



Release Notes

Compaq StorageWorks HSG80 Array Controller (ACS V8.4) for Windows NT - Intel

This document summarizes features and characteristics of the StorageWorks HSG80 Array Controller (Array Controller Software Version 8.4) that are supported in the release of the RA8000/ESA12000 Fibre Channel Solution Software V8.4 / V8.3 for Windows NT - Intel platform kit

These *Release Notes* provide information for the HSG80 Array Controller Software (ACS) Version 8.4, not covered elsewhere in the documentation. This document should be used by individuals responsible for configuring, installing, and using the HSG80 array controller.

Read this entire document before installing or upgrading the software.

These release notes include the following sections:

- 1.0 Identifying Your ACS Software Revision Level
- 2.0 Hardware and Software Support
- 3.0 New Features
- 4.0 Configuration Rules
- 5.0 ACS V8.4 Operating Constraints
- 6.0 StorageWorks Command Console
- 7.0 SWCC Operating Constraints
- 8.0 Avoiding Problem Situations
- 9.0 Documentation Update

Release Package Contents

The RA8000/ESA12000 Fibre Channel (ACS Version 8.4/8.3) Solution Software Kit for Windows NT –Intel supports both V8.3 and V8.4 StorageWorks products. Provided below are the kit items pertinent to the V8.4 (Fibre Channel Switch) Solution:

- A cover letter
- The HSG80 Array Controller documentation set:
 - *Quick Setup Guide – RA8000/ESA12000 HSG80 FC Storage System for Windows NT Server –Intel (ACS V8.4 with Fibre Channel Switch)*
 - *RA8000/ESA12000 Fibre Channel Solution Software for Windows NT –Intel - Installation Reference Manual*
 - *StorageWorks Command Console Version 2.1 User's Guide*
 - *HSG80 Solutions ACS Version 8.4 Software Product Description*
 - *HSG80 Array Controller ACS Version 8.4 Configuration and CLI Reference Guide*
 - *HSG80 Array Controller ACS Version 8.3 and 8.4 Maintenance and Service Guide*
 - *HSG80 Solutions Software License*
 - *Registration Card*
 - *StorageWorks Warranty Booklet*

NOTE

The Warranty book uses DIGITAL and DIGITAL terminology. A COMPAQ Warranty booklet is not yet available. Please check with your COMPAQ service representative for any questions on warranty items.

- *Release Notes –COMPAQ StorageWorks HSG80 Array Controller (ACS V8.4) for Windows NT Server–Intel (This document)*
- *Application Notes –RA8000/ESA12000 FC-Fabric Configurations for Windows NT – Intel*
- *RA8000/ESA12000 Fibre Channel Cluster Solutions for Windows NT – User's Guide*
- RA8000/ESA12000 Fibre Channel Solution Software V8.4/V8.3 for Windows NT/Intel CD-ROM

Intended Audience

This document has been prepared for customers who have purchased the RAID Array 8000 Fibre Channel with an HSG80 controller, and for Compaq Multivendor Customer Services personnel responsible for installing and maintaining systems that include the HSG80 array controller.

Visit our Web Site for the Latest Information

Check our web for the latest drivers, technical tips and documentation for the HSG80 Array Controller at:

<http://www.compaq.com/>

1.0 IDENTIFYING YOUR ACS SOFTWARE REVISION LEVEL

You can identify ACS Software Version 8.4 by entering the SHOW THIS_CONTROLLER command at the CLI prompt. The resulting display lists the software revision level as **V8.4F-0**.

2.0 HARDWARE AND SOFTWARE SUPPORT

This section lists the hardware and software supported by the RA8000/ESA12000 Fibre Channel Storage System.

2.1 Required Driver Revision

HSZDISK.SYS Version 4.2 is a class driver required for all HSG80 Array Controller configurations. It is designed to enhance the many availability and error recovery features built into your Compaq RAID subsystem, and to provide more robust operation than the native Windows NT Server SCSI disk class driver. HSZDISK.SYS Version 4.2 only affects Compaq RAID devices. Other SCSI disk drives in your system continue to be serviced by the native SCSIDISK.SYS class driver. The HSZDISK.SYS Version 4.2 driver is included in the CD-ROM labeled, *RA8000/ESA12000 FC Solution SW for Windows NT Intel*

2.2 Operating System Support

ACS Version 8.4 on HSG80 controllers is used in conjunction with Windows NT Server Version 4.0 (Intel) and Service Pack 4.

2.3 Microsoft Clusters Server Support

ACS Version 8.4 supports Windows NT clusters. Refer to the *RA8000/ESA12000 Cluster Solution for Windows NT Installation Guide* for more information.

2.4 Host Adapter for Windows NT Intel

The KGPSA-BC host adapter is supported by the Windows NT Server operating system for HSG80 controllers operating with Intel Servers. Refer to Table 1 below.

