

HP Emulex Converged Network Adapter Installation Guide

Abstract

This document provides information about installing, configuring, and troubleshooting the HP Emulex Converged Network Adapters (CNAs). In this document, CNA refers to HP models CN1000E and CN1100E.

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<http://www.hp.com/go/storagewarranty>

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1 Installing the Emulex CNA

This chapter describes the following topics for installing the CNA:

- “Installation prerequisites” (page 5)
- “Installing the Emulex CNA” (page 6)

See the server documentation for additional information about installing the CNA.



WARNING! Disconnect the host from the power source before installing the CNA. To reduce the risk of personal injury from hot surfaces, allow the internal server or workstation components to cool before touching.

Installation prerequisites

Before you begin, make sure you have the following items available:

- An optical multimode cable with an LC-style duplex connector and approved SFP+ module or copper cable
- A server with an empty x8 PCIe bus slot

Recording reference numbers

Each CNA is shipped with the following two numbers clearly marked on the board:

- IEEE address (Port 1 MAC address)
- Serial number

The MAC address is a unique 48-bit identifier used when configuring the system. The Fibre Channel industry uses the World Wide Name (WWN) derived from the MAC address for Fibre Channel connectivity. The adapter has two ports. Therefore, it has two MAC addresses and two WWNs, one for each port. Use the serial number when communicating with HP.

NOTE: The factory default MAC addresses are permanent identifiers that cannot be changed. The MAC address for Port 1 is listed on the CNA. The MAC address for Port 2 and the WWNs are calculated based on the Port 1 address as follows:

MAC address/WWN	Calculation	Example
Port 1 MAC address	Assigned at the factory and printed on the CNA IEEE address label	F4-CE-46-FD-9C-68
Port 1 WWN	10:00:[Port 1 MAC address]	10:00:F4:CE:46-FD-9C-68
Port 2 MAC address	Port 1 MAC address + 4	F4-CE-46-FD-9C-6C
Port 2 WWN	10:00:[Port 1 MAC address + 4]	10:00:F4:CE:46-FD-9C-6C

Record the serial number and MAC addresses and WWNs for your CNA before installation.

Serial number (on CNA): _____

Port 1 MAC address: _____

Port 1 WWN: _____

Port 2 MAC address: _____

Port 2 WWN: _____

Installing the Emulex CNA

The CNA uses removable optical transceivers or copper interface cables.

⚠ CAUTION: Electrostatic discharge (ESD) can damage electronic components. Be sure you are properly grounded before beginning this procedure, as described in [“Electrostatic discharge” \(page 9\)](#).

ⓘ IMPORTANT: The CNA is only supported in PCI Express 8 lane and larger PCIe slots. This may require optional PCIe riser cards or cages. For instructions on installing the riser card or cage, see the server documentation.

To install the CNA into a server:

1. Be sure the server is powered off.
2. Remove the access panel.
3. Wearing an anti-static wrist strap, remove the blank panel from an empty x8 or larger PCIe bus slot.

NOTE: The CNA comes with a standard PCIe bracket installed. A low-profile bracket is included in the box with the CNA. The low-profile mounting bracket is shorter than the standard bracket: approximately 7.90 cm (3.11 inches) compared to 12.06 cm (4.75 inches) long.

4. If you require a different mounting bracket, change the bracket as follows. Otherwise, go to [Step 5](#).
 - a. Remove any transceivers or cables from the CNA transceiver cage assembly by pulling the bail (handle) out and down to release the latch, and then gently pull the transceiver out. Do not force it. After the latch is released, the transceiver/cable slides out easily.

Figure 1 A typical optical transceiver

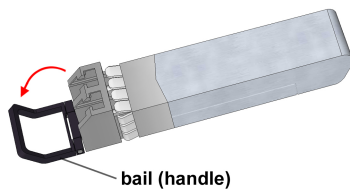
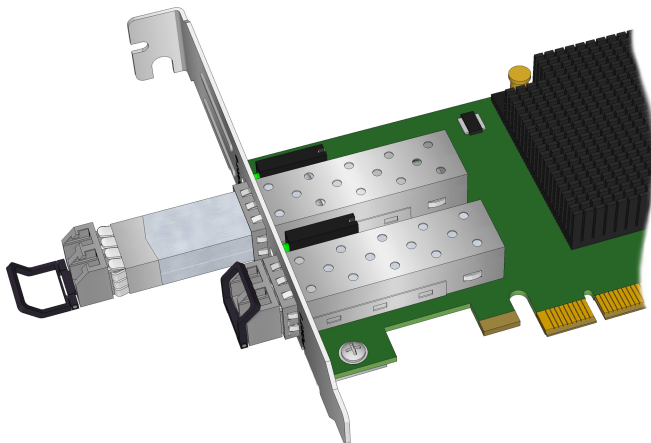
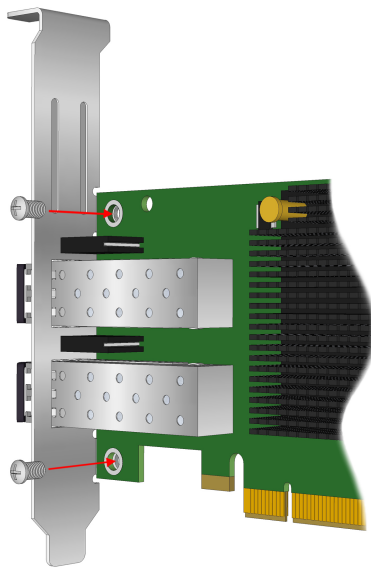


Figure 2 Removing a transceiver



- b. Observing ESD precautions, store the transceiver in an ESD-safe place.
- c. Remove the mounting bracket screws from the top of the CNA.

