

StorageTek Dual 8 Gb FC Dual GbE ExpressModule HBA From QLogic Installation Guide

For HBA Models SG-PCIEFCGBE-Q8-Z, SG-XPCIEFCGBE-Q8-Z, SG-PCIEFCGBE-Q8-N, and SG-XPCIEFCGBE-Q8-N

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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

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◆◆◆ CHAPTER 1

HBA Overview

This chapter provides a basic overview of the StorageTek Dual 8Gb FC Dual GbE ExpressModule HBA, which uses 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 10](#)
- [“System Interoperability” on page 11](#)
- [“Boot Support” on page 15](#)
- [“Environmental Requirements” on page 15](#)

Kit Contents

- StorageTek Dual 8Gb FC Dual GbE ExpressModule HBA, QLogic
- *Accessing Documentation* document

HBA Features and Specifications

The StorageTek Dual 8Gb FC Dual GbE ExpressModule HBA (SG-(X)PCIEFCGBE-Q8-Z, SG-(X)PCIEFCGBE-Q8-N) consists of a single-wide, ExpressModule bus expansion board. The board interfaces an eight-lane PCI Express bus, supporting two Fibre Channel (FC) optical media ports and two UTP (copper) Gigabit Ethernet ports. The two FC ports operate at 8 Gbit/second and feature 8/4/2 autonegotiation.

The HBA is also backward compatible with FC ports that operate at 4 Gbit/second and 2 Gbit/second. The Gigabit Ethernet ports can be configured to operate in 10-, 100-, or 1000-Mbit/second Ethernet networks.

TABLE 1-1 HBA Features and Specifications

Feature	Description
PCI connector	x8
PCI signaling environment	PCI Express version 1.0 x8 (8 active lanes)
PCI transfer rate (maximum)	PCI Express 1.0 (2.5 Gbit/second)
Number of FC ports	Two
FC bus type (external)	Fiber-optic media, short-wave, multimode fiber
FC transfer rate	800 MB/second per port maximum, half-duplex 1600 MB/second 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)
RAM (FC)	1 MB, parity protected, per port
NVRAM/Boot Code/FW	One 2-MB Flash ROM, field-programmable
External FC connectors	Two Small-Form Factor Pluggable (SFP+) multimode optic with LC-style connectors
Maximum FC cable length	2 Gbit/second : 300 meters using 50/125 mm core fiber 150 meters using 62.5/125 mm core fiber 4 Gbit/second: 150 meters using 50/125 mm core fiber 70 meters using 62.5/125 mm core fiber 8 Gbit/second: 50 meters using 50/125 mm core fiber 21 meters using 62.5/125 mm core fiber
Number of Ethernet ports	Two
GbE interface type	IEEE 802.3ab compliant, copper
GbE transfer rate	10/100/1000 Mbit/second
External connectors	Two RJ-45 connectors
Ethernet frame size	Jumbo frames up to 9 KB
Host CPU offload	TCP/IP checksum calculation
LED indicators and button	Three LEDs per FC channel (blue, green, amber) on front panel as status indicators Two LEDs per Ethernet channel (green/orange, yellow) in the Ethernet port as status indicators Power LED, Attention LED, and a button on front panel to support hot-swap functionality
Form Factor	PCI ExpressModule, single-wide

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	<ul style="list-style-type: none"> ■ Oracle Solaris 10 1/13 with patches 149176-02 and 145649-04, at minimum ■ Oracle Solaris 11.1 with SRU 7 <p>To obtain the latest patches and SRUs, go to http://support.oracle.com</p>
Oracle Solaris OS for the SPARC (64-bit) platform	<ul style="list-style-type: none"> ■ Oracle Solaris 10 1/13 with patches 149175-02 and 145648-04, at minimum ■ Oracle Solaris 11.1 with SRU 7 <p>To obtain the latest patches and SRUs, go to http://support.oracle.com</p>
Linux OS	<ul style="list-style-type: none"> ■ 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	<ul style="list-style-type: none"> ■ Window Server 2008 R2 including SP1 (64-bit) ■ Windows Server 2012
VMware Technology	<ul style="list-style-type: none"> ■ 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 and Ethernet network design of the HBA. This section contains the following topics:

- “Host Platform Support” on page 11
- “Storage Support” on page 12
- “Switch Support” on page 13
- “Software Support” on page 14

Host Platform Support

The HBA is supported by the platforms and operating systems listed in [Table 1-3](#).

