Shared Storage for Sun Solaris Using UltraSCSI Hubs

COMPAQ
STORAGEWORKS

Application Note
EK–SMA18–AN. B01

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Sun Solaris Shared Storage Configuration Components

> **NOTE**
>
> Please review the *Shared Storage Solutions Using UltraSCSI Hubs Application Note* before referencing this document.

The shared storage configuration consists of:

- Up to four Sun servers running:

    – Solaris V2.6

    – HSZ70 Solution Software V7.0B for Sun Solaris 2.x

- STORAGEWORKS RAID Array (RA) 7000 or STORAGEWORKS Enterprise Storage Array (ESA) 10000 with a single or dual-redundant HSZ70 controllers using HSOF V7.0B or newer firmware, up to two pairs of controllers.

- UltraSCSI Hub, DWZZH-03, with three differential ports

> **NOTE**
>
> The DWZZH-21 3-port UltraSCSI hub, with 2 single-ended ports and 1 differential port, is for special OEM applications only. It is not supported in shared storage configurations.

    OR

    UltraSCSI Hub, DWZZH-05, with five differential ports and fair arbitration

Configuration Set-up Procedures

> **NOTE**
>
> Please refer to the *DWZZH 16-Bit UltraSCSI Hub User's Guide* before proceeding with the following configuration set-up procedures.

The following describes the set-up procedures for a shared storage configuration, which includes a standalone Sun Solaris host. These procedures apply to homogeneous (same operating system) and heterogeneous (different operating systems) configurations. The differences required by a Multi-Host High Availability configuration are described following the procedures.

Before connecting the host systems to the storage subsystem via the Hub, complete the following:

Host Adapters:

1. Verify the host adapters are internally terminated; i.e., the host terminators are securely installed on the host adapter board.

2. Set each host bus adapter to a unique SCSI ID. To set unique SCSI IDs for multiple SCSI adapters, the "scsi-initiator-id" environment variable must be modified on a per SBUS basis. Use the following steps at the Open Boot Prompt (OBP) level. The examples used show three adapters in the server:

> **NOTE**
>
> For a 5-port hub with fair arbitration enabled, the host adapter SCSI IDs **must** be set to 15, 14, 13 and 12. If narrow addressing is used, the adapter SCSI IDs must be set to 3, 2, 1, and 0. For further information on adapter SCSI settings, consult the *DWZZH 16-Bit UltraSCSI Hub User's Guide*.

    a) Determine the path name of the X1065A adapters to be given unique SCSI Ids. At the ok prompt type:

```
ok> show-devs
```

OBP 3.x (Example using Ultra 1)

```
…
/sbus@1f,0/QLGC,isp@1,10000
/sbus@1f,0/QLGC,isp@2,10000
/sbus@1f,0/QLGC,isp@3,10000
…
```

OBP 2.x (Example using Sparc 10)

```
…
/iommu@f,e0000000/sbus@f,e0001000/QLGC,isp@1,10000
/iommu@f,e0000000/sbus@f,e0001000/QLGC,isp@2,10000
/iommu@f,e0000000/sbus@f,e0001000/QLGC,isp@3,10000
…
```

b) Edit the NVRAMRC to set the correct SCSI IDs.
At the ok prompt type:

ok> *nvedit*

c) Type the following starting from line 0, pressing Return after each line:

OBP 3.x (Example using Ultra 1)

```
0: probe-all install-console banner

1: " /sbus@1f,0/QLGC,isp@1,10000" begin-select-dev

2: d# 15 encode-int " scsi-initiator-id" property

3:  " /sbus@1f,0/QLGC,isp@2,10000" begin-select-dev

4: d# 14 encode-int " scsi-initiator-id" property

5: " /sbus@1f,0/QLGC,isp@3,10000" begin-select-dev

6: d# 13 encode-int " scsi-initiator-id" property
```

