Brocade 2-Port 10GbE Converged Network Adapter for IBM BladeCenter

Installation and User's Guide

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Installation and User's Guide

Note: Before using this information and the product it supports, read the warranty information provided with the product and general information in the “Notices” appendix of this guide.

Contents

Safety

Before installing this product, read the Safety Information.

قبل تركيب هذا المنتج، يجب قراءة الملاحظات الآمنية

Antes de instalar este produto, leia as Informações de Segurança

在安装本产品之前，请仔细阅读 Safety Information
(安全信息)。

安裝本產品之前，請先閱讀「安全資訊」。

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

Pred instalací tohoto produktu si prectete príru cku bezpecnostních instrukcí.

Læs sikkerhedsforskrifterne, før du installerer dette produkt.

Lees voordat u dit product installeert eerst de veiligheidsvoorschriften.

Ennen kuin asennat tämän tuotteen, lue turvaohjeet kohdasta Safety Information.

Avant d'installer ce produit, lisez les consignes de sécurité.

Vor der Installation dieses Produkts die Sicherheitshinweise lesen.

Πριν εγκαταστήσετε το προϊόν αυτό, διαβάστε τις πληροφορίες ασφάλειας (safety information).

.לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות

A termék telepítése előtt olvassa el a Biztonsági előírásokat!

Prima di installare questo prodotto, leggere le Informazioni sulla Sicurezza.

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

Пред да се инсталира овој продукт, прочитајте информацијата за безбедност.

Les sikkerhetsinformasjonen (Safety Information) før du installerer dette produktet.

Przed zainstalowaniem tego produktu, należy zapoznać się
z książką "Informacje dotyczące bezpieczeństwa" (Safety Information).

Antes de instalar este produto, leia as Informações sobre Segurança.

Перед установкой продукта прочтите инструкции по
технике безопасности.

Pred inštaláciou tohto zariadenia si pečítaje Bezpečnostné predpisy.

Pred namestitvijo tega proizvoda preberite Varnostne informacije.

Antes de instalar este producto, lea la información de seguridad.

Läs säkerhetsinformationen innan du installerar den här produkten.

Important:

Each caution and danger statement in this document is labeled with a number. This number is used to cross reference an English-language caution or danger statement with translated versions of the caution or danger statement in the Safety Information document.

For example, if a caution statement is labeled “Statement 1,” translations for that caution statement are in the Safety Information document under “Statement 1.”

Be sure to read all caution and danger statements in this document before you perform the procedures. Read any additional safety information that comes with the server or optional device before you install the device.

Statement 1:

DANGER

Electrical current from power, telephone, and communication cables is hazardous.

To avoid a shock hazard:

Do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.

Connect all power cords to a properly wired and grounded electrical outlet.

When possible, use one hand only to connect or disconnect signal cables.

Never turn on any equipment when there is evidence of fire, water, or structural damage.

Disconnect the attached power cords, telecommunications systems, networks, and modems before you open he device covers, unless instructed otherwise in the installation and configuration procedures.

Connect and disconnect cables as described in the following table when installing, moving, or opening covers on this product or attached devices.

To Connect:	To Disconnect:
1. Turn everything OFF.	1. Turn everything OFF.
2. First, attach all cables to devices.	2. First, remove power cords from outlet.
3. Attach signal cables to connectors.	3. Remove signal cables from connectors.
4. Attach power cords to outlet.	4. Remove all cables from devices.
5. Turn device ON.	

Statement 21:

CAUTION

Hazardous energy is present when the blade server is connected to the power source. Always replace the blade server-cover before installing the blade server. This device is intended for use only with UL Listed IBM BladeCenter units.

United Kingdom telecommunications safety requirement:

Notice to Customers

This apparatus is approved under approval number NS/G/1234/J/100003 for indirect connection to public telecommunication systems in the United Kingdom.

Chapter

1 Introduction

The Brocade 2-Port 10GbE Converged Network Adapter for IBM® BladeCenter® combines the functions of a Host Bus Adapter (HBA) and Network Interface Card (NIC) on one PCIe x8 card. This adapter fully supports FCoE protocols and allows Fibre Channel traffic to converge onto 10 Gbps Converged Enhanced Ethernet (CEE) networks. FCoE and 10 Gbps CEE operations run simultaneously.

The adapter has two configurable ports. Communication signals are routed from the blade server through the high-speed connector on the adapter to Ethernet and Fibre Channel switch modules installed in a BladeCenter chassis, such as a BladeCenter H, that has been configured with at least one Multi-Switch Interconnect Module for IBM BladeCenter (MSIM). Up to two MSIMs can be installed; one in I/O bays 7 and 8 and another in I/O bays 9 and 10. (For the latest compatibility information for BladeCenter and other IBM products, see http://www.ibm.com/servers/eserver/serverproven/compat/us/.)

For more about the design, architecture, and features of the adapter, see "Technology overview" on page 4 and "Features, specifications, and standards" on page 8.

Notes:

1. Unless otherwise stated, references to the Brocade 2-Port 10GbE Converged Network Adapter for IBM BladeCenter is also referred to throughout this document as the adapter or expansion card.
2. Unless otherwise stated, references to the blade server apply to all blade servers that support the I/O modules and adapter.
3. The illustrations in this document might differ slightly from your hardware.
4. This Installation and User's Guide contains the following instructions and information:
   - Installing the adapter in an IBM BladeCenter blade server.
   - Removing the adapter from a blade server.
   - Configuring the adapter.
   - Updating the firmware and device drivers of the adapter.
   - Using the Brocade BIOS Configuration utility, the Host Connectivity Manager (HCM), and Brocade Command Utility (BCU) to configure the adapter.
   - Performing basic troubleshooting tasks and solving problems with the adapter
   - Getting help, service, and technical assistance.

To support each I/O module that you install in the BladeCenter unit, you must also install a compatible expansion card or adapter in each blade server that you want to communicate with the I/O module. For installation details, see Chapter 2, "Installing and removing an adapter". For additional information about expansion cards and other BladeCenter components, see the BladeCenter documentation that comes with these devices.

The following illustration shows an example of a BladeCenter H unit with the I/O-module bays identified. For a list of supported BladeCenter units, see http://www.ibm.com/servers/eserver/serverproven/compat/us/.

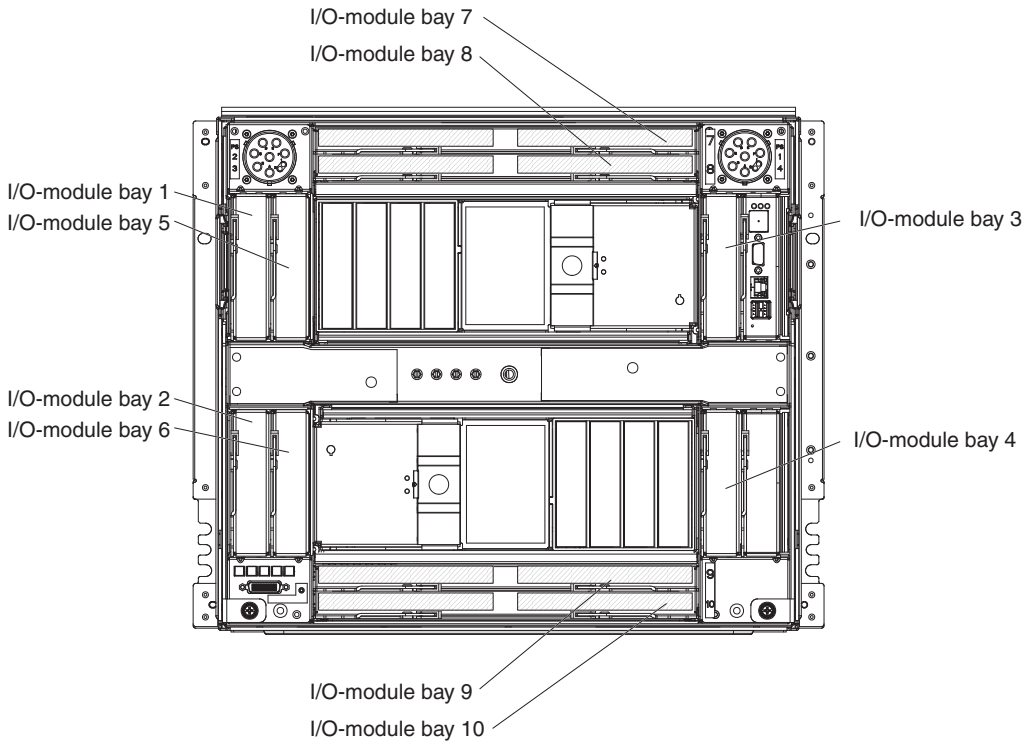


FIGURE 1 BladeCenter H unit with I/O module bays identified

If firmware and documentation updates are available, you can download them from the IBM Web site. To check for updates, complete the following steps.

1. Go to http://www.ibm.com/systems/support/.

2. Under **Product support**, click **BladeCenter**.

3. Under **Popular links**, click **Software** and **device drivers** for firmware updates, or click **Publications lookup** for documentation updates.

Changes are made periodically to the IBM Web site. Procedures for locating firmware and documentation might vary slightly from what is described in this document.

Notes:

- Any I/O modules that are installed in bay 8 and bay 10 of a Multi-Switch Interconnect Module for IBM BladeCenter (MSIM) must support Fibre Channel operation.
- Any I/O modules that are installed in bay 7 and bay 9 of an MSIM must support Ethernet operation: If you install the adapter into a IBM BladeCenter Storage Expansion Unit 3, the two 1GB Ethernet ports are not functional. Only the 8GB Fibre Channel ports are supported in this expansion unit.
- If your blade server supports concurrent Keyboard/Video/Mouse (cKVM) or modular flash drive optional devices, you can install these optional devices in the same blade server as the Brocade 2-Port 10GbE Converged Network Adapter for IBM BladeCenter. However, if the adapter has already been installed in the blade server and you plan to install the IBM

BladeCenter Concurrent KVM Feature Card or an optional modular flash drive in the blade server or remove these devices from the blade server, you must first remove the adapter from the blade server, as described in"Removing the high speed adapter from a blade server" on page 22.

For additional information, see the following documentation:

- The Installation and User's Guide for your blade server.
- The documentation that comes with the IBM BladeCenter Concurrent KVM Feature Card.
- The documentation that comes with the modular flash drive optional devices.

- At the time of this printing, the blade servers on the *Proven List* support the Brocade 2-Port 10GbE Converged Network Adapter for IBM BladeCenter: Access the *Proven List* at the following location.

  http://www-03.ibm.com/systems/info/x86servers/serverproven/compat/us/eserver.html

- Contact your IBM marketing representative or authorized reseller for information about the types of compatible BladeCenter units, blade servers, and optional devices for the I/O modules, BladeCenter units, and blade servers.

  See the following location for a list of supported BladeCenter units, blade servers, and optional devices for the I/O modules, BladeCenter units, and blade servers at the time of this printing.

  http://www-03.ibm.com/systems/info/x86servers/serverproven/compat/us/eserver.html

- For details about installation, configuration, and use of compatible devices, see the documentation that comes with these devices.
- This document might contain references or links to other companies' Web sites, also known as non-IBM Web sites. As of the date of this document, the addresses of non-IBM Web sites are correct. However, these addresses might be updated after this document has been published. Certain conditions apply to the use of non-IBM Web sites. For additional information, see Appendix C, "Notices".
- You can find detailed hardware and software information, including documentation, about IBM products at http://publib.boulder.ibm.com/infocenter/systems/index.jsp.
- You can find detailed hardware and software information, including documentation, about BladeCenter devices at http://publib.boulder.ibm.com/infocenter/systems/scope/blades/index.jsp or http://publib.boulder.ibm.com/infocenter/systems/scope/bladecenter/index.jsp.

You can obtain up-to-date information about your adapter and other IBM server products at http://www.ibm.com/systems/x/. You can obtain up-to-date information about compatible I/O modules and other IBM products at http://www.ibm.com/systems/support/.

At http://www.ibm.com/support/mysupport/, you can create a personalized support page by identifying IBM products that are of interest to you. From this personalized page, you can subscribe to weekly e-mail notifications about new technical documents, search for information and downloads, and access various administrative services.

This Installation and User's Guide and the most recent versions of other documents that provide detailed information about your BladeCenter unit, blade server, and available optional devices are provided in Portable Document Format (PDF) at http://www.ibm.com/systems/support/.

For service or assistance, see Appendix A, "Getting help and technical assistance".

Record information about the Brocade 2-Port 10GbE Converged Network Adapter for IBM BladeCenter in Table 1. You can find this information on the labels on the adapter. Register the adapter with IBM at http://www.ibm.com/support/mysupport/. The product name and serial number are required for registration.