Figure 3 Removing the bracket



- d. Remove the bracket and store it for future use.
 - e. Align the new mounting bracket tabs with the holes in the CNA.
-
- ⓘ **IMPORTANT:** Be careful not to push the bracket past the grounding tabs on the transceiver housing. Make sure the LEDs are properly aligned with the holes in the bracket.
-
- f. Install the screws that attach the CNA to the bracket.
 - g. Slide the transceiver into the housing. When the latch engages, it clicks.
 - h. Push the bail back into place.
5. Insert the CNA into the empty PCIe slot. Press firmly until the CNA is seated.
 6. Secure the CNA mounting bracket to the case with the panel clip.
 7. Replace the server case, and then tighten the screws on the case.
- The CNA is now installed in the server and ready for media attachment.

8. Attach the media:
 - a. For fiber optic cable connections:
 1. Insert the SFP transceiver module into the cage.
 2. Connect one end of the fiber optic cable to the LC connector on the CNA.
 3. Connect the other end of the cable to the Converged Network switch.

Figure 4 Emulex CNA with optical transceivers

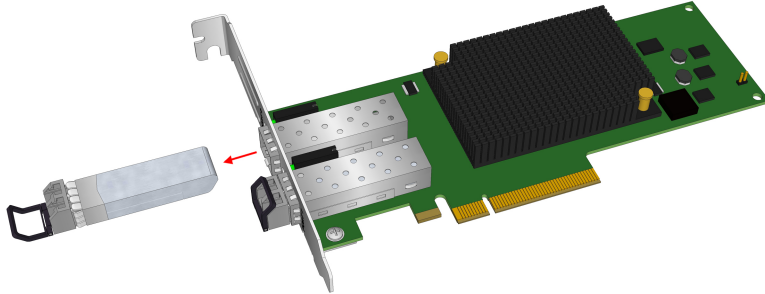
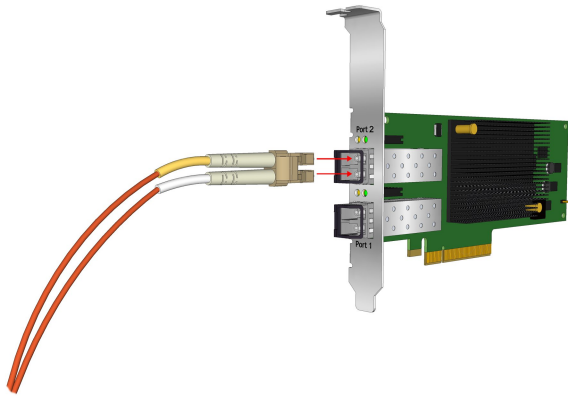
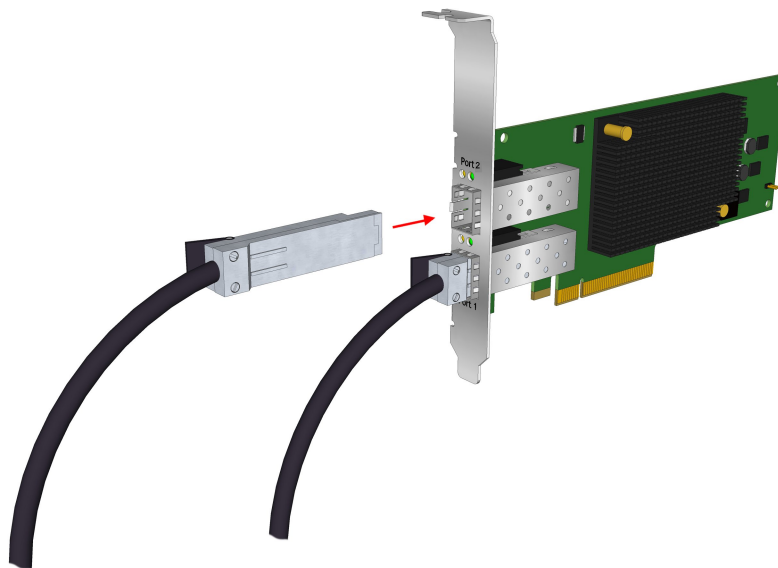


Figure 5 Connecting fiber optic cable



- b. For copper cable connections:
 1. Connect one end of the copper cable to the CNA.
 2. Connect the other end of the cable to the Converged Network switch.

Figure 6 Connecting the direct attach copper cable



9. Apply the power:
 - a. Verify that the CNA is installed securely in the server.
 - b. Verify that the correct media is attached.
 - c. Plug in and power on the server.
 - d. Observe the Link and Activity LEDs to be sure the CNA connects to the switch.
For more information about the meaning of the LED indicators, see [“CNA LED states” \(page 16\)](#).
 - e. Watch the server console for any POST error messages and the CNA BIOS startup message similar to the one in [Figure 7 \(page 9\)](#)

Figure 7 CNA BIOS example startup message

```
!!! Emulex OneConnect FCoE BIOS !!!, Version 4.00a7
Copyright (c) 1997-2009 Emulex. All rights reserved.

Press <Alt E> or <Ctrl E> to enter Emulex BIOS configuration
utility. Press <s> to skip Emulex BIOS
```

Electrostatic discharge

To prevent damage to the system, be aware of the precautions you need to follow when setting up the system or handling parts. A discharge of static electricity from a finger or other conductor may damage system boards or other static-sensitive devices. This type of damage may reduce the life expectancy of the device.

