RA8000 / ESA12000
FC-AL Configurations
for Novell Netware

COMPAQ
STORAGEWORKS

Application Note
EK-FCALN-AA.B01

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> **NOTE**
>
> This application note describes RA8000/ESA12000 FC-AL standard configurations.

Enterprise Network Storage Architecture (ENSA)

Compaq StorageWorks RAID Array 8000 (RA8000 FC) and Enterprise Storage Array 12000 (ESA12000 FC) products are the latest in fully integrated Fibre Channel RAID storage solutions. These products provide the key initial step in delivering on Compaq's ENSA vision. ENSA addresses the issues that customers expect to face now and in the future. Both products address today's issues including: economical capacity growth, data protection, high availability, increased distance, multi-vendor platform support, and investment protection by being the base for building the ENSA vision.

Product Overview

The RA8000 and ESA12000 FC storage systems are based on a common architecture and offer customers centralized management, high availability, and exceptional performance and scalability in open systems environments. These products provide a Fibre Channel storage solution with industry leading SAN (Storage Area Network) support utilizing FC-AL (arbitrated loop) technology.

The RA8000 FC is a mid-range storage system available in a pedestal enclosure for departmental use in the office. It can also be installed in server racks for small data centers. An easy-to-deploy, flexible solution for open systems, the RA8000 supports up to 1.3 TB of storage.

The ESA12000 FC, designed for the data center, is available in three easy-to-order building blocks, each optimized for specific, high-capacity customer requirements. The ESA12000 FC offers unprecedented levels of storage, scaling in performance and capacity as user requirements increase.

These storage systems incorporate the latest in RAID technology providing RAID levels 0, 1, 0+1, adaptive 3/5, and non-RAID disks. Compaq's implementation of RAID capability assures that data availability will be maintained despite hardware failure. Features such as read ahead cache and mirrored write back cache improve or minimize the affect on performance while preserving data availability and supporting high availability.

The RA8000/ESA12000 FC platform kits contain the necessary operating system specific software and documentation needed to install, configure, and monitor you storage system. All platform kits include the StorageWorks Command Console (SWCC) for storage management operations including configuring, status inquiry and notification facilities. SWCC provides a user oriented graphical user interface (GUI) simplifying the most complex of storage management operations.

General Configuration Guidelines

Fibre Channel storage technology offers more configuration flexibility then parallel SCSI storage. This application note describes typical RA8000/ESA12000 FC Netware configurations based on the configuration maximums listed. It is strongly recommended that you not exceed the maximums listed.

The maximums and notes listed apply to all configurations, additional information specific to particular configurations is provided in each configuration section.

Configuration Maximums

- 500 meters per optical cable segment, 1 kilometer distance between server and storage
- For the maximum number of FC HBAs per server, please reference your server documentation.
- When configuring more than one FC HBA in a single server, each HBA must be connected to a different loop
- Controller Transparent Failover Mode
      4 server on a single loop with 1 storage system
      Up to 8 servers on two loops (4 servers per loop) with 1 storage system
- The maximum storage capacity stated (1.3 TB) assumes 18GB disks, increases in disk drive capacity will increase overall storage capacity for the same enclosure footprint

General Configuration Notes

- <u>All configurations shown in this document utilize dual HSG80 controllers to support transparent failover capability. Single HSG80 controller configurations are supported, but not shown in this document. These configuration guidelines also apply to single controller configurations.</u>
- Dual redundant controllers should be configured for Transparent Failover Mode
- All configuration diagrams show a front view of the storage system, Controller A is the top controller; Controller B is the bottom controller. Controller Host Port 1 is the left port; Host Port 2 is the right port
- Each storage system can be configured using SWCC or the Command Line Interface (CLI) configured through the HSG80 controller maintenance serial port
- All configurations utilize ACS V8.3 (Array Controller Software) configured for FC-AL topology
- All configurations utilize short wavelength lasers and multi-mode fibre channel optical cables in each cable segment. Label both ends of each FC cable with the same unique identification marking (number, letter, etc.) prior to installation
- All configurations require the Connection Name *Operating System* parameter set to "WINNT"
- By default the HSG80 Command Console LUN (CCL) is enabled. This must be disabled for Netware (using the CLI, "SET *controller* NOCOMMAND_CONSOLE_LUN")
- All configuration require the Arbitrated Loop Physical Address (AL_PA) to be set to hard and a unique address for each port.
              Set *controllername* port_1_topology = loop_hard
              Set *controllername* port_1_al_pa=71
              Set *controllername* port_2_topology = loop_hard
              Set *controllername* port_2_al_pa=72