TABLE 1-3 Platform and Operating System Support

Platform	Supported OS/Technology
Oracle SPARC Servers	
Sun Blade T6300	Oracle Solaris

Platform	Supported OS/Technology
Sun Blade T6320	Oracle Solaris
Sun Blade T6340	Oracle Solaris
SPARC T3-1B	Oracle Solaris
SPARC T3-4	Oracle Solaris
SPARC T4-1B	Oracle Solaris
SPARC T4-4	Oracle Solaris
SPARC T5-1B	Oracle Solaris
<hr/>	
Oracle x86 Servers	
<hr/>	
Sun Blade X3-2B	Oracle Solaris, Linux, Windows, VMware
Sun Blade X4-2B	Oracle Solaris, Linux, Windows, VMware
Sun Blade X6220	Oracle Solaris, Linux, Windows, VMware
Sun Blade X6240	Oracle Solaris, Linux, Windows, VMware
Sun Blade X6250	Oracle Solaris, Linux, Windows, VMware
Sun Blade X6270	Oracle Solaris, Linux, Windows, VMware
Sun Blade X6270 M2	Oracle Solaris, Linux, Windows, VMware
Sun Blade X6275	Oracle Solaris, Linux, Windows, VMware
Sun Blade X6440	Oracle Solaris, Linux, Windows, VMware
Sun Fire X4800	Oracle Solaris, Linux, Windows, VMware
Sun Server X2-8	Oracle Solaris, Linux, Windows, VMware

Storage Support

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

- [“Array Support” on page 12](#)
- [“Disk System Support” on page 13](#)
- [“Chassis Support” on page 13](#)
- [“Tape Storage Support” on page 13](#)

Array Support

The HBA supports the following arrays:

- StorageTek 2540
- StorageTek 6140
- Storage 6180
- StorageTek 6540

- Sun Storage 6580
- StorageTek 6780

Disk System Support

The HBA supports the following disk system storage:

- StorageTek 9970 System
- StorageTek 9980/9985/9985V System
- StorageTek 9990/9900V System

Chassis Support

The HBA supports the following chassis:

- Sun Blade 6000
- Sun Blade 6048

Tape Storage Support

The HBA supports the following tape storage devices:

- StorageTek SL24 tape autoloader
- StorageTek SL48 tape library
- StorageTek SL500 modular library
- StorageTek SL3000 modular library
- StorageTek SL8500 modular library
- StorageTek SDLT600 and DLT-S4 tape drives
- StorageTek L1400 tape library
- StorageTek LTO-3 and LTO-4 tape drives
- StorageTek Virtual Tape Library (VTL): VTL Value and VTL Plus
- StorageTek T10000A and T10000B tape drives
- StorageTek T9840C and T9840D tape drives
- IBM and HP LTO3 and LTO4 tape drives

Switch Support

The HBA is supported by the following Fibre Channel switches:

- Brocade DCX backbone switch
- Brocade 48000 director
- Brocade Mi10K director
- Brocade M6140 director
- Brocade 200E switch
- Brocade 300 switch
- Brocade 4900 switch
- Brocade 5000 switch
- Brocade 5100 switch
- Brocade 5300 switch
- Cisco MDS 9124 24-port multilayer fabric switch
- Cisco MDS 9134 multilayer fabric switch
- Cisco MDS 9140 fabric switch
- Cisco MDS 9216A multilayer fabric switch
- Cisco MDS 9216i multilayer fabric switch
- Cisco MDS 9222i multiservice modular switch
- Cisco MDS 9509 multilayer director
- Cisco MDS 9513 multilayer director
- QLogic 5600Q Series switch
- QLogic 5800V Series switch
- QLogic 9000 Series switch

The HBA is supported with all 1 Gbit Ethernet switches.