To prevent electrostatic damage, observe the following precautions:

- Avoid hand contact by transporting and storing products in static-safe containers.
- Keep electrostatic-sensitive parts in their containers until they arrive at static-free workstations.
- Place parts on a grounded surface before removing them from their containers.
- Avoid touching pins, leads, or circuitry.
- Always be properly grounded when touching a static-sensitive component or assembly (see [“Grounding methods” \(page 9\)](#)).

Grounding methods

There are several methods for grounding. Use one or more of the following methods when handling or installing electrostatic-sensitive parts:

- Use a wrist strap connected by a ground cord to a grounded workstation or computer chassis. Wrist straps are flexible straps with a minimum of 1 megohm (± 10 percent) resistance in the ground cords. To provide proper ground, wear the strap snug against the skin.
- Use heel straps, toe straps, or boot straps at standing workstations. Wear the straps on both feet when standing on conductive floors or dissipating floor mats.
- Use conductive field service tools.
- Use a portable field service kit with a folding static-dissipating work mat.

If you do not have any of the suggested equipment for proper grounding, have an HP-authorized reseller install the part.

NOTE: For more information on static electricity, or assistance with product installation, contact your HP-authorized reseller.

2 Installing drivers and software

For the latest information about storage array support, see the HP SPOCK website at <http://www.hp.com/storage/spock>. You must sign up for an HP Passport to enable access.

Some CNA download kits include a `readme.txt` file that may contain additional information about installing firmware and drivers, plus enhancements and fixes in the current release. Information in the `readme.txt` file supersedes this and other HP Emulex documents.

The Emulex OneCommand Manager application is available for the CNA. See the *Emulex OneCommand Manager Application User Manual*:

1. Go to <http://www.hp.com/support/manuals>.
2. Under storage, click **Storage Networking**.
3. Click **HP Converged Network Adapters**.
4. Select **Manuals**.

Order of the installation

The order of installation is important. It must be done as follows:

1. Install the network driver.
2. Install the FCoE driver.
3. Install the OneCommand Manager utility.
4. Update the CNA firmware and BIOS (if required).
5. Install multipathing software (if required).

Downloading software and drivers

This section describes how to locate and download drivers and software.

Downloading the Windows driver kit (Smart Component) or Linux driver kit

To download the driver kit:

1. Go to <http://www.hp.com/go/support>.
2. Click **Drivers & Software**.
3. Using the HP model number as your guide, enter the CNA model number, and then click **Search**.
4. Select your operating system.
5. Select the Windows driver kit (Smart Component) or Linux driver kit and download it to your server.

NOTE: Install the network driver kit before you install the storage Fibre Channel driver.

Downloading the OneCommand Manager application kit

To download the OneCommand Manager application kit:

1. Go to <http://www.hp.com/go/support>.
2. Click **Drivers & Software**.
3. Using the HP model number as your guide, enter the CNA model number, and then click **Search**.
4. Select your operating system.
5. Select the OneCommand Manager Application Kit and download it to your server.

Downloading firmware

To download firmware:

1. Go to <http://www.hp.com/go/support>.
2. Click **Drivers & Software**.
3. Using the HP model number as your guide, enter the CNA model number, and then click **Search**.
4. Click **Cross operating system (BIOS, Firmware, Diagnostics, etc.)**.
5. Select the Firmware image and download it to your server.

Downloading multipathing software

To download Windows MPIO DSM software:

1. Go to <http://www.hp.com/go/support>.
2. Click **Drivers & Software**.
3. Enter **MPIO DSM**, and then click **Search**.
4. Select the MPIO DSM software for your arrays and download it to your server.

To download the Linux HP Device Mapper kit:

1. Go to <http://www.hp.com/go/devicemapper>.
2. Select your operating system.
3. Select the Device Mapper Multipath Enablement Kit and download it to your server.

Installing drivers and software

This section describes how to install drivers and software.

Installing the Windows device driver using the HP Smart Component kit

To install the Windows drivers:

1. Obtain the latest Smart Component for your configuration and copy it to your Windows server.
2. Unzip the driver Smart Component.
3. Double-click the FCoE Smart Component executable to begin the installation, and then click **Install**.

The Smart Component automatically installs the FCoE driver without user intervention.

4. Click **Reboot** to complete the installation.

Installing the Windows utility using the HP Smart Component kit

To install the CNA Windows OneCommand Manager utility:

1. Obtain the latest Smart Component for your configuration and copy it to your Windows server.
2. Unzip the Smart Component.
3. Double-click the network Smart Component executable to begin the installation, and then click **Install**.

The Smart Component automatically installc the OneCommand Manager software without any user intervention. When the installation is finished, click **Finish** to complete the installation.

NOTE: The NIC driver must be installed and the NIC ports enabled for the OneCommand Manager to operate properly.

