



SNC/Gateway 3000

User Guide

 Advanced Digital Information Corp

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ADICADIC Europe ADIC Germany Beteiligungs GmbH, KG
Tel.: +1 303-705-3900 ZAC des Basses Auges Eschenstraße 3
Fax: +1-303-792-24651, rue Alfred de Vigny D-89558 Böhmenkirch, Germany
ATAC: 1-800-827-3822 78112 Fourqueux, France Tel.: +00.800.9999.3822
www.adic.com Tel.: +33.1.3087.5300
Fax: +33.1.3087.5301
Part number: OT806300P Rev A

ADIC • 9 BROWN ROAD • ITHACA, NEW YORK, USA • 1-607-266-4000
ADIC • 11431 WILLOWS ROAD, NE • REDMOND, WASHINGTON, USA • 1-800-336-1233
ADIC • 10949 EAST PEAKVIEW AVENUE • ENGLEWOOD, COLORADO, USA • 1-800-827-3822

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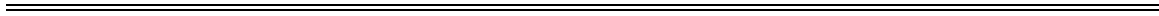
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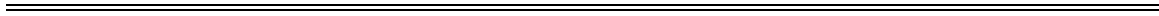
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Chapter 1: Notices

This manual is intended for use with the ADIC Gateway and ADIC Storage Networking Controller (ADIC SNC). Where the text states “ADIC Gateway,” the user may read both “ADIC Gateway” and “ADIC Storage Networking Controller.”

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Safety Notices

The **ATTENTION** notice indicates the possibility of damage to a program, device, system, or data.

The **DANGER** notice warns you of conditions or procedures that could result in death or severe personal injury.

DANGER

AN ELECTRICAL OUTLET THAT IS NOT CORRECTLY WIRED COULD PLACE HAZARDOUS VOLTAGE ON METAL PARTS OF THE SYSTEM OR THE DEVICES THAT ATTACH TO THE SYSTEM. IT IS THE RESPONSIBILITY OF THE CUSTOMER TO ENSURE THAT THE OUTLET IS CORRECTLY WIRED AND GROUNDED TO PREVENT AN ELECTRICAL SHOCK.

Safety Inspection

Perform the following safety checks to identify unsafe conditions. Be cautious of potential safety hazards not covered in the safety checks. If unsafe conditions are present, determine how serious the hazards are and whether you should continue before correcting the problem.

Remove AC Power

Perform the following steps to remove AC power.

1. Perform a controlled system shutdown of attached host systems.
2. Set the Power switch on the ADIC Gateway to the off position.
3. Disconnect the power cord from the power source.

External Machine Check

Perform the following external machine check:

1. Verify that all external covers are present and not damaged.
2. Ensure all latches and hinges are in correct operating condition.

-
-
3. If the ADIC Gateway is not installed in a rack cabinet, check for loose or broken feet.
 4. Check the power cord for damage.
 5. Check the external signal cable for damage.
 6. Check the cover for sharp edges, damage, or alterations that expose the internal parts of the device.
 7. Correct any problems that you find.

Internal Machine Check

Perform the following internal machine checks.

1. Check the condition of the inside of the machine for any metal or other contaminants, or any indication of water, other fluid, fire, or smoke damage.
2. Check for any obvious mechanical problems, such as loose components.
3. Check any exposed cables and connectors for wear, cracks, or pinching.

Safety Label Check

Perform the following label check.

1. Verify that the safety label shown in Figure 1-1 is installed on the ADIC Gateway
2. If the safety label is missing, order and install it.

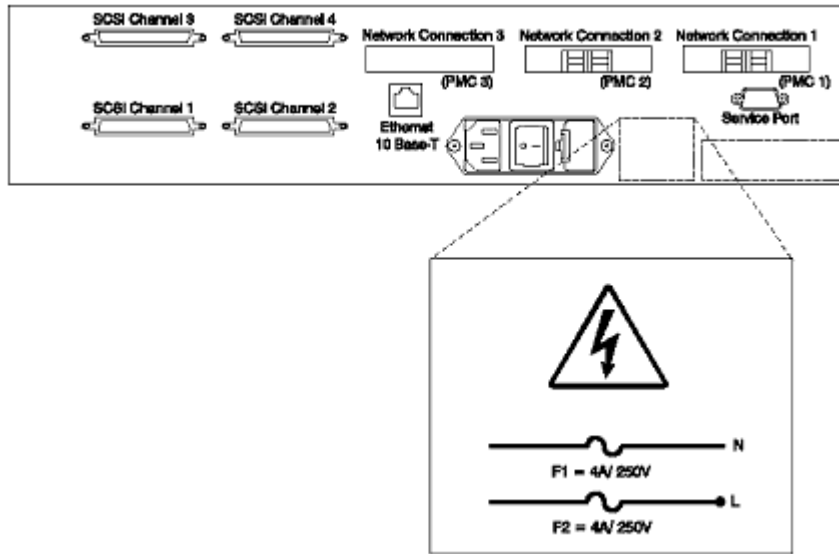


Figure 1-1: Safety Label

3. Check the voltage label on the bottom of the device to ensure it matches the voltage at the power source.
4. Check the voltage level at the power source.
5. Check for proper grounding. See Figure 1-2.

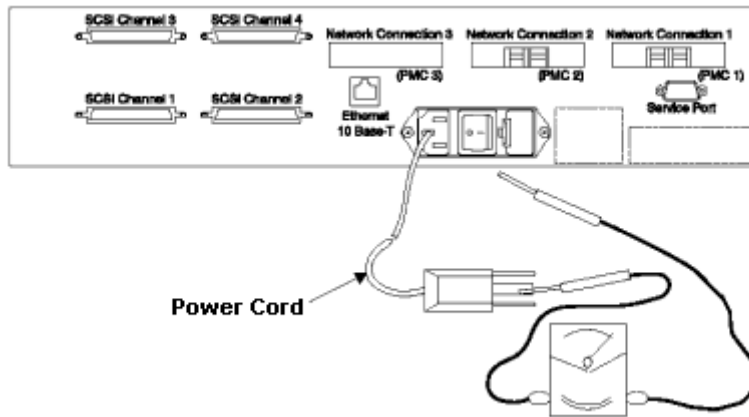


Figure 1-2: Ground Test

Note: Always use an analog meter, never a digital meter, to perform the ground check of the outlet. A digital meter can give the wrong readings if ground current is present.

-
-
6. With the power cord connected to the ADIC Gateway, verify that there is 1.0 ohm or less resistance between the ground lug on the power cord plug and the metal frame.
 7. If the ADIC Gateway passes the test in the previous steps, connect the power cord to the power source.

Fusing Requirements

Figure 1-3 shows the fusing label.

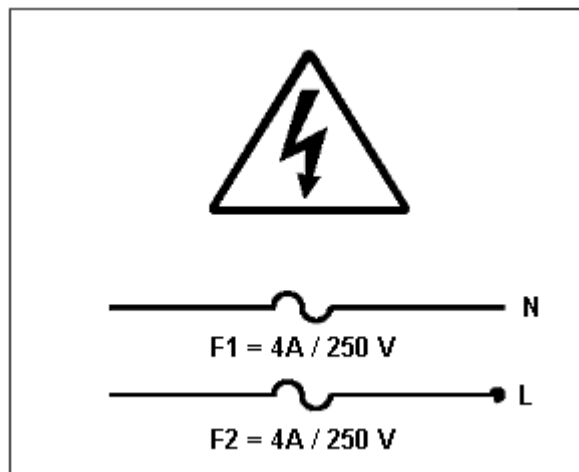


Figure 1-3: Fusing Label

The ADIC Gateway uses double-pole / neutral fusing.

Replace these fuses with the same rating.

The fuses are 4A – Time Lag / 250 V

AC Grounding

Figure 1-4 shows AC grounding on the ADIC Gateway.

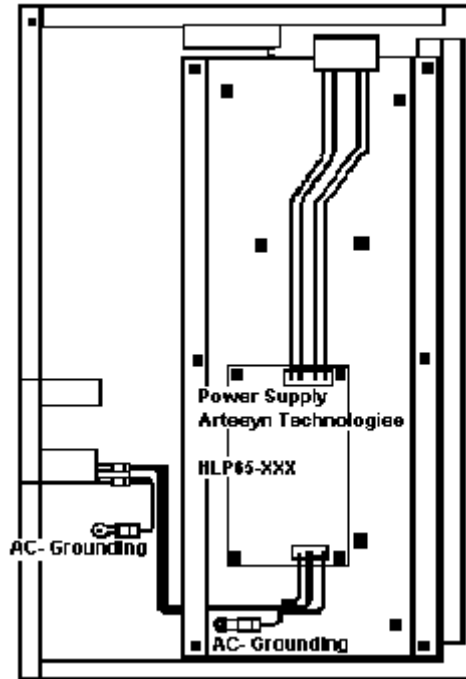


Figure 1-4: AC Grounding

Environmental Notices and Statements

Product Recycling

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

Lithium Battery

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.

General Restrictions

The classification is valid only if the module is operated within the specified temperature and voltage limits. The system using the module must provide power supply protection that guarantees that the system power source will cease to provide power if the maximum recommended operation limit or more is detected on the +3.3 V/+5 V at the power source. The operating temperature of the module must be in the temperature range given in the recommended operating limits. These limits guarantee the laser safety.

Usage Restrictions

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

Electronic Emission Statements

This section gives the electronic emission notices or statements for the United States and other countries.

Federal Communications Commission (FCC) Statement

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. DISC is not responsible for any radio or television interference caused by using other than recommended cables and connectors or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Industry Canada Compliance Statement

This Class A digital apparatus complies with Canadian ICES-003.

Avis de conformité à la réglementation d'Industrie Canada: Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

European Community Compliance Statement

This product is in conformity with the protection requirements of EC Council Directive 89/336/EEC on the approximation of the laws of the Member States relating to electromagnetic compatibility. ADIC cannot accept responsibility for any failure to satisfy the protection requirements resulting from a non-recommended modification of the product, including the fitting of non-ADIC option cards.

This product has been tested and found to comply with the limits for Class A Information Technology Equipment according to European Standard EN 55022. The limits for Class A equipment were derived for commercial and industrial environments to provide reasonable protection against interference with licensed communication equipment.

Attention: This is a Class A product. In a domestic environment, this product may cause radio interference in which case the user may be required to take adequate measures.

Where shielded or special cables (for example, cables fitted with ferrites) are used in the test to make the product comply with the limits:

Properly shielded and grounded cables and connectors must be used in order to reduce the potential for causing interference to radio and TV communications and to other electrical or electronic equipment. Such cables and connectors are available from ADIC authorized dealers. ADIC cannot accept responsibility for any interference caused by using other than recommended cables and connectors.

Japanese Voluntary Control Council for Interference (VCCI) Class 1 Statement

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づくクラス A 情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

Chapter 2: Introduction

This chapter describes the ADIC Gateway. It provides the following information:

- Overview
- Configuration Support
- Hardware Product Description and Features
- Supported Platforms
- Supported Devices
- Operating Specifications
- Agency Approvals
- Features

Overview

The ADIC Gateway is the interface between storage and Open System Host interfaces and provides Fibre Channel to SCSI connectivity.

Configuration Support

The ADIC Gateway is a self-configuring product with Fibre Channel and SCSI interface options. The ADIC Gateway can have up to four on-board UltraSCSI channels and up to six SAN interfaces, which are configurable using plug-in cards.

Address Mapping

The ADIC Gateway maps addresses across and between these different interfaces and preserves the persistency of the address maps across power ups of systems, devices, and the ADIC Gateway. The ADIC Gateway supports the attachment of up to 255 unique devices across multiple interfaces.

Interface Protocol Awareness

The ADIC Gateway 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 ADIC Gateway has the capability to manage the access security between end points on the Fibre Channel interfaces and the SCSI channels.

ADIC Management Console

The ADIC Management Console offers full capability for remote management, configuration, and event notification. Each ADIC Gateway has internal Event Logging, Event Analysis, and periodic Health Checks for predictive failure analysis. All of these management, configuration, and notification capabilities are accessible via standard SNMP protocol for use with major network management applications. The ADIC Management Console offers Java application software for the ADIC Gateway remote management and configuration.

Access Security Capabilities

The ADIC Gateway is aware of the hosts and devices that are attached to its interfaces and provides access security between hosts and devices. Access security between different hosts and devices is a requirement for multi-initiator SAN solutions. Using the ADIC Management Console, you can partition the SAN for different levels of access and performance.

Virtual Private SAN™ Option

VPS 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.

VPS is a Virtual Private connection or channel between a storage element and the user of that element in a Storage Area Network. Virtual Private SAN is created by a method of Access Security that manages the access between an Initiator (user, host, system, ..) to Target/LUN (Device, Disk or Tape, ...) and also protects and preserves such permission.

- VPS is completely host independent and requires no software components on the host.
- VPS has no interface dependencies and supports Fibre Channel, SCSI or any other SAN interface.
- VPS supports SAN connectivity/fan-out products such as hubs and switches.
- VPS is independent of the storage elements and requires no change in legacy or new storage devices.

An optional automatic host registration service that sends periodic host status information to VPS is provided.

VPS is an optional software capability for the ADIC Gateway that requires a license key to be enabled.

Data Mover

The ADIC Gateway can move data directly between storage devices that are attached to it. This direct movement of data can be from disk to disk, disk to tape, tape to disk or tape to tape. Data Mover frees-up valuable system resources on the server and substantially increases the speed of backup and restore operations.

Data Mover is the engine for Server-Free backup and restore and HSM applications that support the Extended Copy Specification (ANSI T10/99-143r1).

The Data Mover capability is always available to users of the ADIC Gateway

Virtual Private Map™ Option

VPM technology enables legacy and new systems equipped with SCSI Host Bus Adapters to access SAN devices.

- VPM allows Fibre Channel and SCSI Target devices to be mapped to private SCSI host channels.
- VPM is completely host independent and requires no software components on the host.

VPM is an optional software capability for the ADIC Gateway that requires a license key to be enabled before use.

Channel Zoning

Channel Zoning is a means of managing the access security between SAN connections and SCSI channels on a channel by channel basis.

Channel Zoning can be used to secure access between a server and its storage, segregating them, for example, from other servers and their respective storage.

The default settings allow all SAN connections to access all SCSI Channels.

The Channel Zoning capability is always available to users of the ADIC Gateway.

Hardware Product Description and Features

This section describes the capabilities of the product and outlines some of the key features of its interfaces.

- An Intel i960RD 66 MHz I/O processor with integrated instruction set and data caches
- Interleaved fast-page-mode (FPM) processor memory using

- standard 60 nanosecond FPM SIMMs for command, control, and code execution
- Non-volatile FLASH memory for operational firmware, power on self-test code, diagnostic functions, system utilities, persistent configuration tables, and event log. The default configuration is 2 MB.
- VxWorks™ real-time operating system (RTOS)

Fibre Channel Interfaces

Interfaces for host and device attachment can be configured for up to three plug-in PCI Mezzanine Cards (PMCs). These interfaces can be configured to use single-port copper, single-port Short Wave Optical, single-port Long Wave Optical, or dual-port Short Wave Optical Fibre Channel PMCs.

The PMCs can be replaced in the field by the customer or by a service representative.

Table 2-1: Fibre Channel Connections

Connection Type	Connector	Cable Type	Speed	Distance
Copper	HSSDC		1.062.5 Mb/sec	30 m
Optical Short Wave	Duplex SC	62.5 μ multimode	1.062.5 Mb/sec	300 m
Optical Short Wave	Duplex SC	50 μ multimode	1.062.5 Mb/sec	500 m
Optical Long Wave	Duplex SC	9 μ multimode	1.062.5 Mb/sec	10 km

Fibre Channel interfaces support the following Public and Private Loop modes:

- Target
- Initiator
- Target and Initiator

Fibre Channel Interfaces also support the following connection options:

- Loop
- Point-to-Point
- Loop Preferred

Fibre Channel interfaces are in compliance with the following standards and specifications:

- Private Loop (FC-PLDA, Rev. 2.1, Sept 22, 1997) Class 3
- Public Loop (FC-FLA, Rev. 2.7, Aug 12, 1997) Class 3
- Fibre Channel-AL-2 Rev. 6.4, Aug 28, 1998
- Fibre Channel-PH Rev. 4.3, June 1, 1994
- SCSI- Fibre Channel P, Rev. 12, May 30, 1995

Ultra2 SCSI I/O Interfaces

- Any or all of the three PCI Mezzanine Card (PMC) interfaces can be configured to use a dual-ported Ultra2/3 SCSI PMC board instead of a Fibre PMC.
- Ultra2/3 SCSI PMCs are available as Single-Ended/Low Voltage Differential (SE/LVD) or High Voltage Differential (HVD).
- SCSI PMCs use standard VHDCI stacked right-angle SCSI connectors, and autonegotiate speeds of up to 80 MHz for Ultra SCSI-2 and 160 MHz for Ultra SCSI-3.
- The cable lengths can be as long as 25 meters with HVD interfaces and 12 meters for LVD/SE interfaces.

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

Ultra SCSI I/O Modules

The key features and capabilities of the ADIC Gateway's on-board Ultra SCSI I/O modules are listed below.

- Up to four Ultra Wide SCSI channels--Single-Ended (SE), high voltage differential (HVD), and/or Low Voltage Differential (LVD)--with internal termination are possible.
- SCSI channels have automatic speed and width negotiation capability for wide or narrow bus widths and Standard, Fast, or Ultra speeds. These parameters can be viewed from the ADIC Management Console.
- You can disable the termination on SCSI channels through the installation of a jumper or from the ADIC Management Console.
- The SCSI ID of each channel is set by default to 7 and can be changed from the ADIC Management Console.
- Each SCSI channel supports up to 15 SCSI target IDs and up to 32 LUNs per ID (subject to an overall total of 256 devices). The ADIC Gateway uses one LUN for command and control so that the remaining 255 LUNs are available for SCSI devices. For each Fibre Channel interface, the ADIC Gateway occupies one Fibre Channel ID and all SCSI target devices are available as LUNs on the same Fibre Channel ID.
- The unit comes with SCSI-3 68-pin jackscrew external connectors for maximum mechanical reliability.
- Cable lengths can be as long as 25 meters with SCSI HVD interfaces.

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 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 (DTE). 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 the shell interface.

The service port is configured at 19,200 Baud, 8 data bits, no parity and XON/XOFF. It connects to the host serial port with a 9-pin to 9-pin null modem cable.

Enclosure

The enclosure is designed for strength, durability, and electromagnetic and radio frequency interference (EMI/RFI) immunity.

The external dimensions are:

- 2U (3.5") high
- 11" deep
- 16.73" (standard 19" rack) wide

It is available with standard 19-inch Rack Mount or Desk Top configuration kits.

The enclosure has two ball bearing cooling fans that draw air in through the side of the enclosure. The exhaust is on the opposite side.

Two temperature switches monitor the internal temperature of the enclosure. One switch indicates a temperature warning at 60°C and the other indicates a temperature alarm at 70°C.

The enclosure has an Enclosure Monitor Register facility. It monitors the status and health of all components of the enclosure and reports it to the ADIC Management Console. Status is also displayed on the front panel LED indicators.

Power Supply Unit

The power supply is an auto-sensing universal power supply nominally supporting power between 100 -127 VAC and 200-240 VAC, at a frequency of 50/60 Hz, with a maximum input power rating of 90W.

It has the highest reliability and mean time between failure (MTBF) numbers and is manufactured by a leading power supply company with excellent field reliability results in the industry.

It has a standard integrated power entry, on/off switch, and fuse holder. It uses two 250 V 4A time lag fuses.

The power supply status is monitored as part of the Enclosure Monitor Register and is reported by the front panel LED, and to the ADIC Management Console.

LED Indicators

On the front panel there are LEDs that provide a visual indication of the status and activity of the ADIC Gateway and its interfaces. When the ADIC Gateway is first turned on, some of the LEDs will be on and others will flash while it is booting. Starting from the left of the front panel, the following list describes how to interpret the LED signals after the ADIC Gateway has finished booting.



Figure 2-1: LEDs on Front Panel

- **SAN Connections**

A group of six green LEDs that indicate Status and Activity on the SAN interfaces for each of the three PMC slots.

If a single-port Fibre Channel card is installed, the Status LED will be ON when the port is up and is connected to a live Fibre Channel device. The Activity LED will flash when there is activity on the SAN interface.

If a dual-port Fibre Channel card is installed, the Status LED will be ON when both ports are up and are connected to live Fibre Channel devices. The Status LED will flash once per second when the numerically lower port is down and the numerically higher port is up. The Status LED will flash every two seconds when the numerically higher port is down and the numerically higher port is up. The Activity LED will flash when there is activity on one or both SAN interfaces.

- **SCSI Channels**

A group of four green LEDs. One LED for each of the four SCSI chan-

nels. A flashing Activity LED indicates activity on a SCSI Channel.

- Ethernet

A group of three LEDs (two green, one amber) indicate the Link, Transmit, and Collision statuses of the Ethernet Port network connection.

- Temperature

A group of two amber LEDs indicate Temperature Warning and Temperature Alarm. Normally the LEDs are OFF indicating temperature is within acceptable limits.

- Power

A green LED indicates the status of the main power supply. Normally the Power LED is ON indicating that the power supply is ON and output voltage is within acceptable limits.

- RDY

A green RDY LED indicates a status of ready. Normally the RDY LED flashes once per second indicating good health. The RDY LED begins flashing after the ADIC Gateway has finished booting. If the LED is ON for more than a few seconds it means there is a problem. If the LED is OFF (and the ADIC Gateway is turned on) it means there is a problem. If the LED is flashing rapidly (and you have not selected "Identify Gateway" via the ADIC Management Console), it means there is a problem.

Supported Platforms

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

For a current list of supported platforms, configurations, and host bus adapters, visit "Service and Support" at www.adic.com, or call the ADIC Technical Assistance Center at 1-800-827-3822.

Supported Devices

The architecture and implementation of the ADIC Gateway software has full SCSI-2 and SCSI-3 target and initiator support. The ADIC Gateway has support for disk, tape, and medium changer devices. The product supports all these devices with the same ADIC Gateway firmware. Multiple target device type drivers coexist to support different device types.

For a current list of supported devices, see the Web site and technical support contact information, visit “Service and Support” at www.adic.com, or call the ADIC Technical Assistance Center at 1-800-827-3822.

Operating Specifications

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

Installation Options

- Desk top with four rubber feet
- Rack mount with two rack mount brackets

Physical Dimensions

- Height: 3.5” (2U)
- Width: 16.73”(Standard 19” rack)
- Depth: 11”

Operating Environment

POWER ON, OPERATING EXTREMES

- Temperature: 10°C to 40°C (50°F to 104°F)
- Relative Humidity: 8% to 80%
- Wet Bulb: 27°C (80°F)

POWER ON, RECOMMENDED OPERATING POINTS

TEMPERATURE

- 22°C (72°F) Relative Humidity: 45%

POWER ON, RECOMMENDED OPERATING RANGES

- Temperature: 22°C to 25°C (68°F to 77°F)
- Relative Humidity: 40% to 50%

POWER OFF

- Temperature: 5°C to 45°C (41°F to 113°F)
- Relative Humidity: 8% to 80%
- Wet Bulb: 27°C (80°F)

STORAGE

- Temperature: 0°C to 60°C (32° F to 140° F)
- Relative Humidity: 8% to 80%
- Wet Bulb: 29°C (84.2°F)

Power Consumption

The power consumption of this product depends on the number and type of installed interface options. The following numbers are line power consumption values for a fully configured product. The maximum line power consumption is 90 watts in active mode. Typical line power consumption is 60 watts in active mode.

AC Power Requirement

100 -127 VAC and 200-240 VAC, at a frequency of 50/60 Hz

Agency Approvals

The SAN Router is tested and conforms to the following agency approval requirements:

- Class 1 laser product (with Fibre Channel optical option only)
- Complies with FDA 21 CFR 1040.10 and 1040.11
- CSA Mark with an NRTL/C indicator
- The NRTL/C indicator adjacent to the CSA Mark signifies that the product has been evaluated to the applicable ANSI/UL and CSA standards, for use in the U.S and Canada.
- FCC Rules, Part 15, Class A
- EMC directive 89/336/EEC (CE Mark)
- EN55022, Class A
- EN61000-4-2 ENV50140
- Australian EMC Framework (C-Tick mark)
- AS/NZS 3548:1994, Class A
- VCCI, Class 1

Introduction to the ADIC Management Console

The Director uses a combination of industry-standard Simple Network Management Protocol (SNMP) requests and a method or technology known as SCSI over TCP, which encapsulates SCSI commands and/or data in TCP packets.

Client/Server Model

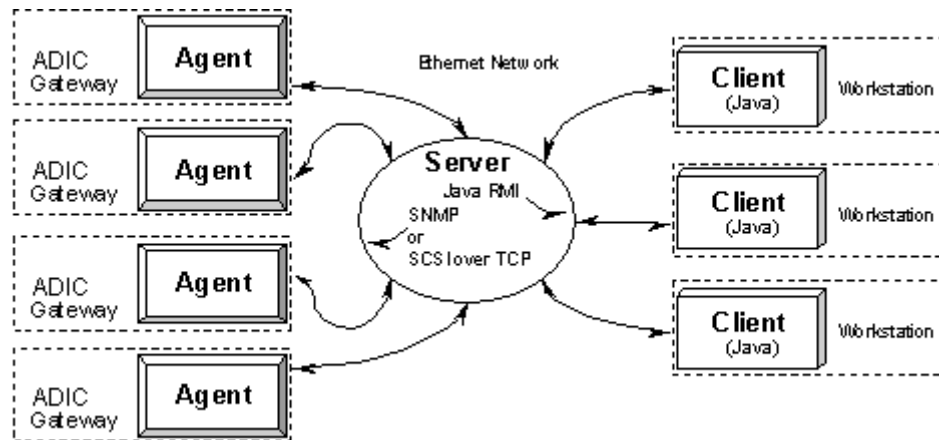


Figure 2-2: ADIC Management Console Application Model

Agent

Each ADIC Gateway is a stand-alone, SNMP-manageable host. The ADIC Management Console uses SNMP as the primary method of communication with the agents. This allows you to set and retrieve information that controls the operation of the agent. It also provides alerts (traps) when an event has occurred that requires intervention. The SCSI/TCP component allows you to update firmware on the ADIC Gateways and target devices and manipulate device operating parameters. The agent component is embedded in the operating software of the ADIC Gateway.

Server

The Server component is a Java application that runs on a host computer system (see "Installation Requirements"). The server is responsible for maintaining communication with the managed agents, and acts as an intermediary between the agent running on the ADIC Gateway and multiple Clients. It provides security features by maintaining account names and passwords on behalf of the Client application. By keeping track of different Client views, a user can recall a saved view from any Client.

The Server coordinates the requests from multiple clients to manage multiple ADIC Gateways. Communication between the Server and the agents is carried out either by SNMP or SCSI/TCP, as required. Specifically, the Java Management Application Programming Interface (JMAPI) is used where possible to provide an industry standard and transportable interface. All communications between the Clients and the Server is implemented using the Java Remote Method Invocation (RMI), a form of remote procedure call (RPC).

The Server is written to be both transportable and efficient. Multiple Clients can share data the Server already knows about rather than having to request the data again. In addition, the Server receives all traps from the agents and forwards them to the Clients that have registered to receive them.

Client

The Client is a Java application. One or more Clients connect to a Server in order to manage the ADIC Gateways. The Client operates from any compatible computer, as long as a TCP/IP connection is established to the Server component. This allows for dial-in configurations using Point-to-Point Protocol (PPP), intranet, or Internet access (where allowed by local network policy and firewall configurations). If the client is started on the same host as the server, a connection will automatically be established.

The Client is the application that provides the user interface and allows viewing and manipulating of all ADIC Gateways and device parameters. Each Client can be configured by the individual user to show only the ADIC Gateways of interest. This means that one Client can monitor one set of ADIC Gateways and other managers can be responsible for totally different ADIC Gateways, without interfering with each other.

The Client uses Java RMI calls to communicate with the server, and SCSI over TCP to communicate directly to the ADIC Gateways for some operations.

Features

SNMP

SNMP community strings serve to group network devices into logical collections for management purposes. The community strings on the Server must match those on the ADIC Gateway you wish to manage.

There are three different strings defined for the ADIC Management Console:

`Read` for querying the ADIC Gateway.

`Write` for controlling the ADIC Gateway.

`Trap` for receiving event messages from the ADIC Gateway

The ADIC Gateway can maintain 32 `Read` and `Write` community strings and 1 `Trap` community string.

SNMP Community Support

A set of commands is provided for manipulating the SNMP Community strings. These strings act as passwords for authenticating requests made from managing applications such as the ADIC Management Console.

There are three different communities defined: `Read` (allows “Gets” only), `Write` (allows “Sets”, i.e., changes to be made) and `Trap` (defines the Community string that a trap recipient will allow). In order for a managing application to view or control an SNMP agent (such as the ADIC Gateway), it must provide the correct community string for each request. The ADIC Gateway allows up to 32 community strings for each of the Read and Write communities. There is only a single Trap community string.

Security

Logging on to a server is required to manage the ADIC Gateway via the ADIC Management Console application. Two levels of privilege control what type of access is allowed:

Administrator

Allows full access, including changing parameters

User

Allows viewing of data and parameters only

Service Port access is managed with User accounts created via telnet or the serial interface on the ADIC Gateway

SAN Access Control

Access control features include Channel Zoning, optional Virtual Private SAN (VPS™) and optional Virtual Private Map (VPM™).

Channel Zoning allows selected SCSI channels to be available to selected SAN connections.

The VPS option requires a software license key to enable the Initiator-Target/LUN access control feature. VPS manages access permission between any host attached to a SAN connection and any storage element attached to the ADIC Gateway. This includes storage devices attached to any SCSI Channel and storage devices attached to any other SAN Connection on the ADIC Gateway.

The VPM option requires a software license key to enable target devices on any channel to be mapped to any SCSI host channel.

Host Registration Service

The Host Registration Service is software that installs on the host from the CD-ROM or it can be downloaded from the website. It simplifies VPS configuration for the system administrator. It removes the burden of physically tracing each connection to correlate the Fibre Channel HBA World Wide Name (WWN) with a specific host.

The registration service installs on most host platforms and it provides the ADIC Gateway with periodic host status information including the host name, host type and type of HBA installed. Host information is sent over the host Fibre Channel connection to the ADIC Gateway.

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 on or offline.

Saved Views

Each user can store their own preferred views on the server. Loading a previous view automatically connects the user to one or more ADIC Gateway in a single step rather than specifying connections to ADIC Gateways individually. Because they are stored on the server, the same views are available to the user from any client.

Network Discovery

Network discovery allows you to locate any ADIC Gateway based on network addresses and network masks. This allows management of an ADIC Gateway without knowing the specific Internet Protocol (IP) address beforehand. Alternatively, the IP address (or name, if it can be resolved through DNS) of an ADIC Gateway can be entered directly for instant access.

Configuration Options

You can set up an ADIC Gateway with a number of non-default parameters, channel settings, and event management variables.

Software Updates

You can update the ADIC Gateway firmware from the client. You can also send device micro-code to individual target devices as a means to update their firmware.

Event Logging

You can retrieve and view the ADIC Gateway event logs in a table. Filtering based upon the significance of events simplifies fault isolation.

Health Checks

Instantaneous and periodic health checks allow monitoring of each SAN Gateway and devices attached to it. The level and interval of the health check is selectable to obtain greater confidence or minimize the impact on system performance.

Views

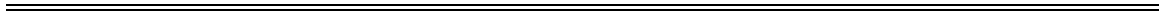
Two different viewing modes are available.

Tree view shows all available ADIC Gateways and can be expanded to show greater levels of detail.

Front panel view shows the status of the LED indicators for a selected ADIC Gateway.

Heartbeat

Each component of the ADIC Management Console monitors the components with which it communicates to ensure continuity of service. If the ADIC Gateway is no longer available, the server component notifies monitoring clients



Chapter 3: Installation

This section covers installation of the ADIC Gateway, SCSI devices, and the host adapter. Before you or your service representative installs the ADIC Gateway you must perform the steps in the Pre-installation checklist.

Note: Ensure SCSI device interfaces match the interfaces of the attached SCSI devices (SE/LVD or HVD).

Instructions on how to install the product is divided into three sections:

Pre-installation Checklist:

Before you or the service representative installs the ADIC Gateway check the items on the pre-installation checklist.

Installation Checklist:

The installation checklist has instructions on how to install the ADIC Gateway. You may have the option of having a service representative perform this portion of the installation for you.

Post-installation Checklist:

After you or the service representative installs the ADIC Gateway, follow the post-installation checklist to complete the installation.

Pre-installation Checklist

It is important that the items in this checklist are verified before you begin the installation of the ADIC Gateway. This ensures a successful installation of the product.

Table 3-1: Pre-Installation Steps

Step	User Action or Decision	Comments and References
1	<ul style="list-style-type: none">• Desktop Install• Rack Mount Install	Decide whether the ADIC Gateway is to be installed on a desktop or rack mounted. See "Desktop Configuration" on page 38 or "Rack Mount Configuration" on page 38

Table 3-1: Pre-Installation Steps

Step	User Action or Decision	Comments and References
2	Verify host platform OS, required Service Pack installed For example: Windows NT 4.0, Service Pack 6a (or later)	For a current list of supported platforms required host platform code updates and information on how to obtain them, ADIC Gateway
3	Verify required Fibre Channel Host Bus Adapter, HBA BIOS and device driver procured, installed	For a list of supported HBAs and the required BIOS and device driver, visit "Service and Support" at www.adic.com , or call the ADIC Technical Assistance Center at 1-800-827-3822 See also "Host Adapter Setup" on page 44
4	If you will be connecting more than one host to the ADIC Gateway and you want to use the Virtual Private SAN or Virtual Private Map access options, be sure you have the necessary licenses	See "Setting up Access Control" on page 58
5	If you are using Virtual Private SAN or Virtual Private Map, install the Host Registration Service on the hosts that will be connected to the ADIC Gateway	For Windows NT/Windows 2000, see "Installing the SAN Explorer and Host Registration Service" on page 44 For Solaris, AIX and other platforms, see "Installing the Host Registration Service" on page 44
6	Ensure that all host Fibre Channel cables <ul style="list-style-type: none">• Have been ordered with the product or have been preinstalled and checked• Are marked with:<ul style="list-style-type: none">-Host system identifier- ADIC Gateway system identifier	Refer to the HBA Specification provided with your HBA and "Hardware Product Description and Features" on page 15

Table 3-1: Pre-Installation Steps

Step	User Action or Decision	Comments and References
7	<p>Ensure that SCSI disk or tape system installation has been completed.</p> <ul style="list-style-type: none"> • For tape attach, tape device driver installed or updated • Mark both ends of each SCSI cable with <ul style="list-style-type: none"> -Target ID and channel number -ADIC Gateway ID and channel number 	<p>Usually done by you or a service representative during target device installation</p>
8	<p>Decide on network parameters. Ethernet port configuration decisions:</p> <ul style="list-style-type: none"> • Static IP address_____ • Netmask (if required)_____ • User-defined ADIC Gateway name (optional)_____ <p>If the ADIC Gateway is not on the same TCP/IP subnet as the server*, assign the default network gateway address and/or route table entries.</p> <p>_____</p> <p>Attention: Save this configuration information for future reference.</p>	<p>Obtain the network parameters from your network administrator.</p> <p>Attention: Use of incorrect network parameters can cause problems on the Ethernet network.</p> <p>The default network name is ADIC Gateway. 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 ADIC Gateway</p>
9	<p>Run the Ethernet cable from the ADIC Management Console server to the network hub</p>	<p>None</p>

Table 3-1: Pre-Installation Steps

Step	User Action or Decision	Comments and References
10	Run the Ethernet cable from the network hub to the ADIC Gateway	None
* Server in this context means the computer used for the ADIC Management Console server application		

Installation Checklist

The installation checklist has instructions on how to install the ADIC Gateway with SCSI attached storage and FC attached hosts. You may have the option of having a service representative perform this portion of the installation for you.

Table 3-2: Installation Steps

Step	User Action or Decision	Comments and References
1	Acquire information for ADIC Gateway installation	Refer to Step 8 in Table 3-1: "Pre-Installation Steps"
2	Unpack the ADIC Gateway. Check the components against the ship group list	
3	If desktop, install four rubber feet (ADIC Gateway supplied parts) If rack mount, install rack mounting (ADIC Gateway supplied parts)	If desktop, go to "Desktop Configuration" on page 38. If rack mount, go to "Rack Mount Configuration" on page 38.
4	Connect the Power Cord to the SAN Gateway	Go to "Connecting Power" on page 43.

Table 3-2: Installation Steps

5	Connect the service terminal to the Service Port and start up a terminal emulation session	See "Connecting to the Service Port" on page 217.
Step	User Action or Decision	Comments and References
6	Turn on the ADIC Gateway and observe the startup messages on the service terminal	Look for "done executing startup script" message (See "Startup Message Reference" on page 315) Within one minute, the Ready LED should start flashing once per second. If the "done executing startup script" message is not seen or the Ready LED is not flashing as expected, go to "Start MAP" on page 157
7	Issue the <code>initializeBox</code> command from the service terminal. After issuing this command, the ADIC Gateway will reboot automatically.	See "Service Port Command Reference" on page 223. Attention: This command will erase all configuration information. It should be used only during initial ADIC Gateway installation
8	If you purchased licenses for the Data Mover Module, VPS, or VPM, you should activate them now by typing <code>sncFeatureEnable</code> <code>vpmFeatureEnable</code> <code>vpsFeatureEnable</code>	see Appendix B: Service Port Command Reference
9	Look for the "done executing startup script" message on the service terminal, then turn off the ADIC Gateway	None

Table 3-2: Installation Steps

10	The SCSI disk or tape subsystems must be installed and verified before the ADIC Gateway installation can continue	None
11	Connect the SCSI cables from the target devices to the ADIC Gateway. Turn on the SCSI target devices	Go to “Attaching SCSI Devices” on page 39
Step	User Action or Decision	Comments and References
12	Turn on the ADIC Gateway	Within one minute, the Ready LED should start flashing once per second and the “done executing startup script” message should be displayed on the service terminal
13	Issue the <code>targets</code> command from the service terminal.	See “Appendix B: Service Port Command Reference”. If all attached SCSI targets are not shown, go to “SCSI MAP” on page 171
13	<ul style="list-style-type: none"> • Configure the Ethernet Port (Host Name, Address, Routes, Enable Ethernet, reboot). • Connect the Ethernet cable from the network hub to the ADIC Gateway • Observe Ethernet Link LED 	Configure the Ethernet Port using information from Step 8, Table 3-1: “Pre-Installation Steps” on page 29. Go to “ADIC Gateway Network Setup” on page 49. If the Ethernet Link LED is not on, go to “Ethernet MAP” on page 187
14	Issue <code>hostTypeShow</code> command from the service terminal to view host type settings for the Fibre Channel ports. If the hosts that will be connected are not the type shown, issue <code>setHost</code> command from the service terminal to set the host type for each Fibre Channel port	See ““setHost [port],“OS”” on page 270”. If the Virtual Private SAN access control option will be installed, VPS will configure the host type for each host and override the Fibre Channel port host type settings

Table 3-2: Installation Steps

15	Power down the FC host(s). Connect the FC cables from the FC HBA(s) to the ADIC Gateway. Power up the FC host(s)	If SAN Connection Status LED for the attached host(s) is not on, check FC cables. You may have to change the polarity of the FC cables. If problem persists, go to “Fibre Channel MAP” on page 178
Step	User Action or Decision	Comments and References
16	Issue <code>fcShow</code> command from the service terminal to show the status of each FC interface that is installed and connected. Issue <code>fcShowDevs</code> command from the service terminal to show SCSI target devices that are connected as seen by the Fibre Channel interface	See “Service Port Command Reference” on page 223. In the output of the <code>fcShow</code> command, look for the Firmware State column. If the word Ready does not appear, go to “Fibre Channel MAP” on page 178. Check to see that all SCSI target devices are seen by each FC interface. If not, go to “SCSI MAP” on page 171
17	Verify all target devices are available to the host system(s)	Use appropriate host system utilities for disk and tape. If all devices are NOT available, reboot host system(s) and check again. If problem persists, go to “Start MAP” on page 157
18	Perform steps in Table 3-3, on page 36 “Post-Installation Checklist”	In SAN Configuration, two specific areas require understanding and attention: <ul style="list-style-type: none"> • Access Control • Save Configuration For more information on these, see “Understanding SAN Configurations” on page 53

Post-installation Checklist

Perform the actions listed in Table 3 after you or your service representative have completed the installation steps.

Table 3-3: Post-Installation Steps

Step	Customer Actions	Comments and References
1	Install the ADIC Management Console software. For an updated list of supported systems, visit “Service and Support” at www.adic.com , or call the ADIC Technical Assistance Center at 1-800-827-3822.	See “Install the ADIC Management Console Software” on page 46 The designated system will be used as the central point for monitoring and controlling ADIC Gateways
2	Ensure that the designated system has access to the same Ethernet subnet as the ADIC Gateway	Consult your network administrator
3	Start-up the ADIC Management Console server	See “Startup and Configuration” on page 47
4	Start-up the ADIC Management Console client: <ul style="list-style-type: none">• Connect to the server (if it does not find the server running on the same system)• Log on• Add new administrator account and password. This removes the default account• Log off and log on using the new administrator account	Connect using the name or IP address of the designated server system. See “Startup and Configuration” on page 47
5	From the client, connect to the desired ADIC Gateways	See “Connect SAN Gateway” on page 80
6	Save your user/administrator view	See “Save Current View as” on page 66

Table 3-3: Post-Installation Steps

7	If later firmware is available, perform the following for each ADIC Gateway: <ul style="list-style-type: none">• Update firmware• Restart	See “Controls Menu Group” on page 94 To obtain information about firmware updates, visit “Service and Support” at www.adic.com , or call the ADIC Technical Assistance Center at 1-800-827-3822
8	If you chose an Access Control option in Step 8 of Table 3-1: “Pre-Installation Steps” on page 29, Use the ADIC Management Console to enable Access Control	See “Access Options” on page 97
9	At this time, you MUST save the ADIC Gateway configuration	See “Save SAN Gateway Configuration” on page 90
10	Become familiar with using the ADIC Management Console	See “Using the ADIC Management Console” on page 63
11	You must use the ADIC Management Console to monitor and maintain your Storage Area Network. If a trap/event is reported by the ADIC Management Console, check the reported event code, then see and perform the recommended action	See “Remote Event Notification” on page 307

Note: We highly recommend that you save your ADIC Gateway configuration periodically. You **MUST** save your configuration if you add or remove devices, or if you make changes to access control or other operating parameter settings

ADIC Gateway Setup

Placing the ADIC Gateway

Whether installed in a rack or on a desk, the ADIC Gateway must be situated with a minimum of one inch of clearance on either side to allow adequate airflow

through the box. The ventilation holes in each side of the unit must never be blocked.

There are no spacing requirements above or below the unit.

Desktop Configuration

The ADIC Gateway is shipped with four rubber feet that should be used when the ADIC Gateway is placed on a desktop or other flat surface. Perform the following to install the rubber feet.

1. Turn the ADIC Gateway upside down.
2. Remove the backing from the adhesive side. Apply to each of the corners on the bottom of the ADIC Gateway approximately ¼-inch from each edge. See Figure 3-1.

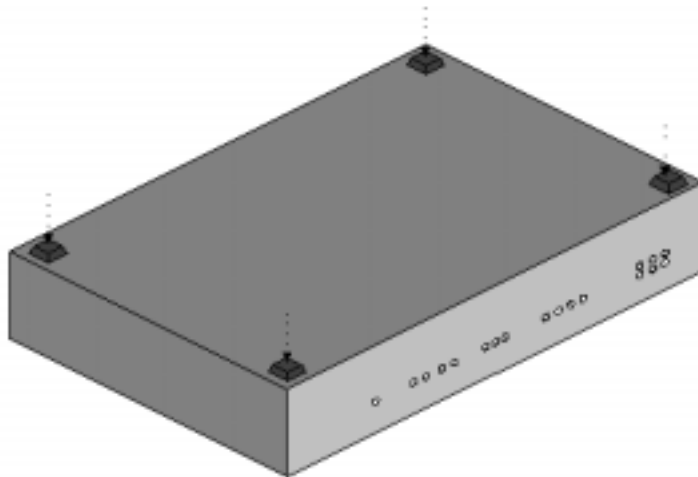


Figure 3-1: Installing the Rubber Feet for Desktop Use

Rack Mount Configuration

The ADIC Gateway rack mount kit (included) contains brackets, screws, and washers that enable it to be mounted in a standard rack. See Figure 3-2. If your rack does not have threaded rails, you will need to provide clipnuts to complete the installation. The rack screws that are provided are threaded 10-32. If this does not match the threaded rails, you will need to provide other screws to complete the installation. To install into a rack, perform the following:

1. Using one of the brackets, locate the holes you will be using on each side rail of the rack. Insert the clipnuts (A) if the rails are not threaded.

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2. Attach a bracket (D) to each side of the ADIC Gateway using the small screws (A) provided with the brackets.
 3. Place a washer on each screw (C). Hold the ADIC Gateway in the rack and secure with four screws.

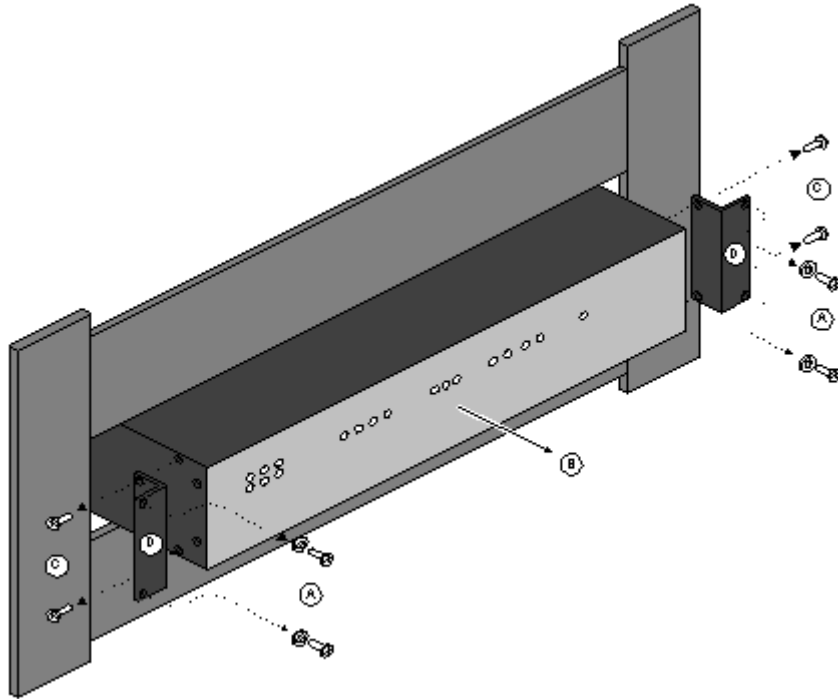


Figure 3-2: Installation Into a Rack

When mounted in an enclosed rack, provision must be made to exchange 24 CFM of air between the interior of the rack and the room environment for each ADIC Gateway installed.

Attaching SCSI Devices

SCSI devices are attached to any of the SCSI connectors on the rear of the ADIC Gateway. The device types and speeds, as well as cabling, target IDs, and termination are discussed below. High quality cables with the correct latches or screws must be used at all times to ensure reliable connections. Cables are not provided with the ADIC Gateway.

Note: Ensure that you read this section before you attach any devices to the ADIC Gateway. A summary table appears at the end of this discussion.

Maximum Number of LUNS

The ADIC Gateway supports up to 255 LUNS.

Attention: Do not attach more than 255 LUNS to the ADIC Gateway. Exceeding the 255 LUN limit will result in unreliable behavior.

Transfer Rates: Ultra, Fast, and Asynchronous

The SCSI protocol defines two methods of data transfer: synchronous and asynchronous. Asynchronous transfers may run as fast as 5 MHz, while synchronous transfers may run as fast as 160 MHz (Ultra3).

The rate of transfer is negotiated between a SCSI initiator, such as the ADIC Gateway, and each target. For each target device identified during a bus scan, the ADIC Gateway will request a transfer rate at the fastest transfer rate supported by the ADIC Gateway. The target will then reply with the maximum transfer rate it will support.

Note: In general, devices that are capable of running at Ultra2/3 speeds should not be mixed on a bus with slower devices, since the bus speed will be set to match the slowest device on the bus.

Wide and Narrow SCSI Buses

A SCSI bus may be either narrow (8 bit) or wide (16 bit). The ADIC Gateway SCSI buses are all wide, but may be connected to narrow devices with the correct cable adapters.

Although it is possible to mix narrow and wide devices on a single SCSI bus, this configuration is not recommended. If any of the devices supports Ultra2/3 speeds, then a mix of narrow and wide devices is prohibited.

In order for the ADIC Gateway to locate and communicate with the devices, each device on the SCSI bus must be assigned a unique target ID. On a wide (16 bit) SCSI bus, the SCSI standard allows for a total of 16 target IDs. On a narrow (8 bit) SCSI bus, the SCSI standard allows for a total of 8 target IDs. There are no requirements about the ordering or position of the target IDs on the SCSI bus. The only requirement is that there be no duplicate target IDs. By default, the ADIC Gateway uses ID 7. Thus, peripheral devices may be assigned IDs 0 through 6 and 8 through 15, typically selected by a switch or jumpers. These settings may be changed.

Attention: Make sure you do not assign more than one device on a bus to the same target ID. This will prevent that bus from working properly.

The SCSI protocol also defines a priority-based arbitration method, based on the target ID of the device attaching to the bus. The SCSI ID priority order is, from highest to lowest, 7, 6, 5, 4, 3, 2, 1, 0, 15, 14, 13, 12, 11, 10, 9, 8.

Table of SCSI Terminology and Limitations

The following table (look for updates at <http://www.scsita.org/>) defines the number of devices supported, based on the negotiated transfer type. When reviewing the limitations of a bus, the capabilities of the fastest devices must be considered. The bus length indicates total SCSI bus length, including any internal device cables, rather than the length between any two devices.

Table 3-4: SCSI Trade Association Terminology

Endorsed Terminology for SCSI Parallel Interface Technology	Max. Bus Speed, MBytes/Sec	Bus Width, Bits	Max. Bus Lengths, in Meters (1)			Max. Devices
			SE	HVD	LVD	
SCSI 1 (2)	5	8	6	(3)	25	8
Fast SCSI (2)	10	8	3	(3)	25	8
Fast Wide SCSI (2)	20	16	3	(3)	25	16
Ultra SCSI (2)	20	8	1.5	(3)	25	8
Ultra SCSI (2)	20	8	3	-	-	4
Wide Ultra SCSI	40	16	-	(3)	25	16
Wide Ultra SCSI	40	16	1.5	-	-	8
Wide Ultra SCSI	40	16	3	-	-	4
Ultra2 SCSI (2,4)	40	8	(4)	12	25	8
Wide Ultra2 SCSI (4)	80	16	(4)	12	25	16
Ultra3 SCSI or Ultra 160 (6)	160	16	(4)	(5)	12	16
Ultra320	320	16	(4)	(5)	12	16

Notes:

1. The listed maximum bus lengths may be exceeded in Point-to-Point and engineered applications.
2. Use of the word "Narrow", preceding SCSI, Ultra SCSI, or Ultra2 SCSI is optional.
3. Low Voltage Differential (LVD) was not defined in the original SCSI standards for this speed. If all devices on the bus support LVD, then 12-meters operation is possible at this speed. However, if any device on the bus is singled-ended only, then the entire bus switches to single-ended mode and the distances in the single-ended column apply.
4. Single-ended is not defined for speeds beyond Ultra.
5. HVD (High Voltage Differential) is not defined for speeds beyond Ultra2.
6. After Ultra2 all new speeds are wide only.

SCSI Bus Termination

Each end of a SCSI bus must be terminated correctly. The ADIC Gateway provides termination on each of its buses. The terminators can be disabled using a jumper on the ADIC Gateway motherboard. They can also be enabled or disabled from the ADIC Management Console. Each interface has a separate control for the terminators.

Attention: Improper SCSI bus termination may result in excessive errors on the SCSI bus, and may lead to data corruption or the inability to communicate with target devices.

The ADIC Gateway provides termination power on all SCSI buses for external terminators.

Many SCSI target devices have internal terminators. It is imperative that the terminators be disabled for all devices EXCEPT those at the physical ends of the SCSI bus.

Problems on the SCSI Bus

When A SCSI bus fails to operate correctly, it is most often caused by incorrect connections to the SCSI bus. Common problems include:

- **Missing terminator at the end of a SCSI bus:** Check that an external terminator is attached or that the end device has termination enabled.
- **Excessive termination:** Check that all devices other than the end

-
-
- devices have termination disabled.
- **Multiple devices at the same ID:** If two or more devices are configured at the same SCSI ID, only one of those devices will be seen by the ADIC Gateway, and data transfers to that device will be unreliable. Check that only one device is set to each ID.
 - **Target device set to initiator's ID:** If a target device is set to the same ID as the ADIC Gateway (ID 7), the bus will be unstable and targets will not be identified. Check that no target devices are set to ID 7, or if one must be set to 7, change the ADIC Gateway Initiator ID.
 - **Bent pins in a SCSI connector:** The pins in the SCSI connectors are somewhat fragile. Inspect each connector to find pins that were bent when the connector was attached. Replace any cables with bent pins.
 - **Improper device type:** A DE device on an SE bus or an SE device on a DE bus will cause the bus to be unusable.
 - **Improper terminator type:** A DE terminator on an SE bus or an SE terminator on a DE bus will cause the bus to be unusable.
 - **Inadequate cables:** Older cables may not be suitable for running at Ultra speeds. Be sure all cables are rated for Ultra.
 - **Mixed cable types:** If a SCSI bus has both round cables and flat ribbon cables, it may suffer problems when running at Ultra speeds. Use the same cable type consistently for all segments of the SCSI bus.
 - **Unshielded cables:** An unshielded SCSI cable used external to a cabinet may cause reliability problems, due to interference from other electrical devices. Use only shielded cables.

Connecting Power

The ADIC Gateway must be connected to AC Power with a voltage of 100 to 127 or 200 to 240 volts, at a frequency of 50 to 60 Hz. A power switch is located next to the power connector on the rear panel of the ADIC Gateway.

The ADIC Gateway uses two 250 V, 4 amp Time Lag fuses. They are located in the fuse holder next to the power switch on the rear panel. If the ADIC Gateway Main Power LED does not light when the ADIC Gateway power cord is connected to the power source and is turned on, then check these fuses. Replace only with F4AL-type fuses.

Note: A proper power cable is provided with each ADIC Gateway.

Other Installation Issues

Host Adapter Setup

Hosts are connected to the ADIC Gateway through specific Host Bus Adapters (HBAs). The installation procedure varies slightly, depending on which adapter you will be using. The procedure involves these steps:

1. Install the adapter in the host system, following the manufacturer's recommendations.
2. Power on the host system and update the adapter firmware, if necessary.
3. Boot the operating system and install the device driver for the HBA.
4. Reboot and verify that the device driver has started and that expected target devices are seen by the operating system.
5. Install optional utility software, if desired.

Perform steps 4 and 5 after the ADIC Gateway is installed and connected to the host system.

Installing the SAN Explorer and Host Registration Service

The SAN Explorer software allows viewing all connected Fibre Channel, SSA and SCSI devices. In addition, you can update the code on all devices and view the LUN mapping through switches to which your ADIC Gateway may be attached. The software also has an option that lets you choose to install the Host Registration Service.

See the readme file in the **[host type]/HOSTSW** folder on the CD-ROM for installation instructions. For software updates, visit "Service and Support" at www.adic.com, or call the ADIC Technical Assistance Center at 1-800-827-3822.

INSTALLING THE HOST REGISTRATION SERVICE

The Host Registration Service for Virtual Private SAN provides the ADIC Gateway with periodic host status information including the host name, host type and HBA. Host information is sent over the host connection to the ADIC Gateway. 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 or SCSI port that the host is connected to and you can tell whether the host is on or offline.

The default period is set to send host status every 15 minutes. If you want, you can change the period to any value between 1 and 255 minutes. See the readme file on the CD-ROM in the **HOSTSW** folder for the specific host platform you are using. The readme file contains the installation procedure and information about changing how often host status information is sent.

