IBM BladeCenter HX5
Type 7873, 7872, 1910 and 1909

IBM

Problem Determination and Service Guide

IBM BladeCenter HX5
Type 7873, 7872, 1910 and 1909

Problem Determination and Service Guide

> **Note**
>
> Before using this information and the product it supports, read the general information in "Notices" on page 277, the *Warranty Information* document, and the *IBM Safety Information* and the *Environmental Notices and User Guide* documents on the IBM *Documentation* CD.
>
> **The most recent version of this document is available at http://www.ibm.com/supportportal.**

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.

在安裝本产品之前，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.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních 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.

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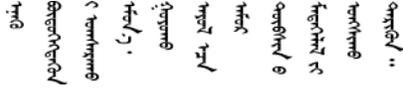
Les sikkerhetsinformasjonen (Safety Information) før du installerer dette produktet.

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.

ཐོན་�རྫས་འདི་བདེ་སྐྱིད་མ་བྱས་གོང་། སྐོར་གྱི་ཡིད་གཟབ་
བྱ་འདུ་མིན་ཡོད་པའི་འོད་སྲེར་བལྟ་དགོས།

Bu ürünü kurmadan önce güvenlik bilgilerini okuyun.

مەزكۈر مەھسۇلاتنى ئورنتششتن بۇرۇن بىخەتەرلىك ئۇچۇرلىرىنى ئوقۇپ چىقىڭ.

Youq mwngz yungh canjbinj neix gaxgonq, itdingh aeu doeg aen
canjbinj soengq cungj vahgangj ancien siusik.

Guidelines for trained service technicians

This section contains information for trained service technicians.

Inspecting for unsafe conditions

Use this information to help you identify potential unsafe conditions in an IBM®
product that you are working on.

Each IBM product, as it was designed and manufactured, has required safety items
to protect users and service technicians from injury. The information in this section
addresses only those items. Use good judgment to identify potential unsafe
conditions that might be caused by non-IBM alterations or attachment of non-IBM
features or optional devices that are not addressed in this section. If you identify
an unsafe condition, you must determine how serious the hazard is and whether
you must correct the problem before you work on the product.

Consider the following conditions and the safety hazards that they present:

- Electrical hazards, especially primary power. Primary voltage on the frame can cause serious or fatal electrical shock.
- Explosive hazards, such as a damaged CRT face or a bulging capacitor.
- Mechanical hazards, such as loose or missing hardware.

To inspect the product for potential unsafe conditions, complete the following steps:

1. Make sure that the power is off and the power cords are disconnected.
2. Make sure that the exterior cover is not damaged, loose, or broken, and observe any sharp edges.
3. Check the power cords:
   - Make sure that the third-wire ground connector is in good condition. Use a meter to measure third-wire ground continuity for 0.1 ohm or less between the external ground pin and the frame ground.
   - Make sure that the power cords are the correct type.
   - Make sure that the insulation is not frayed or worn.
4. Remove the cover.
5. Check for any obvious non-IBM alterations. Use good judgment as to the safety of any non-IBM alterations.
6. Check inside the system for any obvious unsafe conditions, such as metal filings, contamination, water or other liquid, or signs of fire or smoke damage.
7. Check for worn, frayed, or pinched cables.
8. Make sure that the power-supply cover fasteners (screws or rivets) have not been removed or tampered with.

Guidelines for servicing electrical equipment

Observe these guidelines when you service electrical equipment.

- Check the area for electrical hazards such as moist floors, nongrounded power extension cords, and missing safety grounds.
- Use only approved tools and test equipment. Some hand tools have handles that are covered with a soft material that does not provide insulation from live electrical current.
- Regularly inspect and maintain your electrical hand tools for safe operational condition. Do not use worn or broken tools or testers.
- Do not touch the reflective surface of a dental mirror to a live electrical circuit. The surface is conductive and can cause personal injury or equipment damage if it touches a live electrical circuit.
- Some rubber floor mats contain small conductive fibers to decrease electrostatic discharge. Do not use this type of mat to protect yourself from electrical shock.
- Do not work alone under hazardous conditions or near equipment that has hazardous voltages.
- Locate the emergency power-off (EPO) switch, disconnecting switch, or electrical outlet so that you can turn off the power quickly in the event of an electrical accident.
- Disconnect all power before you perform a mechanical inspection, work near power supplies, or remove or install main units.
- Before you work on the equipment, disconnect the power cord. If you cannot disconnect the power cord, have the customer power-off the wall box that supplies power to the equipment and lock the wall box in the off position.

- Never assume that power has been disconnected from a circuit. Check it to make sure that it has been disconnected.
- If you have to work on equipment that has exposed electrical circuits, observe the following precautions:
  - Make sure that another person who is familiar with the power-off controls is near you and is available to turn off the power if necessary.
  - When you work with powered-on electrical equipment, use only one hand. Keep the other hand in your pocket or behind your back to avoid creating a complete circuit that could cause an electrical shock.
  - When you use a tester, set the controls correctly and use the approved probe leads and accessories for that tester.
  - Stand on a suitable rubber mat to insulate you from grounds such as metal floor strips and equipment frames.
- Use extreme care when you measure high voltages.
- To ensure proper grounding of components such as power supplies, pumps, blowers, fans, and motor generators, do not service these components outside of their normal operating locations.
- If an electrical accident occurs, use caution, turn off the power, and send another person to get medical aid.

Safety statements

These statements provide the caution and danger information that is used in this documentation.

Important:

Each caution and danger statement in this documentation 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 documentation before you perform the procedures. Read any additional safety information that comes with your system 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.
- Connect to properly wired outlets any equipment that will be attached to this product.
- 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 the 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 2

CAUTION:
When replacing the lithium battery, use only IBM Part Number 33F8354 or an equivalent type battery recommended by the manufacturer. If your system has a module containing a lithium battery, replace it only with the same module type made by the same manufacturer. The battery contains lithium and can explode if not properly used, handled, or disposed of.

Do not:
- Throw or immerse into water
- Heat to more than 100°C (212°F)
- Repair or disassemble

Dispose of the battery as required by local ordinances or regulations.

Statement 12

CAUTION:
The following label indicates a hot surface nearby.

Statement 21

CAUTION:
Hazardous energy is present when the blade is connected to the power source. Always replace the blade cover before installing the blade.

UL regulatory information

This device is for use only with supported blade chassis.

Start here

You can solve many problems without outside assistance by following the troubleshooting procedures in this documentation and on the World Wide Web.

This document describes the diagnostic tests that you can perform, troubleshooting procedures, and explanations of error messages and error codes. The documentation that comes with your operating system and software also contains troubleshooting information.

Diagnosing a problem

Before you contact IBM or an approved warranty service provider, follow these procedures in the order in which they are presented to diagnose a problem with your blade server.

Procedure

1. **Return the server to the condition it was in before the problem occurred.** If any hardware, software, or firmware was changed before the problem occurred, if possible, reverse those changes. This might include any of the following items:
   - Hardware components
   - Device drivers and firmware
   - System software
   - UEFI firmware
   - System input power or network connections
2. **View the light path diagnostics LEDs and event logs.** The blade server is designed for ease of diagnosis of hardware and software problems.
   - **Light path diagnostics LEDs:** See "Light path diagnostics" on page 200 for information about using light path diagnostics LEDs.
   - **Event logs:** See "Event logs" on page 149 for information about notification events and diagnosis.
   - **Software or operating-system error codes:** See the documentation for the software or operating system for information about a specific error code. See the manufacturer's website for documentation.
3. **Run IBM Dynamic System Analysis (DSA) and collect system data.** Run Dynamic System Analysis (DSA) to collect information about the hardware, firmware, software, and operating system. Have this information available when you contact IBM or an approved warranty service provider. For instructions for running DSA, see the *Dynamic System Analysis Installation and User's Guide*.

   To download the latest version of DSA code and the *Dynamic System Analysis Installation and User's Guide*, go to http://www.ibm.com/support/entry/portal/docdisplay?lndocid=SERV-DSA.
4. **Check for and apply code updates.** Fixes or workarounds for many problems might be available in updated UEFI firmware, device firmware, or device drivers. To display a list of available updates for the blade server, go to http://www.ibm.com/support/fixcentral.

Attention: Installing the wrong firmware or device-driver update might cause the blade server to malfunction. Before you install a firmware or device-driver update, read any readme and change history files that are provided with the downloaded update. These files contain important information about the update and the procedure for installing the update, including any special procedure for updating from an early firmware or device-driver version to the latest version.

Important: Some cluster solutions require specific code levels or coordinated code updates. If the device is part of a cluster solution, verify that the latest level of code is supported for the cluster solution before you update the code.

a. **Install UpdateXpress system updates.** You can install code updates that are packaged as an UpdateXpress System Pack or UpdateXpress CD image. An UpdateXpress System Pack contains an integration-tested bundle of online firmware and device-driver updates for your blade server. In addition, you can use IBM ToolsCenter Bootable Media Creator to create bootable media that is suitable for applying firmware updates and running preboot diagnostics. For more information about UpdateXpress System Packs, see http://www.ibm.com/support/entry/portal/docdisplay?lndocid=SERV-XPRESS . For more information about the Bootable Media Creator, see http://www.ibm.com/support/entry/portal/docdisplay?lndocid=TOOL-BOMC.

Be sure to separately install any listed critical updates that have release dates that are later than the release date of the UpdateXpress System Pack or UpdateXpress image (see step 4b).

b. **Install manual system updates.**

1) **Determine the existing code levels.**

From the advanced management module web interface, click **Monitors** and then click **Firmware VPD**.

In DSA, click **Firmware/VPD** to view system firmware levels, or click **Software** to view operating-system levels.

2) **Download and install updates of code that is not at the latest level.**

To display a list of available updates for the blade server, go to http://www.ibm.com/support/fixcentral.

When you click an update, an information page is displayed, including a list of the problems that the update fixes. Review this list for your specific problem; however, even if your problem is not listed, installing the update might solve the problem.

5. **Check for and correct an incorrect configuration.** If the blade server is incorrectly configured, a system function can fail to work when you enable it; if you make an incorrect change to the blade server configuration, a system function that has been enabled can stop working.

a. **Make sure that all installed hardware and software are supported.** See http://www.ibm.com/systems/info/x86servers/serverproven/compat/us to verify that the blade server supports the installed operating system, optional devices, and software levels. If any hardware or software component is not supported, uninstall it to determine whether it is causing the problem. You must remove nonsupported hardware before you contact IBM or an approved warranty service provider for support.

b. **Make sure that the server, operating system, and software are installed and configured correctly.** Many configuration problems are caused by loose power or signal cables or incorrectly seated adapters. You might be able to solve the problem by turning off the blade server, reconnecting cables,

reseating adapters, and turning the blade server back on. For information about performing the checkout procedure, see "Checkout procedure" on page 147. For information about configuring the blade server, see Chapter 2, "Configuring the blade server," on page 19.

6. **See controller and management software documentation.** If the problem is associated with a specific function (for example, if a RAID hard disk drive is marked offline in the RAID array), see the documentation for the associated controller and management or controlling software to verify that the controller is correctly configured.

   Problem determination information is available for many devices such as RAID and network adapters.

   For problems with operating systems or IBM software or devices, go to http://www.ibm.com/supportportal.

7. **Check for troubleshooting procedures and RETAIN tips.** Troubleshooting procedures and RETAIN tips document known problems and suggested solutions. To search for troubleshooting procedures and RETAIN tips, go to http://www.ibm.com/supportportal.

8. **Use the troubleshooting tables.** See "Troubleshooting tables" on page 250 to find a solution to a problem that has identifiable symptoms.

   A single problem might cause multiple symptoms. Follow the troubleshooting procedure for the most obvious symptom. If that procedure does not diagnose the problem, use the procedure for another symptom, if possible.

   If the problem remains, contact IBM or an approved warranty service provider for assistance with additional problem determination and possible hardware replacement. To open an online service request, go to http://www.ibm.com/support/entry/portal/Open_service_request. Be prepared to provide information about any error codes and collected data.

Undocumented problems

If you have completed the diagnostic procedure and the problem remains, the problem might not have been previously identified by IBM. After you have verified that all code is at the latest level, all hardware and software configurations are valid, and no light path diagnostics LEDs or log entries indicate a hardware component failure, contact IBM or an approved warranty service provider for assistance.

To open an online service request, go to http://www.ibm.com/support/entry/portal/Open_service_request. Be prepared to provide information about any error codes and collected data and the problem determination procedures that you have used.

Chapter 1. Introduction

The IBM BladeCenter HX5 Type 7873, 7872, 1910, and 1909 blade servers are high-density, scalable blade servers ideally suited for high performance and virtualized environments. A BladeCenter HX5 can be combined with the IBM MAX5 for BladeCenter expansion blade to provide memory expansion for medium to large businesses.

The IBM BladeCenter HX5 Type 7873, 7872, 1910, and 1909 blade servers support the following components:
- Up to two multi-core microprocessors
- Up to 16 memory modules (DIMMs)

  Note: Combining a BladeCenter HX5 and an IBM MAX5 expansion blade supports up to 40 DIMMs.
- Up to two internal solid state drives (SSDs)
- Expansion devices, such as:
  - Horizontal-compact-form-factor (CFFh) expansion cards
  - Vertical-combination-I/O (CIOv) expansion cards

In addition, you can combine two BladeCenter HX5 blade servers to form a *scalable blade complex*. Combining two BladeCenter HX5 blade servers in a scalable blade complex provides for *FlexNode partitioning*. With FlexNode partitioning, you can deploy the blade servers as a single server or as two independent servers, without changing the physical configuration. The ability to switch between single-partition mode and stand-alone mode is provided through the advanced management module web interface. For more information about scalable blade complexes and FlexNode partitioning, see "Working with a scalable blade complex" on page 16.

Note: You can combine two BladeCenter HX5 blade servers to form a scalable blade complex. You can also combine a single BladeCenter HX5 blade server with an IBM MAX5 expansion blade for expanded memory access. You cannot attach an IBM MAX5 to a scalable blade complex.

For more information about the advanced management module web interface, see the *IBM BladeCenter Advanced Management Module: User's Guide*.

The BladeCenter HX5 blade server is supported in the following BladeCenter® chassis:
- IBM BladeCenter H
- IBM BladeCenter HT
- IBM BladeCenter S

For the latest information about the BladeCenter chassis that support the BladeCenter HX5 blade server, see http://www.ibm.com/servers/eserver/serverproven/compat/us/eserver.html.

This *Problem Determination and Service Guide* provides information about:
- Starting and configuring the blade server
- Installing and removing hardware devices
- Performing troubleshooting on the blade server

Packaged with the blade server are software CDs that help you to configure hardware, install device drivers, and install the operating system.

To download the latest firmware and device drivers, complete the following steps.

Note: Changes are made periodically to the IBM website. The actual procedure might vary slightly from what is described in this document.

1. Go to http://www.ibm.com/supportportal/.
2. Under **Product support**, click **BladeCenter**.
3. Under **Popular links**, click **Software and device drivers**.
4. Click **BladeCenter HX5** to display the matrix of downloadable files for the blade server.

The blade server comes with a limited warranty. For information about the terms of the warranty and getting service and assistance, see the *Warranty Information* document for your blade server. This document is available on the IBM *Documentation* CD. You can obtain up-to-date information about the blade server at http://www.ibm.com/systems/bladecenter.

The blade server might have features that are not described in the documentation that comes with the blade server. The documentation might be updated occasionally to include information about those features. Technical updates might also be available to provide additional information that is not included in the blade server documentation.

To obtain the latest and most up-to-date documentation for this product, go to http://publib.boulder.ibm.com/infocenter/bladectr/documentation/index.jsp.

You can subscribe to information updates that are specific to your blade server at http://www.ibm.com/support/mynotifications.

The model number and serial number are on the ID label that is located next to the power LED on the blade server bezel. They are also on a label on the side of the blade server that is visible when the blade server is not in the BladeCenter chassis.

Release
handle

Release
buttons

Release
handle
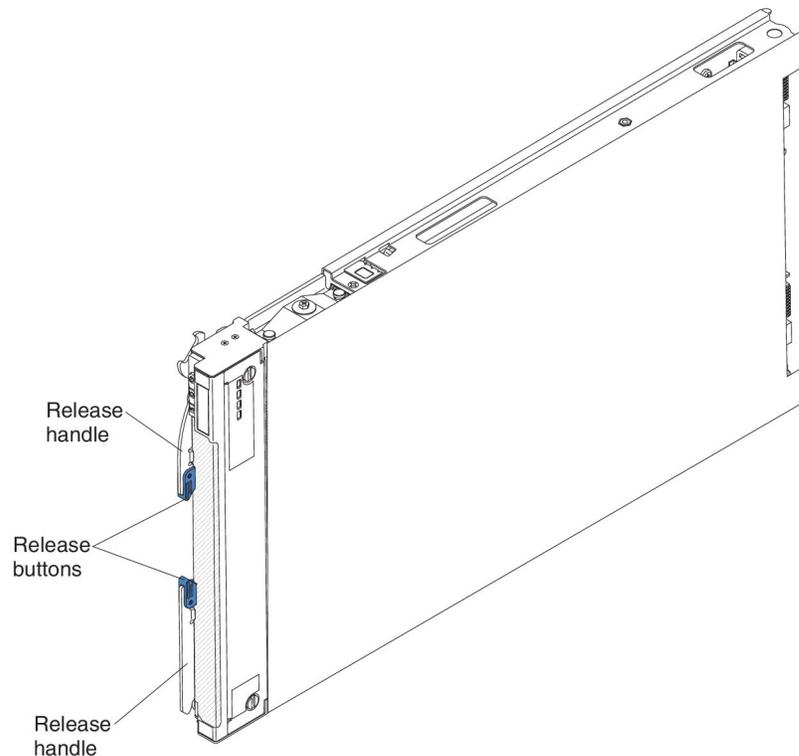
A set of blank labels for your blade server comes with the BladeCenter chassis. When you install the blade server in the BladeCenter chassis, write identifying information about the blade server on a label. Then place the label on the BladeCenter chassis bezel. See the documentation for your BladeCenter chassis for recommended label placement.

Important: Do not place the label on the blade server itself or in any way block the ventilation holes on the blade server.

Related documentation

Use this information to identify and locate related blade server documentation.

This *Problem Determination and Service Guide* contains information to help you resolve problems yourself, and it contains information for service technicians. The following documentation is also available:

- *Installation and User's Guide*

  This document contains general information about the blade server, including how to install supported optional devices and how to configure the blade server.

- *Safety Information*

  This document contains translated caution and danger statements. Each caution and danger statement that appears in the documentation has a number that you can use to locate the corresponding statement in your language in the *Safety Information* document.

- *Warranty Information*

  This document contains information about the terms of the warranty.

- *Environmental Notices and User Guide*

  This document contains translated environmental notices.

- *Integrated Management Module User's Guide*

  This document explains how to use the functions of the IMM that is installed in an IBM server. The IMM works with IBM System x® Server Firmware to provide systems-management capability for System x and BladeCenter servers.
- *Advanced Management Module User's Guide*

  This document provides information about configuring the advanced management module and managing components that are installed in an IBM® BladeCenter® chassis.
- *Advanced Management Module Command-Line Interface Reference Guide*

  This document explains how to use the advanced management module command-line interface (CLI) to directly access BladeCenter management functions. The command-line interface also provides access to the text-console command prompt on each blade server through a Serial over LAN (SOL) connection.
- *Advanced Management Module Messages Guide*

  This document provides a complete list of all non-device-specific events and recommended actions, sorted by event ID. For event information specific to this blade server, see "IMM error codes in AMM" on page 162.

In addition to the documentation in this library, be sure to review the *Planning and Installation Guide* for your BladeCenter chassis for information to help you prepare for system installation and configuration.

To check for updated documentation, complete the following steps.
1. Go to http://www.ibm.com/supportportal/.
2. Under **Product support**, click **BladeCenter**.
3. Under **Popular links**, click **Publications lookup**.
4. From the **Product family** menu, select **BladeCenter HX5** .

You can also find documentation that is related to BladeCenter products at http://publib.boulder.ibm.com/infocenter/bladectr/documentation/index.jsp.

Notices and statements in this document

Use this information to understand the most common documentation notices and statements and how they are used.

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 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 hazardous to you. A danger statement is placed just before the description of a potentially lethal or hazardous procedure step or situation.

Features and specifications

Use this table to view specific information about the blade server, such as blade server hardware features and the dimensions of the blade server.

Notes:

1. Power, cooling, removable-media drives, external ports, and advanced systems management are provided by the BladeCenter chassis.
2. The operating system in the blade server must provide USB support for the blade server to recognize and use USB media drives and devices. The BladeCenter chassis uses USB for internal communications with these devices.

The following table is a summary of the features and specifications of the BladeCenter HX5 blade server.

Table 1. Features and specifications

Microprocessor: Up to 2 multi-core Intel Xeon processors.
Note: Use the Setup utility to determine the type and speed of the microprocessors in the blade server.

Memory:
* 16 dual inline memory module (DIMM) connectors
* Type: Very Low Profile (VLP) double-data rate (DDR3) DRAM. Supports 2 GB, 4 GB, 8 GB, 16 GB, and 32 GB DIMMs with up to 512 GB of total memory on the system board

If two BladeCenter HX5 blade servers are assembled into a scalable blade complex, up to 1 TB is available to the scalable blade complex.

If the IBM MAX5 is installed:
* Supports up to 40 dual inline memory module (DIMM) connectors for up to 1.25 TB of total memory.

Note: The BladeCenter HX5 blade server supports memory sparing.

Integrated functions:
* Horizontal-compact-form-factor (CFFh) expansion card interface
* Vertical-combination-I/O (CIOv) expansion card interface
* Local service processor: integrated management module (IMM) with Intelligent Platform Management Interface (IPMI) firmware
* Integrated Matrox G200eV video controller

* Broadcom BCM5709S dual-port Gigabit Ethernet controller
* Integrated keyboard/video/ mouse (cKVM) controller through IMM
* Light path diagnostics
* RS-485 interface for communication with the management module
* Automatic server restart (ASR)
* USB 2.0 for communication with cKVM and removable media drives (an external USB port is not supported)
* Serial over LAN (SOL)
* Wake on LAN (WOL)
* Redundant buses for communication with keyboard, mouse, and removable media drives

Predictive Failure Analysis (PFA) alerts:
* Microprocessors
* Memory

Electrical input: 12 V dc

Size:

Single BladeCenter HX5 blade server:
* Height: 24.5 cm (9.7 in) (6U)
* Depth: 44.6 cm (17.6 in)
* Width: 2.9 cm (1.14 in)
* Maximum weight: 5.6 kg (12.38 lb)

2 BladeCenter HX5 blade servers assembled into a scalable blade complex:
* Height: 24.5 cm (9.7 in) (6U)
* Depth: 44.6 cm (17.6 in)
* Width: 5.8 cm (2.28 in)
* Maximum weight: 11.23 kg (24.76 lb)

A BladeCenter HX5 blade server combined with an IBM MAX5 expansion blade:
* Height: 24.5 cm (9.7 in) (6U)
* Depth: 44.6 cm (17.6 in)
* Width: 5.8 cm (2.28 in)
* Maximum weight: 9.5 kg (21.0 lb)

Environment:
* Air temperature:
  - Blade server on: 10°C to 35°C (50°F to 95°F). Altitude: 0 m to 914.4 m (0 ft to 3000 ft)
  - Blade server on: 10°C to 32°C (50°F to 89.6°F). Altitude: 914.4 m to 2133.6 m (3000 ft to 7000 ft)
  - Blade server off: 10°C to 43°C (50°F to 109.4°F). Altitude: 914.4 m to 2133.6 m (3000 ft to 7000 ft)
  - Blade server shipping: -40°C to 60°C (-40°F to 140°F)
* Humidity:
  - Blade server on: 8% to 80%
  - Blade server off: 8% to 80%
  - Blade server storage: 5% to 80%
  - Blade server shipping: 5% to 100%
* Particulate contamination

  Attention: Airborne particulates and reactive gases acting alone or in combination with other environmental factors such as humidity or temperature might pose a risk to the server. For information about the limits for particulates and gases, see "Particulate contamination" on page 279.

Blade server controls and LEDs

Use this information for details about the controls and LEDs on the blade server and IBM MAX5 expansion blade.

The following illustration identifies the buttons and LEDs on the blade server control panel.
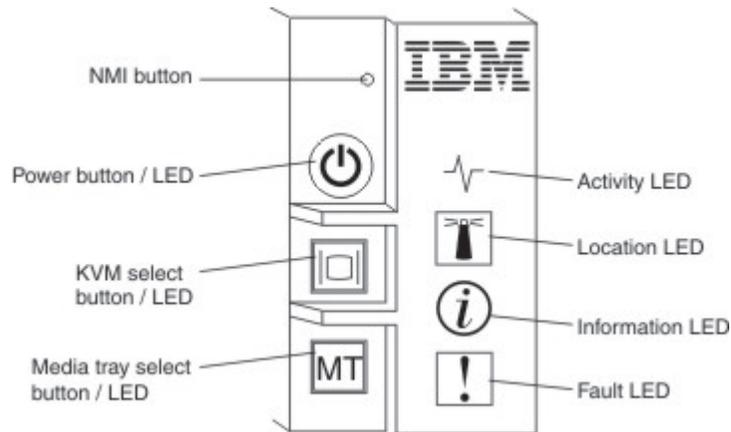
NMI button (recessed)

> The nonmaskable interrupt (NMI) dumps the partition. Use this recessed button only as directed by IBM Support.
>
> **Note:** You can also send an NMI event to the selected blade server remotely using the AMM. Refer to the *BladeCenter Advanced Management Module User's Guide* for information pertaining to the proper installation and configuration of Java, operating systems, and browsers that are supported for remote access.

Power button/LED

> When the blade server has power, press this button to turn on or turn off the blade server.
>
> **Note:** The power button works only if local power control is enabled for the blade server. Local power control is enabled and disabled through the advanced management module web interface.
>
> After the blade server is removed from the chassis, press this button to activate the system board LEDs (light path diagnostics). See "System-board LEDs - BladeCenter HX5" on page 15 for more information.
>
> This button is also the power LED. This green LED indicates the power status of the blade server:
> - **Flashing rapidly**: The LED flashes rapidly for one of the following reasons:
>   - The blade server has been installed in a chassis. When you install the blade server, the LED flashes rapidly for up to 90 seconds while the integrated management module (IMM) on the blade server is initializing and synchronizing with the advanced management module.
>   - The blade server does not have power permissions assigned to it through the advanced management module.
>   - The BladeCenter chassis does not have enough power to turn on the blade server.
>   - The IMM on the blade server is not communicating with the advanced management module.

- **Flashing slowly**: The blade server has power and is ready to be turned on.
- **Lit continuously**: The blade server has power and is turned on.

When the blade server is on, pressing this button causes an orderly shutdown of the blade server so that it is safe to remove. This includes shutting down the operating system (if possible) and removing power from the blade server.

Note: If you press the power button on the blade server that is part of a scalable blade complex running as a single partition, both blade servers in the partition power on or shut down.

If an operating system is running, you might have to press the button for approximately 4 seconds to initiate the shutdown.

Attention: Pressing the button for 4 seconds forces the operating system to shut down immediately. Data loss is possible.

KVM select button/LED

Press this button to associate the shared BladeCenter chassis keyboard, video, and mouse (KVM) ports with the blade server. The LED on this button flashes while the request is being processed and then is lit when the ownership of the keyboard, video, and mouse has been transferred to the blade server. It can take approximately 20 seconds to switch the keyboard, video, and mouse control to the blade server.

Using a keyboard that is directly attached to the advanced management module, you can press keyboard keys in the following sequence to switch KVM control between blade servers instead of using the KVM select button:

NumLock NumLock *blade_server_number* Enter

Where *blade_server_number* is the two-digit number of the blade server bay in which the blade server is installed. A blade server that occupies more than one blade server bay is identified by the lowest bay number that it occupies.

If there is no response when you press the KVM select button, you can use the advanced management module web interface to determine whether local control has been disabled on the blade server. See the *IBM BladeCenter Advanced Management Module: User's Guide* for more information.

Notes:

1. The operating system in the blade server must provide USB support for the blade server to recognize and use the keyboard and mouse, even if the keyboard and mouse have PS/2-style connectors.

2. If you install a supported Microsoft Windows operating system on the blade server while it is not the current owner of the keyboard, video, and mouse, a delay of up to 1 minute occurs the first time that you switch the keyboard, video, and mouse to the blade server. All subsequent switching takes place in the normal KVM switching time frame (up to 20 seconds).

Media tray select button/LED

Press this button to associate the shared BladeCenter chassis media tray (removable-media drives) with the blade server. The LED on the button flashes while the request is being processed and then is lit when the

ownership of the media tray has been transferred to the blade server. It can take approximately 20 seconds for the operating system in the blade server to recognize the media tray.

If there is no response when you press the media-tray select button, you can use the advanced management module web interface to determine whether local control has been disabled on the blade server.

Note: The operating system in the blade server must provide USB support for the blade server to recognize and use the removable-media drives.

Activity LED

When this green LED is lit (flashing), it indicates that there is activity on the network or external storage device.

Location LED

The system administrator can remotely turn on this blue LED to aid in visually locating the blade server. When this LED is lit, the location LED on the BladeCenter chassis is also lit. The location LED can be turned on and off through the advanced management module web interface or through IBM Systems Director. For more information about the advanced management module web interface, see the *IBM BladeCenter Advanced Management Module: User's Guide*. For more information about IBM Systems Director, see the documentation, which is available at http://publib.boulder.ibm.com/infocenter/director/v6r2x/index.jsp.

Information LED

When this amber LED is lit, it indicates that an Automatic BIOS recovery (ABR) has occurred. The blade server starts up using the backup UEFI image. See "Light path diagnostics LEDs" on page 205 for more information about the Information LED.

The information LED can be turned off through the advanced management module CLI, SNMP, or web interfaces or through IBM® Systems Director. For more information about the advanced management module web interface, see the *IBM BladeCenter Advanced Management Module: User's Guide*. For more information about IBM Systems Director, see the documentation, which is available at http://publib.boulder.ibm.com/infocenter/director/v6r2x/index.jsp.

Fault LED

When this amber LED is lit, it indicates that a system error has occurred in the blade server. In addition, the fault LED on the chassis system LED panel is lit. See "Light path diagnostics LEDs" on page 205 for more information about the LEDs on the BladeCenter HX5 blade server.

The fault LED turns off only after the error is corrected.

Note: When the fault LED turns off, you should also clear the IMM event log. Use the Setup utility to clear the IMM event log.

IBM MAX5 LEDs

When there is a fault on the IBM MAX5 expansion blade, the front bezel of the IBM MAX5 expansion blade will appear to have an orange glow. You can press the light path button on the system board of the IBM MAX5 expansion blade to determine which LEDs are lit.

Note: If there is an orange glow, it will be referred to as MEU (Memory Expansion Unit) Fault in the system event log.

The following LEDs are available on the IBM MAX5 expansion blade light path diagnostic panel:

See Light Path Below (LP1)
This amber LED indicates that there is a problem with the BladeCenter HX5 to which the IBM MAX5 expansion blade was attached. If this LED is lit, complete the following steps:

1. Remove the IBM MAX5 expansion blade (see "Removing an IBM MAX5 expansion blade" on page 87).
2. Press the power button on the BladeCenter HX5 blade server to determine which LEDs are lit on the blade server.

The See Light Path Below (LP1) LED is referred to as MEU Look Below in the system event log.

System Board (S BRD)
This amber LED indicates that there is a problem with the system board. If this amber LED is lit, complete the following steps:

1. Install the IBM MAX5 (see "Installing an IBM MAX5 expansion blade" on page 89).
2. Install the BladeCenter HX5 in the chassis (see "Installing a blade server in a BladeCenter chassis" on page 65).
3. Restart the blade server.
4. Check system-event and IMM/AMM logs related to memory and resolve those events (see "POST error codes" on page 152 and "IMM error codes in AMM" on page 162).
5. If the problem remains, replace the system board on the IBM MAX5 (see "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144 for instructions).

The System Board (S BRD) LED is referred to as MEU Error in the system-event log.

Light path power (LP2)
This amber LED indicates that one or more LEDs are lit on the IBM MAX5 system board. See "Light path diagnostics LEDs - IBM MAX5" on page 206 for additional information.See the *Problem Determination and Service Guide* for additional information..

The Light path power (LP2) LED is referred to as MEU LED Power in the system event log.

See "Light path diagnostics LEDs - IBM MAX5" on page 206 for more information about the LEDs on the IBM MAX5 expansion blade.

Scalability indicators

The BladeCenter HX5 blade server provides scalability indicators, which are viewable through the front bezel of the blade server when it is installed in a BladeCenter chassis. The scalability indicators remain lit until the blade server is started.

The BladeCenter HX5 blade server can be deployed as a stand-alone blade server. It can also be combined with another BladeCenter HX5 blade server to form a scalable blade complex. When two BladeCenter HX5 blade servers are combined into a scalable blade complex, you can specify that they operate as a single hardware partition or operate in stand-alone mode.

The scalability indicators show whether a BladeCenter HX5 blade server is a stand-alone blade server or a node in a scalable blade complex operating as a single hardware partition.

When a BladeCenter HX5 blade server is a stand-alone blade server, the scalability indicators continually move up and down the front of the bezel.

LEDs
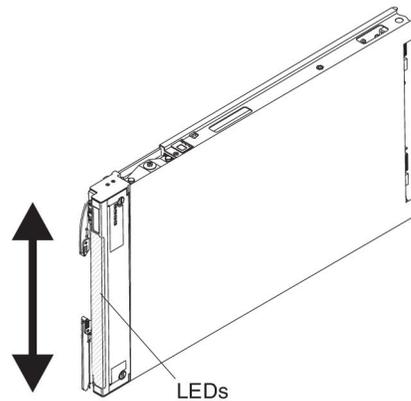
When a BladeCenter HX5 blade server is part of the scalable blade complex operating in single partition mode, the scalability indicators move up the first blade server, cross over to the second blade server, and then move down the second blade server.

Note: If you have set up a scalable blade complex in single partition mode but when you start the blade servers, the scalability indicators for each blade server seem to be operating independently, there might be a problem with the configuration of the scalable blade complex.

LEDs
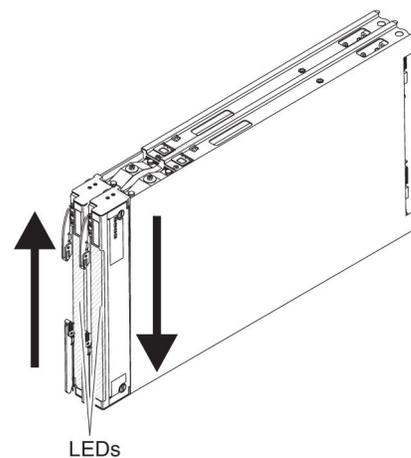
Turning on the blade server

After you connect the blade server to power through the BladeCenter chassis, the blade server can be started in any of the following ways.

About this task

- You can press the power button on the front of the blade server (see "Blade server controls and LEDs" on page 6) to start the blade server. The power button works only if local power control is enabled for the blade server. Local power control is enabled and disabled through the advanced management module web interface.

  Notes:
  1. Wait until the power LED on the blade server flashes slowly before you press the power button. While the service processor in the blade server is initializing and synchronizing with the advanced management module, the power-on LED flashes rapidly, and the power-control button on the blade server does not respond. This process can take approximately 90 seconds after the blade server has been installed.
  2. While the blade server is starting, the power LED on the front of the blade server is lit and does not flash. See "Blade server controls and LEDs" on page 6 for the power LED states.
- If a power failure occurs, the BladeCenter chassis and the blade server can be configured through the advanced management module web interface to start automatically when power is restored.
- You can turn on the blade server through the advanced management module web interface. For more information about the advanced management module web interface, see the *IBM BladeCenter Advanced Management Module: User's Guide*.
- You can turn on the blade server through the Wake on LAN feature. The blade server must be connected to power (the power-on LED is flashing slowly), the blade server must be communicating with the advanced management module, the operating system must support the Wake on LAN feature, and the Wake on LAN feature must be enabled through the advanced management module interface.

  Note: Procedure to enable the Wake on LAN feature varies depending on the network device. Refer to the documentation that is provided for your network device for more information.

Turning off the blade server

When you turn off the blade server, it is still connected to power through the BladeCenter chassis. The blade server can respond to requests from the service processor, such as a remote request to turn on the blade server. To remove all power from the blade server, you must remove it from the BladeCenter chassis.

About this task

Before you turn off the blade server, shut down the operating system. See the operating-system documentation for information about shutting down the operating system.

The blade server can be turned off in any of the following ways:
- You can press the power button on the blade server (see "Blade server controls and LEDs" on page 6). Pressing the button starts an orderly shutdown of the operating system, if this feature is supported by the operating system.
- If the operating system stops functioning, you can press and hold the power button for more than 4 seconds to turn off the blade server.

Attention: Pressing the button for 4 seconds forces the operating system to shut down immediately. Data loss is possible.

- You can turn off the blade server through the advanced management module web interface. For more information about the advanced management module web interface, see the *IBM BladeCenter Advanced Management Module: User's Guide*.

System board layouts

Use these system board layouts to locate connectors, LEDs, and switches on the system board of the blade server.

Blade server connectors - BladeCenter HX5

Use this information to locate blade server system board components and connectors for optional devices.

The following illustration shows the system board components, including connectors for user-installable optional devices, in the blade server.

Power sharing connector

Scaling card connector

Control panel connector

DIMMs 1 - 8

I/O expansion connector (SSD)

I/O expansion connector (CIOv)

Microprocessor 1

TIGHTEN SCREWS ALTERNATELY

Microprocessor 2

Battery

Hypervisor inteposer connector

DIMMs 9 - 16

Blade expansion connector
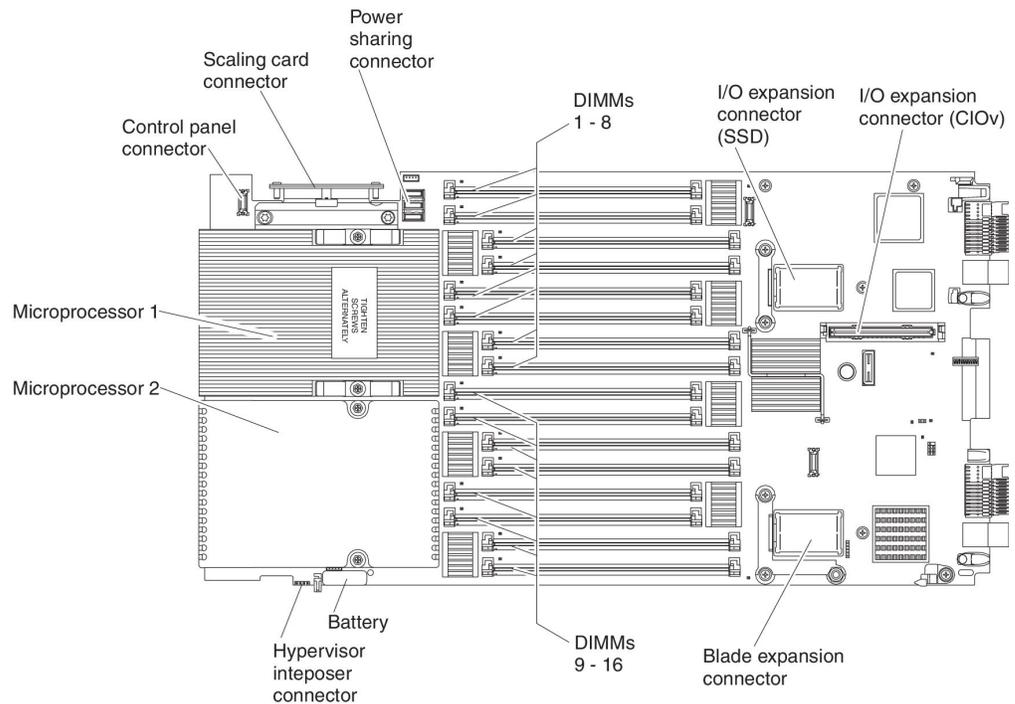
Note: The optional SSD expansion card is installed in the I/O expansion connector (SSD).

System-board switches

Use this information to locate and understand the system-board switches in the blade server.

The following illustration shows the location of the switch block and the IMM backup jumper on the system board.

SW2
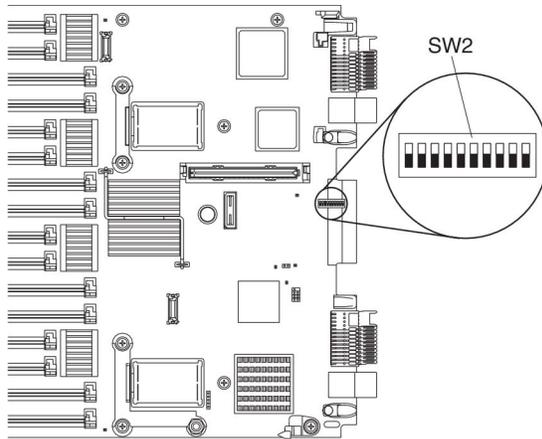
The following table describes the function of the switches in the switch block (SW2).

Switch number	Description	Switch setting	Definition
SW2 - 1	Reserved		
SW2 - 2	Force power on	The default position is off.	Turning this switch to the on position forces the blade server to power on
SW2 - 3	Trusted Platform Module (TPM) physical presence	The default position is off.	Turning this switch to the on position indicates a physical presence to the TPM.
SW2 - 4	Password override switch	The default position is off.	Turn this switch to the on position overrides the power on password.
SW2 - 5	Real time clock (RTC) reset	The default position is off.	Turning this switch to the on position resets the RTC. A momentary toggle is all that is required. To avoid excessive battery drain, do not leave this switch on.
SW2 - 6	Reserved		
SW2 - 7	Flash bank select	The default position is off.	Turning this switch to the on position forces the blade to boot from the backup UEFI image.
SW2 - 8	Wake on LAN (WOL) disable	The default position is off.	Turning this switch to the on position disables WOL.
SW2 - 9	Force H8 update	The default position is off.	N/A
SW2-10	Reserved		

Blade server connectors - IBM MAX5

Use this information to locate the IBM MAX5 expansion blade connectors.

The following illustration shows the system board components, including connectors for user-installable optional devices, in the IBM MAX5 expansion blade.
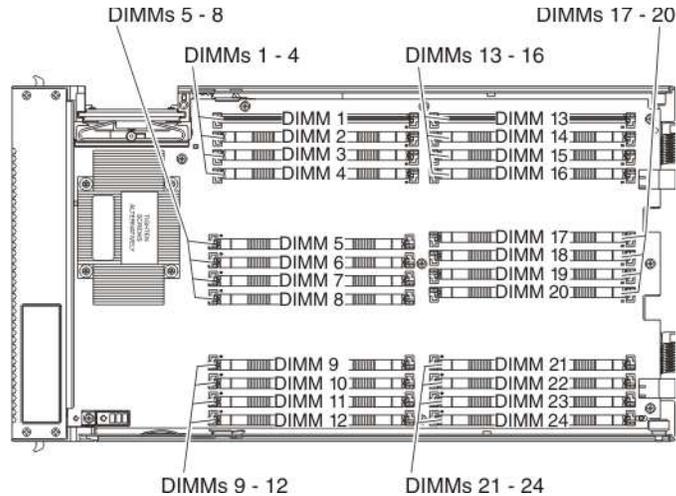
System-board LEDs - BladeCenter HX5

Use this information to locate system-board LEDs in the blade server.

The following illustration shows the LEDs on the system board. For more information about using light path diagnostics to view and resolve LEDs, see "Light path diagnostics" on page 200. For information about diagnosing and solving possible errors that are indicated by the light path diagnostics LEDs. see "Light path diagnostics LEDs" on page 205.
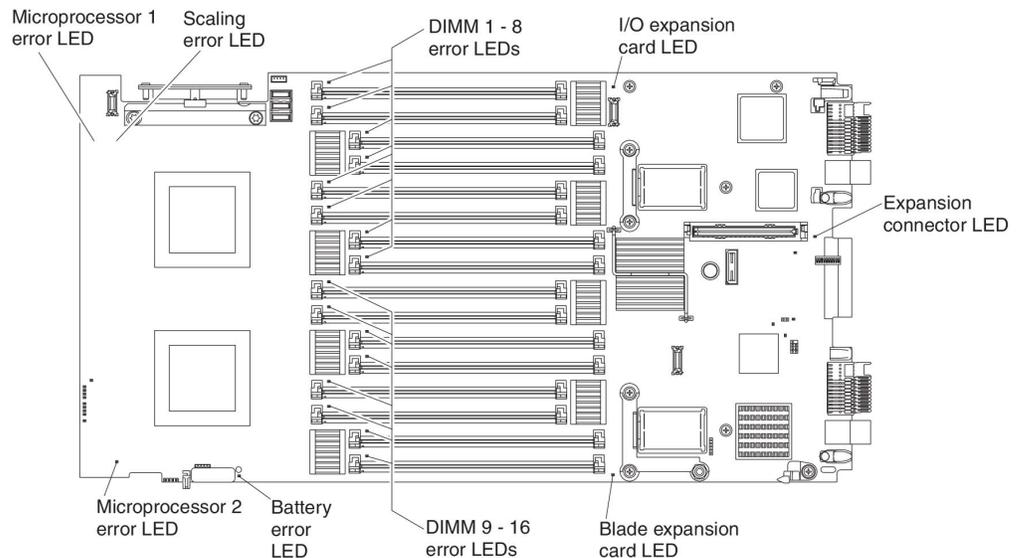
System-board LEDs - IBM MAX5 expansion blade

Use this information to locate system-board LEDs in the IBM MAX5 expansion blade.

The following illustration shows the LEDs on the system board. To determine if one or more LEDs are lit on the IBM MAX5 expansion blade system board, check the front bezel for an orange glow. For more information about using light path diagnostics to view and resolve LEDs, see "Light path diagnostics" on page 200. For information about diagnosing and solving possible errors that are indicated by the light path diagnostics LEDs. see "Light path diagnostics LEDs - IBM MAX5" on page 206.
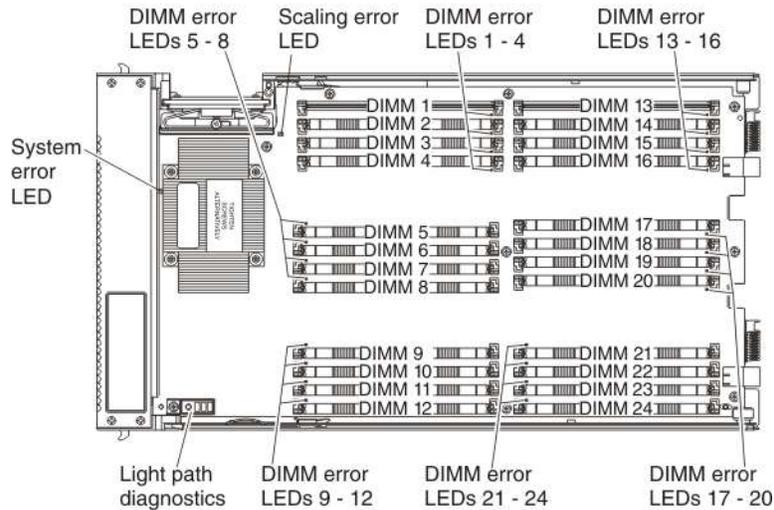
Working with a scalable blade complex

You can assemble two BladeCenter HX5 blade servers together to create a scalable blade complex.

A scalable blade complex supports the following implementation modes:

- **Single partition**. The complex functions as a single server that contains up to four multi-core processors and up to 32 DIMMs. When the complex is implemented as a single hardware partition, the leftmost blade server (as installed in a BladeCenter chassis) is called the primary blade server. The blade server on the right is called the secondary blade server.

Primary blade server

Secondary blade server
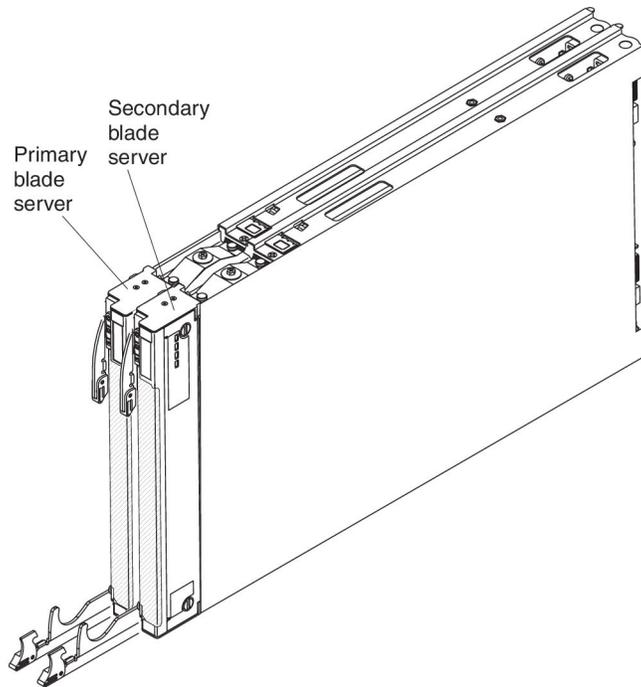
- **Multiple partitions (independent partitions)**. The blade servers are combined into a scalable blade complex, but each of the blade servers is set up as a single partition.
- **Stand-alone mode**. The blade servers operate independently.

Important: If you install the primary blade server of a scalable blade complex in blade server bay 7 of a BladeCenter H Type 8852 chassis, the secondary blade server is installed in blade server bay 8. The primary blade server receives power from power domain 1 of the chassis and the secondary blade server receives power from power domain 2 of the chassis. The following situations can occur if there is a power loss to either power domain, depending on how the scalable blade complex is implemented:

- If the scalable blade complex is implemented in single partition mode, a loss of power to power domain 1 or power domain 2 results in both blade servers in the scalable blade complex going down.
- If the scalable blade complex is implemented in stand-alone mode, a loss of power to power domain 1 results in the entire scalable blade complex going down. A loss of power to power domain 2 results in the blade server installed in blade server bay 8 going down, but the blade server installed in blade server bay 7 continues to function.

With FlexNode processing, you can toggle between single partition mode and stand-alone mode without having to modify the physical setup of the blade servers. To toggle between modes, use the advanced management module web interface.

For example, assume that you have created a scalable blade complex and defined that complex as a single partition through the advanced management module web interface:

- You can toggle the scalable blade complex to stand-alone mode through the web interface. In stand-alone mode, you can install a different operating system on each blade server and run different applications on each blade server.

- You can then toggle the blade server complex back to a single partition and run applications that take advantage to up to 4 processors and 32 DIMMs. The operating system that is in use is the operating system of the primary blade server.
- Later, you can toggle the complex back to stand-alone mode again to gain access to the operating system on the secondary blade server.

Single partition mode considerations

The following considerations apply to the blade servers in a scalable blade complex that operates as a single hardware partition:

- All UEFI settings (set through the Setup utility) should be the same on both blade servers. If they are not, the settings that are defined for the primary blade server replace the UEFI settings on the secondary server.

  Note: When you upgrade the firmware for the blade servers operating in single partition mode, you only have to upgrade the primary blade server. The firmware on the secondary blade server is automatically updated. See "Using the Setup utility" on page 20 for more information about the Setup utility.
- The primary blade server has access to the SSDs on the secondary blade server. However, the SSDs on the primary blade server cannot be combined with the SSDs on the secondary blade server to form a single RAID array. RAID arrays can be formed only using the SSDs within a blade server.
- The primary blade server has access to any I/O expansion cards that are installed in the secondary blade server. However, the I/O expansion cards in the secondary blade server cannot be used for a Serial Over LAN connection.
- The primary blade server has access to any expansion blades that are installed on the secondary blade server.

  Important: An expansion blade installed on the secondary blade server cannot be used for a Serial Over LAN connection.
- If you press the power button on one blade server, both blade servers in the partition either power up or power down, depending on the state of the blade servers when you press the power button.

Chapter 2. Configuring the blade server

There are several components on the blade server that you can configure and several methods for configuring those components.

About this task

Note: If you intend to use a scalable blade complex in single partition mode, you must partition the complex before you turn on the blade servers or begin the configuration process. See "Partitioning a scalable blade complex" on page 20 for information.

Typically, you complete the following steps to configure the blade server:

Procedure

1. Configure the Unified Extensible Firmware Interface (UEFI) firmware for the blade server. You can configure the UEFI firmware by using the Setup utility or the Advanced Settings Utility (ASU). For more information about the Setup utility, see "Using the Setup utility" on page 20. For more information about ASU, see "Using the Advanced Settings Utility (ASU)" on page 25.

   Note: For more information about firmware configuration options, see *Introducing UEFI-Compliant Firmware on IBM System x and BladeCenter Servers* at http://www.ibm.com/systems/support/supportsite.wss/ docdisplay?lndocid=MIGR-5083207&brandind=5000008.

2. Set the boot protocol. To set the boot protocol, use either the Setup Utility or the Preboot Execution Environment (PXE) boot agent utility program. For more information about the PXE boot agent utility program, see "Using the PXE boot agent utility program" on page 25.

   Note: You can temporarily redefine the boot order by using the Boot menu program that is provided with the blade server firmware

3. Configure the RAID array.

   You can install up to two solid state drives in the blade server and implement RAID level-0 (striping) or RAID level-1 (mirror) arrays in operating systems that are listed on the ServerProven® list at http://www.ibm.com/servers/ eserver/serverproven/compat/us/eserver.html. For the blade server, you must configure the RAID by using the LSI Configuration Utility program.

   Note: If you are implementing a scalable blade complex in single partition mode, you cannot combine the SSD in both the primary and the secondary server to define a RAID array. RAID arrays can be defined using only the SSDs within a blade server.

   If an optional RAID expansion card is installed, you can use it to control all the storage drives that are installed in the blade server. See the documentation that comes with the expansion card for information about how to configure the RAID array.

   Important: You must create the RAID array *before* you install the operating system on the blade server.

4. Configure the integrated management module (IMM). To configure the IMM, use either the Setup utility or the Advanced Settings Utility (ASU).

5. Update the blade server firmware. For more information about updating blade server firmware, see "Updating firmware and device drivers" on page 31 If you are performing inband updates to firmware on blade servers operating as a single partition in a scalable blade complex, see "Updating firmware for blade servers operating as a single partition" on page 32. If you are updating firmware for blade servers that are operating as independent partitions in a scalable blade complex or you are performing out-of-band updates to firmware for blade servers in a scalable blade complex, see "Updating firmware for each blade server independently" on page 32.

6. Use IBM FastSetup IBM FastSetup is a no-cost software tool that helps simplify the maintenance and deployment of selected IBM BladeCenter chassis, servers, and components. The intuitive graphical interface initializes all phases of server setup, including discovery, update, and configuration. Features include templates that enable replication of settings to many servers and automation that reduces hands-on time and user errors. Wizards and other default settings enable customization capabilities. The low-touch, set-once and walk-away feature reduces the hands-on server setup time from days to minutes, particularly for larger deployments. For information about this tool, see http://www.ibm.com/support/entry/portal/docdisplay?brand=5000008 &lndocid=TOOL-FASTSET.

What to do next

Partitioning a scalable blade complex

Before you configure the blade servers that are part of a scalable blade complex operating in single partition mode, you must partition the scalable blade complex.

About this task

For more information about scalable blade complexes and operating modes, see "Working with a scalable blade complex" on page 16.

To partition a scalable blade complex, complete the following steps:

Procedure

1. From the advanced management module web interface, click **Scalable Complex** > **Configuration**.
2. Select one or more of the blade servers that are part of the complex.
3. Click **Available actions** > **Create partition**.

Using the Setup utility

Use these instructions to start the Setup utility.

About this task

To start the Setup utility, complete the following steps:

Procedure

1. Turn on the blade server (see "Turning on the blade server" on page 11).
2. Immediately give the blade server control of the BladeCenter unit shared keyboard, video, and mouse ports.

- If you are managing the blade server by using the BladeCenter system console, press the KVM select button on the blade server (see "Blade server controls and LEDs" on page 6 for information).
- If you are managing the blade server from a remote location, see the *IBM BladeCenter Advanced Management Module: User's Guide*, *IBM BladeCenter Advanced Management Module: Command-Line Interface Reference Guide*, or *Serial over LAN Setup Guide for IBM BladeCenter* for information and instructions.

3. When the prompt `Press <F1> Setup` is displayed, press F1. If you have set an administrator password, you must type the administrator password to access the full Setup utility menu. If you do not type the administrator password, a limited Setup utility menu is available.
4. Follow the instructions on the screen.

Results

The following menu items are on the Setup utility main menu. Depending on the version of the Unified Extensible Firmware Interface (UEFI), some menu items might differ slightly from these descriptions.

- **System Information**

  Select this choice to view information about the server. When you make changes through other choices in the Setup utility, some of those changes are reflected in the system information; you cannot change settings directly in the system information. This choice is on the full Setup utility menu only.

  – **System Summary**

    Select this choice to view configuration information, including the ID, speed, and cache size of the microprocessors, machine type and model of the server, the serial number, the system UUID, and the details about the memory that is installed in the BladeCenter HX5 blade server and the IBM MAX5 expansion blade.

  – **Product Data**

    Select this choice to view the system board identifier, the revision level or issue date of the firmware, the integrated management module and diagnostics code, and the version and date.