- Record the FC HBA *Worldwide ID* (WWID) IEEE address shown on the back of each FC HBA prior to installing into a server
- Use the recorded WWID to identify the connection name displayed from the CLI at the controller using the "SHOW CONNECTIONS" command
- Rename connection names. By default new connection names are automatically added to the

controller connection name table as "!NEWCONnn" (where nn is a number from 1 to 32). The controllers add a connection when a path to an adapter from each active controller host port is detected. Once you have identified each connection using the FC HBA WWID, rename the connection names to a name meaningful to the specific configuration i.e., SERVER1P1, using the CLI, "RENAME *old-name new-name*". (Note: Connection names can be a maximum of 9 characters)

- Each active controller host port on a loop presents one SCSI Target ID to each FC HBA on the same loop. LUNs (logical units) can consist of single disks (JBOD), a storageset of multiple disks or a partition, configured for a specific RAID level of 0, 1, 0 + 1, or 3/5

Technical Contents

This application note describes four common RA8000/ESA12000 FC Novell Netware FC-AL configurations, and provides the configuration and parts and reference information required to support it. The presentation of this material is as follows:

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Configuration #1 - One Server, Dual Controller Transparent Failover

This two-controller configuration (Figure 1) provides dual redundant controllers configured in Transparent Failover mode. The configuration consists of an RA8000 or ESA12000 storage enclosure with two HSG80 array controllers on a single loop. In normal operation Controller A provides the active path for all storagesets to the server through Port 1. A second controller, Controller B is a hot standby. Controller B will automatically become active in the event of a failure in Controller A. All units being accessed through Port 1 of Controller A will become accessible through Port 1 of Controller B. In the initial configuration a single controller host port (Port 1) is active providing access up to 24 disks. An additional 48 disks can be added using two expansion enclosures. Additional servers can be added to this configuration as required using the existing hub.
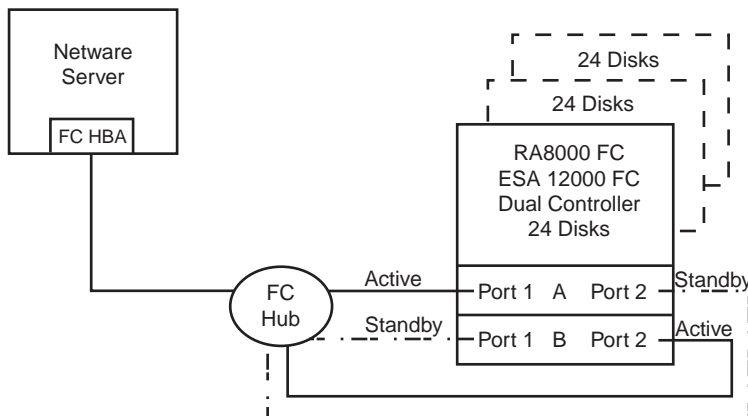
Figure 1   Configuration #1
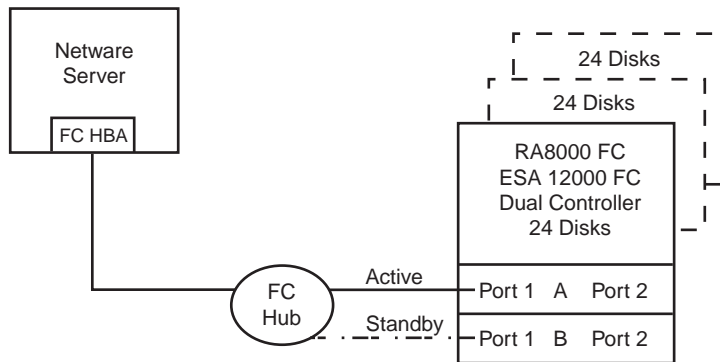
SHR-1467

Utilization of a second controller (Controller B) as an active controller can double LUN capacity can be accomplished without sacrificing redundancy. Two fibre channel cables, one connected to Controller A Port 2, and one connected to Controller B Port 2, result in Configuration #2, shown in Figure 2. This configuration provides full controller redundancy in the event that Controller A or Controller B fails. In either failover scenario the surviving controller will transition a standby port to the active state providing access to all units to the server.