Table 1 Intel Server Adapter KGPSA-BC

Bus	Operating System Version	Supported Systems	Adapter Firmware Version	Driver Version
PCI to Fibre Channel	WNT 4.0 Service Pack 4	Intel Based Server	SF2.20X1	NTSCSI 4.10X1

NOTE

The required adapter firmware and installation procedure are included on the RA8000/ESA12000 Solution Software V8.4/V8.3 CD (P/N AG-RFAAC-BE).

2.5 Device Support

ACS Software Version 8.4 supports the devices listed in Table 2, at the indicated hardware and microcode levels.

Table 2 Supported Disk Drives

Device	Capacity in Gigabytes	Spindle Speed (RPM)	Minimum Microcode Version	Minimum Hardware Version
DS-RZ1CB-VW	4.3	7,200	LYJ0 or 0656	A01
DS-RZ1CD-VW	4.3	10,000	0306	A01
DS-RZ1CF-VW 380691-B21	4.3	7,200	N1H1 or 1614	A01
DS-RZ1DB-VW	9.1	7,200	LYJ0 or 0307	A01
DS-RZ1DF-VW 380595-B21	9.1	7,200	N1H1, 0372, or 1614	A01
DS-RZ1DD-VW 380588-B21	9.1	10,000	0306	A01
DS-RZ1EF-VW 380694-B21	18.2	7,200	N1H1 or 0372	A01
DS-RZ1ED-VW 380589-B21	18	10,000	0306	A01

NOTE

Additional disk drive information is available in the following Product Notes:

<u>DEVICE</u>	<u>PRODUCT NOTE</u>
DS-RZ1CB-VW/DS-RZ1DB-VW	EK-SM2DS-PN
DS-RZ1CD-VW	EK-RZ1CD-PN
DS-RZ1EF-VW	EK-RZ1EF-PN

3.0 NEW FEATURES

This section briefly describes new features that are supported with the HSG80 ACS firmware V8.4. For more information on these features, see the *HSG80 Array Controller ACS Version 8.4 Configuration and CLI Reference Guide*.

3.1 External Cache Battery

Compaq recommends that you replace the ECB every two years to prevent battery failure.

If you are shutting down your controller for longer than one day, complete the additional steps in “Shutting Down the Subsystem for an Extended Time” in the *HSG80 Array Controller ACS Version 8.4*. This will prevent the ECB from discharging during planned power outages.

3.2 CLI Commands

ADD CONNECTIONS and SET CONNECTIONS now support the following Operating Systems:

- DIGITAL_UNIX
- IBM
- SNI
- VMS
- WINNT
- SGI
- HP

3.3 Host Ports

Each controller has two host ports. Each HBA will see a maximum of 8 units on a host port. This maximum is a limitation of the host. Refer to the *COMPAQ StorageWorks RA8000/ESA12000 FC-AL Application Notes* for information about unit numbering.

4.0 CONFIGURATION RULES

The following list outlines the configuration rules for the controller:

- Maximum 127 visible LUNs and one Command Console LUN (CCL)
- Maximum 512-GB LUN capacity
- Maximum 72 physical devices
- Maximum 20 RAID-5 storage sets
- Maximum 30 RAID-5 and RAID-1 storage sets
- Maximum 45 RAID-5, RAID-1, and RAID-0 storage sets
- Maximum 8 partitions of a storage set or individual disk
- Maximum 6 members per mirror set
- Maximum 14 members per RAID-5 storage set
- Maximum 24 members per stripe set
- Maximum 48 physical devices per striped mirror set

5.0 ACS V8.4 OPERATING CONSTRAINTS

This section describes the operating constraints for ACS Software Version 8.4. An operating constraint is a limitation placed on the operation of the controller. Keep these constraints in mind to avoid problems and to help achieve the maximum performance from your controller. Other constraints on host adapters or other system components may also apply. See the host documentation for more details.

5.1 Boot Support

Installation of the Windows NT operating system on the RA8000/ESA12000 storage system is not supported.

5.2 Disk Geometry Limitations

Table 3 presents known limitations that certain operating systems have regarding storage unit size.

Table 3 Operating System Storage Unit Limitation

Disk Size	Storageset Configuration	Operating System and Version
4 GB	Any	Windows NT 4.0 FAT File System
16 Terabytes	Any	Windows NT 4.0 NTFS File System

5.3 PVA Switch Setting

After installing the EMU in each cabinet, ensure that the SCSI ID number on the PVA is set according to Table 4.

Table 4 SCSI ID Number on the PVA

Cabinet	PVA SCSI ID Setting
Master enclosure	0
First expansion enclosure	2
Second expansion enclosure	3

5.4 FRUTIL Limitation

NOTE

FRUTIL cannot be run in remote copy set environments on the target side specifically when I/O is in progress.

If the host load is quiesced, you can run FRUTIL on the initiator or target. If the host load is not quiesced and FRUTIL is run while remote copy I/Os are running, the normalization process will reset.