Installing firmware on Windows systems

Use the OneCommand Manager utility to install the CNA firmware/BIOS:

1. Before you begin, make sure you have the following installed:
 - Network driver
 - FCoE driver
 - OneCommand Manager utility
2. Download the firmware image to your Windows server
3. Follow the procedure in the Updating Adapter Firmware chapter of the *OneCommand Manager Application User Guide*.

Installing multipathing software on Windows

If you require multiple-path redundancy, after installing the operating system, you must install the HP-supplied MPIO DSM kits specific to your storage arrays:

1. Download the MPIO software. See “[Downloading multipathing software](#)” (page 11).
2. Double-click the executable file and follow the on-screen instructions.

<http://h18006.www1.hp.com/products/sanworks/multipathoptions/index.html>

Installing the CNA Linux drivers

NOTE: If performing a Boot from SAN (BFS) installation, do not install the `u1dk` kit. You must install the FCoE and NIC drivers before installing the OneCommand Manager utility.

Download the Linux driver kit as described in “[Downloading the Windows Windows driver kit \(Smart Component\) or Linux driver kit](#)” (page 10).

To install the Linux drivers, follow the instructions in the `readme.txt` file that is included in the kit.

Installing the Linux utility

To install the Linux OneCommand Manager application kit:

1. Download the appropriate utility kit for your distribution. See “[Downloading the OneCommand Manager application kit](#)” (page 10).
2. Uncompress the file.
3. Change to the `elxocm-<operating system>-<version>` directory.
4. Execute the install command:

```
# ./install.sh
```

NOTE: The NIC driver must be installed and the NIC ports enabled for the OneCommand Manager to operate properly.

Installing firmware on Linux systems

To install the CNA firmware/BIOS image using the OneCommand Manager utility:

1. Before you begin, make sure you have the following installed:
 - Network driver
 - FCoE driver
 - OneCommand Manager utility
2. Download the firmware image.
3. Follow the instructions in the Updating Adapter Firmware chapter of the *OneCommand Manager Application User Guide*.

Installing and configuring multipathing software on Linux

If you require multiple-path redundancy, see the *Native Linux Multipath Disk Arrays Device-Mapper for HP StorageWorks Reference Guide* or download the HPDMmultipath-4.4.1 Enablement Kit. Both are available on the HP SPOCK website at <http://www.hp.com/storage/spock>. You must sign up for an HP Passport to enable access.

After you log in, under Application Notes on the left of the screen, click **Solutions: Linux**.

3 Troubleshooting

This chapter contains the following topics for information to help resolve potential CNA problems:

- “Isolating CNA problems” (page 14)
- “CNA LED states” (page 16)
- “CNA startup BIOS message” (page 17)

Isolating CNA problems

This section describes how to resolve typical problems with the CNA.

Observe and collect data

The first step in troubleshooting any CNA problem is to observe and collect information about the problem so the problem can be isolated. Consider the following:

- If the CNA has been working, what has changed? For example, changes to switch or storage system firmware could affect the CNA.
- Identify the expected and observed results.
- List as many of the observed symptoms as possible.
- Collect relevant information including, but not limited to:
 - CNA firmware, BIOS, and utilities revision information
 - Applicable switch and storage subsystems revision information
 - Operating system driver and path management revision information and log files
 - CNA LED and startup BIOS message

Isolate the problem to the component

After collecting the data, use the data to isolate the problem to a particular component. The typical components in a CNA solution are a server with a CNA, cables, Converged Network (CN) switch, storage subsystem, and Fibre Channel switches. Because the focus on this chapter is the CNA, this section describes typical CNA problem isolation.

CNA problem isolation

Most of the common problems with the CNA are either link connectivity issues, which affect both Ethernet and Fibre Channel access, or Fibre Channel storage discovery issues.

Verify server and CNA startup BIOS messages

1. Look for server POST errors.
2. Verify that the CNA is detected and has the appropriate firmware. See “CNA startup BIOS message” (page 17).

If either of these steps reveals errors, the most likely cause is a faulty CNA or the CNA is incompatible with the server model.

Verify the CNA link

1. Verify that the CNA link is active by observing the CNA LEDs. See “CNA LED states” (page 16).
2. Verify connectivity at the CN switch port. Use the appropriate switch management utility to display the port information and verify the CNA port WWN. See [Figure 8 \(page 15\)](#) and [Figure 9 \(page 15\)](#) for an example of displaying the CN switch link status.

Figure 8 Example of B-series loginshow output

```
BR8000-1:admin> fcoe --loginshow
=====
Port    Te port    Device WWN                Device MAC                Session MAC
=====
8       Te 0/0      10:00:00:00:c9:93:c9:13  00:00:c9:93:c9:13        0e:fc:00:04:08:01
11      Te 0/3      10:00:00:00:c9:93:c8:b3  00:00:c9:93:c8:b3        0e:fc:00:04:0b:01
12      Te 0/4      10:00:00:00:c9:93:ca:8b  00:00:c9:93:ca:8b        0e:fc:00:04:0c:01
13      Te 0/5      10:00:00:00:c9:93:c9:bf  00:00:c9:93:c9:bf        0e:fc:00:04:0d:01
14      Te 0/6      10:00:00:00:c9:93:ca:e3  00:00:c9:93:ca:e3        0e:fc:00:04:0e:01
15      Te 0/7      10:00:00:00:c9:93:ca:eb  00:00:c9:93:ca:eb        0e:fc:00:04:0f:01
16      Te 0/8      10:00:00:00:c9:93:c9:1b  00:00:c9:93:c9:1b        0e:fc:00:04:10:01
17      Te 0/9      10:00:00:00:c9:93:c9:3b  00:00:c9:93:c9:3b        0e:fc:00:04:11:01
18      Te 0/10     10:00:00:00:c9:93:c8:5b  00:00:c9:93:c8:5b        0e:fc:00:04:12:01
19      Te 0/11     10:00:00:00:c9:95:b5:ef  00:00:c9:95:b5:ef        0e:fc:00:04:13:01
20      Te 0/12     10:00:00:00:c9:93:ca:93  00:00:c9:93:ca:93        0e:fc:00:04:14:01
21      Te 0/13     10:00:00:00:c9:95:b5:bf  00:00:c9:95:b5:bf        0e:fc:00:04:15:01
24      Te 0/16     10:00:00:00:c9:93:ca:2b  00:00:c9:93:ca:2b        0e:fc:00:04:18:01
BR8000-1:admin>
```