For Windows NT and Windows 2000: See the readme file in the **NT/HOSTSW** folder on the CD-ROM. The Host Registration Service installs as part of the SAN Explorer executable. For software updates, visit “Service and Support” at www.adic.com, or call the ADIC Technical Assistance Center at 1-800-827-3822.

For Solaris: A single program is provided for Solaris 2.6 that runs from the command line or by inclusion in a startup script. Installation is through a Solaris "package". See the readme file in the **SOLARIS/HOSTSW** folder on the CD-ROM. For software updates, visit “Service and Support” at www.adic.com, or call the ADIC Technical Assistance Center at 1-800-827-3822.

For AIX: See the readme file in the **AIX/HOSTSW** folder on the CD-ROM. For availability and information regarding software updates, visit “Service and Support” at www.adic.com, or call the ADIC Technical Assistance Center at 1-800-827-3822.

For other platforms, such as HP-UX: See the appropriate readme file on the CD-ROM. For availability and information regarding software updates, visit “Service and Support” at www.adic.com, or call the ADIC Technical Assistance Center at 1-800-827-3822.

Power-Up and Boot Sequence Guidelines

Before you reboot the ADIC Gateway, you must stop all I/O between the host and SCSI devices.

The ADIC Gateway scans the SCSI buses when it boots. If you add or remove SCSI devices after the ADIC Gateway has booted, it will not detect the changes. You can invoke a SCSI rescan or reboot from the ADIC Management Console client or from the service terminal.

Before you turn on or restart the hosts that are connected to the ADIC Gateway, you must wait until it has finished booting. You will know that the ADIC Gateway has finished booting when the **RDY** light on the user panel blinks at intervals of one second.

Some operating systems provide you with software methods that allow you to add or remove SCSI devices dynamically after the host has booted. To ensure reliable operation, reboot the host.

If you update ADIC Gateway firmware you must reboot in order to use the new firmware. To ensure compatibility between the firmware features or functions and the host, reboot the host.

If you update SCSI device firmware, the SAN Explorer application does not display the new firmware version until the ADIC Gateway has issued a SCSI Inquiry. The SCSI Inquiry occurs when it rescans the SCSI buses. The same is true for the ADIC Management Console client application and the service terminal.

Install the ADIC Management Console Software

The ADIC Management Console allows you to manage multiple ADIC Gateways from any location on your network. The system consists of two Java applications. You should install the Server on just a single system on your network to manage multiple ADIC Gateways from multiple ADIC Management Console Clients.

This section describes the installation and initial configuration of the Server and Client components. The installation for the ADIC Management Console consists of three components, as described in “Client/Server Model” on page 23. The agent component is provided as part of the operating software already installed on the ADIC Gateway hardware.

The installation program installs the appropriate software components on your Server and Client system. It also installs the required Java Runtime Environment.

SERVER

The system used for the Server does not need to be used as a Client and can be placed in a locked closet. It does need network access to the ADIC Gateways it will be managing, so appropriate routes will have to be set on that system and on the ADIC Gateways.

CLIENT

The Client system can be located anywhere, as long as it can connect to the Server system using TCP/IP.

Installation Requirements

Minimum configuration guidelines are presented for each system platform in the readme file located in the **SANMGMT** folder on the CD-ROM. For an updated list of supported platforms and installation instructions, visit “Service and Support” at www.adic.com, or call the ADIC Technical Assistance Center at 1-800-827-3822.

An example of the installation requirements for Windows NT/Windows 2000 is listed below.

Installing the Software on Windows NT/Windows 2000

Server System Requirements

- Windows NT 4.0 Server or Workstation, Service Pack 6a or Windows 2000
- Minimum memory: 64MB
- Free hard disk space: 40MB
- Ethernet with TCP/IP protocol installed

Client System Requirements

- Windows NT 4.0 Server or Workstation, Service Pack 6a or Windows 2000
 - Minimum memory: 96MB
 - Free hard disk space: 30MB
 - Ethernet with TCP/IP protocol installed
1. Log on to the target machine with administrator privileges.
 2. Insert the CD and execute the **ADIC_SD_** executable from the **x:\NT\SAN-MGMT** directory, where **x** is the letter of your CD-ROM drive.
 3. The default install option is set to install both the Management Console Server and Management Console Client. Choose to install both the Server and the Client on at least one system. When you install the ADIC Management Console on any other attached system, you can opt to install the Client only.

Startup and Configuration

The first time you install the server component, there is one pre-defined user account, which has administrator privileges. That account is called **Admin** and the password is **password**.

Note: User names and passwords are case sensitive.

FOR SECURITY:

1. Start the Server application
 - a. Click on the Windows NT/Windows 2000 **Start** button
 - b. Select **Programs > ADIC > Server**
2. Start the Client application
 - a. Click the Windows NT/Windows 2000 **Start** button
 - b. Select **Programs > ADIC > Client**

-
-
3. Connect to the Server (automatic if Server and Client are running on same system)
 4. Log on to the Server. See Figure 3-3.

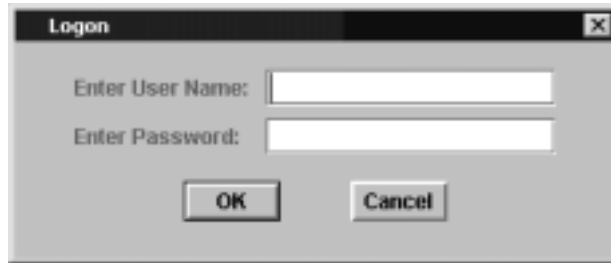


Figure 3-3: Logon to Server

5. Add a new user account with administrator privileges. See Figure 3-4.



Figure 3-4: Add An Administrative User Account

To log on, use the pre-defined Admin account, see “Startup and Configuration” on page 47.

To add a new administrator account (pull down the **Admin** menu and click on **Add User**). See Figure 3-5.



Figure 3-5: Adding A User Account

Remember that user names and passwords are case sensitive. After you add a new administrator account, the pre-defined **Admin** account is deactivated.

Attention: Save your administrator account information in a secure location. If you lose this information and do not have another administrator account available, you must contact your service representative.

Use this new administrator account to set up other user accounts (with or without Administrator privileges) that you might need.

ADIC Gateway Network Setup

The ADIC Gateway must be connected to a 10-base-T Ethernet network for use with the ADIC Management Console software. An RJ-45 connector is located on the rear panel of the ADIC Gateway for connection to the Ethernet. You will need to first configure the IP address by connecting a terminal or terminal emulator to the Service Port of the ADIC Gateway.

To configure the network, connect to the ADIC Gateway Service Port. See “Connecting to the Service Port” on page 217.

For all of the following examples, substitute the values you determined in Step 8 of Table 3-1: “Pre-Installation Steps” .

Set the host name:

The host name is set using the `hostNameSet` command. In the example shown, the host name of the ADIC Gateway was “Gateway” and is now being set to “foster.” The shell prompt will change to reflect the new name.

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

Set the host network address:

The network address is set using the `ethAddrSet` command. 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"
```

Set the network routes and/or default gateway:

If a network gateway is needed for the ADIC Gateway to communicate with other systems, you must specify one.

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

When more complicated routing is required to reach the ADIC Management Console server, use the `route` command to specify the destination address, as a full address (single host) or as an abbreviated subnet address, and 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
foster >
```

Add User Account for Telnet (optional):

If you want to access the ADIC Gateway’s command line interface through its Ethernet port using a Telnet session, you need to add a user account. In the example below, specify the desired user name and user password. The user that you specify must be 3 or more characters and the password you specify must be

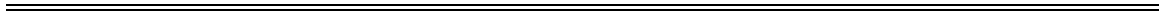
8 or more characters. For further information, see the user commands in “Service Port Command Reference” on page 223.

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

Reboot the ADIC Gateway:

The ADIC Gateway must be rebooted to activate the Ethernet port, using the `reboot` command.

```
foster > reboot
```



Chapter 4: Understanding SAN Configurations

One of the functions of the ADIC Gateway is to connect hosts with one kind of interface, either as Fibre Channel or SCSI, to devices with different interfaces, either Fibre Channel or SCSI. In a typical configuration, each ADIC Gateway Storage Area Network interface is connected to either a single host or multiple hosts using Fibre Channel hubs or switches.

It is important to understand how devices attached to the ADIC Gateway as targets appear to the host systems. It is different than the way that targets attach directly to a host system without any intervening ADIC Gateways, or bridges. See also “Device Mapping” on page 110.

Device Configuration and Mapping

In SCSI terminology, a tape drive or a disk drive is attached to a “bus” and has a unique address on that bus. There are three parts of the address in a conventional parallel SCSI:

- Bus
- Target ID
- LUN

A simple case of several disk drives connected to the same bus is shown below.

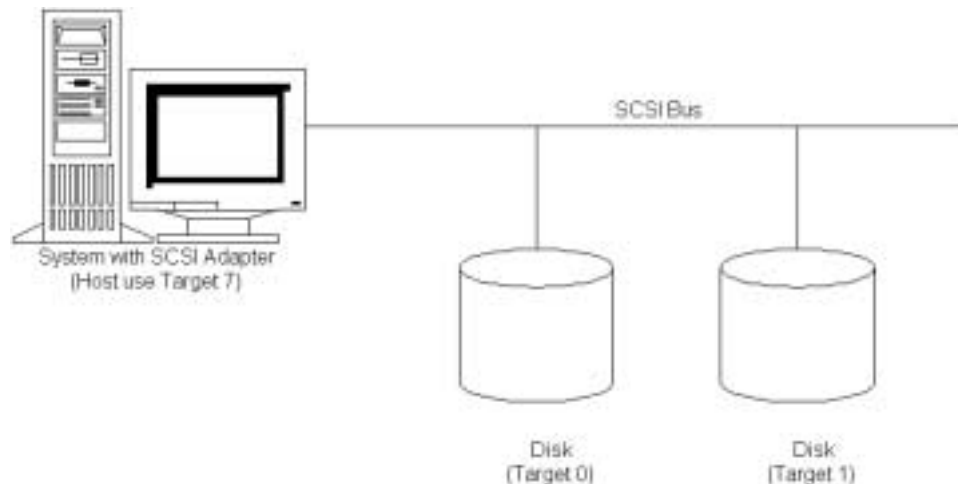


Figure 4-1: Basic SCSI Connection to System

This configuration has a device map (from the device point of view) that looks like this:

Table 4-1: Target Device Map

Target ID	Device
0	Disk (Target 0)
1	Disk (Target 1)
7	Host System

If a product such as an ADIC Gateway or a RAID controller is placed between the system and the target devices, the addressing will have another layer. This is because the targets (disk drives) are not directly attached to the host. Instead, the targets are connected to a SCSI bus that is part of the RAID controller or ADIC Gateway, and they are not directly attached to the system. See Figure 4-2.

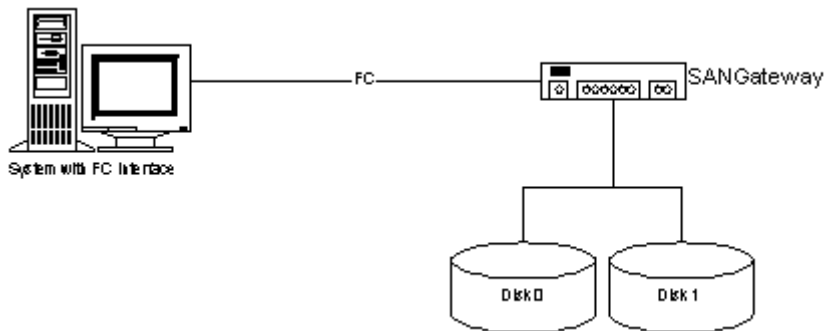


Figure 4-2: System With ADIC Gateway Attached Through Fibre Channel

This analysis would also be true even if the host interface and the device channels are the same type, for example, Fibre Channel host to Fibre Channel disk drives, when an ADIC Gateway or RAID controller is used, or SCSI host to SCSI tape drives. For more information on attaching SCSI hosts, see “Installing and Using Virtual Private Map” on page 147.

With the introduction of an ADIC Gateway, a level of indirection has been added and the system now has only a single target ID directly attached to it (the ADIC Gateway). The ADIC Gateway forwards commands to and from its targets (the disk drives). However, there is a need to map the devices (disks) so the host system can use them. This level of indirection is handled through another layer of

mapping, or LUNs. The device map might now look like this from the host point of view:

Table 4-2: Host Device Map

Target ID	LUN	Device
0	0	ADIC Gateway
0	1	Disk 0
0	2	Disk 1
125		Host System

For simplification, hard IDs were chosen for the Fibre Channel devices in the mapping scheme. A hard ID is a number from 0 to 125 used in place of the World Wide Name assigned to each Fibre Channel device. A soft ID is an ID assigned by the ADIC Gateway during device discovery. Although a soft ID should never change, when Fibre Channel devices are added or removed from a loop, the Fibre Channel host may scramble their device IDs. When using Fibre Channel hubs or switches, hard IDs are preferred because the host won't lose track of the devices. In the mapping scheme LUN 0 points to the ADIC Gateway. This allows you to send commands to control the ADIC Gateway and is referred to as the Command and Control LUN.

Host System Considerations

The host operating system imposes limitation on the number of LUNs and target IDs. It requires SCSI devices to be mapped exactly the same way every time the host is booted. The ADIC Gateway has the ability to deal with these issues.

Mapping Devices to Targets and LUNs

The most common SCSI implementation in use (SCSI-2) allows eight LUNs per target ID, so if you want to connect more than seven devices (remember, LUN 0 is reserved for the ADIC Gateway), this address limitation needs to be circumvented. Fibre Channel and other serial interfaces implement a newer SCSI specification (SCSI-3), which allows for many more LUNs per target.

The number of LUNs is still limited by the host operating system. In that case, another abstraction is required from the host adapter (either in firmware on the adapter or from the device driver on the host system). This varies with the implementation, but a common method is to create additional "pseudo" target IDs when you use up the eight-LUN allotment. In the previous example (adding more drives), the host system "sees" that target 0 has LUNs 0 through 7, then target 1, LUNs 0 through 7 for the next eight devices, continuing until all devices are

accounted for. With a SCSI-type mapping, there are 16 target IDs available per bus, but one must be reserved for the host adapter. This allows for 15 targets with 8 LUNs each, or 120 total devices.

Different operating systems have different limits on the number of LUNs supported. For example, Windows NT 4.0 had an eight-LUN limit until the release of Service Pack 4. The limit is now 255 LUNs per target ID. The increase implies that you need not use “pseudo” targets. When operating system vendors implement the new SCSI-3 specifications in their software, it will be possible to exceed the SCSI-2 device addressing limits.

Persistent Device Maps

Some operating systems (e.g., Windows NT) may not care about the SCSI address of a device when the system has booted.

Note: An exception might exist for devices, such as media changers that are not handled by operating system device drivers. Instead, they are directly controlled by an application, such as a backup program.

Users access the devices only by logical drive letters or network names. If no devices are added or removed while the system is running, there is no problem if a device changes addresses when a system is rebooted again. Other operating systems (e.g., UNIX) do care about the SCSI addresses and require constant device addresses when mounting the file systems.

Newer serial technologies present problems for either case because they allow for the dynamic addition and removal of devices. In the case of an interface that must map a unique (but not changeable by switches) ID to a SCSI-like Target and LUN, it is important that existing devices do not “move” around if new devices are added. In this latter case, each device must have a constant address when the system is rebooted. Within the ADIC Gateway, tables are maintained to ensure “device persistence.” As new devices are added, each one is assigned a unique LUN. If you remove a device, its LUN is reserved because there is the possibility that the device was removed for maintenance purposes, or is temporarily powered off. This address map can contain up to 255 entries and is stored in non-volatile memory within the ADIC Gateway. Commands are provided to help you maintain the device map. ADIC Management Console’s **Controls > Device Map** allows management of this persistent device map. You may also manage the device map via the Service Port. See “Appendix A: Connecting to the Service Port.”

Alternate SCSI IDs

A host sends Inquiry or Test Unit Ready commands to a tape drive or changer device during system startup when it scans the SCSI buses. If another host is

sharing the device and the device is busy doing I/O, it could take several minutes for the device to respond.

In a standard queuing model, the command sent by the second host starting-up would be blocked behind the I/O command and could timeout, preventing the host from finding the device. The ADIC Gateway can issue a command to the drive, while another command is already in process by issuing the command from a second or Alternate ID on the SCSI Channel. This technique allows the Inquiry or Test Unit Ready to be processed immediately.

When a reservation is held for a device by an Initiator and the ADIC Gateway receives a command from another Initiator for the same device, the ADIC Gateway issues the command to the device by sending it from the Alternate ID. The majority of the commands received by the ADIC Gateway will be returned to the Initiator with RESERVATION CONFLICT status. The ADIC Gateway uses the Alternate ID to issue the following commands to the target device.

INQUIRY,
TEST UNIT READY,
PREVENT/ALLOW MEDIUM REMOVAL,
RELEASE,
REQUEST SENSE

DEFAULT ALTERNATE SCSI ID

When the ADIC Gateway scans a SCSI Channel, it determines which IDs are currently being used by target devices and sets the Alternate ID to the highest ID not in use. The default Primary SCSI ID is 7. If no target is present at ID 6, the ADIC Gateway chooses ID 6 for the Alternate ID. Both the Primary ID and Alternate ID may be explicitly set if necessary.

CHANGING THE ALTERNATE SCSI ID

The Alternate ID can be set to any SCSI ID between 0 and 15. A system administrator could choose to explicitly set the ID to prevent the ADIC Gateway from selecting a particular ID not currently in use. This allows a device with a particular ID to be added in the future. Performance criteria based on SCSI Bus Priority may also be a good reason for explicitly setting both the Primary and Alternate SCSI IDs rather than accepting the defaults. See “SCSI Channel” on page 105.

Adding and Replacing SCSI Target Devices

If new SCSI devices are added to the ADIC Gateway, the SCSI buses must be re-scanned for the ADIC Gateway to detect them. You can use the `scsiRescan`

command from the terminal or system connected to the service port or the ADIC Management Console to request a SCSI rescan.

Attention: Do not attach more than 255 LUNs to the ADIC Gateway. Exceeding the 255 LUN limit will result in unreliable behavior.

Replacing an Existing SCSI Device

If you have to replace a SCSI target device, remove the old device, set the new device to the same SCSI ID as the old device and attach it to the same SCSI channel on the ADIC Gateway. Perform a SCSI rescan to update the configuration data. The new device will be available to host systems with the same LUN as the old device.

Setting up Access Control

The ADIC Gateway allows you to connect more than one host to it. In its default configuration, all hosts can access all target devices. Host operating systems do not always handle multiple systems using the same target devices simultaneously. When more than one host tries to use the same disk drives or LUN, the file systems on those devices become corrupted. Or, if multiple hosts access the same tape device, backup and restore operations might be interrupted.

You can choose from three Access Control options that can be enabled in the ADIC Management Console application.

If you choose Channel Zoning, you can set the desired access between Fibre Channel connections in initiator mode and any port in target mode.

If you choose Virtual Private SAN, you can set the desired access permissions between individual hosts and individual LUNs.

If you choose Virtual Private Map, you can set the desired access permissions between SCSI hosts and individual LUNs.

For further information about Channel Zoning, Virtual Private SAN, and Virtual Private Map, see “Access Options” on page 97.

Note: Cluster configurations and some newer backup programs do manage concurrent access to devices.

Attention: If Access Control is not utilized for tape devices, the tape application must support RESERVE/RELEASE or provide some method (via hardware, software or manually) to control access to data on tape.

Fibre Channel Port Modes and Connection Options

The Fibre Channel ports support Private and Public Fibre Channel Fabric Loop attachments. Both Loop and Point-to-Point connection options are available. The default Port Mode setting is Public Target and the default connection setting is Loop. From the ADIC Management Console, you can view the settings and change port parameters.

Port Mode Options

TARGET

In this mode, the port operates as a Target allowing a Fibre Channel Initiator (Host or FC switch) to attach to it.

INITIATOR

In this mode, the port operates as an Initiator allowing Fibre Channel Targets (disks, tape devices, or FC switch) to attach to it.

TARGET AND INITIATOR

In this mode, the ADIC Gateway has access to target devices on the Fibre Channel, and Initiators on the Fibre Channel have access to Targets attached to the ADIC Gateway. The port operates simultaneously as a Target and Initiator.

PRIVATE

With this option, the ADIC Gateway scans the local loop for devices but does not check for Fabric devices. You can select this option if you are connecting target devices directly to the port.

PUBLIC

With this option, the ADIC Gateway scans the loop for Fabric devices. If it finds a Fabric device, it logs-in and queries the Name Server for target devices that are available on the Fabric. If it finds Targets attached to the Fabric, it adds all of them to the device map. You can select this option if you are connecting a Fibre Channel switch to the port and you want the ADIC Gateway to have access to all of the available target devices attached to the switch. Otherwise, if target devices are connected directly to the port, it automatically switches to Private mode.

Connection Type Options

LOOP

With this connection option, the port operates with attached loop-capable devices. If a point-to-point device is attached, the ADIC Gateway will not be able to communicate with it.

POINT-TO-POINT

With this connection option, the port supports point-to-point fabric connection (F_Port Login). It also operates in “old port mode” for compatibility with N_Port devices that do not support Loop. If loop-capable devices are attached, the ADIC Gateway will not be able to communicate with them.

LOOP PREFERRED

With this connection option, the port operates in Loop mode unless it detects a connection to an N_Port device in which case it automatically switches to Point-to-Point.

POINT-TO-POINT PREFERRED

With this connection option, the port operates in Point-to-Point mode unless it detects a connection to a loop device in which case it automatically switches to Loop.

Preserving the ADIC Gateway Configurations

It is important to preserve the mapping of device addresses. The ADIC Gateway automatically saves the device map in non-volatile memory to ensure the persistence between boots and power cycles. For information on device maps, see “Persistent Device Maps” on page 56. Note that the Ethernet addresses and names are not included in the “saved” configuration file.

To provide a backup of the device maps and other configured parameters, you must use the ADIC Management Console to save each ADIC Gateway's configuration when you:

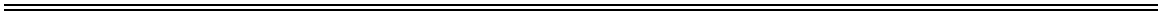
- Install the ADIC Gateway
- Add new devices
- Remove devices permanently
- Change Target IDs or LUNs

Use the ADIC Management Console to save or load the configuration. See “Save SAN Gateway Configuration” on page 90. You must save the configuration so that it can be reloaded in case you or the service representative must replace the ADIC Gateway base.

Note: Save a backup copy of your ADIC Gateway configurations frequently.

Updating the ADIC Gateway Software

The ADIC Gateway is a programmable device and contains an operating system and operational firmware. If you are instructed to update your firmware, see “Update Firmware” on page 117.



Chapter 5: Using the ADIC Management Console

Menus allow you to select views of one or more ADIC Gateways and the devices connected to them, and to perform various actions. From the main screen, six major menu groups are available:

- File
- View
- Admin
- Tools
- Controls
- Help

Some menu options will appear grayed, signifying they are currently disabled. Options can be disabled for one of two reasons:

- Insufficient user privileges or
- The option does not apply to the currently selected item.

There are two privilege modes:

- User
User privilege allows you to view data, but does not allow you to make changes to ADIC Gateway settings, configurations, or user accounts.
- Administrator
Administrator privilege allows you to have full access to all options.

Unless otherwise noted below, administrator privilege is required to modify any parameter.

See “Startup and Configuration” on page 47 for information on starting the Server and Client components.

Starting the ADIC Management Console

Before a Client can manage any ADIC Gateways ("Agents"), it must establish a connection to the Server. If the Server and Client are running on the same system, a connection is automatically made when the Client starts. If the Server is on a different system the dialog in Figure 5-1 is displayed.

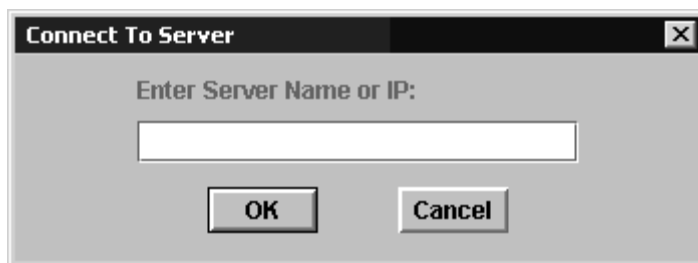


Figure 5-1: Connect to Server

You can enter an IP address or a name if it can be resolved by the Client system. After you connect to the Server, log on. See Figure 5-2.

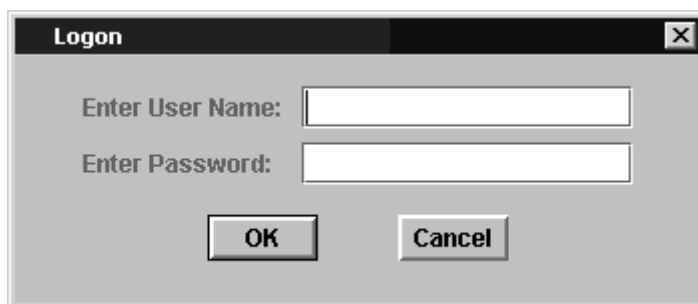


Figure 5-2: Logon to Server

Unless you have already added your own Administrator level account via the service port, use the default account specified on page 47. At this point, you can:

- Retrieve a saved view. See "File Menu Group" on page 66.
- Perform a "Discovery" of all ADIC Gateways on a subnet. See "Tools Menu Group" on page 79".
- Connect to a specific ADIC Gateway. See "Tools Menu Group" on page 79.

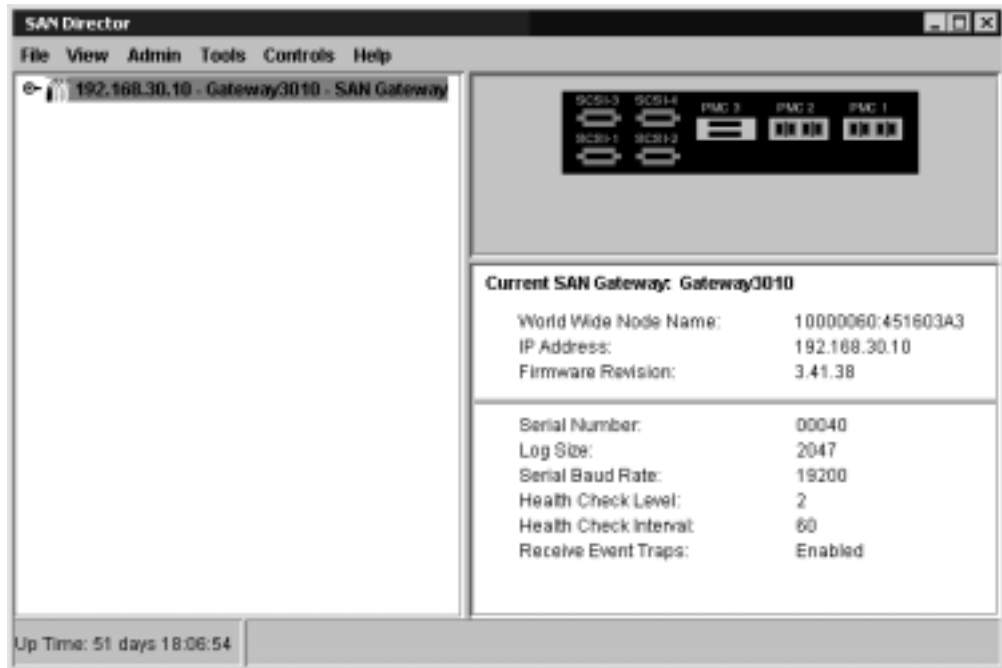


Figure 5-3: Initial Tree View

The ADIC Management Console's main screen is made up of two panels, the Tree View panel on the left and the Data panel on the right. The Tree View in Figure 5-3 is an unexpanded Tree View for a single ADIC Gateway. For an expanded view, see Figure 5-9. Because the ADIC Gateway with IP address 192.168.30.10 is selected, it is shown in Tree View with blue highlighting. Its Name is "Gateway3010" and its Genre is "SANGateway."

On the right hand side of the screen, at the top of the Data panel, is a representation of the ADIC Gateway's Channel configuration as it appears on the back of the ADIC Gateway

Product data for the selected ADIC Gateway is displayed textually below the Channel configuration graphic.

Near the bottom of the screen, the Up Time for the selected ADIC Gateway is displayed. Up Time indicates how many hours, minutes and seconds have elapsed since the ADIC Gateway was last booted.

The area at the very bottom of the screen is used to display status messages. See "View Menu Group" on page 68 for further information.

File Menu Group

The “File Menu Group” offers commands for loading, manipulating, and saving view files. See Figure 5-4.

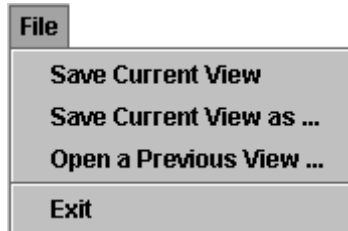


Figure 5-4: File Menu

A view file is a list of ADIC Gateways viewed at any one given time. Each user can save preferred views on the server. Loading a previous view automatically connects the user to one or more ADIC Gateways in a single step rather than specifying connections to them individually. Because they are stored on the server, the same views are available to the user from any client.

You can have many views. At the beginning of a session, you can choose to load a view from the **Open a Previous View** menu, which displays all the views that you saved previously (for your logon account only) so that you can recall an earlier viewing environment.

Save Current View

The current collection being viewed defines the view. For this option to be available (not grayed-out), the current view name must be known either from a previous loading or a **Save Current View as** operation. For example, if you initially load a view that includes the ADIC Gateways that are being used to store data for Marketing, Hardware, and Web Service, and then during the course of the session decide to disconnect from the ADIC Gateway handling Hardware's storage, performing a **Save Current View** only saves a view of the ADIC Gateways handling storage connections for Marketing and Web Service. The original view is overwritten by the new view. If you did not perform a **Save Current View**, the original view of the three ADIC Gateways managing Marketing, Hardware, and Web Service storage is still valid for the next time that view is loaded.

Save Current View as

The **Save Current View As** option saves the currently viewed collection of ADIC Gateways on the server. You are prompted to enter a name or short phrase so you can choose to reload the same view in the future. See Figure 5-5.



Figure 5-5: Save Current View As

Open a Previous View

Figure 5-6 is an example list of views previously saved by a user. From this list you can select a view by clicking on the name, and then selecting an action option.

If you press the **Load** button, you are returned to the main screen and in a few seconds the ADIC Management Console establishes connections to all of the ADIC Gateways in the view and then displays them on the screen.

If you press the **Delete** button, the selected view is removed from the list. You can delete as many views as you want.

If you press the **Close** button, the window closes and you are returned to the main screen.



Figure 5-6: Saved Views

Exit

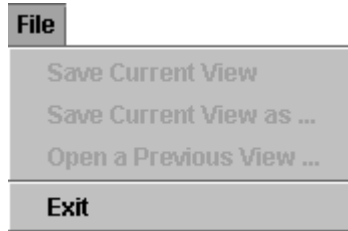


Figure 5-7: Exit

Exit stops the ADIC Management Console Client application and closes its window. See Figure 5-7.

Attention: If you exit without selecting a save option after making changes to a view, the changes you made are lost.

View Menu Group

The “View Menu Group” offers two display options. You can view an entire collection of ADIC Gateways in a hierarchical tree, or you can view the front panel of a single ADIC Gateway. Tree View is the default view and is selected when the **SAN Gateway Front Panel** option is unchecked. See Figure 5-8. In Tree View, you see icons representing one or more ADIC Gateways in a hierarchical tree structure.



Figure 5-8: View Menu

When you click the node symbol at the left of the ADIC Gateway icon, the tree expands to show connected elements represented by other icons. The ADIC Gateway node expands to show channels, and channels expand to show attached devices. In Tree View, when you click the node symbol of an expanded

element, its tree collapses. Figure 5-9 shows the Tree View of an ADIC Gateway with two tree elements expanded

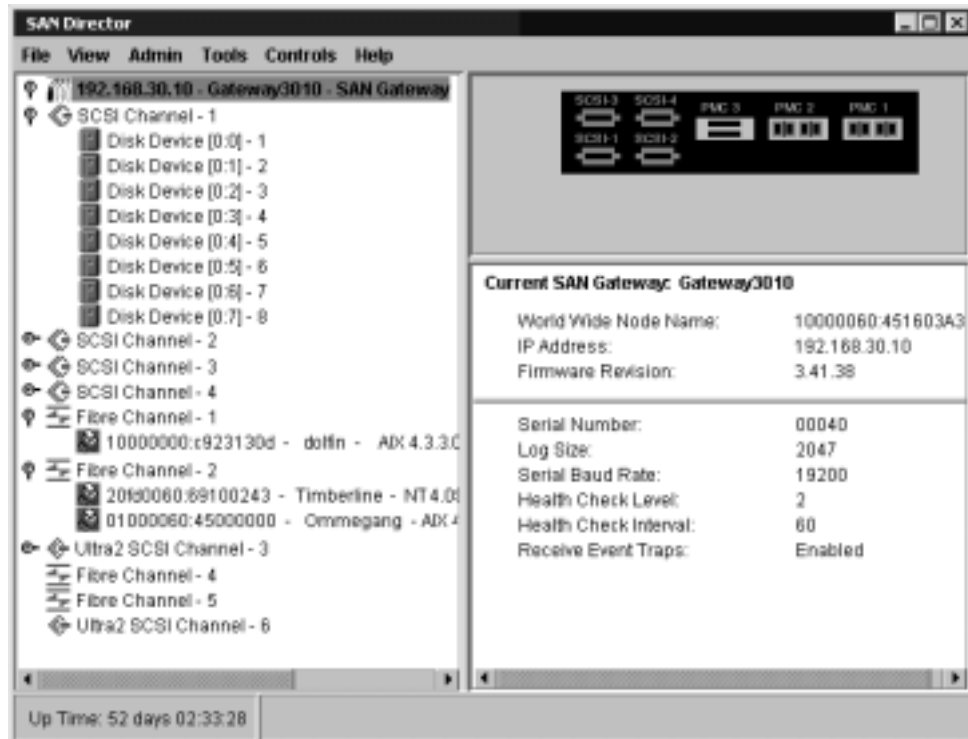


Figure 5-9: Expanded Tree View

The icons used in the Tree View carry specific meaning, both in their design and in their color. See See Figure 5-10.















Tree View Icon	Mode	Channel Type	Front Panel Icon
Blue 	Target	Ultra2 SCSI High Voltage Differential SCSI High Voltage Differential	
Green 	Initiator	Ultra2 SCSI High Voltage Differential SCSI High Voltage Differential	
Blue 	Target	Ultra2 SCSI Low Voltage Differential SCSI Low Voltage Differential	
Green 	Initiator	Ultra2 SCSI Low Voltage Differential SCSI Low Voltage Differential	
Blue 	Target	Short Wave Fibre Optical (Single / Dual) Long Wave Fibre Optical (Single) Copper Fibre (Single)	
Green 	Initiator	Short Wave Fibre Optical (Single / Dual) Long Wave Fibre Optical (Single) Copper Fibre (Single)	
Purple 	Target/Initiator	Short Wave Fibre Optical (Single / Dual) Long Wave Fibre Optical (Single) Copper Fibre (Single)	

Figure 5-10: Icons for Channel Modes and Channel Types

In Figure 5-9, Fibre Channels 2, 4, and 5 are blue, SCSI Channels 1-4 and Ultra2 SCSI Channels 3 and 6 are green, and Fibre Channel 1 is purple. Blue indicates that the channel is in **Target** mode. **Target** is the default mode for Fibre Channels. When channels are set to **Target**, you are able to see attached hosts, and switches like the Brocade switch, which broadcasts a World Wide Name.

Green indicates that the channel is in **Initiator** mode. **Initiator** is the default mode for SCSI Channels. When channels are set to **Initiator** you will be able to see attached devices, and ADIC Gateways.

In addition to **Target** mode and **Initiator** mode, Fibre Channels can function in **Target and Initiator** mode. When that is the case, the Fibre Channel icon is purple. Fibre Channel 1 in Figure 5-9 is set to **Target and Initiator** mode. You will be able to see hosts and devices, as well as cascaded ADIC Gateways when a channel is set to **Target and Initiator**. If there is no node symbol preceding a Channel, as for example Fibre Channels 4 and 5 or the Ultra2 SCSI Channel 6 in Figure 5-9, there are no attached elements to display. If there is no node symbol preceding a SCSI Channel set to **Target** mode, a SCSI host could still be attached. The ADIC Management Console does not display SCSI hosts unless VPSReg is running on the host. Nor will it display an icon for a switch that does not broadcast a WWN.

In Figure 5-9, the ADIC Gateway is selected. Product information about the ADIC Gateway appears in the Data panel, which is in the lower right half of the ADIC Management Console main screen. The information in the Data panel presents a

variety of information, including the unit's WWN, IP Address, Firmware Revision, Serial Number, and Ethernet Speed.

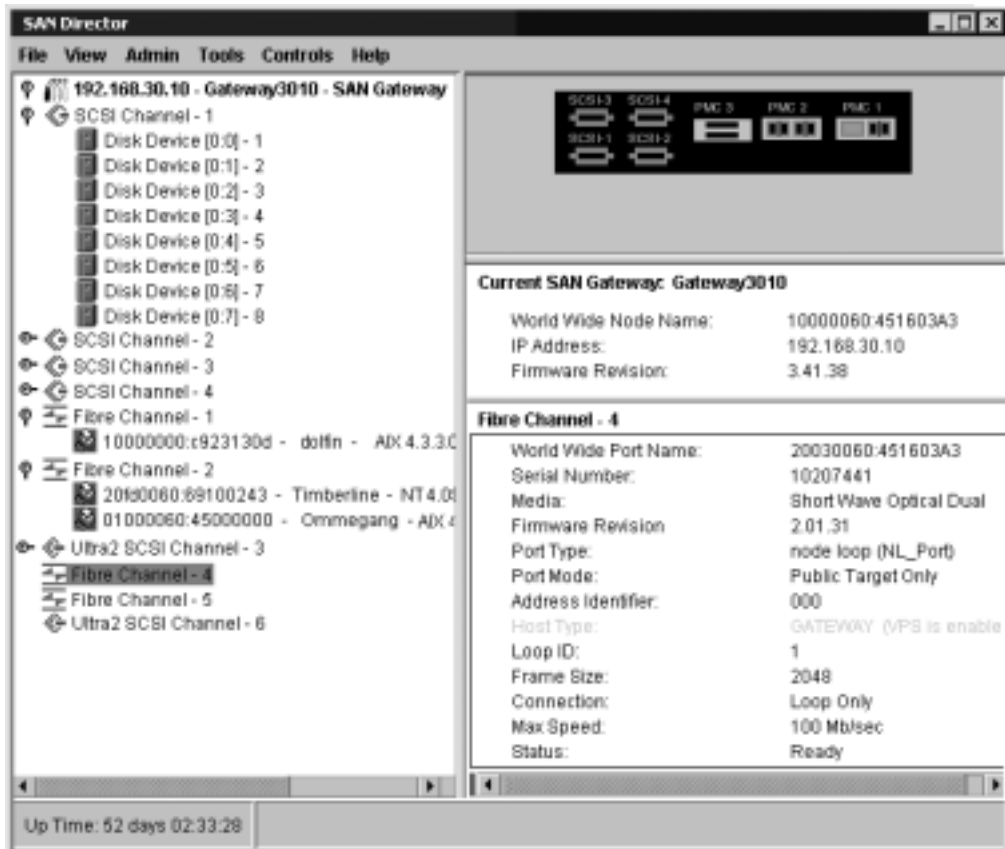


Figure 5-11: Information About a Channel

When a Channel is selected, the lower part of the Data panel display includes the WWN, port mode, connection type, and maximum speed. See Figure 5-11. The firmware revision level of the HBA attached to the selected Channel is presented as distinct from the firmware revision level of the ADIC Gateway.

Information About a Selected Channel

When a device is selected, information about its capacity, status, width, and speed is all included in the lower portion of the Data panel. See Figure 5-13. For a list of the different icons used in Tree View, see Figure 5-12.








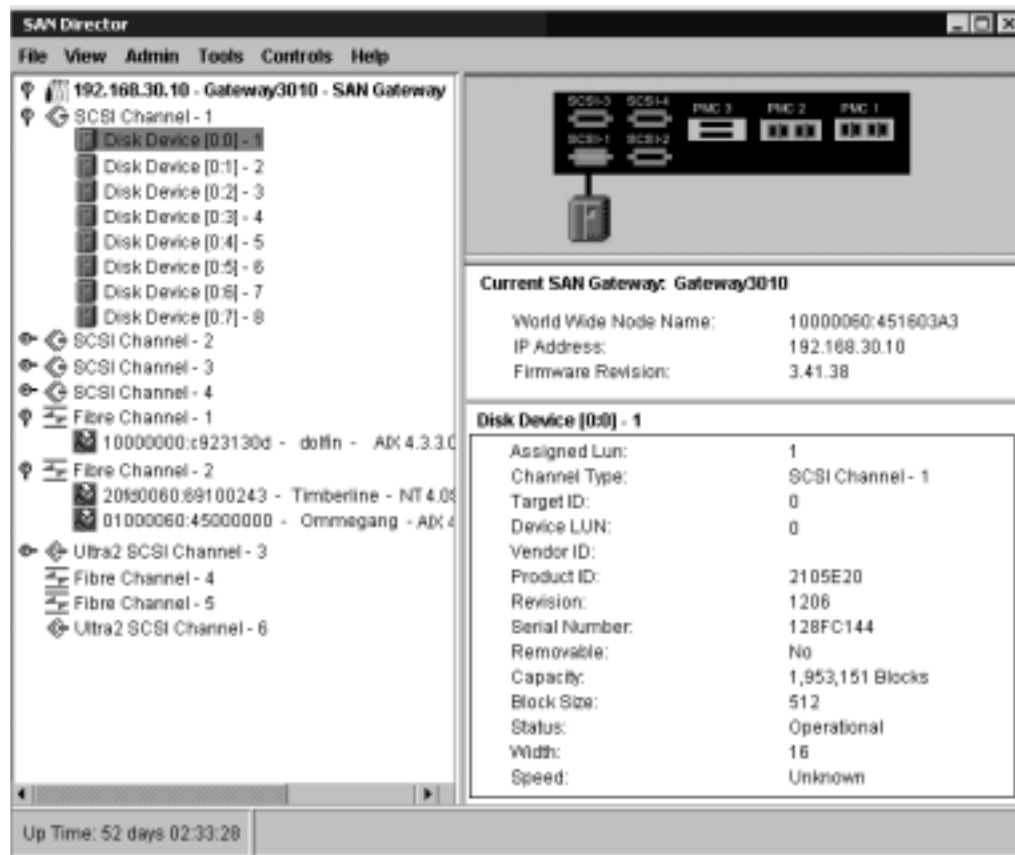
Icon	Name
	Disk Device
	Disk Device
	Tape Device
	Medium Changer
	Gateway
	Host
	Switch

Figure 5-12: Icons used in Tree View



The screenshot shows the SAN Director application window. The left pane displays a tree view of the storage infrastructure, including a SAN Gateway (192.168.30.10) and various channels (SCSI, Fibre, Ultra2 SCSI). The right pane shows a graphical representation of the gateway hardware and a detailed data panel for the selected 'Disk Device [0:0] - 1'.

Current SAN Gateway: Gateway0010

World Wide Node Name:	10000060:451603A3
IP Address:	192.168.30.10
Firmware Revision:	3.41.38

Disk Device [0:0] - 1

Assigned Lun:	1
Channel Type:	SCSI Channel - 1
Target ID:	0
Device LUN:	0
Vendor ID:	
Product ID:	2105E20
Revision:	1206
Serial Number:	128FC144
Removable:	No
Capacity:	1,953,151 Blocks
Block Size:	512
Status:	Operational
Width:	16
Speed:	Unknown

Up Time: 52 days 02:33:28

Figure 5-13: Information About a Selected Device

When a host is selected, information about its WWN, Network Name, Operating System and HBA attachment is all included in the lower portion of the Data panel.

No matter what component in Tree View is selected--host, channel, device, or the ADIC Gateway itself--the top "paragraph" of the Data panel states the IP address, Name, WWN, and Firmware revision level of the current ADIC Gateway.

Some information that is presented in the Tree View panel is also presented in the Data panel. For example, both Tree View and the Data panel display the **Channel Number**, **Target ID**, **Device LUN** and **Assigned LUN** of a device. Tree View graphically specifies the device type. The Data panel displays textual information about the **Vendor ID**, **Product ID**, **Serial Number**, as well as other information about the size and capacity of the device. At the top of the Data panel there is a graphic showing the back of the ADIC Gateway. In Figure 5-13 for example, the slot where the selected device attaches is shown in green. The slot is connected by a black line to an icon appropriate to the device being represented. For hosts on a Fibre Channel connection, the slot is connected by an orange line to an icon representing the host. See Figure 5-14. Note that when the Channel itself is selected neither the host nor the device icon appears in the ADIC Gateway front view graphic.

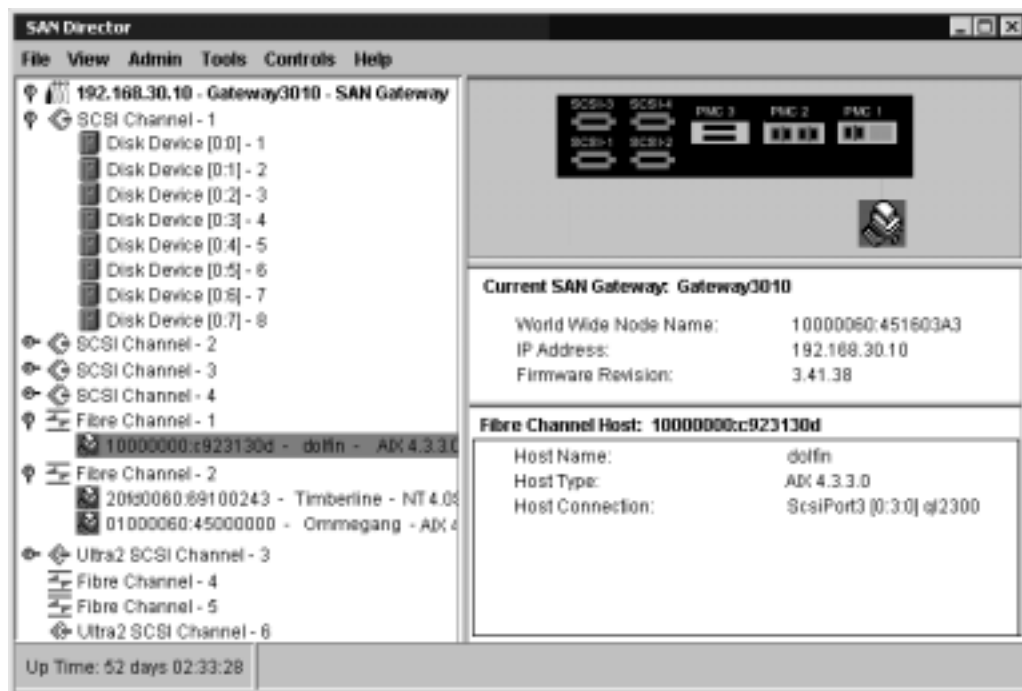


Figure 5-14: Information About a Host

SAN Gateway Front Panel

Choosing the **SAN Gateway Front Panel** option shows you a front-panel view of the selected ADIC Gateway. You can see the status of the lights on the front panel of the ADIC Gateway. The lights are refreshed automatically, about five times per second. The ADIC Gateways product data is displayed below the front panel. Figure 5-15 is an example of the Front Panel View.



Figure 5-15: Front Panel View

Refresh SAN Gateway

When you select the **Refresh SAN Gateway** option, the ADIC Management Console Client requests the Server to contact the selected ADIC Gateway and update all data. This refreshes the data for the ADIC Gateway and all attached devices. The **Refresh SAN Gateway** option can also be accessed by right-clicking on the ADIC Gateway in the Tree View display. **Refresh SAN Gateway** is the first of the available right-click options. See Figure 5-16.

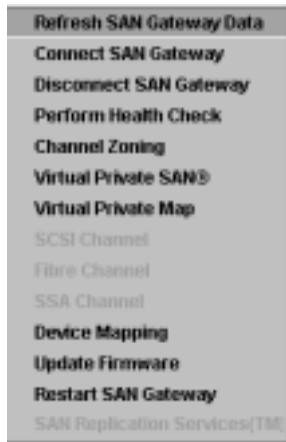


Figure 5-16: Refresh View

Admin Menu Group

The “Administrative Menu Group” is used for connecting to the server, logging on, and controlling user accounts.

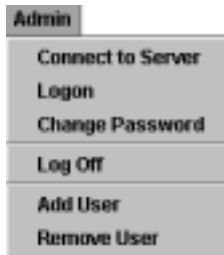


Figure 5-17: Admin Menu

Connect to Server

To connect to the server, you are prompted to enter the name or IP address of the ADIC Management Console Server system. See Figure 5-18.

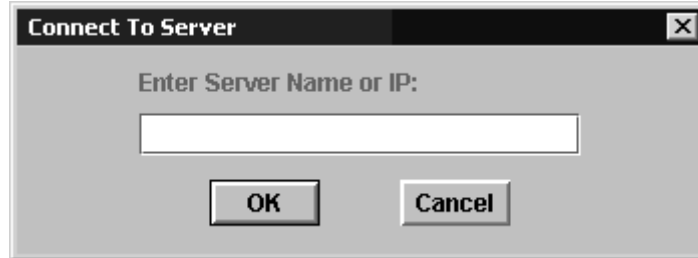


Figure 5-18: Connect To Server

The status/message line at the bottom of the screen shows whether your connection was successful or unsuccessful. After you have made a successful connection, you can log on.

Logon

To log on, enter a user name and password. See Figure 5-19. If your logon is successful, your privilege level is shown on the status/message line at the bottom of the screen. If your logon is unsuccessful, the reason is shown on the status/message line.

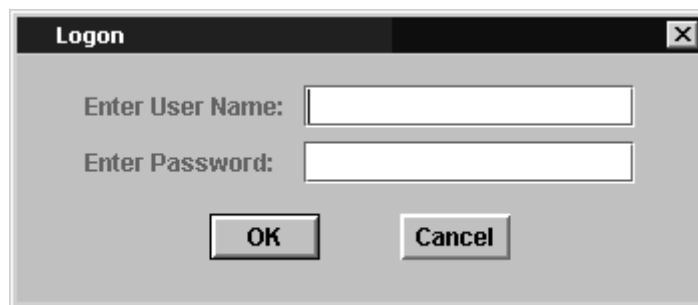
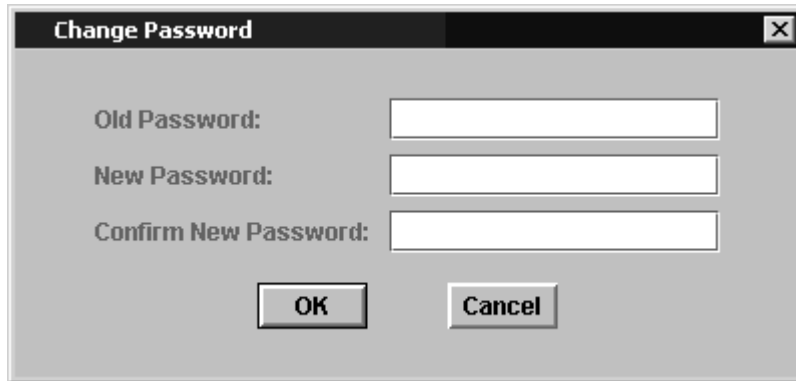


Figure 5-19: Logon to Server

Change Password

After you log on successfully, you can select the Change Password option. See Figure 5-20. To change your password, enter the current password, the new password, and the new password again to confirm it. Press **OK** and verify whether the change was accepted by looking on the status/message line to see the status of your transaction.

If you do not want to change your password, press **Cancel** for your old password to remain unchanged.

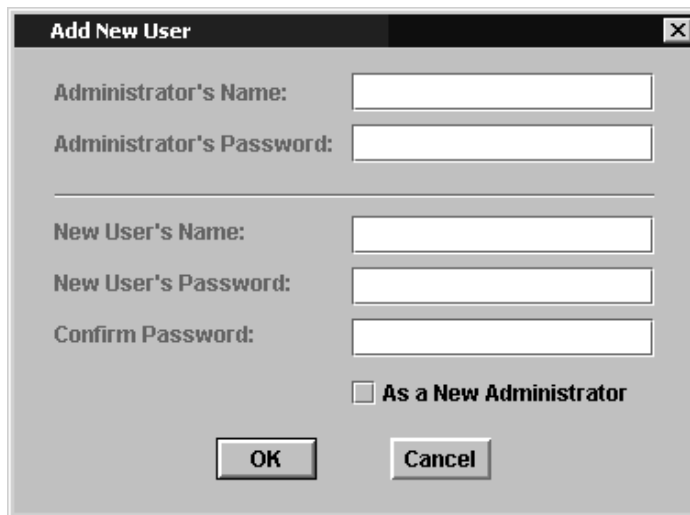


The image shows a dialog box titled "Change Password" with a close button (X) in the top right corner. It contains three text input fields: "Old Password:", "New Password:", and "Confirm New Password:". Below the fields are two buttons: "OK" and "Cancel".

Figure 5-20: Change Password

Add New User

You can add a new user if you successfully logged on with administrator privileges. See Figure 5-21. You must enter a valid administrator name and password and then enter the new user name and password. If you want to give the new user administrator privileges, checkmark the New Administrator box. Press **OK** to add the new user.



The image shows a dialog box titled "Add New User" with a close button (X) in the top right corner. It contains six text input fields: "Administrator's Name:", "Administrator's Password:", "New User's Name:", "New User's Password:", and "Confirm Password:". Below the fields is a checkbox labeled "As a New Administrator". At the bottom are two buttons: "OK" and "Cancel".

Figure 5-21: Add A User

If you decide not to add a new user, press **Cancel** to return to the main screen.

Remove User

You can remove a user if you successfully logged on with administrator privileges. You must enter a valid administrator name and password and then select the name of the user you want to remove. See Figure 5-22. Press **Remove** to remove the user. You may repeat this process to remove another user. Finally, press **OK** to return to the main screen.



The screenshot shows a dialog box titled "Remove User". At the top, there is a title bar with the text "Remove User" and a close button (X). Below the title bar, there are two input fields: "Administrator's Name:" and "Administrator's Password:". Below these fields is a horizontal line. Underneath the line, there is a "Select:" label and a list box containing the names "Jane" and "John". To the right of the list box, there are three buttons stacked vertically: "OK", "Remove", and "Cancel".

Figure 5-22: Remove a User

If you decide not to remove the user, press **Cancel** to return to the main screen.

If You Lose the Password

If you lose the administrator password and there is no other user account that has administrator privileges, you must contact your service representative.

Tools Menu Group

The **Tools Menu Group** provides options for finding and connecting to ADIC Gateways and controlling ADIC Gateway status reports.

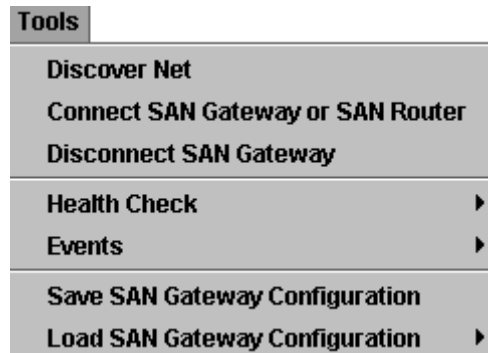


Figure 5-23: Tools Menu

Discover Net

With Discover Net, you can discover all ADIC Gateways on the network. When you select this option, you are prompted to enter the **Network Address** and the **Network Mask**. See Figure 5-24. These parameters tell the ADIC Management Console which subnet addresses to check.

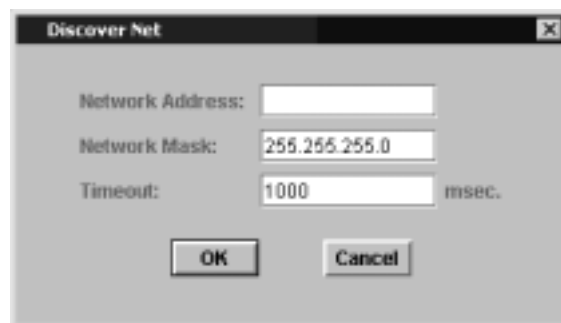


Figure 5-24: Discover Net

In the **Network Address** box enter "0" in the place of the subnet you wish to explore, e.g. the entry "192.168.22.0" searches for IP addresses between "192.168.22.0" and "192.168.22.255".