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
VERITAS Storage Foundation (VxSF) 4.1/5.0	Oracle Solaris
VERITAS NetBackup 5.1/6.x	Oracle Solaris
StorageTek Performance Suite 3.0/4.0	Oracle Solaris
VERITAS Cluster Support 5.0	Oracle Solaris
StorageTek Enterprise Backup Software (EBS) 7.2/7.3/7.4	Oracle Solaris, Linux, and Windows
StorageTek Utilization Suite 3.0/4.0	Oracle Solaris
StorageTek Availability Suite 3.0/4.0	Oracle Solaris
VERITAS File System 5.0	Oracle Solaris

Software (minimum version)	Supported OS
VERITAS Volume Manager (VxVM) 5.0	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

The HBA environmental requirements are listed in [Table 1-5](#).

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

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 18
- “LED Descriptions and Status” on page 22
- “Configuring the HBA for Hot-Plug Operation” on page 25
- “Testing the Installation” on page 25
- “Removing the Hardware” on page 26

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 or from Oracle as part number 250-1007. 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 module housing and do not touch 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](#)
- [“Connecting the Cables to the HBA” on page 19](#)
- [“To Power On the HBA” on page 21](#)

▼ 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 ExpressModule slot in which to install the HBA.**
3. **Press down the plastic tab to release the ExpressModule latch and pull the lever out until it is nearly perpendicular with the ExpressModule front panel.**

FIGURE 2-1 Releasing the HBA Latch

4. Insert the HBA into its slot, being careful that the tooth on the bottom of the lever does not come in contact with the chassis sheet metal during insertion.
5. When the HBA is inserted nearly all the way into its slot, push the lever back into its fully closed position, allowing the lever tooth to insert the HBA fully into place.

Connecting the Cables to the HBA

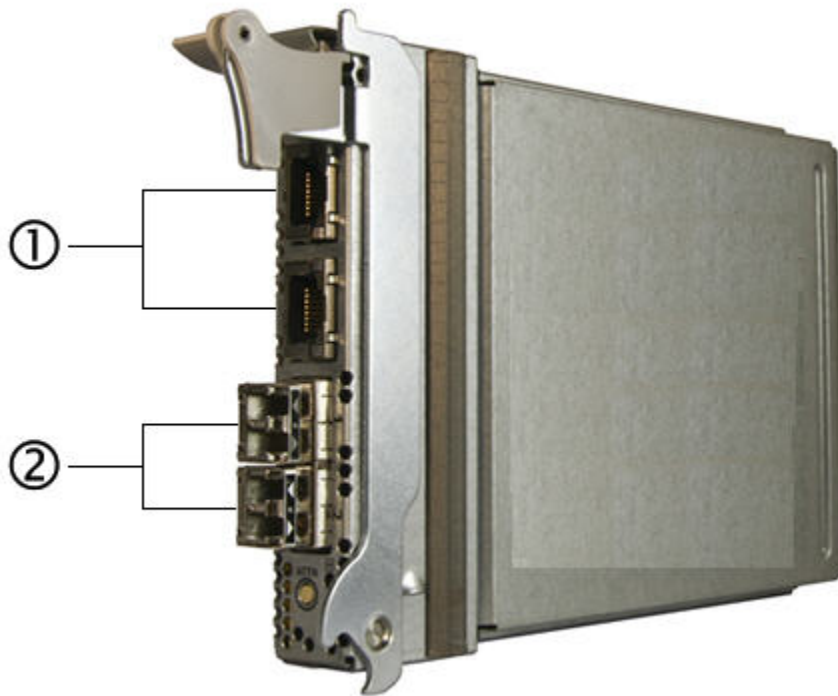
Note - The HBA does not allow normal data transmission on an optical link unless it is connected to another similar or compatible Fibre Channel (FC) product (that is, multimode to multimode).

