIC Management Console User's Guide*.

- 3 If the host should have access to devices on a FC, verify that the FC port mode is set to "Initiator," "Target," or "Target and Initiator."

If the port mode for the host connection is set to "Target," the host will not be able to see the attached FC device.

Check SCSI Channel Devices

- 1 Enter the `scsiShow` command from the service terminal.
- 2 If all of the attached SCSI devices are not displayed, go to [SCSI Channel MAP](#) on page 46.

Check Channel Zoning Settings

- 1 Enter the `fcShowDevs` command from the service terminal.
- 2 Look at the display for the FC interface. If all of the SCSI devices are displayed under the FC interface, then host access to SCSI devices is not being restricted by Channel Zoning.
- 3 Use the ADIC Management Console to change Channel Zoning settings.

For information on Channel Zoning, see the *ADIC Management Console User's Guide*.

SCSI Channel MAP

Perform these steps if:

- Errors are reported on the SCSI bus
- SCSI I/O fails to operate
- Parity errors are detected on the SCSI bus
- SCSI device reports unit attention on non-removable device
- Unexpected SCSI bus reset occurs
- Unexpected SCSI disconnect reported by a SCSI device

Get SCSI Information for the SNC

- 1 Connect a service terminal to the SNC.
- 2 Press **Enter** at the service terminal. If the prompt is not displayed, go to [Service Port MAP](#) on page 60.
- 3 If the SNC is off, then turn it on.
- 4 Verify that the **RDY** LED is blinking once per second.
- 5 As the SNC is booting, several status messages should be displayed on the service terminal. The last status message is `Done executing startup script`.

If no status messages are displayed, go to [Service Port MAP](#) on page 60.

- 6 Enter the `showBox` command from the service terminal.
- 7 Write down the information for each SCSI channel.

`SCSI -1 requires Low Voltage Differential cable`

- 8 If the SCSI interfaces are not all displayed, replace the SNC. Go to [Before Removing or Replacing the SNC](#) on page 28. Continue through [Replacing the SNC](#) on page 28.

9 Exit this MAP.

If the SCSI interfaces display properly, go to [Check Attached SCSI Devices from the Service Port](#) on page 47.

Check Attached SCSI Devices from the Service Port



CAUTION

The SNC supports up to 2048 LUNs. If more than 2048 LUNs are attached, unreliable behavior will result. The SNC takes up one LUN (0) as its Command and Control LUN. Therefore, only 2047 LUNs are available to the user.

- 1 Issue the `scsiShow` command from the service terminal to display a list of attached SCSI devices.
- 2 For each SCSI channel, make a list of attached devices. Include SCSI device ID, manufacturer, and device status/flags.
- 3 Go to [Compare Listed versus Physical Devices](#).

Compare Listed versus Physical Devices

For each SCSI channel, compare the list of attached devices with the physical devices.

If any of the physical devices are not shown, go to [Check SCSI Bus Termination](#) on page 47.

If all the physical devices are shown, go to [Compare Listed versus Supported Devices](#) on page 47.

Compare Listed versus Supported Devices

- 1 Compare the attached devices to the list of supported devices listed.
- 2 If the attached devices are all supported, go to [SCSI Loop Back Test](#) on page 50.
If any attached devices are not supported, report them to the system administrator for possible replacement.



CAUTION

If all other diagnostic procedures fail to isolate a SCSI problem, and there are unsupported SCSI devices attached to the SNC, those devices will need to be removed or replaced.

Check SCSI Bus Termination



CAUTION

If in this procedure you determine that you need to remove a SCSI cable or terminator, all I/O to the SNC must be stopped and the SNC must be turned off.

- 1 Verify the termination for the end device attached to the channel in question.
The last physical device on a chain of SCSI devices needs to be terminated.
If the end device has internal termination, be sure it is enabled.
Otherwise check that an external terminator is attached to the device.
A Differential (DE) terminator on a Single Ended (SE) bus or an SE terminator on a DE bus will cause the bus to be unusable.
- 2 Verify the termination for the other devices attached to the channel in question.

Check that all SCSI devices other than the end devices have internal termination disabled.

A DE terminator on a SE bus or an SE terminator on a DE bus will cause the bus to be unusable.

- 3 If there are SCSI termination problems, power down the Scalar 24 and correct them.

If you corrected SCSI termination problems, go to [SCSI Health Check](#).

If SCSI termination is OK, go to [Check for Multiple SCSI IDs](#) on page 48.

- 4 If you powered down the Scalar 24, turn it back on.

Check for Multiple SCSI IDs

If two or more devices on the same SCSI channel are configured at the same SCSI ID, only one of those devices will be seen by the SNC. Data transfers to that device will be unreliable.



CAUTION

If in this procedure you determine that you need to correct any SCSI IDs, all I/O to the SNC must be stopped and the SNC must be turned off.

- 1 Enter the `scsiShow` command from the service terminal.
For more information, see the [scsiShow](#) on page 106.
- 2 Write down the SCSI IDs of all devices connected to each SCSI channel.
- 3 Check that only one device is set to each ID for each SCSI channel.
Assign a new SCSI ID to any conflicting target device.
- 4 Check that for each SCSI Channel, no devices are set to ID 7 except the SNC channel ID.
If a target device is set to the same ID as the SNC (ID 7), the bus will be unstable and data corruption may result.
- 5 If you do not need to correct any SCSI IDs, go to [Improper Device Type](#).
- 6 If you corrected any SCSI IDs, reboot the Scalar 24.
- 7 After it finishes booting, enter the `scsiShow` command.
- 8 Compare the list of attached devices with the physical devices.
- 9 If not all of the physical devices are shown, go to [Improper Device Type](#) on page 48.
- 10 If all of the physical devices are shown, go to [SCSI Health Check](#) on page 50.

Improper Device Type

- 1 Check to be sure that all the devices attached to a single SCSI bus are of the same type.
Only low voltage differential devices may be attached to low voltage differential SCSI channels.
When a mix of Ultra2/3 SCSI and Ultra SCSI devices are connected to a single bus, the bus will run at the Ultra SCSI speed. Because the bus will auto-adjust to the slowest speed, it is not recommended that you run both Ultra2/3 SCSI and Ultra SCSI devices on the same bus.



CAUTION

If in this procedure you determine that you need to replace a SCSI device, all I/O to the SNC must be stopped and it must be turned off.

- 2 Replace any improper SCSI device with a proper device.
- 3 Reconnect the SCSI cable.

- 4 If you do not have to replace an improper device, go to [Examine SCSI Cables](#).
If you replaced any devices, reboot the Scalar 24.
- 5 After the SNC finishes booting, enter the `scsiShow` command from the service terminal.
- 6 Compare the list of attached devices with the physical devices.
- 7 If not all of the physical devices are shown, go to [Examine SCSI Cables](#).
- 8 If all of the physical devices are shown, go to [SCSI Health Check](#).

Examine SCSI Cables



CAUTION

If in this procedure you determine that you need to remove a SCSI cable, all I/O to the SNC must be stopped and the SNC must be turned off.

- 1 Look for damaged cables.
Check for breaks in the cable jacket, exposed or frayed cable shield, exposed or broken wires.
- 2 Replace any damaged cables.
- 3 Look for inadequate cables.
Older SCSI cables may not be suitable for running at Ultra2/3 speeds. Be sure all cables are rated for Ultra2/3.
- 4 Replace any cables not suitable for running at Ultra 2/3 speeds.
- 5 Check for mixed cable types.
If a SCSI bus has both round cables and flat ribbon cables, it may suffer problems when running at Ultra2/3 speeds.
Use the same cable type consistently for all segments of the SCSI bus.
- 6 Replace any cables that are of the wrong type.
- 7 Check for unshielded cables.
An unshielded SCSI cable used external to a cabinet may cause reliability problems, due to interference from other electrical devices.
- 8 Replace all unshielded cables.
- 9 If no cables are replaced, go to [Examine SCSI Cables](#).
- 10 If cables were replaced, go to [SCSI Health Check](#).

Examine SCSI Connectors



CAUTION

Before removing a SCSI cable, all I/O to the SNC must be stopped and the SNC must be turned off.

- 1 Inspect each connector to find out if pins were bent when the connector was attached.
- 2 Replace any cables that have bent pins.
- 3 If you did not have to replace or re-secure a SCSI cable, go to [SCSI Loop Back Test](#).
- 4 If you replaced or re-secured a SCSI cable, reboot the Scalar 24.
- 5 After it finishes booting, enter the `scsiShow` command from the service terminal.

For more information, see the [scsiShow](#) on page 106.

- 6 Compare the list of attached devices with the physical devices.
- 7 If not all of the physical devices are shown, go to [SCSI Loop Back Test](#).
- 8 If all of the physical devices are shown, go to [SCSI Health Check](#).

SCSI Health Check

- 1 Perform a Health Check. For more information, see [Perform Health Check](#) on page 44.
- 2 Check the Event Log for SCSI errors. For more information, see [Check the Host Event Log](#) on page 45.
- 3 Perform a component check. For more information, see [Quick Component Check](#) on page 44.
- 4 If errors are still indicated, go to [SCSI Loop Back Test](#) on page 50.

If no errors are reported, exit this MAP.

SCSI Loop Back Test



CAUTION

Before performing diagnostics, all FC and SCSI cables must be disconnected from the SNC. Before changing any SCSI cables, all I/O to the SNC must be stopped and the SNC must be turned off. Do not perform SCSI loop back tests on SCSI channels that are attached to SCSI target devices. If you do this, you will corrupt the data on the device.

- 1 If the SNC's command prompt on the terminal is not `diagmode >`, enter the `diagBoot` command on the service terminal.

For more information, see [Entering Diagnostic Mode](#) on page 135.

- 2 Power down the Scalar 24.
- 3 In addition to the suspect SCSI channel, choose one of the other SCSI channels to use for the loop back test.
- 4 Label and remove those cables.
- 5 Connect a short SCSI loopback test cable to those two SCSI channels.
- 6 Power on the system.
- 7 Wait for the SNC to finish booting.
- 8 Enter the `scsiChannelTest(1,2)` command. The following example shows a loop back test on SCSI channels 1 and 2.

```
diagmode > scsiChannelTest (1,2)
SCSI-1 -> SCSI-2 [#####] 10 iterations PASSED
SCSI-2 -> SCSI-1 [#####] 10 iterations PASSED
value = 0 = 0x0
```

- 9 If the SNC returns a PASSED status, go to [Testing SCSI Cables](#) on page 50.

Testing SCSI Cables

If the cables of the devices attached to a channel have a compatible pinout on both sides, the SNC can test the cable using the loop back test.

- 1 Stop all I/O to the SNC.

- 2 If the SNC's command prompt on the terminal is not `diagmode >` place the SNC in diagnostic mode.
For more information, see [Entering Diagnostic Mode](#) on page 135.
- 3 Shut down the SNC.
- 4 Remove the cable from one attached SCSI device, and attach it as a loop back cable to the SNC.
- 5 Power on the SNC.
- 6 After the SNC has finished booting, enter the `scsiChannelTest(x,y)` command from the service terminal (where 'x' and 'y' are the slot numbers connected by the loopback cable) to perform a loop back test.
For an example, see [SCSI Loop Back Test](#) on page 50.
If the SNC returns a FAILED status, the cable is faulty and must be replaced.
If the SNC returns a PASSED status, go to [Isolating SCSI Devices](#) on page 51 to isolate bad devices on the SCSI bus.

Isolating SCSI Devices

- 1 Restore the SNC to normal operation.
See [Restoring Normal Mode](#) on page 136.
- 2 Power down the Scalar 24.
- 3 Perform [Step 4 - Step 11](#) for each SCSI device that was found missing in [Step 1](#) under [Compare Listed versus Physical Devices](#) on page 47.
- 4 Remove all devices from the SCSI buses.
- 5 Attach ONLY the device in question to the SCSI channel it was originally connected to using a known-good SCSI cable and terminators.
- 6 Power the SNC back on. Wait for it to finish booting.
- 7 Enter the `scsiShow` command from the service terminal and verify the device's presence.
For more information, see the [scsiShow](#) on page 106.
- 8 If the device is missing from the display, it needs to be replaced and/or serviced.
Inform the system administrator of any suspected bad devices found in this step.
Replace or remove any bad devices.
- 9 If the device is present, perform a health check.
For more information, see [Perform Health Check](#) on page 44.
- 10 Review the host event log.
For more information, see [Check the Host Event Log](#) on page 45.
- 11 If SCSI errors are found, then inform the system administrator that the connected device appears to be bad.
Replace or remove any bad devices.
- 12 After all possible device checks are performed go to [Restore SCSI Setup](#).

Restore SCSI Setup

- 1 Shut down the SNC.
- 2 Reconnect all available SCSI devices to their proper channel assignments.

Use the original configuration, except where changes have been made per this MAP.

- 3 Wait for the SNC to finish booting.
- 4 If the SNC is in diagnostic mode (command prompt = `diagmode >`), then restore normal operation. For more information, see [Restoring Normal Mode](#) on page 136.
- 5 Perform a health check. For more information, see [Perform Health Check](#) on page 44.
- 6 Review the host event log. For more information, see [Check the Host Event Log](#) on page 45.
- 7 If all attached SCSI devices and cables are determined to be good, yet SCSI errors persist, replace the SNC.
- 8 Go to [Before Removing or Replacing the SNC](#) on page 28.
- 9 Proceed through [Replacing the SNC](#) on page 28.
- 10 Exit this MAP.

Fibre Channel MAP

Perform these steps if:

- The FC interface reports a reset or system error
- The FC interface reports an error processing a request or response
- The FC interface reports an excess of 10 LIPs in a 10-minute interval
- Other FC errors reported
- FC LED is off

Verify FC Connections

- 1 Connect the service terminal to the service port.
- 2 Press **Enter** on the service terminal. If the prompt is not displayed, go to [Service Port MAP](#) on page 60.
- 3 From the service terminal, enter the `showBox` command.
- 4 Confirm that the FC connection is correctly displayed. If `showBox` displays the FC connections correctly, go to [Examine Cables](#) on page 53.
- 5 If the FC connection does not display correctly in the `showBox` display, remove the SFP and replace it with a known-good SFP. Go to [Removing the SFP](#) on page 28. Proceed through [Replacing the SFP](#) on page 28.
- 6 Proceed to [Test SFP](#) on page 52

Test SFP



CAUTION

You must stop I/O at the FC host.

- 1 With a known-good SFP installed, confirm that the SNC's FC connection is correctly displayed by issuing the `showBox` command from the service terminal.
- 2 If the output of the `showBox` command matches the FC configuration, exit this MAP.
If the output of the `showBox` command, still does not match the FC configuration, remove the known-good SFP and reinstall the original SFP.
- 3 Go to [Examine Cables](#) on page 53.

Examine Cables



CAUTION

If in this procedure, you need to remove or replace the FC cable, you must stop I/O at the FC host.

- 1 Remove the cables.
- 2 If any cables are obviously damaged, replace them.
- 3 Use dusting spray/compressed gas to dust off optical connectors on the SFP and cable ends.
- 4 Reconnect the cables.
- 5 Perform Health Check. For more information, see [Perform Health Check](#) on page 44.
- 6 View the event log at viewing level 3.
For more information, see [Table 6](#) on page 42.
- 7 If errors are gone, exit this MAP.
If errors persist, go to [Fibre Channel Loop Back Test](#) on page 53.

Fibre Channel Loop Back Test



CAUTION

Before performing diagnostics, the FC cables must be removed from the SNC. All I/O to the SNC must be stopped.

- 1 Attach a FC loop back plug to the FC port.
- 2 If the front-panel FC LED is not on, replace the SNC.
- 3 Go to [Before Removing or Replacing the SNC](#) on page 28.
Continue through [Replacing the SNC](#) on page 28.
- 4 Exit this MAP.
If the interface panel FC LED is on, proceed to [Step 5](#).
- 5 If the SNC's command prompt on the service terminal is not `diagmode >`, place the SNC in diagnostic mode. For more information, see [Entering Diagnostic Mode](#) on page 135.
- 6 Substituting the FC slot number for `x`, enter the `fcSlotTest x` command.
For more information, see [fcSlotTest \[x\]](#) on page 138.
- 7 If the test failed, replace the SNC.
- 8 Go to [Before Removing or Replacing the SNC](#) on page 28.
Continue through [Replacing the SNC](#) on page 28.
- 9 Exit this MAP.
If the test passed, the FC port is good.

- 10 Remove the loop back plug.

Go to [Testing Fibre Channel Optic Cable](#) on page 54.

Testing Fibre Channel Optic Cable



CAUTION

If the FC cable is extremely long it may be more practical to replace the FC device first; then if the problem is not resolved, replace the cable.

- 1 If the cables are already removed, reattach them.
Attach matching cable ends (red-to-red or 'A'-to-'A' and so on) to both slots of the FC port.
- 2 Substituting the FC slot number for x , from the service terminal enter the `fcSlotTest x` command.
- 3 If the test passes, the FC optical cable is good.
Go to [Replace Fibre Channel Device](#).
If the test fails, go to [Replace Fibre Channel Cable](#) on page 54.

Replace Fibre Channel Cable

- 1 Replace the cables to the FC ports with known good cables.
- 2 Perform Health Check.
For more information, see [Perform Health Check](#) on page 44.
- 3 View the event log at viewing level 3.
For more information, see [Table 6](#) on page 42.
- 4 If problems persist, inform the network administrator that there seems to be a problem with a device or a host bus adapter.
If problems are gone, exit this MAP.
- 5 Replace external devices that are attached to the FC port.
Go to [Replace Fibre Channel Device](#) on page 54.

Replace Fibre Channel Device

The device that needs to be replaced is one of the following:

- FC HBA
 - FC Switch
 - FC Hub
 - FC Disk subsystem
- 1 Inform the system administrator that it is necessary to replace the FC device connected to the SNC to resolve the FC errors.
 - 2 Repeat this MAP, beginning with the section [Connect the service terminal to the service port](#), on page 52, after replacing the external component.

MAP for the SNC

Perform these steps if:

- RDY LED not blinking once per second after power has been on for one minute
- The SNC is not responding
- SNC processor memory fault detected
- SNC PCI bus parity error detected
- SNC PCI interface error detected
- The ADIC Management Console Server could not verify the connection to the SNC

Observe Operational LED Behavior

When the SNC is first powered on, the front-panel's LEDs flash a variety of patterns as it performs the Power On Self Test (POST) and then starts booting. For more information, see [POST Error Codes](#) on page 143.

Within one minute, the SNC should have booted successfully and the RDY LED should be blinking once per second. If the RDY LED is not blinking as expected, go to [Start MAP](#) on page 42.

Temperature MAP

Perform the procedures in the sections below if:

- The SNC generates trap event codes 62, 64, or 67 (Inlet Air, I/O Processor, or Fan have entered a Warning Range)
- The SNC generates trap event codes 63, 65, or 68 (Inlet Air, I/O Processor, or Fan have entered Alarm Range)
- Health Check generates trap event code 112 or 114 (Fan or Power are running in Warning or Alarm Range)

Notification of Problems in Temperature Subsystem

Operators are normally notified of problems or potential problems in SNC subsystems by the event traps that appear in the “Received Event Trap” window of the ADIC Management Console client. For more information, see the *ADIC Management Console User's Guide*.

However, when sensors detect a Warning or Alarm condition in the Temperature subsystem, not only are trap event codes 62, 63, 64, or 65 generated, but a pop-up dialog box immediately alerts the user. See the [envMonShow](#) on page 76 for operational temperature ranges that will generate these messages. If the temperature problems are due to a reduction in blower functionality, event codes 62, 63, 64, or 65 will be accompanied by event codes 67 or 68. See the [envMonRangeShow](#) on page 77 for conditions that will generate these messages.

Temperature Warnings or Alarms Received

- 1 Verify that room temperature is within satisfactory limits.
- 2 If room temperature is not within satisfactory limits, adjust it.
- 3 If the room temperature is within satisfactory limits, and alarm or warning messages are being generated, check the air intake for obstructions.

- 4 If obstructions are found, remove them and permit the SNC to cool.
- 5 If temperatures stabilize, exit this MAP.
- 6 If no obstructions are found, or temperatures do not stabilize, check the SNC's Air Outlet for obstructions.
- 7 If obstructions are found, remove them and permit the SNC to cool.
- 8 If temperatures stabilize, exit this MAP.
- 9 If no obstructions are found, or temperatures do not stabilize, replace the unit.
Proceed to [Before Removing or Replacing the SNC](#) on page 28.
Continue through [Replacing the SNC](#) on page 28.

Fan Speed is in Warning or Alarm Range

If you were directed to this MAP because of trap event code 67, indicating that the Fan is in Warning Range-
-replace the SNC at the next scheduled maintenance.

If you were directed to this MAP because of trap event code 68, indicating that the Fan is in Alarm Range,
Proceed to [Before Removing or Replacing the SNC](#) on page 28.

Continue through [Replacing the SNC](#) on page 28.

Power MAP

Perform the steps below if:

- All LEDs are off
 - The SNC generates trap event codes 59 or 60, indicating that the Power is running in the Warning or Alarm Range. A string accompanying a trap event will indicate which power supply is specifically involved.
 - Health Check generates a trap event code 113, indicating that Power is running in Warning or Alarm Range
- 1 Verify that the SNC is correctly installed in a Scalar 24 SNC slot.
 - 2 Verify the status of the PWR LED.
 - 3 If the PWR LED remains off, try a different power cord.
 - 4 If the PWR LED remains off, remove the SNC.

Proceed to [Before Removing or Replacing the SNC](#) on page 28.

Continue through [Replacing the SNC](#) on page 28.