In the **Network Mask** box enter a subnet mask that matches the class of network you are searching, e.g. for a **Network Address** entry of "192.168.30.0" leave the default entry "255.255.255.0" as the **Network Mask**. For a **Network Address** entry of "192.168.0.0" change the **Network Mask** to "255.255.0.0".

You must enter a **Timeout** value in milliseconds to limit how long to wait for a response from each IP address that is checked. You may set the **Timeout** value considerably lower than the default (1000 milliseconds) in order to speed discovery. Before starting the discovery process, you are given an estimate of how long the discovery will take and you have an opportunity to abort the process or continue. The default **Timeout** value is intentionally set to a high number in order to make certain that all devices on a slow network are discovered.

When the discovery is finished, each ADIC Gateway that was found is displayed in the tree. The collection displayed defines the current view. If a view was already loaded, the new ADIC Gateways that were discovered become part of that view *only* if you perform a **Save Current View**. To create a new view with a different name, perform a **Save Current View as**. See Figure 5-5 on page 67.

Connect SAN Gateway

If you want to connect to a specific ADIC Gateway you are prompted to enter the name or IP address of the ADIC Gateway. See Figure 5-25. To use a name, the name must be resolvable to an IP address by the server system. Contact your network administrator for assistance. If found, the ADIC Gateway is added to the tree display. If a view was already loaded, the new ADIC Gateway becomes part of that view *only* if you perform a **Save Current View**. To create a new view with a different name, perform a **Save Current View as**. See Figure 5-5 on page 67.



Figure 5-25: Connect to Server

The **Connect SAN Gateway** option of the **Tools** menu is not the only way to connect to a particular ADIC Gateway. You can also bring up the **Connect** dialog box by right-clicking the ADIC Gateway in the Tree View display. Scroll down to the **Connect SAN Gateway** option, which is the second choice in the right-click menu:

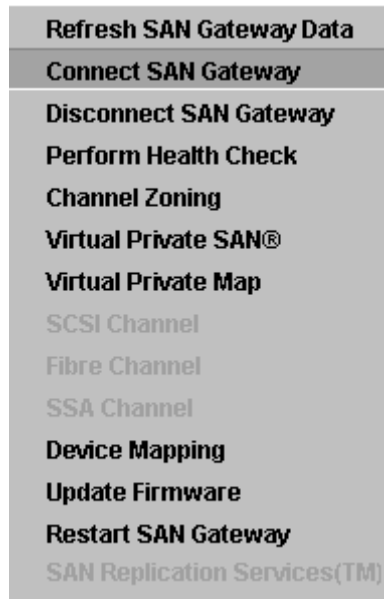


Figure 5-26: Right Click Menu for Connecting To Gateway

Disconnect SAN Gateway

The **Disconnect SAN Gateway** menu choice ends your connection to the selected ADIC Gateway and removes it from the display. ADIC Management Console asks you to confirm that you want to break the connection. See Figure 5-27. If you have changed your mind, press **No**. Otherwise, click on **Yes**. If you perform a **Save Current View**, after answering **Yes**, the ADIC Gateway you disconnected from is removed from the view you are saving.



Figure 5-27: Disconnect Dialog Box

The **Disconnect SAN Gateway** option of the “Tools” menu is not the only way to disconnect from a particular ADIC Gateway. You can also bring up the **Disconnect**

dialog box by right-clicking the ADIC Gateway in the Tree View display. The **Disconnect SAN Gateway** option is the third choice in the right-click menu.



Figure 5-28: Disconnect Via Right-Click

Health Check

The Health submenus allow you to determine the status of the selected ADIC Gateway. You can also check target devices and controllers. **Perform Health Check** requests an immediate health check at the current level specified.

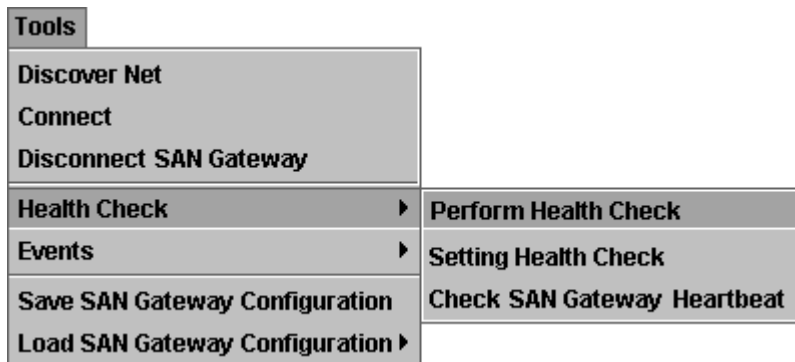


Figure 5-29: Health Check Submenu

Perform Health Check can also be selected from the right-click menu. In Tree View, select the ADIC Gateway, and then scroll down to the fourth option, **Perform Health Check**.



Figure 5-30: Perform Health Check Via Right-Click

This check is performed regardless of the Health Check Interval setting. **Setting Health Check** displays the control panel shown in Figure 5-31.

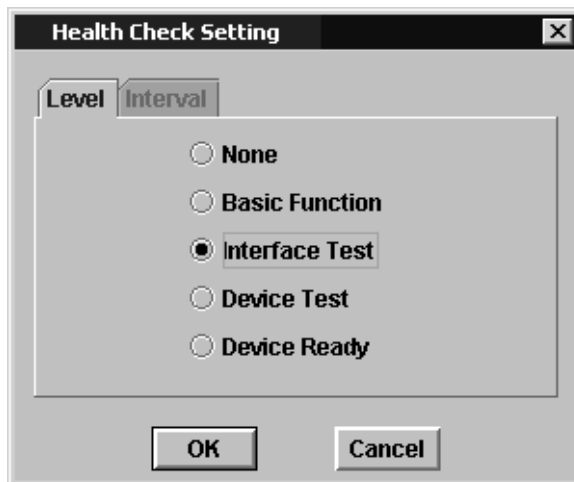


Figure 5-31: Health Check Settings

Level allows you to choose how thorough the health check will be when it is performed. Each level is defined as follows:

Table 5-1: Health Check Levels

Level #	Level Name	Functionality
0	None	Health check disabled
1	Basic Function	Check power supply and temperature status
2	Interface Test	Everything from level 1, plus check all interfaces
3	Device Test	Everything from level 2, plus perform device Inquiry on each target device
4	Device Ready	Everything from level 3, plus perform Test Unit Ready on each target device (non-removable media only)

Interval allows you to enter, in minutes, the amount of time that elapses between automatic health checks on the selected ADIC Gateway. The interval can range from 0 to 65,535 minutes. The default interval is 60 minutes.

Check SAN Gateway Heartbeat performs a simple communication check on the selected ADIC Gateway. A message is displayed on the status line indicating whether or not a response was received from the ADIC Gateway. Heartbeat checks are performed automatically at regular intervals.

Events

Submenus under **Events** allow you to control the way the event log is displayed and how traps are generated.

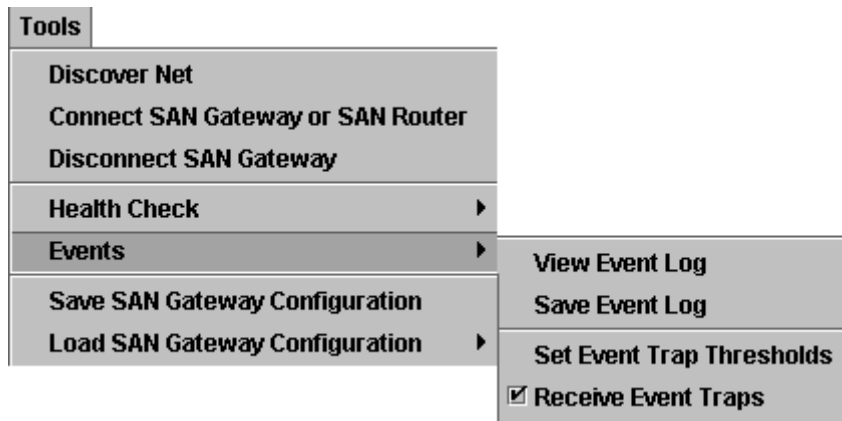


Figure 5-32: Events Submenu

View Event Log displays a list of entries in the event log for the selected ADIC Gateway. The types of events displayed may be a subset of the events in the log depending on the Event Viewing level. See Figure 5-33. The types of events in the event log that match the selected level will be displayed. The most recent events

are displayed at the top of the list. Selecting **Warning** will display **Warning** and **Notice** events.

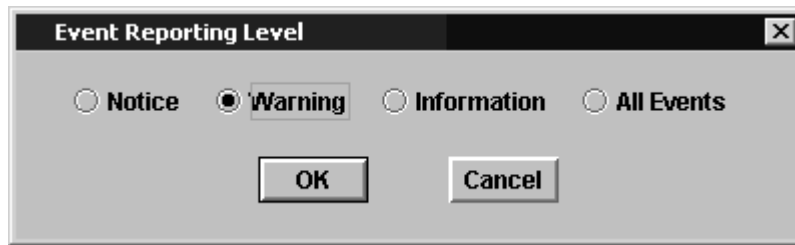
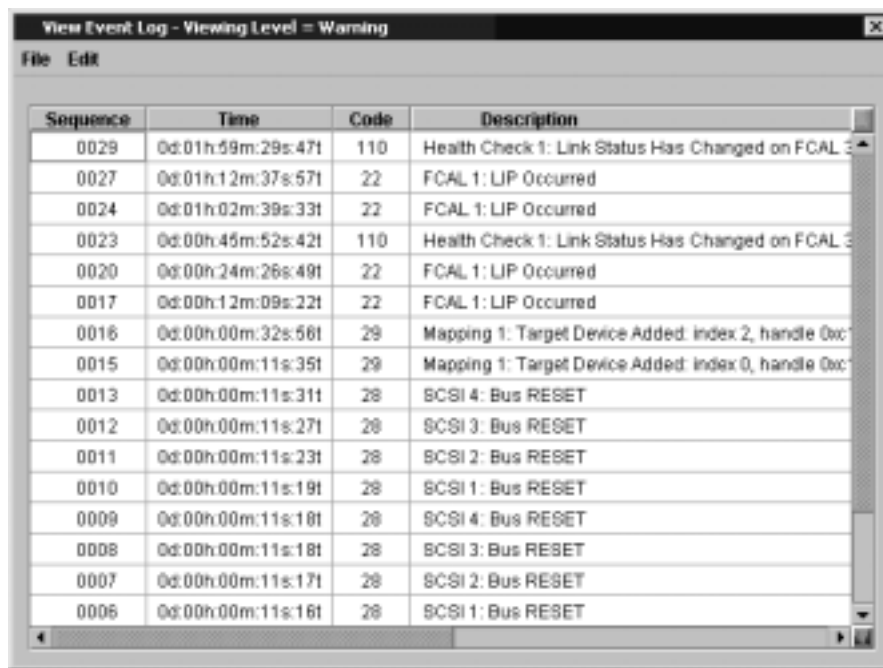


Figure 5-33: Event Viewing Levels

Selecting **Information** will display **Information**, **Warning** and **Notice** events. Figure 5-34 contains the contents of a typical Event Log.

A screenshot of a "View Event Log" window with the title "Viewing Level = Warning". It has a menu bar with "File" and "Edit". Below the menu bar is a table with four columns: "Sequence", "Time", "Code", and "Description". The table contains 14 rows of event data.

Sequence	Time	Code	Description
0029	0d:01h:59m:29s:47l	110	Health Check 1: Link Status Has Changed on FCAL 3
0027	0d:01h:12m:37s:57l	22	FCAL 1: LIP Occurred
0024	0d:01h:02m:39s:33l	22	FCAL 1: LIP Occurred
0023	0d:00h:45m:52s:42l	110	Health Check 1: Link Status Has Changed on FCAL 3
0020	0d:00h:24m:26s:49l	22	FCAL 1: LIP Occurred
0017	0d:00h:12m:09s:22l	22	FCAL 1: LIP Occurred
0016	0d:00h:00m:32s:56l	29	Mapping 1: Target Device Added: index 2, handle 0xc
0015	0d:00h:00m:11s:35l	29	Mapping 1: Target Device Added: index 0, handle 0xc
0013	0d:00h:00m:11s:31l	28	SCSI 4: Bus RESET
0012	0d:00h:00m:11s:27l	28	SCSI 3: Bus RESET
0011	0d:00h:00m:11s:23l	28	SCSI 2: Bus RESET
0010	0d:00h:00m:11s:19l	28	SCSI 1: Bus RESET
0009	0d:00h:00m:11s:18l	28	SCSI 4: Bus RESET
0008	0d:00h:00m:11s:18l	28	SCSI 3: Bus RESET
0007	0d:00h:00m:11s:17l	28	SCSI 2: Bus RESET
0006	0d:00h:00m:11s:16l	28	SCSI 1: Bus RESET

Figure 5-34: Typical Event Log

If the log is lengthy, you can navigate through it by using the scroll bar.

Save Event Log allows you to save a copy of the currently displayed entries of the selected ADIC Gateway event log to a text file. From the browser dialog, you

enter a name for the file and the location where you want to save it. Figure 5-35 shows the browser dialog.

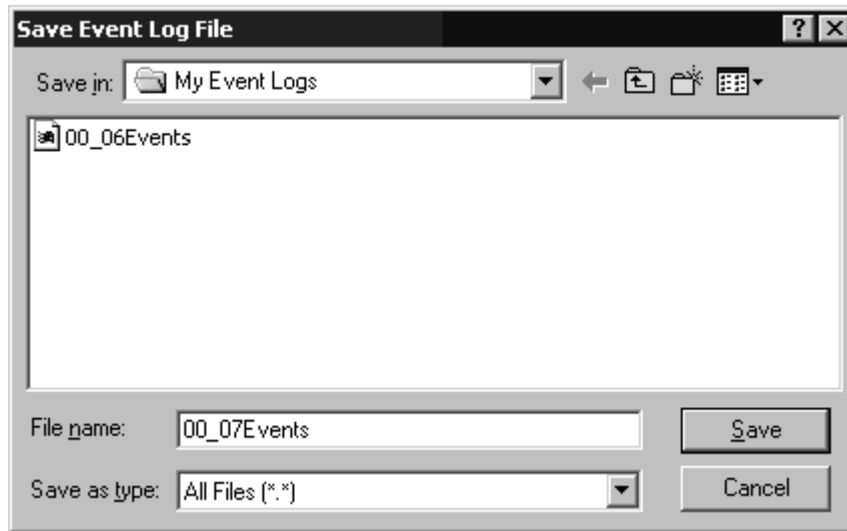


Figure 5-35: Save Event Log Dialog Box

After saving the log, you have an option that clears the whole Event Log on the selected ADIC Gateway. See Figure 5-36.

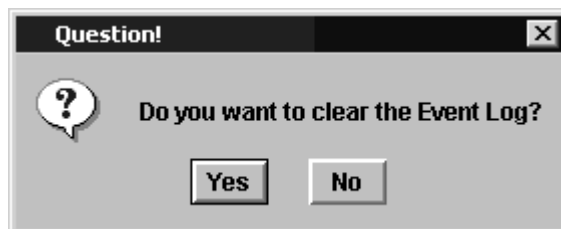
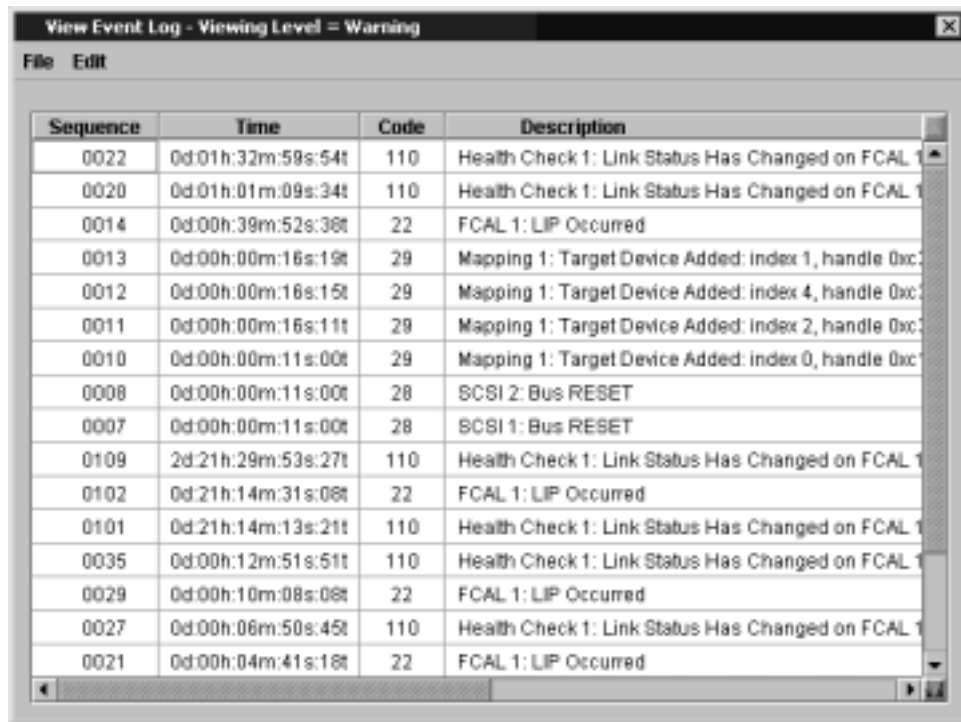


Figure 5-36: Clear Event Log

Set Event Trap Threshold displays the list of the events and their current trap threshold level settings for the selected ADIC Gateway. The **Trap Threshold Level** determines how many times the event can occur before a trap is issued which sends a message to all users monitoring the ADIC Gateway. If you have administrator privileges, you can modify a threshold level by selecting an event (clicking on it), and then pressing the **Change** button. For the threshold change dialog, see Figure 5-38 on page 89. You are then prompted to enter a new value for the Trap Threshold Level. Figure 5-38 shows the Event Trap Threshold Settings main window.

Attention: Do not change trap thresholds unless recommended by your service representative.



The screenshot shows a window titled "View Event Log - Viewing Level = Warning". It contains a table with the following data:

Sequence	Time	Code	Description
0022	0d:01h:32m:59s:54t	110	Health Check 1: Link Status Has Changed on FCAL 1
0020	0d:01h:01m:09s:34t	110	Health Check 1: Link Status Has Changed on FCAL 1
0014	0d:00h:39m:52s:36t	22	FCAL 1: LIP Occurred
0013	0d:00h:00m:16s:19t	29	Mapping 1: Target Device Added: index 1, handle 0xc
0012	0d:00h:00m:16s:15t	29	Mapping 1: Target Device Added: index 4, handle 0xc
0011	0d:00h:00m:16s:11t	29	Mapping 1: Target Device Added: index 2, handle 0xc
0010	0d:00h:00m:11s:00t	29	Mapping 1: Target Device Added: index 0, handle 0xc
0008	0d:00h:00m:11s:00t	28	SCSI 2: Bus RESET
0007	0d:00h:00m:11s:00t	28	SCSI 1: Bus RESET
0109	2d:21h:29m:53s:27t	110	Health Check 1: Link Status Has Changed on FCAL 1
0102	0d:21h:14m:31s:08t	22	FCAL 1: LIP Occurred
0101	0d:21h:14m:13s:21t	110	Health Check 1: Link Status Has Changed on FCAL 1
0035	0d:00h:12m:51s:51t	110	Health Check 1: Link Status Has Changed on FCAL 1
0029	0d:00h:10m:08s:08t	22	FCAL 1: LIP Occurred
0027	0d:00h:06m:50s:45t	110	Health Check 1: Link Status Has Changed on FCAL 1
0021	0d:00h:04m:41s:18t	22	FCAL 1: LIP Occurred

Figure 5-37: Set Event Threshold

A threshold level of zero disables traps for that event. A threshold level of one means that a trap is sent each time the event occurs. Any other value (up to 255) specifies how many times the event can occur in a ten-minute period; that is, the

specified number of events must occur within a ten-minute period or no trap will be issued.

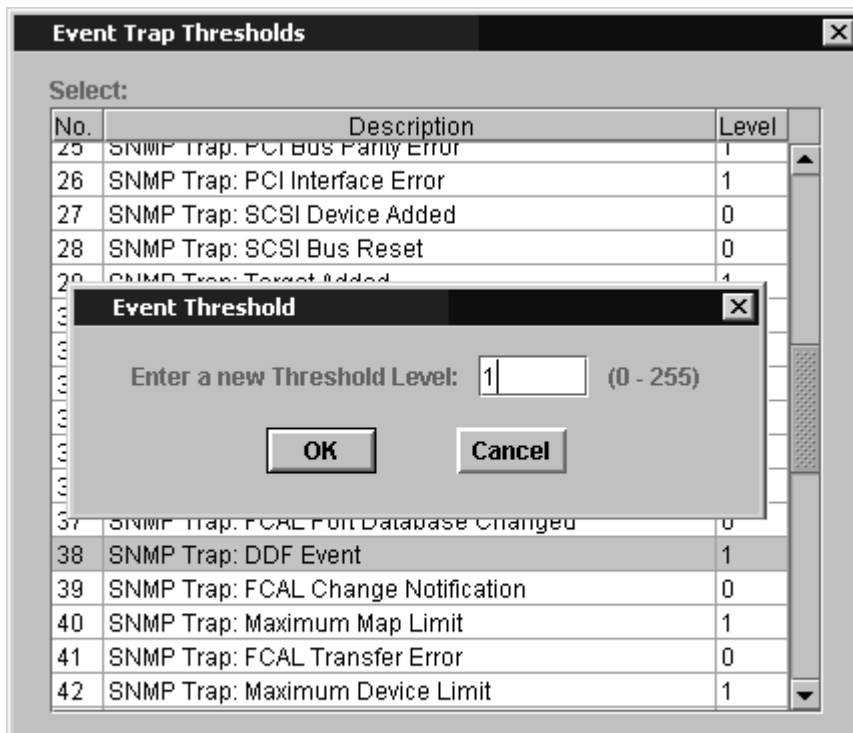


Figure 5-38: Change Event Threshold Dialog Box

Receive Event Traps is the last option on the Events submenu. It controls whether your ADIC Management Console client receives trap notifications for the ADIC Gateways you are monitoring in your current view. See Figure 5-32 on page 85. By default, event traps are enabled (indicated by the check mark). Select this option to disable receiving traps (the check mark will be removed).


When a trap is received, the symbol  is displayed in the status/message area on the bottom of the main screen. You can look in the Received Event Traps window to see the trap message. The message identifies the ADIC Gateway by its IP address. It includes a date and time stamp, an event code and a description of the event that caused the trap.

Figure 5-39 is an example of the Event Traps window. The Event Traps window is a separate window that is always present when the ADIC Management Console application is connected to a server. You can **Minimize** the window but you cannot

close it. You can double-click on an event in the window to display more detailed information.

Gateway IP	Time	Code	Description
192.168.30.200	August 2, 2001 2:53:08 PM	Code: 110	Health Check Event
192.168.30.200	August 2, 2001 2:53:08 PM	Code: 109	Health Check Event
192.168.30.200	August 2, 2001 2:53:08 PM	Code: 109	Health Check Event
192.168.30.200	August 2, 2001 2:53:08 PM	Code: 110	Health Check Event
192.168.30.200	August 2, 2001 2:53:08 PM	Code: 109	Health Check Event
192.168.30.200	August 2, 2001 2:53:08 PM	Code: 110	Health Check Event
192.168.30.200	August 2, 2001 4:46:18 PM		Failed Heartbeat occurred on SAN Gateway
192.168.30.4	August 2, 2001 5:15:40 PM		Revived Heartbeat occurred on SAN Gateway
192.168.30.2	August 2, 2001 5:43:36 PM	Code: 109	Health Check Event

Figure 5-39: Received Event Trap Window

In Figure 5-39 the Event Trap window contains some typical Health Check events. You can also see, for example, that the ADIC Gateway at IP address 192.168.30.200 went down (“failed heartbeat occurred”) at 4:46 p.m. on August 2, 200. This ADIC Gateway came back online at 5:15 p.m. on that day (“revived heartbeat occurred”).

Save SAN Gateway Configuration

Save SAN Gateway Configuration copies the vital configuration information from the selected ADIC Gateway to a file on the ADIC Management Console server or to a file and location you specify in the browser dialog. Figure 5-40 shows the pull-down menu. Figure 5-41 shows the **Save SAN Gateway Configuration** dialog.

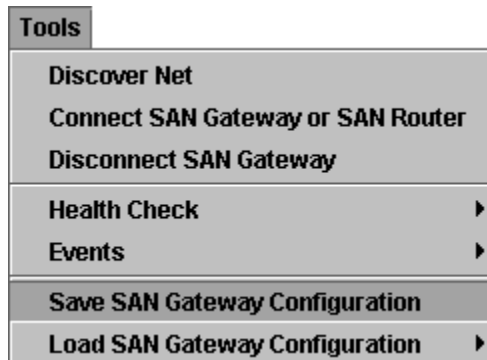


Figure 5-40: Save Gateway Configuration

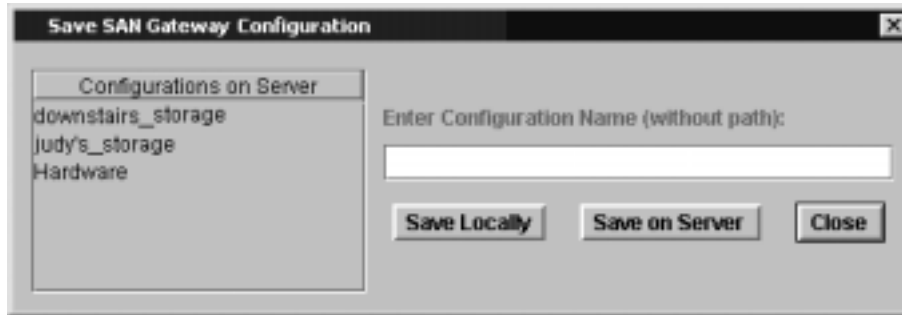


Figure 5-41: Save Configuration Dialog

Enter a Name for the ADIC Gateway configuration you wish to save or select one from the list of configurations already on the server. You can save the configuration to a local file (**Save Locally**) or to a file on the server (**Save on Server**), or both. Press **Close** to dismiss the dialog when you are done.

Attention: It is important that you save the configuration of each ADIC Gateway initially and any time there is a change in the device address maps. It is a good idea to save the configuration locally and on the Server to ensure that you have access to the file.

Load SAN Gateway Configuration

Load SAN Gateway Configuration allows you to restore a saved configuration if you replaced the ADIC Gateway.

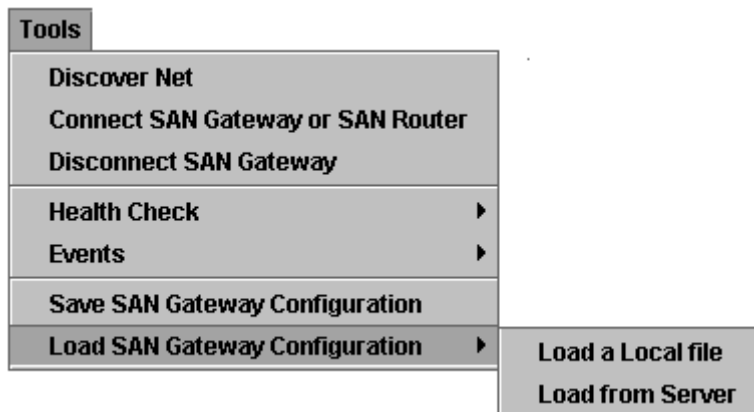


Figure 5-42: Load SAN Gateway Configuration

Before you choose the file, however, the ADIC Gateway sends you a warning.

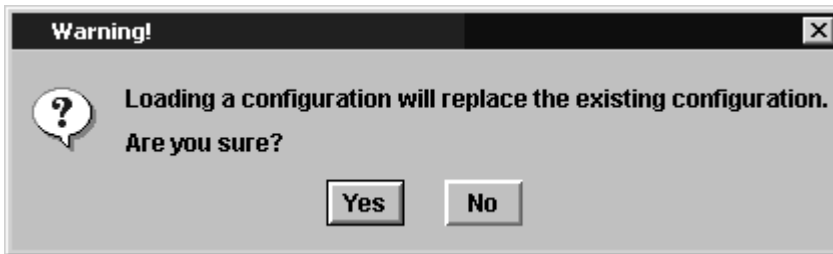


Figure 5-43: Warning Before Loading a Configuration

See Figure 5-43. If you decide not to replace the configuration, press **No**. Otherwise, press **Yes**. You have the option to load a configuration from a file that was saved on the server or one that was saved locally. If you select the **Load a Local File** option, the file browser in Figure 5-44 will pop up and allow you to select the configuration file. If you want to load a configuration file that has been stored on the server, the file browser in Figure 5-45 appears. Select the file that you wish to use, and press the **Load** button.

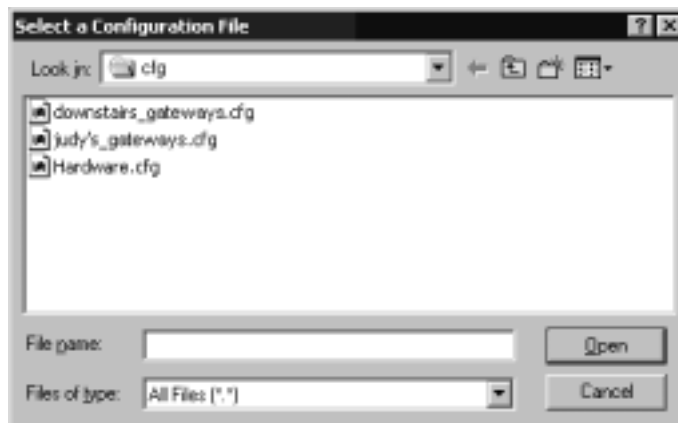


Figure 5-44: Load a Local File

Attention: After you load a saved configuration, you must reboot the ADIC Gateway for the configuration changes to take effect.

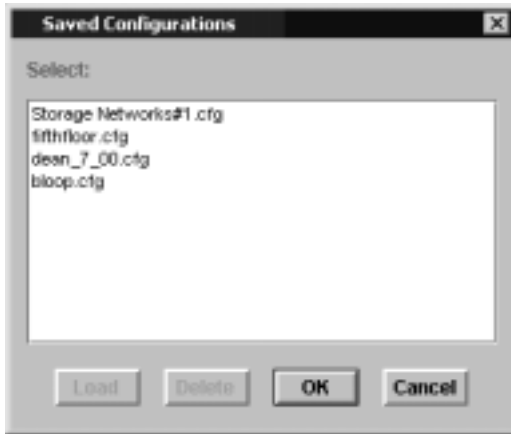


Figure 5-45: Load a File From the Server

Attention: If you replace the ADIC Gateway and do not load the saved configuration, you might not be able to use the storage devices attached to the ADIC Gateway or data may be lost.

Controls Menu Group

The **Controls Menu Group** allows you to control how the selected ADIC Gateway and attached devices perform. To access a specific channel control, select the channel in Tree View before pulling down the Controls menu.



Figure 5-46: Controls Menu

Feature Enable

Use this menu if you want to enable the optional, licensed features Virtual Private SAN (VPS[®]), Data Mover, or Virtual Private Map (VPM) for the selected ADIC

Gateway. If these features are already enabled or unavailable they will be grayed out on the menu.

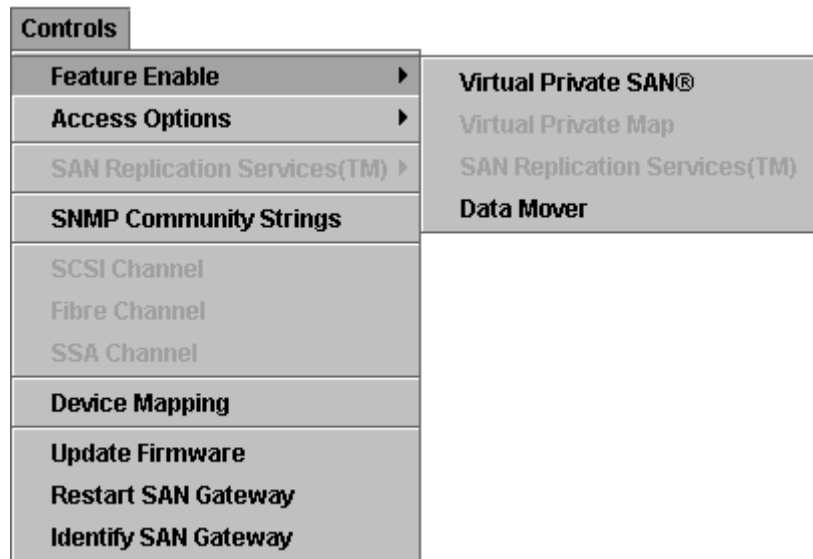


Figure 5-47: Enabling Optional Features

Feature Enable: Virtual Private SAN

Virtual Private SAN allows you to control access permission between FC hosts (HBAs) and storage devices (Target LUNs) attached to the ADIC Gateway. If you need to enable this feature, you must have the License Key that corresponds to the serial number of your ADIC Gateway.

Attention: When you enable VPS, it takes full control of the SAN connections. By default, VPS inherits access permissions for hosts that are currently attached and online. If you add a host to a SAN connection the new host will not have access to any LUNs until you assign LUNs to it. Please see “Installing and Using Virtual Private SAN” on page 121 before enabling VPS.

When you select **Controls > Feature Enable > Virtual Private SAN**, you are presented with the dialog box shown in Figure 5-48.



Figure 5-48: Enter License Key to Enable VPS

Note: If this feature is factory enabled, you can activate it by simply entering the word **enable** rather than an actual license key.

Feature Enable: Virtual Private Map

Virtual Private Map allows you to control access permissions between SCSI hosts and storage devices (Target LUNs) attached to the ADIC Gateway. If you need to enable this feature, you must have the License Key that corresponds to the serial number of your ADIC Gateway. For more about Virtual Private Map, see “Installing and Using Virtual Private Map” on page 147.

When you select **Controls > Feature Enable > Virtual Private Map**, you are presented with the dialog box shown in Figure 5-49.



Figure 5-49: Feature Enable: Virtual Private Map

Note: If this feature is factory enabled, you can enable and activate it by simply entering the word **enable** rather than an actual license key.

Feature Enable: Data Mover

Data Mover allows you to use Server-Free tape backup applications that support SNIA Extended SCSI Copy. Enabling this feature allows the ADIC Gateway to move blocks of data directly between storage devices attached to the ADIC Gateway.

When you select **Controls > Feature Enable > Data Mover**, you are presented with the dialog box shown in Figure 5-50.



Figure 5-50: Feature Enable: Data Mover

Note: If this feature is factory enabled, you can enable and activate it by simply entering the word **enable** rather than an actual license key.

Access Options

Use this menu if you want to view or configure Access Control settings for the selected ADIC Gateway. You can choose **Channel Zoning**, **Virtual Private SAN®** or

Virtual Private Map. If a feature has not been enabled it will be grayed out on the menu. See Figure 5-51.

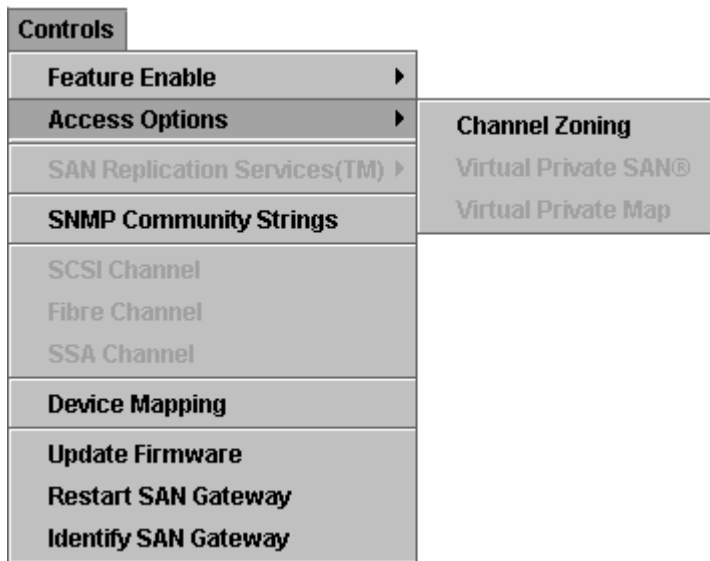


Figure 5-51: Selecting An Access Control Option

The Access Control option settings are also available from the right-click menu. See Figures 5-52, 5-54, and 5-56.

In order to prevent more than one host from accessing the same target devices, it is usually necessary to use some type of Access Control.

Access Options: Channel Zoning

Channel Zoning may be accessed via the **Controls > Access Options > Channel Zoning** pop-up menu or by selecting the ADIC Gateway in Tree View and then

using the right-click menu. It does not need to be **Enabled** first. **Channel Zoning** is the fifth option on the right-click menu. See Figure 5-52.

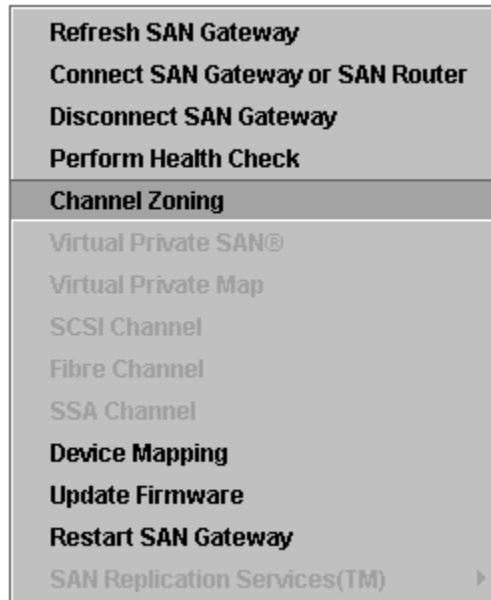


Figure 5-52: Access Options: Channel Zoning

Channel Zoning allows you to configure zones to restrict access between SAN connections and SCSI Channels. The default settings allow all SAN connections to access all SCSI Channels. See Figure 5-53.

When you select this menu option, a dialog box displays the current Channel Zoning settings. If you have administrator privileges, you can change the settings. Figure 5-53 shows the default settings for an ADIC Gateway.

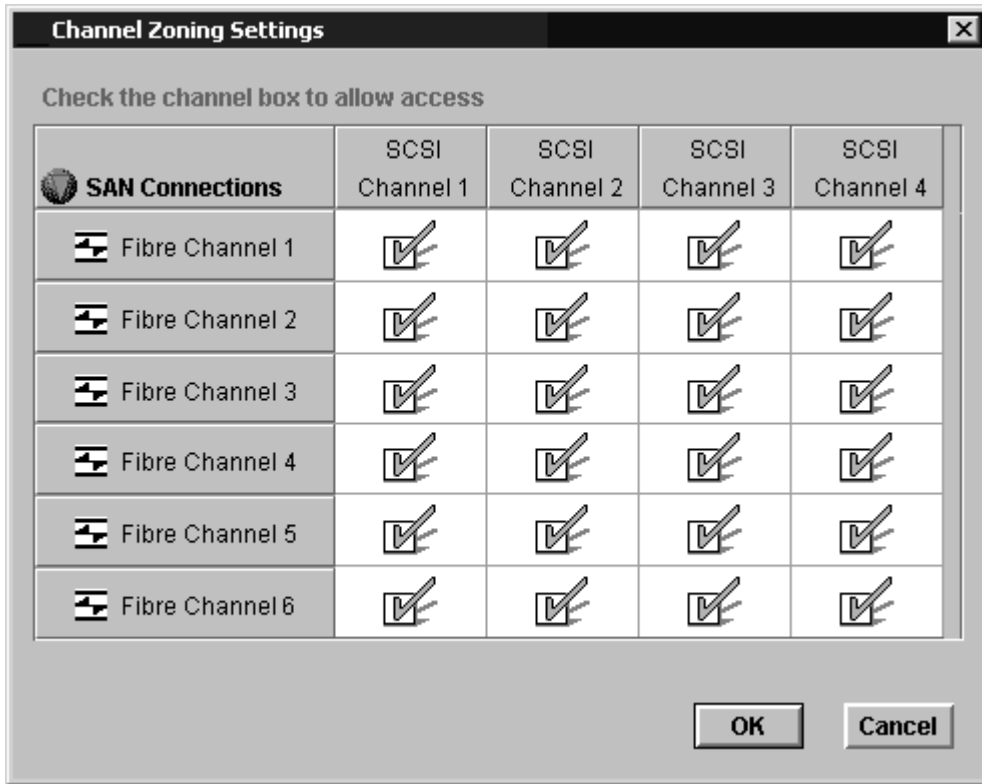


Figure 5-53: Default Channel Zoning Settings

Remove check marks in the boxes to create restricted access zones for the desired SAN connections and SCSI Channels. All combinations are possible. Bear in mind that an entire channel is zoned when the box is clicked.

If you are using the VPS Access option, it is possible, but not recommended, to set up Channel Zoning settings.

Attention: If you make changes to the Channel Zoning settings you must reboot the ADIC Gateway for the new settings to take effect.

Access Options: Virtual Private SAN

Virtual Private SAN provides you with a finer degree of access control between host bus adapters in individual systems and Target LUNs on storage devices. VPS can be used to allow multiple Fibre Channel hosts connected directly or via switches and hubs to be able to share the same SCSI or Fibre Channels while restricting their access to selected LUNs.

Once you have **Enabled** Virtual Private SAN, you can open the Virtual Private SAN settings box by selecting the ADIC Gateway in Tree View, and then going to **Controls > Access Options > Virtual Private SAN**. You may also choose to use the right-click menu. **Virtual Private SAN** is the sixth option on the right-click menu. See Figure 5-54.

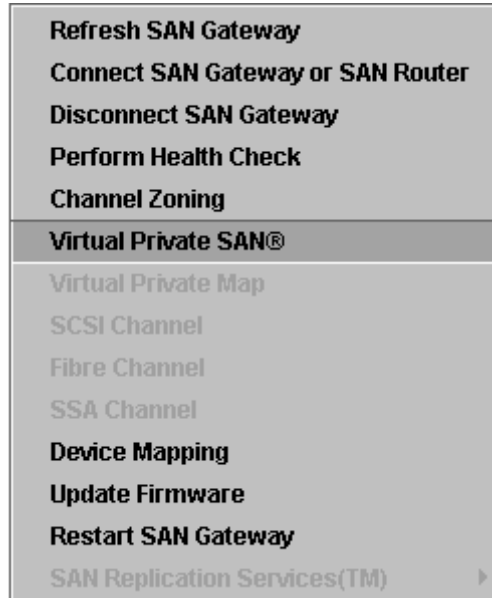


Figure 5-54: Right-Click Menu: VPS

Attention: If you did not use Channel Zoning to restrict access between SAN connections and SCSI Channels, VPS has full control of all SAN and SCSI Channels. If you did create restricted access zones, VPS can only assign access permission within each accessible zone.

Figure 5-55 shows the Virtual Private SAN Access Settings window. For a full explanation of Virtual Private SAN, see “Installing and Using Virtual Private SAN” on page 121.



Figure 5-55: VPS Access Settings

Access Options: Virtual Private Map

VPM is a software feature of the ADIC Gateway that allows any SAN device to map to any desired ID/LUN on a SCSI attached host. VPM's drag and drop interface allows mapping of Fibre Channel and SCSI devices to a private SCSI host channel. The system administrator uses the ADIC Management Console to administrate VPM and create a private device map.

Once you have **Enabled** Virtual Private VPM, you can open the Virtual Private Map settings box by selecting the ADIC Gateway in Tree View, and then going to **Controls > Access Options > Virtual Private Map**. You may also choose to use the

right-click menu. **Virtual Private Map** is the seventh option on the right-click menu. See Figure 5-56.



Figure 5-56: Right-Click Menu: VPM

The VPM settings dialog box consists of two panels. See Figure 5-57.

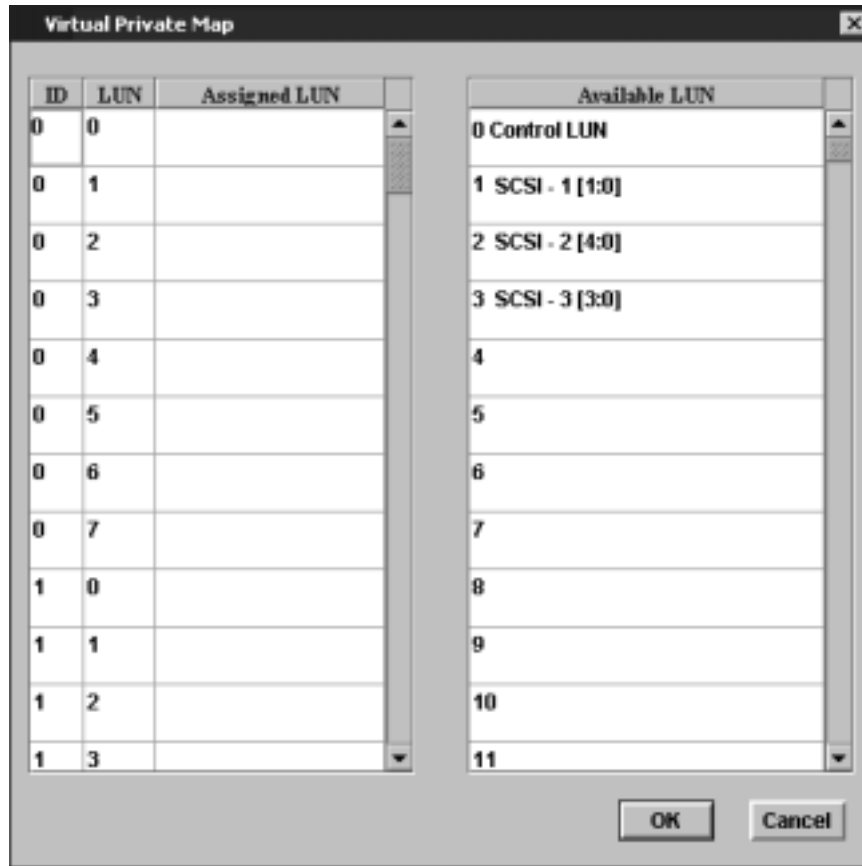


Figure 5-57: SCSI Devices Available For Mapping With VPM

Drag devices from the Available LUN column and drop them in the Assigned LUN column next to the desired ID and LUN to make them available on the selected SCSI channel. For more information on Virtual Private Map, see "Installing and Using Virtual Private Map" on page 147.

SNMP Community Strings

This menu option will display a dialog (Figure 5-58) that allows you to modify the SNMP community strings for the ADIC Management Console. They are stored on the Server.



Figure 5-58: SNMP Community Strings

SNMP community strings serve to group network devices into logical collections for management purposes. The community strings on the Server must match those on the ADIC Gateway you wish to manage.

There are three different strings defined for the ADIC Management Console:

Read allows the ADIC Management Console to get information from ADIC Gateways with matching **Read** community strings.

Write allows the ADIC Management Console to manipulate the settings of ADIC Gateways with matching **Write** community strings.

Trap allows the ADIC Management Console to receive **Trap** messages from ADIC Gateways with matching **Trap** community strings.

The default settings for the ADIC Management Console allow the system administrator to control and collect reports from all associated ADIC Gateways. See the `snmp` suite of service port commands for information about changing community string settings on specific ADIC Gateways.

SCSI Channel

If you have administrator privileges, you may change a SCSI Channel's configuration by selecting the channel in Tree View and then using the Controls pull-down menu item (**Controls > SCSI Channel**) to open the SCSI Channel Parameters dialog box. You can also open this dialog box by selecting the appropriate SCSI Channel in Tree View and then using the right-click menu. **SCSI**

Channel is the eighth option in the list. See Figure 5-59. Unless you have selected a SCSI channel in Tree View, the **SCSI Channel** option will be grayed out.

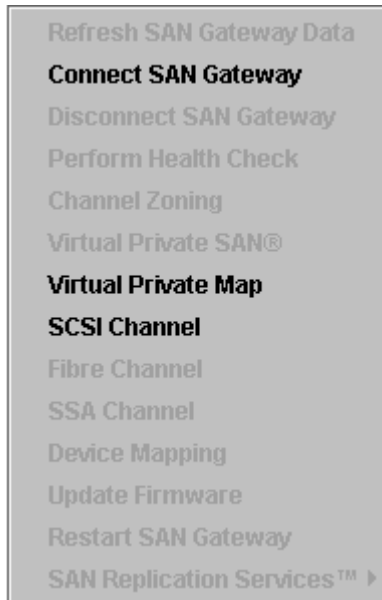


Figure 5-59: SCSI Channel Parameters Via the Right-Click Menu

Figure 5-60 shows you the parameters for a selected SCSI channel.

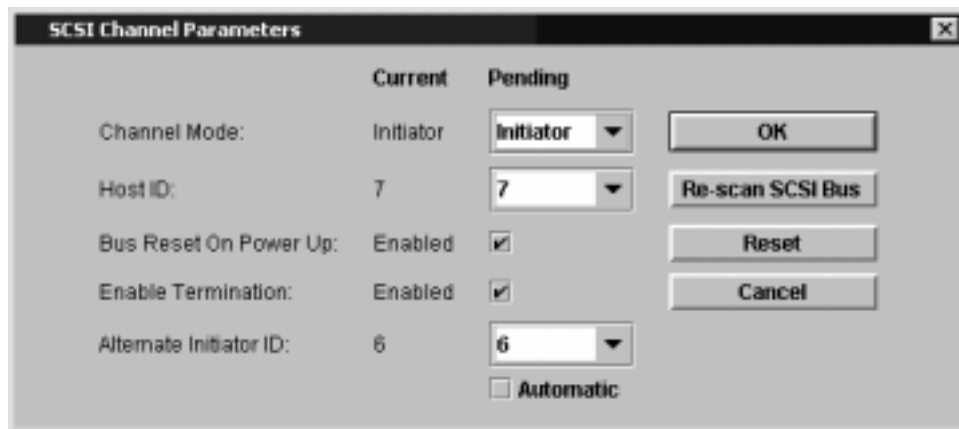


Figure 5-60: SCSI Channel Controls

Attention: If you change any of the SCSI Channel Parameter settings, you have to reset the SCSI Channel or reboot the ADIC Gateway to use the new settings.

Channel Mode identifies the channel as either an Initiator or a Target.

Host ID is typically assigned as 7.

You can press the **Rescan SCSI Bus** button to rescan the SCSI bus so the ADIC Gateway can discover devices that have been added or removed. It also refreshes the data for the devices on the SCSI channel and updates the display.

Bus Reset on Power Up is typically enabled. Removing the check mark from this box disables SCSI bus reset on power-up.

The default **Alternate Initiator ID** is set automatically by the ADIC Gateway. When the ADIC Gateway scans the SCSI Bus, it determines which IDs are currently being used by target devices and sets the Alternate ID to the highest ID not in use. You can change the Alternate ID using the pull-down or typing a new number. To restore the automatic default selection, choose “-1” from the drop down list.

Termination is typically **Enabled**. Removing the check mark from this box disables the internal termination circuits.

Pressing the **Reset** button reinitializes the SCSI Channel. This will cause the ADIC Gateway to abort all pending commands, reset the channel, and perform a rescan.

Attention: Use Reset carefully because it causes pending I/O commands to return failed status back to the host operating system and may have unexpected results. Make sure all I/O is stopped before issuing this command.

When you are finished viewing or setting SCSI Channel parameters, you may press **Cancel** to abort all changes and return to the main screen or you may press

OK to keep your changes and return to the main screen. If you press **OK**, two warnings about the SCSI reset are issued. See Figures 5-61 and 5-62.

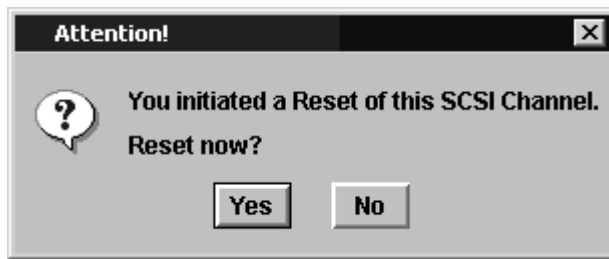


Figure 5-61: First SCSI Reset Warning



Figure 5-62: Second SCSI Reset Warning

Fibre Channel

Fibre Channel shows you parameters for the selected Fibre Channel interface. If you have administrator privileges, you can change the settings by selecting the Channel in Tree View and then going to **Controls > Fibre Channel**. You may also access the Fibre Channel Parameters dialog box by selecting the Channel in Tree View and then using the right-click menu. **Fibre Channel** is the ninth option. See

Figure 5-63. Unless you have selected the Channel, the Fibre Channel option will be grayed out on the menu.

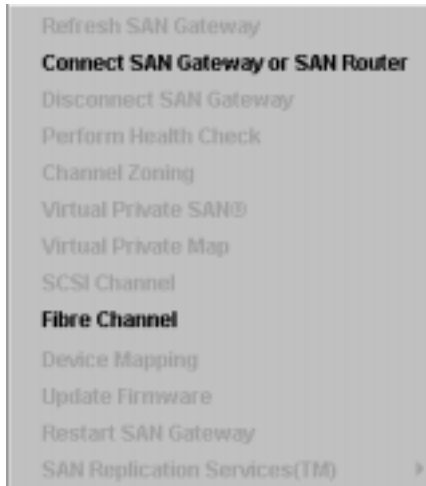


Figure 5-63: Fibre Channel Parameters Via the Right-Click Menu

Attention: If you change any of the Fibre Channel Parameter settings, you have to reset the Fibre Channel or reboot the ADIC Gateway to use the new settings.

Host Type has fourteen possible values: nt, aix, solaris, hp-ux, netware, gateway, switch, generic, unisys, as400, autosense/nt, linux, fcr-2, and pv-136t-fc. The default setting is NT. The host type is either the name of the host Operating System or the type of network appliance attached to the port. This setting controls the way the ADIC Gateway translates SCSI commands, such as the format of SCSI sense data, which needs to be presented differently for some hosts. If the VPS option is enabled, the host type setting in the VPS control panel will be used rather than this setting.

The default **Loop ID** setting is Soft and should typically not be changed. (It may be appropriate to use another Loop ID setting when using Fibre Channel switches). If you remove the check mark from the box, you can enter a loop ID value from 0 to 125.

Frame Size has three possible values: 512, 1024, and 2048. The Fibre Channel frame size is specified by each receiving node and need not match any other

node. The frame size should typically be set to 2048. (It may be appropriate to use another frame size if required by a particular software application.)

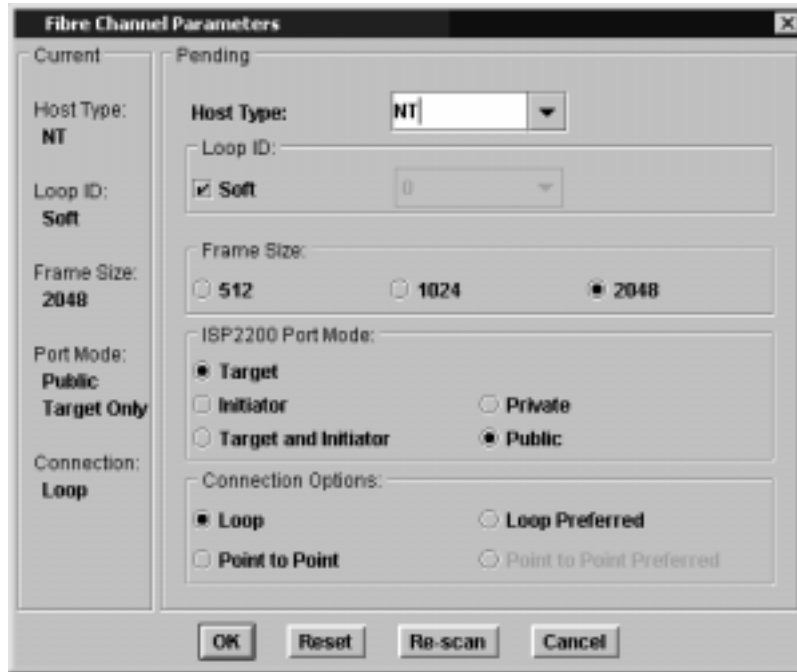


Figure 5-64: Fibre Channel Default Settings

Figure 5-64 shows the default Port Mode setting, which is “Target.” The default connection option is “Loop.” You have options for changing the port mode and connection.