6.0 STORAGEWORKS COMMAND CONSOLE (SWCC)

Minimum System Configuration

The Command Console Client requires the minimum system configuration, shown in Table 5, to operate.

Table 5 Client Minimum System Configuration Requirements

Feature	Requirement
Architecture Intel 486	66 MHz, 16 MB memory, 1 MB free disk space, CD-ROM drive OR Windows NT - compatible Digital Equipment Corporation Alpha(r) system 1 MB free disk space, CD-ROM drive
Operating System	Windows NT version 4.0 (with Service Pack 3) OR Windows 95 (build 950 or later)
Monitor	15-inch VGA monitor
Input Devices	Keyboard, mouse
Modem	Hayes-compatible
Fibre Channel	Fibre Channel PLDA host adapter, adapter Special Windows NT device driver, (for local connection HSZDISK.SYS, version 4.2 via host bus only) or later required.
Serial Port	(for Standard, PC serial port capable of at connection via least 9600 baud. Serial port only)
Network Adapter	TCP/IP-compatible network card (for network connection only)
Controller	StorageWorks HSG80 controller running
Compatibility	Operating software version 8.4

6.1 Clarifications

This section presents clarifications on the behavior of the software in certain situations.

6.1.1 Install the Latest Version of the Device-Specific Client

If the software finds a previous version of device-specific Client of the same type that it wants to install, the software will ask if you want to overwrite that Client. Verify that you are installing the latest version of that device-specific Client. If the device-specific Client on your computer was installed separately, that Client on your computer may be newer than the version that you are installing.

6.1.2 Cautions When Configuring from a Configuration File

When reconfiguring a storage subsystem from a configuration file, the program prompts you to choose whether or not the program initializes your virtual disks. You must choose the appropriate option or you risk the loss of your data as the configuration file is loaded and your subsystem is reconfigured.

- Do not initialize virtual disks—Choose this option when your virtual disks contain valuable user data, and you wish to retain that data. You might, for instance, need to replace a failed subsystem component such as a controller or cache module. In this case, your subsystem configuration must be transferred to the new hardware, but you do not wish to change any information on your storage devices themselves.
- Initialize virtual disks—Choose this option when your virtual disks do not contain user data, or when you do not care if the data on them is lost. You might use this option when configuring a storage subsystem from scratch, to make it match the configuration in your configuration file.

Virtual Disk Recovery from a Configuration File

Note that when you delete a virtual disk, the disk's member drives are all reinitialized and any user data is lost. You cannot restore the virtual disk's data by reconfiguring your subsystem from a configuration file. A configuration file contains only information about the structure of a virtual disk and does not contain the disk's data itself.

6.1.3 Warning Message Windows

The controller software responds to problems in parsing and executing commands from Client and Agent by returning a message window entitled "Warning". The content of such messages may contain such indications as "Command Execution Error," along with pertinent detailed information.

These messages are simply passed through for display by Client and Agent. They are not errors associated with problems in the software, rather in the controller.

6.1.4 Virtual Disk Maximum Capacity

The maximum capacity of RAID-based virtual disks is determined by the capacity of the smallest member, not the largest.

- The maximum capacity of RAID 0 virtual disks is equal to the number of members times the capacity of the *smallest* member.
- The maximum capacity of RAID 1 virtual disks is equal to the capacity of the *smallest* member.
- The maximum capacity of RAID 0+1 virtual disks is equal to the number of members in one stripe times the capacity of the *smallest* mirrorset member.
- The maximum capacity of RAID 3/5 virtual disks is equal to the number of members minus one times the capacity of the *smallest* member.

6.1.5 Local Client/Agent Network Connection

To create a local connection to take advantage of Agent's event notification features, you can run both Client and Agent on the same Windows NT host machine and connect them using a network connection. No special installation instructions are necessary to implement this type of connection. Install each component as if Client were to run on a system remote from the host machine.

Note that, because Client only runs on Windows NT or Windows 95 systems, and Agent only runs on Windows NT and UNIX-based systems, you can only implement this type of connection on a Windows NT system.

Note also that you cannot use Client with a local connection of either type while an Agent is running on the local machine.

6.1.6 Operating System Considerations

Client provides a graphical interface that replaces your controller's CLI interface. It cannot, however, perform all the operating system configuration necessary to make your subsystem's virtual disks visible to the user in the operating system.

When you create or delete virtual disks using either the CLI or Client, you are adding or removing “disks” in the subsystem in a manner similar to plugging or unplugging physical disk drives on the host bus. In either case, there are certain operating system configuration actions you must perform to make these “disks” visible or invisible to the operating system’s file system.

Windows NT Configuration

On a Windows NT host and after you create or delete a virtual disk using Client (or the CLI), you must perform the following steps to properly configure the NT file system to recognize your changes.