  This choice is on the full UEFI Setup Utility menu only.

- **System Settings**

  Select this choice to view or change the server component settings.

  – **Adapters and UEFI Drivers**

    Select this choice to view information about the adapters and UEFI drivers installed in the server.

    Note: Before you configure a UEFI-compatible device, you should update the firmware for your blade server. See "Updating firmware and device drivers" on page 31 for information about how to update the firmware for your blade server.

    To configure a UEFI-compatible expansion card, complete the following steps:

    1. Select **Please refresh this page first** and press Enter.
    2. Select the device driver that you want to configure and press Enter.
    3. When you have finished changing settings, press Esc to exit from the program; select **Save** to save the settings that you have changed.

  – **Processors**

    Select this choice to view or change the processor settings.

– **Memory**

Select this choice to view or change the memory settings related to the BladeCenter HX5 blade server and the MAX5 expansion blade.

Note: Select the **Memory Scaling Affinity** setting to specify whether the memory in the MAX5 expansion blade is distributed to each processor domain (non-pooled) or set up as a separate memory domain (pooled).

– **Devices and I/O Ports**

Select this choice to view or change assignments for devices and input/output (I/O) ports. You can configure the remote console redirection, and enable or disable integrated Ethernet controllers. If you disable a device, it cannot be configured, and the operating system cannot detect it (disabling a device is equivalent to disconnecting the device).

You can also choose to enable or disable adapter option ROM support. Disabling support can potentially improve the time it takes the blade server to start.

– **Power**

Select this choice to view or change Active Energy Manager (AEM) power capping to control power consumption and processor performance states.

– **Operating Modes**

Select this choice to determine operational settings, such as operating mode (acoustic, efficiency, or performance) and memory speed.

– **Integrated Management Module**

Select this choice to view or change the settings for the integrated management module (IMM).

  - **POST Watchdog Timer**

  Select this choice to view or enable the POST watchdog timer.

  - **POST Watchdog Timer Value**

  Select this choice to view or set the POST loader watchdog timer value.

  - **Reboot System on NMI**

  Select this choice to enable or disable restarting the system whenever a nonmaskable interrupt (NMI) occurs. **Disable** is the default.

  - **Commands on USB Interface Preference**

  Select this choice to specify whether the Ethernet over USB interface is enabled or disabled.

  Note: This option is primarily for older operating systems that have problems with USB communications device class (CDC) Ethernet interfaces. Disabling this option will cause the following issues:

  • Online update packages will not work.
  • Updates that use Bootable Media Creator (BoMC) will not work because BoMC uses the LAN over USB interface.
  • You must install the IPMI device driver to use ASU to change the IMM or UEFI configuration.
  • You cannot set the IMM OS Loader watchdog.

  - **Network Configuration**

  Select this choice to view the system management network interface port, the IMM MAC address, the current IMM IP address, and host name; define the static IMM IP address, subnet mask, and gateway address; specify

whether to use the static IP address or have DHCP assign the IMM IP address; save the network changes; and reset the IMM.

- **Reset IMM to Defaults**

  Select this choice to reset the IMM to the default settings.

- **Reset IMM**

  Select this choice to reset the IMM.

– **Legacy Support**

Select this choice to view or set legacy support.

- **Force Legacy Video on Boot**

  Select this choice to enable or disable force INT video support, if the operating system does not support UEFI video output standards. The default is **Enable**.

- **Rehook INT**

  Select this choice to enable or disable devices from taking control of the boot process. The default is **Disable**.

- **Legacy Thunk Support**

  Select this choice to enable or disable UEFI to interact with PCI mass storage devices that are non-UEFI compliant. The default is **Enable**.

– **System Security**

Select this choice to view or configure security options for Trusted Platform Module (TPM).

– **Network**

Select this choice to view or configure the network device options, such as iSCSI, PXE, and Broadcom.

– **Trusted Platform Module (TPM)**

Select this choice to view and configure TPM settings.

- **Date and Time**

  Select this choice to set the date and time for the server. The date is set in *month/day/year* format. The time is set in 24-hour format (*hour:minute:second*).

  This choice is on the full UEFI Setup Utility menu only.

- **Start Options**

  Select this choice to view or change the start options, including the startup sequence, keyboard NumLock state, PXE boot option, and PCI device boot priority. Changes in the startup options take effect when you start the blade server.

  The startup sequence specifies the order in which the blade server checks devices to find a boot record. The blade server starts from the first boot record that it finds. If the blade server has Wake on LAN hardware and software and the operating system supports Wake on LAN functions, you can specify a startup sequence for the Wake on LAN functions. For example, you can define a startup sequence that checks for a disc in the CD-RW/DVD drive, then checks the hard disk drive, and then checks a network adapter.

  This choice is on the full UEFI Setup utility menu only.

- **Boot Manager**

  Select this choice to view, add, delete, or change the device boot priority, boot from a file, select a one-time boot, or reset the boot order to the default setting.

- **System Event Logs**

  Select this choice to access the System Event Manager, where you can view the POST event log and the system-event log.

The POST event log contains the three most recent error codes and messages that were generated during POST.

The system-event log contains POST and system management interrupt (SMI) events and all events that are generated by the baseboard management controller that is embedded in the integrated management module.

Important: If the system-error LED on the front of the server is lit but there are no other error indications, clear the system-event log. Also, after you complete a repair or correct an error, clear the system-event log to turn off the system-error LED on the front of the server.

- **POST Event Viewer**

  Select this choice to enter the POST event viewer to view the POST error messages.

- **System Event Log**

  Select this choice to view the system-event log.

- **Clear System Event Log**

  Select this choice to clear the system-event log.

- **User Security**

  Select this choice to set, change, or clear passwords.

  You can set, change, and delete a power-on password and an administrator password through this selection. If you set a power-on password, you must type the power-on password to complete the system startup and to have access to the Setup Utility menu.

  The password must be from 6 to 20 characters. You can use any combination of ASCII printable characters for the password. Keep a record of your password in a secure place.

  If you forget the power-on password, you can regain access to the blade server either by removing the blade server battery and then reinstalling it (see "Removing the battery" on page 75 and "Installing the battery" on page 76) or by using the power-on password override switch (see "System-board switches" on page 13).

  An administrator password is intended to be used by a system administrator; it limits access to the full Setup utility menu.

  Attention: If you set an administrator password and then forget it, there is no way to change, override, or remove it. You must replace the system board.

- **Save Settings**

  Select this choice to save the changes that you have made in the settings.

- **Restore Settings**

  Select this choice to cancel the changes that you have made in the settings and restore the previous settings.

- **Load Default Settings**

  Select this choice to cancel the changes that you have made in the settings and restore the factory settings.

- **Exit Setup**

  Select this choice to exit from the Setup utility. If you have not saved the changes that you have made in the settings, you are asked whether you want to save the changes or exit without saving them.

Using the PXE boot agent utility program

Use the Preboot Execution Environment (PXE) boot agent utility program to select the boot protocol and other boot options and to select a power-management option.

About this task

Notes:

1. The blade server does not support Remote Program Load (RPL) selection for the boot protocol option.
2. Enabling PXE might reduce the number of optional expansion modules that your blade server can manage.

To start the PXE boot agent utility program, complete the following steps:

1. Turn on the blade server (see "Turning on the blade server" on page 11).
2. When the `Broadcom NetXtreme Boot Agent vX.X.X` prompt is displayed, press Ctrl + S. You have 2 seconds (by default) to press Ctrl + S after the prompt is displayed.
3. Follow the instructions on the screen to change the settings of the selected items.

Using the Boot Selection Menu program

The Boot Selection Menu program is a built-in, menu-driven configuration utility program that you can use to temporarily redefine the first startup device without changing settings in the Setup utility.

About this task

To use the Boot Selection Menu program, complete the following steps:

Procedure

1. Turn off the blade server.
2. Restart the blade server.
3. Press F12 (**Select Boot Device**). If a bootable USB mass storage device is installed, a submenu item (**USB Key/Disk**) is displayed.
4. Use the Up Arrow and Down Arrow keys to select an item from the Boot Selection Menu and press **Enter**.

Results

The next time the blade server starts, it returns to the startup sequence that is set in the Setup utility.

Using the Advanced Settings Utility (ASU)

You can use the Advanced Settings Utility (ASU) to modify firmware settings from the command line on multiple operating systems, such as Linux, Windows, and Windows Professional Edition (PE).

About this task

You can use the ASU to perform the following tasks:

- Modify selected firmware UEFI settings without restarting the blade server to access F1 settings.
- Modify selected settings in integrated management module (IMM) based blade servers for the IMM firmware and IBM System x Server Firmware.
- Modify a limited number of VPD settings on IMM-based blade servers.
- Modify iSCSI boot settings.

For more information about using the ASU, see http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=TOOL-CENTER&brandind=5000016.

Updating the Universal Unique Identifier (UUID)

The Universal Unique Identifier (UUID) must be updated when the system board is replaced. Use the Advanced Settings Utility to update the UUID.

About this task

You can download the ASU from the IBM website. To download the ASU and update the UUID, complete the following steps.

Procedure

1. Download the Advanced Settings Utility (ASU) from http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=TOOL-ASU&brandind=5000016.
2. Select one of the following methods to access the IMM to set the UUID:
   - Online from the target system (LAN or keyboard console style (KCS) access)
   - Remote access to the target system (LAN based)
   - Bootable media containing ASU (LAN or KCS, depending upon the bootable media)

   Note: IBM provides a method for building a bootable media. You can create a bootable media using the Bootable Media Creator (BoMC) application from http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=TOOL-BOMC&brandind=5000016. In addition, the Windows-based and Linux-based toolkits are also available to build a bootable media.
3. Copy and unpack the ASU package, which also includes other required files, to the server. Be sure to unpack the ASU and the required files to the same directory. In addition to the application program (asu or asu64), the following files are required:
   - For Windows-based operating systems:
     - ibm_rndis_server_os.inf
     - device.cat
   - For Linux-based operating systems:
     - cdc_interface.sh
4. After you unpack ASU, use the following command syntax to set the UUID:
   asu set SYSTEM_PROD_DATA.SysInfoUUID *uuid_value* [*access_method*]

   uuid_value

   Up to 16-byte hexadecimal value assigned by you.

access_method

> The access method that you selected to use from the following methods:

- Online authenticated LAN access, use the following syntax:

  [host *imm_internal_ip*] [user *imm_user_id*][password *imm_password*]

  Where:

  imm_internal_ip
  > The IMM internal LAN/USB IP address. The default value is 169.254.95.118.

  imm_user_id
  > The IMM account (1 of 12 accounts). The default value is USERID.

  imm_password
  > The IMM account password (1 of 12 accounts). The default value is PASSW0RD (with a zero, not the letter O).

  Note: If you do not specify any of these parameters, ASU uses the default values. When the default values are used and ASU is unable to access the IMM by using the online authenticated LAN access method, ASU automatically uses the unauthenticated KCS access method.

  The following commands are examples of using the user ID and password default values and not using the default values:

  Example that does not use the user ID and password default values:
  asu set SYSTEM_PROD_DATA.SYsInfoUUID *uuid_value* user *user_id* password *password*

  Example that does use the user ID and password default values:
  asu set SYSTEM_PROD_DATA.SysInfoUUID *uuid_value*

- Online KCS access (unauthenticated and user restricted):

  You do not need to specify a value for *access_method* when you use this access method.

  Example:
  asu set SYSTEM_PROD_DATA.SysInfoUUID *uuid_value*

  The KCS access method uses the IPMI/KCS interface. This method requires that the IPMI driver be installed. Some operating systems have the IPMI driver installed by default. ASU provides the corresponding mapping layer. See the *Advanced Settings Utility User's Guide* for more details. You can access the guide from http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=TOOL-ASU&brandind=5000016..

- Remote LAN access. Use the following syntax:

  Note: When you use the remote LAN access method to access IMM using the LAN from a client, the *host* and the *imm_external_ip* address are required parameters.

  host *imm_external_ip* [user *imm_user_id*[[password *imm_password*]

  Where:

  imm_external_ip
  > The external IMM LAN IP address. There is no default value. This parameter is required.

imm_user_id
> The IMM account (1 of 12 accounts). The default value is USERID.

imm_password
> The IMM account password (1 of 12 accounts). The default value is PASSW0RD (with a zero, not a letter O).

The following commands are examples of using the user ID and password default values and not using the default values:

Example that does not use the user ID and password default values:
```
asu set SYSTEM_PROD_DATA.SYsInfoUUID uuid_value host imm_ip
user user_id password password
```

Example that does use the user ID and password default values:
```
asu set SYSTEM_PROD_DATA.SysInfoUUID uuid_value host imm_ip
```

- Bootable media:

  You can also build a bootable media using the applications available at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=TOOL-CENTER&brandind=5000016..

5. Restart the blade server.

Updating the DMI/SMBIOS data

The Desktop Management Interface (DMI) must be updated when the system board is replaced. Use the Advanced Settings Utility to update the DMI.

To download the ASU and update the DMI, complete the following steps.

1. Download the Advanced Settings Utility (ASU) from http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=TOOL-ASU&brandind=5000016.

2. ASU sets the DMI in the IMM. Select one of the following methods to access the IMM to set the DMI:
   - Online from the target system (LAN or keyboard console style (KCS) access)
   - Remote access to the target system (LAN based)
   - Bootable media containing ASU (LAN or KCS, depending upon the bootable media)

     Note: IBM provides a method for building a bootable media. You can create a bootable media using the Bootable Media Creator (BoMC) application from http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=TOOL-BOMC&brandind=5000016. In addition, the Windows-based and Linux-based toolkits are also available to build a bootable media.

3. Copy and unpack the ASU package, which also includes other required files, to the server. Make sure that you unpack the ASU and the required files to the same directory. In addition to the application program (asu or asu64), the following files are required:
   - For Windows-based operating systems:
     - ibm_rndis_server_os.inf
     - device.cat
   - For Linux-based operating systems:
     - cdc_interface.sh

4. After you unpack ASU. Use the following syntax:

```
asu set SYSTEM_PROD_DATA.SysInfoProdName m/t_model [access_method]
asu set SYSTEM_PROD_DATA.SysInfoSerialNum s/n [access_method]
asu set SYSTEM_PROD_DATA.SysEncloseAssetTag asset_tag [access_method]
```

Where:

m/t_model

> The server machine type and model number. Type mtm *xxxxyyy*, where *xxxx* is the machine type and *yyy* is the server model number.

s/n The serial number on the server. Type sn *zzzzzzz*, where *zzzzzzz* is the serial number.

asset_method

> The server asset tag number. Type asset *aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa*, where *aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa* is the asset tag number.

[access_method]

> The access method that you select to use from the following methods:

- Online authenticated LAN access. Use the following syntax:

  ```
  [host imm_internal_ip] [user imm_user_id] [password imm_password]
  ```

  imm_internal_ip

  > The IMM internal LAN/USB IP address. The default value is 169.254.95.118.

  imm_user_id

  > The IMM account (1 of 12 accounts). The default value is USERID.

  imm_password

  > The IMM account password (1 of 12 accounts). The default value is PASSW0RD (with a zero, not the letter O).

  Note: If you do not specify any of these parameters, ASU uses the default values. When the default values are used and ASU is unable to access the IMM using the online authenticated LAN access method, ASU automatically uses the following unauthenticated KCS access method.

  The following commands are examples of using the user ID and password default values and not using the default values:

  Examples that do not use the userid and password default values:

  ```
  asu set SYSTEM_PROD_DATA.SYsInfoProdName m/t_model --user
  imm_user_id --password imm_password
  ```

  ```
  asu set SYSTEM_PROD_DATA.SYsInfoSerialNum s/n --user imm_user_id
  --password imm_password
  ```

  ```
  asu set SYSTEM_PROD_DATA.SYsEncloseAssetTag asset_tag --user
  imm_user_id --password imm_password
  ```

  Examples that do use the user ID and password default values:asu set
  SYSTEM_PROD_DATA.SysInfoProdName *m/t_model* asu set
  SYSTEM_PROD_DATA.SysInfoSerialNum *s/n* asu set
  SYSTEM_PROD_DATA.SysEncloseAssetTag *asset_tag*

- Online KCS access (unauthenticated and user restricted):

  You do not need to specify a value for *access_method* when you use this access method.

  The KCS access method uses the IPMI/KCS interface. This method requires that the IPMI driver is installed. Some operating systems have the IPMI driver installed by default. ASU provides the corresponding mapping layer.

See the *Advanced Settings Utility Users Guide* for more details. You can access the ASU Users Guide from http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=TOOL-ASU&brandind=5000016.

The following commands are examples of using the user ID and password default values and not using the default values:

Examples that do not use the user ID and password default values:

```
asu set SYSTEM_PROD_DATA.SYsInfoProdName m/t_model
asu set SYSTEM_PROD_DATA.SYsInfoSerialNum s/n
asu set SYSTEM_PROD_DATA.SYsEncloseAssetTag asset_tag
```

- Remote LAN access. Use the following syntax:

  Note: When using the remote LAN access method to access IMM using the LAN from a client, the *host* and the *imm_external_ip* address are required parameters.

  ```
  host imm_external_ip [user imm_user_id][password imm_password]
  ```

  imm_external_ip
  > The external IMM LAN IP address. There is no default value. This parameter is required.

  imm_user_id
  > The IMM account (1 of 12 accounts). The default value is USERID.

  imm_password
  > The IMM account password (1 of 12 accounts). The default value is PASSW0RD (with a zero, not the letter O).

  The following commands are examples of using the user ID and password default values and not using the default values:

  Examples that do not use the user ID and password default values:

  ```
  asu set SYSTEM_PROD_DATA.SYsInfoProdName m/t_model--host imm_ip --user
  imm_user_id --password imm_password
  asu set SYSTEM_PROD_DATA.SYsInfoSerialNum s/n --host imm_ip --user
  imm_user_id--password imm_password
  asu set SYSTEM_PROD_DATA.SYsEncloseAssetTag asset_tag--host imm_ip
  --user imm_user_id --password imm_password
  ```

  Examples that do use the user ID and password default values:

  ```
  asu set SYSTEM_PROD_DATA.SysInfoProdName m/t_model--host imm_ip
  asu set SYSTEM_PROD_DATA.SysInfoSerialNum s/n --host imm_ip
  asu set SYSTEM_PROD_DATA.SysEncloseAssetTag asset_tag --host imm_ip
  ```

- Bootable media:

  You can also build a bootable media using the applications available from http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=TOOL-BOMC&brandind=5000016.

5. Restart the blade server.

Using the LSI Logic Configuration Utility program

Use these instructions to start the LSI Logic Configuration Utility program.

About this task

You can use the LSI Logic Configuration Utility program to perform the following tasks:

- Set the device boot order
- Add or remove devices from the boot list
- Manage the RAID configuration

To start the LSI Logic Configuration Utility program, complete the following steps:

Note: The LSI controller on your blade server is a UEFI compatible device. It can be configured through the Setup utility for your blade server (see "Using the Setup utility" on page 20).

Procedure

1. Turn on the blade server, and make sure that the blade server is the owner of the keyboard, video, and mouse.
2. When the `<<<Press Ctrl-C to start LSI Logic Configuration Utility>>>` prompt is displayed, press Ctrl+C.
3. Use the arrow keys to select the controller from the list of adapters; then, press `Enter`.
4. Follow the instructions on the screen to change the settings of the selected items; then, press `Enter`. If you select **SAS Topology** or **Advanced Adapter Properties**, additional screens are displayed.

Updating firmware and device drivers

IBM periodically makes UEFI code, service processor (IMM) firmware, diagnostic firmware updates, and device driver updates available for the blade server. Several methods are available to update the firmware for the blade server.

If you are updating the firmware for the blade servers in a scalable blade complex operating in single partition mode, you only must update the firmware for the primary blade server. When you update the firmware for the primary blade server, the firmware for the secondary blade server is updated as well. Device drivers are updated through the operating system.

You can update the firmware and device drivers for the blade server by using one of the following methods.

- Using UpdateXpress System Packs. UpdateXpress System Packs (UXSP) contain an integration-tested bundle of online, updatable firmware and device drivers for your servers. For more information about UpdateXpress System Packs, see http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-XPRESS&brandind=5000008
- Using the IBM ToolsCenter Bootable Media Creator. You can use IBM ToolsCenter Bootable Media Creator to create bootable media that is suitable for applying firmware updates, running preboot diagnostics, and deploying Windows operating systems on supported systems. Using IBM ToolsCenter Bootable Media Creator, you can create a single bootable image on supported media (such as CD, DVD, ISO image, USB flash drive, or set of PXE files) that bundles multiple IBM BladeCenter tools and updates from UpdateXpress System Packs, which contain Windows and Linux® firmware and device-driver updates. You can also create an *IBM ServerGuide Setup and Installation* CD for deploying Windows operating systems and updates on supported systems. For more information about the Bootable Media Creator, see http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=TOOL-BOMC&brandind=5000008.

- Downloading the firmware and device drivers from http://www.ibm.com/
  support/fixcentral/systemx/groupView?query.productGroup=ibm
  %2FBladeCenter . Follow the instructions that come with the firmware and
  device drivers to install them.

  You must make sure that you update the firmware for each blade server in the
  scalable blade complex to the same levels before resetting the scalable blade
  complex. Refer to the following table to select the correct procedure to follow
  based on your configuration and preferred update method:

Table 2. Procedures to update firmware for blade servers in a scalable blade complex

Scalable blade complex mode	Inband updates	Out-of-band updates
Single partition	"Updating firmware for blade servers operating as a single partition"	"Updating firmware for each blade server independently"
Independent partitions	"Updating firmware for each blade server independently"	"Updating firmware for each blade server independently"

For more information about updating firmware and the preferred methods, see the
Firmware Update Best Practices white paper at http://www-947.ibm.com/
systems/support/supportsite.wss/docdisplay?lndocid=MIGR-5082923
&brandind=5000020.

For additional instructions about updating the firmware before attaching a IBM
MAX5 expansion blade, see http://www.ibm.com/support/entry/portal/
docdisplay?lndocid=MIGR-5085756

Updating firmware for blade servers operating as a single partition

If you are performing inband updates to firmware on blade servers operating as a
single partition in a scalable blade complex, updates made to the firmware on the
primary blade server are also applied to the secondary blade server.

You can obtain the firmware updates from http://www.ibm.com/support/
fixcentral/systemx/groupView?query.productGroup=ibm%2FBladeCenter .

Complete the following steps to update the firmware for the blade servers
operating as a single partition in a scalable blade complex:

1. Run the IMM firmware update package on the primary blade server.
2. Run the UEFI firmware update package on the primary blade server.
3. Run the FPGA firmware update package on the primary blade server.
4. Run the DSA preboot firmware update package the primary blade server.
5. Restart the scalable blade complex to activate the firmware.

The firmware updates that were made to the primary blade server are applied to
the secondary blade server.

Updating firmware for each blade server independently

If you are updating firmware for blade servers that are operating as independent
partitions in a scalable blade complex or you are performing out-of-band updates
to firmware for blade servers in a scalable blade complex, updates must be applied
to each system in the scalable complex independently.

You can obtain the firmware updates from http://www.ibm.com/support/
fixcentral/systemx/groupView?query.productGroup=ibm%2FBladeCenter .

Complete the following steps to update the firmware for the blade servers:

Note: The blade servers in the scalable blade complex must be at the same
firmware levels before they are restarted.

1. Update the IMM firmware on the primary blade server. Then update the IMM
   firmware on the secondary blade server.
2. Reset the IMM on the primary and secondary systems. Complete the following
   steps to reset the IMM through the advanced management module web
   interface:
   a. Click **Blade Tasks** > **Power/Restart**.
   b. Click the checkbox next to the blade servers to be reset.
   c. Click **Available actions** > **Restart Blade System Mgmt Processor**.
   d. Click **Perform Action**.
3. Update the UEFI firmware on the primary blade server. Then update the UEFI
   firmware on the secondary blade server.
4. Update the FPGA firmware on the primary blade server. Then update the
   FPGA firmware on the secondary blade server.
5. Update the DSA preboot firmware on the primary blade server. Then update
   the DSA Preboot firmware on the secondary blade server.
6. Restart both blade servers to activate the firmware

You can also use an Expect type script to automate advanced management module
command-line interface (CLI) commands for updating the firmware for both blade
servers. Complete the following steps to use an Expect type script:

1. Download the firmware for the BladeCenter HX5 blade server from
   http://www.ibm.com/support/fixcentral/systemx/
   groupView?query.productGroup=ibm%2FBladeCenter . Place the files on a
   TFTP server that is on the same TCP/IP subnet as the advanced management
   module for the chassis in which the blade servers are installed.

   Note: Remember to record the directory location on the TFTP server where you
   place the files; you will need that location to run the Expect type script.
2. Generate an Expect type script that will log in to the advanced management
   module CLI, update the firmware for the blade servers, and restart the blade
   servers when complete.
3. From a computer that is on the same TCP/IP subnet as the advanced
   management module for the chassis in which the scalable blade complex is
   installed, run the Expect type script.

Example of an Expect script

The following script illustrates how an Expect type script might be created to
update the firmware for both blade servers.

Important: IBM does not provide support for Expect scripts. For more information
about using Expect, see the Expect website at http://expect.sourceforge.net/. For
more information about using the advanced management module CLI, see the
BladeCenter Advanced Management Module Command-Line Interface Reference Guide at
http://publib.boulder.ibm.com/infocenter/bladectr/documentation/topic/
com.ibm.bladecenter.advmgtmod.doc/adv_man_mod_printable_doc.html.

```
#!/usr/bin/expect

##########################################################################
#                                                                        #
#  This tool has been built from the following sources:                  #
#                                                                        #
#  support/FlashMNBladeViaAmm.exp                        : 1.1           #
#  support/include/Log.exp                               : 1.9           #
#  support/include/AMM.exp                               : 1.29          #
#  support/include/MultiNode.exp                         : 1.1           #
#  support/include/FlashBlade.exp                        : 1.16          #
#                                                                        #
##########################################################################


##########################################################################
#                                                                        #
#  Code from source       : support/include/Log.exp                      #
#                                                                        #
##########################################################################


##########################################################################
#                                                                        #
#  Globals.                                                              #
#                                                                        #
##########################################################################

log_user 0
exp_internal -f /tmp/diag.txt 0

set fm_logfile ""
set g_normal_timeout_value 30
set timeout $g_normal_timeout_value

##########################################################################
#                                                                        #
#  Init the logging system.                                              #
#                                                                        #
##########################################################################

proc log_init { display_stdout } {
    global fm_logfile

    if {$display_stdout == 0} {
        log_user 1
    }

    set fm_logfile "/tmp/expect_logs.txt"
}

##########################################################################
#                                                                        #
#  Log to a directory.                                                   #
#                                                                        #
##########################################################################

proc log_init_directory { directory } {
    global fm_logfile

    set fm_logfile "$directory/ExpectLogs.txt"
    exp_internal -f $directory/ExpectDiag.txt 0
}

##########################################################################
#                                                                        #
#  Temp hack.                                                            #
#                                                                        #
##########################################################################

proc log_init_custom { logfile } {
    global fm_logfile
    global g_module_name
    global g_test_results_base_dir

    #
    #  Cache the module name.
    #

    set g_module_name $logfile

    #
```

```
    #  Figure out the logfile path.
    #

    test_results_set_base_dir

    #
    #  Set it.
    #

    set fm_logfile "$g_test_results_base_dir/Logfile.txt"
}

#############################################################################
#                                                                           #
#  Capture a log message with a nice time stamp.                            #
#                                                                           #
#############################################################################

proc ft_log { message } {
    global fm_logfile

    set date_val [ timestamp -format "%m/%d: %X: " ]

    log_file $fm_logfile
    send_log -- "$date_val $message\n"
    log_file

    send_user -- "$date_val $message\n"
}

#############################################################################
#                                                                           #
#  Bail on a critical error.                                                #
#                                                                           #
#############################################################################

proc ft_error { message } {
    ft_log "ERROR: $message"
    puts "\n\nERROR: $message"
    exit
}

#############################################################################
#                                                                           #
#  Code from source      : support/include/AMM.exp                          #
#                                                                           #
#############################################################################

#############################################################################
#                                                                           #
#  Globals.                                                                 #
#                                                                           #
#############################################################################

set amm_id ""                         ;#  Spawn ID for AMM ssh connection.
set save_amm ""                       ;#  Save pointer of original amm value.
set save_target ""                    ;#  Save pointer for current AMM state.
set save_userid ""                    ;#  Save pointer of original userid value.
set save_password ""                  ;#  Save pointer of original password value.
array set g_imm_fw_levels  { }        ;#  Array of IMM firmware levels.
array set g_uefi_fw_levels { }        ;#  Array of uEFI firmware levels.

#############################################################################
#                                                                           #
#  Unexpected EOF handler.                                                  #
#                                                                           #
#############################################################################

proc eof_handler { } {
    global save_amm save_userid save_password

    ft_log "Unexpected EOF talking to AMM."

    #
    #  Clean up any zombies.
    #

    catch {close -i $amm_id}
    wait -nowait
```

```
    #
    #  The AMM closed the connection on us -- try to resume.
    #

    set amm_id ""

    set rv [ amm_login $save_amm $save_userid $save_password ]
    set rv [ amm_restore_save_target ]
}


############################################################################
#                                                                          #
#  Save off the current target value.                                      #
#                                                                          #
############################################################################

proc amm_save_target { string } {
    global save_target

    set save_target $string
}


############################################################################
#                                                                          #
#  Restore the AMM to its saved target value.                              #
#                                                                          #
############################################################################

proc amm_restore_save_target { } {
    global amm_id save_target

    send -i $amm_id "env -T $save_target\r"

    expect -i $amm_id -exact "OK" {
        return 0
    }

    ft_error "Unable to restore AMM target after disconnect."
}


############################################################################
#                                                                          #
#  Handy function to collect all flash failure logs for a given blade.     #
#                                                                          #
############################################################################

proc collect_flash_failure_logs { blade } {
    global g_target_blade g_test_results_dir

    #
    #  Create a storage space for our output.
    #

    set g_target_blade $blade
    set rv [ test_results_set_cwd ]

    #
    #  Have to be on an MM[N] target.
    #

    set rv [ amm_set_mm_target ]

    #
    #  Grab the VDBG data from the AMM.
    #

    ft_log "Blade: $blade -- Collecting AMM vdbg log."

    set vdbg_output "$g_test_results_dir/AMM_vdbg.txt"
    set rv [ collect_vdbg $vdbg_output ]

    if {$rv == 0} {
        ft_log "Blade: $blade -- Successfully collected AMM vdbg log."
    } else {
        ft_log "Blade: $blade -- Failure collecting AMM vdbg log."
    }


    #
    #  Grab the FFDC data from the IMM.
    #
```

```
        ft_log "Blade: $blade -- Collecting IMM FFDC logs."

        set rv [ imm_ffdc_init_capture $blade ]
        set rv [ imm_ffdc_collect_capture $blade ]
        set fn [ imm_ffdc_get_service_file_name $blade ]
        set rv [ collect_file_from_amm service "." $fn $g_test_results_dir/IMM_FFDC.tgz ]

        if {$rv == 0} {
            ft_log "Blade: $blade -- Successfully collected IMM FFDC data."
        } else {
            ft_log "Blade: $blade -- Failure collecting IMM FFDC data."
        }

        #
        #  Cleanup.
        #

        set rv [ imm_ffdc_cleanup_amm $fn ]
}

############################################################################
#                                                                          #
#  Reset all of the configured blades in the chassis.                      #
#                                                                          #
############################################################################

proc reset_all_blades { } {
    global blade_presence_bits

    for {set slot 1} {$slot < 15} {incr slot 1} {

        if { ! [info exists blade_presence_bits($slot)]} {
            continue
        }

        set present $blade_presence_bits($slot)

        if {$present == 1} {

            set rv [ reset_blade $slot ]

            if {$rv != 0} {
                ft_log "Blade: $slot did not reboot."
            }
        }
    }
}

############################################################################
#                                                                          #
#  Reset a blade via the AMM.  Returns 0 on success and 1 on timeout.      #
#                                                                          #
############################################################################

proc reset_blade { blade } {
    global amm_id

    #
    #  Reboot the blade.
    #

    send -i $amm_id "reset -T blade\[$blade\]\r\n"

    expect -i $amm_id "OK" {
        ft_log "Blade $blade:  Rebooted host OS."
        return 0
    } timeout {
        return 1
    }
}

############################################################################
#                                                                          #
#  Reset a blade via the AMM.  Returns 0 on success and 1 on timeout.      #
#                                                                          #
############################################################################

proc reset_blade_gator { blade } {
    global amm_id
```

```
        #
        #  Gator zap.
        #

        set gator_map    { 1 2 3 4 5 6 7 8 9 a b c d e f }
        set gator_offset [lindex $gator_map $blade_no]

        send -i $amm_id "dbg gator x $gater_offset -Tsystem:mm\[1\]\r\n"

        expect -i $amm_id "OK" {
            ft_log "Blade $blade:  Gator zap."
            return 0
        } timeout {
            return 1
        }
    }


    ##########################################################################
    #                                                                        #
    #  Reboot the AMM.                                                        #
    #                                                                        #
    ##########################################################################

    proc reboot_amm { } {
        global amm_id

        #
        #  Reboot the AMM.
        #

        send -i $amm_id "reset\r"

        #
        #  The AMM CLI needs to have the session opened until it goes away.
        #

        sleep 10

        ft_log "AMM:  Rebooted."

        return 0
    }


    ##########################################################################
    #                                                                        #
    #  Set the MM target to the value.                                       #
    #                                                                        #
    ##########################################################################

    proc amm_set_mm_target { } {
        global amm_id

        #
        #  We should discover what bay the MM is in, hardcoded to 1 right now.
        #

        set mm 1

        send -i $amm_id "env -T system:mm\[$mm\]\r"
        expect -i $amm_id -exact "system:mm\[$mm\]"

        expect -i $amm_id "OK" {
            set rv [ amm_save_target "system:mm\[$mm\]" ]
            return 0
        }

        return 1
    }


    ##########################################################################
    #                                                                        #
    #  Set the CLI target to 'system'.                                       #
    #    Returns 0 on success and 1 on failure.                              #
    #                                                                        #
    ##########################################################################

    proc amm_set_system_target { } {
        global amm_id
```

```
        send -i $amm_id "env -T system\r"

        expect -i $amm_id "OK" {
            set rv [ amm_save_target "system" ]
            return 0
        }

        return 1
}


##############################################################################
#                                                                            #
#  Set the CLI target to a blade.                                            #
#    Returns 0 on success and 1 on failure.                                  #
#                                                                            #
##############################################################################

proc amm_set_blade_target { blade_no } {
    global amm_id

    send -i $amm_id "env -T system:blade\[$blade_no\]\r"

    expect -i $amm_id "OK" {
        set rv [ amm_save_target "system:blade\[$blade_no\]" ]
        return 0
    }

    return 1
}


##############################################################################
#                                                                            #
#  Collect the current SOL ready status.                                     #
#                                                                            #
##############################################################################

proc blade_collect_sol_ready_status { } {
    global amm_id

    send -i $amm_id "sol\r"

    expect -i $amm_id "OK" {
    } timeout {
        return 1
    }

    expect -i $amm_id "SOL Session: Ready" {
        return 0
    }

    return 1
}



##############################################################################
#                                                                            #
#  Log into the AMM.                                                         #
#                                                                            #
##############################################################################

proc amm_login { amm userid password } {
    global amm_id save_amm save_userid save_password

    #
    #  Backup our login creds.
    #

    set save_amm $amm
    set save_userid $userid
    set save_password $password

    #
    #  SSH command with no host key checking.
    #

    spawn ssh -o StrictHostKeyChecking=no -o UserKnownHostsFile=/dev/null -l$userid $amm

    set amm_id $spawn_id
    ft_log "AMM: Login -- id: $amm_id"
```

```
        #
        #  Install an end of file handler to bomb out incase the AMM connection dies.
        #

        expect_after -i $amm_id eof eof_handler

        #
        #  Log into the AMM.
        #

        expect {
            "password:" {
            send "$password\r"
            }
        }

        #
        #  Make sure we made it.
        #

        expect -exact "system>"
}

#############################################################################
#                                                                           #
#  Log out of the AMM.  (Be nice to the CLI, it won't run commands some times  #
#  if you close the connection on it too soon).                             #
#                                                                           #
#############################################################################

proc amm_logout { } {
    global amm_id

    #
    #  Log out and let the CLI figure out what happened.
    #

    send -i $amm_id "exit\r"
    catch {close -i $amm_id}

    #
    #  Reap the child process.
    #

    wait

    ft_log "AMM: Logout -- id: $amm_id"
    set amm_id ""
}

#############################################################################
#                                                                           #
#  Collect the blade info from the AMM.                                     #
#                                                                           #
#############################################################################

proc collect_blade_info { blade } {
    global amm_id amm g_imm_fw_levels g_uefi_fw_levels

    send -i $amm_id "info -T blade\[$blade\]\r"

    #
    #  Find the BIOS string.
    #

    expect -i $amm_id "BIOS" {

        expect -i $amm_id "Build ID:" {

            expect -i $amm_id "\n" {

                set temp $expect_out(buffer)
                set length [ string length ${temp} ]
                set length [ expr $length - 3 ]

                set uefi_level [string range ${temp} 1 $length]
                set g_uefi_fw_levels($blade) $uefi_level
            }
        }
    }
```

```
    #
    #  Find the SP string.
    #

    expect -i $amm_id -re "Blade*" {

        expect -i $amm_id "Build ID:" {

            expect -i $amm_id "\n" {

                set temp $expect_out(buffer)
                set length [ string length ${temp} ]
                set length [ expr $length - 3 ]

                set imm_level [string range ${temp} 1 $length]
                set g_imm_fw_levels($blade) $imm_level
            }
        }
    }

    return 0
}

###############################################################################
#                                                                             #
#  Collect the blade power state from the AMM.                                #
#                                                                             #
###############################################################################

proc collect_blade_power_state { blade } {
    global amm_id amm

    send -i $amm_id "info -T blade\[$blade\]\r"
}

###############################################################################
#                                                                             #
#  Collect a file from the AMM.                                               #
#                                                                             #
###############################################################################

proc collect_file_from_amm { remote_directory filename local_copy } {
    global amm userid password

    set command "/usr/bin/curl"
    set arg1 "--silent"
    set arg2 "--user"
    set arg3 "${userid}:${password}"
    set arg4 "ftp://${amm}/${remote_directory}/${filename}"
    set arg5 "-o"
    set arg6 "${local_copy}"

    set run_command [list exec $command $arg1 $arg2 $arg3 $arg4 $arg5 $arg6]

    if {[catch $run_command result]} {
        ft_log "Curl: command crashed with result $result fetching $arg4"
        ft_log "Curl: The command was: ($command $arg1 $arg2 $arg3 $arg4 $arg5 $arg6"
        return 1
    }

    return 0
}

###############################################################################
#                                                                             #
#  Delete a file from the AMM.                                                #
#                                                                             #
###############################################################################

proc delete_file_from_amm { filename } {
    global amm_id

    send -i $amm_id "files -d ${filename}\r"

    expect -i $amm_id "OK" {
        return 0
    }

    return 1
```

```
    }

    ############################################################################
    #                                                                          #
    #  Code from source      : support/include/MultiNode.exp                   #
    #                                                                          #
    ############################################################################

    set multinode_complex [ list ]

    ############################################################################
    #                                                                          #
    #  Build a list of complexes.                                              #
    #                                                                          #
    ############################################################################

    proc populate_complex_list { } {
        global amm_id multinode_complex

        set multinode_entry [ list ]

        send -i $amm_id "scale\r\n"

        expect {

            #
            #  Find the complex ID.
            #

            -i $amm_id "Complex ID:" {

                expect -i $amm_id "\n" {
                    set temp $expect_out(buffer)
                    set complex [ string trimright $temp ]
                    set complex [ string range ${complex} 1 4 ]

                    set multinode_entry [ list ]
                    lappend multinode_entry ${complex}
                } timeout {
                    ft_error "parse error"
                }

                exp_continue
            }

            #
            #  Find the slots.
            #

            -i $amm_id "Bay: " {

                expect -i $amm_id "\n" {
                    set temp $expect_out(buffer)
                    set bay [ string trimright $temp ]
                    set bay [ string range ${bay} 0 [string length ${bay}]]

                    lappend multinode_entry ${bay}

                } timeout {
                    ft_error "parse error"
                }

                exp_continue
            }

            -i $amm_id "No scalable complex found" {
                ft_log "AMM: No multi nodes found."
            }
        }

        lappend multinode_complex $multinode_entry
    }

    ############################################################################
    #                                                                          #
    #  Return a list element for a given slot configuration.                   #
    #                                                                          #
    ############################################################################

    proc get_multinode_list_for_slot { slot_no } {
```

```
        global multinode_complex

        set empty [ list ]
        set temp [ list ]

        #
        #   Return an empty list if the multinode complex is has nothing.
        #

        set count [ llength $multinode_complex ]

        if {$count == 0 } {
            return $empty
        }

        #
        #   Search each list in the multinode complex list.
        #

        foreach temp $multinode_complex {

            #
            #   Now seach the sublist.
            #

            foreach temp1 $temp {
                if {$temp1 == $slot_no} {
                    return $temp
                }
            }
        }

        return $empty
}

###########################################################################
#                                                                         #
#   Send the update command for the blade.                                #
#                                                                         #
###########################################################################

proc flash_update_mn_blade { blade_no firmware_image } {
    global amm_id tftp_server g_normal_timeout_value

    #
    #   Tell the AMM no timeout.
    #

    send -i $amm_id "telnetcfg -t 0\r\n"
    expect -i $amm_id -exact "OK"

    #
    #   Populate a list of multi node targets.
    #

    set slots [ list ]
    set slots [ get_multinode_list_for_slot $blade_no ]

    #
    #   Validate it has data.
    #

    set count [ llength $slots ]

    if {$count == 0} {
        ft_error "Unable to find any valid multi node configuration."
        return 1
    }

    #
    #   Get a big timeout value while we flash.
    #

    set timeout 1000

    set complex_name [ lindex $slots 0 ]

    ft_log "Attempting to flash complex: $complex_name"

    #
```

```
              #  Flash each slot number.
              #

              foreach slot $slots {
                  if {$slot == $complex_name} {
                      continue
                  }

                  ft_log "Flashing slot number: $slot"

                  #
                  #  Send the update command.
                  #

                  send -i $amm_id "update -i $tftp_server -l $firmware_image -T system:blade\[$slot\]:sp\r\n"

                  #
                  #  Process results.
                  #

                  set rv 1

                  expect {
                      -i $amm_id "successful" { set rv 0 }
                      -i $amm_id "meant"      { set rv 1 }
                      -i $amm_id "failed"     { set rv 1 }
                      -i $amm_id "*nable*"    { set rv 1 }
                  }

                  if {$rv == 0} {
                      ft_log "AMM reports flash success for slot $slot"
                  } else {
                      return ${rv}
                  }
              }

              #
              #  Restore the timeout and return the rv.
              #

              set timeout $g_normal_timeout_value

              return 0
          }

          ###########################################################################
          #                                                                         #
          #  Code from source      : support/include/FlashBlade.exp                 #
          #                                                                         #
          ###########################################################################

          ###########################################################################
          #                                                                         #
          #  Sometimes the AMM leaves old UPD files hanging around.                  #
          #                                                                         #
          ###########################################################################

          proc purge_old_upd_files { } {
              global amm_id

              #
              #  AMM53 series introduced a strange behaviour that needs to
              #  be investigated but can be worked around with a delay.
              #

              sleep 20

              #
              #  Look for stale files.
              #

              send -i $amm_id "files -T system:mm\[1\]\r\n"

              expect {
                  -i $amm_id "Available:" { return }

                  -i $amm_id "volatile/*.upd*" {

                      puts "\n\n Must delete: $expect_out(buffer)\n\n"
                      return
```

```
            }
        }
    }

    ##########################################################################
    #                                                                        #
    #  Send the update command for the blade.                                #
    #                                                                        #
    ##########################################################################

    proc flash_update_blade { blade_no firmware_image } {
        global amm_id tftp_server g_normal_timeout_value

        #
        #  Get a big timeout value while we flash.
        #

        set timeout 1000

        #
        #  Make sure the AMM knows too.
        #

        send -i $amm_id "telnetcfg -t 0\r\n"
        expect -i $amm_id -exact "OK"

        #
        #  Populate a list
        #


        #
        #  Send the update command.
        #

        send -i $amm_id "update -i $tftp_server -l $firmware_image -T system:blade\[$blade_no\]:sp\r\n"

        #
        #  Process results.
        #

        set rv 1

        expect {
            -i $amm_id "successful" { set rv 0 }
            -i $amm_id "meant"      { set rv 1 }
            -i $amm_id "failed"     { set rv 1 }
            -i $amm_id "*nable*"    { set rv 1 }
        }

        #
        #  Restore the timeout and return the rv.
        #

        set timeout $g_normal_timeout_value

        return $rv
    }

    ##########################################################################
    #                                                                        #
    #  This loop will flash all blades in a given chassis to a given level of #
    #  IMM or uEFI firmware via the AMM.                                      #
    #                                                                        #
    ##########################################################################

    proc flash_all_blades { firmware } {

        global blade_presence_bits

        for {set slot 1} {$slot < 15} {incr slot 1} {

            if { ! [info exists blade_presence_bits($slot)]} {
                continue
            }

            set present $blade_presence_bits($slot)

            if {$present == 1} {
```

```
                    ft_log "Blade: $slot -- Updating to firmware: $firmware."

                    set rv [ flash_update_blade $slot $firmware ]

                    if {$rv == 0} {
                        ft_log "Blade: $slot -- Firmware update success."
                    } else {
                        ft_log "Blade: $slot -- Firmware update failed."
                        set rv [ collect_flash_failure_logs $slot ]
                    }

                    global amm_id
                    send -i $amm_id "\r"
                    set rv [ ft_delay 2 ]
                }
            }
        }


        #######################################################################
        #                                                                     #
        #  Script startup -- check usage and assign globals.                  #
        #                                                                     #
        #######################################################################

        if {$argc < 6} {
            puts "USAGE: $argv0 <Chassis_Ip> <Userid> <Password> <TftpServer> <TftpFilename> <Blade_No>"
            exit
        }

        set amm           [lindex $argv 0]
        set userid        [lindex $argv 1]
        set password      [lindex $argv 2]
        set tftp_server   [lindex $argv 3]
        set tftp_filename [lindex $argv 4]
        set blade_no      [lindex $argv 5]

        #######################################################################
        #                                                                     #
        #  Code start.                                                        #
        #                                                                     #
        #######################################################################

        set rv [ log_init 1 ]
        set rv [ amm_login $amm $userid $password ]
        set rv [ purge_old_upd_files ]
        set rv [ populate_complex_list ]
        set rv [ amm_set_mm_target ]
        set rv [ flash_update_mn_blade $blade_no $tftp_filename ]

        #
        #  Display user output data.
        #

        if {$rv == 0} {
            ft_log "FlashStatusOut: success"
        } else {
            ft_log "FlashStatusOut: failure"
        }

        exit
```

Recovering from a UEFI update failure

Use this information to recover from a UEFI update failure in the blade server.

About this task

Important: Some cluster solutions require specific code levels or coordinated code
updates. If the device is part of a cluster solution, verify that the latest level of
code is supported for the cluster solution before you update the code.

If the server firmware has become corrupted, such as from a power failure during an update, you can recover the server firmware in one of four ways:

- **In-band manual recovery method** (See "In-band manual recovery method.")
- **Out-of-band manual recovery method** (See "Out-of-band manual recovery method" on page 48.)
- **In-band automated boot recovery method** (See "In-band automated boot recovery method" on page 49.)
- **Out-of-band automated boot recovery method** (See "Out-of-band automated boot recovery method" on page 50.)

In-band manual recovery method
About this task

To recover the server firmware and restore the server operation to the primary bank, complete the following steps:

Procedure

1. Download the blade server UEFI firmware update from the World Wide Web (see "Updating firmware and device drivers" on page 31).
2. Turn off the server (see "Turning off the blade server" on page 12).
3. Remove the blade server from the BladeCenter unit (see "Removing the blade server from the BladeCenter chassis" on page 64).
4. Remove the server cover. See "Removing the blade server cover" on page 70 for more information.
5. Locate the UEFI boot block recovery switch (SW2-7) on the system board (see "System-board switches" on page 13).
6. Use your finger to move switch SW2-7 to the ON position.
7. Replace the cover and reinstall the blade server in the BladeCenter unit, making sure that the media tray is selected by the relevant blade server. See "Installing the blade server cover" on page 72 and "Installing a blade server in a BladeCenter chassis" on page 65.
8. Restart the blade server (see "Turning on the blade server" on page 11). The system begins the power-on self-test (POST).
9. Boot the server to an operating system that is supported by the firmware update package that you downloaded.
10. Perform the firmware update by following the instructions that are in the firmware update package readme file.
11. Copy the downloaded firmware update package into a directory.
12. From a command line, type `filename-s`, where *filename* is the name of the executable file that you downloaded with the firmware update package.
13. Reboot the server and verify that it completes POST (see "Turning off the blade server" on page 12 and "Turning on the blade server" on page 11).
14. Turn off the server (see "Turning off the blade server" on page 12).
15. Remove the blade server form the BladeCenter unit (see "Removing the blade server from the BladeCenter chassis" on page 64).
16. Remove the server cover. See "Removing the blade server cover" on page 70.
17. Move the UEFI boot block recovery switch (SW2-7) to the OFF position (see "System-board switches" on page 13).

18. Replace the cover and reinstall the blade server in the BladeCenter unit, making sure that the media tray is selected by the relevant blade server. See "Installing the blade server cover" on page 72 and "Installing a blade server in a BladeCenter chassis" on page 65.

19. Restart the blade server (see "Turning off the blade server" on page 12 and "Turning on the blade server" on page 11). The system begins the power-on self-test (POST).If this does not recover the primary bank continue with the following steps.

20. Remove the blade server form the BladeCenter unit (see "Removing the blade server from the BladeCenter chassis" on page 64).

21. Remove the server cover. See "Removing the blade server cover" on page 70.

22. Reset the CMOS by removing the battery (see "Removing the battery" on page 75).

23. Leave the battery out of the server for 5 minutes.

24. Reinstall the battery (see "Installing the battery" on page 76).

25. Replace the cover and reinstall the blade server in the BladeCenter unit, making sure that the media tray is selected by the relevant blade server. See "Installing the blade server cover" on page 72 and "Installing a blade server in a BladeCenter chassis" on page 65.

26. Restart the blade server (see "Turning on the blade server" on page 11).

Results

The system begins the power-on self-test (POST).

Out-of-band manual recovery method
About this task

To recover the server firmware and restore the server operation to the primary bank, complete the following steps:

Procedure

1. Download the blade server UEFI firmware update from the World Wide Web (see "Updating firmware and device drivers" on page 31).

2. Turn off the server (see "Turning off the blade server" on page 12).

3. Remove the blade server from the BladeCenter unit (see "Removing the blade server from the BladeCenter chassis" on page 64).

4. Remove the server cover. See "Removing the blade server cover" on page 70 for more information.

5. Locate the UEFI boot block recovery switch (SW2-7) on the system board (see "System-board switches" on page 13).

6. Use your finger to move switch SW2-7 to the ON position.

7. Replace the cover and reinstall the blade server in the BladeCenter unit, making sure that the media tray is selected by the relevant blade server. See "Installing the blade server cover" on page 72 and "Installing a blade server in a BladeCenter chassis" on page 65.

8. Restart the blade server (see "Turning on the blade server" on page 11). The system begins the power-on self-test (POST).

9. Boot the server to the operating system or the F1 UEFI configuration menu.

10. Log into the Advanced Management's web interface.

11. After you log in, select **MM Control -> Network Protocol** and ensure that TFTP is enabled on the management module. The default setting is disable.

12. Select **Blade Tasks -> Firmware update** and select the blade server you want to recover.

13. Use the browse button to point to the UEFI update file.

14. Click the **Update** button to update the UEFI firmware.

15. Reboot the server and verify that it completes POST (see "Turning off the blade server" on page 12 and "Turning on the blade server" on page 11).

16. Turn off the server (see "Turning off the blade server" on page 12).

17. Remove the blade server form the BladeCenter unit (see "Removing the blade server from the BladeCenter chassis" on page 64).

18. Remove the server cover. See "Removing the blade server cover" on page 70.

19. Move the UEFI boot block recovery switch (SW2-7) to the OFF position (see "System-board switches" on page 13).

20. Replace the cover and reinstall the blade server in the BladeCenter unit, making sure that the media tray is selected by the relevant blade server. See "Installing the blade server cover" on page 72 and "Installing a blade server in a BladeCenter chassis" on page 65.

21. Restart the blade server (see "Turning off the blade server" on page 12 and "Turning on the blade server" on page 11). The system begins the power-on self-test (POST). If this does not recover the primary bank continue with the following steps.

22. Remove the blade server form the BladeCenter unit (see "Removing the blade server from the BladeCenter chassis" on page 64).

23. Remove the server cover. See "Removing the blade server from the BladeCenter chassis" on page 64.

24. Reset the CMOS by removing the battery (see "Removing the battery" on page 75).

25. Leave the battery out of the server for 5 minutes.

26. Reinstall the battery (see "Installing the battery" on page 76).

27. Replace the cover and reinstall the blade server in the BladeCenter unit, making sure that the media tray is selected by the relevant blade server. See "Installing the blade server cover" on page 72 and "Installing a blade server in a BladeCenter chassis" on page 65.

28. Restart the blade server (see "Turning on the blade server" on page 11).

Results

The system begins the power-on self-test (POST).

In-band automated boot recovery method
About this task

To download the server UEFI firmware update package from the World Wide Web, complete the following steps.

Note: Use this method if the SYS BRD LED on the light path diagnostics panel is lit and there is an AMM event log entry or Booting Backup Image is displayed on the firmware splash screen; otherwise, use the in-band manual recovery method.

Procedure

1. Download the blade server UEFI firmware update from the World Wide Web (see "Updating firmware and device drivers" on page 31).
2. Boot the server to an operating system that is supported by the firmware update package that you downloaded (see "Turning on the blade server" on page 11).
3. Perform the firmware update by following the instructions that are in the firmware update package readme file.
4. Restart the server (see "Turning off the blade server" on page 12 and "Turning on the blade server" on page 11).
5. At the firmware splash screen, press F3 when prompted to restore to the primary bank. The server boots from the primary bank.

Out-of-band automated boot recovery method

About this task

To download the server UEFI firmware update package from the World Wide Web, complete the following steps.

Note: Use this method if the SYS BRD LED on the light path diagnostics panel is lit and there is an AMM event log entry or Booting Backup Image is displayed on the firmware splash screen; otherwise, use the out-of-band manual recovery method.

Procedure

1. Download the blade server UEFI firmware update for your blade server (see "Updating firmware and device drivers" on page 31).
2. Log into the Advanced Management Module's web interface.
3. After you log in, select **MM Control** → **Network Protocols** and ensure that TFTP is enabled on the management module. It is disabled by default.
4. Select **Blade Tasks** → **Firmware update** and select the blade server to recover.
5. Use the browse button to point to the UEFI update file.
6. Click the **Update** button to update the UEFI firmware.
7. Restart the server (see "Turning off the blade server" on page 12 and "Turning on the blade server" on page 11).
8. At the firmware splash screen, press F3 when prompted to restore to the primary bank. The server boots from the primary bank.

Automated boot recovery (ABR)

About this task

While the server is starting, if the integrated management module detects problems with the server firmware in the primary bank, the server automatically switches to the backup firmware bank and gives you the opportunity to recover the firmware in the primary bank. For instructions for recovering the UEFI firmware, see "Recovering from a UEFI update failure" on page 46. After you have recovered the firmware in the primary bank, complete the following steps:

Procedure

1. Restart the server.

2. When the prompt Press F3 to restore to primary is displayed, press F3 to start the server from the primary bank.

Nx boot failure

About this task

Configuration changes, such as added devices or adapter firmware updates, and firmware or application code problems can cause the server to fail POST (the power-on self-test). If this occurs, the server responds in either of the following ways:

- The server restarts automatically and attempts POST again.
- The server hangs, and you must manually restart the server for the server to attempt POST again.

After a specified number of consecutive attempts (automatic or manual), the Nx boot failure feature causes the server to revert to the default UEFI configuration and start the Setup utility so that you can make the necessary corrections to the configuration and restart the server. If the server is unable to successfully complete POST with the default configuration, there might be a problem with the system board.

To specify the number of consecutive restart attempts that will trigger the Nx boot failure feature, complete the following steps:

Procedure

1. In the Setup utility, click **System Settings** > **Operating Modes** > **POST Attempts Limit**.
2. The available options are 3, 6, 9, and 255 (disable Nx boot failure). Select your option.

Accessing the IMM

Unlike a baseboard management controller, the IMM does not require IPMI device drivers or USB daemons for in-band IMM communication. Instead, a LAN over USB interface enables in-band communications to the IMM; the IMM hardware on the system board presents an internal Ethernet interface from the IMM to the operating system. LAN over USB is also called the *USB in-band interface* in the IMM web interface.

In a scalable blade complex, each IMM is shown as a LAN over USB device in the operating system. For each blade server in the scalable blade complex to be a unique and known IP address, both blade servers have different default IP addresses. The default IP address for the primary blade server is 169.254.95.118, and the Keyboard Controller Style (KCS) address is 0x6CA8.