OBP 2.x (Example using Sparc 10)

```
0: probe-all install-console banner

1: " /iommu@f,e0000000/sbus@f,e0001000/QLGC,isp@1,10000" begin-select-dev

2: d# 15 xdrint " scsi-initiator-id" attribute

3: " /iommu@f,e0000000/sbus@f,e0001000/QLGC,isp@2,10000" begin-select-dev

4: d# 14 xdrint " scsi-initiator-id" attribute

5: " /iommu@f,e0000000/sbus@f,e0001000/QLGC,isp@3,10000" begin-select-dev

6: d# 13 xdrint " scsi-initiator-id" attribute
```

d) Press the Ctrl-C after typing line 6:.

e) Save the new NVRAMRC program.
At the ok prompt type:

ok> *nvstore*
ok> *setenv use-nvramrc? true*

f) To allow NVRAMRC to set the SCSI IDs, the global "scsi-initiator-id" environment variable must be set to its default value of 7.
At the ok prompt type:

ok> *setenv scsi-initiator-id 7*

g) Reset and reboot the host to have the changes take affect.

OBP 3.x (Example using Ultra 1)
At the ok prompt type:

ok> *reset-all*

OBP 2.x (Example using Sparc 10)
At the ok prompt type:

ok> *reset*

Most hosts will issue one or more Bus Resets during boot and possibly during shutdown. These Bus Resets will interrupt any SCSI operation being performed by other hosts, but they will not cause data loss or corruption. The hosts will retry the SCSI operation and may report a warning or error from the "unexpected Bus Reset." The actual warning or error reported is dependent on the operating system of that host.

Storage Controller:

NOTE

The following controller function settings are modified using either STORAGEWORKS Command Console (SWCC) or Command Line Interface (CLI).

---

1. Set the HOST_FUNCTION mode to "A" for all controller target IDs (storagesets) that will be used by the Sun Solaris host system. For example, if you are using the HSZ70 Command Line Interface, enter:

    SET THIS_CONTROLLER HOST_FUNCTION=(4,A)

    This sets the HSZ70 controller SCSI target ID 4 to HOST_FUNCTION mode A.

2. Restrict the access to the storage units used by the Sun Solaris server. The access to the storage unit is made exclusive to a specific host initiator SCSI ID. For example, if you are using the HSZ70 Command Line Interface, enter:

    SET D400 ACCESS_ID=15

    This restricts access to storage unit D400 to the host with SCSI ID 15.

    For further instructions on setting up the storage controllers, refer to the *HSZ70 Array Controller, HSOF Version 7.0, Configuration Manual.*

UltraSCSI Hub:

1. Place the UltraSCSI hub in either a STORAGEWORKS BA356 storage shelf or pedestal, or in the lower right-hand device slots of the BA370 shelf within the RA7000 or ESA10000. Installation in a BA356 shelf is the preferred approach.

> **CAUTION**
>
> Do not exceed 25 meters maximum length per bus segment when installing the UltraSCSI hub.

2. Cable the host port of the storage controller to a port of the UltraSCSI hub. When using fair arbitration on a 5-port hub, the top port is designated as the storage controller port.

3. Cable the host adapters to the other ports of the UltraSCSI hub.

> **NOTE**
>
> For a 5-port hub with fair arbitration enabled, the correct adapters must be cabled to the correct ports. In a narrow SCSI addressing configuration, it is necessary to connect the jumper pins on the back of the 5-port hub. No jumper is required for a wide SCSI addressing configuration. For further information on 5-port hub settings, refer to the *DWZZH 16-Bit UltraSCSI Hub User's Guide.*

High Availability (HA):