Figure 2   Configuration #2 (Configuration 1 with Double LUN Capacity)
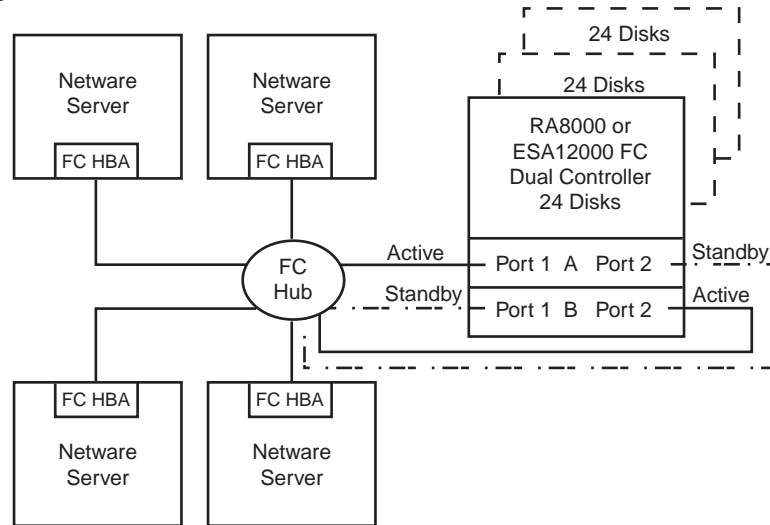

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Configurations #1 and #2 Notes

- Single Fibre Channel Loop
- Dual HSG80 controllers configured in Transparent Failover Mode
- Up to 500 meters per cable segment
- Up to 72 disks with 2 optional expansion enclosures

Configuration #3 – Up to Four Servers, Dual Controller Transparent Failover, Shared Storage Enclosure

Configuration three utilizes a dual controller pair on a single loop to provide storage and controller redundancy for up to four separate (non-cooperating) servers. The four servers share the storage enclosure in that each server has exclusive access its own set of LUNs. This is made possible by the setting of exclusive "host access" at the unit level to give each server an access to individual storage units. Additional levels of access control are necessary for this configuration because all servers are sharing the single fibre channel loop. As with all dual controller configurations, controller failover and performance benefits are inherent.

