StorageTek 8 Gb FC PCIe HBA From QLogic Installation Guide

For HBA Models SG-XPCIE1FC-QF8-Z, SG-PCIE1FC-QF8-Z, SG-XPCIE1FC-QF8-N, SG-PCIE1FC-QF8-N and SG-XPCIE2-QF8-Z, SG-PCIE2FC-QF8-Z, SG-XPCIE2-QF8-N, SG-PCIE2FC-QF8-N, 7106958, 7106957

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Using This Documentation

- **Overview** – Describes how to install and troubleshoot the host bus adapter
- **Audience** – Technicians, system administrators, and authorized service providers
- **Required knowledge** – Advanced experience troubleshooting and replacing hardware

Product Documentation Library

Late-breaking information and known issues for this product are included in the documentation library at http://docs.oracle.com/cd/E19629_01/index.html.

Feedback

Provide feedback about this documentation at http://www.oracle.com/goto/docfeedback.

♦ ♦ ♦ CHAPTER 1

HBA Overview

This chapter provides a basic overview of Oracle's single and dual port StorageTek 8 Gb FC PCI-Express host bus adapter (HBA), which use QLogic technology. This chapter also describes the various operating systems, host platforms, storage, and infrastructure configurations that support the HBA and lists the HBA environmental requirements.

This chapter contains the following topics:

- "Kit Contents" on page 9
- "HBA Features and Specifications" on page 9
- "Operating System and Technology Requirements" on page 11
- "System Interoperability" on page 12
- "Boot Support" on page 15
- "Environmental Requirements" on page 16

Kit Contents

- StorageTek 8 Gb FC PCIe HBA
- Extra standard bracket
- *Accessing Documentation* document

HBA Features and Specifications

The StorageTek 8 Gb FC PCIe HBA (single port: SG-XPCIE1FC-QF8-Z, SG-PCIE1FC-QF8-Z, SG-XPCIE1FC-QF8-N, SG-PCIE1FC-QF8-N, dual port: SG-XPCIE2FC-QF8-Z, SG-PCIE2FC-QF8-Z, SG-XPCIE2FC-QF8-N, SG-PCIE2FC-QF8-N, 7106958, 7106957) consists of a PCI-Express Small Form Factor HBA. The board interfaces an eight-lane PCI-Express bus, with the eight lanes supporting either one or two Fibre Channel (FC) optical media ports. Each independent FC port operates at 8 Gbit/sec and features 8/4/2 autonegotiation.

HBA Feature Summary

The following is a summary of the HBA features (see Table 1-1 for a detailed list of features):

- Adherance to the *PCI Express Card Electromechanical Specification*
- Solaris Dynamic Reconfiguration support
- Fibre Channel boot for all supported operating systems
- Oracle VTS diagnostics support

Fibre Channel Feature Summary

The following is a summary of the Fibre Channel features of the HBA:

- Support for these FC topologies:
  - FC-SW switched fabric (N_Port)
  - FC-AL arbitrated loop (NL_Port)
  - Point-to-point (N_Port)
- Removable SFP shortwave optics for attachment to multi-mode fiber with LC-style connectors
- Compatibility with:
  - Fibre Channel Physical and Signaling (FC-PH, FC-PH-2, FC-PH-3)
  - Fibre Channel Framing and Signaling (FC-FS)
  - Fibre Channel Physical Interface (FC-PI)
  - Fibre Channel Generic Services (FC-GS-3)
  - Fibre Channel Tape and Medium Changers (FC-Tape)
  - Fibre Channel Protocol for SCSI (FC-FCP)
  - Fibre Channel Protocol for SCSI, 2nd version (FCP-2)

Table 1-1 lists the HBA features and specifications.

TABLE 1-1 HBA Features and Specifications

Feature	Description
PCIe connector	x8
PCIe signaling environment	PCI-Express x8 (8 active lanes)
PCIe transfer rates (maximum)	PCI-Express Gen 1 x8 at 2.5 Gbps PCI-Express Gen 2 x4 at 5 Gbps
Number of FC ports	One (single port) or two (dual port)
FC bus type (external)	Fiber-optic media, short-wave, multimode fiber (400-M5- SN-S)
FC transfer rate	800 MBps per port maximum, half-duplex

Feature	Description
	1600 MBps per port maximum, full-duplex
FC topologies	FC-SW switched fabric (N-Port), FC-AL arbitrated loop (NL-Port), and point-to-point (N-Port)
Nonvolatile memory	Type: Flash (SPI) Size (total for all ports): 2 MB Purpose: Firmware, Universal Boot Code, POST Store persistent data, such as driver trace info Store HBA parameters Store VPD data Non-volatile error log to reduce number of “no defect found” returned adapters. Error log can wrap around. Software should be able to read this error-log (IBM request Section 1.6.2)
External FC connectors	Two small form-factor pluggable (SFP) multimode optics with LC-style connectors
FC rate: multi-mode optic distance	Limited: 2Gb OM1 – 150m OM2 – 300m OM3 – 500m 4Gb OM1 – 70m OM2 – 150m OM3 – 380m 8Gb OM1 – 21m OM2 – 50m OM3 – 150m Linear: 2Gb OM1 – n/a OM2 – n/a OM3 – n/a 4Gb OM1 – n/a OM2 – n/a OM3 – n/a 8Gb OM1 – 40m OM2 – 100m OM3 – 300m
LED indicators	Three LEDs per FC channel (yellow, green, amber) on front panel as status indicators
Maximum power consumption	SG-XPCIE1FC-QF8-Z (single port): 7.3 watts SG-XPCIE2FC-QF8-Z(dual port): 9.7 watts
Form Factor	Low profile MD2, PCI-Express HBA

Operating System and Technology Requirements

The HBA requires the operating system (OS) and technology versions listed in Table 1-2.