Ethernet MAP

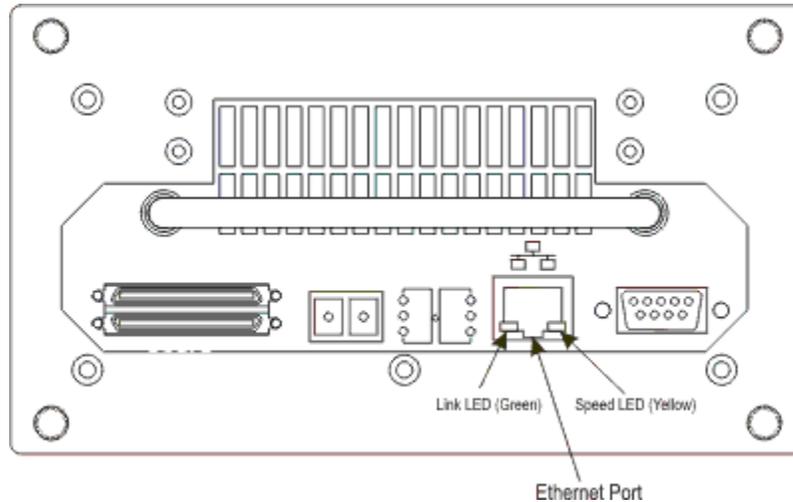
The network administrator must provide the following information before you can perform this MAP:

- The IP address for the SNC - REQUIRED
- The net mask for the SNC in decimal and hex formats - REQUIRED
- The network gateway IP address for the SNC - if assigned
- The IP address of a computer on the same subnet as the SNC for PING tests - REQUIRED

- The IP address of the ADIC Management Console Server - REQUIRED. For more information, see the *ADIC Management Console User's Guide*.
- The SNC must be booted and its Ethernet Port must be attached to the local area network.

For the position of the Ethernet port on the SNC, see [Figure 9](#) .

Figure 9 Ethernet Port on Interface Panel



- 5 Verify that the Ethernet Link LED, which is the green LED on the left, is on. This LED is a combined link/activity LED. If the link is up and there is activity, it will blink.
- 6 If the LED is on, go to [Step 7](#).
If the LED is not on, proceed to [Before Removing or Replacing the SNC](#) on page 28.
Continue through [Replacing the SNC](#) on page 28.
Exit this MAP.
- 7 Determine the speed of the network, by following the procedure in [Perform Health Check](#) on page 44.
If the Health Check generates a trap event code of 115, then the SNC's yellow Speed LED should be on.
Verify that the yellow Speed LED, which is the yellow LED on the right, correctly reflects the speed of the network.
- 8 If the yellow Speed LED correctly reflects the speed of the network, go to [Step 10](#).
If the yellow Speed LED does not correctly reflect the speed of the network, go to [Step 9](#).
- 9 Inform the System Administrator that there may be a problem with the Ethernet cable quality, the intermediate link speeds or interconnect speeds.
If the System Administrator can find no problems with the Ethernet cable quality, the intermediate link speeds, or interconnect speeds, but the SNC yellow Speed LED does correctly reflect the network speed, go to [Ethernet MAP](#) on page 56.
Continue through [Replacing the SNC](#) on page 28.
Exit this MAP.
- 10 Remove the Ethernet cable from the SNC Ethernet Port and attach the Ethernet loop back plug.
- 11 Verify that the Ethernet LEDs are functioning correctly.
If they are, proceed to [Step 12](#).

If they are not, inform the System Administrator that there is a network hardware problem where the SNC is attached.

Exit this MAP.

- 12 Remove the Ethernet loop back plug.
- 13 Obtain another Ethernet cable.
- 14 Use this cable to attach the SNC to the local area network.
- 15 Connect the service terminal to the service port.
- 16 Press **Enter** at the service terminal.

If the prompt is not displayed, go to [Service Port MAP](#) on page 60.

- 17 From the service terminal, enter the `ifShow` command.

```
SNC4000 > ifShow
ibmEmac (unit number 0):
  Flags: (0x8063) UP BROADCAST MULTICAST ARP RUNNING
  Type: ETHERNET_CSMACD
  Internet address: 172.16.76.211
  Broadcast address: 172.16.255.255
  Netmask 0xffff0000 Subnetmask 0xffff0000
  Ethernet address is 00:60:45:17:02:f0
  Metric is 0
  Maximum Transfer Unit size is 1500
  114192 packets received; 364 packets sent
  114023 multicast packets received
  116 multicast packets sent
  0 input errors; 0 output errors
  0 collisions; 0 dropped
lo (unit number 0):
  Flags: (0x8069) UP LOOPBACK MULTICAST ARP RUNNING
  Type: SOFTWARE_LOOPBACK
  Internet address: 127.0.0.1
  Netmask 0xff000000 Subnetmask 0xff000000
  Metric is 0
  Maximum Transfer Unit size is 32768
  0 packets received; 0 packets sent
  0 multicast packets received
  0 multicast packets sent
  0 input errors; 0 output errors
  0 collisions; 0 dropped
value = 29 = 0x1d
```

- 18 If there is no entry for `ibmEmac`, replace the SNC. Go to [Before Removing or Replacing the SNC](#) on page 28.

Continue through [Replacing the SNC](#) on page 28.

Exit this MAP.

If there is an entry for `ibmEmac`, write down the values of the:

- internet address,
- netmask,
- subnetmask

- 19 Verify that the internet address is the same as the IP address supplied by the network administrator.

- 20 Verify that the netmask value is the same as the netmask in hex format supplied by the network administrator.
- 21 Verify that the subnetmask is the same as the netmask. If these values are correct, go to [Step 24](#).
If these values are not correct, proceed to [Step 22](#).
- 22 Use the `ethAddrSet` command to set the correct IP address and netmask values.
For more information, see the [ethAddrSet](#) on page 78.
- 23 From the service terminal, enter the `reboot` command and wait for the SNC to finish booting.
Go back to [Step 17](#).
- 24 Enter the command `ping "<host IP address>"`, where `<host IP address>` is four decimal numbers separated by periods.

`<host IP address>` is the address provided by the network administrator for PING testing.

Display of successful PING test:

```
SNC4000 > ping "192.168.1.1", 10
PING 192.168.1.1: 56 data bytes
64 bytes from 192.168.1.1: icmp_seq=0. time=0. ms
----192.168.1.1 PING Statistics----
10 packets transmitted, 10 packets received, 0% packet loss
round-trip (ms) min/avg/max = 0/0/0
value = 0 = 0x0
```

Display of failed PING test:

```
SNC4000 > ping "192.168.1.251",10
PING 192.168.1.251: 56 data bytes
request timed out
value = -1 = 0xffffffff
```

- 25 If the PING test passes, go to [Step 26](#).
If the PING test fails, inform the System Administrator that there is a network hardware problem where the SNC is attached.
Exit this MAP.
- 26 Remove the Ethernet cable from the SNC and install the Ethernet loop back plug.
- 27 From the service terminal, enter the `diagBoot` command.
For more information, see [Diagnostic Command Reference](#) on page 135.
- 28 Wait for the SNC to finish booting.
- 29 Verify that the `diagmode>` prompt is displayed.
- 30 From the service port, enter the `elTest` command.

```
diagmode > elTest
==== Testing Ethernet ====
Init complete.
```

```
Ethernet OK
value = 0 = 0x0
```

- 31** If the test fails, replace the SNC.

Go to [Before Removing or Replacing the SNC](#) on page 28.

Continue through [Replacing the SNC](#) on page 28.

Exit this MAP.

If the test passes, remove the Ethernet loop back plug.

Proceed to [Step 32](#).

- 32** From the service terminal, enter the `normalBoot` command and wait for the SNC to finish booting.

- 33** Reattach the Ethernet cable to the SNC.

- 34** From the service terminal, enter the `gateAddrGet` command and write down the network gateway address that is displayed.

For more information, see the [gateAddrGet](#) on page 85.

- 35** Compare this address to the one provided by the network administrator.

If both addresses are the same, go to [Step 36](#).

```
SNC4000 > gateAddrGet
Gateway Address set to 192.168.1.1
value = 0 = 0x0
```

If the network gateway address is incorrect, set it to the value provided by the network administrator using the `gateAddrSet` command.

For more information, see the [gateAddrSet](#) on page 85.

- 36** From the service terminal, enter the `reboot` command.

- 37** Wait until the SNC has finished booting.

- 38** From the service terminal, use the `ping` command to PING the IP address of the ADIC Management Console Server. For more information, see the *ADIC Management Console User's Guide*.

- 39** From the host running the ADIC Management Console Server, PING the SNC.

If both PING tests succeed, exit this MAP.

If a PING test fails, inform the network administrator to check and correct the network connection, route tables, and network gateway addresses for both the ADIC Management Console Server and the SNC.

Service Port MAP

These steps are performed if the SNC boots and responds to the ADIC Management Console, but the service port does not respond. For more information, see the *ADIC Management Console User's Guide*.

Check the RS-232 Cable

This test requires another laptop or desktop computer with a functioning RS-232 9-pin port. Terminal emulation software must be installed and running.

- 1 Remove the RS-232 cable from the service port.
- 2 Connect it to the compatible port on the other computer.
- 3 Connect the service terminal to the cable.

- 4 Set the service terminal and the other computer to 19200 baud, 8 data bits, no parity, one stop, Xon/Xoff (or Hardware) flow control.
- 5 Enter test lines in the service terminal and the other computer.
- 6 Confirm that they are displayed on each other.
If this fails, replace the RS-232 cable.
If this succeeds, remove the cable from the other computer
Proceed to [Check Connection with Boot Messages](#).

Check Connection with Boot Messages

- 1 Reconnect the terminal to the SNC with the RS-232 cable.
- 2 Stop all I/O to the SNC.
- 3 Shut down the SNC and keep the power off for 5 seconds.
- 4 Turn the SNC on.
If boot messages fail to appear on the service terminal, then replace the SNC.
Go to [Before Removing or Replacing the SNC](#) on page 28.
Proceed through [Replacing the SNC](#) on page 28.

Scalar Firewall Manager Settings MAP

Perform the procedures in the sections below if SFM devices are unavailable.

Check Scalar Firewall Manager Access Settings

- 1 Connect the service terminal to the service port.
- 2 Press **Enter** on the service terminal.
If the prompt is not displayed, go to [Service Port MAP](#) on page 60.
- 3 Enter the `sfmShow -1` command from the service terminal.
- 4 If **SFM State: Inactive** is displayed, Scalar Firewall Manager® is not controlling access between the host and target devices. Proceed to [Step 5](#).
If **SFM State: Active** is displayed, Scalar Firewall Manager is controlling access between the host and the target devices. Proceed to [Step 8](#).
- 5 Enter the `sfmFeatureEnable` command from the service terminal.
If SFM devices are available, exit this MAP.
If SFM devices are not available, proceed to [Step 6](#).
- 6 Enter the `licenseShow` command from the service terminal.

```
License "s2zhq-7xdhd": Valid
Features:
SFM
Value = 2 = 0 x 2
```
- 7 If the output from the `licenseShow` command shows that SFM is Valid, as in the example, proceed to [Step 8](#).

If the output from the `licenseShow` command shows that SFM is not Valid, exit this MAP and contact your service representative.

- 8 Use the ADIC Management Console to verify the host and target device access settings. For more information, see the *ADIC Management Console User's Guide*.

Exit this MAP.

If the ADIC Management Console is not available, you can temporarily make SFM inactive to verify that the host can access all devices. Proceed to [Verify Host Access to Devices](#) on page 62.

Verify Host Access to Devices

- 1 Shut down all of the hosts.
- 2 Enter the `sfmInactiveSet` command from the service terminal.

For more information, see the [sfmInactiveSet](#) on page 112.

- 3 Startup one of the hosts.
- 4 If the host can access all of the target devices, shut down the host and repeat [Step 2](#) and [Step 3](#) for each of the other hosts.

If each host can access all devices then there is a problem with the Scalar Firewall Manager Access settings. Go to [Step 5](#).

If the host cannot access all of the target devices, then there is a problem with the devices or their SAN connections. Proceed to [Device Access MAP](#) on page 45 or [Fibre Channel MAP](#) on page 52.

- 5 Shut down all of the hosts.
- 6 Enter the `sfmActiveSet` command from the service terminal.
For more information, see the [sfmActiveSet](#) on page 110.
- 7 Use the ADIC Management Console to verify the host and target device access settings. For more information, see the *ADIC Management Console User's Guide*.

B

Service Port Command Reference

A “shell” interface provides access to the management and configuration commands referenced in this chapter. The shell is accessible by connecting a terminal or computer with terminal emulation software to the SNC 4000 service port. For more information, see [Connecting to the Service Port](#) on page 23.

Managing the SNC 4000

The ADIC Management Console application is the preferred method for managing the SNC 4000. When you use the ADIC Management Console, the operations described in this reference are carried out through the client application. For more information, see the *ADIC Management Console User's Guide*.

Commands

This section specifies the commands that are available to control, manage, and service the SNC 4000. The commands are listed alphabetically by function in Table 7. The commands are listed in alphabetical order beginning on page 71.

Table 7 Commands Listed Alphabetically by Function

Command or Command Group	Description	Page
disableCC	Disable Command and Control Interface	75
enableCC	Enable Command and Control Interface	76
setSnaCCLun	Change Command and Control Interface LUN	109
Data Mover		
sncFeatureEnable	Enable the optional Data Mover feature	114
Data Path Conditioning (Multi-path mapping)		
ampFeatureEnable	Enable the optional multi-path mapping feature	71
ghostIOSet	Change the length of time that commands to FC targets remain queued	85

Table 7 Commands Listed Alphabetically by Function

Command or Command Group	Description	Page
ghostIOShow	Display the length of time that commands to FC targets remain queued	86
mapMultipathSet	Change the setting for mapping new targets	95
mapMultipathShow	Display the current setting for mapping new targets	95
mapRemoveDevice	Remove a device from the persistent device map	96
tPathShow	Display the state of targets mapped for failover	121
DHCP		
dhcpClientShow	Display data received from DHCP server	74
dhcpEnable	Enable DHCP	74
dhcpDisable	Display data received from DHCP server	74
dhcpState	Display state of DHCP	75
resolvParamShow	Display list of DNS servers	101
Diagnostics	Diagnostic commands are located in Diagnostic Command Reference on page 135.	
Environmental Sensors		
envMonShow	Display all environmental channel states	76
Ethernet Network		
arptabShow	Display a list of known ARP entries	71
ethAddrGet	Display Ethernet Port address	78
ethAddrSet	Set Ethernet Port address	78
gateAddrGet	Display network gateway address	85
gateAddrSet	Set network gateway address	85
host "add"	Add host table entries	88
host "delete"	Delete network host table entries	88
host "list"	List network host table entries	89
hostNameSet	Change SNC 4000's network name	89
icmpstatShow	Display statistics for ICMP	90
ifShow	Display Ethernet Port parameters and status	90
inetstatShow	Display all Internet protocol sockets	91
ipstatShow	Display statistics for IP	92

Table 7 Commands Listed Alphabetically by Function

Command or Command Group	Description	Page
macShow	Display Ethernet Port Media Access Control address	93
mbufShow	Display mbuf statistics	98
route	Edit route table entries	101
route "add"	Add network route table entries	102
route "delete"	Delete network route table entries	102
route "list"	List network route table entries	102
snmpCommunitiesShow	Display list of Community names currently in use	115
snmpReadCommunityAdd	Add Community name with Read permission	116
snmpReadCommunityRemove	Remove Community name Read permission	116
snmpTrapCommunitySet	Set Community name passed with traps	116
snmpWriteCommunityAdd	Add Community name with Write permission	116
snmpWriteCommunityRemove	Remove Community name Write permission	116
tcpstatShow	Display statistics for TCP	121
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trapDestShow	Display trap destination table	122
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userDelete	Delete a user from the password file	123
userList	Display the contents of the password file	123
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Fibre Channel		

Table 7 Commands Listed Alphabetically by Function

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Table 7 Commands Listed Alphabetically by Function

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Help		
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Table 7 Commands Listed Alphabetically by Function

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sysConfigShow	Display configuration settings	116
sysVpdShow	Display Vital Product Data	117
sysVpdShowAll	Display Vital Product Data for all subsystems	117
version	Display Firmware version	124
uptime	Display time elapsed since last boot	123
SAN Access Security: Scalar Firewall Manager (SFM)	For commands used with Extended VPS (eVPS), see below.	
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sfmActiveSet	Reactivate Scalar Firewall Manager if inactive	110
sfmConnectionSet	Enter connection information for a specific host	110
sfmFeatureDisable	Disable Scalar Firewall Manager	110
sfmFeatureEnable	Enable Scalar Firewall Manager with license key	110
sfmFileShow	Show the SFM data store in the file	111
sfmHostShow	Display LUN access permissions for a specific host	111
sfmInactiveSet	Deactivate Scalar Firewall Manager access control allowing all hosts to access all LUNs	112
sfmNameSet	Enter a name for a specific host	112
sfmShow	Display status information for one or all registered hosts	112
sfmSparseAccessSet	Set access permission for a specific host and specific LUNs	113
sfmTypeSet	Enter Operating System information for a specific host	113
SAN Access Security: Extended VPS (eVPS)	For commands used with Scalar Firewall Manager (SFM), see above.	
vps	See vpsShow	132

Table 7 Commands Listed Alphabetically by Function

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vpsAccessClear	Disable eVPS access to all LUNs for all hosts	125
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vpsActiveSet	Reactivate VPS or eVPS if inactive	126
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vpsFileShow	Shows the VPS or eVPS data stored in the file	128
vpsHostInbandAccessGet	Display in-band access settings for a particular eVPS host	128
vpsHostInbandAccessSet	Set the in-band access level for a single eVPS host	129
vpsHostShow	Display LUN access permissions for a specific VPS or eVPS host	129
vpsInactiveSet	Deactivate VPS or eVPS if active	130
vpsMapAdd	Assign a target device to an eVPS host	130
vpsMapDelete	Delete a previous eVPS LUN assignment	131
vpsMapClear	Clear all the mapping assignments for a specified eVPS host	131
vpsMapShow	List all available mapping information for an eVPS host	131
vpsNameSet	Enter a name for a specific VPS or eVPS host	131
vpsShow	Display status information for one or all registered VPS or eVPS hosts	132
vpsSparseAccessSet	Set access permission for a specific VPS or eVPS host and specific LUNs	132
vpsTypeSet	Enter operating system information for a specific VPS or eVPS host	133
wwnLockModeSet	Set the state of the WWN Locking Mode	133
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SCSI		

Table 7 Commands Listed Alphabetically by Function

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scsiHostIdGet	Display SCSI Host ID Numbers	104
scsiHostIdSet	Set SCSI Host ID Numbers	105
scsiRescan	Rescan for devices on one or all SCSI Channels	105
scsiResetDisableGet	Display SCSI Bus Reset on Power-Up Setting	105
scsiResetDisableSet	Set the SCSI Bus Reset on Power-Up Setting	105
scsiShow	Display SCSI Channels and attached devices	106
scsiTermGet	Display termination status information for SCSI Channels	107
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Startup		
diagBoot	Shutdown and restart in Diagnostic mode	137
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Time and Date		
date	Display the date and time	73
dateSetFromRTC	Set the Real Time Clock as the source of date display	73
hostShow	Display the IP address of the system timeserver	89
rdate	Set a remote system as the source of date display	100
rtcDateSet	Manually set the Real Time Clock	102
rtcSetCurrent	Synchronize the Real Time Clock with the timeserver	102
setNettime	Enable or disable timeserver functionality	108
setTimeHost	Add a host running timeserver to the system	109
tzSet	Set the time zone offset from Greenwich Mean Time	122

Table 7 Commands Listed Alphabetically by Function

Command or Command Group	Description	Page
Virtual Private Map		
copyScsiAssign	Copy SCSI assignments from a source channel to a destination channel	
deleteScsiAssign	Delete an assignment previously created	
setScsiAssign	Assign a target device to a SCSI channel	
showScsiAssign	List the current assigned addresses for the indicated channel	
vpmFeatureEnable	Enable the optional Virtual Private Map feature	
vpmFeatureEnabled	Display status information about Virtual Private Map	

Each command outputs a status “value” in decimal and hexadecimal after execution and before a new prompt is displayed.

```
value = 0 = 0x0
```

Usually a value of 0 indicates success, but some successful commands return a different value.

ampFeatureEnable

The `ampFeatureEnable` command enables the optional multi-path mapping feature. You enable the feature by entering the unique license key.

```
SNC > ampFeatureEnable "N499F-ZZ"  
Copy OK: 60 bytes copied  
AMP Enabled, License is Valid  
value = 0 = 0x0  
SNC >
```

If the license key was factory-installed, you can enter the word “enable” (in quotes) rather than the actual license key.

```
SNC > ampFeatureEnable "enable"  
AMP Enabled, License is Valid  
value = 0 = 0x0  
SNC >
```

If `value = 1 = 0x1` message is displayed, it means the license is already installed and multi-path mapping is already enabled.

If the `value = -1 = 0xffffffff` message is displayed, it means the license is not already installed and you do need to enter the license key.

arptabShow

The `arptabShow` command displays the contents of the ARP table. The ARP table contains the current Internet-to-Ethernet address mappings. This information may be useful to the LAN administrator.

```
SNC4000 > arptabShow  
  
LINK LEVEL ARP TABLE  
destination          gateway                flags  Refcnt  Use                Interface
```

```
-----
172.16.1.1      00:04:4e:15:64:8    405  0      10      ibmEmac0
172.16.34.209  00:60:97:ba:86:db   405  1      471     ibmEmac0
-----
value = 75 = 0x4b = 'K'
```

cd

You can move to a different directory (usually in the flash file system) using the `cd` command.

```
SNC4000 > cd "MGMT"
value = 0 = 0x0
```

clearReservation [devId]

The `clearReservation` command can be used to force-clear a reservation held by a host for the specified target device. It may be necessary to issue this command if a host that has a reservation for a shared device was disconnected from the SNC 4000 without properly shutting down the application software that issued the reservation. If this is the case, other hosts that attempt to access the shared device will repeatedly receive reservation conflict status from the device. Issuing this command may result in resetting the target device.



CAUTION

Be sure to suspend I/O before initiating this command.

Parameter	Value
devId	The index of the device (LUN)

```
SNC4000 > clearReservation 4
value = 0 = 0x0
```

The above example shows the `clearReservation` command being used to clear a reservation on a target device at LUN 4.

cleHelp

The `cleHelp` command displays a list of the Command Log Event facility commands.

```
SNC4000 > cleHelp
CLE - Command Log Event facility
cleShow <lun> - Displays Logged Events for a specific LUN
cleShowAll - Displays Logged Events for All LUNs
value = 0 = 0x0
```

cleShow <LUN>

The `cleShow` command displays the last 64 Command Log events for a device at the specified LUN. This log is not maintained for disk devices because the performance impact is significant. The manufacturer may request the contents of the command log for diagnostic purposes. Information about interpreting these events is not provided.

cleShowAll

The `cleShowAll` command performs a `cleShow` for all LUNs. The manufacturer may request the contents of the command log for diagnostic purposes. Information about interpreting these events is not provided.

copyScsiAssign [source channel], [dest channel]



Note

If you are using Firmware 4.40 on a Fibre Channel blade, this command is unavailable.