Use multimode fiber-optic cable, intended for short-wave lasers, that adheres to the specifications in the following table.

Fiber-Optic Cable	Maximum Length	Minimum Length	Connector
62.5/125 mm (multimode)	150 meters at 2.125 Gbit/second	2 meters	LC
	70 meters at 4.25 Gbit/second		
	21 meters at 8.5 Gbit/second		
50/125 mm (multimode)	300 meters at 2.125 Gbit/second	2 meters	LC
	150 meters at 4.25 Gbit/second		
	50 meters at 8.5 Gbit/second		

▼ To Connect the Cables to the HBA

1. **Connect the fiber-optic cable(s) to LC connector(s) on the HBA.**
2. **Connect the other end of the fiber-optic cable(s) to Fibre Channel device(s).**
3. **Connect the Ethernet cable(s) to the Ethernet connector(s) on the HBA.**
4. **Connect the other end of the Ethernet cable(s) to the Ethernet device(s).**

FIGURE 2-2 Attaching the Cables**Figure Legend**

- 1 Connect Ethernet cable(s) to the Ethernet connector(s)
- 2 Connect fiber-optic cable(s) to the LC connector(s)

▼ To Power On the HBA

After installing the hardware and connecting the cables, you can power on the HBA by pressing the Attention button.

1. **Verify that the HBA is securely installed in the system.**
2. **Verify that the correct optical and Ethernet cables are attached.**
3. **Refer to your system installation or service manual to determine how to power up the system blade.**

4. Watch the Light-Emitting Diodes (LEDs) status for the power-on self test (POST) results as shown in [Table 2-1](#), [Table 2-2](#), and [Table 2-3](#).

LED Descriptions and Status

This section contains the following topics:

- “LED and Switch Locations” on page 22
- “Fibre Channel LED Indicator Status” on page 23
- “Ethernet LED Indicator Status” on page 24
- “Power and Attention Switch LED Scheme” on page 24

LED and Switch Locations

See [Figure 2-3](#) to determine the LED locations.

Each port has a corresponding set of LEDs that provide a visual indication of the operating state.

FIGURE 2-3 LED Locations

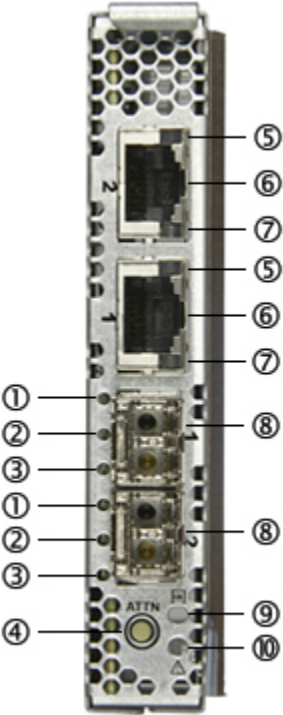


Figure Legend

- 1 Blue LED (Fibre Channel)
- 2 Green LED (Fibre Channel)
- 3 Amber LED (Fibre Channel)
- 4 Attention button
- 5 Green/Orange LED (Ethernet)
- 6 Ethernet ports (GbE port 2 on top, port 1 below)
- 7 Yellow LED (Ethernet)
- 8 Fibre channel ports (FC port 1 on top, port 2 below)
- 9 Power LED
- 10 Attention LED

Fibre Channel LED Indicator Status

Table 2-1 summarizes the Fibre Channel LED indicator combinations (LEDs 1, 2, and 3 in Figure 2-3).