Currently, we have qualified and tested the 3-port hub in our HA environment. For Sun Solaris, the V7.0B platform kit contains the directions and information to properly configure, including cabling, an HA configuration. Document *EK-HASUN-MH* outlines the configuration rules and requirements for Sun-based HA solutions. This document references cable kit DS-SWXKT-xx and provides the necessary information and material to properly configure the Sun system in an HA environment.
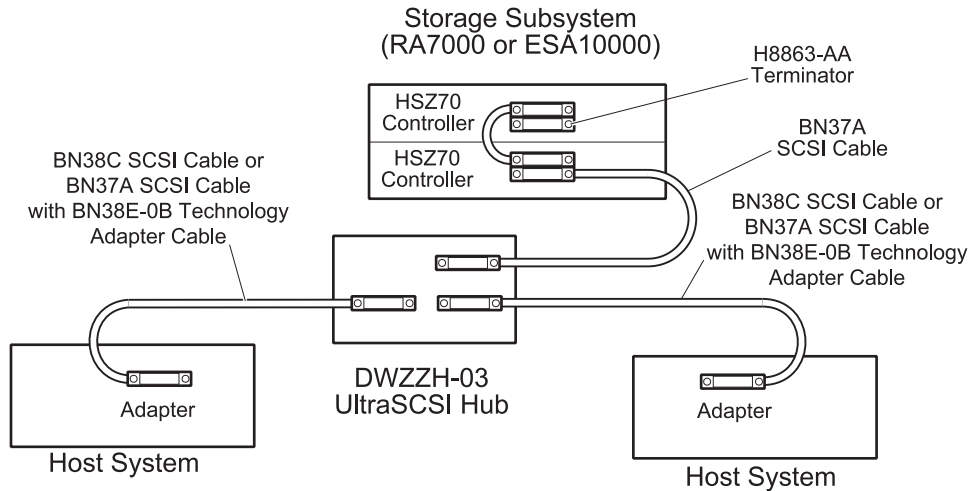
An HA configuration must have exclusive use of the SCSI bus. An HA configuration is not supported with additional non-HA hosts nor with additional HA configurations on the same UltraSCSI hub.

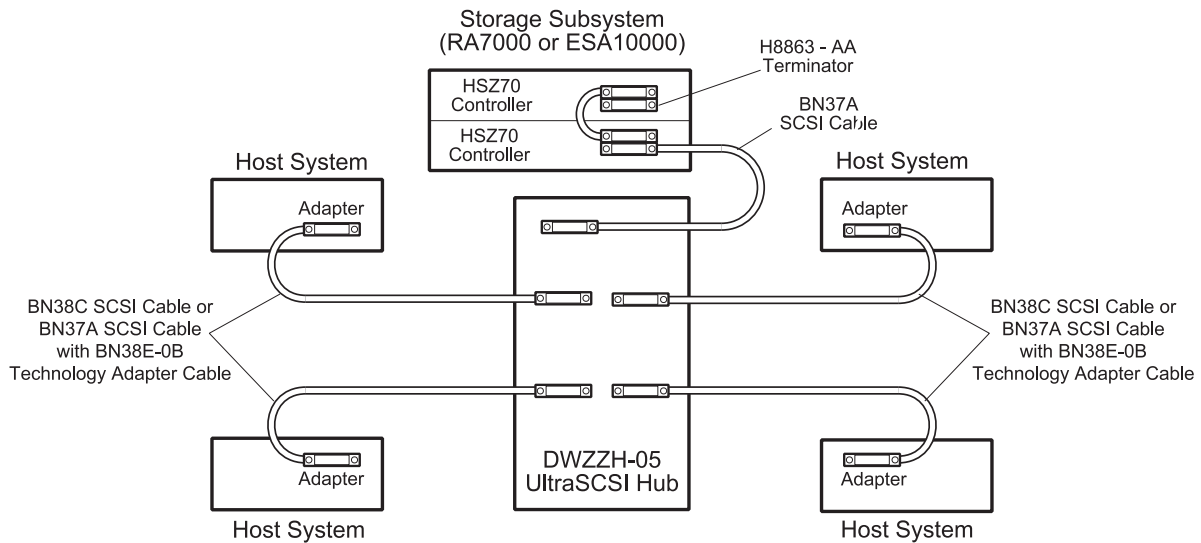## Example Configurations (Figures 1 and 2):

NOTE

The host adapters shown in the following diagrams are configured with internal termination.

Figure 1 Example 3-Port UltraSCSI Hub Configuration Layout

SHR-1101

Figure 2 Example 5-Port UltraSCSI Hub Configuration Layout

SHR-1132

The host adapters can be connected to the UltraSCSI hubs using two interchangeable cabling options:

- BN38C VHDCI-to-HD68 SCSI cables

- BN37A VHDCI-to-VHDCI SCSI cables coupled with BN38E-0B VHDCI-to-HD68 technology adapter cables

The BN38C cables are recommended. See the *UltraSCSI Configuration Guidelines* for a complete list of the available cables.