TABLE 1-2 Supported Operating System/Technology Versions (Minimum)

Operating System/Technology	Supported Versions (minimum)
Oracle Solaris OS for the x86 (64-bit) platform	■ Oracle Solaris 10 1/13 with patches 149176-02 and 145649-04, at minimum ■ Oracle Solaris 11.1 with SRU 7 To obtain the latest patches and SRUs, go to http://support.oracle.com
Oracle Solaris OS for the SPARC (64-bit) platform	■ Oracle Solaris 10 1/13 with patches 149175-02 and 145648-04, at minimum ■ Oracle Solaris 11.1 with SRU 7 To obtain the latest patches and SRUs, go to http://support.oracle.com
Linux OS	■ Oracle Enterprise Linux 5.9 (Red Hat Compatible Kernel (RHCK) and Unbreakable Enterprise Kernel (UEK) 2, at minimum) ■ Oracle Linux 6.4 (RHCK and UEK2, at minimum) ■ Red Hat Enterprise Linux 5.9 (64-bit) ■ Red Hat Enterprise Linux 6.4 (64-bit) ■ SUSE Linux Enterprise Server 11 SP2 (32-bit and 64-bit)
Microsoft Windows OS Standard, Enterprise, and Datacenter Editions	■ Window Server 2008 R2 including SP1 (64-bit) ■ Windows Server 2012

Operating System/Technology	Supported Versions (minimum)
VMware Technology	■ VMware ESX/ESXi 5.0 ■ VMware ESX/ESXi 5.1

System Interoperability

This section provides information about selected platforms, storage systems, switches, and software that are compatible with the heterogeneous FC network design of the HBA. This section contains the following topics:

- "Host Platform Support" on page 12
- "Storage Support" on page 13
- "Switch and Director Support" on page 14
- "Software Support" on page 15

Host Platform Support

The HBA is supported by the platforms and operating systems listed in Table 1-3. For up-to-date information, see your system Product Notes and web pages.

TABLE 1-3 Platform and Operating System Support

Platform	Supported OS/Technology
Oracle SPARC Servers	
SPARC Enterprise T2000	Oracle Solaris
SPARC Enterprise T5120	Oracle Solaris
SPARC Enterprise T5140	Oracle Solaris
SPARC Enterprise T5220	Oracle Solaris
SPARC Enterprise T5240	Oracle Solaris
SPARC Enterprise T5440	Oracle Solaris
Sun Fire V245	Oracle Solaris
Sun Fire V445	Oracle Solaris
SPARC Enterprise M4000	Oracle Solaris
SPARC Enterprise M5000	Oracle Solaris
SPARC Enterprise M8000	Oracle Solaris
SPARC Enterprise M9000-32	Oracle Solaris
SPARC Enterprise M9000-64	Oracle Solaris
SPARC M5-32	
SPARC T4-1	Oracle Solaris

Platform	Supported OS/Technology
SPARC T4-2	Oracle Solaris
SPARC T5-2	Oracle Solaris
SPARC T5-4	Oracle Solaris
SPARC T5-8	Oracle Solaris
Oracle x86 Systems	
Sun Blade X4-2B	Oracle Solaris, Linux, VMware, and Windows
Sun Fire X2100 M2	Oracle Solaris, Linux, Windows, VMware
Sun Fire X2200 M2	Oracle Solaris, Linux, Windows, VMware
Sun Fire X4100 M2	Oracle Solaris, Linux, Windows, VMware
Sun Fire X4140	Oracle Solaris, Linux, Windows, VMware
Sun Fire X4200 M2	Oracle Solaris, Linux, Windows, VMware
Sun Fire X4240	Oracle Solaris, Linux, Windows, VMware
Sun Fire X4440	Oracle Solaris, Linux, Windows, VMware
Sun Fire X4600	Oracle Solaris, Linux, Windows, VMware
Sun Fire X4600 M2	Oracle Solaris, Linux, Windows, VMware
Sun Fire X4150	Oracle Solaris, Linux, Windows
Sun Fire X4250	Oracle Solaris, Linux, Windows
Sun Fire X4450	Oracle Solaris, Linux, Windows
Sun Fire X4540	Oracle Solaris, Linux, Windows
Sun Server X2-4	Oracle Solaris, Linux, VMware, and Windows
Sun Server X3-2	Oracle Solaris, Linux, VMware, and Windows
Sun Server X3-2L	Oracle Solaris, Linux, VMware, and Windows
Sun Server X4-2	Oracle Solaris, Linux, VMware, and Windows
Sun Server X4-2L	Oracle Solaris, Linux, VMware, and Windows

Storage Support

This section lists the arrays, storage systems, chassis, and tape storage devices supported by the HBA. This section provides the following topics:

- "Array and System Support" on page 13
- "Tape Storage Support" on page 14

Array and System Support

The HBA supports connecting to, using a supported switch, the following arrays and systems:

- StorageTek 2540 array
- StorageTek 6140 array

- StorageTek 6540 array
- StorageTek 9970 system
- StorageTek 9980/9985 system
- Oracle StorageTek 9990 system

Tape Storage Support

The HBA supports connecting to, using a supported switch, the following tape storage devices:

- StorageTek SL24 tape autoloader
- StorageTek SL48 tape library
- StorageTek SL500 modular library
- StorageTek L1400 tape library
- StorageTek SL3000 tape library
- StorageTek SL8500 modular library
- StorageTek Virtual Tape Library (VTL): VTL Value and VTL Plus
- StorageTek T10000A and T10000B tape drives
- StorageTek T9840C tape drive
- StorageTek T9840D tape drive
- StorageTek T9940B tape drive
- IBM and HP LTO3 tape drives
- IBM and HP LTO4 tape drives
- Quantum DLT-S4 tape drive

Switch and Director Support

The HBA is supported by the following SAN switches and directors:

- Brocade DCX backbone switch
- Brocade 200E switch
- Brocade 300 switch
- Brocade 4100 switch
- Brocade 4900 switch
- Brocade 5000 switch
- Brocade 5100 switch
- Brocade 5300 switch
- Brocade 7500 switch
- Brocade Mi10K director
- Brocade M6140 director

- Cisco MDS 9124 24-port multilayer fabric switch
- Cisco MDS 9134 multilayer fabric switch
- Cisco MDS 9222i multiservice modular switch
- Cisco MDS 9509 multilayer director
- Cisco MDS 9513 multilayer director
- QLogic SANbox 5600 switch
- QLogic SANbox 5602 switch
- QLogic SANbox 5802v switch
- QLogic SANbox 9000 stackable chassis FC switch series
- Oracle Storage Fibre Channel Switch 5802

Software Support

The HBA supports the software applications listed in Table 1-4.

TABLE 1-4 Supported Software Applications

Software (minimum version)	Supported OS
Sun Cluster 3.x	Oracle Solaris
Sun StorEdge Enterprise Backup Software 7.2/7.3/7.4	Oracle Solaris, Linux, and Windows
Sun StorageTek Availability Suite 3.0/4.0	Oracle Solaris
Sun StorageTek Performance Suite 3.0/4.0	Oracle Solaris
Sun StorageTek Utilization Suite 3.0/4.0	Oracle Solaris
Veritas NetBackup 5.1, 6.*x*	Oracle Solaris
Veritas Storage Foundation 4.1/5.0	Oracle Solaris
Support for native multi-pathing	Oracle Solaris

Boot Support

The HBA supports the following boot types:

- Oracle Solaris 10 01/13 for the x86 and SPARC environments
- Oracle Solaris 11.1 for the x86 and SPARC environments
- Preboot Execution Environment (PXE) boot capable (for x86 systems)
- RHEL 5.9 and 6.4
- SLES 11 SP2
- Oracle Enterprise Linux 5.9 and 6.4
- VMware ESX/ESXi 5.0 and 5.1

- Windows Server 2008 R2 including SP1
- Windows Server 2012

Environmental Requirements

Table 1-5 lists the HBA minimum environmental requirements.

TABLE 1-5 HBA Environmental Requirements

Specification	Operating	Non-Operating
Temperature	0˚ to 40˚C, noncondensing	-40˚C to 70˚C, noncondensing
Humidity	10% to 90% RH, noncondensing, 27˚C max wet bulb	93% RH, noncondensing, 38˚C max wet bulb
Altitude	3000m	12,000m
Vibration	0.20G in all axes, 5–500 Hz sine	1.0G in all axes, 5–500 Hz sine
Shock	Operating: 5G, 11 ms half-sine	30G 11 ms half-sine

♦ ♦ ♦ CHAPTER 2

Hardware Installation and Removal

This chapter describes how to install and remove the HBA. Refer to your system installation or service manual for detailed instructions.

This chapter contains the following topics:

- "Observing ESD and Handling Precautions" on page 17
- "Installing the Hardware" on page 17
- "Testing the Installation" on page 21
- "Replacing the SFP+ Unit on the HBA" on page 27
- "Removing the Hardware" on page 27

Observing ESD and Handling Precautions

Caution - Damage to the HBA can occur as the result of careless handling or electrostatic discharge (ESD). Always handle the HBA with care to avoid damage to electrostatic sensitive components.

To minimize the possibility of ESD-related damage, use both a workstation antistatic mat and an ESD wrist strap. You can get an ESD wrist strap from any reputable electronics store. Observe the following precautions to avoid ESD-related problems:

- Leave the HBA in its antistatic bag until you are ready to install it in the system.
- Always use a properly fitted and grounded wrist strap or other suitable ESD protection when handling the HBA and observe proper ESD grounding techniques.
- Hold the HBA by the edge of the PCB, not the connectors.
- Place the HBA on a properly grounded antistatic work surface pad when it is out of its protective antistatic bag.

Installing the Hardware

Follow the procedures in this section to install the hardware:

- "To Install the HBA" on page 18
- "To Connect the Optical Cable" on page 19
- "To Apply Power" on page 20

▼ To Install the HBA

1. **Attach an ESD wrist strap (see "Observing ESD and Handling Precautions" on page 17).**
2. **Refer to your system installation or service manual to determine an appropriate PCI-Express slot in which to install the HBA.**
3. **Shut down, power off, and unplug the system, if required.**
4. **Remove the system case.**
5. **Remove the blank panel from an empty PCI-Express slot.**
6. **(Optional) Perform the following steps to replace the PCI bracket.**

Note - The HBA comes with a low-profile PCI bracket installed. This bracket is approximately 3.11 in. (7.9 cm) long. A standard mounting bracket, which is approximately 4.75 in. (12.6 cm), is provided with each X-option order.

---

   a. **Remove the SFP(s), if installed.**

   b. **Remove the mounting bracket screws from the HBA (see Figure 2-1).**

FIGURE 2-1 Removing the Bracket Screws

   c. **Remove the bracket and store it for future use.**

   d. **Align the new mounting bracket tabs with the holes in the HBA.**

Note - Be careful not to push the bracket past the grounding tabs of the transceiver housing. Ensure that the LEDs are properly aligned with the holes in the bracket.

e. **Replace the screws that attach the HBA to the bracket.**

f. **Reinstall the SFP(s), if removed in Step 6.a.**

7. **Insert the HBA into the empty PCI-Express 8-lane slot.**

8. **Press firmly until the HBA is seated.**

9. **Secure the mounting bracket of the HBA to the case with the panel screw or clip.**

10. **Replace the system case and tighten the case screws.**

The HBA is now installed and you can connect the optical cables.