Figure 9 Example of C-series show interface output

```
Nexus-2# show interface fcoe
Ethernet1/1 is FCoE UP
  vfc1 is Up
    FCID is 0x91001a
    PWWN is 10:00:00:00:c9:93:c9:0f
    MAC addr is 00:00:c9:93:c9:0f
Ethernet1/2 is FCoE down
Ethernet1/3 is FCoE UP
  vfc3 is Down
Ethernet1/4 is FCoE UP
  vfc4 is Up
    FCID is 0x91001e
    PWWN is 10:00:00:00:c9:93:c8:af
    MAC addr is 00:00:c9:93:c8:af
Ethernet1/5 is FCoE UP
  vfc5 is Up
    FCID is 0x910013
    PWWN is 10:00:00:00:c9:93:ca:87
    MAC addr is 00:00:c9:93:ca:87
Ethernet1/6 is FCoE UP
  vfc6 is Up
    FCID is 0x910017
    PWWN is 10:00:00:00:c9:93:c9:c3
    MAC addr is 00:00:c9:93:c9:c3
Ethernet1/7 is FCoE UP
  vfc7 is Up
    FCID is 0x91001b
    PWWN is 10:00:00:00:c9:93:ca:df
    MAC addr is 00:00:c9:93:ca:df
Ethernet1/8 is FCoE UP
  vfc8 is Up
    FCID is 0x91001c
    PWWN is 10:00:00:00:c9:93:ca:e7
    MAC addr is 00:00:c9:93:ca:e7
Ethernet1/9 is FCoE UP
  vfc9 is Up
    FCID is 0x910020
```

3. Observe the CN switch and CNA link error counters.

If any of these steps detect errors, the most likely causes are incompatible or faulty cables, SFPs, or CN switch ports. Cable or SFP problems can cause a wide range of symptoms from solid to intermittent and even performance issues. The FCoE switch port and CNA port error counters are good indications of potential intermittent and performance problems.

Verify Fibre Channel switch zoning for FC storage

Verify that the Fibre Channel zoning and the CNA port WWNs match those displayed by the CNA.

Verify Fibre Channel storage device discovery

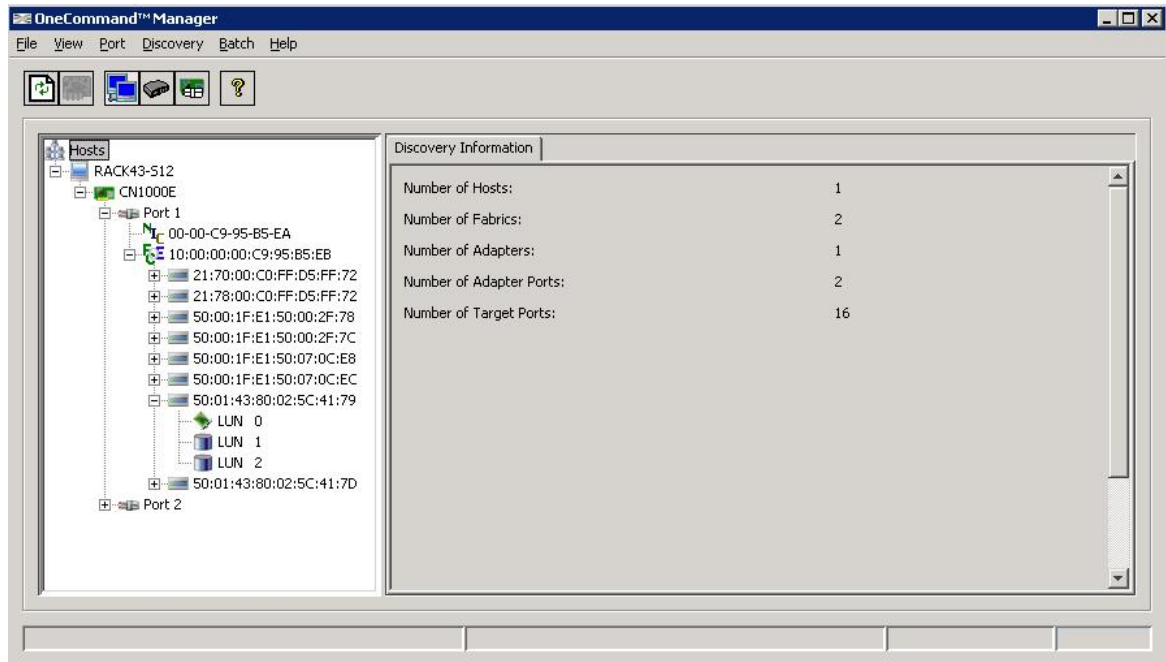
After verifying startup BIOS message, link, and zoning, verify that the CNA can discover the configured Fibre Channel storage devices.

