

StorageTek SL8500 Modular Library System

Host Connectivity Guide



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Preface

This book provides a high-level look at the connections between Oracle's StorageTek SL8500 and hosts. For host-specific information commands, see the appropriate host documentation.

Audience

This guide is intended primarily for administrators and operators of Oracle's StorageTek SL8500 modular library system. It can also be used by Oracle partners and support representatives.

Access to Oracle Support

Oracle customers have access to electronic support through My Oracle Support. For information, visit <http://www.oracle.com/support/contact.html> or visit <http://www.oracle.com/accessibility/support.html> if you are hearing impaired.

Obtaining Customer Documentation

To access current product documentation for Tape Storage:

1. **Use Web browser to go to the following Web page:**
<http://www.oracle.com/technetwork/documentation/tape-storage-curr-187744.html>
The Tape Storage Products page opens.
2. **Find the section for the appropriate product and its releases.**
3. **To view a list of documents for a product release, click "View Library."**
A new page opens with a listing of all documents related to the product. You can download individual documents listed on the page.
4. **To download the entire suite of documents for the product, click "Download."**
A compressed archive file will download that contains the entire suite of documents for that product.

Summary of Changes

Current Version: E35821-01, August 2012

This guide is an update and a replacement for the document previously titled *Sun StorageTek SL8500 Modular Library System Host Connectivity Technical Brief*.

Edits made include:

- Adding information on Redundant Electronics
- Updating and rewriting information and drawings on all features covered
- Removing worksheets
- Removing industry-standard information
- Updating glossary
- Adding how to obtain customer documentation in the Preface

Revision History

Revision 3161958-02, January 2008

This revision was the last revision prior to this new document.

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Introduction

Connectivity Features

This manual includes information on the following optional connectivity features:

- **Dual TCP/IP**: Provides two connections between a library or a library in a complex and an ACSLS or ELS/HSC host(s). Dual TCP/IP avoids the single point of failure shown in [FIGURE 1-1](#).
- **Multi TCP/IP**: Provides multiple connections between a library complex and an ACSLS or ELS/HSC host(s).
- **Redundant Electronics (RE)**: Provides redundant library control and communications, and protects against failure should the active HBC/HBCR card fail or if communication to the card is lost.
- **Partitioning**: Can be used with Dual TCP/IP and RE.

If your configuration includes the StorageTek Tape Analytics (STA) server, please refer to the STA Configuration Guide for details on the STA server's connection to the library.

Purpose of This Document

This document is a high-level view of optional connectivity features.

Additional Resources

For more in-depth information, see the latest edition of one or more of the following:

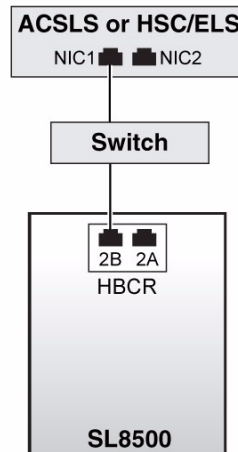
- *SL8500 Installation Manual*
- *SL8500 User's Guide*
- *ACSLs Administrator's Guide* (Enterprise Library Connection Options appendix)
- *ELS 7.0/7.1 Configuring HSC and VTS* (Configuring the SL8500 Library Communications section)
- *HSC 6.2 Systems Programmer's Guide* (Appendix A: HSC Support for the SL8500 Library)
- *HSC Operator's Guide*

- *Command, Control and Utility Reference (ELS)*

Single Connection Between Library and Host

Dual TCP/IP and Multi TCP/IP prevents a single point of failure. If there is only one connection path between the SL8500 library and a host (as shown in Figure [FIGURE 1-1](#)), that connection can be a single point of failure.

FIGURE 1-1 Single Path and Single Point of Failure Between Library and Host



Components for Connections

The components involved in inter-library and external connections for SL8500 libraries include:

Library-side:

- HBC/HBCR controller card with ports 2A and 2B
- An inter-library communications (ILC) Ethernet switch for connection between libraries in an SL8500 complex using port 1A
- Host-side:
 - Network interface cards (NICs) for ACCLS servers
 - Open Systems Adapters (OSAs) for IBM mainframe servers for ELS/HSC
- Ethernet switches or routers between library and host

HBC/HBCR Ports

The HBC/HBCR card (shown in [FIGURE 1-2](#)) is the library controller responsible for coordinating all component operations within a single library and providing the interface connection with the host.

FIGURE 1-2 The HBC/HBCR Card



Port 2B: Primary External Connectivity

Port 2B is the primary connection between a host and a single library or a library complex.

Port 2A: Secondary External Connectivity

Port2A is a secondary port that can provide secondary external connectivity.

Port 1A

In a library complex of two or more SL8500s, the inter-library connection (ILC) switch resides in one library and supports connection between up to five SL8500s. (For library complexes with more than five SL8500s, two ILC switches are required.) Port 1A on the HBC/HBCR card connects to this ILC switch.

Dual TCP/IP

The purpose and benefits of Dual TCP/IP are to prevent a loss of connection between the library and host by automatically recognizing and avoiding a failing communication path. Dual TCP/IP provides two separate connections between the library host management software (ACSL or ELS/HSC) and the SL8500 library's HBC/HBCR controller card.

How Dual TCP/IP is Used

With Dual TCP/IP, the SL8500 library and the host(s) (ACSL or ELS/HSC):

- Alternate use of both paths when both are available (available with ELS/HSC and ACSL 8.1 or higher.)

Note – Prior to ACSL 8.1, ACSL does not alternate between the two paths. Instead it uses the second path if the first path is busy.)

- Detect when a path is unavailable.
- Automatically resend transmissions over the available path.
- After retrying for a set amount of time, mark a nonfunctioning path as unavailable and use the functioning path.
- Monitor the unavailable path.
- Reconnect to the path when it becomes available again.

Route Command

When you enable Dual TCP/IP for an SL8500 library, you must define the route(s) on the library from the:

- Library's 2A port to the host(s) (ACSL or ELS/HSC) that will communicate with the library
- Library's 2B port to the host(s) (ACSL or ELS/HSC) that will communicate with the library

To use Dual TCP/IP with SL8500 library, the routing tables on the library must be managed using the `route` command. This forces a route to the defined network interfaces on the library, creating a one-to-one relationship between interfaces.

Network Topology Recommendations

The following are suggestions. For certain topologies, a more complicated setup is required and may require consultation between the system administrator and Oracle services.

Network Connection

A private network connection through an Ethernet switch or router is recommended for maximum throughput and minimum resource contention.

