

Oracle Storage Dual-Port 32 Gb Fibre Channel PCIe Low Profile HBA, Emulex Installation Guide For HBA Model 7335907



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Preface

- **Overview** – Describes how to install and remove the Oracle Storage Dual-Port 32 Gb Fibre Channel PCIe Low Profile HBA, Emulex
- **Audience** – Technicians, system administrators, and authorized service providers
- **Required knowledge** – Advanced experience troubleshooting and replacing hardware

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Product Documentation Library

Documentation and resources for this product and related products are available at [Oracle Storage Dual-Port 32 Gb Fibre Channel PCIe Low Profile HBA, Emulex Documentation](#).

Feedback

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

1

HBA Overview

This chapter provides a basic overview of the Oracle Storage Dual-Port 32 Gb Fibre Channel (FC) PCIe Low Profile HBA, which uses Broadcom, formerly Emulex, 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](#)
- [HBA Features and Specifications](#)
- [Operating System and Technology Requirements](#)
- [System Interoperability](#)
- [Environmental Requirements](#)

Kit Contents

- Oracle Storage Dual-Port 32 Gb Fibre Channel PCIe Low Profile HBA, Emulex, with a low-profile bracket installed
- *Installing Components* document

HBA Features and Specifications

The Oracle Storage Dual-Port 32 Gb Fibre Channel PCIe Low Profile HBA, which uses Broadcom, formerly Emulex, technology (part number: 7335907), is a low-profile, PCIe card that allows connectivity to Fibre Channel (FC) storage outside of the server. The board interfaces an eight-lane PCIe bus, supporting two enhanced Small Form-Factor Pluggable Plus (SFP+) FC optical media ports. Each independent FC port operates at 32 Gb/s and features 32/16/8 autonegotiation.

Feature	Description
Lane width	x8 PCIe 3.0 x8 lane width up to 8 GT/s per lane
Data rate (maximum)	32 Gb/s FC per port, negotiable to 16, and 8 Gb/s
PCIe hot-plug and hot-swap functionality	Supported
Number of FC ports	Two
FC transfer rate	6400 MBps/line rate 28.05 GBAUD, full duplex
FC topologies	Switched fabric (N-Port), arbitrated loop (NL-Port), and point-to-point (N-Port) Note: Fibre Channel arbitrated loop is not supported.

Feature	Description
FC SAN boot support	Bootting is supported for all supported operating systems. For more information about supported operating systems, see Operating System and Technology Requirements .
Diagnostic support	Provided by Oracle VTS software
External connectors	Two enhanced Small-Form Factor Pluggable Plus (SFP+) multimode optics with LC-style connectors per port
FC Compatibility	<ul style="list-style-type: none"> Fibre Channel Physical and Signaling (FC-PH, FC-PH2/3) Fibre Channel Generic Services (FC-GS-6) Fibre Channel Framing and Signaling (FC-FS-4) Fibre Channel Link Services (FC-LS-2), including NPIV Fibre Channel Physical Interface (FC-PI, FC-PI-4, FC-PI-5, PC-PI6) Fibre Channel Tape and Medium Changers (FC-Tape) Fibre Channel Protocol for SCSI, (FCP-4-SCSI) Fibre Channel Switch Fabric (FC-SW-4) FMA support T-10 DIFF or T10-PI support
LED indicators	Two LEDs per port (yellow and green) on the front panel as status indicators
Maximum power consumption	10.6 Watts

Operating System and Technology Requirements

The HBA requires the operating system (OS) and technology levels, at minimum, listed in [Supported Operating System/Technology Versions \(Minimum\)](#).

Note:

If you need to contact Oracle Support, first verify that you have a supported OS installed on the host system, and install the latest HBA driver, utility, and firmware versions. Updating the system and HBA to the latest OS, driver, utility, and firmware versions might address the issue, preventing the need to contact Oracle Support about an issue that has already been fixed.