TABLE 1 Product information

Product Name	**Brocade 2-Port 10GbE Converged Network Adapter for IBM BladeCenter**
Model Number	
Serial Number	

If you participate in the IBM client reference program, you can share information about your use of technology, best practices, and innovative solutions; build a professional network; and gain visibility for your business. For more information about the IBM client reference program, see http://www.ibm.com/ibm/clientreference/.

Technology overview

The Brocade 2-Port 10GbE Converged Network Adapter for IBM BladeCenter is a standard, compact-form-factor adapter whose architecture integrates both the Ethernet and Fibre Channel technologies in a single-card design, resulting in faster system processing and enhanced networking performance.

The adapter supports Ethernet and Fibre Channel networks and devices. Thus, this adapter is also known as a combo high-speed expansion card. The adapter uses FCoE to converge standard data and storage networking data onto a shared Ethernet link. Both Ethernet and Fibre Channel communications are routed through the CEE ports on the adapter to the BladeSystem midplane and onto I/O modules installed in the BladeCenter unit.

The Brocade 2-Port 10GbE Converged Network Adapter provides a connection to high-speed I/O-module bays 7 and 9 when used with a supported BladeCenter unit, such as a BladeCenter H. The BladeCenter unit must be configured with at least one High-Speed Switch Module for IBM BladeCenter (HSSM) to support the available switch modules.

A CFFh-expansion card, such as the Brocade 2-Port 10GbE Converged Network Adapter, can be used in combination with a CFFv-expansion card in a blade server, providing simultaneous connections to I/O-module bays 3 and 4, and the high-speed I/O-module bays in a BladeCenter chassis such as the BladeCenter H unit.

Fibre Channel technology is outlined in the SCSI-3 Fibre Channel Protocol (SCSI-FCP) standard. Fibre Channel is a high-speed data transport technology that is used for mass storage and networking.

By adding Fibre Channel expansion cards to the blade servers and Fibre Channel-compatible I/O modules to the BladeCenter unit, you can attach the blade server to an external storage area network (SAN) through the external 4 Gbps (Gigabits per second) or 8 Gbps optical ports on the I/O modules. Depending on the system configuration, the adapter provides up to 8 Gbps or 16 Gbps of full-duplex bandwidth per port.

Inventory checklist

Make sure that the shipping carton contains the following items:

- One Brocade 2-Port 10GbE Converged Network Adapter for IBM BladeCenter
- IBM Important Notices document
- IBM Warranty Information booklet
- The Documentation CD, which contains the following documents:
  - This Installation and User's Guide (this document)
  - IBM Environmental Notices and User Guide
  - IBM Warranty Information booklet
  - IBM Safety Information document (multilingual)

If any of these items are missing or damaged, contact your authorized reseller for replacement.

Related documentation

This *Installation and User's Guide* contains instructions for installing, removing, configuring, and troubleshooting the adapter. This document also contains information about updating the firmware and device drivers for the adapter. This document is included on the Documentation CD that comes with the adapter.

In addition to this *Installation and User's Guide*, the following IBM documents are available to help with the installation, configuration, and use of the other BladeCenter devices associated with the installation of the adapter.

- *IBM BladeCenter H Installation and User's Guide*

  This document includes the I/O-module bay locations in the BladeCenter H.

- *IBM BladeCenter blade server Installation and User's Guide*

  Each type of blade server has a customized Installation and User's Guide. This document includes server-specific expansion card installation requirements.

- *IBM BladeCenter Interoperability Guide*

  This document provides instructions to install the blade server in the interconnect module. For the latest version of this document, go to http://www.ibm.com/systems/support/ and search for "BladeCenter Interoperability Guide."

- *The Installation Guide or Installation and User's Guide for the I/O module installed in your BladeCenter*

  This document contains installation and configuration instructions for the I/O module.

- *IBM BladeCenter SAN Solutions Guide*

  This document provides user-oriented information about how the BladeCenter Fibre Channel optional devices are used to provide different SAN storage solutions for different application requirements.

- *IBM BladeCenter Fibre Channel I/O Interoperability Guide*

  This document provides detailed Fibre Channel I/O-module configuration data and step-by-step configuration procedures for integrating the BladeCenter unit into other vendor switch fabrics. Each vendor configuration includes an initial integration checklist, configuration limitations, supported I/O module and firmware versions, specific management-application operations, and a successful-integration checklist.The most recent versions of this and other BladeCenter documentation are at http://www.ibm.com/systems/support/.

The most recent versions of this and other BladeCenter documentation are at http://www.ibm.com/systems/support/.

Additionally, most BladeCenter documentation is now available from the IBM Systems Information Center. To access this information, complete the following steps.

1. Go to http://publib.boulder.ibm.com/infocenter/bladectr/documentation/index.jsp.
2. In the Contents pane, select **Combined IBM Systems Information**.
3. Select **Systems hardware**.
4. Select **BladeCenter information**.

The IBM Documentation CD

The *IBM Documentation CD* contains documentation for your BladeCenter product in Portable Document Format (PDF) and includes the IBM Documentation Browser to help you find information quickly.

Hardware and software requirements

You can run the *IBM Documentation CD* on any system that meets the hardware and software requirements.

The IBM Documentation CD requires the following minimum hardware and software:

- Microsoft® Windows® XP, Windows 2000, or Red Hat Linux®
- 100 MHz microprocessor v 32 MB of RAM
- Adobe® Acrobat Reader 3.0 (or later) or xpdf, which comes with Linux operating systems

Using the Documentation Browser

Use the Documentation Browser to browse the contents of the CD, read brief descriptions of the documents, and view documents, using Adobe Acrobat Reader or xpdf. The Documentation Browser automatically detects the regional settings in use in your system and displays the documents in the language for that region (if available). If a document is not available in the language for that region, the English-language version is displayed.

Use one of the following procedures to start the Documentation Browser:

- If Autostart is enabled, insert the CD into the CD or DVD drive. The Documentation Browser starts automatically.
- If Autostart is disabled or is not enabled for all users, use one of the following procedures:
  - If you are using a Windows operating system, insert the CD into the CD drive and click **Start –> Run**. In the **Open** field, type

    ```
    e:\win32.bat
    ```

    where *e* is the drive letter of the CD or DVD drive, and click **OK**.
  - If you are using Red Hat Linux, insert the CD into the CD or DVD drive; then, run the following command from the /mnt/cdrom directory:

    ```
    sh runlinux.sh
    ```

Select your BladeCenter product from the **Product** menu. The **Available Topics** list displays all the documents for your BladeCenter product. Some documents might be in folders. A plus sign (+) indicates each folder or document that has additional documents under it. Click the plus sign to display the additional documents.

When you select a document, a description of the document is displayed under **Topic Description**. To select more than one document, press and hold the Ctrl key while you select the documents. Click **View Book** to view the selected document or documents in Acrobat Reader or xpdf. If you selected more than one document, all the selected documents are opened in Acrobat Reader or xpdf.

To search all the documents, type a word or word string in the **Search** field and click **Search**. The documents in which the word or word string appears are listed in order of the most occurrences. Click a document to view it, and press Crtl+F to use the Acrobat search function, or press Alt+F to use the xpdf search function within the document.

Click **Help** for detailed information about using the Documentation Browser.

Notices and statements in this document

The caution and danger statements in this document are also in the multilingual *Safety Information* document, which is on the *IBM Documentation CD*. Each statement is numbered for reference to the corresponding statement in your language in the *Safety Information* document.

The following notices and statements are used in this document:

- **Note:** These notices provide important tips, guidance, or advice.
- **Important:** These notices provide information or advice that might help you avoid inconvenient or problem situations.
- **Attention:** These notices indicate possible damage to programs, devices, or data. An attention notice is placed just before the instruction or situation in which damage might occur.
- **Caution:** These statements indicate situations that can be potentially hazardous to you. A caution statement is placed just before the description of a potentially hazardous procedure step or situation.
- **Danger:** These statements indicate situations that can be potentially lethal or extremely hazardous to you. A danger statement is placed just before the description of a potentially lethal or extremely hazardous procedure step or situation.

Features, specifications, and standards

This adapter supports the following features for enhanced performance and connectivity in the SAN and Ethernet networks:

- BIOS support:
  - x86 and x64 Basic Input/Output System (BIOS)
  - Unified Extensible Firmware Interface (UEFI)
  - PCI BIOS 2.1 or later
- Brocade Host Connectivity Manager (HCM) device management and Brocade Command Line Utility (BCU) tools.
- Hyper-V consolidates multiple server roles as separate virtual machines (VMs) using the Windows Server 2008 operating system and provides integrated management tools to manage both physical and virtual resources.
- Management APIs for integration with Brocade Data Center Fabric Manager (DCFM) and other management frameworks.
- PCIe interface with eight lanes. The adapter operates in Gen 1 and Gen 2 server connectors that have the following specifications per lane:
  - PCIe Gen 2 connector. Transfer rate of 5 Gigatransfers per second (GT/s) per lane. Data rate of 500 MBps per lane.
  - PCIe Gen 1 connector. Transfer rate of 2.5 GT/s per lane. Data rate of 250 MBps per lane.
- Plug-n-play and power management for all supported operating systems.
- RoHS-6.
- Storage Management Initiative Specification (SMI-S).

  Specification supporting the Common Information Model (CIM) Provider, which allows any standard Common Information Model (CIM) and SMI-S based management software to manage installed Brocade adapters.

  NOTE
  Although SMI-S Provider and CIM Provider may be used interchangeably, CIM is the more generic term, while SMI-S is storage-specific.

- Switch fabric topology - The Brocade 2-Port 10GbE Converged Network Adapter connects to an FCoE switch through its 10 GbE ports.
- Windows Management Implementation (WMI).
- Windows Preinstallation Environment (WinPE), a minimal operating system with limited services for Windows Server or Windows Vista used for unattended deployment of workstations and servers. WinPE is designed for use as a standalone preinstallation environment and as a component of other setup and recovery technologies. WinPE is supported by Brocade Windows 2008 adapter drivers.
- Windows Server 2003, Windows Server 2008, RedHat Enterprise Linux (RHEL), SUSE Linux Enterprise (SLES), and VMware ESX Server.
- Windows Server Core, a minimal server option for Windows Server 2008 operating systems that provides a low-maintenance server environment with limited functionality. All configuration and maintenance is done through command line interface windows or by connecting to a system remotely through a management application. Windows Server Core is supported by Windows Server 2008 adapter drivers.

FCoE features

The Brocade 2-Port 10GbE Converged Network Adaptersupport the following Fibre Channel over Ethernet (FCoE) features:

- 500,000 IOPS per port for maximum IO transfer rates.
- 10 Gbps throughput per port full duplex
- Target rate limiting. You can enable or disable this feature on specific ports. Target Rate Limiting relies on the storage driver to determine the speed capability of a discovered remote ports, then uses this information to throttle FCP traffic rate to slow-draining targets. This reduces or eliminates network congestion and alleviates I/O slowdowns at faster targets.

  Target rate limiting is enforced on all targets that are operating at a speed lower than that of the target with the highest speed. If the driver is unable to determine a remote port's speed, 1 Gbps is assumed. Target Rate Limiting protects only FCP write traffic.
- N_Port ID Virtualization (NPIV). This allows multiple N_Ports to share a single physical N_Port. This allows multiple Fibre Channel initiators to occupy a single physical port and reduce SAN hardware requirements.
- Boot over SAN. This feature provides the ability to boot the host operating system from a boot device located somewhere on the SAN instead of the host's local disk or direct attached storage. Specifically, this "boot device" is a logical unit number (LUN) located on a storage device.
- Fabric-based boot LUN discovery, a feature that allows the host to obtain boot LUN information from the fabric zone database. Fabric OS 6.2 is required on adjacent switches to support this feature.
- Persistent binding. This enables you to permanently assign a system SCSI target ID to a specific Fibre Channel device.
- Fibre Channel-Security Protocol (FC-SP) providing device authentication through key management.
- FCoE Initialization Protocol (FIP) support for the following:
  - FIP 2.0
  - preFIP and FIP 1.03
  - FIP Discovery protocol for dynamic FCF discovery and FCoE link management.
  - FPMA FIP fabric login.
  - FIP VLAN discovery.
  - FIP discovery solicitation and FCP discovery.
  - Login (FIP and FCoE).
  - FIP link down handling.
  - FIP version compatibility.
  - FIP keep alive
  - FIP clear virtual links

NOTE
The Brocade 2-Port 10GbE Converged Network Adapter FIP logic automatically adapts to the adequate FIP version and preFIP to enable backward compatibility.