TABLE 2-1 Fibre Channel LED Indicator Status Definitions

Blue LED (8 Gbps)	Green LED (4 Gbps)	Amber LED (2 Gbps)	Activity
Off	Off	Off	Power off
On	On	On	Power on
Blinking	Blinking	Blinking	Power on (firmware initialization)
Blue, Green, and Amber LEDs blinking alternately			Firmware error
Off	Off	On/blinking	Online, 2 Gbps link I/O activity
Off	On/blinking	Off	Online, 4 Gbps link I/O activity
On/blinking	Off	Off	Online, 8 Gbps link I/O activity
Blinking	Off	Blinking	Beacon

Ethernet LED Indicator Status

Table 2-2 summarizes the Ethernet LED indicator combinations (LEDs 5 and 7 in [Figure 2-3](#)).

TABLE 2-2 Ethernet LED Indicator Status Definitions

Top LED (Link/Speed)		Bottom LED (Link/Activity)	Hardware State	Speed
Green LED	Orange LED	Yellow LED		
Off	Off	Off	Power on, link is down	All
Off	Off	On	Power on, link is up	10 Mbit
Off	On	On		100 Mbit
On	Off	On		GbE
Off	Off	Blinking	Network activity	10 Mbit
Off	On	Blinking		100 Mbit
On	Off	Blinking		GbE

Power and Attention Switch LED Scheme

Table 2-3 summarizes the Power and Attention switch LED combination (LEDs 9 and 10 in [Figure 2-3](#)).

TABLE 2-3 Power and Attention LED Scheme

Switch LED	Activity
Green Power	
Off	Power Off Insertion or removal of the HBA is permitted.
On	Power On Insertion or removal of the HBA is not permitted.

Switch LED	Activity
Blinking Yellow Attention	Hot-plug operation is in progress and insertion or removal of the HBA is <i>not</i> permitted.
Off	Normal operation
On	Operational problem at this slot
Blinking	Slot is being identified at the user's request

Configuring the HBA for Hot-Plug Operation

▼ To Configure the HBA for Hot-Plug Operation

1. **Locate the green Power LED near the bottom of the HBA front panel (Figure 2-3).** See [Table 2-3](#) to determine its status.
2. **If the green Power LED is not illuminated, briefly press the Attention button near the bottom of the HBA front panel.**
The green Power LED will blink for approximately five seconds and then remain on, indicating that the HBA has been properly configured.
3. **To cancel the operation, press the Attention button again before the Power LED stops blinking.**

Testing the Installation

This section contains the following topics:

- [“To Test the Installation for the Oracle Solaris OS” on page 25](#)
- [Chapter 2, “Hardware Installation and Removal”](#)
- [Chapter 2, “Hardware Installation and Removal”](#)

▼ To Test the Installation for the Oracle Solaris OS

1. **Use the `cfgadm` command to verify proper HBA installation.**

```
# cfgadm
```

If the HBA is properly installed and connected, you will see output similar to the following.

```
Ap_Id Type Receptacle Occupant Condition
c3 fc connected configured ok
c4 fc connected configured ok
pcie5 ethern/hp connected configured ok
```

2. **If the HBA is shown as unconfigured or disconnected, use the `cfgadm -c configure` command to configure the HBA.**

Note - Diagnostic support for the HBA is included in the SunVTS software. The SunVTS software is available for download at: <http://www.sun.com/oem/products/vts>

3. **To see the details and state of each FC port, use the `fcinfo hba-port` command.???**
4. **To view a list of ports, use the `luxadm -e port` command.???**
5. **To plumb and configure GigE ports, use the `ifconfig` command with the driver name of `e1000g`.???**

Testing the Installation for the Windows OS

If the HBA has been installed correctly, the Windows OS detects the device and displays the Found New Hardware window. The Found New Hardware wizard will launch.

Note - Leave the Found New Hardware wizard window open, and then load the Fibre Channel and Ethernet drivers, as described in “[Installing Software for the Windows OS](#)” on page 37.

Testing the Installation for the VMware Technology

If the HBA has been installed correctly, you will see the following line in the `/var/log/vmkernel` file:

```
VMKernel qla2300_707.o loaded successfully
```

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. Either halt the operating system and remove power from the server blade, or prepare the HBA for hot-plug removal with one of the following:
 - The HBA Attention button
 - The Oracle Solaris OS
2. Remove the HBA hardware.