Table 1-1 Supported Operating System/Technology Versions (Minimum)

Operating System/Technology	Supported Versions (minimum)
Oracle Solaris OS for x86 and SPARC (64-bit) platforms	Oracle Solaris 11.4 with SRU 16 To obtain the latest patches and SRUs, go to: My Oracle Support

Table 1-1 (Cont.) Supported Operating System/Technology Versions (Minimum)

Operating System/Technology	Supported Versions (minimum)
Oracle VM Technology	Oracle VM 3.4.6
Linux OS	<ul style="list-style-type: none"> Oracle Linux 8.4 with Red Hat Compatible Kernel (RHCK) and Unbreakable Enterprise Kernel (UEK) Release 6 (R6) Oracle Linux 7.7 with RHCK and UEK Release 5
Microsoft Windows Server OS Standard, Enterprise, and Datacenter Editions	<ul style="list-style-type: none"> Window Server 2019 Windows Server 2016
VMware Technology	VMware ESXi 6.5 U1

System Interoperability

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

- [Host Platform Support](#)
- [Storage Support](#)
- [Switch Support](#)

Host Platform Support

The HBA is supported by the platforms listed in this section. For up-to-date information, see your system Product Notes and server platform product web pages. For operating system version information, see [Operating System and Technology Requirements](#).

Table 1-2 Oracle x86 Server Platform Support

Oracle x86 Server Platforms	Supported OS/Technology
Oracle Server X9-2 and X9-2L	Oracle Solaris, Windows, Linux, VMware
Oracle Server X8-2, X8-2L, and X8-8	Oracle Solaris, Windows, Linux, VMware
Oracle Server X7-2, X7-2L, and X7-8	Oracle Solaris, Windows, Linux, VMware

Table 1-3 Oracle SPARC Server Platform Support

Oracle SPARC Server Platforms	Supported OS/Technology
SPARC M7-4, M7-8, M7-16, and M7-32	Oracle Solaris
SPARC M8-8	Oracle Solaris
SPARC M10-1, M10-4, M10-4S	Oracle Solaris
SPARC M12-1, M12-2, and M12-2S	Oracle Solaris
SPARC S7-2 and S7-2L	Oracle Solaris
SPARC T8-1, T8-2, and T8-4	Oracle Solaris

The host system must have at least one PCI Express 8-lane slot to support the HBA.

Storage Support

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

- [Array and System Support](#)
- [Tape Storage Support](#)

Array and System Support

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

- Oracle FS1-2 Flash Storage System
- Oracle ZFS Storage Appliance

Tape Storage Support

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

- Oracle StorageTek SL8500 modular library system
- Oracle StorageTek SL4000 modular library system
- Oracle StorageTek SL3000 modular library system
- Oracle StorageTek SL150 modular tape library
- Oracle StorageTek T10000C tape drive
- Oracle StorageTek T10000D tape drive
- Oracle StorageTek T10000E tape drive
- IBM LTO5, LTO6, and LTO7 tape drives

Switch Support



Note:

For technical support issues with any switches, refer to the product documentation or contact the switch manufacturer.

The HBA supports connecting to any 32/16/8 Gb/s Fibre Channel (FC) switch from any vendor that follows standard FC specifications, with the following considerations:

- Direct Access Storage for FC is not supported.
- FC-AL is not supported.

**Note:**

This documentation lists switches that are specifically *not* supported by the HBA, when applicable.

Environmental Requirements

This topic lists the HBA environmental requirements.

Table 1-4 HBA Environmental Requirements

Specification	Operating	Non-Operating
Temperature	0° to 55° C, non-condensing	-20° C to 85° C, non-condensing
Airflow	150 lfm at 55° C	n/a
Humidity	10% to 90% RH, non-condensing, 22° C max wet bulb	5% to 95% RH, non-condensing, 22° C max wet bulb
Altitude	3,000 m	12,000 m
Vibration	0.25 G in all axes swept for 5-500 Hz sine	1.0 G in all axes 5-500-5 Hz sine
Shock	5 G, 11 ms half-sine	30 G, 11 ms half-sine

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Hardware Installation and Removal

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

This chapter contains the following topics:

- [Observing ESD and Handling Precautions](#)
- [Best Practices for Booting From SAN \(BFS\) Configurations](#)
- [Installing the Hardware](#)
- [Replacing the SFP+ Unit on the HBA](#)
- [Removing the HBA Hardware](#)

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 edge of the PCB, not by the connectors.
- Place the HBA on a properly grounded antistatic work surface pad when it is out of its protective antistatic bag.

