

HP StorageWorks installation guide for Brocade 8Gb and 4Gb host bus adapters



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About this guide

This guide provides information about installing, configuring, and troubleshooting the following single and dual channel host bus adapters.

Table 1 HP Brocade Fibre Channel 8Gb and 4Gb HBAs model and part numbers

HP model number	HP part number	Description
HP 41B	AP767A	PCIe 4Gb FC Single Port HBA
HP 42B	AP768A	PCIe 4Gb FC Dual Port HBA
HP 81B	AP769A	PCIe 8Gb FC Single Port HBA
HP 82B	AP770A	PCIe 8Gb FC Dual Port HBA

Recording reference numbers

Each HBA ships with a unique address identifier that is stored in flash memory. Fibre Channel industry standards issue two unique identifiers: world wide port name (WWPN) and world wide node name (WWNN), each of which is derived from the HBA's IEEE address. Combined, the WWPN and WWNN create the world wide name (WWN), which is an 8-byte identifier that uniquely identifies an HBA on an FC fabric.

Each HBA has a unique serial number that is located on a label at the bottom of the HBA. The serial number label is located on the end of the HBA opposite from the SFP receivers. Check the HBA and record its serial number below so that you have the number in the unlikely event that the NVRAM is corrupted.



NOTE:

The WWN is a permanent identifier that cannot be changed.

HBA serial number: _____

Intended audience

This guide is intended for technical support personnel.

Related documentation

In addition to this guide, see the release notes for *HP StorageWorks Brocade Fibre Channel host bus adapters*.

These and other HP documents can be found on the HP website <http://www.docs.hp.com>.

Document conventions and symbols

Table 2 Document conventions

Convention	Element
Medium blue text: Related document-ation	Cross-reference links and email addresses
Medium blue, underlined text (http://www.hp.com)	website addresses
Bold font	<ul style="list-style-type: none">• Key names• Text typed into a GUI element, such as into a box• GUI elements that are clicked or selected, such as menu and list items, buttons, and check boxes
<i>Italic font</i>	Text emphasis
Monospace font	<ul style="list-style-type: none">• File and directory names• System output• Code• Text typed at the command line
<i>Monospace, italic font</i>	<ul style="list-style-type: none">• Code variables• Command-line variables
Monospace, bold font	Emphasis of file and directory names, system output, code, and text typed at the command line

WARNING!

Indicates that failure to follow directions could result in bodily harm or death.

CAUTION:

Indicates that failure to follow directions could result in damage to equipment or data.

IMPORTANT:

Provides clarifying information or specific instructions.

NOTE:

Provides additional information.



TIP:

Provides helpful hints and shortcuts.

HP technical support

Telephone numbers for worldwide technical support are listed on the HP support website: <http://www.hp.com/support/>.

Collect the following information before calling:

- Technical support registration number (if applicable)
- Product serial numbers
- Product model names and numbers
- Applicable error messages
- Operating system type and revision level
- Detailed, specific questions

Subscription service

HP strongly recommends that customers register online using the Subscriber's choice website: <http://www.hp.com/go/e-updates>.

Subscribing to this service provides you with email updates on the latest product enhancements, newest driver versions, and firmware documentation updates as well as instant access to numerous other product resources.

After subscribing, locate your products by selecting **Business support** and then **Storage** under Product Category.

Helpful websites

For other product information, see the following HP websites:

- <http://www.hp.com>
- <http://www.hp.com/go/storage>
- http://h20000.www2.hp.com/bizsupport/site/search/r4_0/jsp/search.jsp?lang=en&cc=us&tx=storageworks%20hba%20manual
- <http://www.hp.com/support/>
- <http://www.docs.hp.com>
- www.brocade.com/hba

1 HBA features

This chapter describes HBA features such as:

- Environmental and power specifications
- Physical specifications

Environmental and power specifications

The following table lists environment and power specifications for the HBAs.

Table 3 Environmental and power specifications

Property	Specification
Airflow	None required
Operating temperature (dry bulb)	0° C to 50° C (32° F to 122° F)
Operating humidity	5% to 93% (relative-noncondensing)
Nonoperating temperature	–43° C to 73° C (-40° F to 163° F)
Nonoperating humidity	5% to 95% relative-noncondensing
Power dissipation	6.3W Maximum not including SFP. Reduced in green power mode.
Operating range	3.3V operation

Physical specifications

The HBAs are low-profile MD2 form factor PCI Express (PCIe) cards that are shipped with a standard profile bracket installed, and a low profile bracket included, for mounting in your host system.