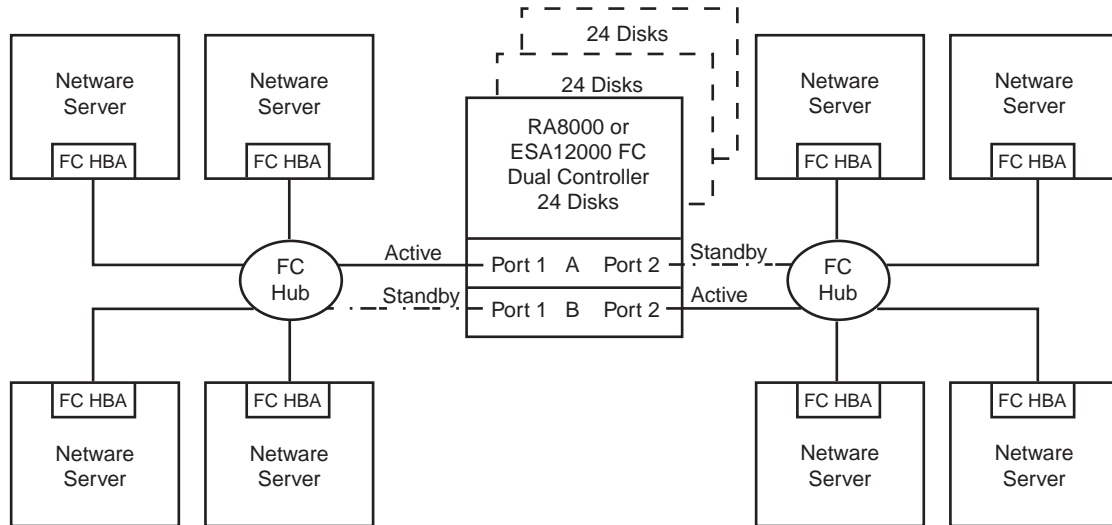**Figure 3   Configuration #3**

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Configuration #3 Notes

- Single Fibre Channel Loop
- Shared storage enclosure
- Dual HSG80 controllers configured in Transparent Failover Mode
- Up to 500 meters per cable segment
- Up to 72 disks with 2 optional expansion enclosures
- In this configuration 8 logical connections are available
- Rename the connection names, i.e., SERVER1P1, SERVER1P2, SERVER2P1, etc.
- Set exclusive unit access for each unit to a specific server connection name, i.e., for unit D0 ENABLE = SERVER1P1, for unit D100 ENABLE = SERVER2P2. If you are using SWCC to create units, by default units are enabled on all known connection names. You must explicitly disable connection names enabled for units to prevent access. See the instructions for setting the exclusive access for each unit.

Configuration #4 – Up to Eight Servers, Dual Controller Transparent Failover, Shared Storage Enclosure

Configuration #4 (Figure 4) utilizes a dual controller pair on two fibre channel loops to provide storage and controller redundancy to two groups of up to four separate (non-cooperating) servers. The eight servers share the storage enclosure in that each server has exclusive access to its own set of LUNs. This is made possible by the setting of exclusive "host access" at the unit level to give each server an access to individual storage units. Additional levels of access control are necessary for this configuration because each group of four servers is sharing the same loop.

Figure 4   Configuration #4

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Configuration #4 Notes

- Two Fibre Channel Loops
- Shared storage enclosure
- Dual HSG80 controllers configured in Transparent Failover Mode
- Up to 500 meters per cable segment
- Up to 72 disks with 2 optional expansion enclosures
- Up to 64 LUNs 8 available to each server with 2 active controller host ports
- In this configuration 8 connections are available
- Rename the connection names, i.e., SERVER1P1, SERVER2P1, SERVER5P2, etc.
- Set exclusive unit access for each unit to a specific server connection name, i.e., for unit D0 ENABLE = SERVER1P1, for unit D100 ENABLE = SERVER5P2. If you are using SWCC to create units, by default units are enabled on all known connection names. You must explicitly disable connection names enabled for units to prevent access. See the instructions for setting the exclusive access for each unit.
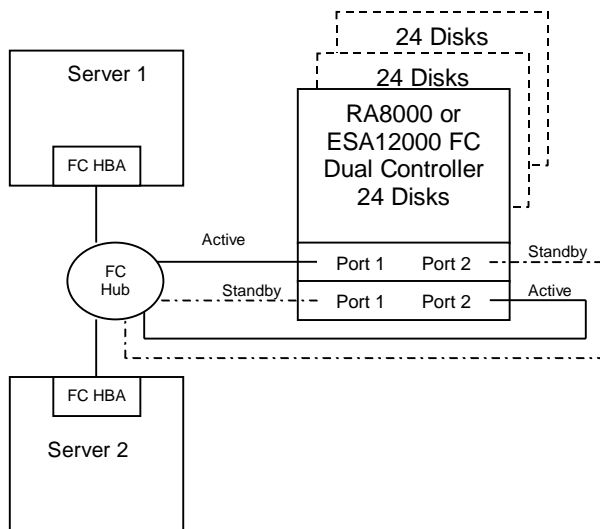
HSG80 Configuration Settings

This section explains how to configure the HSG80 controllers of a Fibre Channel RAID Array system in a Netware environment, including the settings required to support FC-AL shared storage (reference the basic shared storage setup, shown in Figure 5).

> **NOTE**
>
> All commands in this section are performed via the StorageWorks Command Line Interface (CLI) utility. For further information on CLI commands, refer to the *RA8000/ESA12000 Fibre Channel Solution Software V8.3 for Novell Netware Installation Reference Guide* (AA-RFB9A-TE).