Best Practices for HBA Installation

Before installing the HBA into the system, review the best practices in this section to avoid potential issues:

- [General Best Practices](#)
- [Best Practices For Switches and Zoning](#)
- [Best Practices For Booting From SAN \(BFS\) Configurations](#)
- [Best Practices For Testing the Environment](#)

General Best Practices

Follow these general best practices for installing and configuring the HBA:

- Spread the I/O load among multiple HBAs and multiple ports to avoid bottlenecks and promote higher availability.
- Use fixed link speeds instead of autonegotiation wherever possible. While the HBA supports autonegotiation, autonegotiation slows the system down in the event of a fabric rebuild.
- Do not configure both tape devices and disks on the same HBA port, even if using a switch and zoning.
- If more than one HBA model is present in the configuration, enable only the OptionROM (OpROM) for the first HBA seen in the boot sequence. There is a limited amount of space for OpROMs; therefore, do *not* unnecessarily enable all OpROMs, as space usage issues might occur.
- When installing the HBA, be sure to also install the latest version (version 11.1.218.x or newer) of the command-line utility available from the manufacturer web site (see [Installing Utilities for Updating the BIOS and Firmware](#)). Keep the HBA utilities, firmware, and drivers up-to-date, and update them in that order.
- After installing the OneCommand Manager CLI utility, ensure that the `elxhbamgrd` daemon process is running (The OneCommand Manager utility starts this daemon process, by default, upon installation.). In the event of a failure, the `elxhbamgrd` daemon produces a usable firmware dump for troubleshooting. The location of dump files varies, based on your operating system:
 - Windows: `OneCommandManager-installation-directory\Util\Dump`
 - Oracle Solaris: `/opt/ELXocm/Dump`
 - Linux: `/var/log/emulex/ocmanager/Dump`

Firmware dumps are written to Flash memory on the HBA, and the files reside there until you manually extract and clear the files to produce room for new firmware dumps. A firmware dump cannot be overwritten in Flash. With the OneCommand Manager utility installed and running, if a failure occurs on the HBA, the utility captures and collects firmware dumps during boot up, and then automatically clears the Flash memory on the HBA. However, if the failure case does *not* capture the dump file, or the OneCommand Manager utility is *not* running, you can manually run the OneCommand Manager utility in order to collect and capture the dump file.

Best Practices for Switches and Zoning

Follow these best practices for switches and zoning in your environment:

- FC-SW configurations: check with the switch manufacturer for optimal configuration recommendations, including zoning.
- Note that FC-AL is not supported. Use FC-P2P instead.
- Use single initiator hard zoning to do the following:
 - Avoid Registered State Change Notification (RSCN) storms.
 - Shield devices from indiscriminate SCSI inquiries.

- Provide security by avoiding inappropriate access.
- Use meaningful names for zones, and document the entire configuration.
- Use FCP-2 (also called FC-TAPE or FCP Error Recovery) only with tape and/or sequential devices. While FCP-2 might not cause problems for hard disk drives (HDDs), FCP-2 is a sequence-level error recovery mechanism that is irrelevant to HDDs.
- If using FC tape backups, place tape ports and backup servers on the same FC switch to avoid tying up inter-switch links (ISLs).
- Storage Area Network (SAN) switches can be a major source of disruption if you do not take extreme care with respect to configuration. Do not perform updates to switch operating systems and/or firmware, or enable new features on SAN switches, until you have first tried the updated switches in a test configuration. The HBA might not support newer switch features, and switch operating system and/or firmware updates might require changes to, and/or restoration of, switch configuration settings.

Best Practices for Booting From SAN (BFS) Configurations

If you plan to install a Boot From SAN (BFS) HBA, follow these best practices:

- Some devices and operating systems do not yet support UEFI-based BIOS and can boot only from the Legacy BIOS boot mode. However, many servers with UEFI firmware allow you to enable a Legacy BIOS compatibility mode.
- Legacy BIOS - Many tweaks and patches have been added over the years to resolve various issues, and not all were done with the larger ecosystem (many different types of servers, HBAs, OSES, and so on) in mind.
- Secure Boot (a UEFI-specific feature) can help you control the boot process, preventing unauthorized code from running.
- Larger devices (greater than 2 TB) require the use of a GUID Partition Table (GPT) instead of a Master Boot Record (MBR). GPT is the standard for EFI. In Legacy BIOS, booting from a device greater than 2 TB is not supported.
- Disable OpROM and BIOS for all HBA cards except the one connected to the boot device.
- When installing a Boot From SAN (BFS) HBA, configure a single connection to a single SAN target/LUN, install the boot OS, and get that working before installing other HBAs and storage. If the configuration is complex, finding the root cause for any BFS issues becomes far more complicated.
- Once BFS is installed and working, make sure that the HBA driver and firmware are at the latest revision levels. If required, configure a multipath connection, and perhaps one or more alternate boot LUNs.