- Interrupt Coalescing

  This feature provides a method to delay generation of host interrupts and thereby combine (coalesce) processing of multiple events. This reduces the interrupt processing rate and reduces the time that the CPU spends on context switching. You can configure the following parameters per port to adjust interrupt coalescing:

  - Interrupt time delay. There is a time delay during which the host generates interrupts. You can increase this delay time and thereby coalesce multiple interrupts events into one. This results in fewer interrupts for interrupt events.
  - Interrupt latency timer. An interrupt is generated when no new reply message requests occur after a specific time period. You can adjust this time period and thereby minimize I/O latency.

CEE and networking features

The Brocade 2-Port 10GbE Converged Network Adapter supports the following features for Converged Enhanced Ethernet (CEE):

- 10 Gbps throughput per port full duplex
- 1500 or 9600 byte (Jumbo) frames

  These frames allow data to be transferred with less effort, reduces CPU utilization, and increases throughput. Mini-jumbo frames are required to encapsulate FCoE frames on CEE. Network administrators can change the jumbo packet size from the default setting using host operating system commands as described in the “Adapter Configuration” appendix in the *Brocade Adapters Installation and Reference Manual.* Note that the MTU size refers to the MTU for network configuration only. Internally, hardware will always be configured to support FCoE frames that require mini-Jumbo size frames.

  NOTE
  The jumbo frame size set for the network driver cannot be greater than the setting on the attached FCoE switch or the switch cannot accept jumbo frames.

- Checksum/CRC offloads for FCoE packets, IPv4/IPv6 TCP and UDP packets, and IPv4 header.

  The checksum offload supports Checksum offloads for TCP & UDP packets and IPv4 header. This enables the adapter to compute the checksum, which saves host CPU cycles. The CPU utilization savings for TCP checksum offload can range from few percent with MTU of 1500, and up to 10-15% for MTU of 9000. The greatest savings are provided for larger packets.

- Data Center Bridging Capability Exchange Protocol (DCBCXP) (802.1)

  Used between adapter and FCoE switch to exchange configuration with directly connected peers. DCBCXP uses LLDP to exchange parameters between two link peers.

- Enhanced transmission selection (802.1Qaz)

  Provides guidelines for creating priority groups to enable guaranteed bandwidth per group. More important storage data traffic can be assigned higher priority and guaranteed bandwidth so it is not stalled by less-important traffic.

- Ethernet flow control

  Ethernet flow control is a mechanism for managing data transmission between two network nodes to prevent a fast sender from over running a slow receiver. When an overwhelmed receiver generates a PAUSE frame, this halts transmission for a specified period of time.Traffic resumes when time specified in the frame expires or PAUSE zero is received.

- Flexible MAC address
- Header data split (HDS) feature for advanced link layer

  Enables Network Driver Interface Specification (NDIS) miniport to split incoming packets into header and data payload, which are mapped to two or more memory descriptor lists. Increases system performance through intelligent cache management.

- Intermediate driver

  This provides support for teaming and for multiple VLANs on Windows systems. You can install this driver with other adapter software.

- Link aggregation (NIC teaming)

  A network interface "team" is a collection of physical Ethernet interfaces (adapter ports) acting a single interface. Teaming overcomes problems with bandwidth limitation and redundancy often associated with Ethernet connections. Combining (aggregating) ports can increase the link speed beyond the limits of one port and provide redundancy. You can team up to eight ports across multiple adapters in three modes: failover, failback, or 802.3ad.

  - Failover mode provides fault tolerance. Only one port in a team is active at a time (primary port), and the others are in standby mode. If the primary port goes down, a secondary port is chosen using a round-robin algorithm as the next primary. This port continues to be primary, even if the original primary port returns.
  - Failback mode is an extension of the Failover mode. In addition to the events that occur during a normal failover, if the original primary port comes back up, that port again becomes the primary port.
  - 802.3ad is an IEEE specification that includes Link Aggregation Control Protocol (LACP) as a method to control how several physical ports bundle to form a single logical channel. LACP allows a network device to negotiate automatic bundling of links by sending LACP packets to the peer (a device directly connected to a device that also implements LACP). This mode provides larger bandwidth in fault tolerance.

  Configuration is required on the switch for NIC teaming to function.

  Be aware when configuring ports for teaming that converged FCoE and network traffic is not supported on ports that participate in an IEEE 802.3ad-based team. This must be enforced by the user as there is no mechanism to control this in the software.

- Interrupt coalescing

  To avoid flooding the host system with too many interrupts, this allows the system to reduce the number of interrupts generated by generating a single interrupt for multiple packets. Increasing the "coalescing timer" should lower the interrupt count and lessen CPU utilization.

- Interrupt moderation

  Implements dynamic selection interrupt coalescing values based on traffic and system load profiles. Traffic is continuously monitored to place in categories between “high throughput sensitive” and “high latency sensitive.” Similarly, the host system is monitored regularly to place it in categories between “highly loaded” and “minimally loaded.” The driver dynamically selects interrupt coalescing values based on this profiling.

- MSI-X

  This is an extended version of Message Signaled Interrupts (MSI), defined in the PCI 3.0 specification. MSI-X helps improve overall system performance by contributing to lower interrupt latency and improved utilization of the host CPU. MSI-X is supported by Linux RHEL5, SLES 10 and 11, Windows 2008, and VMware ESX Server 3.5 and 4.0.

- Network Priority

  The Brocade 2-Port 10GbE Converged Network Adapter supports this feature, which provides a mechanism to enable CEE flow control (802.1Qbb Priority-based Flow Control: Pause 802.1p) on network traffic. In addition, it guarantees mutual exclusion of FCoE and network priorities to ensure proper enhanced transmission selection (ETS). This feature is not supported on HBAs.

  This feature does not need to be enabled on the adapter or switch. Specific CEE attributes, including priorities for FCoE traffic, are configured on the FCoE switch. These attributes propagate to the adapter CEE port through the DCBCXP. adapter firmware processes this information and derives priorities for network traffic. The network driver is notified of the network priority and tags both FCoE and Network frames with their priorities.

- Priority-based flow control (802.1Qbb)

  Defines eight priority levels to allow eight independent lossless virtual lanes. Pauses traffic based on the priority levels and restarts traffic through a high-level pause algorithm.

- Receive side scaling (RSS) feature for advanced link layer

  Enables receive processing to be balanced across multiple processors while maintaining in-order delivery of data, parallel execution, and dynamic load balancing.

- TCP segmentation offload (TSO) and large send offload (LSO)

  Large chunks of data must be segmented to smaller segments to pass through network elements. LSO increases outbound throughput by reducing CPU overhead. Offloading to the network card, where segmentation can be done by the Transmission Control Protocol (TCP), is called TCP segmentation.

- Virtual function-level statistics
- VLAN (802.1Q)

  A Virtual LAN (VLAN) is a way to provide segmentation of an Ethernet network. A VLAN is a group of hosts with a common set of requirements that communicate as if they were attached to the same LAN segment, regardless of their physical location. A VLAN has the same attributes as a physical LAN, but it allows for end stations to be logically grouped together.

- VLAN filtering and tagging

  A mechanism that allows multiple networks to transparently share the same physical network link without leakage of information between networks. Switches are configured to insert an appropriate VLAN tag into all data frames arriving from devices in a given VLAN. After the frames are switched, the VLAN tag is stripped before the frame is sent back to the devices. In this way, traffic from devices in one VLAN cannot be leaked to another VLAN.

- VMware NetQueue

  Improves performance in 10 GbE virtualized environments. Requires MSI-X support on host system.

Adapter specifications

Table 2 contains additional specifications for the adapter.

TABLE 2 Additional adapter specifications

Feature	Description
Port speeds	10.312 Gbps
ASIC	• Provides the FCoE functionality for the Brocade 2-Port 10GbE Converged Network Adapter. • Two on-board processors, each operating at 400 MHz, which coordinate and process data in both directions.
External serial FLASH memory	• Stores firmware and adapter BIOS code • 4 MB capacity
Data transfer rate	10.312 Gbps full-duplex
Performance per port	500,000 IOPs (maximum)
Power dissipation	10 W maximum
Dimensions	4.9 in. by 0.5 in. by 6.3 in. (12.44 cm by 1.27 cm by 16 cm)

TABLE 2 Additional adapter specifications

Feature	Description
Topology	10 Gbps CEE
Supported Ethernet protocols and features	• 803.3ae (10 Gbps Ethernet) • 802.1q (VLAN) • 802.1Qaz (enhanced transmission selection) • 802.1Qbb (priority flow control) • 802.1AB (Link Layer Discovery Protocol) • 802.3ad (link aggregation) • 802.1p (priority encoding) • 802.3x (Ethernet flow control) • 802.3ap (KX/KX4) • 802.3ak (CX4) • EEE 1149.1 (JTAG) for manufacturing debug and diagnostics. • IPv4 Specification (RFC 791) • IPv6 Specification (RFC 2460) • TCP/UDP Specification (RFC 793/768) • ARP Specification (RFC 826) • DCB Capability Exchange Protocol 802.1 (DCBCXP) • DCBX protocol 1.0 and 1.1 • RSS with support for IPV4TCP, IPV4, IPV6TCP, IPV6 hash types • HDS (header-data split) • Syslog • Jumbo frames • Interrupt coalescing • Interrupt moderation • Network Priority • VLAN Discovery using proprietary logic • VLAN discovery for untagged/priority-tagged FIP frames • LKA (Link Keep Alive) protocol

Supported FCoE protocols and features	• preFIP, FIP 1.03, and FIP 2.0 (FC-BB5 rev. 2 compliant)
	  • FIP discovery protocol for dynamic FCF discovery and FCoE link management.
	  • FPMA and SPMA type FIP fabric login.
	• FCP3 - initiator mode only
	• FC-SP authentication
	• SCSI SBC-3
	• NPIV
	• IP-over-FC
	• Target rate limiting
	• Boot Over SAN
	• Fabric-Based Boot LUN Discovery
	• Persistent binding
	• I/O interrupt coalescing and moderation

Other features	• ASIC Flip-flops Parity Protected • T10 Data CRC • ECC Memory Parity Protected

WoL and SoL limitations

The following defines limitations of support for Wake on LAN (WoL) and Serial over LAN (SoL) for the Brocade 2-Port 10GbE Converged Network Adapter for IBM BladeCenter:

- WoL. The adapter does not support WoL over its 10GbE links. WoL is supported using the IBM BladeCenter 1GbE NIC included on the IBM server blades.
- SoL. The adapter does not support SoL over its 10GbE links. SoL is supported using the IBM 1GbE NIC included on the IBM server blades.

For more information

For more information on the Brocade 2-Port 10GbE Converged Network Adapter for IBM BladeCenter, refer to the B*rocade Adapters Installation and Reference Manual* located on the following link:

http://www.brocade.com/sites/dotcom/services-support/drivers-downloads/CNA/IBM.page

See the following chapters and information:

- Introduction chapter

  This chapter provides detailed information on hardware and software features, driver packages, boot installation packages, and operating system support.

- Specifications chapter

  This chapter provides complete hardware specifications, including environmental and power information.

1 For more information

Chapter

2

Installing and removing an adapter

This chapter provides information about and instructions for installing an adapter in a blade server or storage-expansion unit, and removing an adapter from a blade server or storage-expansion unit.

In this document, the descriptions and illustrations of the adapter installation and removal procedures pertain to installing the adapter on a blade server system board and removing the adapter from a blade server system board. The procedures for installing the adapter in a storage-expansion unit and removing the adapter from a storage-expansion unit are similar to the procedures for installing the adapter on a blade server system board and removing the adapter from a blade server system board. Your blade server or storage-expansion unit might be different from the devices that appear in the illustrations in this document. For additional information, see the documentation that comes with your blade server or storage-expansion unit.

To support each I/O module that you install in the BladeCenter unit, you must also install a compatible adapter, such as an Ethernet or Fibre Channel expansion card, in each blade server that you want to communicate with the I/O module. The Brocade 2-Port 10Gb Converged Network adapter for IBM BladeCenter is compatible with various types of I/O modules, including the following devices:

- IBM10Gb Intelligent Pass-thru Module for IBM BladeCenter
- IBM 10Gb Ethernet Switch Blade for IBM BladeCenter

NOTE
For detailed information about I/O modules, see the Installation and User's Guide and other documents that come with compatible I/O modules.

The maximum number of adapters that you can install in the BladeCenter unit varies according to the type of BladeCenter unit that you are using, because each type of BladeCenter unit supports a different number of blade servers. You can install one adapter per blade server.

Notes:

- The Brocade 2-Port 10Gb Converged Network Adapter can only be used in blades that allow one CFFh and one CFFv/CIOv option card.
- For the locations of the BladeCenter unit I/O-module bays, see Chapter 1, "Introduction".
- The blade servers or BladeCenter units that are described or shown in this document might be different from your blade server or BladeCenter unit. For additional information, see the documentation that comes with your blade server or BladeCenter unit.
- Contact your IBM marketing representative or authorized reseller for information about the types of compatible BladeCenter units, blade servers, I/O modules, and optional devices for the I/O modules, BladeCenter units, and blade servers.