Considerations for Configuration

The simplest topology through a private network is often the best because it:

- Offers maximum throughput
- Provides minimum resource contention
- Lends itself to higher security for library communication
- Is the least expensive alternative
- Provides quick identification of any problems within the network

ACSL S Hosts

Software Requirements

The minimum level of software required for configuring ACSLS with Dual TCP/IP is ACSLS 7.1 with PUT0701 for Solaris or AiX.

Commands

ACSL S provides the ability to configure two TCP/IP connections to a single library, using `acsss_config` or the Dynamic Configuration `config` utility.

When configuring libraries, the user is asked how many connections there are to the library and then the name of the devices (IP addresses).

To provide two independent routes between the SL8500 and ACSLS, the routing tables on the ACSLS server can be defined using the `route` command.

Reference the ACSLS documentation to configure the routing tables on the ACSLS server to support Dual TCP/IP.

Recommended Configuration

The recommended configuration for Dual TCP/IP implementations is two network interfaces on two separate subnets for the ACSLS server. This provides:

- Maximum throughput and minimum resource contention for network communication

- Adds a second physical connection which improves reliability

For more information about ACSLS, the SL8500, and Dual TCP/IP, see the *ACSLS Administrator's Guide* (Enterprise Library Connection Options appendix).

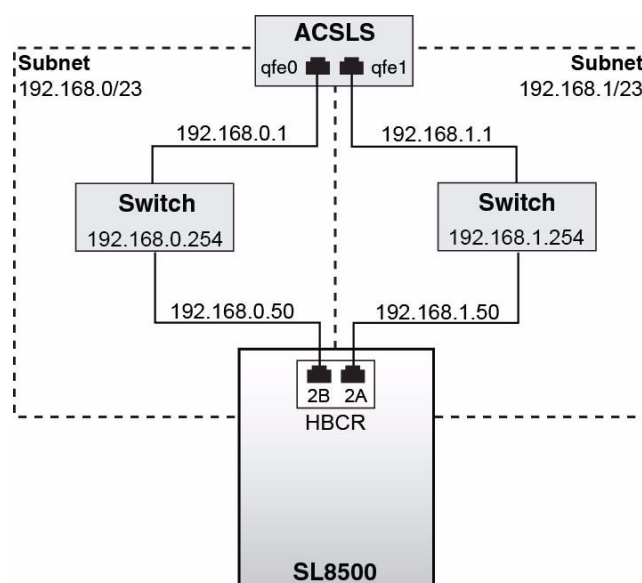
ACSLS Examples

Dual TCP/IP and Shared Subnets

In this example, the ACSLS server and the library share two separate subnets. The SL8500 uses a one-to-one relationship with the network interfaces on the ACSLS server in which the:

- Network interface card on subnet 192.168.0/23 connects to Port 2A
- Network interface card on subnet 192.168.1/23 connects to Port 2B

FIGURE 2-1 ACSLS Dual TCP/IP with Shared Subnets



Routing

A relationship can be forced by using the UNIX `route` commands.

For more information, see the latest edition of:

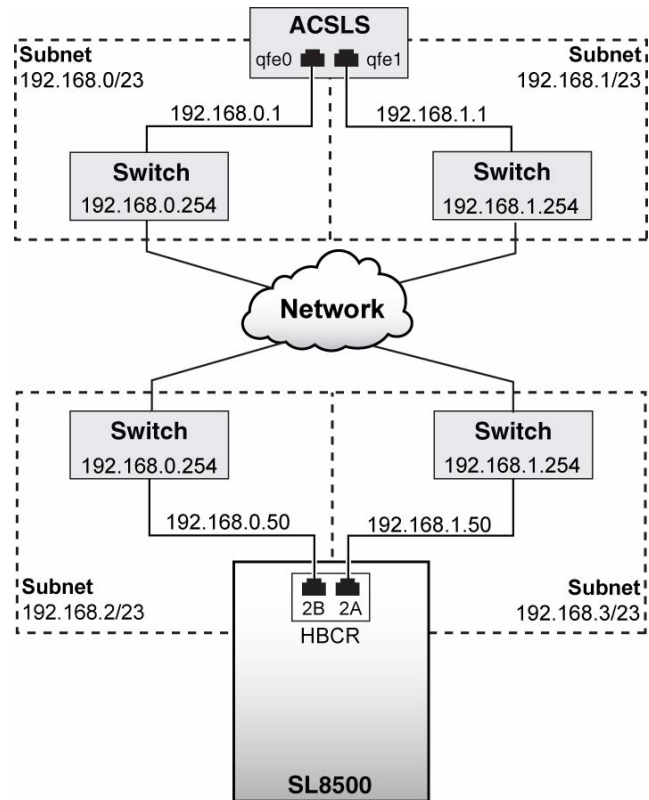
- *ACSLS Administrator's Guide* (Enterprise Library Connection Options appendix)
- *SL8500 Installation Manual*

Dual TCP/IP Through a Public Network

The following is another preferred example of an ACSLS configuration with Dual TCP/IP. In this example, the ACSLS server contains two network interfaces that reside on two separate subnets. However, both interfaces pass through a public network and into two different subnets before connecting to the SL8500 library.

This configuration uses the same commands as in the first example. See [“ACSLS Examples” on page 7](#).