1. Boot the host system. This action has the effect of forcing the NT Disk Administrator to recognize added virtual disks as raw disks, available for use. It also notes that deleted virtual disks are no longer present.
2. Create file system partitions on your disks. When you create a virtual disk in the controller, you have the option to partition it *at the controller level* in any way you wish, as long as you create at least one partition per disk. Each of the *controller-level* partitions you create becomes a virtual disk, visible to the host. In Disk Administrator, you must partition these newly added virtual disks at NT’s file system (NTSF) level.
3. Once you have partitioned your drives in Windows NT, the file system assigns each drive a unique drive letter. Make a note of the drive letters assigned.
4. Format your disks—You must format each newly added disk in NT to make it fully usable as an NT-compatible disk.
5. Start the Agent Configurator by double clicking its icon in the Command Console Start Menu group.
6. Navigate through the menus until a popup appears, prompting you to rescan your subsystems. Click Yes to perform the rescan and display a list of subsystems.
7. Make sure that the access device you’ve been using for your subsystem still exists. If you inadvertently deleted it, you must assign another device in its place. If no access device exists, Client cannot communicate with your subsystem.
8. Click the Next button until you can exit the configurator.
9. Select the Services option in the Windows Control Panel.
10. Scroll down to highlight the Steam entry.
11. Click the Stop button and wait for a prompt indicating that the service is halted.
12. Click the Start button and wait for a prompt indicating that the service is started.
13. Exit Control Panel.
14. Windows NT now recognizes any changes you may have made in your virtual disk configuration.

6.1.7 Enabling Subsystems in NT Agent Configurator

In the Step 3 dialogue box of the NT Agent Configurator, a check box entitled “Subsystem Enabled” has been added. If this box is not checked, the program configures the *storage.ini* file such that the subsystem selected in the dialogue box is invisible to the host. If the box is checked, the subsystem is visible. The default state for all subsystems is “enabled.”

6.1.8 Case Sensitivity in Client, Host, and Storage Subsystem Names

In configuring Command Console for network operation, you must enter names or IP addresses to identify your hosts, storage subsystems, and Client systems. If you use names (as opposed to IP addresses) the names in Client and Agent must be consistent to allow the programs to communicate with each other. This section discusses issues of case sensitivity associated with name entry in Client and Agent. This information does not apply when you use IP addresses.

In the connection dialogues in Client, you are required to enter host names, and you also have the option to enter specific storage subsystem names. In the Agent installation and configuration programs, you are required to enter Client and storage subsystem names.

Host and Subsystem Names in Client

Enter host and subsystem names in Client without regard to case. The software converts all names internally to lower case, regardless of the way you enter them.

Subsystem Names in Agent Installation/Configuration Programs

Enter subsystem names in the Agent installation/configuration programs without regard to case. The software converts all names internally to lower case, regardless of the way you enter them.

Client Names in Agent Installation/Configuration Programs

For Windows NT and UNIX-based Agents:

Enter Client names in the installation/configuration programs without regard to case. The software converts all names internally to lower case, regardless of the way you enter them.

Case Sensitivity in Agent STORAGE.INI File

If you choose to manually edit an Agent STORAGE.INI file, enter storage subsystem names only in lower-case form. If you use upper-case characters in a name, Client and Agent may not be able to communicate because of a name mismatch.

Case Sensitivity in Agent CLIENT.INI File

For Windows NT and UNIX-based Agents:

If you choose to manually edit an Agent *client.ini* file, enter Client names exactly as formatted within your network. The names you enter must match the names your name server recognizes, or Client and Agent may not be able to communicate with each other.

6.1.9 ServerWORKS Connections

You can manually configure any Agent to send SNMP traps to a host running Digital Equipment Corporation's ServerWORKS by editing the *client.ini* file. Edit the file to include the ServerWORKS host name and SNMP notification.

6.1.10 Running Client Via Network Connections

You can operate Client over PPP, SLIP, or RAS network connections. Be aware though, that some restrictions on features exist. See *Operating Constraints*.

6.1.11 Display in VGA Mode

There are numerous issues involving the use of Client on a system with standard, VGA resolution. The Storage window requires a minimum amount of screen space to properly display its contents. When you use VGA display resolution, screen space becomes more limited. It is highly recommended that you use Client with a minimum of SVGA (800x600) display resolution.

If you must use VGA resolution, consider the following suggestions:

- If you are running under Windows 95, enable the Auto Hide feature for the Task Bar. This feature provides more screen space when the Task Bar is not being used.
- You may not be able to see the scroll bars on the bottom of the display. You can use the Storage window's menu settings to remove the toolbar from the display to make room for the bottom scroll bars.
- If you are using Client with a 24-device, high-availability enclosure, it may be easier to configure the subsystem if you set the system type to *Generic* for configuration purposes. Return the setting to *High-Availability 24-Device Pedestal* for monitoring and viewing.