Table 4 HBA mounting brackets

Bracket type	Dimension
Standard	1.84 cm by 12.08 cm (73 in. by 4.76 in.)
Low profile	16.765 cm by 6.89 cm (6.6 in by 2.714 in.)

PCI express interface

Use the HBAs in PCI Express computer systems with an Industry Standard Architecture/Extended Industry Standard Architecture (ISA/EISA) bracket type. On-board flash memory provides BIOS support

over the PCI Express bus. The PCI Express interface supports PCI Express specifications Gen2 (PCI Express Base Specification 2.0) and Gen1 (PCI Express Base Specification 1.0, 1.1a, and 1.1). It operates as an x8 lane DMA bus master at 2.5 GHz, half duplex.

PCI system values

Table 5 HP Brocade Fibre Channel 8Gb and 4Gb HBAs PCI system values

HP model number	PCI SsDevID	PCI Subsystem vendor ID
PCIe 8Gb FC Single Port HBA (Part # AP769A)	0x1743	0x103c
PCIe 8Gb FC Dual Port HBA (Part # AP770A)	0x1742	0x103c
PCIe 4Gb FC Single Port HBA, (Part # AP767A)	0x1741	0x103c
PCIe 4Gb FC Single Port HBA (Part # AP768A)	0x1744	0x103c

Fibre channel interface

The Fibre Channel interface supports features outlined in the following table:

Table 6 Fibre channel interface

Feature	Description
Port speeds	<p>HP StorageWorks Brocade 825 and 815</p> <ul style="list-style-type: none"> An installed 8 Gbps SFP+ allows user-selectable or auto-negotiated speeds of 8, 4, or 2 Gbps per port. An installed 4 Gbps SFP allows user-selectable or auto-negotiated speeds of 4, 2, or 1 Gbps per port. <p>HP StorageWorks Brocade 425 or 415</p> <ul style="list-style-type: none"> An installed 8 Gbps SFP+ allows user-selectable or auto-negotiated speeds of 4 or 2 Gbps per port only. An installed 4 Gbps SFP allows user-selectable or auto-negotiated speeds of 4, 2, or 1 Gbps per port.
Transceivers	Multimode small form factor pluggable (SFP)
Connector	LC
ASIC	<ul style="list-style-type: none"> Provides the Fibre Channel functionality for all HBA models. Two on-board processors, each operating at 400 MHz, generate signal timing and link protocol in compliance with Fibre Channel standards.
External serial FLASH memory	<ul style="list-style-type: none"> Stores firmware and HBA BIOS code 4 MB capacity

Data rate Per port – half duplex	8Gb HBAs <ul style="list-style-type: none"> • 800 MB/s at 8 Gbps • 400 MB/s at 4 Gbps • 200 MB/s at 2 Gbps 4Gb HBAs <ul style="list-style-type: none"> • 400 MB/s at 4 Gbps • 200 MB/s at 2 Gbps • 100 MB/s at 1 Gbps
Performance per port	500,000 IOPs (maximum) for both 8Gb and 4Gb HBAs
Protocols	<ul style="list-style-type: none"> • SCSI over FC (FCP) • FCP3 – initiator mode only • FC-SP
Other features	<ul style="list-style-type: none"> • ASIC flip-flops parity Protected • ECC memory parity Protected • Quality of Service (QoS) • Target rate limiting • T10 data CRC • NPIV • Multiple priority (VC_RDY) • Frame-level load balancing • FC-SP authentication • Fabric-based boot LUN discovery • Persistent binding • Fabric-Based configuration

Fiber optic cable

The following table summarizes maximum distances supported for different fiber optic types. This table assumes a 1.5 dB connection loss and an 850 nm laser source.

Table 7 Fiber optic cable specifications

Port speed	OM1 (M6) Standard 62.5/125 micron	OM2 (M5) Standard 50/125 micron	OM3 (M5E) Laser-optimized 50/125 micron -300
8 Gbps	50 m	50 m	150 m
4 Gbps	70 m	150 m	380 m
2 Gbps	150 m	300 m	500 m

2 HBA hardware installation

Preparing for the installation

Make sure that you have the following items available before you install an HBA.

- Phillips #1 screwdriver.
- HBA with appropriate mounting bracket attached.
- 62.5/125 or 50/125 micron multimode optical cable with LC duplex connectors to connect the HBA to the fabric.

ESD Precautions

When handling the HBA, use correct electrostatic discharge (ESD) procedures.