The `copyScsiAssign` command copies the SCSI assignments from a source channel to a destination channel.

```
SNC4000 > copyScsiAssign 1,2
value = 0 = 0x0
```

csClearLogFile

The `csClearLogFile` command clears the contents of the event log.

```
SNC4000 > csClearLogFile
value = 0 = 0x0
```

date

The `date` command displays the system's date and the time.

The system may be set to read its local Real Time Clock (see the `dateSetFromRTC` command) or a remote host. See the `rdate "timeserver"` command.

The local Real Time Clock can also be synchronized with a remote timeserver See the `rtcSetCurrent` command.

```
SNC4000 > date
SNC4000 > THU JAN 25 20:32:49 2001
```

dateSetFromRTC

The `dateSetFromRTC` command sets the SNC 4000's RTC as the source of the date display. Use the `date` command to display the date and time.

```
SNC4000 > dateSetFromRTC
value = 0 = 0x0
```

deleteScsiAssign [dev ID],[channel], [id],[lun]



Note

When you are using Firmware 4.40 on a Fibre Channel blade, this command is unavailable.

The `deleteScsiAssign` command deletes assignments previously created.

Example 1, below, uses the output of Example 2, next page, to delete assignments from SCSI Channel 2.

Example 1:

```
SNC4000 > deleteScsiAssign 64,2,0,0
value = 0 = 0x0
SNC4000 > deleteScsiAssign 82,2,0,1
value = 0 = 0x0
SNC4000 > deleteScsiAssign 98,2,0,2
value = 0 = 0x0
SNC4000 > deleteScsiAssign 124,2,0,3
value = 0 = 0x0
```

Example 2:

```
SNC4000 > showScsiAssign
SCSI 2
  ID Lun DevId
    0  0   64
    0  1   82
    0  2   98
    0  3  124
```

dhcpClientShow

The `dhcpClientShow` command displays data received from the DHCP server, including IP addresses, domain names, and IP address lease duration information.

```
Snc4000 > dhcpClientShow
```

dhcpDisable

The `dhcpDisable` command disables DHCP.

```
SNC4000 > dhcpDisable
value = 0 = 0x0
```

Example:

```
SN9710012704 > dhcpClientShow
  Domain Name : (null)
  DNS Addr    :
value = 0 = 0x0
```

dhcpEnable

The `dhcpEnable` command enables DHCP.

```
SNC4000 > dhcpEnable
value = 1 = 0x1
```

Example:

```
SN9710012704 > dhcpClientShow
DHCP server: 172.16.33.10
Timer T1: 129526 seconds remaining.
Timer T2: 226726 seconds remaining.
DHCP server name:
Boot file name:
DNS domain name: adic.com
Router discovery enabled.
RFC 894 Ethernet encapsulation enabled.
Maximum datagram size: 576
Default IP Time-to-live: 64
Interface MTU: 576
ARP cache timeout: 60
Default TCP Time-to-live: 64
TCP keepalive interval: 7200
Client lease origin: 1056992956
Client lease duration: 259200
Client renewal (T1) time value: 129600
Client rebinding (T2) time value: 226800
DHCP server: 172.16.33.10
Assigned IP address: 172.16.34.182
```

```

Client subnet mask: 255.255.248.0
Client router solicitation address: 255.255.255.255
Client IP routers: 172.16.32.2
Client DNS name servers:
    172.16.9.63
    172.16.40.24
Domain Name : adic.com
DNS Addr    : 172.16.9.63
Client DNS name servers:
    172.16.9.63
    172.16.40.24

```

dhcpState

The `dhcpState` command displays the state of the DHCP server: enabled or disabled.

```
SNC4000 > dhcpState
```

diagBoot

This command is used only to transition the SNC 4000 from normal operation to the special diagnostic mode.



CAUTION

After completing use of the diagnostic commands, use the `normalBoot` command to restore your system to normal operation.

It copies the existing bootline to a file in the `ffs:mt` directory on the SNC 4000 and installs a new bootline directing the SNC 4000 to boot using a special diagnostic startup script `ffs:mt/diagnstk.rc`. It renames the persistent map file `config/device.map` as `config/device.bak` (a new file will be generated after rebooting). Finally, `diagBoot` issues a reboot command to put the changes into effect.

diagHelp

The `diagHelp` command displays a list of the diagnostic commands.

```

SNC4000 > diagHelp
** Diagnostic commands: Available in Diagnostic Mode Only **
elTest      Test Ethernet port w/loop-back cable
fcSlotTest <portnum> Test specified Fibre Channel port w/loop-back cable
normalBoot  Shutdown and restart in normal mode
scsiChannelTest <x,y> Test specified SCSI Channels w/loop-back cable

See User's Guide for more information
value = 0 = 0x0

```

disableCC [option number]

Disable the command and control interface (LUN 0) using the `disableCC` command. Specify one of two option parameters as follows.

Option Number	Value
1	Hides the Command and Control interface and results in Inquiry data returning "device not available" for LUN 0.

Option Number	Value
2	Completely disables all Command and Control functions

The SNC 4000 is addressable as a SCSI target device for command and control support. On a FC Interface, this device will be seen as logical unit number 0, (LUN 0). The LUN 0 device returns a device type of 0Ch in an inquiry command, indicating it is a controller device. Controller devices are defined in the SCSI-3 Controller Commands specification (SCC).

In some cases, it may be desirable to disable this feature. If LUN 0 is disabled, then a device type of 2Ch will be returned in an inquiry to LUN 0, indicating that the device is not presently available at this LUN. LUN 0 will remain reserved for the Command and Control interface and will not be allocated to another target device.

Other commands are available for re-enabling the Command and Control interface or reassigning it to a different LUN rather than hiding or disabling it. See the `enableCC` command and the `setSnaCCLun` command for further information.



CAUTION

If you enter the `disableCC` command without specifying an option number, it has the same effect as `disableCC 1`.

```
SNC4000 > disableCC
value = 0 = 0x0
SNC4000 >
```

enableCC

To restore the capability to send commands to the command and control interface (LUN 0), use the `enableCC` command. The command is typically used to re-enable the interface after it was disabled by the `disableCC` command.

```
SNC4000 > enableCC
value = 0 = 0x0
```

envMonShow

The `envMonShow` command lists all of the environmental channel states and their current values. Use the command `envMonRangeShow` to restrict output to a display of the ranges relevant to each state. The following channels have been defined:

Channel Name	Description
Air Inlet Temp	Temperature of the air as it enters the unit
IO Processor Temperature	Temperature of the IO Processor
Input Power: +5 Volts	Voltage level of the +5 input
Input Power: +12 Volts	Voltage level of the +12 input
Local Power: +2.5 Volts	Voltage level of the local +2.5 supply
Local Power: +3.3 Volts	Voltage level of the local +3.3 supply
Fan	Fan running (for tachometer fans: RPM of fan)

```
SNC4000 > envMonShow
Description                               State      Value
```

```

-----
Air Inlet Temp          Nominal      27 C
IO Processor Temp      Nominal      30 C
Input Power: +5 Volts  Nominal      5.20 V
Input Power: +12 Volts Nominal      12.25 V
Local Power: +2.5 Volts Nominal      2.48 V
Local Power: +3.3 Volts Nominal      3.29 V
Fan                    Nominal      3245 RPM

```

```

All Power              Nominal
All Temp.              Nominal
Sample Count          2158

```

```
value = 1 = 0x1
```

```
snc4000 > envMonRangeShow
```

```
Air Inlet Temp (C):
```

```
Nominal: 5 to 45
```

```
Warning: 4 <= N < 5 or 45 < N <= 50
```

```
Alarm:   N < 4 or N > 50
```

```
IO Processor Temp (C):
```

```
Nominal: 5 to 80
```

```
Warning: 4 <= N < 5 or 80 < N <= 108
```

```
Alarm:   N < 4 or N > 108
```

```
Input Power: +5 Volts (V):
```

```
Nominal: 4.94 to 5.35
```

```
Warning: 4.83 <= N < 4.94 or 5.35 < N <= 5.46
```

```
Alarm:   N < 4.83 or N > 5.46
```

```
Input Power: +12 Volts (V):
```

```
Nominal: 11.62 to 12.62
```

```
Warning: 11.50 <= N < 11.62 or 12.62 < N <= 12.87
```

```
Alarm:   N < 11.50 or N > 12.87
```

```
Local Power: +2.5 Volts (V):
```

```
Nominal: 2.40 to 2.58
```

```
Warning: 2.36 <= N < 2.40 or 2.58 < N <= 2.62
```

```
Alarm:   N < 2.36 or N > 2.62
```

```
Local Power: +3.3 Volts (V):
```

```
Nominal: 3.20 to 3.39
```

```
Warning: 3.13 <= N < 3.20 or 3.39 < N <= 3.46
```

```
Alarm:   N < 3.13 or N > 3.46
```

```
Fan (RPM):
```

```
Nominal: 2520 to 3780
```

```
Warning: 2205 <= N < 2520 or 3780 < N <= 4095
```

```
Alarm:   N < 2205 or N > 4095
```

```
value = 1 = 0x1
```

envMonRangeShow

The `envMonRangeShow` command specifies operational ranges for the SNC 4000's environmental channels. It displays ranges of values associated with the Nominal, Warning, and Alarm states for voltage, temperature, and fan/blower operation according to the channels defined in the `envMonShow` command:

```

SNC4000 > envMonRangeShow
Air Inlet Temp (C):
    Nominal: 5 to 45
    Warning: 4 <= N < 5 or 45 < N <= 50
    Alarm:   N < 4 or N > 50
Air Outlet Temp (C):
    Nominal: 5 to 50
    Warning: 4 <= N < 5 or 50 < N <= 55
    Alarm:   N < 4 or N > 55
IO Processor Temp (C):
    Nominal: 5 to 80
    Warning: 4 <= N < 5 or 80 < N <= 108
    Alarm:   N < 4 or N > 108
Input Power: +5 Volts (V):
    Nominal: 4.94 <= N <= 5.36
    Warning: 4.84 <= N < 4.94 or 5.36 < N <= 5.46
    Alarm:   N < 4.94 or N > 5.46
Input Power: +12 Volts (V):
    Nominal: 11.00 to 12.93
    Warning: 10.75 <= N < 11.00 or 12.93 < N <= 13.18
    Alarm:   N < 10.75 or N > 13.18
Local Power: +2.5 Volts (V):
    Nominal: 2.42 to 2.58
    Warning: 2.36 <= N < 2.42 or 2.58 < N <= 2.62
    Alarm:   N < 2.36 or N > 2.62
Local Power: +3.3 Volts (V):
    Nominal: 3.20 to 3.39
    Warning: 3.13 <= N < 3.20 or 3.39 < N <= 3.46
    Alarm:   N < 3.13 or N > 3.46

Fan :
Nominal: 1; Alarm: 0
value = 1 = 0x1

```

ethAddrGet

The `ethAddrGet` command displays the IP address of the SNC 4000, specified as 4 decimal numbers separated by periods.

```

SNC4000 > ethAddrGet
IP Address set to 192.168.1.176
value = 0 = 0x0

```

ethAddrSet

The `ethAddrSet` command changes the IP address of the SNC 4000. An IP address is specified as 4 decimal numbers separated by periods.

```

SNC4000 > ethAddrSet "192.168.1.54"
Host Address set to 192.168.1.54 for Ethernet interface
value = 0 = 0x0

```

If a netmask is required, specify it after the IP address in “dotted decimal” form. For example:

```

SNC4000 > ethAddrSet "10.0.0.2","255.255.0.0"
Inet Mask set to ffff0000 for Ethernet interface
Write complete
Host Address set to 10.0.0.2 for Ethernet interface
value = 0 = 0x0

```

fcConnTypeGet [port]

The `fcConnTypeGet` command is used to display the current setting of a FC port's connection type. See also the `fcConnTypeSet` command.

Parameter	Value	Meaning
port	1	The SNC 4000 Connection labeled FC1
connection type	0	Loop
	1	Point-to-point
	2	Loop preferred

The following example shows how the connection type is displayed when FC port 1 is specified and its connection type is loop.

```
SNC4000 > fcConnTypeGet 1
value = 0 = 0x0
```

fcConnTypeSet [port],[connection]

The `fcConnTypeSet` command is used to set the type of connection for a FC port. See also the `fcConnTypeGet` command.

Parameter	Value	Meaning
Port	1	The SNC 4000 Connection labeled FC1
Connection Type	0	Loop
	1	Point-to-Point
	2	Loop Preferred

The following example shows how to set the FC port connection type to point-to-point.

```
SNC4000 > fcConnTypeSet 1,1
value = 0 = 0x0
```



CAUTION

You must issue the `fcRestart` command or reboot the SNC 4000 for the new setting to take effect. See the `fcRestart` command for further information.

fcFibreSpeedGet [port]

The `fcFibreSpeedGet` command displays the requested speed of the FC port. The actual speed can be viewed in the output of the `fcShow` command. The example below shows that the FC port has a maximum speed of 1 Gb/sec.

```
SNC4000 > fcFibreSpeedGet 1
value = 1= 0x1
```

Parameter	Value	Meaning
port	1	The SNC 4000Connection labeled FC1

Parameter	Value	Meaning
value =	0	Speed is set to Autorange
	1	Speed is set to 1 Gb/sec
	2	Speed is set to 2 Gb/sec

fcFibreSpeedSet [port],[speed]

The `fcFibreSpeedSet` command sets the FC port speed to 1 Gb/sec or 2 Gb/sec for the FC port. The port can also be set to autorange, as in the example below.

Parameter	Value	Meaning
Port	1	The SNC 4000 connection labeled FC1
Speed	0	Autorange
	1	1 Gb/sec
	2	2 Gb/sec

```
SNC4000 > fcFibreSpeedSet 1,0
value = 0 = 0x0
```



CAUTION

You must issue the `fcRestart` command or reboot the SNC 4000 for the new setting to take effect. The initiator and the device must both be capable of the selected speed. See the `fcRestart` command for further information.

fcGbicShow [port]

The `fcGbicShow` command displays the SFP information for each installed SFP. Specifying the port number is optional.

Parameter	Value	Meaning
Port	1	The SNC 4000 connection labeled FC1

```
SNC4000 > fcGbicShow
```

```
-----
Ctrl : Module :   Module
ID   : Code   :   Information
-----
1 : 4 : Serial Module Definition Protocol
   : Connector Type ----- SC
   : Nominal Speed ----- 2.5 Gb/sec
   : Link length for 9/125 um ----- 0 meters
   : Link length for 50/125 um ----- 5500 meters
   : Link length for 62.5/125 um ----- 2700 meters
   : Vendor Name ----- FINISAR CORP.
   : Vendor OUI ----- 009065
   : Vendor Part Number ----- FTR-8519-3-2.5
   : Vendor Revision ----- 1A
   : Vendor Serial Number ----- B2557JC
   : Vendor Mfg. Date ----- 10-26-2000
```

```

: RX LOS Implemented ----- Yes
: TX Fault Implemented ----- Yes
: TX Disable Implemented ----- Yes

```

fcPortModeGet [port]

The `fcPortModeGet` command displays the mode for the specified FC port. The default port mode is Public Target. See also the `fcPortModeSet` command.

Parameter	Value	Meaning
Port	1	The SNC 4000 connection labeled FC1

After the command executes, the number displayed as a value indicates the port mode as follows:

Value	Port Mode
1	Private Target
2	Private Initiator
3	Private Target and Initiator
17	Public Target
18	Public Initiator
19	Public Target and Initiator

The following example shows how the connection type is displayed when the FC port is specified and the port mode is Private Target.

```

SNC4000 >fcPortModeGet 1
value = 1 = 0x1

```



CAUTION

You must issue the `fcRestart` command or reboot the SNC 4000 for the new setting to take effect. See the `fcRestart` command for further information.

fcPortModeSet [port],[mode]

The `fcPortModeSet` command sets the mode for the specified FC port. See also the `fcPortModeGet` command.

The default port mode is Public Target. Consequently, if attached to a Fabric device the SNC 4000 will register as a “Target” with the name server. If the port mode is “Private Target,” the SNC 4000 does not register with the name server and the Fabric device will not recognize the SNC 4000 as a Target.

The port must be in Initiator mode if you want the SNC 4000 to scan for target devices on the port. When the port is in “Private Initiator” mode, the SNC 4000 only scans for devices on the local loop. If the port mode is in “Public Initiator” mode, the SNC 4000 also scans for devices attached to a Fabric.

Parameter	Value	Meaning
Port	1	The SNC 4000 connection labeled FC1

Parameter	Value	Meaning
Mode	1	Private Target
	2	Private Initiator
	3	Private Target and Initiator
	17	Public Target
	18	Public Initiator
	19	Public Target and Initiator

```
SNC4000 > fcPortModeSet 1
value = 0 = 0x0
```



CAUTION

You must issue the `fcRestart` command or reboot the SNC 4000 for the new setting to take effect. See the `fcRestart` command for further information.

fcRestart [port]

The `fcRestart` command restarts the specified FC port. You typically use this command to restart the port after changing its configuration settings so that the changes take effect. Issuing this command is an alternative to rebooting the SNC 4000 in order to make the configuration changes take effect.



CAUTION

This command interrupts traffic.

Parameter	Value	Meaning
Port	1	The SNC 4000 connection labeled FC1

The following example shows the display when the FC port is specified.

```
SNC4000 > fcRestart 1
value = 0 = 0x0:
Restart of FC Channel 1 succeeded
```

In order to get the command prompt (e.g. `SNC4000 >`) to show after you have executed the `fcRestart` command, you will need to press the **Enter** key.

fcShow [level]

The `fcShow` command displays the channel status for the FC interface.

Level	Meaning
0 or <blank>	sets the verbosity level to the display in the example below
1	displays the information displayed below, and appends a break-out for each channel that includes Node Type, Node Name, Port Name and Port ID

Level	Meaning
2	displays the information included at levels 0 and 1, and appends loop ID link stats

```

SNC4000 > fcShow
-----Fibre Channel Controllers-----
Ctrlr : PCI Addr : ISP   : Firmware   : Firmware   : Loop : Fabric :
Port : E
xt. : Link
  Id : Bs Dv Fn : Type   : State     : Version   : ID   : Attached : Mode : F
IFO : Speed
-----
  1 : 00 07 00 : 2300   : Sync Lost : 3.00.25  : None  : No      : Targ : N
one : 1 Gbps
  2 : 00 08 00 : 2300   : Sync Lost : 3.00.25  : None  : No      : Targ : N
one : 2 Gbps
-----
-----
value = 95 = 0x5f = '_'

value = 95 = 0x5f = '_'

```

Ctrlr Id	Indicates the Port Number for this interface.
PCI Addr	The PCI address of the interface, showing bus, device id, and function number.
ISP Type	The type of FC Controller.
Firmware State	The current state of the interface as reported by the FC controller. Firmware states are listed below.
Configuration Wait	Firmware is not initialized.
Waiting for AL_PA	Firmware is performing or waiting to perform loop initialization.
Waiting for login	Firmware is attempting port and process logins with all loop ports.
Ready	Indicates that the interface is connected and operational and ready to process SCSI commands. Any other value indicates intermediate states or interface failure.
Sync Lost	The firmware has detected a loss-of-sync condition and is re-synchronizing the serial link receiver. This is the state reported when the FC link does not detect a connection to a FC device.
Error	The firmware has detected an unrecoverable error condition.
Nonparticipating	The firmware is not participating on the loop since it did not acquire an AL_PA during initialization.
Failed	The firmware is not responding to commands.
Firmware Version	The version of firmware on the FC controller.
Loop ID	The FC Loop ID for this interface. PtoP indicates a point-to-point connection.
Fabric Attached	Indicates whether the port is attached to a Fabric.
Port Mode	Indicates whether the port is set to Target or Initiator mode
Ext. FIFO	Indicates that FIFOs external to the FC controller are on the board. If they are, their size in KB will be output into this column.
Link Speed	Indicates the actual speed of the connection. This figure is only meaningful when the Firmware State is reported as Ready .

**CAUTION**

If the Firmware State is anything but Ready, the information output by this command will be unreliable.

fcShowDevs

The `fcShowDevs` command displays information about the devices that are accessible from each FC interface. The display shows the LUN that the SNC 4000 has assigned to each device, the SCSI Channel that the device is attached to, the actual SCSI ID and LUN of the device, the vendor, product, revision and serial number of the device.

```
SNC4000 >fcShowDevs
Targets Visible to Hosts on FC 1:
LUN Chan  Id  Lun  Vendor  Product          Rev  SN
-----
   0   0   0   0  ADIC    Scalar SNC       413* 601526
   1   1   6   0  ADIC    Scalar 100       100A ADIC_1_07032002002
   2   1   1   0  IBM     ULT3580-TD1     22U0 6811088354
  22   2   2   0  IBM     ULT3580-TD1     22U0 6811085725fcShowNames
```

fcShowNames

The `fcShowNames` command displays the node and port names (addresses) of the FCs.

- Ctrlr Id** Indicates the Channel Number for the interface
- PCI Addr** The PCI address of the interface, showing bus, device id, and function number.
- ISPType** The type of FC Controller, ISP2310.
- Node Name** The FC node name for the SNC 4000.
- Port Name** The FC port name for the interface.

fcTxDisable [port]

The `fcTxDisable` command disables a FC port transmitter.

Parameter	Value	Meaning
Port	1	The SNC connection labeled FC1

```
SNC4000 > fcTxDisable 1
value = 0 = 0x0
```

fcTxEnable [port]

The `fcTxEnable` command enables or re-enables a FC port transmitter

Parameter	Value	Meaning
Port	1	The SNC connection labeled FC1

```
SNC4000 > fcTxEnable 1
value = 0 = 0x0
```

gateAddrGet

The `gateAddrGet` command displays the default network gateway address if one has been set. This address is used when connections are made to a different subnet and there are no explicit routes defined for that subnet. Consult your network administrator for more information on the default gateway (sometimes referred to as default router) address.

```
SNC4000 > gateAddrGet
Gateway Address set to 192.168.1.1
value = 0 = 0x0
```

gateAddrSet

The `gateAddrSet` command changes the default network gateway address. This address is used when connections are made to a different subnet and there are no explicit routes defined for that subnet. Consult your network administrator for more information on the default gateway (sometimes referred to as default router) address.