FIGURE 2-2 ACSLS Dual TCP/IP

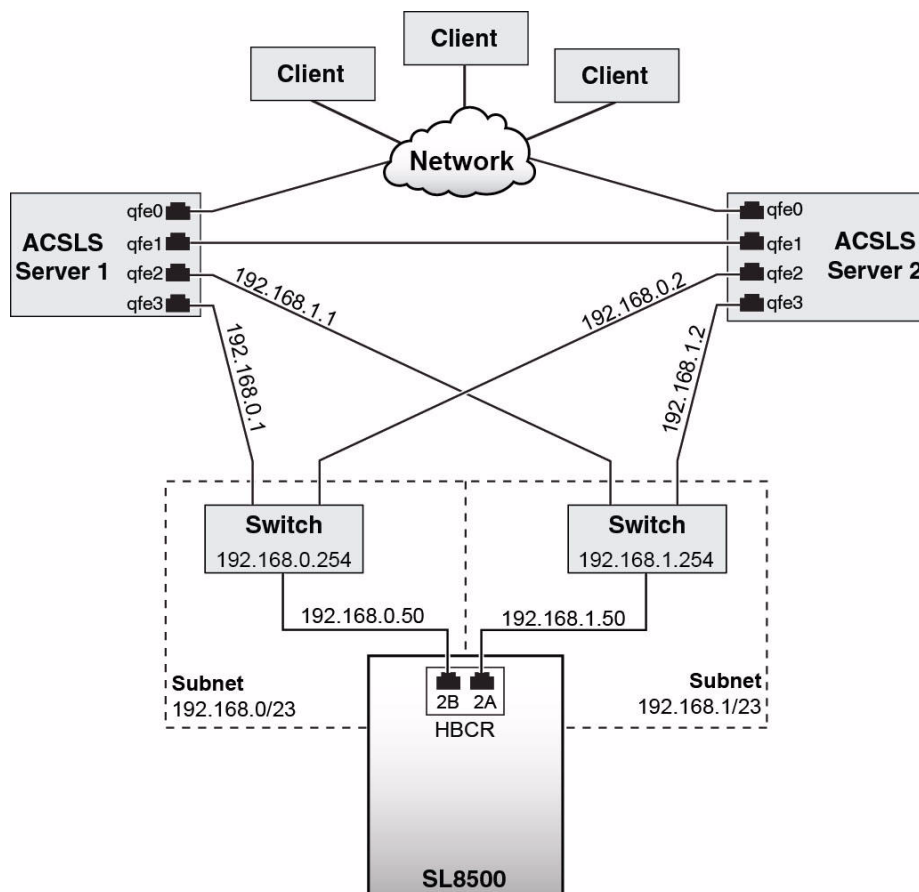


High Availability Dual TCP/IP

The following example is an ACSLS High Availability (HA) environment which requires Dual TCP/IP. The purpose of the High Availability (HA) environment is to have two ACSLS servers, one active and one standby.

In this configuration, two ACSLS servers connect six network interfaces (three on each server) to two separate subnets. A third subnet connects the two ACSLS servers through a public network.

FIGURE 2-3 ACSLS High Availability Dual TCP/IP



For more information on ACSLS High Availability (HA) and Dual TCP/IP, see the *ACSL S Administrator's Guide* (Enterprise Library Connection Options appendix).

Routing

It is recommended that you separate the SL8500 network interfaces over two different subnets when using ACSLS HA. The two different ACSLS servers use different network interfaces. This means that custom route entries should be added to both ACSLS HA servers. Add the IP addresses for both servers to the SL8500 configuration.

Routing Tables

In order to support the Dual TCP/IP feature, add custom entries to the routing tables on the ACSLS server.

Any customized routing table entries will be lost after a reboot of the ACSLS server. This is the nature of the system routing tables and is an expected behavior.

To maintain custom routing table entries, create scripts to add custom routes to be initialized at boot time. These scripts can then be placed in the rc directory structure for automatic execution at boot time.

For more information, refer to the *ACSLs Administrator's Guide* (Enterprise Library Connection Options appendix, section on Retaining Customized Routing Table Entries After a Reboot).

ELS/HSC Hosts

Software Requirements

The minimum level of software required is NCS 6.2 with the following PTFs:

- HSC/MVS/VM:
 - SOS620 L1H168G
 - SMS620 L1H168F
 - MSP: MSP PTF LF620DL

Commands

Note – To configure mainframe routing, refer to *HSC Systems Programmer's Guide* (Appendix A: HSC Support for the SL8500 Library), and *ELS 7.0/7.1 Configuring HSC and VTCS Document* (Configuring SL8500 Library Communications section).

The configuration process for connecting Dual TCP/IP and one or more ELS/HSC hosts is:

1. Use the LMUPATH control statement to define network LMU attachments in a Dual TCP/IP environment for an SL8500.
2. Specify a second LMUADDR parameter to define the Dual TCP/IPs. ELS automatically determines whether the connection is Dual TCP/IP or dual LMU.
3. Take the ACS offline and bring it back online to pick up the revised LMUPATH statement that includes the second connection.

For more information about configuring the routing tables on the system mainframes to support Dual TCP/IP, refer to the manual *ELS 7.0/7.1 Configuring HSC and VTCS* (Configuring SL8500 Library Communications section).

Dual IP Connection

The LMUPATH control statement allows you to define network LMU attachments. In a Dual TCP/IP connection environment for an SL8500, specify a second LMUADDR parameter to define dual IP. The ELS/HSC automatically determines whether or not the connection is dual IP or dual LMU.

To pick up the revised LMUPATH statement that includes the second connection, vary the ACS offline and back online to pick up the revised LMUPATH statement that includes the second connection. Follow these steps:

1. Vary the ACS offline.
2. Issue the LMUPDEF command to bring in the updated LMUPDEF file containing the updated LMUPATH statement.
3. Vary the ACS online.

Refer to the latest edition of the following documentation for LMUPATH and LMUPDEF usage.

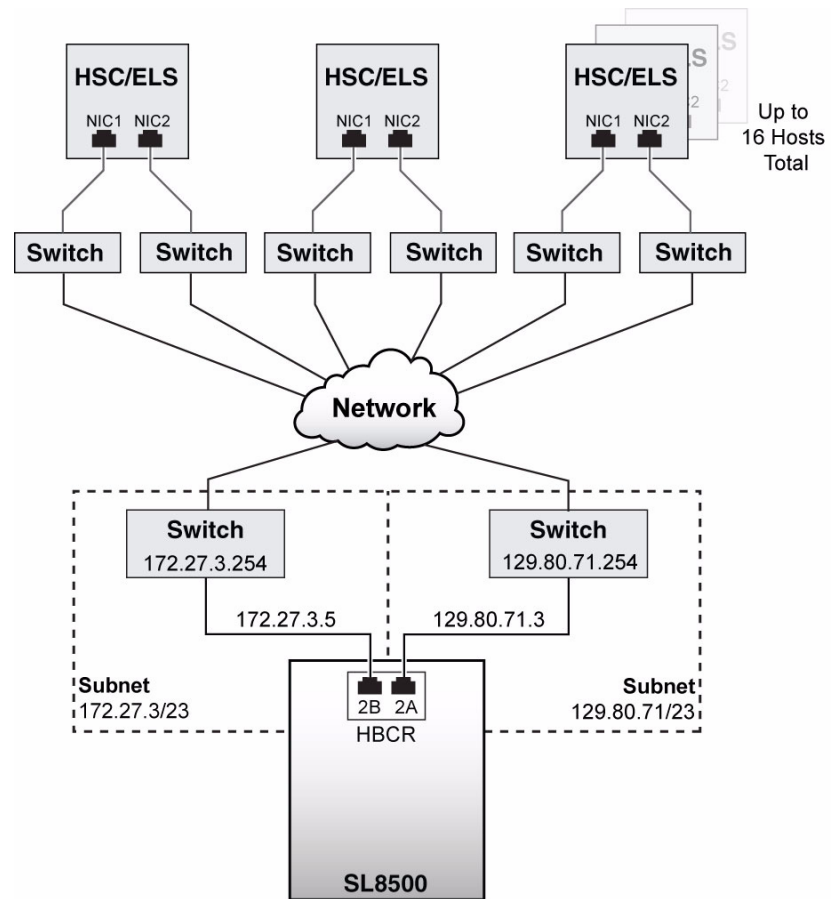
- For NCS:
 - *HSC Operator's Guide*
 - *HSC 6.2 Systems Programmer's Guide* (MVS and VM, Appendix A: HSC Support for the SL8500 Library)
- For ELS: *Command, Control Statement, and Utility Reference*

ELS/HSC Example

Dual TCP/IP

The following example shows a preferred configuration for mainframe systems using Dual TCP/IP. The mainframe host contains two network interfaces that reside on two separate subnets. Each connection travels through a public network, then connects to two different subnets before reaching the SL8500 library.