For packets to be routed correctly from the host to the IMMs, each of the LAN over USB interfaces must appear on a separate subnet to the host. The IMM implements a DHCP server that services only the LAN over USB interface. It assigns the subnet mask on the LAN over USB interfaces for the host to 255.255.255.0.

The following table shows the IP addresses for each of the blade servers in a complex.

Table 3. LAN over USB addresses

Blade server	Logical node ID	IMM IP address	Host address	Host subnet	Host subnet mask	Keyboard Controller Style (KCS) address
Primary	0	169.265.95.118	169.254.95.120	169.254.95.0/24	255.255.255.0	0x8CA6
Secondary	1	169.265.96.118	169.254.96.120	169.254.96.0/24	255.255.255.0	0x8CA8

LAN over USB devices are not aware of LAN over USB devices in other partitions. If you configure the two blade servers as two independent partitions in a scalable blade complex, each blade server is considered to the primary blade server of the hardware partition that contains that blade server. The logical ID of the primary in each partition is 0 and the default IP address of each primary blade server is 169.254.95.118.

Potential conflicts with the LAN over USB interface

In some situations, the IMM LAN over USB interface can conflict with certain network configurations, applications, or both.

For example, Open MPI (Message Passing Interface) attempts to use all the available network interfaces on a server. Open MPI detects the IMM LAN over USB interface and attempts to use it to communicate with other systems in a clustered environment. The LAN over USB interface is an internal interface, so this interface does not work for external communication with other systems in the cluster.

Resolving conflicts with the IMM LAN over USB interface

Use any of the following actions to resolve LAN over USB conflicts with network configurations and applications.
- For conflicts with Open MPI, configure the application so that it does not attempt to use this interface.
- Take down the interface (run `ifdown` under Linux).
- Remove the device driver (run `rmmod` under Linux).
- Disable the LAN over USB interface from the advanced management module web interface:
  1. Log in to the AMM web interface.
  2. In the navigation pane, click **Blade Configuration** under the **Blade Tasks** heading.
  3. Scroll down to the Service Processor LAN over USB interface on the Blade Configuration web page. The section lists all blades in the chassis that can enable or disable the LAN over USB interface.
  4. Select the check boxes next to the blade servers that you want to enable or disable.
  5. Click **Disable** to disable the LAN over USB interface on the selected blade servers.

Configuring the LAN over USB interface manually

An IMM must be configured to use the LAN over USB interface. The firmware update package or Advanced Settings Utility attempt to perform the setup automatically, if needed. If the automatic setup fails or if you prefer to set up the LAN over USB manually, use one of the following processes.

For more information about LAN over USB configuration on different operating systems, see the IBM white paper *Transitioning to UEFI and IMM* at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=MIGR-5079769.

Installing the LAN over USB Windows device driver

When you install a Windows operating system, there will be an unknown RNDIS device in the Device Manager. IBM provides a Windows INF file that identifies this device. The signed version of the INF file is included in all of the Windows versions of the IMM, UEFI, and DSA update packages. Complete the following steps to install ibm_rndis_server_os.inf.

Note: You only have to perform these steps if the server is running a Windows operating system and the ibm_rndis_server_os.inf file has not been previously installed. The file only has to be installed once. It is required by Windows operating systems to detect and use the LAN over USB functionality.

1. Obtain a Windows version of the server UEFI code package (see "Updating firmware and device drivers" on page 31 for more information).
2. Extract the ibm_rndis_server_os.inf and device.cat files from the firmware update package and copy them to the \WINDOWS\inf subdirectory.

   Note: You can use the -x *path* command-line interface option to extract the files. For more information about this option, see the readme file that comes with the update package.
3. (Windows 2003) Install the ibm_rndis_server_os.inf file by right-clicking the file and clicking **Install**. This generates a PNF file of the same name in \WINDOWS\inf.

   (Windows 2008) Click **Computer Management**, then **Device Manager** and find the RNDIS Device. Click **Properties > Driver > Reinstall driver**. Point the server to the \Windows\inf directory where it can find the ibm_rndis_server_os.inf file and install the device.
4. Click **Computer Management** then **Device Manager**. Right-click **Network adapters** and select **Scan for hardware changes**. A small pop-up confirms that the Ethernet device is found and installed. The New Hardware Wizard starts automatically.
5. When you are prompted Can Windows connect to Windows Update to search for software?, select **No, not this time**. Click **Next** to continue.
6. When you are prompted What do you want the wizard to do?, select **Install from a list or specific location (Advanced)**. Click **Next** to continue.
7. When you are prompted Please choose your search and installation options, select **Don't search. I will choose the driver to install**. Click **Next** to continue.
8. When you are prompted Select a hardware type, and then click Next, select **Network adapters**. Click **Next** to continue.
9. When you are prompted with the statement Completing the Found New Hardware Wizard, click **Finish**.

   Note: A new local area connection appears. If the message This connection has limited or no connectivity is displayed, ignore this message.
10. Return to the Device Manager. **IBM USB Remote NDIS Network Device** appears under **Network Adapters**.

11. Use the **Network Configuration** option of the Setup utility to view or set the IP address. See Table 3 on page 52 for information about the IP addresses. See "Using the Setup utility" on page 20 for information about the Setup utility.

Installing the LAN over USB Linux device driver

Versions of Linux since RHEL5 Update 3 and SLES10 Service Pack 2 support the LAN over USB interface by default. This interface is detected and displayed during the installation of these operating systems.

See Table 3 on page 52 for information about the IP addresses.

Note: Older Linux distributions might not detect the LAN over USB interface, and might require manual configuration. For information about configuring LAN over USB on specific Linux distributions, see the IBM white paper *Transitioning to UEFI and IMM* at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=MIGR-5079769.

The IMM LAN over USB interface requires that the usbnet and cdc_ether device drivers be loaded. If the drivers have not been installed, use **modprobe** to install them. When these drivers are installed, the IMM USB network interface is shown as a network device in the operating system. To discover the name that the operating system has assigned to the IMM USB network interface, type:

```
dmesg | grep -i cdc ether
```

Chapter 3. Parts listing

This chapter contains the parts listing for the BladeCenter HX5 blade server and the IBM MAX5 expansion blade.

Parts listing - BladeCenter HX5

The following replaceable components are available for the IBM IBM BladeCenter HX5 Type 7873, 7872, 1910, and 1909 blade servers. For an updated parts listing on the web, complete the following steps.

Note: Changes are made periodically to the IBM website. The actual procedure might vary slightly from what is described in this document.

1. Go to http://www.ibm.com/supportportal/.
2. Under **Product support**, click **BladeCenter**.
3. Under **Popular links**, click **Part documents lookup**.
4. From the **Product Family** menu, select **BladeCenter HX5** and click **Go**.

Note: The illustrations in this document might differ slightly from your hardware.
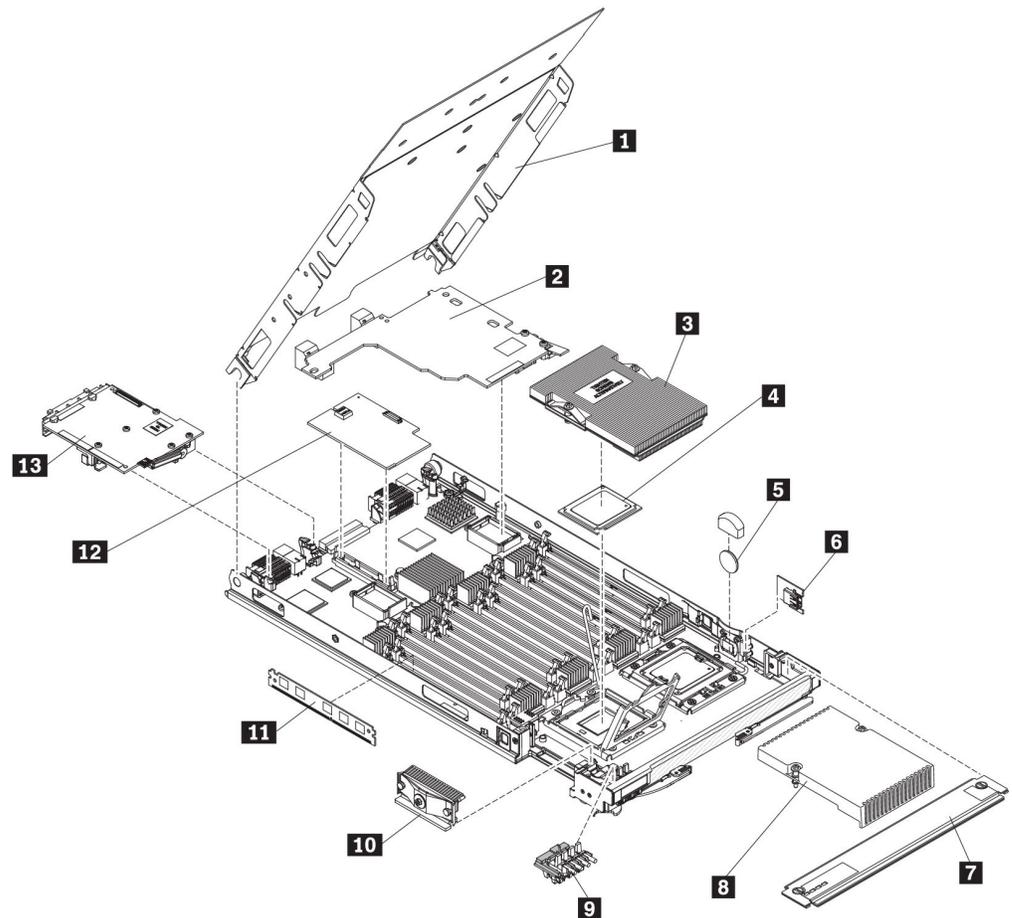
Replaceable components are of the following types:

- **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:** 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 and getting service and assistance, see the *Warranty and Support Information* document.

Note: The IBM MAX5 for BladeCenter shares parts with the BladeCenter HX5 blade server. Use the following table to determine which parts to order for the following IBM MAX5 for BladeCenter parts:
- Cover
- Memory

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
1	Cover (Type 7872)	68Y7859		
1	Cover (Type 7873 and 1910 models)	68Y7957		
2	QLogic Ethernet and 8 GB Fibre Channel Expansion Card (CFFh)		00Y3273	
2	QLogic 2-Port 10Gb Converged Network Adapter (CFFh)		00Y3283	
2	2/4 Port Ethernet Expansion Card (CFFh)		44W4488	
2	2-Port 40 Gb Infiniband Expansion Card (CFFh)		60Y0927	
2	Brocade 2-Port 10GbE Converged Network Adapter (CFFh)		81Y1654	
2	Broadcom 4-Port 10 Gb Ethernet Expansion Card (CFFh)		46M6165	
2	Broadcom 2-Port 10 Gb Ethernet Expansion Card (CFFh)		46M6169	
2	Broadcom 2-Port 10 Gb Virtual Fabric Adapter (CFFh)		90Y9337	
2	Emulex Virtual Fabric Adapter (CFFh)		00Y3294	
2	Emulex Virtual Fabric Adapter (CFFh)		49Y4239	
2	Emulex 10Gb Virtual Fabric Adapter (CFFh)		00Y3296	
2	Emulex 10Gb Virtual Fabric Adapter (CFFh)		49Y4261	
2	Emulex 10GbE Virtual Fabric Adapter II (CFFh)		90Y3553	
2	Emulex 10GbE Virtual Fabric Adapter Advanced II (CFFh)		90Y3569	
2	Emulex 10GbE Virtual Fabric Adapter 2 for IBM BladeCenter (CFFh)		00Y3290	
2	Intel 10Gb 2-Port Ethernet Expansion Card (CFFh)		42C1812	
3	CPU heat sink, microprocessor (95W/105W)			68Y7864
4	Intel Xeon E7520 Processor, 1.86GHz/18M/4.8GT/s, 4C, 95W (Type 7872 models)			46M6861
4	Intel Xeon L7545 Processor, 1.86GHz/18M/5.86GT/s, 6C, 95W (Type 7872 models)			46M6866
4	Intel Xeon L7555 Processor, 1.86GHz/24M/5.86GT/s, 8C, 95W (Type 7872 and 1909 models)			46M6871

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
4	Intel Xeon E7530 Processor, 1.86GHz/12M/5.8GT/s, 6C, 105W (Type 7872 models)			59Y5897
4	Intel Xeon E7540 Processor, 2.00GHz/18M/6.4GT/s, 6C, 105W (Type 7872 models)			59Y5857
4	Intel Xeon E6510 Processor, 1.73GHz/12M/4.8GT/s, 4C, 105W (Type 7872 models)			46M6948
4	Intel Xeon E6540 Processor, 2.00GHz/18M/6.4GT/s, 6C, 105W (Type 7872 models)			46M6953
4	Intel Xeon X6550 Processor, 2.00GHz/18M/6.4GT/s, 8C, 130W (Type 7872 models)			46M6993
4	Intel Xeon X7542 Processor, 2.66GHz/18M/6.4GT/s, 6C, 130W (Type 7872 models)			59Y5902
4	Intel Xeon X7550 Processor, 2.00GHz/18M/6.4GT/s, 8C, 130W (Type 7872 models)			59Y5907
4	Intel Xeon X7560 Processor, 2.26GHz/24M/6.4GT/s, 8C, 130W (Type 7872 models)			46M6958
4	Intel Xeon E7-2803 Processor, 1.73GHz/18M/4.8GT/s, 6C, 105W (Type 7873 models)			69Y3063
4	Intel Xeon E7-2820 Processor, 2.00GHz/18M/5.86GT/s, 8C, 105W (Type 7873 models)			69Y3069
4	Intel Xeon E7-2830 Processor, 2.13GHz/24M/6.4GT/s, 8C, 105W (Type 7873 and 1910 models)			69Y3075
4	Intel Xeon E7-2850 Processor, 2.00GHz/24M/6.4GT/s, 10C, 130W (Type 7873 models)			69Y3085
4	Intel Xeon E7-2860 Processor, 2.26GHz/24M/6.4GT/s, 10C, 130W (Type 7873 models)			69Y3095
4	Intel Xeon E7-4807 Processor, 1.86GHz/18M/4.8GT/s, 6C, 95W (Type 7873 models)			88Y6071
4	Intel Xeon E7-4820 Processor, 2.00GHz/18M/5.86GT/s, 8C, 105W (Type 7873 models)			88Y6077
4	Intel Xeon E7-4830 Processor, 2.13GHz/24M/6.4GT/s, 8C, 105W (Type 7873 models)			88Y6083
4	Intel Xeon E7-4850 Processor, 2.00GHz/24M/6.4GT/s, 10C, 130W (Type 7873 models)			88Y6093
4	Intel Xeon E7-4860 Processor, 2.26GHz/24M/6.4GT/s, 10C, 130W (Type 7873 models)			88Y6103
4	Intel Xeon E7-8837 Processor, 2.67GHz/24M/6.4GT/s, 8C, 130W (Type 7873 models)			88Y6113
4	Intel Xeon E7-8867L Processor, 2.13GHz/30M/6.4GT/s, 10C, 105W (Type 7873 models)			88Y6125
4	Intel Xeon E7-2870 Processor, 2.40GHz/30M/6.4GT/s, 10C, 130W (Type 7873 models)			88Y6151
4	Intel Xeon E7-4870 Processor, 2.40GHz/30M/6.4GT/s, 10C, 130W (Type 7873 models)			88Y6161
5	Battery, 3.0 volt (all models)	33F8354		
6	Embedded Hypervisor Card (interposer)		59Y5988	

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
7	Front access cover		68Y7860	
8	CPU heat sink filler		68Y7861	
9	Operator control panel		59Y5985	
10	Scaling card filler		68Y7862	
11	Memory, 2 GB, 2R x 8, 1 Gbit DDR-3 1333 MHz VLP RDIMM (Type 7872 and 1909 models)		49Y1438	
11	Memory, 2 GB, 1R x 8, 2 Gbit PC3L-10600R-999 VLP RDIMM (1.35V capable) (Type 7873 models)		46C0572	
11	Memory, 4 GB, 2R x 8, 2 Gbit DDR-3 1333 MHz VLP RDIMM (Type 7872 models)		44T1586	
11	Memory, 4 GB, 2R x 8, 2 Gbit PC3L-10600R-999 VLP RDIMM (1.35V capable) (Type 7873 and 1910 models)		46C0576	
11	Memory, 8 GB, 2R x 4, 2 Gbit DDR-3 1333 MHz VLP RDIMM (Type 7872 models)		49Y1556	
11	Memory, 8 GB, 2R x 8, 4 Gbit DDR-3 1333 MHz VLP RDIMM (1.35V capable) (Type 7873 models)		00D4987	
11	Memory, 8 GB, 4R x 8, 2 Gbit DDR-3 1066 MHz VLP RDIMM (Type 7872 models)		46C7504	
11	Memory, 8 GB, 4R x 8, 2 Gbit PC3L-8500R-777 VLP RDIMM (1.35V capable) (Type 7873 models)		46C0582	
11	Memory, 16 GB, 2R x 4, 4 Gbit DDR-3 1333 MHz VLP RDIMM (1.35V capable) (Type 7873 models)		49Y1528	
11	Memory, 16 GB, 2R x 4, 4 Gbit DDR-3 1600 MHz VLP RDIMM (Type 7873 models)		90Y3159	
11	Memory, 16 GB, 4R x 4, 2 Gbit DDR-3 1066 MHz VLP RDIMM (1.35V capable) (Type 7873 models)		90Y3223	
11	Memory, 32 GB, 4R x 4, 4 Gbit DDR-3 1333 MHz VLP RDIMM (1.35V capable) (Type 7873 models)		00D5010	
12	QLogic 8 Gb Fibre Channel Expansion Card (CIOv)		44X1948	
12	QLogic 4 Gb Fibre Channel Expansion Card (CIOv)		49Y4237	
12	Emulex 8Gb Fibre Channel Expansion Card (CIOv)		46M6138	
12	Ethernet Expansion Card (CIOv)		44W4487	
12	SAS Connectivity Card (CIOv)		46C4069	
13	SSD expansion card		46M6909	
13	Solid state drive, 1.8-inch 50 GB SLC		43W7737	
13	Solid state drive, 1.8-inch 50 GB MLC		43W7729	
13	Solid state drive, 1.8-inch 200 GB MLC		40K6897	
	BladeCenter HX5 blade server base assembly (Type 7872 and 1909 models)			69Y3050
	BladeCenter HX5 blade server base assembly (Type 7873 and 1910 models)			69Y3049
	FRU, 2 GB USB Key		42D0545	
	Kit, miscellaneous parts		68Y7856	
	320 GB High IOPS SD Class SSD PCIe Adapter	46M0887		

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
	Alcohol wipes	59P4739		
	Power Jumper		95Y1692	
	Scalability tray (click-and-scale tray)		68Y7867	
	BladeCenter HX5 blade label kit		68Y7858	
	Scaling Card, 3/16-inch Hex Driver	68Y7865		
	Microprocessor Installation Tool (Type 7872 and 7873 models)	68Y7268		
	BladeCenter HX5 Speed Burst Card		59Y5890	
	BladeCenter HX5 2-node scalability card		46M6976	
	IBM MAX5 expansion blade (version 1)		88Y6176	
	IBM MAX5 expansion blade (version 2)		88Y6129	
	IBM MAX5 1-node scalability card		59Y5878	
	IBM BladeCenter PCI Express Gen 2 Expansion Blade	68Y7441		

Miscellaneous Parts Kit

The following parts are provided in the miscellaneous parts kit:
- Standoffs
- Guide, Hypervisor card screw
- Screw, Plastite 48
- Bracket, Ejector upper
- Baffle, DIMM air
- Screw, HSDC clip M3 x 6
- Screw, 3.5 x 5 hex head, Pan/Phillips, System board
- Screw, M3 Flex-to-LGA
- Nut, Custom insert
- Screw, Tiedown Bracket

Parts listing - IBM MAX5

The following replaceable components are available for the IBM IBM MAX5 expansion blade. There are two versions of the IBM MAX5 expansion blade, referred to as the IBM MAX5 version 1 and IBM MAX5 version 2 in this document. IBM MAX5 version 2 has a "MAX5" identifying label on the bottom of the front bezel. The functionality of the two IBM MAX5 expansion blades are equivalent except for the type of DIMMs supported. The type of DIMMs supported will differ, depending on the version of IBM MAX5 expansion blade installed.

For an updated parts listing on the web, complete the following steps.

Note: Changes are made periodically to the IBM website. The actual procedure might vary slightly from what is described in this document.
1. Go to http://www.ibm.com/supportportal/.
2. Under **Product support**, click **BladeCenter**.
3. Under **Popular links**, click **Part documents lookup**.
4. From the **Product Family** menu, select **BladeCenter HX5** and click **Go**.

Note: The illustrations in this document might differ slightly from your hardware.

Replaceable components are of four 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:** 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 and getting service and assistance, see the *Warranty and Support Information* document.

Table 4. Parts listing, IBM MAX5 version 1

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
1	Cover (Type 7872 models)	68Y7859		
1	Cover (Type 7873 models)	68Y7957		
2	Memory, 4 GB, 2R x 8, 2 Gbit DDR-3 1333 MHz VLP DIMM		44T1586	
2	Memory, 8 GB, 4R x 8, 2 Gbit DDR-3 1066 MHz VLP DIMM		46C7504	
	CPU tall heat sink, microprocessor (130W) **Note:** This heat sink can be installed only in an BladeCenter HX5 blade server that has an IBM MAX5 expansion blade installed.			44X2170
	IBM MAX5 expansion blade (version 1)		88Y6176	

Table 4. Parts listing, IBM MAX5 version 1 (continued)

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
	IBM MAX5 1-node scalability card		59Y5878	
	Miscellaneous parts kit		44X2168	
	DIMM fillers		60H2962	

Table 5. Parts listing, IBM MAX5 version 2

Index	Description	CRU part number (Tier 1)	CRU part number (Tier 2)	FRU part number
1	Cover (Type 7872 models)	68Y7859		
1	Cover (Type 7873 models)	68Y7957		
2	Memory, 2 GB, 1R x 8, 2 Gbit PC3L-10600R-999 VLP RDIMM (1.35V capable)		46C0572	
2	Memory, 4 GB, 2R x 8, 2 Gbit PC3L-10600R-999 VLP RDIMM (1.35V capable)		46C0576	
2	Memory, 8 GB, 2R x 8, 4 Gbit DDR-3 1333 MHz VLP RDIMM (1.35V capable)		00D4987	
2	Memory, 8 GB, 4R x 8, 2 Gbit PC3L-8500R-777 VLP RDIMM (1.35V capable)		46C0582	
2	Memory, 16 GB, 2R x 4, 4 Gbit DDR-3 1333 MHz VLP RDIMM (1.35V capable)		49Y1528	
2	Memory, 16 GB, 2R x 4, 4 Gbit DDR-3 1600 MHz VLP RDIMM		90Y3159	
2	Memory, 16 GB, 4R x 4, 2 Gbit DDR-3 1066 MHz VLP RDIMM (1.35V capable)		90Y3223	
2	Memory, 32 GB, 4R x 4, 4 Gbit DDR-3 1333 MHz VLP RDIMM (1.35V capable)		00D5010	
	CPU tall heat sink, microprocessor (130W) **Note:** This heat sink can be installed only in an BladeCenter HX5 blade server that has an IBM MAX5 expansion blade installed.			44X2170
	IBM MAX5 expansion blade (version 2)		88Y6129	
	IBM MAX5 1-node scalability card		59Y5878	
	Miscellaneous parts kit		44X2168	
	DIMM fillers		60H2962	

Miscellaneous Parts Kit

The following parts are provided in the miscellaneous parts kit:
- Float plate assembly
- Bezel screw
- Heat sink baffle
- Left filler plate
- Right filler plate
- Screw, M3x16 socket hex drive

Chapter 4. Removing and replacing blade server components

Use this information to remove and replace components in the blade server.

About this task

Replaceable components are of four 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:** You may install a Tier 2 CRU yourself or request IBM to install it, at no additional charge, under the type of warranty that is designated for your server.
- **Field replaceable unit (FRU):** FRUs must be installed only by trained service technicians.

See "Parts listing - BladeCenter HX5" on page 55 to determine whether a component is a Tier 1 CRU, Tier 2 CRU, or FRU.

For information about the terms of the warranty and getting service and assistance, see the *Warranty and Support Information* document.

Installation guidelines

Use these guidelines before you install the blade server or optional devices.

- Before you begin, read "Safety" on page v and "Handling static-sensitive devices" on page 64. This information helps you work safely.
- When you install your new blade server, take the opportunity to download and apply the most recent firmware updates. This step helps ensure that any known issues are addressed and that your blade server is ready to function at maximum levels of performance.
- Observe good housekeeping in the area where you are working. Place removed covers and other parts in a safe place.
- Back up all important data before you make changes to disk drives.
- Before you remove a blade server from the BladeCenter chassis, you must shut down the operating system and turn off the blade server. You do not need to shut down the chassis itself.
- Blue on a component indicates touch points, where you can grip the component to remove it from or install it in the blade server, open or close a latch, and so on.
- For a list of supported optional devices for the blade server, see http://www.ibm.com/servers/eserver/serverproven/compat/us/eserver.html .

System reliability guidelines

Use these guidelines to ensure that the blade server meets the proper cooling and system reliability requirements.

- To ensure proper cooling, do not operate the BladeCenter chassis without a blade server or blade filler installed in each blade server bay. See the documentation for your BladeCenter chassis for additional information.

- Each microprocessor socket always contains either a microprocessor dust cover and heat sink filler or a microprocessor and heat sink. If the blade server has only one microprocessor, it must be installed in microprocessor socket 1.
- Make sure that the ventilation holes on the blade server are not blocked.
- The blade server battery must be operational. If the battery becomes defective, replace it immediately.

Handling static-sensitive devices

To reduce the possibility of damage from electrostatic discharge, observe these precautions.

About this task

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

- When you work on a BladeCenter chassis that has an electrostatic discharge (ESD) connector, use a wrist strap, especially when you handle modules, optional devices, or blade servers. To work correctly, the wrist strap must have a good contact at both ends (touching your skin at one end and firmly connected to the ESD connector on the front or back of the BladeCenter chassis).
- 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 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 part of the BladeCenter chassis or any *unpainted* metal surface on any other grounded rack component in the rack in which you are installing the device 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 blade server 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 blade server cover or on a metal surface.
- Take additional care when you handle devices during cold weather. Heating reduces indoor humidity and increases static electricity.

Returning a device or component

If you are instructed to return a device or component, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Removing the blade server from the BladeCenter chassis

Use these instructions to remove a BladeCenter HX5 blade server or a scalable blade complex from a BladeCenter chassis.

About this task

The following illustration shows how to remove a BladeCenter HX5 blade server from a chassis.
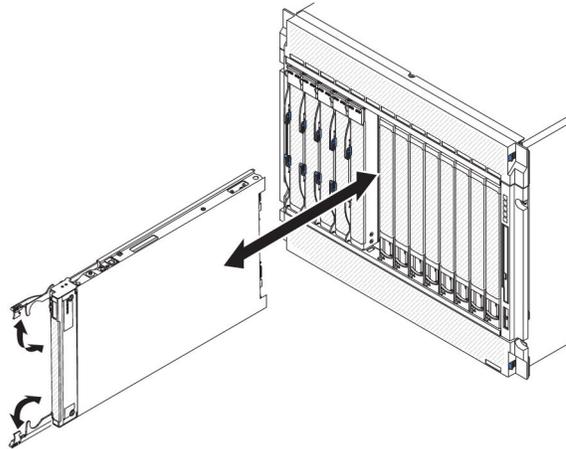
Attention:

- To maintain proper system cooling, do not operate the BladeCenter chassis without a blade server or filler module installed in each blade server bay.

- When you remove the blade server, note the blade server bay number. Reinstalling a blade server into a different blade server bay from the one it was removed from can have unintended consequences. Some configuration information and update options are established according to blade server bay number. If you reinstall the blade server into a different bay, you might have to reconfigure the blade server.

To remove a BladeCenter HX5 blade server or scalable blade complex, complete the following steps:

Procedure

1. Before you begin, read "Safety" on page v and "Installation guidelines" on page 63.
2. If the blade server is operating, shut down the operating system.
3. Press the power button to turn off the blade server (see "Turning off the blade server" on page 12 for more information).

   Note: If the blade server is part of a scalable blade complex operating in single partition mode, pressing the power button on one blade server causes both blade servers to shut down.

4. Open the two release handles as shown in the illustration. The blade server moves out of the blade server bay approximately 0.6 cm (0.25 inch).
5. Pull the blade server out of the bay.
6. Install either a blade filler or another blade server in the blade server bay within 1 minute.

Installing a blade server in a BladeCenter chassis

Use these instructions to install a BladeCenter HX5 blade server in a BladeCenter chassis.

About this task

The following illustration shows how to install a BladeCenter HX5 blade server into a BladeCenter chassis. See the documentation for your BladeCenter chassis for additional information.
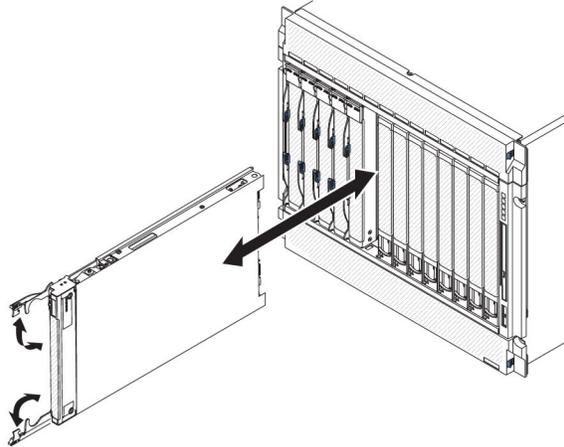

Statement 21

CAUTION:
Hazardous energy is present when the blade server is connected to the power source. Always replace the blade cover before installing the blade server.

To install a BladeCenter HX5 blade server, complete the following steps.

Procedure

1. Before you begin, read "Safety" on page v and "Installation guidelines" on page 63.
2. Select the blade server bay for the blade server; at least one blade server bay is required.

   Notes:
   a. For BladeCenter chassis that support up to 14 blade servers, when any blade server or device is in blade server bay 7 through 14, power modules must be installed in all four power-module bays. For additional information, see the *Installation and User's Guide* for your chassis.
   b. If you are reinstalling a blade server that you removed, you must install it in the same blade server bay from which you removed it. Some blade server configuration information and update options are established according to blade server bay number. Reinstalling a blade server into a different blade server bay from the one it was removed from can have unintended consequences. If you reinstall the blade server into a different bay, you might have to reconfigure the blade server.
   c. To maintain proper system cooling, do not operate the BladeCenter chassis without a blade server, expansion unit, or filler module installed in each blade server bay.

3. Make sure that the release handles on the blade server are in the open position (perpendicular to the blade server).
4. Slide the blade server into the blade server bay until it stops.
5. Push the release handles on the front of the blade server to the closed position.

   Note: After the blade server is installed, the IMM in the blade server initializes and synchronizes with the advanced management module. This process takes approximately 90 seconds to complete. The power LED flashes rapidly, and the power-control button on the blade server does not respond until this process is complete.
6. Turn on the blade server (see "Turning on the blade server" on page 11 for instructions).
7. Make sure that the power LED on the blade server control panel is lit continuously, indicating that the blade server is receiving power and is turned on.
8. If you have other blade servers to install, do so now.
9. Optional: Write identifying information about one of the labels that come with the blade servers and place the label on the BladeCenter chassis bezel. See the documentation for your BladeCenter chassis for information about the label placement.

   Important: Do not place the label on the blade server or in any way block the ventilation holes on the blade server.

Results

If this is the initial installation of the blade server in the BladeCenter chassis, you must configure the blade server through the Setup utility and install the blade server operating system. See the *Installation and User's Guide* for details.

If you have changed the configuration of the blade server or if you are installing a different blade server from the one that you removed, you must configure the blade server through the Setup utility, and you might have to install the blade server operating system. For more information, see the *Installation and User's Guide*.

Disassembling a scalable blade complex

Use this information to disassemble a scalable blade complex.

About this task

Note: If you are going to disassemble a blade server complex and use both blade servers as independent, stand-alone servers, you must make sure that you have the following components for *each* blade server:
- A blade server cover

  Note: You need a blade server cover for the secondary blade server only if you intend to remove the scalability tray. You do not need to remove the scalability tray if you are installing both blade servers in adjacent blade server bays of the same chassis.
- A 1-node speed burst card or a scalability filler
- A hypervisor key for each of the blade servers that you will use in a virtualized environment, if required

If you do not have these components for each blade server, make sure that you order them before you disassemble a scalable blade complex.

To disassemble a scalable blade complex, complete the following steps.

Procedure

1. Before you begin, read "Safety" on page v and "Installation guidelines" on page 63.
2. If the scalable blade complex is installed in a BladeCenter chassis, remove it (see "Removing the blade server from the BladeCenter chassis" on page 64 for instructions).
3. Remove the cover from the topmost blade server (see "Removing the blade server cover" on page 70 for instructions).
4. Stand the blade servers upright on a clean, flat work surface, with the 2-node scalability card facing up.

5. Remove the 2-node scalability card (see "Removing the 2-node scalability card" on page 83 for instructions).
6. Press the blade server cover release on each side of the blade server and lift the topmost blade server from the bottom blade server as shown in the following illustration.

7. Install either a 1-node speed burst card (see "Installing the 1-node speed burst card" on page 82) or a scalability filler on each blade server. To install a scalability filler, complete the following steps:

   a. Align the pins on the bottom of the filler with the holes on the scalability connector on the blade server.

   b. Press down firmly so that the filler is flush with the scalability connector on the blade server.

   c. Tighten the screw on the scalability filler by hand to ensure that the screw threads start properly.

   d. Using the hex driver that comes with the scalability kit, tighten the nut that attaches the filler to the blade server.

8. Optional: Remove the scalability tray from the topmost blade server (see "Removing the scalability tray" on page 78 for instructions).

   Note: You only need to remove the scalability tray if you intend to install the blade servers in blade server bays that are not adjacent or if you intend to install the blade servers in different BladeCenter chassis.

9. Install a cover on each blade server (see "Installing the blade server cover" on page 72 for instructions).

Assembling a scalable blade complex

Use this information to assemble a scalable blade complex.

About this task

To assemble a scalable blade complex, you need the following parts:

- Two BladeCenter HX5 blade servers
- 2-node scalability kit, which includes the 2-node scalability card, the scalability tray, and the 3/16" hex driver.

To assemble a scalable blade complex, complete the following steps:

Procedure

1. Before you begin, read "Safety" on page v and "Installation guidelines" on page 63.

2. Remove the covers for both blade servers (see "Removing the blade server cover" on page 70).

3. Install all optional components, such as DIMMs and SSDs in each of the blade servers.

4. Optional: Install a hypervisor key, if required, to use the scalable blade complex as a single hardware partition in a virtualized environment. To determine whether you have to install a hypervisor key, see the documentation that comes with your virtualization software. For more information about virtualization, see http://www.ibm.com/itsolutions/virtualization/.

   Note: If you are using a scalable blade complex that is configured as a single hardware partition, install the hypervisor key in the primary blade server in the complex. If the blade servers in a scalable blade complex are operating independently, install a hypervisor key in each blade server, if required.

5. Install the scalability tray in the topmost blade server (see "Installing the scalability tray" on page 80 for instructions).

6. Attach the blade server with the scalability tray to the bottom blade server.
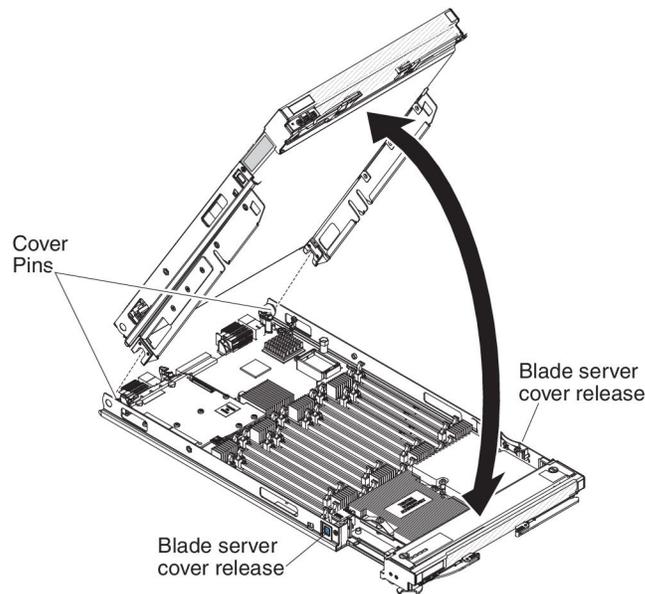
a. Lower the topmost blade server so that the slots at the rear slide down onto the pins at the rear of the bottom blade server, as shown in the illustration.

b. Pivot the topmost blade server to the closed position, as shown in the illustration, until it clicks into place.

7. Install the 2-node scalability card (see "Installing the 2-node Scalability card" on page 85).

8. Install the blade cover on the topmost blade server (see "Installing the blade server cover" on page 72 for instructions).

9. Install the scalable blade complex into the chassis (see "Installing a blade server in a BladeCenter chassis" on page 65 for instructions).

Removing and replacing Tier 1 customer replaceable units (CRUs)

Use this information for removing and replacing Tier 1 CRUs.

About this task

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.

Removing the blade server cover

Use these instructions to open and remove the cover from a blade server or from the topmost blade server in a scalable blade complex.

About this task

To open and remove the blade server cover, complete the following steps.

Procedure

1. Before you begin, read "Safety" on page v and "Installation guidelines" on page 63.

2. If the blade server or scalable blade complex is installed in a BladeCenter chassis, remove it. See "Removing the blade server from the BladeCenter chassis" on page 64 for instructions.
3. Carefully lay the blade server on a flat, static-protective surface, orienting the blade server with the bezel pointing toward you.
4. Press the blade server cover release on each side of the blade server, topmost blade server in a scalable blade complex, or expansion unit, and lift the cover away from the blade server, as shown in the following illustration.
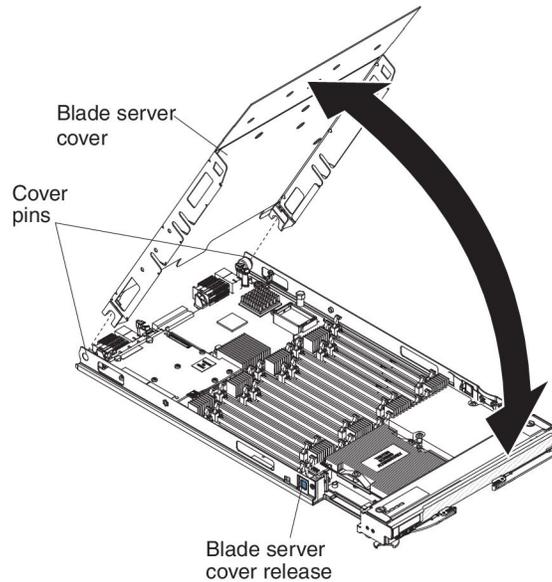
5. Lay the cover flat or store it for future use.

Results

Statement 12

CAUTION:
The following label indicates a hot surface nearby.

Statement 21

CAUTION:
Hazardous energy is present when the blade server is connected to the power source. Always replace the blade cover before installing the blade server.

Installing the blade server cover

Use these instructions to install and close the cover for a blade server or for the topmost blade server in a scalable blade complex.

About this task

Attention: You cannot insert the blade server into the BladeCenter chassis until the cover is installed and closed. Do not attempt to override this protection.

Statement 21

CAUTION:
Hazardous energy is present when the blade server is connected to the power source. Always replace the blade cover before installing the blade server.

To install and close the blade server cover, complete the following steps:

Procedure

1. Before you begin, read "Safety" on page v and "Installation guidelines" on page 63.
2. Carefully lay the blade server on a flat, static-protective surface, orienting the blade server with the bezel pointing toward you.
3. Lower the cover so that the slots at the rear slide down onto the pins at the rear of the blade server, as shown in the illustration. Before you close the cover, make sure that all components are installed and seated correctly and that you have not left loose tools or parts inside the blade server.

Blade server cover

Cover pins

Blade server cover release
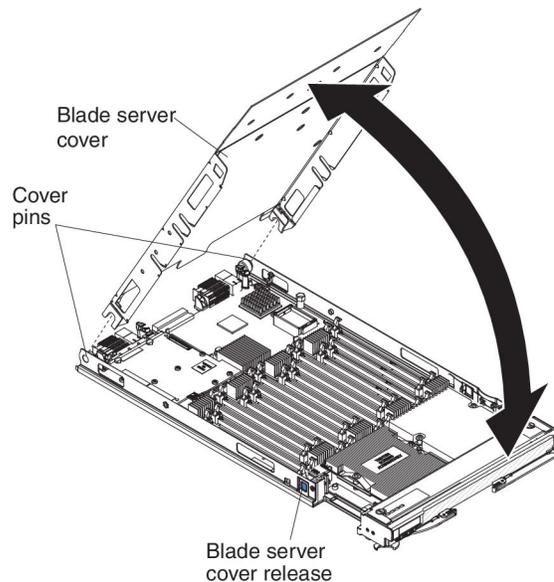
4. Pivot the cover to the closed position, as shown in the illustration, until it clicks into place.
5. Install the blade server or scalable blade complex into the BladeCenter chassis (see "Installing a blade server in a BladeCenter chassis" on page 65 for instructions).

Removing an expansion unit

Use these instructions to remove an expansion unit from a blade server or from the topmost blade server in a scalable blade complex.

About this task

To open and remove an expansion unit, complete the following steps.

Procedure

1. Before you begin, read "Safety" on page v and "Installation guidelines" on page 63.
2. If the blade server or scalable blade complex is installed in a BladeCenter chassis, remove it. See "Removing the blade server from the BladeCenter chassis" on page 64 for instructions.
3. Carefully lay the blade server on a flat, static-protective surface, orienting the blade server with the bezel pointing toward you.
4. Open the blade server cover (see "Removing the blade server cover" on page 70 for instructions).
5. Press the blade server cover release on each side of the blade server and lift the expansion unit from the blade server.
6. Rotate the expansion blade open; then, lift the expansion blade from the blade server.
7. If additional expansion units need to be removed, repeat steps 5 and 6.
8. If you are instructed to return the expansion unit, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

   Important: Do not return the blade cover. You will need to install the blade cover from the BladeCenter HX5 on to the new expansion unit. The BladeCenter HX5 blade cover contains the system-service label on the bottom of the cover.

Results

Statement 12

CAUTION:
The following label indicates a hot surface nearby.

Statement 21

CAUTION:
Hazardous energy is present when the blade server is connected to the power source. Always replace the blade cover before installing the blade server.

Installing an expansion unit

Use these instructions to install an expansion unit or for the topmost blade server in a scalable blade complex.

About this task

Attention: You cannot insert the blade server into the BladeCenter chassis until the cover is installed and closed. Do not attempt to override this protection.

Statement 21

CAUTION:
Hazardous energy is present when the blade server is connected to the power source. Always replace the blade cover before installing the blade server.

Cover Pins

Blade server cover release

Blade server cover release

To install and close the blade server cover, complete the following steps:

Procedure
1. Before you begin, read "Safety" on page v and "Installation guidelines" on page 63.
2. Carefully lay the blade server on a flat, static-protective surface, orienting the blade server with the bezel pointing toward you.
3. Locate the blade expansion connector and remove the cover if one is installed (see "Blade server connectors - BladeCenter HX5" on page 13).
4. Touch the static-protective package that contains the optional expansion unit to any *unpainted* metal surface on the BladeCenter unit or any *unpainted* metal surface on any other grounded rack component; then, remove the optional expansion unit from the package.
5. Orient the optional expansion unit as shown in the illustration.
6. Lower the expansion unit so that the slots at the rear slide down onto the cover pins at the rear of the blade server; then, pivot the expansion unit down onto the blade server.
7. If the expansion unit has a cover already installed, remove it (see "Removing the blade server cover" on page 70).
8. Install the blade cover from the BladeCenter HX5 (see "Installing the blade server cover" on page 72).

   Important: The BladeCenter HX5 blade cover contains the system-service label on the bottom of the cover.
9. Install the blade server or scalable blade complex into the BladeCenter chassis (see "Installing a blade server in a BladeCenter chassis" on page 65 for instructions).

Removing the battery

Use this information to remove the battery from the blade server.

About this task

To remove the battery, complete the following steps:

Procedure

1. Before you begin, read "Safety" on page v and "Installation guidelines" on page 63.
2. If the blade server or scalable blade complex is installed in a BladeCenter chassis, remove it. See "Removing the blade server from the BladeCenter chassis" on page 64 for instructions.
3. Carefully lay the blade server on a flat, static-protective surface.
4. If you are installing the removing the battery from a blade server that is the bottom blade server in a scalable blade complex, disassemble the blade complex (see "Disassembling a scalable blade complex" on page 67 for instructions).
5. If an optional expansion unit is installed, remove the expansion unit (see "Removing an expansion unit" on page 73 for instructions).

   Note: Optional expansion units are not supported when a IBM MAX5 expansion blade is installed.
6. If an IBM MAX5 expansion blade is installed, remove it (see "Removing an IBM MAX5 expansion blade" on page 87 for instructions).
7. Open the blade server cover (see "Removing the blade server cover" on page 70 for instructions).
8. Locate the battery on the system board.
9. Use your fingers to lift the battery cover from the battery connector.
10. Release the battery by using your finger to press the top of the battery towards the middle of the blade server and out of the battery connector.
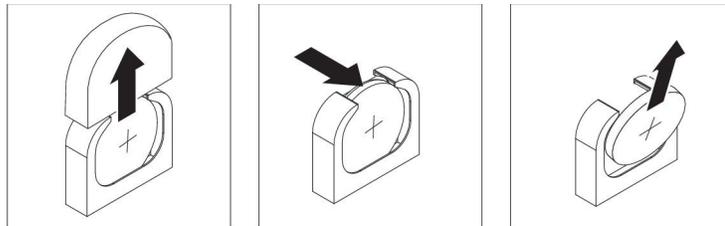
11. Use your thumb and index finger to lift the battery from the socket.
12. Dispose of the battery as required by local ordinances or regulations.

Installing the battery

Use this information to install a battery on the system board in the blade server.

About this task

The following notes describe information that you must consider when you are replacing the battery in the blade server:

- You must replace the battery with a lithium battery of the same type from the same manufacturer.
- To order replacement batteries, call 1-800-426-7378 within the United States, and 1-800-465-7999 or 1-800-465-6666 within Canada. Outside the U.S. and Canada, call your IBM marketing representative or authorized reseller.
- After you replace the battery, you must reconfigure the blade server and reset the system date and time.
- To avoid possible danger, read and follow the following safety statement.

Statement 2

CAUTION:
When replacing the lithium battery, use only IBM Part Number 33F8354 or an equivalent type battery recommended by the manufacturer. If your system has a module containing a lithium battery, replace it only with the same module type made by the same manufacturer. The battery contains lithium and can explode if not properly used, handled, or disposed of.

Do not:
- **Throw or immerse into water**
- **Heat to more than 100° C (212° F)**
- **Repair or disassemble**

Dispose of the battery as required by local ordinances or regulations.

To install the battery, complete the following steps:

Attention: Touching the battery on a metal surface, such as the side of the blade server, when you replace the battery can cause it to fail.

Procedure

1. Before you begin, read "Safety" on page v and "Installation guidelines" on page 63.
2. If the blade server or scalable blade complex is installed in a BladeCenter chassis, remove it. See "Removing the blade server from the BladeCenter chassis" on page 64 for instructions.
3. Carefully lay the blade server on a flat, static-protective surface.
4. If you are installing the battery in a blade server that is the bottom blade server in a scalable blade complex, disassemble the blade complex (see "Disassembling a scalable blade complex" on page 67 for instructions).
5. If an optional expansion unit is installed, remove the expansion unit (see "Removing an expansion unit" on page 73 for instructions).

   Note: Optional expansion units are not supported when a IBM MAX5 expansion blade is installed.
6. If an IBM MAX5 expansion blade is installed, remove it (see "Removing an IBM MAX5 expansion blade" on page 87 for instructions).
7. Open the blade server cover (see "Removing the blade server cover" on page 70 for instructions).
8. Follow any special handling and installation instructions that come with the battery.
9. Locate the battery socket on the system board.
10. Orient the battery so that the positive (+) side faces in towards the center of the blade server.
11. Tilt the battery so that you can insert it into the bottom of the socket.
12. As you slide the battery into place, press the top of the battery into the socket.
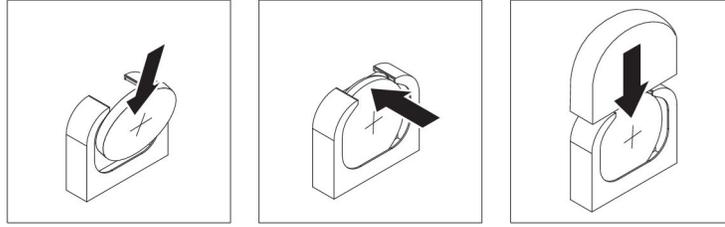
13. If you removed a plastic cover from the battery holder, use your fingers to install the battery cover on top of the battery connector.

14. If the blade server is part of a scalable blade complex, assemble the scalable blade complex (see "Assembling a scalable blade complex" on page 69 for instructions).

15. Install the IBM MAX5 expansion blade if you removed one (see "Installing an IBM MAX5 expansion blade" on page 89 for instructions).

16. Install the optional expansion unit, if you removed one from the blade server (see "Installing an expansion unit" on page 74 for instructions).

17. Install the cover onto the blade server (see "Installing the blade server cover" on page 72 for instructions).

18. Install the blade server or scalable blade complex into the BladeCenter chassis (see "Installing a blade server in a BladeCenter chassis" on page 65 for instructions).

19. Turn on the blade server, start the Setup utility, and reset the configuration (see "Using the Setup utility" on page 20 for instructions).

Removing and replacing Tier 2 CRUs

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 the server.

Removing the scalability tray

To remove the scalability tray from a blade server, complete the following steps.

About this task

Important: The scalability tray should be removed only by trained service personnel.

Procedure

1. Before you begin, read "Safety" on page v and "Installation guidelines" on page 63.

2. If the scalable blade complex is installed in a BladeCenter chassis, remove it (see "Removing the blade server from the BladeCenter chassis" on page 64 for instructions).

3. Remove the cover from the topmost blade server (see "Removing the blade server cover" on page 70 for instructions).

4. Stand the blade servers upright on a clean, flat work surface, with the 2-node scalability card facing up.

5. Remove the 2-node scalability card (see "Removing the 2-node scalability card" on page 83 for instructions).

6. Press the blade server cover release on each side of the blade server and lift the topmost blade server from the bottom blade server as shown in the

following illustration.

Secondary
BladeCenter HX5
blade server

Blade server
cover release

Blade server
cover release

7. Carefully lay the blade server on a flat, static-protective surface, with the cover side down.

8. Using a small screwdriver, press down on the spring plates to disengage them.
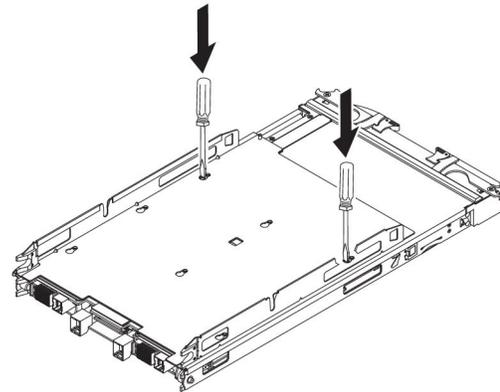
9. Pressing down firmly on the middle of the tray, slide the scalability tray back.
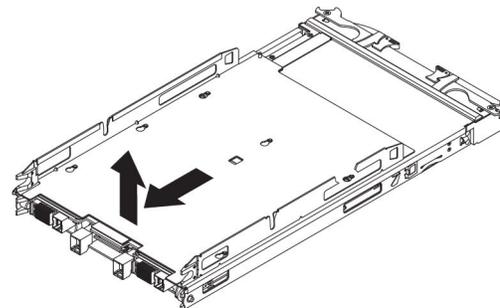
10. Lift the scalability tray away from the blade server.

11. If you are instructed to return the scalability tray, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the scalability tray

Use this information to install the scalability tray on a blade server.

About this task

To install the scalability tray, complete the following steps:

Procedure

1. Before you begin, read "Safety" on page v and "Installation guidelines" on page 63.
2. If the blade server is installed in a BladeCenter chassis, remove it (see "Removing the blade server from the BladeCenter chassis" on page 64 for instructions).
3. Carefully lay the blade server on a flat, static-protective surface, with the cover side down.
4. Align the scalability tray flush with the blade server in the start position. The pins on the scalability tray should be aligned with the holes in the blade server.
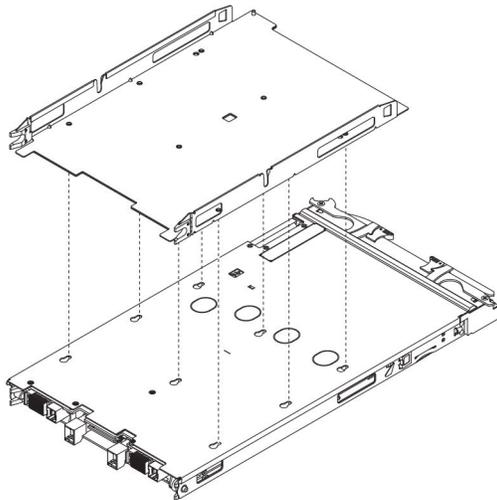
5. Pressing down firmly on the middle of the tray, slide the scalability tray forward toward the bezel until there is an audible click from each side of the blade server.
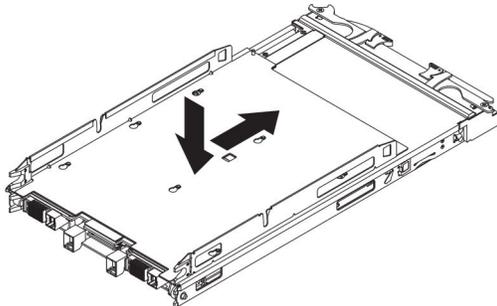
6. Attempt to pull the scalability tray back to ensure that the scalability tray is firmly seated.
7. Look in the holes on each side of the blade server to ensure that the spring plates are engaged.
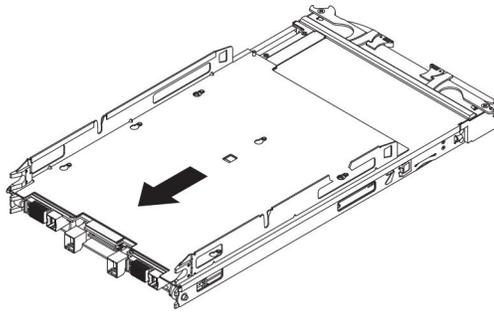
Removing the 1-node speed burst card

Use this information to remove the 1-node speed burst card from a blade server.

About this task

To remove the 1-node speed burst card, complete the following steps.
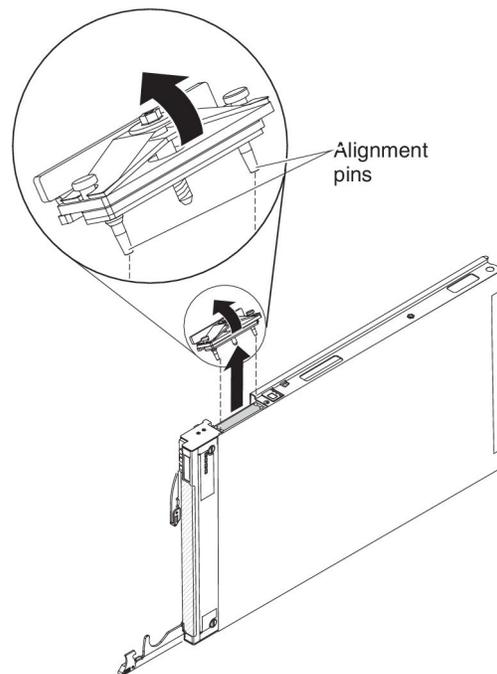
Alignment pins

Procedure

1. Before you begin, read "Safety" on page v and "Installation guidelines" on page 63.
2. If the scalable blade complex is installed in a BladeCenter chassis, remove it (see "Removing the blade server from the BladeCenter chassis" on page 64 for instructions).
3. Carefully lay the blade server on a flat, static-protective surface.
4. Open the blade server cover (see "Removing the blade server cover" on page 70 for instructions).
5. Stand the blade server upright on a clean, flat work surface, with the scalability connector facing up.

6. Open the lower handle (rotate the lower handles down) to allow the blade server to sit flat on the work surface.

7. Using the 3/16" hex driver that comes with the 1-node speed burst card, loosen the nut that attaches the 1-node speed burst card to the blade server.

8. Lift the 1-node speed burst card off the blade server.

9. If you are instructed to return the speed burst card, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the 1-node speed burst card

Use this information to install a 1-node speed burst card in a blade server.

About this task

To install a 1-node speed burst card, complete the following steps:

Procedure

1. Before you begin, read "Safety" on page v and "Installation guidelines" on page 63.

2. If the blade server or scalable blade complex is installed in a BladeCenter chassis, remove it. See "Removing the blade server from the BladeCenter chassis" on page 64 for instructions.