Successful `gateAddrSet`:

```
SNC4000 > gateAddrSet "10.0.0.1"
value = 0 = 0x0
```

Failed `gateAddrSet` (1):

The following message is received when trying to set a new gateway address and that address is currently unreachable. The following message is sent to the terminal.

```
SNC4000 > gateAddrSet "10.0.0.1"
gateAddrSet: Error setting current gate addr: S_errno_ENETUNREACH
value = -1 = 0xffffffff = payloadChecksum + 0xffd418a3
```

The new gateway address is written to the bootup parameters to be used at the next boot. If at next boot, the address is reachable, then it will be written to the system file. If at next boot the gateway address is not reachable and therefore not written to the system file, the following message is displayed:

Failed `gateAddrSet` (2):

```
SNC4000 > gateAddrSet "172.16.76.1"
gateAddrSet: Error deleting old gateway addr: S_errno_ESRCH
Gateway Address set to 172.16.76.1 for Ethernet interface
value = 0 = 0x0
```

ghostIOSet [ticks]

The `ghostIOSet` command changes the number of ticks that a command remains queued for transmissions to the target. Each tick is 1/60th of a second. The number of ticks can be set from 1 to 60. If ticks are set to 0, command queuing is disabled.

Parameter	Value	Valid Range	Meaning
Ticks	1/60th of a second	0-60	Number of ticks commands remain in queue

```
SNC > ghostIOSet 30
Ghost I/O support is enabled.
Stale commands will be deleted after 30 ticks (500 ms).
value = 30 = 0x1e
SNC >
```

ghostIOShow

The `ghostIOShow` command displays the current status of command queuing. The value 0 is returned when command queuing is disabled. Otherwise the number of ticks that commands remain in queue is displayed.

```
SNC > ghostIOShow
Ghost I/O is disabled.
value = 0 = 0x0
SNC >
```

help

The `help` command displays a list of the shell commands.

```
SNC4000 > help

help          Print this list
cleHelp       Print Command Log Entry info
diagHelp      Print Diagnostic Help info
hlthChkHelp   Print Health Check Help info
ioHelp        Print I/O Utilities Help info
mapHelp       Print Device Map Help info
netHelp       Print Network Help info
snmpHelp      Print SNMP Help info
userHelp      Print User account info
h [n]        Print (or set) shell history
pwd           Print working path
shellLock     Lock or unlock shell command interface
version       Print Version info
whoami        Print user name
clearReservation [devId] Clear reservation on a target (may reset target)
diagBoot      Shutdown and restart in diagnostic mode
initializeBox Delete all device maps, restore factory defaults,
reboot
ridTag ["value"] Display and set serial number of replaced base unit
disableCC [option] Disable Command and Control Interface
                option 1 - Report as Invalid (AIX mode)
                option 2 - Fully disabled
enableCC      Enable Command and Control Interface
scsiRescan [chan] Rescan SCSI Channel (all if chan not specified)
scsiShow      Display info for SCSI Channels
fcShow        Display info for Fibre Channels
fcShowDevs    Display devices available on each Fibre Channel
fcShowNames   Display Node and Port names for Fibre Channels
hostTypeShow  Display Default Host Type settings
loggerDump [count] Display Logger Dump Records
loggerDumpCurrent [level] Display Logger Dump Records for current boot
reboot        Shut down and restart
reset         Restart without shut down
setFcFrameSize [chan],[size] Set FC Frame Size
setFcHardId [chan],[id] Set FC Loop ID
setHost [chan],[OS] Set default host type for FC Channel
                OS may be "aix", "nt", "solaris", "hpux"
setSnaCCLun   Set LUN for Controller Device (typically zero)
showBox       Display graphic of current hardware configuration
sysConfigShow Display System Config Parameters
sysVpdShow    Display Vital Product Data
```

```
sysVpdShowAll      Display Vital Product Data for all subsystems
targets            List all known target devices
uptime             Display time since last boot
```

See User's Guide for more information

```
value = 39 = 0x27 = ''
```

hlthChkHelp

The `hlthChkHelp` command displays a list of the Health Check commands.

```
SNC4000 > hlthChkHelp
hlthChkIntervalGet  - Show Check Interval
hlthChkIntervalSet <interval> - Set Check Interval
hlthChkLevelGet     - Show Check Level
hlthChkLevelSet <level> - Set Check Level
hlthChkNow          - Run Health Check Now
```

See User's Guide for more information

```
value = 0 = 0x0
```

hlthChkIntervalGet

The current Health Check interval can be viewed using the `hlthChkIntervalGet` command. The example below shows the current interval is 60 minutes.

```
SNC4000 > hlthChkIntervalGet
value = 60 = 0x3c = '<'
```

hlthChkIntervalSet

The Health Check interval controls how often the Health Check process runs. The interval may range from 1 to 65,535 minutes (about 45 days). Set the interval using the `hlthChkIntervalSet` command.

```
SNC4000 > hlthChkIntervalSet 60
value = 0 = 0x0
```

hlthChkLevelGet

To display the current Health Check level, use the `hlthChkLevelGet` command. The example below shows that the current level is 2.

```
SNC4000 > hlthChkLevelGet
value = 2 = 0x02
```

hlthChkLevelSet

To set the Health Check level, use the `hlthChkLevelSet` command. The example below shows setting the level to 3.

```
SNC4000 > hlthChkLevelSet 3
value = 0 = 0x0
```

hlthChkNow

The `hlthChkNow` function causes the SNC 4000 to execute an immediate, level 4 Health Check. Results are displayed that will indicate which devices or subsystems failed the check.

```
SNC4000 > hlthChkNow
Health Check: Starting level 4 check
Health Check: Step 1 -- Checking System
Health Check: Step 2 -- Checking Interfaces
Health Check: Step 3 -- Checking Devices
Health Check: Step 4 -- Checking Device States
Health Check: Passed
```

```
value = 0 = 0x0
```

host “add”, “hostname”, “ipAddress”

The `host “add”` command adds the named host to the host table and host file. If the IP address is already assigned to a host, then the new name is added as an alias for the host. The `host “add”` command is invoked to add known hosts and their IP addresses. Alias names are supported, allowing multiple names to a single host.

The `host` utilities maintain a host file, `nvfs:/mgt/hosts`, which is used at system startup to initialize the network hosts table. This table associates network names with IP addresses. Use of the `hosts` table is entirely optional, but might facilitate frequently needed connections. Each host entry is a single line of the format:

```
IP-address      official_host_name  nicknames ...
```

where

IP-address is a text string in standard IP Address format (i.e., 10.0.0.2).

official_host_name is the first name selected for this host.

nicknames is an optional list of additional aliases for the host (separated by spaces).

The following is an example of host file contents.

```
192.168.1.90 bruno
200.0.0.42 socrates
200.0.0.45 plato
200.0.0.47 fred
```



Note The host file does not exist until you enter the `host “add”` command.

```
SNC4000 > host "add", "plato", "200.0.0.45"
```

host “delete”, “hostname”

The `host “delete”` command deletes the named host from the hosts table and hosts file. If the `hostname` is an alias, then only the alias is removed. If `hostname` is the official host name, the entry and all aliases are removed.

The `host` utilities maintain a host file, `nvfs:/mgt/hosts`, which is used at system startup to initialize the network hosts table. This table associates network names with IP addresses. Use of the `hosts` table is entirely optional, but might facilitate frequently needed connections. Each host entry is a single line of the format:

```
IP-address      official_host_name  nicknames ...
```

where

IP-address is a text string in standard IP Address format (i.e., 10.0.0.2).

official_host_name is the first name selected for this host.

nicknames is an optional list of additional aliases for the host (separated by spaces).

The following is an example of host file contents.

```
192.168.1.90 bruno
200.0.0.42 socrates
200.0.0.45 plato
200.0.0.47 fred
```

```
SNC4000 > host "delete", "plato"
```

host “list”

The `host “list”` command prints the content of the hosts file.

The `host` utilities maintain a host file, `nvfs:/mgnt/hosts`, which is used at system startup to initialize the network hosts table. This table associates network names with IP addresses. Use of the `hosts` table is entirely optional, but might facilitate frequently needed connections. Each host entry is a single line of the format:

```
IP-address      official_host_name  nicknames ...
```

where

IP-address is a text string in standard IP Address format (i.e., 10.0.0.2).

official_host_name is the first name selected for this host.

nicknames is an optional list of additional aliases for the host (separated by spaces).

The following is an example of host file contents.

```
SNC4000 > host "list"
192.168.1.90 bruno
200.0.0.42 socrates
200.0.0.45 plato
200.0.0.47 fred
value = 0 = 0x0
```

hostNameSet

The `hostNameSet` command changes the network name of the SNC 4000. The shell prompt will be set to the new host name.

```
SNC4000 > hostNameSet "foster"
Target hostname set to foster
value = 0 = 0x0
foster >
```

hostShow

The `hostShow` command displays the IP address and alias (if any) of the unit processing the `hostShow` command, the localhost and the timeserver host.

```
SNC4000 > hostShow
hostname      inet address      aliases
-----
localhost     127.0.0.1
SNC4000       172.16.38.48
host          172.16.1.1
value = 0 = 0x0
```

hostTypeShow

The `hostTypeShow` command displays the host type setting for each FC. The possible host types are **AIX**, **Gateway**, **ADIC SNC**, **HP-UX**, **Linux**, **NT** (includes **Windows 2000**), **Netware**, **Generic**, **Solaris**, **Autosense/NT**, or **Dell PV-132T-FC**.

```
SNC4000 > hostTypeShow
FC 1: Type 1 - nt
```

icmpstatShow

The `icmpstatShow` command displays ICMP statistics for the Ethernet network. Interpreting these statistics requires detailed knowledge of Internet networking protocols. This information may be useful to the LAN administrator.

```
SNC4000 > icmpstatShow
ICMP:
0 call to icmp_error
0 error not generated because old message was icmp
0 message with bad code fields
0 message < minimum length
0 bad checksum
0 message with bad length
0 message response generated
value = 30 = 0x1e
```

ifShow

The `ifShow` command is used to show the Ethernet port parameters and status as shown below. The SNC 4000 will show two devices. `ibmEmac` is the Ethernet port. `lo` is the local loopback port.

```
SNC4000 > ifShow
ibmEmac (unit number 0):
  Flags: (0x8063) UP BROADCAST MULTICAST ARP RUNNING
  Type: ETHERNET_CSMACD
  Internet address: 172.16.38.48
  Broadcast address: 172.16.255.255
  Netmask 0xffff0000 Subnetmask 0xffff0000
  Ethernet address is 00:00:60:00:00:00
  Metric is 0
  Maximum Transfer Unit size is 1500
  0 octets received
  0 octets sent
  2354 packets received
  2 packets sent
  2354 unicast packets received
  1 unicast packets sent
  0 non-unicast packets received
  1 non-unicast packets sent
  0 input discards
  0 input unknown protocols
  0 input errors
  102 output errors
  0 collisions; 0 dropped
lo (unit number 0):
  Flags: (0x8069) UP LOOPBACK MULTICAST ARP RUNNING
  Type: SOFTWARE_LOOPBACK
  Internet address: 127.0.0.1
  Netmask 0xff000000 Subnetmask 0xff000000
```

```

Metric is 0
Maximum Transfer Unit size is 32768
0 packets received; 0 packets sent
0 multicast packets received
0 multicast packets sent
0 input errors; 0 output errors
0 collisions; 0 dropped
value = 29 = 0x1d

```

inetstatShow

The `inetstatShow` command displays statistics about Internet protocol sockets for the Ethernet network. Interpreting these statistics requires detailed knowledge of Internet networking protocols. This information may be useful to the LAN administrator.

```

SNC4000 > inetstatShow
Active Internet connections (including servers)
PCB      Proto Recv-Q Send-Q Local Address      Foreign Address    (state)
-----
1f43fa4  TCP      0      0 0.0.0.0.52787      0.0.0.0.0
1f43e9c  TCP      0      0 0.0.0.0.23         0.0.0.0.0
1f43e18  TCP      0      0 0.0.0.0.21         0.0.0.0.0
1f43c08  TCP      0      0 0.0.0.0.513        0.0.0.0.0
1f43f20  UDP      0      0 0.0.0.0.161        0.0.0.0.0
value = 1 = 0x1
SNC4000 >
SNC4000 >
SNC4000 > ipstatShow
      total 792
      badsum 0
      tooshort 0
      toosmall 0
      badhlen 0
      badlen 0
      infragments 0
      fragdropped 0
      fragtimeout 0
      forward 0
      cantforward 672
      redirectsent 0
      unknownprotocol 0
      nobuffers 0
      reassembled 0
      outfragments 0
      noroute 0
value = 1 = 0x1

```

initializeBox

The `initializeBox` command removes configuration files, such as management configuration and SCSI device maps, and then prompts to reboot.



CAUTION

Use this function with care as data may be lost as a result of devices moving to different LUNs when the mapping database is removed. Make sure all I/O has been stopped.

ipstatShow

The `ipstatShow` command displays Internet protocol statistics for the Ethernet network. Interpreting these statistics requires detailed knowledge of Internet networking protocols. This information may be useful to the LAN administrator.

```
SNC4000 > ipstatShow
total 20012
      badsum      0
      tooshort    0
      toosmall    0
      badhlen     0
      badlen      0
      infragments 0
      fragdropped 0
      fragtimeout 0
      forward     0
      cantforward 16920
      redirectsent 0
      unknownprotocol 2
      nobuffers   0
      reassembled 0
      outfragments 0
      noroute     0
```

```
value = 1 = 0x1
```

licenseShow

The `licenseShow` command displays information about software license keys that are installed and the corresponding features that are available. The following example shows an SNC 4000 that contains a license key for the SFM and Data Mover Module features.

```
SNC4000 > licenseShow
License "24Z48-3P3MN-6SAV9": Valid
Features:
  Scalar Firewall Manager - SFM (TM),
  ADIC Management Console(TM).loggerDump [number]
```

loggerDump [number]

Dump records from the system event log to the console using the `loggerDump` command. A numeric parameter may be used to indicate the number of events to display. With no parameter specified, all events in the log file are displayed starting with the most recent events.

```
SNC4000 > loggerDump
*** Dumping 10 of 10 records ***
SEQUENCE  TIME                               CODE  DESCRIPTION
0001      FEB 21 2002 17:58:06      31    NOTICE: LOGGING STARTED
0002      FEB 21 2002 17:58:06      14    CS 1: Rev. 4.11.05 Built Feb 5
2002, 18:03:37
0003      FEB 21 2002 17:58:12     14SFM1: Enabled: State = Active, Hosts = 1
0004      FEB 21 2002 17:58:12      14    FCAL 1: External FIFO depth is
unknown (0x0700)
0005      FEB 21 2002 17:58:12      14    FCAL 2: External FIFO depth is
unknown (0x0700)
0006      FEB 21 2002 17:58:13      14    FCAL 1: LIP Initiated
0007      FEB 21 2002 17:58:13      14    FCAL 2: LIP Initiated
0008 FEB 21 2002 17:58:13      28    USCSI 2: Bus RESET
```

loggerDumpCurrent [level]

Dump records from the system event log to the console with the `loggerDumpCurrent` command. Only records logged since the system was booted are dumped. Level specifies the event log level for the events as follows:

Number	Level	Explanation
0	Notice	Events recorded in the Event Log but not displayed by the Event Viewer
1	Warning	Includes events that should always be reported, such as device removals, and changes to temperature or power systems
2	Information	Includes events that might result in later problems

```
SNC4000 > loggerDumpCurrent 2
*** Dumping 5 current records (of 13 total) with level <= 2 ***
SEQUENCE  TIME                CODE  DESCRIPTION
0007      FEB 26 2002 19:01:14    28    USCSI 2: Bus RESET
0010      FEB 26 2002 19:01:14    29    Mapping 1: Target Device Added:
index 0
, handle 0x08fda380
0012      FEB 26 2002 19:01:26    29    Mapping 1: Target Device Added:
index 1
, handle 0x09ffcf08
0013      FEB 26 2002 19:01:27    70    NOTICE: Reboot Complete
value = 0 = 0x0
SNC4000 >
```

ls or ll

The SNC 4000 contains a file system in its flash memory. Use the `ls` command to display the files as shown below.

```
SNC4000 >ls
license.dat
sna.rc
vxWorks.stvalue = 0 = 0x0
```

To obtain detailed information about the file, use the `ll` command instead.

macShow

The `macShow` command displays the Media Access Control (MAC) address for the Ethernet interface.

```
SNC4000 > macShow
Enet MAC Address: 0.60.45.d.0.80
value = 33 = 0x21 = '!'
```

mapCompressDatabase



CAUTION

Compressing the map database will cause device addresses to change unpredictably. Use this command only when no host systems are expecting devices to remain at their current addresses.

Occasionally, it may be necessary to eliminate inactive entries and reorder the active entries in the Persistent Device Map database. The `mapCompressDatabase` command removes entries for devices that are no longer present and reassigns existing device entries to new addresses. The devices will be assigned new addresses immediately and hosts must rescan for devices or be rebooted.

This may be required when a host system has a limited number of logical units that may be supported, and changing devices on the SNC 4000 has caused the logical unit numbers to increase beyond the host's supported level.

When you run this command you will be given the option of also clearing the SFM access settings. Because devices will be assigned new addresses, clearing the SFM database ensures that hosts will not have access to the wrong LUNs. Accepting this option requires that the system administrator must reassign SFM access permissions between the hosts and LUNs.

```
SNC4000 > mapCompressDatabase
```

```
CAUTION: This command will compress the Persistent Device Map.
Existing SFM Access Settings may become invalid and should be cleared
because LUN assignments may change!
Do you want to compress the Device Map? (y or n) y
0xc1689ac0 (tShell): Wrote 23 device maps to file 'nvfs:config/device.map'
Device Map Compressed
- Do you want to clear SFM Access Settings? (y or n) y
SFM Access Cleared
value = 23 = 0x17
```

If you have not been using SFM, the output of this command will not reference SFM.

```
SNC4000 > mapCompressDatabase
This command will compress the Persistent Device Map.

Do you want to compress the Device Map? (y or n) y
0xc1689ac0 (tShell): Wrote 23 device maps to file 'nvfs:config/device.map'
Device Map Compressed
value = 23 = 0x17
```

mapHelp

The `mapHelp` command displays a list of the persistent address map database commands.

```
SNC4000 > mapHelp
mapCompressDatabase - Compress Device Map Database
(reboot required)
mapRebuildDatabase - Rebuild Device Map Database (reboot required)
mapShowDatabase - Show the Map Database
mapShowDevs - Show currently attached devices
mapWinnowDatabase - Remove unattached devices from database
```

See User's Guide for more information

```
value = 0 = 0x0
```

```
SNC >
```

mapMultipathSet

The `mapMutipathSet` command configures a device for a given mode of operation. Multiple path target support is available for Fibre Channel targets only. Three modes are possible.

The first mode is called "single path," which is the default. In this mode, targets are mapped only once, regardless of how many physical paths there are to the device.

The second mode is called "manual multi-path" (MMP). In this mode the SNC will map a single Fibre Channel attached device through both Fibre Channels on an SNC 4000 series. This feature requires specialized high availability host software. It is a separately licensed feature.

The third mode is called "automatic multi-path" (AMP). In this mode the SNC maps multiple Fibre Channel paths to a target device and automatically switches the I/O to a good link when link failures occur. This feature can be used to create redundancy on all Fibre Channel links between the SNC and the target including links not directly connected to the SNC (i.e., target to switch). AMP does not require specialized host software. It is a separately licensed feature.



CAUTION

After setting up the mapping mode, the device must be mapped by using the `fcRescan` command. For more information, see the `fcRescan [port]` command.

Value	Meaning
0	Multipath mode set to single path mode
1	Multipath mode set to manual control mode
2	Multipath mode set to automatic mode.

```
SNC > mapMultipathSet 0
Multipath mode set to single path mode.
value = 0 = 0x0
SNC >
```

In order to change the mapping mode associated with a given device, the device must first be removed from the device map using [mapRemoveDevice \[devId\]](#).

For more information about this command and an example of its use, refer to the [mapRemoveDevice \[devId\]](#) on page 96.

This command takes a single parameter which is the device ID (DevId) of the device to be removed from the map. Device ID can be determined by finding the device in the list generated by [mapShowDevs](#).

For more information about this command and an example of its use, refer to the [mapShowDevs](#) on page 97.

See also [mapMultipathShow](#).

mapMultipathShow

The `mapMultipathShow` command displays the current setting for mapping new targets.

```
SNC > mapMultipathShow
Multipath mode set to automatic mode.
value = 2 = 0x2
SNC >
```

mapRebuildDatabase



CAUTION

Clearing the map database will cause device addresses to change unpredictably. Use this command only when no host systems are expecting devices to remain at their current addresses. The SNC 4000 must be rebooted after executing this command.

Occasionally, it may be necessary to eliminate the Persistent Device Map database entirely, allowing the existing devices to have new addresses assigned. The `mapRebuildDatabase` command deletes the current database. When the SNC 4000 is next booted, the devices found will be assigned new addresses.

When you run this command you will be given the option of also clearing the SFM access settings. Because devices will be assigned new addresses, clearing the SFM database ensures that hosts will not have access to the wrong LUNs. Accepting this option requires that the system administrator reassign SFM access permissions between the hosts and LUNs.