FIGURE 2-4 ELS/HSC Dual TCP/IP



For more information, refer to:

- *ELS 7.0/7.1 Configuring HSC and VTS* (Configuring the SL8500 Library Communications section)
- *HSC 6.2 Systems Programmer's Guide* (Appendix A: HSC Support for the SL8500 Library)

Configuration Tasks

Prior to beginning configuration tasks, please coordinate with both your system and network administrators to:

- Understand your current network environment
- Validate that the current network is configured properly
- Identify all necessary IP addresses in advance

Task	Page
Prepare for Configuration	14
Configure the Library	15
Configure the ACSLS Host	17
Configure the ELS Host	18

▼ Prepare for Configuration

Task Tool

This task requires:

- Serial or Ethernet cable
- PC
- Terminal emulator to access CLI (such as Putty or HyperTerminal, or STDS for Oracle support representatives)

Task Purpose

Use this procedure to prepare for configuring the SL8500 library for Dual TCP/IP.

Task Steps

1. Gather information regarding the network, routing and IP addresses by the following:
 - a. Ask the network administrator for this information.
 - b. Use the appropriate `network ip` command. See [“Network IP Commands for TCP/IP” on page 35](#).
2. Connect a PC to the CLI port for a serial connection or an available IP port.
3. Access CLI through a terminal emulator.
4. Using CLI, login and enter the password for the SL8500 library.

The SL8500 prompt appears.
5. If you encounter errors, verify your PC is configured properly. The SL8500 does not support DHCP. If you need further assistance, contact your Oracle representative.

▼ Configure the Library

Task Tool

This task can be performed at the CLI.

Task Purpose

Use this procedure to configure the SL8500 library for Dual TCP/IP.

Note – For a complete list of all network commands, use the CLI help command: SL8500>help network.

Task Steps

1. Take both ports down (offline) using the appropriate network ip commands.

```
sl8500> network ip link set dev 2A down
sl8500> network ip link set dev 2B down
```

Note – If you are adding dual port functions to port 2A only on an existing library that is currently online, do not take Port 2B down.

2. Add the new IP addresses and subnet masks for both ports.

```
SL8500> network ip address add IP_address/netmask dev 2A
SL8500> network ip address add IP_address/netmask dev 2B
```

3. To make the change active, bring both ports back up (online).

```
SL8500> network ip link set dev 2A up
SL8500> network ip link set dev 2B up
```

4. Enter the network routing for each port's configuration. See the following examples.

Example 1: Multiple Host Interface to Dual Port SL8500

Use the network ip route commands. The IP address and netmask for each host must be added.

```
SL8500> network ip route add IP_address/netmask dev 2A
SL8500> network ip route add IP_address/netmask dev 2B
```

Example 2: Single Host Interface to Dual Port SL8500

Use the network ip policy route commands. No netmask value is required because the destination is to one host.

```
SL8500> network ip policy route add host_IP_address dev 2A
SL8500> network ip policy route add host_IP_address via
gateway_IP_address dev 2A
SL8500> network ip policy enable 2A | 2B
SL8500> network ip policy status
```

5. Verify the configuration.

```
sl8500> network ip address show
sl8500> network ip route show
```

```
SL8500> network ip policy route show dev 2A | 2B
```

6. Check the date and time for accuracy.

```
SL8500> time
time print
time HH: MM
time HH:MM:SS
```

7. Disconnect the PC from the HBC/HBCR card.

8. Test the configuration to ensure the customer can access the library through both ports.

▼ Configure the ACSLS Host

Task Tool

This task can be performed at the UNIX command prompt.

Task Purpose

Use this procedure to configure the ACSLS host for Dual TCP/IP.

Task Steps

1. **Optional: Update the routing tables of the ACSLS server by following the ACSLS documentation.**

Note – If there is a single network interface on the ACSLS server, no special routing is required on the host.

Note – This step can be done at the same time you are updating the SL8500 routing tables.

After the SL8500 library and the host have been configured with updated routing, follow the next steps to configure the new port connection to the host.

2. **At the ACSLS server, use the Dynamic Config command to add an additional port connection to the SL8500.**
 - a. Ensure the ACS is in online or diagnostic mode to ACSLS.
 - b. Use `config port acs_id` to add an additional port.
 - c. If not already online, bring the ACS online to ACSLS.
3. **If an existing IP address is being removed and replaced by a different port, perform the following tasks:**

TABLE 2-1 Tasks for Removal and Replacement of IP Address

Step	Task	Command for ACSLS 7.3 and previous	Command for ACSLS 8.0 and higher
a.	Shut down ACSLS	<code>kill.acsss</code>	<code>acsss disable</code>
b.	Configure the new ports	<code>acsss_config</code>	<code>acsss_config</code>
c.	Bring ACSLS back up	<code>rc.acsss</code>	<code>acsss enable</code>

▼ Configure the ELS Host

Task Tool

This task can be performed at the IBM mainframe Console or PARMLIB.

Task Purpose

Use this procedure to configure the ELS host for Dual TCP/IP.

Task Steps

1. **Update the routing tables of the IBM mainframe by following the ELS documentation.**

Note – If there is a single network interface on the IBM mainframe, no special routing is required on the host.

Note – This step can be done at the same time you are updating the SL8500 routing tables.

After the SL8500 library and the host have been configured with updated routing, follow the next steps to configure the new port connection to the host.

2. **At the IBM mainframe, modify the LMUPATH control statement for this ACS, adding the second connection to the SL8500 library.**
3. **If it is not already offline, take this ACS offline.**
4. **Bring this ACS online to load the updated LMUPATH control statement and use the additional connection to the SL8500.**

Note – For more information, see *ELS 7.1 Command, Control, and Utility Reference* (ELS Command Interfaces) and *Configuring HSC and VTCS 7.1* (Configuring SL8500 Library Communications).