When you are finished viewing or setting Fibre Channel parameters, you can press the **Reset** button to make your changes take effect immediately. If you press the **OK** button, you will be reminded that a **Reset** or **Reboot** are required for the changes to take effect. Press **OK** to keep your changes and return to the main screen. Press **Cancel** to abort your changes and return to the main screen.

Device Mapping

Using the ADIC Management Console, you can edit the ADIC Gateway’s persistent address map database and customize the LUN assignment for each target device. Select the ADIC Gateway in Tree View and then select **Device Mapping** from the **Controls** pull-down menu. You may also access the Device

Mapping dialog box via the right-click menu. See Figure 5-65. **Device Mapping** is the fourth choice from the bottom.



Figure 5-65: Device Mapping on the Right-Click Menu

Attention: Making changes to LUN assignments in the persistent address map database can affect Virtual Private SAN and Virtual Private Map access settings. If you assign different LUNs to devices that were under VPS or VPM access control, the same LUN could become associated with different devices and data would be lost.

After you have finished editing the device map, you must reboot the ADIC Gateway for any changes to take effect.

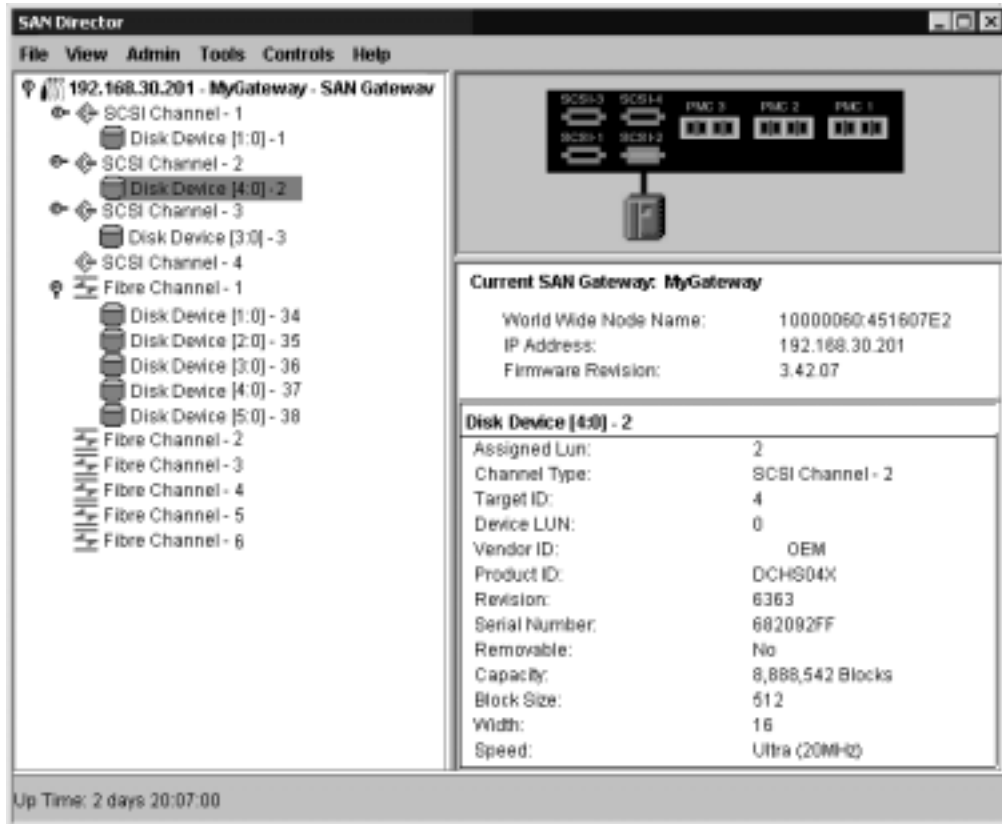


Figure 5-66: Devices Available for Mapping

In Figure 5-66, several SCSI and Fibre devices are displayed all of which are available for mapping. The selected device is on SCSI Channel 2 of the Gateway at 192.168.30.201. The Target ID of the selected tape device is 4, its Device LUN is 0, and its Assigned LUN is 2. The Data panel uses textual labels to specify this information. Tree View uses the format [Target ID:Device LUN] - Assigned LUN. The Assigned LUN is the LUN number that the ADIC Gateway has assigned to this device in its persistent device map.

For more information on Channel Numbering, see Appendix F: Channel Number Reference.

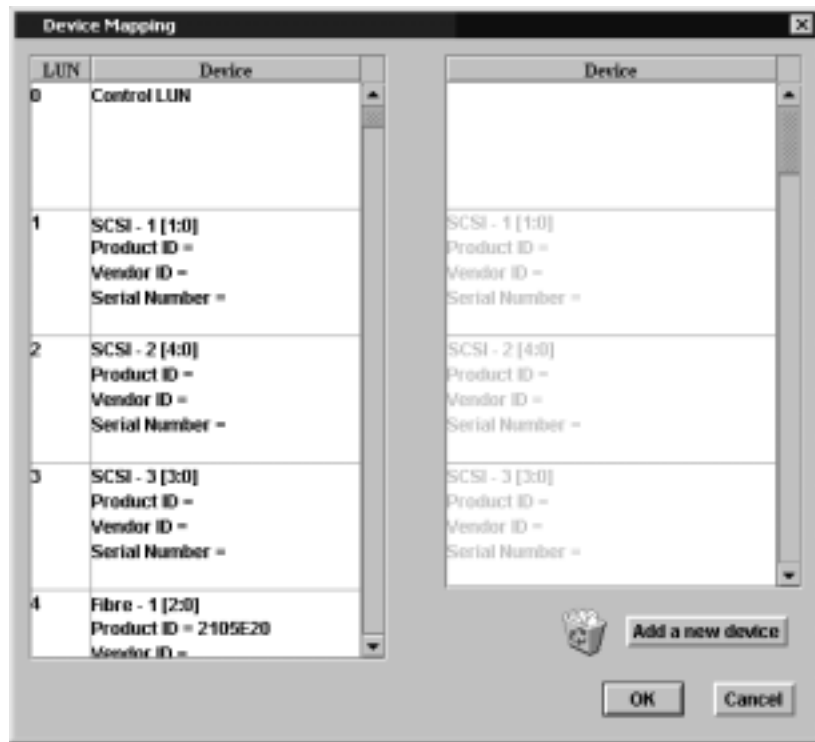


Figure 5-67: Device Mapping Window

As shown in Figure 5-67, devices that have already been entered into the persistent device map appear in black type on the left. The Device Mapping Window uses the format 'Channel [Target ID:Device LUN] after the text string "SCSI" or "Fibre". The assigned LUN for each device shows up only in the left-most column of the window, labeled 'LUN.' Grayed-out images of these same devices, without the Assigned LUNs, appear in the right-hand column. LUN 0 is typically occupied by the ADIC Gateway Command and Control LUN, unless it has been assigned to another LUN.

In order to assign devices to appropriate LUNs, you may drag and drop devices in two different ways. You may move devices back and forth from column to column or you may move them vertically within the left-hand column to different LUNs.

If a device that appears in the Available LUN column is not already assigned, you may delete it by dragging it down to the recycle bin icon.

In Figure 5-68, LUN 0 is still occupied by the ADIC Gateway Command and Control LUN. Fibre devices have been assigned lower Assigned LUNs than the

SCSI devices. When you are satisfied with the assignments that have been made, press **OK**. If you decide not to make any changes, press **Cancel**.

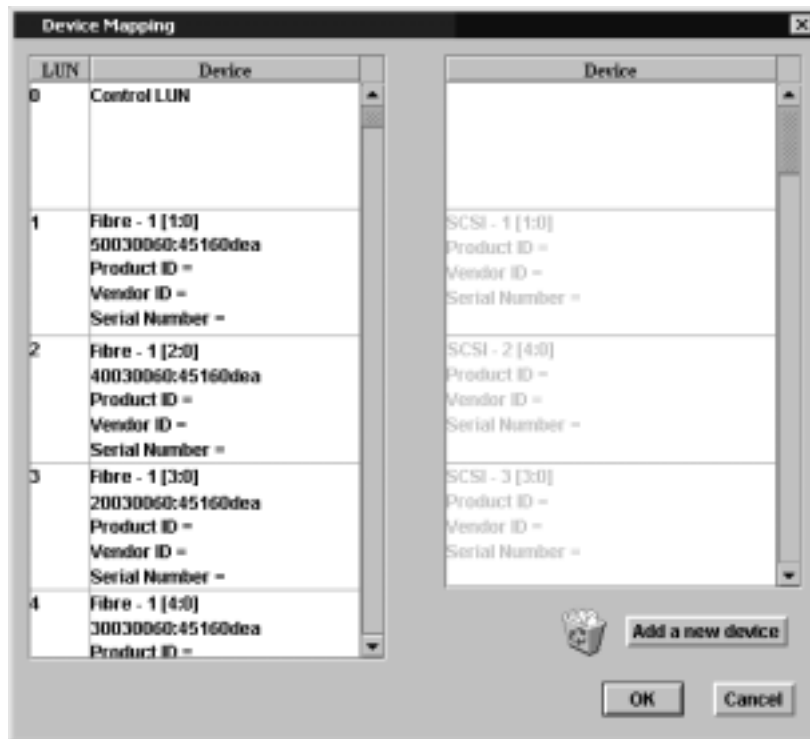


Figure 5-68: Devices That Have Been Remapped

From the ADIC Management Console, select the Gateway, then from the Controls menu, choose **Restart SAN Gateway**. Reboot the host, or use some other method to ensure that the host is aware of the new device map.

Pre-Assigning Device Numbers

To assign a LUN to a device that is currently not present on the system, but for which a soft LUN assigned during device discovery will not be adequate, press the **Add a new device** button.

The default device type is SCSI, see Figure 5-69. Fill in the desired Channel Number, Target ID and LUN Number for a SCSI device.



Figure 5-69: Add New SCSI Device

If the device to be added is a Fibre Channel device, use the pull-down to select Fibre, and then fill in the desired LUN and the WWN of the device, if known. See Figure 5-70.

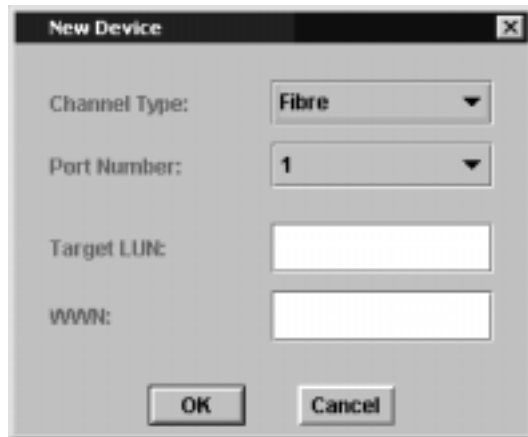


Figure 5-70: Add New Fibre Channel Device

The new device or devices will appear in the right-hand column of the Device Mapping Window. In Figure 5-69, a new entry has been made for a SCSI device that will be connected to SCSI Channel 2. It will have a target ID of 2 and a Target

LUN of 1. It appears in the right-hand column of the Device mapping screen. See Figure 5-71.

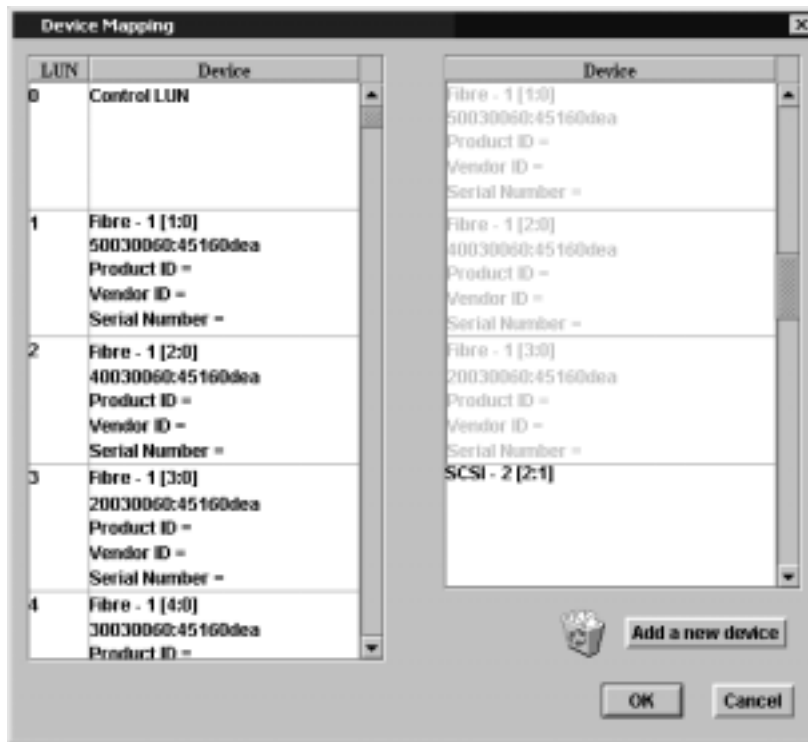


Figure 5-71: New SCSI Channel Device

Make sure that each device in the right-hand column is mapped to a LUN in the left-hand column, or the **Device Mapping** window will not close. See Figure 5-72. When you have assigned all devices, press **OK**.

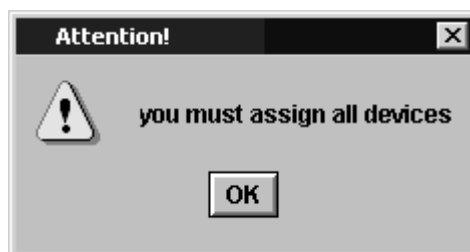


Figure 5-72: Unmapped Devices Warning

From the ADIC Management Console, select the ADIC Gateway, then from the Controls menu, choose **Restart SAN Gateway**. Reboot the host, or use some other method to ensure that the host is aware of the new device map.

Update Firmware

With the ADIC Gateway selected in Tree View, you can use the **Controls > Update Firmware** option to update ADIC Gateway operational firmware or you can use it to send micro-code to SCSI target devices as a means to update their firmware. You can also access the **Update Firmware** file browser by using the right-click menu. **Update Firmware** is the third option from the bottom. See Figure 5-73.

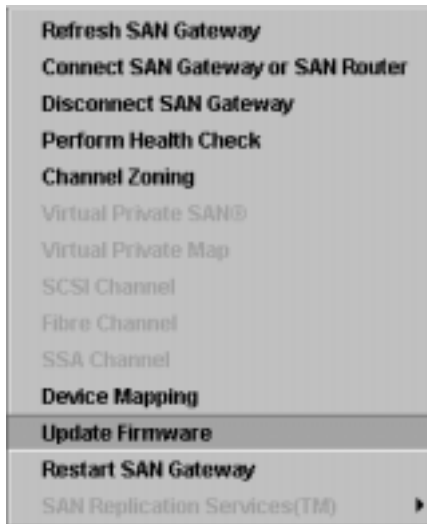


Figure 5-73: Update Firmware Via the Right-Click Menu

You can see the file browser in Figure 5-74. Select the file you want to load, and then press the **Yes** button. The firmware file is sent to the currently selected device (ADIC Gateway or target device). Otherwise, press the **No** button to abort the download and return to the main screen. For the latest firmware, visit “Service and Support” at www.adic.com, or call the ADIC Technical Assistance Center at 1-800-827-3822. The readme file that accompanies the new firmware will list the file or files that you need to upload and whether or not they should be uploaded in a certain order if there is more than one.

Attention: You must stop all activity from all of the attached hosts before you update ADIC Gateway firmware. After you update ADIC Gateway firmware, you must reboot the ADIC Gateway to use the new firmware.

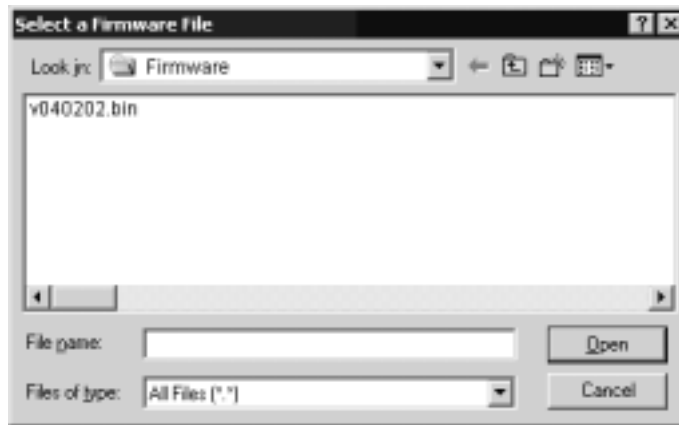


Figure 5-74: Update Firmware

Restart SAN Gateway

After you select an ADIC Gateway in Tree View, you can use the **Controls > Restart SAN Gateway** option to reboot it. You can also reboot a selected ADIC Gateway via the right-click menu. **Restart SAN Gateway** is the second option from the bottom. See Figure 5-75.

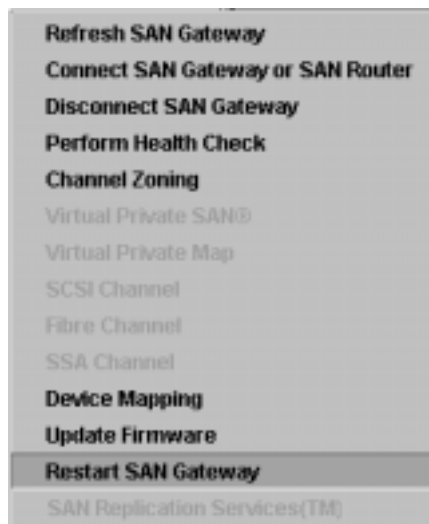


Figure 5-75: Using the Right-Click Menu to Restart a Gateway

Attention: Restart will immediately stop all I/O activity. Any connected host must stop sending commands to devices attached to the ADIC Gateway or it will cause timeouts or other failures to be reported on the host system.

When you select **Restart SAN Gateway**, the following message is displayed:

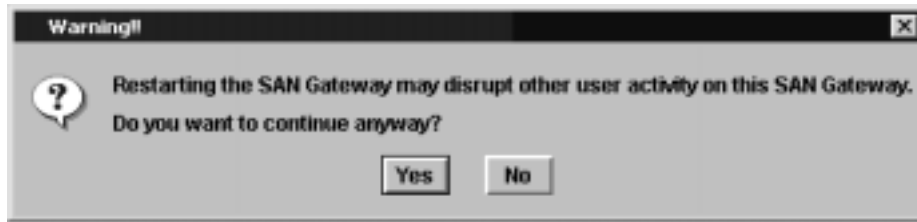


Figure 5-76: Warning Before Restarting an ADIC Gateway

Identify ADIC Gateway

Identify SAN Gateway allows you to visually identify the selected ADIC Gateway. Pressing the **Turn Ready LED On** button makes the RDY light flash rapidly. See Figure 5-77. For the position of the RDY LED, see Figure 5-15 on page 74. Pressing the **Cancel** button restores the RDY light to its normal operation and returns you to the main screen.

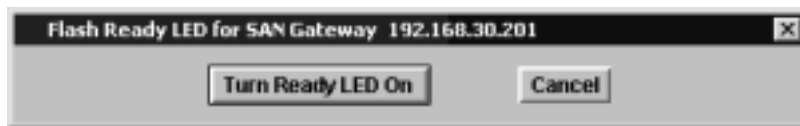
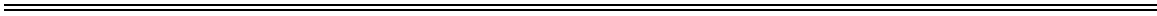


Figure 5-77: Identify SAN Gateway



Chapter 6: Installing and Using Virtual Private SAN

This chapter introduces Virtual Private SAN. It describes its key features and functions and provides information on installing and using VPS. This chapter is organized as follows:

- Introduction to Virtual Private SAN
- Host Registration
- Installing the Host Registration Service
- Installing Virtual Private SAN
- Entering Host Parameters
- Changing Access Permissions
- Determining LUN Assignments
- Adding and Removing Hosts
- Combining VPS with Channel Zoning

Introduction to Virtual Private SAN

VPS 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 ADIC Gateway SCSI and Fibre Channels. The system administrator uses the ADIC Management Console to administrate VPS.

1. VPS 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.
2. VPS 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.
3. VPS keeps track of Fibre Channel HBAs by their unique World Wide Name (WWN). Because Fibre Channel switches also have a WWN, VPS can see FC switches connected to the ADIC Gateway and control their access.

-
-
4. VPS manages access for hosts connected through FC switches and hubs to the ADIC Gateway. The ADIC Gateway supports up to 256 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 16 initiators per port. Consequently, with the default setting, an ADIC Gateway with six Fibre Channel ports can support up to 96 host connections.
 5. VPS creates and maintains a database in non-volatile memory to hold persistent information about each HBA (or Initiator) and its LUN access privileges.
 6. When you perform a **Save SAN Gateway Configuration** from the ADIC Management Console, it saves both the persistent device map and the VPS database to a file. This allows all configuration settings to be loaded onto another ADIC Gateway in the event that the ADIC Gateway needs to be replaced.
 7. When VPS is enabled for the first time, it takes a “snapshot” of the existing configuration. VPS automatically assigns access between HBAs and the storage elements that they currently have access to so that an existing configuration will not be affected. This means that online hosts attached to an ADIC Gateway will continue to retain their current access permissions to storage elements.
 8. Any HBA (or Initiator) that is added to a SAN connection at a later time will only have access to the ADIC Gateway 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

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

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

At this point, VPS has registered the HBA or Initiator but has minimal information about it. The system administrator can proceed to complete the registration by

using the ADIC Management Console to manually enter the “unknown” host information and assign access privileges to LUNs.

Installing the Host Registration Service

If there are multiple hosts connected to the SAN, the system administrator cannot easily tell which host is associated with each WWN. Unless it receives a periodic status indication from the host, VPS cannot determine whether a host stays online (connected and running) or goes offline (disconnected or shutdown); consequently, the status field contains the value “online” for any host that was registered since the ADIC Gateway was last booted. It is important for the system administrator to know whether hosts are online or offline when configuring VPS access settings.

A Host Registration Service is provided to simplify VPS configuration and it allows the system administrator to monitor host status. It removes the burden of physically tracing each connection to correlate the Fibre Channel HBA WWN with a specific host. If the service is not installed, its absence does not impede VPS operation. However, the information it provides to the system administrator is very valuable. It helps the system administrator correctly identify each host HBA and also obtain host status information.

The registration service installs on most host platforms and it provides VPS with periodic host status information including the host name, host type, host connection and the online or offline status. Host information is sent over the host Fibre Channel connection to the ADIC Gateway.

The service registers the host with VPS automatically when the host system starts up and its default setting re-registers the host at 15-minute intervals. The registration period is also communicated. VPS checks to see whether the host has re-registered at the proper interval. If a host does not re-register after two registration periods have elapsed, VPS changes the status field in the database to offline. You can change the re-registration period to any value between 1 and 255 minutes. See the readme file provided with the Host Registration Service utility for further information about changing the registration period.

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.

Note: You have to refresh the ADIC Gateway from the ADIC Management Console to see host status changes.

The Host Registration Service utility is provided on the CD-ROM. For the Windows NT/Windows 2000 platform, you install it from within the SAN Explorer installation program. For Solaris, AIX and other platforms, see the readme file in

the HOSTSW folder for installation instructions. For software updates, visit “Service and Support” at www.adic.com, or call the ADIC Technical Assistance Center at 1-800-827-3822.

Installing Virtual Private SAN

VPS is a software module that is part of the ADIC Gateway operational firmware. Check the readme file on the CD-ROM to find out if the firmware and software that you have will support VPS. For firmware and software updates, see the Web site and technical support contact information in the of this manual.

By default, VPS is not enabled. Virtual Private SAN is an optional feature that requires you to enter a software license key to activate it. Obtain the key where you purchased the ADIC Gateway.

Note: If this feature is factory enabled, you can activate it by simply entering the word **enable** rather than an actual license key to activate it. “Installation Steps for an Existing SAN Gateway” on page 132.

Installation Instructions

The steps you need to take to install and enable VPS are different for a new ADIC Gateway installation than they are if you are adding VPS to an ADIC Gateway that was installed at an earlier time. If you are performing a new installation, go to the section “Installation Steps for a New SAN Gateway Installation” on page 124.

As a convenience to you, VPS will inherit host access privileges to storage elements on an existing ADIC Gateway configuration. VPS will automatically assign host access to the same storage elements that the hosts have been using. If you want VPS to inherit host access permissions, go to the section “Installation Steps for an Existing SAN Gateway” on page 132.

Installation Steps for a New SAN Gateway Installation

Note: This procedure assumes that the storage devices and the ADIC Gateway is turned on and the ADIC Management Console software has already been installed.

1. If you already installed the Host Registration Service during the Pre-installation checklist, go to step 2. If not, install it on each host now. See “Installing the Host Registration Service” on page 123.

Note: If you do not install the Registration Service you have to enter host parameters manually. See “Entering Host Parameters” on page 137.

2. Shut down the hosts.

3. If the ADIC Management Console Server and Client are already running and you are already logged in with administrative privileges and connected to the ADIC Gateway, go to step 4. If not, start the Server and Client, login as the administrator and connect to the ADIC Gateway.
4. From the ADIC Management Console, select the ADIC Gateway. From the **Controls** menu, select **Restart SAN Gateway**. Restarting the ADIC Gateway eliminates the possibility that it has any previous knowledge of the hosts.
5. Wait for the ADIC Gateway to finish booting.
6. From the **Controls** menu, select **Feature Enable > Virtual Private SAN**.
7. In the dialog box, enter the License Key for your specific ADIC Gateway.

Note: If this feature is factory enabled, you can activate it by simply entering the word **enable** rather than an actual license key.

8. Startup one of the hosts and wait for it to finish booting. From the ADIC Management Console, select the ADIC Gateway. From the **View** menu, select **Refresh SAN Gateway**.
9. After the ADIC Gateway has been refreshed, expand the tree to show tree elements. Expand the tree for the Fibre Channel that the host is connected to and verify that the registered host is displayed. Figure 6-1 is an example that shows how a registered host that has the Host Registration Service running is displayed.

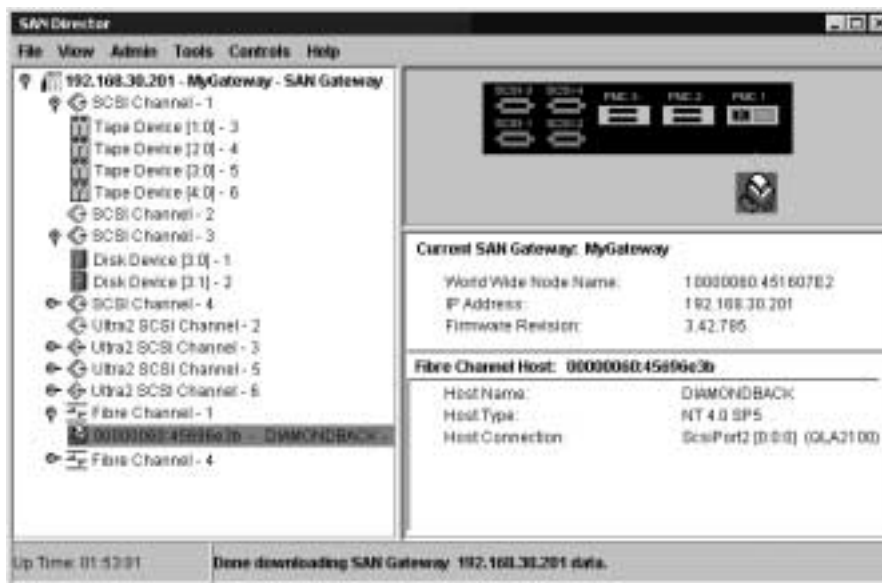


Figure 6-1: One Registered Host Online

In the Tree View panel of Figure 6-1, you can see that the host is connected to ADIC Gateway Fibre Channel port 1. In the text string after the host icon in Tree View, you can read the WWN of the HBA and the beginning of the network name of the computer. You can use the scroll bar to expand your view of this panel (see Figure 6-2) or you can read the host type, operating system, patch level, and other host connection information (SCSI map from the host point of view) in the Data panel. These parameters were provided automatically from the Host Registration Service.

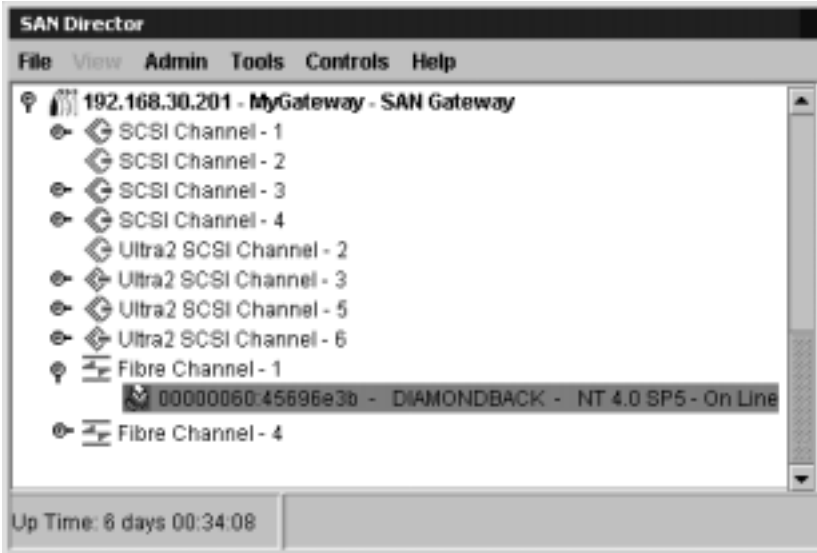


Figure 6-2: Detail of Host Information in Tree View Panel

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10. Repeat steps 8 and 9 until all hosts are displayed. Figure 6-3 is an example that shows how two registered hosts are displayed.

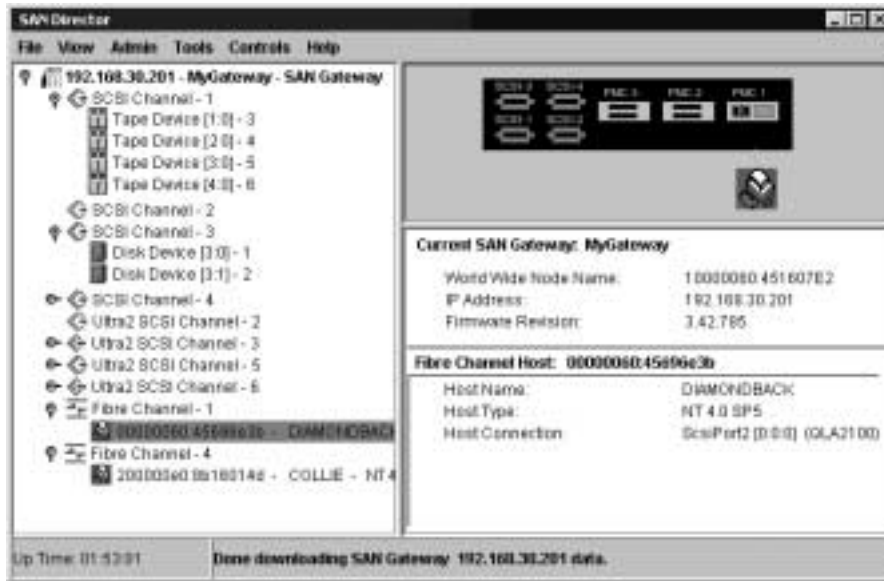


Figure 6-3: Confirming That Two Registered Hosts are Online

- Expand the tree to display storage devices and determine their assigned LUNs. Figure 6-4 shows the Assigned LUN for the selected SCSI device on SCSI Channel 3.

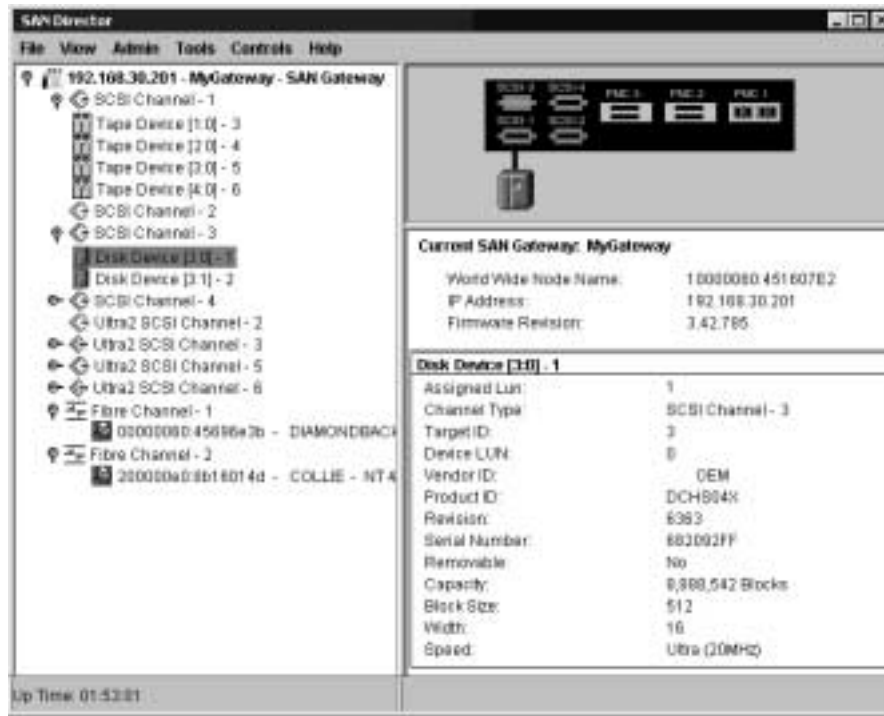


Figure 6-4: Determining the Assigned LUN

The Assigned LUN for the selected device is displayed in the first line of the Disk Device description area. In the above example, the Assigned LUN for the selected disk device is 1.

- Make a list of each Assigned LUN and decide the LUNs you want to allocate to each host.

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13. From the ADIC Management Console, select the ADIC Gateway. From the **Controls** menu, select **Access Options > Virtual Private SAN**. Figure 6-5 shows a Virtual Private SAN window that does not yet have any access settings.

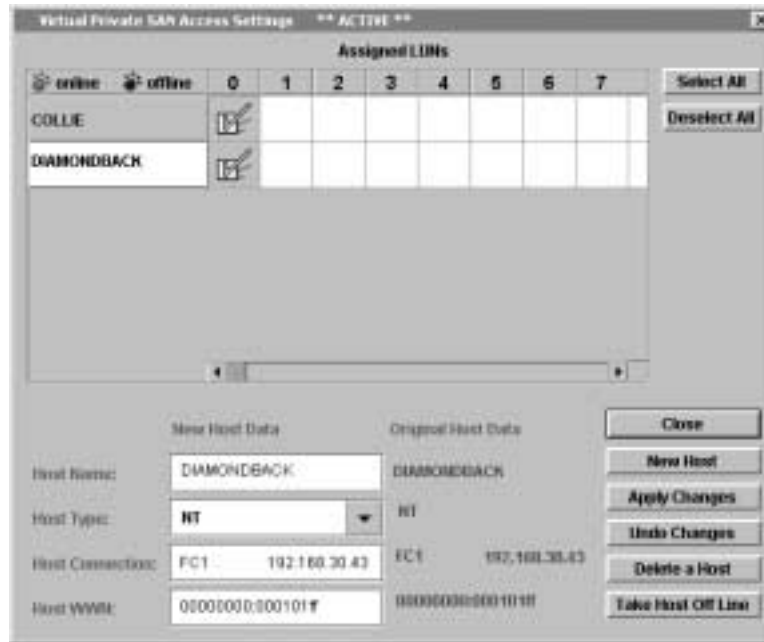


Figure 6-5: Initial VPS Window before Access Assignments

Registered hosts are shown in the column on the left. When a host is online, its name is in black. When a host is registered but not currently online its name is in blue. If no hosts are displayed, the New Host Data area shows only a default Host Type. When you select a host, its parameters are displayed at the bottom of the window and you can edit them. See “Entering Host Parameters” on page 137 for further information about editing host data fields.

After you have selected a certain host, and its parameters are displayed at the bottom of the window, you can still see parameters for another host by hovering

the mouse over the other host's name. A pop-up with host parameters will appear. See Figure 6-6.

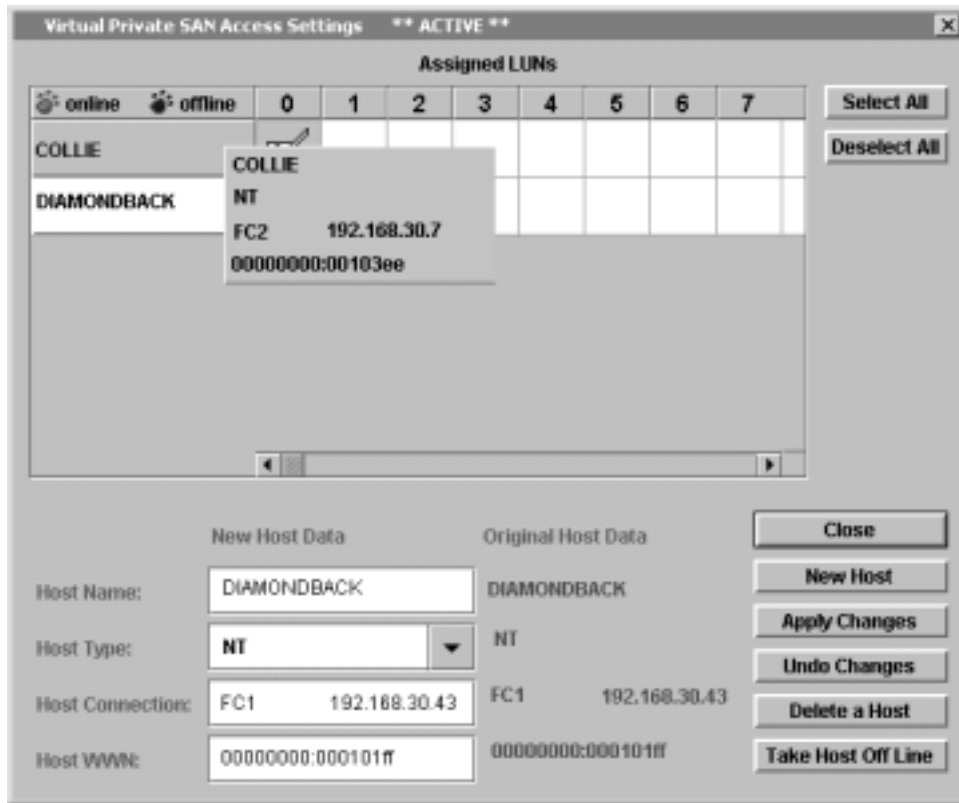


Figure 6-6: VPS Host Parameters Pop-Up

14. Use the scroll bar below the squares to scroll right or left and locate the desired LUN.

Assign host access to a LUN by pointing the mouse to a square in the Assigned LUNs area and clicking. Checkmarks in the Assigned LUNs area indicate that access is enabled between the LUN and corresponding host. If you change your mind, you can click the square again and the checkmark will

be removed. Figure 6-7 is an example of the VPS Access Settings window after access settings have been made.

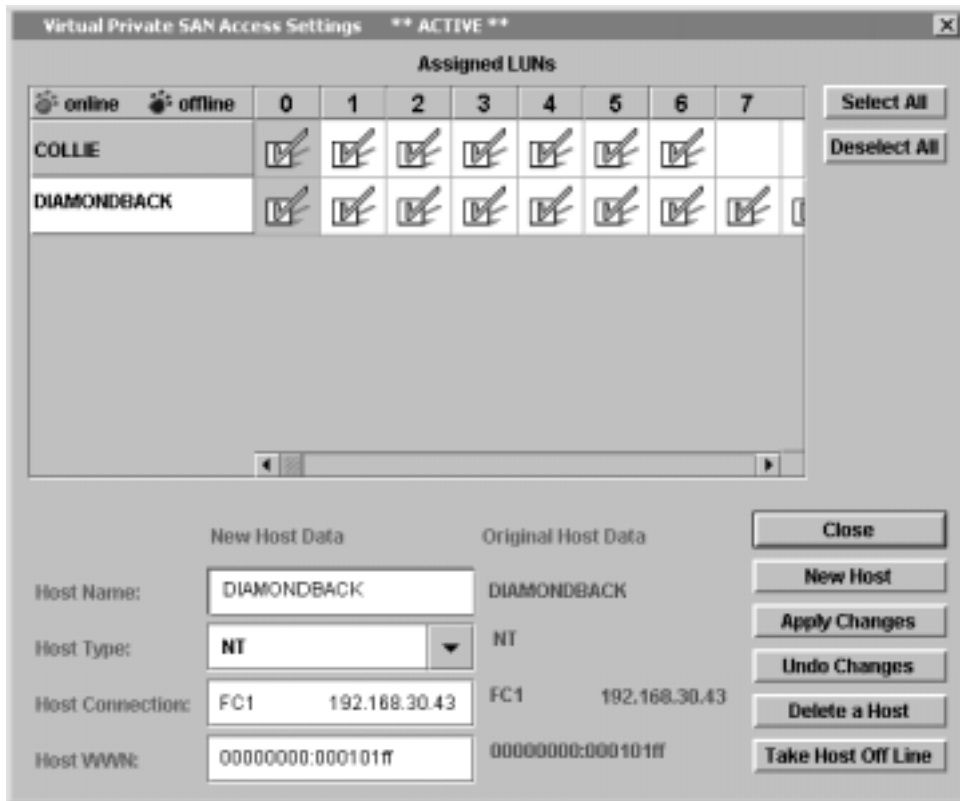


Figure 6-7: Assigning Host Access Permissions

For more information about the device at a specific LUN, you can hover the mouse over the Assigned LUN number in the header row. See Figure 6-8. The pop-up will state the Channel Number, Target ID and Device LUN, product ID, vendor ID, and serial number of the device.

Note: You can create combinations of “exclusive” and “shared” access to LUNs from different HBAs installed in the same host.

Attention: Devices mapped to a particular host with VPS (or VPM) are available for mapping to other hosts via both the Assigned LUN checkboxes of the VPS Access Settings window and the Assigned LUN column of the VPM window. If multiple assignments are made, the system administrator should verify that the devices are intended

to be available to more than one host.

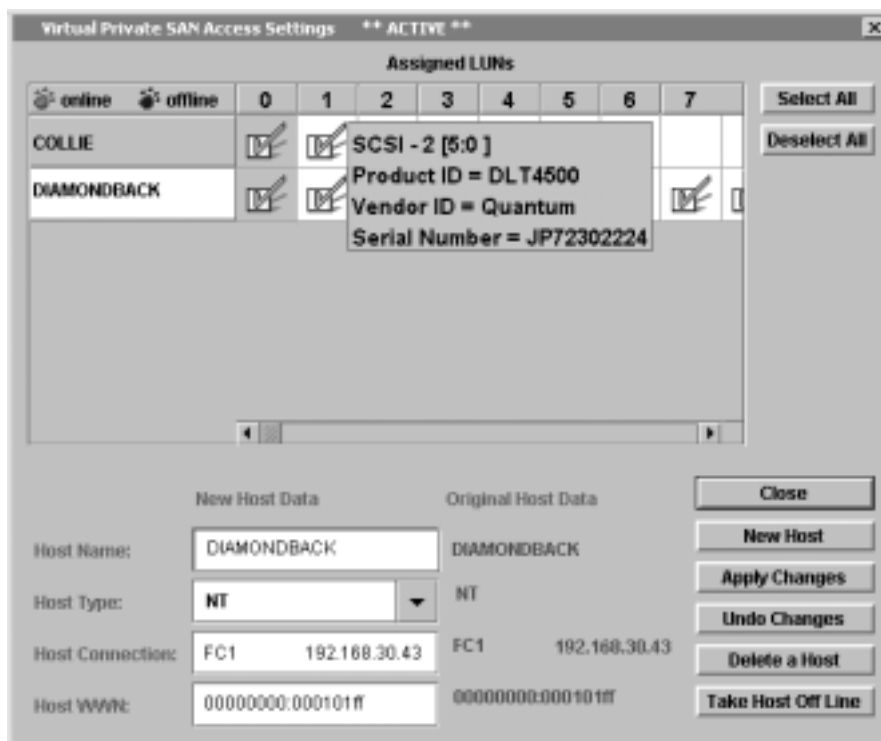


Figure 6-8: VPS Device Parameters Pop-Up

15. After you have finished assigning the desired access privileges, press the **Apply Changes** button. Press the **Close** button to return to the main screen.
16. You now have to reboot the hosts or use some other host method to rescan for devices before the host can see the new devices.
17. You have completed the VPS installation. If you need to add a new host or remove a host from the SAN configuration, enter host parameters, etc., see the appropriate section in this chapter for further information.
18. Save your configuration, as explained in “Save SAN Gateway Configuration” on page 90.

Installation Steps for an Existing SAN Gateway

Note: This procedure assumes that the storage devices, ADIC Gateway and hosts are turned on and the ADIC Management Console software has already been installed. The hosts need to be online to inherit their current access privileges when you enable VPS.

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1. The default Channel Zoning settings allow any-to-any access. If you did not change the default settings, go to step 2.

Otherwise, if you have changed Channel Zoning settings to create restricted access zones, confirm that you want to keep those settings and restrictions. If you want to keep those settings, go to step 2.

You can use a combination of Channel Zoning and VPS but VPS can only control access permissions between devices in the same access zone. See the section on “Combining VPS with Channel Zoning” on page 145. You may want to consider removing Channel Zoning access restrictions. If you do, you need to reboot the ADIC Gateway after changing the settings.

Note: If you need to reboot the ADIC Gateway, VPS will not be able to inherit host access permissions. You will have to manually assign access for them. If this is the case, exit this procedure and go to the section “Installation Steps for an Existing SAN Gateway” on page 132.

2. If the ADIC Management Console Server and Client are already running and you are already logged in with administrative privileges go to step 3. If not, start the Server and Client, login as the administrator and connect to the ADIC Gateway.
3. From the ADIC Management Console, select the ADIC Gateway. From the **Controls** menu, select **Feature Enable > Virtual Private SAN**.
4. In the dialog box, enter the License Key for your specific ADIC Gateway.

Note: If this feature is factory enabled, you can activate it by simply entering the word **enable** rather than an actual license key.

5. Install the Host Registration Service on each host. See “Installing the Host Registration Service” on page 123.

Note: If you do not install the Registration Service you have to enter host parameters manually. See “Entering Host Parameters” on page 137.

6. After the hosts have finished booting. From the ADIC Management Console, select the ADIC Gateway. From the **View** menu, select **Refresh SAN Gateway**.
7. After the ADIC Gateway has been refreshed, expand the tree to show tree elements. Expand the tree for the Fibre Channels and verify that all registered

hosts are displayed. Figure 6-8 is an example that shows how registered hosts are displayed.

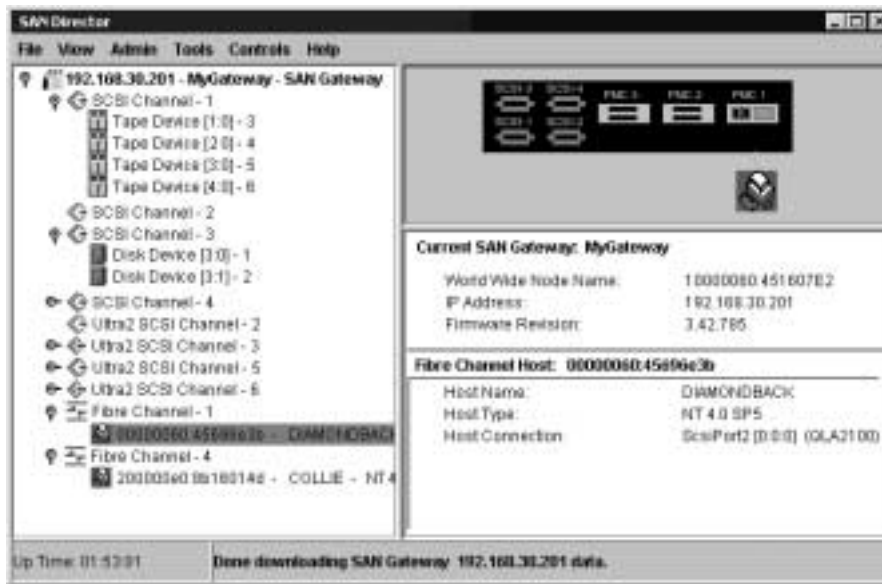


Figure 6-8: Two Hosts Online

In the Tree View panel of Figure 6-8, you can see that hosts are connected to the ADIC Gateway Fibre Channel ports 1 and 2. In the text string after the host icons in Tree View, you can read the WWN of the HBAs and the beginning of the network names of the computers. You can use the scroll bar to expand your view of this panel (see Figure 6-10) or you can read the host type, operating system,

patch level, and other host connection information (SCSI map from the host point of view) for a selected host from the Data panel.

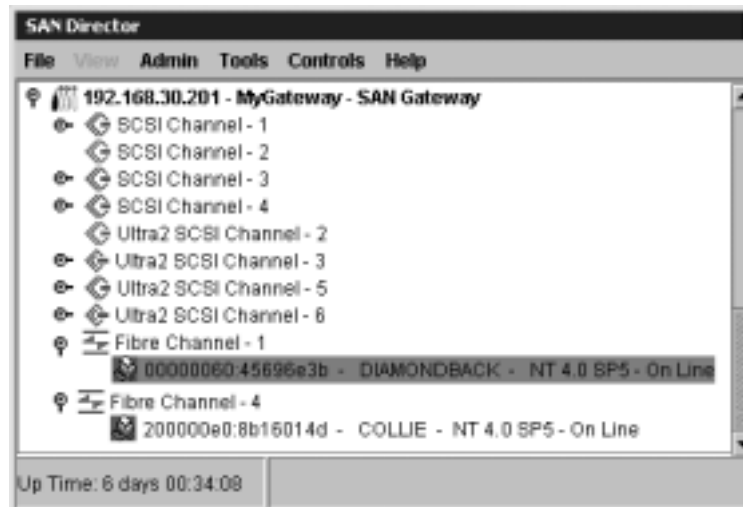


Figure 6-9: Detail of Tree View Panel

- From the ADIC Management Console, select the ADIC Gateway. From the **Controls** menu, select **Access Options > Virtual Private SAN**. Figure 6-10 shows the Virtual Private SAN Access Settings window.

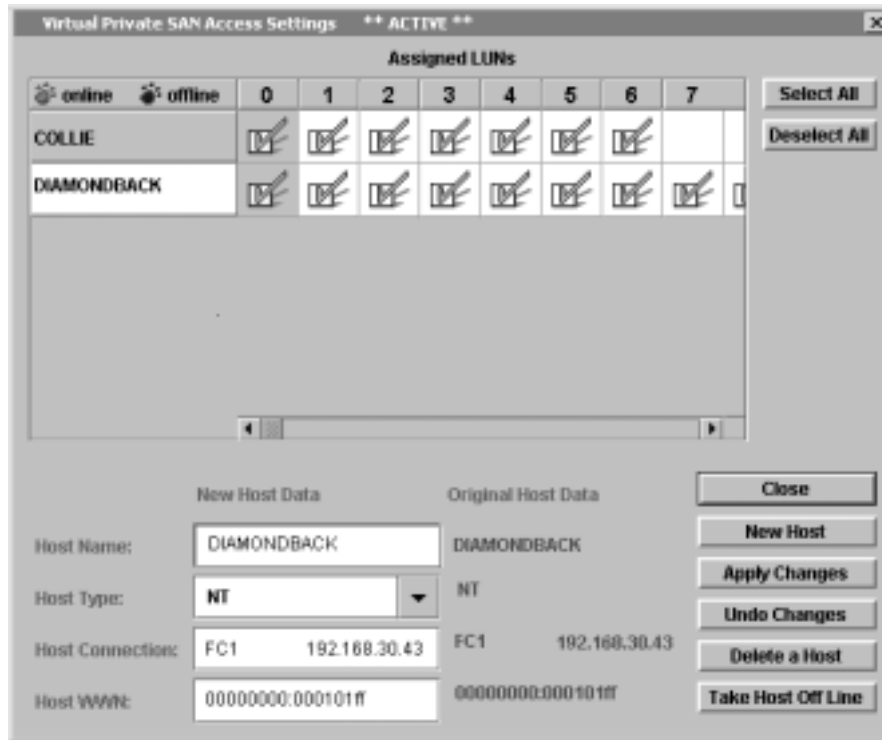


Figure 6-10: Checking Access Settings Inherited from Hosts

- Registered hosts are shown in the column on the left. When a host is online its name is black. When a host is registered but not currently online its name is blue. When you select a host, its parameters are displayed at the bottom of the window and you can edit them. See “Entering Host Parameters” on page 137 for further information about editing host data fields.

Checkmarks in the Assigned LUNs area indicate that access is enabled between the LUN and corresponding host. See “Changing Access Permissions” on page 140 for further information about changing access settings.

Verify that the access settings are as desired. You can find out the ADIC Gateway channel that each LUN is on and see how the ADIC Gateway has made LUN assignments by pressing the **Close** button and going back to the main screen.

- Expand the tree to display SCSI or Fibre Channel storage devices and determine their assigned LUNs. Figure 6-11 shows the Assigned LUN for the

selected SCSI device on SCSI Channel3.

The Assigned LUN for the selected device is displayed in the first line of the Disk Device description area. In this example, the assigned LUN for the selected disk device is 1.

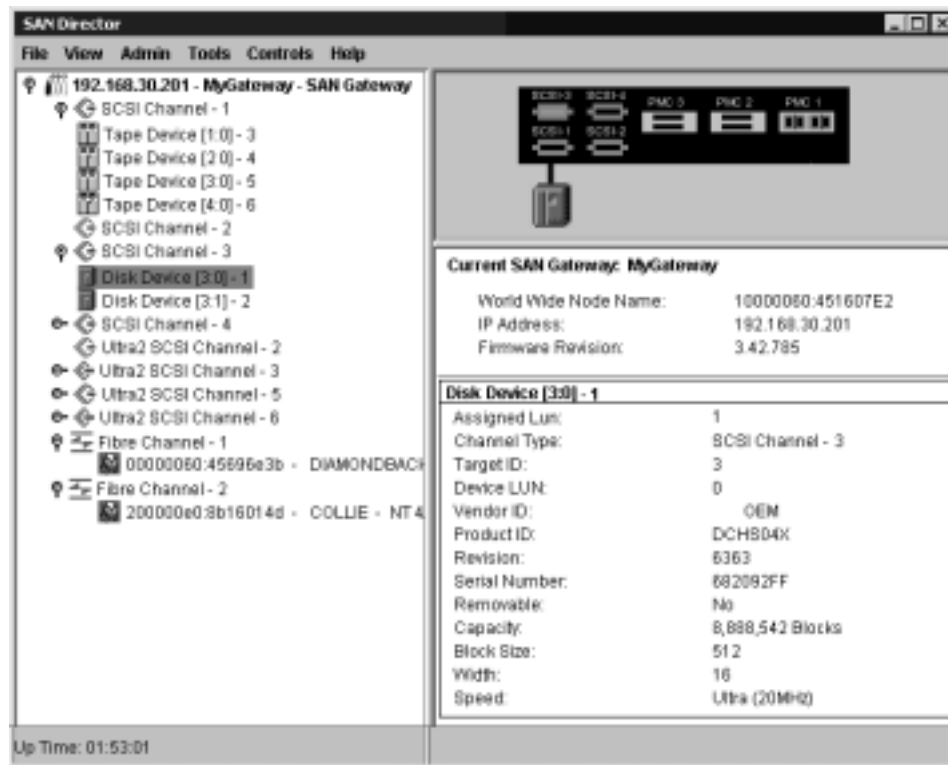


Figure 6-11: Checking the Assigned LUN

11. After you have determined the assigned LUN for each device, you can go back to the VPS window and confirm that the access settings are as desired.
12. Your transition to VPS is complete. If you need to add a new host or remove a host from the SAN configuration, enter host parameters, etc., see the appropriate section in this chapter for further information.
13. Save your configuration, as explained in “Save SAN Gateway Configuration” on page 90.

Entering Host Parameters

You may need to manually enter host parameters if the Host Registration Service is not installed or when automatic host registration is not available for a specific host type (for example, to register a Fibre Channel switch). When you see the

WWN of the host in the VPS Access Settings window and the other fields are shown as “unknown” you can change them to meaningful parameters. The WWN is acquired automatically and it does not need to be changed. You can also enter the WWN for a host that is not yet attached to the SAN (see “Adding and Removing Hosts” on page 143).