This may be required when a host system has a limited number of logical units that may be supported, and changing devices on the SNC 4000 has caused the logical unit numbers to increase beyond the host's supported level.

```
SNC4000 > mapRebuildDatabase
This command will clear the Persistent Device Map.
Existing SFM Access Settings may become invalid and
should be cleared because LUN assignments may change!
These changes will take effect when the SNC 4000 is rebooted.
Do you want to clear the Device Map? (y or n) y
Removing the Persistent Device Map
Device Map Cleared - Do you want to clear SFM Access Settings? (y or n) y
SFM Access Cleared - Reboot SNC 4000 (y or n) y== reboot
```

mapRemoveDevice [devId]

The `mapRemoveDevice` command is used to remove a device from the persistent device map. This command takes a single parameter which is the device ID (`devId`) of the device to be removed from the map. Device ID can be determined by finding the device in the list generated by [mapShowDevs](#).

```
SNC > mapRemoveDevice 2
Must stop the IO for this device before continue. Continue(y/n)? y
value = 0 = 0x0
SNC >
```

mapShowDatabase

The SNC 4000 maintains a database of attached devices, to insure that each time a host attaches to it, the target devices are seen at a consistent address. The database will list not only the devices presently connected, but also devices that have previously been connected. If a previously attached device is later reattached, it will be assigned back to its previous address. Use the `mapShowDatabase` command to display the persistent device map table.

```
SNC4000 > mapShowDatabase
devId  Type  Chan  tId  tLun  UID                               Path
-----
000    SNC  127   127  127   00000060:45000000  SINGLE
SN:
001    SCSI  001   006  000   20100060:45000000  SINGLE
SN:
002    SCSI  001   001  000   20200060:45000000  SINGLE
SN:
```

```

003    SCSI  001  008  000  20400060:45000000  SINGLE
SN:
004    SCSI  001  009  000  20600060:45000000  SINGLE
SN:
005    SCSI  001  010  000  20800060:45000000  SINGLE
SN:
007    SCSI  002  011  000  20c00060:45000000  SINGLE
SN:
008    SCSI  002  012  000  20e00060:45000000  SINGLE
SN:
009    SCSI  002  013  000  21000060:45000000  SINGLE
SN:
010    SCSI  001  001  001  20300060:45000000  SINGLE
SN:
011    SCSI  001  008  001  20500060:45000000  SINGLE
SN:
012    SCSI  001  009  001  20700060:45000000  SINGLE
SN:
013    SCSI  001  010  001  20900060:45000000  SINGLE
SN:
014    SCSI  002  002  001  20b00060:45000000  SINGLE
SN:
015    SCSI  002  011  001  20d00060:45000000  SINGLE
SN:
016    SCSI  002  012  001  20f00060:45000000  SINGLE
SN:
017    SCSI  002  013  001  21100060:45000000  SINGLE
SN:
022    SCSI  002  002  000  20a00060:45000000  SINGLE
SN:

```

devId The index of the device in the database.

Type The type of interface where the device is connected. SNC indicates an internal device. SCSI or FC indicate I/O interfaces.

Chan The channel number of the interface where the device is attached

TId Target ID mapping for SCSI Initiators

TLun Target LUN mapping for SCSI Initiators

UID For a FC interface, the Unique ID of the device. For SCSI interface, the SNC 4000's Unique ID.

mapShowDevs

The SNC 4000 maintains a cross-reference map of device addresses. Information about the presently attached and available devices in the map can be displayed using the `mapShowDevs` command.

```

SNC4000 > mapShowDevs
devId  Type  Chan  iId  iLun  UID                      tId  tLun  Handle    Path
-----
000    SNC  127  127  127  20000060.45000000  001  000  09803c80h  SINGLE
SN:
001    SCSI  001  006  000  20100060.45000000  255  255  097fd288h  SINGLE
SN:
002    SCSI  001  001  000  20200060.45000000  255  255  09ffc288h  SINGLE
SN:
022    SCSI  002  002  000  21600060.45000000  255  255  097fd688h  SINGLE
SN:

```

Type	The type of interface where the device is attached to the SNC 4000.
Chan	The channel number of the interface
ild	For a SCSI interface only - device ID of the device
iLun	For a SCSI interface only – Logical unit number of the device.
UID	For a FC interface – Unique ID of the device. For SCSI interface, a constructed Unique ID based on the SNC 4000's Unique ID.
tld	Target ID mapping for SCSI Initiators
tLun	Target LUN mapping for SCSI Initiators
Handle	An internal pointer used for some diagnostic operations.
ltl	An internal pointer used for some diagnostic operations.

mapWinnowDatabase

Occasionally, you may want to eliminate inactive entries from the database. The `mapWinnowDatabase` command reduces the database to only the devices presently attached. The address mapping of the current devices will not be altered.

```
SNC4000 > mapWinnowDatabase
0xc0ac8340 (tShell): Wrote 4 device maps to file 'nvfs:config/device.map'
value = 4 = 0x4
SNC4000 >
```



CAUTION

Winnowing the database might cause unattached devices to change addresses unpredictably if they are reattached. Use this command only when you are sure that the devices you are interested in are connected and available to the SNC 4000. You must reboot the SNC 4000 after executing this command for the new setting to take effect.

mapWinnowDatabaseLun [dev ID]

The `mapWinnowDatabaseLun` command acts like the existing function `mapWinnowDatabase` except that it operates on only one specified LUN, which is input as a parameter. The `mapWinnowDatabaseLun` command operates against the device list output by the `mapShowDatabase` command. Issue the `mapShowDatabase` command before and after issuing the `mapWinnowDatabaseLun` command to verify functionality.

The `mapWinnowDatabaseLUN` command frees the LUN for use in the device map. If the LUN is currently assigned to an attached device, no action is taken. If the LUN refers only to historical data (device not currently attached), the LUN is freed for reuse.

```
SNC4000 > mapWinnowDatabaseLun 14
value = 31 = 0x1f
SNC4000 >
```

mbufShow

The `mbufShow` command displays statistics about the distribution of mbufs on the Ethernet network. Interpreting these statistics requires detailed knowledge of Internet networking protocols. This information may be useful to the LAN administrator.

```
SNC4000 > mbufShow
type          number
-----
FREE         :    398
```

```

DATA      :      2
HEADER    :      0
SOCKET    :      0
PCB       :      0
RTABLE    :      0
HTABLE    :      0
ATABLE    :      0
SONAME    :      0
ZOMBIE    :      0
SOOPTS    :      0
FTABLE    :      0
RIGHTS    :      0
IFADDR    :      0
CONTROL   :      0
OOBDATA   :      0
IPMOPTS   :      0
IPMADDR   :      0
IFMADDR   :      0
MRTABLE   :      0
TOTAL     :     400
number of mbufs: 400
number of times failed to find space: 0
number of times waited for space: 0
number of times drained protocols for space: 0

```

CLUSTER POOL TABLE

size	clusters	free	usage
64	100	99	4
128	100	100	591
256	40	40	3
512	40	40	92
1024	25	25	11
2048	25	25	0

value = 80 = 0x50 = 'P'

netHelp

The `netHelp` command displays a list of the Ethernet network commands.

```

SNC4000 > netHelp
arptabShow - Display a list of known ARP entries
ethAddrSet "inetaddr", "netmask" - set IP Address
gateAddrGet - Display Default IP gateway
gateAddrSet "inetaddr" - set Default IP gateway
host "<func>", "hostname", "inetaddr"
  func - "add" - add to host table
        - "delete" - delete from host table
        - "list" - list host table
hostNameSet - set host name
icmpstatShow - Display statistics for ICMP
ifShow - Display info about network interfaces
inetstatShow - Display all Internet protocol sockets
ipstatShow - Display statistics for IP
macShow - Display Media Access Control Address

```

```

mbufShow - Display mbuf statistics
route "<func>","destination","gateway"
  func - "add" - add route to route table
        - "delete" - delete route from route table
        - "list" - list route table
tcpstatShow - Display statistics for TCP
udpstatShow - Display statistics for UDP

```

See User's Guide for more information

```
value = 0 = 0x0
```

normalBoot

Certain commands and tests are only available in diagnostic mode. Switching to diagnostic mode saves all configuration parameters so that they are restored before returning to normal operation. Use the `normalBoot` command to restore the SNC 4000 to normal operating conditions.

This command is used only to transition an SNC 4000 from the special diagnostic mode to normal operations. It restores the bootline that was copied by `diagBoot`. The new persistent device map is erased, and the original map file is renamed `config/device.map` restoring it for use when the SNC 4000 reboots. The `normalBoot` command will then reboot the unit.

rdate "timeserver"

The `rdate "timeserver"` command sets the system date and time to be read from a remote system. The [setTimeHost](#) on page 109 must already have been entered before the `rdate "timeserver"` command is issued. To see data from the new setting, use the `date` command. To set the date and time to be read from a remote system named "Cronos," enter the following command:

```

SNC4000 > rdate "Cronos"
value = 0 = 0x0

```

reboot

The `reboot` command requests that the SNC 4000 shut down existing operations and then restart. This is the preferred method of restarting the SNC 4000. There are processes running within the SNC 4000 that may have writes pending to files within the flash file system. Following a reboot command, these processes flush their data to the flash file system, and the flash file system writes all pending data out to the flash memory. The SNC 4000 will reset only after all pending data has been written successfully to flash.

```
SNC4000 > reboot
```

reserveShow [level]

The `reserveShow` command outputs a list of devices with reservations. By adding the flag "1" a list of all devices is output.

Level	Explanation
<blank>	Show target devices with reservations
1	Show all target devices regardless of whether a reservation is held or not

```

SNC4000 > reserveShow
Idx Tdev          Vendor   Product          Rev | Reservation ITL  Host's
Port Name

```

```

-----|-----
value = 0 = 0x0

SNC4000 > reserveShow 1
Idx Tdev          Vendor  Product          Rev  | Reservation ITL  Host's
Port Name
-----|-----
   0 0x8fda380 ADIC    SNC 4000        40b5 |
   1 0x9ffc08 IBM     DNES-309170W    SA30 |
value = 0 = 0x0

```

reset

The `reset` command immediately initiates a reset cycle. Any pending data writes to the flash file system will be lost. This operation is not typically used. The `reboot` command should be used to gracefully shutdown and restart the SNC 4000.

```
SNC4000 > reset
```

restartScsi [channel]

The `restartScsi` command restarts the specified SCSI Channel without issuing a bus reset.

```
SNC4000 > restartScsi 1
value = 0 = 0x0
```

resolveParamShow

The `resolveParamShow` command displays a list of DNS servers. This command is used to determine the IP addresses of named hosts and is used whenever DHCP is enabled.

```
SNC4000 > resolvParamShow
```

.rm

To remove a file, use the `rm` command and specify the file name in quotes:

```
SNC4000 > rm "file.ext"
```

route

The `route` utilities maintain a route file, `nvfs:/mgmt/route`, which is used at system startup to initialize the network routing table. Each route entry is a single line of the format:

```
destination:gateway
```

where

destination is an IP address (for a subnet or host) or the name of a host that is described in the hosts file.

gateway is an IP address or the name of a gateway to a host. The gateway must be a device on the local subnet.

An IP address is a text string in standard IP Address format (i.e., 10.0.0.2). A host or gateway name must be listed in the hosts file.

Here is an example of the contents of the route file.

```
socrates:bruno
10.0.0:bruno
```

The first line instructs the system to reach the host “socrates” by directing the IP packets to the host “bruno”. The second example shows how all traffic for the subnet 10.0.0 (implied netmask is 255.255.255.0) is sent to the host “bruno” for forwarding. By default, no routes are defined in the route file.

The `route` command is invoked to add, remove, and list the route table.

route “add”,“destination”,“gateway”

The `route “add”` command adds a route to the destination through the gateway.

```
SNC4000 > route "add", "200.0.0", "bruno"
```

route “delete”,“destination”,“gateway”

The `route “delete”` command removes a route to the destination through the gateway.

```
SNC4000 > route "delete", "200.0.0", "bruno"
```

route “list”

The `route “list”` command lists the existing routes.

```
SNC4000 > route "list"
Destination SNC 4000
-----
socrates    bruno
Destination SNC 4000
-----
200.0.0    bruno
value = 0 = 0x0
```

rtcDateSet[year],[month],[dayofmonth],[dayofweek], [hour],[minute],[second]

The `rtcDateSet` command allows you to set the date and time manually.

- You must use a 24-hour clock.
- All parameters are digits.
- The year can be either two or four digits.
- Single digit months or hours should not be filled out with leading zeroes.
- A digit from 1-7 needs to be entered for the `[dayofweek]` parameter, but it doesn't matter what you enter, since the command will automatically correct it if it is wrong.

To display the new time and date data after entering the `rtcDateSet` command, enter the `date` command.

To set the RTC to 9:35 A.M. on Friday, January 26, 2001, enter the following string:

```
SNC4000 > rtcDateSet 2001,1,26,5,9,30,00
value = 0 = 0x0
```



CAUTION

The time will be one hour off when Daylight Savings Time is in effect.

rtcSetCurrent

The `rtcSetCurrent` command is used after the `rdate “timeserver”` command in order to synchronize the local Real Time Clock with the timeserver running on a remote host. Use the `date` command to see the synchronized settings.

```
SNC4000 > rtcSetCurrent
value = 0 = 0x0
```

rz

The `rz` command initiates a receive Zmodem file transfer session. You use this command when you want to download a file from the service terminal to the SNC 4000. The file can be either a firmware or configuration file. After issuing this command, you start the file transfer from the service terminal by initiating a send file operation that uses Zmodem protocol.

The example below shows the `rz` command when it is used to receive a file that contains operational firmware. The SNC 4000 extracts individual firmware modules from the file and saves them temporarily in memory. After the file transfer has completed, the SNC 4000 copies the firmware modules to nonvolatile flash memory. The SNC 4000 must be rebooted to use the updated firmware.

```
SNC4000 > rz
**B000000023be50
Firmware Update in Progress....
Found Image File BOOTROM.IMG " loading
.....Found Image File IPOST.IMG " loading
.....Found Image File SPOST.IMG " loading
Firmware Update Complete. Reboot for Update to Take Effect.
value = 0 = 0x0
SNC4000 >
```

The example below shows the `rz` command when it is used to receive a file that contains configuration parameters. See also the `sz` command for information about sending a configuration file.

```
SNC4000 > rz
**B000000023be50
Configuration Update in Progress....
Configuration Update Complete. Reboot for Update to Take Effect.
value = 0 = 0x0
```

scsiAltIdGet [channel]

The `scsiAltIdGet` command displays the alternate ID number for a specified channel. If no channel is specified, alternate IDs are displayed for all SCSI channels. When the alternate ID is set to be automatically chosen, the AltID value is designated as "Auto."

Example 1

```
SNC4000 > scsiAltIdGet
SCSIbus AltId -----
SCSI 1 1
SCSI 2 6
value = -1 = 0xffffffff
```

Example2

```
SNC4000 > scsiAltIdGet
SCSIbus AltId -----
SCSI 1 Auto - 6
SCSI 2 Auto - 6
value = -1 = 0xffffffff
```

scsiAltIdSet [channel],[id]

The `scsiAltIdSet` command sets the Alternate Id for the specified SCSI Channel.

Parameter	Value
SCSI Channel Number	1 - 2
ID	0 -15

```
SNC4000 > scsiAltIdSet 2,6
Alternate Id set to 6 for SCSI 2
will take effect upon reboot
value = 0 = 0x0
```



CAUTION

You must reboot the SNC 4000 after executing this command for the new setting to take effect.

scsiHostChanGet [channel]

The `scsiHostChanGet` command displays Host Channel modes for a SCSI channel. If no channel is specified, Host Channel modes are displayed for all SCSI channels.

```
SNC4000 > scsiHostChanGet
SCSIbus HostChan -----
SCSI 1 Channel is Target
SCSI 2 Channel is Initiator
value = -1 = 0xffffffff
```

scsiHostChanSet [channel],[mode]

The `scsiHostChanSet` command sets the Channel Mode to “Target” or “Initiator” for the specified SCSI Channel.

Parameter	Value	Meaning
SCSI Channel Number	1 - 2	Selected Channel
Mode	0	Initiator
	1	Target

```
SNC4000 > scsiHostChanSet 2,1
Host Chan set to TARGET for SCSI 2 will take effect upon reboot
value = 0 = 0x0
```



CAUTION

You must reboot the SNC 4000 after executing this command for the new settings to take effect.

scsiHostIdGet [channel]

The `scsiHostIDGet` command displays the Host ID number for a specified SCSI Channel. If no channel is specified, Host IDs are displayed for all SCSI channels.

```
SNC4000 > scsiHostIdGet
SCSIbus HostId -----
SCSI 1 7
SCSI 2 7
value = -1 = 0xffffffff
```

scsiHostIdSet [channel],[id]

The `scsiHostIdSet` command sets the Host ID for a specified SCSI Channel.

Parameter	Value
SCSI Channel Number	1 - 2
ID	0 -15

```
SNC4000 > scsiHostIdSet 2,7
Host Id set to 7 for SCSI 2
will take effect upon reboot
value = 0 = 0x0
```



CAUTION

You must reboot the SNC 4000 after executing this command for the new settings to take effect.

scsiRescan [channel]

The command `scsiRescan` requests a SCSI rescan for new devices. If channel is specified (1 or 2), then only that channel is scanned. Otherwise, if channel is not specified or if channel is 0, then all channels are scanned.

```
SNC4000 > scsiRescan 2
Done
value = 0 = 0x0
```

Rescanning a SCSI bus may delay I/O commands pending on that bus for several seconds. Do not rescan SCSI buses when this delay may not be tolerated. When possible, only scan the bus where a new device has been added.

When a device is discovered, there may be further device specific initialization that continues after the scan has completed in which case the device may not show up immediately when you issue the `fcShowDevs` command. An example of this is a disk that requires a SCSI Start Unit command to become ready. (Tape and Changer devices and Disks that indicate Ready status are available on scan completion).

If a SCSI target device should require replacement, remove the old device, set the new device to the same SCSI bus ID as the old device and attach it to the same channel. Rescan the channel to update the configuration data. The new device should be available to host systems with the same LUN as the old device.

scsiResetDisableGet [channel]

The `scsiResetDisableGet` command displays the SCSI Bus Reset On Power Up is enabled. False means that SCSI Bus Reset On Power Up is disabled.

```
SNC4000 > scsiResetDisableGet
SCSIbus Reset Disable -----
SCSI 1 TRUE
SCSI 2 FALSE | default
value = -1 = 0xffffffff
```

scsiResetDisableSet [channel],[mode]

The `scsiResetDisableSet` command sets the SCSI Bus Reset On Power Up for the specified SCSI channel. False is default and enables reset of SCSI bus on power-up. True disables SCSI bus reset on power-up.

Parameter	Value	Meaning
SCSI Channel Number	1 - 2	Selected Channel
Mode	0	Enable Reset on Power Up
	1	Disable Reset on Power Up

```
SNC4000 > scsiResetDisableSet 1,1
Reset Disable set to TRUE for SCSI 1
will take effect upon reboot
value = 0 = 0x0
```

scsiShow

The `scsiShow` command displays all SCSI channels and information about the devices attached to each channel. The following example shows the display for two disk devices attached to SCSI Channel 1 and a tape library attached to SCSI Channel 2:

```
SNC4000 > scsiShow
SCSI Initiator Channel 1: 0xc08b5b60
ID LUN Vendor Product Rev | Sync/Off Width
-----|-----
1 0 OEM OEM DCHS04X 6363 | 12/15 16 S W 0/ 0 8 S W Q
2 0 OEM OEM DCHS04X 6363 | 12/15 16 S W 0/ 0 8 S W Q
SCSI Initiator Channel 2: 0xc08d26e0
ID LUN Vendor Product Rev | Sync/Off Width
-----|-----
0 0 OEM 03570C12 5346 | 25/15 16 S W 0/ 0 8 S W
0 1 OEM 03570C12 5346 |
1 0 OEM 03570C12 5346 | 25/15 16 S W 0/ 0 8 S W
value = 0 = 0x0
```

Value	Description
ID	The SCSI ID of the target device
LUN	The SCSI LUN of the target device
Vendor	The content of the Vendor ID field from the SCSI Inquiry Data
Product	The content of the Product ID field from the SCSI Inquiry Data
Rev	The content of the Revision ID field from the SCSI Inquiry Data
SYNC/Off	The negotiated synchronous transfer period and offset. The period is the negotiated transfer period. Multiply the period times 4 nanoseconds to determine the actual period (exception: if the period is negotiated to 12, then 50ns. is used). The offset indicates the REQ/ACK offset that was negotiated. A zero in these fields indicates that asynchronous transfer is in use.
Width	The negotiated transfer width in bits, either 8 or 16.

scsiTermGet [channel]

The `scsiTermGet` command displays termination status information for the specified channel. If no channel is specified, status information is displayed for all SCSI channels.

```

SNC4000 > scsiTermGet
  SCSIbus Termination -----
SCSI 1 Enabled |default
SCSI 2 Enabled
value = 0 = 0x0
SNC4000 >
SNC4000 > scsiTermGet 2
  SCSIbus Termination -----
SCSI 2 Enabled | default
value = 0 = 0x0

```

setFcFrameSize [channel],[size]

Set the frame size for a channel using the `setFcFrameSize` command.

Parameter	Value
SAN Channel Number	1
Frame Size	512,1024, or 2048

If an invalid size is set, then the frame size of 2048 will be used.



CAUTION

You must reboot the SNC 4000 after executing this command for the new setting to take effect.

```

SNC4000 > setFCFrameSize 1,2048
value = 2048 = 0x800

```

setFcHardId [channel],[id]

Set the Hard AL_PA for a channel using the `setFcHardId` command.

Parameter	Value	Meaning
FC Connection Number	1	
ID Number	0 to 125	
	255	Use Soft ID method

The ID settings 0 to 125, inclusive, are valid IDs. [255] requests the Soft ID method. If an invalid id is requested, then the Soft ID method will be used.

```

SNC4000 > setFcHardId 1,1
value = 0 = 0x0

```



CAUTION

You must reboot the SNC 4000 after executing this command for the new setting to take effect.

setHost [port],“OS”

The `setHost` command sets the operating system type for the specified SAN interface. This provides some customization in the way the SNC 4000 is presented to the particular operating system. If [port] is 0, the change applies to all SAN connections; otherwise the host type is applied.

Parameter	Value	
Port	0	Changes will apply to all FC Connections
	1	Changes will apply to the FC Connection (Connection 1)
OS	"nt" "aix" "solaris" "hp-ux" "linux" "netware" "gateway" "generic" "unisys" "adic snc" "pv-132t-fc" "autosense/nt"	



CAUTION

You must reboot the SNC 4000 after executing this command for the new setting to take effect.

setNettime [value]

The `setNettime` command enables or disables timeserver functionality.