6.1.12 Tuning Fault Notification

For faster fault notification, remove any unused host system names in the *client.ini* file for each of your Agent programs. Inactive systems may force timeouts that slow Client response to your commands.

Also, ensure that you are not using event notification while using RAS connections. See "Delayed Event Notification on RAS Connections" in the next section, for more details.

6.1.13 Paging and Event Logging Continues After Client is Terminated

In certain situations, you may experience continuing paging and NT Event Logging in response to subsystem faults, even though Client is not running. This behavior is normal and is a result of paging and Event Logging activity started by Client when it was running.

Client's Asynchronous Event Services (AES) module runs under either Windows NT or Windows 95 as a Service, and continues to run, even after Client itself has terminated. The AES module communicates with Agents whenever it is running, and activates paging and Event Logging when a subsystem event occurs.

In Windows NT, to terminate paging and Event Logging after Client has been closed, go to the Services section of Control Panel, select the "AsyncEventSvc" Service, and stop it.

In Windows 95, the state of the AES module and a control for it are available in Control Panel as a separate icon named "ASYNCEVENTSVC".

6.1.14 Operating Parameters of Partition Virtual disks

Keep in mind that virtual disks based on partitions on any container are all closely related. They all share the same target and operating parameters of the container. If you change any of this information for one partition on the container, it automatically changes for all the partitions on that container.

7.0 SWCC OPERATING CONSTRAINTS

This section describes the operating constraints for the software. An operating constraint is a limitation placed on the operation of the controller by the nature of its design. Keep these constraints in mind, to avoid problems and to help you to get the maximum performance from your controller.

7.1 Compatibility Among Product Versions

CAUTION

Pay particular attention to the instructions below for uninstalling existing Client and Agent components from your local system. Failure to remove existing components before installation may result in Windows Registry corruption.

Version 2.x software components are not compatible with Version 1.1 components, and operation with mixed components is not supported. You must uninstall your Version 1.1 software, including Clients and Agents, before you install Version 2.x components. Use the instructions that came with your Version 1.x software to uninstall it.

Before you install your new Client software, you must uninstall any existing version 2.x CLI Window. Use the Windows NT or Windows 95 “Add/Remove Programs” feature or the instructions that came with your existing software to uninstall it. The installation program will install a newer CLI Window version in your old version’s place.

Before you install your new Client software, you must uninstall any existing version 2.x Storage Window of the same type as the one you wish to install. Use the Windows NT or Windows 95 “Add/Remove Programs” feature or the instructions that came with your existing software to uninstall it. The installation program will install a newer Storage Window version in your old version’s place.

Note that, in configurations with existing version 2.x components, you need not remove the Navigation Tree components. You also need not remove any Storage Window components other than one matching the one you wish to install. The installation program will install your new Client Storage and CLI Windows seamlessly under your existing Navigation Tree.

7.2 Failover Mode Set in CLI

Client is intended to be used to configure and monitor your storage only, and there are some functions available in the CLI that are not available in graphic form in the GUI. If you wish to use your controller’s multiple-bus failover mode, you must enable and control that function via the CLI.

7.3 No Direct Host Bus Connections on Windows 95

Direct host bus connections are not supported on Windows 95. Only serial and network connections are supported.

7.4 Connection Limitations

Local SCSI or serial connections are only available with standalone Storage Windows. You cannot use the Navigation Tree to connect locally to a subsystem.

7.5 Some Features Dependent Upon Connection Type

Because of the nature of the connections you can use between Client and your subsystems, the features available with each connection type vary slightly. Some connection types impose limitations on Client's features, as noted in Table 6.

Table 6 Feature Limitations

Feature Connection Type	Create virtual disk	Delete Virtual Disk	Fault Events: Client Visual Notification	Fault Events: Paging Notification	Fault Events: NT Event Logging
Local Serial Connection (Navigation Tree and Agent not used)	Supported	Supported	Supported	Not Supported	Not Supported
Local SCSI Bus Connection (Navigation Tree and Agent not used)	Supported	Supported	Supported	Not Supported	Not Supported
Local Network Connection (Client and Agent running on the same host)	Supported	Supported	Supported	Supported	Supported
Remote Network Connection (Client running on a PC remote Agent on a host)	Supported, not recommended. Follow-up OS configuration cannot be performed remotely	Supported, not recommended. Follow-up OS configuration cannot be performed remotely	Supported	Supported	Supported
Remote RAS Connection (Client running on a remote PC with a dial-up network connection)	Supported, not recommended. Follow-up OS configuration cannot be performed remotely	Supported, not recommended. Follow-up OS configuration cannot be performed remotely	Supported	Supported	Supported

7.6 Delayed Event Notification on RAS Connections

Visual fault notification, paging, and NT Event Logging may be delayed significantly in situations where RAS connections are used for multiple Clients. An Agent with multiple Clients in its *client.ini* file must poll each Client whenever a fault occurs. Any Clients not currently network-connected significantly delay this process, because Agent must wait for their connections to time out before moving on to the other Clients.