3. Carefully lay the blade server on a flat, static-protective surface.

4. Open the blade server cover (see "Removing the blade server cover" on page 70 for instructions).

5. If an optional expansion unit is installed, remove the expansion unit (see "Removing an expansion unit" on page 73 for instructions).

   Note: Optional expansion units are not supported when a IBM MAX5 expansion blade is installed.

6. Stand the blade server upright on a clean, flat work surface, with the scalability filler connector facing up.

7. Open the lower handle (rotate the lower handles down) to allow the blade server to sit flat on the work surface.

8. Remove the scalability filler from the blade server or 2-node scalability card (see "Installing the 2-node Scalability card" on page 85). To remove the scalability filler, complete the following steps:

   a. Using the 3/16" hex driver that is provided with the 1-node speed burst card, loosen the nut that attaches the filler to the blade server.

   b. Lift the filler off the blade server.

9. Align the pins on the bottom of the 1-node speed burst card with the holes on the scalability connector on the blade server.

10. Press down firmly so that the 1-node speed burst card is flush with the scalability connector on the blade server.

11. Tighten the screw on the filler by hand to ensure that the screw threads start properly.

    Important: Always hand tighten the screw before using the 3/16" hex driver.

12. Using the 3/16" hex driver, tighten the nut that attaches the 1-node speed burst card to the blade server.

    Note: If you are using a torque driver, the correct torque is 15 in-lb.

13. Install the optional expansion unit, if you removed one from the blade server (see "Installing an expansion unit" on page 74 for instructions).

14. Install the cover onto the blade server (see "Installing the blade server cover" on page 72 for instructions).

15. Install the blade server or scalable blade complex into the BladeCenter chassis (see "Installing a blade server in a BladeCenter chassis" on page 65 for instructions).

Removing the 2-node scalability card

Use this information to remove the 2-node scalability card from a blade server.

About this task

To remove the 2-node scalability card, complete the following steps:

### Procedure

1. Before you begin, read "Safety" on page v and "Installation guidelines" on page 63.

2. If the blade server or scalable blade complex is installed in a BladeCenter chassis, remove it. See "Removing the blade server from the BladeCenter chassis" on page 64 for instructions.

3. Remove the cover for the topmost blade server (see "Removing the blade server cover" on page 70 for instructions).

4. Stand the blade servers upright on a clean, flat work surface, with the scalability connector on the blade servers facing up.

5. Release the lower handles (rotate the lower handles down) to allow the blade servers to sit flat on the work surface.
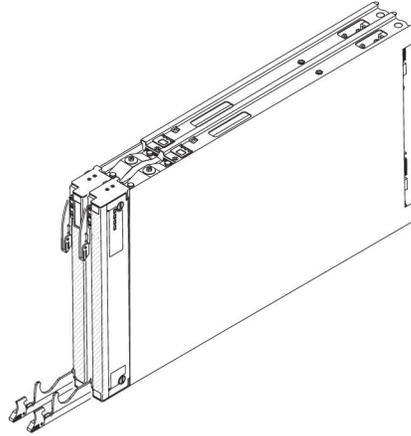
6. Loosen each screw on the 2-node scalability card, using the provided 3/16" hex driver. Alternate the loosening of each screw until both screws are removed.

7. Lift the 2-node scalability card off both blade servers and store the card in a safe place.

Alignment pins

Alignment pins
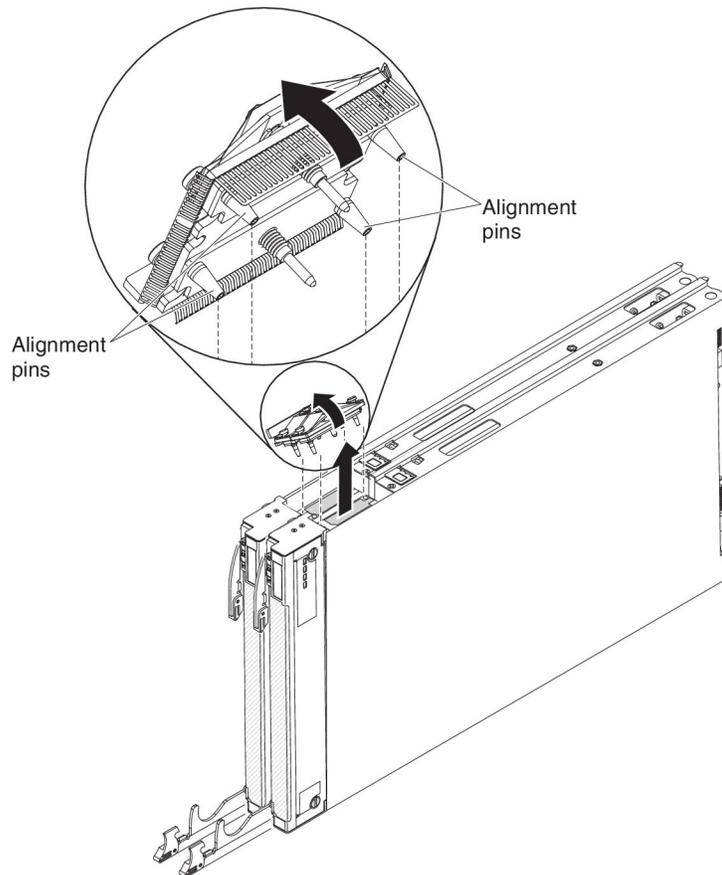
Note: When you remove the 2-node scalability card, the BladeCenter HX5 blade servers are no longer scaled; each blade server operates independently in a chassis. You do not need to remove the scalability tray from the topmost blade server as long as you install the two blade servers in adjacent blade server bays. If you do remove the scalability tray, you must also install a cover on the bottom blade server.

8. If you are instructed to return the 2-node scalability card, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the 2-node Scalability card

Use this information to install the 2-node scalability card on a blade server.

About this task

To install the 2-node scalability card, complete the following steps:

Procedure

1. Before you begin, read "Safety" on page v and "Installation guidelines" on page 63.
2. If the blade servers are installed in a BladeCenter chassis, remove them (see "Removing the blade server from the BladeCenter chassis" on page 64 for instructions).
3. If an optional expansion unit is installed, remove the expansion unit (see "Removing an expansion unit" on page 73 for instructions).

   Note: Optional expansion units are not supported when a IBM MAX5 expansion blade is installed.
4. Remove the covers for both blade servers (see "Removing the blade server cover" on page 70 for instructions).
5. Remove the 1-node speed burst cards (see "Installing the 1-node speed burst card" on page 82) or scalability fillers from both blade servers, depending on which you have installed. To remove the scalability filler, complete the following steps:

   a. Using the 3/16" hex driver that comes with the scalability kit, loosen the nut that attaches the filler to the blade server.

   b. Lift the filler off of the blade server.
6. Attach the scalability tray to the topmost blade server (see "Installing the scalability tray" on page 80).
7. Attach the blade server with the scalability tray to the bottom blade server.
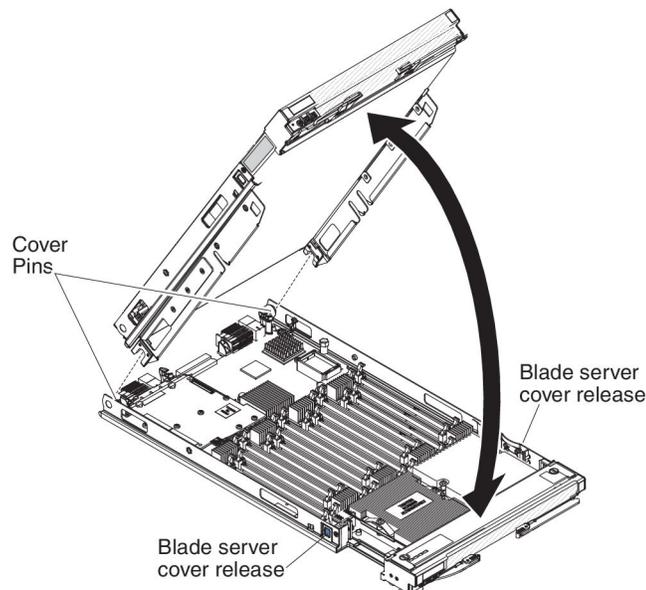
a. Lower the topmost blade server so that the slots at the rear slide down onto the pins at the rear of the bottom blade server, as shown in the illustration.

b. Pivot the topmost blade server to the closed position, as shown in the illustration, until it clicks into place.

8. Stand the blade servers upright on a clean, flat work surface, with the scalability connector on the blade servers facing up.

9. Release the lower handles (rotate the lower handles down) to allow the blade servers to sit flat on the work surface.
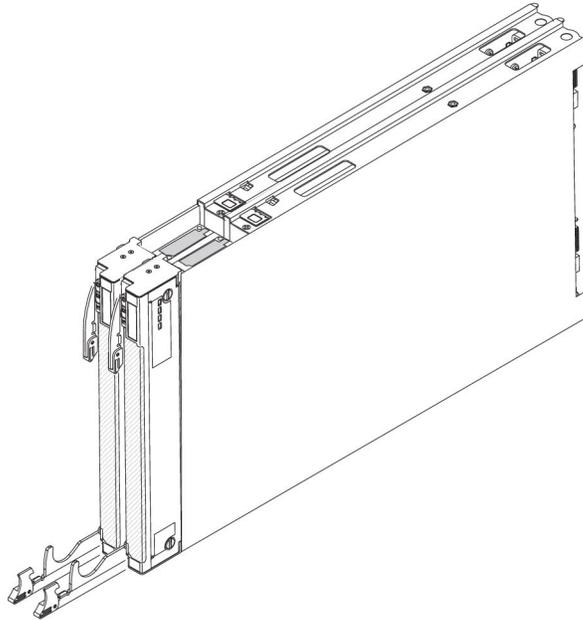
10. Align the pins on the bottom of the IBM 2-node scalability card with the holes on the scalability connector on the blade server.

11. Press down firmly so that the 2-node scalability card is flush with the scalability connector on the blade server.

Alignment pins

Alignment pins
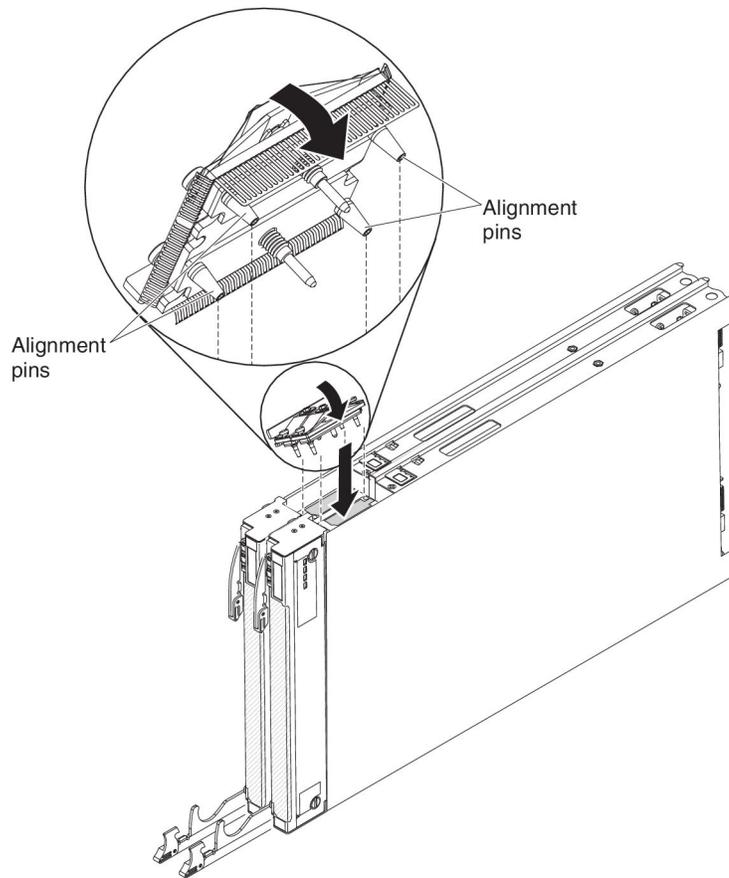
12. Make sure that the 2-node scalability card is flush with the edge of the blade server.

13. Alternately tighten the screws on the 2-node scalability card by hand to ensure that the screw threads start properly.

    Important: Always hand tighten each screw before you use the 3/16" hex driver.

14. Alternately tighten each screw on the 2-node scalability card using the 3/16" hex driver. Alternate the tightening of each screw until both screws are tightened.

    Note: If you are using a torque driver, the correct torque is 15 in-lb.

15. Install the optional expansion unit, if you removed one from the blade server (see "Installing an expansion unit" on page 74 for instructions).

16. Install the blade cover on the topmost blade server (see "Installing the blade server cover" on page 72 for instructions).

17. Install the scalable blade complex into the chassis (see "Installing a blade server in a BladeCenter chassis" on page 65 for instructions).

Removing an IBM MAX5 expansion blade

Use these instructions to remove an IBM MAX5 expansion blade from the BladeCenter HX5 blade server.

About this task

Note: To use a BladeCenter HX5 blade server that has tall heat sinks, you must install another IBM MAX5 expansion blade.

To remove an IBM MAX5, complete the following steps:
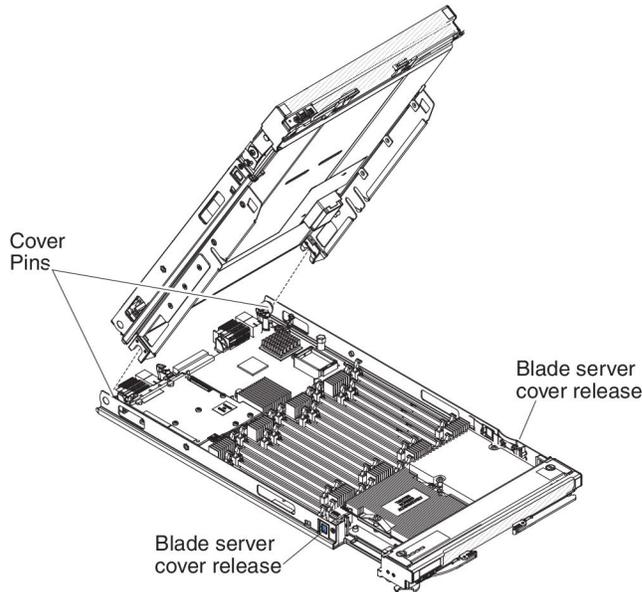
Procedure

1. Before you begin, read "Safety" on page v and "Installation guidelines" on page 63.
2. If the blade server or scalable blade complex is installed in a BladeCenter chassis, remove it. See "Removing the blade server from the BladeCenter chassis" on page 64 for instructions.
3. Carefully lay the blade server on a flat, static-protective surface.
4. Remove the IBM MAX5 1-node scalability card (see "Removing the IBM MAX5 1-node Scalability card" on page 92 for instructions).
5. Remove the IBM MAX5:
   a. Press the blade server cover release on each side of the blade server and lift the IBM MAX5 from the blade server.
   b. Rotate the IBM MAX5 open; then, lift the IBM MAX5 from the blade server.
6. If your BladeCenter HX5 blade server does not have tall heat sinks and you are not installing another IBM MAX5 expansion blade, complete the following steps:
   a. Locate the power sharing connector on the BladeCenter HX5 blade server and install the power jumper (see "Blade server connectors - BladeCenter HX5" on page 13).
   b. Remove the EMC gasket from the upper ridge of the "Blade server connectors - BladeCenter HX5" on page 13 blade server if one is installed.
7. If you are instructed to return the IBM MAX5 expansion blade, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing an IBM MAX5 expansion blade

Use these instructions to install an IBM MAX5 expansion blade.

About this task

Note: Before installing an IBM MAX5 expansion blade option, make sure that you have updated the firmware on the BladeCenter HX5 blade server to the latest level. If you attach and try to use the IBM MAX5 expansion blade without updating the server firmware, you might get unexpected system behavior or the server might not power on. For information about updating the firmware on the BladeCenter HX5 blade server, see "Updating firmware and device drivers" on page 31.

There are two versions of the IBM MAX5 expansion blade, referred to as the IBM MAX5 version 1 and IBM MAX5 version 2 in this document. IBM MAX5 version 2 has a "MAX5" identifying label on the bottom of the front bezel. The functionality of the two IBM MAX5 expansion blades are equivalent except for the type of DIMMs supported. The type of DIMMs supported will differ, depending on the version of IBM MAX5 expansion blade installed. For the list of DIMMs available for your IBM MAX5 expansion blade, see "Parts listing - IBM MAX5" on page 59 or go to http://www.ibm.com/supportportal/ for an updated parts listing.

To install an IBM MAX5, complete the following steps.
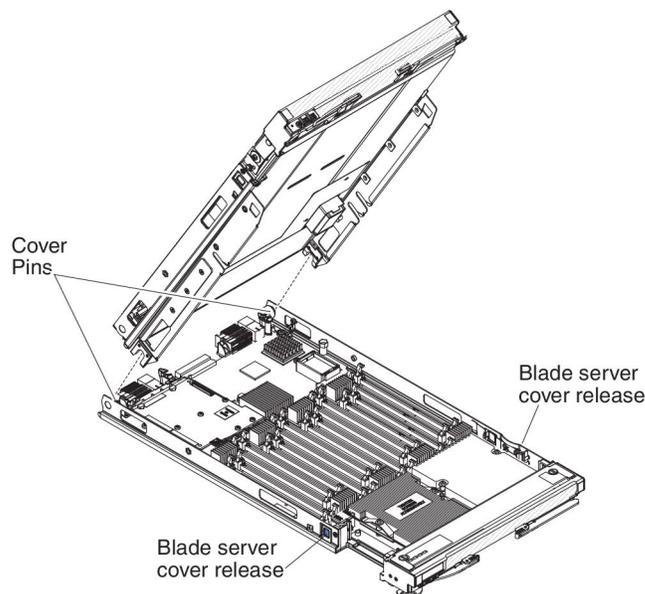
Cover Pins

Blade server cover release

Blade server cover release

Procedure

1. Before you begin, read "Safety" on page v and "Installation guidelines" on page 63.
2. If the blade server is installed in a BladeCenter chassis, remove it (see "Removing the blade server from the BladeCenter chassis" on page 64 for instructions).
3. Carefully lay the blade server on a flat, static-protective surface.
4. Open the blade server cover (see "Removing the blade server cover" on page 70 for instructions).
5. If an optional expansion unit is installed, remove the expansion unit (see "Removing an expansion unit" on page 73 for instructions).

Note: Optional expansion units are not supported when a IBM MAX5 expansion blade is installed.

6. If you are installing an IBM MAX5 for the first time, locate the power sharing connector on the BladeCenter HX5 blade server and remove the power jumper if one is installed (see "Blade server connectors - BladeCenter HX5" on page 13).

7. If you are installing the IBM MAX5 expansion blade option for the first time on an BladeCenter HX5 with tall heat sinks, complete the following steps:

   a. Remove the operator control panel access panel:
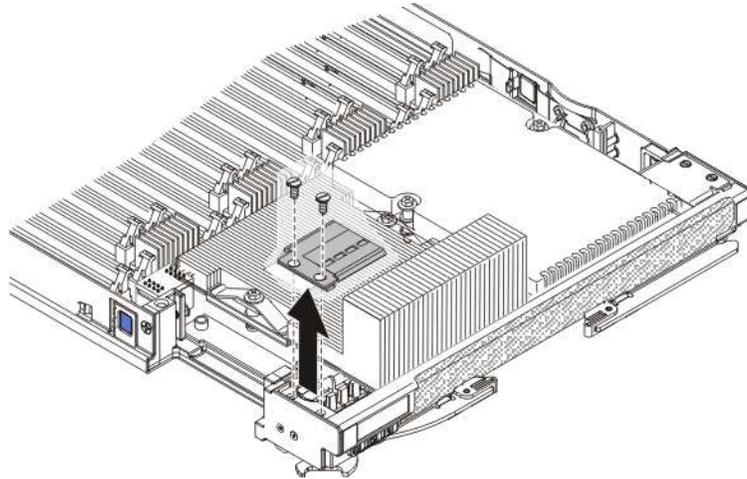
      1) Using a screwdriver, remove each of the screws on the right access panel.
      2) Lift the access panel away from the blade server.

   b. Remove the embedded hypervisor card access panel:
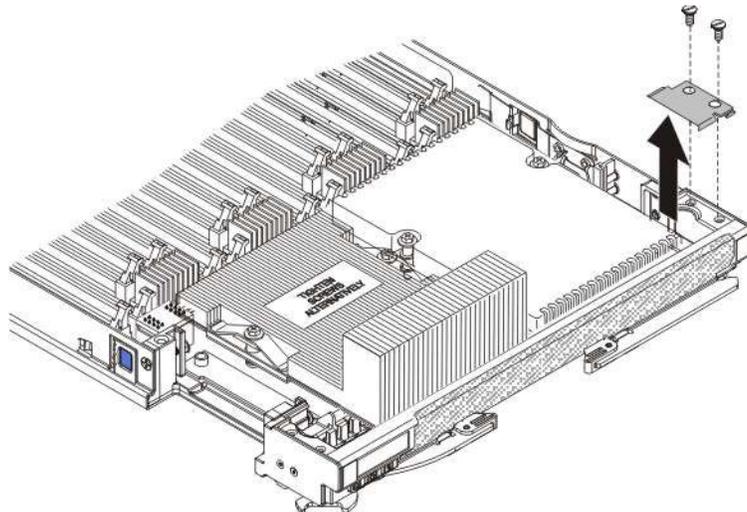
      1) Using a screwdriver, remove each of the screws on the right access panel.
      2) Lift the access panel away from the blade server.

   c. Install the EMC gasket on the upper ridge of the BladeCenter HX5 blade server bezel.

   d. Install the operator control panel access panel:
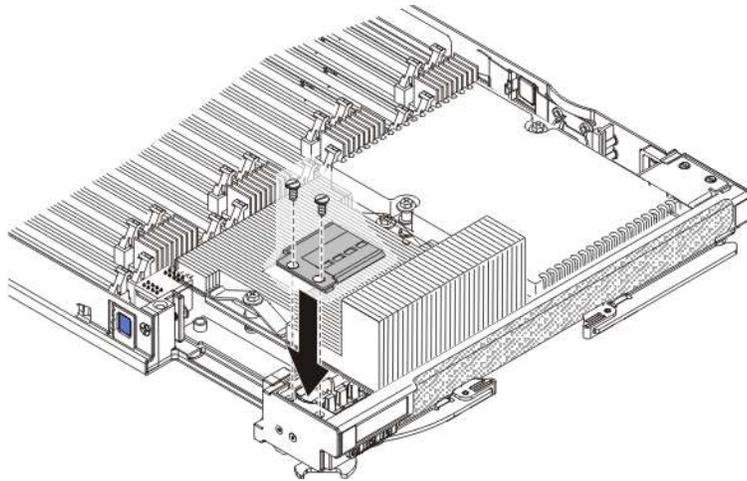
        1) Align the holes in the access panel with the holes in the blade server.

        2) Use a screwdriver to install the screws in the holes of the access panel.

  e. Install the embedded hypervisor key access panel:
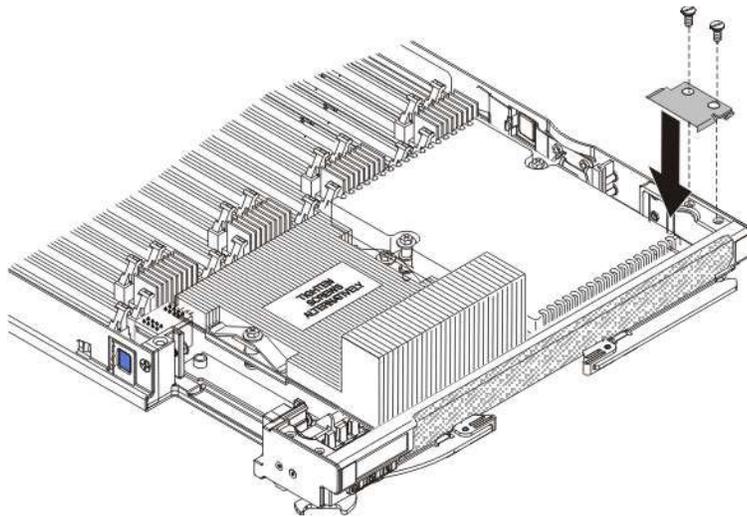
        1) Align the holes in the access panel with the holes in the blade server.

        2) Use a screwdriver to install the screws in the holes of the access panel.

  f. Remove the heat sink access plates on the IBM MAX5 expansion blade.
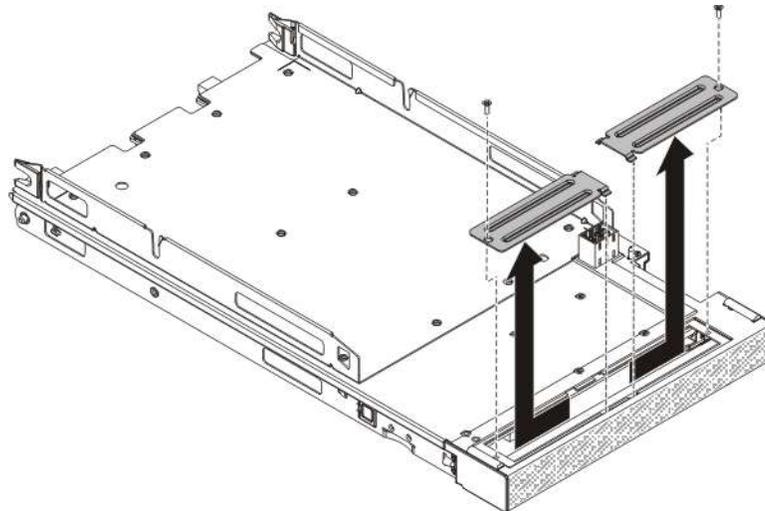
    1) Lay the IBM MAX5 expansion blade on a flat, static-protective surface, cover side down.

    2) Use a screwdriver to remove both heat sink access plates.

8. Touch the static-protective package that contains the IBM MAX5 to any *unpainted* metal surface on the BladeCenter chassis or any *unpainted* metal surface on any other grounded rack component; then, remove the optional expansion unit from the package.

9. Orient the IBM MAX5 as shown in the illustration.

10. Lower the IBM MAX5 so that the slots at the rear slide down onto the cover pins at the rear of the blade server; then, pivot the IBM MAX5 down onto the blade server.

11. Press the IBM MAX5 firmly into the closed position until it clicks into place.

12. Install the IBM MAX5 1-node scalability card (see "Installing the IBM MAX5 1-node Scalability card" on page 94 for instructions).

13. If you are replacing a defective IBM MAX5 expansion blade, transfer the memory DIMMs from the defective expansion blade to the new expansion blade (see "Removing a DIMM - IBM MAX5 expansion blade" on page 110 and "Installing a DIMM - IBM MAX5" on page 111).

14. Install the blade server or scalable blade complex into the BladeCenter chassis (see "Installing a blade server in a BladeCenter chassis" on page 65 for instructions).

Results

Removing the IBM MAX5 1-node Scalability card

Use this information to remove the IBM MAX5 1-node scalability card from a blade server.

About this task

To remove the IBM MAX5 1-node scalability card, complete the following steps.

Procedure

1. Before you begin, read "Safety" on page v and "Installation guidelines" on page 63.

2. If the blade server or scalable blade complex is installed in a BladeCenter chassis, remove it. See "Removing the blade server from the BladeCenter chassis" on page 64 for instructions.

3. Remove the cover for the expansion blade (see "Removing the blade server cover" on page 70 for instructions).

4. Stand the blade server and expansion blade upright on a clean, flat work surface, with the scalability connector on the blade servers facing up.

5. Open the lower handles (rotate the lower handles down) to allow the blade server and expansion blade to sit flat on the work surface.
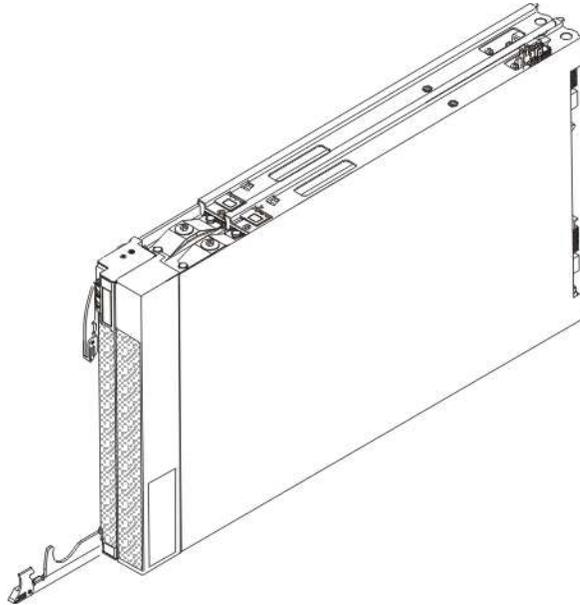
6. Loosen each screw on the 1-node scalability card, using the provided 3/16" hex driver. Alternate the loosening of each screw until both screws are removed.

7. Lift the 1-node scalability card off of the blade server and expansion blade and store the card in a safe place.

Alignment pins

Alignment pins
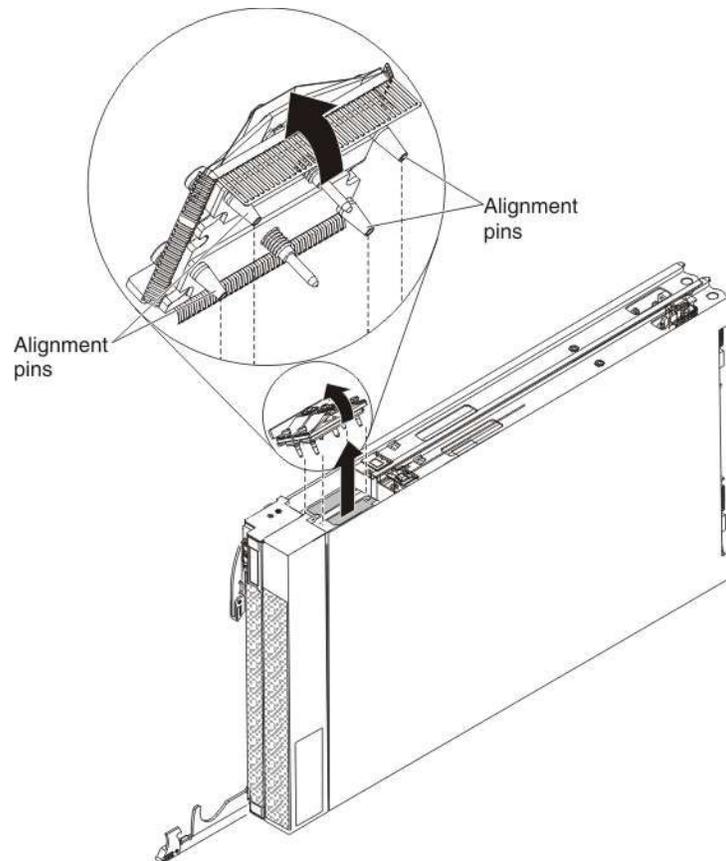
8. Install either a 1-node Speed Burst card (see "Installing the 1-node speed burst card" on page 82) or a scalability filler. To install a scalability filler, complete the following steps:

   a. Align the pins on the bottom of the filler with the holes on the scalability connector on the blade server.

   b. Press down firmly so that the filler is flush with the scalability connector on the blade server.

   c. Tighten the screw on to the 1-node scalability card by hand to ensure that the screw threads start properly.

   d. Using the socket nut driver provided with the scalability kit, tighten the nut that attaches the filler to the blade server.

9. If you are instructed to return the 1-node scalability card, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the IBM MAX5 1-node Scalability card

Use this information to install the IBM MAX5 1-node scalability card on a blade server.

About this task

To install the IBM MAX5 1-node scalability card, complete the following steps.

Procedure

1. Before you begin, read "Safety" on page v and "Installation guidelines" on page 63.

2. If the blade server or scalable blade complex is installed in a BladeCenter chassis, remove it. See "Removing the blade server from the BladeCenter chassis" on page 64 for instructions.

3. Remove the cover for the blade server (see "Removing the blade server cover" on page 70 for instructions).

4. If an optional expansion unit is installed, remove the expansion unit (see "Removing an expansion unit" on page 73 for instructions).

   Note: Optional expansion units are not supported when a IBM MAX5 expansion blade is installed.

5. Remove the 1-node Speed Burst card (see "Installing the 1-node speed burst card" on page 82) or scalability filler from the blade server, depending on which you have installed. To remove the scalability filler, complete the following steps:

   a. Using the socket nut driver provided with the scalability kit, loosen the nut that attaches the filler to the blade server.

   b. Lift the filler off of the blade server.

6. Install the IBM MAX5 expansion blade (see "Installing an IBM MAX5 expansion blade" on page 89).

7. Remove the cover for the expansion blade (see "Removing the blade server cover" on page 70 for instructions).

8. Stand the blade server and expansion blade upright on a clean, flat work surface, with the scalability connector on the blade servers facing up.

9. Open the lower handles (rotate the lower handles down) to allow the blade server and expansion blade to sit flat on the work surface.
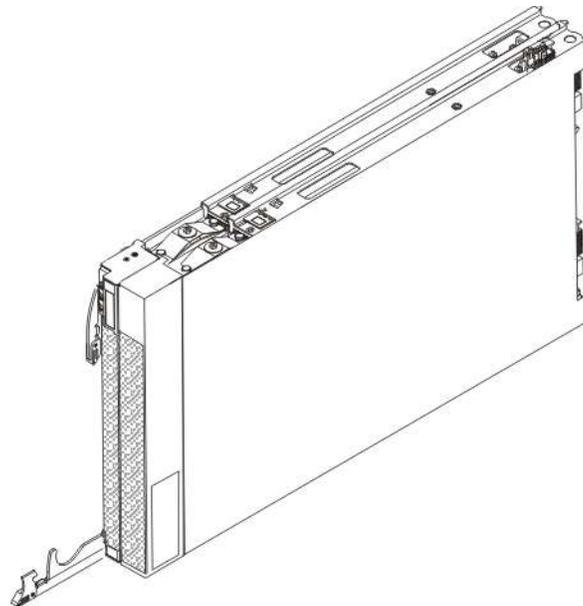
10. Align the pins on the bottom of the IBM MAX5 1-node scalability card with the holes on the scalability connector on the blade server.

11. Press down firmly so that the 1-node scalability card is flush with the scalability connector on the blade server.
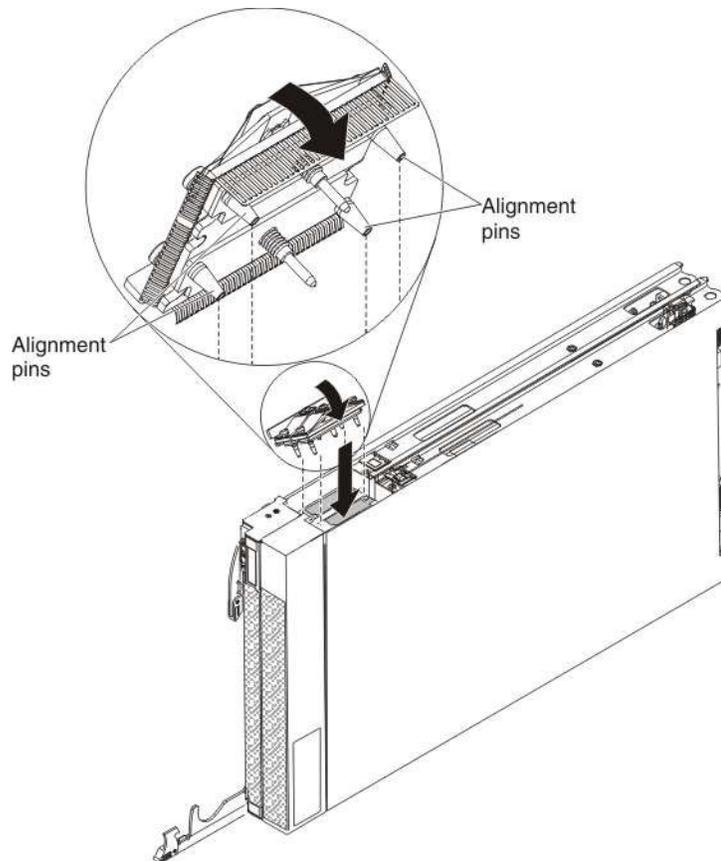
12. Make sure that the 1-node scalability card is flush with the edge of the blade server.

13. Alternately tighten the screws on the 1-node scalability card by hand to ensure that the screw threads start properly.

    Important: Always hand tighten each screw before you use the 3/16" hex driver.

14. Install the blade server cover (see "Installing the blade server cover" on page 72 for instructions).

15. Install the blade server into the chassis (see "Installing a blade server in a BladeCenter chassis" on page 65 for instructions).

Removing an expansion unit

Use these instructions to remove an expansion unit from a blade server or from the topmost blade server in a scalable blade complex.

About this task

Cover Pins

Blade server cover release

Blade server cover release

To open and remove an expansion unit, complete the following steps.

Procedure
1. Before you begin, read "Safety" on page v and "Installation guidelines" on page 63.
2. If the blade server or scalable blade complex is installed in a BladeCenter chassis, remove it. See "Removing the blade server from the BladeCenter chassis" on page 64 for instructions.
3. Carefully lay the blade server on a flat, static-protective surface, orienting the blade server with the bezel pointing toward you.
4. Open the blade server cover (see "Removing the blade server cover" on page 70 for instructions).
5. Press the blade server cover release on each side of the blade server and lift the expansion unit from the blade server.
6. Rotate the expansion blade open; then, lift the expansion blade from the blade server.
7. If additional expansion units need to be removed, repeat steps 5 on page 73 and 6 on page 73.
8. If you are instructed to return the expansion unit, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

   Important: Do not return the blade cover. You will need to install the blade cover from the BladeCenter HX5 on to the new expansion unit. The BladeCenter HX5 blade cover contains the system-service label on the bottom of the cover.

Results

Statement 12

CAUTION:
The following label indicates a hot surface nearby.

Statement 21

CAUTION:
Hazardous energy is present when the blade server is connected to the power source. Always replace the blade cover before installing the blade server.

Installing an expansion unit

Use these instructions to install an expansion unit or for the topmost blade server in a scalable blade complex.

About this task

Attention: You cannot insert the blade server into the BladeCenter chassis until the cover is installed and closed. Do not attempt to override this protection.

Statement 21

CAUTION:
Hazardous energy is present when the blade server is connected to the power source. Always replace the blade cover before installing the blade server.

Cover Pins

Blade server cover release

Blade server cover release

To install and close the blade server cover, complete the following steps:

Procedure

1. Before you begin, read "Safety" on page v and "Installation guidelines" on page 63.
2. Carefully lay the blade server on a flat, static-protective surface, orienting the blade server with the bezel pointing toward you.
3. Locate the blade expansion connector and remove the cover if one is installed (see "Blade server connectors - BladeCenter HX5" on page 13).
4. Touch the static-protective package that contains the optional expansion unit to any *unpainted* metal surface on the BladeCenter unit or any *unpainted* metal surface on any other grounded rack component; then, remove the optional expansion unit from the package.
5. Orient the optional expansion unit as shown in the illustration.
6. Lower the expansion unit so that the slots at the rear slide down onto the cover pins at the rear of the blade server; then, pivot the expansion unit down onto the blade server.
7. If the expansion unit has a cover already installed, remove it (see "Removing the blade server cover" on page 70).
8. Install the blade cover from the BladeCenter HX5 (see "Installing the blade server cover" on page 72).

   Important: The BladeCenter HX5 blade cover contains the system-service label on the bottom of the cover.
9. Install the blade server or scalable blade complex into the BladeCenter chassis (see "Installing a blade server in a BladeCenter chassis" on page 65 for instructions).

Removing an SSD expansion card

Use this information to remove an SSD expansion card.

About this task

To remove an SSD expansion card, complete the following steps:

Procedure

1. Before you begin, read "Safety" on page v and "Installation guidelines" on page 63.
2. If the blade server or scalable blade complex is installed in a BladeCenter chassis, remove it. See "Removing the blade server from the BladeCenter chassis" on page 64 for instructions.
3. Carefully lay the blade server on a flat, static-protective surface.
4. If you are removing the SSD expansion card from a blade server that is the bottom blade server in a scalable blade complex, disassemble the blade complex (see "Disassembling a scalable blade complex" on page 67 for instructions).
5. If an optional expansion unit is installed, remove the expansion unit (see "Removing an expansion unit" on page 73 for instructions).

   Note: Optional expansion units are not supported when a IBM MAX5 expansion blade is installed.
6. If an IBM MAX5 expansion blade is installed, remove it (see "Removing an IBM MAX5 expansion blade" on page 87 for instructions).
7. Open the blade server cover (see "Removing the blade server cover" on page 70 for instructions).
8. If a CFFh expansion card is installed, remove it (see "Removing a CFFh expansion card" on page 120 for instructions).
9. Locate the blue expansion card lever on the SSD expansion card and lift the lever to release the SSD expansion card from the blade expansion connector on the system board.
10. Rotate the SSD expansion card up and lift it away from the expansion-card standoffs.
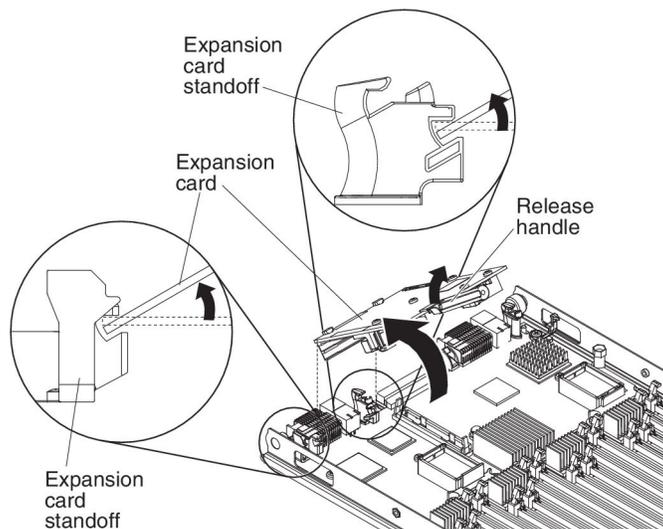
11. If you are instructed to return the SSD expansion card, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing an SSD expansion card

Use this information to install an SSD expansion card.

About this task

To install an SSD expansion card, complete the following steps:

Procedure

1. Before you begin, read "Safety" on page v and "Installation guidelines" on page 63.
2. If the blade server or scalable blade complex is installed in a BladeCenter chassis, remove it. See "Removing the blade server from the BladeCenter chassis" on page 64 for instructions.
3. Carefully lay the blade server on a flat, static-protective surface.
4. If you are installing the SSD expansion card in a blade server that is the bottom blade server in an existing scalable blade complex, disassemble the blade complex (see "Disassembling a scalable blade complex" on page 67 for instructions).
5. If an optional expansion unit is installed, remove the expansion unit (see "Removing an expansion unit" on page 73 for instructions).

   Note: Optional expansion units are not supported when a IBM MAX5 expansion blade is installed.
6. If an IBM MAX5 expansion blade is installed, remove it (see "Removing an IBM MAX5 expansion blade" on page 87 for instructions).
7. Open the blade server cover (see "Removing the blade server cover" on page 70 for instructions).
8. If a CFFh expansion card is installed, remove it (see "Removing a CFFh expansion card" on page 120 for instructions).
9. Insert the back of the SSD expansion card into the expansion-card standoffs on the blade server and rotate the expansion card down toward the system board.

   Note: The expansion card standoff in the middle of the blade server has two slots. The top slot is for the CFFh expansion card. Be sure to insert the SSD expansion card into the bottom slot of the expansion-card standoff that is located in the middle of the blade server.
10. Carefully push down on the SSD expansion card (pressing on the blue label) until the expansion card is seated.

Note: Make sure that the expansion card lever is in the closed position.
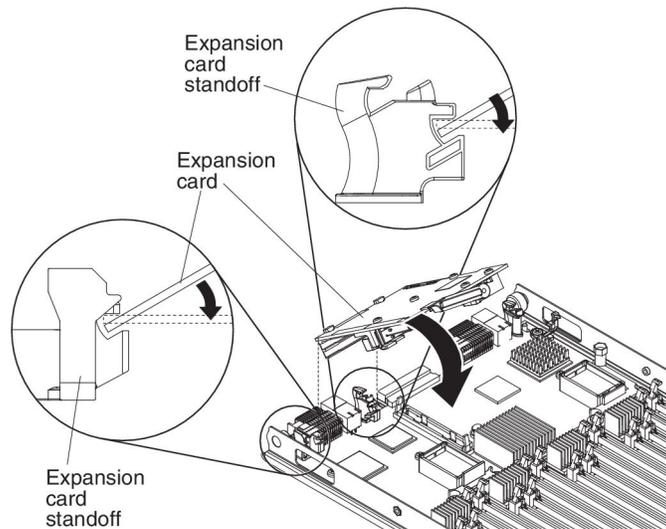
11. Install the CFFh expansion card, if you removed one from the blade server (see "Installing a CFFh expansion card" on page 123 for instructions).

12. If the blade server is part of a scalable blade complex, assemble the scalable blade complex (see "Assembling a scalable blade complex" on page 69 for instructions).

13. Install the IBM MAX5 expansion blade if you removed one (see "Installing an IBM MAX5 expansion blade" on page 89 for instructions).

14. Install the optional expansion unit, if you removed one from the blade server (see "Installing an expansion unit" on page 74 for instructions).

15. Install the cover onto the blade server (see "Installing the blade server cover" on page 72 for instructions).

16. Install the blade server or scalable blade complex into the BladeCenter chassis (see "Installing a blade server in a BladeCenter chassis" on page 65 for instructions).

Removing a solid state drive

Use this information to remove a solid state drive.

About this task

The blade server has a solid state drive expansion card for installing or removing solid state drives. To remove a solid state drive, complete the following steps:

Procedure

1. Before you begin, read "Safety" on page v and "Installation guidelines" on page 63.

2. If the blade server or scalable blade complex is installed in a BladeCenter chassis, remove it. See "Removing the blade server from the BladeCenter chassis" on page 64 for instructions.

3. Carefully lay the blade server on a flat, static-protective surface.

4. Open the blade server cover (see "Removing the blade server cover" on page 70 for instructions).

5. If an optional expansion unit is installed, remove the expansion unit (see "Removing an expansion unit" on page 73 for instructions).

Note: Optional expansion units are not supported when a IBM MAX5 expansion blade is installed.

6. If you are removing the SSD expansion card from a blade server that is the bottom blade server in a scalable blade complex, disassemble the blade complex (see "Disassembling a scalable blade complex" on page 67 for instructions).

7. If an IBM MAX5 expansion blade is installed, remove it (see "Removing an IBM MAX5 expansion blade" on page 87 for instructions).

8. If a CFFh expansion card is installed, remove it (see "Removing a CFFh expansion card" on page 120 for instructions).

9. Remove the SSD expansion card (see "Removing an SSD expansion card" on page 99 for instructions).

10. Turn over the SSD expansion card.
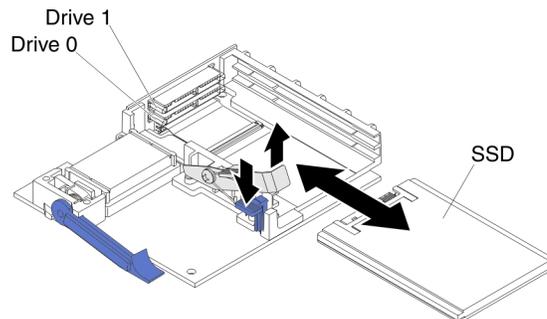
11. Press down on the blue tab. The retention lever automatically opens so that the solid state drive or drives are accessible.

12. Slide the solid state drive out of the slot.

    Note: When you remove a drive from the SSD expansion card, consider labeling the drive to indicate the slot from which the drive was removed so that you can install the drive back in to the same slot.

13. Close the retention lever and secure it with the blue tab.

    Note: You might have to press the blue tab before you close the retention lever.

14. If you are instructed to return the solid state drive, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a solid state drive

Use this information to install a solid state drive.

About this task

You can install up to two solid state drives in the SSD expansion card. The blade server supports using RAID 0 or RAID 1 when two storage drives are installed. See "Using the LSI Logic Configuration Utility program" on page 30 for information about RAID configuration.

To install a solid state drive, complete the following steps:

Procedure

1. Before you begin, read "Safety" on page v and "Installation guidelines" on page 63.
2. If the blade server or scalable blade complex is installed in a BladeCenter chassis, remove it. See "Removing the blade server from the BladeCenter chassis" on page 64 for instructions.
3. Carefully lay the blade server on a flat, static-protective surface.
4. If you are removing the SSD expansion card from a blade server that is the bottom blade server in a scalable blade complex, disassemble the blade complex (see "Disassembling a scalable blade complex" on page 67 for instructions).
5. If an optional expansion unit is installed, remove the expansion unit (see "Removing an expansion unit" on page 73 for instructions).

   Note: Optional expansion units are not supported when a IBM MAX5 expansion blade is installed.
6. If an IBM MAX5 expansion blade is installed, remove it (see "Removing an IBM MAX5 expansion blade" on page 87 for instructions).
7. Open the blade server cover (see "Removing the blade server cover" on page 70 for instructions).
8. Remove the SSD expansion card (see "Removing an SSD expansion card" on page 99 for instructions).
9. Turn over the SSD expansion card.
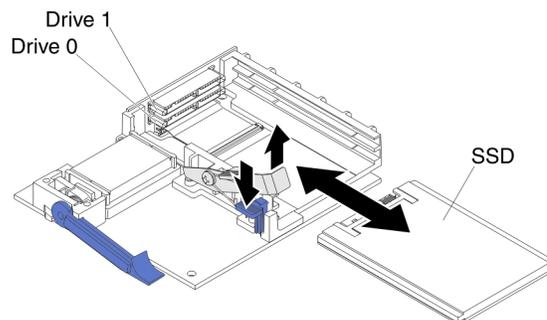
10. Touch the static-protective package that contains the solid state drive to any *unpainted* metal surface on the BladeCenter unit or any *unpainted* metal surface on any other grounded rack component; then, remove the solid state drive from the package.
11. Slide the solid state drive into the slot until it is firmly seated in the connector.
12. If you have a second solid state drive to install, repeat steps 10 through 11.
13. Close the retention lever and secure it with the blue tab.

    Note: You might need to press the blue tab before you close the retention lever.
14. Install the SSD expansion card (see "Installing an SSD expansion card" on page 100 for instructions).
15. Install the CFFh expansion card, if you removed one from the blade server (see "Installing a CFFh expansion card" on page 123 for instructions).
16. If the blade server is part of a scalable blade complex, assemble the scalable blade complex (see "Assembling a scalable blade complex" on page 69 for instructions).

17. Install the IBM MAX5 expansion blade if you removed one (see "Installing an IBM MAX5 expansion blade" on page 89 for instructions).
18. Install the optional expansion unit, if you removed one from the blade server (see "Installing an expansion unit" on page 74 for instructions).
19. Install the cover onto the blade server (see "Installing the blade server cover" on page 72 for instructions).
20. Install the blade server or scalable blade complex into the BladeCenter chassis (see "Installing a blade server in a BladeCenter chassis" on page 65 for instructions).

Removing a DIMM - BladeCenter HX5

Use this information to remove a dual inline memory module (DIMM) from the blade server.

About this task

The following illustration shows how to remove a DIMM from the blade server.
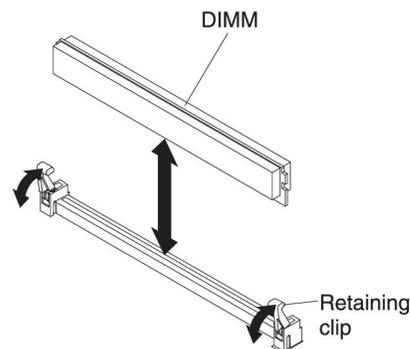
To remove a DIMM, complete the following steps:

Procedure

1. Before you begin, read "Safety" on page v and "Installation guidelines" on page 63.
2. If the blade server or scalable blade complex is installed in a BladeCenter chassis, remove it. See "Removing the blade server from the BladeCenter chassis" on page 64 for instructions.
3. Carefully lay the blade server on a flat, static-protective surface.
4. If you are removing the DIMM from a blade server that is the bottom blade server in a scalable blade complex, disassemble the blade complex (see "Disassembling a scalable blade complex" on page 67 for instructions).
5. If an IBM MAX5 expansion blade is installed, remove it (see "Removing an IBM MAX5 expansion blade" on page 87 for instructions).
6. Open the blade server cover (see "Removing the blade server cover" on page 70 for instructions).
7. If an optional expansion unit is installed, remove the expansion unit (see "Removing an expansion unit" on page 73 for instructions).

   Note: Optional expansion units are not supported when a IBM MAX5 expansion blade is installed.

8. Locate the DIMM connectors (see "Blade server connectors - BladeCenter HX5" on page 13). Determine which DIMM you want to remove from the blade server.

   Attention: To avoid breaking the retaining clips or damaging the DIMM connectors, handle the clips gently.

9. Make sure that both retaining clips on the DIMM connector from which you are removing the DIMM are in the open position.

10. Using your fingers, pull the DIMM out of the connector.

11. If you are instructed to return the DIMM, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a DIMM - BladeCenter HX5

The blade server has a total of 16 dual inline memory module (DIMM) connectors. The blade server supports very low profile (VLP) DDR3 DIMMs with error code correction (ECC) in 2 GB, 4 GB, 8 GB, 16 GB, and 32 GB capacities.

About this task

For a current list of supported DIMMs for the blade server, see http://www.ibm.com/servers/eserver/serverproven/compat/us/eserver.html.

Note: If you are installing a DIMM as a result of a DIMM failure, you might need to re-enable the DIMM. To determine whether you need to re-enable the DIMM:

1. Verify that the amount of memory installed in the BladeCenter HX5 is the expected amount of memory. You can verify the amount of memory that is installed through the operating system, by watching the monitor as the blade server starts up, or through the advanced management module web interface.

   For more information about the advanced management module web interface, see the *IBM BladeCenter Advanced Management Module: User's Guide*.

2. Run the Setup Utility to re-enable the DIMMs (see "Using the Setup utility" on page 20 for more information).

Depending on your model and the memory mode that is set in the Setup utility, the blade server can support a minimum of 4 GB and a maximum of 256 GB of system memory on the system board in a blade server with one processor. If two processors are installed, the blade server can support a minimum of 8 GB and a maximum of 512 GB of system memory.

Memory must be installed in pairs of DIMMs per installed processor. DIMMs must be the same size, speed, and technology within installed pairs.

If a single processor is installed, it can access the first eight DIMM connectors. The following table lists the memory configurations and installation order for the BladeCenter HX5 when one processor is installed.

Table 6. System memory configuration for a single processor **(one processor)**

Installed memory	DIMM connector							
	1	2	3	4	5	6	7	8
2 DIMMs	X			X				
4 DIMMs	X			X	X			X
6 DIMMs	X	X	X	X	X			X
8 DIMMs	X	X	X	X	X	X	X	X

The following table lists the memory configurations and installation order for the BladeCenter HX5 when two processors are installed.

Table 7. System memory configuration for a two processors **(two processors)**

Installed memory	DIMM connector															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
2 DIMMs	X			X												
4 DIMMs	X			X					X			X				
6 DIMMs	X			X	X			X	X			X				
8 DIMMs	X			X	X			X	X			X	X			X
10 DIMMs	X	X	X	X	X			X	X			X	X			X
12 DIMMs	X	X	X	X	X			X	X	X	X	X	X			X
14 DIMMs	X	X	X	X	X	X	X	X	X	X	X	X	X			X
16 DIMMs	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Important: If you are installing memory in a scalable blade complex, install the DIMMs to have a balance of memory among processors. Additional memory can be installed in the topmost BladeCenter HX5 blade server of the scalable blade complex so that you do not need to disassemble the scalable blade complex. For example, if you are installing four DIMMs in a scalable blade complex that consists of two BladeCenter HX5 blade servers, you would install two DIMMs (in connectors 1 and 4) of each blade server.

The BladeCenter HX5 blade server supports memory mirroring. When enabled, the first DIMM quadrant is duplicated onto the second DIMM quadrant for each processor.

Notes:

- To enable memory mirroring, the DIMMs installed for each processor must be identical.
- Memory mirroring reduces the available memory by half. For example, if the server has 64 GB of installed memory, only 32 GB of addressable memory is available when memory mirroring is enabled.

If one processor is installed, memory mirroring is set up as follows:

Table 8. Memory mirroring with one processor

DIMM Quadrant	Mirrored Quadrant
DIMM 1, DIMM 2, DIMM 3, DIMM 4	DIMM 5, DIMM 6, DIMM 7, DIMM 8

If two processors are installed, memory mirroring is set up as follows:

Table 9. Memory mirroring with two processors

DIMM Quadrant	Mirrored Quadrant
DIMM 1, DIMM 2, DIMM 3, DIMM 4	DIMM 5, DIMM 6, DIMM 7, DIMM 8
DIMM 9, DIMM 10, DIMM 11, DIMM 12	DIMM 13, DIMM 14, DIMM 15, DIMM 16

The BladeCenter HX5 blade server also supports memory sparing, in which the contents of the failing DIMM are transferred to the spare DIMM.