- The first level of CNA Fibre Channel storage device discovery is performed at the BIOS level using the OneConnect FCoE BIOS utility. Use this utility (see “CNA startup BIOS message”

(page 17)) at system startup to discover and display the storage devices in the attached FC fabric.

- When the server boots, the operating system performs the next level of discovery. Using the OneCommand Manager utility (see Figure 10 (page 16)), you can view all Fibre Channel storage devices known to the server.

Figure 10 OneCommand Manager



If the storage controller cannot be seen, then the most likely causes are Fibre Channel zoning or SAN connectivity between the CNA and the storage controller.

If the storage controller can be seen, but not any of its LUNs, then the most likely cause of not seeing discrete LUNs is a LUN mapping problem.

CNA LED states

You can observe green and amber LEDs through openings in the CNA mounting bracket. See Figure 11 (page 17). Table 1 (page 17) describes the CNA LED link states.

NOTE: When power is applied to the CNA, both LEDs on both ports light for approximately 10 seconds.

Figure 11 CNA LED indicators

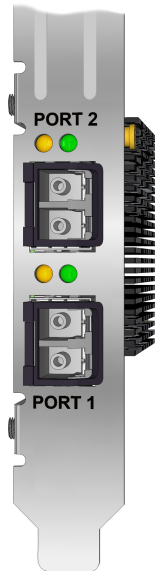


Table 1 CNA LED descriptions

LED	Meaning
Link activity (Green)	Flash = activity Off = no activity
Link state (Amber)	On = link up Off = link down

CNA startup BIOS message

The CNA BIOS that is typically used to configure Boot from SAN (BFS) can also aid in troubleshooting CNA installation, SAN link, and zoning configuration issues. During the system startup the CNA startup BIOS message displays on the system console. This message provides minimal information, such as the BIOS revision and if a CNA is configured for BFS. It also displays the LUN path information to the boot device.

During startup, you have the option to enter the BIOS configuration utility by pressing **Ctrl+E** on the system console (see [Figure 12 \(page 17\)](#)).

Figure 12 CNA BIOS

```
!!! Emulex OneConnect FCoE BIOS !!!, Version 4.00a7
Copyright (c) 1997-2009 Emulex. All rights reserved.

Press <Alt E> or <Ctrl E> to enter Emulex BIOS configuration
utility. Press <s> to skip Emulex BIOS
```

[Figure 13 \(page 18\)](#) shows the first screen that displays the CNA ports and their respective Port WWNs. Use the arrow keys to select a CNA port.

Figure 13 CNA select screen

```
Emulex OneConnect FCoE BIOS Utility, OB4.00a7

This utility displays and saves changes when selected.
You will be prompted to reboot for all changes to take effect.

Emulex Adapters in the System:

1. CN1000E:      Bus:07 Dev:00 Func:02  WWPN: 10000000C995B5EB
2. CN1000E:      Bus:07 Dev:00 Func:03  WWPN: 10000000C995B5EB

Enter <Esc> to exit <PageDn> to Next Page
<↑/↓> to Highlight, <Enter> to Select

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```

Figure 14 (page 18) shows the CNA BIOS main menu. On this screen, the CNA firmware and BIOS versions display along with the CNA Port WWN, BIOS enablement state, VLAN, and DCBX mode. Take note of the code revisions and compare them to the latest supported version for your server. This menu is typically used for configuring BFS. In addition to the revision configuration information display, **Scan for Target Devices** is also a useful troubleshooting tool for zoning issues. This display is limited and only displays the first LUN for each storage device detected.

Many parameters and options are available with this utility, but do not change any parameters unless instructed by technical support.

Figure 14 CNA BIOS main menu

```
Emulex OneConnect FCoE BIOS Utility, OB4.00a7

01: CN1000E:      Bus#: 07 Dev#: 00 Func#: 02
Mem Base: FBF00000  Firmware Version: 2.701.374.6  BIOS: Disabled!
Port Name: 10000000C995B5EB  Node Name: 20000000C995B5EB
Vlan ID: 0200  DCBX mode: CEE mode

Enable/Disable Boot from SAN
Scan for Target Devices
Reset Adapter Defaults
Configure Boot Devices
Configure DCBX mode
Configure FCF CEE Parameters
Configure FCF CIN Parameters
Configure Advanced Adapter Parameters

Enter <Esc> to Previous Menu
<↑/↓> to Highlight, <Enter> to Select
```

Figure 15 (page 19) shows the CNA BIOS device details.

Figure 15 CNA BIOS device details

```
Emulex OneConnect FCoE BIOS Utility, 0B4.88a7

01: CN1000E:                               Bus#: 07 Dev#: 00 Func#: 02
Mem Base: FBF00000 Firmware Version: 2.701.374.6   BIOS: Disabled!
Port Name: 10000000C995B5EB                 Node Name: 20000000C995B5EB
Vlan ID: 0200 DCBX mode: CEE mode

                Devices Present on This Adapter:

01. DID:160000 WWPN:50014380 025C4179 LUN:01   HP     HSV300     0005
02. DID:160001 WWPN:50014380 025C417D LUN:01   HP     HSV300     0005
03. DID:16000A WWPN:50001FE1 50002F7C LUN:01   HP     HSV210     5000
04. DID:16000B WWPN:50001FE1 50002F78 LUN:01   HP     HSV210     5000
05. DID:16000E WWPN:50001FE1 50070CEC LUN:01   HP     HSV210     5000
06. DID:16000F WWPN:50001FE1 50070CE8 LUN:01   HP     HSV210     5000

                Enter <Esc> to Previous Menu
```

4 Support and other resources

Contacting HP

For worldwide technical support information, see the HP support website:

<http://www.hp.com/support>

Before contacting HP, collect the following information:

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

Subscription service

HP recommends that you register your product at the Subscriber's Choice for Business website:

<http://www.hp.com/go/e-updates>

After registering, you will receive e-mail notification of product enhancements, new driver versions, firmware updates, and other product resources.

New and changed information in this edition

The following additions and changes have been made for this edition:

- Added support for CN1100E.
- Updated download links and procedures.

Related information

The following documents [and websites] provide related information:

- <http://www.hp.com/go/san>

You can find these documents from the Manuals page of the HP Business Support Center website:

<http://www.hp.com/support/manuals>

In the Storage section, click **Storage Networking** and then select your product.

HP websites

For additional information, see the following HP websites:

- <http://www.hp.com>
- <http://www.hp.com/go/storage>
- http://www.hp.com/service_locator
- <http://www.hp.com/support/manuals>
- <http://www.hp.com/support/downloads>
- <http://www.hp.com/storage/whitepapers>

Typographic conventions

Table 2 Document conventions

Convention	Element
Blue text: Table 2 (page 21)	Cross-reference links and e-mail addresses
Blue, underlined text: http://www.hp.com	Website addresses
Bold text	<ul style="list-style-type: none">• Keys that are pressed• Text typed into a GUI element, such as a box• GUI elements that are clicked or selected, such as menu and list items, buttons, tabs, and check boxes
<i>Italic</i> text	Text emphasis
Monospace text	<ul style="list-style-type: none">• File and directory names• System output• Code• Commands, their arguments, and argument values
<i>Monospace, italic</i> text	<ul style="list-style-type: none">• Code variables• Command variables
Monospace, bold text	Emphasized monospace text

 **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.

Customer self repair

HP customer self repair (CSR) programs allow you to repair your HP storage product. If a CSR part needs replacing, HP ships the part directly to you so that you can install it at your convenience. Some parts do not qualify for CSR. Your HP-authorized service provider will determine whether a repair can be accomplished by CSR.

For more information about CSR, contact your local service provider, or see the CSR website:

<http://www.hp.com/go/selfrepair>

This product has no customer replaceable components.

A Emulex CNA specifications

This chapter contains the following CNA specifications:

- “Environmental specifications” (page 22)
- “Physical specifications” (page 22)
- “Emulex CNA media specifications” (page 23)

Environmental specifications

Table 3 (page 22) lists the CNA environmental specifications.

Table 3 Environmental specifications

Environment	Minimum	Maximum
Operating temperature	0°C (32°F)	55°C (131°F)
Storage temperature	-40°C (-40°F)	70°C (158°F)
Relative humidity (non-condensing)	5%	85%
Airflow	150 lf/min (minimum)	N/A

Physical specifications

Table 4 (page 22) lists the physical specifications.

Table 4 Physical specifications

Parameter	Range
PCIe slot requirements	Minimum eight-lane PCI Express slot
Physical dimension	Low-profile form factor, 6.60 inches by 2.71 inches, and accommodates both the full-height and low-profile bracket
Power requirements	14.5 Watts typical
Agency approvals	<ul style="list-style-type: none">• Class 1 Laser Product per DHHS 21CFR (J) & EN60825-1• UL recognized to UL60950-1 2nd Edition• CUR recognized to CSA 22.2, No. 60950-1-07• TUV certified by to EN60950-1• FCC Rules, Part 15, Class A• Industry Canada, ICES-003, Class A• EMC Directives 2004/108/EEC (CE Mark) EN55022, Class A EN55024• Australian EMC Framework (C-Tick Mark) AS/NZS CISPR22:2006 Class A• Japan VCCI, Class A• Taiwan BSMI, Class A• Korea KCC, Class A• RoHS Compliant (Directive 2002/95/EC)• China RoHS compliant

Emulex CNA media specifications

The CNA does not ship with cable media. Select either the fiber optic or copper cabling option, and purchase the parts separately (see [Table 5 \(page 23\)](#)).

Table 5 Fiber optic and copper cabling parts

Media type	Supported media
Supported SFP+ optical media	<ul style="list-style-type: none">• HP BLc 10Gb SR SFP+ (part number 455883-B21)
Supported copper media for connection to B-series switches	<ul style="list-style-type: none">• HP 1m B-series Active Copper SFP+ Cable (part number AP818A)• HP 3m B-series Active Copper SFP+ Cable (part number AP819A)• HP 5m B-series Active Copper SFP+ Cable (part number AP820A)
Supported copper media for connection to C-series switches	<ul style="list-style-type: none">• HP 3m C-series Passive Copper SFP+ Cable (part number AP784A)• HP 5m C-series Passive Copper SFP+ Cable (part number AP785A)• HP 7m C-series Active Copper SFP+ Cable (part number QK701A)• HP 10m C-series Active Copper SFP+ Cable (part number QK702A)