To avoid this situation, set the *notification_method* parameter for each Client in the *client.ini* file to "0", to defeat event fault notification.

7.7 CLI RUN Commands

Do not issue RUN commands in the CLI Window. Use only a maintenance terminal connection to issue RUN commands.

7.8 Creating Partition Units Across Targets or Ports

Be aware that the name you pick for a unit assigns it to a particular host bus target. If you create a unit from free space on a device, the program forces you use a unit name that puts the unit on the same host target as the other partitions on the device.

On dual-port controllers, partitions on the same device that are assigned to different host ports are not supported.

7.9 No Code Load in Multiple-Bus Failover Mode

The controller code load feature is not functional in multiple-bus failover mode. Do not attempt to update your controller's software in this mode.

7.10 Maximum Members Dependent Upon Virtual Disk Type

Client has certain limitations on the maximum number of members you can use to create a virtual disk. The maximum number of members allowed in a RAID-based virtual disk is dependent on the disk type.

- JBOD virtual disks—maximum of one member
- Striped virtual disks—maximum of 14 members
- Mirrored virtual disks—maximum of 6 members
- Striped mirrored virtual disks—maximum of 28 members
- Parity virtual disks—maximum of 14 members

If you need to create virtual disks with more members than those allowed above, use the CLI interface to your controller.

7.11 Maximum Number of Active Connections Limited

The controller maintains a table of host port connections that can contain up to 32 named connections.

8.0 AVOIDING PROBLEM SITUATIONS

In certain situations, under specific conditions, you may experience unusual behavior with the software. This section presents information to help you to avoid such situations and to recover from them if they occur.

8.1 Establishing a SWCC SCSI Direct Connection

Establishing a SCSI direct connection lists all available drives, including the system drive. You must select a drive that belongs to the HSG80 controller, otherwise the connection will fail.

8.2 Virtual Disk Wizard in Multiple-Bus Failover Mode

In Step 4 of 5 of the *Add Virtual Disk Wizard*, the default value for *host access* is “none”. You must change this to one of the host names provided; otherwise, the virtual disk you have just added will be inaccessible.

8.3 Incomplete Scans Cause Connection Loss

For proper display of subsystem status, Client performs a “scan” to collect information about your storage subsystems. The program displays scan progress screens while the process occurs. In some, rare situations, you may experience incomplete scans or scans that appear to hang. In these cases, the likely cause is that Client has lost its connection with the virtual disk it was using for communication with your subsystem.

This problem may show up with either local SCSI or network connections.

To remedy this situation, you must first restart both of your controllers, followed by restarting Client and Agent. If the system still does not operate properly, you must reboot your host system. If your host is running Windows NT[®], you must ensure that the special device driver, HSZDISK.SYS, is installed and running properly after it is booted.

8.4 Mirrored Cache Mode Not Retained After Configuration Restore

If you restore your controller configuration from a configuration file, the mirrored cache setting may not be properly enabled. You must restore the mirrored cache setting manually, using a CLI Window.

8.5 Error Message on Exiting Storage Window

Under certain conditions, when you exit a Storage Window, you may experience an “Illegal Operation Error” message. You may ignore this message.

8.6 Inappropriate Error Message on Device Delete

If you select a disk, then chose Device/Delete, a dialog box may appear, asking “Are you sure?”. If you choose the “NO” option, the message “Nothing selected to delete!” is displayed. You may ignore this message.

8.7 Storage Window Corruption After Making/Removing Spare Device

If you select a disk and make it a spare (using either menu or context menu options), then remove the device as a spare, some information in the Storage Window may be left corrupted. To reconstruct the window, you must exit the window and open a new one.

8.8 Cache Policy Not Shown in Controller Properties Sheet

The controller cache policy may not be properly shown in the controller properties sheet. The field may be blank. You must use a CLI Window to obtain the cache policy setting.

8.9 Incorrect Capacity Shown in Add Virtual Disk Wizard

In some circumstances, in Step 3 of the Add Virtual Disk Wizard, if you specify a capacity greater than the available disk capacity, an error message results. If you back up to Step 2 of the Wizard and return to Step 3, the correct capacity is then displayed. An attempt to move to Step 4 of the Wizard at this point, however, results in the same error message, even though the correct capacity is shown.

To complete your virtual disk, you must exit the Wizard and attempt to recreate the virtual disk.

8.10 Storage Window Corruption While Deleting a Virtual Disk

In some circumstances, if you delete and confirm deletion of a RAID-based virtual disk, a “Subsystem Connection Status” window may be displayed, and the Storage Window goes blank. The Storage Window may remain blank for several seconds until the “Subsystem Connection Status” window disappears.