Notes:
- To enable memory sparing, the DIMMs installed for each processor must be identical.
- Memory sparing reserves memory capacity for failover in the event of a DIMM failure, and the reserved capacity is subtracted from the total available memory. Memory sparing provides less redundancy than memory mirroring does. If a predetermined threshold of correctable errors is reached, the contents of the failing DIMM are copied to the spare memory, and the failing DIMM or rank is disabled. To enable memory sparing through the Setup utility, select **System Settings** > **Memory**.
- See "Installing a DIMM - IBM MAX5" on page 111 for more information about memory requirements for the IBM MAX5 expansion blade.

If one processor is installed, memory sparing is set up as follows:

Table 10. Memory sparing with one processor

DIMM Pair	Spare Pair
DIMM 2, DIMM 3	DIMM 1, DIMM 4
DIMM 6, DIMM 7	DIMM 5, DIMM 8

If two processors are installed, memory sparing is set up as follows:

To install a DIMM, complete the following steps:

Table 11. Memory sparing with two processors

DIMM Pair	Spare Pair
DIMM 2, DIMM 3	DIMM 1, DIMM 4
DIMM 6, DIMM 7	DIMM 5, DIMM 8
DIMM 10, DIMM 11	DIMM 9, DIMM 12
DIMM 14, DIMM 15	DIMM 13, DIMM 16

Note: If all DIMMs are of the same size, the memory reference code (MRC) sets sparing in the farthest DIMM pair. Otherwise, the largest DIMM pair is set aside as spare.

DIMM installation procedure

To install a DIMM, complete the following steps:

Procedure

1. Before you begin, read "Safety" on page v and "Installation guidelines" on page 63.
2. Read the documentation that comes with the DIMMs.
3. If the blade server or scalable blade complex is installed in a BladeCenter chassis, remove it. See "Removing the blade server from the BladeCenter chassis" on page 64 for instructions.
4. Carefully lay the blade server on a flat, static-protective surface.

5. If you are installing the DIMM into a blade server that is the bottom blade server in a scalable blade complex, disassemble the blade complex (see "Disassembling a scalable blade complex" on page 67 for instructions).

6. If an IBM MAX5 expansion blade is installed, remove it (see "Removing an IBM MAX5 expansion blade" on page 87 for instructions).

7. Open the blade server cover (see "Removing the blade server cover" on page 70 for instructions).

8. Locate the DIMM connectors (see "Blade server connectors - BladeCenter HX5" on page 13). Determine the DIMM connector into which you will be installing memory.

9. If another memory module is already installed in the DIMM connector, remove it (see "Removing a DIMM - BladeCenter HX5" on page 105).

10. Touch the static-protective package that contains the DIMM to any *unpainted* metal surface on the BladeCenter unit or any *unpainted* metal surface on any other grounded rack component in the rack in which you are installing the DIMM for at least 2 seconds; then, remove the DIMM from its package.

11. To install the DIMMs, repeat the following steps for each DIMM that you install.
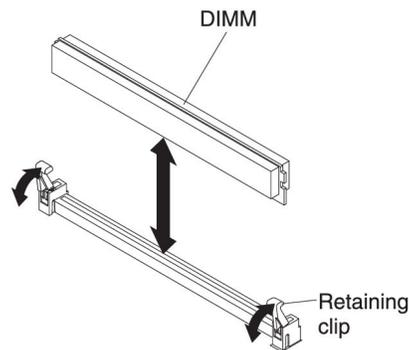
a. Make sure that both retaining clips on the DIMM connector into which you are installing the DIMM are in the open position.

b. Turn the DIMM so that the DIMM keys align correctly with the DIMM connector on the system board.

   Attention: To avoid breaking the retaining clips or damaging the DIMM connector, handle the clips gently.

c. Press the DIMM into the DIMM connector. The retaining clips lock the DIMM into the connector.

d. Make sure that the small tabs on the retaining clips are in the notches on the DIMM. If there is a gap between the DIMM and the retaining clips, the DIMM has not been correctly installed. Press the DIMM firmly into the connector, and then press the retaining clips toward the DIMM until the tabs are fully seated. When the DIMM is correctly installed, the retaining clips are parallel to the sides of the DIMM.

12. Install the IBM MAX5 expansion blade if you removed one (see "Installing an IBM MAX5 expansion blade" on page 89 for instructions).

13. Install the optional expansion unit, if you removed one from the blade server (see "Installing an expansion unit" on page 74 for instructions).

14. Install the cover onto the blade server (see "Installing the blade server cover" on page 72 for instructions).

15. Install the blade server or scalable blade complex into the BladeCenter chassis (see "Installing a blade server in a BladeCenter chassis" on page 65 for instructions).

Removing a DIMM - IBM MAX5 expansion blade

Use this information to remove a dual inline memory module (DIMM) from the IBM MAX5 expansion blade.

About this task

The following illustration shows how to remove a DIMM from the expansion blade.
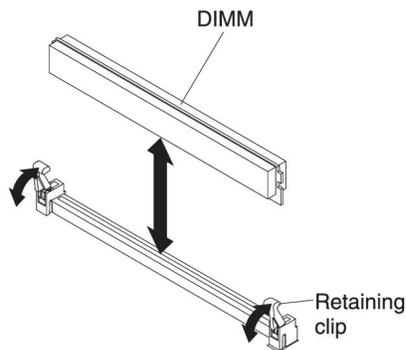
To remove a DIMM, complete the following steps:

Procedure

1. Before you begin, read "Safety" on page v and "Installation guidelines" on page 63.
2. Carefully lay the expansion blade on a flat, static-protective surface.
3. Open the expansion blade cover (see "Removing the blade server cover" on page 70 for instructions).
4. If the IBM MAX5 expansion blade is installed on an BladeCenter HX5 blade server that is installed in a BladeCenter chassis:
   a. Remove the blade server from the chassis (see "Removing the blade server from the BladeCenter chassis" on page 64 for instructions).
   b. Remove the IBM MAX5 expansion blade (see "Removing an IBM MAX5 expansion blade" on page 87 for instructions).
5. Locate the DIMM connectors (see "Blade server connectors - IBM MAX5" on page 15). Determine which DIMM you want to remove from the expansion blade.

   Attention: To avoid breaking the retaining clips or damaging the DIMM connectors, handle the clips gently.
6. Make sure that both retaining clips on DIMM connector from which you will be removing the DIMM are in the open position.
7. Using your fingers, pull the DIMM out of the connector.
8. If you are instructed to return the DIMM, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a DIMM - IBM MAX5

The expansion blade has a total of 24 dual inline memory module (DIMM) connectors. The expansion blade supports 2 GB (Type 7873 models), 4 GB, 8 GB, 16 GB (Type 7873 models), and 32 GB (Type 7873 models) memory DIMMs. Typically, you will install all memory supported by the BladeCenter HX5 blade server before installing memory in the IBM MAX5 expansion blade.

About this task

There are two versions of the IBM MAX5 expansion blade, referred to as the IBM MAX5 version 1 and IBM MAX5 version 2 in this document. IBM MAX5 version 2 has a "MAX5" identifying label on the bottom of the front bezel. The functionality of the two IBM MAX5 expansion blades are equivalent except the type of DIMMs supported. The type of DIMMs supported will differ, depending on the version of IBM MAX5 expansion blade installed.

Note: To ensure that all memory installed in the IBM MAX5 expansion blade is recognized by UEFI, make sure that you install a minimum of 2 DIMMs in the BladeCenter HX5 blade server.

The maximum memory speed is determined by the combination of the microprocessor, DIMM speed, DIMM type, and the Operating Modes in UEFI settings. When one quad-rank 16 GB or larger RDIMM is installed with one of the microprocessors listed in the following table, the 16 GB or larger RDIMMs operate at 1066 MHz. You cannot change the **QPI Link Frequency** to **Minimal Power** through **System Settings** > **Processors** > **QPI Link Frequency**.

Table 12. Quad-rank 16 GB RDIMM speed downshift configurations

Description	CRU part number
Intel Xeon E7-2830 Processor, 2.13GHz/24M/6.4GT/s, 8C, 105W	69Y3075
Intel Xeon E7-2850 Processor, 2.00GHz/24M/6.4GT/s, 10C, 130W	69Y3085
Intel Xeon E7-2860 Processor, 2.26GHz/24M/6.4GT/s, 10C, 130W	69Y3095
Intel Xeon E7-4830 Processor, 2.13GHz/24M/6.4GT/s, 8C, 105W	88Y6083
Intel Xeon E7-4850 Processor, 2.00GHz/24M/6.4GT/s, 10C, 130W	88Y6093
Intel Xeon E7-4860 Processor, 2.26GHz/24M/6.4GT/s, 10C, 130W	88Y6103
Intel Xeon E7-8837 Processor, 2.67GHz/24M/6.4GT/s, 8C, 130W	88Y6113
Intel Xeon E7-8867L Processor, 2.13GHz/30M/6.4GT/s, 10C, 105W	88Y6125
Intel Xeon E7-2870 Processor, 2.40GHz/30M/6.4GT/s, 10C, 130W	88Y6151
Intel Xeon E7-4870 Processor, 2.40GHz/30M/6.4GT/s, 10C, 130W	88Y6161

Depending on the memory mode that is set in the Setup utility, the expansion blade can support a minimum of 4 GB and a maximum of 768 GB of system memory. For a current list of supported DIMMs for the expansion blade, see http://www.ibm.com/servers/eserver/serverproven/compat/us/eserver.html.

Memory must be installed in pairs of DIMMs. Observe the following rules with populating the IBM MAX5 expansion blade:

Table 13. DIMM population rules

DIMM Grouping A		
All DIMMs in this group must be the same technology (DRAM size, such as 2 Gbit)		
DIMM 1, DIMM 8	DIMM 2, DIMM 7	All DIMMs must be the same DRAM width (such as 4R x 8)
DIMM 3, DIMM 6	DIMM 4, DIMM 5	All DIMMs must be the same DRAM width (such as 4R x 8)
DIMM Grouping B		
All DIMMs in this group must be the same technology (DRAM size, such as 2 Gbit)		
DIMM 13, DIMM 17	DIMM 14, DIMM18	All DIMMs must be the same DRAM width (such as 4R x 8)
DIMM 15, DIMM 19	DIMM 16, DIMM 20	All DIMMs must be the same DRAM width (such as 4R x 8)
DIMM Grouping C		
All DIMMs in this group must be the same technology (DRAM size, such as 2 Gbit)		
DIMM 9, DIMM 21	DIMM 10, DIMM 22	All DIMMs must be the same DRAM width (such as 4R x 8)
DIMM 11, DIMM 23	DIMM 12, DIMM 24	All DIMMs must be the same DRAM width (such as 4R x 8)

Notes:

- Each DIMM pair must be the exact same size and speed. For example, DIMM 1 and DIMM 8 must be the same size and speed. DIMM 2 and DIMM 7 must be the same size and speed. However, DIMM 1 and DIMM 2 have to be the same technology, but they do not need to be the same size and speed.
- When populating the IBM MAX5, use the DIMMs with the greatest size first. For example, install all 8 GB DIMMs before you install 4 GB DIMMs. Populate the DIMMs according to the DIMM population table for your environment. See Table 14 through Table 16 on page 113 for the DIMM population order.

The installation order for DIMMs depends on whether you intend to optimize the DIMM installation for performance or for power saving.

The following table lists the memory configurations and installation order to optimize the IBM MAX5 for performance.

Table 14. System memory configuration for performance

Installed memory	DIMM connector																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
2 DIMMs	X							X																
4 DIMMs	X							X					X				X							
6 DIMMs	X							X				X	X				X							X
8 DIMMs	X		X			X		X				X	X				X							X
10 DIMMs	X		X			X		X				X	X		X		X		X					X
12 DIMMs	X		X			X		X		X		X	X		X		X		X			X		X
14 DIMMs	X	X	X			X	X	X		X		X	X		X		X		X			X		X
16 DIMMs	X	X	X			X	X	X		X		X	X	X	X		X	X	X			X		X

Table 14. System memory configuration for performance (continued)

Installed memory	DIMM connector																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
18 DIMMs	X	X	X			X	X	X		X	X	X	X	X	X		X	X	X			X	X	X
20 DIMMs	X	X	X	X	X	X	X	X		X	X	X	X	X	X		X	X	X			X	X	X
22 DIMMs	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X		X	X	X
24 DIMMs	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

The following table lists the memory configurations and installation order to optimize the IBM MAX5 for power saving.

Table 15. System memory configuration for power saving (uses a maximum of 8 DIMMs)

Installed memory	DIMM connector																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
2 DIMMs	X							X																
4 DIMMs	X		X			X		X																
6 DIMMs	X	X	X			X	X	X																
8 DIMMs	X	X	X	X	X	X	X	X																

Table 16. System memory configuration for mirroring with power savings (uses a maximum of 16 DIMMs). This configuration mirrors the DIMMs in DIMM Grouping A with the DIMMs in DIMM Grouping B.
Note: Mirroring is supported between DIMM pairs.

Installed memory	DIMM connector																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
4 DIMMs	X							X					X				X							
8 DIMMs	X		X			X		X					X		X		X		X					
12 DIMMs	X	X	X			X	X	X					X	X	X		X	X	X					
16 DIMMs	X	X	X	X	X	X	X	X					X	X	X	X	X	X	X	X				

DIMM installation procedure

To install a DIMM, complete the following steps:

Procedure

1. Before you begin, read "Safety" on page v and "Installation guidelines" on page 63.
2. Read the documentation that comes with the DIMMs.
3. If the IBM MAX5 expansion blade is installed on an BladeCenter HX5 blade server that is installed in a BladeCenter chassis:
   a. Remove the blade server from the chassis (see "Removing the blade server from the BladeCenter chassis" on page 64 for instructions).
   b. If an optional expansion unit is installed, remove the expansion unit (see "Removing an expansion unit" on page 73 for instructions).
   c. Remove the IBM MAX5 expansion blade (see "Removing an IBM MAX5 expansion blade" on page 87 for instructions).
4. Carefully lay the expansion blade on a flat, static-protective surface.

5. Open the expansion blade cover (see "Removing the blade server cover" on page 70 for instructions).
6. Locate the DIMM connectors (see "Blade server connectors - BladeCenter HX5" on page 13). Determine the DIMM connector into which you will be installing memory.
7. If another memory module is already installed in the DIMM connector, remove it (see "Removing a DIMM - BladeCenter HX5" on page 105).
8. Touch the static-protective package that contains the DIMM to any *unpainted* metal surface on the BladeCenter unit or any *unpainted* metal surface on any other grounded rack component in the rack in which you are installing the DIMM for at least 2 seconds; then, remove the DIMM from its package.
9. To install the DIMMs, repeat the following steps for each DIMM that you install.
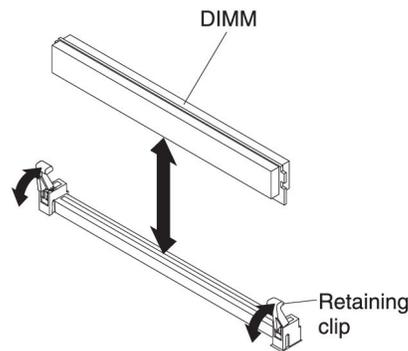
a. Make sure that both retaining clips on the DIMM connector into which you are installing the DIMM are in the open position (standing straight up).
b. Turn the DIMM so that the DIMM keys align correctly with the DIMM connector on the system board.

    Attention: To avoid breaking the retaining clips or damaging the DIMM connector, handle the clips gently.
c. Press the DIMM into the DIMM connector. The retaining clips lock the DIMM into the connector.
d. Make sure that the small tabs on the retaining clips are in the notches on the DIMM. If there is a gap between the DIMM and the retaining clips, the DIMM has not been correctly installed. Press the DIMM firmly into the connector, and then press the retaining clips toward the DIMM until the tabs are fully seated. When the DIMM is correctly installed, the retaining clips are parallel to the sides of the DIMM.

10. Install the cover on the expansion blade (see "Installing the blade server cover" on page 72 for instructions).
11. Install the IBM MAX5 expansion blade (see "Installing an IBM MAX5 expansion blade" on page 89 for instructions).

    Note: Make sure that you have removed the power sharing cover on the BladeCenter HX5 blade server before installing the IBM MAX5 expansion blade.
12. Install the optional expansion unit, if you removed one from the blade server (see "Installing an expansion unit" on page 74 for instructions).
13. Install the blade server into the chassis (see "Removing the blade server from the BladeCenter chassis" on page 64 for instructions).

Removing a hypervisor key

Use this information to remove a hypervisor key from the blade server.

About this task

The following illustration shows the removal of a hypervisor key from the blade server.
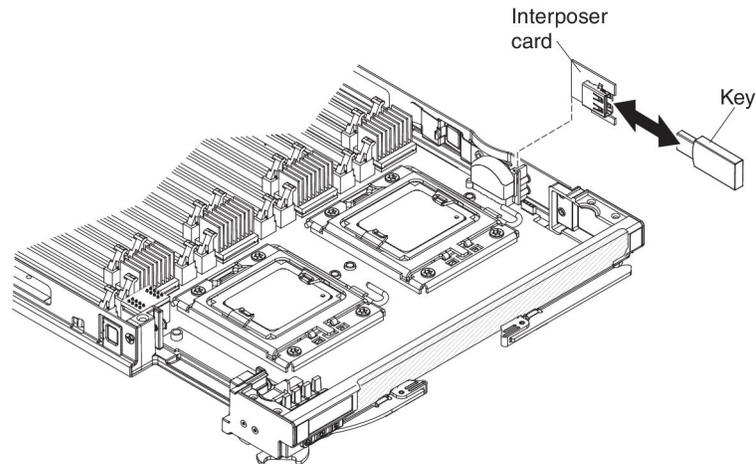
To remove the hypervisor key, complete the following steps:

Procedure

1. Before you begin, read "Safety" on page v and "Installation guidelines" on page 63.
2. If the blade server or scalable blade complex is installed in a BladeCenter chassis, remove it. See "Removing the blade server from the BladeCenter chassis" on page 64 for instructions.
3. Carefully lay the blade server on a flat, static-protective surface.
4. If you are removing the hypervisor key from a blade server that is the bottom blade server in a scalable blade complex, disassemble the blade complex (see "Disassembling a scalable blade complex" on page 67 for instructions).
5. If an optional expansion unit is installed, remove the expansion unit (see "Removing an expansion unit" on page 73 for instructions).

   Note: Optional expansion units are not supported when a IBM MAX5 expansion blade is installed.
6. If an IBM MAX5 expansion blade is installed, remove it (see "Removing an IBM MAX5 expansion blade" on page 87 for instructions).
7. Open the blade server cover (see "Removing the blade server cover" on page 70 for instructions).
8. Remove the access panel.

   There are two types of access panels available for the BladeCenter HX5 blade server, depending on whether tall heat sinks are installed.

   • Complete the following steps to remove the access panel on a BladeCenter HX5 blade server that does not have tall heat sinks:

a. Using a screwdriver or a coin, turn each of the screws toward the middle of the blade server until they are in the unlocked position.

b. While you lift the back of the access panel, slide the panel away from the bezel.

- Complete the following steps to remove the embedded hypervisor card access panel on a BladeCenter HX5 blade server that does have tall heat sinks:

a. Using a screwdriver, remove each of the screws on the right access panel.

b. Lift the access panel away from the blade server.

9. Locate the hypervisor interposer on the system board (see "Parts listing - BladeCenter HX5" on page 55).

10. Press down on the front edge of the hypervisor interposer to disengage the hypervisor interposer from the hypervisor interposer card guide.

11. Carefully lift the hypervisor interposer up from the system board.

12. Pull the hypervisor key away from the hypervisor interposer.

13. If you are instructed to return the hypervisor key, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a hypervisor key

Use these instructions to install a hypervisor key in the blade server.

About this task

If you are using the BladeCenter HX5 blade server in a virtualized environment, you might have to install a hypervisor key, depending on the virtualization software that you are using. If you are using a scalable blade complex that is configured as a single hardware partition, install the hypervisor key in the bottom (left) blade server in the complex.

If the blade servers in a scalable blade complex are operating independently, you might need to install a hypervisor key in each blade server. To determine whether you need a hypervisor key, see the documentation that comes with your virtualization software. For more information about virtualization, see http://www.ibm.com/itsolutions/virtualization/.

The following illustration shows the installation of the hypervisor key.
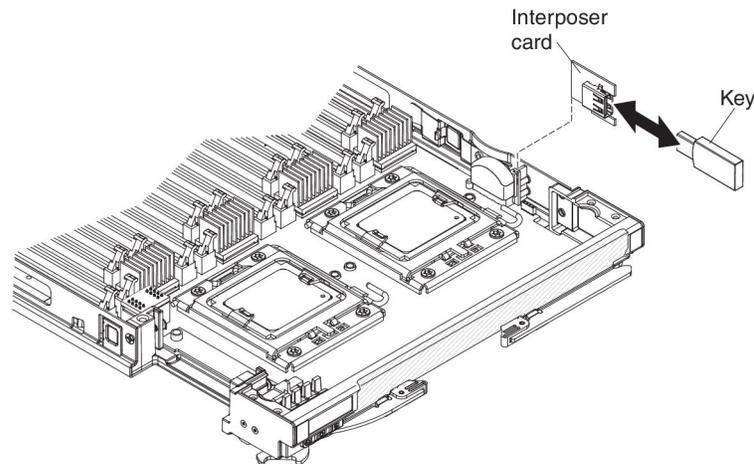
To install a hypervisor key, complete the following steps:

Procedure

1. Before you begin, read "Safety" on page v and "Installation guidelines" on page 63.
2. If the blade server or scalable blade complex is installed in a BladeCenter chassis, remove it. See "Removing the blade server from the BladeCenter chassis" on page 64 for instructions.
3. Carefully lay the blade server on a flat, static-protective surface.
4. If you are installing the hypervisor key in a blade server that is the bottom blade server in a scalable blade complex, disassemble the blade complex (see "Disassembling a scalable blade complex" on page 67 for instructions).
5. If an optional expansion unit is installed, remove the expansion unit (see "Removing an expansion unit" on page 73 for instructions).

   Note: Optional expansion units are not supported when a IBM MAX5 expansion blade is installed.

6. If an IBM MAX5 expansion blade is installed, remove it (see "Removing an IBM MAX5 expansion blade" on page 87 for instructions).

7. Open the blade server cover (see "Removing the blade server cover" on page 70 for instructions).

8. Remove the access panel.

   There are two types of access panels available for the BladeCenter HX5 blade server, depending on whether tall heat sinks are installed.

   • Complete the following steps to remove the access panel on a BladeCenter HX5 blade server that does not have tall heat sinks:

   a. Using a screwdriver or a coin, turn each of the screws toward the middle of the blade server until they are in the unlocked position.

   b. While you lift the back of the access panel, slide the panel away from the bezel.

   • Complete the following steps to remove the embedded hypervisor card access panel on a BladeCenter HX5 blade server that does have tall heat sinks:

   a. Using a screwdriver, remove each of the screws on the right access panel.

   b. Lift the access panel away from the blade server.

9. Remove the hypervisor interposer:

a. Locate the hypervisor interposer on the system board (see "Parts listing - BladeCenter HX5" on page 55).

b. Press down on the front edge of the hypervisor interposer to disengage the hypervisor interposer from the hypervisor interposer card guide.

c. Carefully lift the hypervisor interposer up from the system board.

d. Pull the hypervisor key away from the hypervisor interposer, if one is installed.

10. Touch the static-protective package that contains the hypervisor key to any *unpainted* metal surface on the BladeCenter unit or any *unpainted* metal surface on any other grounded rack component in the rack in which you are installing the hypervisor key for at least 2 seconds; then, remove the USB module from its package.

11. Install the hypervisor key into the hypervisor adapter:

a. Orient the connector on the hypervisor key with the connector on the hypervisor adapter.

b. Use your fingers to push the hypervisor key into the hypervisor adapter.

12. Install the hypervisor adapter:

a. Orient the connector on the hypervisor interposer with the interposer connector on the system board, aligning the pins on the side of the hypervisor interposer with the pinholes on the interposer connector (see "Blade server connectors - BladeCenter HX5" on page 13).

b. Use your fingers to push the adapter into the connector on the blade server.

Attention: Be careful not to damage the pins on the hypervisor interposer.

13. Install the access panel:

There are two types of access panels available for the BladeCenter HX5 blade server, depending on whether tall heat sinks are installed.

• Complete the following steps to install the access panel on a BladeCenter HX5 blade server that does not have tall heat sinks:

a. Make sure that the screws on the access panel are in the open position (the screw insert is parallel to the side of the access panel).

b. Slide the back of the cover under the blade server bezel, aligning the screws with the slots on the blade server.

c. Using a screwdriver or a coin, turn each of the screws away from the middle of the blade server until it is in the locked position.

- Complete the following steps to install the embedded hypervisor key access panel on a BladeCenter HX5 blade server that does have tall heat sinks:
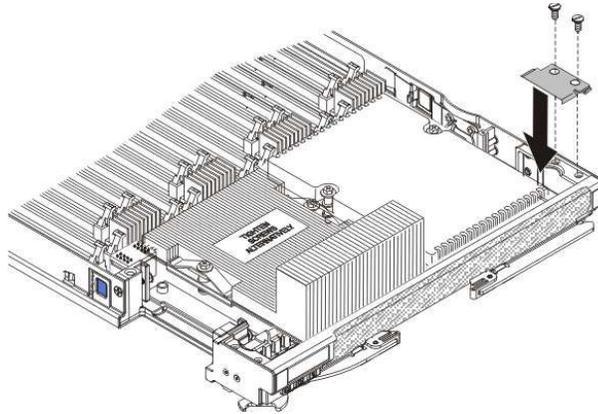
a. Align the holes in the access panel with the holes in the blade server.

b. Use a screwdriver to install the screws in the holes of the access panel.

14. If the blade server is part of a scalable blade complex, assemble the scalable blade complex (see "Assembling a scalable blade complex" on page 69 for instructions).

15. Install the IBM MAX5 expansion blade if you removed one (see "Installing an IBM MAX5 expansion blade" on page 89 for instructions).

16. Install the optional expansion unit, if you removed one from the blade server (see "Installing an expansion unit" on page 74 for instructions).

17. Install the cover onto the blade server (see "Installing the blade server cover" on page 72 for instructions).

18. Install the blade server or scalable blade complex into the BladeCenter chassis (see "Installing a blade server in a BladeCenter chassis" on page 65 for instructions).

Removing an I/O expansion card
About this task

The following sections describe how to remove the following expansion cards:
- CFFh
- CIOv

For information about removing the SSD expansion card, see "Removing an SSD expansion card" on page 99.

Removing a CFFh expansion card
Use these instructions to remove a CFFh expansion card from the blade server.

About this task

To remove a CFFh expansion card, complete the following steps:

Procedure
1. Before you begin, read "Safety" on page v and "Installation guidelines" on page 63.

2. If the blade server or scalable blade complex is installed in a BladeCenter chassis, remove it. See "Removing the blade server from the BladeCenter chassis" on page 64 for instructions.

3. Carefully lay the blade server on a flat, static-protective surface.

4. If an optional expansion unit is installed, remove the expansion unit (see "Removing an expansion unit" on page 73 for instructions).

   Note: Optional expansion units are not supported when a IBM MAX5 expansion blade is installed.

5. If you are removing the CFFh card from a blade server that is the bottom blade server in a scalable blade complex, disassemble the blade complex (see "Disassembling a scalable blade complex" on page 67 for instructions).

6. Open the blade server cover (see "Removing the blade server cover" on page 70 for instructions).

7. If an IBM MAX5 expansion blade is installed, remove it (see "Removing an IBM MAX5 expansion blade" on page 87 for instructions).

8. Locate the CFFh expansion card. The CFFh card is installed in the blade expansion connector (see "Blade server connectors - BladeCenter HX5" on page 13).

9. Lift the release lever on the CFFh expansion card.

10. Use your fingers to hold the edge of the CFFh expansion card where it connects to the blade expansion connector; then, lift the card.
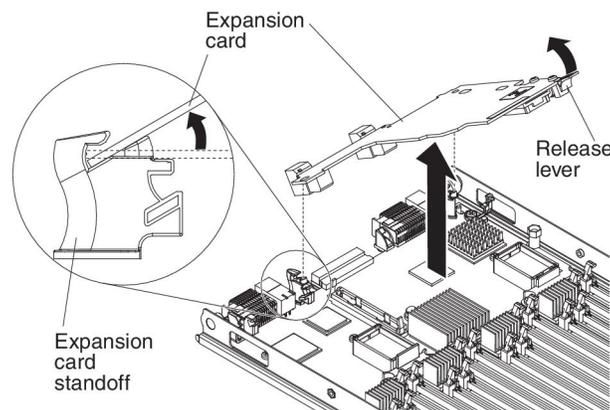
11. Lift the card away from the expansion-card standoff.

12. If you are instructed to return the CFFh expansion card, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Removing a CIOv expansion card

Use these instructions to remove a CIOv expansion card from the blade server.

About this task

The following illustration shows how to remove a vertical-combination-I/O (CIOv) expansion card.
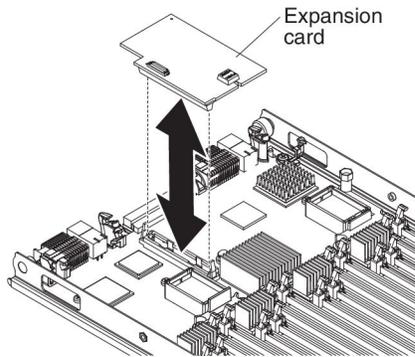
Expansion card

To remove a CIOv expansion card, complete the following steps:

Procedure

1. Before you begin, read "Safety" on page v and "Installation guidelines" on page 63.
2. If the blade server or scalable blade complex is installed in a BladeCenter chassis, remove it. See "Removing the blade server from the BladeCenter chassis" on page 64 for instructions.
3. Carefully lay the blade server on a flat, static-protective surface.
4. If you are removing the CIOv card from a blade server that is the bottom blade server in a scalable blade complex, disassemble the blade complex (see "Disassembling a scalable blade complex" on page 67 for instructions).
5. If an IBM MAX5 expansion blade is installed, remove it (see "Removing an IBM MAX5 expansion blade" on page 87 for instructions).
6. Open the blade server cover (see "Removing the blade server cover" on page 70 for instructions).
7. If an optional expansion unit is installed, remove the expansion unit (see "Removing an expansion unit" on page 73 for instructions).

   Note: Optional expansion units are not supported when a IBM MAX5 expansion blade is installed.
8. Remove the CFFh expansion card, if one is installed (see "Removing a CFFh expansion card" on page 120 for instructions).
9. Locate the CIOv expansion connector (see "Blade server connectors - BladeCenter HX5" on page 13).
10. Using your fingers, move the retaining clips away from the CIOv card; then, lift the card out of the connector.
11. If you are instructed to return the CIOv expansion card, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Results

Installing an I/O expansion card
About this task

The following sections describe how to install the following expansion cards:
- CFFh expansion cards, for example:
  - QLogic 2-Port 10Gb Converged Network Adapter

- QLogic Ethernet and 8 GB Fibre Channel Expansion Card
- 2/4-Port Gb Ethernet Expansion Card
- 2-Port 40 Gb Infiniband Expansion Card
- Brocade 2-Port 10 Gb Ethernet Converged Network Adapter
- Broadcom 2-Port 10 Gb Ethernet Expansion Card
- Broadcom 2-Port 10 Gb Virtual Fabric Adapter
- Broadcom 4-Port 10 Gb Ethernet Expansion Card
- Emulex Virtual Fabric Adapter
- Emulex Virtual Fabric Adapter Advanced
- Emulex 10 Gb Ethernet Virtual Fabric Adapter 2
- Emulex 10 Gb Ethernet Virtual Fabric Adapter Advanced 2
- Intel 10 Gb 2-Port Ethernet Expansion Card
- CIOv expansion cards, for example:
  - Ethernet Expansion Card
  - QLogic 8 Gb Fibre Channel Expansion Card
  - QLogic 4 Gb Fibre Channel Expansion Card
  - SAS Connectivity Card

Note: A CIOv expansion card is supported for all combinations.

The following illustration shows the cards that are supported in a blade server.
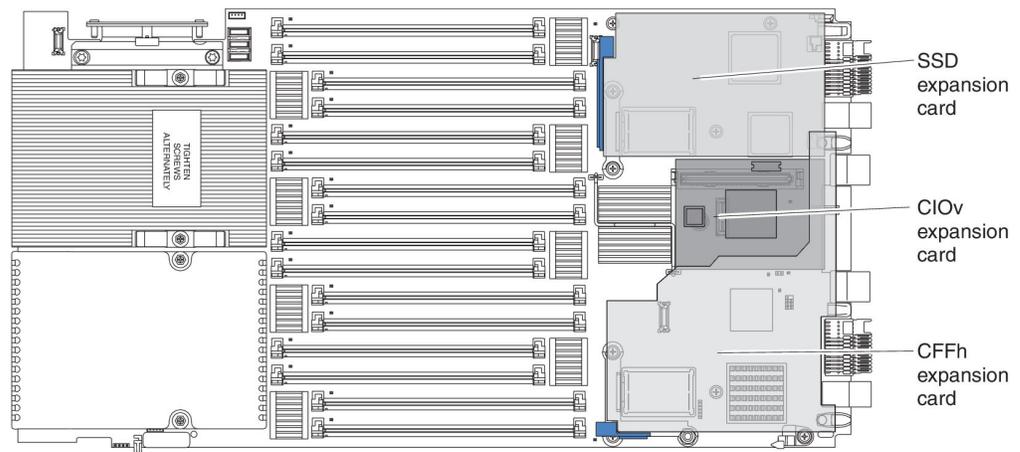
For information about installing an SSD expansion card, see "Installing an SSD expansion card" on page 100.

To determine which expansion cards are supported in the BladeCenter HX5 blade server, see http://www.ibm.com/servers/eserver/serverproven/compat/us/eserver.html.

Product documentation for expansion cards is available at http://publib.boulder.ibm.com/infocenter/bladectr/documentation/index.jsp?topic=/com.ibm.bladecenter.common.nav.doc/bc_expansion_cards_welcome_page.html.

Installing a CFFh expansion card

Use these instructions to install a compact-form-factor expansion card in the blade server.

About this task

The blade server supports a horizontal-combination-form-factor (CFFh) expansion card. The following illustration shows how to install a CFFh expansion card.
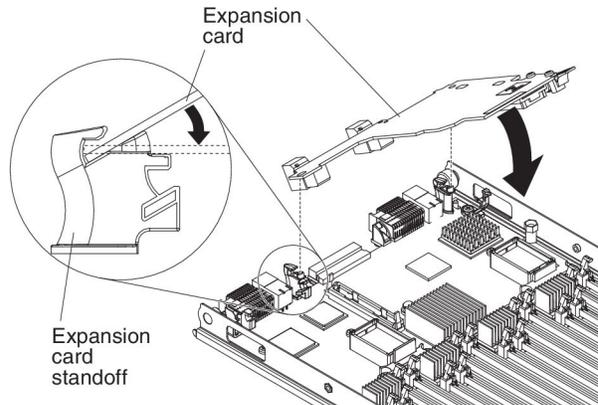
To install a CFFh expansion card, complete the following steps:

Procedure

1. Before you begin, read "Safety" on page v and "Installation guidelines" on page 63.
2. If the blade server or scalable blade complex is installed in a BladeCenter chassis, remove it. See "Removing the blade server from the BladeCenter chassis" on page 64 for instructions.
3. Carefully lay the blade server on a flat, static-protective surface.
4. If an optional expansion unit is installed, remove the expansion unit (see "Removing an expansion unit" on page 73 for instructions).

   Note: Optional expansion units are not supported when a IBM MAX5 expansion blade is installed.
5. If you are installing the CFFh card in a blade server that is the bottom blade server in a scalable blade complex, disassemble the blade complex (see "Disassembling a scalable blade complex" on page 67 for instructions).
6. If an IBM MAX5 expansion blade is installed, remove it (see "Removing an IBM MAX5 expansion blade" on page 87 for instructions).
7. Open the blade server cover (see "Removing the blade server cover" on page 70 for instructions).
8. Locate the blade server expansion connector (see "Blade server connectors - BladeCenter HX5" on page 13).
9. If a cover is installed on the blade expansion connector, remove it by using your fingers to lift the cover from the blade expansion connector.
10. Touch the static-protective package that contains the expansion card to any *unpainted* metal surface on the BladeCenter unit or any *unpainted* metal surface on any other grounded rack component; then, remove the expansion card from the package.
11. Orient the expansion card and slide the slots at the back of the card onto the pins on the expansion-card standoff; then, gently pivot the card into the blade server expansion connector.
12. Firmly press the indicated locations to seat the expansion card.

Note: For device-driver and configuration information to complete the installation of the expansion card, see the documentation that comes with the expansion card.

13. If the blade server is part of a scalable blade complex, assemble the scalable blade complex (see "Assembling a scalable blade complex" on page 69 for instructions).

14. Install the IBM MAX5 expansion blade if you removed one (see "Installing an IBM MAX5 expansion blade" on page 89 for instructions).

15. Install the optional expansion unit, if you removed one from the blade server (see "Installing an expansion unit" on page 74 for instructions).

16. Install the cover onto the blade server (see "Installing the blade server cover" on page 72 for instructions).

17. Install the blade server or scalable blade complex into the BladeCenter chassis (see "Installing a blade server in a BladeCenter chassis" on page 65 for instructions).

Installing a CIOv expansion card

Use these instructions to install a CIOv expansion card in the blade server.

About this task

The following illustration shows the location and installation of a CIOv expansion card.
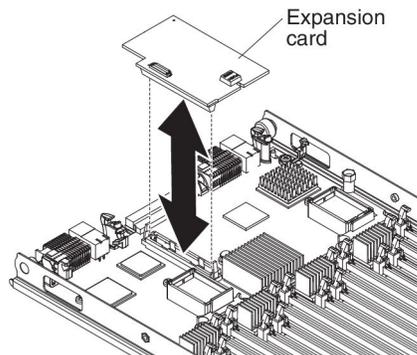
To install a CIOv expansion card, complete the following steps:

Procedure

1. Before you begin, read "Safety" on page v and "Installation guidelines" on page 63.

2. If the blade server or scalable blade complex is installed in a BladeCenter chassis, remove it. See "Removing the blade server from the BladeCenter chassis" on page 64 for instructions.

3. Carefully lay the blade server on a flat, static-protective surface.

4. If you are installing the CIOv card in a blade server that is the bottom blade server in a scalable blade complex, disassemble the blade complex (see "Disassembling a scalable blade complex" on page 67 for instructions).

5. If an optional expansion unit is installed, remove the expansion unit (see "Removing an expansion unit" on page 73 for instructions).

Note: Optional expansion units are not supported when a IBM MAX5 expansion blade is installed.

6. If an IBM MAX5 expansion blade is installed, remove it (see "Removing an IBM MAX5 expansion blade" on page 87 for instructions).

7. Open the blade server cover (see "Removing the blade server cover" on page 70 for instructions).

8. If a CFFh expansion card is installed, remove it (see "Removing a CFFh expansion card" on page 120 for instructions).

9. Locate the CIOv expansion connector (see "Blade server connectors - BladeCenter HX5" on page 13).

10. Touch the static-protective package that contains the expansion card to any *unpainted* metal surface on the BladeCenter unit or any *unpainted* metal surface on any other grounded rack component; then, remove the expansion card from the package.

11. Orient the connector on the expansion card with the CIOv expansion connector on the system board; then, press the card into the CIOv expansion connector.

12. Firmly press on the indicated locations to seat the expansion card.

    Note: For device-driver and configuration information to complete the installation of the expansion card, see the documentation that comes with the expansion card.

13. Install the CFFh expansion card, if you removed one from the blade server (see "Installing a CFFh expansion card" on page 123 for instructions).

14. If the blade server is part of a scalable blade complex, assemble the scalable blade complex (see "Assembling a scalable blade complex" on page 69 for instructions).

15. Install the IBM MAX5 expansion blade if you removed one (see "Installing an IBM MAX5 expansion blade" on page 89 for instructions).

16. Install the optional expansion unit, if you removed one from the blade server (see "Installing an expansion unit" on page 74 for instructions).

17. Install the cover onto the blade server (see "Installing the blade server cover" on page 72 for instructions).

18. Install the blade server or scalable blade complex into the BladeCenter chassis (see "Installing a blade server in a BladeCenter chassis" on page 65 for instructions).

Removing the control panel

Use this information to remove the control panel from the blade server.

About this task

To remove the control panel, complete the following steps:

Procedure

1. Before you begin, read "Safety" on page v and "Installation guidelines" on page 63.

2. If the blade server or scalable blade complex is installed in a BladeCenter chassis, remove it. See "Removing the blade server from the BladeCenter chassis" on page 64 for instructions.

3. Carefully lay the blade server on a flat, static-protective surface.

4. If you are removing the control panel from a blade server that is the bottom blade server in a scalable blade complex, disassemble the blade complex (see "Disassembling a scalable blade complex" on page 67 for instructions).

5. If an optional expansion unit is installed, remove the expansion unit (see "Removing an expansion unit" on page 73 for instructions).

   Note: Optional expansion units are not supported when a IBM MAX5 expansion blade is installed.

6. If an IBM MAX5 expansion blade is installed, remove it (see "Removing an IBM MAX5 expansion blade" on page 87 for instructions).

7. Open the blade server cover (see "Removing the blade server cover" on page 70 for instructions).

8. Remove the access panel.

   There are two types of access panels available for the BladeCenter HX5 blade server, depending on whether tall heat sinks are installed.

   • Complete the following steps to remove the access panel on a BladeCenter HX5 blade server that does not have tall heat sinks:

   a. Using a screwdriver or a coin, turn each of the screws toward the middle of the blade server until they are in the unlocked position.

   b. While you lift the back of the access panel, slide the panel away from the bezel.

   • Complete the following steps to remove the operator control panel access panel on a BladeCenter HX5 blade server that does have tall heat sinks:

a. Using a screwdriver, remove each of the screws on the right access panel.

b. Lift the access panel away from the blade server.

9. Locate the control panel connector on the system board (see "Blade server connectors - BladeCenter HX5" on page 13)

10. Pull the top of the control panel toward the bezel to disengage the control panel from the control panel connector on the system board.
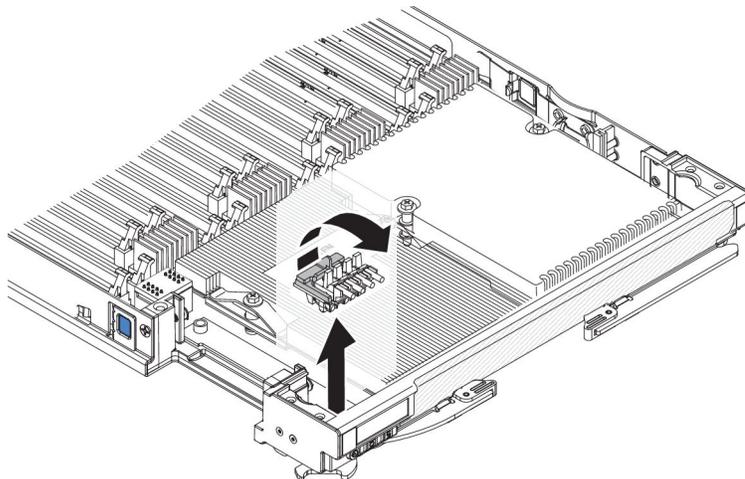
11. Use your fingers to grasp the tab on the control panel and pull it away from the blade server.

12. If you are instructed to return the control panel, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the control panel

Use these instructions to install the control panel in the blade server.

About this task

The blade server has a control panel that provides controls and information LEDs for the blade server (see "Blade server controls and LEDs" on page 6). The following illustration shows how to install the control panel.
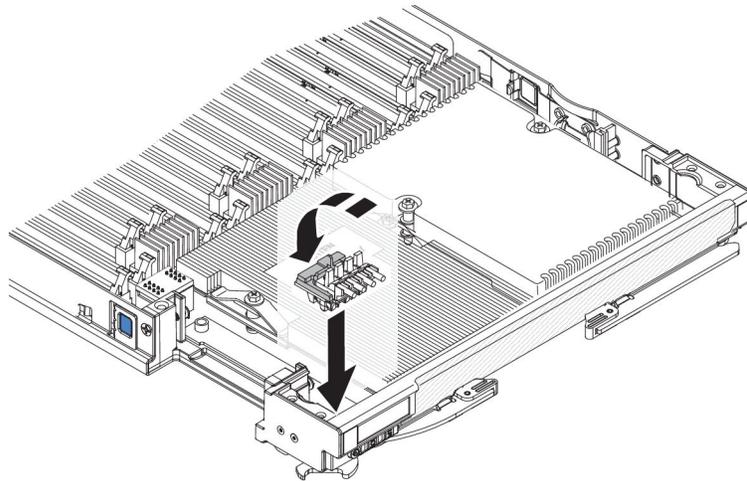
To install the control panel, complete the following steps:

Procedure

1. Before you begin, read "Safety" on page v and "Installation guidelines" on page 63.
2. If the blade server or scalable blade complex is installed in a BladeCenter chassis, remove it. See "Removing the blade server from the BladeCenter chassis" on page 64 for instructions.
3. Carefully lay the blade server on a flat, static-protective surface.
4. If you are installing the control panel in a blade server that is the bottom blade server in a scalable blade complex, disassemble the blade complex (see "Disassembling a scalable blade complex" on page 67 for instructions).
5. If an optional expansion unit is installed, remove the expansion unit (see "Removing an expansion unit" on page 73 for instructions).

   Note: Optional expansion units are not supported when a IBM MAX5 expansion blade is installed.
6. If an IBM MAX5 expansion blade is installed, remove it (see "Removing an IBM MAX5 expansion blade" on page 87 for instructions).
7. Open the blade server cover (see "Removing the blade server cover" on page 70 for instructions).
8. Remove the access panel.

   There are two types of access panels available for the BladeCenter HX5 blade server, depending on whether tall heat sinks are installed.

   • Complete the following steps to remove the access panel on a BladeCenter HX5 blade server that does not have tall heat sinks:

   a. Using a screwdriver or a coin, turn each of the screws toward the middle of the blade server until they are in the unlocked position.

   b. While you lift the back of the access panel, slide the panel away from the bezel.

- Complete the following steps to remove the operator control panel access panel on a BladeCenter HX5 blade server that does have tall heat sinks:

   a. Using a screwdriver, remove each of the screws on the right access panel.

   b. Lift the access panel away from the blade server.

9. Locate the control-panel connector on the blade server (see "Blade server connectors - BladeCenter HX5" on page 13).

10. Touch the static-protective package that contains the control panel to any *unpainted* metal surface on the BladeCenter unit or any *unpainted* metal surface on any other grounded rack component in the rack in which you are installing the control panel for at least 2 seconds; then, remove the USB module from its package.

11. Orient the control panel so that the front of the control panel is facing the bezel.

12. Use your fingers to insert the LEDs on the control panel into the holes on the bezel.

13. Rotate the control panel down and press down until it is seated.

14. Install the access panel:

There are two types of access panels available for the BladeCenter HX5 blade server, depending on whether tall heat sinks are installed.

- Complete the following steps to install the access panel on a BladeCenter HX5 blade server that does not have tall heat sinks:

   a. Make sure that the screws on the access panel are in the open position (the screw insert is parallel to the side of the access panel).

   b. Slide the back of the cover under the blade server bezel, aligning the screws with the slots on the blade server.

   c. Using a screwdriver or a coin, turn each of the screws away from the middle of the blade server until it is in the locked position.

- Complete the following steps to install the operator control panel access panel on a BladeCenter HX5 blade server that does have tall heat sinks:

   a. Align the holes in the access panel with the holes in the blade server.

   b. Use a screwdriver to install the screws in the holes of the access panel.

15. If the blade server is part of a scalable blade complex, assemble the scalable blade complex (see "Assembling a scalable blade complex" on page 69 for instructions).

16. Install the IBM MAX5 expansion blade if you removed one (see "Installing an IBM MAX5 expansion blade" on page 89 for instructions).

17. Install the optional expansion unit, if you removed one from the blade server (see "Installing an expansion unit" on page 74 for instructions).

18. Install the cover onto the blade server (see "Installing the blade server cover" on page 72 for instructions).
19. Install the blade server or scalable blade complex into the BladeCenter chassis (see "Installing a blade server in a BladeCenter chassis" on page 65 for instructions).

Removing and replacing field replaceable units

Use this information to remove and replace field replaceable units (FRUs). FRUs must be installed only by trained service technicians.

About this task

Note: The illustrations in this document might differ slightly from your hardware.

Removing a microprocessor and heat sink

Use this information to remove a microprocessor and heat sink from the blade server.

About this task

Read the following important guidelines before you remove a microprocessor that is not faulty (for example, when you are replacing the system-board assembly).

If you are not replacing a defective heat sink or microprocessor, the thermal material on the heat sink and microprocessor will remain effective if you carefully handle the heat sink and microprocessor when you remove or install these components. Do not touch the thermal material or otherwise allow it to become contaminated.

Notes:
1. The microprocessor and heat-sink assembly are both field replaceable units (FRUs) and must be replaced by a trained service technician. To contact an IBM service representative, see "Hardware service and support" on page 275.

To remove a microprocessor, complete the following steps.
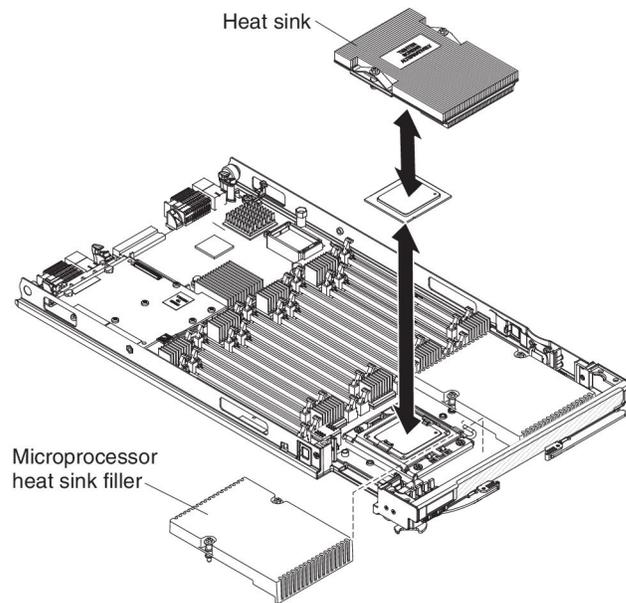
Heat sink

Microprocessor
heat sink filler

Procedure

1. Before you begin, read "Safety" on page v and "Installation guidelines" on page 63.
2. If the blade server or scalable blade complex is installed in a BladeCenter chassis, remove it. See "Removing the blade server from the BladeCenter chassis" on page 64 for instructions.
3. Carefully lay the blade server on a flat, static-protective surface.
4. If an optional expansion unit is installed, remove the expansion unit (see "Removing an expansion unit" on page 73 for instructions).

   Note: Optional expansion units are not supported when a IBM MAX5 expansion blade is installed.
5. If you are removing the microprocessor and heat sink from a blade server that is the bottom blade server in a scalable blade complex, disassemble the blade complex (see "Disassembling a scalable blade complex" on page 67 for instructions).
6. If an IBM MAX5 expansion blade is installed, remove it (see "Removing an IBM MAX5 expansion blade" on page 87 for instructions).
7. Open the blade server cover (see "Removing the blade server cover" on page 70 for instructions).
8. Remove the access panel if you have the standard heat sinks installed.

   **Note:** If you have the tall heat sinks installed, you do not need to remove the access panel.

  a. Using a screwdriver or a coin, turn each of the screws toward the middle of the blade server until they are in the unlocked position.

  b. While you lift the back of the access panel, slide the panel away from the bezel.

 9. Locate the microprocessor to be removed (see "Blade server connectors - BladeCenter HX5" on page 13).

10. Remove the heat sink.

  Attention: Do not touch the thermal material on the bottom of the heat sink. Touching the thermal material will contaminate it. If the thermal material on the microprocessor or heat sink becomes contaminated, you must replace the heat sink.

  a. Use a screwdriver to loosen the screw on one side of the heat sink to break the seal with the microprocessor.

  b. Use a screwdriver to loosen the screws on the heat sink, rotating each screw two full turns until each screw is loose.

  c. Use your fingers to gently pull the heat sink from the microprocessor.

  Attention: Do not use any tools or sharp objects to lift the release lever on the microprocessor socket. Doing so might result in permanent damage to the system board.
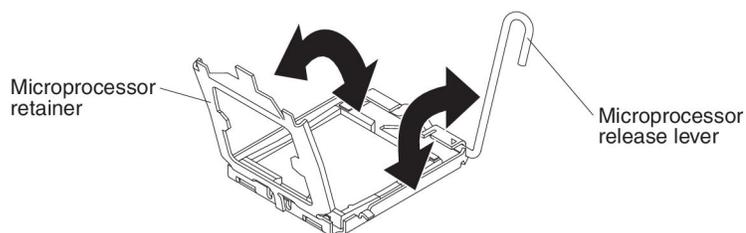
11. Rotate the locking lever on the microprocessor socket from its closed and locked position until it stops in the fully open position (approximately a 135° angle). Lift the microprocessor retainer cover upward.

  Attention: Do not touch the connectors on the microprocessor and the microprocessor socket.

12. Find the microprocessor installation tool that came with the new microprocessor.

Attention: If you are removing E7 series microprocessors, you must use the microprocessor installation tool with the text "X7500 + E7" on the bottom of the tool (see the following illustration). Tools that do not have this text on the bottom will not work correctly with the E7 series microprocessors.
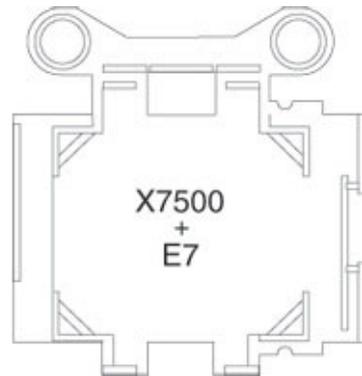

13. Place the microprocessor installation tool down over the microprocessor, aligning the holes on the tool with the screws on the microprocessor bracket.

    Note: The alignment holes on the tool will not sit flush on the microprocessor bracket screws. However, the holes can be used as a guide to ensure the proper alignment between the microprocessor installation tool and the microprocessor bracket.

14. Twist the handle clockwise to attach the tool to the microprocessor.

    Note: You can pick up or release the microprocessor by twisting the microprocessor installation tool handle.
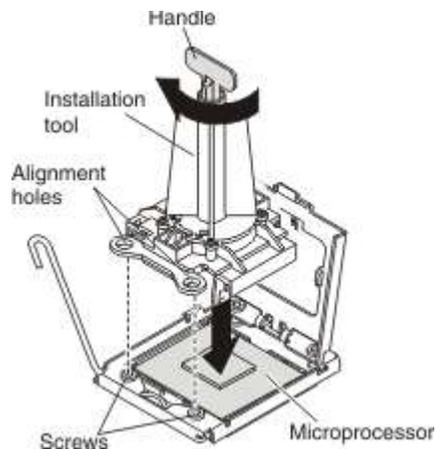
15. Carefully lift the microprocessor straight up and out of the socket, and place it on a static-protective surface.
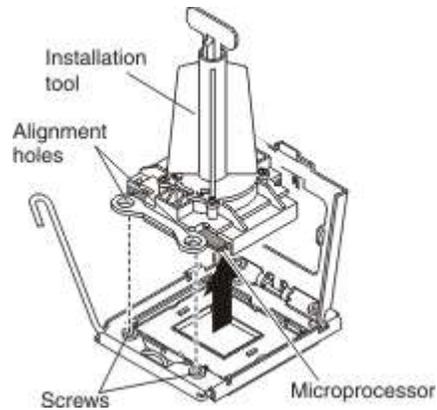
16. If you are instructed to return the microprocessor and heat sink, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing a microprocessor and heat sink

Use this information to install a microprocessor and heat sink in the blade server.

About this task

Note: The optional microprocessors that IBM supports are limited by the capacity and capability of the server. Any microprocessors that you install must have the same specifications as the microprocessors that came with the blade server.

The following illustration shows how to install a microprocessor and heat sink in the blade server.
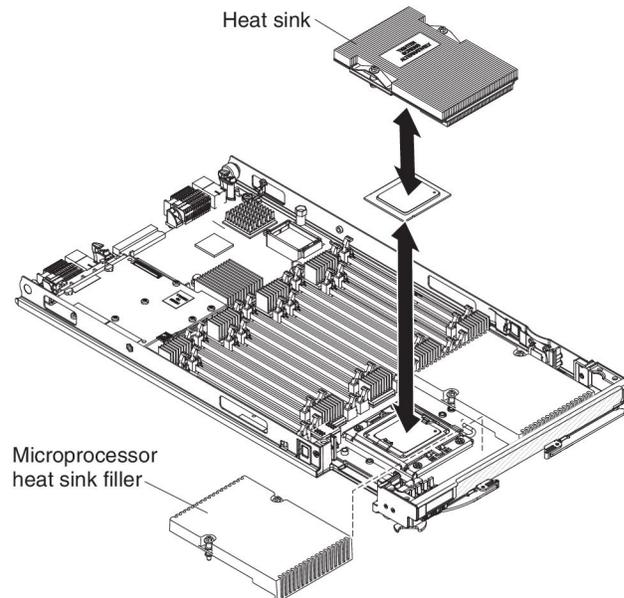
Attention:

1. Do not use any tools or sharp objects to lift the locking lever on the microprocessor socket. Doing so might result in permanent damage to the system board.
2. Do not touch the contacts in the microprocessor socket. Touching these contacts might result in permanent damage to the system board.