▼ To Connect the Optical Cable

Note - The HBA does not allow normal data transmission on an optical link unless it is connected to another similar or compatible Fibre Channel product (that is, multimode to multimode).

Use multimode fiber-optic cable, intended for short-wave lasers, that adheres to the specifications listed in Table 1-1 in Table 1-1.

1. **Connect the fiber-optic cable to an LC connector on the HBA.**

Figure 2-2 shows the single port HBA and Figure 2-3 shows the dual port HBA.

FIGURE 2-2 Connecting the Optical Cable: Single Port HBA

FIGURE 2-3 Connecting the Optical Cable: Dual Port HBA

2. **Connect the other end of the cable to the FC device.**

   After the optical cable is connected to the HBA, you can power on the system, if required. See your system installationg and service manual for more information.

▼ To Apply Power

1. **Verify that the HBA is securely installed in the system.**

2. **Verify that the correct fiber-optic cable is attached.**

3. **Refer to your system installation or service manual to determine how to power on the system.**

4. **Observe the light-emitting diode (LED) status for the power-on self test (POST) results as shown in the following table..**

   The yellow, green, and amber LEDs can be seen through openings in the mounting bracket of the HBA. The following table summarizes the LED status conditions.

Yellow LED	Green LED	Amber LED	State
Off	Off	Off	Power off
On	On	On	Power on (before firmware initialization)
Flash	Flash	Flash	Power on (after firmware initialization)
Flash in sequence†	Flash in sequenceStep 4	Flash in sequenceStep 4	Firmware fault
Off	Off	On (for link up) or Flash (if I/O activity)	2 Gbps link UP/ACT
Off	On (for link up) or Flash (if I/O activity)	Off	4 Gbps link UP/ACT
On (for link up) or Flash (if I/O activity)	Off	Off	8 Gbps link UP/ACT

Yellow LED	Green LED	Amber LED	State
Flash	Off	Flash	Beacon

†Flash sequence is yellow LED > green LED > amber LED, then back to yellow LED.

Testing the Installation

This section contains the following topics:

- "To Verify Proper Installation (Oracle SPARC)" on page 21
- "To Verify Attached Storage (Oracle SPARC)" on page 24

▼ To Verify Proper Installation (Oracle SPARC)

1. **Use the `show-devs` command at the `ok` prompt to list the installed devices.**

   The HBA can be identified in the output by looking for the `SUNW,qlc@`*n* and `SUNW,qlc@`*n*`,1` node names, where *n* is usually a single-digit number from 0 to 9. In this example, there is a dual port HBA installed.

```
{0} ok show-devs
/ebus@c0
/pci-performance-counters@0
/pci@0
/niu@80
/cpu@e
/cpu@d
/cpu@c
/cpu@b
/cpu@a
/cpu@9
/cpu@8
/cpu@7
/cpu@6
/cpu@5
/cpu@4
/cpu@3
/cpu@2
/cpu@1
/cpu@0
/virtual-devices@100
/virtual-memory
/memory@m0,8000000
/aliases
/options
/openprom
/chosen
```

```
/packages
/ebus@c0/serial@0,ca0000
/pci@0/pci@0
/pci@0/pci@0/pci@9
/pci@0/pci@0/pci@8
/pci@0/pci@0/pci@2
/pci@0/pci@0/pci@1
/pci@0/pci@0/pci@8/pci@0
/pci@0/pci@0/pci@8/pci@0/pci@a
/pci@0/pci@0/pci@8/pci@0/pci@9
/pci@0/pci@0/pci@8/pci@0/pci@8
/pci@0/pci@0/pci@8/pci@0/pci@2
/pci@0/pci@0/pci@8/pci@0/pci@1
/pci@0/pci@0/pci@8/pci@0/pci@2/SUNW,qlc@0,1
/pci@0/pci@0/pci@8/pci@0/pci@2/SUNW,qlc@0
/pci@0/pci@0/pci@8/pci@0/pci@2/SUNW,qlc@0,1/fp@0,0
/pci@0/pci@0/pci@8/pci@0/pci@2/SUNW,qlc@0,1/fp@0,0/disk
/pci@0/pci@0/pci@8/pci@0/pci@2/SUNW,qlc@0/fp@0,0
/pci@0/pci@0/pci@8/pci@0/pci@2/SUNW,qlc@0/fp@0,0/disk
/pci@0/pci@0/pci@2/scsi@0
/pci@0/pci@0/pci@2/scsi@0/disk
/pci@0/pci@0/pci@2/scsi@0/tape
/pci@0/pci@0/pci@1/pci@0
/pci@0/pci@0/pci@1/pci@0/pci@3
/pci@0/pci@0/pci@1/pci@0/pci@2
/pci@0/pci@0/pci@1/pci@0/pci@1
/pci@0/pci@0/pci@1/pci@0/pci@3/network@0,1
/pci@0/pci@0/pci@1/pci@0/pci@3/network@0
/pci@0/pci@0/pci@1/pci@0/pci@2/network@0,1
/pci@0/pci@0/pci@1/pci@0/pci@2/network@0
/pci@0/pci@0/pci@1/pci@0/pci@1/pci@0
/pci@0/pci@0/pci@1/pci@0/pci@1/pci@0/usb@0,2
/pci@0/pci@0/pci@1/pci@0/pci@1/pci@0/usb@0,1
/pci@0/pci@0/pci@1/pci@0/pci@1/pci@0/usb@0
/pci@0/pci@0/pci@1/pci@0/pci@1/pci@0/usb@0,2/hub@4
/pci@0/pci@0/pci@1/pci@0/pci@1/pci@0/usb@0,2/storage@2
/pci@0/pci@0/pci@1/pci@0/pci@1/pci@0/usb@0,2/storage@2/disk
/virtual-devices@100/rtc@5
/virtual-devices@100/console@1
/virtual-devices@100/random-number-generator@e
/virtual-devices@100/ncp@6
/virtual-devices@100/n2cp@7
/virtual-devices@100/channel-devices@200
/virtual-devices@100/flashprom@0
/virtual-devices@100/channel-devices@200/virtual-channel-client@1
/virtual-devices@100/channel-devices@200/virtual-channel@0
/virtual-devices@100/channel-devices@200/virtual-channel-client@2
/virtual-devices@100/channel-devices@200/virtual-channel@3
/openprom/client-services
/packages/obp-tftp
/packages/kbd-translator
/packages/SUNW,asr
/packages/dropins
/packages/terminal-emulator
```

```
/packages/disk-label
/packages/deblocker
/packages/SUNW,builtin-drivers
```