Figure 5 Basic Shared Storage Setup

HSG80 Configuration Settings Required for Netware

Netware requires HSG80 parameters to be configured as follows:

Command Console LUN disabled
Port_1_Topology = LOOP_HARD
Port_1_AL_PA = 71
Port_2_Topology = LOOP_HARD
Port_2_AL_PA = 72

To view the configuration settings, from the CLI prompt, type:

```
HSG80> show this

Controller:
        HSG80 ZG81701099 Software V83G-0, Hardware  E02
        NODE_ID          = 5000-1FE1-0000-3420
        ALLOCATION_CLASS = 0
        SCSI_VERSION     = SCSI-2
        Configured for dual-redundancy with ZG81700990
            In dual-redundant configuration
        Device Port SCSI address 7
        Time: 21-MAY-1999 14:45:05
        Command Console LUN is disabled
Host PORT_1:
        Reported PORT_ID = 5000-1FE1-0000-3421
        PORT_1_PROFILE   = PLDA
```

```
                PORT_1_TOPOLOGY  = LOOP_HARD (loop up)
                PORT_1_AL_PA     = 71 (71 negotiated)
        Host PORT_2:
                Reported PORT_ID = 5000-1FE1-0000-3422
                PORT_2_PROFILE   = PLDA
                PORT_2_TOPOLOGY  = LOOP_HARD (standby)
                PORT_2_AL_PA     = 72 (72 negotiated)
        Cache:
                64 megabyte write cache, version 0012
                Cache is GOOD
                Unflushed data in cache
                CACHE_FLUSH_TIMER = DEFAULT (10 seconds)
        Mirrored Cache:
                64 megabyte write cache, version 0012
                Cache is GOOD
                Unflushed data in cache
        Battery:
                FULLY CHARGED
                Expires:                 WARNING: UNKNOWN EXPIRATION DATE!
                WARNING: AN UNKNOWN NUMBER OF DEEP DISCHARGES HAVE OCCURRED!
                NOCACHE_UPS
```

HSG80 Shared Storage Configuration Settings

To configure the HSG80 for shared storage, you must set:

- StorageSet Unit Number/Port Assignment
- Exclusive Storageset Access

The Storageset Unit Number determines the RAID controller port to which the storageset will be assigned. By default, units D0 - D99 will be located on port 1 and units D100 - D199 will be located on port 2.

Exclusive Storageset Access determines which servers can access which units. By default, all servers will be able to access all storagesets unless the exclusive access is set.

Provided below is an example that assumes that the RAID storagesets have been created, and the adapter drivers (CPQFC.HAM and CPQSHD.CDM) have been loaded, as described in the *RA8000/ESA12000 Fibre Channel Solution Software V8.3 for Novell Netware* Installation Reference Guide. In this example, units D0 and D1 (on port 1), and D100 and D101 (on port 2) have been created. Also, exclusive access has been set to enable Server 1 to access only units D0 and D100, and Server 2 to only access units D1 and D101.

After you start the server and load the drivers, connection to the RAID will be established. To show the connection, type:

```
HSG80> show connection

Connection                              Unit
Name      Operating system Controller Port Address    Status     Offset

!NEWCON1   WINNT     OTHER          2   000001    OL other    100
     HOST_ID=5008-05F1-FADB-81F0          ADAPTER_ID=5008-05F1-FADB-81F0

!NEWCON2   WINNT     THIS           1   000001    OL this     0
     HOST_ID=5008-05F1-FADB-81F0          ADAPTER_ID=5008-05F1-FADB-81F0
HSG80>
```

The connection information displays the world wide ID of each host bus adapter that resides on the loop. This number is assigned to each board and is listed on the back of the board. Record this number for each system before you install the adapter. After the adapter installation, you can rename the connection a more meaningful name. In this example the last 4 digits of the world wide ID on the host bus adapter in SERVER 1 is 81F0.