Value	Meaning
0	Disables timeserver functionality
1	Enables timeserver functionality

```
SNC4000 > setNettime 1
Nettime 1 value = 0 = 0x0
```

setScsiAssign [devID], [channel], [id], [lun]



Note

When you are using Firmware 4.40 on a Fibre Channel blade, this command is unavailable.

The `setScsiAssign` command assigns a target device to a SCSI channel [channel] with SCSI Target ID [id] and Logical Unit Number of [lun].

The indicated channel must be configured to be running in target mode. The [id] and [lun] must be available on that channel.



Note

The `targets` command displays the devID as the ldx.

The example below shows the device with devID of 64 assigned to ID 0, LUN 0 on SCSI Channel 2.

```
SNC4000 > setScsiAssign 64,2,0,0
```

```
value = 0 = 0x0
SNC4000 > setScsiAssign 82,2,0,1
value = 0 = 0x0
SNC4000 > setScsiAssign 98,2,0,2
value = 0 = 0x0
SNC4000 > setScsiAssign 124,2,0,3
value = 0 = 0x0
```

setSnaCCLun [newLUN]

The `setSnaCCLun` command reassigns the SNC 4000's Command and Control LUN to the specified value. **newLUN** is the new value for the Command and Control LUN. Valid values are 0 through 127.

The new setting takes effect immediately. The previous value is removed from the device map and database and a trap is generated indicating that the device was removed.

If the new LUN is not currently in use, a new entry is added in the device map and database. A trap will be generated indicating the new device was added.

If the new LUN is already in use, the Command and Control LUN will be disabled. It will remain disabled until the device mapped at the requested LUN is removed and deleted from the database. In this case, you can use the `mapRebuildDatabase` command to remove the previous LUN assignment and to allow the new Command and Control LUN to be enabled.



CAUTION

Because AIX and NT use LUN 0 when they issue a Report LUNs command, you must make sure that a device is configured at LUN 0.

setTimeHost

The `setTimeHost` command adds a host running timeserver to the SNC 4000 system. The “`setNettime 1`” command must already have been issued. To add a host named Cronos to the system enter the following command:

```
SNC4000 > setTimeHost "Cronos"
Time Host Cronos value = 0 = 0x0
```

sfmAccessApply

The `sfmAccessApply` command causes the settings that have been changed and stored in memory to take effect immediately and also saves them to the SFM database.

sfmAccessClear [disable code]

The `sfmAccessClear` command disables all host access to all LUNs except to LUN 0 (the Command and Control interface). The disable code is `0xfacade02`.

The following command example shows how to disable all access.

```
SNC4000 > sfmAccessClear 0xfacade02
value = 0 = 0x0
```

sfmAccessSet [hostindex],<Starting LUN>,<Ending LUN>,<Access>

The `sfmAccessSet` command sets the access for the specified range of LUNs for the specified host connection index.

Access Value	
0	Disables access to the LUNs
1	Enables access to the LUNs

When you enter this command, the settings are stored in memory but are not applied until you enter the `sfmAccessApply` command. The following example shows how to enable the host at connection index 1 to access LUNs 2 through 32. Existing `hostindex` values can be determined by looking at the “Id” column in the output of the `sfmShow -1` command.

```
SNC4000 > sfmAccessSet 1,2,32,1
value = 0 = 0x0
```

sfmActiveSet

The `sfmActiveSet` command places SFM in the active state. This means that all of the current access settings are put into effect. You would typically only use this command after making SFM inactive. See the `sfmInactiveSet` command.

```
SNC4000 > sfmActiveSet
value = 0 = 0x0
```

If SFM is already active, the following is displayed.

```
SNC4000 > sfmActiveSet
SFM: Already Active
value = 21 = 0x15
```

sfmConnectionSet [hostindex],“host connection string”

The `sfmConnectionSet` command sets the host connection information for the host at the specified connection index. The connection may be a device name, port address, etc. The following example shows setting the host connection information. Existing `hostindex` values can be determined by looking at the “Id” column in the output of the `sfmShow -1` command.

```
SNC4000 > sfmConnectionSet 1,"ScsiPort2 [0:0:0] (QLA2100)"
value = 0 = 0x0
```

sfmFeatureDisable

The `sfmFeatureDisable` command disables the SFM feature. It erases the appropriate configuration file, and reboots the appliance. No provision is made to restore the existing configuration. Users should save the appliance configuration before disabling the feature.

For more information, see [Saving a Configuration File](#) on page 17.

```
SNC > sfmFeatureDisable
All SFM configuration information will be lost, the feature disabled, and
the system will be automatically rebooted! Do you want to disable SFM?
(y or n) y
```

sfmFeatureEnable “license key string”

The `sfmFeatureEnable` command enables the SFM feature. Each license key is unique for each SNC 4000 serial number. The SFP is factory-enabled, so you can specify “enable” rather than an actual license key.

sfmFileShow

The `sfmFileShow` command shows the SFM data stored in the file.

```
SNC > sfmFileShow
SFM File: '/nvfs/config/iac.pif'
MagicNumber = 0xfacade03, State = 2, Hosts = 3, Writes = 14.
SFM License Key = "MDDVHH-MX9XXXx"

State = 0, Type = 1, Flags = 0xffc00001, Offline
WWN: 00000060:45abcdef
Name: 'ASAHI'
Host Type: 'Windows 2000 SP 1'
Device Id: 'FC 1'
LUN Access:
0: 01 01 01 01 00 00 00 00 00 00 00 00 00 00 00 00
16: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
32: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
48: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
64: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
LUN MAP:
0: 0000 0001 0002 0004 ffff ffff
fff
fff
16: ffff ffff
fff
fff
32: ffff ffff
fff
fff
48: ffff ffff
fff
fff
ffff 64: ffff ffff
```

sfmHostShow [hostIndex]

The `sfmHostShow` command displays all known Scalar Firewall Manager information for the specified host connection index. The LUN access map is displayed as 16 rows of 16 bytes, one byte for each LUN.

- hostIndex** is the Id obtained from the `sfmShow` command.
- 00** in the LUN Access map indicates the host has no access to the LUN.
- 01** in the LUN Access map indicates the host has access to the LUN.

The following command example shows SFM information for host Id 1.

```
SNC4000 > sfmHostShow 1
Host(1):
State = 0, Type = 1, Flags = 0x00000000, Online
WWN: 200000e0:8b0057d8
Name: 'LABATTS'
Host Type: 'NT 4.0 SP5'
Device Id: 'ScsiPort6 [0:0:0] (QLA2100)'
LUN Access:
0: 01 01 01 00 00 00 00 00 00 00 00 00 00 01 01 00
16: 00 00 00 00 00 00 00 00 00 01 01 00 00 00 00 00
32: 00 00 00 00 00 01 01 00 00 00 00 00 00 00 00 00
48: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
64: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
```

```

80: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
96: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
112: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
128: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
144: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
160: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
176: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
192: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
208: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
224: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
240: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
value = 0 = 0x0

```

sfmInactiveSet

The `sfmInactiveSet` command de-activates SFM making all LUNs available to all host connections. This command typically would be used when troubleshooting a SAN configuration. It removes SFM access control without deleting SFM access settings. Use the `sfmActiveSet` command to re-activate SFM.

```

SNC4000 > sfmInactiveSet
value = 0 = 0x0

```

If SFM is already inactive, the following is displayed.

```

SNC4000 > sfmInactiveSet
SFM: Already Inactive
value = 23 = 0x17

```

sfmNameSet [hostindex], "name string"

The `sfmNameSet` command sets the host name field to the specified "name string" for the specified host connection index. The following command example shows setting the host name for host Id 1 to "LANDERS". Existing hostindex and name values can be determined by looking at the "Id" and "Host Name" columns in the output of the `sfmShow -1` command.

```

SNC4000 > sfmNameSet 1, "LANDERS"
value = 0 = 0x0

```

sfmShow [hostIndex]

The `sfmShow` command displays information about hosts that have been registered with Scalar Firewall Manager based on the value of hostIndex.

Hostindex	Meaning
-1	Displays brief list of all known host connections
0	Full display of all known host connections, and if online displays a list of all LUNs available to that connection
N (1-48)	Display the full information for the host N only

The following command example shows SFM information for the hosts that have been registered by SFM. Hosts that have the Host Registration Service running with periodic re-registration are shown with a status of Periodic. One of the hosts has more than one FC connection to the SNC 4000.

```

SNC4000 > sfmShow -1
SFM State: Active
Id World Wide Name St. Typ HexFlags Status Host Name Host Type Host

```

```

Connection
-----
001 200000e0.8b0057d8 000 001 00000000 Online LANDERS NT 4.0 SP5 ScsiPort6
0:0:0](QLA2200)
002 200000e0.8b16014d 000 001 00000000 Periodic SUPERIOR NT 4.0 SP5
ScsiPort7 [0:0:0](QLA2200)
003 200000e0.8b160152 000 001 00000000 Offline SUPERIOR NT 4.0 SP5
ScsiPort7 [0:0:0](QLA2200)
value = 0 = 0x0

```

sfmSparseAccessSet[hostindex],“LUN string”,[Access]

The `sfmSparseAccess` command sets the access for the specified LUNs for the specified host connection index. Same as `sfmAccessSet` except LUNs are entered as a string of characters separated by commas. Existing `hostindex` values can be determined by looking at the “Id” column in the output of the `sfmShow - 1` command.

Access	Meaning
0	Disables access to the LUNs
1	Enables access to the LUNs

When you enter this command, the settings are stored in memory but are not applied until you enter the `sfmAccessApply` command. The following command example enables host access to the LUNs 1, 2, 3, 4, 6, 9, 22, 23 and 45 on host connection index 1.

```

SNC4000 >sfmSparseAccessSet 1,"1,2,3,4,6,9,22,23,45,"1
value = 0 = 0x0

```

sfmTypeSet [hostIndex],“OS type string”

The `sfmTypeSet` command sets the Operating System type for the specified host connection index. Existing `hostindex` values can be determined by looking at the “Id” column in the output of the `sfmShow - 1` command. OS must begin with “NT”, “AIX”, “Linux”, “SOLARIS”, “HP-UX” or “NETWARE”. Additional information may be appended to these strings as desired.

Choosing “Linux” sets the host type default to “Solaris”.

The following command example shows setting the host type to NT 4.0 SP5 for host Id 1.

```

SNC4000 > sfmTypeSet 1,"NT 4.0 SP5"
value = 0 = 0x0

```

shellLock

Only one management interface may be in use at a time. If a network interface is opened, Only one management interface may be in use at a time. If a network interface is opened, the service port interface is not available. The `shellLock` command may be used to prevent a network protocol access to the shell.

A numeric parameter specifies if the shell is to be locked or unlocked. If the parameter is 0, then the shell is unlocked.

```

SNC4000 > shellLock 1
value = 1 = 0x1
SNC4000 >
.. Shell is now locked
SNC4000 > shellLock 0
value = 1 = 0x1

```



```
SNC4000 > sncFeatureEnable "enable"
value = 0 = 0x0
Data Mover Module License is Valid
```

If `value = 1 = 0x1` message is displayed, it means the license is already installed and Data Mover Module is already enabled.

If the `value = -1 = 0xffffffff` message is displayed, it means the license is not already installed and you do need to enter the license key.

snmpCommunitiesShow

The `snmpCommunitiesShow` command displays the list of SNMP community strings in use by the SNC 4000.

```
SNC4000 > snmpCommunitiesShow
ReadCommunity ViewIndex
-----
pub      1
ReadCommunity ViewIndex
-----
public   1
icmp     2

WriteCommunity ViewIndex
-----
priv     1
private  1
TrapCommunity
-----
private
value = 9 = 0x9
```

SNMP community strings serve to group network devices into logical collections for management purposes. The community string must match on both the ADIC Management Console Server and the SNC 4000 you wish to manage. The default settings do match. Use the ADIC Management Console to view or edit strings that apply to the Server.

For more information, see the *ADIC Management Console User's Guide*.

To view or edit strings that apply to the SNC 4000, use the `snmp...` commands explained below.

snmpHelp

The `snmpHelp` command displays a list of the `snmp` commands.

```
SNC4000 > snmpHelp
snmpCommunitiesShow
snmpReadCommunityAdd "string"
snmpReadCommunityRemove "string"
snmpTrapCommunitySet "string"
snmpWriteCommunityAdd "string"
snmpWriteCommunityRemove "string"
trapDestAdd "ipaddress"
trapDestRemove "ipaddress"
trapDestShow

See User's Guide for more information

value = 0 = 0x0
```



snmpReadCommunityAdd “string” ,[view]

The `snmpReadCommunityAdd` command adds the specified string to the list of accepted strings for SNMP Read operations (Get and GetNext). The View switch must be set to “1” to be accepted by the ADIC Management Console.

For more information, see the *ADIC Management Console User’s Guide*.

```
SNC4000 > snmpReadCommunityAdd "adic",1
Success
value = 4 = 0x4
```

snmpReadCommunityRemove “string”

The `snmpReadCommunityRemove` command removes the specified string from the list of accepted strings for SNMP Read operations.

```
SNC4000 > snmpReadCommunityRemove "adic"
Success
value = 3 = 0x3
```

snmpTrapCommunitySet “string”,[view]

The `snmpTrapCommunitySet` command sets the community string passed with all SNMP traps. The View switch must be set to “1” to be accepted by the ADIC Management Console.

For more information, see the *ADIC Management Console User’s Guide*.

```
SNC4000 > snmpTrapCommunitySet "adic",1
Success
value = 8 = 0x8
```

snmpWriteCommunityAdd “string”,[view]

The `snmpWriteCommunityAdd` command adds the specified string to the list of accepted strings for SNMP Write operations (Set). The View switch must be set to “1” to be accepted by the ADIC Management Console.

For more information, see the *ADIC Management Console User’s Guide*.

```
SNC4000 > snmpWriteCommunityAdd "adic",1
Success
value = 0 = 0x0
```

snmpWriteCommunityRemove “string”

The `snmpWriteCommunityRemove` command removes the specified string from the list of accepted strings for SNMP Write operations.

```
SNC4000 > snmpWriteCommunityRemove "adic"
Success
value = 0 = 0x0
```

sysConfigShow

The `sysConfigShow` command displays current system parameter settings. The display shows whether or not the SNC 4000’s Command and Control interface is enabled or disabled and the LUN that is assigned to it, whether or not enhanced tape performance features are enabled, the MAC address of the Ethernet port, and the SNC 4000’s FC Node address.

```
SNC4000 > sysConfigShow
Current System Parameter Settings:
Comamnd and Control Device (CC) : 0 Enabled
```

```

LUN : 0
Allow Early Write Status for Tape : 1 Enabled
Allow R/W Acceleration for Tape : 1 Enabled
Enet MAC Address: 0.60.45.0.0.0
Active System Node Name Mode is 0
FC Node WWN: 10000060.45000000
Memory Snoop: Enabled
Device Inquiry after Host SCSI Bus Reset: Disabled
SCSI Rescan for 5 minutes after power-up
Enable All SCSI Target IDs: Disabled
WWN Locking Mode: Disabled
VPD page MD5 Logical Unit Identifier Support: Disabled

```

sysNodeNameModeSet [Mode]

The `sysNodeNameModeSet` command changes the FC Node Name Mode for the FC interface ports. In the default mode (Mode 0), each FC port on the SNC 4000 has the same node name. For configurations that require the node name to be different, use the `sysNodeNameModeSet` command to change the mode to 1.

An example configuration that requires the Node Name on each FC port to be different is where the host has two Host Bus Adapters (HBAs) installed for redundancy. In this configuration, each HBA is connected to a different FC port on the SNC 4000. Fail-over software on the host defines one of the HBAs as the primary connection and the other HBA as a spare. If the primary HBA should fail, the fail-over software routes data transfers to the SNC 4000 through the spare HBA

Mode	Definition
0	Node name is the same on all FC interfaces (default)
1	Node name is based on port name but different from port name

If you change the mode, you must reboot the SNC 4000 for new setting to take effect.

See also the `sysNodeNameModeShow` command.

```

SNC4000 > sysNodeNameModeSet 1
Please REBOOT the box to activate your new mode
value = 0 = 0x0

```

sysNodeNameModeShow

The `sysNodeNameModeShow` command displays the current FC Node Name mode. The default mode is 0. See the `sysNodeNameModeSet` command for further information.

```

SNC4000 > sysNodeNameModeShow
Active system node name mode is 1

Mode 0: Node name is the same on all FC Interfaces
Mode 1: Node name is based on port name, but different from port name
value = 1 = 0x1

```

sysVpdShow or sysVpdShowAll

The `sysVpdShow` command displays Vital Product data information. The Vital Product Data for the SNC 4000 includes such items as serial numbers and installed memory sizes, as shown below.

```

SNC4000 > sysVpdShow

```

***** VPD Base Rev. 1 *****

Name SNC
Mfg ADIC
OEM ADIC
Manufacture Date JUN 13 05:19:59 1974
UID 00:00:00:60:45:17:00:17
S/N 600023
Assy HCO BKA01001P
RID Tag
Firmware ID Firmware-4
FirmwareVend ADIC
Firmware Version 4.01
Config File Sys /nvfs
Code File Sys /ffs

A Board Name ADIC FCR2
A Board S/N
A Board HCO BK001120P

B Board Name B Board Proc
B Board S/N
B Board HCO BK002100P

value = 0 = 0x0

The `sysVpdShowAll` shows a little more information and includes product data for the FC SFP.

```
SNC4000 > sysVpdShowAll  
===[ Vital Product Data ]===
```

***** VPD Base Rev. 2 *****

Name SNC
Mfg ADIC
OEM ADIC
Manufacture Date APR 10 12:55:35 2002
UID 00:60:45:17:05:F6
S/N 601526
Assy HCO BKA01001P
RID Tag
Firmware ID Firmware-4
FirmwareVend ADIC
Config File Sys /nvfs
Code File Sys /ffs

***** Processor BOARD *****

----- Processor Board VPD -----

Name Tupper 1FC/2LVD
S/N 21085568
HCO Unknown
Flash Megs 8 Meg
Dram Megs 32 Meg
Sys Ram n/a
NV RAM 128K
CPU PPC405GP
IO Devices

```

Fan HCO                00P          none
----- Ethernet VPD -----
IO Class               Fixed IO
IO Type                Ether
IO Mfg                 IBM
Device Index          01
IO Class Enum          n/a
IO Type Enum           n/a
Label Index           02
Bus Id                 n/a
----- FC 1 VPD -----
IO Class               Fixed IO
IO Type                Fibre Channel
IO Mfg                 QLogic
Device Index          02
IO Class Enum          n/a
IO Type Enum           n/a
Label Index           02
Bus Id                 0.7.0
----- IO Option Card VPD -----
IO Class               Option IO
IO Type                SFP
IO Mfg                 unknown
S/N                   unknown
HCO                   none
Device Index          04
IO Class Enum          n/a
IO Type Enum           n/a
Slot Index            1
Bus Id                 n/a
Device Data            unknown
----- RS232 VPD -----
IO Class               RS232
IO Type                RS232
IO Mfg                 unknown
S/N                   n/a
HCO                   n/a
Device Index          06
IO Class Enum          n/a
IO Type Enum           n/a
Baud                  19200
Flow                  Hardware
----- RS232 VPD -----
IO Class               RS232
IO Type                RS232
IO Mfg                 unknown
S/N                   n/a
HCO                   n/a
Device Index          07
IO Class Enum          n/a
IO Type Enum           n/a
Baud                  unknown
Flow                  unknown
----- SCSI 1 VPD -----
IO Class               Fixed IO
IO Type                SCSI
IO Mfg                 LSI Logic

```

```

Device Index      08
IO Class Enum     n/a
IO Type Enum      n/a
Label Index       03
Bus Id            1.0.0
----- SCSI 2 VPD -----
IO Class          Fixed IO
IO Type           SCSI
IO Mfg            LSI Logic
Device Index      09
IO Class Enum     n/a
IO Type Enum      n/a
Label Index       03
Bus Id            1.0.1

```

sz “filename”

The `sz` command initiates a send Zmodem file transfer session. You use this command when you want to save configuration information to a file in case the SNC 4000 needs to be replaced. The SNC 4000 uses Zmodem protocol to upload its persistent address map database and configuration parameter settings from its nonvolatile flash memory to a file on the service terminal. After issuing this command, you start the file transfer from the service terminal by initiating a receive file operation that uses Zmodem protocol.

The filename “config.cfg” is shown in the example below. You can specify a different name for the file but the name must not exceed 8 characters and it must end in .cfg. See also the `rz` command for information about receiving a configuration file.

```

SNC4000 > sz "config.cfg"
Configuration Download Complete: config.cfg
value = 0 = 0x0
SNC4000 >

```

targets

The SNC 4000 maintains a list of target devices that are attached to the I/O channels. The `targets` command will list each device currently attached, providing descriptions of the devices.

```

SNC4000 > targets
Idx Tdev  Vendor Product  Rev | Type Specific
-----|-----
 0 0xc194a400 ADIC Local 0252 | Cmd/Cntrl Status 0h
 2 0xc1ffc390 ADIC 5324 | Tape: Blk Size 32768 , flags 7h
 3 0xc1ffc290 ADIC 5324 | Changer: flags 7h
value = 4 = 0x4

```

Idx	Device Index in the target list.
Tdev	An internal pointer, used for some diagnostic operations
Vendor	The content of the Vendor ID field from the SCSI Inquiry Data
Product	The content of the Product ID field from the SCSI Inquiry Data
Rev	The content of the Revision ID field from the SCSI Inquiry Data
Type Specific	For each device type, information pertinent to the device

tcpstatShow

The `tcpstatShow` command displays TCP statistics for the Ethernet network. Interpreting these statistics requires detailed knowledge of Internet networking protocols. This information may be useful to the LAN administrator.

```
SNC4000 > tcpstatShow
TCP:
  301 packets sent
    278 data packets (18371 bytes)
    0 data packet (0 byte) retransmitted
    23 ack-only packets (22 delayed)
    0 URG only packet
    0 window probe packet
    0 window update packet
    0 control packet
  516 packets received
    272 acks (for 18372 bytes)
    1 duplicate ack
    0 ack for unsent data
    276 packets (322 bytes) received in-sequence
    0 completely duplicate packet (0 byte)
    0 packet with some dup. data (0 byte duped)
    0 out-of-order packet (0 byte)
    0 packet (0 byte) of data after window
    0 window probe
    0 window update packet
    0 packet received after close
    0 discarded for bad checksum
    0 discarded for bad header offset field
    0 discarded because packet too short
  0 connection request
  1 connection accept
  1 connection established (including accepts)
  1 connection closed (including 0 drop)
  0 embryonic connection dropped
  272 segments updated rtt (of 272 attempts)
  0 retransmit timeout
    0 connection dropped by rexmit timeout
  0 persist timeout
  1 keepalive timeout
    1 keepalive probe sent
    0 connection dropped by keepalive
value = 36 = 0x24 = '$
```

tPathShow

The `tPathShow` command displays the state of targets that are mapped for automatic failover. If there are no targets mapped for failover, no targets are displayed.

```
SNC > tPathShow
value = 0 = 0x0
SNC >
```

If there are targets mapped for failover, `tPathShow` displays each target and all of the alternate paths that can be used for each target.

```
SNC > tPathShow
FC deviceId=1 SN=A276CC34
```

```

FC1 WWPN=20100060.451702ca loopId=130 <next path>
FC2 WWPN=20200060.451702ca loopId=131
FC deviceId=2 SN= A276CC32
FC1 WWPN=20100060.451702ca loopId=130 <next path>
FC2 WWPN=20200060.451702ca loopId=131
value = 0 = 0x0
SNC >

```

trapDestAdd “ipAddress”

The `trapDestAdd` command allows you to add an ethernet address as a trap recipient to the SNMP trap destination table that is maintained within the SNC 4000. The broadcast address for the Ethernet port is also automatically included in the table. When the ADIC Management Console is running, it inserts its address into the table automatically.