2. **To identify the port as a StorageTek 8 Gb FC port, use the `cd` command to change to the `SUNW,qlc@`*n* directories, and use the `.properties` command, as shown in the following example:**

```
cd /pci@0/pci@0/pci@8/pci@0/pci@2/SUNW,qlc@0
```

In the next example, the `.properties` command output displays the properties of one port in a dual port HBA.

```
{1} ok select /pci@1e,600000/pci@0/pci@2/SUNW,qlc@0
QLogic QLE2562 Host Adapter FCode(SPARC): 2.03b1 06/06/08
Firmware version 4.03.02
{1} ok .properties
assigned-addresses 81060010 00000000 00002000 00000000 00000100
82060014 00000000 04000000 00000000 00004000 82060030 00000000
04040000 00000000 00040000
manufacturer QLGC version QLE2562
Host Adapter FCode(SPARC): 2.03 06/30/08
model QLE2562
node-wwn 20 00 00 1b 32 14 40 66
port-wwn 21 00 00 1b 32 14 40 66
reg 00060000 00000000 00000000 00000000 00000000 01060010 00000000
00000000 00000000 00000100 03060014 00000000 00000000 00000000
00001000
compatible pciex1077,2532.1077.171.2
pciex1077,2532.1077.171
pciex1077,171
pciex1077,2532.2
pciex1077,2532
pciclass,c0400
short-version 2.03 06/30/08
devsel-speed 00000000
max-latency 00000000
min-grant 00000000
#size-cells 00000000
#address-cells 00000002
device_type scsi-fcp
name SUNW,qlc
fcode-rom-offset 0000b200
interrupts 00000001
class-code 000c0400
subsystem-id 00000171
subsystem-vendor-id 00001077
revision-id 00000002
device-id 00002532
vendor-id 00001077
{1}
```

▼ To Verify Attached Storage (Oracle SPARC)

- **If online storage is connected to the HBA, use the `apply show-children` command to list the attached storage.**

Note - You might need to run the `reset-all` command before using the `apply show-children` command.

In the example that follows, a storage JBOD has one target and two LUNs attached to one port of a dual port HBA.

```
{0} ok show-disks
a) /pci@0/pci@0/pci@8/pci@0/pci@2/SUNW,qlc@0,1/fp@0,0/disk
b) /pci@0/pci@0/pci@8/pci@0/pci@2/SUNW,qlc@0/fp@0,0/disk
c) /pci@0/pci@0/pci@2/scsi@0/disk
d) /pci@0/pci@0/pci@1/pci@0/pci@1/pci@0/usb@0,2/storage@2/disk
q) NO SELECTION
Enter Selection, q to quit: b
{0} ok select /pci@0/pci@0/pci@8/pci@0/pci@2/SUNW,qlc@0
QLogic QLE2562  Host Adapter FCode(SPARC): 2.03  06/30/08
Firmware version 4.03.02
{0} ok show-children
Adapter portID - 11000
************** Fabric Attached Devices **************
  Dev# 0(0)   PortID 100e8    Port WWN 21000011c68115b3
   LUN    0(0)    DISK  SEAGATE ST336854FC      0005

  Dev# 1(1)   PortID 10100    Port WWN 201500a0b84718a4
   LUN    a(10)    DISK  STK     FLEXLINE 380    0619
   LUN    b(11)    DISK  STK     FLEXLINE 380    0619

{0} ok
```

▼ To Verify Proper Installation (Oracle x86)

1. **During system power-on initiation, the following system booting BIOS initialization screen is displayed.**

```
QLogic Corporation
QLE2562 PCI Fibre Channel ROM BIOS version 2.02
Copyright (c) QLogic Corporation 1992-2008. All rights reserved.
www.qlogic.com

Press <Ctrl-Q> or <Alt-Q> for Fast!UTIL
BIOS for Adapter 0 is disabled
BIOS for Adapter 1 is disabled
```

```
ROM BIOS NOT INSTALLED
```

2. Immediately press Control-Q.

The following QLogic *Fast!*UTIL menu is displayed.

```
QLogic Corporation
QLE2562 PCI Fibre Channel ROM BIOS version 2.02
Copyright (c) QLogic Corporation 1993-2008. All rights reserved.
www.qlogic.com

Press <Ctrl-Q> or <Alt-Q> for Fast!UTIL
BIOS for Adapter 0 is disabled

BIOS for Adapter 1 is disabled

ROM BIOS NOT INSTALLED

<CTRL-Q> Detected, Initialization in progress, Please wait...
```

Then the following QLogic *Fast!*UTIL menu is displayed.

```
                  QLogic Fast!UTIL
                 Select Host Adapter

------------------------------------------------------------
Adapter Type   I/O Address   Slot   Bus   Device   Function

QLE2562              9400     01    02       01         1
QLE2562              9800     01    02       01         0
```

3. Use the Arrow key to highlight the HBA port that has connected devices and press Enter.

The following QLogic *Fast!*UTIL menu is displayed.

```
                 QLogic Fast!UTIL
                 Selected  Adapter
------------------------------------------------------------
Adapter Type   I/O Address   Slot   Bus   Device   Function

 QLE2562             9400     01    02       01          1

------------------------------------------------------------
   Fast!UTIL Options

   Configuration Settings
   Scan Fibre Devices
   Fibre Disk Utility
   Loopback Data Test
   Select Host Adapter
   Exit Fast!UTIL
```

4. **Use the Arrow key to highlight Scan Fibre Devices and press Enter.**

   In the example that follows, a storage JBOD has six targets attached to one port of a dual port HBA.