To install a microprocessor and heat sink, complete the following steps:

Procedure

1. Before you begin, read "Safety" on page v and "Installation guidelines" on page 63.
2. If the blade server or scalable blade complex is installed in a BladeCenter chassis, remove it. See "Removing the blade server from the BladeCenter chassis" on page 64 for instructions.
3. Carefully lay the blade server on a flat, static-protective surface.
4. If you are installing the microprocessor and heat sink in a blade server that is the bottom blade server in a scalable blade complex, disassemble the blade complex (see "Disassembling a scalable blade complex" on page 67 for instructions).
5. If an optional expansion unit is installed, remove the expansion unit (see "Removing an expansion unit" on page 73 for instructions).

   Note: Optional expansion units are not supported when a IBM MAX5 expansion blade is installed.
6. If an IBM MAX5 expansion blade is installed, remove it (see "Removing an IBM MAX5 expansion blade" on page 87 for instructions).
7. Open the blade server cover (see "Removing the blade server cover" on page 70 for instructions).
8. Remove the access panel if you have the standard heat sinks installed.

   Note: If you have the tall heat sinks installed, you do not need to remove the access panel.

   a. Using a screwdriver or a coin, turn each of the screws toward the middle of the blade server until they are in the unlocked position.

b. While you lift the back of the access panel, slide the panel away from the bezel.

9. Open the microprocessor socket release lever and retainer.
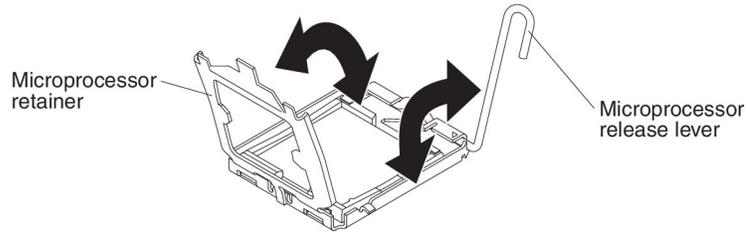
a. Rotate the release lever on the microprocessor socket from its closed and locked position until it stops in the fully open position (approximately a 135° angle).

b. Rotate the microprocessor retainer on the microprocessor socket from its closed position until it stops in the fully open position (approximately a 135° angle).

10. If a dust cover is installed over the microprocessor socket, lift the dust cover from the socket and store it in a safe place.

11. Install the microprocessor in the microprocessor installation tool.

Attention: If you are installing E7 series microprocessors in the blade server, you must use the microprocessor installation tool with the text "X7500 + E7" on the bottom of the tool (see the following illustration). Tools that do not have this text on the bottom will not work correctly with the E7 series microprocessors.
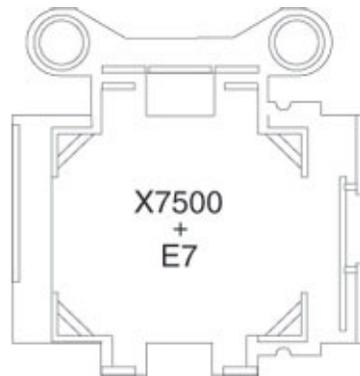
a. Remove the static-protective bag and the foam surrounding the bag from the box.

b. Touch the static-protective bag that contains the new microprocessor to any *unpainted* surface on the BladeCenter chassis or any *unpainted* metal surface on any other grounded rack component.

c. Carefully remove the microprocessor from the static-protective bag, touching only the edges of the microprocessor.

d. If there is a plastic protective cover on the bottom of the microprocessor, carefully remove it.

Protective cover
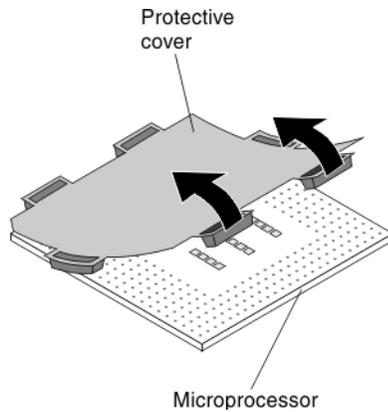
Microprocessor

e. Put the microprocessor back in the box, component side down, on the solid piece of foam.

f. Twist the handle of the installation tool counterclockwise so that it is in the open position.

g. Using the triangle on the microprocessor to align it with the installation tool, place the microprocessor on the underside of the tool.

h. Twist the handle of the installation tool clockwise to secure the microprocessor in the tool.

Note: You can pick up or release the microprocessor by twisting the microprocessor installation tool handle.

Handle

Installation tool
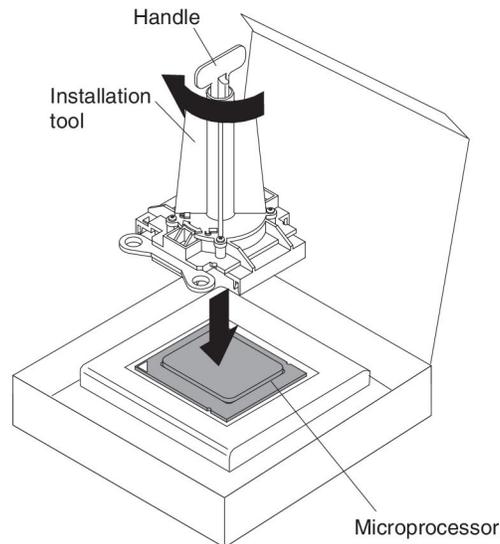
Microprocessor

12. Carefully place the microprocessor into the microprocessor socket, using the alignment tabs on the microprocessor with the alignment notches in the microprocessor socket as a guide.

The alignment holes on the tool will not sit flush on the microprocessor bracket screws. However, the holes can be used as a guide to ensure the proper alignment between the microprocessor installation tool and the microprocessor bracket.

Attention:

- Do not press the microprocessor into the socket.
- Do not touch exposed pins of the microprocessor socket.
- Make sure that the microprocessor is oriented and aligned correctly in the socket before you try to close the microprocessor retainer.
- Do not touch the thermal material on the bottom of the heat sink or on top of the microprocessor. Touching the thermal material will contaminate it. If the thermal material on the microprocessor or heat sink becomes contaminated, contact your service technician.
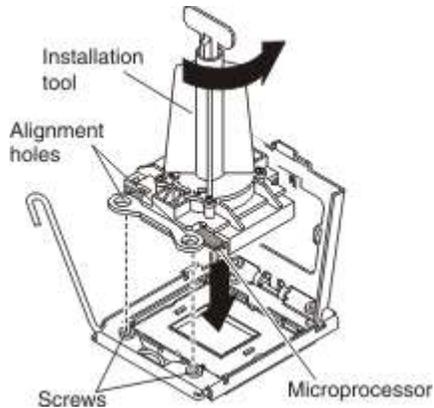
13. Carefully close the microprocessor retainer.
14. Rotate the locking lever on the microprocessor socket to the closed and locked position. Make sure that the lever is secured in the locked position by pressing the tab on the microprocessor socket.
15. If you are reinstalling a heat sink that was removed from the blade server, complete the following steps:

    Attention:

    - Do not touch the thermal material on the bottom of the heat sink. Touching the thermal material will contaminate it. If the thermal material on the microprocessor or heat sink becomes contaminated, contact your service technician.
    - Do not touch exposed pins of the microprocessor socket.

    a. Make sure that the thermal material is still on the bottom of the heat sink and on the top of the microprocessor.
    b. Align and place the heat sink on top of the microprocessor in the retention bracket, thermal material side down. Press firmly on the heat sink.
    c. Align the three screws on the heat sink with the holes on the heat-sink retention module.
    d. Press firmly on the captive screws and tighten them with a screwdriver, alternating among the screws until they are tight. If possible, each screw should be rotated two full rotations at a time. Repeat until the screws are tight. Do not overtighten the screws by using excessive force. If you are using a torque wrench, tighten the screws to 1.13 ± 0.13 Newton-meters (Nm) (10 ± 0.15 in-lbs).

16. If you are installing a new heat sink, complete the following steps:

Attention:

- Do not set down the heat sink after you remove the plastic cover.
- Do not touch the thermal material on the bottom of the heat sink. Touching the thermal material will contaminate it. If the thermal material on the microprocessor or heat sink becomes contaminated, contact your service technician.
- Do not touch exposed pins of the microprocessor socket.

  a. Remove the plastic protective cover from the bottom of the heat sink.

  b. Align and place the heat sink on top of the microprocessor in the retention bracket, thermal material side down. Press firmly on the heat sink.

  c. Align the screws on the heat sink with the holes on the heat-sink retention module.

  d. Press firmly on the captive screws and tighten them with a screwdriver, alternating among the screws until they are tight. If possible, each screw should be rotated two full rotations at a time. Repeat until the screws are tight. Do not overtighten the screws by using excessive force. If you are using a torque wrench, tighten the screws to 8.5 Newton-meters (Nm) to 13 Nm (6.3 foot-pounds to 9.6 foot-pounds).

17. Make sure that, at a minimum, memory modules are installed in DIMM connectors 1 and 4. See "Installing a DIMM - BladeCenter HX5" on page 106 for more information on installing a memory module.

18. Install the access panel if you have standard heat sinks installed.

    Note: If you have the tall heat sinks installed, you do not need to install the access panel.
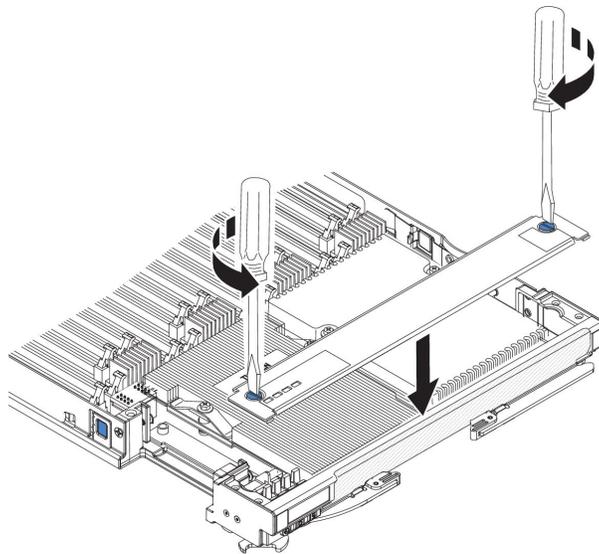
    a. Make sure that the screws on the access panel are in the open position (the screw insert is parallel to the side of the access panel).

    b. Slide the back of the cover under the blade server bezel, aligning the screws with the slots on the blade server.

    c. Using a screwdriver or a coin, turn each of the screws away from the middle of the blade server until it is in the locked position.

19. If the blade server is part of a scalable blade complex, assemble the scalable blade complex (see "Assembling a scalable blade complex" on page 69 for instructions).

20. Install the IBM MAX5 expansion blade if you removed one (see "Installing an IBM MAX5 expansion blade" on page 89 for instructions).
21. Install the optional expansion unit, if you removed one from the blade server (see "Installing an expansion unit" on page 74 for instructions).
22. Install the cover onto the blade server (see "Installing the blade server cover" on page 72 for instructions).
23. Install the blade server or scalable blade complex into the BladeCenter chassis (see "Installing a blade server in a BladeCenter chassis" on page 65 for instructions).

Removing the system-board assembly - BladeCenter HX5

Use this information to remove the system-board assembly from the blade server.

About this task

Attention: The system-board assembly is a field replaceable unit (FRU) and must be replaced by a trained service technician. To contact an IBM service representative, see "Hardware service and support" on page 275.

When you replace the system board, you replace the system board and blade base as one assembly. After replacement, you must either update the blade server with the latest firmware or restore the pre-existing firmware that the customer provides.

Note: See "System board layouts" on page 13 for more information about the locations of the connectors, jumpers, and LEDs on the system board.

To remove the system-board assembly, complete the following steps:

Procedure

1. Before you begin, read "Safety" on page v and "Installation guidelines" on page 63.
2. If the blade server is installed in a BladeCenter chassis, remove it (see "Removing the blade server from the BladeCenter chassis" on page 64 for instructions).
3. Carefully lay the blade server on a flat, static-protective surface.
4. If an optional expansion unit is installed, remove the expansion unit (see "Removing an expansion unit" on page 73 for instructions).

   Note: Optional expansion units are not supported when a IBM MAX5 expansion blade is installed.
5. If you are removing the system-board assembly from a blade server that is the bottom blade server in a scalable blade complex, disassemble the blade complex (see "Disassembling a scalable blade complex" on page 67 for instructions).
6. If an IBM MAX5 expansion blade is installed, remove it (see "Removing an IBM MAX5 expansion blade" on page 87 for instructions).
7. Open the blade server cover (see "Removing the blade server cover" on page 70 for instructions).
8. Remove the access panel if you have the standard heat sinks installed.

   Note: If you have the tall heat sinks installed, you do not need to remove the access panel.

   a. Using a screwdriver or a coin, turn each of the screws toward the middle of the blade server until they are in the unlocked position.

   b. While you lift the back of the access panel, slide the panel away from the bezel.

9. Remove all of the installed components in the following list from the system-board assembly; then, place them on a static-protective surface or install them on the new system-board assembly.

   • DIMMs. See "Removing a DIMM - BladeCenter HX5" on page 105.

   • USB module. See "Removing a hypervisor key" on page 115.

   • I/O expansion cards. See "Removing a CIOv expansion card" on page 121 and "Removing a CFFh expansion card" on page 120.

   • Storage drives. See "Removing a solid state drive" on page 102.

   • Microprocessors and heat sinks. See "Removing a microprocessor and heat sink" on page 132.

   • Power jumper. Locate the power sharing connector on the BladeCenter HX5 blade server and remove the power jumper if one is installed (see "Blade server connectors - BladeCenter HX5" on page 13).

10. Use an alcohol wipe to remove any thermal grease from the tabs on the microprocessor retainer frame on the old system board.
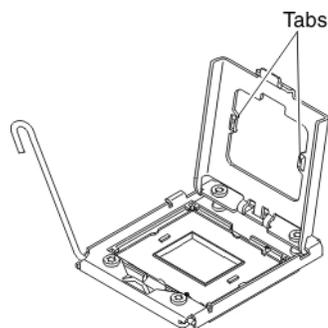
11. If you are instructed to return the system-board assembly, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Installing the system-board assembly - BladeCenter HX5

Use this information to install the system-board assembly in the blade server.

About this task

Attention: The system-board assembly is a field-replaceable unit and must be replaced by a trained service technician. To contact an IBM service representative, see "Hardware service and support" on page 275.

Important: When you replace the system board, you must either update the server with the latest firmware or restore the pre-existing firmware that the customer provides. Make sure that you have the latest firmware or a copy of the pre-existing firmware before you proceed. See "Updating the DMI/SMBIOS data" on page 28 and "Updating firmware and device drivers" on page 31 for more information.

To install the system-board assembly, complete the following steps:

Procedure

1. Remove the access panel if you have the standard heat sinks installed.

   Note: If you have the tall heat sinks installed, you do not need to remove the access panel.
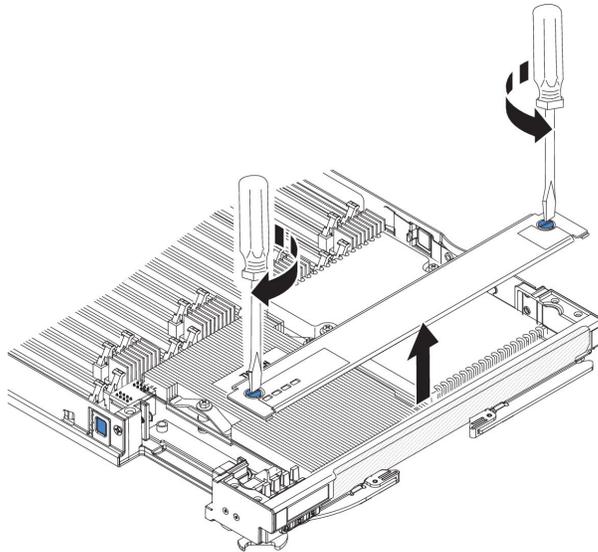
   a. Using a screwdriver or a coin, turn each of the screws toward the middle of the blade server until they are in the unlocked position.
   b. While you lift the back of the access panel, slide the panel away from the bezel.

2. Install all of the components in the following list that you removed from the old system-board assembly onto the new system-board assembly.
   - DIMMs. See "Installing a DIMM - BladeCenter HX5" on page 106.
   - USB module. See "Installing a hypervisor key" on page 117.
   - I/O expansion cards. See "Installing a CIOv expansion card" on page 125 and "Installing a CFFh expansion card" on page 123.
   - Storage drives. See "Installing a solid state drive" on page 103.
   - Microprocessors and heat sinks. See "Removing a microprocessor and heat sink" on page 132.

- Power jumper. Locate the power sharing connector on the BladeCenter HX5 blade server and install the power jumper if one was removed from the old system-board assembly installed (see "Blade server connectors - BladeCenter HX5" on page 13).

3. Install the access panel if you have standard heat sinks installed.

   Note: If you have the tall heat sinks installed, you do not need to install the access panel.
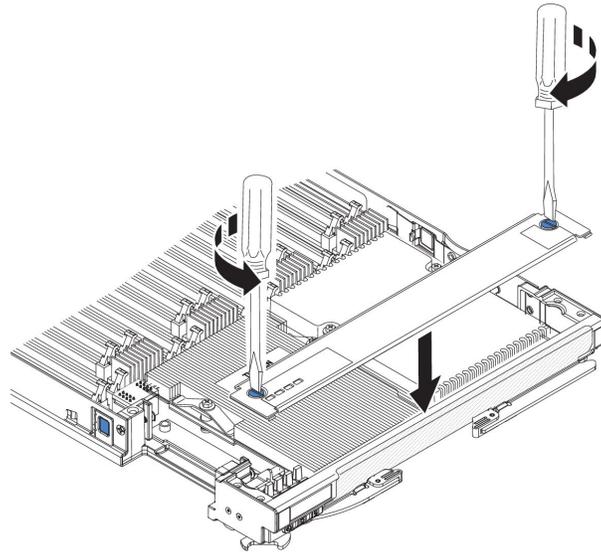
   a. Make sure that the screws on the access panel are in the open position (the screw insert is parallel to the side of the access panel).
   b. Slide the back of the cover under the blade server bezel, aligning the screws with the slots on the blade server.
   c. Using a screwdriver or a coin, turn each of the screws away from the middle of the blade server until it is in the locked position.

4. If the blade server is part of a scalable blade complex, assemble the scalable blade complex (see "Assembling a scalable blade complex" on page 69 for instructions).

5. Install the IBM MAX5 expansion blade if you removed one (see "Installing an IBM MAX5 expansion blade" on page 89 for instructions).

6. Install the optional expansion unit, if you removed one from the blade server (see "Installing an expansion unit" on page 74 for instructions).

7. Install the cover onto the blade server (see "Installing the blade server cover" on page 72 for instructions).

8. Install the blade server or scalable blade complex into the BladeCenter chassis (see "Installing a blade server in a BladeCenter chassis" on page 65 for instructions).

9. The Universal Unique Identifier (UUID) must be updated when the system board is replaced. Use the Advanced Settings Utility to update the UUID in the UEFI-based server (see "Updating the Universal Unique Identifier (UUID)" on page 26).

10. Update the server with the latest firmware or restore the pre-existing firmware that the customer provides. See "Updating the DMI/SMBIOS data" on page 28 and "Updating firmware and device drivers" on page 31 for more information.

Chapter 5. Diagnostics

Use this information to review the diagnostic tools that are available to help you solve problems that might occur in the blade server.

Review the diagnostic tools that are available to help you solve problems that might occur in the blade server.

Note: The blade server uses shared resources that are installed in the BladeCenter chassis. Problems with these shared resources might appear to be in the blade server (see "Solving shared BladeCenter resource problems" on page 265 for information about isolating problems with these resources).

If you cannot diagnose and correct a problem by using the information, see "Getting help and technical assistance," on page 273 for more information.

Service bulletins

IBM continually updates the support website with tips and techniques that you can use to solve any problems that you might be having with the BladeCenter HX5 blade server.

To find any service bulletins that are available for the BladeCenter HX5 blade server, go to the BladeCenter support search website at http://www.ibm.com. In the **Search** field, enter the following terms: 7872 and `retain tip`.

Checkout procedure

The checkout procedure is the sequence of tasks that you should follow to diagnose a problem in the blade server.

About this task

Before you perform the checkout procedure for diagnosing hardware problems, review the following information:
- Read "Safety" on page v and "Installation guidelines" on page 63.
- IBM Dynamic Systems Analysis (DSA) provides the primary method of testing the major components of the server, such as the microprocessor board, Ethernet controller, keyboard, mouse (pointing device), serial ports, and hard disk drives. You can also use it to test some external devices. If you are not sure whether a problem is caused by the hardware of by the software, you can use DSA to confirm that the hardware is working correctly.
- When you run DSA, a single problem might cause more than one error message. When this happens, correct the cause of the first error message. The other error messages usually will not occur the next time you run DSA.

  Exception: If multiple error codes or light path diagnostics LEDs indicate a microprocessor error, the error might be in a microprocessor or in a microprocessor socket.

- If the blade server is halted and a POST error code is displayed, see "POST error codes" on page 152. If the blade server is halted and no error message is displayed, see "Troubleshooting tables" on page 250 and "Solving undetermined problems" on page 271.
- For intermittent problems, check the error log; see "Event logs" on page 149 and "IBM Dynamic System Analysis" on page 207.
- If no LEDs are lit on the blade server front panel, verify the blade server status and errors in the advanced management module web interface; also see "Solving undetermined problems" on page 271.
- If device errors occur, see "Troubleshooting tables" on page 250.

To perform the checkout procedure, complete the following steps:

Procedure

1. If the blade server is running, turn off the blade server.
2. Turn on the blade server. Make sure that the blade server has control of the video (the LED on the keyboard/video/mouse button is lit). If the blade server does not start, see "Troubleshooting tables" on page 250.
3. Record any POST error messages that are displayed on the monitor. If an error is displayed, look up the first error in the "POST error codes" on page 152.
4. Check the control panel blade-error LED; if it is lit, check the light path diagnostics LEDs (see "Light path diagnostics" on page 200).
5. Check for the following results:
   - Successful completion of POST, indicated by beginning the startup of the operating system.
   - Successful completion of startup, indicated by a readable display of the operating-system desktop.

Diagnostic tools overview

Use this overview to locate specific diagnostic tools to diagnose and solve hardware-related problems.

The following tools are available to help you diagnose and solve hardware-related problems:

- **POST codes, error messages, and error logs**

  The POST error codes indicate the detection of a problem. For more information, see "POST error codes" on page 152.

- **Troubleshooting tables**

  These tables list problem symptoms and actions to correct the problems. See "Troubleshooting tables" on page 250

- **Light path diagnostics**

  Use light path diagnostics LEDs on the system board to diagnose system errors. If the system-error LED on the system LED panel on the front or rear of the BladeCenter chassis is lit, one or more error LEDs on the BladeCenter chassis components also might be lit. These LEDs help identify the cause of the problem. For more information about the blade server error LEDs, see "Light path diagnostics LEDs" on page 205.

- **Dynamic System Analysis (DSA) Portable Edition diagnostic program**

  DSA tests the major components of the BladeCenter unit, including the management modules, I/O modules, removable-media drives, and the blade

servers, while the operating system is running. For documentation and download information for DSA, see http://www.ibm.com/systems/management/. For more information about diagnostic programs and error messages, see "IBM Dynamic System Analysis" on page 207.

Note: If you are unable to find the system error logs in the blade server firmware code, view the advanced management module event log.

- **Dynamic System Analysis (DSA) Preboot diagnostic program**

  The DSA Preboot diagnostic programs are stored in read-only memory. DSA Preboot collects and analyzes system information, as well as offers a rich set of diagnostic tests to aid in diagnosing server problems. The diagnostic programs collect the following information about the server:

  – Drive health information
  – Event logs for ServeRAID controllers and service processors
  – Hardware inventory, including PCI and USB information
  – Light path diagnostics status
  – LSI RAID and controller configuration
  – Network interfaces and settings
  – ServeRAID configuration
  – Service processor status and configuration
  – System configuration
  – Vital product data, firmware, and Unified Extensible Firmware Interface (UEFI) configuration
  – Microprocessor, input/output hub, and UEFI error logs
  – Scalability Link status

  DSA creates a DSA log, which is a chronologically ordered merge of the system-event log (as the IPMI event log), the integrated management module (IMM) chassis-event log (as the ASM event log), and the operating-system event logs. You can send the DSA log as a file to IBM service or view the information as a text file or HTML file.

  DSA Preboot offers the following diagnostic tests of your server:

  – Microprocessor
  – Memory
  – IMM I^{2}C
  – Optical (CD or DVD) drive
  – Hard disk drive
  – Ethernet controller

  For more information about diagnostic programs and error messages, see the "IBM Dynamic System Analysis" on page 207.

Event logs

Error codes and messages are displayed in the following event logs:

- **POST event log:** This log contains the three most recent error codes and messages that were generated during POST. You can view the POST event log through the Setup utility.
- **System event log:** This log contains POST and system management interrupt (SMI) events and all events that are generated by the BMC that is embedded in the IMM. You can view the system-event log through the Setup utility and through the Dynamic System Analysis (DSA) program (as the IPMI event log).

The system-event log is limited in size. When it is full, new entries will not overwrite existing entries; therefore, you must periodically save and then clear the system-event log through the Setup utility. When you are troubleshooting, you might have to save and then clear the system-event log to make the most recent events available for analysis.

Messages are listed on the left side of the screen, and details about the selected message are displayed on the right side of the screen. To move from one entry to the next, use the Up Arrow (↑) and Down Arrow (↓) keys.

Some IMM sensors cause assertion events to be logged when their setpoints are reached. When a setpoint condition no longer exists, a corresponding deassertion event is logged. However, not all events are assertion-type events.

- **Advanced management module event log:** This log contains a filtered subset of IMM, POST, and system management interrupt (SMI) events. You can view the advanced management module event log through the advanced management module web interface. For more information about viewing the advanced management module event log, see the *Advanced Management Module Installation and User's Guide*.

- **DSA log:** This log is generated by the Dynamic System Analysis (DSA) program, and it is a chronologically ordered merge of the system-event log (as the IPMI event log), the IMM chassis-event log (as the ASM event log), and the operating-system event logs. You can view the DSA log through the DSA program.

Viewing event logs through the Setup utility

Use this information to view the IMM log through the Setup utility.

About this task

To view the POST event log or system-event log, complete the following steps:

1. Turn on the blade server.
2. When the prompt `<F1> Setup` is displayed, press F1. If you have set both a power-on password and an administrator password, you must type the administrator password to view the event logs.
3. Select **System Event Logs** and use one of the following procedures:
   - To view the POST event log, select **POST Event Viewer**.
   - To view the system-event log, select **System Event Log**.

Viewing event logs without restarting the blade server

If the blade server is not hung, methods are available for you to view one or more event logs without having to restart the blade server.

About this task

You can view the advanced management module event log through the **Event Log** link in the advanced management module web interface. For more information, see the *IBM BladeCenter Advanced Management Module: User's Guide*.

If you have installed DSA Portable Edition, you can use it to view the system-event log (as the IPMI event log), the operating-system event logs, or the merged DSA log. You can also use DSA Preboot to view these logs, although you must restart the blade server to use DSA Preboot. To install Portable DSA or DSA

Preboot or to download a DSA Preboot CD image, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA or complete the following steps.

Note: Changes are made periodically to the IBM website. The actual procedure might vary slightly from what is described in this document.

1. Go to http://www.ibm.com/supportportal/.
2. Under **Product support**, click **BladeCenter**.
3. Under **Popular links**, click **Software and device drivers**.
4. Under **Related downloads**, click **Dynamic System Analysis (DSA)** to display the matrix of downloadable DSA files.

If IPMItool is installed in the blade server, you can use it to view the system-event log. Most recent versions of the Linux operating system come with a current version of IPMItool. For information about IPMItool, see http://www.ibm.com/supportportal/ or complete the following steps.

Note: Changes are made periodically to the IBM website. The actual procedure might vary slightly from what is described in this document.

1. Go to http://www.ibm.com/developerworks/.
2. Click **Linux**.
3. Click **Linux blueprints**.
4. Click **Blueprints for Linux on IBM systems**, and then click **Using Intelligent Platform Management Interface (IPMI) on IBM Linux platforms**.

The following table describes the methods that you can use to view the event logs, depending on the condition of the blade server. The first two conditions generally do not require that you restart the blade server.

Table 17. Methods for viewing event logs

Condition	Action
The blade server is not hung and is connected to a network.	Use any of the following methods: • In a web browser, type the IP address of the advanced management module and go to the Event Log page. • Run Portable DSA to view the event logs or create an output file that you can send to IBM service and support. • Use IPMItool to view the system-event log.
The blade server is not hung and is not connected to a network.	Use IPMItool locally to view the system-event log.

Table 17. Methods for viewing event logs (continued)

Condition	Action
The blade server is hung.	• If DSA Preboot is installed, restart the blade server and press F2 to start DSA Preboot and view the event logs. • If DSA Preboot is not installed, insert the DSA Preboot CD and restart the blade server to start DSA Preboot and view the event logs. • Alternatively, you can restart the blade server and press F1 to start the Setup utility and view the POST event log or system-event log. For more information, see "Viewing event logs through the Setup utility" on page 150.

POST error codes

Use this information to diagnose and solve POST error codes for the blade server.

The following table describes the POST error codes that appear in the IMM system event log and suggested actions to correct the detected problems.

• Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. • See "Parts listing - BladeCenter HX5" on page 55 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU). • If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.	

Error code	Description	Action

0010002	Microprocessor not supported.	1. (Trained service technician) Complete the following steps:
		  a. Remove microprocessor 2 and restart the server (see "Removing a microprocessor and heat sink" on page 132 and "Installing a microprocessor and heat sink" on page 136).
		  b. If the problem remains, remove microprocessor 1 and install microprocessor 2 in the connector for microprocessor 1; then, restart the server (see "Removing a microprocessor and heat sink" on page 132 and "Installing a microprocessor and heat sink" on page 136).
		  c. If the problem goes away, microprocessor 1 might have failed; replace the microprocessor.
		2. (Trained service technician) Replace the following components one at a time in the order shown, restarting the server each time:
		  • Microprocessor 1 (see "Removing a microprocessor and heat sink" on page 132 and "Installing a microprocessor and heat sink" on page 136).
		  • Microprocessor 2, if installed (see "Removing a microprocessor and heat sink" on page 132 and "Installing a microprocessor and heat sink" on page 136).
		  • System board (see "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144).

0011000	Invalid microprocessor type	1. Update the server firmware (see "Updating firmware and device drivers" on page 31. 2. (Trained service technician) Remove and replace the affected microprocessor with a supported type (see "Removing a microprocessor and heat sink" on page 132 and "Installing a microprocessor and heat sink" on page 136). Use light path diagnostic LEDs to determine the affected processor ("Light path diagnostics LEDs" on page 205).

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See "Parts listing - BladeCenter HX5" on page 55 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.

Error code	Description	Action
0011002	Microprocessor mismatch.	1. Run the Setup utility and view the microprocessor information to compare the installed microprocessor specifications. 2. (Trained service technician) Remove and replace one of the microprocessors so that they both match (see "Removing a microprocessor and heat sink" on page 132 and "Installing a microprocessor and heat sink" on page 136).

0011004	Microprocessor failed BIST.	1. Update the server firmware (see "Updating firmware and device drivers" on page 31).
		2. (Trained service technician) Complete the following steps:
		  a. Reseat the microprocessor (see "Removing a microprocessor and heat sink" on page 132 and "Installing a microprocessor and heat sink" on page 136).
		  b. Replace the following components one at a time in the order shown, restarting the server each time:
		    1) Microprocessor (see "Removing a microprocessor and heat sink" on page 132 and "Installing a microprocessor and heat sink" on page 136).
		    2) System board (see "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144).

001100A	Microcode update failed	1. Update the server firmware (see "Updating firmware and device drivers" on page 31). 2. (Trained service technician only) Replace the microprocessor (see "Removing a microprocessor and heat sink" on page 132 and "Installing a microprocessor and heat sink" on page 136).
0050001	DIMM disabled.	1. Check the system event log for any memory errors that might be related to the specified DIMM and resolve those errors. **Note:** If the system event log is full, new events will not be posted to the log. You can clear the system event log through the Setup Utility (see "Using the Setup utility" on page 20). Select **System Event Logs** and then select **Clear System Event Log**. 2. Enable the DIMM connector (slot) for the specified DIMM using the Setup utility (see "Using the Setup utility" on page 20) or the Advanced Settings Utility (see "Using the Advanced Settings Utility (ASU)" on page 25). To enable the DIMM connector using the Setup utility, select **System Settings** and then select **Memory**. 3. Reseat the affected DIMM (see "Removing a DIMM - BladeCenter HX5" on page 105 and "Installing a DIMM - BladeCenter HX5" on page 106) and enable the DIMM connector (see step 2). 4. Save the settings and exit from the Setup utility.

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See "Parts listing - BladeCenter HX5" on page 55 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.

Error code	Description	Action
0051003	Uncorrectable runtime DIMM error	1. Refer to TIP H21455 for minimum code level. 2. Check the IBM support website for an applicable retain tip or firmware update that applies to this memory error. 3. Swap one of the DIMMs with a DIMM of the same size and type from another channel (see "Installing a DIMM - BladeCenter HX5" on page 106. For example, if a problem occurs on DIMM 1 and DIMM 4, swap DIMM 1 with a similar DIMM in slot 9. 4. Enable all affected DIMMs using the Setup utility. 5. If the failure remains on the original DIMM slots, replace the DIMM that was not moved. If the failure follows the DIMM that was moved, replace the DIMM that was swapped. 6. If the problem occurs on the same DIMM connector, check the DIMM connector. If the connector is damaged, (Trained service technician only) replace the system-board assembly (see "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144).
0051006	DIMM mismatch detected.	Make sure that the DIMMs match and have been installed in the correct order (see "Installing a DIMM - BladeCenter HX5" on page 106). If you receive this error code for a blade server configuration that includes an IBM MAX5 expansion blade, multiple DIMMs might have been disabled. After you replace the mismatched DIMM, make sure that all DIMMs have been enabled using the Setup utility (see "Using the Setup utility" on page 20) or using the Advanced Settings Utility (see "Using the Advanced Settings Utility (ASU)" on page 25).

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See "Parts listing - BladeCenter HX5" on page 55 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.

Error code	Description	Action
0051009	No memory detected.	1. Make sure that the server contains the correct number of DIMMs, in the correct order (see "Installing a DIMM - BladeCenter HX5" on page 106).
		2. Reseat the DIMMs (see "Removing a DIMM - BladeCenter HX5" on page 105 and "Installing a DIMM - BladeCenter HX5" on page 106).
		3. Turn off the blade server. Then turn on the blade server and immediately turn it off (before POST completes) four times, using either the power button on the front of the blade server or the advanced management module web interface. **Note:** Make sure that you turn off the blade server immediately after starting it. Turning on the blade server and immediately turning it off four times will cause UEFI to be start using default settings the next time the server is started. If the problem is resolved, run the Setup utility, select **Load Default Settings**, and save the settings to recover the server firmware.
		4. Remove the battery and reinstall the battery to clear CMOS memory and NVRAM. The real time clock will also be reset.
		5. Remove all DIMM pairs and make sure that a pair of DIMMs that are known to be operational are installed in DIMM connectors 1 and 4). Then, restart the blade server. If the problem is resolved, continue adding DIMM pairs back to the system (see "Installing a DIMM - BladeCenter HX5" on page 106), restarting the blade server each time a DIMM pair is added. **Note:** If the blade server fails to start after adding a DIMM pair, replace one of the DIMMs with a DIMM of the same size and type (see "Removing a DIMM - BladeCenter HX5" on page 105 and "Installing a DIMM - BladeCenter HX5" on page 106). If the issue is resolved, continue to add additional DIMM pairs. If the problem remains, replace the second DIMM of the pair with the original removed DIMM. If the problem remains, continue to Step 6.
		6. (Trained service technician only). If there are two processors installed in the system, swap microprocessors (see "Removing a microprocessor and heat sink" on page 132 and "Installing a microprocessor and heat sink" on page 136).
		7. (Trained service technician only) Replace the system board (see "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144).

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See "Parts listing - BladeCenter HX5" on page 55 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.

Error code	Description	Action
005100A	No usable memory detected.	1. Make sure that the server contains the correct number of DIMMs, in the correct order (see "Installing a DIMM - BladeCenter HX5" on page 106). 2. Reseat the DIMMs (see "Removing a DIMM - BladeCenter HX5" on page 105 and "Installing a DIMM - BladeCenter HX5" on page 106). 3. Turn off the blade server. Then turn on the blade server and immediately turn it off (before POST completes) four times, using either the power button on the front of the blade server or the advanced management module web interface. **Note:** Make sure that you turn off the blade server immediately after starting it. Turning on the blade server and immediately turning it off four times will cause UEFI to be start using default settings the next time the server is started. If the problem is resolved, run the Setup utility, select **Load Default Settings**, and save the settings to recover the server firmware. 4. Remove the battery and reinstall the battery to clear CMOS memory and NVRAM. The real time clock will also be reset. 5. Remove all DIMM pairs and make sure that a pair of DIMMs that are known to be operational are installed in DIMM connectors 1 and 4). Then, restart the blade server. If the problem is resolved, continue adding DIMM pairs back to the system (see "Installing a DIMM - BladeCenter HX5" on page 106), restarting the blade server each time a DIMM pair is added. **Note:** If the blade server fails to start after adding a DIMM pair, replace one of the DIMMs with a DIMM of the same size and type (see "Removing a DIMM - BladeCenter HX5" on page 105 and "Installing a DIMM - BladeCenter HX5" on page 106). If the issue is resolved, continue to add additional DIMM pairs. If the problem remains, replace the second DIMM of the pair with the original removed DIMM. If the problem remains, continue to Step 6. 6. (Trained service technician only). If there are two processors installed in the system, swap microprocessors (see "Removing a microprocessor and heat sink" on page 132 and "Installing a microprocessor and heat sink" on page 136). 7. (Trained service technician only) Replace the system board (see "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144).
0058001	Memory predictive failure analysis (PFA) threshold exceeded.	1. Refer to TIP H21455 for minimum code level. 2. Check the IBM support website for an applicable retain tip or firmware update that applies to this memory error. 3. Swap the affected DIMMs (as indicated by the error LEDs on the system board or the event logs) to a different memory channel or microprocessor (see "Installing a DIMM - BladeCenter HX5" on page 106 for memory population sequence). 4. If the error still occurs on the same DIMM, replace the affected DIMM (as indicated by the error LEDs on the system board or the event logs). 5. If the problem occurs on the same DIMM connector, check the DIMM connector. If the connector is damaged, (trained service technician only) replace the system-board assembly (see "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144).

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See "Parts listing - BladeCenter HX5" on page 55 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.**

Error code	Description	Action
0058007	DIMM population is unsupported	1. Make sure that the server contains the correct number of DIMMs, in the correct order (see "Installing a DIMM - BladeCenter HX5" on page 106). 2. Check the system event log for any memory errors that might be related to specified DIMM pair and resolve those errors. **Note:** If the system event log is full, new events will not be posted to the log. You can clear the system event log through the Setup Utility (see "Using the Setup utility" on page 20). Select **System Event Logs** and then select **Clear System Event Log**. 3. Reseat the DIMMs (see "Removing a DIMM - BladeCenter HX5" on page 105 and "Installing a DIMM - BladeCenter HX5" on page 106) and restart the blade server. 4. Remove the specified DIMM pair and replace the DIMM pair with an identical pair of known good DIMMs, and then restart the server. Repeat as necessary. If the failures continue, go to step 5. 5. (Trained service technician only) Replace the system board (see "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144).
0058008	DIMM failed memory test	1. Refer to TIP H21455 for minimum code level. 2. Check the IBM support website for an applicable retain tip or firmware update that applies to this memory error. 3. Swap the affected DIMMs (as indicated by the error LEDs on the system board or the event logs) to a different memory channel or microprocessor (see "Installing a DIMM - BladeCenter HX5" on page 106 for memory population sequence). 4. Enable all affected DIMMs using the Setup utility. 5. If the failure remains on the original DIMM slots, replace the DIMM that was not moved. If the failure follows the DIMM that was moved, replace the DIMM that was swapped. 6. If the problem occurs on the same DIMM connector, check the DIMM connector. If the connector is damaged, (Trained service technician only) replace the system-board assembly (see "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144).
00580A1	Invalid DIMM population for mirroring mode.	1. Make sure that the server contains the correct number of DIMMs, in the correct order (see "Installing a DIMM - BladeCenter HX5" on page 106). 2. Check the system event log for any memory errors that might be related to the specified DIMM and resolve those errors. **Note:** If the system event log is full, new events will not be posted to the log. You can clear the system event log through the Setup Utility (see "Using the Setup utility" on page 20). Select **System Event Logs** and then select **Clear System Event Log**. 3. Reseat the DIMMs (see "Removing a DIMM - BladeCenter HX5" on page 105 and "Installing a DIMM - BladeCenter HX5" on page 106) and restart the blade server. 4. Remove the specified DIMM pair and replace the DIMM pair with an identical pair of known good DIMMs, and then restart the server. Repeat as necessary. If the failures continue, go to step 5. 5. (Trained service technician only) Replace the system board (see "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144).
00580A4	Memory population changed.	Information only. Memory has been added, moved, or changed.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See "Parts listing - BladeCenter HX5" on page 55 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.**

Error code	Description	Action
00580A5	Mirror failover complete	Information only. Memory redundancy has been lost. Check the system-event log for uncorrected DIMM failure events.
00580B0	Memory SMI link failure	1. Check the IBM support website for an applicable retain tip or firmware update that applies to this memory error. 2. Check the DIMM connector and the associated microprocessor connector (make sure you use the microprocessor installation and removal tool). 3. (Trained service technician only) If the connector is damaged, replace the system board assembly (see "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144).
00580B1	Memory SMI lane fail down	Information only.
0068002	CMOS battery cleared.	1. Reseat the battery. 2. Clear the CMOS memory (see "System-board switches" on page 13). 3. Replace the following components one at a time in the order shown, restarting the server each time: a. Battery (see "Removing the battery" on page 75 and "Installing the battery" on page 76). b. (Trained service technician only) System board. See "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144.
2011001	PCI-X SERR	1. Use light path diagnostic LEDs to determine whether an I/O fault LED is lit ("Light path diagnostics LEDs" on page 205). If it is, resolve the problem. 2. Check the system-event log to determine which I/O expansion cards are affected. 3. Reseat all affected I/O-expansion cards. 4. If you have recently updated the device drivers for the affected I/O-expansion cards, revert to a previous device driver. 5. Update the firmware and device drivers for the PCI device. 6. Remove the I/O-expansion cards from the system board. 7. Replace the following components one at a time in the order shown, restarting the server each time: a. The I/O-expansion cards b. (Trained service technician only) System board (see "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144).
2018001	PCI Express® uncorrectable error	1. Turn off the blade server. Then turn on the blade server and immediately turn it off (before POST completes) four times, using either the power button on the front of the blade server or the advanced management module web interface. **Note:** Make sure that you turn off the blade server immediately after starting it. Turning on the blade server and immediately turning it off four times will cause UEFI to be start using default settings. 2. Remove the battery and reinstall the battery to clear CMOS memory and NVRAM. The real time clock will also be reset. 3. Remove any recently installed hardware. 4. Update the server firmware through the advanced management module web interface.

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See "Parts listing - BladeCenter HX5" on page 55 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).
- If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.

Error code	Description	Action

2018002	Option ROM resource allocation failure.	Informational message that some devices might not be initialized.
		1. Run the Setup utility (see "Using the Setup utility" on page 20). Select **Start Options** from the menu and modify the boot sequence so that you change the load order of the optional-device ROM code.
		2. Run the Setup utility (see "Using the Setup utility" on page 20) and disable unused resource to make more space available:
		  • Select **Start Options**
		  • Select **Planar Ethernet (PXE/DHCP)** to disable the integrated Ethernet controller ROM.
		  • Select **Advanced Functions**, followed by **PCI Bus Control**, and then **PCI ROM Control Execution** to disable the ROM of the adapters in the PCI slots.
		  • Select **Devices and I/O Ports** to disable any of the integrated devices.
		3. Replace the following components one at a time in the order shown, restarting the server each time:
		  a. Expansion cards (see "Removing an I/O expansion card" on page 120 and "Installing an I/O expansion card" on page 122).
		  b. (Trained service technician only) System board (see "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144).

3*xx*0007 (*xx* can be 00-19)	Firmware fault detected, system halted.	1. Recover the server firmware to the latest level. Run the Setup utility, select **Load Default Settings**, and save the settings to recover the server firmware. 2. Undo any recent configuration changes, or clear CMOS memory to restore the settings to the default values. 3. Remove any recently installed hardware.
3038003	Firmware corrupted.	1. Revert to a previous version of the firmware for the blade server. 2. If the blade server will not start, switch to the backup UEFI image. Set switch 7 to the on position. See "System-board switches" on page 13 for the location of switch 7. 3. Restart the server until you see F1 Setup or the Boot Device selection. 4. Power down the server. 5. (Trained service technician only) Replace the system board (see "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144).
3048005	Booted secondary (backup) server firmware image.	Information only. The backup switch was used to boot the secondary bank.
3048006	Booted secondary (backup) UEFI image because of automatic boot failure recovery	1. Run the Setup utility (see "Using the Setup utility" on page 20). Select **Load Default Settings** and save the settings to recover the server firmware. 2. Remove the blade server from the chassis. 3. Install the blade server into the chassis and turn on the blade server.

305000A	Real time clock (RTC) date/time is incorrect	1. Run the Setup utility (see "Using the Setup utility" on page 20) to adjust the date and time. Then, restart the blade server.
		2. Reseat the battery.
		3. Replace the following components one at a time in the order shown, restarting the blade server each time:
		  a. Battery
		  b. (Trained service technician only) System board (see "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144).

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See "Parts listing - BladeCenter HX5" on page 55 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.**

Error code	Description	Action

3058001	System configuration is not valid	1. Run the Setup utility (see "Using the Setup utility" on page 20). Select **Load Default Settings** and save the settings.
		2. Reseat the following components one at a time in the order shown, restarting the blade server each time:
		  a. Battery
		  b. Failing device. If the device is a field replaceable unit (FRU), it must be replaced by a trained service technician.
		3. Replace the following components one at a time in the order shown, restarting the blade server each time:
		  a. Battery
		  b. Failing device. If the device is a field replaceable unit (FRU), it must be replaced by a trained service technician.
		  c. (Trained service technician only) System board (see "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144)

3058004	Three boot failures	1. Undo any recent system changes, such as new settings or newly installed devices. 2. Check the advanced management module event log for any power related issues and resolve them. You can access the event log through the advanced management module web interface. For more information see the *Advanced Management Module Installation and User's Guide*. 3. Remove all hardware that is not listed on the ServerProven website. 4. Run the Setup utility (see "Using the Setup utility" on page 20). Select **Load Default Settings** and save the settings. Then, restart the blade server.
3108007	System configuration restored to default settings	Information only. This is message is usually associated with the CMOS battery clear event.
3138002	Boot configuration error	1. Run the Setup utility and remove any recent changes made to the settings (see "Using the Setup utility" on page 20). 2. Run the Setup utility (see "Using the Setup utility" on page 20). Select **Load Default Settings** and save the settings.
3008000	IMM communication failure.	1. Remove the blade server from the chassis for 30 seconds and then install the blade server into the chassis (see "Removing the blade server from the BladeCenter chassis" on page 64 and "Installing a blade server in a BladeCenter chassis" on page 65). 2. Restart the blade server. 3. Update the blade server firmware (see "Updating firmware and device drivers" on page 31). 4. (Trained service technician only) Replace the system board (see "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144).
3008002	Error updating system configuration to IMM	1. Remove the blade server from the chassis for 30 seconds and then install the blade server into the chassis (see "Removing the blade server from the BladeCenter chassis" on page 64 and "Installing a blade server in a BladeCenter chassis" on page 65). 2. Restart the blade server. 3. Run the Setup utility (see "Using the Setup utility" on page 20). Select **Load Default Settings** and save the settings. Then, restart the blade server. 4. Update the server firmware (see "Updating firmware and device drivers" on page 31).

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See "Parts listing - BladeCenter HX5" on page 55 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.**

Error code	Description	Action
3008003	Error retrieving system configuration from IMM	1. Remove the blade server from the chassis for 30 seconds and then install the blade server into the chassis (see "Removing the blade server from the BladeCenter chassis" on page 64 and "Installing a blade server in a BladeCenter chassis" on page 65). 2. Restart the blade server. 3. Run the Setup utility (see "Using the Setup utility" on page 20). Select **Load Default Settings** and save the settings. Then, restart the blade server. 4. Update the server firmware (see "Updating firmware and device drivers" on page 31).
3008004	IMM system event log full.	1. Run the Setup utility. 2. Select **System Event Logs**. 3. Select **Clear System Event Log**. 4. Restart the server.
3818001	Core Root of Trust Measurement (CRTM) update failed	1. Revert to a previous version of the firmware for the blade server. 2. If the blade server will not start, switch to the backup UEFI image. Set switch 7 to the on position. See "System-board switches" on page 13 for the location of switch 7. 3. Update the firmware for the server. Make sure that you are using the latest firmware from http://www.ibm.com/support/fixcentral/systemx/ groupView?query.productGroup=ibm%2FBladeCenter . 4. Set switch 7 to the off position. See "System-board switches" on page 13 for the location of switch 7.
3818002	Core Root of Trust Measurement (CRTM) update aborted	1. Revert to a previous version of the firmware for the blade server. 2. If the blade server will not start, switch to the backup UEFI image. Set switch 7 to the on position. See "System-board switches" on page 13 for the location of switch 7. 3. Update the firmware for the server. Make sure that you are using the latest firmware from http://www.ibm.com/support/fixcentral/systemx/ groupView?query.productGroup=ibm%2FBladeCenter . 4. Set switch 7 to the off position. See "System-board switches" on page 13 for the location of switch 7.
3818003	Core Root of Trust Measurement (CRTM) flash lock failed	1. Revert to a previous version of the firmware for the blade server. 2. If the blade server will not start, switch to the backup UEFI image. Set switch 7 to the on position. See "System-board switches" on page 13 for the location of switch 7. 3. Update the firmware for the server. Make sure that you are using the latest firmware from http://www.ibm.com/support/fixcentral/systemx/ groupView?query.productGroup=ibm%2FBladeCenter . 4. Set switch 7 to the off position. See "System-board switches" on page 13 for the location of switch 7.
3818004	Core Root of Trust Measurement (CRTM) system error	1. Revert to a previous version of the firmware for the blade server. 2. If the blade server will not start, switch to the backup UEFI image. Set switch 7 to the on position. See "System-board switches" on page 13 for the location of switch 7. 3. Update the firmware for the server. Make sure that you are using the latest firmware from http://www.ibm.com/support/fixcentral/systemx/ groupView?query.productGroup=ibm%2FBladeCenter . 4. Set switch 7 to the off position. See "System-board switches" on page 13 for the location of switch 7.

• Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.		
• See "Parts listing - BladeCenter HX5" on page 55 to determine which components are customer replaceable units (CRU) and which components are field replaceable units (FRU).		
• If an action step is preceded by "(Trained service technician only)," that step must be performed only by a Trained service technician.		

Error code	Description	Action
3818005	Current® Bank Core Root of Trust Measurement (CRTM) capsule signature invalid	1. Revert to a previous version of the firmware for the blade server. 2. If the blade server will not start, switch to the backup UEFI image. Set switch 7 to the on position. See "System-board switches" on page 13 for the location of switch 7. 3. Update the firmware for the server. Make sure that you are using the latest firmware from http://www.ibm.com/support/fixcentral/systemx/ groupView?query.productGroup=ibm%2FBladeCenter . 4. Set switch 7 to the off position. See "System-board switches" on page 13 for the location of switch 7.
3818006	Opposite bank CRTM capsule signature invalid	1. Revert to a previous version of the firmware for the blade server. 2. If the blade server will not start, switch to the backup UEFI image. Set switch 7 to the on position. See "System-board switches" on page 13 for the location of switch 7. 3. Update the firmware for the server. Make sure that you are using the latest firmware from http://www.ibm.com/support/fixcentral/systemx/ groupView?query.productGroup=ibm%2FBladeCenter . 4. Set switch 7 to the off position. See "System-board switches" on page 13 for the location of switch 7.
3818007	CRTM update capsule signature invalid	1. Revert to a previous version of the firmware for the blade server. 2. If the blade server will not start, switch to the backup UEFI image. Set switch 7 to the on position. See "System-board switches" on page 13 for the location of switch 7. 3. Update the firmware for the server. Make sure that you are using the latest firmware from http://www.ibm.com/support/fixcentral/systemx/ groupView?query.productGroup=ibm%2FBladeCenter . 4. Set switch 7 to the off position. See "System-board switches" on page 13 for the location of switch 7.
3828004	AEM power capping disabled	1. Check the settings and the event logs. 2. Make sure that the Active Energy Manager feature is enabled in the Setup utility. Select **System Settings** > **Power** > **Active Energy Manager** > **Capping Enabled**. 3. Update the UEFI firmware. 4. Update the IMM firmware.

IMM error codes in AMM

The integrated management module (IMM) consolidates the service processor functionality, video controller, and remote presence capabilities in a single chip on the system board. The IMM monitors all components of the blade server and posts events in the IMM event log. In addition, most events are also sent to the advanced management module event log.

The following table lists IMM error messages that are displayed in the advanced management module event log and suggested actions to correct the detected problems. These events, in a slightly different format, are also displayed in the IMM event log.

Note: An updated list of IMM error messages and corrective actions are available on the IBM website at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=MIGR-5079339&brandind=5000008.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Type	Error Message	Action
Error Code: 0x80010200 **Note:** Multiple events can be displayed for this error code. Be sure to read the message text to determine the appropriate recovery actions.		
Error	System board (Planar 12V) voltage under critical threshold. Reading: *X*, Threshold: *Y*	1. If the under voltage problem is occurring on all blade servers, look for other events in the log related to power and resolve those events (see "Event logs" on page 149). 2. View the event log provided by the advanced management module for your BladeCenter chassis and resolve any power related errors that might be displayed. 3. If other modules or blade servers are logging the same issue, check the power supply for the BladeCenter chassis. 4. (Trained service technician only) Replace the system-board assembly (see "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144).
Error	System board (Planar 5V) voltage under critical threshold. Reading: *X*, Threshold: *Y*	1. Remove all expansion cards from the blade server (see "Removing an I/O expansion card" on page 120). 2. Remove all storage drives from the blade server (see "Removing a solid state drive" on page 102). 3. (Trained service technician only) Replace the system-board assembly (see "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144).
Error	System board (Planar 3.3V) voltage under critical threshold. Reading: *X*, Threshold: *Y*	1. Remove all expansion cards from the blade server (see "Removing an I/O expansion card" on page 120). 2. Remove all storage drives from the blade server (see "Removing a solid state drive" on page 102). 3. (Trained service technician only) Replace the system-board assembly (see "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144).
Error Code: 0x80010201		
Error	CMOS Battery (CMOS Battery) voltage under critical threshold. Reading: *X*, Threshold: *Y*	Replace the system battery (see "Removing the battery" on page 75 and "Installing the battery" on page 76).
Error Code: 0x80010900 **Note:** Multiple events can be displayed for this error code. Be sure to read the message text to determine the appropriate recovery actions.		

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Type	Error Message	Action
Error	System board (Planar 12V) voltage over critical threshold. Reading: X, Threshold: Y	1. If the over voltage problem is occurring on all blade servers, look for other events in the log related to power and resolve those events. 2. View the event log provided by the advanced management module for your BladeCenter chassis and resolve any power-related errors that might be displayed. 3. If other modules or blade servers are logging the same issue, check the power supply for the BladeCenter chassis. 4. (Trained service technician only) Replace the system-board assembly (see "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144).
Error	System board (Planar 5V) voltage over critical threshold. Reading: X, Threshold: Y	1. Remove all expansion cards from the blade server (see "Removing an I/O expansion card" on page 120). 2. Remove all storage drives from the blade server (see "Removing a solid state drive" on page 102). 3. (Trained service technician only) Replace the system-board assembly (see "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144).
Error	System board (Planar 3.3V) voltage over critical threshold. Reading: X, Threshold: Y	(Trained service technician only) Replace the system board (see "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144).
Error Code: 0x80030100		
Information	Group 1, memory (Mem Lane Spared) occurred/recovered.	Information only.
Error Code: 0x80070100 **Note:** Multiple events can be displayed for this error code. Be sure to read the message text to determine the appropriate recovery actions.		
Warning	Expansion Module X, (BPE4_Y Slot Z) bus uncorrectable error **Notes:** 1. X = Module number 2. Y = BPE4 ID (1, 2, 3, or 4). The max BPE4 number is 4, and there are 2 slots in each BPE4. Module number is based on the configuration of the BPE4	1. Update the firmware for the service processor (BMC), BIOS, and firmware for the advanced management module. 2. Reseat the memory DIMMs (see "Removing a DIMM - BladeCenter HX5" on page 105 and "Installing a DIMM - BladeCenter HX5" on page 106). 3. Reseat any expansion cards that are installed (see "Removing an I/O expansion card" on page 120 and "Installing an I/O expansion card" on page 122). 4. (Trained service technician only) Replace the system board (see "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144).