  See http://www.ibm.com/servers/eserver/serverproven/compat/us/ for a list of supported BladeCenter units, blade servers, I/O modules, and optional devices for the I/O modules, BladeCenter units, and blade servers.

  For details about installation, configuration, and use of compatible devices, see the documentation that comes with these devices.

- Configuration requirements for expansion cards, blade servers, and the BladeCenter unit might vary. You can obtain up-to-date information about these devices at http://www.ibm.com/systems/bladecenter/.

The Brocade 2-Port 10Gb Converged Network adapter for IBM BladeCenter supports Ethernet and Fibre Channel networks and devices. Before you install this high speed expanson card into a blade server, review the information about the BladeCenter I/O-module information in the following table. For additional information, see "Technology overview" on page 4.

TABLE 3 High speed connections to adapter ports

BladeCenter unit I/O-module bays	adapter support	adapter card ports
7 (upper left interconnect-module bay) 7 – Supports an HSSM that supports CEE/FCoE traffic	Ethernet	1
9 (lower left interconnect-module bay) 9 – Supports an HSSM that supports CEE/FCoE traffic	Ethernet	3

See the following BladeCenter documentation for additional information. These documents are described in "Related documentation" on page 5.

- The *Installation and User's Guide* for your blade server or storage-expansion unit
- The *Installation Guide* for your BladeCenter unit
- The *Installation and User's Guide* or *Installation Guide* for your I/O module.
- The *Multi-Switch Interconnect Module for IBM BladeCenter Installation and User's Guide*

Installation guidelines

Before you install the Brocade 2-Port 10Gb Converged Network Adapter in the blade server or storage-expansion unit or the blade server in the BladeCenter unit, read the following information:

- Read the Safety information that begins on page vii, "Handling static-sensitive devices" on page 19, and the safety statements in the BladeCenter unit documentation. This information will help you work safely.
- Observe good housekeeping in the area where you are working. Place removed covers and other parts in a safe place.
- Blue on a component indicates touch points, where you can grip the component to remove it from or install it in the blade server or BladeCenter unit, open or close a latch, and so on.
- Orange on a component or an orange label on or near a component on the high speed adapter, blade server, or BladeCenter unit indicates that the component can be hot-swapped, which means that if the BladeCenter unit and operating system support hot-swap capability, you can remove or install the component while the BladeCenter unit is running. (Orange can also indicate touch points on hot-swap components.) See the instructions for removing or installing a specific hot-swap component for any additional procedures that you might have to perform before you remove or install the component.
- You do not have to turn off the BladeCenter unit to install or replace any of the hot-swap modules on the front or rear of the BladeCenter unit.
- When you are finished working on the blade server or BladeCenter unit, reinstall all safety shields, guards, labels, and ground wires.

- Make sure that you are using the latest versions of device drivers, firmware, and BIOS for your blade server, management module, and I/O modules that are used by the high speed adapter. See http://www.ibm.com/systems/support/ for the latest information about upgrading the device drivers and firmware for BladeCenter components. See the latest instructions in the documentation that comes with the updates.
- For a list of supported optional devices for the BladeCenter unit and other IBM products, see http://www.ibm.com/servers/eserver/serverproven/compat/us/.
- If your blade server supports Concurrent KVM (cKVM) or modular flash drive optional devices, you can install these optional devices in the same blade server as the Brocade 2-Port 10Gb Converged Network adapter for IBM BladeCenter. However, if the high speed adapter has already been installed in the blade server and you plan to install the IBM BladeCenter Concurrent KVM Feature Card or an optional modular flash drive in the blade server or remove these devices from the blade server, you must first remove the high speed adapter from the blade server, as described in "Removing the high speed adapter from a blade server" on page 22.

System reliability guidelines

To help ensure proper cooling, performance, and system reliability, make sure that the following requirements are met:

- Each of the module bays on the rear of the BladeCenter unit contains either a module or a filler module.
- A removed hot-swap module is replaced with an identical module or filler module within 1 minute of removal.
- A removed hot-swap blade server is replaced with another blade server or filler blade within 1 minute of removal.
- The ventilation areas on the sides of the blade server are not blocked.
- You have followed the reliability guidelines in the documentation that comes with the BladeCenter unit. Cables are not required for the high speed adapter. If you must install cables for other BladeCenter optional devices, see the *IBM Configuration and Options Guide* at http://www.ibm.com/servers/eserver/xseries/cog/. If you must install cables for BladeCenter components, see the cable-routing information in the documentation that comes with the BladeCenter components and the cables.

Handling static-sensitive devices

Attention: Static electricity can damage the BladeCenter unit and other electronic devices. To avoid damage, keep static-sensitive devices in their static-protective packages until you are ready to install them.

To reduce the possibility of electrostatic discharge, observe the following precautions:

- Limit your movement. Movement can cause static electricity to build up around you.
- Handle the device carefully, holding it by its edges or its frame.
- Do not touch solder joints, pins, or exposed printed circuitry.
- Do not leave the device where others can handle and damage it.

- While the device is still in its static-protective package, touch it to an unpainted metal surface of the BladeCenter unit chassis or an unpainted metal surface on any other grounded rack component in the rack that you are installing the device in for at least 2 seconds. This drains static electricity from the package and from your body.
- Remove the device from its package and install it directly into the BladeCenter unit without setting down the device. If it is necessary to set down the device, put it back into its static-protective package. Do not place the device on the BladeCenter unit or on a metal surface.
- Take additional care when you handle devices during cold weather. Heating reduces indoor humidity and increases static electricity.
- Some types of BladeCenter units come with electrostatic discharge (ESD) connectors. If the BladeCenter unit is equipped with an ESD connector, see the documentation that comes with the BladeCenter unit for using the ESD connector.

Installing the high speed adapter in a blade server

To install the high speed adapter in a blade server or storage-expansion unit, complete the following steps:

1. Read the “Safety” on page vii and “Installation guidelines” on page 18.
2. Turn off the blade server, if you have not already done so.
3. If the blade server is installed in the BladeCenter unit, remove it. (For instructions, see the documentation that comes with your BladeCenter unit.)
4. Carefully place the blade server on a flat, static-protective surface.
5. Remove the cover from the blade server or storage-expansion unit. For instructions, see the Installation and User's Guide that comes with your blade server or storage-expansion unit and the documentation that comes with your BladeCenter unit.
6. If you have not already done so, touch the static-protective package that contains the high speed adapter to any unpainted metal surface of the BladeCenter unit or any unpainted metal surface on any other grounded rack-component for at least 2 seconds.
7. Remove the new high speed adapter from its static-protective package.
8. Locate the expansion-card connectors on the system board in the blade server, as shown in Figure 2 on page 21.
9. If you have not already done so, check for check for protective covers over the connectors on the underside of the high speed adapter and over the system-board blade-expansion connector.
    - If there are protective covers over the connectors on the underside of the high speed adapter, remove them.
    - If there is a protective cover over the system-board blade-expansion connector, also known as the PCI Express expansion-card connector on the system board, remove the protective cover. The protective cover contains the words “BLADE EXPANSION.” In Figure 2 on page 21 the PCI Express connector is the large rectangular expansion-card connector on the right side of the system board. This connector is indicated by the down arrow immediately above it.

10. Align the high speed adapter over the system board in the blade server, as shown in Figure 2, so that the expansion-card connectors on the reverse side of the high speed adapter are correctly aligned above the matching expansion-card connectors on the system board in the blade server.
11. Install the high speed adapter as shown in Figure 2.
    a. Make sure that the card-guide holes are aligned.
    b. At an angle, slide the card into the mounting posts that are shown in Figure 2. Then, gently pivot the card into the expansion-card connectors.
    c. To correctly seat the high speed adapter in the blade server, press down firmly on the high speed adapter.

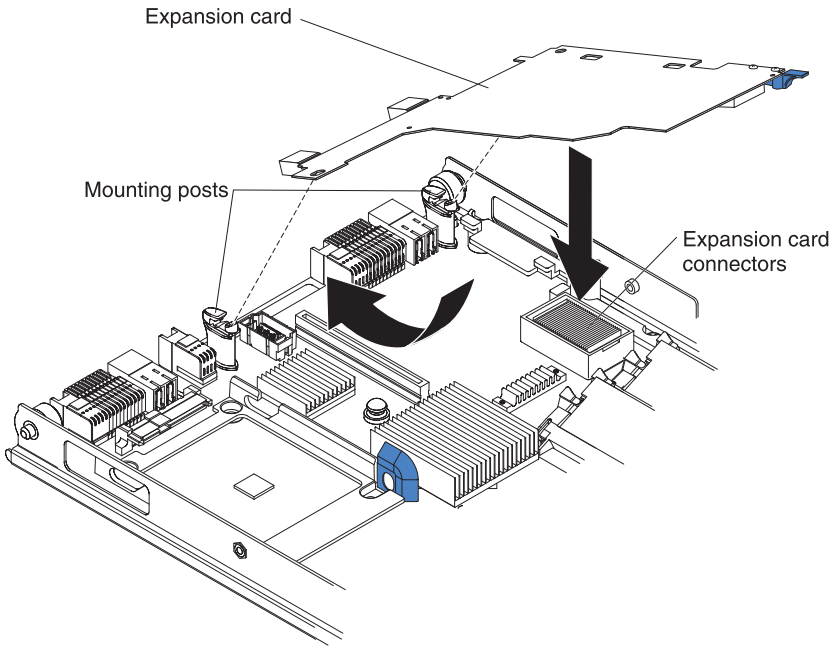


FIGURE 2 Installing the Brocade 2-Port 10Gb Converged Network adapter for IBM BladeCenter in a blade server

12. Make sure that you are using the latest versions of device drivers, utilities, firmware code, and BIOS code for the high speed adapter, your blade server, the management module, and the I/O modules that are used by the high speed adapter. If these items are not current, the BladeCenter unit might not recognize the high speed adapter and might not turn it on.

    If necessary, install the latest versions of device drivers, utilities, firmware code, and BIOS code for the previously listed devices.

    To download the most recent driver packages, utilities, boot code, and documentation for the Brocade 2-Port 10Gb Converged Network Adapter, go to the following location: http://www.brocade.com/sites/dotcom/services-support/drivers-downloads/CNA/IBM.page.

    For the latest information about upgrading device drivers, firmware, and BIOS code for other BladeCenter components, go to http://www.ibm.com/systems/support. The instructions are in the documentation that comes with the updates. Also see the *Installation and User's Guide* for your blade server for additional information.

13. Reinstall the cover on the blade server or storage-expansion unit. For instructions, see the *Installation and User's Guide* that comes with your blade server or storage-expansion unit, and the documentation that comes with your BladeCenter unit.
14. Reinstall the blade server in the BladeCenter unit. For instructions, see the documentation that comes with your BladeCenter unit. Turn on the blade server, and continue with your BladeCenter system activities.

Configuring a command session

After you install the high speed adapter, turn on the blade server; then, use the following list to determine how to set up a command session:

- If the blade server supports local console connection through the management-module switch control of the keyboard/video/mouse (KVM) to the blade server, see the *Installation and User's Guide* for the blade server for instructions.
- If the blade server does not support local console connection, see the *Installation and User's Guide* for the blade server for instructions for setting up a command session with the blade server

Removing the high speed adapter from a blade server

To remove the high speed adapter from a blade server or storage-expansion unit, complete the following steps:

1. Read the safety information that begins on page vii and "Installation guidelines" on page 18.
2. Turn off the blade server, if you have not already done so.
3. If the blade server is installed in the BladeCenter unit, remove it (see the documentation that comes with your BladeCenter unit for instructions).
4. Carefully place the blade server on a flat, static-protective surface.
5. Remove the cover from the blade server or storage-expansion unit. For instructions, see the *Installation and User's Guide* that comes with your blade server or storage-expansion unit and the documentation that comes with your BladeCenter unit.

   Attention: To prevent damage to the connectors on the system board and the high speed adapter, carefully perform the following steps.
6. Remove the high speed adapter, as shown in Figure 3 on page 23:
   a. Rotate the handle on the high speed adapter labeled "RELEASE ONLY" to the vertical position, while you gently pull upward on the edge of the high speed adapter near the "Press to Install" label.
   b. At an angle, slide the high speed adapter out of the mounting posts.
   c. Gently lift the high speed adapter straight up and out of the blade server.