Best Practices For Testing the Environment

Test the storage environment by doing the following:

- Boot the OS on the host server, and then disable the primary path to the SAN boot device to validate the multipath connection.
- Physically pull the cable from the system.
- Intentionally disrupt zoning at the FC switch that you plan to attach to the HBA.

- If you have installed any alternate boot LUNs, try to boot from those (after disrupting the primary connection(s)).
- Make sure that the boot LUN is set as the first boot device in the system BIOS/UEFI settings.

Installing the Hardware

The hardware installation process involves the following general tasks, as described in these sections:

- [To Install the HBA](#)
- [To Connect the Optical Cable](#)
- [To Apply Power](#)

To Install the HBA

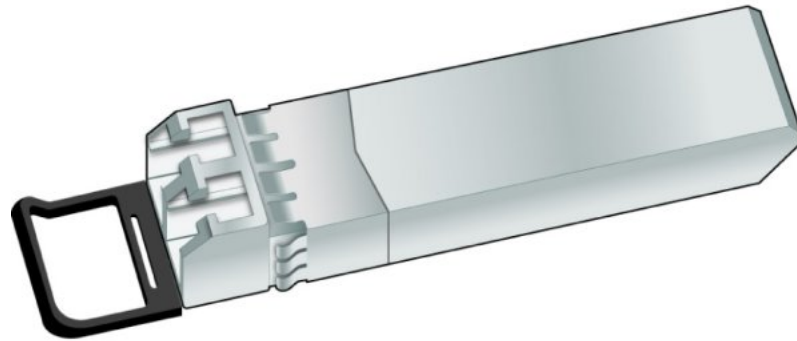
1. Attach an antistatic strap (refer to Observing ESD and Handling Precautions).
2. Refer to your system installation guide or service manual to determine an appropriate PCIe slot in which to install the HBA.
3. Shut down, power off, and unplug the system, if required.
4. Remove the system case.
5. Remove the blank panel from an empty PCIe slot.
6. (Optional) Perform the following steps if you need to replace the transceivers.
 - a. Remove each transceiver from its cage assembly by pulling the bail (handle) out and down to release the latch and gently pull the transceiver out of its housing.

Do not force it. After the latch is released, the transceiver slides out easily.

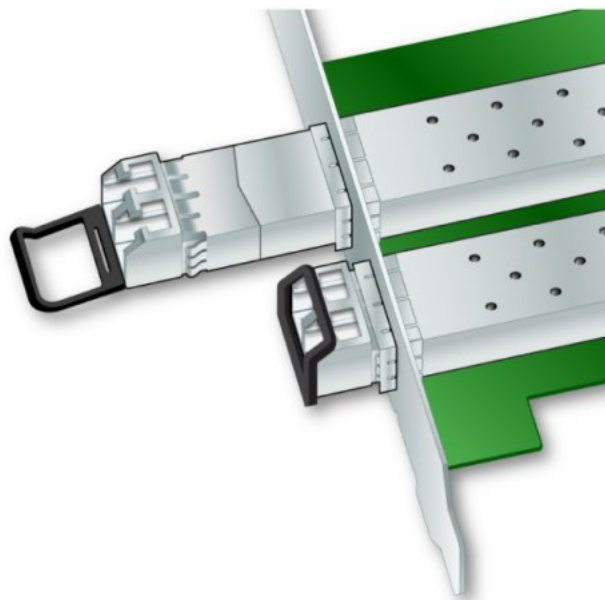
 **Caution:**

This is a delicate operation—take care not to damage the transceiver.

The following image shows the transceiver.



The following image shows an optical transceiver that is partially removed from its housing, and an optical transceiver that is latched in place.



- b.** Observing ESD precautions, store each transceiver in an ESD-safe place.
 - c.** Install each new transceiver by sliding the new transceiver into the housing.
When the latch engages, it clicks.
 - d.** Push the bail back into place.
- 7.** Insert the HBA into the empty PCIe 8-lane slot and press firmly until the adapter is seated.