From the **Controls** menu, select **Access Options > Virtual Private SAN** to display the VPS Access Settings Window. Figure 6-12 shows how a Fibre Channel switch is displayed before its parameters have been entered.

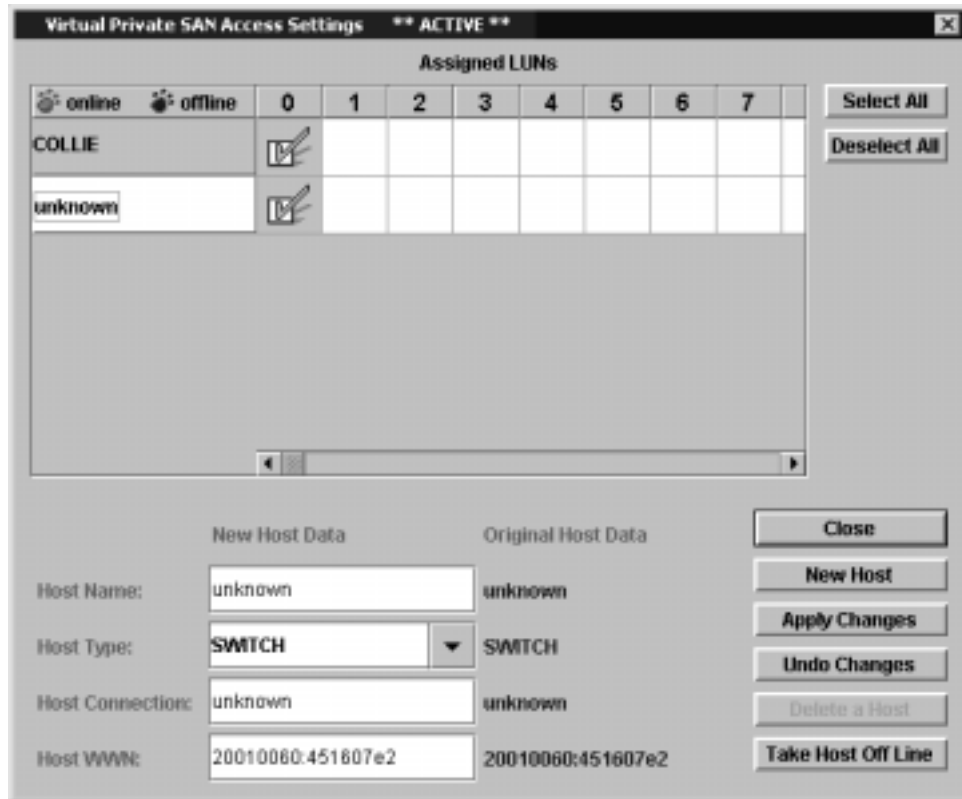


Figure 6-12: Unknown Host Parameters

In the Fibre Channel switch example above, initially the WWN is known but the other parameters are “unknown”.

When you select a host in the left column, its parameters are displayed as fields below the New Host Data label and you can edit the fields. At the right of the fields there is an area labeled Original Host Data that shows the values that were in the fields before you made changes. The fields contain the following parameters.

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- Host Name:** Usually the name of the computer on the Local Area Network (LAN). System administrators use this name to refer to the host.
- Host Type:** The type of host, version of the operating system software and the Service Pack Level (NT/Windows 2000) or patch level (e.g., Solaris, AIX). Select the arrow at the right of the Host Type field to choose the appropriate entry from the pull-down list.
- Host Connection:** Indicates the way the host has mapped its connection to the ADIC Gateway. It is typically a representation of the host SCSI mapping to bus, target and LUN. It also identifies the type of HBA.
- Host WWN:** The World Wide Name of the HBA or Initiator. The WWN is a unique identifier that also contains a manufacturer field. If you are entering this number manually, you must enter a colon after the first eight characters of the WWN for the ADIC Management Console to accept your entry, even if the

manufacturer of your Host Bus Adapter displays it with some other punctuation.

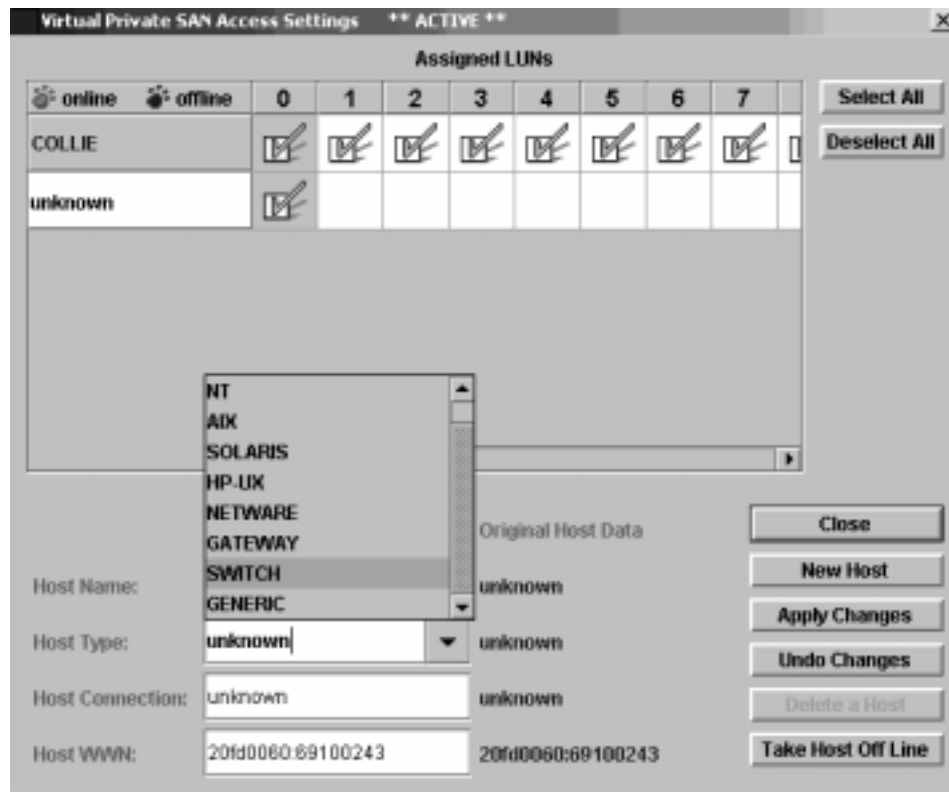


Figure 6-13: Entering Parameters for a Fibre Channel Switch

Figure 6-13 shows the Host Type pop-up list and an example of parameters that were entered for the Fibre Channel switch.

Changing Access Permissions

Attention: Ensure that the host is not accessing the device LUN if you intend to remove its access privileges. If possible, unmount the file system or shutdown the host before removing access. If you give shared access to a LUN, ensure that some other software will manage device sharing.

From the ADIC Management Console, select the ADIC Gateway. From the **Controls** menu, select **Access Options > Virtual Private SAN** to display the VPS Access Settings window as shown in Figure 6-14.

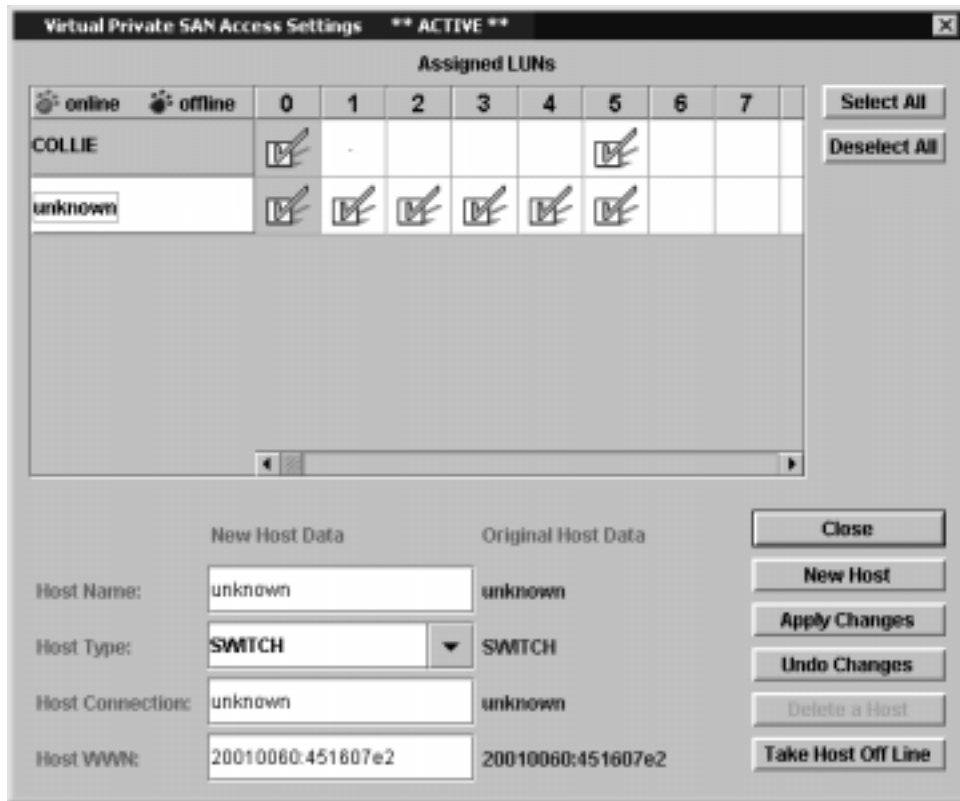


Figure 6-14: Changing Access Permissions

You can use the scroll bar below the squares to scroll right or left and locate the desired LUN. You can use the scroll bar at the right of the squares to scroll up or down and locate the desired host.

Note: You can create combinations of “exclusive” and “shared” access to LUNs from different HBAs installed in the same host.

You can enable host access to a LUN by pointing the mouse to the specific empty square in the Assigned LUNs area and clicking. Checkmarks in the Assigned LUNs area indicate that access is enabled between the LUN and corresponding host. If you change your mind, you can click the square again and the checkmark will be removed.

You can disable host access to a LUN by pointing the mouse to the specific checkmarked square and clicking. If you change your mind, you can click the square again and the checkmark will reappear.

After you have finished assigning the desired access privileges, you can press the **Apply Changes** button and the new settings will take effect immediately.

You can press the **Undo Changes** button to abort your changes.

You can press the **Close** button to return to the main screen.

Note: You have to reboot the hosts or use some other host method to rescan for devices before the host can see new devices.

Determining LUN Assignments

You can expand the tree to display SCSI Channel storage devices and determine their assigned LUNs. Figure 6-15 shows the Assigned LUN for the selected SCSI device on SCSI Channel 3.

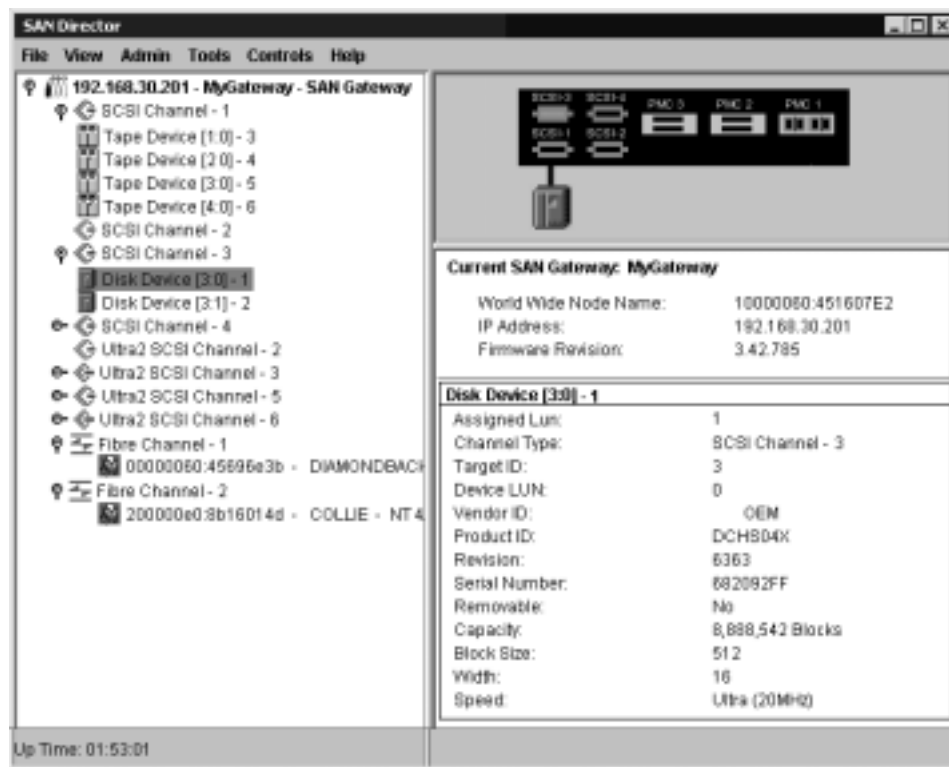


Figure 6-15: Determining the Assigned LUN

The Assigned LUN is displayed below Disk Device description on the right side of the screen. In the above example, the assigned LUN for the selected disk device is 1.

Adding and Removing Hosts

After VPS is already 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. VPS 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, go to the section “Attaching a New Host to the SAN,” below. Otherwise, if you want to configure VPS before attaching the host, go to the section “Adding a Host Before Attaching it to the SAN” on page 144.

Attaching a New Host to the SAN

When you attach a new host to the SAN, VPS automatically detects the host and adds it to the VPS database. When you connect or refresh the ADIC Gateway from the ADIC Management Console, you can see the new host in the VPS Access Settings window. If the Host Registration Service is running on the host, VPS automatically obtains the host parameters. If the Host Registration Service is not running on the host, VPS 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, refer to the section “Installing the Host Registration Service” on page 66.
3. If you need to determine LUN assignments for the devices you want to assign to the new host, refer to the section “Changing Access Permissions” on page 140.
4. For further information about entering host parameters, refer to the section “Entering Host Parameters” on page 78.
5. Refer to the section “Changing Access Permissions” on page 140 to assign access permissions for the new host.
6. Save your configuration, as explained in “Save SAN Gateway Configuration” on page 90.
7. Verify that the new host has access to the assigned devices.

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. You add the host by pressing the **New Host** button in the VPS Access Settings window and manually entering the WWN and other parameters as shown in Figure 6-16.

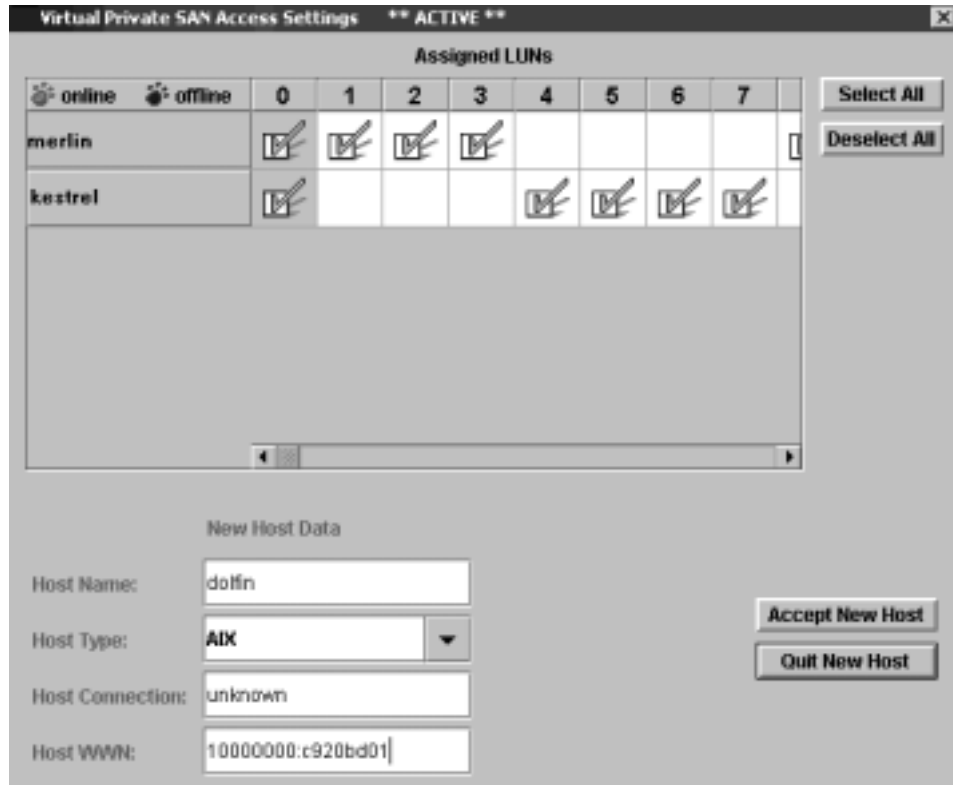


Figure 6-16: Adding a New Host

You must at least enter the Host WWN and Host Type. You can enter the other parameters if you know them or you can enter them at a later time. You can also let VPS automatically obtain the remaining parameters from the Host Registration Service at a later time. For further information about entering host parameters, refer to the section “Entering Host Parameters” on page 137.

When you are finished entering the host parameters, press the **Accept New Host** button.

If you press the **Quit New Host** button, VPS will discard all of the new host data.

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

Follow these steps to finish configuring VPS:

1. If you need to determine LUN assignments for the devices you want to assign to the new host, refer to the section “Determining LUN Assignments” on page 142.
2. Refer to the section “Changing Access Permissions” on page 140 to assign access permissions for the new host.
3. When you are ready to attach the new Host to the SAN, go to the section “Attaching a New Host to the SAN” on page 143.

Removing a Host from the SAN Configuration

You may want to remove a host from the VPS database. VPS will prevent you from removing a host that is online. Follow these steps to remove a host from the configuration.

1. Stop all I/O from the host to the ADIC Gateway and disconnect it, or shut down the host.

Attention: If the host is still attached and it performs an I/O to the ADIC Gateway or the Host Registration Service re-registers the host, you will not be able to remove the host from the VPS database.

2. From the ADIC Management Console, select the ADIC Gateway and expand the tree to display the Fibre Channel that the host is connected to. If the host status is “offline” go to step 3.

If the host status is “online” and the Host Registration Service was previously re-registering it periodically, you can refresh the ADIC Gateway and wait for VPS to automatically take the host “offline”. Otherwise, if you are sure that the host is not online you can manually take it offline.

3. From the Controls menu, select **Access Options > Virtual Private SAN** to display the VPS Access Settings Window.
4. If VPS displays the host online, you can press the **Take Host Off Line** button. Otherwise, if the host is already offline, press the **Delete Host** button and the host will be deleted from the database.

Combining VPS with Channel Zoning

Although it is possible to combine VPS and Channel Zoning, it is not recommended. VPS settings will not be in effect if any of the LUNs included in the VPS setting are on Channels that have been zoned out. No warning or Trap will be sent. 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.

Chapter 7: Installing and Using Virtual Private Map

This chapter introduces Virtual Private Map. It describes key features and functions and provides information on enabling and using VPM. This chapter is organized as follows:

- Introduction to Virtual Private Map
- Enabling Virtual Private Map
- Mapping Devices With VPM
- Removing Devices From VPM

Introduction to Virtual Private Map

- VPM is a software feature of the ADIC Gateway that allows any SAN device to map to any desired ID/LUN on a SCSI attached host. VPM's drag and drop interface allows mapping of FC devices to SCSI ID/LUNs. The system administrator uses the ADIC Management Console to administrate VPM and create a private device map.
- VPM expands the usefulness of legacy SCSI hosts in the new SAN infrastructure. It allows for the creation of independent private maps.
- VPM technology enables Storage Area Networks to create a daisy-chain of virtual, multiple SCSI devices connected to a single SCSI host.
- VPM is another method of access and security control in SAN, similar to VPS, and designed specifically for hosts connected to SAN via SCSI.
- VPM is completely host and device independent and requires no software components on the host.
- VPM manages access for hosts connected through SCSI interfaces to the ADIC Gateway. The ADIC Gateway supports up to 256 LUNs across all of its interfaces
- When you perform a "Save Configuration" from the ADIC Management Console, it saves both the persistent device map and the VPM database to a file. This allows all configuration settings to be loaded onto another ADIC Gateway in the event that the ADIC Gateway needs to be replaced.

Enabling Virtual Private Map

By default, VPM is not enabled. Virtual Private Map is an optional feature that requires you to enter a software license key to activate it. You may need to obtain the key where you purchased the ADIC Gateway. Use the Feature Enable option of the Controls menu to enable VPM. See “Feature Enable: Virtual Private Map” on page 96. If **Virtual Private Map** is grayed out on the Feature Enable submenu, VPM has already been enabled or is not available.

Note: If this feature is factory enabled, you can activate it by simply entering the word **enable** rather than an actual license key to activate it.

Mapping Devices With VPM

After you have finished assigning devices to a SCSI host channel, the devices will be immediately available to the host. Reboot the host, or use some other method to ensure the host rescans for devices.

Attention: Devices mapped to a particular host with VPM (or VPS) are available for mapping to other hosts via both the Assigned LUN column of the VPM window and the Assigned LUN checkboxes of the VPS Access Settings window. If multiple assignments are made, the system administrator should verify that the devices are intended to be available to more than one host.

Map Devices on a Fibre Channel to a SCSI Host

1. With the ADIC Gateway selected, choose **Feature Enable > Virtual Private Map** (see instructions on page 96). If this feature is unavailable or is already enabled, it will be grayed out on the menu.

2. After the VPM feature is enabled, select the SCSI channel where the host attaches and check the channel mode display in the right-hand panel to be sure it is set to Target. See Figure 4.

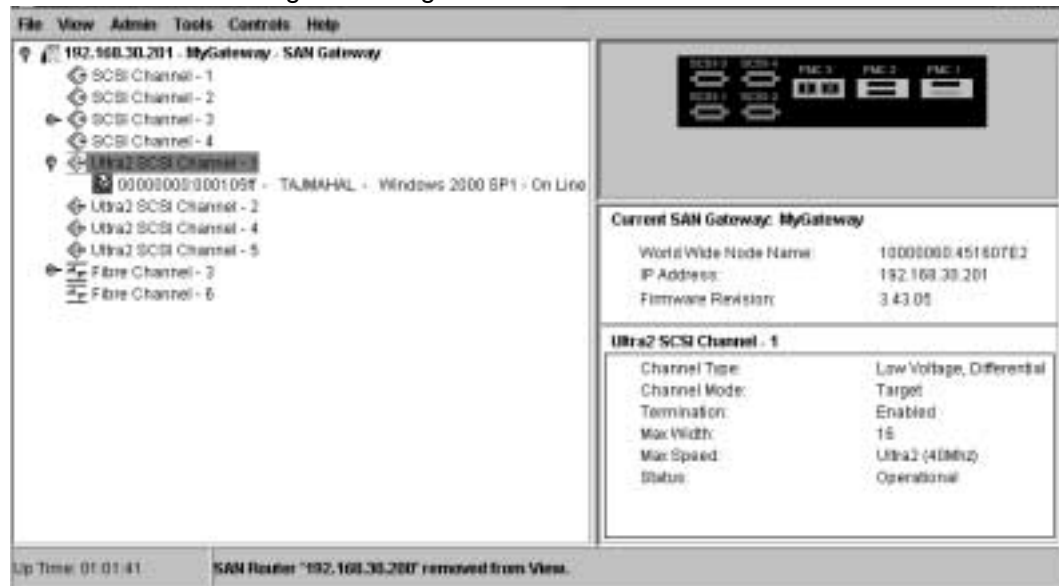


Figure 7-1:SCSI Channel Set to Target

3. If it is not, select the SCSI Channel, go to **Controls > SCSI Channel**, and choose the **Target** radio button. See “SCSI Channel” on page 105. Answer “yes” to both questions about resetting the channel.
4. After the channel has reset, select the ADIC Gateway and choose **View > Refresh San Gateway**. Expand the Fibre Channel with the devices that you want the SCSI host to access.
5. Select the SCSI channel in Tree View to verify Channel information. See Figure 4. In order for the ADIC Management Console to display a SCSI host, you must install the Host Registration Software. See “Installing the Host Registration Service” on page 123.
6. With the SCSI channel that is set to Target selected (in this example, Ultra2SCSI Channel 1, where the host attaches) go to **Controls > Access Options > Virtual Private Map**. A view of all available and mapped devices will be

displayed in the Virtual Private Mapping window. The Fibre Channel devices on Fibre Channel 3 in Figure 7-1 are displayed in Figure 7-2.

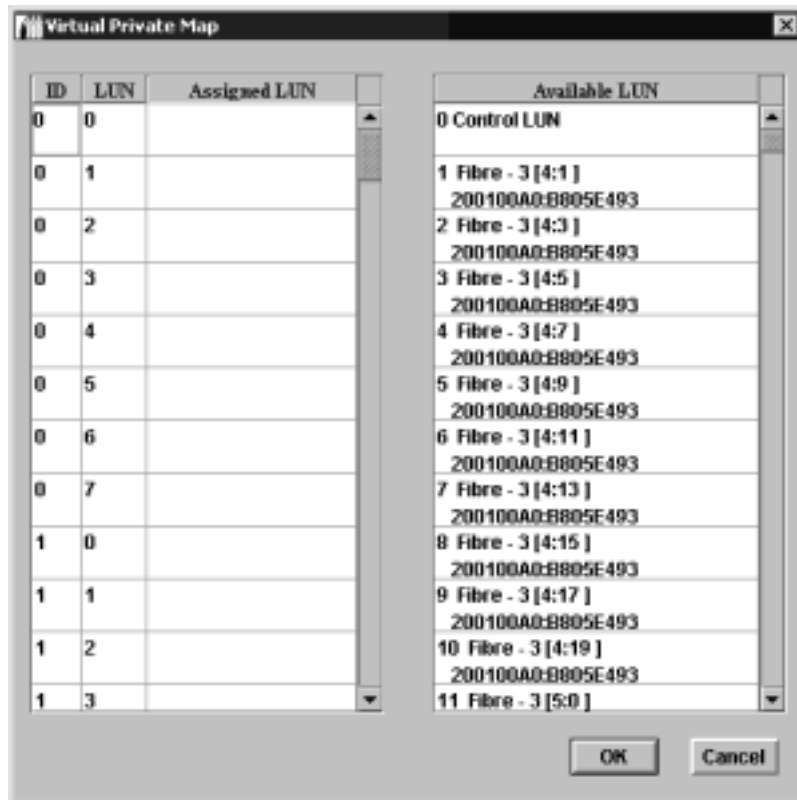


Figure 7-2:Initial VPM Mapping Window (Fibre Devices)

- In Figure 7-2 you can see how these devices look to the ADIC Gateway before they have been assigned to a SCSI host channel. LUN 0, shown in Figure 7-2, is reserved for the ADIC Gateway Command and Control LUN. When the Command and Control LUN is mapped, its Channel numbering convention follows a different numbering practice than the practice followed in Tree View. See “Channel Number Reference” on page 321.

The numbers in the first line of each Available LUN are to be read as follows: Starting in the right-hand panel, the first number is the LUN assignment from the ADIC Gateway’s persistent device map. “Fibre - 3”, for example, represents the ADIC Gateway Fibre Channel port where the device is attached. Inside the square brackets, the first number is the Target ID, and the second number is the Target LUN.

The unique World Wide Name of each device is displayed on the next line, unless the devices are attached to a multi-LUN device, e.g. a RAID controller. In that case, the WWN is the same for every device attached to the controller.

The Assigned LUN column of the VPM display provides map space for IDs 0-15 associated with the selected SCSI channel, LUNs 0-7 associated with each ID, and a box into which a device from the Available LUN column can be dragged and dropped in order to occupy a particular ID and LUN on the SCSI host channel.

Drag and drop the devices from the Available LUN column to the appropriate LUN in the Assigned LUN column. When a target device has been mapped, it appears gray in the Available LUN column. See Figure 7-3.

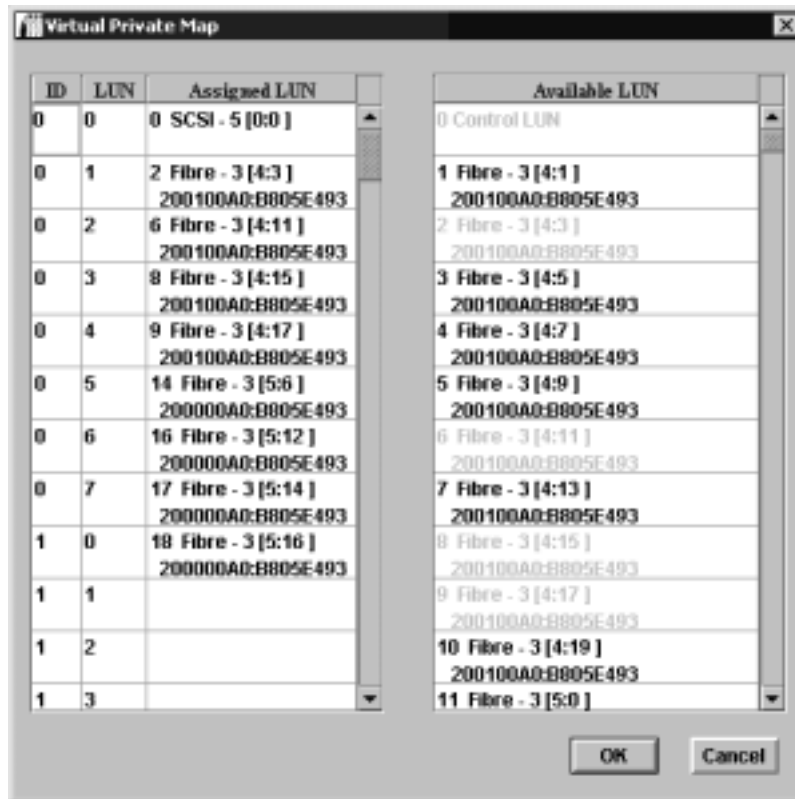


Figure 7-3:VPM Mapping Changes Made (Fibre Devices)

6. You must drag the Command and Control LUN over to the Assigned LUN column. For more information on Channel numbering, see “Channel Number Reference” on page 321.
7. When you are satisfied with the changes you have made to the device map, press **OK**. If you do not want to retain the map, press **Cancel**.
8. Reboot the host, or use some other method to ensure the host rescans for devices.

Map Devices on a SCSI Channel to a SCSI Host

1. With the ADIC Gateway selected, choose **Feature Enable > Virtual Private Map** (see instructions on page 96). If this feature is unavailable or is already enabled, it will be grayed out on the menu.
2. After the VPM feature is enabled, select the SCSI channel where the host attaches and check the channel mode display in the right-hand panel to be sure it is set to Target. See Figure 7-4.

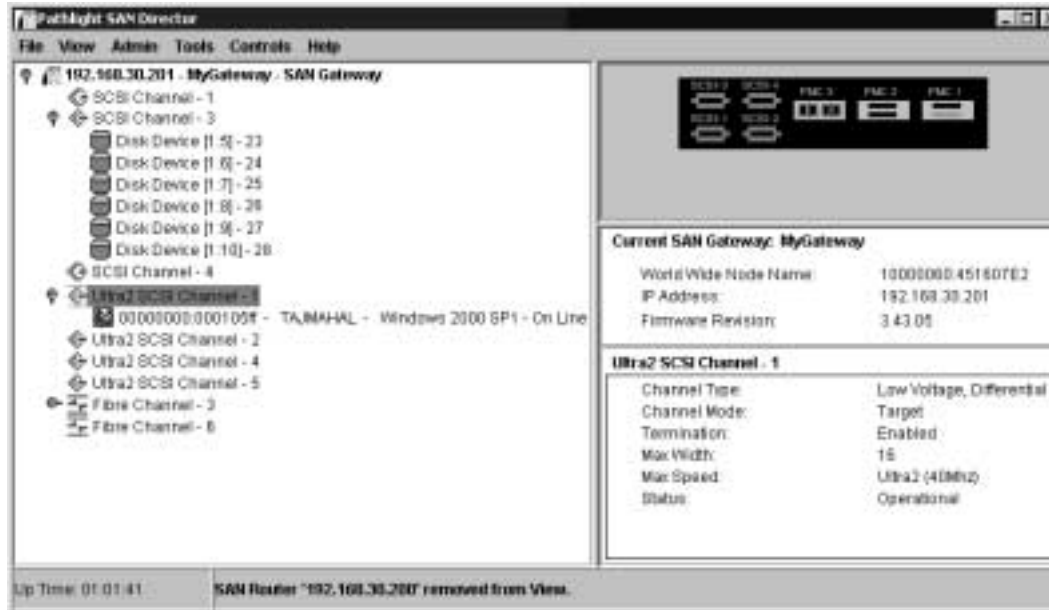


Figure 7-4:SCSI Devices Available for Mapping

3. If it is not, select the SCSI Channel, go to **Controls > SCSI Channel**, and choose the **Target** radio button. See "SCSI Channel" on page 105. Answer "yes" to both questions about resetting the channel
4. After the channel has reset, select the ADIC Gateway and choose **View > Refresh San Gateway**. Expand the SCSI Channel with the devices that you want the SCSI host to access. Select the SCSI channel in Tree View to verify Channel information.
5. In order for the ADIC Management Console to display a SCSI host, you must install the Host Registration Software. See "Installing the Host Registration Service" on page 123.
6. With the SCSI channel that is set to Target selected (in this example, Ultra2SCSI Channel 1, where the host attaches) go to **Controls > Access Options > Virtual Private Map**. A view of all available and mapped devices will be

displayed in the Virtual Private Mapping window. The SCSI devices shown in Tree View in Figure 7-4 are shown in the VPM window in Figure 7-5.

- In Figure 7-5 you can see how these devices look to the ADIC Gateway before they have been assigned to a SCSI host channel. You have to use the scroll bar to get down to the LUN numbers that they are using.

The numbers in the first line of each Available LUN are to be read as follows: Starting in the right-hand panel, the first number is the LUN assignment from the ADIC Gateway's persistent device map. The next number is the channel, e.g. "SCSI- 3." For more information on Channel numbering, see "Channel Number Reference" on page 321. Inside the square brackets, the first number is the Target ID, and the second number is the Target LUN.

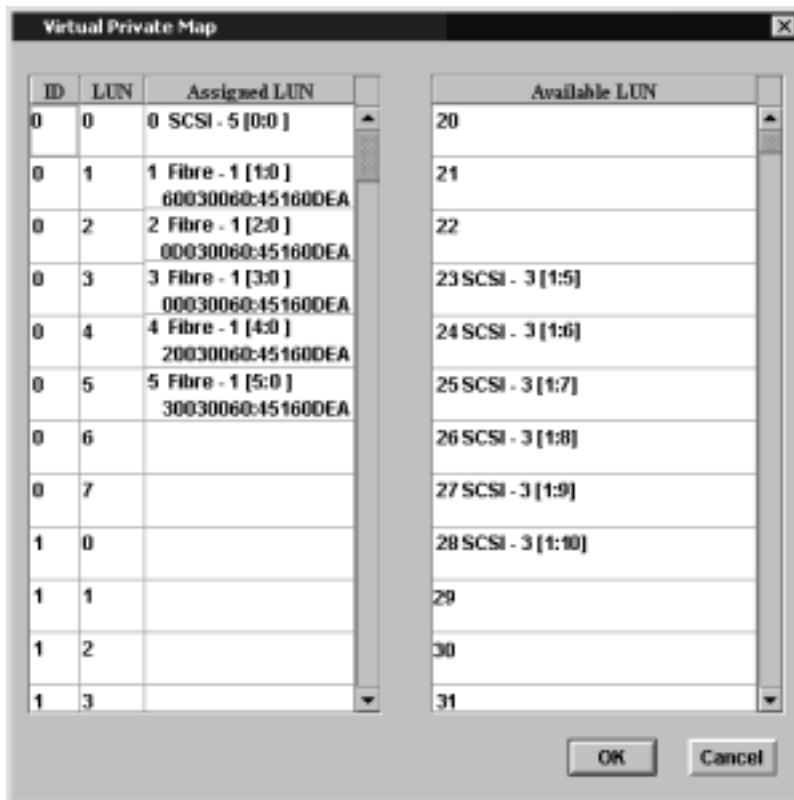


Figure 7-5:Initial VPM Mapping Window (SCSI Devices)

- The Assigned LUN column of the VPM display provides map space for IDs 0-15 associated with the selected SCSI channel, LUNs 0-7 associated with each ID, and a box into which a device from the Available LUN column can be dragged and dropped in order to occupy a particular ID and LUN on the SCSI host channel.

Drag and drop the devices from the Available LUN column to the appropriate

LUN in the Assigned LUN column. When a target device has been mapped, it appears gray in the Available LUN column (see Figure 7-6).

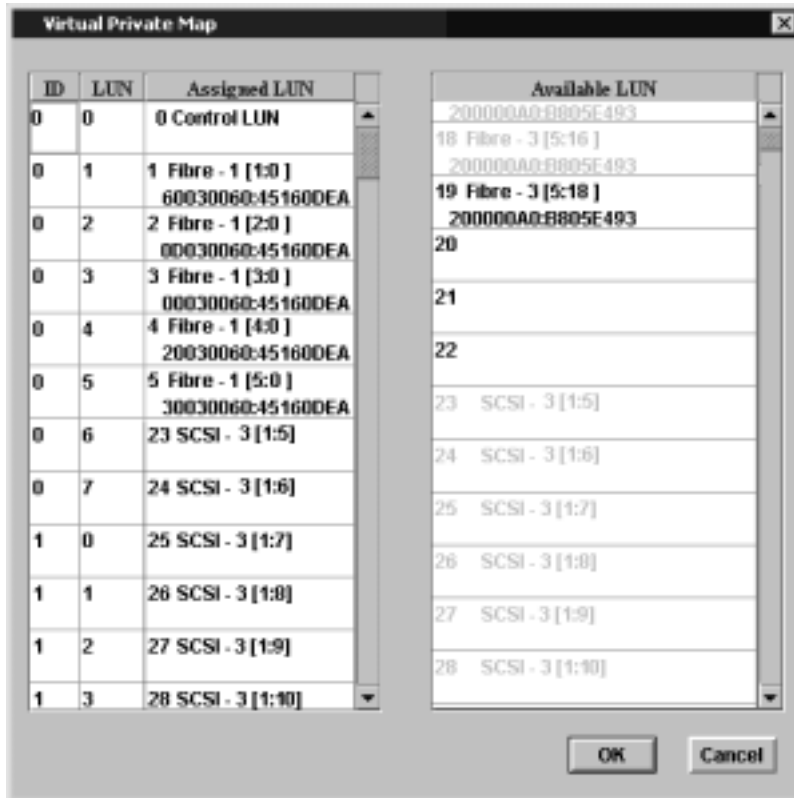


Figure 7-6:VPM Mapping Changes Made (SCSI Devices)

- The ADIC Gateway's persistent device map contains the product ID, Vendor ID and Serial Number of SCSI devices it knows about. This information can be read in the Data panel of the ADIC Management Console when the device is highlighted in Tree View (see Figure 7-4).

When the SCSI devices are read by VPM, only the assigned LUN, the SCSI channel, the target ID, and the target LUN are displayed (see Figure 7-5).

Figure 7-6 shows SCSI devices assigned to specific LUNs that the SCSI host has access to.

- You must drag the Command and Control LUN over to the Assigned LUN column. For more information on channel numbering, see "Channel Number Reference" on page 321.
- When you are satisfied with the changes you have made to the device map, press **OK**. If you do not want to retain the map, press **Cancel**.

9. Reboot the host, or use some other method to ensure the host rescans for devices.

Removing Devices From VPM

1. With the SCSI channel that is set to Target selected, go to **Controls > Access Options > Virtual Private Map**. The Virtual Private Mapping window will present its view of all available and mapped devices.
2. Select the device that you wish to become inaccessible to the SCSI host in the left-hand panel. Drag and drop it into the right-hand panel. See Figure 7-7.

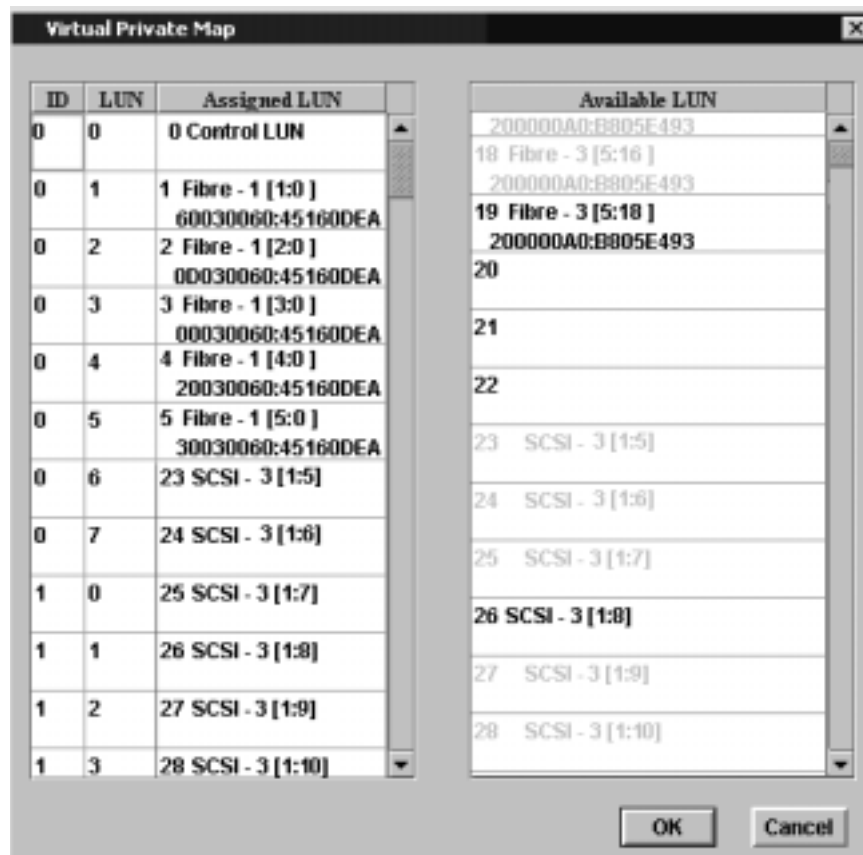
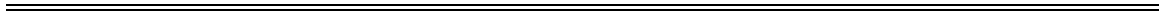


Figure 7-7: Device Removed From Virtual Private Map

3. Press **OK**.
4. When you are satisfied with the changes you have made to the device map, press **OK**. If you do not want to retain the map, press **Cancel**.
5. Reboot the host, or use some other method to ensure the host rescans for devices.



Chapter 8: Maintenance Action Plans

This section describes the maintenance action plan for the ADIC Gateway

Start MAP

Always start problem determination here and review the following steps. 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 217.

For the latest information on the ADIC Gateway, visit “Service and Support” at www.adic.com, or call the ADIC Technical Assistance Center at 1-800-827-3822.

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. If the event code or error symptoms are known, go to the “Service Reference Table” on page 161 with that event code or symptom, and perform the recommended action.

Visually Inspect LEDs

Observe front-panel ADIC Gateway LED status indicators and check against the “Service Reference Table” on page 161. For more information about expected LED behavior, see “LED Indicators” on page 19.

If the **RDY** LED is flashing as expected but the SCSI, Ethernet and SAN Connection LEDs are off, the ADIC Gateway may have been left in diagnostic mode. The device drivers for SCSI, Fibre Channel and Ethernet interfaces are disabled when in diagnostic mode. If the command prompt on the service terminal is `diagmode >`, return the ADIC Gateway to normal mode by entering the `normalBoot` command on the service terminal (see “Boot Modes” on page 295).

Check for Problems on Attached SCSI Devices

Check the following on the SCSI devices to determine whether they are the source of the problem:

- LEDs
- Display panels
- Firmware levels
- Operability

Check FC Host Versions

For an updated list of supported ADIC Gateway host platforms and Fibre Channel Host Bus Adapters, visit “Service and Support” at www.adic.com, or call the ADIC Technical Assistance Center at 1-800-827-3822.

You’ll need to determine the following:

- 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.

Check ADIC Gateway Product Versions

For an updated list of required updates, visit “Service and Support” at www.adic.com, or call the ADIC Technical Assistance Center at 1-800-827-3822.

1. If the ADIC Management Console application is in use, use the **Help > About** menu in the ADIC Management Console to determine its software version. If an update is needed, download the update from the Web site and perform the update.
2. To check the firmware version, start the ADIC Management Console and connect to the ADIC Gateway. When the initial Tree View appears, choose the ADIC Gateway and then read the firmware version from the right-hand panel of the display.

If the client application is not available, use the `version` command from the service terminal to determine the firmware version (see the “`version`” command on page 283). If an update is required, download the update from the Web site and perform the update.

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3. Hardware version information is viewed by using the `sysVpdShow` command from the service terminal. If your service representative determines that the hardware version is at issue in your situation, you may need to use the "`sysVpdShow` or `sysVpdShowAll`" command on page 277.

Check Event Log

For information on accessing the Event Log, see "Events" on page 85. Go to **Tools > Events > View Event Log**.

When viewing the log, set the viewing level to **Warning**. A message that looks like:

```
000001 0185 0d:00h:00m:05s:15t -- NOTICE: LOGGING STARTED
```

should be in the list. If not, then continue viewing the event log until the start message can be found in the log. If this start message cannot be found, then use the log message with the lowest sequence number (the first number on the display line) as the start of the current log.

Check the event codes against the "Service Reference Table" on page 161. If there are no abnormal events, go to "Perform Health Check" on page 159.

If the client application is not available, use the `loggerDumpCurrent 2` command from the service terminal. See the "`loggerDump [number]`" command on page 252. Check the event codes against the "Service Reference Table" on page 161. To see additional log messages, follow the procedure "Event Log Dump" on page 297. If there are no abnormal events, go to "Perform Health Check," on page 159.

Quick Component Check

From the service terminal, enter the `showBox` command. See the "`showBox`" command on page 273. 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 MAP" on page 171. If the DDF board is missing, see "DDF Board MAP" on page 185. If a Fibre Channel is missing, go to "Fibre Channel MAP" on page 178.

Perform Health Check

1. If the ADIC Management Console application is in use, see "Health Check" on page 82.
2. Go to **Tools > Health Check > Setting Health Check**
3. On the Level tab of the Health Check Setting dialog box, choose the **Device Ready** radio button.

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4. Go to **Tools > Health Check > Setting Health Check > Perform Health Check**.
 5. Write down the event codes reported by the Health Check procedure.
 6. If Health Check cannot be performed using the client application, use the `hlthChkNow` command from the service terminal. See also “Manual Health Check” on page 296”.

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 178.

Service Reference Table

Review all visual observations and event codes against the following table. Numerical equivalents for the Event Viewing Levels are shown in Table 8-1.

Table 8-1: 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

Default Trap Threshold settings, displayed in column 3 of Table 8-2, are explained in “Events” on page 85. Make a list of the recommended Action numbers from column 5 of Table 8-2. Where multiple action numbers are shown, more than one action may be required to determine the problem. Look at the Table 8-3 and follow the appropriate action.

Table 8-2: Service Reference Table

Event Code	Viewing Level	Default Trap Threshold	Description	Action
			Visual Observations	
N.A.	N.A.	N.A.	All LEDs are off	5
N.A.	N.A.	N.A.	READY LED not blinking once per second after power has been on for one minute	3, 14
N.A.	N.A.	N.A.	Temperature Warning LED on	4
N.A.	N.A.	N.A.	Temperature Alarm LED on	4
N.A.	N.A.	N.A.	ADIC Gateway not responding	3, 6, 14
N.A.	N.A.	N.A.	Persistent reboots	3
N.A.	N.A.	N.A.	Host application error message or host log entry indicates SCSI target error	12
N.A.	N.A.	N.A.	Host cannot access attached devices	12
N.A.	N.A.	N.A.	SAN Connection LED off although cables are attached and host systems are on and have booted	2
N.A.	N.A.	N.A.	Heartbeat failure	7
N.A.	N.A.	N.A.	fcShow command returns Firmware State = Sync Lost	2,0
N.A.	N.A.	N.A.	ADIC Management Console failure	7
N.A.	N.A.	N.A.	Service terminal connection failure	8

Table 8-2: Service Reference Table

Event Code	Viewing Level	Default Trap Threshold	Description	Action
			Generic Event Descriptions	
8	2	0	Sense data recorded following a check condition NOTE: 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	1, 2
11	1	1	ADIC Gateway reports a temperature change (event message indicates the change to High, Very High, Reduced, to High, or OK)	4
13	1	1	ADIC Gateway 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	Fibre Channel interface reports a LIP reset was received from a host	0, 2
18	1	1	Fibre Channel interface reports a system error	2
19	1	1	Fibre Channel interface reports an error processing a request	2
20	1	1	Fibre Channel interface reports an error processing a response	2

Table 8-2: Service Reference Table

Event Code	Viewing Level	Default Trap Threshold	Description	Action
21	1	1	ADIC Gateway processor memory fault detected	6,3,2,1,
22	1	10	Fibre Channel interface detected a LIP	2
23	2	0	Fibre Channel interface reports a loop up	0
24	2	0	Fibre Channel interface reports a loop down	0
25	1	1	ADIC Gateway PCI bus parity error detected	6,3,2,1
26	1	1	ADIC Gateway PCI interface error detected	6,3,2,1
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
29	1	1	ADIC Gateway has added a device to its configuration table NOTE: The trap is held off until the ADIC Gateway has been up for 60 seconds	0
30	1	1	ADIC Gateway has removed a device from its configuration	0,1,2
31	2	0	ADIC Gateway logging service has started	0
33 ¹	1	1	An interface has detected a bus fault (event message indicates the specific interface)	1,2

Table 8-2: Service Reference Table

Event Code	Viewing Level	Default Trap Threshold	Description	Action
34 ¹	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	Fibre Channel Port Database change detected	0
38	1	1	An error was detected on the DDF memory board	6
39	1	1	Directory Server on Fabric has changed	0
40	1	1	Maximum LUN limit has been exceeded	10
41	1	0	Fibre Channel transfer failure (NOTE: error recovery may have succeeded)	0
42	1	1	Maximum device limit has been exceeded (persistent Address Map database is full)	11
43	1	1	Fibre Channel 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

Table 8-2: Service Reference Table

Event Code	Viewing Level	Default Trap Threshold	Description	Action
60	1	1	Power has entered Alarm Range	5
61 ²	1	1	Inlet Air, Outlet Air, or I/O Processor temperatures have entered Nominal Range from a Warning or Alarm Range	0
62 ²	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
64 ²	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
69	2	1	ECC Memory Error	6
70 ³	1	1	Firmware upload completed	0
71 ³	1	1	ADIC Gateway restart completed	0

Table 8-2: Service Reference Table

Event Code	Viewing Level	Default Trap Threshold	Description	Action
72	1	1	Maximum number of initiators has been exceeded	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	Fibre Channel 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	Fibre Channel link status changed	0,2
111	1	1	Fibre Channel transfer failures detected since the last report NOTE: 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
114	1	1	Temperature is running in Warning or Alarm Range	4

Table 8-2: Service Reference Table

Event Code	Viewing Level	Default Trap Threshold	Description	Action
115	1	1	Network is running at 10 Mbits/sec	7
			<p style="text-align: center;">Heartbeat Event Descriptions</p> <p>NOTE: These event codes are not logged in the Event Log. Notification of these events occurs from the ADIC Management Console</p>	
200 ³	N.A.	N.A.	The Server could not verify the connection to the ADIC Gateway	7,3
201 ³	N.A.	N.A.	The Client could not communicate with the Server	7,9
202 ^{3,4}	N.A.	N.A.	The Server could not communicate with the Client	7,9
203 ^{3,5}	N.A.	N.A.	Heartbeat communication restored	0
<p>¹Check the Event Log to find out which interface (FCAL or SCSI) caused this event. Then use the appropriate action number.</p> <p>² This trap signals a change in state. A string sent with the trap will indicate the nature of the previous state.</p> <p>³ Events not logged in ADIC Gateway Event Log.</p> <p>⁴ Not Reported. View the Server Log.</p> <p>⁵ Event reported only when ADIC Management Console 2.7 or higher is running.</p>				

Table 8-3: Action Reference Table

Action Number	Action
0	No action necessary
1	Go to "SCSI MAP" on page 171

Table 8-3: Action Reference Table

Action Number	Action
2	Go to “Fibre Channel MAP” on page 178
3	Go to “ADIC Gateway MAP” on page 182
4	Go to “Temperature MAP” on page 184
5	Go to “Power MAP” on page 184
6	Go to “DDF Board MAP” on page 185
7	Go to “Ethernet MAP” on page 187
8	Go to “Service Port MAP” on page 191
9	Contact your network administrator
10	Reduce the number of target devices attached to the ADIC Gateway
11	Go to “Database Full MAP” on page 168
12	Go to “Device Access MAP” on page 169
13	Go to “Retrieving the Code 43 Dump File” on page 297
14	Go to “Data Path Protection MAP” on page 192

Database Full MAP

These steps are performed if Event Code 42 is reported indicating the persistent address map database is full (more than 255 devices are in the database).

If the database has no room for a newly detected device, the new device will not be mapped (assigned a LUN). The database can become full if there are more devices attached than there were previously or if devices were moved to different ports or channels. You can free up database entries that are no longer needed, but keep the devices that are currently attached at the same assigned LUNs.

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

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1. Connect the service terminal to the Service Port (see “Connecting to the Service Port” on page 217).
 2. Press the `Enter` key on the service terminal. If the prompt is not displayed, go to “Service Port MAP” on page 191 to determine whether the RS-232 cable and service terminal are working properly.
 3. From the service terminal, enter the `mapShowDatabase` command to display the contents of the database (see “Service Port Command Reference” on page 223”).
 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 ADIC Gateway.
 7. After the ADIC Gateway has finished booting, repeat steps 3 and 4 to verify that all attached devices have been mapped.

Device Access MAP

These steps are performed if a host is not able to access SCSI or Fibre Channel devices.

1. Connect the service terminal to the Service Port (see “Connecting to the Service Port” on page 217).
2. Press the `Enter` key on the service terminal. If the prompt is not displayed, go to “Service Port MAP” on page 191 to determine whether the RS-232 cable and service terminal are working properly.

Check Fibre Channel Port Status

1. Enter the `fcShow` command from the service terminal (see “Service Port Command Reference” on page 223). If the `fcShow` command does not display a Firmware State of **Ready** for the attached Fibre Channel SAN connections, go to “Fibre Channel MAP” on page 178.
2. The ADIC Gateway Fibre Channel ports are set by default to **Target** mode. If the port mode for the host connection was changed to Initiator from the ADIC Management Console, the host will not be able to see the SCSI devices. Verify that the port mode was not inadvertently changed using the ADIC Management Console **Controls > Fibre Channel** menu. See “Fibre Channel” on page 108.

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3. If the host attached to a SAN connection is not able to access a Fibre Channel device on another SAN connection, then go to “Check Fibre Channel Initiator Port Mode” on page 170.

Check SCSI Channel Devices

1. Enter the `scsiShow` command from the service terminal. If all of the attached SCSI devices are not displayed, go to “SCSI MAP” on page 171.

Check Channel Zoning Settings

1. Enter the `fcShowDevs` command from the service terminal. Look at the display for each Fibre Channel interface. If all of the SCSI devices are displayed under each Fibre Channel interface, then host access to SCSI devices is not being restricted by Channel Zoning. Go to “Check Virtual Private SAN Access Settings”.
2. If you want to modify Channel Zoning settings, you can use the ADIC Management Console **Controls > Access Options > Channel Zoning** menu to change the settings. See “Access Options: Channel Zoning” on page 98. The ADIC Management Console allows every combination of Channel Zoning settings.

Check Fibre Channel Initiator Port Mode

The port mode of the Fibre Channel that the target devices are attached to must be set to Initiator or Target and Initiator mode. If the port mode is set to Target, the ADIC Gateway will not see the target devices. Verify the port mode using the ADIC Management Console **Controls > Fibre Channel** menu. See “Fibre Channel” on page 108

Check Virtual Private SAN Access Settings

1. Enter the `vpsShow -1` command from the service terminal (see “Service Port Command Reference” on page 223)
2. If “VPS Feature NOT Enabled” is displayed, then VPS is not controlling access between the host and target devices. Exit this MAP.
3. If “VPS State: Active” is displayed, then VPS is controlling access between the host and the target devices. Use the ADIC Management Console **Controls > Access Options > Virtual Private SAN** menu to verify the host and target device access settings. If the ADIC Management Console is not available, you can temporarily make VPS inactive to verify that the host can access all devices by proceeding to step 4.
4. Shut down all of the hosts.