Supported copper media for connection to HP A5820X-14XG-SFP+ switches	<ul style="list-style-type: none">• HP X240 SFP+ SFP+ 0.65 m Direct Attach Cable (part number JD095B)• HP X240 SFP+ SFP+ 1.2 m Direct Attach Cable (part number JD096B)• HP X240 SFP+ SFP+ 3 m Direct Attach Cable (part number JD097B)



CAUTION: Take care not to plug optical cables into cages without transceivers in them.

NOTE: A CNA does not allow data transmission on either 10 Gb optical or copper link unless it is connected to a compatible optical or copper interface connection (that is, multimode to multimode). See the appropriate CN switch QuickSpec for the appropriate media supported by your switch.

B Regulatory compliance and safety

Laser device

All HP systems equipped with a laser device comply with safety standards, including International Electrotechnical Commission (IEC) 825. With specific regard to the laser, the equipment complies with laser product performance standards set by government agencies as a Class 1 laser product. The product does not emit hazardous light.

Laser safety warning



WARNING! To reduce the risk of exposure to hazardous radiation:

- Do not try to open the laser device enclosure. There are no user-serviceable components inside.
 - Do not operate controls, make adjustments, or perform procedures to the laser device other than those specified in this document.
 - Allow only HP-authorized service technicians to repair the laser device.
-

Certification and classification information

This product contains a laser internal to the fiber optic (FO) transceiver for connection to the Fibre Channel communications port.

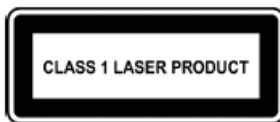
In the USA, the FO transceiver is certified as a Class 1 laser product conforming to the requirements contained in 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007.

Outside the USA, the FO transceiver is certified as a Class 1 laser product conforming to the requirements contained in IEC 825-1:1993 and EN 60825-1:1994, including Amendment 11:1996 and Amendment 2:2001.

Laser product label

The optional label in [Figure 16 \(page 24\)](#) or equivalent may be located on the surface of the HP-supplied laser device.

Figure 16 Class 1 laser product label



This optional label indicates that the product is classified as a CLASS 1 LASER PRODUCT. This label may appear on the laser device installed in your product.

Notice for North America (FCC & IC)

FCC Compliance Information Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense. Shielded cables must be used between this equipment and attached peripheral devices. The reader is cautioned that changes or modifications made to the equipment not expressly approved by Emulex could void the user's authority to operate this equipment. The above statement applies to products marketed in the USA.

International notices and statements

Canadian notice (avis Canadien)

Class A equipment

This class A digital apparatus meets all requirements of the Industry Canada (IC) Interference - Causing Equipment Standard (ICES- 003).

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada. This statement applies to products marketed in Canada.

European Union regulatory notice



Products bearing the CE marking comply with the following EU Directives:

- Low Voltage Directive 2006/95/EC
- EMC Directive 2004/108/EC
- Ecodesign Directive 2009/125/EC, where applicable

CE compliance of this product is valid if powered with the correct CE-marked AC adapter provided by HP.

Compliance with these directives implies conformity to applicable harmonized European standards (European Norms) that are listed in the EU Declaration of Conformity issued by HP for this product or product family and available (in English only) either within the product documentation or at the following website: <http://www.hp.eu/certificates> (enter the product number in the search field).

The compliance is indicated by one of the following conformity markings placed on the product:

 	For non-telecommunications products and for EU harmonized telecommunications products, such as Bluetooth® within power class below 10mW. For EU non-harmonized telecommunications products (if applicable, a 4-digit notified body number is inserted between CE and !).
--	---

Please refer to the regulatory label provided on the product. The point of contact for regulatory matters is:

Hewlett-Packard GmbH, Dept./MS: HQ-TRE, Herrenberger Strasse 140, 71034 Boeblingen, Germany.

Japanese notice

この装置は、クラス A 情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者は適切な対策を講ずるよう要求されることがあります。

VCCI-A

Korean notice

A급 기기 (업무용 방송통신기기)	이 기기는 업무용(A급)으로 전자파적합등록을 한 기기이오니 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정 외의 지역에서 사용하는 것을 목적으로 합니다.
-----------------------	---

Glossary

This glossary defines acronyms and terms used in this guide and is not a comprehensive glossary of computer terms.

B

BFS Boot from SAN.

C

CN Converged Network.

CNA Converged Network Adapter.

D

DSM Device Specific Module.

E

ESD Electrostatic discharge.

F

FC Fibre Channel. A comprehensive set of standards for concurrent communication among servers, storage systems, and peripheral devices.

FCoE Fibre Channel over Ethernet protocol.

Fibre Channel A serial data transport infrastructure and protocol used to implement SANs. See also <http://www.fibrechannel.org/> and <http://www.t11.org/>.

L

LC Lucent connector. An industry-standard connector for fiber optic cable connections.

M

MPIO Multipath I/O (Microsoft software).

S

SFP Small form-factor pluggable transceiver.

W

WWN World Wide Name. A unique identifier assigned to a Fibre Channel device.

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<http://www.luxmanual.com>

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<http://tv.somanuals.com>