For more information, see the *ADIC Management Console User’s Guide*.

```

SNC4000 > trapDestAdd 192.168.1.75
value = 0 = 0x0

```

trapDestRemove “ipAddress”

The `trapDestRemove` command allows you to remove an ethernet address as a trap recipient from the SNMP trap destination table that is maintained within the SNC 4000. When the ADIC Management Console is running, it inserts its address into the table automatically.

For more information, see the *ADIC Management Console User’s Guide*.

The broadcast address for the Ethernet port is also automatically included in the table

```

SNC4000 > trapDestRemove "10.0.0.2"
value = 0 = 0x0

```

trapDestShow

The `trapDestShow` command allows you to view the SNMP trap destination table maintained within the SNC 4000. The broadcast address for the Ethernet port is also automatically included in the table. When the ADIC Management Console is running, it inserts its address into the table automatically.

For more information, see the *ADIC Management Console User’s Guide*.

```

SNC4000 > trapDestShow
Trap Destination IP Address
-----
192.168.30.255
206.0.64.17
206.0.64.25
206.0.64.35
206.0.64.255
value = 1 = 0x1

```

tzSet “timezone”

The `tzSet` command sets the timezone offset from Greenwich Mean Time.

```

SNC4000 > tzSet "PDT"
TZ Set TIMEZONE
value = 0 = 0x0

```

udpstatShow

The `udpstatShow` command displays UDP statistics for the Ethernet network. Interpreting these statistics requires detailed knowledge of Internet networking protocols. This information may be useful to the LAN administrator.

```
SNC4000 > udpstatShow
UDP:
  8514 total packets
  8445 input packets
  69 output packets
  0 incomplete header
  0 bad data length field
  0 bad checksum
  8383 broadcasts received with no ports
  0 full socket
value = 15 = 0xf
```

uptime

The `uptime` command displays the elapsed time since the last boot of the SNC 4000.

```
SNC4000 > uptime
Elapsed time since reset 4d:23h:12m:46s:10t
value = 10 = 0xa
```

The example indicates that 4 days, 23 hours, 12 minutes, 46 seconds and 10 clock ticks have elapsed since the SNC 4000 was last booted. There are 60 ticks per second.

user

The `userAdd`, `userDelete`, and `userList` commands provide control of the user list. The persistent address map file can be sent to the SNC 4000 or retrieved from it using FTP. If you need to use FTP, use the user commands to create a login and password so you can access the SNC 4000 from the Ethernet network.

userAdd "username", "password"

The `userAdd` command adds a user and password to the password file. The parameter "username" must be from 3 to 80 characters. The parameter "password" must be from 8 to 40 characters.

```
SNC4000 > userAdd "nancy", "password"
value = 0 = 0x0
```

userDelete "username", "password"

The `userDelete` command deletes a user from the password file. It is not possible to remove a user without knowing the user's password. If the user's password is forgotten or unknown, you have to delete the password file, reboot the SNC 4000, and then add all user names and passwords again.

```
SNC4000 > userDelete "nancy", "password"
value = 0 = 0x0
```

userList

The `userList` command displays the contents of the password file (passwords are encrypted).

```
SNC4000 > userList
```

```
Name : Password
nancy : SyecycRz
fred : b9dczebQbd
martha : RQQdRedb9d
user : cScQRSQzzz
value = 0 = 0x0
```

userHelp

The `userHelp` command displays a list of the user commands.

```
SNC4000 > userHelp

userAdd "name","password" - Add user to user list
userDelete "name","password" - Delete user from user list
userList          - Display user list

See User's Guide for more information

value = 0 = 0x0
```

version

The SNC 4000 is an intelligent device and has software that controls all functions. The revision of that operating software can be displayed with the `version` command. The first line displayed is the SNC 4000 firmware version. The lines that follow pertain to the operating system software version.

```
SNC4000 > version

ADIC Firmware-4
Version 0401.0701 Built Mar 2 2001, 10:55:47 on EDELWEISS by terryk
VxWorks (for Buckhorn - IBM PowerPC 405GP Rev. D) version 5.4.
Kernel: WIND version 2.5.
value = 26 = 0x1a
```

vpmFeatureEnable "licensekeystring"



CAUTION: When you are using Firmware 4.40 on a Fibre Channel blade, this command is unavailable.

The `vpmFeatureEnable` command enables the optional VPM feature. You enable the feature by entering the unique license key.

```
SNC > vpmFeatureEnable "BVRXC-G79DN"
value = 0 = 0x0
SNC >
```

If the license key was factory-installed, you can enter the word "enable" rather than the actual license key.

```
SNC > vpmFeatureEnable "enable"
value = 0 = 0x0
VPM License is Valid
SNC >
```

If `value = 1 = 0x1` message is displayed, it means the license is already installed and VPM is already enabled.

If the `value = -1 = 0xffffffff` message is displayed, it means the license is not already installed and you do need to enter the license key.

See also the `licenseShow` command.

vpmFeatureEnabled



Note

When you are using Firmware 4.40 on a Fibre Channel blade, this command is unavailable.

The `vpmFeatureEnabled` command allows you to check the status of the VPM feature. A returned value of "1" means that VPM is already enabled. A returned value of "0" means that VPM is disabled. In the following example, VPM is already enabled.

```
SNC > vpmFeatureEnabled
vpmFeatureEnabled = 0xc0199468: value = 1 = 0x1
SNC >
```

vps. See vpsShow

vpsAccessApply

The `vpsAccessApply` command causes the settings that have been changed and stored in memory to take effect immediately and also saves them to the VPS or eVPS database.

```
SNC > vpsAccessApply
value = 0 = 0x0
SNC >
```

vpsAccessClear [disable code]

The `vpsAccessClear` command disables all VPS or eVPS host access to all LUNs except to LUN 0 (the command and control interface). The disable code is stored as the "MagicNumber" in the output of the `vpsFileShow` command.

The following command example shows how to disable all access using the disable code `0xfacade03`.

```
SNC >vpsAccessClear 0xfacade03
value = 0 = 0x0
SNC >
```

vpsAccessSet [hostIndex],[Starting lun],[Ending lun],[Access]

The `vpsAccessSet` command sets the access for the specified range of LUNs for the specified VPS or eVPS host connection index.

Access	Meaning
0	Disables access to the LUNs
1	Enables access to the LUNs

When you enter this command, the settings are stored in memory but are not applied until you enter the `vpsAccessApply` command. The following example shows how to enable the host at connection index 1 to access LUNs 2 through 32. Existing `hostIndex` values can be determined by looking at the "ID" column in the output of the [vpsShow \[hostIndex\]](#) command.

```
SNC > vpsAccessSet 1,2,32,1
value = 0 = 0x0
SNC >
```

vpsActiveSet

The `vpsActiveSet` command places VPS or eVPS in the active state. This means that all of the current access settings are put into effect. You would typically only use this command after making VPS or eVPS inactive. See the `vpsInactiveSet` command.

```
SNC > vpsActiveSet
value = 0 = 0x0
SNC >
```

If VPS or eVPS is already active, the following is displayed.

```
SNC > vpsActiveSet
VPS: Already Active
value = 21 = 0x15
SNC >
```

vpsConnectionSet [hostIndex], "host connection string"

The `vpsConnectionSet` command sets the host connection information for the VPS or eVPS host at the specified connection index. The connection may be a device name, port address, etc. The following example shows setting the host connection information. Existing "hostIndex" values can be determined by looking at the "Id" column in the output of the `vpsShow -1` command.

```
SNC > vpsConnectionSet 1, "ScsiPort2 [0:0:0] (QLA2100)"
value = 0 = 0x0
SNC >
```

vpsDefaultInbandAccessGet 1

The `vpsDefaultInbandAccessGet` command gets the default access level to in-band API commands for all hosts. It takes a verbose argument of 1. The output of this command lists the current read and write access levels for the system itself and for other hosts.

To view the in-band access level for a particular host, use the [vpsHostInbandAccessGet \[hostIndex\].1](#) command.

If maintenance in/out commands are not working, this is the first thing to check. To change the default in-band access setting for all hosts, refer to the [vpsDefaultInbandAccessSet \[setting\]](#) command.

```
SNC > vpsDefaultInbandAccessGet 1
Read Access:
Self: 1, 3rd Party: 1
Write Access:
Self: 0, 3rd Party: 0
value = 3 = 0x3
```

vpsDefaultInbandAccessSet [setting]

The `vpsDefaultInbandAccessSet` command sets the default access level for in-band API commands for all hosts. After you have made the setting, check the results with `sfmFileShow`.

Value	Meaning
1	Self-read
2	3rd-Party read
3	Self-read + 3rd-Party read
4	Self-write

Value	Meaning
5	Self-read + self-write
7	Self-read + 3rd-Party read + Self-write
8	3rd Party write
10	3rd-Party read + 3rd-Party write
11	3rd-Party read + 3rd-Party write + Self-read
14	3rd-Party read + 3rd-Party write + Self-write
15	Self-read + 3rd-Party read + Self-write + 3rd Party write

```

SNC > vpsDefaultInbandAccessGet 1
Read Access:
Self: 1, 3rd Party: 1
Write Access:
Self: 0, 3rd Party: 0
value = 3 = 0x3
SNC > vpsDefaultInbandAccessSet 15
value = 0 = 0x0
SNC > vpsDefaultInbandAccessGet 1
Read Access:
Self: 1, 3rd Party: 1
Write Access:
Self: 1, 3rd Party: 1
value = 15 = 0xf

```

To set the in-band access level for a particular host, use the [vpsHostInbandAccessSet 1,\[setting\]](#) command.

vpsFeatureDisable

The `vpsFeatureDisable` command disables the eVPS feature. It erases the appropriate configuration file, and reboots the appliance. No provision is made to restore the existing configuration. Users should save the appliance configuration before disabling the feature.

For more information, see [Saving a Configuration File](#) on page 17.

```

SNC > vpsFeatureDisable
All VPS and eVPS configuration information will be lost,
the features disabled, and the system will be automatically rebooted!
Do you want to disable VPS and eVPS? (y or n) y

```

vpsFeatureEnable "license key string"

The `vpsFeatureEnable` command enables the optional VPS or eVPS feature. You enable these features by entering the unique license key.

```

SNC > vpsFeatureEnable "BVRXC-G79DN"
value = 0 = 0x0
SNC >

```

If the license key was factory-installed, you can enter the word "enable" rather than the actual license key.

```

SNC > vpsFeatureEnable "enable"
value = 0 = 0x0
eVPS License is Valid
SNC >

```

If `value = 1 = 0x1` message is displayed, it means the license is already installed and VPS or eVPS is already enabled.

If the `value = -1 = 0xffffffff` message is displayed, it means the license is not already installed and you do need to enter the license key.

See also the `licenseShow` command.

vpsFileShow

The `vpsFileShow` command shows the VPS or eVPS data stored in the file.

```
SNC > vpsFileShow
VPS File: '/nvfs/config/iac.pif'
  MagicNumber = 0xfacade03, State = 2, Hosts = 3, Writes = 14.
VPS License Key = "MDDVHH-MX9XXXx"
  State = 0, Type = 1, Flags = 0xffc00001, Offline
  WWN:          00000060:45abcdef
  Name:         'ASAHI'
  Host Type:    'Windows 2000 SP 1'
  Device Id:    'FC 1'
  LUN Access:
    0: 01 01 01 01 00 00 00 00 00 00 00 00 00 00 00 00
   16: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
   32: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
   48: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
   64: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
LUN MAP:
  0: 0000 0001 0002 0004 ffff ffff ffff ffff ffff ffff ffff ffff ffff ffff
ffff ffff
ffff
  16: ffff ffff
ffff ffff
ffff
  32: ffff ffff
ffff ffff
ffff
  48: ffff ffff
ffff ffff
ffff
  64: ffff ffff
ffff
```

vpsHostInbandAccessGet [hostIndex],1

The `vpsHostInbandAccessGet` command displays the current in-band access settings for a particular host. To view the default setting for all hosts, use the `sfmFileShow` command.

Existing `hostIndex` values can be determined by looking at the "Id" column in the output of the [sfmShow \[hostIndex\]](#) command.

For more information about the verbosity argument, refer to the `sfmFileShow` command.

```
SNC > vpsHostInbandAccessGet 1,1
Read Access:
Self: 1, 3rd Party: 1
Write Access:
Self: 0, 3rd Party: 0
value = 3 = 0x3
```

vpsHostInbandAccessSet 1,[setting]

The `vpsHostInbandAccessSet` command sets the default access level for in-band API commands for a particular host. After you have made the setting, check the results with [vpsHostInbandAccessGet \[hostIndex\].1](#).

The default access level is 5, self-read and self-write access only.

Value	Meaning
1	Self-read
2	3rd-Party read
3	Self-read + 3rd-Party read
4	Self-write
5	Self-read + Self-write
7	Self-read + 3rd-Party read + Self-write
8	3rd Party write
10	3rd-Party read + 3rd-Party write
11	3rd-Party read + 3rd-Party write + Self-read
14	3rd-Party read + 3rd-Party write + Self-write
15	Self-read + 3rd-Party read + Self-write + 3rd Party write

```
SNC > vpsHostInbandAccessSet 1,7
value = 0 = 0x0
SNC > vpsHostInbandAccessGet 1,1
Read Access:
Self: 1, 3rd Party: 1
Write Access:
Self: 1, 3rd Party: 0
value = 7 = 0x7
```

To view the in-band access level for a particular host, use the [vpsHostInbandAccessGet \[hostIndex\].1](#) command.

vpsHostShow [hostIndex]

The `vpsHostShow` command displays all known VPS or eVPS information for the specified host connection index. The LUN access map is displayed as 16 rows of 16 bytes, one byte for each LUN.

Parameter	Value	Meaning
hostIndex		is the Id obtained from the <code>sfmShow</code> command.
[LUN]	00	in the LUN Access map indicates the host has no access to the LUN.
	01	in the LUN Access map indicates the host has access to the LUN.

The following command example shows VPS or eVPS information for host ID 1.

```
SNC > vpsHostShow 1
Host(1):
```

```

State = 0, Type = 1, Flags = 0x00000000, Online
WWN: 200000e0:8b0057d8
Name: 'LABATTS'
Host Type: 'NT 4.0 SP5'
Device Id: 'ScsiPort6 [0:0:0] (QLA2100)'
LUN Access:
0: 01 01 01 00 00 00 00 00 00 00 00 00 00 01 01 00
16: 00 00 00 00 00 00 00 00 00 00 01 01 00 00 00 00
32: 00 00 00 00 00 01 01 00 00 00 00 00 00 00 00 00
48: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
64: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
80: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
96: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
112: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
128: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
144: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
160: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
176: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
192: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
208: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
224: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
240: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
value = 0 = 0x0
SNC >

```

vpsInactiveSet

The `vpsInactiveSet` command de-activates VPS or eVPS making all LUNs available to all host connections. This command typically would be used when troubleshooting a SAN configuration. It removes eVPS access control without deleting VPS or eVPS access settings. Use the `sfmActiveSet` command to re-activate VPS or eVPS.

```

SNC > vpsInactiveSet
value = 0 = 0x0
SNC >

```

If VPS or eVPS is already inactive, the following is displayed.

```

SNC > vpsInactiveSet
VPS: Already Inactive
value = 23 = 0x17
SNC >

```

vpsMapAdd [devID] [hostIndex] [lun]

The `vpsMapAdd` command assigns a target device (`devId`) to a host (`hostIndex`) with the specified Logical Unit Number of (`lun`). If the assignment is successful, the value 0 is output. If the assignment fails, the value -1 is output. In the example below, the assignment was successful.

Device ID can be determined by finding the device in the list generated by [mapShowDevs](#).

Existing `hostIndex` values can be determined by looking at the "ID" column in the output of the [sfmShow \[hostIndex\]](#) command.

To verify the effects of the `vpsMapAdd` command, issue the [vpsMapShow \[hostIndex\]](#) command.

```

SNC > vpsMapAdd 1,6,3
value = 0 = 0x0
SNC > vpsMapShow
Host Lun Internal Chan Id Lun Vendor Product Rev SN

```

```

-----
1 0 0 0 0 0 ADIC Scalar SNC 4134 600613
1 1 1 4 5 0 ADIC Scalar 1000 3.01 123456789
1 2 2 4 6 0 ADIC Scalar 1000 3.00 123444789
1 4 4
1 6 3 4 6 1 ADIC Scalar 1000 3.00 123455589
value = 0 = 0x0
SNC >

```

vpsMapClear [index]

The `vpsMapClear` command clears all of the mapping assignments for the host specified by `[index]`.

vpsMapDelete [devID] [hostIndex] [lun]

The `vpsMapDelete` command deletes a previous LUN assignment. If the deletion is successful, the value 0 is output. If the deletion fails, the value -1 is output. In the example below, the deletion was successful.

To verify the effects of the `vpsMapDelete` command, issue the [vpsMapShow \[hostIndex\]](#) command.

```

SNC > vpsMapDelete 1,3
value = 0 = 0x0
SNC > vpsMapShow
Host Lun Internal Chan Id Lun Vendor Product Rev SN
-----
1 0 0 0 0 0 ADIC Scalar SNC 4134 600613
1 1 1 4 5 0 ADIC Scalar 1000 3.01 123456789
1 2 2 4 6 0 ADIC Scalar 1000 3.00 123444789
1 4 4
value = 0 = 0x0
SNC >

```

vpsMapShow [hostIndex]

The `vpsMapShow` command lists all available eVPS mapping information for a host. If no host is specified then the device maps for all hosts are listed.

```

SNC > vpsMapShow
Host Lun Internal Chan Id Lun Vendor Product Rev SN
-----
1 0 0 0 0 0 ADIC Scalar SNC 4134 600613
1 1 1 4 5 0 ADIC Scalar 1000 3.01 123456789
1 2 2 4 6 0 ADIC Scalar 1000 3.00 123444789
1 4 4
value = 0 = 0x0
SNC >

```

vpsNameSet [hostIndex],"name string"

The `vpsNameSet` command sets the host name field to the specified "name string" for the specified host connection index. The following command example shows setting the host name for host ID 1 to "LANDERS". Existing `hostIndex` and name values can be determined by looking at the "Id" and "Host Name" columns in the output of the `sfmShow -1` command.

```

SNC > vpsNameSet 1,"LANDERS"
value = 0 = 0x0
SNC >

```

vpsShow [hostIndex]

The `vpsShow` command displays information about hosts that have been registered with VPS or eVPS based on the value of `hostIndex`.



Note

You can enter `vps` as a shortcut for `vpsShow -1`.

Hostindex	Meaning
-1	Displays brief list of all known host connections
0	Full display of all known host connections, and if online displays a list of all LUNs available to that connection
N (1-48)	Display the full information for the host N only

The following command example shows VPS or eVPS information for the hosts that have been registered by VPS or eVPS. Hosts that have the HRS (host registration service) running with periodic re-registration are shown with a status of "Periodic." One of the hosts has more than one Fibre Channel connection to the SNC.

```
SN60023 > vpsShow -1
VPS State: Active
Id World Wide Name St. Typ HexFlags Status Host Name Host Type Host
Connection
-----
001 200000e0.8b0057d8 000 001 00000000 Online LANDERS NT 4.0 SP5 ScsiPort6
[0:0:0](QLA2200)
002 200000e0.8b16014d 000 001 00000000 Periodic SUPERIOR NT 4.0 SP5
ScsiPort7 [0:0:0](QLA2200)
003 200000e0.8b160152 000 001 00000000 Offline SUPERIOR NT 4.0 SP5
ScsiPort7 [0:0:0](QLA2200)
value = 0 = 0x0
SN60023 >
```

vpsSparseAccessSet[hostindex],"LUN string",[Access]

The `vpsSparseAccessSet` command sets the access for the specified LUNs for the specified host connection index. Same as `vpsAccessSet` except LUNs are entered as a string of characters separated by commas. Existing `hostindex` values can be determined by looking at the "ID" column in the output of the `vpsShow -1` command.

Access	Meaning
0	Disables access to the LUNs
1	enables access to the LUNs

When you enter this command, the settings are stored in memory but are not applied until you enter the `vpsAccessApply` command. The following command example enables host access to the LUNs 1, 2, 3, 4, 6, 9, 22, 23 and 45 on host connection index 1.

```
SNC >vpsSparseAccessSet 1,"1,2,3,4,6,9,22,23,45","1
value = 0 = 0x0
SNC >
```

vpsTypeSet [hostIndex],"OS type string"

The `vpsTypeSet` command sets the operating system type for the specified host connection index. Existing `hostIndex` values can be determined by looking at the "Id" column in the output of the `vpsShow - 1` command. OS must begin with "NT", "AIX", "Linux", "SOLARIS", "HP-UX" or "NETWARE". Additional information may be appended to these strings as desired.