   The following QLogic *Fast!*UTIL menu is displayed.

```
                    QLogic Fast!UTIL

Scan Fibre Channel Loop

ID  Vendor  Product           Rev    Port Name        Port ID

0   SEAGATE ST336752FSUN36G   0205   21000004CF64C8E0 0000CC
1   SEAGATE ST336752FSUN36G   0205   21000004CF6493D0 0000CB
2   SEAGATE ST336752FSUN36G   0205   21000004CF6428C4 0000CA
3   SEAGATE ST336752FSUN36G   0205   21000004CF64C5B2 0000C9
4   SEAGATE ST336752FSUN36G   0205   21000004CF6096F0 0000C7
5   SEAGATE ST336752FSUN36G   0205   21000004CF648010 0000C6
6   SUN     StorEdge 3510F    D1046  215000C0FF00225B 0000CD
7   No device present
8   No device present
9   No device present
10  No device present
11  No device present
12  No device present
13  No device present
14  No device present
15  No device present
```

5. **To exit the QLogic *Fast!*UTIL, press the Escape key, highlight Exit Fast!UTIL, and press Enter.**

   The following QLogic *Fast!*UTIL menu is displayed.

```
                  QLogic Fast!UTIL
                  Selected  Adapter

-----------------------------------------------------------
Adapter Type   I/O Address   Slot   Bus   Device   Function

QLE2562              9400     01    02       01         1

-----------------------------------------------------------
Fast!UTIL Options

Configuration Settings
Scan Fibre Devices
Fibre Disk Utility
Loopback Data Test
Select Host Adapter
Exit Fast!UTIL
```

The following QLogic *Fast!*UTIL menu is displayed.

```
                QLogic Fast!UTIL

Exit Fast!UTIL
--------------------------------

Reboot System
Return to Fast!UTIL
```

Replacing the SFP+ Unit on the HBA

The Small Form Factor Pluggable (SFP+) optics unit on this card is considered a part of the card, NOT as a separate field replaceable unit (FRU). Therefore, in the event that the SFP + unit malfunctions, you must return the entire card in order to receive a replacement SFP + unit. Always return any malfunctioning card with the SFP+ unit attached. For information about removing the card from a system in order to return it, see “To Remove the HBA ” on page 27.

Removing the Hardware

The following instructions describe the tasks required to remove the HBA. Refer to your system installation or service manual for detailed HBA removal instructions.

The following steps summarize the hardware removal process:

1. Halt the operating system and remove power from the system.
2. Remove the HBA hardware.

▼ To Remove the HBA

1. **Use an ESD strap (refer to “Observing ESD and Handling Precautions” on page 17).**
2. **Refer to your system documentation to shut down, power off, and unplug the system.**
3. **Disconnect all cables.**
4. **Unscrew the case screws and remove the system case.**

5. **Remove the mounting bracket of the HBA from the system by unscrewing the panel screw or removing the clip, whichever is being used.**

   You can now remove the HBA.

♦ ♦ ♦ CHAPTER 3

Software Installation

After you have completed the hardware installation and powered on the computer, follow the instructions in this chapter for your operating system to install the HBA driver and any other utilities required by the HBA.

This chapter contains the following topics:

- "Installing Software for the Oracle Solaris OS" on page 29
- "Installing Software for the Red Hat/SUSE Linux OS" on page 30
- "Installing Software for the VMware Technology" on page 35
- "Installing Software for the Windows OS" on page 35
- "Installing a CLI for Updating the BIOS and FCode" on page 37

Installing Software for the Oracle Solaris OS

This section contains the following topics:

- "Installing the Fibre Channel Driver" on page 29
- "Diagnostic Support for the Oracle Solaris OS" on page 30

Installing the Fibre Channel Driver

The `qlc` HBA driver for the Solaris OS is included with the Oracle Solaris 10 01/13 and the Oracle Solaris 11.1 OSes (or later). You must load the latest `qlc` driver by installing the appropriate platform patches and SRUs:

- **Oracle Solaris 10 01/13 (for the SPARC environment)**: patches 149175-02 and 145648-04
- **Oracle Solaris 10 1/13 (for the x86 environment)**: patches 149176-02 and 45649-04
- **Oracle Solaris 11.1**: SRU 7

You can download these patches and SRUs at:

`http://support.oracle.com`

▼ To Install or Update the `qlc` HBA Driver From a Patch

1. **Log in as the root user.**
2. **Navigate to the directory that contains the patch.**
3. **Add the latest patch by using the `patchadd` command.**

```
# patchadd patch-number
```

Diagnostic Support for the Oracle Solaris OS

Diagnostic support for the HBA is included in the Oracle VTS software. The Oracle VTS software is available for download at: http://support.oracle.com/

For information about the Oracle VTS software, see the Oracle VTS documentation at: http://docs.oracle.com/cd/E19719-01/index.html

The `qlctest` utility, which is provided as part of the Oracle VTS software, supports the following functions:

- Connectivity verification
- Firmware version and checksum testing
- Self-testing
- Loopback tests
  - External
  - Internal, single-bit
  - Internal, 10-bit
  - Mailbox

Installing Software for the Red Hat/SUSE Linux OS

This section describes how to download and install the fibre channel drivers required by the HBA. It also describes how to install diagnostic support software for the HBA. This section contains the following topics:

- "Downloading the Red Hat/SUSE Linux Drivers" on page 31
- "Installing the Red Hat/SUSE Linux Drivers" on page 31
- "Diagnostic Support for the Red Hat/SUSE OS" on page 34

Downloading the Red Hat/SUSE Linux Drivers

This section describes how to download the fibre channel driver for the HBA.