In this case the !NEWCON1 (default connection name) shows the adapter ID from Server1, Port 2 as **81F0**. Now rename these to something meaningful, as follows:

```
HSG80> rename !newcon1 SVR1_prt2
HSG80> rename !newcon2 SVR1_prt1
HSG80> show connection
Connection                              Unit
Name    Operating system Controller Port Address  Status  Offset

SVR1_PRT2    WINNT        OTHER      2   000008  OL other    100
    HOST_ID=5008-05F1-FADB-81F0          ADAPTER_ID=5008-05F1-FADB-81F0

SVR_PRT1     WINNT        THIS       1   000008  OL this      0
    HOST_ID=5008-05F1-FADB-81F0          ADAPTER_ID=5008-05F1-FADB-81F0
```

In the next example, the last 4 digits of the world wide ID on the adapter in Server2 is 5912.

```
SVR2_PRT2    WINNT        OTHER      2   000001  OL other    100
    HOST_ID=5008-05F1-FADB-5912          ADAPTER_ID=5008-05F1-FADB-5912

SVR2_PRT1    WINNT.       THIS       1   000001  OL this      0
HOST_ID=5008-05F1-FADB-5912              ADAPTER_ID=5008-05F1-FADB-5912
```

To show the units you have created, type:

```
HSG80>show units
D0
D1
D100
D101
```

To set exclusive access for a unit you must first disable access for all, type:

```
HSG80> set d0 disable_access = all
HSG80> set d1 disable_access = all
HSG80> set d100 disable_access = all
HSG80> set d101 disable_access = all
```

To enable units d0 and d100 to access only SERVER1 connection, type:

```
HSG80> set d0 enable_access = SVR1_PRT1
HSG80> set d100 enable_access = SVR1_PRT2

HSG80> show d0

 LUN                                              Uses
 -----------------------------------------------------------
 D0                                               R1
    LUN ID:      6000-1FE1-0000-3420-0009-8170-1099-01AF
    NOIDENTIFIER
    Switches:
      RUN                 NOWRITE_PROTECT        READ_CACHE
      READAHEAD_CACHE     WRITEBACK_CACHE
      MAXIMUM_CACHED_TRANSFER_SIZE = 32
    Access:
       SVR1_PRT1
    State:
      ONLINE to this controller
      Not reserved
Size: 16751956 blocks
Geometry (C/H/S): ( 7413 / 20 / 113 )
```

```
HSG80> show d100

 LUN                                                      Uses
 --------------------------------------------------------
 D100                                             R2
    LUN ID:       6000-1FE1-0000-3420-0009-8170-1099-01B3
    NOIDENTIFIER
    Switches:
      RUN                    NOWRITE_PROTECT         READ_CACHE
      READAHEAD_CACHE        WRITEBACK_CACHE
      MAXIMUM_CACHED_TRANSFER_SIZE = 32
    Access:
        SVR1_PRT2
    State:
      ONLINE to the other controller
    Size: 16751956 blocks
    Geometry (C/H/S): ( 7413 / 20 / 113 )
HSG80>
```

From the console of Netware SERVER1, scan for new devices as shown below, or reboot the server, and the luns should appear.

```
      SERVER1:scan for new devices
```

To see the new devices, type:

```
      SERVER1:list devices
        0x0001: [V502-A0-D0:1] Compaq StorageWorks RA8000 Disk ID 0 LUN 0
        0x0002: [V502-A0-D1:5] Compaq StorageWorks RA8000 Disk ID 1 LUN 0
        0x0004: [V025-A1-D1:0] COMPAQ CRD-S88P rev:0.91
        0x000A: [V500-A2-D0:0] Compaq 53C875 Slot 0 ID 0 COMPAQ WDE4360S
```

Continue this process until all units have been assigned as needed.

```
      HSG80> set d1 enable_access = SVR2_PRT1
      HSG80> set d101 enable_access = SVR2_PRT2
      HSG80> show d1

      LUN                                                 Uses
      -------------------------------------------------------------
      D1                                             R3
         LUN ID:       6000-1FE1-0000-3420-0009-8170-1099-01B7
         NOIDENTIFIER
         Switches:
           RUN                    NOWRITE_PROTECT         READ_CACHE
           READAHEAD_CACHE        WRITEBACK_CACHE
           MAXIMUM_CACHED_TRANSFER_SIZE = 32
         Access:
            SVR2_PRT1
         State:
           ONLINE to this controller
           Not reserved
         Size: 35529666 blocks
         Geometry (C/H/S): ( 10512 / 20 / 169 )


      HSG80> show d101

      LUN                                                 Uses
      -------------------------------------------------------------
      D101                                           R4
         LUN ID:       6000-1FE1-0000-3420-0009-8170-1099-01BB
         NOIDENTIFIER
         Switches:
           RUN                    NOWRITE_PROTECT         READ_CACHE
           READAHEAD_CACHE        WRITEBACK_CACHE
           MAXIMUM_CACHED_TRANSFER_SIZE = 32
         Access:
            SVR2_PRT2
         State:
```

```
        ONLINE to the other controller
      Size: 35529666 blocks
      Geometry (C/H/S): ( 10512 / 20 / 169 )
  HSG80>
```