Multi TCP/IP

The Multi TCP/IP feature provides multiple connections between an SL8500 library complex and an ACSLS or ELS/HSC host(s). Specifically:

- For ACSLS: Up to 15 connections
- For ELS/HSC: Up to 32 connections

Version Requirements

Hosts without the latest level of software (ACSLs or ELS/HSC), PUTs, and PTFs will not be able to use multiple connections to a library complex.

The Multi TCP/IP feature requires a minimum of:

- SL8500 library firmware FRS_3.97 or higher
- SL Console 3.38
- For ACSLS:
 - Versions 7.1 and 7.1.1 with PUT0701
 - ACSLS HA 2.0 also requires PTF 6514766
- For NCS / ELS/HSC:
 - HSC version 6.2 with PTFs L1H168F (VM) and L1H168G (MVS)
 - MSP version 6.2 with PTF LF620DL
 - ELS version 7.0 with PTF L1H168H
 - ELS version 7.1 with PTF L1H168I

Note – Only the latest versions will provide the greatest number of connections to a host.

Configuration Recommendations

To optimize library performance, connect to the libraries with the most activity.

When connecting to more than one library in a complex, the connections should be through different subnets for redundancy. If one subnet fails, communications between the hosts and the libraries continue over the other subnets.

If you also are using Dual TCP/IP and are connected to the secondary Port 2A on the HBC/HBCR card, the command line interface (CLI) must be used to configure routing and assign any policies for that port.

Port 2B is the default port for the library. The default gateway is typically assigned to this port.

Port 2A and 2B must be on two different broadcast domains.

ACSLS Connections

For SL8500 3.97 or higher, ACSLS can connect to more than one SL8500 in an ACS (library complex).

ACSLS 8.1 can have up to fifteen connections to a library complex (ACS). For example, one set up might be:

- 15 connections to four SL8500s
- Two connections to each of two SL8500s
- Two connections to one SL8500 and two connections to each of two other SL8500s
- For an SL8500 10-string complex, two connections to five SL8500s and one connection to the remaining five SL8500s.

ACSLS 8.1 and later directs requests to the library that should process the request. Requests going to other libraries are distributed among all other libraries.

If you have only a single connection between the ACSLS server and each SL8500 controller card, routing tables are not necessary for ACSLS or the SL8500.

For more information, refer to the *ACSLS Administrator's Guide* (Enterprise Library Connections Options appendix).

ELS/HSC Connections

ELS/HSC with the current maintenance release can connect to all SL8500 libraries in a complex. ELS/HSC requests are directed to the library that should process the request.

Without the latest maintenance releases, ELS/HSC will distribute communications to the libraries evenly. Connections to multiple libraries distribute the communication with ELS/HSC among all of the connected libraries, as opposed to having one library handle all communication with ELS/HSC.

The following shows multiple LMUADDR parameters consisting of four IP addresses. In this case, each IP address indicates a TCP/IP connection to each of four separate SL8500 libraries connected in ACS 00.

```
LMUPATH ACS(00) LMUADDR(123.456.789.012,123.456.789,
013,123.456.789.014,123.456.789.015)
```

Refer to the latest edition of the following documents for more information:

- For NCS/HSC:
 - *HSC Configuration Guide*
 - *HSC 6.2 Systems Programmer's Guide* (MVS and VM)

- For ELS 7.0/7.1:
 - *ELS 7.0/7.1 Configuring HSC and VTCS*
 - *Command, Control Statement, and Utility Reference*

Configuration Examples

The following configuration examples show the features of and requirements for each configuration.

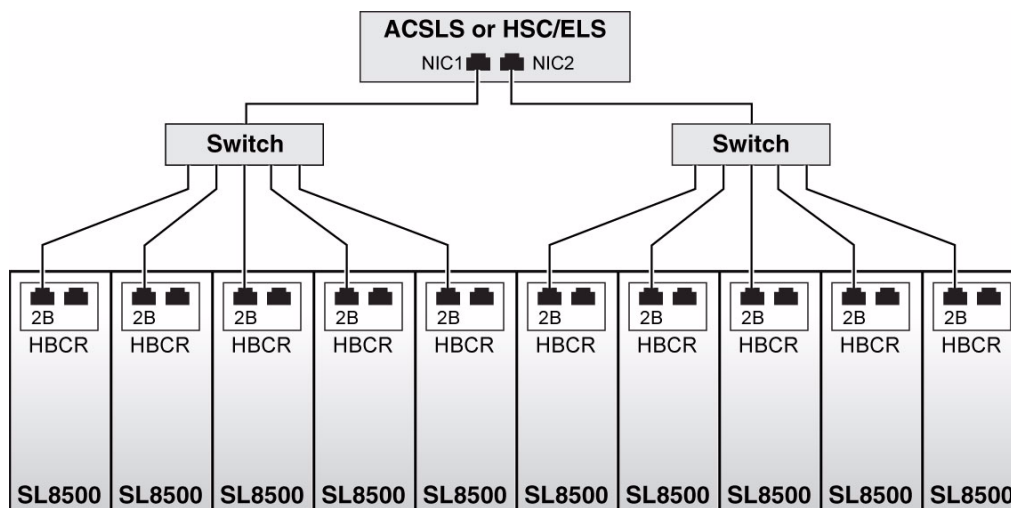
Minimum software requirements for all examples are:

- Library FRS_3.98
- SL Console 3.38
- ACSLS 7.1 with PUT0701 or HSC 6.2

Multi TCP/IP

In this example, Multi TCP/IP protects against the connection failure between the host and any library in the complex (Port 2B of each library). Two subnets are used to provide continued connectivity if one subnet fails.

FIGURE 3-1 Host Server with Multi TCP/IP



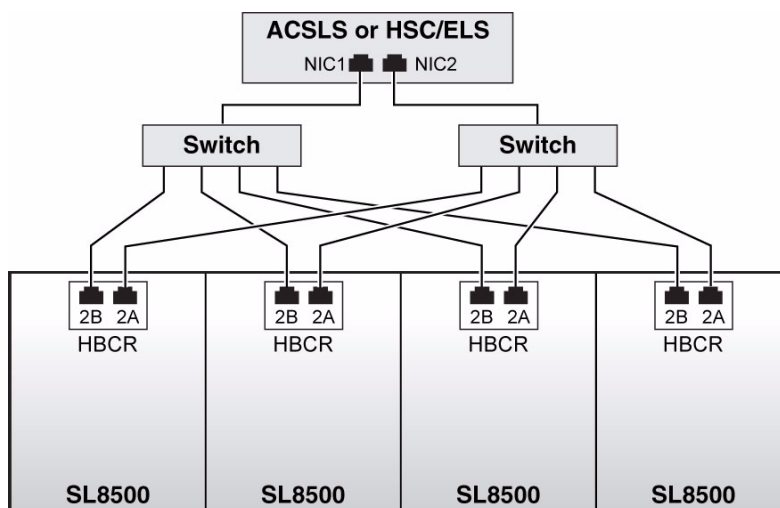
Multi TCP/IP and Dual TCP/IP

In this example:

- Multi TCP/IP protects against the failure of a connection path between the libraries in the complex and the host.
- Dual TCP/IP protects against the failure of the Ethernet link between any one library and a host (using Port 2A).