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5. Enter the `vpsInactiveSet` command from the service terminal.
 6. Startup one of the hosts.
 7. If the host can access all of the target devices, shut down the host and repeat steps 6 and 7 for each of the other hosts.
 8. If each host can access all devices then there is a problem with the Virtual Private SAN Access settings. Go to step 10.
 9. If the host cannot access all of the target devices, then there is a problem with the devices or their SAN connections. After you resolve the problem, proceed to step 10.
 10. Shut down all of the hosts.
 11. Reactivate Virtual Private SAN by entering the `vpsActiveSet` command from the service terminal.
 12. Use the ADIC Management Console **Controls > Access Options > Virtual Private SAN** menu to verify the host and target device access settings.
 13. Restart the hosts and verify that each host can access the devices that have been assigned by VPS.

SCSI MAP

These steps are performed 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 ADIC Gateway SCSI Information

1. Connect the service terminal to the Service Port (see See “Connecting to the Service Port” on page 217)
2. If the ADIC Gateway is off, then turn it on and wait until the ADIC Gateways **Ready** LED is blinking once per second.
3. As the ADIC Gateway is booting, several status messages should be displayed on the service terminal. If no status messages are displayed, go to “Service Port MAP” on page 191 to determine whether the RS-232 cable and

service terminal are working properly. Otherwise, look for the last status message “Done executing startup script”.

4. Enter the `showBox` command from the service terminal (see See “Service Port Command Reference” on page 223)
5. Write down the information for each SCSI channel (e.g., “SCSI -1 requires Low Voltage Differential cable”).
6. If the SCSI interfaces are not all displayed, replace the ADIC Gateway. Go to “Final Diagnostic Tests” on page 208.Fill it out and return it with your unit.
7. If they display properly, go to “Check Attached SCSI Devices from the Service Port,” in the next section.

Check Attached SCSI Devices from the Service Port

Attention: The ADIC Gateway supports up to 256 LUNs. If more than 256 LUNs are attached this will result in unreliable behavior. Only 255 LUNs are available to the user, for the ADIC Gateway takes up one LUN (0) as its Command and Control LUN.

1. Issue the `scsiShow` command from the service terminal to display a list of attached SCSI devices (see “Service Port Command Reference” on page 223).
2. For each SCSI channel, make a list of attached devices (SCSI device ID, manufacturer, device status/flags). Go to “Compare List versus Physical Devices” below.

Compare List versus Physical Devices

For each SCSI channel (starting with channel 1), perform the following:

1. Compare the list of attached devices with the physical devices. If all of the physical devices were not shown, go to “Check SCSI Bus Termination” below.
2. Go to “Compare Listed versus Supported Devices.”

Compare Listed versus Supported Devices

1. Compare the attached SCSI devices to the list of supported devices found on the Web site. Write down any devices that are not supported and report them to the system administrator for possible replacement.

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

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-
2. If the attached SCSI devices are all supported devices, go to “SCSI Loop Back Test” on page 175.

Check SCSI Bus Termination

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

For each SCSI device attached to the questionable SCSI channel:

1. Verify the termination.

The ADIC Gateway has internal terminators on its SCSI channels. The terminators can be disabled from the ADIC Management Console. Use the **Controls > SCSI Channel** menu to verify that termination has not inadvertently been disabled.

2. The last physical device on a chain of SCSI devices needs to be terminated.
 - If the end device has internal termination, make sure that is enabled. Otherwise, check that an external terminator is attached to the end 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. Verify the type of terminators for each SCSI channel.
3. Excessive termination: Check that all SCSI devices other than the end devices have internal termination disabled.
4. If SCSI termination is OK, go to “Check for Multiple SCSI IDs” below.
5. If you corrected a SCSI termination problem, turn the ADIC Gateway back on. After the ADIC Gateway finishes booting, enter the `scsiShow` command from the service terminal. Compare the list of attached devices with the physical devices. If not all of the physical devices are shown, go to “Check for Multiple SCSI IDs” below. Otherwise, go to “SCSI Health Check” on page 175.

Check for Multiple SCSI IDs

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

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 ADIC Gateway. Data transfers to that device will be unreliable.

1. Write down the SCSI IDs of all devices connected to each SCSI channel.

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2. Check that only one device is set to each ID for each SCSI channel.
 3. If a target device is set to the same ID as the ADIC Gateway (ID 7), the bus will be unstable and data corruption may result.
 4. Check that for each SCSI Channel, no devices are set to ID 7 (except the ADIC Gateway channel ID).
 5. If you do not need to correct any SCSI IDs, go to “Improper Device Type”.
 6. Assign a new SCSI ID to the target device.
 7. Reboot the ADIC Gateway. After it finishes booting, enter the `scsiShow` command from the service terminal. Compare the list of attached devices with the physical devices. If not all of the physical devices were shown, go to “Improper Device Type”. Otherwise, go to “SCSI Health Check” on page 175.

Improper Device Type

Attention: Only high voltage differential-ended devices must be attached to ADIC Gateway high voltage differential SCSI channels and only low voltage differential devices must be attached to low voltage differential SCSI channels.

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

1. When a mix of Ultra 2/3 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 Ultra 2/3 SCSI and Ultra SCSI devices on the same bus.
2. If you do not have to replace an improper device, go to “Examine SCSI Cables”.
3. Replace the improper SCSI device with a proper device. Reconnect the SCSI cable.
4. Turn on the ADIC Gateway. After the ADIC Gateway finishes booting, enter the `scsiShow` command from the service terminal. Compare the list of attached devices with the physical devices. If not all of the physical devices are shown, go to “Examine SCSI Cables”. Otherwise, go to “SCSI Health Check” on page 175.

Examine SCSI Cables

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

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1. Look for damaged cables. Check for breaks in the cable jacket, exposed or frayed cable shield, exposed or broken wires. Replace any damaged cables.
 2. 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. Replace any that are not.
 3. 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. Replace any cables that do not match.
 4. Check for unshielded cables. An unshielded SCSI cable used external to a cabinet may cause reliability problems, due to interference from other electrical devices. Replace all unshielded cables.
 5. Go to “Examine SCSI Connectors”.

Examine SCSI Connectors

Attention: Before removing a SCSI cable, all I/O to the ADIC Gateway must be stopped and the ADIC Gateway must be turned off.

1. The pins in the SCSI connectors are somewhat fragile. Inspect each connector to find pins that were bent when the connector was attached. Replace any cables that have bent pins.
2. If you did not have to replace or re-secure a SCSI cable, go to “SCSI Loop Back Test”.
3. If you replaced or re-secured a SCSI cable, turn on the ADIC Gateway. After it finishes booting, enter the `scsiShow` command from the service terminal. Compare the list of attached devices with the physical devices. If not all of the physical devices are shown, go to “SCSI Loop Back Test”. Otherwise, go to “SCSI Health Check”.

SCSI Health Check

1. Perform a Health Check and check the event log for SCSI errors (see “Perform Health Check” on page 159 and “Check the Host Event Log” on page 160).
2. If errors are still indicated, go to “SCSI Loop Back Test” below.
3. If no errors are reported, exit this MAP.

SCSI Loop Back Test

Attention: Before performing diagnostics, all FC and SCSI cables

must be disconnected from the ADIC Gateway.

Before changing any SCSI cables, all I/O to the ADIC Gateway must be stopped and the ADIC Gateway 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 ADIC Gateway command prompt on the terminal is not `diagmode >`, enter the `diagBoot` command on the service terminal (see “Diagnostic Command Reference” on page 295).
2. Power the ADIC Gateway off.
3. In addition to the suspect SCSI channel, choose one of the other SCSI channels to use for the loop back test.
4. Mark and remove attached cables.
5. Connect a short SCSI loopback test cable to the two SCSI channels. An appropriate SCSI loopback cable is included in the CE Tool Kit.
6. Turn the ADIC Gateway on and wait for the ADIC Gateway to finish booting.
7. Enter the `scsiChannelTest(1,2)` command (see “Service Port Command Reference” on page 223). The following example shows a loop back test on SCSI channels 1 and 2.

```
diagmode > scsiChannelTest 1,2
SCSI-1 -> SCSI-2 [#####] 151 iterations
SCSI-2 -> SCSI-1 [#####] 151 iterations
PASSED
value = 0 = 0x0
```

8. If the ADIC Gateway returns a FAILED status, go to “Check DDF Interactions” on page 178.
9. If the ADIC Gateway returns a PASSED status, go to “Testing SCSI Cables”.

Testing SCSI Cables

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

1. Stop all I/O to the ADIC Gateway.
2. Connect the terminal to the Service Port. See “Connecting to the Service Port” on page 217.

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3. If the ADIC Gateway's command prompt on the terminal is not `diagmode >` place the ADIC Gateway in diagnostic mode (see "Diagnostic Command Reference" on page 295).
 4. Turn off the ADIC Gateway.
 5. Draw a diagram of the devices and their connections to the SCSI channels.
 6. Remove the cable from one attached SCSI device, and attach it as a loop back cable to the ADIC Gateway.
 7. Power on the ADIC Gateway.
 8. When the ADIC Gateway finishes 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.
 9. If the ADIC Gateway returns a FAILED status, the cable is faulty and must be replaced.
 10. If the ADIC Gateway returns a PASSED status, go to "Isolating SCSI devices" and try to isolate bad devices on the SCSI bus.

Isolating SCSI devices

1. Restore the ADIC Gateway to normal operation (see "Restoring Normal Mode" on page 296).
2. Perform this step for each SCSI device that was found missing in "Compare List versus Physical Devices" on page 172.
3. Turn off the ADIC Gateway.
4. Remove all devices from the SCSI buses.
5. Attach ONLY the device in question to the SCSI channel it was originally connected to (refer to the list made in "Check for Multiple SCSI IDs" on page 173) using a known-good SCSI cable and terminators.
6. Turn on the ADIC Gateway and wait for it to finish booting.
7. Enter the `scsiShow` command from the service terminal and verify the device's presence.
8. If the device is missing, then 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, then perform a health check (see "Perform Health Check" on page 159).

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10. Review the host event log (see “Check the Host Event Log” on page 160).
 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” below.

Check DDF Interactions

1. With the SAN Gateway on and booted, type the `ddfTest` command. The test should return either a pass or fail status. If the DDF does not return a PASSED status, replace it (go to “Removing and Installing the DDF Board” on page 204).
2. If the DDF passed, replace the SAN Gateway base (go to “Prepare the New Base Unit” on page 206).

Restore SCSI Setup

1. Turn off the ADIC Gateway.
2. Reconnect all available SCSI devices to their proper channel assignments (either their original configuration, or with any changes made per this MAP).
3. Turn on the ADIC Gateway and wait for it to finish booting.
4. If the ADIC Gateway is in diagnostic mode (command prompt = `diagmode >`), then restore normal operation (see “Restoring Normal Mode” on page 296).
5. Perform a health check (see “Perform Health Check” on page 159).
6. Review the host event log (see “Check the Host Event Log” on page 160).
7. If all attached SCSI devices and cables are determined to be good, yet SCSI errors persist, then replace the ADIC Gateway. Go to “Final Diagnostic Tests” on page 208. Fill it out and return it with your unit.
8. Exit this MAP.

Fibre Channel MAP

These steps are performed if

- The Fibre Channel interface reports a reset or system error
- The Fibre Channel interface reports an error processing a request

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- or response
 - The Fibre Channel interface reports an excess of 10 LIPs in a 10-minute interval
 - Other Fibre Channel errors reported
 - FC connection LED is off

Verify Fibre Channel Connections

1. Connect the service terminal to the Service Port (see “Connecting to the Service Port” on page 217).
2. Press the **Enter** key on the service terminal. If the prompt is not displayed, go to “Service Port MAP” on page 191. To determine whether the RS-232 cable and service terminal are working properly.
3. From the service terminal, enter the `showBox` command (see “Appendix B: Service Port Command Reference”).
4. Confirm that the Fibre Channel connections are correctly displayed. If `showBox` displays the PMC cards correctly, go to “Examine Cables” below.
5. If the Fibre Channel connections do not display correctly in the `showBox` display, go to “Testing DDF with PMC Cards Removed” on page 187.

Examine Cables

Attention: If in this procedure, you need to remove or replace the Fibre Channel cable, you must stop I/O at the Fibre Channel 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 Fibre Channel cards and cable ends.
4. Reconnect the cables.
5. Perform “Perform Health Check” on page 159.
6. If errors persist, go to “Check Optical Cable Type” on page 179.

Check Optical Cable Type

The optical cable diameter is important for long wave Fibre Channel optical transceivers. Short wave PMCs will function with any cable diameter (though not necessarily all lengths). The cable diameter is expressed as the ratio of the diameter of its fiber core over the diameter of the protective cladding.

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1. Write down the core/cladding diameter printed on the cable jacket. Also write what Fibre Channel port it was plugged into.
 2. For each Fibre Channel that is listed as FCOLW, check the core/cladding diameter on the jacket. Only cables with 9/125 diameter are acceptable. Replace any 50/125 or 62.5/125 cables with the 9/125 rating, then retest (see “Perform Health Check” on page 159).
 3. If the problem is not resolved, go to “Fibre Channel Loop Back Test” below.

Fibre Channel Loop Back Test

Attention: Before performing diagnostics, the Fibre Channel cables must be removed from the ADIC Gateway. All I/O to the ADIC Gateway must be stopped.

1. Attach the Fibre Channel loop back plug provided in the Service Tool Kit to the Fibre Channel port.
2. If the front-panel FC Connection Status LED is not on, replace the ADIC Gateway. Go to “Final Diagnostic Tests” on page 208. Fill it out and return it with your unit.
3. If the ADIC Gateway command prompt on the service terminal is not `diagmode >`, place the ADIC Gateway in diagnostic mode (see “Diagnostic Command Reference” on page 295). Wait for the ADIC Gateway to finish booting.
4. Substituting the Fibre Channel slot number for *x*, from the service terminal enter the `fcSlotTest x` command (see Appendix C, “Diagnostic Command Reference”). If the test failed, replace the ADIC Gateway. Go to “Final Diagnostic Tests” on page 208. Fill it out and return it with your unit.
5. If the test passed, the Fibre Channel port is good. Remove the loop back plug and reconnect the Fibre Channel cables.
6. Exit diagnostic mode and return the ADIC Gateway to normal mode (see “Restoring Normal Mode” on page 296).
7. Inform the systems administrator that an external component of the Fibre Channel subsystem appears to be bad. This may be the cables or the host bus adapter.
8. If the optical cable is easy to remove, go to “Testing Fibre Channel Optical Cable,” below, to test it.
9. Otherwise, go to “Replace Fibre Channel Cable” on page 181 and replace the cable.

Testing Fibre Channel Optical Cable

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

1. Turn the ADIC Gateway off. Mark and remove optical cables from both the ADIC Gateway and their attachments.
2. Turn on the ADIC Gateway and wait for the ADIC Gateway to finish booting.
3. If the cable connectors are coupled together, then mark down their orientation and remove the coupler.
4. Attach matching cable ends (red-to-red or 'A'-to-'A' and so on) to both slots of the Fibre Channel port.

Replace Fibre Channel Cable

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

1. If the ADIC Gateway is still on, turn it off.
2. Replace the cables to the Fibre Channel ports with known good cables.
3. Power up the ADIC Gateway and wait for it to finish booting.
4. Perform health check (see page 159) and view the event log at viewing level 3 (see page 160).
5. If problems persist, replace other external devices that are attached to the Fibre Channel ports (go to "Replace Fibre Channel Device).
6. Otherwise, exit this MAP.

Replace Fibre Channel Device

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

- Fibre Channel HBA
- Fibre Channel Switch
- Fibre Channel Hub
- Fibre Channel Disk subsystem

Inform the system administrator that it is necessary to replace the Fibre Channel device connected to the ADIC Gateway to resolve the Fibre Channel errors. Repeat this MAP after replacing an external component.

ADIC Gateway MAP

These steps are performed if -

- You were directed here from the “Power MAP” on page 184 because all of the LEDs are off.
- You were directed here from the “Power MAP” on page 184 because the Power LED is on but the Ready LED is not blinking once per second.
- The SAN Gateway detected a PCI bus error not isolated to another subsystem
- The SAN Gateway continually reboots itself without operator intervention

Observe Operational LED Behavior

When the ADIC Gateway is first powered on, the front-panel LEDs flash a variety of patterns as it performs the Power On Self Test (POST) and then starts booting. Within two minutes, the ADIC Gateway should have booted successfully and the Ready LED should be blinking once per second. If the Ready LED is not blinking as expected, go to “Start MAP” on page 157.

Isolating Startup Problems

It is possible for a damaged PMC card or DDF board to cause power supply shutdown or prevent the ADIC Gateway from booting successfully. To check for this condition, it is necessary to open the ADIC Gateway and remove all of its PMC cards and DDF board.

OPEN THE SAN GATEWAY BY PERFORMING THE FOLLOWING:

1. Read “Handling Electro Static Discharge-Sensitive Parts” on page 197.
2. Go to “Preparing for Removal and Replacement” on page 198.
3. Go to “Removing the ADIC Gateway” on page 199.
4. Go to “Removing the Cover” on page 201.
5. Remove each PMC card. See “PCI Mezzanine Cards (PMCs)” on page 202.
6. Remove the DDF board. See “Removing and Installing the DDF Board” on page 204.
7. Turn on the ADIC Gateway and observe the Power LED. If the Power LED is off, replace the SAN Gateway Base. Go to “Prepare the New Base Unit” on page 206.

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8. Wait at least one minute. Then check to see whether the Ready LED is blinking. If the Ready LED is not blinking once per second, replace the ADIC Gateway Base. Go to “Prepare the New Base Unit” on page 206.
 9. Check the DDF board.
 - Turn off the ADIC Gateway.
 - Install the DDF board. See “Replacing the DDF Board” on page 204.
 - Turn on the ADIC Gateway
 - If the Power LED is off, the DDF board is causing power supply shutdown. The DDF board must be replaced with a new FRU. Go to “DDF Board” on page 204.
 - Wait at least one minute before checking to see whether the Ready LED is blinking. If the Ready LED is not blinking once per second, the DDF board is preventing successful boot-up and must be replaced with a new FRU. Go to “DDF Board” on page 204.
 - Connect the service terminal to the Service Port. See “Connecting to the Service Port” on page 217.
 - Enter the `diagBoot` command on the service terminal. See “Boot Modes” on page 295.
 - As the ADIC Gateway is finished booting, several status messages should be displayed on the service terminal. If no status messages are displayed, go to “Service Port MAP” on page 191 to determine whether the RS-232 cable and service terminal are working properly. Otherwise, look for the last status message `done executing startup script`. See “Startup Message Reference” on page 315.
 10. Check the PMC cards. For each card:
 - Turn off the ADIC Gateway.
 - Install a PMC card following the procedure used normally for installing a new PMC card. See “Replacing the PMC” on page 203.
 - Turn on the ADIC Gateway.
 - If the Power LED is off, the PMC card is causing power supply shutdown. The PMC card must be replaced with a new FRU. Go to “Replacing the PMC” on page 203.

Temperature MAP

Perform these steps if:

- The ADIC Gateway reports a temperature warning or alarm.
- The Temp Warn or Temp Alarm LEDs are on.

Check Environmental Conditions

The ADIC Gateway is specified over an operational temperature of 10° C - 40° C (50° F -104° F). If the immediate environment of the ADIC Gateway exceeds these limits, then additional cooling or change of location is required.

If the ambient temperature is within specification, go to “Check for Airflow Obstructions” below.

Check for Airflow Obstructions

There should be an airspace gap of at least one-inch on both sides of the ADIC Gateway to ensure adequate airflow.

If obstructions are found, then remove them. Allow several minutes for the ADIC Gateway to cool. If either the Warn or Alarm LED is still lit, then go to “Unresolved Temperature Warning/Alarm” below.

Unresolved Temperature Warning/Alarm

If the Temp Warn or Alarm LEDs remain illuminated, then replace the ADIC Gateway base (go to “Preparing for Removal and Replacement” on page 198).

Power MAP

Perform this MAP if:

- The ADIC Gateway is not operational.
- The ADIC Gateway will not respond to any method of management or control.
- The SAN ADIC Gateway fails to perform any I/O.
- All LEDs are off.

Check Power Source

- Verify that the ADIC Gateway is plugged into an active AC power

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- source.
 - Verify the operation of other equipment connected to the same AC power source.
 - If the power source is good, then go to “Check Fuses.”
 - Connect the ADIC Gateway into an active AC power source; turn on the ADIC Gateway, verifying the status of the Power LED. If the LED lights, obtain a new power source for the ADIC Gateway.
 - If the Power LED remains off, go to “Check Fuses.”

Check Fuses

1. Turn off the ADIC Gateway and remove the power cord.
2. Remove the fuse holder from the power entry module and inspect the fuses. See “Removing the Fuses” on page 205.
3. If the fuses are good, then return the fuses and fuse holder to the power entry module (go to “Check Power Cord” below).
4. If the fuses are bad, obtain replacements and place them in the fuse holder. Return the fuse holder to the power entry module. Plug the power cord into the power entry module. Turn on the ADIC Gateway and observe the Power LED.
5. If the LED remains off, go to “Check Power Cord” below.

Check Power Cord

1. Try a different power cord and connect it to the ADIC Gateway’s power entry module.
2. Turn on the ADIC Gateway and observe the Power LED. If the LED remains off, go to “ADIC Gateway MAP” on page 182.

DDF Board MAP

This step is performed if:

- Unexplained errors on the SCSI channels.
- Unexplained errors on a PMC Interface.
- Unexplained ADIC Gateway PCI bus errors.
- Event Code 21 or 69 is reported

Basic Testing of the DDF Board

Attention: This test requires all I/O to be stopped.

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1. If Event Code 69 is repeatedly reported, replace the DDF Board. See “Removing and Installing the DDF Board” on page 204. If there is a single occurrence of Event Code 69, proceed with this MAP.
 2. Connect the terminal to the Service Port (see “Connecting the Service Terminal” on page 218).
 3. If the ADIC Gateway’s command prompt on the service terminal is not `diagmode>`, from the service terminal enter the `diagBoot` command (see “Boot Modes” on page 295). Wait for the ADIC Gateway to finish booting.
 4. From the service terminal, enter the `ddfTest` command (see “Diagnostic Command Reference” on page 295).
 5. The ADIC Gateway should respond with a message as shown below:

```

==== Testing DDF board ====

Bitwalk PCI-0
  0 Passed 1 Passed 2 Passed 3 Passed
Bitwalk PCI-1
  0 Passed 1 Passed 2 Passed 3 Passed
Access PCI-0
  0 Passed 1 Passed 2 Passed 3 Passed 4 Passed 5 Passed 6 Passed
  7 Passed
Access PCI-1
  0 Passed 1 Passed 2 Passed 3 Passed 4 Passed 5 Passed 6 Passed
  7 Passed
Burst PCI-0 Passed
Burst PCI-1 Passed
MemSize PCI-0 is 64 Mbytes
MemSize PCI-1 is 64 Mbytes
Burst Address PCI-0 .....Passed
Burst Address PCI-1 .....Passed
RP DMA PCI-0 Passed
RP DMA PCI-1 Passed
Data Sharing Passed

DDF Test PASSED
value = 0 = 0x0

```

6. If the test responds with “DDF Board PASSED” then leave this MAP.
7. To eliminate the possibility that other PMC cards are causing an interaction problem with the DDF, go to “Testing DDF with PMC Cards Removed”.

Testing DDF with PMC Cards Removed

1. Open the ADIC Gateway by performing the following:
 - “Handling Electro Static Discharge-Sensitive Parts” on page 197
 - “Preparing for Removal and Replacement” on page 198
 - “Removing the ADIC Gateway” on page 199
 - “Removing the Cover” on page 201
2. Remove each PMC card. See “Removing the PMC” on page 202.
3. Turn on the ADIC Gateway.
4. Repeat the `ddfTest` command. If the DDF board still fails, then replace it (see “DDF Board” on page 204).
5. If the DDF board passes, then there is a problem with one or more of the PMC cards.
6. For each PMC card:
 - Turn off the ADIC Gateway
 - Install a PMC card following the procedure used normally for installing a new PMC card (see “Replacing the PMC” on page 203).
 - Turn on the ADIC Gateway.
 - Repeat the `ddfTest` command.

If the `ddfTest` fails, replace the PMC card.

Ethernet MAP

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

- The IP address for the ADIC Gateway- REQUIRED
 - The net mask for the ADIC Gateway in decimal and hex formats - REQUIRED
 - The network gateway IP address for the ADIC Gateway- if assigned
 - The IP address of a computer on the same subnet as the ADIC Gateway for PING tests - REQUIRED
 - The IP address of the host running the ADIC Management Console Server - REQUIRED
1. The ADIC Gateway must be booted and its Ethernet Port (See Figure 9-2) must be attached to the local area network.

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2. Verify that the Ethernet Link LED, which is the green LED on the left, is on. If the LED is on, go to step 3. If it is not on, go to “Final Diagnostic Tests” on page 208 and return it with your unit. Exit this MAP.
 3. Verify that the yellow Speed LED, which is the yellow LED on the right, correctly reflects the speed of the network. To determine the speed of the network, Go to “Perform Health Check” on page 159.
 4. If the Health Check generates a Trap Event Code of 115, then the ADIC Gateway yellow Speed LED should be on. If it is, go to Step 6. If it is not, go to Step 5.
 5. Inform the System Administrator that there may be a problem with the Ethernet cable quality, the intermediate link speeds or interconnect speeds. If no problems can be found and ADIC Gateway yellow Speed LED does not come on, go to “Final Diagnostic Tests” on page 208 and return it with your unit. Exit this MAP.
 6. Remove the Ethernet cable from the ADIC Gateway Ethernet Port and attach the Ethernet loop back plug provided in the Service Tool Kit.
 7. Verify that the Ethernet LEDs are functioning correctly. If they are not, inform the system administrator that there is a network hardware problem where the ADIC Gateway is attached.
 8. Remove the Ethernet loop back plug. Obtain another Ethernet cable. Use this cable to attach the ADIC Gateway to the local area network.
 9. Connect the service terminal to the Service Port (see “Connecting to the Service Port” on page 217”).
 10. Press the Enter key on the service terminal. If the prompt is not displayed, go to “Service Port MAP” on page 191 to determine whether the RS-232 cable and service terminal are working properly.

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11. From the service terminal, enter the `ifShow` command (see “Service Port Command Reference” on page 223).

```
Gateway > ifShow
lnPci (unit number 0):
  Flags: (0x63) UP BROADCAST ARP RUNNING
  Internet address: 192.168.1.56
  Broadcast address: 192.168.1.255
  Netmask 0xffffffff Subnetmask 0xffffffff
  Ethernet address is 00:60:45:0d:00:c1
  Metric is 0
  Maximum Transfer Unit size is 1500
  2 packets received; 4 packets sent
  0 input errors; 0 output errors
  0 collisions
lo (unit number 0):
  Flags: (0x69) UP LOOPBACK ARP RUNNING
  Internet address: 127.0.0.1
  Netmask 0xff000000 Subnetmask 0xff000000
  Metric is 0
  Maximum Transfer Unit size is 4096
  4 packets received; 4 packets sent
  0 input errors; 0 output errors
  0 collisions
```

12. Write down the values of the internet address, netmask, and subnetmask.
13. Compare the internet address with the IP address supplied by the network administrator. Compare the netmask value with the netmask in hex format supplied by the network administrator. The subnetmask should be the same as the netmask. If these values are correct, go to step 15.
14. Otherwise, use the `ethAddrSet` command to set the correct IP address and netmask values (see the "`ethAddrSet`" command on page 236). From the service terminal, enter the `reboot` command and wait for the ADIC Gateway to finish booting. Go back to step 11.
15. Enter the command `ping "<host IP address>"`, 10 where `<host IP address>` is four decimal numbers separated by periods. This is the address provided by the network administrator for PING testing.

Display of successful PING test:

```
Gateway > 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
64 bytes from 192.168.1.1: icmp_seq=0. time=0. ms
64 bytes from 192.168.1.1: icmp_seq=0. time=0. ms
64 bytes from 192.168.1.1: icmp_seq=0. time=0. ms
64 bytes from 192.168.1.1: icmp_seq=0. time=0. ms
64 bytes from 192.168.1.1: icmp_seq=0. time=0. ms
64 bytes from 192.168.1.1: icmp_seq=0. time=0. ms
64 bytes from 192.168.1.1: icmp_seq=0. time=0. ms
64 bytes from 192.168.1.1: icmp_seq=0. time=0. ms
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:

```
Gateway > ping "192.168.1.251",10
PING 192.168.1.251: 56 data bytes
no answer from 192.168.1.251
value = -1 = 0xffffffff
```

16. If the PING test passed, go to step 21.

17. If the PING test failed, remove the Ethernet cable from the ADIC Gateway and install the Ethernet loop back plug. From the service terminal, enter the `diagBoot` command. Wait for the ADIC Gateway to finish booting. Verify that the `diagmode>` prompt is displayed.

18. From the service port, enter the `elTest` command.

```
Diagmode > elTest
==== Testing Ethernet ====
External loopback LANCE-0
Ethernet OK
value = 0 = 0x0
```

19. If the test failed, replace the ADIC Gateway. Go to "Final Diagnostic Tests" on page 208.

20. If the test passed, remove the Ethernet loop back plug. From the service terminal, enter the `normalBoot` command and wait for the ADIC Gateway to finish booting. Reattach the Ethernet cable to the ADIC Gateway.

21. From the service terminal, enter the `gateAddrGet` command and write down the network gateway address that is displayed. Compare this address to the

one provided by the network administrator. If both addresses are the same, go to step 25.

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

22. If the network gateway address is incorrect, set it to the value provided by the network administrator using the `gateAddrSet` command.
23. From the service terminal, enter the `reboot` command and wait until the ADIC Gateway has finished booting.
24. From the service terminal, use the `ping` command to PING the IP address of the host running the ADIC Management Console Server (see step 15).
25. From the host running the ADIC Management Console Server, PING the ADIC Gateway.
26. If both PING tests succeeded, exit this MAP.
27. If the 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 and the ADIC Gateway.
28. Go to step 24.

Service Port MAP

These steps are performed if the ADIC Gateway boots and responds to the ADIC Management Console, but the Service Port does not respond.

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 null-modem cable from the service port, and connect it to the compatible port on the other computer.
2. Connect the service terminal to the cable.
3. Set the service terminal and the other computer to 19200 baud, 8 data bits, no parity, one stop, XON-XOFF.
4. Enter test lines in the service terminal and the other computer. Confirm that they are displayed on each other. If this fails, replace the RS-232 cable.

-
-
5. If the cable is good, remove it from the other computer
 6. Go to “Check Connection with Boot Messages” below.

Check Connection with Boot Messages

1. Reconnect the terminal to the ADIC Gateway with the RS-232 null modem cable.
2. Stop all I/O to the ADIC Gateway.
3. Perform a graceful shutdown of the ADIC Gateway and keep the power off for 5 seconds. Then turn it back on.
4. If boot messages fail to appear on the service terminal, then replace the ADIC Gateway. Go to “Final Diagnostic Tests” on page 208. Fill it out and return it with your unit.

Data Path Protection MAP

These steps are performed if:

- **READY** LED is not blinking once per second after power has been on for one minute
- ADIC Gateway not responding
- A message has appeared in the ADIC Gateway Event log, with the following codes:
CLASS: CS_EVCLASS_SYSTEM_FAULT0x07
CODE: CS_EVCODE_IBF0x0A
ERROR NUM:DATA FLOW_FAULT0x1010

1. Turn off the ADIC Gateway.
2. Unplug the ethernet cable, as well as all FC and SCSI cables.
3. Connect the null modem cable (and the 9- to 25-pin adapter if applicable) between the computer serial (COM) port and the ADIC Gateway Service Port. See “Initial Setup of HyperTerminal” on page 219.
4. Turn on the ADIC Gateway and observe the boot messages. If a bus fault resulted in abnormal behavior of the ADIC Gateway the boot should stop at a user menu. The boot should stop with the attempt to load firmware.

-
-
5. Use the `p` command to display the contents of the bootline.

```
[VxWorks Boot]: p
boot device           : lnPci
processor number      : 0
file name             : ffs0:vxWorkst.Z
inet on ethernet (e) : 10.0.0.41:fffffc00
gateway inet (g)     : 10.99.2.1
flags (f)            : 0xc
target name (tn)     : pl17003
startup script (s)   : Bus_Fault_Detected
other (o)            : lnPci
```

6. Note that the startup script reads `Bus_Fault_Detected`. If this is not present go to See “ADIC Gateway MAP” on page 182.
7. Change the bootline to allow a diagnostic boot. Use the `c` command and then press the Enter key until you reach the `flags` field. Change `flags` to 0. Continue to press the Enter key until you reach the `startup script` line. Change the `startup script` parameters to `ffs0:/mt/diagnstk.rc`

```
[VxWorks Boot]: c

'.' = clear field; '-' = go to previous field; ^D = quit

boot device           : lnPci
processor number      : 0
host name            :
file name             : ffs0:vxWorkst.Z
inet on ethernet (e) : 10.0.0.41:fffffc00
inet on backplane (b):
host inet (h)        :
gateway inet (g)     : 10.99.2.1
user (u)             :
ftp password (pw) (blank = use rsh):
flags (f)            : 0
target name (tn)     : pl17003
startup script (s)   : ffs0:/mt/diagnstk.rc
other (o)            : lnPci
```

Write complete

8. Enter the `@` command to start diagnostics boot:

```
[VxWorks Boot]: @
```

9. Wait for Gateway to finish booting.

```
      :
      :
diagInit
=====

      Diagnostics Version 2.04

=====
value = 0 = 0x0

SRS Disabled, License is Invalid

Done executing startup script ffs0:/mt/diagnstk.rc
- Service Port Reflected Signal Test
Starting shell
Gateway >
```

10. Start the DDF test.

```
Diagmode> ddfTest

==== Testing DDF board ====

Bitwalk PCI-0
  0 Passed 1 Passed 2 Passed 3 Passed
Bitwalk PCI-1
  0 Passed 1 Passed 2 Passed 3 Passed
Access PCI-0
  0 Passed 1 Passed 2 Passed 3 Passed 4 Passed 5 Passed 6 Passed
  7 Passed
Access PCI-1
  0 Passed 1 Passed 2 Passed 3 Passed 4 Passed 5 Passed 6 Passed
```

```
7 Passed
Burst PCI-0 Passed
Burst PCI-1 Passed
MemSize PCI-0 is 64 Mbytes
MemSize PCI-1 is 64 Mbytes
Burst Address PCI-0 .....Passed
Burst Address PCI-1 .....Passed
RP DMA PCI-0 Passed
RP DMA PCI-1 Passed
Data Sharing Passed
Page Xing PCI-0 ....Passed
Page Xing PCI-1 ....Passed
```

```
DDF Test PASSED
value = 0 = 0x0
Diagmode>
```

11. Change the bootline to restore the normal startup script. Use the `bootChange` command. Then press the Enter key until you get to the startup script line. At startup script enter `ffs0:sna.rc` Then reboot the Gateway:

```
Diagmode> bootChange
```

```
'.' = clear field; '-' = go to previous field; ^D = quit
```

```
boot device          : lnPci0
processor number     : 0
host name           :
file name           : ffs0:vxWorkst.Z
inet on ethernet (e) : 10.0.0.41:fffffc00
inet on backplane (b):
host inet (h)       :
gateway inet (g)    : 10.99.2.1
user (u)            :
ftp password (pw) (blank = use rsh):
flags (f)           : 0x0
target name (tn)    : pl17003
startup script (s)  : ffs0:sna.rc
other (o)           : lnPci
```

```
Write complete
value = 0 = 0x0
Gateway >
```

12. Reboot and wait for firmware to start.

```
Gateway > reboot
```

13. Manually invoke repeated data path tests. Use the `repeat` command to iterate the `ddfc` command. In this example `ddfc` will be run 200 times. If an error occurs then the Gateway will be rebooted and re-enter the `Bus_Fault_Detected` state.

```
Gateway> repeat 200,ddfc
0 Bit errors
0 Bit errors
0 Bit errors
0 Bit errors
0 Bit errors
:
:
:
0 Bit errors
value = 0 = 0x0
Gateway >
```

14. If errors occur, visit “Service and Support” at www.adic.com, or call the ADIC Technical Assistance Center at 1-800-827-3822.

Chapter 9: Removal and Replacement Procedures

This section describes the ADIC Gateway removal and replacement procedures.

Handling ESD-Sensitive Parts

Attention: Always wear an electrostatic discharge (ESD) wrist strap properly connected to the ESD ground bracket when you service this machine.

How to Attach the ESD Wrist Strap

Before you touch any ESD-sensitive part, place the ESD wrist strap on either wrist. This strap has a high resistance (>1 megohm) resistor in series with the grounding clip so there is no danger to you. It discharges the static electricity from your body.

Connect the clip on the flexible grounding cord to the ADIC Gateway. Keep the strap on and connected while you touch, insert, or remove any ESD-sensitive part.

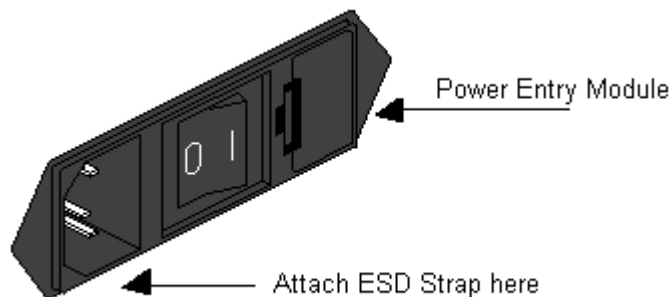


Figure 9-1: Placement of ESD Protection Strap

Attention: When you wear the ESD wrist strap, ensure the flexible grounding cord remains connected to you and to the power entry module.

Handling Electro Static Discharge-Sensitive Parts

Attention: It is highly recommended that you follow industry best practice when handling Electro Static Discharge (ESD) Sensitive

Parts.

- 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.
- You may opt to 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.

Preparing for Removal and Replacement

These steps are performed if

- A repair action is required and the ADIC Gateway must be prepared for FRU removal and replacement.
- Diagnostics are going to be performed

Attention: Turn off attached host systems to ensure that all I/O through the ADIC Gateway has stopped.

1. Verify that the latest SAN configuration has been saved. See “Save SAN Gateway Configuration” on page 90.
2. Turn off the ADIC Gateway and disconnect the power cord.
3. For each cable attached to the ADIC Gateway, repeat the following:
 - Remove the cable.
 - Mark what the cable was connected to (for example, ADIC Gateway number 3, Ultra LVD SCSI Channel 1).
 - If the final cable has been removed, then return to the MAP that

sent you here.

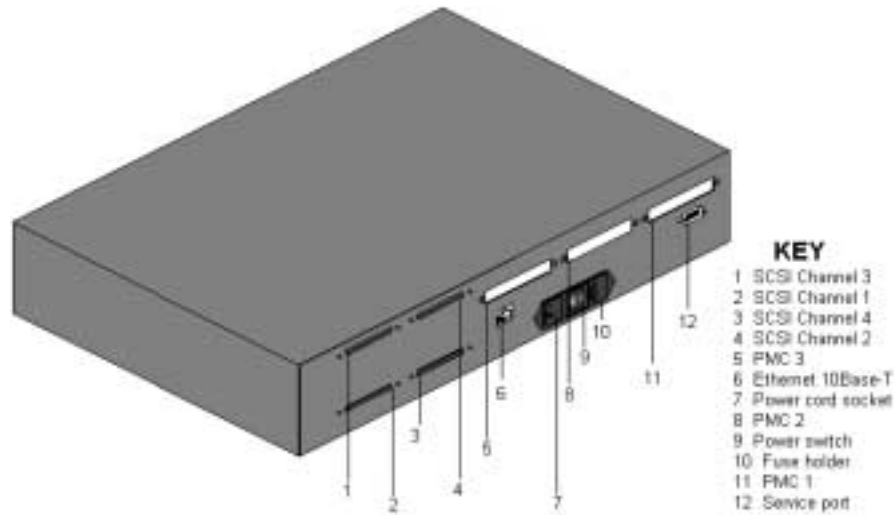


Figure 9-2: Key to Back Panel

ADIC Gateway

Attention: Follow all ESD-sensitive parts procedures while performing this procedure. For ESD information, see “Handling Electro Static Discharge-Sensitive Parts” on page 197.

This procedure describes how to remove and replace the ADIC Gateway in a rack. This procedure must be followed whenever an FRU is to be replaced.

Removing the ADIC Gateway

Perform the following to remove the ADIC Gateway from the rack cabinet. Refer to Figure 9-3 below.

1. Remove the cable (see “Preparing for Removal and Replacement” on page 198).
2. Remove the retaining screws from the rackmount ears **(A)**.
3. Pull the ADIC Gateway out of the rack enclosure **(B)**.
4. Remove the rackmount ear screws with an Allen wrench **(C)**.

-
-
5. Remove the rackmount ears (**D**)

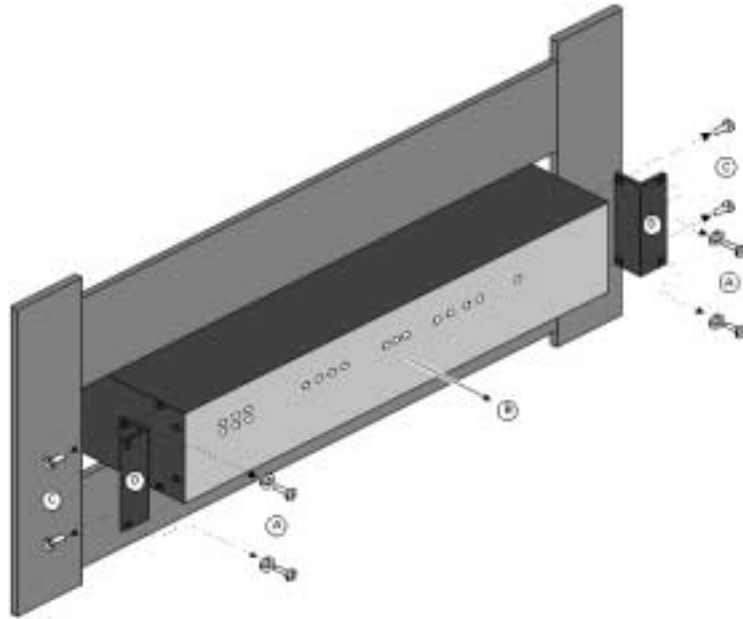


Figure 9-3: Removing the Unit from a Rack Cabinet

Replacing the ADIC Gateway

1. If replacing a desktop ADIC Gateway, install the rubber feet on the new unit (see “Desktop Configuration” on page 18). After installing the feet, go to step 7.
2. If replacing a rack-mount ADIC Gateway transfer the rack mount ears from the original unit to the new unit.
3. Hold the rack mount ear over the mounting holes (**D**).
4. Install the rack mount ear screws and tighten with an Allen wrench (**C**).
5. Insert the ADIC Gateway into the space in the rack cabinet (**B**).
6. Install the retaining screws and washers to hold the ADIC Gateway into the rack cabinet (**A**).
7. Reconnect the cables to their designated ports. See Figure 9-2 for cable locations.

Cover

Attention: Follow all ESD-sensitive parts procedures while performing this procedure. For ESD information. See “Handling ESD-Sensi-

tive Parts” on page 197.

This procedure describes how to remove and replace the cover. Refer to See Figure 9-4 while performing this repair action.

Removing the Cover

1. Mark and remove the ADIC Gateway cables (see “Preparing for Removal and Replacement” on page 198).
2. If the ADIC Gateway is not installed in a rack cabinet, go to step 3.

If the ADIC Gateway is installed in a rack cabinet, remove the ADIC Gateway (see “Preparing for Removal and Replacement” on page 198).

3. Remove the four retaining screws located on the sides, next to the front panel (**A**). Facing the back of the ADIC Gateway grasp the sides of the unit with both hands. Thumbs should be on top of the box (**B**).
4. Push thumbs down and toward the box’s front to dislodge the cover (**C**).
5. Slide the cover all the way forward and lift off the chassis.

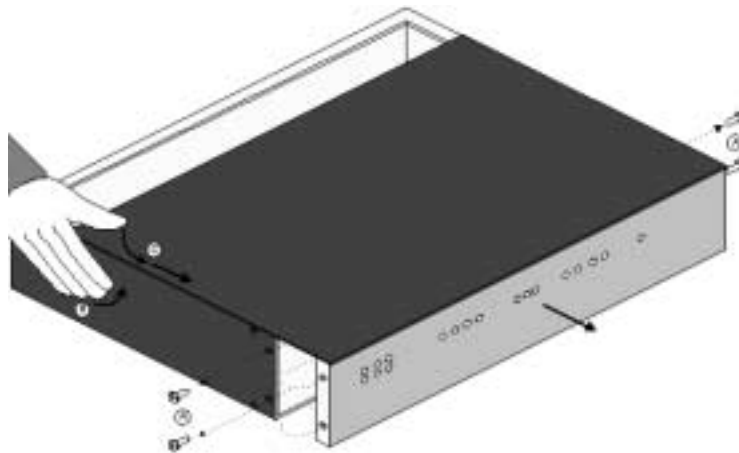


Figure 9-4: Removing the Cover

Replacing the Cover

1. Place the back corners of the lid onto the lip at the front of the ADIC Gateway chassis.
2. Hook both corners of the cover onto the lip.
3. Push the cover back until it stops (**C**).

-
-
4. Install the four retaining screws (**A**).

PCI Mezzanine Cards (PMCs)

Attention: Follow all ESD-sensitive parts procedures while performing this procedure. For ESD information, see See “Handling ESD-Sensitive Parts” on page 197

This procedure describes how to remove and replace the Fibre Channel PMC card. Refer to Figure 9-5 while performing this repair action.

Removing the PMC

1. Mark and remove the ADIC Gateway cables (see “Preparing for Removal and Replacement” on page 198).
2. Remove the cover. See “Removing the Cover” on page 201.
3. If the PMC you are removing is an Ultra 2/3 SCSI PMC, go to Step 7.
4. Use compressed gas dust spray to blow the fiber optic cable connectors you just removed.
5. Place dust caps on the fiber optic cable ends after cleaning.
6. Place dust caps on the Fibre Channel PMC card connectors.
7. Remove the two bulkhead screws holding the PMC to the back panel of the chassis (**A**).
8. Remove the two retaining screws located on the PMC, towards the front panel (**B**).
9. Lift up on the front panel edge of the PMC until the card is 45° from the motherboard (**C**). See Figure 9-5 on page 203.

-
-
10. Pull the PMC out of the ADIC Gateway and place it in a static-protective bag (D).

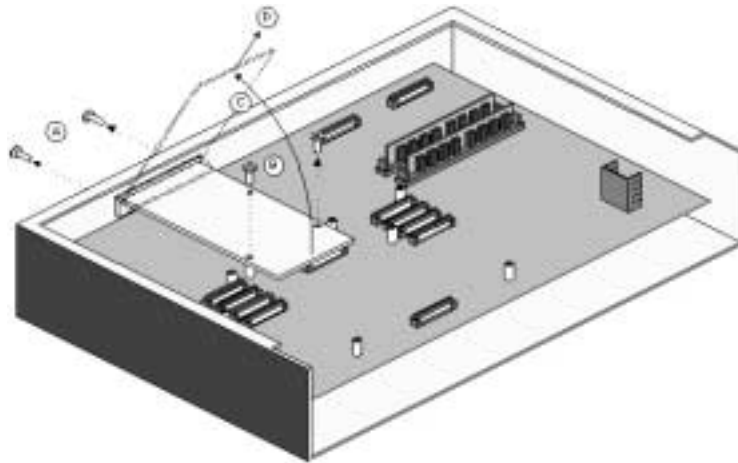


Figure 9-5: Removing PMC Option Card

Replacing the PMC

1. Hold the PMC at a 45° angle from the ADIC Gateway base, with the external connector facing down.
2. Center the bezel in the PMC slot opening (D).
3. Lower the front end of the PMC. Line-up the mounting holes of the card with the binding posts on the motherboard (C).
4. Push the PMC down onto the PMC connectors. It should fit snugly at the connector.
5. Install the two retaining screws (B).
6. Install the two bulkhead screws (A).
7. Remove the dust caps from the new PMC.
8. If the PMC you are replacing is an Ultra 2/3 SCSI PMC, go to Step 10.
9. Use compressed gas dust spray to blow the PMC connector to ensure it is dust free.
10. Replace the ADIC Gateway cover (see “Replacing the Cover” on page 201).
11. Go to “Final Diagnostic Tests” on page 208.

DDF Board

Attention: Follow all ESD-sensitive parts procedures while performing this procedure. For ESD information, see “Handling ESD-Sensitive Parts” on page 197.

This procedure describes how to remove and replace the DDF board. Refer to See Figure 9-6 while performing this repair action.

Removing and Installing the DDF Board

1. If your ADIC Gateway is rack-mounted, mark and remove the ADIC Gateway cables (see “Preparing for Removal and Replacement” on page 56).
2. Remove the cover. See “Removing the Cover” on page 201.
3. Remove the five retaining screws securing the DDF board to the motherboard (**A**).
4. Lift up on the four corners of the DDF board to remove (**B**).
5. Place the DDF board in the static-protective bag.

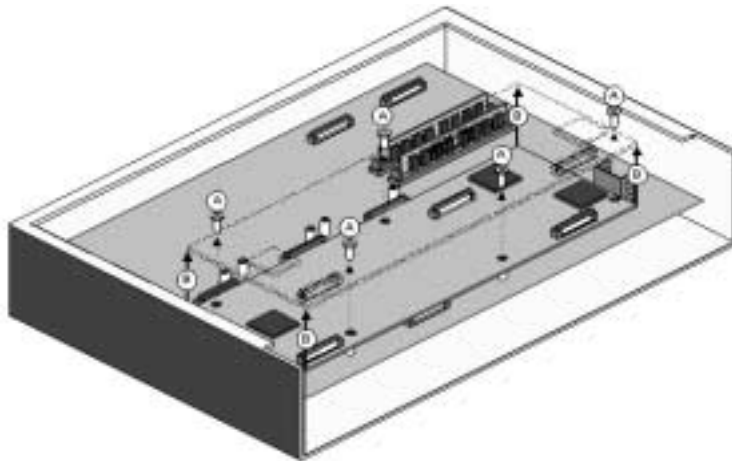


Figure 9-6: Removing the DDF Board

Replacing the DDF Board

1. Observe the orientation of the DDF board in the diagram.
2. Hold the DDF board over the binding posts and line them up with the mounting holes and motherboard connectors.
3. Press the DDF board down onto the motherboard connectors.

-
-
4. Install the five retaining screws securing the DDF board to the motherboard (A).

5. Replace the cover (see See “Replacing the Cover” on page 201)

Go to See “Final Diagnostic Tests” on page 208

Fuse Removal

This procedure describes how to remove and replace the fuses. Refer to See Figure 9-7 when performing this repair action.

Removing the Fuses

1. Turn off the ADIC Gateway if it is on.
2. Disconnect the power cord from the power source.
3. Locate the fuse holder on the back of the ADIC Gateway.
4. Pull the fuse holder out of the ADIC Gateway (B).
5. Remove the fuses from the ADIC Gateway (C).

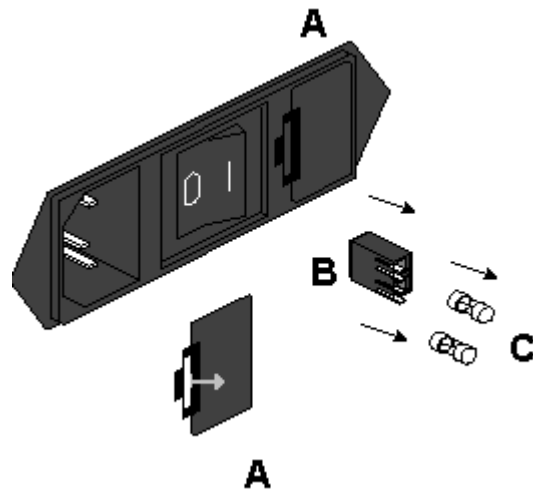


Figure 9-7: Removing the Fuses

Replacing the Fuses

1. Place the new fuses (type F4AL) into the fuse holder (C).
2. Place the fuse holder into its receptacle and push firmly.

-
-
3. Make sure the latch engages (**B**).
 4. Connect the power cord to the power source.
 5. Turn on the ADIC Gateway.

Base Unit

Attention: Follow all ESD-sensitive parts procedures while performing this procedure. For ESD information, see “Handling ESD-Sensitive Parts” on page 197.

This procedure describes how to remove and replace the ADIC Gateway base.

1. Mark and remove the cables (see “Preparing for Removal and Replacement” on page 198).
2. If rack mounted, see “Removing the ADIC Gateway” on page 199.
3. Remove the cover. See “Removing the Cover” on page 201.

Prepare the New Base Unit

Removing and Replacing the FRUs

Attention: Follow all ESD-sensitive parts procedures while performing this procedure. For ESD information, see “Handling ESD-Sensitive Parts” on page 197.

This procedure describes how to transfer the FRUs from the original ADIC Gateway to the new ADIC Gateway base unit.

1. Set the new ADIC Gateway base next to the original ADIC Gateway.
2. Remove the cover. See “Removing the Cover” on page 201.
3. For each populated PMC slot, remove the PMC card from the original unit to the new one (see “Removing the PMC” on page 202).
4. Transfer the bulkhead plates on the unoccupied PMC slots of the original unit to the new ADIC Gateway base (see “Bulkhead Panel” on page 207).
5. Remove the DDF board (see page 204) and place into the new ADIC Gateway base. Replace ADIC Gateway cover (see “Replacing the Cover” on page 201).
6. Go to “Final Diagnostic Tests” on page 208.

Bulkhead Panel

Attention: Follow all ESD-sensitive parts procedures while performing this procedure. For ESD information, see “Handling ESD-Sensitive Parts” on page 197.

This procedure describes how to remove and replace a bulkhead panel. The bulkhead panel covers unused PMC slots. Refer to Figure 9-8 while performing this procedure.

Removing a Bulkhead Panel

1. Remove the cover. See “Removing the Cover” on page 201.
2. Remove the retaining screws from the bulkhead panel (**A**).
3. Remove the bulkhead panel from the ADIC Gateway (**B**).

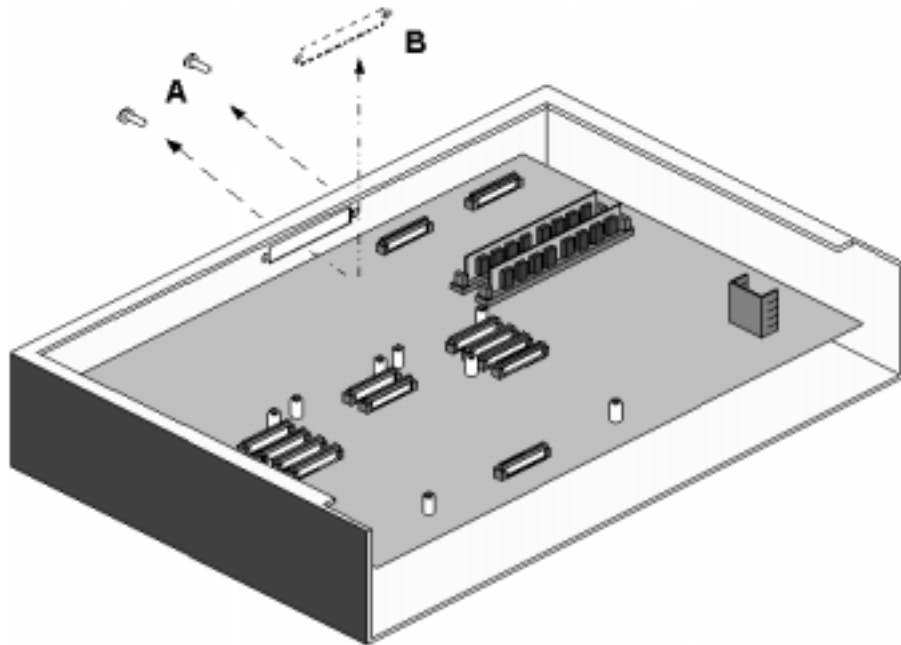


Figure 9-8: Removing a Bulkhead Panel

Replacing a Bulkhead Panel

1. Place the bulkhead panel in the ADIC Gateway so that it covers the hole in the PMC slot (**B**).
2. Line up the screw holes on the bulkhead plate with the holes in the back panel.

-
-
3. Insert and tighten the retaining screws (A).

Final Diagnostic Tests

After a FRU has been replaced, a complete diagnostic check must be performed to verify the new FRU and 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 217
- “Diagnostic Command Reference” on page 295

Final Test Preparation

1. Attach the service terminal and power cord to the ADIC Gateway.
2. Turn on the ADIC Gateway and wait until it has finished booting.
3. From the Service Terminal, enter the `diagBoot` command.
4. Wait until the ADIC Gateway has finished booting into diagnostic mode.
5. From the Service Terminal, enter the `showBox` command.
6. Verify that the ADIC Gateway accurately displays the channel information
7. If the `showBox` display is accurate, go to step 9. If not, go to “Start MAP” on page 157.
8. Proceed to “Fibre Channel Tests” below.

Fibre Channel Tests

TEST FIBRE PMC SLOT 1

1. If there is a dual-port PMC in Slot 1, got to Step 5.
2. Attach the Fibre Channel loop back plug to the card in slot 1.
3. From the service terminal, enter the `fcSlotTest 1` command.
4. If the test passed, remove the loop back plug and go to Test Fibre PMC Slot 2. If not, go to “Start MAP” on page 157.
5. Attach the Fibre Channel loop back plug to slot 1.
6. From the service terminal, enter the `fcSlotTest 1` command.

-
-
7. If the test passed, go to Step 8. If not, go to “Start MAP” on page 157.
 8. Attach the Fibre Channel loop back plug to slot 4.
 9. From the service terminal, enter the `fcSlotTest 4` command.
 10. If the test passed, remove the loop back plug and go to Test Fibre PMC Slot 2. If not, go to “Start MAP” on page 157.

TEST FIBRE PMC SLOT 2

1. If there is a dual-port PMC in Slot 2, got to Step 5.
2. Attach the Fibre Channel loop back plug to the card in slot 2.
3. From the service terminal, enter the `fcSlotTest 2` command.
4. If the test passed, remove the loop back plug and go to Test Fibre PMC Slot 3. If not, go to “Start MAP” on page 157.
5. Attach the Fibre Channel loop back plug to slot 2.
6. From the service terminal, enter the `fcSlotTest 2` command.
7. If the test passed, go to Step 8. If not, go to “Start MAP” on page 157.
8. Attach the Fibre Channel loop back plug to slot 5.
9. From the service terminal, enter the `fcSlotTest 5` command.
10. If the test passed, remove the loop back plug and go to Test Fibre PMC Slot 3. If not, go to “Start MAP” on page 157.

TEST FIBRE PMC SLOT 3

1. If there is a dual-port PMC in Slot 3, got to Step 5.
2. Attach the Fibre Channel loop back plug to the card in slot 3.
3. From the service terminal, enter the `fcSlotTest 3` command.
4. If the test passed, remove the loop back plug and go to Ultra SCSI Tests. If not, go to “Start MAP” on page 157.
5. Attach the Fibre Channel loop back plug to slot 3.
6. From the service terminal, enter the `fcSlotTest 3` command.
7. If the test passed, go to Step 8. If not, go to “Start MAP” on page 157.
8. Attach the Fibre Channel loop back plug to slot 6.

-
-
9. From the service terminal, enter the `fcSlotTest 6` command.
 10. If the test passed, remove the loop back plug and go to Ultra SCSI Tests. If not, go to “Start MAP” on page 157.

Ultra 2/3 SCSI PMC Tests

TEST ULTRA 2/3 SCSI PMC SLOT 1

1. Attach the appropriate VHDCI cable to slot 1.
2. From the service terminal, enter the `xscsiChannelTest 1` command.
3. If the test passed, go to step 4. If not, go to “Start MAP” on page 157.
4. Attach the appropriate VHDCI cable to slot 4.
5. From the service terminal, enter the `xscsiChannelTest 4` command.
6. If the test passed, remove the loop back plug and go to Test Ultra 2/3 SCSI PMC Slot 2. If not, go to “Start MAP” on page 157.

TEST ULTRA 2/3 SCSI PMC SLOT 2

1. Attach the appropriate VHDCI cable to slot 2.
2. From the service terminal, enter the `xscsiChannelTest 2` command.
3. If the test passed, go to step 4. If not, go to “Start MAP” on page 157.
4. Attach the appropriate VHDCI cable to slot 5.
5. From the service terminal, enter the `xscsiChannelTest 5` command.
6. If the test passed, remove the loop back plug and go to “Test Ultra 2/3 SCSI PMC Slot 3”. If not, go to “Start MAP” on page 157.

TEST ULTRA 2/3 SCSI PMC SLOT 3

1. Attach the appropriate VHDCI cable to slot 3.
2. From the service terminal, enter the `xscsiChannelTest 3` command.
3. If the test passed, go to step 4. If not, go to “Start MAP” on page 157.
4. Attach the appropriate VHDCI cable to slot 6.
5. From the service terminal, enter the `xscsiChannelTest 6` command.
6. If the test passed, remove the loop back plug and go to “Ultra SCSI Tests” below. If not, go to “Start MAP” on page 157.

Ultra SCSI Tests

TEST SCSI PORT 1 AND 2

1. Attach the appropriate VHDCI loop back cable between slots 1 and 2.
2. From the service terminal, enter the `scsiChannelTest 1,2` command.
3. If the test passed, remove the loop back cable and go to Ethernet Test. If not, go to “Start MAP” on page 157.

TEST SCSI PORT 3 AND 4

1. Attach the appropriate VHDCI loop back cable between slots 3 and 4.
2. From the service terminal, enter the `scsiChannelTest 3,4` command.
3. If the test passed, remove the loop back cable and go to Ethernet Test. If not, go to “Start MAP” on page 157.

DDF Test

1. From the service terminal, enter the `ddfTest` command.
2. If the test passed, go to the next step. If not, go to “Start MAP” on page 157.
3. Proceed to Ethernet Test.

Ethernet Test

1. If you did not replace the ADIC Gateway base, go to step 3.
2. Obtain the ADIC Gateway’s Ethernet network parameters. Configure the Ethernet Port Host Name, Address, Routes, Enable Ethernet (see “ADIC Gateway Network Setup” on page 49).
3. Attach the Ethernet loop back plug to the Ethernet port.
4. From the service terminal, enter the `elTest` command.
5. If the test passed, go to the next step. If not, go to “Start MAP” on page 25.
6. Remove the Ethernet loop back plug.
7. Proceed to “Updating the ADIC Gateway” on page 212“Updating the ADIC Gateway” on page 212

Updating the ADIC Gateway

1. From the service terminal, enter the `hardwareConfig` command to update the ADIC Gateway's Vital Product Data (VPD).
2. From the service terminal, enter the `normalBoot` command.
3. Wait until the ADIC Gateway has finished booting.
4. From the service terminal, enter the `version` command. Write down the firmware version number.
5. To determine whether the ADIC Gateway firmware version requires an update, visit "Service and Support" at www.adic.com, or call the ADIC Technical Assistance Center at 1-800-827-3822. If an update is required, download the new file or files and the associated readme. This firmware is used when performing the steps in "Post-Repair Checklist" below.
6. If you replaced the ADIC Gateway, enter the `ridTag` command and type the identifier. See "Service Port Command Reference" on page 223.

Attention: You must perform this step if you replaced the ADIC Gateway.

7. Power down the ADIC Gateway and unplug the power cord.
8. Disconnect the RS-232 cable from the ADIC Gateway.
9. Perform the "Post-Repair Checklist" below.

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 9-1: Post-Repair Checklist

Step	Actions	Comments and References
1	Reinstall the ADIC Gateway in its original location.	

Table 9-1: Post-Repair Checklist

Step	Actions	Comments and References
2	Ensure that the FC hosts are turned off. if not, disconnect the FC cables now.	Although you were just instructed to reconnect all cables, if you cannot turn off the FC hosts you must disconnect the FC hosts before turning on the ADIC Gateway. This is a safety precaution that ensures that FC hosts cannot perform any I/O to the SCSI target devices prior to restoring the ADIC Gateway configuration in step8, below.
3	Attach the service terminal to the ADIC Gateway	None.
4	Turn on the ADIC Gateway.	None.
5	Wait for the ADIC Gateway to finish booting.	Within one minute, the Ready 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 157.
6	From the service terminal, enter the <code>targets</code> command.	See ""Service Port Command Reference" on page 223." If all attached SCSI devices are not shown, go to "Start MAP" on page 157.
7	If you replaced the ADIC Gateway, configure the network parameters	Obtain the network parameters. See "ADIC Gateway Network Setup" on page 49.

Table 9-1: Post-Repair Checklist

Step	Actions	Comments and References
8	<p>Perform the following:</p> <ol style="list-style-type: none"><li>1. Start the ADIC Management Console server and client, logon with administrator privileges and connect to the ADIC Gateway<li>2. If you downloaded new firmware in Step 5 of “Updating the ADIC Gateway” on page 212, use the Controls > Update Firmware menu item to update the firmware now.<li>3. Use the Tools > Load SAN Gateway menu item to load the persistent address map into the ADIC Gateway.<li>4. Use the Controls > Restart SAN Gateway menu item to restart the ADIC Gateway.<li>5. Use the Controls > Disconnect SAN Gateway menu item.	<p>This step must be performed if you replaced the ADIC Gateway Base.</p>

Table 9-1: Post-Repair Checklist

Step	Actions	Comments and References
9	<ol style="list-style-type: none">1. If you disconnected the FC cables in Step 2 above, reconnect them now.2. Turn on (or reboot) the FC hosts.	<p>If SAN Connection Status LEDs for the attached hosts are not on, check the FC cables. You may have to change the polarity of the FC cables. If the problem persists, go to “Start MAP” on page 157.</p>
10	<ol style="list-style-type: none">1. From the service terminal, enter the <code>fcShow</code> command to show the status of each FC interface that is installed and connected.2. From the service terminal, enter the <code>fcShowDevs</code> command to show the SCSI target devices that are connected as seen by the Fibre Channel interface.	<p>In the output of the <code>fcShow</code> command, look for the Firmware State column. If the word Ready does not appear, go to “Fibre Channel MAP” on page 178. Check to see that all SCSI target devices are seen by each FC interface. If not, go to “SCSI MAP” on page 171.</p>
11	<p>Verify that all (or the designated) target devices are available to the host systems.</p>	<p>Use appropriate host system utilities for disk and tape.</p> <p>If “Access Control” is enabled (Channel Zoning, VPS, or VPM) the hosts will only see the devices that have been assigned to them.</p> <p>If the designated devices are NOT available, reboot the host and check again. If the problem persists, go to “Start MAP” on page 157.</p>

Table 9-1: Post-Repair Checklist

Step	Actions	Comments and References
12	Disconnect the RS-232 cable from the ADIC Gateway and from the service terminal. return it, the SCSI loop back cable, FC loop back plug, and Ethernet loop back plug to the Service Tool Kit.	None.
13	End of repair.	

Appendix A: Connecting to the Service Port

The service port is an RS-232C Data Terminal Equipment (DTE) port, configured at 19200 Baud, with 8 data bits, no parity and hardware flow control. The 9-pin connector is compatible with serial ports on PCs. A PC may be used to connect to the service port, using a 9-pin to 9-pin null modem cable. For connection to another system, such as a UNIX workstation, a different cable or an adapter may be required.

Service Port Connections

The figure shows the service port connections:

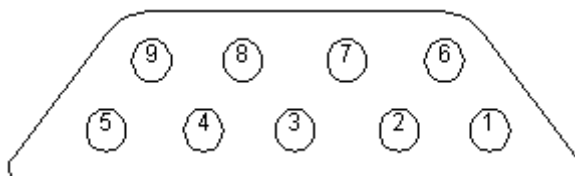


Figure A-1: Service Port Pinout

Connections are listed in the following table.

Table A-1: DB-9 RS-232 Connector Pin Assignments

Pin Number	Signal Name	Abbreviation	Direction relative to ADIC Gateway
1	Carrier Detect	CD	In
2	Receive Data	RD	In
3	Transmit Data	TD	Out
4	Data Terminal Ready	DTR	Out
5	Signal Ground	SG	-
6	Data Set Ready	DSR	In
7	Request to Send	RTS	Out
8	Clear to Send	CTS	In

Table A-1: DB-9 RS-232 Connector Pin Assignments

9	Ring Indicator	RI	In
---	----------------	----	----

Table 2 lists the null modem cable connections.

Table A-2: Null Modem Cable Connections

Service Port Pin Number	Signal Name	9-pin AT connector	25-pin (DB25) connector (DTE)
1	Carrier detect (not used)	n/c	n/c
2	Receive data <-> Transmit data	3	2
3	Transmit data <-> Receive data	2	3
4	Data terminal ready <-> Data set ready	6	6
5	Signal ground	5	7
6	Data set ready <-> Data terminal ready	4	20
7	Request to send <-> Clear to send	8	5
8	Clear to send <-> Request to send	7	4
9	Ring indicator (not used)	n/c	n/c

Connecting the Service Terminal

HARDWARE REQUIRED

- RS-232 DB9F null model cable
- RS-232 DTE Terminal or desktop/laptop computer running terminal emulation software
- RS-232 DB9M-to-DB25F adapter if the terminal uses a DB25M connector

Initial Setup of HyperTerminal

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

1. Connect the null modem cable (and the 9- to 25-pin adapter if applicable) between the computer serial (COM) port and the ADIC Gateway Service Port.
2. Turn on the service terminal.
3. On the service terminal, select the HyperTerminal icon and double-click on it.
4. In the New Connection dialog enter ADIC Gateway for the name and click OK.
5. In the Connect To dialog, for the Connect using field select the COM Port number that you have chosen and click OK.

6. In the COM Properties dialog select the following:

Bits per second:19200
Data bits:8
Parity:None
Stop bits:1
Flow Control:Xon/Xoff

7. Click OK.

Verifying the Connection

If the ADIC Gateway is already on, then characters typed in the terminal should be visible to the operator. The simplest test is to press the Enter key. The ADIC Gateway will respond by displaying a command prompt like:

```
Gateway >
```

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

Updating Firmware and Configurations

Although the ADIC Management Console is the simplest and most efficient tool for updating firmware and saving/loading configurations, you can use the service terminal as an alternate method to perform these operations.

The ADIC Gateway service port supports Zmodem file transfers. The procedures below are specific for using the HyperTerminal program on the service terminal to

transfer files. Other terminal emulation programs operate in a similar fashion. The Zmodem send and receive functions in some terminal emulation programs automatically issue the command string “rz” before sending a file and the command string “sz” before receiving a file. However, even if the program you are using automatically sends the “rz” command, manually issuing the command string “rz” before starting the transfer has no negative effect on the transfer.

Updating Firmware

1. From the Hyper Terminal window, at the `Gateway >` command prompt, type `rz` and then press the **Enter** key.
2. From the HyperTerminal window select **Transfer** and **Send File**.
3. From the **Send File** dialog enter the path and filename 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. It will take several minutes for the file to be transferred. The Zmodem file send dialog will display the current status and it will close automatically when the file transfer has completed.
5. Wait for the “Firmware Update Complete” status message to be displayed on the service terminal indicating successful completion. You must reboot the ADIC Gateway for the update to take effect.

If HyperTerminal reports an error, try to send the file again. If the ADIC Gateway reports an error, make a note of the error code and see the “Zmodem Status Code Table” on page 221 for further information.

Saving a Configuration File

1. From the HyperTerminal window enter `sz “config.cfg” <Enter>`. The filename “config.cfg” is shown here as an example. You can specify a different filename but it must be in quotes, 8 characters or less and 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. For the Receiving protocol select **Zmodem** and press the **Receive** button.
4. Wait for the “Configuration Download Complete” status message to be displayed on the service terminal indicating successful completion.

If HyperTerminal reports an error, try to receive the file again. If the ADIC Gateway reports an error, make a note of the error code and see the “Zmodem Status Code Table” for further information.

Loading a Configuration File

1. From the Hyper Terminal window, at the Gateway > command prompt, type `rz` and then press the **Enter** key.
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.

If HyperTerminal reports an error, try to send the file again. If the ADIC Gateway reports an error, make a note of the error code and see the “Zmodem Status Code Table” for further information.

Zmodem Status Code Table

The following table shows Zmodem status codes reported by the ADIC Gateway:

Table A-3: Zmodem Status Codes

Status Code	Description
0	OK
-1	Error unwrapping file -bad file, or out of space
-2	Error opening file
-3	Error writing file
-4	Error closing file
-5	Service Port Function Only
-6	Can't create Debug file - only applicable under lab conditions
-7	Cancelled by host
-8	“Command” not supported
-9	Memory Buffer allocation failed - problem with ADIC Gateway memory allocation
-10	No file to send
-11	Garbage - degraded link
-12	CRC Error - degraded link
-13	Timeout Error

Table A-3: Zmodem Status Codes

Status Code	Description
-14	File size error - file size is different than it was supposed to be
-15	Invalid file type
-16	Too many retries - degraded link
-17	Position Error - file data has been lost

Appendix B: Service Port Command Reference

A “shell” interface provides access to management and configuration commands. The shell is accessible by connecting a terminal or computer with terminal emulation software to the ADIC Gateway’s Service Port.

The ADIC Management Console application should be used for managing the ADIC Gateway. When you use the ADIC Management Console, most of the operations described in this reference will be carried out through the client application.

The following table is a list of the commands grouped by function.

Table B-1: Commands Grouped By Function

Group	Description	Page
Command and Control		
<code>disableCC</code>	Disable Command and Control Interface	235
<code>enableCC</code>	Enable Command and Control Interface	236
<code>setSnaCCLun</code>	Change Command and Control Interface LUN	271
Data Mover		
<code>sncFeatureEnable</code>	Enable the optional Data Mover feature	274
Diagnostics	Diagnostic commands are discussed in the section “Diagnostic Command Reference” on page 295	
Ethernet Network		
<code>arptabShow</code>	Display a list of known ARP entries	232
<code>ethAddrSet</code>	Set Ethernet Port address	236
<code>gateAddrGet</code>	Display network gateway address	243

Table B-1: Commands Grouped By Function

Group	Description	Page
gateAddrSet	Set network gateway address	243
host "add"	Add host table entries	247
host "delete"	Delete network host table entries	248
host "list"	List network host table entries	248
hostNameSet	Change ADIC Gateway's network name	249
icmpstatShow	Display statistics for ICMP	250
ifShow	Display Ethernet Port parameters and status	250
inetstatShow	Display all Internet protocol sockets	251
ipstatShow	Display statistics for IP	251
macShow	Display Ethernet Port Media Access Control address	254
mbufShow	Display mbuf statistics	258
route	Edit route table entries	261
route "add"	Add network route table entries	262
route "delete"	Delete network route table entries	262
route "list"	List network route table entries	262
snmpCommunitiesShow	Display list of Community names currently in use	274
snmpReadCommunityAdd	Add Community name with Read permission	275
snmpReadCommunityRemove	Remove Community name Read permission	276
snmpTrapCommunitySet	Set Community name passed with traps	276
snmpWriteCommunityAdd	Add Community name with Write permission	276

Table B-1: Commands Grouped By Function

Group	Description	Page
snmpWriteCommunityRemove	Remove Community name Write permission	276
tcpstatShow	Display statistics for TCP	279
trapDestAdd	Add recipient IP address to trap destination table	280
trapDestRemove	Remove recipient IP address from trap destination table	280
trapDestShow	Display trap destination table	281
udpstatShow	Display statistics for UDP	281
userAdd	Add a user and password to the password file	282
userDelete	Delete a user from the password file	282
userList	Display the contents of the password file	283
Event Logging		
cleShow	Display Command Log events for the specified LUN	233
cleShowAll	Display Command Log events for all LUNs	233
loggerDump	Display Event Log records	252
loggerDumpCurrent	Display Event Log records for current boot	253
supportDump	Display information used in troubleshooting	305
Fibre Channel		
fcConnTypeGet	Display the current setting of a Fibre Channel port's connection type	236
fcConnTypeSet	Set the type of connection for a Fibre Channel port	237

Table B-1: Commands Grouped By Function

Group	Description	Page
<code>fcPortModeGet</code>	Display the mode for the specified Fibre Channel port	238
<code>fcPortModeSet</code>	Set the mode for the specified Fibre Channel port	238
<code>fcRestart</code>	Restart the specified Fibre Channel port	239
<code>fcShow</code>	Display Fibre Channel interface status	240
<code>fcShowDevs</code>	Display attached SCSI and Fibre Channel Target Devices from Fibre Channel port perspective	241
<code>fcShowNames</code>	Display Node and Port names for Fibre Channels	242
<code>setFcFrameSize</code>	Set Frame Size for specific Fibre Channel port	269
<code>setFcHardId</code>	Set Loop ID for specific Fibre Channel port	270
<code>setHost</code>	Set Host OS type for specific Fibre Channel port	270
<code>targets</code>	Display attached SCSI and Fibre Channel Target devices	279
Flash File System		
<code>cd</code>	Set current working path	232
<code>ll</code>	List directory contents in long format	253
<code>ls</code>	List directory contents	253
<code>rm</code>	Remove (delete) a file	261
<code>rz</code>	Initiate a receive Zmodem file transfer session	262
<code>sz</code>	Initiate a send Zmodem file transfer session	278

Table B-1: Commands Grouped By Function

Group	Description	Page
Health Check		
hlthChkIntervalGet	Display Health Check Interval	246
hlthChkIntervalSet	Set Health Check Interval	246
hlthChkLevelGet	Display Health Check Level	246
hlthChkLevelSet	Set Health Check Level	246
hlthChkNow	Perform a Health Check Now	247
Help		
clehelp	Display Command Log Entry command info	233
diagHelp	Display Diagnostic command info	234
help	Display info for all shell commands	244
hlthChkhelp	Display Health Check command info	245
mapHelp	Display Device Map command info	255
netHelp	Display Network command info	259
snmpHelp	Display SNMP command info	275
userHelp	Display User account command info	283
Product Data and Maintenance		
clearReservation	Force-clear a reservation on the specified target LUN	232
dataScrubberDisable	Disable the Data Scrubber	233
dataScrubberEnable	Enable the Data Scrubber	234
hardwareConfig	Re-inventory FRUs and update Vital Product Data (must be in diagnostic mode)	243

Table B-1: Commands Grouped By Function

Group	Description	Page
<code>initializeBox</code>	Restore factory defaults by deleting all configuration files including persistent address map and VPS databases and then reboot	251
<code>licenseShow</code>	Display information about installed software license keys	252
<code>mapCompressDatabase</code>	Remove inactive device entries and reassign LUNS contiguously in persistent address map database	254
<code>mapRebuildDatabase</code>	Delete and reconstruct persistent address map database	255
<code>mapShowDatabase</code>	Display all persistent address map database entries	256
<code>mapShowDevs</code>	Display persistent address map database entries for attached devices only	257
<code>mapWinnowDatabase</code>	Remove inactive device entries from persistent address map database	258
<code>shellLock</code>	Lock or unlock the shell command interface	272
<code>showBox</code>	Display graphic of hardware	273
<code>sysConfigShow</code>	Display configuration settings	276
<code>sysVpdShow</code>	Display Vital Product Data	277
<code>sysVpdShowAll</code>	Display Vital Product Data for all subsystems	277
<code>ridTag</code>	Display and set serial number of replaced Base	260
<code>version</code>	Display Firmware version	283
<code>uptime</code>	Display time elapsed since last boot	282

Table B-1: Commands Grouped By Function

Group	Description	Page
SAN Access Security		
<code>vpsAccessApply</code>	Apply access settings and save in Virtual Private SAN database	284
<code>vpsAccessClear</code>	Disable Virtual Private SAN access to all LUNs for all hosts	284
<code>vpsAccessSet</code>	Set Virtual Private SAN access permission for a specific host and a specific LUN range	284
<code>vpsActiveSet</code>	Reactivate Virtual Private SAN if inactive	285
<code>vpsConnectionSet</code>	Enter connection information for a specific host	285
<code>vpsFeatureEnable</code>	Enable Virtual Private SAN with license key	285
<code>vpsHostShow</code>	Display LUN access permissions for a specific host	286
<code>vpsInactiveSet</code>	Deactivate Virtual Private SAN access control allowing all hosts to access all LUNs	287
<code>vpsNameSet</code>	Enter a name for a specific host	287
<code>vpsShow</code>	Display status information for one or all registered hosts	287
<code>vpsSparseAccessSet</code>	Set access permission for a specific host and specific LUNs	288
<code>vpsTypeSet</code>	Enter Operating System information for a specific host	289
SCSI		
<code>fcShowDevs</code>	Display SCSI and Fibre Channel Target Devices from Fibre Channel port perspective	241
<code>scsiAltIdGet</code>	Display SCSI Alternate IDs	263
<code>scsiAltIdSet</code>	Change SCSI Alternate IDs	264

Table B-1: Commands Grouped By Function

Group	Description	Page
scsiHostChanGet	Display SCSI Host Channel Modes	264
scsiHostChanSet	Set SCSI Host Channel Modes	264
scsiHostIdGet	Display SCSI Host ID numbers	265
scsiHostIdSet	Set SCSI Host ID numbers	266
scsiRescan	Rescan for devices on one or all SCSI Channels	266
scsiResetDisableGet	Display SCSI Bus Reset on Power-Up Setting	267
scsiResetDisableSet	Set the SCSI Bus Reset on Power-Up Setting	267
scsiShow	Display SCSI Channels and attached devices	268
scsiTermGet	Display termination status information for SCSI Channels	269
scsiTermSet	Set termination status for the selected channel	269
targets	Display attached SCSI and Fibre Channel Target devices	279
xscsiAltIdGet	Display SCSI Alternate IDs for Ultra 2/3 SCSI Channels	289
xscsiAltIdSet	Change SCSI Alternate IDs for Ultra 2/3 SCSI Channels	289
xscsiHostChanGet	Display SCSI Host Channel Modes for Ultra 2/3 SCSI Channels	290
xscsiHostChanSet	Set SCSI Host Channel Modes for Ultra 2/3 SCSI Channels	290
xscsiHostIdGet	Display SCSI Host ID Numbers for Ultra 2/3 SCSI Channels	290
xscsiHostIdSet	Set SCSI Host ID Numbers for Ultra 2/3 SCSI Channels	291

Table B-1: Commands Grouped By Function

Group	Description	Page
xscsiRescan	Rescan for devices on one or all Ultra 2/3 SCSI Channels	291
xscsiResetDisableGet	Display SCSI Bus Reset on Power Up Settings for Ultra 2/3 SCSI Channels	292
xscsiResetDisableSet	Set the SCSI Bus Reset on Power Up Settings for Ultra 2/3 SCSI Channels	292
xscsiTermGet	Display termination status for Ultra 2/3 SCSI Channels	292
xscsiTermSet	Set termination status for Ultra 2/3 SCSI Channels	293
Startup		
diagBoot	Shutdown and restart in Diagnostic mode	234
normalBoot	Shutdown and restart in Normal mode	260
reset	Restart without shutdown	260
reboot	Shutdown and restart	260
Virtual Private Map		
copyScsiAssign	Copy SCSI assignments from a source channel to a destination channel	233
deleteScsiAssign	Delete an assignment previously created	234
setScsiAssign	Assign a target device to a SCSI channel	271
showScsiAssign	List the current assigned addresses for the indicated channel	274
vpmFeatureEnable	Enable the optional Virtual Private Map feature	283

Commands

This section describes the commands that are available to control, manage, and service the ADIC Gateway. The commands are listed in alphabetical order for easier reference.

Each command displays a status “value” in decimal and hexadecimal after execution and before a new prompt is displayed. Usually a value of 0 indicates success, but some commands may return a different value.

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.

```
Gateway > arptabShow
192.168.1.19 at 8:0:20:23:2f:db
value = 0 = 0x0
Gateway >
```

cd

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

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

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 ADIC Gateway 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.

Parameter	Value
devId	The index of the device (LUN)

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

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.

```
Gateway > 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
Gateway >
```

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]

Copies the SCSI assignments from a source channel to a destination channel.

dataScrubberDisable

Issue this command to disable the Memory Scrubber, an independent low-priority task that checks the full data buffer space, approximately once per hour.

```
Gateway > dataScrubberDisable
value = 0 = 0x0
Gateway >
```

dataScrubberEnable

Issue this command to enable the Memory Scrubber, an independent low-priority task that checks the full data buffer space, approximately once per hour.

```
Gateway > dataScrubberDisable
value = 1 = 0x1
Gateway >
```

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

Deletes an assignment previously created

diagBoot

This command is used only to transition the ADIC Gateway from normal operation to the special diagnostic mode. The `diagBoot` command first ensures that the `ffs:mt` directory exists. It verifies that the files `diagnstk.o` and `diagnstk.rc` are in the flash file system. If they are in the root directory, it moves them to the `ffs:mt` directory.

It copies the existing bootline to a file in the `ffs:mt` directory on the ADIC Gateway and installs a new bootline directing the ADIC Gateway 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.

```
Gateway > diagHelp
** Diagnostic commands: Available in Diagnostic Mode Only **
ddfTest          Test DDF Memory
elTest           Test Ethernet port w/loop-back cable
fcSlotTest <portnum> Test specified Fibre Channel port w/loop-
back cable
hardwareConfig   Re-inventory FRUs and update Vital Product
Data
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

Gateway >

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.
2	Completely disables all Command and Control functions

The ADIC Gateway is addressable as a SCSI target device, for command and control support. On a Fibre Channel 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.

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

Gateway > `disableCC`

value = 0 = 0x0

Gateway >

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.

```
Gateway > enableCC
value = 0 = 0x0
```

ethAddrSet

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

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

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

```
Gateway > 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
Gateway >
```

fcConnTypeGet [port]

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

Parameter	Value	Meaning
Port	1 - 6	The SAN Connection number

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

```
MyGateway > fcConnTypeGet 1
value = 0 = 0x0
MyGateway > fcConnTypeGet 2
value = 0 = 0x0
MyGateway > fcConnTypeGet 3
value = 0 = 0x0
MyGateway > fcConnTypeGet 4
value = 0 = 0x0
MyGateway > fcConnTypeGet 5
value = 0 = 0x0
MyGateway > fcConnTypeGet 6
value = 0 = 0x0
MyGateway >
```

The number displayed as a value indicates the connection type as follows:

Value	Connection Type
0	loop
1	point-to-point
2	loop preferred

fcConnTypeSet [port],[connection]

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

Parameter	Value	Meaning
Port	1 - 6	The SAN Connection number
Connection	0	Loop
	1	Point-to-Point
	2	Loop Preferred

The following example shows how to set Fibre Channel port 1 connection type to point-to-point.

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

Attention: You must issue the `fcRestart` command or reboot the ADIC Gateway for the new setting to take affect. See the `fcRestart` command for further information.

fcPortModeGet [port]

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

Parameter	Value	Meaning
Port	1- 6	The SAN Connection number

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 Fibre Channel port 1 is specified and the port mode is **Private Target**.

```
Gateway >fcPortModeGet 1
value = 1 = 0x1
Gateway >
```

fcPortModeSet [port],[mode]

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

The default port mode is **Public Target**. This means that if attached to a Fabric device the ADIC Gateway will register as a **Target** with the name server. If the port mode is **Private Target**, the ADIC Gateway does not register with the name server and the Fabric device will not recognize the ADIC Gateway as a **Target**.

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

Parameter	Value	Meaning
Port	1- 6	The SAN Connection number
Mode	1	Private Target
	2	Private Initiator
	3	Private Target and Initiator
	17	Public Target
	18	Public Initiator
	19	Public Target and Initiator

```
Gateway > fcPortModeSet 1,2
value = 0 = 0x0
Gateway >
```

fcRestart [port]

The `fcRestart` command restarts the specified Fibre Channel port. You typically use this command to restart the port after changing its configuration settings so that the changes take affect. Issuing this command is an alternative to rebooting the ADIC Gateway in order to make the configuration changes take affect.

Attention: This command interrupts traffic.

Parameter	Value	Meaning
Port	1 - 6	The SAN Connection number

The following example shows the display when Fibre Channel port 1 is specified.

```
Gateway > fcRestart 1
value = 0 = 0x0
FCT Restart 1 :
Controller Restart Successful
Gateway >
```

fcShow [level]

The `fcShow` command displays the channel status for each Fibre Channel 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
2	displays the information included at levels 0 and 1, and appends loop ID link stats

Fibre Channel Controllers

```
CtrlrId:PCI Addr:ISP Type:Firmware State:Version:Loop ID:FabricAttached:
PortMode
```

```
-----
1 : 00 18 00 : 2300 : Ready : 2.01.7 : 1 : No : Targ
2 : 00 18 00 : 2300 : Ready : 2.01.7 : 1 : No : Targ
3 : 00 18 00 : 2300 : Ready : 2.01.7 : 1 : No : Targ
4 : 00 18 00 : 2300 : Ready : 2.01.7 : 1 : No : Targ
5 : 00 18 00 : 2300 : Ready : 2.01.7 : 1 : No : Targ
6 : 00 18 00 : 2300 : Ready : 2.01.7 : 1 : No : Targ
-----
```

```
value = 80 = 0x50 = 'P'
```

```
Gateway >
```

- | | |
|---|--|
| Ctrlr Id | Indicates the Port Number for this interface. |
| PCI Addr | The PCI address of the interface, showing bus, device id, and function number. |
| ISPTyp | The type of Fibre Channel Controller. |
| Firmware State | The current state of the interface as reported by the Fibre Channel PMC adapter firmware. Firmware states are listed below. |
| <ul style="list-style-type: none">Configuration WaitWaiting for AL_PAWaiting for login | <ul style="list-style-type: none">Firmware is not initialized.Firmware is performing or waiting to perform loop initialization.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 Fibre Channel link does not detect a connection to a Fibre Channel 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 Fibre Channel PMC adapter.
Loop ID	The Fibre Channel 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

fcShowDevs

The `fcShowDevs` command displays information about the devices that are accessible from each Fibre Channel interface. The display shows the LUN that the ADIC Gateway 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.

MyGateway > fcShowDevs

FC 1:

LUN	Chan	Id	Lun	Vendor	Product	Rev	SN
0	0	0	0	ADIC	Gateway	32b2	00112
1	2	3	1	XXX	2105E20	1206	128FC144
2	2	3	2	XXX	2105E20	1206	12AFC144
3	2	4	1	XXX	2105E20	1206	326FC144
4	2	4	2	XXX	2105E20	1206	328FC144
5	2	5	1	XXX	2105E20	1206	526FC144
6	2	5	2	XXX	2105E20	1206	528FC144
7	2	6	1	XXX	2105E20	1206	726FC144
8	2	6	2	XXX	2105E20	1206	728FC144

FC 4:

LUN	Chan	Id	Lun	Vendor	Product	Rev	SN
0	0	0	0	ADIC	Gateway	32b2	00112
1	2	3	1	XXX	2105E20	1206	128FC144
2	2	3	2	XXX	2105E20	1206	12AFC144
3	2	4	1	XXX	2105E20	1206	326FC144
4	2	4	2	XXX	2105E20	1206	328FC144
5	2	5	1	XXX	2105E20	1206	526FC144
6	2	5	2	XXX	2105E20	1206	528FC144
7	2	6	1	XXX	2105E20	1206	726FC144
8	2	6	2	XXX	2105E20	1206	728FC144

value = 6 = 0x6

MyGateway >

fcShowNames

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

Gateway >fcShowNames

Ctrlr	Id	Bs	Dv	Fn	ISP	Type	Node Name	Port Name
1	00	06	00	2300	10000060.451603bb	20010060.451603bb		
2	00	18	00	2300	10000060.451603bb	20040060.451603bb		

value = 64 = 0x40 = '@'

Gateway >

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 Fibre Channel Controller, ISP2300.
Node Name	The Fibre Channel node name for the ADIC Gateway.
Port Name	The Fibre Channel port name for the interface.

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.

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

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.

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

hardwareConfig

In order to use this command, the ADIC Gateway must be in diagnostic mode. The `hardwareConfig` command records the configurations of installed FRUs by copying them to the nonvolatile vital product data (VPD) stored on the ADIC Gateway base. The fields that are updated are the SCSI channel types and PMC

card types. The service representative enters the `hardwareConfig` command after replacing any FRUs. This causes the ADIC Gateway to update the VPD.

```
Gateway > hardwareConfig
==== Recording Hardware Configuration ====
  Scanning PMC option slots...
  Scanning SCSI IO Modules...
  Checking memory sizes...
MemSize PCI-0 is 64 Mbytes ...Done
value = 0 = 0x0
Gateway >
```

help

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

```
Gateway > 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
cd "path"    Set current working path
copy ["in"][,"out"] Copy in file to out file (0
= std in/out)
h [n]        Print (or set) shell history
ls ["path"[,long]] List contents of directory
ll ["path"]  List contents of directory -
long format
pwd          Print working path
rename "old","new" Change name of file
rm ["name"]  Remove (delete) a file
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", "as400", "  autosense/nt"...
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 = 0 = 0x0
Gateway >

```

hlthChkHelp

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

```

Gateway > 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
Gateway >
```

hlthChkIntervalGet

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

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

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.

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

hlthChkLevelGet

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

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

hlthChkLevelSet

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

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

Gateway >

hlthChkNow

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

```
Gateway > 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
Gateway >
```

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, `ffs:/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.

```
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.

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

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, `ffs:/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
```

```
Gateway > host "delete", "plato"
Gateway >
```

host "list"

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

The `host` utilities maintain a host file, `ffs:/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.

```
Gateway > 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
Gateway >
```

hostNameSet

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

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

hostTypeShow

The `hostTypeShow` command displays the host type setting for each Fibre Channel. The possible host types are "nt" "aix" "solaris" "hp-ux" "netware" "gateway" "switch" "generic" "unisys" "as400" "autosense/nt" "fcr-2" and "pv-136t-fc"

```
Gateway > hostTypeShow
FC 1: Type 2 - nt
FC 4: Type 1 - solaris
```

```
value = 0 = 0x0
Gateway >
```

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.

```
Gateway > 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
Input histogram:
  destination unreachable: 1
  0 message response generated
value = 30 = 0x1e
Gateway >
```

ifShow

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

```
Gateway > ifShow
lnPci (unit number 0):
  Flags: (0x63) UP BROADCAST ARP RUNNING
  Internet address: 192.168.1.54
  Broadcast address: 192.168.1.255
  Netmask 0xffffffff00 Subnetmask 0xffffffff00
  Ethernet address is 00:60:45:0d:00:c0
  Metric is 0
  Maximum Transfer Unit size is 1500
  13 packets received; 12 packets sent
  0 input errors; 0 output errors
  0 collisions
lo (unit number 0):
  Flags: (0x69) UP LOOPBACK ARP RUNNING
  Internet address: 127.0.0.1
  Netmask 0xff000000 Subnetmask 0xff000000
  Metric is 0
  Maximum Transfer Unit size is 4096
  4 packets received; 4 packets sent
```

```
    0 input errors; 0 output errors
    0 collisions
value = 18 = 0x12
Gateway >
```

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.

```
Gateway > inetstatShow
Active Internet connections (including servers)
PCB  Proto Recv-Q Send-Q Local Address  Foreign Address
(state)
-----
-----
c1fee18c TCP      0    0 192.168.1.59.23  206.0.64.117.4239
ESTABLISHED
c1fee40c TCP      0    0 0.0.0.0.52787   0.0.0.0.0        LISTEN
c1fee58c TCP      0    0 0.0.0.0.21     0.0.0.0.0        LISTEN
c1fee68c TCP      0    0 0.0.0.0.23     0.0.0.0.0        LISTEN
c1feea0c TCP      0    0 0.0.0.0.513    0.0.0.0.0        LISTEN
c1fee48c UDP      0    0 0.0.0.0.161    0.0.0.0.0
value = 1 = 0x1
Gateway >
```

initializeBox

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

Attention: 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.

```
Gateway > ipstatShow
total 8380
badsum 0
tooshort 0
toosmall 0
```

```
        badhlen  0
        badlen   0
        fragments 0
        fragdropped 0
        fragtimeout 0
        forward  0
        cantforward 0
        redirectsent 0
```

```
value = 1 = 0x1
Gateway >
```

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 ADIC Gateway that contains a license key for the VPS and Data Mover features.

```
Gateway > licenseShow
License "wsk96-sd59a": Valid
  Features:
    VPS,
    Data Mover.
value = 1 = 0x1
Gateway >
```

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.

```
Gateway > loggerDump 4
*** Dumping 4 (1018 through 1021) of 1021 records ***
000008 1018 0d:00h:00m:07s:22t -- SCSI 2: Bus RESET
000009 1019 0d:00h:00m:07s:22t -- Target device added: index 0,
handle 0xc0ec2600
000010 1020 0d:00h:00m:08s:18t -- Target device added: index
10, handle 0xc0ad2590
000011 1021 0d:00h:00m:08s:28t -- SCSI 2: New Device at Id 6,
Lun 0
Gateway >
```

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

Table B-2: Event Log Levels

Level	Name	Explanation
0	Notice	Events which are never shown by the remote event viewer but are recorded in the ADIC Gateway event log
1	Warning	Conditions that should always be reported, such as temperature alarms and device removals
2	Information	Events that might result in a later problem
3	All Events	Events that are not errors or warnings

The following is an example dump after a typical boot sequence with four target devices added (one additional one is shown; that is the Command and Control LUN of the ADIC Gateway itself).

```
Gateway > loggerDumpCurrent 1
*** Dumping 9 (1010 through 1018) current records with level >=
0 ***
000001 0d:00h:00m:05s:56t -- NOTICE: CS and LOGGING STARTED
000002 0d:00h:00m:07s:19t -- FCAL 1: LIP occurred
000003 0d:00h:00m:07s:19t -- FCAL 1: Loop up
000004 0d:00h:00m:07s:22t -- SCSI 1: Bus RESET
000005 0d:00h:00m:07s:22t -- SCSI 2: Bus RESET
000006 0d:00h:00m:07s:22t -- Target device added: index 0,
handle 0xc0ec2600
000007 0d:00h:00m:08s:18t -- Target device added: index 9,
handle 0xc1f9e090
000008 0d:00h:00m:08s:18t -- Target device added: index 10,
handle 0xc0ad2590
000009 0d:00h:00m:08s:28t -- SCSI 2: New Device at Id 6, Lun 0
value = 0 = 0x0
Gateway >
```

ls or ll

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

```
Gateway >
CONFIG
```

```
LOG
VXWORKST.Z
SNA.RC
MGMT
MT
value = 0 = 0x0
Gateway >
```

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.

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

mapCompressDatabase

Attention: 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 ADIC Gateway 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 VPS access settings. Because devices will be assigned new addresses, clearing the VPS database ensures that hosts will not have access to the wrong LUNs. Accepting this option requires that the system administrator must reassign VPS access permissions between the hosts and LUNs.

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

Existing VPS 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 'ffs:config/  
device.map'  
Device Map Compressed  
- Do you want to clear VPS Access Settings? (y or n) y  
VPS Access Cleared  
value = 23 = 0x17  
Gateway >
```

mapHelp

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

```
Gateway > 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  
Gateway >
```

mapRebuildDatabase

Attention: 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 ADIC Gateway 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 ADIC Gateway 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 VPS access settings. Because devices will be assigned new addresses, clearing the VPS database ensures that hosts will not have access to the wrong LUNs. Accepting this option requires that the system administrator must reassign VPS 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 ADIC Gateway has caused the logical unit numbers to increase beyond the host's supported level.

```
Gateway > mapRebuildDatabase
This command will clear the Persistent Device Map.
Existing VPS Access Settings may become invalid and
should be cleared because LUN assignments may change!
These changes will take effect when the Gateway 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 VPS Access Settings?
(y or n) y
VPS Access Cleared - Reboot Gateway? (y or n) y== reboot
Gateway >
```

mapShowDatabase

The ADIC Gateway 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.

```
Gateway > mapShowDatabase
devId Type Chan tId tLun UID
-----
000 SNA 127 127 127 00000060:450d00c0
001 SCSI 001 003 000 00000060:450d00c0
002 SCSI 001 002 000 00000060:450d00c0
003 SCSI 001 001 000 00000060:450d00c0
004 SCSI 002 002 000 00000060:450d00c0
005 SCSI 002 000 000 00000060:450d00c0
006 SCSI 002 006 000 00000060:450d00c0
007 SCSI 002 009 000 00000060:450d00c0
008 SCSI 002 002 001 00000060:450d00c0
009 SCSI 002 005 000 00000060:450d00c0
010 SCSI 002 005 001 00000060:450d00c0
011 SCSI 001 000 000 00000060:450d00c0
012 SCSI 001 006 000 00000060:450d00c0
value = 0 = 0x0
Gateway >
```

devId	The index of the device in the database.
Type	The type of interface where the device is connected. SNA indicates an internal device. SCSI or Fibre Channel 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 Fibre Channel interface, the Unique ID of the device. For SCSI interface, the ADIC Gateway Unique ID.

mapShowDevs

The ADIC Gateway 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.

```
Gateway > mapShowDevs
devId Type Chan iId iLun UID          tId tLun Handle  Itl
-----
000 SNA  127  127 127  00000060.450d00c0 001 000  c0ec2600h
00000000h
009 SCSI 002  005 000  09000060.450d00c0 255 255  c1f9e090h
00000000h
010 SCSI 002  005 001  0a000060.450d00c0 255 255  c0ad2590h
00000000h
012 SCSI 001  006 000  0c000060.450d00c0 255 255  c1ffdf10h
c1ffdc80h
value = 0 = 0x0
Gateway >
```

Type	The type of interface where the device is attached to the ADIC Gateway.
Chan	The channel number of the interface
iId	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 Fibre Channel interface – Unique ID of the device. For SCSI interface, a constructed Unique ID based on the ADIC Gateway's Unique ID.

tId	Target ID mapping for SCSI Initiators
tLun	Target LUN mapping for SCSI Initiators
Handle	An internal pointer used for some diagnostic operations.
ItI	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.

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

Attention: 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 ADIC Gateway. You must reboot the ADIC Gateway after executing this command for the new setting to take effect.

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.

```
Gateway > mbufShow
type      number
-----
FREE      :    23
DATA      :     0
HEADER    :     1
SOCKET    :     0
PCB       :    11
RTABLE    :     3
HTABLE    :     0
ATABLE    :     0
```

```
SONAME : 0
ZOMBIE : 0
SOOPTS : 0
FTABLE : 0
RIGHTS : 0
IFADDR : 2
TOTAL : 40
number of mbufs: 40
number of clusters: 4
number of interface pages: 0
number of free clusters: 4
number of times failed to find space: 0
number of times waited for space: 0
number of times drained protocols for space: 0
value = 47 = 0x2f = '/'
Gateway >
```

netHelp

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

```
Gateway > 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
Gateway >
```

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 ADIC Gateway to normal operating conditions.

This command is used only to transition an ADIC Gateway 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 ADIC Gateway reboots. The `normalBoot` command will then reboot the unit.

reboot

The `reboot` command requests that the ADIC Gateway shut down existing operations and then restart. This is the preferred method of restarting the ADIC Gateway. There are processes running within the ADIC Gateway 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. Only after all pending data has successfully been written to flash, will the ADIC Gateway start a reset cycle.

```
Gateway > reboot
```

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 ADIC Gateway.

```
Gateway > reset
```

ridtag ["value"]

The `ridtag` command is used to change the replacement identifier (RID) tag for the ADIC Gateway after it has been replaced by the service representative. This should be the final step after replacing and verifying that the replacement unit is performing satisfactorily.

The `sysVpdShow` command will display the RID tag. Before replacing the ADIC Gateway, the customer engineer must determine the existing RID tag, if there is one, or the original serial number if no replacement has been made.

If the `ridtag` command is entered with a string, that string becomes the RID tag recorded for the unit.

```
Gateway > ridtag "12D345677"  
*** value = 0 = 0x0
```

If a string is not entered, the existing RID tag is displayed.

```
Gateway > ridtag  
RID Tag = 12D345677  
value = 0 = 0x0  
Gateway >
```

On original equipment, the RID tag will be blank.

rm

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

```
Gateway > rm "file.ext"
```

route

The `route` utilities maintain a route file, `ffs:/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

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

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

route "delete","destination","gateway"

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

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

route "list"

The `route "list"` command lists the existing routes.

```
Gateway > route "list"
Destination      Gateway
-----
socrates         bruno
Destination      Gateway
-----
 200.0.0         bruno
value = 0 = 0x0
Gateway >
```

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 ADIC Gateway. 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 ADIC Gateway extracts individual firmware modules from the file and saves them temporarily in memory. After the file transfer

has completed, the ADIC Gateway copies the firmware modules to nonvolatile flash memory. The ADIC Gateway must be rebooted to use the updated firmware.

```
Gateway > 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
```

Gateway >
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.

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

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.

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

For information about Ultra2/3 SCSI channels, see the `xscsiAltIdGet` command.

scsiAltIdSet [channel],[id]

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

Parameter	Value
SCSI Channel number	1 - 4
ID	0 -15

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

Attention: You must reboot the ADIC Gateway after executing this command for the new setting to take effect.

To set Alternate ID numbers for Ultra 2/3 SCSI Channels, see the `xscsiAltIdSet` command

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.

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

For information about Ultra2/3 SCSI channels, see the `xscsiHostChanGet` command.

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 - 4	Selected Channel
Mode	0	Initiator
	1	Target

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

Attention: You must reboot the ADIC Gateway after executing this command for the new settings to take effect.

To set Host Channel Modes for Ultra 2/3 SCSI Channels only, see the `xscsiHostChanSet` command.

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.

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

For information about Ultra2/3 SCSI channels, see the `xscsiHostIdGet` command.

scsiHostIdSet [channel],[id]

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

Parameter	Value
Channel number	1 - 4
ID	0 -15

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

Attention: You must reboot the ADIC Gateway after executing this command for the new settings to take effect.

To set Host IDs for Ultra 2/3 SCSI Channels only, see the `xscsiHostIdSet` command.

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.

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

Notes:

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.

If a channel is specified, that channel is scanned and the prompt is returned on completion. If no channel is specified (or 0 is specified), SCSI Channels 1 through 4 are scanned in sequence and the prompt

is returned on completion.

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.

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

For information about Ultra2/3 SCSI channels, see the `xscsiResetDisableGet` command.

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
Channel number	1 - 4	Selected Channel
Mode	0	Enable Reset on Power Up
	1	Disable Reset on Power Up

```
Gateway > scsiResetDisableSet 1,1
Reset Disable set to TRUE for SCSI 1
```

will take effect upon reboot
value = 0 = 0x0
Gateway >

To specify Bus Reset Settings for Ultra2/3 SCSI channels only, see the `xscsiResetDisableSet` command

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:

```
Gateway > 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
Gateway >
```

- 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.

```
Gateway > scsiTermGet
  SCSIbus Termination -----
  SCSI 1 Enabled - default
  SCSI 2 Enabled
value = 0 = 0x0
Gateway >
Gateway > scsiTermGet 2
  SCSIbus Termination -----
  SCSI 2 Enabled - default
value = 0 = 0x0
Gateway >
```

Information solely about Ultra2/3 SCSI channels may be requested by entering the `xscsiTermGet` command.

scsiTermSet [channel],[termination]

The `scsiTermSet` command enables or disables the termination for the SCSI Channel.

Parameter	Value	Meaning
Channel number	1 - 4	Selected Channel
Termination	0	Enable Termination
	1	Disable Termination

To set termination status for Ultra 2/3 SCSI Channels only, use the `xscsiTermSet` command.

setFcFrameSize [channel],[size]

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

Parameter	Value
SAN Channel Number	1 - 6
Frame size	512,1024, or 2048

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

Attention: You must reboot the ADIC Gateway after executing this command for the new setting to take effect.

```
Gateway > setFcFrameSize 1,2048
value = 2048 = 0x800
Gateway >
```

setFcHardId [channel],[id]

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

Parameter	Value	Meaning
Channel	1 - 6	
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.

```
Gateway > setFcHardId 1,4
value = 0 = 0x0
Gateway >
```

Attention: You must reboot the ADIC Gateway 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 ADIC Gateway 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 SAN Connections
	1 - 6	Changes will apply to SAN Connection 1 - 6, as specified
OS	"nt" "aix" "solaris" "hp-ux" "netware" "gateway" "switch" "generic" "unisys" "as400" "fcr-2" "pv-136t-fc" "autosense /nt"	

Attention: You must reboot the ADIC Gateway after executing this command for the new setting to take effect.

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

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.

setSnaCCLun [newLUN]

The `setSnaCCLun` command reassigns the ADIC Gateway 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.

Attention: 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.

shellLock

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.

```
Gateway > shellLock 1
value = 1 = 1x1
Gateway >
  .. Shell is now locked
Gateway > shellLock 0
value = 0 = 0x0
```

showScsiAssign

Lists the current assigned addresses for the indicated channel. If channel is omitted, or is 0 (zero) then all assignments are shown for all Target channels.

sncFeatureEnable "licensekeystring"

The `sncFeatureEnable` command enables the optional Data Mover feature. You enable the feature by entering the unique license key.

```
Gateway > sncFeatureEnable "BVRXC-G79DN"  
value = 0 = 0x0  
Gateway >
```

If the license key was factory-installed, you can enter the word "enable" rather than the actual license key.

```
Gateway > sncFeatureEnable "enable"  
value = 0 = 0x0  
Data Mover License is Valid  
Gateway >
```

If `value = 1 = 0x1` message is displayed, it means the license is already installed and Data Mover 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 ADIC Gateway.

```
Gateway > snmpCommunitiesShow  
  
ReadCommunity  ViewIndex  
-----  
pub            1  
ReadCommunity  ViewIndex  
-----  
public        1  
icmp          2  
  
WriteCommunity ViewIndex  
-----  
priv          1  
private       1  
TrapCommunity
```

```
-----  
private  
value = 9 = 0x9  
Gateway >
```

snmpHelp

The `snmpHelp` command displays a list of the snmp commands.

```
Gateway > 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  
Gateway >
```

snmpReadCommunityAdd "string"

The `snmpReadCommunityAdd` command adds the specified string to the list of accepted strings for SNMP Read operations (Get and GetNext).

```
Gateway > snmpReadCommunityAdd "DISC Inc."  
Success  
value = 4 = 0x4  
Gateway >
```

snmpReadCommunityRemove "string"

The `snmpReadCommunityRemove` command removes the specified string from the list of accepted strings for SNMP Read operations.

```
Gateway > snmpReadCommunityRemove "DISC Inc."  
Success  
value = 3 = 0x3  
Gateway >
```

snmpTrapCommunitySet "string"

The `snmpTrapCommunitySet` command sets the community string passed with all SNMP traps.

```
Gateway > snmpTrapCommunitySet "DISC Inc."  
Success  
value = 8 = 0x8  
Gateway >
```

snmpWriteCommunityAdd "string"

The `snmpWriteCommunityAdd` command adds the specified string to the list of accepted strings for SNMP Write operations (Set).

```
Gateway > snmpWriteCommunityAdd "DISC"  
Success  
value = 0 = 0x0  
Gateway >
```

snmpWriteCommunityRemove "string"

The `snmpWriteCommunityRemove` command removes the specified string from the list of accepted strings for SNMP Write operations.

```
Gateway > snmpWriteCommunityRemove "DISC"  
Success  
value = 0 = 0x0  
Gateway >
```

sysConfigShow

The `sysConfigShow` command displays current system parameter settings. The display shows whether or not the ADIC Gateway 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 ADIC Gateway Fibre Channel Node address.

```
Gateway > sysConfigShow  
Current System Parameter Settings:  
Command 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: 0.60.45.16.1.4  
FC Node WWN: 10000060.45160104  
value = 0 = 0x0  
Gateway >
```

sysVpdShow or sysVpdShowAll

The `sysVpdShow` command displays Vital Product data information. The Vital Product Data for the ADIC Gateway includes such items as serial numbers and installed memory sizes, as shown below.