From Netware SERVER2, scan for new devices as shown below, or reboot the server, and the luns should appear.

```
    SERVER2:scan for new devices
```

To see the new devices, type:

```
    SERVER2:list devices
    0x0001: [V502-A0-D0:1] Compaq StorageWorks RA8000 Disk ID 0 LUN 1
    0x0002: [V502-A0-D1:5] Compaq StorageWorks RA8000 Disk ID 1 LUN 1
    0x0004: [V025-A1-D1:0] COMPAQ CRD-S88P rev:0.91
    0x000A: [V500-A2-D0:0] Compaq 53C875 Slot 0 ID 0 COMPAQ WDE4360S
```

Base Configuration Parts List

- One or Netware 4.2 or 5.0 Servers

Compaq Part #	Description
380559-001	RA8000/ESA12000 FC Solution Software V8.3 for Novell Netware
380577-001	ACS V8.3 FC-AL Controller SW
223180-B21	Compaq Fibre Channel Adapter
380560-B21 (Blue) 380560-B22 (Opal) 380660-B21 380580-001 (Blue) 380580-002 (Opal) 380590-B21 (Blue) 380590-B22 (Opal) 380600-001 (Blue) 380600-002 (Opal) 380610-B21 (Blue) 380610-B22 (Opal)	RA8000 Pedestal w/dual HSG80 RA8000 Pedestal w/dual HSG80 RA8000 Rackable w/dual HSG80 ESA12000 w/dual HSG80 24 Slot 60HZ ESA12000 w/dual HSG80 24 Slot 60HZ ESA12000 w/dual HSG80 24 Slot 50HZ ESA12000 w/dual HSG80 24 Slot 50HZ ESA12000 w/dual HSG80 48 Slot 60HZ ESA12000 w/dual HSG80 48 Slot 60HZ ESA12000 w/dual HSG80 48 Slot 50HZ ESA12000 w/dual HSG80 48 Slot 50HZ
234453-001 295573-B22 (DEC)	FC Optical Hub, 7-Port (no GBICs) FC Optical Hub, 12-Port (no GBICs)
380561-B21	FC Optical GBIC
234457-B21 234457-B22 234457-B23 234457-B24 234457-B25	FC 2 Meter Optical Cable FC 5 Meter Optical Cable FC 15 Meter Optical Cable FC 30 Meter Optical Cable FC 50 Meter Optical Cable
380691-B21 380595-B21 380694-B21 380588-B21 380589-B21	4GB UW 7200 RPM Disk 9GB UW 7200 RPM Disk 18GB UW 7200 RPM Disk 9GB UW 10000 RPM Disk 18GB UW 10000 RPM Disk

Optional Configuration Components

Compaq Part #	Description
380570-B21 (Blue) 380570-B22 (Opal) 380568-B21 380640-001 (Blue) 380640-002 (Opal) 380650-B21 (Blue) 380650-B22 (Opal)	Pedestal Expansion 24 slots Pedestal Expansion 24 slots Rackable Expansion 24 slots ESA12000 Expansion 48 Slot 60HZ ESA12000 Expansion 48 Slot 60HZ ESA12000 Expansion 48 Slot 50HZ ESA12000 Expansion 48 Slot 50HZ
See above	Additional Disks Drives

Product Details

The RA8000/ESA12000 storage systems utilize the Compaq HSG80 RAID controller running Array Controller Software (ACS) V8.3. The ACS software is designed to support multiple platforms providing features including: dual controller operation, two controller failover modes – Transparent and Multiple-Bus, mirrored write back cache, read ahead cache, RAID implementation, disk mirroring, and disk partitioning capabilities. In addition, ACS manages host interconnect and protocol services to provide data for event notification and status such as displayed by SWCC.