8. Secure the mounting bracket of the HBA to the case with the panel screw or clip.
9. Replace the system case and tighten the case screws.

The HBA is now installed in the system and is ready for media attachment.

To Connect the Optical Cable

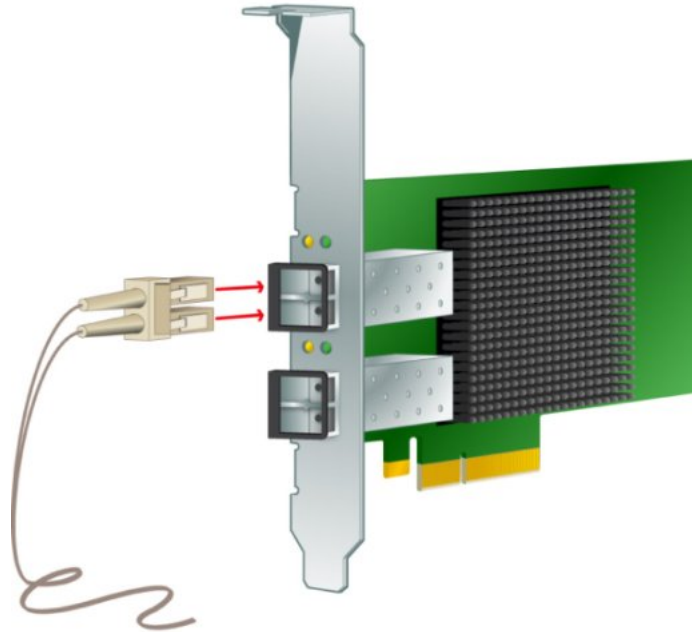
Note:

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 in the following table.

Fiber-Optic Cable	Maximum Length	Minimum Length	Connector
OM4 - Multimode 50/125 micron fiber (4700 MHz*km bandwidth cable)	<ul style="list-style-type: none"> • 4 GFC: 0.5m - 400m • 8 GFC: 0.5m - 190m • 16 GFC: 0.5m - 125m • 32 GFC: 0.5m - 100m 	0.5 meters	LC
OM3 - Multimode 50/125 micron fiber (2000 MHz*km bandwidth cable)	<ul style="list-style-type: none"> • 4 GFC: 0.5m - 380m • 8 GFC: 0.5m - 150m • 16 GFC: 0.5m - 100m • 32 GFC: 0.5m - 70m 	0.5 meters	LC
OM2 - Multimode 50/125 micron fiber (500 MHz*km bandwidth cable)	<ul style="list-style-type: none"> • 4 GFC: 0.5m - 150m • 8 GFC: 0.5m - 50m • 16 GFC: 0.5m - 35m • 32 GFC: 0.5m - 20m 	0.5 meters	LC

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

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 guide or service manual to determine how to power on the system.

LED Status Overview

Yellow and green LEDs can be seen through openings in the mounting bracket of the HBA. Each port has a corresponding set of yellow and green LEDs.

LEDs

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

Note:

For the Link Rate conditions, there is a 1-second pause when the LED is off between each group of fast blinks (2, 3, 4, or 5). Observe the LED sequence for several seconds to be sure you have correctly identified the pattern.

Green LED	Yellow LED	State
Off	Off	No SFP+ module installed or boot failure (dead board)
Off	On	POST failure (dead board)
Off	Slow Blink	Boot failure after POST
Off	Fast Blink	Not defined
Off	Flashing	POST processing in progress
On	Off	Failure in Common Code Module
On	On	Failure in Common Code Module
On	2 Fast Blinks	Normal (Link up at 4 GFC)
On	3 Fast Blinks	Normal (Link up at 8 GFC)
On	4 Fast Blinks	Normal (Link up at 16 GFC)
On	5 Fast Blinks	Normal (Link up at 32 GFC)
On	Flashing	Not defined
Slow Blink	Off	Normal – link down
Slow Blink	On	Not defined
Slow Blink	Slow Blink	Not defined
Slow Blink	Fast Blink	Not defined
Slow Blink	Flashing	Not defined
Fast blink	Off	Not defined
Fast blink	On	Not defined
Fast blink	Slow blink	Not defined
Fast blink	Fast blink	Beaconing
Fast blink	Flashing	Not defined

Replacing the SFP+ Unit on the HBA

The Small Form Factor Pluggable Plus (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](#).