▼ To Download the Fibre Channel Driver

1. **Go to the QLogic support site for Oracle at:**

   `http://driverdownloads.qlogic.com/QLogicDriverDownloads_UI/Oracle_Search.aspx`

2. **Locate the table containing the HBA model that you want (SG-*model-number*).**

3. **At the bottom of the table, in the Software for row, click Linux.**

4. **In the Red Hat or SUSE Linux table, find the appropriate driver (the file name is in the format `qle256`*x*`-vx.yy.zz-dist.tgz`).**

5. **In the Download column of that row, click Download.**

6. **Save the file to a directory on the hard disk of the computer.**

Note - Because the driver distribution file is now larger than 1.44 Mb, it cannot fit on a 1.44 Mb floppy disk; therefore, you must use a USB driver or local hard disk to download the file.

Installing the Red Hat/SUSE Linux Drivers

▼ To Install and Load the Red Hat/SUSE Linux Drivers

After you download the drivers, as described in "Downloading the Red Hat/SUSE Linux Drivers" on page 31, you can install the drivers by following the steps in this section:

1. **"To Build the Fibre Channel Driver " on page 31**

2. **"To Load the Newly Built Fibre Channel Driver" on page 32**

▼ To Build the Fibre Channel Driver

The driver installation makes extensive use of the `build.sh` script, which is located in driver source (`extras/build.sh`).

From the source code, you can build a `qla2xxx.ko` module and a `qla2xxx_conf.ko` module for the host. You can then choose to load the driver manually or automatically, as described in "To Load the Newly Built Fibre Channel Driver" on page 32.

1. **In the directory that contains the source driver file, `qla2xxx-x.yy.zz-dist.tgz`, use the commands shown in the following example.**

```
# tar -xvzf *.tgz
# cd qlogic
# ./drvrsetup (this extracts the source files directory into the current directory)
# cd qla2xxx-x.yy.zz (x.yy indicates the driver version; zz indicates the file extension, which
 is typically .ko for kernel modules (binaries)).
```

2. **Build and install the driver modules from the source code by executing the `build.sh` script.**

```
# ./extras/build.sh install
```

This build script does the following:

- **Builds the driver `.ko` files.**
- **Copies the `.ko` files to the appropriate directory: `/lib/modules/2.6.../kernel/drivers/scsi/qla2xxx`**
- **Adds the appropriate directive in the `modprobe.conf.`*local* to remove the `qla2xxx_conf` module when unloading the `qla2xxx` module.**
- **Updates the newly built `qla2xxx_conf.ko` module with any previously saved data in `/etc/qla2xxx.conf`.**

3. **Choose how you want to load the driver, as described in "To Load the Newly Built Fibre Channel Driver" on page 32.**

To Load the Newly Built Fibre Channel Driver

After you build the fibre channel driver, as described in "To Build the Fibre Channel Driver " on page 31, you can choose to manually or automatically load the driver. This section contains the following topics:

- "To Manually Load the Fibre Channel Driver" on page 33
- "To Automatically Load the Fibre Channel Driver" on page 33

▼ To Manually Load the Fibre Channel Driver

After building the fibre channel driver, you can choose to manually load the driver. If you want to automatically load the driver, skip to "To Automatically Load the Fibre Channel Driver" on page 33.

1. **Build the driver binary, as described in "To Build the Fibre Channel Driver " on page 31.**

2. **Manually load the driver by using the `modprobe -v` command.**

```
# modprobe -v qla2xxx
```

3. **If you want to manually unload the driver, use the `modprobe -r` command.**

```
# modprobe -r qla2xxx
# modprobe -r qla2xxx_conf (SANsurfer use only)
```

▼ To Automatically Load the Fibre Channel Driver

After building the fibre channel driver, you can choose to automatically load the driver. If you want to manually load the fibre channel driver, see "To Manually Load the Fibre Channel Driver" on page 33.

1. **Build the driver binary, as described in "To Build the Fibre Channel Driver " on page 31.**

2. **Install the driver module (`*.ko`) files to the appropriate kernel module directory.**

```
# ./extras/build.sh install
```

3. **For Red Hat Linux users, edit the `/etc/modprobe.conf` file and add the following entries, if they are not present:**

   - **`alias scsi_hostadapter1 qla2xxx_conf` (for use only with SANsurfer)**
   - **`alias scsi_hostadapter2 qla2xxx`**

4. **For SUSE Linux users, edit the `/etc/sysconfig/kernel` file and modify the `INITRD_MODULES` directive as shown in the following example.**

   In this example, note that you must add the first module, `qla2xxx_conf` (for SANsurfer), followed by the `qla2xxx` module. The `qla2xxx_conf` module is for use only with SANsurfer while the `qla2xxx` module is a common module.

```
 ...
INITRD_MODULES="..... qla2xxx_conf qla2xxx"
...
```

5. **Change to the `/boot` directory.**

6. **Back up the current RAMDISK image.**

```
# cp -f initrd-2.6.kernel-version.img initrd-2.6.kernel-version.img.bak
```

7. **Build the RAMDISK image with the `mkinitrd -f` command.**

```
Red Hat: # mkinitrd -f initrd-2.6.kernel-version.img kernel-version
SUSE: # /sbin/mk_initrd
```

8. **Reboot the system to load the RAMDISK image with the driver.**

Diagnostic Support for the Red Hat/SUSE OS

Diagnostic support for the HBA is available through the SANsurfer PRO graphical user interface (GUI) utility or the SANsurfer command-line interface (CLI) utility. These utilities support the following functions:

- Connectivity verification
- BIOS, FCode, EFI, and firmware version information
- Link status, including topology, data rate, and statistics
- Vital product data (VPD) information
- Attached devices list
- Option ROM, NVRAM update utilities
- Loopback test
- Read/Write Buffer test

▼ To Install Diagnostic Support for the Red Hat/SUSE Linux OS

1. **Go to the QLogic support site for Oracle at:**

   http://driverdownloads.qlogic.com/QLogicDriverDownloads_UI/Oracle_Search.aspx

2. **Locate the table containing the HBA model that you want (SG-*model-number*).**

3. **At the bottom of the table, click Windows.**

4. **Locate the SANsurfer CLI (command-line interface) or SANsurfer PRO (GUI) diagnostic utility.**
5. **Click Download to copy diagnostic archive to a local file system.**
6. **Click Readme link for additional information.**

Installing Software for the VMware Technology

The HBA drivers included on the VMware distribution are sufficient for supporting the HBA. No further action is required.

To verify that the drivers loaded successfully, look for the following lines in the `/var/log/vmkernel` file:

```
Initialization for qla2300_707_vmw succeeded with module ID 2.
[timestamp] b12-4600a vmkernel: 0:00:01:18.878 cpu1:1041)qla2300_707_vmw loaded successfully.
```

The first line indicates that the fibre channel driver loaded successfully.

Installing Software for the Windows OS

This section describes how to download and install the fibre channel drivers required by the HBA. It also describes how to install diagnostic support software for the HBA. This section contains the following topics:

- "To Download the Fibre Channel Driver" on page 35
- "To Install the Fibre Channel Driver" on page 36
- "Diagnostic Support for the Windows OS" on page 36

▼ To Download the Fibre Channel Driver

1. **Go to the QLogic support site for Oracle at:**

   `http://driverdownloads.qlogic.com/QLogicDriverDownloads_UI/Oracle_Search.aspx`
2. **Locate the table containing the HBA model that you want (SG-*model-number*).**
3. **At the bottom of the table, in the Software for row, click Windows.**
4. **In the table for your Windows operating system, find the appropriate driver.**

5. **In the Download column of that row, click Download.**
6. **Save the file to a directory on the hard disk of the computer.**
7. **Unzip (extract) the driver files to a location on the hard disk of the computer.**

▼ To Install the Fibre Channel Driver

After installing the HBA and restarting the computer, the Windows OS detects the newly installed device and displays the Found New Hardware with Fibre Channel Controller message. The Found New Hardware wizard launches.

Note - This procedure requires a system configured with the latest Service Pack and Windows Update.

---

1. **On the first screen of the Found New Hardware wizard, click Search for a suitable driver for my device (recommended), and then click Next.**
2. **Browse to the location on the where you downloaded the Fibre Channel driver, then click Next.**

   Windows displays a message, letting you know it found a driver for this device.
3. **On the Completing the Found New Hardware Wizard window, click Finish.**
4. **If the system displays the following message, click Yes to restart the computer:**

```
System Settings Change. Windows has finished installing a new device. The software that
 supports your device requires that you restart your computer. You must restart your computer
 before the new settings will take effect. Do you want to restart your computer now?
```

Diagnostic Support for the Windows OS

Diagnostic support for the HBA is available through QLogic's SANsurfer FC HBA Manager (GUI) tool and the SANsurfer FC HBA CLI tool. These tools support the following functions:

- Connectivity verification
- BIOS, FCode, EFI, and firmware version information
- Link status, including topology, data rate, and statistics
- Vital Product Data (VPD) information
- Attached devices list
- Option ROM, NVRAM update utilities

- Loopback test
- Read/Write Buffer test

▼ To Install Diagnostic Support for the Windows OS

1. **Go to the QLogic support site for Oracle at:**

   http://driverdownloads.qlogic.com/QLogicDriverDownloads_UI/Oracle_Search.aspx

2. **Locate the table containing the HBA model that you want (SG-*model-number*).**
3. **At the bottom of the table, click Windows.**
4. **Locate the SANsurfer CLI or SANsurfer PRO (GUI) diagnostic utility.**
5. **Click Download to copy the diagnostic archive to a local file system.**
6. **Click Readme for additional information.**

Installing a CLI for Updating the BIOS and FCode

If you need to update the fibre channel BIOS and FCode, you can do so by using the SANsurfer command-line interface (CLI).

If you have not done so already, you can download the SANsurfer CLI package from the QLogic support site for Oracle at:

http://driverdownloads.qlogic.com/QLogicDriverDownloads_UI/Oracle_Search.aspx

Follow the installation instructions in the `README.TXT` file. Installation instructions are also available in the QLogic document, *SANsurfer FC HBA CLI User's Guide* (SN0054614-00), which can be found on the QLogic web site, http://www.qlogic.com.

For instructions on how to update the BIOS and FCode, see the *SANsurfer FC HBA CLI User's Guide* at the QLogic web site.

♦ ♦ ♦ CHAPTER 4

Known Issues

This chapter provides supplementary and workaround information for the universal HBA. Specific Change Request (CR) identification numbers are provided for service personnel.

This chapter contains the following topic:

- "`vpd r/w failed` Error Messages Are Displayed" on page 39

`vpd r/w failed` Error Messages Are Displayed

CR 19154195

Conditions:

- Operating System: Oracle Enterprise Linux 5.9 operating system (OS) with Unbreakable Enterprise Kernel (UEK) 3
- Operating Protocol Mode: CNA and HBA
- Environment: Universal HBA installed in an x86 system, during functional check procedures

Issue:

After upgrading the Oracle Linux OS to UEK 3, you might receive "vpd r/w failed" messages upon issuing functional check commands, such as `dmesg` and `lspci`.

Workaround:

None. Ignore these messages as they do not adversely affect the functionality of the universal HBA.