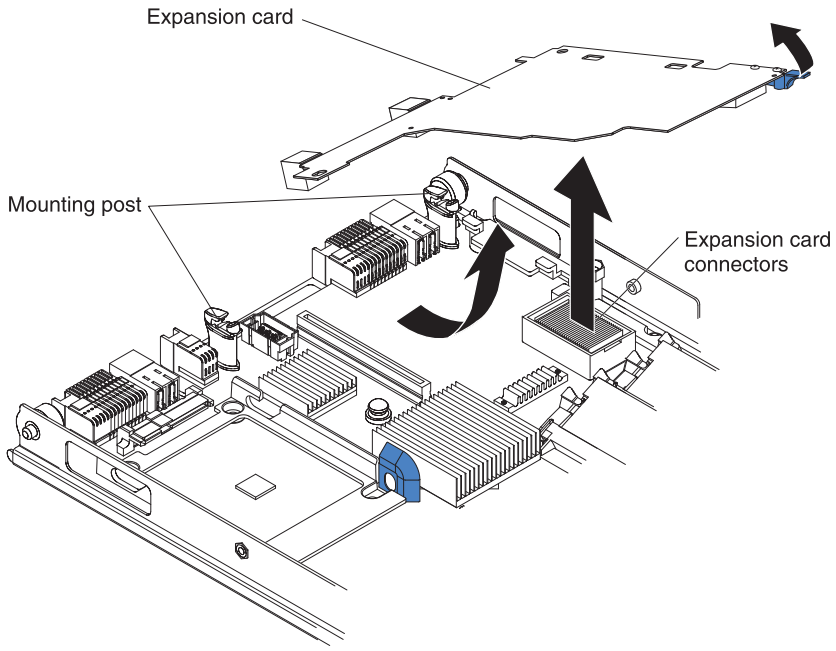


FIGURE 3 **Removing the Brocade 2-Port 10Gb Converged Network adapter for IBM BladeCenter from a blade server**

7. If you are replacing the high speed adapter, follow the installation instructions in step 6 on page 20 through step 12 on page 21. If you are not replacing the high speed adapter, continue with step 8.
8. Reinstall the cover on the blade server or storage-expansion unit. For instructions, see the *Installation and User's Guide* that comes with your blade server or storage-expansion unit, and the documentation that comes with your BladeCenter unit.
9. Reinstall the blade server in the BladeCenter unit. For instructions, see the documentation that comes with your BladeCenter unit. Turn on the blade server, and continue with your BladeCenter system activities.

Chapter

Updating the boot code and installing device drivers 3

After you install the Brocade 2-Port 10Gb Converged Network Adapter, make sure that the latest boot code is installed; then, install the device drivers.

Notes:

1. The supported operating systems vary, depending on the types of blade servers, other hardware, and the software packages that you are using.
2. This document might contain references or links to other companies' Web sites, also known as non-IBM Web sites. As of the date of this document, the addresses of non-IBM Web sites are correct. However, these addresses might be updated after this document has been published. Certain conditions apply to the use of non-IBM Web sites. For additional information, see Appendix C, “Notices”.
3. Changes are made periodically to the IBM Web site. Procedures for locating firmware and documentation might vary slightly from what is described in this document.
4. For the latest information about operating-system support, versions of device drivers, utilities, software installer packages, and additional documentation for the Brocade 2-Port 10Gb Converged Network Adapter, go to the following location:

   http://www.brocade.com/sites/dotcom/services-support/drivers-downloads/CNA/IBM.page.

Installing the device drivers and HCM

The Brocade 2-Port 10Gb Converged Network Adapter for IBM BladeCenter requires installation of both the storage (FC/FCoE) and the network (Ethernet/NIC) driver. Both of these drivers install as one package. The latest driver packages, boot code image, utilities, and additional documentation for supported operating systems are provided at the following location:

http://www.brocade.com/sites/dotcom/services-support/drivers-downloads/CNA/IBM.page.

The GUI-based Brocade Adapter Software Installer (BASI) application installs the Host Connectivity Manager (HCM), all driver packages, and utilities based on your host operating system.

Installing software using BASI

This section contains instructions for using the GUI-based BASI only. For detailed instructions on installing software using BASI, BASI commands, native installer scripts, and operating system commands, refer to the *Brocade Adapters Installation and Reference Manual* at the following location.

http://www.brocade.com/sites/dotcom/services-support/drivers-downloads/CNA/IBM.page.

Important notes

Following are important notes for installation:

- The Brocade Adapter Software Installer (BASI) is available for Windows and Linux operating systems. For VMware systems, it will only operate on "guest" operating systems. Find the installer program for your host's operating system and platform at the following location:

  http://www.brocade.com/sites/dotcom/services-support/drivers-downloads/CNA/IBM.page.

  - Windows systems BASI

    `brocade_adapter_software_installer_windows_<version>.exe`

  - Linux systems BASI

    `brocade_adapter_software_installer_linux_<version>.bin`

  NOTE
  To install drivers on VMware systems, refer to the instructions for using software installer scripts and "native" system commands in the *Brocade Adapters Installation and Reference Manual* located at the following location.
  http://www.brocade.com/sites/dotcom/services-support/drivers-downloads/CNA/IBM.page.

- The procedures in this section assume that the host's operating system has been installed and is functioning normally.
- Software installation or upgrade on a host system with a large number of adapters could take much longer than normal.
- On Linux SLES 10 and 11 systems when installing the source-based driver packages (brocade_driver_linux_<version>.tar.gz) or when using the Brocade Adapter Software Installer and the kernel has been upgraded to a version without pre-compiled binaries, perform the following tasks to make sure the drivers will load on system reboot:

  - For Linux SLES 10 systems, make sure that the LOAD_UNSUPPORTED_MODULES_AUTOMATICALLY variable on your system is set to "yes." This variable is in the following configuration file.

    /etc/sysconfig/hardware/config

  - For Linux SLES 11, change the "allow_unsupported_modules" value from 0 to 1 in the following file.

    /etc/modprobe.d/unsupported-modules

- When installing the driver package on Windows 2008 and VMware systems, open the TCP/IP port 34568 to allow HCM Agent communication with the HCM. (Necessary because of firewall issues.)

  - For VMware, use the following command s to open port 34568:

    ```
    /usr/sbin/esxcfg-firewall -o 34568,tcp,in,https
    /usr/sbin/esxcfg-firewall -o 34568,udp,out,https
    ```

  - For Windows, use Windows Firewall and Advanced Service (WFAS) to open port 34568.

- Before installing the driver on Windows systems, install the following hot fixes from the Microsoft "Help and Support" website, then reboot the system:

  - Windows 2003

    KB932755 (or later) is the minimum requirement.

KB943545 is recommended if the HP command view management application is used to manage HP EVA arrays in the target system.

- Windows 2008

  KB968675 is recommended. This fixes a non-paged memory leak in a Windows 2008 storage stack.

- You must use the Brocade Adapter Software Installer application to install the Host Connectivity Manager (HCM). You can install HCM to the host system where the adapter is installed or to a separate remote management platform.
- The Brocade Adapter Software Installer is not supported on the VMware “console” operating system. However, you can use the appropriate software installer to install HCM to a guest system (Windows, Linux, or Solaris), however. To install adapter drivers on VMware systems, refer to the instructions for using software installer scripts and “native” system commands in the *Brocade Adapters Installation and Reference Manual*.
- If you receive errors when launching the GUI-based Brocade Adapter Software Installer, such as InvocationTargetException errors, your system may not be able to run a GUI-based application.
- Installing software with the Brocade Adapter Software Installer automatically starts the HCM Agent.

Installing software

Use these steps to install software using the GUI-based BASI application.

1. Obtain software from the following location.

   http://www.brocade.com/sites/dotcom/services-support/drivers-downloads/CNA/IBM.page

   - Download the appropriate Brocade Adapter Software Installer for your system:

     Windows

     ```
     brocade_adapter_software_installer_windows_<version>.exe
     ```

     Linux

     ```
     brocade_adapter_software_installer_linux_<platform>_
     <version>.bin
     ```

   - Download an ISO 9660 (.iso) optical disk image. The brocade_adapter_software_<version>_ISO_<date>.iso image includes the latest HCM, HBA driver packages, boot installation packages, and documentation. You can use the ISO image to create a CD that you can carry to your system for installation tasks.

   NOTE
   For Windows systems only. Using a CD created with the ISO image will automatically start the correct installer program for your system. Make sure that the autorun feature is enabled. When you launch this CD and the Brocade Software Installer **Introduction** screen displays, skip to step 3.

2. Execute the appropriate Adapter Software Installer (refer to step 1).

   The Brocade Software Installer **Introduction** screen displays with instructions for using the installer.

3. Click **Next.**

4. When the License Agreement screen displays, select **I accept the terms of the License Agreement**, then click **Next** to continue.
5. If a backup directory exists for previously installed software, a "Found Backed up data" message displays prompting you to restore old configurations. Select either to restore or not to restore and continue installation. If this message does not display, go on to step 6.
6. If a screen displays listing existing software components already installed on your system, select either of the following options, click **Continue**, then skip to step step 10. If this message does not display, go on to step 7.
   - **Install with existing configuration**. The installer compares each configured property and keeps the original value if different than the default value.
   - **Install with default configuration**. The installer upgrades the software and loads with default configurations.

   NOTE
   Existing versions of the software components will be overwritten with the current versions you are installing if you continue.
7. If a message displays prompting you to close HCM, close the application if it is running, then click **OK** on the message box.

   The **Choose Install Set** screen displays.
8. Select which software you want to install, then click **Next**.
9. If the **Choose Install Folder** screen displays, prompting you to choose a destination folder for the software, select either of the following options. If this screen does not display, go on to step 10.
   - 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.
10. When the **Package Location Information** screen displays listing the installed software components and their location on your system, click **Next** to continue.
11. Review information on the **Pre-Installation Summary** screen and click **Install** to begin installation.

    A dialog box displays showing installation progress.

    NOTE
    For Windows systems, a **Force Driver Installation** message box displays if a better driver is already installed for the adapter. If a message displays, select **OK** to overwrite the existing driver or **Cancel** to quit installation.
12. Click **Done** when the **Install Complete** screen displays to confirm installation.
13. If a message or screen displays instructing you to restart or reboot the system, perform the action indicated.
14. Verify driver installation through tools available on your host system. Refer to the "Confirming driver package installation" section in the "Software Installation" chapter of the *Brocade Adapters Installation and Reference Manual* for details.

To make sure that the drivers and boot code are synchronized, be sure to update your adapter with the latest boot image whenever you install or update adapter driver packages. from the following location.
http://www.brocade.com/sites/dotcom/services-support/drivers-downloads/CNA/IBM.page.
Refer to the following "Installing boot code" section for instructions.

NOTE
Installing expansion card software creates a Brocade Command Line Utility (BCU) desktop shortcut on your system desktop. Use this shortcut instead of other methods to launch the BCU> command prompt and enter BCU commands.

Installing boot code

Boot code for the adapter installs with the driver packages. However, whenever you update drivers, you should also update with the latest boot code image. The latest boot code image and additional documentation for supported operating systems are provided at the following location:

http://www.brocade.com/sites/dotcom/services-support/drivers-downloads/CNA/IBM.page.

You can update boot code using BCU commands or HCM. For instructions to install the boot code image, refer to the *Brocade Adapters Installation and Reference Manual* also on this website.

Customizing the configuration of the high speed adapter

After you install the device drivers and connect the Brocade 2-Port 10Gb Converged Network Adapter to the fabric and target devices, you can use the tools described in Chapter 4, "Using configuration tools" in the *Brocade Installation and Reference Manual* to further configure its settings, verify its operational status, and check for proper connection.

3 Customizing the configuration of the high speed adapter

Chapter

4

Using configuration tools

This chapter provides an overview of the tools available for customizing the configuration of the Brocade 2-Port 10Gb Converged Network Adapter when it is installed in a blade server.

Note: For information about the types of compatible BladeCenter units and blade servers, contact your IBM marketing representative or authorized reseller. For a list of supported BladeCenter units and blade servers, see http://www.ibm.com/servers/eserver/serverproven/compat/us/. For details about installation, configuration, and use of compatible BladeCenter units and blade servers, see the documentation that comes with these devices.

To configure and manage the storage and networking features of the Brocade 2-Port 10Gb Converged Network Expansion Card (CFFh) for IBM BladeCenter, you can use the following tools:

- Brocade BIOS Configuration Utility
- Brocade Host Connectivity Manager (HCM
- Brocade Command Line Utility (BCU)
- Other networking tools for Windows, Linux, and VMware

Brocade BIOS Configuration Utility

The Brocade BIOS Configuration Utility allows you to perform the following operations on selected adapters:

- Enable or disable BIOS to support boot over SAN.
  - You must enable BIOS to support boot over SAN for an adapter port. If disabled, the host system cannot boot from Fibre Channel disk drives.
  - The default setting for the adapter boot BIOS is *enabled* on all adapter ports.
- Enable one of the following Boot Options:
  - Auto Discover

    Host boots from LUN information provided by the fabric.
  - Flash Values

    Host boots from LUN information stored in flash memory.
  - First LUN

    Host boots from the first visible LUN.
- Select boot LUNs from discovered targets.
- Review adapter properties, such as the following:
  - Port speed
  - PWWN
  - NWWN
  - BIOS version

For details on how to activate and use the BIOS Configuration Utility, refer to Appendix B, "Using the BIOS Configuration Utility".