The HSG80 controller has two FC host ports providing up to a total of nearly 200 Mbytes per second of available bandwidth. Disk drives are connected to the controller through 6 UltraSCSI channels providing up to 40 Mbytes per second per channel of available bandwidth. Servers can use multiple host bus adapters (HBAs) to multiple RA8000 FC systems for unlimited storage capacity.

The RA8000 FC is supplied in two basic building blocks, a pedestal style cabinet and what has been termed a "rackable" model. The pedestal is a self-contained desk height cabinet, it is available in Digital Classic Top Gun blue and in Compaq Opal. The rackable is shipped ready to be mounted in a 19" Compaq rack or a 19"cabinet/rack using an included universal RETMA/metric mounting kit.

RA8000 FC controllers come with 64 MB of cache. Cache options allow for 128 MB, 256 MB and 512MB of cache in each controller. ESA12000 FC controllers come with 256 MB of cache. Cache options allow for 512MB of cache in each controller. Cache features include read ahead and mirrored write back cache for use in optimizing performance where redundant capabilities are required for high availability system configurations. In the rare event that a storage controller fails the mirrored data is immediately available to the remaining controller for continuing operation.

The RA8000 FC pedestals and rackables come in both single controller and in dual controller models to allow the customer to select the level of high availability required for their application. A single controller model can be upgraded to a dual controller model when warranted by the application.

High availability is supported by the use of redundancy and hot swappable components. The RA8000 FC disk enclosures include redundant cooling, and have 5 power supplies providing N+1 redundancy. Power can be upgraded to full redundancy with the addition of 3 more supplies and a 2nd power distribution unit for AC input redundancy. StorageWorks components are "hot" swappable including storage controllers when operating as a redundant pair.

You can configure and monitor the RA8000 and ESA12000 FC using the StorageWorks Command Console (SWCC), a client/server tool, included in the HSG80 Software Solutions Platform kit. The client provides an easy to use graphical user interface. It can be used to monitor your storage system and notify you of events by updating a graphic display, sending electronic mail, or alerting via a pager. The Command Console Client includes applications (or Storage Windows) that communicate with the Command Console Agent software running on the host platform.

The Command Console client is available on Windows 95 and on Intel/Alpha platforms running Windows NT. A Storage Window for the HSG80 controller supports the Array Controller Software (ACS) V8.3 and offers integration with Compaq's Insight Manager (CIM). Insight Manager can receive SNMP traps from the Command Console Agent and Insight Manager services can directly launch SWCC for notification or configuring operations.

Configuration References

Table 3 lists the documents that provide further information on the configuration of RA8000 and ESA12000 Fibre Channel Storage Systems:

Table 3 Configuration Reference Material

Topic	Document Title	Order Number
HSG80 Array Controller – Release Notes	*Release Notes, HSG80 Array Controller (ACS V8.3) for Novell Netware*	*AA–RFB8A–TE*
Quick Setup Guide	*RAID Array 8000/ESA12000 Fibre Channel Storage Subsystem for Novell Netware*	*AA–RFB7A–TE*
Solution Software Installation for Netware	*RA8000/ESA12000 Fibre Channel Solution Software V8.3 for Novell Netware – Installation Reference Guide*	*AA–RFB9A–TE*
HSG80 Array Controller Configuration	*HSG80 Array Controller ACS Version 8.3 Configuration and CLI Reference Guide*	*EK-HSG80-RG*
HSG80 Array Controller Maintenance	*HSG80 Array Controller ACS Version 8.3 Maintenance and Service Guide*	*EK–HSG80-SV*
StorageWorks Command Console	*Command Console V2.1 (HSG80) for RAID Array 8000/ESA12000 – User's Guide*	*AA–RFA2A–TE*
Warranty Information	*DIGITAL StorageWorks Warranty Terms and Conditions*	*EK-HSXSW-WC*
HSG80 Array Controller Parts	*HSG80 Array Controller Illustrated Parts Map*	*EK-HSG80-MP or 355217-001*
RA8000/ESA12000 Configuration	*RA8000/ESA12000 Fibre Channel HSG80 Storage Subsystem Configuration Poster*	*EK–HSG80-CP or 355207-001*