Removing the HBA Hardware

The procedure in this section describe how to remove the HBA. Refer to your system installation guide or service manual for detailed HBA adapter removal instructions.

To Remove the HBA

1. Use an ESD strap (refer to Observing ESD and Handling Precautions).
2. Refer to your system documentation to halt the operating system and 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.
6. Remove the HBA from its PCIe slot.

3

HBA Software Installation

After you have completed the HBA hardware installation and powered on the system, follow the instructions in this chapter to install any HBA utilities, firmware, and operating system-specific drivers, in that order, that might be required by the HBA.



Note:

Software listed in this chapter as being located at the Oracle designated web site will only be available at the web site if required by the HBA.

This chapter contains the following topics:

- [Installing Utilities for Updating the BIOS and Firmware](#)
- [Installing Diagnostic Software](#)
- [Installing Drivers](#)

Installing Utilities for Updating the BIOS and Firmware

Use the `HBAnywhere` utility or the `OneCommandManager` command-line interface (CLI) utility to update the BIOS and firmware for the HBA. These utilities provide support for the following functions:

- Discover local and remote hosts, HBAs, targets, and LUNs
- Reset HBAs
- Set HBA driver parameters
- Update firmware
- Enable or disable the system BIOS
- Run diagnostic tests on HBAs
- Manage out-of-band HBAs
- Manage local and in-band remote HBAs

For more information about the `HBAnywhere` and `OneCommandManager` utilities, download their user guides from the Emulex (now Broadcom) support site for Oracle at: [Oracle Fibre Channel Downloads](#).

To Install Utilities for Updating the BIOS or Firmware

1. Go to the Emulex (now Broadcom) support site for Oracle at: [Oracle Fibre Channel Downloads](#)
2. Click the type of HBA, and then click the model number of the HBA for which you want to install utility software.

3. In the Utilities section, click the utility for the OS that you want, and download the utility to a local file system.
4. Install the utility as described in the Emulex (now Broadcom) documentation, located on the Emulex (Broadcom) web site.

Installing Diagnostic Software

This section contains the following topics:

- [Diagnostic Support for the Oracle Solaris OS](#)
- [Diagnostic Support for All Other Supported Operating Systems](#)
- [Using the OneCommand Manager CLI for Troubleshooting a Fatal Error](#)

Diagnostic Support for the Oracle Solaris OS

In an Oracle Solaris OS environment, diagnostic support for the HBA is included in the Oracle VTS software. Oracle VTS software is available for download at: [My Oracle Support](#)

For information about the Oracle VTS software, see the Oracle VTS documentation at: [Oracle VTS 7.0 Software Documentation](#)

The `emlxtest` utility, which is included in the Oracle VTS software, supports the following functions:

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

Diagnostic Support for All Other Supported Operating Systems

Diagnostic support for the HBA with all supported operating systems other than the Oracle Solaris OS is available through the `HBAnywhere` utility or the OneCommand Manager command-line interface (CLI) utility, version 11.1.218.x, or newer. These utilities support the following functions:

- Production of useful firmware dump information, in the unlikely event of a failure (from the OneCommand Manager CLI only)
- 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 Utilities for a Supported OS Other Than the Oracle Solaris OS

1. Go to the Emulex (now Broadcom) support site for Oracle at:
[Oracle Fibre Channel Downloads](#)
2. Click the type of HBA, and then click the model number of the HBA for which you want to install diagnostic software.
3. In the Utilities section, click the diagnostic support utility for the OS that you want, and download the diagnostic utility to a local file system.
4. Install the diagnostic utility as described in the Emulex (now Broadcom) documentation, located on the Emulex (Broadcom) web site.

Using the OneCommand Manager CLI for Troubleshooting a Fatal Error

In the event of a failure, the OneCommand Manager application command-line interface (CLI) produces a usable firmware (FW) dump that you can send to Emulex (now Broadcom) for troubleshooting. The default location of the firmware dump varies by operating system:

- Windows – `/Util/Dump` subdirectory of the OneCommand Manager installation directory
- Oracle Solaris – `/opt/ELXocm/Dump`
- Linux – `/var/log/emulex/ocmanager/Dump`

About Automatic Firmware Dumps

This section lists the requirements for producing automatic firmware dumps, and provides general information about the OneCommand Manager CLI firmware dumps.