```
Gateway > sysVpdShow
```

```
===== VPD =====  
name SAN Gateway  
uid 00:60:45:16:01:04  
s/n 100111  
mfg DISC, Inc.  
board OntarioII 1.1  
" s/n 08357659  
flash 2Mbyte  
dram 32Mbyte  
slot1 10772100 FCOSW  
scsi 1: DET 2: DET  
EC OTA08000H  
RID Tag  
value = 0 = 0x0  
Gateway >
```

The fields are:

- The product's Name, up to 16 characters
- The product's unique Ethernet MAC address, 32 characters displayed as hexadecimal bytes separated by colons
- The product's serial number, up to 16 characters
- The product's manufacturer, up to 16 characters
- The name of the motherboard contained in the base unit, up to 16 characters
- The motherboard's serial number, up to 16 characters
- The size of the FLASH memory on the motherboard
- The size of the DRAM on the motherboard
- The GBIC type installed in SAN Connection slot one
- The SCSI type for each of the two channels, DET for "Differential, terminated" and SET for "Single-ended, terminated"
- The Engineering Change (EC) level for the motherboard, up to 16 characters
- The RID Tag identifier, up to 16 characters

The `sysVpdShowAll` shows a little more information and includes product data for the Fibre Channel GBIC.

```
Gateway > sysVpdShowAll
===[ Vital Product Data ]===

--[ Base Assembly ]-----
Name   Gateway
Mfg    ADIC
UID    00:60:45:16:01:04
S/N    100111
Assy   HCO OTA08000H
Board  OntarioII 1.1
      " S/N 08357659
Flash  2 Mbyte
Dram   32 Mbyte
RID Tag 100111

--[ Slot 1 ]-----
Type   10772100 FCOSW
S/N    123456
UID    0060.45160065
HCO    SC004120H
value = 0 = 0x0
Gateway >
```

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 ADIC Gateway needs to be replaced. The ADIC Gateway 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.

```
Gateway > sz "config.cfg"
Configuration Download Complete: config.cfg
value = 0 = 0x0
Gateway >
```

targets

The ADIC Gateway 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.

```
Gateway > targets
Idx Tdev      Vendor  Product      Rev | Type Specific
-----|-----
 0 0xc194a400 DISC, Inc. SAN Gateway Local 0252 | Cmd/Cntrl
Status 0h
 2 0xc1ffc390 IBM     03570C11     5324 | Tape: Blk Size 32768 ,
flags 7h
 3 0xc1ffc290 IBM     03570C11     5324 | Changer: flags 7h
value = 4 = 0x4
Gateway >
```

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.

```
Gateway > 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 unsend 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 = '$'
Gateway >

```

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 ADIC Gateway. When the ADIC Management Console is running, it inserts its address into the table automatically. The broadcast address for the Ethernet port is also automatically included in the table.

```

Gateway > trapDestAdd 192.168.1.75
value = 0 = 0x0
Gateway >

```

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

ADIC Gateway. When the ADIC Management Console is running, it inserts its address into the table automatically. The broadcast address for the Ethernet port is also automatically included in the table.

```
Gateway > trapDestRemove "10.0.0.2"  
value = 0 = 0x0  
Gateway >
```

trapDestShow

The `trapDestShow` command allows you to view the SNMP trap destination table maintained within the ADIC Gateway. When the ADIC Management Console is running, it inserts its address into the table automatically. The broadcast address for the Ethernet port is also automatically included in the table

```
Gateway > 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  
Gateway >
```

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.

```
Gateway > 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  
Gateway >
```

uptime

The `uptime` command displays the elapsed time since the last boot of the ADIC Gateway.

```
Gateway > uptime
Elapsed time since reset 4d:23h:12m:46s:10t
value = 10 = 0xa
Gateway >
```

The example indicates that 4 days, 23 hours, 12 minutes, 46 seconds and 10 clock ticks have elapsed since the ADIC Gateway 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 ADIC Gateway 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 ADIC Gateway 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.

```
Gateway > userAdd "nancy", "password"
value = 0 = 0x0
Gateway >
```

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 ADIC Gateway, and then add all user names and passwords again.

```
Gateway > userDelete "nancy", "password"
value = 0 = 0x0
Gateway >
```

userList

The `userList` command displays the contents of the password file (passwords are encrypted).

```
Gateway > userList
Name : Password
nancy : SyecycRz
fred : b9dczebQbd
martha : RQQdRedb9d
admin : cScQRSQzzz
value = 0 = 0x0
Gateway >
```

userHelp

The `userHelp` command displays a list of the user commands.

```
Gateway > 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
Gateway >
```

version

The ADIC Gateway is an intelligent device and has software that controls all functions. The revision of that firmware can be displayed with the `version` command. The first line displayed is the ADIC Gateway firmware version. The lines that follow pertain to the firmware version.

```
Gateway > version
Gateway Version 0339.11 Built Dec 13 1999, 15:14:14
VxWorks (for DISC, Inc. (i960RD)) version 5.3.1.
Kernel: WIND version 2.5.
value = 26 = 0x1a
Gateway >
```

vpnFeatureEnable

The `vpnFeatureEnable` command enables the optional Virtual Private Map feature. You enable the feature by entering the unique license key. If the license

key was factory installed, VPM is already enabled. See also the `licenseShow` command.

```
Router> vpmFeatureEnable "H822F-KCRV2"  
value = 0 = 0x0  
Router >
```

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 database.

vpsAccessClear [disable code]

The `vpsAccessClear` 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.

```
Gateway >vpsAccessClear 0xfacade02  
value = 0 = 0x0  
Gateway >
```

vpsAccessSet [hostindex],<Starting LUN>,<Ending LUN>,<Access>

The `vpsAccessSet` command sets the access for the specified range of LUNs 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 (see page 287).

Access	
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.

```
Gateway > vpsAccessSet 1,2,32,1  
value = 0 = 0x0  
Gateway >
```

vpsActiveSet

The `vpsActiveSet` command places VPS 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 inactive. See the `vpsInactiveSet` command.

```
Gateway > vpsActiveSet
value = 0 = 0x0
Gateway >
```

If VPS is already active, the following is displayed.

```
Gateway > vpsActiveSet
VPS: Already Active
value = 21 = 0x15
Gateway >
```

vpsConnectionSet [hostindex], "host connection string"

The `vpsConnectionSet` 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 `vpsShow -1` command.

```
Gateway > vpsConnectionSet 1, "ScsiPort2 [0:0:0] (QLA2100)"
value = 0 = 0x0
Gateway >
```

vpsFeatureEnable "license key string"

The `vpsFeatureEnable` command enables the VPS feature. Each license key is unique for each ADIC Gateway serial number. If the feature is factory-enabled you can specify "enable" rather than an actual license key.

vpsHelp

The `vpsHelp` command displays a list of the Virtual Private SAN commands.

```
Gateway > vpsHelp
vpsAccessApply
vpsAccessClear <disable code>
vpsAccessSet [host index], <starting lun>, <ending lun>, <access>
vpsActiveSet
vpsConnectionSet [host index], "host connection string"
vpsFeatureEnable "license key string"
vpsHostShow [host index]
```

```

vpsInactiveSet
vpsNameSet [host index], "name string"
vpsShow [host index]
vpsSparseAccessSet [host index], "LUN string" <access>
vpsTypeSet [host index] "OS type string"

```

See User's Guide for more information

```

value = 0 = 0x0
Gateway >

```

vpsHostShow [hostIndex]

The `vpsHostShow` command displays all known Virtual Private SAN 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 <code>vpsShow</code> 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 VPS information for host Id 1.

```

Gateway > 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 00 01 01 00
  16: 00 00 00 00 00 00 00 00 00 00 01 01 00 00 00 00 00
  32: 00 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 00
  64: 00 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 00
  96: 00 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 00
  128: 00 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 00
  160: 00 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 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
Gateway >

```

vpsInactiveSet

The `vpsInactiveSet` command de-activates VPS making all LUNs available to all host connections. This command typically would be used when troubleshooting a SAN configuration. It removes VPS access control without deleting VPS access settings. Use the `vpsActiveSet` command to re-activate VPS.

```

Gateway > vpsInactiveSet
value = 0 = 0x0
Gateway >

```

If VPS is already inactive, the following is displayed.

```

Gateway > vpsInactiveSet
VPS: Already Inctive
value = 23 = 0x17
Gateway >

```

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 `vpsShow -1` command.

```

Gateway > vpsNameSet 1, "LANDERS"
value = 0 = 0x0
Gateway >

```

vpsShow [hostIndex]

The `vpsShow` command displays information about hosts that have been registered with Virtual Private SAN based on the value of hostIndex.

Tip: You can enter `vps` as a shortcut for `vpsShow -1`.

Hostindex	Meaning
-1	Displays brief list of all known host connections

Hostindex	Meaning
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 information for the hosts that have been registered by VPS. 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 Fibre Channel connection to the SAN Gateway.

```
Gateway > 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
Gateway >
```

vpsSparseAccessSet [hostindex], "LUN string", [Access]

The `vpsSparseAccess` 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.

```
Gateway > vpsSparseAccessSet 1, "1,2,3,4,6,9,22,23,45," 1
value = 0 = 0x0
Gateway >
```

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 can be "nt" "aix" "solaris" "hp-ux" "netware" "gateway" "switch" "generic" "unisys" "as400" "autosense/nt" "fcr-2", or "pv-136t-fc". Additional information can be appended to the end of the string.

The following command example shows setting the host type to NT 4.0 SP5 for host Id 1.

```
Gateway > vpsTypeSet 1, "NT 4.0 SP5"
value = 0 = 0x0
Gateway >
```

xscsiAltIdGet [channel]

The `xscsiAltIdGet` command displays the alternate ID number for a specified Ultra2/3 SCSI Channel.

```
Gateway > xscsiAltIdGet 5
SCSIbus   AltId  -----  -----
XSCSI 5    Auto
value = -1 = 0xffffffff
Gateway >
```

For information about alternate ID numbers for Ultra SCSI channels, see the `scsiAltIdGet` command.

xscsiAltIdSet [channel], [id]

The `xscsiAltIdSet` command sets the Alternate Id for an Ultra2/3 SCSI Channel.

Channel numbers 1 - 6 (Ultra2/3 SCSI)

Id channel numbers 0-15

```
Gateway > xscsiAltIdSet 6,3
Alternate Id set to 3 for SCSI 6 will take effect upon reboot
value = 0 = 0x0
Gateway >
```

Attention: You must reboot the ADIC Gateway after executing this command for the new setting to take effect.

To set Alternate ID numbers for Ultra SCSI channels, see the `scsiAltIdSet` command.

xscsiHostChanGet [channel]

The `xscsiHostChanGet` command displays Host Channel mode for a specified Ultra2/3 SCSI Channel.

```
Gateway > xscsiHostChanGet 5
SCSIbus   HostChan  -----
XSCSI 5   Channel is Initiator
value = -1 = 0xffffffff
Gateway >
```

For information about Host Channel modes for Ultra SCSI channels, see the `scsiHostChanGet` command.

xscsiHostChanSet [channel], [mode]

The `xscsiHostChanSet` command sets the Channel Mode to Target or Initiator for an Ultra 2/3 SCSI Channel.

```
Channel numbers 1 - 6 (Ultra2/3 SCSI)
Mode 0   Initiator Mode (False)
Mode 1   Target Mode (True)
Gateway > xscsiHostChanSet 6,1
Host Chan set to TRUE for XSCSI 6 will take effect upon reboot
value = 0 = 0x0
Gateway >
```

Attention: You must reboot the ADIC Gateway after executing this command for the new settings to take effect.

To set Host Channel Modes for Ultra SCSI channels, see the `scsiHostChanSet` command.

xscsiHostIdGet [channel]

The `xscsiHostIDGet` command displays the Host ID number for a specified Ultra 2/3 SCSI Channel.

```
Gateway > xscsiHostIdGet 5
SCSIbus   HostId  -----
XSCSI 5   7
value = -1 = 0xffffffff
Gateway >
```

For information about Host IDs for Ultra SCSI channels, see the `scsiHostIdGet` command.

xscsiHostIdSet [channel], [id]

The `xscsiHostIdSet` command sets the Host ID for a specified Ultra 2/3 SCSI Channel.

Channel numbers 1 - 6 (Ultra2/3 SCSI)

Id numbers can be 0-15

```
Gateway > xscsiHostIdSet 5,9
Host Id set to 9 for XSCSI 5
will take effect upon reboot
value = 0 = 0x0
Gateway >
```

Attention: You must reboot the ADIC Gateway after executing this command for the new settings to take effect.

To set Host IDs for Ultra SCSI channels, see the `scsiHostIdSet` command.`xscsiRescan`

The command `xscsiRescan` requests a SCSI rescan for new devices on the Ultra 2/3 channels 1 - 6. If channel is specified (1, 2, 3, 4, 5, or 6), then only that channel is scanned. Otherwise, if channel is not specified or if channel is 0, then all channels are scanned.

```
Gateway > xscsiRescan 4
Done
value = 0 = 0x0
Gateway >
```

Notes:

1. 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.
2. If a channel is specified, that channel is scanned and the prompt is returned on completion. If no channel is specified (or 0 is specified), SCSI Channels 1 through 6 are scanned in sequence and the prompt is returned on completion.
3. 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).
4. 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.

To rescan Ultra SCSI channels, see the `scsiRescan` command.

xscsiResetDisableGet [channel]

The `xscsiResetDisableGet` command displays the SCSI Bus Reset On Power Up setting for a specified Ultra 2/3 SCSI Channel. False means that SCSI Bus Reset On Power Up is enabled. True means that SCSI Bus Reset On Power Up is disabled.

```
Gateway > xscsiResetDisableGet 5
SCSIbus   Reset Disable  -----
XSCSI 5   FALSE - default
value = -1 = 0xffffffff
Gateway >
```

For information about Bus Reset Settings for Ultra SCSI channels, see the `scsiResetDisableGet` command.

xscsiResetDisableSet [channel], [mode]

The `xscsiResetDisableSet` command sets the SCSI Bus Reset On Power Up mode for an Ultra 2/3 SCSI Channel.

Channel numbers 1 - 6 (Ultra2-SCSI)

Mode 0 = Enable Bus Reset On Power Up

Mode 1 = Disable Bus Reset On Power Up

```
Gateway > xscsiResetDisableSet 5,1
Reset Disable set to TRUE for XSCSI 5
will take effect upon reboot
value = 0 = 0x0
Gateway >
```

To specify Bus Reset Settings for Ultra SCSI channels, see the `scsiResetDisableSet` command.

xscsiTermGet [channel]

The `xscsiTermGet` command displays termination status information for the specified Ultra 2/3 SCSI channel.

```
Gateway> xscsiTermGet 6
SCSIbus   Termination  -----
XSCSI 6   Enabled
```

```
value = 0 = 0x0
Gateway >
```

For termination status Information for Ultra SCSI channels, see the `scsiTermGet` command.

xscsiTermSet [channel], [termination]

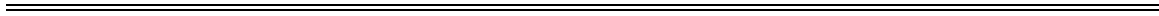
The `xscsiTermSet` command enables or disables the termination for an Ultra 2/3 SCSI Channel.

```
Channel numbers  1 - 6 (Ultra2/3 SCSI)
termination 0    = Enable Termination
termination 1    = Disable Termination
```

```
Gateway > xscsiTermSet 5,1
Termination for XSCSI 5
will take effect upon channel reset
value = 0 = 0x0
Gateway >
```

Attention: You must reboot the ADIC Gateway after executing this command for the new settings to take effect

To set termination status for Ultra SCSI Channels, see the `scsiTermSet` command.



Appendix C: Diagnostic Command Reference

This section is a reference for the procedures used when diagnostics are required.

Boot Modes

The ADIC Gateway has two modes of operation: `normal mode` and `diagmode`. Two commands are available from the service terminal to reboot the ADIC Gateway to the desired mode. The ADIC Gateway remains in the existing mode until it has been directed to reboot in the other mode.

When the ADIC Gateway 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 ADIC Gateway interfaces. In addition, the device drivers for the Ethernet, Fibre Channel, 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 SAN Gateway's diagnostic module are required (see "diagBoot" on page 298). Perform the following:

1. Stop all I/O.

Attention: Before entering `diagmode`, you must disconnect all SCSI and FC cables from the ADIC Gateway. If you do not, the data on the attached disk or tape devices will become corrupted.

2. Power down the ADIC Gateway.
3. Remove the Ethernet cable, if installed.
4. Connect the terminal to the Service Port.
5. Turn on ADIC Gateway 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.
7. If the command prompt displayed on the service terminal is not `diagmode >`, type the `diagBoot` command.
8. Wait for the ADIC Gateway to reboot.

-
-
9. At the `diagmode >` prompt, proceed with the appropriate diagnostic tests.

Restoring Normal Mode

`normalBoot` is performed if the ADIC Gateway was placed in diagnostic mode and needs to be restored to normal operation. See "`normalBoot`" on page 298.

1. If the ADIC Gateway is on, power it off.
2. Connect the terminal to the Service Port, if it is not already connected.
3. Turn on the ADIC Gateway and wait for it to finish booting.
4. From the service terminal, type the `normalBoot` command.
5. Wait for the ADIC Gateway to reboot.
6. At the `Gateway >`, 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 a ADIC Gateway and its attached interfaces and devices.

Manual Health Check

Health Check is performed manually from the service terminal **only** if the ADIC Gateway is in normal mode. This procedure uses the `hlthChkNow` command that performs a "Device Ready" Level Health Check that includes a SCSI device availability check. The SCSI target devices must be connected and turned on so that Health Check can determine their operational status.

For other commands associated with healthchecks, see terms beginning with the `hlthChk` prefix in "Service Port Command Reference" on page 223.

For an explanation of Health Check Levels, see "Health Check" on page 82.

For a list of Health Check Event Descriptions, see at Table 8-2 on page 161.

1. Stop all I/O.
2. Remove the Ethernet cable if installed.

-
-
3. Connect the terminal to the Service Port.
 4. From the service terminal, type the `hlthChkNow` command.
 5. 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.

Event Log Dump

The events that have been logged in the ADIC Gateway's Event Log can be displayed on the service terminal or viewed from the ADIC Management Console. 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.

1. 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.
2. The Event Log holds more than 2000 events. When the log becomes full, the oldest events are overwritten by the most recent events.
3. You can choose to view only those events logged since the ADIC Gateway was last booted or you can view a longer list of events that have accumulated from previous boots.
4. 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` and `loggerDumpCurrent` commands in "Connecting to the Service Port" on page 217.

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 ADIC Gateway performed an error recovery operation and had to reset the Fibre Channel interface to clear a lock-up condition. This event is also recorded in the ADIC Gateway 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 Fibre Channel interface prior to the reset. Follow these steps to retrieve the file.

1. Connect the service terminal to the Service Port (see "Connecting to the Service Port" on page 217).

-
-
2. Press the **Enter** key on the service terminal. If the prompt is not displayed, go to “Service Port MAP” on page 191 to determine whether the RS-232 cable and service terminal are working properly.
 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.
Note: Dump file names end in `.dmp` and the files are automatically deleted whenever you update the ADIC Gateway’s firmware.

Refer to the section ““Saving a Configuration File” on page 220.” 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 and save each file to the service terminal.

Boot Mode Commands

diagBoot

1. This command is used only to transition a ADIC Gateway from normal operations to the special diagnostic mode.
2. The `diagBoot` command first ensures that the `/ffs:mt` directory exists.
3. It copies the existing bootline to a file in the `/ffs:mt` directory on the ADIC Gateway.
4. It installs a new bootline directing the ADIC Gateway to boot using a special diagnostic startup `script /ffs:mt/diagnstk.rc`.
5. It renames the persistent map file `config/device.map` as `config/device.bak` (a new file will be generated after rebooting).
6. It issues a `reboot` command to put the changes into effect.

normalBoot

1. The `normalBoot` command is used only to transition the ADIC Gateway from the special diagnostic mode to resume normal operation.
2. It restores the bootline that was copied by `diagBoot`.
3. It erases the new persistent device map and renames the original map file `config/device.map` – restoring it for use when the ADIC Gateway reboots.

-
-
4. It reboots the ADIC Gateway.

Diagnostic Commands

This section is a reference for the commands that are available when the ADIC Gateway is booted in `diagmode`.

1. The command set is limited while in `diagmode`. You will need to use the `showBox` command and commands (with the suffix `Test`) when testing the DDFm Board, the Ethernet, Fibre Channel, and SCSI interfaces.
2. The Ethernet loop back plug, Fibre Channel loop back plug, and SCSI cable provided in the Service Tool Kit are required for the corresponding loop back test.

Attention: You must disconnect the FC and SCSI cables from the ADIC Gateway. If you do not, the data on the attached disk or tape devices will become corrupted.

`ddfTest`

The `ddfTest` is a comprehensive series of tests designed to exercise all data flow paths.

In the following sample code, “PCI-0” indicates accesses to the DDF board’s primary PCI interface, and “PCI-1” the secondary PCI bus interface. This is useful in isolating problems on one bus but not the other.

```
Diagmode > ddfTest

==== Testing DDF board ====

Bitwalk PCI-0
  0 Passed 1 Passed 2 Passed 3 Passed
Bitwalk PCI-1
  0 Passed 1 Passed 2 Passed 3 Passed
Access PCI-0
  0 Passed 1 Passed 2 Passed 3 Passed 4 Passed 5 Passed 6 Passed
  7 Passed
Access PCI-1
  0 Passed 1 Passed 2 Passed 3 Passed 4 Passed 5 Passed 6 Passed
```

```
7 Passed
Burst PCI-0 Passed
Burst PCI-1 Passed
MemSize PCI-0 is 64 Mbytes
MemSize PCI-1 is 64 Mbytes
Burst Address PCI-0 .....Passed
Burst Address PCI-1 .....Passed
RP DMA PCI-0 Passed
RP DMA PCI-1 Passed
Data Sharing Passed
```

```
DDF Test PASSED
value = 0 = 0x0
```

DESCRIPTION OF TEST MESSAGES

This tests basic access to each “word lane” in the DDF data path. Each PCI bus has four 32-bit word lanes associated with it.

```
Bitwalk PCI-0
 0 Passed 1 Passed 2 Passed 3 Passed
Bitwalk PCI-1
 0 Passed 1 Passed 2 Passed 3 Passed
```

This tests 8, 16, and 32-bit access to the DDF memory array. Numbers 0 to 3 indicate the four work-lanes of the lower bank of DDF memory. Numbers 4 to 7 are the word lanes of the upper bank of DDF memory.

```
Access PCI-0
 0 Passed 1 Passed 2 Passed 3 Passed 4 Passed 5 Passed 6 Passed
7 Passed
Access PCI-1
 0 Passed 1 Passed 2 Passed 3 Passed 4 Passed 5 Passed 6 Passed
7 Passed
```

This tests the DDF board’s PCI burst transfer logic.

```
Burst PCI-0 Passed
Burst PCI-1 Passed
```

This is the memory size as determined from each PCI bus.

```
MemSize PCI-0 is 64 Mbytes
MemSize PCI-1 is 64 Mbytes
```

Then the burst address test is run. This checks for errors in the memory array's address logic. The dots represent a test progress display. Each dot represents 1/16 of the test complete.

```
Burst Address PCI-0 .....Passed
Burst Address PCI-1 .....Passed
```

The next test is the deep burst test.

```
RP DMA PCI-0 Passed
RP DMA PCI-1 Passed
```

The last test looks at data written to one side of the memory and compares it to data read from the other side.

```
Data Sharing Passed
```

An ADIC Gateway without a DDF board will return the following:

```
=== Testing DDF board ===
** DDF init failure **
value = -1 = 0xffffffff

elTest
```

`elTest` is the Ethernet loop back test. The ADIC Gateway must be in diagnostic mode to use this command and a loop back plug must be installed on the Ethernet port.

```
diagmode > elTest
==== 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 > elTest
==== Testing Ethernet ====
Init complete.
Ethernet timeout error
Ethernet timeout error
Ethernet timeout error
Ethernet timeout error
Ethernet timeout error
Ethernet timeout error
Ethernet test reported 6 errors out of 12 iterations
value = 6 = 0x6
```

fcSlotTest [x]

The ADIC Gateway must be in diagnostic mode to use this command and a loop back plug must be connected to the PMC card.

The `fcSlotTest` command performs a confidence test on a Fibre Channel slot. Substitute for `x` the Fibre Channel 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 Fibre Channel slot 1.

```
diagmode > fcSlotTest 1
FC 1 [#####] Iterations 51 Errors 0 - PASSED
Fibre Channel Port 1 returns PASSED
value = 0 = 0x0
diagmode > fcSlotTest 2
FC 1 [#####] Iterations 51 Errors 0 - PASSED
Fibre Channel Port 2 returns PASSED
value = 0 = 0x0
```

The following outputs are examples Fibre Channel 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
```

Note: If the Fibre Channel “link” LED does not come on, the test will not pass.

UNSUCCESSFUL FIBRE TEST 2 (CABLE NOT PLUGGED IN):

```
diagmode > fcSlotTest 2
FC 1 [#####] Iterations 37 Errors 37 - FAILED
Fibre Channel Port 1 returns FAILED
value = -1 = 0xffffffff = pNullDmaDesc + 0xfe4ea9f7
```

scsiChannelTest (x,y)

The ADIC Gateway 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. Parenthesis 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 (3,4)
SCSI-3 -> SCSI-4 [#####] 10 iterations PASSED
SCSI-4 -> SCSI-3 [#####] 10 iterations PASSED
value = 0 = 0x0
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
```

supportDump

The `supportDump` command outputs the result of a number of Service Port commands in a standard way and in a specific order. The resulting file is used for troubleshooting. The individual commands called by `supportDump` are:

```
envShow
version
showBox
sysVpdShowAll
sysConfigShow
licenseShow
vpsShow
hostTypeShow
targets
scsiShow
fcShow
fcShowDevs
mapShowDevs
mapShowDatabase
showScsiAssign
fctShowChan
cleShowAll
loggerDumpCurrent
envMonShow
dmva
reserveShow
```

xscsiChannelTest (x,y)

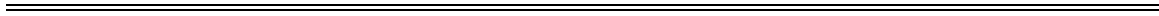
The ADIC Gateway must be in diagnostic mode to use this command and you must have the appropriate short VHDCI offset cable with 68-pin connectors, either HVD or LVD/SE.

The `xscsiChannelTest` command performs a confidence test on a pair of Ultra 2/3 SCSI channels. Substitute for `x` and `y` the Ultra 2/3 SCSI channel numbers you want to test. Parenthesis are optional. This command can be used to test the Ultra 2/3 SCSI interface or an Ultra 2/3 SCSI cable.

The example below shows the display for a test on Ultra 2/3 SCSI channels 1 and 4.

```
diagmode > scsiChannelTest 1,4
XSCSI-1 -> XSCSI-4 [#####] 101 iterations PASSED
XSCSI-4 -> XSCSI-1 [#####] 101 iterations PASSEDPASSED
value = 0 = 0x0
```

For Ultra SCSI channels, use the `scsiChannelTest` command.



Appendix D: Remote Event Notification

Several features of the ADIC Management Console were designed to assist with the maintenance and service of the ADIC Gateway. These are described in the following sections.

Event Logging and Viewing

The ADIC Management Console allows you to retrieve and view event log information that is stored in the non-volatile memory of the ADIC Gateway. The ADIC Gateway filters the data based on the setting of the Event Viewing Level. Note that only a fraction of the possible event codes refer to actual error conditions, and some of those might have been anticipated and error recovery was performed. Other events are recorded for informational purposes. Each event has an assigned viewing level, which indicates a “severity.”

The event logger on the ADIC Gateway records all events, but the Client retrieves only the events it is interested in, based on the Client’s viewing level (default is set to 2). The event viewing level is cumulative; that is, a viewing level of 3 also

displays level 2 and level 1 events. Level 0 events are displayed by the Client only when the viewing level is set to All Events. See Table 8-1.

Sequence	Time	Code	Description
0029	0d:01h:59m:29s:47t	110	Health Check 1: Link Status Has Changed on FCAL 3
0027	0d:01h:12m:37s:57t	22	FCAL 1: LIP Occurred
0024	0d:01h:02m:39s:33t	22	FCAL 1: LIP Occurred
0023	0d:00h:45m:52s:42t	110	Health Check 1: Link Status Has Changed on FCAL 3
0020	0d:00h:24m:26s:49t	22	FCAL 1: LIP Occurred
0017	0d:00h:12m:09s:22t	22	FCAL 1: LIP Occurred
0016	0d:00h:00m:32s:56t	29	Mapping 1: Target Device Added: index 2, handle 0w:
0015	0d:00h:00m:11s:35t	29	Mapping 1: Target Device Added: index 0, handle 0w:
0013	0d:00h:00m:11s:31t	28	SCSI 4: Bus RESET
0012	0d:00h:00m:11s:27t	28	SCSI 3: Bus RESET
0011	0d:00h:00m:11s:23t	28	SCSI 2: Bus RESET
0010	0d:00h:00m:11s:19t	28	SCSI 1: Bus RESET
0009	0d:00h:00m:11s:18t	28	SCSI 4: Bus RESET
0008	0d:00h:00m:11s:18t	28	SCSI 3: Bus RESET
0007	0d:00h:00m:11s:17t	28	SCSI 2: Bus RESET
0006	0d:00h:00m:11s:16t	28	SCSI 1: Bus RESET


Figure D-1: Viewing Events in the Event Log

Events and Traps

Events are recorded in the ADIC Gateway event log. For each event, an assigned Viewing Level corresponds with the event log facility available to the Client application (all events are recorded in the ADIC Gateway log regardless of the assigned level).

A Trap Threshold is preset for each event so that when the number of instances of that event reaches the threshold, a trap will be sent. The count is then reset. If the threshold is 0, no traps are sent. If the threshold is 1, a single occurrence of the event will generate a Trap. If the threshold is set to 2, it will take two occurrences of the event in order for a Trap to be generated. For an explanation of the action numbers, see at Table 8-2 on page 161.

When a trap is received by the Server, it attempts to notify all registered Clients (that is, Clients that are actively monitoring the ADIC Gateway that issued the

Trap). When the Client receives a trap message, the symbol  is displayed on the status/message area at the bottom of the ADIC Management Console screen.

This is an indication that a trap has been received and a message has been written to the Event Trap window Figure D-2 is an example of event trap messages in the Event Trap window.

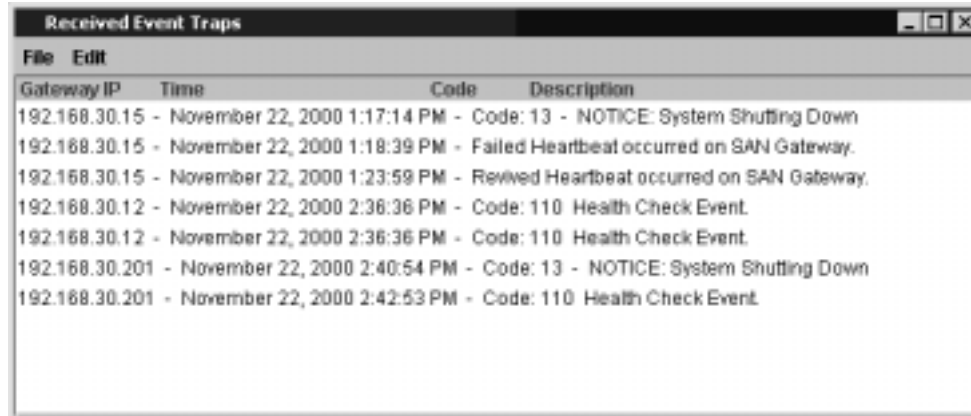


Figure D-2: Event Traps Displayed By Client

The IP address of the ADIC Gateway, a date/timestamp (provided by the server) the Event Code and a brief description of the event are displayed. You can double click on an event in the window to display more detailed information.

This information helps locate potential problems and should be monitored regularly. It is also stored in the ADIC Gateway event log.

Heartbeats

The communication paths between the three components described in "Client/Server Model" on page 23 are checked periodically to make sure that each is listening to the other. These checks define "heartbeats."

While a ADIC Gateway is being monitored, the Server application periodically attempts to communicate with it (every two minutes). A fault is reported to any interested Client if a ADIC Gateway is no longer available.

While a Client is connected to a Server, the Client periodically tests the connection to the Server to make sure it is still available. If the Server fails this test, the user is notified and the connection is closed.

While a Client is monitoring one or more ADIC Gateways, the Server tests the connection to the Client at regular intervals. If a Client is not available to the Server, it is removed from the registry of interested parties.

Because it is possible for a connection to be temporarily unavailable due to a network condition, the Server does not sever a connection based on a missed

heartbeat. However, it does attempt to notify a Client when a ADIC Gateway fails to respond.

Heartbeat failures are assigned event codes and notifications are sent to the Client where possible. Heartbeat events are not logged in the event log because SNMP traps are not issued (traps can only come from a ADIC Gateway). The Default Trap Thresholds column at Table 8-2 on page 161 shows the threshold settings that apply to specific event codes.

Health Check

The Health Check function provides a method to periodically determine the operational state of a ADIC Gateway and its attached interfaces and devices.

When the Health Check is disabled, the ADIC Gateway performs no periodic checks beyond monitoring environmental status lines, which indicate power supply and temperature conditions.

The Health Check function posts SNMP traps, when required, to convey status information to the ADIC Management Console. The ADIC Gateway broadcasts SNMP traps on the local IP network segment. In addition, specific addresses may be configured to send directed SNMP traps to host systems located on other subnets. Routing information must be set-up for traps to be directed to a different subnet. The ADIC Management Console server automatically registers itself as a trap recipient when it connects to a ADIC Gateway.

Health Check failure events are recorded in the event log and the trap is always sent on each occurrence.

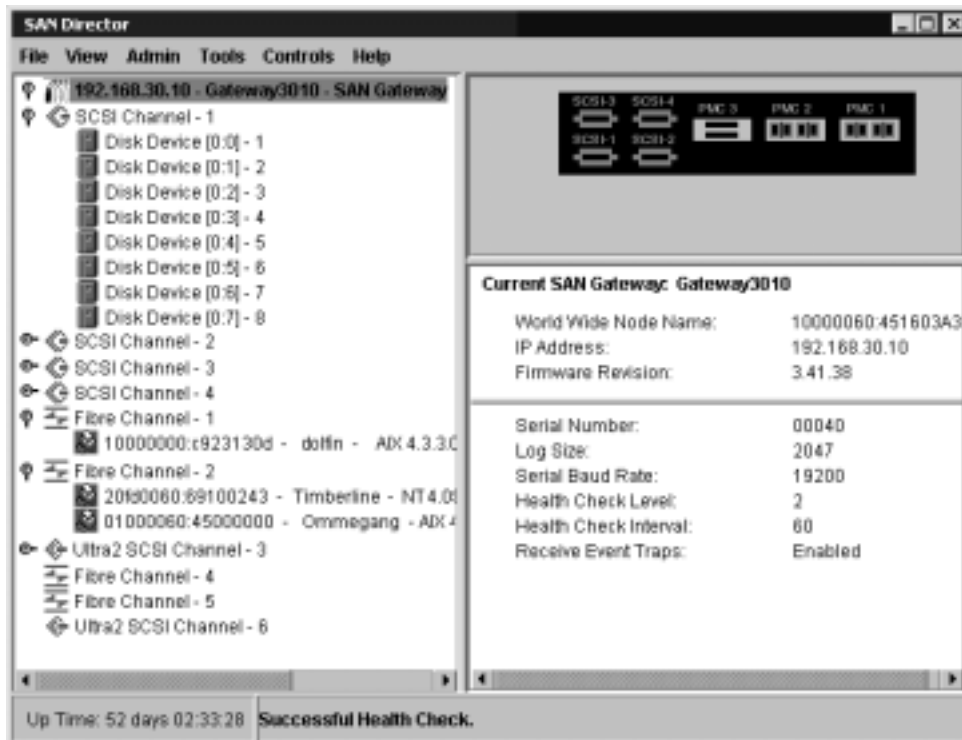


Figure D-3: Successful Health Check

Health Check is enabled when the level is set to a value greater than 0. This can be set from the Client application or from the service terminal.

Health Check Level Control

The Health Check level may be set to the levels described below using the ADIC Management Console. For more information on the traps sent from the Health Check facility, see Table 8-2. The Health Check level is stored in the ADIC Gateway's configuration tables and is persistent across boots.

0 — None

Although no health check is performed, the ADIC Gateway monitors the power and temperature and records variations in the event log. Traps for all such events are generated based on the threshold settings regardless of the Health Check level.

1 — Basic Function

When set to the “Basic Function” level, the ADIC Gateway periodically scans the system resources to locate problems. Health Check status will be set if either of the following conditions is true:

Temperature Sensors detect WARNING or ALARM status

Power Supply sensors detect a change in status since the last report.

2 — Interface Test

The “Interface Test” level includes the “Basic Function” Level Health Check plus an Interface Health Check. It performs an active poll of the interface device, such as a Fibre Channel or SCSI controller. The controller is queried in an interface-dependent method to determine if it is currently functional. If a controller is not functional, a Health Check trap will be sent indicating which interface failed.

Also enabled at the “Interface Test” level is a test of the Fibre Channel link status registers (which monitor FC link errors). A trap will be sent if any change in these registers is detected.

3 — Device Test

The “Device Test” level performs both the “Basic Function” level and “Interface Test” level Health Checks plus a Device Health Check. It polls every attached device to determine its status. A Device will be considered healthy if it responds to a simple SCSI Inquiry command.

4 — Device Ready

The “Device Ready” test performs all test functions of the lower Health Check levels plus a Device Functional Health Check. At this level, each target device is sent a SCSI Test Unit Ready command when the interval expires. If the device reports “Good Status,” it is considered healthy. If it is not ready, the sense data from the device is interpreted to determine if the device is in a “normal” not ready state, or if the device is in a failed state. For removable media devices, such as tape drives, level 4 is treated the same as level 3.

If a device is determined to be in a “failed” state, an SNMP trap is issued.

After a successful health check, a Trap is generated.

Health Check Interval

The Health Check interval controls how often the Health Check process runs. The interval may range from 1 to 65,535 minutes. The default setting is 60 minutes. In Figure D-4, the interval has been reset to 1 minute.

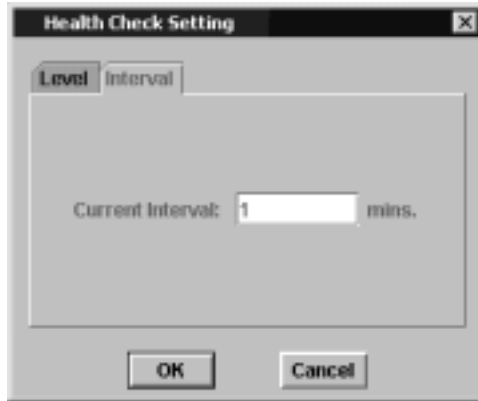


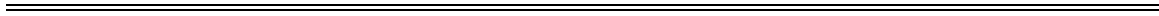
Figure D-4: Health Check Interval

Performance Impact of Health Checks

At higher levels (3 or 4), the Health Check process may interfere with high demand I/O operations. For example, in a video delivery application, you may want to select a very low level, or even level 0 to disable Health Checks.

If a device fails during normal I/O, the event will be logged in the Event Log. Health Check will not detect the failure nor send a trap unless the Health Check level is set to 3 or 4.

A trap issued from Health Check will be sent each time the Health Check Interval expires. This means that there will be repeated messages if the same conditions exist on successive checks.



Appendix E: Startup Message Reference

POST Messages

Observe the messages displayed on the service terminal as shown in the sample code below.

```
== SAN Gateway IPOST Release 1.32 at 0xFEBFC150 ==
== Testing Dram ==
2.1 : Simple Access Leaf1  217 - Testing
2.1 : Simple Access Leaf2  217 - Testing  211 - Pass
2.2 : Bitwalk Leaf1       227 - Testing
2.2 : Bitwalk Leaf2       227 - Testing  221 - Pass
2.3 : Burst Access       237 - Testing  231 - Pass
2.4 : DRAM size          247 - Testing 0x2000000 = 32768 Kb  241 - Pass
2.5 : Pattern            257 - Testing  251 - Pass
2.6 : Address            267 - Testing  261 - Pass
<< Initial POST Passed >>
3.2 : Loading SPOST      327 - Testing
Loading Secondary POST from 0xFEBF0000
  loading ELF module from 0xFEBF0000
Starting secondary post

== SAN Gateway SPOST Release 1.32 ==
== Configuring PMC Buses ==
== PCI Config $Revision: 1.6 $ displaying device map ==
0:6:0 22001077 4-02900117 10-00001301 14-80083000 30-80060000
0:7:0 22001077 4-02900117 10-00001201 14-80082000 30-80040000
0:18:0 22001077 4-02900117 10-00001101 14-80081000 30-80020000
0:19:0 22001077 4-02900117 10-00001001 14-80080000 30-80000000

1:6:0 000F1000 4-02000117 10-00009501 14-8805A000 18-88059000
1:6:1 000F1000 4-02000117 10-00009401 14-88058000 18-88057000
1:7:0 20001022 4-02800107 10-00009601 14-88056000 30-88040000
1:8:0 22001077 4-02900117 10-00009301 14-88055000 30-88020000
1:10:0 000F1000 4-02000117 10-00009201 14-88054000 18-88053000
1:10:1 000F1000 4-02000117 10-00009101 14-88052000 18-88051000
1:20:0 22001077 4-02900117 10-00009001 14-88050000 30-88000000

Secondary POST finished
```

Boot Rom Messages

After the ADIC Gateway completes its power-on self-test, it will attempt to find, load, and run the real-time LIC boot loader. See the sample code below.

```
== Booting from Flash ==

loading COFF module from 0xFEE02000

Loaded. Entry at 0xC0010028

== VxWorks BootLoader ==
  Copyright 1984-1996 Wind River Systems, Inc.
  CPU: Pathlight (i960RD) Version: 5.3.1
  BSP version: 1.2/1 Creation date: Apr 30 1999, 10:43:29

== Build for SAN Gateway ==

Initializing Flash

Press ^P to stop auto-boot...
0
auto-booting...

boot device      : ffs0
processor number  : 0
host name        : host computer
file name        : ffs0:/vxWorkst.Z
inet on ethernet (e) : 192.168.30.6
host inet (h)    : aaa.bbb.ccc.ddd
gateway inet (g) : eee.fff.ggg.hhh
user (u)         : username
ftp password (pw) : user password
flags (f)        : 0x8
target name (tn) : sangateway 0
startup script (s) : ffs0:sna.rc
other (o)        : lnPci

Attaching network interface lnPci0... done.
Attaching network interface lo0... done.
Initializing ffs0:
AutoSync disabled
Mounting ffs0: succeeded.
done.
Loading ffs0:vxWorkst.Z ... Inflating ffs0:vxWorkst.Z...
Read data into 0xclabeb20, len 0x000b5fa5
Inflate to 0xclb74ad0
Inflated
entry = 0xc0012b40
1587584 + 374012 + 284676
Starting at 0xc0012b40...

Initializing Flash
Initializing ffs0:
AutoSync disabled
Mounting ffs0: succeeded.
done.
Loading ffs0:/vxWorkst.Z ... Inflating ffs0:/vxWorkst.Z...
Read data into 0xclabf420, len 0x000a4983
Inflate to 0xclb63db0
Inflated
entry = 0xc0010000
1270208 + 242396 + 231132
Starting at 0xc0010000...
```

LIC Initialization Messages

After the BootLoader finds and loads the license internal code (LIC), the Bootloader will transfer control and start ADIC Gateway operations. See the sample code on the next page.

```
Initializing Flash
Initializing ffs0:
Mounting ffs0: AutoSync disabled
succeeded.
ffs0: already initialized

Adding 6687 symbols for standalone.
Attached TCP/IP interface to lnPci unit 0
Attaching network interface lo0... done.

NFS client support not included.
```

```
-----
| SAN Gateway Firmware Version 0342
| Copyright Pathlight Technology, Inc, 1997-1999
|
| VxWorks version: 5.3.1
| KERNEL: WIND version 2.5
| Copyright Wind River Systems, Inc., 1984-1997
|
| CPU: Pathlight (i960RD). Processor #0.
| Memory Size: 0x2000000
| BSP version 1.3/0
|
-----
```

```
ffs0:/ - disk check in progress ...
System clock is set to TUE SEP 12 07:52:00 2000
instead of THU JAN 01 00:00:00 1970
ffs0:/ - Volume is OK
```

```
total # of clusters: 1,784
# of free clusters: 541
# of bad clusters: 0
total free space: 553,984
max contiguous free space: 346,112 bytes
# of files: 17
# of folders: 6
total bytes in files: 1,224 Kb
# of lost chains: 0

total bytes in lost chains: 0
```

```
Executing startup script ffs0:sna.rc ...
#! /bin/csh -f
sna_monitor_init
```

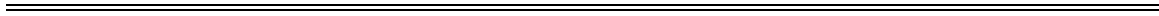
```
SAN Gateway Version 0338.12 Built Oct 25 1999, 18:00:46
value = -1040715920 = 0xc1f7ef70
dbgInit
value = 0 = 0x0
CNFinit
value = 0 = 0x0
csSrcvInit
value = 0 = 0x0
amemInit
Testing DDF - PCI 0 DMA PageX Testing DDF - PCI 1 DMA PageX Test PASSED
Amem interrupt handler installed
value = 0 = 0x0
scsintInit
```

Final Startup Messages

In the final stage of the boot process, information is displayed about the firmware version, ADIC Gateway name, optional features that are enabled or disabled, SCSI Channels, and the IP address. In the example below, after the ADIC Gateway command prompt, a message is displayed as a result of a response from a host that is running the Host Registration Service for Virtual Private SAN access control.

```
SAN Gateway Version 0338.12 Built Oct 25 1999, 18:00:46
Gateway307
Data Mover is Disabled
SAN Director License is Valid
SCSI 3 - DE - Terminated
SCSI 1 - DE - Terminated
SCSI 4 - DE - Terminated
SCSI 2 - DE - Terminated
IP Address set to 192.168.30.7
value = 0 = 0x0

Done executing startup script ffs0:sna.rc
- Service Port Reflected Signal Test
Starting shell
Gateway307 > 0xc1c3e500 (vcml0): VPS Registration: 'SINGHA' UID 00000
```



Appendix F: Channel Number Reference

This reference describes the convention used for channel numbers (also called port numbers) and PMC option card slots. Labels on the rear panel and LEDs on the front panel of the ADIC Gateway identify the channels, PMC slots and Storage Area Network connections. The ADIC Management Console software and service port commands associate these numbers to specific hardware connections.

Channel Numbering Convention

Each figure in this section represents a rear panel view of the ADIC Gateway to illustrate the numbering convention for the Ultra SCSI channels, single and dual port Fibre Channel PMC option cards, and Dual Channel Ultra2/3 SCSI PMC option cards.

Ultra SCSI Channel and PMC Slot Numbering

Table F-1 shows that the four Ultra SCSI channels are numbered from bottom to top, from left to right and the three PMC option slots are numbered from right to left

Table F-1: UltraSCSI and PMC Slot Number Assignments

Ultra SCSI Channels		PMC 3	PMC 2	PMC 1
SCSI 3	SCSI 4			
SCSI 1	SCSI 2			

Single Port Fibre Channel PMC Option Card Numbering

When three single port Fibre Channel PMCs are installed, the Fibre Channels are numbered from right to left as shown in Table F-2.

Table F-2: PMC Single Port Fibre Channel Assignments

Ultra SCSI Channels		PMC 3	PMC 2	PMC 1
SCSI 3	SCSI 4	Single Port Fibre Channel	Single Port Fibre Channel	Single Port Fibre Channel
SCSI 1	SCSI 2	3	2	1

Dual Port Fibre Channel PMC Option Card Numbering

When three dual-port Fibre Channel PMCs are installed, the Fibre Channels are numbered from right to left as shown in Table F-3.

Table F-3: PMC Dual Port Fibre Channel Assignments

Ultra SCSI Channels		PMC 3		PMC 2		PMC 1	
SCSI 3	SCSI 4	Dual Port Fibre Channels		Dual Port Fibre Channels		Dual Port Fibre Channels	
SCSI 1	SCSI 2	6	3	5	2	4	1

Dual Channel Ultra2/3 SCSI PMC Option Card Numbering

When three Ultra2 or Ultra3 PMCs are installed, the SCSI Channels are numbered from bottom to top, from right to left as shown in Table F-4.

Table F-4: PMC Ultra 2/3 SCSI Channel Assignments

Ultra SCSI Channels		PMC 3		PMC 2		PMC 1	
SCSI 3	SCSI 4	Dual Channel Ultra 2/3 SCSI Channel 6		Dual Channel Ultra 2/3 SCSI Channel 5		Dual Channel Ultra 2/3 SCSI Channel 4	
SCSI 1	SCSI 2	Dual Channel Ultra 2/3 SCSI Channel 3		Dual Channel Ultra 2/3 SCSI Channel 2		Dual Channel Ultra 2/3 SCSI Channel 1	

Skipping PMC Slots and Mixing Option Cards

When a PMC slot is empty, or when there are a mix of single channel and dual channel PMC cards installed, the channels retain the numbering convention associated with each PMC slot. Consequently, some channel numbers are

skipped as shown in Table F-5, which shows an empty PMC slot and a mix of single and dual channel PMCs installed.

Table F-5: Assignments for Single and Dual Port PMCs

Ultra SCSI Channels		PMC 3	PMC 2	PMC 1
SCSI 3	SCSI 4	(EMPTY)	Dual Channel Ultra 2/3 SCSI Channel 5	(EMPTY)
SCSI 1	SCSI 2		Dual Channel Ultra 2/3 SCSI Channel 2	

Dual Channel Ultra2/3 SCSI PMC Numbers in Device Maps

If you need to add or change a LUN assignment for a device attached to an Ultra2/3 SCSI channel, or you need to use the optional Virtual Private Map feature to map a device to an Ultra2/3 channel, you need to know about a different numbering scheme.

In the left-hand panel shown in Figure F-1, the ADIC Management Console displays Ultra2 SCSI Channel 1 and in the right-hand panel next to the ADIC

Gateway rear panel graphic, the ADIC Management Console again refers to this channel as “1”

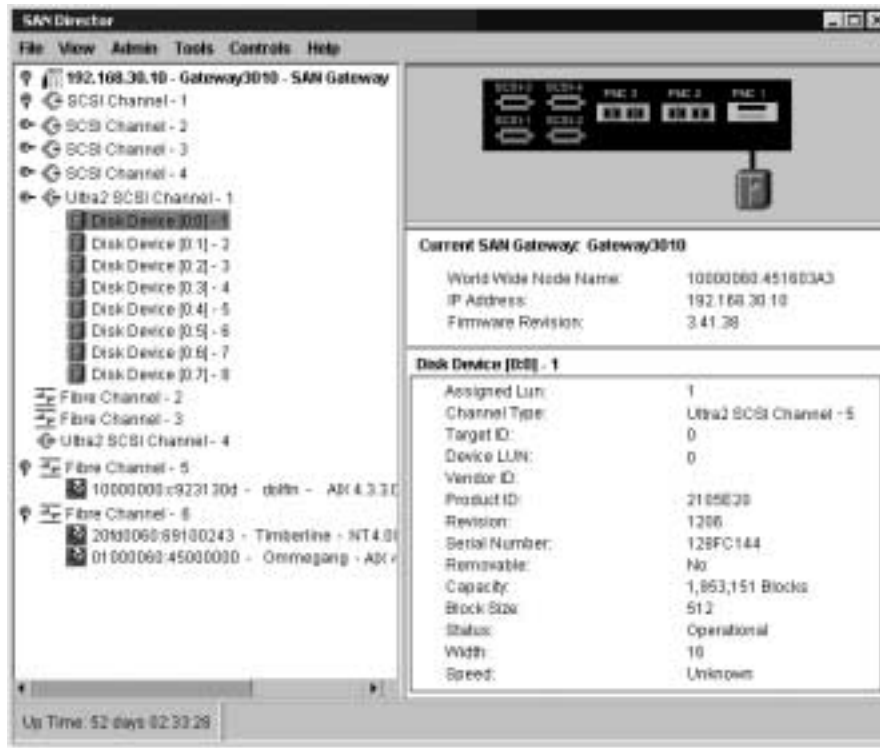


Figure F-1: Dual Channel Ultra2/3 SCSI PMC Number in Tree View Display

In the tabular information below the rear panel graphic, the ADIC Management Console displays a different number shown in Figure F-1 as SCSI Channel “5”. This is how the channel number is represented in the ADIC Gateway device map and in Virtual Private Map.

Table F-6 illustrates the rear panel of the ADIC Gateway and shows the numbers for the Dual Ultra2/3 SCSI channels that appear in the maps.

Table F-6: SCSI Channels in Device Map and VPM

Ultra SCSI Channels		PMC 3	PMC 2	PMC 1
SCSI 3	SCSI 4	Dual Channel Ultra 2/3 SCSI Channel 10	Dual Channel Ultra 2/3 SCSI Channel 9	Dual Channel Ultra 2/3 SCSI Channel 8
SCSI 1	SCSI 2	Dual Channel Ultra 2/3 SCSI Channel 7	Dual Channel Ultra 2/3 SCSI Channel 6	Dual Channel Ultra 2/3 SCSI Channel 5

Appendix G: POST Error Codes

The power-on self-test (POST) indicates DRAM test progress by flashing the front-panel SAN Connection and SCSI Channel LEDs in specific patterns. Figure G-1 shows the LED designation used for the decoding scheme. Progress messages are also sent to the Service Port and can be viewed on the service terminal.

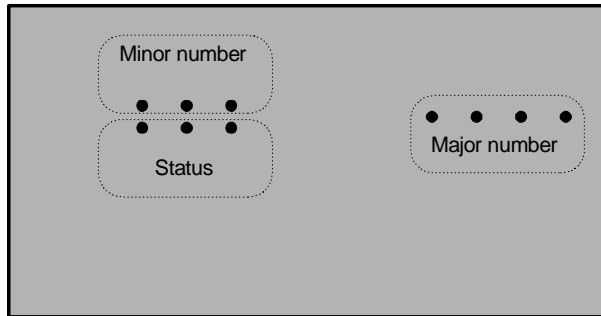


Figure G-1: Decoding POST LEDs

While POST is running, the “Ready” LED will remain off. If POST detects an error, it will flash the error code on and off 10 times (about five seconds). Table G-1 shows the status codes, a description of the status, and the patterns indicated on the LEDs.

Table G-1: POST Codes

Status Code	Description	LED Indication
2.1.2	Ram access error – leaf 1	
2.1.4	Ram access error – leaf 2	
2.1.6	Ram access error	
2.1.7	Testing ram access	

Table G-1: POST Codes

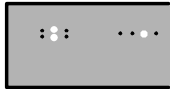
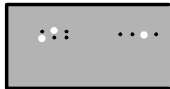
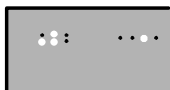
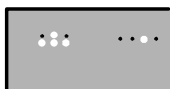
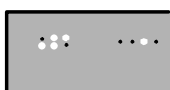

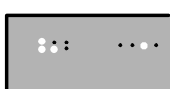

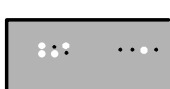
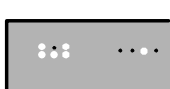
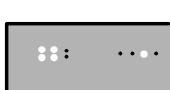
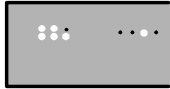

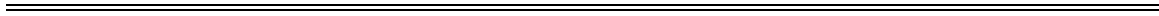
2.2.2	Bitwalk error – leaf 1	
2.2.4	Bitwalk error – leaf 2	
2.2.6	Bitwalk error	
2.2.7	Testing ram bitwalk	
2.3.6	Burst access error	
2.3.7	Testing burst access	
2.4.6	Memory size error	
2.4.7	Testing memory size	
2.5.6	Pattern test memory error	
2.5.7	Pattern testing memory	
2.6.6	Address test error	

Table G-1: POST Codes

2.6.7	Testing memory address lines	
3.2.7	Loading Secondary POST	



Appendix H:Glossary

Acronym	Meaning
BIOS	Basic Input/Output System
DE	Differential Ended
DRAM	Dynamic Random Access memory
DTE	Data Terminal Equipment
ESD	Electrostatic Discharge
EMI	Electromagnetic Interference
FRU	Field Replaceable Unit
GUI	Graphical User Interface
HBA	Host Bus Adapter
HTTP	Hypertext Transfer Protocol
HVD	High Voltage Differential
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
MIB	Management Information Base
MTBF	Mean Time Between Failures

PMC	PCI Mezzanine Card
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
SAN	Storage Area Network
SCSI	Small Computer System Interface
SDRAM	Synchronous Dynamic Random Access Memory
SE	Single-Ended
SNMP	Simple Network Management Protocol
SRS	SAN Replication Services
TCP	Transmission Control Protocol
VPS	Virtual Private SAN