Two subnets are used to provide continued connectivity if one subnet fails.

FIGURE 3-2 Host Server with Multi TCP/IP and Dual TCP/IP



Redundant Electronics

The Redundant Electronics feature provides failover protection should an SL8500 HBC/HBCR controller card fail. Each library uses two HBC/HBCR controller cards instead of one. If the library controller experiences errors, operations switch automatically to the standby (alternate) library controller, with minimal disruption to library and host operations.

Required Components

The Redundant Electronics feature requires all of the following hardware components:

- Active library controller (HBC/HBCR) card
- Standby (alternate) library controller (HBC/HBCR) card
- Active drive controller (HBT) card
- Standby (alternate) drive controller (HBT) card
- One extra for each rail for a total of 8 (2 per rail)

Configuration Recommendations

Each library controller card requires its own unique IP address. If the Dual TCP/IP feature is active on the library, each card requires two unique IP addresses: one for the primary port (2B) and one for the secondary (2A) port. A library equipped with both Redundant Electronics and Dual TCP/IP requires four unique IP addresses.

On each controller card, Port 2B and 2A must be on different broadcast domains. however, on port 2B on the active controller card and port 2B on the standby card can be on the same broadcast domain. The same holds true for the 2A ports.

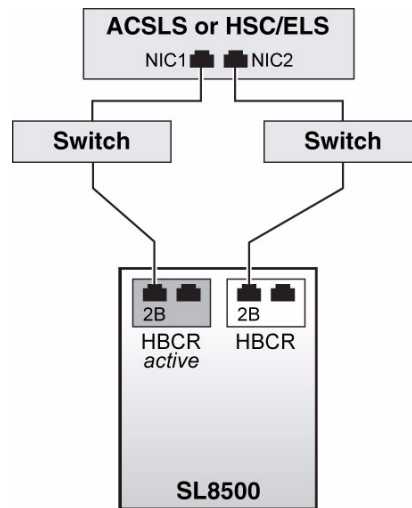
When you use the SL Console to log into a library, you need to connect to the primary port on the active controller. The SL Console does not allow you to connect to the standby (alternate controller), and if you attempt to do so an error message is displayed.

Examples

RE for a Single Library

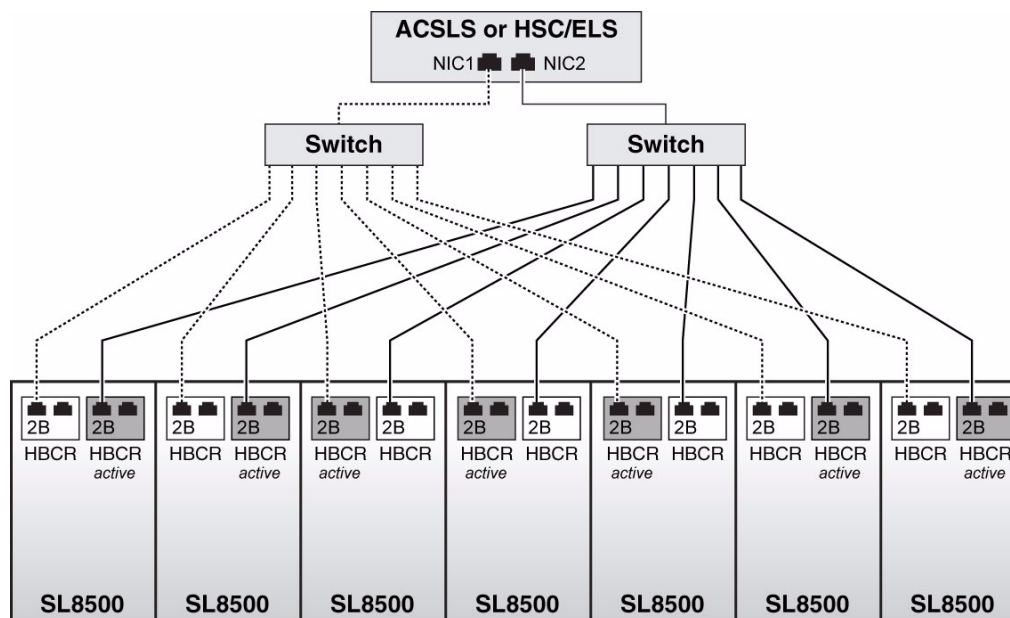
[FIGURE 4-1](#) shows a single library and single server with two controller cards, one in an active state and the other in a standby state.

FIGURE 4-1 Redundant Electronics for one SL8500 Library



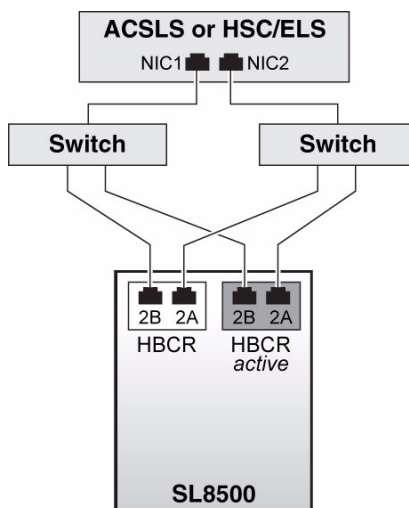
Multi RE for a Library Complex

As shown in [FIGURE 4-2](#), each library in the complex has its own pair of A and B library controllers. It is recommended that you connect ACSLS or ELS/HSC to both the active and the standby HBC/HBCR cards on multiple libraries.

FIGURE 4-2 Redundant Electronics for a Library Complex

RE and Dual TCP/IP

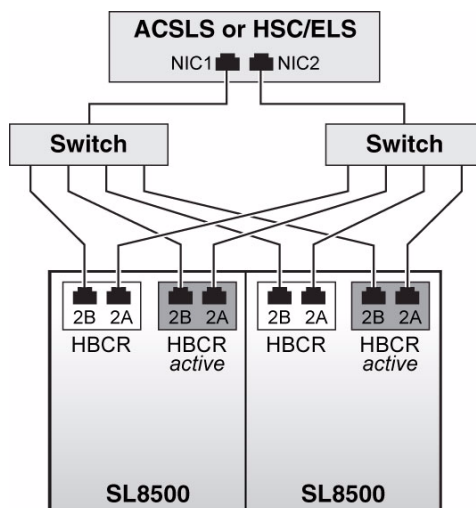
By using both Dual TCP/IP and RE (see [FIGURE 4-3](#)), there is protection against the failure of a connection path and the failure of a library controller card.