Refer to the Boot Code chapter in the *Brocade Adapters Installation and Reference Manual* located on http://www.brocade.com/sites/dotcom/services-support/drivers-downloads/CNA/IBM.page for more details on the following topics:

- Configuring BIOS using BCU commands or HCM
- Configuring boot over SAN
- Configuring UEFI
- Installing operating systems and Brocade 2-Port 10Gb Converged Network Adapter drivers on boot LUNs
- Installing full driver packages on boot LUNs
- Fabric-Based Boot LUN discovery
- Booting systems without operating systems or local drives
- Updating the Windows driver on adapter used for boot over SAN

Using HCM and BCU

The Host Connectivity Manager (HCM) is a management software GUI for configuring, troubleshooting, and monitoring the Brocade 2-Port 10Gb Converged Network Adapter and device connections on local and remote host systems. The Brocade Command Line Utility (BCU), which loads with the driver package, provides commands that perform comparable functions on a local host system. These functions include the following:

- Discovery using the agent software running on the servers attached to the SAN, which enables you to contact the devices in your SAN.
- Configuration management, which enables you to configure local and remote systems. With HCM you can configure the following items:
  - Brocade 2-Port 10Gb Converged Network Adapters
  - FCoE ports
  - Ethernet ports
- Management and monitoring of CEE ports.
- Diagnostics, which enables you to test the adapters and the devices to which they are connected:
  - Link status of each adapter and its attached devices
  - Loopback tests to evaluate the ports and the error rate on the adapter
  - Read/write buffer test, which tests the link between the adapter and its devices
  - FC protocol tests, including echo, ping, and trace route
  - Ethernet loopback test
- Monitoring, which provides statistics for the SAN components.
- Security, which enables you to specify a CHAP secret and configure authentication parameters.
- Event notifications, which provide asynchronous notification of various conditions and problems through a user-defined event filter.

For details on using BCU commands and HCM, refer to the *Brocade Adapters Administrator's Guide* located on the following link:

http://www.brocade.com/sites/dotcom/services-support/drivers-downloads/CNA/IBM.page

Using other networking tools

The following provides an overview of OS-specific tools that you can use configure the networking functionality of the Brocade 2-Port 10Gb Converged Network Adapter. For more detailed information, refer to the "Adapter Configuration" chapter in the *Brocade Adapters Installation and Reference Manual* located on the following link:

http://www.brocade.com/sites/dotcom/services-support/drivers-downloads/CNA/IBM.page

NOTE
These parameters are should only be changed by power users with great caution.

Windows OS

For the Windows OS, you can modify network driver parameters using the Device Manager **Property** pages. You can use the property pages to query the Brocade 2-Port 10GbE Converged Network Adapter for IBM BladeCenter's information and the **Advanced** tab to set specific parameters, including jumbo packet size, flow control, autorecovery, and more.

To open the Windows Device Manager:

1. Run the **devmgmt.msc** command to open the **Device Manager** window.
2. Expand **Network Adapters**.

   An instance of the adapter model should display for each installed adapter port.
3. Right-click an adapter instance and select **Properties**.
4. Select the **Advanced** tab.
5. Select the **Property** that you want to configure and select the **Value**.
6. Click **OK** when finished.

Linux OS

For Linux, the following tools are available:

- ethtool commands to display Ethernet settings and change parameters such as enabling or disabling interrupt moderation, TCO-UDP checksum offload, TCP segmentation offload, and more.
- ifconfig commands to get information about a Linux network interface and change parameters such as jumbo packet size and the locally administered MAC address.
- Module parameters, such as bnad_log_level, to set log levels and bnad_msix to enable or disable message signaled interrupts extended (MSI-X).

For more information on how use these tools, refer to the *Brocade Adapters Installation and Reference Manual* and the help documentation available in the Linux environments.

VMware OS

For VMware, the following tools are available:

- ethtool to enable or disable interrupt moderation
- VM Client interface to enable or disable NetQueue

For VMware, you can list all module parameters that you can configure for the network driver using the **vmkload_mod -s bna** command.

For more information on how use these tools, refer to the *Brocade Adapters Installation and Reference Manual* and help documentation in the VMware environments.

Chapter

Parts listing

5

Replaceable components are of three types:

- Tier 1 customer replaceable unit (CRU): Replacement of Tier 1 CRUs is your responsibility. If IBM installs a Tier 1 CRU at your request, you will be charged for the installation.
- Tier 2 customer replaceable unit (CRU): You may install a Tier 2 CRU yourself or request IBM to install it, at no additional charge, under the type of warranty service that is designated for your server.
- Field replaceable unit (FRU): FRUs must be installed only by trained service technicians.

For information about the terms of the warranty, see the IBM Warranty and Support Information document on the IBM Support CD. The replaceable components in Table 4 are Tier 1 CRUs.

TABLE 4 Replaceable components and corresponding CRU/FRU identifiers

Name of component	CRU/FRU identifier
Brocade 2-Port 10Gb Converged Network Expansion Card (CFFh)	• 81Y1650 (Option) • 81Y1654 (Tier 1 CRU)

If other BladeCenter components require replacement, see the following documentation that comes with these devices:

- *Problem Determination and Service Guide*
- *Installation and User's Guide*

Notes:

1. The latest versions of these documents are at

http://www.ibm.com/systems/support/.

2. Cables are not required for the Brocade 2-Port 10Gb Converged Network Expansion Card (CFFh). If you must install cables for other BladeCenter optional devices, see the IBM Configuration and Options Guide at http://www.ibm.com/servers/eserver/xseries/cog/. If you must install cables for BladeCenter components, see the cable-routing information in the documentation that comes with the BladeCenter components and the cables.

5 Parts listing

Chapter

Solving problems

6

This chapter provides basic troubleshooting information to help you solve some problems that might occur while you are setting up the Brocade 2-Port 10Gb Converged Network Expansion Card (CFFh). If you are having a problem with the high speed adapter, use the following information to help you determine the cause of the problem and the action to take. Additional troubleshooting and debugging procedures are available in the following publications:

- *Problem Determination Service Guide* or *Hardware Maintenance Manual and Troubleshooting Guide* for the blade server
- *Brocade Adapters Troubleshooting Guide* in the following location http://www.brocade.com/sites/dotcom/services-support/drivers-downloads/CNA/IBM.page.

For more detailed information about troubleshooting the ServeRAID™ controller, see the following documents on the Support CD or at http://www.ibm.com/systems/support/.

- BladeCenter unit, blade server, or I/O module *Installation and User's Guide*
- Blade server *Problem Determination and Service Guide*

Make sure that you are using the latest versions of device drivers, utilities, firmware, and BIOS code for the following devices. If these items are not at the latest levels, the BladeCenter unit might not recognize one or more of the following devices, and the BladeCenter unit or these devices might not be able to start.

- The high speed adapters in the BladeCenter unit and in the blade servers
- The blade servers
- The management module
- The I/O modules and controller that are used by the high speed adapters in the BladeCenter unit and in the blade servers

If necessary, install the latest versions of device drivers, utilities, firmware code, and BIOS code for the previously listed devices.

To download the most recent device drivers, utilities, firmware updates, BIOS code updates, and expansion-card boot code updates, go to http://www.ibm.com/systems/support/ for the latest information about upgrading the device drivers, firmware, and BIOS code for BladeCenter components. The instructions are in the documentation that comes with the updates. Also see the *Installation and User's Guide* for your blade server for additional information.

Notes:

- For the latest version of the *IBM BladeCenter Management Module Command-Line Interface Reference Guide*, go to http://www.ibm.com/systems/support/.
- Changes are made periodically to the IBM Web site. Procedures for locating firmware and documentation might vary slightly from what is described in this document.

- This document might contain references or links to other companies' Web sites, also known as non-IBM Web sites. As of the date of this document, the addresses of non-IBM Web sites are correct. However, these addresses might be updated after this document has been published. Certain conditions apply to the use of non-IBM Web sites. For additional information, see Appendix C, "Notices".
- Contact your IBM marketing representative or authorized reseller for information about the types of compatible BladeCenter units, blade servers, and optional devices for the I/O modules, BladeCenter units, and blade servers.
- See http://www.ibm.com/servers/eserver/serverproven/compat/us/ for a list of supported BladeCenter units, blade servers, and optional devices for the I/O modules, BladeCenter units, and blade servers.
- For details about installation, configuration, and use of compatible devices, see the documentation that comes with these devices. If you cannot locate and correct a problem by using the information in this chapter, see Appendix A, "Getting help and technical assistance".

Hardware problems

To determine whether an installation problem is caused by the hardware, perform the following tasks:

- Before you begin your system hardware installation activities, make sure that you have all the hardware devices that are required to support the system configuration that you plan to use. Include the following preinstallation requirements. For additional information, see the documentation that comes with the devices that you are using.
- Make sure that the BladeCenter unit and the blade servers are compatible with the high speed adapter.
- Before you install the high speed adapter in a blade server, make sure that you are using a blade server that supports the high speed adapter.

  At the time of this printing, the blade servers on the *Proven List* support the Brocade 2-Port 10Gb Converged Network Expansion Card (CFFh) for IBM BladeCenter: Access the *Proven List* at the following location.

  http://www-03.ibm.com/systems/info/x86servers/serverproven/compat/us/eserver.html
- Make sure that the I/O modules are compatible with the target high speed adapters that you want to communicate with these I/O modules. Where applicable, certain I/O modules in the BladeCenter unit must support the target high speed adapters in the blade server.
- Make sure that the high speed adapter is correctly installed in the blade server. For additional information, see the *Installation and User's Guide* that comes with the blade server.
- Make sure that the blade server is correctly installed in the BladeCenter unit.

- Make sure that the utility device-driver parameters are correct.
  - If the high speed adapter is installed in a blade server that supports the video function, see "Brocade BIOS Configuration Utility" on page 31 or Appendix B, "Using the BIOS Configuration Utility" for additional information.
  - If the high speed adapter is installed in a blade server that does not support the video function, you can use HCM from a remote host through a network connection to the high speed adapter. You can also configure the high speed adapter remotely by running HCM from an IBM Director console.
  - See the troubleshooting documentation that comes with the applicable device driver.
  - If you determine that the system is correctly configured, see the diagnostics section of the applicable device driver *Installation Guide* or *User's Guide*.
- Make sure that all installed Fibre Channel and Ethernet modules are correctly installed in the bays of the HSSM for IBM BladeCenter:
  - Fibre Channel modules must be installed in HSSM bay 7.
  - Ethernet modules must be installed in HSSM bay 7 or bay 9.

  Note: Installing a second I/O module in the BladeCenter unit provides a backup I/O module in case one I/O module fails. Both I/O modules must be of the same type, in the previously specified I/O-module bay combinations in the BladeCenter unit.
- Make sure that all peripheral devices are correctly connected to the I/O modules, turned on, and operating correctly.

  Notes:

  1. For additional information, see the documentation that comes with the peripheral devices.
  2. If the high speed adapter is installed in a supported BladeCenter blade server, see the documentation that comes with the blade server for information about displaying attached Ethernet or Fibre Channel devices.
  3. Contact your IBM marketing representative or authorized reseller for information about the types of compatible BladeCenter units, blade servers, and optional devices for the I/O modules, BladeCenter units, and blade servers.
  4. See http://www.ibm.com/servers/eserver/serverproven/compat/us/ for a list of supported BladeCenter units, blade servers, and optional devices for the I/O modules, BladeCenter units, and blade servers.
  5. For details about installation, configuration, and use of compatible devices, see the documentation that comes with these devices.

Software problems

To determine whether the installation problem is caused by the software, perform the following tasks:

- Make sure that the correct device drivers are installed. To download or get information about the latest supported device drivers, utilities, and documentation, see http://www.ibm.com/systems/support/. Also see the Installation and *User's Guide* for the blade server for additional information.
- Make sure that the BIOS boot code in the high speed adapter are at the latest levels.

- Make sure that you are using the correct expansion-card NVRAM settings for the storage area network (SAN) and operating system.