- Wear a wrist grounding strap connected to chassis ground (if host is plugged in) or a bench ground.
- Store the HBA in antistatic packaging.

Installing the HBA hardware

WARNING!

The HBA can be damaged by static electricity. Before handling, use standard procedures to discharge static electricity, such as touching a metal surface and wearing a static ground strap. Handle the HBA by the edge and not the board components or gold connector contacts.

1. Remove the HBA from its packaging and check for damage. If it appears to be damaged, or if any component is missing, contact <http://www.hp.com/support/>.
2. Make a backup of your system data.
3. Power down the host. Unplug all power cords and network cables.
4. Remove all covers necessary from the system to access the PCIe slot where you want to install the HBA.
5. Remove the blank bracket panel from the system that covers the PCIe slot where you want to install the HBA. If the panel is secured with a screw, remove the screw and save it for securing the HBA's bracket panel back in the slot.



NOTE:

For best performance, install the HBA into a PCIe slot with an x8 lane or greater transfer interface. To ensure that the number of active lanes is x8 or better, refer to your server documentation for the number of active lanes per connector.

6. If necessary, install the appropriate HBA bracket that fits your case type as follows. If the appropriate bracket is installed on your HBA, go to Step 7.
 - a. Make sure to remove all SFP transceivers from the HBA.
 - b. Remove the two screws attaching the bracket to the HBA card and pull them off the bracket.
 - c. Carefully guide the new mounting bracket onto the HBA card, making sure the bracket mounting tabs align with the holes in the HBA card.
 - d. Replace and tighten the two screws.
 - e. Store the mounting bracket that you removed for future use.
7. Remove all transceivers from the HBA if clearances inside your system case prohibit you from installing the HBA with transceivers installed.
8. Insert the HBA into the desired empty PCIe bus slot. Press firmly until the HBA seats.
9. Secure the HBA's mounting bracket to the case using the method required for your case. Note that in some systems, the bracket may secure to the case with a screw.
10. Make sure required SFPs are installed into HBA receivers.
11. Replace the system's case or cover and tighten all screws.

Removing and installing SFP transceivers

SFP transceivers

All HP StorageWorks Brocade 815 and 825 HBAs ship with the 8 Gbps SFP+. All HP StorageWorks Brocade 415 and 425 HBAs ship with the 4 Gbps SFP.

Use only the following HP StorageWorks Brocade-branded small form factor pluggable (SFP) fiber optic transceivers in the HP StorageWorks Brocade Fibre Channel HBAs:

- 4Gbps SFP, P/N 57-1000013-01
- 8Gbps SFP+, P/N 57-1000012-01

NOTE:

Although you can install an 8 Gbps SFP+ into a HP StorageWorks Brocade 415 or 425 HBA, only 4 Gbps maximum port speed is possible.

Removing SFP transceivers

1. Pull out the protective rubber plug from the SFP connector.
2. Using your thumb and forefinger, unlatch the bail from the side of the cable connector and pull the SFP straight out of the HBA receiver.

Installing SFP transceivers

1. Orient the SFP in front of its slot on the HBA so that it can slide into the HBA receiver slot.
2. Using the bail as a handle, carefully guide the SFP into an HBA receiver until it seats, then latch the bail.

LED operation

LED indicators for each port are visible through the mounting brackets. Since the HP Brocade 825 operates at speeds of up to 8 Gbps, each port has a 1-2, 4, and 8 Gbps LED. The 4 Gbps models, such as the HP Brocade 415, have a 1-2 and 4 Gbps LED for each port.

Table 8 LED operation for HP Brocade 8Gb and 4Gb HBAs

LED	Definition
Steady green	Depending on the LED illuminated, the link is active at 1-2, 4, or 8 Gbps. The port is online (connected to an external device) but has no traffic. Note that only one of these LEDs will be steady green to indicate speed.
Flickering green	Activity, such as data transfers, is occurring on active link.
All LEDs are a flashing a green light	Beaconing is enabled on port
All LEDs are flashing an amber light	Unsupported SFP. Appropriate Brocade-branded SFP not installed.

3 Installing HP Brocade HBA software

This chapter contains the prerequisites and installation instructions for installing HP Brocade HBA software on both Windows and Linux operating systems.

Windows

A smart component is a small self-extracting executable that is used to install HP software such as drivers, agents and other management utilities. The HP Brocade HBA driver and Host Connectivity Manager (HCM) are packaged in smart components. The smart components can be installed in GUI mode or in command-line mode.