FIGURE 4-3 Redundant Electronics with Dual TP/IP

RE, Dual TCP/IP and Multi TCP/IP

As shown in [FIGURE 4-4](#), RE with Multi TCP/IP protect against failure of the library controller cards within a complex and failure of connection to the host.

FIGURE 4-4 Redundant Electronics with Dual TCP/IP and Multi TP/IP



Partitioning

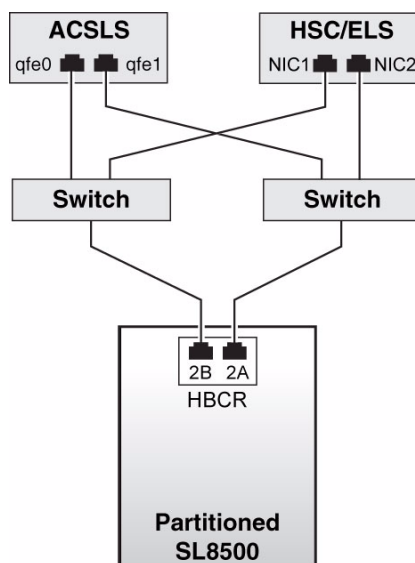
You can use Dual TCP/IP and Redundant Electronics (RE) with a single partitioned library.

Note – For detailed information and detailed steps on partitioning the SL8500, see the *SL8500 User's Guide*.

Dual TCP/IP for Different Host Types

One SL8500 can be connected to both ACSLS and HSC/ELS hosts by using Dual TCP/IP connections, as shown in [FIGURE 5-5](#).

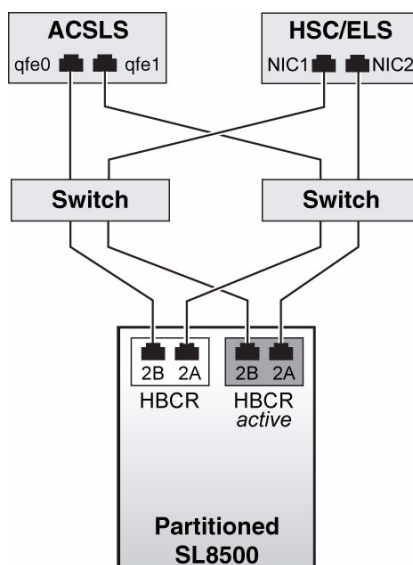
FIGURE 5-5 Dual TCP/IP with Partitioned Library



RE and Dual TCP/IP for Partitioned Library

In [FIGURE 5-6](#), if the active library controller card fails or does not respond to the polling from the standby controller, the standby library controller card will become active, restoring automated tape operations.

FIGURE 5-6 Partitioned Library with Hosts and RE and Dual TCP/IP



Troubleshooting

Shared Network Issues

If possible, use a dedicated private network for host management software-to-library communication. The following are some examples of issues that can arise when you connect the SL8500 library to a shared network.

Configuring the Switch or Router

The library IP ports are configured to auto negotiate with the attached switch. The attached switch port must also be configured to auto negotiate the connection type and speed.

Network Broadcasts

When you connect the library on shared networks, broadcasts sent to all network nodes may also be directed to the library. During the time the library is receiving these irrelevant broadcasts, it cannot receive requests or reply to others in a timely fashion. As a result, the host may determine the TCP/IP connection to the library has been lost because the heavy broadcast traffic has saturated the library.

Heavy network traffic can also overwhelm the Ethernet controller on the HBC/HBCR card. As a result, the processor continuously resets and re-initializes the controller to recover the host-to-library communications.

To prevent these issues, it is recommended that you place the library on a private network or its own subnet.

ARP Floods

A TCP/IP-connected SL8500 can handle standard host traffic and auto-negotiate between 10 and 100 Mbps traffic. However, the SL8500's processor can be overwhelmed by floods of address resolution protocol (ARP) broadcasts. For this reason, it is best to attach the library on a controlled network, such as behind a switch or router.

Shared Network Solutions

If a shared network is required, possible solutions are:

- Directly connect the library to a switch or router that filters out undirected (broadcast) traffic.
- Place the library on its own subnet. This may protect the library from receiving broadcast messages.
- Use a managed switch or router to:
 - Set priorities on ports to supply the host and library with higher priority.
 - Provide dedicated bandwidth between the host and library.
 - Create a virtual local area network (VLAN) between the host and library.
- Use a virtual private network (VPN) to insulate host-to-library traffic from other interference, such as irrelevant broadcasts.

Contention Between Hosts for a Library

An SL8500 library or a partition in an SL8500 can only be managed by a single ACSLS server or a single group of HSC hosts. A non-partitioned library or a single library partition cannot be shared:

- Between two ACSLS servers
- Between two separate groups of HSC hosts
- By an ACSLS server and a group of HSC hosts

Otherwise, the following scenarios can happen:

- If a library is being managed by an ACSLS server, and a second server connects to the library, the second server will tell the library to drop the connection(s) to the first server. The first server will re-connect, and drop the connections to the second server. This process will continue until an administrator shuts down one of the ACSLS servers.
- If two groups of ELS/HSC servers connect to a library, one group may cause the other group's connections to be dropped. The commands from the two HSC groups will also conflict.
- An ACSLS server and a group of HSC hosts will also conflict if they both try to connect to the library at the same time.

Different ACSLS servers and different groups of ELS/HSC hosts can manage separate partitions in a partitioned SL8500 without problems.

To determine if two ACSLS servers and/or groups of HSC hosts are both trying to connect to the library, use the SL Console to monitor the host connections under: System Detail, Library, Status, and the HLI tab. Make sure that two separate hosts are not competing to manage one library or one partition.

Bandwidth Issues

If communication problems arise, issues can be diagnosed by using the following methods:

- Use a sniffer (a device or program that traces the network traffic for the library).
- Display the port statistics on the switch or router to which the library is connected. Search for any errors that were encountered.
- Run a trace with the library management software that displays host-to-library packets and transmissions.

Gigabit Ethernet Connections

The SL8500 library does not support native Gigabit Ethernet (Gig-E) connections. The SL8500 network is only between the ACSLS server or ELS/HSC host. Gig-E communications and speed are not necessary.