▼ To Prepare the HBA for Removal Using the HBA Attention Button

1. **Press and release the Attention button near the bottom of the HBA front panel (Figure 2-3).**

The Attention LED near the button will blink for approximately five seconds, indicating that the HBA is being prepared for removal.

2. **If you want to stop the operation, press the Attention button again before the LED stops blinking.**
3. **When the LED stops blinking and goes dark, you can remove the HBA.**

▼ To Prepare the HBA for Hot-Plug Removal Using the Oracle Solaris OS

If you want to remove the HBA without first halting the operating system and removing power from the associated server blade, you can prepare the HBA for removal as follows:

1. **Use the `cfgadm -al` command to identify the HBA to be removed.**

```
Ap_Id Type Receptacle Occupant Condition
pcie5 ether/hp connected configured ok
pcie6 ether/hp connected configured ok
```

2. **Use the `ifconfig` command to identify the Ethernet ports on the HBA to be disconnected (or, use `ifconfig -a` to show the plumbed Ethernet ports).**

```
e1000g5: flags=201000803<UP,BROADCAST,MULTICAST,IPv4,CoS> mtu 1500 index 6
inet 200.17.188.224 netmask ffffffff broadcast 200.17.188.255
ether 0:c0:dd:9:a9:7b
```

3. Use the `ifconfig e1000g5 unplumb` command to disconnect the Ethernet ports on the HBA.
4. Use the `cfgadm -c unconfigure` command to unconfigure the attachment point ID (Ap_Id) for the HBA. For example:

```
cfgadm -c unconfigure c3
cfgadm -c unconfigure c4
..
cfgadm -c disconnect pcie6ether/hp???
```

5. Use the `cfgadm -c disconnect` command to prepare the HBA for removal.
A blinking Power LED indicates that the HBA is being prepared for removal. A dark Power LED indicates that the HBA is ready to be removed.

▼ To Remove the HBA

1. Power down the system, as described in the system's installation or service manual. ???
2. Disconnect the FC and Ethernet cables.???
3. With an ESD wrist strap attached, depress the ExpressModule latch down to disengage the HBA.
4. Pull forward on the ejector lever to dislodge the HBA.
5. Remove the HBA.

Software Installation

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

This chapter contains the following topics:

- “Installing Software for the Oracle Solaris OS” on page 29
- “Installing Software for the Red Hat or SUSE Linux OS” on page 31
- “Installing Software for the VMware Technology” on page 36
- “Installing Software for the Windows OS” on page 37
- “Installing a CLI for Updating the BIOS and FCode” on page 39

Installing Software for the Oracle Solaris OS

This section contains the following topics:

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

Installing the Fibre Channel Driver

The `qlc` driver 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 or SRU:

- **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 the latest patches and SRUs from this web site:

<http://support.oracle.com>

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

1. **Log into the system 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
```

Installing the Ethernet Driver

Check the support area of the Oracle web site to ensure that you have the latest patch clusters and security patches for the Ethernet driver. You can download the latest patch clusters and security patches at:

<http://support.oracle.com>

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 or SUSE Linux OS

This section describes how to download and install the Fibre Channel and Ethernet 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 or SUSE Linux Drivers” on page 31
- “Installing the Red Hat or SUSE Linux Drivers” on page 32
- “Diagnostic Support for the Red Hat or SUSE OS” on page 35

Downloading the Red Hat or SUSE Linux Drivers

This section describes how to download the Fibre Channel and Ethernet driver for the HBA. This section contains the following topics:

- “To Download the Fibre Channel Driver” on page 31
- “To Download the Ethernet Driver” on page 31

▼ To Download the Fibre Channel Driver

1. **Go to the Oracle support area of the QLogicweb site at:**
http://driverdownloads.qlogic.com/QLogicDriverDownloads_UI/Oracle_Search.aspx
2. **Locate the table containing the SG-(X)PCIEFCGBE-Q8-Z/SG-(X)PCIEFCGBE-Q8-N model.**
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 `qla2x00-vx.yy.zz-dist.tgz`).**
5. **Click the name to download the driver.**
6. **Save the file to a directory on the hard disk of the system.**

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

▼ To Download the Ethernet Driver

1. **Go to the Oracle support area of the QLogic web site at:**

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

2. **Locate and click the link for the Ethernet drivers.**
3. **Find and select the Go to Download Center link.**
4. **Type 82571EB in the search window and click Search.**
5. **Locate and select Intel 82571EB Gigabit Ethernet Controller.**
6. **Using the drop-down menu, either select the individual OS or All Operating Systems, then click Go!**
Individual software downloads are now available.
7. **Download and save the driver on the hard disk of the system.**

Installing the Red Hat or SUSE Linux Drivers

After you download the drivers, as described in “[Downloading the Red Hat or SUSE Linux Drivers](#)” on page 31, you can install the drivers by following the steps in these sections:

1. “[To Build the Fibre Channel Driver](#)” on page 32
2. “[To Load the Newly Built Fibre Channel Driver](#)” on page 33
3. “[To Build and Load the Ethernet HBA Driver](#)” on page 35

▼ 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 33.

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
# ./drvsetup (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 33](#).**

▼ 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 32](#), perform one of the following procedures:**
 - **[“To Manually Load the Fibre Channel Driver” on page 33](#)**
 - **[“To Automatically Load the Fibre Channel Driver” on page 34](#)**

▼ 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 34](#).

1. **Build the driver binary, as described in [“To Build the Fibre Channel Driver” on page 32](#).**
2. **Manually load the driver by using the `modprobe -v` command.**

```
# modprobe -v qla2xxx
```

3. When the Fibre Channel driver is manually loaded, you can build and load the Ethernet driver, as described in [“To Build and Load the Ethernet HBA Driver” on page 35](#).
4. If you want to manually unload the driver, use the `modprobe -r` command.

```
# modprobe -r qla2xxx
# modprobe -r qla2xxx_conf (for use only with the SANsurfer FC HBA CLI utility)
```

▼ 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 32](#).
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 FC HBA CLI)
 - `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 FC HBA CLI), followed by the `qla2xxx` module. The `qla2xxx_conf` module is for use only with SANsurfer FC HBA CLI 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.**
9. **You can now build and load the Ethernet driver, as described in [“To Build and Load the Ethernet HBA Driver” on page 35](#).**

▼ To Build and Load the Ethernet HBA Driver

1. **Build the Ethernet HBA driver.**

```
# rpmbuild --rebuild sun-pci-e-dual-gigabit-kernel-6.1.5.src.rpm
```

2. **Change to the `rpm` directory.**

```
# cd /usr/src/redhat/RPMS/arch
```

3. **Install the Ethernet `rpms`, using the same command for both Red Hat and SUSE OSes.**

```
# rpm -ivh sun-pci-e-dual-gigabit-kernel-6.1.5.rpm
```

4. **Use the `depmod` command to register the HBA.**

```
# depmod
```

5. **Manually load the `e1000` driver for all instances.**

```
# modprobe e1000g
```

Diagnostic Support for the Red Hat or SUSE OS

Diagnostic support for the HBA is available through the SANsurfer FC HBA Manager graphical user interface (GUI) utility or the SANsurfer FC HBA CLI (command-line interface) 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 or SUSE Linux OS

1. **Go to the Oracle support area of the QLogic web site at:**
http://driverdownloads.qlogic.com/QLogicDriverDownloads_UI/Oracle_Search.aspx
2. **Locate the table containing the SG-(X)PCIEFCGBE-Q8-Z/SG-(X)PCIEFCGBE-Q8-N model.**
3. **At the bottom of the table, click Windows.**
4. **Locate the SANsurfer FC HBA CLI (command-line interface) or SANsurfer FC HBA Manager (GUI) diagnostic utility.**
5. **Click Download to copy the diagnostic archive to a local file system.**
6. **Click the corresponding 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:

```
VMKernel qla2300_707.o loaded successfully
```

The first line indicates that the Fibre Channel driver loaded successfully. The second line indicates that the Ethernet driver loaded successfully.

Installing Software for the Windows OS

This section describes how to download and install the Fibre Channel and Ethernet 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 37
- “To Install the Fibre Channel Driver” on page 37
- “To Download and Install the Ethernet Driver” on page 38
- “Diagnostic Support for the Windows OS” on page 38

▼ To Download the Fibre Channel Driver

1. Go to the Oracle support area of the QLogic web site at:
http://driverdownloads.qlogic.com/QLogicDriverDownloads_UI/Oracle_Search.aspx
2. Locate the table containing the SG-(X)PCIEFCGBE-Q8-Z/SG-(X)PCIEFCGBE-Q8-N model.
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 system.
7. Unzip (extract) the driver files to a location on the hard disk of the system.

▼ To Install the Fibre Channel Driver

After installing the HBA and restarting the system, 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 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 system:**

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?

▼ To Download and Install the Ethernet Driver

1. **Go to the Oracle support area of the QLogic web site at:**
http://driverdownloads.qlogic.com/QLogicDriverDownloads_UI/Oracle_Search.aspx
2. **Locate and click the link for the Ethernet drivers.**
3. **Find and select the Go to Download Center link.**
4. **Type 82571EB in the search window and click Search.**
5. **Locate and select Intel 82571EB Gigabit Ethernet Controller.**

6. **Using the drop-down menu, select either the individual OS or All Operating Systems, then click Go!.**

Individual software downloads will now be available.

7. **Download and save the driver on the hard disk of the system.**
8. **Navigate to the location on the hard disk where you downloaded the driver, and run the driver file.**

The driver file is a self-extracting archive. When you run the file, the files are extracted to a temporary directory and the installation wizard is run to install the driver. After the driver is installed, the temporary files are removed.

Diagnostic Support for the Windows OS

Diagnostic support for the HBA is available through the SANsurfer FC HBA Manager GUI utility or the SANsurfer FC HBA 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 Windows OS

1. **Go to the Oracle support area of the QLogic web site at:**
http://driverdownloads.qlogic.com/QLogicDriverDownloads_UI/Oracle_Search.aspx
2. **Locate the table containing the SG-(X)PCIEFCGBE-Q8-Z/SG-(X)PCIEFCGBE-Q8-N model.**
3. **At the bottom of the table, click Windows.**
4. **Locate the SANsurfer FC HBA CLI or SANsurfer FC HBA Manager (GUI) diagnostic utility.**
5. **Click Download to copy the diagnostic archive to a local file system.**
6. **Click the corresponding Readme link 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 FC HBA CLI (command-line interface).

If you have not done so already, you can download the SANsurfer FC HBA CLI package from the Oracle support area of the QLogic web site 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* (part number: 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.

Known Issues

This chapter provides supplementary and workaround information about the HBA. Specific bug identification numbers are provided for service personnel. This section contains the following topic:

- [“Performance Issues” on page 41](#)

Performance Issues

This section contains the following topics:

- [“HBA Online Delay During Hot-Plug” on page 41](#)
- [“Oracle VTS Diagnostic “HBA Component Stress” Test Fails” on page 41](#)

HBA Online Delay During Hot-Plug

Bug 15596005

Issue: After hot-plugging the HBA in a Sun Blade T6320 or Sun Blade T6340, a delay of up to six minutes might occur between the time you run the configuration command until the card is online and ready for use.

Workaround: Wait seven minutes until the HBA is online and available for use.

Oracle VTS Diagnostic “HBA Component Stress” Test Fails

Bug 15590501

Issue: A test failure occurs if you run the loopback test in Oracle VTS diagnostics. This test is part of the *HBA Component Stress Test* suite.

Workaround: Contact Oracle Service for an updated version of the code, referencing bug 15590501. As an alternative, you can run the full test suite with the loopback test disabled.