NOTE:

Firewall issues exist with the HCM agent on Windows 2008. Therefore, when installing the driver smart component on this system, **open TCP/IP port 34568** to allow agent communication with HCM. HP recommends using Windows Firewall and Advanced Service (WFAS) to open port 34568.

Installing the HBA software on Windows from the GUI interface

Instructions for installing software for either the HP Brocade driver or the Host Connectivity Manager (HCM) from the GUI interface are as follows.



NOTE:

While the following instructions are for installing a driver smart component, the steps for installing the HCM smart component are identical.

1. Download the smart component for your operating system and architecture from hp.com and copy it to the target server.
2. Double-click the smart component package icon.
The HP package installation introduction screen appears.
3. Click the **Install** button to begin the installation procedure.
The HP Decision window appears. It will indicate whether the software you are about to install already exists on your system, and if the version that the smart component contains needs to be installed.
4. Click the **Install** button to start the actual software installation.
Upon a successful installation, the Installation summary window will appear.
5. Click the **Close** button to complete the installation.

Extracting the software

If you would rather extract the contents of the smart component to a directory, rather than installing the software as described in the section, [Installing the HBA software on Windows from a command line](#), do the following:

1. Click the **Extract** button on the Introduction screen.
A dialog box will appear.
2. From the dialog box, browse to the directory on your hard drive that you want to contain the extracted smart component files.

Installing the HBA software on Windows from a command line

Instructions for installing software for the HP Brocade driver from a command line are as follows.

1. From a command window, go to the directory where the smart component resides.
2. Execute the following command:

```
# cpxxxxxxx.exe
```

The HP Brocade driver smart components support the following command line options:

 - /s – Silent – Prevents the GUI from appearing and runs the component with default actions.
 - /f – Force – Install the component even if its software is already installed
 - /a – Agent Only – Only install the `hcmagent`. This command does not install the driver.

When running the component from the command line, HP recommends running the /f and /s flags along with it.



NOTE:

If the component is running, the blue package icon will appear in the `systray`.

Linux

- Root or administrator privileges are required for installing the driver package.
- Only one driver installation is required for all HBAs installed in a host system.
- You must use the HP Brocade HBA Software Installer to install the Host Connectivity Manager (HCM).
- You can install HCM to the host system where the HBA is installed or to a separate remote management platform.

Installing the HBA software on Linux using the HP Brocade HBA Software Installer

Installing the driver package and/or HCM in GUI mode

You can also use the GUI-based application to install the driver package only, the driver package and HCM, or HCM only to your system.



NOTE:

To install the driver package, the driver package and HCM, or HCM only, using the software installer commands instead of the GUI-based application, see the section, Using HP Brocade HBA Software Installer commands.

Instructions for installing the driver package and/or the HCM using the HP StorageWorks Brocade Software Installer are as follows:

1. Download the software from the HP StorageWorks website at <http://www.hp.com/go/storage>.
2. To launch the HP Brocade HBA Software Installer in GUI mode, execute the following command without parameters:
 - # ./bfa_setup_<version>.bin
3. Click **Next**. The License Agreement screen appears.
4. Select **I accept the terms of the License Agreement**. Click **Next** to continue.
If a backup directory exists for previously installed software, a message, prompting you to restore the data directory appears. If this message does not display, go to step 6.
5. If a message appears, indicating that an older version of the software already exists on your system, select one of the following options, then go to Step 8. Otherwise, go to Step 6.
 - **Existing configurations**. The installer compares each configured property and keeps the original value if different than the default value.
 - **Default configurations**. The installer upgrades the software and loads with default configurations. Choose whether you want to use the current configuration or not before continuing with the installation.
6. Select the software that you want to install. Click **Next** to continue.



NOTE:

If you are upgrading from an older version of the software, both the Choose Install Set page and the Choose Install Folder page will not display.

7. If the Choose Install Folder screen appears, prompting you to choose a destination folder for the software, select from one of the following options. Otherwise, go to Step 9.
 - Enter a location for installing the software.
 - Select **Choose** to browse to a location on your file system.
 - Select **Restore Default Folder** to enter the default installation folder.The Package Location Information screen appears.
8. Do one of the following:
 - Select **OK** to automatically start the HCM agent.
 - Select **Don't Start** to manually start the HCM agent on Linux systems after you complete the software installation.The Pre-Installation Summary screen appears.
9. Click **Next** to continue.
10. Select **Install** to begin the installation.
11. Select **Done** once a screen appears indicating the installation is complete.
12. Reboot or restart your system if a message appears prompting you to do so.