System-configuration problems

To determine whether the installation problem is caused by the system configuration, perform the following tasks:

- Make sure that the I/O modules that support Ethernet or Fibre Channel operation are correctly configured.
- Make sure that the blade server is correctly configured.
- Make sure that the BladeCenter unit and all other BladeCenter components are correctly configured.
- Make sure that all parameters, internal devices, and external devices have been enabled, where required. These devices might include the I/O module and its internal and external ports.

  For additional information, see the documentation that comes with the management module and the applicable utility programs and devices.

If you still have a system-configuration problem, you must determine whether the system board in the blade server requires a special configuration. To determine whether the system board requires a special configuration, see the documentation that comes with your BladeCenter unit and blade server, or contact your IBM technical-support representative.

Note: For additional information about configuration requirements, see the documentation that comes with your BladeCenter unit, blade server, and other BladeCenter components.

Ethernet device problems

To determine whether your problem is caused by an attached Ethernet device, perform the following tasks.

- Make sure that the adapter is not installed in an IBM BladeCenter Storage Expansion Unit 3. The two 1GB Ethernet ports are not functional when the adapter is installed in this expansion unit.
- Make sure that an I/O module that supports Ethernet operation is correctly installed in bay 7 or bay 9 of a Multi-Switch Interconnect Module for IBM BladeCenter (MSIM).

  NOTE
  Note: Installing a second I/O module in the BladeCenter unit provides a backup I/O module in case one I/O module fails. Both I/O modules must be of the same type, in the previously specified I/O-module bay combinations in the BladeCenter unit.

- Make sure that the blade server is turned on.

- Make sure that the BladeCenter expansion-card settings are the correct values:
  - See the troubleshooting section of the documentation that comes with the applicable Broadcom device driver.
  - If you determine that the system is correctly configured, see the diagnostics section of the applicable device driver Installation Guide or User's Guide.
- Make sure that all parameters, internal devices, and external devices have been enabled, where required. These devices might include the I/O module and its internal and external ports.

  For additional information, see the documentation that comes with the management module and the applicable utility programs and devices.

Fibre Channel device problems

To determine whether your problem is caused by an attached Fibre Channel device, perform the following tasks:

- Make sure that an I/O module that supports Fibre Channel operation is correctly installed in bay 8 or bay 10 of a Multi-Switch Interconnect Module for IBM BladeCenter (MSIM).

  NOTE
  Note: Installing a second I/O module in the BladeCenter unit provides a backup I/O module in case one I/O module fails. Both I/O modules must be of the same type, in the previously specified I/O-module bay combinations in the BladeCenter unit.

- Make sure that the blade server is turned on.
- Make sure that the BladeCenter expansion-card settings are the correct values:
  - If the adapter is installed in a blade server that supports the video function, see "Using HCM and BCU" on page 32.
  - If the adapter is installed in a blade server that does not support the video function, you can use the Host Connectivity Manager (HCM) application from a remote host through a network connection to the blade server in which the adapter is installed. You can also configure the adapter remotely by launching HCM from an IBM Director management console.
  - See the troubleshooting section of the documentation that comes with the applicable Brocade 2-Port 10Gb Converged Network Expansion Card (CFFh) driver.
  - If you determine that the system is correctly configured, see the *Brocade Adapters Troubleshooting Guide*.
- Make sure that all parameters, internal devices, and external devices have been enabled, where required. These devices might include the I/O module and its internal and external ports. For additional information, see the documentation that comes with the management module and the applicable utility programs and devices.

Appendix

Getting help and technical assistance A

If you need help, service, or technical assistance or just want more information about IBM products, you will find a wide variety of sources available from IBM to assist you. This appendix contains information about where to go for additional information about IBM and IBM products, what to do if you experience a problem with your system, and whom to call for service, if it is necessary.

Before you call

Before you call, make sure that you have taken these steps to try to solve the problem yourself:

- Check all cables to make sure that they are connected.
- Check the power switches to make sure that the system and any optional devices are turned on.
- Use the troubleshooting information in your system documentation, and use the diagnostic tools that come with your system. Information about diagnostic tools is in the Problem Determination and Service Guide on the IBM Support CD that comes with your system.
- Go to the IBM support Web site at http://www.ibm.com/systems/support/ to check for technical information, hints, tips, and new device drivers or to submit a request for information.

You can solve many problems without outside assistance by following the troubleshooting procedures that IBM provides in the online help or in the documentation that is provided with your IBM product. The documentation that comes with IBM systems also describes the diagnostic tests that you can perform. Most systems, operating systems, and programs come with documentation that contains troubleshooting procedures and explanations of error messages and error codes. If you suspect a software problem, see the documentation for the operating system or program.

Using the documentation

Information about your IBM system and preinstalled software, if any, or optional device is available in the documentation that comes with the product. That documentation can include printed documents, online documents, readme files, and help files. See the troubleshooting information in your system documentation for instructions for using the diagnostic programs. The troubleshooting information or the diagnostic programs might tell you that you need additional or updated device drivers or other software. IBM maintains pages on the World Wide Web where you can get the latest technical information and download device drivers and updates. To access these pages, go to http://www.ibm.com/systems/support/ and follow the instructions. Also, some documents are available through the IBM Publications Center at http://www.ibm.com/shop/publications/order/.

Getting help and information from the World Wide Web

On the World Wide Web, the IBM Web site has up-to-date information about IBM systems, optional devices, services, and support. The address for IBM System x™ and xSeries® information is http://www.ibm.com/systems/x/. The address for IBM BladeCenter information is http://www.ibm.com/systems/bladecenter/. The address for IBM IntelliStation® information is http://www.ibm.com/intellistation/.

You can find service information for IBM systems and optional devices at http://www.ibm.com/systems/support/.

Software service and support

Through IBM Support Line, you can get telephone assistance, for a fee, with usage, configuration, and software problems with System x and xSeries servers, BladeCenter products, IntelliStation workstations, and appliances. For information about which products are supported by Support Line in your country or region, see http://www.ibm.com/services/sl/products/.

For more information about Support Line and other IBM services, see http://www.ibm.com/services/, or see http://www.ibm.com/planetwide/ for support telephone numbers. In the U.S. and Canada, call 1-800-IBM-SERV (1-800-426-7378).

Hardware service and support

You can receive hardware service through your IBM reseller or IBM Services. To locate a reseller authorized by IBM to provide warranty service, go to http://www.ibm.com/partnerworld/ and click Find a Business Partner on the right side of the page. For IBM support telephone numbers, see http://www.ibm.com/planetwide/.

In the U.S. and Canada, call 1-800-IBM-SERV (1-800-426-7378). In the U.S. and Canada, hardware service and support is available 24 hours a day, 7 days a week. In the U.K., these services are available Monday through Friday, from 9 a.m. to 6 p.m.

IBM Taiwan product service

台灣 IBM 產品服務聯絡方式：
台灣國際商業機器股份有限公司
台北市松仁路 7 號 3 樓
電話：0800-016-888

IBM Taiwan product service contact information:

IBM Taiwan Corporation

3F, No 7, Song Ren Rd.

Taipei, Taiwan

Telephone: 0800-016-888

Appendix

Using the BIOS Configuration Utility B

The Brocade BIOS Configuration Utility (embedded with the boot code) allows you to perform the following tasks:

- Enable or disable BIOS to support boot over SAN.
  - You must enable BIOS to support boot over SAN for an adapter port. If disabled, the host system cannot boot from Fibre Channel disk drives.
  - The default setting for the adapter boot BIOS is *enabled* on all adapter ports.
- Enable one of the following Boot Options:
  - Auto Discover

    Host boots from LUN information provided by the fabric.
  - Flash Values

    Host boots from LUN information stored in flash memory.
  - First LUN

    Host boots from the first visible LUN.
- Set port speed for the adapter (HBAs only).
- Select boot LUNs from discovered targets.
- Review adapter properties, such as the following:
  - Port speed
  - PWWN
  - NWWN
  - BIOS version

You can also perform many of these tasks using the Host Connectivity Manager (HCM) and Brocade Command Line Utility (BCU) commands. For information on these tools as well as details on adapter boot support, updating boot code, configuring boot over SAN, and configuring fabric-based boot LUN discovery, refer to the *Brocade Adapters Installation and Reference Manual* in the following location.

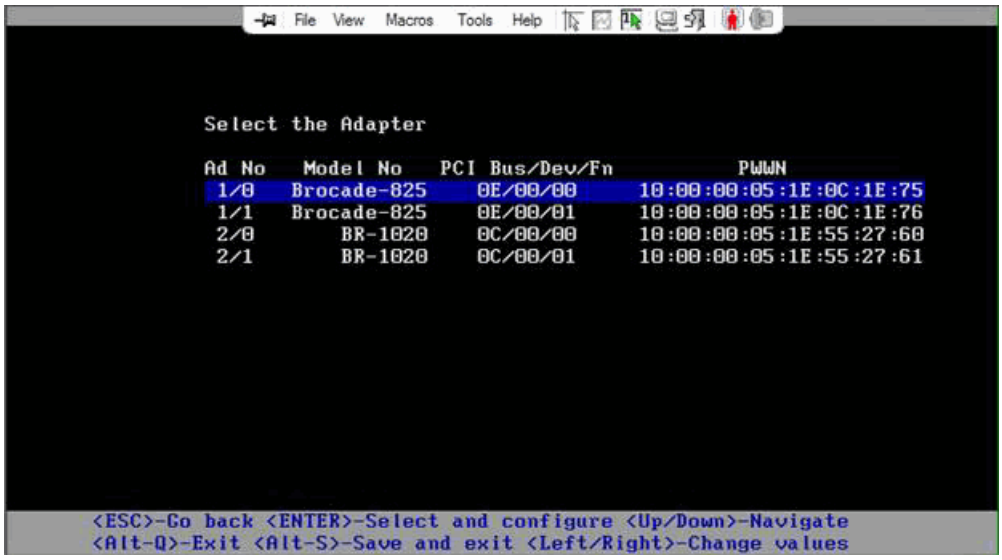
http://www.brocade.com/sites/dotcom/services-support/drivers-downloads/CNA/IBM.page

Procedures

To configure BIOS parameters using the Brocade BIOS Configuration Utility, use the following steps.

1. When you are prompted to enter the Brocade BIOS configuration menu during the Brocade 2-Port 10Gb Converged Network Expansion Card (CFFh) initialization, press *Alt+B* or *Ctrl+B*.

   The Brocade BIOS Configuration Menu displays a list of installed adapter ports, similar to the following.

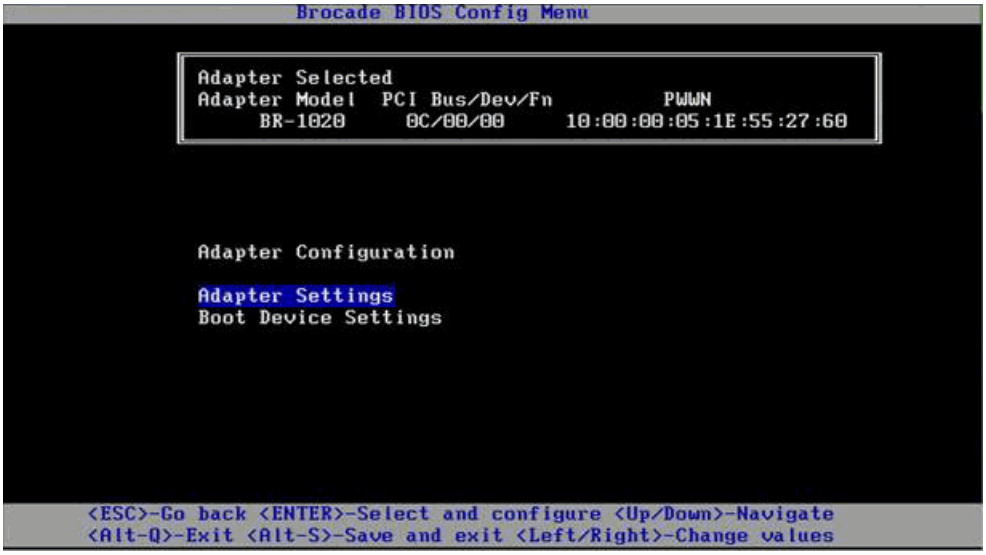


Under the **Ad No** column, 1/0 and 1/1 are the first port and second port respectively on the first installed adapter while 2/0 and 2/1 are the first and second port on the second installed adapter.

A maximum of 8 ports can display on a screen. Select **Page Up** to go to a previous screen or **Page Down** to go to the next screen.

2. Select a port that you want to configure.

   A screen similar to the following displays. (In the following example, port 0 on the Brocade 1020 adapter was selected.)



3. Select one of the following:

   - **Adapter Settings.** Use the Adapter Settings screen to enable BIOS, port speed (HBAs only), and auto discovery of boot LUN information on the fabric. You can determine adapter WWWN and PWWN. Proceed to step 4.