Requirements:

- OneCommand Manager application command-line interface, version 11.1.218.x, or newer
- `elxhbamgrd` process must be running in the background (The ECD installer or system boot starts the process, by default.)

General Information:

- Firmware dumps are written to Flash memory on HBA.
- Firmware dumps reside in the dump directory until you manually extract and clear the firmware dumps.
- A firmware dump cannot be overwritten in Flash.
- You must extract and clear firmware dumps from the HBA Flash in order to make room for new firmware dump files.

Dump Collection if the OneCommand Manager application command-line interface (CLI) is Installed:

- During boot up, the OneCommand Manager CLI clears the flash region upon successful dump capture.
- If the failure occurs on the HBA, and the OneCommand Manager CLI is already installed, the OneCommand Manager CLI captures collect firmware dumps and automatically clears the flash region.
- If the failure case did not capture the dump file, or if the OneCommand Manager CLI is not running, you can manually run the OneCommand Manager CLI to collect the dump file.

Installing Drivers

This section contains the following topics:

- [Installing Drivers for the Oracle Solaris OS](#)
- [Installing Drivers for All Other Supported Operating Systems](#)

Installing Drivers for the Oracle Solaris OS

The HBA driver for the Oracle Solaris OS is included with the Oracle Solaris 11.4 OS (or later). Load the latest driver by installing the Oracle Solaris 11.4 OS with SRU 16.

Before downloading any SRUs, install the utilities and then the firmware, in that order, for the HBA. You can then download and install the latest SRUs at: [My Oracle Support](#)

Installing Drivers for All Other Supported Operating Systems

If drivers for specific operating systems are required by the HBA, the drivers will be available for download at the Emulex (now Broadcom) support site for Oracle. Before installing any drivers, install the utilities and then the firmware, in that order, for the HBA. For more information about installing utilities and firmware, see [Installing Utilities for Updating the BIOS and Firmware](#).

1. After installing the utilities and the latest firmware for the HBA, go to the Emulex (now Broadcom) support site for Oracle at:
[Oracle Fibre Channel Downloads](#)
2. Click the type of HBA, and then click the model number of the HBA for which you want to install a driver.
3. In the Driver section, click the OS driver that you want, and download the driver files to a local file system.
4. Install the driver for OS, as described in the Emulex (now Broadcom) documentation, located on the Emulex (Broadcom) web site.

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Important Information and Known Issues

This chapter provides supplementary and workaround information for the HBA. Specific bug identification numbers are provided for service personnel.

This chapter contains the following topics:

- [The Physical Device Name of the HBA Has Changed](#)
- [HBA Product Accessibility](#)
- [Diversity and Inclusion](#)

The Physical Device Name of the HBA Has Changed

Bug ID: 26094449

Issue:

When listing the physical device name and path of the HBA at a command-line prompt, the HBA device name does not have the usual naming convention of `SUNW,emlxs@ device-number` in the command-line output. Instead, the physical device name is displayed as `emlxs@ device-number`.

Workaround:

If you use automation scripts that expect the `SUNW,emlxs@ device-number` naming convention, edit these scripts to reflect the new naming convention.

HBA Product Accessibility

Oracle strives to make its products, services, and supporting documentation usable and accessible to the disabled community. To that end, products, services, and documentation include features that make the product accessible to users of assistive technology.

For more information about Oracle's commitment to accessibility, go to [Oracle's Accessibility Program](#).

HBA Hardware Accessibility

Oracle Storage Dual-Port 32 Gb Fibre Channel PCIe Low Profile HBA, Emulex hardware has color-coded labels, component touch points, and status indicators (LEDs) that provide information about the system. These labels, touch points, and indicators can be inaccessible features for sight-impaired users. The product's HTML documentation provides context and descriptive text available to assistive technologies to aid in interpreting status and understanding the system.

You can also use the built-in Oracle Integrated Lights Out Manager (ILOM) to obtain information about the system. Oracle ILOM provides a browser-based interface (BUI) and a command-line interface (CLI) that support assistive technologies for real-time viewing of

system status, indicator interpretation, and system configuration. For details, see [Oracle ILOM Accessibility](#).

Oracle ILOM Accessibility

You can use the Oracle ILOM BUI to monitor and manage the server hardware. The Oracle ILOM BUI does not require a special accessibility mode; rather, its accessibility features are always available. The BUI was developed using standard HTML and JavaScript and its features conform to accessibility guidelines.