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Type	Error Message	Action
Warning	Group 2, (PCI express bus *X*, Expansion Module *Y*) firmware progress (I/O Resources) warning **Notes:** 1. *X* = PCI slot (1, 2, or 3) 2. *Y* = Module number (0, 1, or 2)	To allow more PCIe space, choose one of the following steps: • Change MM configuration setting to 1 GB. 1. In the Setup utility, click **System Settings** > **Devices and I/O Ports** > **MM Config Base**. 2. Set **MM Config Base** to 1 GB. • Enable PCI 64-bit resource. 1. In the Setup utility, click **System Settings** > **Devices and I/O Ports** > **PCI 64-Bit Resource**. 2. Enable **PCI 64-Bit Resource**.
Warning	Processor *X*, temperature (CPU *X* OverTemp) warning [Note: *X*=1-2]	1. Make sure that the room temperature is within the operating specifications (see "Features and specifications" on page 5). 2. Make sure that none of the air vents on the BladeCenter chassis and on the blade server are blocked. 3. Make sure that all of the fans on the BladeCenter chassis are running.
Warning	System board, temperature (Inlet Temp) warning	1. Make sure that the room temperature is within the operating specifications (see "Features and specifications" on page 5). 2. Make sure that none of the air vents on the BladeCenter chassis and on the blade server are blocked. 3. Make sure that all of the fans on the BladeCenter chassis are running.
Warning	System board, temperature (MEU Overtemp) warning	1. Make sure that the room temperature is within the operating specifications (see "Features and specifications" on page 5). 2. Make sure that none of the air vents on the BladeCenter chassis and on the blade server are blocked. 3. Make sure that all of the fans on the BladeCenter chassis are running.
Warning	Memory device *X*, temperature (DIMM *X*) warning [Note: *X*=1-16]	1. Make sure that the room temperature is within the operating specifications (see "Features and specifications" on page 5). 2. Make sure that none of the air vents on the BladeCenter chassis and on the blade server are blocked. 3. Make sure that all of the fans on the BladeCenter chassis are running.
Warning	Memory device*X*, temperature (MEU DIMM *X*) warning [Note: *X*=1-24]	1. Make sure that the room temperature is within the operating specifications (see "Features and specifications" on page 5). 2. Make sure that none of the air vents on the BladeCenter chassis and on the blade server are blocked. 3. Make sure that all of the fans on the BladeCenter chassis are running.

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**		
• **See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.**		
• **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**		

Type	Error Message	Action
Error Code: 0x80070200 **Note:** Multiple events can be displayed for this error code. Be sure to read the message text to determine the appropriate recovery actions.		
Error	Chassis, processor (CPU Cooling) critical	1. Make sure that the room temperature is within the operating specifications (see "Features and specifications" on page 5). 2. Make sure that none of the air vents on the BladeCenter chassis and on the blade server are blocked. 3. Make sure that all the fans are on the BladeCenter chassis are running (see the documentation for your BladeCenter chassis). 4. Make sure Acoustics mode is not enabled on the BladeCenter chassis (see the documentation for your BladeCenter chassis). 5. (Trained service technician only) Make sure that the microprocessor heat sink is properly attached to the CPU (see "Removing a microprocessor and heat sink" on page 132 and "Installing a microprocessor and heat sink" on page 136). 6. Replace the processor (see "Removing a microprocessor and heat sink" on page 132 and "Installing a microprocessor and heat sink" on page 136).
Error	Expansion Module *X*, Expansion Card (BPE4_*Y* Fault) critical **Notes:** 1. *X* = Module number 2. *Y* = BPE4 ID (1, 2, 3, or 4). The max BPE4 number is 4, and there are 2 slots in each BPE4. Module number is based on the configuration of the BPE4	1. Reseat the blade expansion unit (see "Removing an expansion unit" on page 73 and "Installing an expansion unit" on page 74). 2. Replace the blade expansion unit (see "Removing an expansion unit" on page 73 and "Installing an expansion unit" on page 74).
Error	Processor *X*, temperature (CPU *X* OverTemp) critical [Note: *X*=1-2]	1. Make sure that the room temperature is within the operating specifications (see "Features and specifications" on page 5). 2. Make sure that none of the air vents on the BladeCenter chassis and on the blade server are blocked. 3. Make sure that all of the fans on the BladeCenter chassis are running. 4. (Trained service technician only) Make sure that the microprocessor heat sink is properly attached to the CPU (see "Removing a microprocessor and heat sink" on page 132 and "Installing a microprocessor and heat sink" on page 136). 5. (Trained service technician only) Replace the processor (see "Removing a microprocessor and heat sink" on page 132 and "Installing a microprocessor and heat sink" on page 136).

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Type	Error Message	Action
Error	Memory device *X*, temperature (DIMM *X* Temp) critical [Note:*X*=1-16]	1. Make sure that the room temperature is within the operating specifications (see "Features and specifications" on page 5). 2. Make sure that none of the air vents on the BladeCenter chassis and on the blade server are blocked. 3. Make sure that all of the fans on the BladeCenter chassis are running. 4. (Trained service technician only) Make sure that the microprocessor heat sink is properly attached to the microprocessor (see "Installing a microprocessor and heat sink" on page 136).
Error	Memory device *X*, temperature (MEU DIMM *X* Temp) critical [Note:*X*=1-24]	1. Make sure that the room temperature is within the operating specifications (see "Features and specifications" on page 5). 2. Make sure that none of the air vents on the BladeCenter chassis and on the blade server are blocked. 3. Make sure that all of the fans on the BladeCenter chassis are running. 4. (Trained service technician only) Make sure that the microprocessor heat sink is properly attached to the microprocessor (see "Installing a microprocessor and heat sink" on page 136).
Error	Group 1 (mem dev 1-40) memory (MEU Mem Lane) critical	1. Reseat the IBM MAX5 expansion blade (see "Removing an IBM MAX5 expansion blade" on page 87 and "Installing an IBM MAX5 expansion blade" on page 89). 2. Replace the IBM MAX5 expansion blade (see "Removing an IBM MAX5 expansion blade" on page 87 and "Installing an IBM MAX5 expansion blade" on page 89).
Error	System board, voltage (Planar Fault) critical	1. Reseat the blade server in the BladeCenter chassis (see "Removing the blade server from the BladeCenter chassis" on page 64 and "Installing a blade server in a BladeCenter chassis" on page 65). 2. Remove the blade server from the BladeCenter chassis and install an identical known good blade server in the BladeCenter chassis (see "Removing the blade server from the BladeCenter chassis" on page 64 and "Installing a blade server in a BladeCenter chassis" on page 65). If the problem is related to a power supply, replace the power supply. 3. (Trained service technician only) Replace the system-board assembly (see "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144).

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Type	Error Message	Action
Error	System board, temperature (Inlet Temp) critical	1. Make sure that the room temperature is within the operating specifications (see "Features and specifications" on page 5). 2. Make sure that none of the air vents on the BladeCenter chassis and on the blade server are blocked. 3. Make sure that all of the fans on the BladeCenter chassis are running.
Error	Proc/IO module 1, temperature (IOH Temp) critical	1. Make sure that the room temperature is within the operating specifications (see "Features and specifications" on page 5). 2. Make sure that none of the air vents on the BladeCenter chassis and on the blade server are blocked. 3. Make sure that all of the fans on the BladeCenter chassis are running.
Error	System board, chip set (Sys Board Fault) critical	1. Make sure that the latest firmware is being used (see "Updating firmware and device drivers" on page 31). 2. Reset the UEFI firmware settings to default values using the Setup utility (see "Using the Setup utility" on page 20). 3. Reseat the blade server in the BladeCenter chassis (see "Removing the blade server from the BladeCenter chassis" on page 64 and "Installing a blade server in a BladeCenter chassis" on page 65). 4. (Trained service technician only) Replace the system-board assembly (see "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144).

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Type	Error Message	Action

Error	Processor *X*, interconnect (CPU *X* Int Link) critical [Note: *X*=1-2]	1. Remove the blade server and ensure the processors are installed correctly (see "Installing a microprocessor and heat sink" on page 136).
		
		2. Verify that the system is running the latest UEFI firmware (see "Updating firmware and device drivers" on page 31).
		
		3. Verify that the scalability card is installed correctly (see "Removing the 2-node scalability card" on page 83 and "Installing the 2-node Scalability card" on page 85, or see "Removing the 1-node speed burst card" on page 81 and "Installing the 1-node speed burst card" on page 82).
		
		4. Run the Setup utility (see "Using the Setup utility" on page 20).
		  a. Make sure that both processors are displayed by the system.
		  b. Load the default settings.
		  c. Go to the **System Settings** menu and make sure the processor is enabled.
		
		5. (Trained service technician only) Replace the processor (see "Removing a microprocessor and heat sink" on page 132 and "Installing a microprocessor and heat sink" on page 136).
		
		6. Replace the scalability card (see "Removing the 2-node scalability card" on page 83 and "Installing the 2-node Scalability card" on page 85, or see "Removing the 1-node speed burst card" on page 81 and "Installing the 1-node speed burst card" on page 82).
		
		7. (Trained service technician only) Replace the system-board assembly (see "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144).

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Type	Error Message	Action
Error	Interconnect *X*, connector (Ext QPI Link *X*) critical [Note: *X*=1-4]	1. Remove the blade server and ensure the processors are installed correctly (see "Installing a microprocessor and heat sink" on page 136). 2. Verify that the system is running the latest UEFI firmware (see "Updating firmware and device drivers" on page 31). 3. Verify that the scalability card is installed correctly (see "Removing the 2-node scalability card" on page 83 and "Installing the 2-node Scalability card" on page 85, or see "Removing the 1-node speed burst card" on page 81 and "Installing the 1-node speed burst card" on page 82). 4. Run the Setup utility (see "Using the Setup utility" on page 20). a. Make sure that both processors are displayed by the system. b. Load the default settings. c. Go to the **System Settings** menu and make sure the processor is enabled. 5. (Trained service technician only) Replace the processor (see "Removing a microprocessor and heat sink" on page 132 and "Installing a microprocessor and heat sink" on page 136). 6. Replace the scalability card (see "Removing the 2-node scalability card" on page 83 and "Installing the 2-node Scalability card" on page 85, or see "Removing the 1-node speed burst card" on page 81 and "Installing the 1-node speed burst card" on page 82). 7. (Trained service technician only) Replace the system-board assembly (see "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144).
Error	PCI express bus 1, Expansion Card (CFFh Exp) critical	1. Check the operating-system event log and the system-event log because it might contain additional information (see "Event logs" on page 149). 2. Update the device drivers for the CFFh expansion card. 3. Reseat the blade server in the BladeCenter chassis (see "Removing the blade server from the BladeCenter chassis" on page 64 and "Installing a blade server in a BladeCenter chassis" on page 65). 4. Reseat the expansion card (see "Removing an I/O expansion card" on page 120 and "Installing an I/O expansion card" on page 122). 5. Replace the expansion card (see "Removing an I/O expansion card" on page 120 and "Installing an I/O expansion card" on page 122).

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Type	Error Message	Action
Error	PCI express bus 2, Expansion Card (CIOh Exp 2 Fault) critical	1. Check the operating-system event log and the system-event log because it might contain additional information (see "Event logs" on page 149). 2. Update the device drivers for the CIOh expansion card. 3. Reseat the blade server in the BladeCenter chassis (see "Removing the blade server from the BladeCenter chassis" on page 64 and "Installing a blade server in a BladeCenter chassis" on page 65). 4. Reseat the expansion card (see "Removing an I/O expansion card" on page 120 and "Installing an I/O expansion card" on page 122). 5. Replace the expansion card (see "Removing an I/O expansion card" on page 120 and "Installing an I/O expansion card" on page 122).
Error	PCI express bus 3, Expansion Card (CIOv Exp Fault) critical	1. Check the operating-system event log and the system-event log because it might contain additional information (see "Event logs" on page 149). 2. Update the device drivers for the CIOv expansion card. 3. Reseat the blade server in the BladeCenter chassis (see "Removing the blade server from the BladeCenter chassis" on page 64 and "Installing a blade server in a BladeCenter chassis" on page 65). 4. Reseat the expansion card (see "Removing an I/O expansion card" on page 120 and "Installing an I/O expansion card" on page 122). 5. Replace the expansion card (see "Removing an I/O expansion card" on page 120 and "Installing an I/O expansion card" on page 122).
Error Code: 0x80070300 **Note:** Multiple events can be displayed for this error code. Be sure to read the message text to determine the appropriate recovery actions.	
Error	Expansion Module X, temperature (BPE4_Y TMP) non-recoverable **Notes:** 1. X = Module number 2. Y = BPE4 ID (1, 2, 3, or 4). The max BPE4 number is 4, and there are 2 slots in each BPE4. Module number is based on the configuration of the BPE4	1. Check the room ambient temperature to ensure that it is within the operating specifications for the chassis (see "Features and specifications" on page 5). 2. If an air filter is installed, make sure that it is cleaned or replaced (see the documentation for your BladeCenter chassis). 3. Make sure that all fan/blower modules are running. Replace fan modules if necessary (see the documentation for your BladeCenter chassis). 4. Make sure that a device or filler is installed in each bay in the front and rear of the chassis, and make sure that there is nothing covering the bays. Any missing components can cause a major reduction in airflow for the blade server (see the documentation for your BladeCenter chassis).

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Type	Error Message	Action
	Expansion Module *X*, voltage (BPE4_*Y* VOL) non-recoverable **Notes:** 1. *X* = Module number 2. *Y* = BPE4 ID (1, 2, 3, or 4). The max BPE4 number is 4, and there are 2 slots in each BPE4. Module number is based on the configuration of the BPE4	1. Check the room ambient temperature to ensure that it is within the operating specifications for the chassis (see "Features and specifications" on page 5). 2. If an air filter is installed, make sure that it is cleaned or replaced (see the documentation for your BladeCenter chassis). 3. Make sure that all fan/blower modules are running. Replace fan modules if necessary (see the documentation for your BladeCenter chassis). 4. Make sure that a device or filler is installed in each bay in the front and rear of the chassis, and make sure that there is nothing covering the bays. Any missing components can cause a major reduction in airflow for the blade server (see the documentation for your BladeCenter chassis).
Error	Processor *X*, temperature (CPU *X* OverTemp) non-recoverable [Note: *X*=1-2]	1. Make sure that the room temperature is within the operating specifications (see "Features and specifications" on page 5). 2. Make sure that none of the air vents on the BladeCenter chassis and on the blade server are blocked. 3. Make sure that all of the fans on the BladeCenter chassis are running. 4. Make sure that each bay of the BladeCenter chassis contains either a device or a filler. 5. Make sure that the blade server is not missing any heat sinks, DIMMs, or heat-sink fillers (see "Parts listing - BladeCenter HX5" on page 55). 6. (Trained service technician only) Make sure that the microprocessor heat sink is properly attached to the microprocessor (see "Installing a microprocessor and heat sink" on page 136).

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Type	Error Message	Action
Error	System board, temperature (Inlet Temp) non-recoverable	1. Make sure that the room temperature is within the operating specifications (see "Features and specifications" on page 5). 2. Make sure that none of the air vents on the BladeCenter chassis and on the blade server are blocked. 3. Make sure that all of the fans on the BladeCenter chassis are running. 4. Make sure that each bay of the BladeCenter chassis contains either a device or a filler. 5. Make sure that the blade server is not missing any heat sinks, DIMMs, or heat-sink fillers (see "Parts listing - BladeCenter HX5" on page 55). 6. (Trained service technician only) Make sure that the microprocessor heat sink is properly attached to the microprocessor (see "Installing a microprocessor and heat sink" on page 136).
Error	Proc/IO module 1, temperature (IOH Temp) non-recoverable	1. Make sure that the room temperature is within the operating specifications (see "Features and specifications" on page 5). 2. Make sure that none of the air vents on the BladeCenter chassis and on the blade server are blocked. 3. Make sure that all of the fans on the BladeCenter chassis are running. 4. Make sure that each bay of the BladeCenter chassis contains either a device or a filler. 5. Make sure that the blade server is not missing any heat sinks, DIMMs, or heat-sink fillers (see "Parts listing - BladeCenter HX5" on page 55). 6. (Trained service technician only) Make sure that the microprocessor heat sink is properly attached to the microprocessor (see "Installing a microprocessor and heat sink" on page 136).
Error Code: 0x80070600 **Note:** Multiple events can be displayed for this error code. Be sure to read the message text to determine the appropriate recovery actions.		

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Type	Error Message	Action
Error	Processor *X*, temperature (CPU *X* OverTemp) non-recoverable [Note: *X*=1-2]	1. Make sure that the room temperature is within the operating specifications (see "Features and specifications" on page 5). 2. Make sure that none of the air vents on the BladeCenter chassis and on the blade server are blocked. 3. Make sure that all of the fans on the BladeCenter chassis are running. 4. Make sure that each bay of the BladeCenter chassis contains either a device or a filler. 5. Make sure that the blade server is not missing any heat sinks, DIMMs, or heat-sink fillers (see "Parts listing - BladeCenter HX5" on page 55). 6. (Trained service technician only) Make sure that the microprocessor heat sink is properly attached to the microprocessor (see "Installing a microprocessor and heat sink" on page 136).
Error	System board, interconnect (Pwr Share Jumper) non-recoverable	1. Reseat the cap on the power sharing connector (see "Blade server connectors - BladeCenter HX5" on page 13). 2. (Trained service technician only) Replace the system-board assembly (see "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144).
Error Code: 0x80090000		
Information	System board, memory (Performance Mode) disabled/enabled	This is informational only, no action is required. The performance mode has been enabled or disabled.
Error Code: 0x800B0100		

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Type	Error Message	Action
Error	Group 1, memory (Bckup Mem Status) is not redundant	1. Check the event logs for other memory errors that might occur (see "Event logs" on page 149). 2. Reseat all of the memory modules in the blade server (see "Removing a DIMM - BladeCenter HX5" on page 105 and "Installing a DIMM - BladeCenter HX5" on page 106). 3. Make sure all of the memory is enabled in the Setup utility (see "Using the Setup utility" on page 20). Notice which memory modules are disabled before you continue to the next step. 4. Replace the memory modules that were disabled in the Setup utility (see "Removing a DIMM - BladeCenter HX5" on page 105 and "Installing a DIMM - BladeCenter HX5" on page 106). 5. (Trained service technician only) Replace the microprocessor that controls the failing memory module. **Note:** DIMM connectors 1 through 8 are controlled by the first microprocessor and DIMM connectors 9 through 16 are controlled by the second microprocessor. See "Removing a microprocessor and heat sink" on page 132 and "Installing a microprocessor and heat sink" on page 136.
Error Code: 0x800B0300		
Warning	Group 1, memory (Bckup Mem Status) is not redundant and operational with minimal resources	1. Check the event logs for other memory errors that might occur (see "Event logs" on page 149). 2. Reseat all of the memory modules in the blade server (see "Removing a DIMM - BladeCenter HX5" on page 105 and "Installing a DIMM - BladeCenter HX5" on page 106). 3. Make sure all of the memory is enabled in the Setup utility (see "Using the Setup utility" on page 20). Notice which memory modules are disabled before you continue to the next step. 4. Replace the memory modules that were disabled in the Setup utility (see "Removing a DIMM - BladeCenter HX5" on page 105 and "Installing a DIMM - BladeCenter HX5" on page 106). 5. (Trained service technician only) Replace the microprocessor that controls the failing memory module. **Note:** DIMM connectors 1 through 8 are controlled by the first microprocessor and DIMM connectors 9 through 16 are controlled by the second microprocessor. See "Removing a microprocessor and heat sink" on page 132 and "Installing a microprocessor and heat sink" on page 136.
Error Code: 0x800B0500		

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Type	Error Message	Action
Error	Group 1, memory (Bckup Mem Status) is not redundant and not operational	1. Check the event logs for other memory errors that might occur (see "Event logs" on page 149). 2. Reseat all of the memory modules in the blade server (see "Removing a DIMM - BladeCenter HX5" on page 105 and "Installing a DIMM - BladeCenter HX5" on page 106). 3. Make sure all of the memory is enabled in the Setup utility (see "Using the Setup utility" on page 20). Notice which memory modules are disabled before you continue to the next step. 4. Replace the memory modules that were disabled in the Setup utility (see "Removing a DIMM - BladeCenter HX5" on page 105 and "Installing a DIMM - BladeCenter HX5" on page 106). 5. (Trained service technician only) Replace the microprocessor that controls the failing memory module. **Note:** DIMM connectors 1 through 8 are controlled by the first microprocessor and DIMM connectors 9 through 16 are controlled by the second microprocessor. See "Removing a microprocessor and heat sink" on page 132 and "Installing a microprocessor and heat sink" on page 136.
Error Code: 0x806F0007 **Note:** Multiple events can be displayed for this error code. Be sure to read the message text to determine the appropriate recovery actions.		

Error	Group 4, processor (One of CPUs) internal error	1. Remove the blade server and ensure the processors are installed correctly (see "Installing a microprocessor and heat sink" on page 136).
		
		2. Verify that the system is running the latest UEFI firmware (see "Updating firmware and device drivers" on page 31).
		
		3. Run the Setup utility (see "Using the Setup utility" on page 20).
		   a. Make sure that both processors are displayed by the system.
		   b. Load the default settings.
		   c. Go to the **System Settings** menu and make sure the processor is enabled.
		
		4. (Trained service technician only) Replace the processor (see "Removing a microprocessor and heat sink" on page 132 and "Installing a microprocessor and heat sink" on page 136).
		
		5. (Trained service technician only) Replace the system-board assembly (see "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144).

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Type	Error Message	Action

Error	Group 4, processor (All CPUs) internal error	1. Remove the blade server and ensure the processors are installed correctly (see "Installing a microprocessor and heat sink" on page 136).
		 2. Verify that the system is running the latest UEFI firmware (see "Updating firmware and device drivers" on page 31).
		 3. Run the Setup utility (see "Using the Setup utility" on page 20).
		   a. Make sure that both processors are displayed by the system.
		   b. Load the default settings.
		   c. Go to the **System Settings** menu and make sure the processor is enabled.
		 4. (Trained service technician only) Replace the processor (see "Removing a microprocessor and heat sink" on page 132 and "Installing a microprocessor and heat sink" on page 136).
		 5. (Trained service technician only) Replace the system-board assembly (see "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144).

Error	Processor *X* (CPU *X* Status) internal error [Note *X*=1,2]	1. Remove the blade server and ensure the processors are installed correctly (see "Installing a microprocessor and heat sink" on page 136).
		 2. Verify that the system is running the latest UEFI firmware (see "Updating firmware and device drivers" on page 31).
		 3. Run the Setup utility (see "Using the Setup utility" on page 20).
		   a. Make sure that both processors are displayed by the system.
		   b. Load the default settings.
		   c. Go to the **System Settings** menu and make sure the processor is enabled.
		 4. (Trained service technician only) Replace the processor (see "Removing a microprocessor and heat sink" on page 132 and "Installing a microprocessor and heat sink" on page 136).
		 5. (Trained service technician only) Replace the system-board assembly (see "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144).

Error Code: 0x806F0009		
Information	System board (Host Power) power on/off	Information only; no action is required.

• **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**		
• **See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.**		
• **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**		

Type	Error Message	Action
Error Code: 0x806F000D		
Information	Hard drive *X* (SSD Exp Drive *X*) removed/installed [Note *X*=1,2]	Information only; no action is required.
Error Code: 0x806F000F **Note:** Multiple events can be displayed for this error code. Be sure to read the message text to determine the appropriate recovery actions.		
Error	FW/BIOS, firmware progress (Firmware Error) FW/BIOS ROM corruption	Install the latest UEFI firmware (see "Updating firmware and device drivers" on page 31).
Error	FW/BIOS, firmware progress (Firmware Error) no system memory	1. Make sure that the server contains the correct number of DIMMs of the correct DIMM type, in the correct order (see "Installing a DIMM - BladeCenter HX5" on page 106 for the correct order to install DIMMs). 2. Reseat the DIMMs (see "Removing a DIMM - BladeCenter HX5" on page 105 and "Installing a DIMM - BladeCenter HX5" on page 106). 3. Install DIMMs in the correct order (see "Installing a DIMM - BladeCenter HX5" on page 106). 4. Replace any DIMMs not of the same type as the other DIMMs installed (see "Removing a DIMM - BladeCenter HX5" on page 105 and "Installing a DIMM - BladeCenter HX5" on page 106). For information about supported DIMM types, see http://www.ibm.com/servers/eserver/serverproven/compat/us/eserver.html. 5. Replace any failed DIMMs (see "Removing a DIMM - BladeCenter HX5" on page 105 and "Installing a DIMM - BladeCenter HX5" on page 106). 6. Restart the blade server four times, using either the power button on the front of the blade server or the advanced management module web interface. 7. Remove the battery and reinstall the battery to clear CMOS memory and NVRAM. The real time clock will also be reset. See "Removing the battery" on page 75 and "Installing the battery" on page 76.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Type	Error Message	Action
Error	FW/BIOS, firmware progress (Firmware Error) no usable system memory	1. Make sure that the server contains the correct number of DIMMs, in the correct order (see "Installing a DIMM - BladeCenter HX5" on page 106). 2. Reseat the DIMMs (see "Removing a DIMM - BladeCenter HX5" on page 105 and "Installing a DIMM - BladeCenter HX5" on page 106). 3. Install DIMMs in the correct order (see "Installing a DIMM - BladeCenter HX5" on page 106). 4. Restart the blade server four times, using either the power button on the front of the blade server or the advanced management module web interface. 5. Remove the battery and reinstall the battery to clear CMOS memory and NVRAM. The real time clock will also be reset.
Error	FW/BIOS, firmware progress (ABR Status) FW/BIOS ROM corruption	1. Run the Setup utility (see "Using the Setup utility" on page 20). Select **Load Default Settings** and save the settings. to recover the server firmware. 2. Reseat the blade server in the BladeCenter chassis (see "Removing the blade server from the BladeCenter chassis" on page 64 and "Installing a blade server in a BladeCenter chassis" on page 65).
Error Code: 0x806F0013		
Error	Chassis (NMI State) diagnostic interrupt	1. Verify that the latest system firmware is installed (see "Updating firmware and device drivers" on page 31). 2. If an expansion card is installed in the blade server, verify that the firmware for each expansion card is up to date. 3. Run the Setup utility and restore system setting to defaults (see "Using the Setup utility" on page 20). 4. Check the event logs for other related error messages (see "Event logs" on page 149). 5. Remove each expansion card, one at a time until the error does not occur (see "Removing an I/O expansion card" on page 120). 6. Replace failing adapter and reinstall any other expansion cards that were removed (see "Installing an I/O expansion card" on page 122). 7. (Trained service technician only) Replace the system-board assembly (see "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144).
Error Code: 0x806F0021 **Note:** Multiple events can be displayed for this error code. Be sure to read the message text to determine the appropriate recovery actions.		

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Type	Error Message	Action
Error	PCI express bus 1 connector (CFFh Exp) fault	1. Verify that the latest system firmware is installed (see "Updating firmware and device drivers" on page 31). 2. Verify that the firmware for the CFFh expansion card is up to date. 3. Run the Setup utility and restore system setting to defaults (see "Using the Setup utility" on page 20). 4. Check the event logs for other related error messages (see "Event logs" on page 149). 5. Reseat the CFFh expansion card (see "Removing an I/O expansion card" on page 120 and "Installing an I/O expansion card" on page 122). 6. Replace the CFFh expansion card (see "Removing an I/O expansion card" on page 120 and "Installing an I/O expansion card" on page 122). 7. (Trained service technician only) Replace the system-board assembly (see "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144).
Error	PCI express bus 2 connector (CIOh Exp 2) fault	1. Verify that the latest system firmware is installed (see "Updating firmware and device drivers" on page 31). 2. Verify that the firmware for the CIOh expansion card is up to date. 3. Run the Setup utility and restore system setting to defaults (see "Using the Setup utility" on page 20). 4. Check the event logs for other related error messages (see "Event logs" on page 149). 5. Reseat the CIOh expansion card (see "Removing an I/O expansion card" on page 120 and "Installing an I/O expansion card" on page 122). 6. Replace the CIOh expansion card (see "Removing an I/O expansion card" on page 120 and "Installing an I/O expansion card" on page 122). 7. (Trained service technician only) Replace the system-board assembly (see "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144).

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Type	Error Message	Action
Error	PCI express bus 3 connector (CIOv Exp) fault	1. Verify that the latest system firmware is installed (see "Updating firmware and device drivers" on page 31). 2. Verify that the firmware for the CIOv expansion card is up to date. 3. Run the Setup utility and restore system setting to defaults (see "Using the Setup utility" on page 20). 4. Check the event logs for other related error messages (see "Event logs" on page 149). 5. Reseat the CIOv expansion card (see "Removing an I/O expansion card" on page 120 and "Installing an I/O expansion card" on page 122). 6. Replace the CIOv expansion card (see "Removing an I/O expansion card" on page 120 and "Installing an I/O expansion card" on page 122). 7. (Trained service technician only) Replace the system-board assembly (see "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144).
Error Code: 0x806F0029		
Information	PCI express bus 3, battery (SAS DC Batt) low	Information only; no action is required.
Error Code: 0x806F002B		
Information	System mgmt software (Scale Config) hardware change detected	Information only; no action is required. **Note:** This event is not displayed in the advanced management module event log. However, it is sent for alerts and SNMP traps.
Error Code: 0x806F0107 **Note:** Multiple events can be displayed for this error code. Be sure to read the message text to determine the appropriate recovery actions.		

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Type	Error Message	Action
Error	Group 4, processor (One of CPUs) thermal trip	1. Make sure that the room temperature is within the operating specifications (see "Features and specifications" on page 5). 2. Make sure that none of the air vents on the BladeCenter chassis and on the blade server are blocked. 3. Make sure that all of the fans on the BladeCenter chassis are running. 4. Make sure that each bay of the BladeCenter chassis contains either a device or a filler. 5. Make sure that the blade server is not missing any heat sinks, DIMMs, or heat-sink fillers (see "Parts listing - BladeCenter HX5" on page 55). 6. (Trained service technician only) Make sure that the microprocessor heat sink is properly attached to the microprocessor (see "Installing a microprocessor and heat sink" on page 136). 7. (Trained service technician only) Replace the microprocessor. See "Removing a microprocessor and heat sink" on page 132 and "Installing a microprocessor and heat sink" on page 136.
Error	Group 4, processor (ALL CPUs) thermal trip	1. Make sure that the room temperature is within the operating specifications (see "Features and specifications" on page 5). 2. Make sure that none of the air vents on the BladeCenter chassis and on the blade server are blocked. 3. Make sure that all of the fans on the BladeCenter chassis are running. 4. Make sure that each bay of the BladeCenter chassis contains either a device or a filler. 5. Make sure that the blade server is not missing any heat sinks, DIMMs, or heat-sink fillers (see "Parts listing - BladeCenter HX5" on page 55). 6. (Trained service technician only) Make sure that the microprocessor heat sink is properly attached to the microprocessor (see "Installing a microprocessor and heat sink" on page 136). 7. (Trained service technician only) Replace the microprocessor. See "Removing a microprocessor and heat sink" on page 132 and "Installing a microprocessor and heat sink" on page 136.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Type	Error Message	Action
Error	Processor *X* (CPU *X* Status) thermal trip [Note: *X*=1-2]	1. Make sure that the room temperature is within the operating specifications (see "Features and specifications" on page 5). 2. Make sure that none of the air vents on the BladeCenter chassis and on the blade server are blocked. 3. Make sure that all of the fans on the BladeCenter chassis are running. 4. Make sure that each bay of the BladeCenter chassis contains either a device or a filler. 5. Make sure that the blade server is not missing any heat sinks, DIMMs, or heat-sink fillers (see "Parts listing - BladeCenter HX5" on page 55). 6. (Trained service technician only) Make sure that the microprocessor heat sink is properly attached to the microprocessor (see "Installing a microprocessor and heat sink" on page 136). 7. (Trained service technician only) Replace the microprocessor. See "Removing a microprocessor and heat sink" on page 132 and "Installing a microprocessor and heat sink" on page 136.
Error Code: 0x806F010C **Note:** Multiple events can be displayed for this error code. Be sure to read the message text to determine the appropriate recovery actions.		
Error	Group 1, memory (One of the DIMMs) uncorrectable ECC memory error	1. Refer to TIP H21455 for minimum code level. 2. Check the IBM support website for an applicable retain tip or firmware update that applies to this memory error. 3. Swap one of the DIMMs with a DIMM of the same size and type from another channel (see "Installing a DIMM - BladeCenter HX5" on page 106. For example, if a problem occurs on DIMM 1 and DIMM 4, swap DIMM 1 with a similar DIMM in slot 9. 4. Enable all affected DIMMs using the Setup utility. 5. If the failure remains on the original DIMM slots, replace the DIMM that was not moved. If the failure follows the DIMM that was moved, replace the DIMM that was swapped. 6. If the problem occurs on the same DIMM connector, check the DIMM connector. If the connector is damaged, (Trained service technician only) replace the system-board assembly (see "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144).

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Type	Error Message	Action
Error	Memory device *X* (DIMM *X* Status) uncorrectable ECC memory error [Note: *X*=1-16]	1. Check the IBM support website for an applicable retain tip or firmware update that applies to this memory error. 2. Swap one of the DIMMs with a DIMM of the same size and type from another channel (see "Installing a DIMM - BladeCenter HX5" on page 106. For example, if a problem occurs on DIMM 1 and DIMM 4, swap DIMM 1 with a similar DIMM in slot 9. 3. Enable all affected DIMMs using the Setup utility. 4. If the failure remains on the original DIMM slots, replace the DIMM that was not moved. If the failure follows the DIMM that was moved, replace the DIMM that was swapped. 5. If the problem occurs on the same DIMM connector, check the DIMM connector. If the connector is damaged, (Trained service technician only) replace the system-board assembly (see "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144).
Error	Memory device *X* (MEU DIMM *X* Status) uncorrectable ECC memory error [Note: *X*=1-24]	1. Check the IBM support website for an applicable retain tip or firmware update that applies to this memory error. 2. Swap one of the DIMMs with a DIMM of the same size and type from another channel (see "Installing a DIMM - IBM MAX5" on page 111. 3. Enable all affected DIMMs using the Setup utility. 4. If the failure remains on the original DIMM slots, replace the DIMM that was not moved. If the failure follows the DIMM that was moved, replace the DIMM that was swapped. 5. If the problem occurs on the same DIMM connector, check the DIMM connector. If the connector is damaged, (Trained service technician only) replace the system-board assembly (see "Removing an IBM MAX5 expansion blade" on page 87 and "Installing an IBM MAX5 expansion blade" on page 89).
Error Code: 0x806F010D		
Error	Hard drive *X* (SSD Exp Drive *X*) fault Note: *X*=1-2	Replace the specified storage drive (see "Removing a solid state drive" on page 102 and "Installing a solid state drive" on page 103).
Error Code: 0x806F010F		
Error	FW/BIOS, firmware progress (Firmware error) hang	Attempt to reboot the blade server.
Error Code: 0x806F0112		
Information	Group 4, processor (CPU Fault Reboot) OEM system boot event	Information only; no action is required.
Error Code: 0x806F0113		

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Type	Error Message	Action
Error	Chassis (NMI State) bus timeout	1. Remove the blade server from the BladeCenter chassis; then, reinstall it. 2. Reseat all the optional devices installed in the blade server one device at a time, restarting the blade server each time, to determine where the problem is located. 3. Remove optional devices from the blade server one at a time to determine where the problem is located. 4. Replace the following components one at a time, in the order shown, restarting the blade server each time: a. All optional devices installed in the blade server b. (Trained service technician only) Replace the system-board assembly (see "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144).
Error Code: 0x806F011B **Note:** Multiple events can be displayed for this error code. Be sure to read the message text to determine the appropriate recovery actions.	
Error	System board, interconnect (Scale-Flex cable) configuration error	1. Reseat the scalable blade complex (see "Removing the blade server from the BladeCenter chassis" on page 64 and "Installing a blade server in a BladeCenter chassis" on page 65). 2. Reseat the scalability expansion card (see "Removing the 2-node scalability card" on page 83 and "Installing the 2-node Scalability card" on page 85). 3. (Trained service technician only) Replace the system-board assembly (see "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144).
Error	Blade bezel 1, interconnect (Front panel) configuration error	1. Reseat the operator control panel (see "Removing the control panel" on page 126 and "Installing the control panel" on page 128). 2. Replace the operator control panel (see "Removing the control panel" on page 126 and "Installing the control panel" on page 128).

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Type	Error Message	Action
Error	Interconnect 5 (SideScale Card) configuration error	1. Reseat the scalable blade complex (see "Removing the blade server from the BladeCenter chassis" on page 64 and "Installing a blade server in a BladeCenter chassis" on page 65). 2. Reseat the scalability expansion card (see "Removing the 2-node scalability card" on page 83 and "Installing the 2-node Scalability card" on page 85, or "Removing the 1-node speed burst card" on page 81 and "Installing the 1-node speed burst card" on page 82). 3. Update the firmware for the blade server (see "Updating firmware and device drivers" on page 31). 4. Replace the scalability expansion card (see "Removing the 2-node scalability card" on page 83 and "Installing the 2-node Scalability card" on page 85, or "Removing the 1-node speed burst card" on page 81 and "Installing the 1-node speed burst card" on page 82). 5. (Trained service technician only) Replace the system-board assembly (see "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144).
Error	Interconnect 5 (Unknown Scale ID) configuration error	1. Reseat the scalable blade complex (see "Removing the blade server from the BladeCenter chassis" on page 64 and "Installing a blade server in a BladeCenter chassis" on page 65). 2. Reseat the scalability expansion card (see "Removing the 2-node scalability card" on page 83 and "Installing the 2-node Scalability card" on page 85, or "Removing the 1-node speed burst card" on page 81 and "Installing the 1-node speed burst card" on page 82). 3. Attempt to create the hardware partition again (see "Working with a scalable blade complex" on page 16). 4. Update the firmware for the blade server (see "Updating firmware and device drivers" on page 31). 5. Replace the scalability expansion card (see "Removing the 2-node scalability card" on page 83 and "Installing the 2-node Scalability card" on page 85, or "Removing the 1-node speed burst card" on page 81 and "Installing the 1-node speed burst card" on page 82). 6. (Trained service technician only) Replace the system-board assembly (see "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144).
Error Code: 0x806F012B		

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Type	Error Message	Action
Information	System mgmt software (Scale Config) software change detected	Information only; no action is required. **Note:** This event is not be displayed in the advanced management module event log. However, it is sent for alerts and SNMP traps.
Error Code: 0x806F0129		
Error	PCI express bus 3, battery (SAS DC Batt) failed	1. Reseat the battery for the storage interface card. 2. Replace the battery for the storage interface card.
Error Code: 0x806F0207 **Note:** Multiple events can be displayed for this error code. Be sure to read the message text to determine the appropriate recovery actions.		

Error	Group 4, processor (One of CPUs) BIST failure	1. Remove the blade server and ensure the processors are installed correctly (see "Installing a microprocessor and heat sink" on page 136).
		2. Verify that the system is running the latest UEFI firmware (see "Updating firmware and device drivers" on page 31).
		3. Run the Setup utility (see "Using the Setup utility" on page 20).
		   a. Make sure that both processors are displayed by the system.
		   b. Load the default settings.
		   c. Go to the **System Settings** menu and make sure the processor is enabled.
		4. (Trained service technician only) Replace the processor (see "Removing a microprocessor and heat sink" on page 132 and "Installing a microprocessor and heat sink" on page 136).
		5. (Trained service technician only) Replace the system-board assembly (see "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144).

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Type	Error Message	Action

Error	Group 4, processor (all CPUs) BIST failure	1. Remove the blade server and ensure the processors are installed correctly (see "Installing a microprocessor and heat sink" on page 136).
		
		2. Verify that the system is running the latest UEFI firmware (see "Updating firmware and device drivers" on page 31).
		
		3. Run the Setup utility (see "Using the Setup utility" on page 20).
		   a. Make sure that both processors are displayed by the system.
		   b. Load the default settings.
		   c. Go to the **System Settings** menu and make sure the processor is enabled.
		
		4. (Trained service technician only) Replace the processor (see "Removing a microprocessor and heat sink" on page 132 and "Installing a microprocessor and heat sink" on page 136).
		
		5. (Trained service technician only) Replace the system-board assembly (see "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144).

Error	Processor *X* (CPU *X* Status) BIST failure [Note *X*=1,2]	1. Remove the blade server and ensure the processors are installed correctly (see "Installing a microprocessor and heat sink" on page 136).
		
		2. Verify that the system is running the latest UEFI firmware (see "Updating firmware and device drivers" on page 31).
		
		3. Run the Setup utility (see "Using the Setup utility" on page 20).
		   a. Make sure that both processors are displayed by the system.
		   b. Load the default settings.
		   c. Go to the **System Settings** menu and make sure the processor is enabled.
		
		4. (Trained service technician only) Replace the processor (see "Removing a microprocessor and heat sink" on page 132 and "Installing a microprocessor and heat sink" on page 136).
		
		5. (Trained service technician only) Replace the system-board assembly (see "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144).

Error Code: 0x806F0208		

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Type	Error Message	Action
Warning	System board, Power Module (EPOW Fault) predictive failure	This warning message generally indicates that power redundancy for the blade was lost. The non redundant condition may have subsequently transitioned back to redundant power state. 1. Check to see if a power module has been removed or replaced and ensure the power modules are installed and functioning properly (see the *Installation and User's Guide* for your chassis). 2. If this warning message is not a result of power redundancy state changes, and there are no other indications of chassis power issues, (trained service technician only) replace the system board assembly (see "Removing an IBM MAX5 expansion blade" on page 87 and "Installing an IBM MAX5 expansion blade" on page 89).
Error Code: 0x806F020D		
Warning	Hard drive *X* (SSD Exp Drive *X*) predictive failure [Note: *X*=1,2]	Replace the storage drive (see "Removing a solid state drive" on page 102 and "Installing a solid state drive" on page 103).
Error Code: 0x806F0229		
Information	PCI express bus 3, battery (SAS DC Batt) absent.	Information only; no action is required.
Error Code: 0x806F030C		
Error	Memory device *X* (DIMM *X* Status) memory scrub failed [Note: *X*=1-16]	1. Refer to TIP H21455 for minimum code level. 2. Check the IBM support website for an applicable retain tip or firmware update that applies to this memory error. 3. Swap the affected DIMMs (as indicated by the error LEDs on the system board or the event logs) to a different memory channel or microprocessor (see "Installing a DIMM - BladeCenter HX5" on page 106 for memory population sequence). 4. Enable all affected DIMMs using the Setup utility. 5. If the failure remains on the original DIMM slots, replace the DIMM that was not moved. If the failure follows the DIMM that was moved, replace the DIMM that was swapped. 6. If the problem occurs on the same DIMM connector, check the DIMM connector. If the connector is damaged, (Trained service technician only) replace the system-board assembly (see "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144).
Error Code: 0x806F0313		

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Type	Error Message	Action
Error	Chassis (NMI State) software NMI	A software nonmaskable interrupt (NMI) has been detected. 1. Check the operating system event log for any related errors and resolve those errors. If you cannot resolve those errors, contact the appropriate service provider for the software. 2. Check the application log for any related errors and resolve those errors. If you cannot resolve those errors, contact the applicable service provider for the software. 3. Check the IBM Support web page for any service bulletins that might be related to this problem.
Error Code: 0x806F032B		
Error	System mgmt software (Scale Config) software incompatibility	1. If this error is occurring on a blade server operating in stand-alone mode, update the FPGA firmware. 2. If this error is occurring on a blade server that is part of a scalable blade complex operating in single partition mode, make sure that the firmware for all IMMs and Field Programmable Gate Arrays (FPGAs) are at the same level in the blade complex.
Error Code: 0x806F0409		
Information	System board (Host Power) AC lost	Information only; no action is required. **Note:** This event isl not be displayed in the advanced management module event log. However, it is sent for alerts and SNMP traps.
Error Code: 0x806F040C **Note:** Multiple events can be displayed for this error code. Be sure to read the message text to determine the appropriate recovery actions.		
Information	Group 1, (One of the DIMMs) memory disabled	1. Check the system event log for any memory errors that might be related to the specified DIMM and resolve those errors. 2. Enable the DIMM connector for the specified DIMM using the Setup utility or the Advanced Settings Utility (ASU) (see "Using the Setup utility" on page 20 or "Using the Advanced Settings Utility (ASU)" on page 25). 3. Reseat the affected DIMM (see "Removing a DIMM - BladeCenter HX5" on page 105 and "Installing a DIMM - BladeCenter HX5" on page 106) and enable the DIMM connector (see step 2). 4. Save the settings and exit from the Setup utility.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Type	Error Message	Action
Information	Memory device *X* (DIMM *X* Status) memory disabled [Note *X* = 1-16]	1. Check the system event log for any memory errors that might be related to the specified DIMM and resolve those errors. 2. Enable the DIMM connector for the specified DIMM using the Setup utility or the Advanced Settings Utility (ASU) (see "Using the Setup utility" on page 20 or "Using the Advanced Settings Utility (ASU)" on page 25). 3. Reseat the affected DIMM (see "Removing a DIMM - BladeCenter HX5" on page 105 and "Installing a DIMM - BladeCenter HX5" on page 106) and enable the DIMM connector (see step 2). 4. Save the settings and exit from the Setup utility.
Information	Memory device *X* (MEU DIMM *X* Status) memory disabled [Note *X* = 1-24]	1. Check the system event log for any memory errors that might be related to the specified DIMM and resolve those errors. 2. Enable the DIMM connector for the specified DIMM using the Setup utility or the Advanced Settings Utility (ASU) (see "Using the Setup utility" on page 20 or "Using the Advanced Settings Utility (ASU)" on page 25). 3. Reseat the affected DIMM (see "Removing a DIMM - IBM MAX5 expansion blade" on page 110 and "Installing a DIMM - IBM MAX5" on page 111) and enable the DIMM connector (see step 2). 4. Save the settings and exit from the Setup utility.
Error Code: 0x806F0413 **Note:** Multiple events can be displayed for this error code. Be sure to read the message text to determine the appropriate recovery actions.		
Error	Expansion Module *X*, (BPE4_*Y* Slot *Z*) PCI parity error **Notes:** 1. *X* = Module number 2. *Y* = BPE4 ID (1, 2, 3, or 4). The max BPE4 number is 4, and there are 2 slots in each BPE4. Module number is based on the configuration of the BPE4	1. If you have a PCI adapter in your blade server, verify that the PCI adapter is supported in the blade server. For a list of supported optional devices for the blade server, see http://www.ibm.com/servers/eserver/serverproven/compat/us/eserver.html . 2. Reseat the PCI adapter (see "Removing an I/O expansion card" on page 120 and "Installing an I/O expansion card" on page 122).
Error Code: 0x806F0507 **Note:** Multiple events can be displayed for this error code. Be sure to read the message text to determine the appropriate recovery actions.		

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.
- If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.

Type	Error Message	Action
Error	Group 4, processor (One of CPUs) configuration error	1. (Trained service personnel only) Remove the blade server and reseat the processors (see "Removing a microprocessor and heat sink" on page 132 and "Installing a microprocessor and heat sink" on page 136). 2. Verify that the system is running the latest UEFI firmware (see "Updating firmware and device drivers" on page 31). 3. Run the Setup utility (see "Using the Setup utility" on page 20). a. Make sure that both processors are displayed by the system. b. Load the default settings. c. Go to the **System Settings** menu and make sure the processor is enabled.
Error	Group 4, processor (4S CPU) configuration error	1. (Trained service personnel only) Remove the blade server and reseat the processors (see "Removing a microprocessor and heat sink" on page 132 and "Installing a microprocessor and heat sink" on page 136). 2. Verify that the system is running the latest UEFI firmware (see "Updating firmware and device drivers" on page 31). 3. Run the Setup utility (see "Using the Setup utility" on page 20). a. Make sure that both processors are displayed by the system. b. Load the default settings. c. Go to the **System Settings** menu and make sure the processor is enabled.
Error	Group 4, processor (2S CPU) configuration error	1. (Trained service personnel only) Remove the blade server and reseat the processors (see "Removing a microprocessor and heat sink" on page 132 and "Installing a microprocessor and heat sink" on page 136). 2. Verify that the system is running the latest UEFI firmware (see "Updating firmware and device drivers" on page 31). 3. Run the Setup utility (see "Using the Setup utility" on page 20). a. Make sure that both processors are displayed by the system. b. Load the default settings. c. Go to the **System Settings** menu and make sure the processor is enabled.

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Type	Error Message	Action

Error	Group 4, processor (All CPUs) configuration error	1. (Trained service personnel only) Remove the blade server and reseat the processors (see "Removing a microprocessor and heat sink" on page 132 and "Installing a microprocessor and heat sink" on page 136).
		2. Verify that the system is running the latest UEFI firmware (see "Updating firmware and device drivers" on page 31).
		3. Run the Setup utility (see "Using the Setup utility" on page 20).
		   a. Make sure that both processors are displayed by the system.
		   b. Load the default settings.
		   c. Go to the **System Settings** menu and make sure the processor is enabled.

Error	Processor X (CPU X Status) configuration error [Note X=1,2]	1. (Trained service personnel only) Remove the blade server and reseat the processor (see "Removing a microprocessor and heat sink" on page 132 and "Installing a microprocessor and heat sink" on page 136).
		2. Verify that the system is running the latest UEFI firmware (see "Updating firmware and device drivers" on page 31).
		3. Run the Setup utility (see "Using the Setup utility" on page 20).
		   a. Make sure that both processors are displayed by the system.
		   b. Load the default settings.
		   c. Go to the **System Settings** menu and make sure the processor is enabled.

Error	Group 4, processor (Missing Boot CPU) configuration error	1. (Trained service personnel only) Remove the blade server and reseat the processors (see "Removing a microprocessor and heat sink" on page 132 and "Installing a microprocessor and heat sink" on page 136).
		2. Verify that the system is running the latest UEFI firmware (see "Updating firmware and device drivers" on page 31).
		3. Run the Setup utility (see "Using the Setup utility" on page 20).
		   a. Make sure that both processors are displayed by the system.
		   b. Load the default settings.
		   c. Go to the **System Settings** menu and make sure the processor is enabled.

Error Code: 0x806F050C **Note:** Multiple events can be displayed for this error code. Be sure to read the message text to determine the appropriate recovery actions.		

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Type	Error Message	Action
Error	Group 1, memory (One of the DIMMs) correctable ECC memory error logging limit reached	1. Refer to TIP H21455 for minimum code level. 2. Check the IBM support website for an applicable retain tip or firmware update that applies to this memory error. 3. Swap the affected DIMMs (as indicated by the error LEDs on the system board or the event logs) to a different memory channel or microprocessor (see "Installing a DIMM - BladeCenter HX5" on page 106 for memory population sequence). 4. If the error still occurs on the same DIMM, replace the affected DIMM (as indicated by the error LEDs on the system board or the event logs). 5. If the problem occurs on the same DIMM connector, check the DIMM connector. If the connector is damaged, (trained service technician only) replace the system-board assembly (see "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144).
Error	Memory device *X* (DIMM *X* Status) correctable ECC memory error logging limit reached [Note *X* = 1-16]	1. Check the IBM support website for an applicable retain tip or firmware update that applies to this memory error. 2. Swap the affected DIMMs (as indicated by the error LEDs on the system board or the event logs) to a different memory channel or microprocessor (see "Installing a DIMM - BladeCenter HX5" on page 106 for memory population sequence). 3. If the error still occurs on the same DIMM, replace the affected DIMM (as indicated by the error LEDs on the system board or the event logs). 4. If the problem occurs on the same DIMM connector, check the DIMM connector. If the connector is damaged, (trained service technician only) replace the system-board assembly (see "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144).
Error Code: 0x806F050D		
Error	Hard drive *X* (SSD Exp Drive *X*) in critical array Note: *X*=1-2	1. Replace the storage drive (see "Removing a solid state drive" on page 102 and "Installing a solid state drive" on page 103). 2. Rebuild the RAID array (see "Using the LSI Logic Configuration Utility program" on page 30).
Error Code: 0x806F0513		

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Type	Error Message	Action
Error	Expansion Module *X*, (BPE4_*Y* Slot *Z*) PCI system error **Notes:** 1. *X* = Module number 2. *Y* = BPE4 ID (1, 2, 3, or 4). The max BPE4 number is 4, and there are 2 slots in each BPE4. Module number is based on the configuration of the BPE4	1. If you have a PCI adapter in your blade server, verify that the PCI adapter is supported in the blade server. For a list of supported optional devices for the blade server, see http://www.ibm.com/servers/eserver/serverproven/compat/us/eserver.html . 2. Reseat the PCI adapter (see "Removing an I/O expansion card" on page 120 and "Installing an I/O expansion card" on page 122).
Error Code: 0x806F052B		
Error	System mgmt software, (IMM FW Failover) unsupported software version	This error occurs when the service processor (IMM) firmware is corrupted and has reverted to a previous version of the firmware. Complete the following steps to correct this error: 1. Check the IBM support website for an applicable firmware update that applies to the blade server. 2. Restart the IMM and verify the IMM is running the correct firmware level after the firmware update. For more information about updating the firmware and the preferred methods, see *Firmware Update Best Practices* at http://www-947.ibm.com/support/entry/portal/docdisplay?brand=5000020&lndocid=MIGR-5082923.
Error Code: 0x806F0607 **Note:** Multiple events can be displayed for this error code. Be sure to read the message text to determine the appropriate recovery actions.		
Error	Group 4, processor (One of CPUs) SM BIOS uncorrectable error	1. Verify that the latest system firmware is installed (see "Updating firmware and device drivers" on page 31). 2. (Trained service technician only) Replace the microprocessors one at a time (see "Removing a microprocessor and heat sink" on page 132 and "Removing a microprocessor and heat sink" on page 132). 3. (Trained service technician only) Replace the system-board assembly (see "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144).
Error	Group 4, processor (all CPUs) SM BIOS uncorrectable error	1. Verify that the latest system firmware is installed (see "Updating firmware and device drivers" on page 31). 2. (Trained service technician only) Replace the system-board assembly (see "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144).

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Type	Error Message	Action
Error	Processor X (CPU X Status) SM BIOS uncorrectable error	1. Verify that the latest system firmware is installed (see "Updating firmware and device drivers" on page 31). 2. (Trained service technician only) Replace microprocessor X (see "Removing a microprocessor and heat sink" on page 132 and "Removing a microprocessor and heat sink" on page 132). 3. (Trained service technician only) Replace the system-board assembly (see "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144).
Error Code: 0x806F060D		
Error	Hard drive X (SSD Exp Drive X) in failed array Note: X=1-2	This error occurs because one or more hard drives in the RAID array have a fault. Perform these steps: 1. Check the event log for errors related to hard drive faults. See "Event logs" on page 149 for more information. 2. Replace the storage drive that has a fault (see "Removing a solid state drive" on page 102 and "Installing a solid state drive" on page 103). 3. Rebuild the RAID array (see "Using the LSI Logic Configuration Utility program" on page 30).
Error Code: 0x806F070C **Note:** Multiple events can be displayed for this error code. Be sure to read the message text to determine the appropriate recovery actions.		
Error	Group 1, memory (All DIMMs) memory configuration error	Make sure that the DIMMs are installed in the correct order and configured correctly (see "Installing a DIMM - BladeCenter HX5" on page 106). If you receive this error code for a blade server configuration that includes an IBM MAX5 expansion blade, multiple DIMMs might have been disabled. After you replace the mismatched DIMM, make sure that all DIMMs have been enabled using the Setup utility (see "Using the Setup utility" on page 20) or using the Advanced Settings Utility (see "Using the Advanced Settings Utility (ASU)" on page 25).
Error	Group 1, memory (One of the DIMMs) memory configuration error	Make sure that the DIMMs are installed in the correct order and configured correctly (see "Installing a DIMM - BladeCenter HX5" on page 106). If you receive this error code for a blade server configuration that includes an IBM MAX5 expansion blade, multiple DIMMs might have been disabled. After you replace the mismatched DIMM, make sure that all DIMMs have been enabled using the Setup utility (see "Using the Setup utility" on page 20) or using the Advanced Settings Utility (see "Using the Advanced Settings Utility (ASU)" on page 25).