8.11 Application Errors When Restarting Agent

You may experience an “application error” error when attempting to restart Agent after manually changing the Agent configuration files. Either of the following issues may be the cause:

- The *client.ini* file must end with a carriage return. If any other character terminates the file, it may cause an application error.
- The *storage.ini* file must not end with a carriage return. If a carriage return terminates the file, it may cause an application error.

8.12 False Restart Message on Agent Installation

When you first install a Windows NT Agent, and you modify more than one configuration parameter, the installation program may prompt you with a message indicating the Agent must be “restarted”, even though it has not yet been completely installed. You may ignore this message, and you must respond to the subsequent prompt, “Would you like to start the Agent service now?” by answering “Yes”.

8.13 Client Access Changes Not In Effect

After manually editing or changing the Agent *client.ini* file with a configurator program, you may notice that your Clients’ access has not changed. To place your changes in effect, you must restart Agent after editing any of the Agent configuration files.

8.14 Reconfiguration After Controller Replacement

If you replace either of the controllers in your subsystem, you must reconfigure your Agent *storage.ini* file to match the serial numbers of the new hardware. See your Agent documentation for details on reconfiguring your *storage.ini* file.

8.15 Storage Window Won't Open

If you cannot open a Storage Window from the Navigation Tree or in standalone mode, the *client.ini* ACCESS_ALLOWED parameter for your Client is probably set to "0", disabling Storage Window access. Use the Agent configuration script or edit the *client.ini* file to enable access to the subsystem.

8.16 Configuration File Deleted on Reinstallation or Upgrade

Make sure to save a copy of the current *swcc2.mdb* file to another directory if you intend to reinstall or upgrade Client. If you uninstall the program, you may inadvertently delete the *swcc2.mdb* file. This file contains your configuration of host systems and storage subsystems used in the Navigation Tree window display.

To reinstate your current Navigation Tree window configuration after installing a new version of Command Console, copy your saved *swcc2.mdb* file back to the directory in which you installed Command Console.

8.17 Character Limit on Max Cached Transfer Quantity Entry

There is a four-character limit on the maximum cached transfer entry field in the *Advanced Options* dialogue box accessed when creating virtual disks. The range of acceptable entries is 1–1024. Do not enter more than four digits in this field, as it may terminate Client with an error.

8.18 Invalid Network Port Numbers During Installation

During Client or Agent installation, you may experience an error if the installation program cannot find an acceptable pair of network port numbers.

Your Client uses Windows sockets (sometimes called "network ports") to communicate with its Agents. The socket numbers at the Client and Agent ends must match for network communication to occur.

In Windows NT, the socket numbers are assigned in the *services* file in the `\winnt\system32\drivers\etc` subdirectory. In Windows 95, the socket numbers are assigned in the *services* file in the `\windows` directory. In UNIX-based systems, the socket numbers are assigned in the *services* file in the `/etc` subdirectory. In the unlikely event that you experience a conflict with the socket numbers, you may edit the file manually.

The default socket numbers for Command Console are "4998" and "4999". If you are installing either Client or Agent and these numbers are already taken by another application, the installation program prompts to warn you that you must choose another pair.

To select another pair for Client, open the file containing the sockets in an ASCII editor, after you have installed Client. Pick two numbers above 1023 that are not already used in the file, and add the following two lines:

```
spgui          number1/tcp # StorageWorks@ Command Console
spagent        number2/tcp # StorageWorks@ Command Console
```

Note that the port numbers that you select must match the port numbers used by all of the Clients to which you wish to connect your Agent.

8.19 Error on First Attempt to Make Connection

You may experience a system error such as a “Command Execution Error” on your first attempt to make a network connection using the Storage Window. If this happens, try the connection again, and it will succeed.

8.20 Client Hangs When Virtual Disk Deleted

If Client is monitoring a particular subsystem, and you delete the virtual disk being used to communicate with that subsystem, the program may hang. To delete the virtual disk Client is using for communications with an Agent, you must first reassign another virtual disk as the communications LUN, using the Agent configurator.

If you are using the Command Console LUN (CCL) as your communications LUN, and you disable it, Client may lose its connection with your subsystem. If you wish to disable the communication LUN, you must first reassign another virtual disk as the communications LUN.

8.21 Missing Tabs in Search Menu in Help

When you select the Search button in Command Console Help, Windows Help may not display an Index or Find Tab.

To prevent this problem, delete any hidden files with a .GID extension that are in the Command Console directory. The WinHelp engine uses .GID files to construct the Index and Find Tabs. If the files are corrupted, the engine may not display one or both of the tabs. Deleting the files causes the engine to reconstruct the .GID files.

8.22 Invalid Cache Errors

Your controller module, cache module, and subsystem devices all contain configuration information used to keep their activity synchronized. This data is called *metadata*. The controller software reports an invalid cache error on the affected controller in situations in which there is a mismatch between the metadata in the controller module and a cache module containing unwritten data. This mismatch can result in loss of the unwritten cache data if the error is not cleared properly.