To navigate a BUI page and select items or enter commands, use standard keyboard inputs, such as the Tab key to go to a selection, or the up and down arrow keys to scroll through the page. You can use standard keyboard combinations to make menu selections.

For example, using the Oracle ILOM Open Problems BUI page, you can identify faulted memory modules (DIMMs) or processors (CPUs) that would otherwise be identified by a lighted LED indicator on the motherboard. Likewise, you can use the Oracle ILOM BUI to monitor the hardware power states that are also indicated by flashing LED indicators on the hardware.

The Oracle ILOM CLI is an alternative and equivalent way to access the Oracle ILOM BUI features and functionality. Because the operating systems that run on the Oracle server hardware support assistive technologies to read the content of the screen, you can use the CLI as an equivalent means to access the color-based, mouse-based, and other visual-based utilities that are part of the BUI. For example, you can use a keyboard to enter CLI commands to identify faulted hardware components, check system status, and monitor system health.

You can use the Oracle ILOM Remote Console Plus to access both a text-based serial console and a graphics-based video console that enable you to remotely redirect host server system keyboard, video, mouse, and storage devices. Note, however, that the Oracle ILOM Java Remote Console Plus does not support scaling of the video frame within the Java application. You need to use assistive technology to enlarge or reduce the content in the Java Remote Console Plus display.

As an alternative method to using the BIOS Setup Utility to configure BIOS settings, Oracle ILOM provides a set of configurable properties that can help you manage the BIOS configuration parameters on an Oracle x86 server. Using Oracle ILOM, you can do the following:

- Back up a copy of the BIOS configuration parameters to an XML file using the Oracle ILOM BUI.
- Edit the XML file using a standard XML editor. The BIOS XML tags correlate directly to the BIOS screen labels.
- Restore the XML file of the backed up or edited configuration parameters to BIOS.

The BUI and CLI methods for using Oracle ILOM are described in the accessible HTML documentation for Oracle ILOM at [Servers Documentation - Systems Management](#).

BIOS Accessibility

When viewing BIOS output from a terminal using the serial console redirection feature, some terminals do not support function key input. However, BIOS supports the mapping of function keys to Control key sequences when serial redirection is enabled.

Descriptions of the function key to Control key sequence mappings are provided in the product documentation, typically within the server Service Manual. You can navigate the BIOS Setup Utility by using either a mouse or keyboard commands.

As an alternative method of configuring BIOS settings using the BIOS Setup Utility screens, Oracle ILOM provides a set of configurable properties that can help you manage the BIOS configuration parameters on an Oracle x86 server. For more information, see [Oracle ILOM Accessibility](#).

Documentation Accessibility

Documentation for Oracle hardware is provided in HTML and PDF formats. The HTML documents are accessible using standard operating system controls and assistive technology. PDF documents are also provided, but are not an accessible format. PDF documents are considered support documents because the PDF content is available in accessible HTML format.

Product documentation provides figures, other types of images, and screenshots that do not rely on color for interpretation. Within the figures, callouts indicate the referenced component information. The callouts are mapped within a table to provide text descriptions of the referenced parts of the figures. In addition, alternative text is provided for all tables and images that provides the context of the information and images.

Note that screen readers might not always correctly read the code examples in the documentation. The conventions for writing code require that closing braces should appear on an otherwise empty line. However, some screen readers might not always read a line of text that consists solely of a bracket or brace.

The documentation might contain links to web sites of other companies and organizations that Oracle does not own or control. Oracle neither evaluates nor makes any representations regarding the accessibility of these web sites.

You can access the accessible HTML documentation for Oracle Storage Dual-Port 32 Gb Fibre Channel PCIe Low Profile HBA, Emulex products at [Oracle Storage Dual-Port 32 Gb Fibre Channel PCIe Low Profile HBA, Emulex Documentation](#).

Diversity and Inclusion

Oracle is fully committed to diversity and inclusion. Oracle respects and values having a diverse workforce that increases thought leadership and innovation. As part of our initiative to build a more inclusive culture that positively impacts our employees, customers and partners, we are working to remove insensitive terms from our products and documentation. We are also mindful of the necessity to maintain compatibility with our customers' existing technologies, and the need to ensure continuity of service as Oracle's offerings and industry standards evolve. Because of these technical constraints, our effort to remove insensitive terms is ongoing and will take time and external cooperation.