Installing the driver package and/or HCM using the command line

The HP Brocade HBA Software Installer can also be utilized at the command line:

```
# sh bfa_setup_<Platform>_<version>.bin
-DCHOSEN_INSTALL_SET=[DRIVER|GUI|BOTH] -DFORCE_WIN_DRIVER_INSTALLATION=1
-DAgent_Start=0 -i silent
```

where:

- # DCHOSEN_INSTALL_SET
Specifies to install either the driver, the GUI (HCM), or both.
- # DFORCE_WIN_DRIVER_INSTALLATION=1
Overwrite an existing driver using the software installer command and parameters.
- -DAgent_Start=0
By default, the HCM Agent starts after installation. -DAgent_Start=0 specifies to not start the HCM Agent automatically after installation.
- -i silent
Specifies that the installation mode should be silent.

Upgrading HCM, HBA driver package or both

You do not need to remove existing software in order to perform a software upgrade, but there is still important information you will want to familiarize yourself before you begin the process. When upgrading the driver for Linux systems, you should not need to reboot the host system after installation. However, if you are having trouble unloading the current driver in memory, you may have to restart your server.



NOTE:

To upgrade HCM, the HBA driver package, or both, use the normal HP Brocade HBA Software Installer instructions.

4 HBA boot code

The HBA supports the following system BIOS and platforms:

- Peripheral Component Interconnect (PCI) firmware specification version 3.0 for option BIOS, for PCI systems.
- BIOS Boot code for x86 and x86_x64 platforms

The HBA boot code loads from option memory into system memory and integrates with the host system (server) BIOS during system boot to facilitate booting from SAN LUNs.

You can download a boot code image from the www.hp.com to perform an online update of the boot image on installed HBAs. You can also download ISO 9660 (.iso) optical disk image files to perform offline updates of the HBA boot code and perform other management functions to facilitate installing the OS on SAN boot LUNs.

Software installation packages

Download the LiveCD ISO image or the boot code image to support boot operations, such as updating HBA boot code to support boot from SAN from the HP HBA website www.hp.com. The LiveCD ISO image appears on the HP website as **Offline BIOS Upgrade Installation kit for HP branded Brocade HBAs**. The multiboot image file for use with HCM or BCU appears as **Online Multiboot Image for HP branded HBAs**.

From the HP website, select your HBA model and then your host's operating system to display the appropriate download screen.

The following packages are available:

- A LiveCD ISO image (`live_cd.iso`) containing the HBA driver, boot code, and minimum operating system to allow you to boot BIOS-based host systems that do not have installed operating systems or local drives. Once you boot the system from the CD, you can update the boot image on installed HBAs and configure boot from SAN using BCU commands.
- HBA boot image. This contains BIOS and firmware images that can be loaded to the HBA online using BCU or HCM.

Enter the following command to update a single HBA using BCU

```
# bcu boot --upload <adapter_id> filename
```

Enter the following command to update all of the HBAs in the server

```
# bcu boot --upload filename a
```

In HCM, right click on a server to update all the HBAs in the server, or a specific HBA. From the drop-down menu, select **Upload boot code image** then follow the remaining steps.

BIOS support

The HBA boot BIOS provides boot support for the HP StorageWorks Brocade HBAs in x86 and x64 host platforms. The BIOS can discover up to 256 storage targets, such as RAID units, and the logical unit numbers (LUNs) on those units when the LUNs are bound to HBA ports.

When HBA BIOS is enabled, the boot code loads from HBA option ROM into system random access memory (RAM) and integrates with the host system (server) BIOS during system boot to facilitate booting from SAN LUNs.



NOTE:

You can enable or disable BIOS for boot over SAN, set port speed, and display HBA BIOS settings using BCU commands. By default, BIOS is enabled on all HBA ports.

The HP StorageWorks Brocade BIOS Configuration Utility, embedded with the boot code, BCU commands, and the HCM allow you to perform the following tasks:

- Enable or disable BIOS.
- Set port speed:
 - 1 Gbps, 2 Gbps, 4 Gbps and Auto for 415 and 425 HBA models
 - 2 Gbps, 4 Gbps, 8 Gbps, and Auto for 815 and 825 HBA models
- Select a boot device from discovered targets.
- Enable one of the following boot LUN options:
 - Auto Discover – When enabled, boot information, such as the location of the boot LUN, is provided by the fabric
 - Flash values – The HBA will obtain the boot LUN information from flash memory.
 - First LUN – The host boots from the first LUN visible to the HBA that is discovered in the fabric.