Configuration Parts List:

Required Components (Minimum) for 3-Port UltraSCSI Hub

3-Port Hub:	Part Name	Part #	Quantity
	Storage Subsystem: **RA7000 or ESA10000** HSZ70 Controller, HSOF V7.0B firmware or newer VHDCI UltraSCSI Tri-Link VHDCI UltraSCSI Differential Terminator	 DS-HSZ70-AH H8861-AA H8863-AA	 1 to 4 1 to 4 1
	Host Adapters (Wide Differential): HD68 UltraSCSI, firmware version 1.24	 Sun X1065A	 1 or 2
	UltraSCSI Hub (3 Differential Ports)	DS-DWZZH-03	1
	UltraSCSI Cables: **RA7000 or ESA10000** VHDCI UltraSCSI, to connect the HSZ70 controller with the UltraSCSI Hub VHDCI to HD68 UltraSCSI, to connect the Adapters with the UltraSCSI Hub **OR** VHDCI UltraSCSI VHDCI to HD68 UltraSCSI Technology Adapter Cable See the *UltraSCSI Configuration Guidelines* for a complete list of the available cables	 BN37A-xx BN38C-xx BN37A-xx BN38E-0B	 1 2 3 2

Required Components (Minimum) for 5-Port UltraSCSI Hub

5-Port Hub:	Part Name	Part #	Quantity
	Storage Subsystem: **RA7000 or ESA 10000** HSZ70 Controller, HSOF V7.0B firmware or newer VHDCI UltraSCSI Tri-Link VHDCI UltraSCSI Differential Terminator	 DS-HSZ70-AH H8861-AA H8863-AA	 1 to 4 1 to 4 1
	Host Adapters (Wide Differential): HD68 UltraSCSI, firmware version 1.24	 X1065A	 1 to 4
	UltraSCSI Hub (5 Differential Ports)	DS-DWZZH-05	1
	UltraSCSI Cables: **RA7000 or ESA10000** VHDCI UltraSCSI, to connect the HSZ70 controller with the UltraSCSI Hub VHDCI to HD68 UltraSCSI, to connect the Adapters with the UltraSCSI Hub **OR** VHDCI UltraSCSI VHDCI to HD68 UltraSCSI Technology Adapter Cable See the *UltraSCSI Configuration Guidelines* for a complete list of the available cables	 BN37A-xx BN38C-xx BN37A-xx BN38E-0B	 1 4 5 4

Configuration References

The following documents provide further information for the configuration of the components utilized in shared storage configurations:

Topic	Document Title	Order Number
Sun Solaris	*Getting Started, HSZ70 Solution Software V7.0B for Sun Solaris 2.x, Installation Guide*	*AA–R60VB–TE*
Sun Solaris	*Release Notes RAID Array 7000/Enterprise Storage Array 10000 for Sun Solaris*	*AA–R60WA–TE*
Sun Solaris High Availability	*RA7000/ESA12000 Multi-Host High Availability Solutions for Sun, Installation Guide*	*EK–HASUN–MH*
RA7000 / ESA10000 (HSZ70 Controller)	*RA7000 and ESA10000 Storage Subsystems, User's Guide*	*EK–SMCPP–UG*
HSZ70 Controller	*HSZ70 Array Controller, HSOF Version 7.0, Configuration Manual*	*EK–HSZ70–CG*
STORAGEWORKS Command Console	*Command Console Version 2.0, User's Guide*	*AA–R60EA–TE*
UltraSCSI	*UltraSCSI Configuration Guidelines*	*EK–ULTRA–CG*
UltraSCSI Hub	*DWZZH 16-Bit UltraSCSI Hub, User's Guide*	*EK–DWZZH–UG*
Shared Storage	*Shared Storage Solutions Using UltraSCSI Hubs*	*EK–SMA21–AN*