Choosing "Linux" sets the host type default to "Solaris".

The following command example shows setting the host type to NT 4.0 SP5 for host ID 1.

```
SNC > vpsTypeSet 1,"NT 4.0 SP5"  
value = 0 = 0x0  
SNC >
```

wwnLockModeSet [option number]

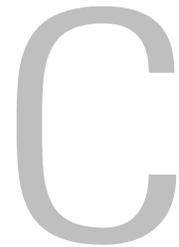
Sets the state of the WWN Locking Mode.

```
SNC4000 > wwnLockModeSet[option number]  
  
1      Enable WWN Locking Mode  
0      Disable WWN Locking Mode
```

wwnLockModeShow [option number]

Shows the state of WWN locking mode.

```
SN611994 > wwnLockModeShow [option number]  
1      Enable Show WWN Locking Mode  
0      Disable Show WWN Locking Mode
```

Diagnostic Command Reference

This section specifies the procedures used when diagnostics are required.

Boot Modes

The SNC 4000 has two modes of operation: `normal` mode and `diagmode`. Two commands are available from the service terminal to reboot the SNC 4000 to the desired mode. The SNC 4000 remains in the existing mode until it has been directed to reboot in the other mode.

When the SNC 4000 is booted in `diagmode`, the command prompt displayed on the service terminal is `diagmode >`. While in `diagmode`, a limited command set is available for testing the SNC 4000 interfaces. In addition, the device drivers for the Ethernet, FC, and SCSI interfaces are disabled so loop back tests can be performed on them.

Entering Diagnostic Mode

Use the `diagBoot` command when the special features of the SNC 4000's diagnostic module are required. Follow this procedure to enter diagnostic mode.

- 1 Stop all I/O.



CAUTION

Before entering `diagmode`, you must disconnect all SCSI and FC cables from the SNC 4000. If you do not, the data on the attached disk or tape devices will become corrupted.

- 2 Shut down the Scalar 24.
- 3 Remove the Ethernet cable, if installed.
- 4 Connect the terminal to the service port.
- 5 Turn on the Scalar 24 and wait for it to finish booting.
- 6 If the command prompt displayed on the service terminal is `diagmode >`, proceed with the appropriate diagnostic tests.

If the command prompt displayed on the service terminal is not `diagmode >`, enter the `diagBoot` command.

- 7 Wait for the SNC 4000 to reboot.

- 8 At the `diagmode >` prompt, proceed with the appropriate diagnostic tests.

Restoring Normal Mode

Follow this procedure if the SNC 4000 was placed in diagnostic mode and needs to be restored to normal operation.

- 1 Connect the terminal to the service port, if it is not already connected.
- 2 If it is not already on, turn on the Scalar 24 and wait for it to finish booting.
- 3 From the service terminal, type the `normalBoot` command.
- 4 Wait for the Scalar 24 to reboot.
- 5 At the command prompt, continue with the MAP that sent you here.

Special Procedures

This section contains information on special procedures.

Health Check

The Health Check function provides a method to periodically determine the operational state of an SNC 4000 and its attached interfaces and devices.

Manual Health Check

Health Check is performed manually from the service terminal only if the SNC 4000 is in normal mode.

See [Perform Health Check](#) on page 44, for instructions.

Event Log Dump

The events that have been logged in the SNC 4000's Event Log can be displayed on the service terminal or viewed from the ADIC Management Console. For more information, see the *ADIC Management Console User's Guide*.

This information may be useful because you can see the normal events and any abnormal events that may lead you to the source of an internal or external failure.

Each entry contains a sequence number, day, and time-stamp, the event code, event source (interface name or system process), an index, and a description of the event.

If the Real Time Clock has been set, the time-stamp will be real time. Otherwise, the time stamp will be relative to the boot-time.

The Event Log holds more than 2000 events. When the log becomes full, the oldest events are overwritten by the most recent events.

You can choose to view only those events logged since the SNC 4000 was last booted or you can view a longer list of events that have accumulated from previous boots.

You can choose to view events by severity level. Selecting **Warning** will display **Warning** and **Notice** events. Selecting **Information** will display **Information**, **Warning** and **Notice** events.

See the [loggerDump \[number\]](#) on page 92 or the [loggerDumpCurrent \[level\]](#) on page 93.

See also [Figure 8](#) on 37.

Retrieving the Code 43 Dump File

If an event code 43 was reported to the ADIC Management Console client, it is an indication that the SNC 4000 performed an error recovery operation and had to reset the FC interface to clear a lock-up condition. For more information, see the *ADIC Management Console User's Guide*.

This event is also recorded in the SNC 4000 event log along with the name of a file that was saved to the flash file system. The file contains information about the state of the FC interface prior to the reset. Follow these steps to retrieve the file.

- 1 Connect the service terminal to the service port.
- 2 Press **Enter** on the service terminal.

If the prompt is not displayed, go to [Service Port MAP](#) on page 60.

- 3 From the service terminal, navigate to the "DUMP" directory by entering the `cd "/ffs/dump"` command.
- 4 From the service terminal, enter the `ls` command to get a file listing for the directory.

There may be more than one file present if the error condition has occurred more than once.



CAUTION

Dump file names end in `.dmp` and the files are automatically deleted whenever you update the SNC 4000's firmware.

- 5 Refer to the section [Saving a Configuration File](#) on page 17.

Substitute the name of the dump file and use that procedure to save the file to the service terminal.

Repeat this step if there is more than one file.

Save each file to the service terminal.

- 6 Send the file to support@adic.com for analysis, attaching the dump file to the message.

Boot Mode Commands

diagBoot

This command is used only to transition an SNC 4000 from normal operations to the special diagnostic mode.



CAUTION

All SCSI and FC cables must be disconnected before entering the `diagBoot` command.

- The `diagBoot` command first ensures that the `/nvfs:mt` directory exists.
- It copies the existing bootline to a file in the `/nvfs:mt` directory on the SNC 4000.
- It installs a new bootline directing the SNC 4000 to boot using a special diagnostic startup script `/ffs:mt/diagnstk.rc`.
- It renames the persistent map file `config/device.map` as `config/device.bak` (a new file will be generated after rebooting).
- It issues a `reboot` command to put the changes into effect.

normalBoot

The `normalBoot` command is used only to transition the SNC 4000 from the special diagnostic mode to resume normal operation.

- It restores the bootline that was copied by `diagBoot`.
- It erases the new persistent device map and renames the original map file `config/device.map` – restoring it for use when the SNC 4000 reboots.
- It reboots the SNC 4000.

Diagnostic Commands

This section is a reference for the commands that are available when the SNC 4000 is booted in `diagmode`.

The command set is limited while in `diagmode`. You will need to use the `showBox` command and three commands (with the suffix `Test`) when testing the Ethernet, FC, and SCSI interfaces.

The Ethernet loop back plug, FC loop back plug, and SCSI cable provided in the Service Tool Kit are required for the corresponding loop back test.



CAUTION

You must disconnect the FC and SCSI cables from the SNC 4000. If you do not, the data on the attached disk or tape devices will become corrupted.

eITest

`eITest` is the Ethernet loop back test. The SNC 4000 must be in diagnostic mode to use this command and a loop back plug must be installed on the Ethernet port.

```
diagmode > eITest
==== Testing Ethernet ====
Init complete.
Ethernet OK
value = 0 = 0x0
```

The test issues a series of loop back tests. Test data is transferred and verified. A good test ends with `Ethernet OK`.

If errors are detected, the test displays the number of bad test iterations as shown below. If your test was not successful, return to the MAP that sent you here.

```
diagmode > eITest
==== Testing Ethernet ====
Init complete.
Ethernet timeout error
Ethernet test reported 6 errors out of 12 iterations
value = 6 = 0x6
```

fcSlotTest [x]

The SNC 4000 must be in diagnostic mode to use this command and a loop back plug must be connected to the SFP.

The `fcSlotTest` command performs a confidence test on a FC slot. Substitute for `x` the FC slot number you want to test. This command can be used to test the slot or the cable.

The following example code shows the display for a test FC slot 1.

```
diagmode > fcSlotTest 1
FC 1 [#####] Iterations 72 Errors 0 - PASSED
Fibre Channel Port 1 returns PASSED
value = 0 = 0x0
```

The following outputs are examples FC port tests that were not successful. If your test was not successful, return to the MAP that sent you here.

Unsuccessful Fibre Test 1:

```
diagmode > fcSlotTest 1
FC 1 [#####] Iterations 7799 Errors 7799 - FAILED
Fibre Channel Port 1 returns FAILED
value = -1 = 0xffffffff = pNullDmaDesc + 0xfe4ea9f7
```

If the FC “link” LED does not come on, the test will not pass.

scsiChannelTest (x,y)

The SNC 4000 must be in diagnostic mode to use this command and a SCSI cable must be connected between two SCSI channels.

The `scsiChannelTest` command performs a confidence test on a pair of SCSI channels. Substitute for `x` and `y` the SCSI channel numbers you want to test. Parentheses are optional. This command can be used to test the SCSI interface or the SCSI cable.

The example below shows the display for a test on SCSI channels 1 and 2.

```
diagmode > scsiChannelTest (1,2)
SCSI-1 -> SCSI-2 [#####] 10 iterations PASSED
SCSI-2 -> SCSI-1 [#####] 10 iterations PASSED
value = 0 = 0x0
```

The following output is an example of a SCSI port test that was not successful. If your test was not successful, return to the MAP that sent you here.

Unsuccessful SCSI Test (cable not plugged in):

```
diagmode > scsiChannelTest (1,2)
SCSI Initiator Error(s) - STO iUnk
SCSI Initiator Error(s) - STO iUnk
SCSI-1 -> SCSI-2 [SCSI Initiator Error(s) - STO iUnk
ERROR, i = 1 ] 1 iterations FAILURE
SCSI-2 -> SCSI-1 [SCSI Initiator Error(s) - STO iUnk
ERROR, i = 1 ] 1 iterations FAILURE
value = -1 = 0xffffffff = pNullDmaDesc + 0xfe4ea9f7
```


fcConnPortModeGet



POST Error Codes

The Power-On-Self-Test (POST) is responsible for testing the integrity of the processor's SDRAM. After testing SDRAM POST will attempt to transfer control to either the default bootrom image or an alternate image.

POST can also download binary images over the service port and write them to flash memory. This enables POST to perform a minimal amount of emergency recovery from FLASH errors.

POST Boot Behavior

The following sections describe POST boot behavior.

ROM Init

Power-on



Figure 10 ROM Init

After applying power the ERR LED will illuminate. At this time postInit code initializes the processor's internal registers and subsystems, including the SDRAM controller. The processor's internal RAM is used as a tiny-stack for this stage of POST. Control is then passed to the `Ipostmain` routine for the SDRAM memory tests.



Note

The power LED is under hardware control on the SNC. It should always be illuminated.

Initial POST

Hardware and service port Initialization



Figure 11 Initial POST

`IpostMain` starts by initializing the service-port and the system hardware. If successful, the ERR LED will extinguish and the **RDY** LED will turn on. POST will then display a firmware version banner on the service port.

Simple Access Test

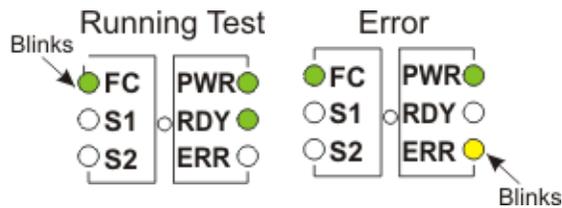


Figure 12 Simple Access

The simple access test verifies that the processor can perform basic writes and reads to the SDRAM. This test is identified by the flash of the **FC** LED. If an error is detected, the **FC** LED will be turned on and the **ERR** LED will blink. The SNC will remain in this state until power is recycled.

Bitwalk Test

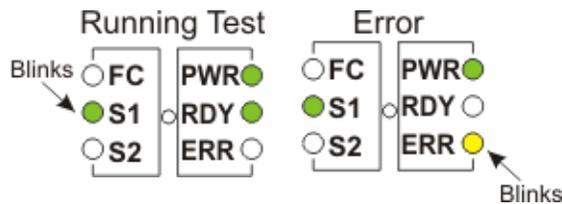


Figure 13 Memory Size

This test verifies that the apparent size of SDRAM meets the minimum and maximum sizes specified for the product. This test is identified by the flash of the **FC** and **S1** LEDs.

Memory Size

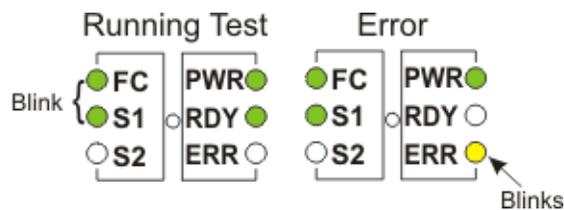


Figure 14 Memory Size

This test verifies that the apparent size of SDRAM meets the minimum and maximum sizes specified for the product. This test is identified by the flash of the **FC** and **S1** LEDs.

Pattern Test

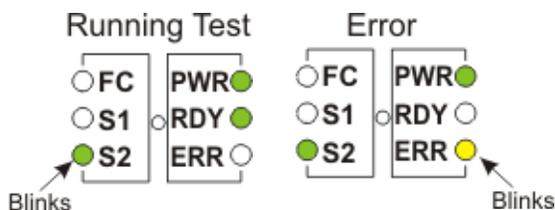


Figure 15 Pattern Test

This test writes and reads a series of diagnostic patterns to each memory location in SDRAM. This test is identified by the repeated flash of the **S2** LED. This test can take several seconds to complete.

Address Test

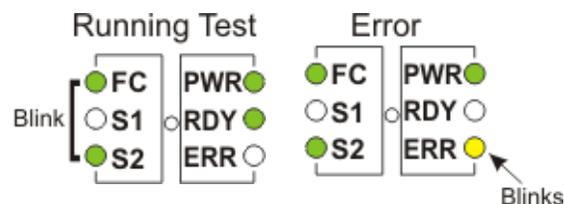


Figure 16 Address Test

This test writes and reads address tags to memory to test for bad SDRAM address lines. This test is identified by the flash of the **FC** and **S2** LED. POST then relocates itself to SDRAM and moves its stack from processor internal RAM to SDRAM. Control is then transferred to the SDRAM-based secondary POST. `IpostMain` starts by initializing the service-port and the system PLD(s). The **ERR** LED will extinguish and the **RDY** LED will turn on. POST will display the following message on the service port:

Secondary POST

This stage of POST attempts to locate and execute the intermediate loader, or “bootrom”. If the operator presses the interrupt button then POST will enter into the service menu. See the section “POST Service Menu” for details.

Identify and Execute Bootrom

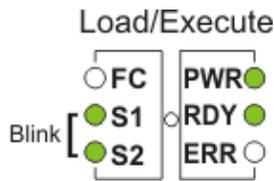


Figure 17 Identify and Execute

POST will examine the FLASH memory primary bootrom locations to determine whether or not it contains a viable bootrom. If the bootrom appears valid then POST will transfer control to it. If the bootrom image is considered invalid then POST will repeat the bootrom checks at the location of the secondary bootrom. This step is indicated by the flash of the **SCSI4** LED.

Start of bootrom

When POST starts a bootrom image it will display a line like:

```
Bootrom (*FFF00100)(2)
```

The number in the first parenthesis is the address of the bootrom's startup code. The number in the second parenthesis is flag to the operating system to determine what type of boot it has - warm or cold. Bootrom code will set the **ERR LED** when it reconfigures the hardware. If successful, the bootrom code will turn off the **RDY LED** and circulate the **FC**, **S1**, and **S2** LEDs while it is counting down to autoboot the main VxWorks system application image.

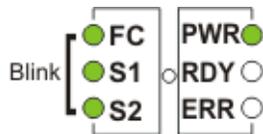


Figure 18 Start of bootrom

When the system starts running the VxWorks system image, all LEDs will turn on momentarily.



Figure 19 VxWorks running

Several LEDs will flash indicating that the different stages of the application are being initialized. When booting is complete, the **RDY LED** will blink.

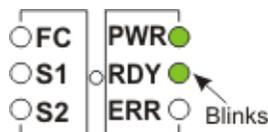


Figure 20 SNC is booted and ready

POST Service Menu

The POST service menu is enabled by pressing <Ctrl><P>. After completing the memory tests POST will display:

```
== POST Version nnn ==  
== POST MENU ==  
A - Cold boot from [A]lternate bootrom  
B - Cold [B]oot from primary bootrom  
R - [R]eceive new boot image from serial port  
V - full [V]ersion information
```

A - Cold boot from [A]lternate bootrom

This option causes POST to transfer control to the alternate bootrom image at address 0xFFE00100 and to treat it as a cold boot.



Note

Boot from option B, Cold [B]oot from primary bootrom unless instructed by service personnel to boot from the alternate bootrom.

B - Cold [B]oot from primary bootrom

This option causes POST to transfer control to the default, or primary, bootrom image at address 0xFFFF00100 and to treat it as a cold boot. After loading a new bootrom image, select this option to boot the SNC.

R - [R]eceive new boot image from serial port

This starts the ZMODEM transfer engine that transfers a single binary bootrom image file to POST using the service port. It will not receive other kinds of binary image files. If the transfer is successful then POST will program the image into the FLASH memory device. While waiting for the file, POST will display:

```
**B000000023be50
```

At this point, the operator may transfer the bootrom file to POST using the ZMODEM protocol. Refer to terminal emulator documentation for further details. After the file is transferred, POST will display:

```
File transfer and update PASSED  
ZMODEM Messages:  
Writing to flash:MMMMMMMM-NNNN
```

MMMMMMMM is the address that is written in FLASH memory and NNNN is the length of the image. At this point, choose option B, Cold [B]oot from primary bootrom.

If errors are encountered, POST will display appropriate messages along with the line:

```
File transfer and update FAILED
```

V- full [V]ersion information

This command will cause POST to display its version number, build date, the machine it was built on, and the user who built it. The display will look like:

```
POST version 0402.02 Built Apr 4 2001, 15:24:06 on TANGLEFOOT by jim
```

Error Displays

POST will flash the ERR LED along with the LEDs associated with any failed test. Refer to the LED assignments in the normal POST sequence. Error messages may also be displayed on the service port.



Startup Message Reference

After the SNC 4000 completes its power-on self-test, it will attempt to find, load, and run the real-time licensed internal code (LIC) boot loader.

Bootrom Messages

See the sample code below.

```
Press any key to stop auto-boot...
0
auto-booting...

boot device      : ibmEmac
unit number     : 0
processor number : 0
file name       : //ffs/vxWorks.st
inet on ethernet (e) : 192.168.1.183
flags (f)       : 0x8
target name (tn) : SN600030
startup script (s) : //ffs/sna.rc

Attaching to TFFS... done.
Loading /ffs/vxWorks.st...2697865
Done
Starting at 0x10000...
```

LIC Initialization Messages

After the BootLoader finds and loads the LIC, the BootLoader will transfer control and start SNC 4000 operations. See the sample code below.

```
Host Name: bootHost
User: buckhorn
Attached TCP/IP interface to ibmEmac unit 0
Attaching network interface lo0... done.
NFS client support not included.
Adding 8123 symbols for standalone.
SDRAM DIMM: 128 Meg - 1 banks detected
Enabling MMU Data Translation
```

```
Firmware-4
Version 0401.5 Built Feb 1 2001, 17:23:51 on redsky for Buckhorn - IBM
PowerPC 405GP Rev. D
Product Type - ADIC   FCR2
Copyright ADIC, 1994-2001
```

```
VxWorks 5.4 WIND version 2.5BSP 1.2/4a
Copyright Wind River Systems, Inc., 1984-2000
```

```
Memory Size: 0x2000000
```

```
/nvfs/ - disk check in progress ...
/nvfs/ - Volume is OK
    total # of clusters: 1,008
    # of free clusters: 935
    # of bad clusters: 0
    total free space: 478,720
    max contiguous free space: 478,720 bytes
    # of files: 5
    # of folders: 10
    total bytes in files: 29,785
    # of lost chains: 0
    total bytes in lost chains: 0
Executing startup script /ffs/sna.rc ...
#! /bin/csh -f
CNFinit
value = 0 = 0x0
csSrvInit
SN600030
Clock set from RTC
value = 0 = 0x0
amemInit
SDRAM DIMM: 128 Meg - 1 banks detected
value = 0 = 0x0
appInit
```

Final Startup Messages

In the final stage of the boot process, information is displayed about the firmware version, SNC 4000 name, optional features that are enabled or disabled, SCSI Channels, and the IP address. In the example below, after the SNC 4000 command prompt, a message is displayed as a result of a response from a host that is running the Host Registration Service for /Scalar Firewall Manager access control.

```
SFM Disabled, License is Invalid
Data Mover Enabled, License is Valid
SAN Management Disabled, License is Invalid
VPM Disabled, License is Invalid
USCSI 2 - LVD Term Enabled
USCSI 1 - LVD Term Enabled
SNC4000
value = 28051936 = 0x1ac09e0
Done executing startup script /ffs/sna.rc
```



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G

Acronyms

BIOS	Basic Input/Output System
DE	Differential Ended
DRAM	Dynamic Random Access Memory
DTE	Data Terminal Equipment
ESD	Electrostatic Discharge
EMI	Electromagnetic Interference
GUI	Graphical User Interface
HBA	Host Bus Adapter
HSM	Hierarchical Storage Management
HTTP	Hypertext Transfer Protocol
I/O	Input/Output
IP	Internet Protocol
JMAPI	Java Management Application Programming Interface
JRE	Java RunTime Environment
LED	Light Emitting Diode
LUN	Logical Unit Number
LVD	Low Voltage Differential
LW	Long Wavelength
MAP	Maintenance Action Plan
MIB	Management Information Base
MTBF	Mean Time Between Failures
POST	Power-On Self test
PPP	Point-to-Point Protocol
RFI	Radio Frequency Interference
RID	Replacement Identification
RMI	Remote Method Invocation
RPC	Remote Procedure Call

RTOS	Real Time Operating System
SCSI	Small Computer System Interface
SDRAM	Synchronous Dynamic Random Access Memory
SE	Single-Ended
SFM	Scalar Firewall Manager
SNMP	Simple Network Management Protocol
TCP	Transmission Control Protocol
VDC	Volts Direct Current

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