CAUTION

Use extreme care in responding to the Command Console invalid cache error prompt. If you inappropriately instruct the program to delete unwritten cache data, you may lose valid user data.

Client displays a message and prompt box when an invalid cache error occurs. You must tell the program whether or not to delete unwritten cache data as the error is cleared. If you are not familiar with the proper treatment of unwritten cache data, see the information in the on-line Help documentation under the topic “Invalid Cache Errors.”

8.23 Connecting Via the Host SCSI Port

Client may indicate that it cannot find your subsystem if you attempt to connect via the host SCSI port under either Windows NT or Windows 95 in either of the following situations:

- A StorageWorks controller subsystem is connected to the host, but the subsystem has no virtual disks configured on it.
- A StorageWorks controller subsystem is not connected to the host.

To avoid the problem, a StorageWorks controller subsystem with at least one virtual disk configured on it must be connected to the host before you attempt to connect Client. If your subsystem has no virtual disks configured on it, and you are using a host port SCSI connection, you must temporarily establish a connection via the controller’s serial maintenance port to create at least one virtual disk on the subsystem.

You can use the controller’s “Command Console LUN” feature to emulate a LUN for Client communication on UNIX systems. See your controller documentation for details.

Note that, because Agent uses a SCSI host bus connection to its subsystems, you must also adhere to this requirement on any host system on which an Agent is running.

8.24 Communications Failure on Power Up with Low Batteries

If the battery in your cache is discharged when you power up the controller, the controller may produce an invalid cache error. If you are using Client as your controller interface at that time, the error may prevent communication with the controller. In this case, the controller status bar in Client changes to yellow, and the program displays a window containing error information.

To clear the error, you must exit Client and use a normal controller maintenance terminal to issue the `CLEAR ERRORS INVALID_CACHE` command before you can use the controller. See your controller documentation for instructions on use of the `CLEAR ERRORS INVALID_CACHE` command.

If the battery remains low, the invalid cache error may reappear. In this case, you can operate your controller with reduced capability, or you can change its cache policy to get around its built-in battery protection, although at some risk to your data. Refer to your controller documentation for details on its cache policy controls.

After you have cleared the invalid cache error, you can use either a normal maintenance terminal or Client as your controller interface.

8.25 Lost Connections Cause Invalid or Missing Fault Displays and Event Logs

Client receives notification for most types of changing subsystem fault conditions on the next monitor interval after they occur. You may experience invalid or lost notifications in situations in which Client's connection with its subsystems is broken. Any Windows NT Event Logs that might have occurred while the connection was broken are also lost.

If the connection between Client and its subsystems is broken for any reason, Client may continue to display faults that are cleared while the connection is broken. Similarly, faults that occur while the connection is broken are not displayed at all.

To avoid lost fault indications, make sure that Client's connections with its subsystems are monitored and maintained. To re-establish a connection with a storage subsystem, you must exit and restart Client.

Broken connections can occur for a variety of reasons:

- For RAS connections—It is the nature of a RAS connection that it is not a full-time connection. Events that occur during a period when the RAS connection is not made are not logged to Windows NT's Event Logging facility.
- For serial controller connections—Bad or missing serial cable. To repair this situation, plug in or replace the cable.
- For host port SCSI connections—Bad or missing SCSI host cable, no LUNs configured on controller on Client startup.
- For network connections—Agent missing or not running, network discontinuity, Agent not properly configured for your Clients.
- THIS controller halted, reset or hung—To repair this situation, restart or replace THIS controller.
- The virtual disk being used for communications with the storage subsystem is no longer available.

8.26 No Agent Notification Causes Invalid or Missing Fault Displays

For some types of faults, Agent does not send Client notification of changes in status as they occur. Client displays whatever fault information it last received. Following are three situations in which a fault can occur without immediate display in Client:

- The OTHER controller fails or is shut down.
- A cache battery on either controller fails or goes low.
- A cache module fails.
- A fan fails
- A power supply fails

In all of these cases, you can get current status by viewing the subsystem in question using the REFRESH option in the View menu.

8.27 Incompatibility with Windows 95 Monitor Energy Saver Mode

If you are using Windows 95, do not use the "energy saver" (low power) monitor mode available with some monitors and graphics adapters. Your system may lock up with a blank screen when the energy saver mode is activated. You may use any screen saver you wish with Command Console.

8.28 Manual Restart Required in Some Situations

In some situations in multiple-bus mode, both controllers must be restarted to properly continue subsystem operation. This function is automatically performed by the software in most cases. If only one controller in a dual-redundant pair restarts, however, you must manually restart the other controller.

9.0 DOCUMENTATION UPDATE

In the RA8000/ESA12000 Fibre Channel Solution Software for Windows NT –Intel Installation Reference Guide, the name of the CD-ROM is erroneous. The correct name of the CD-ROM required is “RA8000/ESA12000 Solution Software V8.4/V8.3” (p/n: AG-RFAAC-BE).