- **Boot Device Settings**. Use the Device Settings screen to select the boot target and LUN for booting the host system. Proceed to step 6.

4. Select **Adapter Settings** and press Enter to begin adapter configuration.

   A screen similar to the following displays showing the port's current BIOS version, NWWN, PWPN, and MAC (CNAs only). Table 5 on page 47 explains options available for BIOS, Port Speed, and Boot LUN settings.

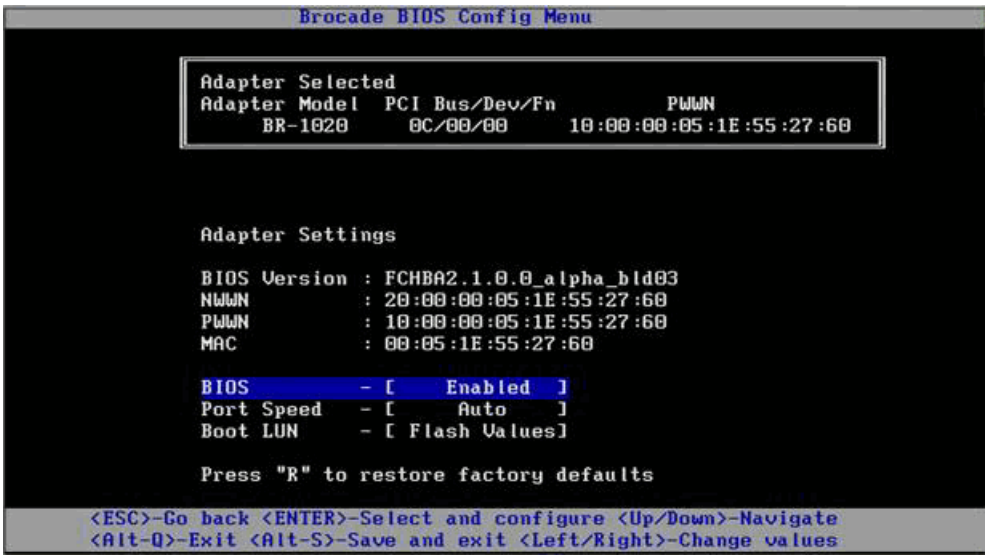


TABLE 5 Brocade BIOS Configuration Utility field descriptions

Field	Description
BIOS	The value of BIOS must be *Enable* for the selected adapter port to support boot over SAN. If this setting is set to Disable, the system will not boot from the Fibre Channel disk drives that are connected to the selected adapter port. **NOTE:** The default setting for all adapter ports is enabled.
BIOS Version	Displays the Brocade BIOS boot code version installed on the card.
Boot LUN	• Auto Discover. When enabled, LUN information, such as the location of the boot LUN, is provided by the fabric Refer to the *Brocade Adapters Installation and Reference Manual* for more information. • Flash Values. Boot LUN information will be obtained from flash memory. Note that values are saved to flash when you configure and save them through the BIOS Configuration Utility and BCU. • First LUN. The host boots from the first LUN visible to the adapter that is discovered in the fabric.
NWWN	Displays the port's Node World-Wide Name.

TABLE 5 Brocade BIOS Configuration Utility field descriptions

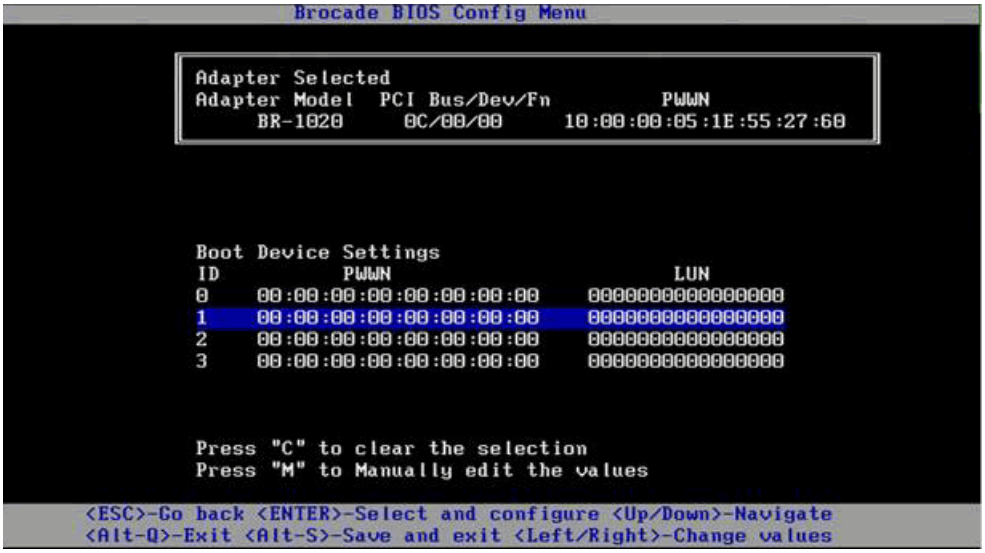
PWWN	Displays the port's unique Port World-Wide Name.
MAC	Displays the port's Media Access Control (MAC) address for adapters.
Port Speed	Sets the speed for the adapter port. **NOTE:** Auto allows the adapter port to automatically negotiate link speed with the connected port. Auto is the only speed option for the 10 Gbps Converged Network adapter.

5. Change any parameters by following the instructions at the bottom of the BIOS Configuration Utility screen. For example, use the following keys to select and change information:
   - Up and Down keys - Scroll to a different field.
   - Enter - Select a field and configure values.
   - Left and Right arrow keys - Change a value.
   - Alt - S - Save configuration values to adapter flash memory.
   - Alt - Q - Exit the utility.
   - Esc - Go back a screen.
   - Page Up or Page Down - Go to preceding or next screen.

   NOTE
   To restore factory default settings, press R.

6. To configure boot devices, select **Boot Device Settings** from the initial menu screen for the adapter port (step 3) and press Enter to designate a discovered LUN as a boot device.

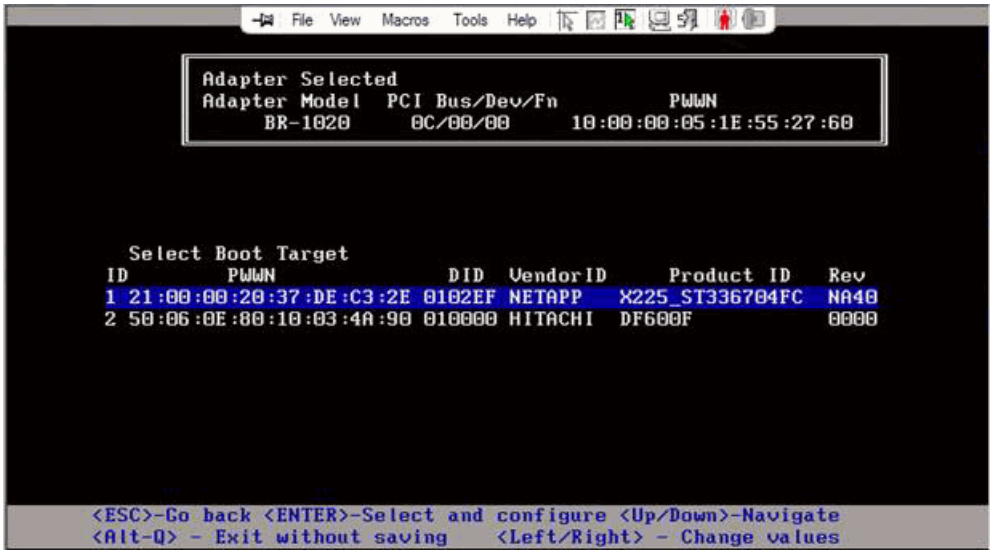
   A list of up to four boot devices display, showing the PWWN of the storage port and the LUN number designated as a boot LUN. The first device listed is the primary boot device. The host first tries to boot from the primary device, then the succeeding devices in the list.



7. Use the Up and Down arrow keys to select a boot device, then use one of the following options to configure boot device settings:

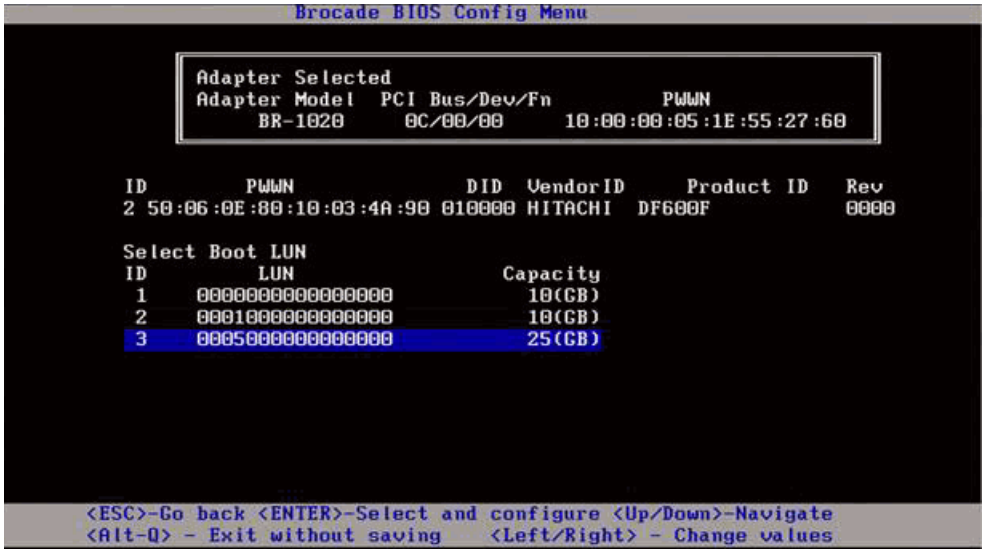
   - Press **C** to clear a selected boot device from the list.
   - Press **M** to manually edit boot device information, then enter the PWWN and LUN values for the boot device. Press **M** to exit.
   - Select a device and press Enter. This displays additional screens that allow you to select discovered LUNs as boot devices.

   If you select a device under Boot Device Settings and press Enter, a screen similar to the following displays listing all discovered boot targets.



8. Select a target on which you want to designate a boot LUN and press Enter.

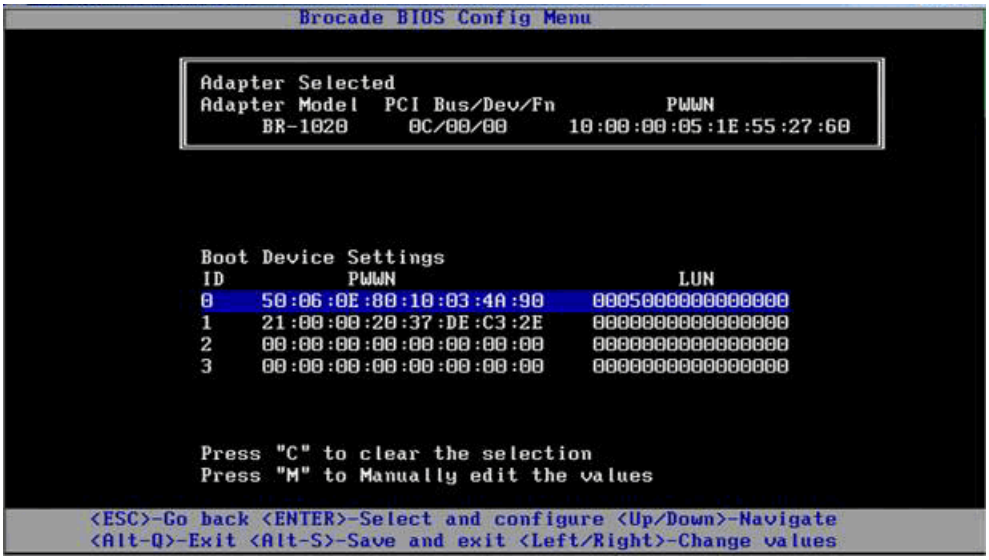
   A screen similar to the following displays listing device information and LUNs visible to the adapter.



9. Select the LUN on the target device you that want to designate as the boot LUN for the host. This must be the same LUN that you bind to the adapter port using the storage system's management or configuration utility.

NOTE
You only need to select the bootable LUN once. After the first boot, the same LUN will be used until changed through the BIOS Configuration Utility.

10. Press Enter. The selected device will be added to the list of boot devices for the adapter.



11. Save or exit the configuration utility.
    - To save the configuration, press the **Alt** and **S** keys.
    - To exit without saving press the **Alt** and **Q** keys.

Appendix

Notices C

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Armonk, New York 10504
914-499-1900

European Community contact:

IBM Technical Regulations, Department M456
IBM-Allee 1, 71137 Ehningen, Germany
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