When connecting to Gig-E networks, choose a switch or router that can convert to 100 Mbps for the library. Whatever the customer puts on the other side of the server, host, or library to their clients is not an issue.

Components and Devices

Disable components and devices at the SL Console to inform the HBC/HBCR card that the component or device is unavailable.

Opening a Service Request

Oracle customers have access to electronic support through My Oracle Support. For information, visit:

- <http://www.oracle.com/support/contact.html>
- <http://www.oracle.com/accessibility/support.html> (for hearing impaired customers)

ACSLS: Gathering Diagnostic Information for Support

To begin gathering information, record the context in which a problem occurs or about which you have a question.

1. Have the following information ready:

- Release and maintenance level of ACSLS currently running
- Hardware platform
- OS release level
- Library(s) being supported by ACSLS
- What ACSLS was doing when the issue occurred

2. If Oracle Support asks you to send the entire set of diagnostic logs and other diagnostic information for analysis, collect all of this data using the command `get_diags`.

Note – You must be logged in as `root` to run `get_diags`.

3. Send all collected data to Oracle Support.

When the `get_diags` utility has collected all of the information, it prompts you to either email the data or make it available for manual transfer.

- a. Email data to Oracle Support.

If you decide to email the data directly from the ACSLS machine, make sure that email communication is possible between your ACSLS machine and the Internet. Your enterprise may have a firewall to prevent email from being sent directly from the target machine. In this case, email the information to yourself within the enterprise and then forward the diagnostic data to Oracle.

- b. Transfer data manually to Oracle Support.

Alternatively, you can transfer the information manually. The `get_diags` utility advises you where to find the waiting tar packages for transfer. Typically, the staging area for diagnostic data is here: `/export/backup/diag/acsss`.

ELS/HSC

Please refer to the latest edition of the following documents for troubleshooting SL8500 library connectivity problems:

- *HSC 6.2 Systems Programmer's Guide* (MVS and VM, Appendix A: HSC Support for the SL8500 Library)
- *ELS 7.0/7.1 Configuring HSC and VTCS* (Appendix D: Configuring SL8500 Library Communications)

SL8500 Library

To gather data for a service request, use the Log Snapshot feature. You can generate and save file that provides a snapshot of the library logs. Then e-mail it to your Oracle support representative who will use it to diagnose problems with the library.

For more information on how to generate and save the Log Snapshot, see the *SL8500 User's Guide* (SL Console Diagnostics and Utilities chapter).

Glossary

A

ACS

See [Automated Cartridge System \(ACS\)](#).

ACSLs

See [Automated Cartridge System Library Software \(ACSLs\)](#).

ACSLs HA

See [Automated Cartridge System Library Software \(ACSLs\) High Availability \(HA\)](#).

Address Resolution Protocol (ARP)

A network layer protocol that converts IP address into physical addresses, like Ethernet addresses. Address Resolution Protocol (ARP) Takeover allows traffic to be redirected from a failing OSA-Express connection to another OSA-Express connection.

ARP

See [Address Resolution Protocol \(ARP\)](#).

Automated Cartridge System (ACS)

An SL8500 library complex.

Automated Cartridge System Library Software (ACSLs)

UNIX server software that manages library contents and controls library hardware to mount and dismount cartridges on tape drives. This application also provides library management services such as entering and ejecting cartridges, cartridge tracking, pooling, reports, and library control. ACSLs accesses and manages information stored in one or more [ACSs \(library complexes\)](#) through command processing across a network. The software includes a system administration component, interfaces to client system applications, and library management facilities.

Automated Cartridge System Library Software (ACSLs) High Availability (HA)

A hardware and software configuration that provides dual redundancy, automatic recovery and automatic fail-over recovery to ensure uninterrupted library management for the SL8500.

C

CDS

See [Control Data Set](#).

D

Control Data Set

Data set used by the ELS/HSC host software to control the functions of the automated library. Also called an ELS library database.

D

Dual TCP/IP

Provides two separate connections between the host software ([ACSL](#) or [HSC](#)) and the library controller.

E

ELS

See [Enterprise Library Software](#).

Enterprise Library Software

The software products that automate tape operations for mainframe users. HSC is a component of ELS.

F

failover

The act of moving to a secondary or redundant path when the primary path fails. Also, in [ACSL HA](#), failing over to the alternate [ACSL](#) server.

H

HBC/HBCR card

The controller card on SL8500.

HLI/PRC

Host-Library Interface/Panel Row Column address.

Host Software Component (HSC)

A component of ELS, HSC is software that resides on mainframe operating systems and controls the library. The HSC receives requests from the programmatic interface and translates them into commands which are carried by the control path to the library. HSC is the overall manager of the library, the interface between a mainframe operating system and an [ACS](#). HSC maintains a control data set, records of the cartridges stored in each ACS.

HSC

See [Host Software Component \(HSC\)](#).

I

ILC switch

See [inter-library communication switch](#).

inter-library communication switch

An Ethernet switch that provides internal communication between libraries in an SL8500 [library complex](#).

library complex

Two or more SL8500 libraries attached to each other with a pass-thru port. *Same as [Automated Cartridge System \(ACS\)](#) for [ACSL](#) or [HSC](#).*

library controller (LC)

The [HBC/HBCR card](#) within the library that controls operations and communicates with the operator panel.

M

Multi TCP/IP

Using TCP/IP connections to multiple libraries to provide redundant communication paths between the host software and an SL8500 [library complex](#).

R

RE

See [Redundant Electronics \(RE\)](#).

Redundant Electronics (RE)

A feature that provides failover protection in enterprise libraries. RE uses a two sets of library controller cards. At any given time, one set is active and the other set is standby. The active library controller can failover to the standby in response to a command from [ACSL](#) or the SL Console. Automatic failover can be initiated by the library in the event of a library card failure.

routing

The process of moving a packet of data from a source to a destination. Routing enables messages to pass from one device to another device, and eventually reach their target.

S

SMC

See [Storage Management Component \(SMC\)](#).

STA

See [StorageTek Tape Analytics \(STA\)](#).

Storage Management Component (SMC)

A component of ELS, software that resides on the MVS host along with the [HSC](#). SMC intercepts mount and dismount messages, translates them into move requests, and routes them to the library.

StorageTek Tape Analytics (STA)

An intelligent monitoring application, available exclusively for Oracle's StorageTek Modular Tape Libraries. STA enables you to monitor globally dispersed libraries from a single, browser-based user interface. You can manage open systems, mixed-media, and mixed-drive environments across multiple library platforms.

STA allows you to increase the utilization and performance of your tape investments by performing detailed performance trending analyses. These analyses are based on a regularly updated database of library operations.

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