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Type	Error Message	Action
Error	Memory device *X* (DIMM *X* Status) memory configuration error [Note *X*=1-16]	Make sure that the DIMMs are installed in the correct order and configured correctly (see "Installing a DIMM - BladeCenter HX5" on page 106). If you receive this error code for a blade server configuration that includes an IBM MAX5 expansion blade, multiple DIMMs might have been disabled. After you replace the mismatched DIMM, make sure that all DIMMs have been enabled using the Setup utility (see "Using the Setup utility" on page 20) or using the Advanced Settings Utility (see "Using the Advanced Settings Utility (ASU)" on page 25).
Error	Memory device *X* (MEU DIMM *X* Status) memory configuration error [Note *X*=1-24]	Make sure that the DIMMs are installed in the correct order and configured correctly (see "Installing a DIMM - IBM MAX5" on page 111). If you receive this error code for a blade server configuration that includes an IBM MAX5 expansion blade, multiple DIMMs might have been disabled. After you replace the mismatched DIMM, make sure that all DIMMs have been enabled using the Setup utility (see "Using the Setup utility" on page 20) or using the Advanced Settings Utility (see "Using the Advanced Settings Utility (ASU)" on page 25).

Error Code: 0x806F070D
Note: Multiple events can be displayed for this error code. Be sure to read the message text to determine the appropriate recovery actions.

Type	Error Message	Action
Information	Hard drive *X* (SSD Exp Drive *X*) rebuild in progress	Information only; no action is required.
Information	Hard drive *X* (SSD Exp Drive X) rebuild complete	Information only; no action is required.

Error Code: 0x806F0807
Note: Multiple events can be displayed for this error code. Be sure to read the message text to determine the appropriate recovery actions.

Type	Error Message	Action

Information	Group 4, processor (One of CPUs) disabled	1. Check the event logs for other related error messages (see "Event logs" on page 149).
		2. Verify that the system is running the latest UEFI firmware (see "Updating firmware and device drivers" on page 31).
		3. Run the Setup utility (see "Using the Setup utility" on page 20).
		  a. Make sure that both processors are displayed by the system.
		  b. Load the default settings.
		  c. Go to the **System Settings** menu and make sure the processor is enabled.
		4. (Trained service technician) Remove the blade server and ensure the processors are installed correctly (see "Installing a microprocessor and heat sink" on page 136).

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Type	Error Message	Action
Information	Group 4, processor (All CPUs) disabled	1. Check the event logs for other related error messages (see "Event logs" on page 149). 2. Verify that the system is running the latest UEFI firmware (see "Updating firmware and device drivers" on page 31). 3. Run the Setup utility (see "Using the Setup utility" on page 20). a. Make sure that both processors are displayed by the system. b. Load the default settings. c. Go to the **System Settings** menu and make sure the processor is enabled. 4. (Trained service technician) Remove the blade server and ensure the processors are installed correctly (see "Installing a microprocessor and heat sink" on page 136).
Information	Processor X (CPU X Status) disabled [Note X=1,2]	1. Check the event logs for other related error messages (see "Event logs" on page 149). 2. Verify that the system is running the latest UEFI firmware (see "Updating firmware and device drivers" on page 31). 3. Run the Setup utility (see "Using the Setup utility" on page 20). a. Make sure that both processors are displayed by the system. b. Load the default settings. c. Go to the **System Settings** menu and make sure the processor is enabled. 4. (Trained service technician) Remove the blade server and ensure the processors are installed correctly (see "Installing a microprocessor and heat sink" on page 136).
Error Code: 0x806F0813 **Note:** Multiple events can be displayed for this error code. Be sure to read the message text to determine the appropriate recovery actions.	
Error	Expansion Module X, (BPE4_Y Slot Z) bus uncorrectable error **Notes:** 1. X = Module number 2. Y = BPE4 ID (1, 2, 3, or 4). The max BPE4 number is 4, and there are 2 slots in each BPE4. Module number is based on the configuration of the BPE4	1. Update the firmware for the service processor (BMC), BIOS, and firmware for the advanced management module. 2. Reseat the memory DIMMs and any expansion cards (see "Removing and replacing Tier 1 customer replaceable units (CRUs)" on page 70). 3. (Trained service technician only) Replace the system board (see "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144).

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

Type	Error Message	Action

Error	Group 4, processor (Critical Int CPU) bus uncorrectable error	1. Remove the blade server and ensure the processors are installed correctly (see "Installing a microprocessor and heat sink" on page 136).
		2. Check the event logs for other related error messages (see "Event logs" on page 149).
		3. Verify that the system is running the latest UEFI firmware (see "Updating firmware and device drivers" on page 31).
		4. Run the Setup utility (see "Using the Setup utility" on page 20).
		   a. Make sure that both processors are displayed by the system.
		   b. Load the default settings.
		   c. Go to the **System Settings** menu and make sure the processor is enabled.

Error	PCI express bus 0 (Planar PCIe Err) bus uncorrectable error	1. Reseat the blade server (see "Removing the blade server from the BladeCenter chassis" on page 64 and "Installing a blade server in a BladeCenter chassis" on page 65). 2. (Trained service technician only) Replace the system-board assembly (see "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144).

- **Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**
- **See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.**
- **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**

| Type	Error Message	Action
Error	Group 1, memory (Critical Int DIM) bus uncorrectable error	1. Check the event logs for other memory errors that might occur (see "Event logs" on page 149). 2. Reseat all of the memory modules in the blade server (see "Removing a DIMM - BladeCenter HX5" on page 105 and "Installing a DIMM - BladeCenter HX5" on page 106). 3. Make sure all of the memory is enabled in the Setup utility (see "Using the Setup utility" on page 20). Notice which memory modules are disabled before you continue to the next step. 4. Replace the memory modules that were disabled in the Setup utility (see "Removing a DIMM - BladeCenter HX5" on page 105 and "Installing a DIMM - BladeCenter HX5" on page 106). 5. (Trained service technician only) Replace the microprocessor that controls the failing memory module. **Note:** DIMM connectors 1 through 8 are controlled by the first microprocessor and DIMM connectors 9 through 16 are controlled by the second microprocessor. See "Removing a microprocessor and heat sink" on page 132 and "Installing a microprocessor and heat sink" on page 136. 6. (Trained service technician only) Replace the system-board assembly (see "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144).
Error	Sub-chassis 1, (Critical Int EXA) bus uncorrectable error	1. Check the IBM MAX5 expansion blade for any lit error LEDs. 2. Reseat the IBM MAX5 expansion blade (see "Removing an IBM MAX5 expansion blade" on page 87 and "Installing an IBM MAX5 expansion blade" on page 89). 3. If the error still occurs, replace the IBM MAX5 expansion blade (see "Removing an IBM MAX5 expansion blade" on page 87 and "Installing an IBM MAX5 expansion blade" on page 89).

Light path diagnostics

Use this information as an overview of light path diagnostics.

Light path diagnostics is a system of LEDs on the control panel and on various internal components of the blade server. When an error occurs, LEDs can be lit throughout the blade server to help identify the source of the error.

Note: You can view the LEDs from the advanced management module web interface. For more information, see the *Advanced Management Module Installation and User's Guide*.

Viewing the light path diagnostics LEDs

Use this information to locate and identify the light path diagnostics LEDs.

About this task

Before you work inside the blade server to view light path diagnostics LEDs, read "Safety" on page v and "Installation guidelines" on page 63.

If an error occurs, view the light path diagnostics LEDs in the following order:

Procedure

1. Look at the control panel on the front of the blade server (see "Blade server controls and LEDs" on page 6).
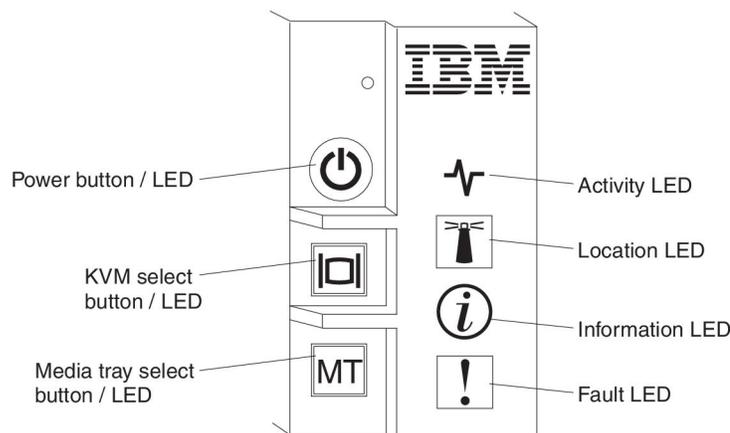
- If the information LED is lit, it indicates that an Automatic BIOS Recovery has occurred. Perform these steps to resolve the issue:
  a. Attempt to update the server firmware again (see "Updating firmware and device drivers" on page 31).
  b. Reseat the blade server (see "Removing the blade server from the BladeCenter chassis" on page 64 and "Installing a blade server in a BladeCenter chassis" on page 65).
  c. (Trained service technician only) Replace the system board (see "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144).
- If the fault LED is lit, it indicates that an error has occurred; view the light path diagnostics panel and LEDs to isolate the failing component.

2. Look for LEDs through the front bezel, which indicate microprocessor errors.
3. To view the light path diagnostics panel and LEDs, complete the following steps:
   a. Remove the blade server or scalable blade complex from the BladeCenter chassis, (see "Removing the blade server from the BladeCenter chassis" on page 64 for instructions).
   b. Carefully lay the blade server on a flat, static-protective surface.

c. Open the blade server cover (see "Removing the blade server cover" on page 70 for instructions).

d. Press the power button. When you press the power button, LEDs on the system board will be lit if there are any hardware-related issues.

Note: When you press the power button, the media tray select button/LED should also be lit if the capacitor is charged. If the media tray select button/LED is lit but no LEDs on the system board are lit, there are no hardware-related issues on the blade server. If the media tray select LED fails to light, install the blade server in a chassis for approximately 2 hours to enable the light path diagnostics panel to charge.

See "System-board LEDs - BladeCenter HX5" on page 15 for the location of the LEDs on the system board. See "Light path diagnostics LEDs" on page 205 for information about resolving those LEDs.

4. View the LEDs displayed on the access panel.

There are two types of access panels available with the BladeCenter HX5, depending on whether the standard heat sinks or the tall heat sinks came installed with the blade server.
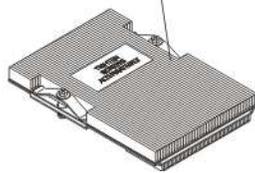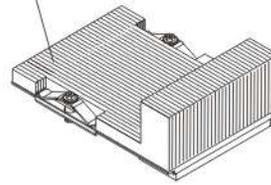
- If you have standard heat sinks, the following LED label is located on the access panel:

- If you have tall heat sinks, the following LEDs label is located on the left access panel:
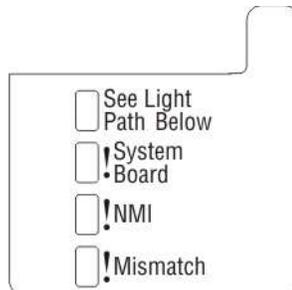
See Light Path Below

This amber LED indicates that there is a problem with one of the servers in the scalable blade complex, but the problem is not with this blade server. If this LED is lit, complete the following steps:

a. Remove the blade server from the scalable blade complex (see "Disassembling a scalable blade complex" on page 67 for instructions).

b. Press the power button on the next blade server in the scalable blade complex. System-board LEDs are lit for any problem components on that blade server.

System Board

This amber LED indicates that there is a problem with the system board. If this amber LED is lit, complete the following steps:

a. Restart the blade server.

b. If the problem remains, replace the system board (see "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144 for instructions).

NMI This amber LED indicates that a non-maskable interrupt (NMI) occurred. If the NMI button was not pressed, complete the following steps:

a. Check the advanced management module event log or the IMM event log for any errors related to this blade server and solve them.

b. Restart the blade server.

c. Replace the system board (see "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144 for instructions).

Mismatch

This amber LED is lit if there are two processors in the blade server and they are not the same type and speed. If this LED is lit, make sure that both processors are identical.

5. If an IBM MAX5 expansion blade is installed, check the front bezel for an orange glow, which indicates that one or more LEDs on the IBM MAX5 expansion blade system board is lit. To view the LEDs on the IBM MAX5 expansion blade system board, complete the following steps:

Note: If there is an orange glow, it will be referred to as MEU Fault in the system event log.

a. Remove the blade server from the BladeCenter chassis, (see "Removing the blade server from the BladeCenter chassis" on page 64 for instructions).

b. Carefully lay the blade server on a flat, static-protective surface.

c. Remove the IBM MAX5 expansion blade (see "Removing an IBM MAX5 expansion blade" on page 87 for instructions).

d. Open the cover on the expansion blade (see "Removing the blade server cover" on page 70 for instructions).

e. Press the light path button on the light path diagnostics panel and view the LEDs that are lit.

(MEU Look Below)

(MEU LED Power)　(MEU Error)
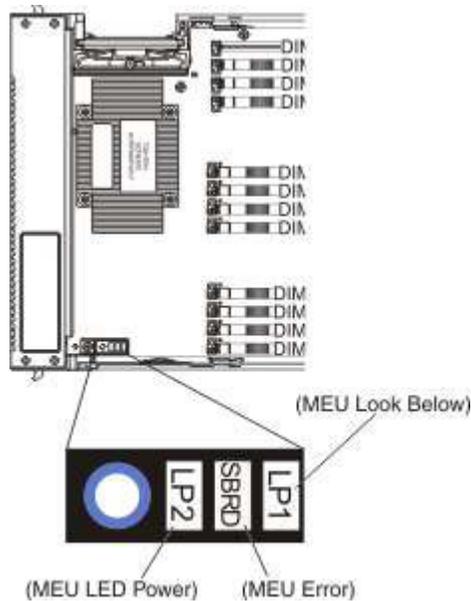
Note: The light path power LED (LP2) will be lit if there is sufficient charge available in the expansion blade to light the LEDs. If the LED power LED is not lit, install the IBM MAX5 expansion blade on the BladeCenter HX5 blade server and then install the blade server in a chassis for approximately 2 hours to enable the light path power LED to charge.

See Light Path Below (LP1)
> This amber LED indicates that there is a problem with the BladeCenter HX5 to which the IBM MAX5 expansion blade was attached. If this LED is lit, complete the following steps:
>
> 1) Remove the IBM MAX5 expansion blade (see "Removing an IBM MAX5 expansion blade" on page 87.
> 2) Press the power button on the BladeCenter HX5 blade server to determine which LEDs are lit on the blade server.
>
> The See Light Path Below (LP1) LED is referred to as MEU Look Below in the system event log.

System Board (S BRD)
> This amber LED indicates that there is a problem with the system board. If this amber LED is lit, complete the following steps:
>
> 1) Install the IBM MAX5 (see "Installing an IBM MAX5 expansion blade" on page 89).
> 2) Install the BladeCenter HX5 in the chassis (see "Installing a blade server in a BladeCenter chassis" on page 65).
> 3) Restart the blade server.
> 4) If the problem remains, replace the system board on the IBM MAX5 (see "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144 for instructions).
>
> The System Board (S BRD) LED is referred to as MEU Error in the system event log.

Light path power (LP2)
> This amber LED indicates that one or more LEDs are lit on the IBM

MAX5 system board. See "System-board LEDs - IBM MAX5 expansion blade" on page 15 for the location of the LEDs on the expansion blade system board. See "Light path diagnostics LEDs - IBM MAX5" on page 206 for additional information about resolving issues indicated by those LEDs.

The Light path power (LP2) LED is referred to as MEU LED Power in the system event log.

Results

Light path diagnostics LEDs

Use this information to diagnose and solve possible errors that are indicated by the light path diagnostics LEDs.

The following table describes the LEDs on the system board and suggested actions to correct detected problems. For information about the location of the LEDs on the system board, see "Blade server controls and LEDs" on page 6. See "Viewing the light path diagnostics LEDs" on page 201 for information about lighting the LEDs.

• Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.	
• See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.	
• If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.	

Lit light path diagnostics LED	Description	Action
None	An error has occurred and cannot be isolated, the service processor has failed, or the blade server is not sufficiently charged to display the LEDs on the system board.	1. Make sure that the light path diagnostics LED is lit, to ensure that there is enough power in the blade server to light the rest of the LEDs. View the media tray select LED. If it is lit, there is sufficient power in the blade server to light the rest of the LEDs. If it is not lit, install the blade server in a chassis for approximately 2 hours to charge the blade server (the blade server does not have to be powered on). See "Viewing the light path diagnostics LEDs" on page 201. 2. Check the IMM event log for information about an error that is not represented by a light path diagnostics LED. See "IMM error codes in AMM" on page 162.
DIMM *x* error	A memory error occurred.	Check for system event, IMM, and AMM logs related to the memory error and resolve these issues.
I/O expansion error	The IMM lights this LED when the expansion card in the I/O-expansion connector has failed. The fault LED on the front panel is also lit.	1. Reseat the SSD expansion card. See "Removing an SSD expansion card" on page 99 and "Installing an SSD expansion card" on page 100. 2. Replace the SSD expansion card. See "Removing an SSD expansion card" on page 99 and "Installing an SSD expansion card" on page 100.
Blade expansion error	The IMM lights this LED when the expansion blade in the blade expansion connector has failed. The fault LED on the front panel is also lit.	1. Reseat the CFFh expansion card. See "Removing a CFFh expansion card" on page 120 and "Installing a CFFh expansion card" on page 123. 2. Replace the CFFh expansion card. See "Removing a CFFh expansion card" on page 120 and "Installing a CFFh expansion card" on page 123.

Microprocessor *x* error	The IMM lights this LED when the microprocessor has failed or overheated or the start microprocessor (CPU 1) is missing. The fault LED on the front panel is also lit.	1. Check the UEFI settings to ensure that the microprocessor is enabled. See "Using the Setup utility" on page 20 for more information.
		
		2. Check the IMM event log for more information. See "Viewing event logs through the Setup utility" on page 150.
		
		3. If the log shows that a microprocessor is disabled or that a microprocessor error has occurred, perform one of the following actions:
		
		  a. (Trained service technician only) Reseat the microprocessor that is indicated by the lit LED. See "Removing a microprocessor and heat sink" on page 132 and "Installing a microprocessor and heat sink" on page 136.
		
		  b. (Trained service technician only) Replace the microprocessor that is indicated by the lit LED. See "Removing a microprocessor and heat sink" on page 132 and "Installing a microprocessor and heat sink" on page 136.

• Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.		
• See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.		
• If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.		

Lit light path diagnostics LED	Description	Action
Scaling error	This LED is lit when the scalability card is not seated correctly or has a fault.	1. Reseat the scalability card. 2. Replace the scalability card. See "Removing the 2-node scalability card" on page 83 and "Installing the 2-node Scalability card" on page 85.
Battery error	The system battery is not installed or is not working.	1. Reseat the battery. See "Removing the battery" on page 75 and "Installing the battery" on page 76. 2. Replace the battery. See "Removing the battery" on page 75 and "Installing the battery" on page 76.
I/O expansion error (CIOv)	The IMM lights this LED when the expansion card in the I/O-expansion connector (CIOv) has failed. The fault LED on the front panel is also lit.	1. Reseat the expansion card. 2. Replace the expansion card. See "Removing a CIOv expansion card" on page 121 and "Installing a CIOv expansion card" on page 125.
Reset indicator	This LED is lit when the blade server is in the process of being reset.	Information only

Light path diagnostics LEDs - IBM MAX5

Use this information to diagnose and solve possible errors that are indicated by the light path diagnostics LEDs.

The following table describes the LEDs on the IBM MAX5 expansion blade system board and suggested actions to correct detected problems. For information about the location of the LEDs on the expansion blade system board, see "System-board LEDs - IBM MAX5 expansion blade" on page 15. See "Viewing the light path diagnostics LEDs" on page 201 for information about lighting the LEDs.

- Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.
- See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.
- If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.

Lit light path diagnostics LED	Description	Action

DIMM *x* error	A memory error occurred.	1. View the logs to determine if there are memory predictive failure alerts or uncorrectable memory errors for any of the installed DIMMs. If so, replace the specified DIMM. See "Removing a DIMM - IBM MAX5 expansion blade" on page 110 and "Installing a DIMM - IBM MAX5" on page 111.
		
		2. Make sure that the DIMM that is indicated by the lit LED is supported. See "Parts listing - BladeCenter HX5" on page 55.
		
		3. Reseat the DIMM that is indicated by the lit LED. See "Removing a DIMM - IBM MAX5 expansion blade" on page 110 and "Installing a DIMM - IBM MAX5" on page 111.
		
		4. Typically the LEDs for both DIMMs in a DIMM pair will be lit (even if there is a problem with only one of the DIMMs). Therefore, you must isolate and replace the failing DIMM:
		
		  a. Swap one of the DIMMs in the failing pair with a DIMM from another DIMM pair (see "Installing a DIMM - IBM MAX5" on page 111 to determine which DIMMs are paired).
		
		  b. Enable the DIMM connectors (slots) for the swapped DIMMs using the Setup utility (see "Using the Setup utility" on page 20) or using the Advanced Setting Utility (see "Using the Advanced Settings Utility (ASU)" on page 25).
		
		  To enable the DIMM connectors using the Setup utility, select **System Settings** and then select **Memory**.
		
		  c. Run the DSA memory test (see "IBM Dynamic System Analysis").
		
		  d. Replace the appropriate DIMM:
		    • If the same problem persists for the original pair of DIMMs, replace the DIMM from that pair that you did **not** swap.
		    • If the problem follows the DIMM (the DIMM pair from which you removed the DIMM in step 4a), replace the swapped DIMM in that DIMM pair
		
		  After you replace a DIMM as a result of this alert, you must enable the DIMM connector (slot) for that DIMM using the Setup utility (see "Using the Setup utility" on page 20) or using the Advanced Setting Utility (see "Using the Advanced Settings Utility (ASU)" on page 25).
		
		  To enable the DIMM connector using the Setup utility, select **System Settings** and then select **Memory**.
		
		  For example: assume that you are receiving this alert for DIMM pair 1 and 8
		  1) Swap DIMM 13 (the DIMM pair is DIMM 13 and DIMM 17) and DIMM 1.
		  2) Run the DSA memory test.
		    • If the problem persists and DIMM 1 and 8 continue to be specified, replace DIMM 8.
		    • If the problem persists and DIMM 13 and 17 are specified, replace DIMM 13.
		  3) Enable the DIMM connector for the DIMM that was replaced.
		
		After installing a DIMM as a result of a DIMM failure, you might need to re-enable the DIMM connector (slot) for the DIMM that you replaced. To determine whether you need to re-enable the DIMM:
		
		1. Verify that the amount of memory installed in the IBM MAX5 is the expected amount of memory. You can verify the amount of memory that is installed through the operating system, by watching the monitor as the blade server starts up, or through the advanced management module web interface.
		
		For more information about the advanced management module web interface, see the *IBM BladeCenter Advanced Management Module: User's Guide.*
		
		2. Run the Setup Utility to re-enable the DIMMs (see "Using the Setup utility" on page 20 for more information).

IBM Dynamic System Analysis

IBM Dynamic System Analysis (DSA) collects and analyzes system information to aid in diagnosing server problems.

DSA collects the following information about the server:

- Drive health information

- Event logs for ServeRAID controllers and service processors
- Hardware inventory, include PCI and USB information
- Installed applications and hot fixes
- Kernel modules
- Light path diagnostics status
- Network interfaces and settings
- Performance data and details about processes that are running
- RAID and controller configuration
- Service processor (integrated management module) status and configuration
- System configuration
- Vital product data and firmware information

If you cannot find a problem by using DSA, see "Solving undetermined problems" on page 271.

Note: DSA Preboot might appear to be unresponsive when you start the program. This is normal operation while the program loads.

To obtain DSA code and the *Dynamic System Analysis Installation and User's Guide*, go to http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA.

DSA editions

Two editions of Dynamic System Analysis are available.

1. **DSA Portable**

   DSA Portable Edition runs within the operating system; you do not have to restart the server to run it. It is packaged as a self-extracting file that you download from the web. When you run the file, it self-extracts to a temporary folder and performs comprehensive collection of hardware and operating-system information. After it runs, it automatically deletes the temporary files and folder and leaves the results of the data collection and diagnostics on the server.

   If you are able to start the server, use DSA Portable.

2. **DSA Preboot**

   DSA Preboot runs outside of the operating system; you must restart the server to run it. It is packaged as an ISO image that you can download from the web, or it is provided in flash memory on the blade server. In addition to the capabilities of the other editions of DSA, DSA Preboot includes diagnostic routines that would be disruptive to run within the operating-system environment (such as resetting devices and causing loss of network connectivity). It has a graphical user interface that you can use to specify which diagnostics to run and to view the diagnostic and data collection results.

   If you are unable to start the server or if you need comprehensive diagnostics, use DSA Preboot.

Running DSA Preboot

Use this information to run DSA Preboot.

About this task

Note: You must enable the KVM feature on the blade server before you start DSA Preboot. See "Blade server controls and LEDs" on page 6.

To run the DSA Preboot diagnostic programs, complete the following steps:

1. If the blade server is running, turn off the blade server and all attached devices.
2. Turn on all attached devices; then, turn on the blade server.
3. When the prompt `<F2> Diagnostics` is displayed, press F2.

   Note: DSA Preboot might appear to be nonresponsive for an unusual length of time when you start the program. This is normal operation while the program loads.

4. Select **Quit to DSA** to exit from the stand-alone memory diagnostic program.

   Note: After you exit from the stand-alone memory diagnostic environment, you must restart the blade server to access the stand-alone memory diagnostic environment again.

5. Enter **gui** to launch the DSA graphical user interface, or select **cmd** to display the DSA interactive menu.
6. From the diagnostic programs screen, select the test that you want to run and follow the instructions on the screen. For additional information, see the *Dynamic System Analysis Installation and User's Guide*, which is available at the IBM Dynamic Systems Analysis website (http://www.ibm.com/systems/support/supportsite.wss/docdisplay?lndocid=SERV-DSA&brandind=5000008).

Help for DSA is available. For help about the DSA CLI, enter `help` from the command line. For help about the DSA user interface, press F1. Pressing F1 within a help panel displays additional online documentation.

Diagnostic text messages

Use this information to understand the diagnostic text messages that display while the tests are running.

A diagnostic text message contains one of the following results:

Passed: The test was completed without any errors.

Failed: The test detected an error.

User Aborted: You stopped the test before it was completed.

Not Applicable: You attempted to test a device that is not present in the blade server.

Aborted: The test could not proceed because of the blade server configuration.

Warning: The test could not be run. There was no failure of the hardware that was being tested, but there might be a hardware failure elsewhere, or another problem prevented the test from running. For example, there might be a configuration problem, or the hardware might be missing or is not being recognized.

The result is followed by an error code or other additional information about the error.

DSA messages

Use this information to review the diagnostic error messages and resolve any errors that might occur in the blade server.

If the diagnostic programs generate error codes that are not listed in the table, make sure that the latest level of the UEFI code is installed. To download the latest firmware for the blade server, go to http://www.ibm.com/supportportal/.

The following table describes the messages that the diagnostic programs might generate and suggested actions to correct the detected problems. Follow the suggested actions in the order in which they are listed in the action column. In the error codes, *x* can be any numeral or letter. However, if the three-digit number in the central position of the code is 000, 195, or 197, *do not* replace a CRU or FRU. These numbers appearing in the central position of the code have the following meanings:

000   The blade server passed the test. Do not replace a CRU or FRU.

195   The Esc key was pressed to end the test. Do not replace a CRU or FRU.

197   This is a warning error, but it does not indicate a hardware failure; do not replace a CRU or FRU. Take the action that is indicated in the Action column, but *do not replace a CRU or a FRU*. See the description for **Warning** in the section "Diagnostic text messages" on page 209 for more information.

Microprocessor test

Use this information to view microprocessor test error codes and resolve test errors.

Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.

- See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.
- If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.

Error code	Description	Action
089-000-xxx	Passed the CPU stress test	N/A

•	See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.
•	If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.

Error code	Description	Action
089-801-xxx	Aborted due to an internal program error.	1. If the blade server has stopped responding, turn off and restart the blade server. See "Turning off the blade server" on page 12 and "Turning on the blade server" on page 11.
		2. Make sure that the DSA code is up-to-date, upgrade if necessary; then, run the test again. The latest code can be found at http://www.ibm.com/systems/support/ supportsite.wss/docdisplay?brandind=5000008 &lndocid=SERV-DSA.
		3. Make sure that the system firmware level is up-to-date, upgrade if necessary; then, run the test again. The installed firmware level can be found in the DSA log within the Firmware/VPD section for this component. The latest level firmware for this component can be found at http://www.ibm.com/support/fixcentral/ systemx/groupView?query.productGroup=ibm %2FBladeCenter .
		4. If the blade server has stopped responding, turn off and restart the blade server; then, run the test again. See "Turning off the blade server" on page 12 and "Turning on the blade server" on page 11.
		5. (Trained service technician only) If the component failure remains, see Chapter 4, "Removing and replacing blade server components," on page 63 to replace the failed component.

• See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.		
• If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.		

Error code	Description	Action
089-802-xxx	Aborted due a system resource availability error.	1. Make sure at least 1 GB of memory is installed in the blade server (see "Installing a DIMM - BladeCenter HX5" on page 106). 2. Make sure that the DSA code is up-to-date, upgrade if necessary; then, run the test again. The latest code can be found at http://www.ibm.com/systems/support/ supportsite.wss/docdisplay?brandind=5000008 &lndocid=SERV-DSA. 3. Make sure that the system firmware level is up-to-date, upgrade if necessary; then, run the test again. The installed firmware level can be found in the DSA log within the Firmware/VPD section for this component. The latest level firmware for this component can be found at http://www.ibm.com/support/fixcentral/ systemx/groupView?query.productGroup=ibm %2FBladeCenter . 4. If the blade server has stopped responding, turn off and restart the blade server; then, run the test again. See "Turning off the blade server" on page 12 and "Turning on the blade server" on page 11. 5. (Trained service technician only) If the component failure remains, see Chapter 4, "Removing and replacing blade server components," on page 63 to replace the failed component.

• See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.	
• If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.	

Error code	Description	Action
089-803-000	CPU test aborted. Memory size is insufficient to run the test. At least 1 GB is required.	1. If the blade server has stopped responding, turn off and restart the blade server. See "Turning off the blade server" on page 12 and "Turning on the blade server" on page 11.
		2. Run the test again.
		3. Make sure that the DSA code is up-to-date, upgrade if necessary; then, run the test again. The latest code can be found at http://www.ibm.com/systems/support/ supportsite.wss/docdisplay?brandind=5000008 &lndocid=SERV-DSA.
		4. Make sure that the system firmware level is up-to-date, upgrade if necessary; then, run the test again. The installed firmware level can be found in the DSA log within the Firmware/VPD section for this component. The latest level firmware for this component can be found at http://www.ibm.com/support/fixcentral/ systemx/groupView?query.productGroup=ibm %2FBladeCenter .
		5. If the blade server has stopped responding, turn off and restart the blade server; then, run the test again. See "Turning off the blade server" on page 12 and "Turning on the blade server" on page 11.
		6. (Trained service technician only) If the component failure remains, see Chapter 4, "Removing and replacing blade server components," on page 63 to replace the failed component.

• See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.	
• If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.	

Error code	Description	Action
089-901-xxx	Failed the CPU stress test.	1. If the blade server has stopped responding, turn off and restart the blade server; then, run the test again. See "Turning off the blade server" on page 12 and "Turning on the blade server" on page 11.
		2. Make sure that the DSA code is up-to-date, upgrade if necessary; then, run the test again. The latest code can be found at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA.
		3. Make sure that the system firmware level is up-to-date, upgrade if necessary; then, run the test again. The installed firmware level can be found in the DSA log within the Firmware/VPD section for this component. The latest level firmware for this component can be found at http://www.ibm.com/support/fixcentral/systemx/groupView?query.productGroup=ibm%2FBladeCenter .
		4. If the blade server has stopped responding, turn off and restart the blade server; then, run the test again.
		5. (Trained service technician only) If the component failure remains, see Chapter 4, "Removing and replacing blade server components," on page 63 to replace the failed component.

Memory tests

Use this information to diagnose and resolve memory test errors.

Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.

• See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.	
• If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.	

Error code	Description	Action
201-000-xxx	Passed the memory stress test.	
202-000-xxx	Passed the memory stress test.	

- See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.
- If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.

Error code	Description	Action
202-801-xxx	Failed the memory stress test due to an internal program error.	1. Turn off and restart the blade server. See "Turning off the blade server" on page 12 and "Turning on the blade server" on page 11. 2. Make sure that the DSA code is up-to-date; upgrade if necessary. The latest code can be found at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 3. Make sure that the system UEFI firmware is at the latest level; upgrade if necessary. The firmware level can be found in the DSA log within the Firmware/VPD section for this component. The latest level firmware for this component can be found at http://www.ibm.com/support/fixcentral/systemx/groupView?query.productGroup=ibm%2FBladeCenter . 4. Run the test again. 5. Turn off and restart the blade server, if necessary, if the blade server hangs. See "Turning off the blade server" on page 12 and "Turning on the blade server" on page 11 6. Run the standard DSA memory diagnostic tests to identify the failing DIMM. 7. Reseat the DIMMs. See "Removing a DIMM - BladeCenter HX5" on page 105 and "Installing a DIMM - BladeCenter HX5" on page 106. 8. Run the test again. 9. See "Removing a DIMM - BladeCenter HX5" on page 105 and "Installing a DIMM - BladeCenter HX5" on page 106 to replace the failing DIMMs.

• See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.	
• If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.	

Error code	Description	Action
202-802-xxx	Failed the memory stress test because memory size is not sufficient to run the test.	1. Make sure that the server contains the correct number of DIMMs, in the correct order (see "Installing a DIMM - BladeCenter HX5" on page 106).
		2. Make sure all of the installed memory is enabled in the Setup utility (see "Using the Setup utility" on page 20).
		3. Make sure that the DSA code is up-to-date; upgrade if necessary. The latest code can be found at http://www.ibm.com/systems/ support/supportsite.wss/ docdisplay?brandind=5000008&lndocid=SERV-DSA.
		4. Make sure that the system UEFI firmware is at the latest level; upgrade if necessary. The firmware level can be found in the DSA log within the Firmware/VPD section for this component. The latest level firmware for this component can be found at http://www.ibm.com/support/fixcentral/ systemx/groupView?query.productGroup=ibm %2FBladeCenter .
		5. Run the test again.
		6. Run the standard DSA memory diagnostic tests to validate all memory.
		7. Reseat the DIMMs. See "Removing a DIMM - BladeCenter HX5" on page 105 and "Installing a DIMM - BladeCenter HX5" on page 106.
		8. Run the test again.
		9. See "Removing a DIMM - BladeCenter HX5" on page 105 and "Installing a DIMM - BladeCenter HX5" on page 106 to replace the failing DIMMs.

• See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.		
• If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.		

Error code	Description	Action
202-901-xxx	Failed the memory stress test.	1. Run the standard DSA memory diagnostic tests to validate all memory. 2. Make sure that the DSA code is up-to-date; upgrade if necessary. The latest code can be found at http://www.ibm.com/systems/ support/supportsite.wss/ docdisplay?brandind=5000008&lndocid=SERV-DSA. 3. Reseat all DIMMs. See "Removing a DIMM - BladeCenter HX5" on page 105 and "Installing a DIMM - BladeCenter HX5" on page 106. 4. Make sure that the system UEFI firmware is at the latest level; upgrade if necessary. The firmware level can be found in the DSA log within the Firmware/VPD section for this component. The latest level firmware for this component can be found at http://www.ibm.com/support/fixcentral/ systemx/groupView?query.productGroup=ibm %2FBladeCenter . 5. Run the standard DSA memory diagnostic tests to validate all memory. 6. Reseat the DIMMs. See "Removing a DIMM - BladeCenter HX5" on page 105 and "Installing a DIMM - BladeCenter HX5" on page 106. 7. Run the test again. 8. Replace the failing DIMMs.

IMM I^{2}C test

Use this information to resolve IMM I^{2}C test errors by referencing the error codes and following the suggested corrective actions.

Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.

• See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.		
• If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.		

Error code	Description	Action
166-000-xxx	Passed the IMM I^{2}C test	

• See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.		
• If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.		

Error code	Description	Action
166-801-xxx	IMM I^{2}C test stopped: the IMM returned an incorrect response length.	1. Turn off the blade server, open the blade server release levers, and pull the blade server away from the blade server bay, but do not remove it. See "Removing the blade server from the BladeCenter chassis" on page 64. 2. Wait 45 seconds and reseat the blade server in the blade server bay and turn on the blade server. See "Installing a blade server in a BladeCenter chassis" on page 65 and "Turning on the blade server" on page 11. 3. Run the test again. See "Diagnostic tools overview" on page 148. 4. Make sure that the DSA code is up-to-date; upgrade if necessary. The latest code can be found at http://www.ibm.com/systems/support/ supportsite.wss/docdisplay?brandind=5000008 &lndocid=SERV-DSA. 5. Make sure that the component firmware level is up-to-date; upgrade if necessary. The installed firmware level can be found in the DSA log within the Firmware/VPD section for this component. The latest level firmware for this component can be found at http://www.ibm.com/support/fixcentral/systemx/ groupView?query.productGroup=ibm%2FBladeCenter .
166-802-xxx	IMM I^{2}C test stopped: the test cannot be completed for an unknown reason.	1. Turn off the blade server, open the blade server release levers, and pull the blade server away from the blade server bay, but do not remove it. See "Removing the blade server from the BladeCenter chassis" on page 64. 2. Wait 45 seconds and reseat the blade server in the blade server bay and turn on the blade server. See "Installing a blade server in a BladeCenter chassis" on page 65 and "Turning on the blade server" on page 11. 3. Run the test again. See "Diagnostic tools overview" on page 148. 4. Make sure that the DSA code is up-to-date; upgrade if necessary. The latest code can be found at http://www.ibm.com/systems/support/ supportsite.wss/docdisplay?brandind=5000008 &lndocid=SERV-DSA. 5. Make sure that the component firmware level is up-to-date; upgrade if necessary. The installed firmware level can be found in the DSA log within the Firmware/VPD section for this component. The latest level firmware for this component can be found at http://www.ibm.com/support/fixcentral/systemx/ groupView?query.productGroup=ibm%2FBladeCenter .

- See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.
- If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.

Error code	Description	Action
166-803-xxx	IMM I²C test stopped: the node is busy; try later.	1. Turn off the blade server, open the blade server release levers, and pull the blade server away from the blade server bay, but do not remove it. See "Removing the blade server from the BladeCenter chassis" on page 64. 2. Wait 45 seconds and reseat the blade server in the blade server bay and turn on the blade server. See "Installing a blade server in a BladeCenter chassis" on page 65 and "Turning on the blade server" on page 11. 3. Run the test again. See "Diagnostic tools overview" on page 148. 4. Make sure that the DSA code is up-to-date; upgrade if necessary. The latest code can be found at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 5. Make sure that the component firmware level is up-to-date; upgrade if necessary. The installed firmware level can be found in the DSA log within the Firmware/VPD section for this component. The latest level firmware for this component can be found at http://www.ibm.com/support/fixcentral/systemx/groupView?query.productGroup=ibm%2FBladeCenter .
166-804-xxx	IMM I²C test stopped: invalid command.	1. Turn off the blade server, open the blade server release levers, and pull the blade server away from the blade server bay, but do not remove it. See "Removing the blade server from the BladeCenter chassis" on page 64. 2. Wait 45 seconds and reseat the blade server in the blade server bay and turn on the blade server. See "Installing a blade server in a BladeCenter chassis" on page 65 and "Turning on the blade server" on page 11. 3. Run the test again. See "Diagnostic tools overview" on page 148. 4. Make sure that the DSA code is up-to-date; upgrade if necessary. The latest code can be found at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 5. Make sure that the component firmware level is up-to-date; upgrade if necessary. The installed firmware level can be found in the DSA log within the Firmware/VPD section for this component. The latest level firmware for this component can be found at http://www.ibm.com/support/fixcentral/systemx/groupView?query.productGroup=ibm%2FBladeCenter .

Error code	Description	Action
166-805-xxx	IMM I^{2}C test stopped: invalid command for the given LUN	1. Turn off the blade server, open the blade server release levers, and pull the blade server away from the blade server bay, but do not remove it. See "Removing the blade server from the BladeCenter chassis" on page 64. 2. Wait 45 seconds and reseat the blade server in the blade server bay and turn on the blade server. See "Installing a blade server in a BladeCenter chassis" on page 65 and "Turning on the blade server" on page 11. 3. Run the test again. See "Diagnostic tools overview" on page 148. 4. Make sure that the DSA code is up-to-date; upgrade if necessary. The latest code can be found at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 5. Make sure that the component firmware level is up-to-date; upgrade if necessary. The installed firmware level can be found in the DSA log within the Firmware/VPD section for this component. The latest level firmware for this component can be found at http://www.ibm.com/support/fixcentral/systemx/groupView?query.productGroup=ibm%2FBladeCenter .
166-806-xxx	IMM I^{2}C test stopped: timeout while processing the command.	1. Turn off the blade server, open the blade server release levers, and pull the blade server away from the blade server bay, but do not remove it. See "Removing the blade server from the BladeCenter chassis" on page 64. 2. Wait 45 seconds and reseat the blade server in the blade server bay and turn on the blade server. See "Installing a blade server in a BladeCenter chassis" on page 65 and "Turning on the blade server" on page 11. 3. Run the test again. See "Diagnostic tools overview" on page 148. 4. Make sure that the DSA code is up-to-date; upgrade if necessary. The latest code can be found at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 5. Make sure that the component firmware level is up-to-date; upgrade if necessary. The installed firmware level can be found in the DSA log within the Firmware/VPD section for this component. The latest level firmware for this component can be found at http://www.ibm.com/support/fixcentral/systemx/groupView?query.productGroup=ibm%2FBladeCenter .

- See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.
- If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.

- See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.
- If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.

Error code	Description	Action
166-807-xxx	IMM I²C test stopped: out of space.	1. Turn off the blade server, open the blade server release levers, and pull the blade server away from the blade server bay, but do not remove it. See "Removing the blade server from the BladeCenter chassis" on page 64. 2. Wait 45 seconds and reseat the blade server in the blade server bay and turn on the blade server. See "Installing a blade server in a BladeCenter chassis" on page 65 and "Turning on the blade server" on page 11. 3. Run the test again. See "Diagnostic tools overview" on page 148. 4. Make sure that the DSA code is up-to-date; upgrade if necessary. The latest code can be found at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 5. Make sure that the component firmware level is up-to-date; upgrade if necessary. The installed firmware level can be found in the DSA log within the Firmware/VPD section for this component. The latest level firmware for this component can be found at http://www.ibm.com/support/fixcentral/systemx/groupView?query.productGroup=ibm%2FBladeCenter .
166-808-xxx	IMM I²C test stopped: reservation canceled or invalid reservation ID.	1. Turn off the blade server, open the blade server release levers, and pull the blade server away from the blade server bay, but do not remove it. See "Removing the blade server from the BladeCenter chassis" on page 64. 2. Wait 45 seconds and reseat the blade server in the blade server bay and turn on the blade server. See "Installing a blade server in a BladeCenter chassis" on page 65 and "Turning on the blade server" on page 11. 3. Run the test again. See "Diagnostic tools overview" on page 148. 4. Make sure that the DSA code is up-to-date; upgrade if necessary. The latest code can be found at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 5. Make sure that the component firmware level is up-to-date; upgrade if necessary. The installed firmware level can be found in the DSA log within the Firmware/VPD section for this component. The latest level firmware for this component can be found at http://www.ibm.com/support/fixcentral/systemx/groupView?query.productGroup=ibm%2FBladeCenter .

	• See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.
	• If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.

Error code	Description	Action
166-809-xxx	IMM I^{2}C test stopped: request data was truncated.	1. Turn off the blade server, open the blade server release levers, and pull the blade server away from the blade server bay, but do not remove it. See "Removing the blade server from the BladeCenter chassis" on page 64. 2. Wait 45 seconds and reseat the blade server in the blade server bay and turn on the blade server. See "Installing a blade server in a BladeCenter chassis" on page 65 and "Turning on the blade server" on page 11. 3. Run the test again. See "Diagnostic tools overview" on page 148. 4. Make sure that the DSA code is up-to-date; upgrade if necessary. The latest code can be found at http://www.ibm.com/systems/support/ supportsite.wss/docdisplay?brandind=5000008 &lndocid=SERV-DSA. 5. Make sure that the component firmware level is up-to-date; upgrade if necessary. The installed firmware level can be found in the DSA log within the Firmware/VPD section for this component. The latest level firmware for this component can be found at http://www.ibm.com/support/fixcentral/systemx/ groupView?query.productGroup=ibm%2FBladeCenter .
166-810-xxx	IMM I^{2}C test stopped: request data length is invalid	1. Turn off the blade server, open the blade server release levers, and pull the blade server away from the blade server bay, but do not remove it. See "Removing the blade server from the BladeCenter chassis" on page 64. 2. Wait 45 seconds and reseat the blade server in the blade server bay and turn on the blade server. See "Installing a blade server in a BladeCenter chassis" on page 65 and "Turning on the blade server" on page 11. 3. Run the test again. See "Diagnostic tools overview" on page 148. 4. Make sure that the DSA code is up-to-date; upgrade if necessary. The latest code can be found at http://www.ibm.com/systems/support/ supportsite.wss/docdisplay?brandind=5000008 &lndocid=SERV-DSA. 5. Make sure that the component firmware level is up-to-date; upgrade if necessary. The installed firmware level can be found in the DSA log within the Firmware/VPD section for this component. The latest level firmware for this component can be found at http://www.ibm.com/support/fixcentral/systemx/ groupView?query.productGroup=ibm%2FBladeCenter .

- See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.
- If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.

Error code	Description	Action
166-811-xxx	IMM I^{2}C test stopped: request data field length limit is exceeded.	1. Turn off the blade server, open the blade server release levers, and pull the blade server away from the blade server bay, but do not remove it. See "Removing the blade server from the BladeCenter chassis" on page 64. 2. Wait 45 seconds and reseat the blade server in the blade server bay and turn on the blade server. See "Installing a blade server in a BladeCenter chassis" on page 65 and "Turning on the blade server" on page 11. 3. Run the test again. See "Diagnostic tools overview" on page 148. 4. Make sure that the DSA code is up-to-date; upgrade if necessary. The latest code can be found at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 5. Make sure that the component firmware level is up-to-date; upgrade if necessary. The installed firmware level can be found in the DSA log within the Firmware/VPD section for this component. The latest level firmware for this component can be found at http://www.ibm.com/support/fixcentral/systemx/groupView?query.productGroup=ibm%2FBladeCenter .
166-812-xxx	IMM I^{2}C Test stopped a parameter is out of range.	1. Turn off the blade server, open the blade server release levers, and pull the blade server away from the blade server bay, but do not remove it. See "Removing the blade server from the BladeCenter chassis" on page 64. 2. Wait 45 seconds and reseat the blade server in the blade server bay and turn on the blade server. See "Installing a blade server in a BladeCenter chassis" on page 65 and "Turning on the blade server" on page 11. 3. Run the test again. See "Diagnostic tools overview" on page 148. 4. Make sure that the DSA code is up-to-date; upgrade if necessary. The latest code can be found at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 5. Make sure that the component firmware level is up-to-date; upgrade if necessary. The installed firmware level can be found in the DSA log within the Firmware/VPD section for this component. The latest level firmware for this component can be found at http://www.ibm.com/support/fixcentral/systemx/groupView?query.productGroup=ibm%2FBladeCenter .

- See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.
- If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.

Error code	Description	Action
166-813-xxx	IMM I^{2}C test stopped: cannot return the number of requested data bytes.	1. Turn off the blade server, open the blade server release levers, and pull the blade server away from the blade server bay, but do not remove it. See "Removing the blade server from the BladeCenter chassis" on page 64. 2. Wait 45 seconds and reseat the blade server in the blade server bay and turn on the blade server. See "Installing a blade server in a BladeCenter chassis" on page 65 and "Turning on the blade server" on page 11. 3. Run the test again. See "Diagnostic tools overview" on page 148. 4. Make sure that the DSA code is up-to-date; upgrade if necessary. The latest code can be found at http://www.ibm.com/systems/support/ supportsite.wss/docdisplay?brandind=5000008 &lndocid=SERV-DSA. 5. Make sure that the component firmware level is up-to-date; upgrade if necessary. The installed firmware level can be found in the DSA log within the Firmware/VPD section for this component. The latest level firmware for this component can be found at http://www.ibm.com/support/fixcentral/systemx/ groupView?query.productGroup=ibm%2FBladeCenter .
166-814-xxx	IMM I^{2}C test stopped: requested sensor, data, or record is not present.	1. Turn off the blade server, open the blade server release levers, and pull the blade server away from the blade server bay, but do not remove it. See "Removing the blade server from the BladeCenter chassis" on page 64. 2. Wait 45 seconds and reseat the blade server in the blade server bay and turn on the blade server. See "Installing a blade server in a BladeCenter chassis" on page 65 and "Turning on the blade server" on page 11. 3. Run the test again. See "Diagnostic tools overview" on page 148. 4. Make sure that the DSA code is up-to-date; upgrade if necessary. The latest code can be found at http://www.ibm.com/systems/support/ supportsite.wss/docdisplay?brandind=5000008 &lndocid=SERV-DSA. 5. Make sure that the component firmware level is up-to-date; upgrade if necessary. The installed firmware level can be found in the DSA log within the Firmware/VPD section for this component. The latest level firmware for this component can be found at http://www.ibm.com/support/fixcentral/systemx/ groupView?query.productGroup=ibm%2FBladeCenter .

- See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.
- If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.

Error code	Description	Action
166-815-xxx	IMM I²C test stopped: invalid data field in the request.	1. Turn off the blade server, open the blade server release levers, and pull the blade server away from the blade server bay, but do not remove it. See "Removing the blade server from the BladeCenter chassis" on page 64. 2. Wait 45 seconds and reseat the blade server in the blade server bay and turn on the blade server. See "Installing a blade server in a BladeCenter chassis" on page 65 and "Turning on the blade server" on page 11. 3. Run the test again. See "Diagnostic tools overview" on page 148. 4. Make sure that the DSA code is up-to-date; upgrade if necessary. The latest code can be found at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 5. Make sure that the component firmware level is up-to-date; upgrade if necessary. The installed firmware level can be found in the DSA log within the Firmware/VPD section for this component. The latest level firmware for this component can be found at http://www.ibm.com/support/fixcentral/systemx/groupView?query.productGroup=ibm%2FBladeCenter .
166-816-xxx	IMM I²C test stopped: the command is illegal for the specified sensor or record type.	1. Turn off the blade server, open the blade server release levers, and pull the blade server away from the blade server bay, but do not remove it. See "Removing the blade server from the BladeCenter chassis" on page 64. 2. Wait 45 seconds and reseat the blade server in the blade server bay and turn on the blade server. See "Installing a blade server in a BladeCenter chassis" on page 65 and "Turning on the blade server" on page 11. 3. Run the test again. See "Diagnostic tools overview" on page 148. 4. Make sure that the DSA code is up-to-date; upgrade if necessary. The latest code can be found at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 5. Make sure that the component firmware level is up-to-date; upgrade if necessary. The installed firmware level can be found in the DSA log within the Firmware/VPD section for this component. The latest level firmware for this component can be found at http://www.ibm.com/support/fixcentral/systemx/groupView?query.productGroup=ibm%2FBladeCenter .

- See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.
- If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.

Error code	Description	Action
166-817-xxx	IMM I²C test stopped: a command response could not be provided.	1. Turn off the blade server, open the blade server release levers, and pull the blade server away from the blade server bay, but do not remove it. See "Removing the blade server from the BladeCenter chassis" on page 64. 2. Wait 45 seconds and reseat the blade server in the blade server bay and turn on the blade server. See "Installing a blade server in a BladeCenter chassis" on page 65 and "Turning on the blade server" on page 11. 3. Run the test again. See "Diagnostic tools overview" on page 148. 4. Make sure that the DSA code is up-to-date; upgrade if necessary. The latest code can be found at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 5. Make sure that the component firmware level is up-to-date; upgrade if necessary. The installed firmware level can be found in the DSA log within the Firmware/VPD section for this component. The latest level firmware for this component can be found at http://www.ibm.com/support/fixcentral/systemx/groupView?query.productGroup=ibm%2FBladeCenter .
166-818-xxx	IMM I²C test stopped: cannot execute a duplicated request.	1. Turn off the blade server, open the blade server release levers, and pull the blade server away from the blade server bay, but do not remove it. See "Removing the blade server from the BladeCenter chassis" on page 64. 2. Wait 45 seconds and reseat the blade server in the blade server bay and turn on the blade server. See "Installing a blade server in a BladeCenter chassis" on page 65 and "Turning on the blade server" on page 11. 3. Run the test again. See "Diagnostic tools overview" on page 148. 4. Make sure that the DSA code is up-to-date; upgrade if necessary. The latest code can be found at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 5. Make sure that the component firmware level is up-to-date; upgrade if necessary. The installed firmware level can be found in the DSA log within the Firmware/VPD section for this component. The latest level firmware for this component can be found at http://www.ibm.com/support/fixcentral/systemx/groupView?query.productGroup=ibm%2FBladeCenter .

- See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.
- If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.

Error code	Description	Action
166-819-xxx	IMM I²C test stopped: a command response could not be provided; the SDR repository is in update mode.	1. Turn off the blade server, open the blade server release levers, and pull the blade server away from the blade server bay, but do not remove it. See "Removing the blade server from the BladeCenter chassis" on page 64. 2. Wait 45 seconds and reseat the blade server in the blade server bay and turn on the blade server. See "Installing a blade server in a BladeCenter chassis" on page 65 and "Turning on the blade server" on page 11. 3. Run the test again. See "Diagnostic tools overview" on page 148. 4. Make sure that the DSA code is up-to-date; upgrade if necessary. The latest code can be found at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 5. Make sure that the component firmware level is up-to-date; upgrade if necessary. The installed firmware level can be found in the DSA log within the Firmware/VPD section for this component. The latest level firmware for this component can be found at http://www.ibm.com/support/fixcentral/systemx/groupView?query.productGroup=ibm%2FBladeCenter .
166-820-xxx	IMM I²C test stopped: a command response could not be provided; the device is in firmware update mode.	1. Turn off the blade server, open the blade server release levers, and pull the blade server away from the blade server bay, but do not remove it. See "Removing the blade server from the BladeCenter chassis" on page 64. 2. Wait 45 seconds and reseat the blade server in the blade server bay and turn on the blade server. See "Installing a blade server in a BladeCenter chassis" on page 65 and "Turning on the blade server" on page 11. 3. Run the test again. See "Diagnostic tools overview" on page 148. 4. Make sure that the DSA code is up-to-date; upgrade if necessary. The latest code can be found at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 5. Make sure that the component firmware level is up-to-date; upgrade if necessary. The installed firmware level can be found in the DSA log within the Firmware/VPD section for this component. The latest level firmware for this component can be found at http://www.ibm.com/support/fixcentral/systemx/groupView?query.productGroup=ibm%2FBladeCenter .

• See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.	
• If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.	

Error code	Description	Action
166-821-xxx	IMM I²C test stopped: a command response could not be provided; IMM initialization is in progress.	1. Turn off the blade server, open the blade server release levers, and pull the blade server away from the blade server bay, but do not remove it. See "Removing the blade server from the BladeCenter chassis" on page 64. 2. Wait 45 seconds and reseat the blade server in the blade server bay and turn on the blade server. See "Installing a blade server in a BladeCenter chassis" on page 65 and "Turning on the blade server" on page 11. 3. Run the test again. See "Diagnostic tools overview" on page 148. 4. Make sure that the DSA code is up-to-date; upgrade if necessary. The latest code can be found at http://www.ibm.com/systems/support/ supportsite.wss/docdisplay?brandind=5000008 &lndocid=SERV-DSA. 5. Make sure that the component firmware level is up-to-date; upgrade if necessary. The installed firmware level can be found in the DSA log within the Firmware/VPD section for this component. The latest level firmware for this component can be found at http://www.ibm.com/support/fixcentral/systemx/ groupView?query.productGroup=ibm%2FBladeCenter .
166-822-xxx	IMM I²C test stopped: the destination is unavailable.	1. Turn off the blade server, open the blade server release levers, and pull the blade server away from the blade server bay, but do not remove it. See "Removing the blade server from the BladeCenter chassis" on page 64. 2. Wait 45 seconds and reseat the blade server in the blade server bay and turn on the blade server. See "Installing a blade server in a BladeCenter chassis" on page 65 and "Turning on the blade server" on page 11. 3. Run the test again. See "Diagnostic tools overview" on page 148. 4. Make sure that the DSA code is up-to-date; upgrade if necessary. The latest code can be found at http://www.ibm.com/systems/support/ supportsite.wss/docdisplay?brandind=5000008 &lndocid=SERV-DSA. 5. Make sure that the component firmware level is up-to-date; upgrade if necessary. The installed firmware level can be found in the DSA log within the Firmware/VPD section for this component. The latest level firmware for this component can be found at http://www.ibm.com/support/fixcentral/systemx/ groupView?query.productGroup=ibm%2FBladeCenter .

• See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.		
• If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.		

Error code	Description	Action
166-823-xxx	IMM I²C test stopped: cannot execute the command; insufficient privilege level.	1. Turn off the blade server, open the blade server release levers, and pull the blade server away from the blade server bay, but do not remove it. See "Removing the blade server from the BladeCenter chassis" on page 64. 2. Wait 45 seconds and reseat the blade server in the blade server bay and turn on the blade server. See "Installing a blade server in a BladeCenter chassis" on page 65 and "Turning on the blade server" on page 11. 3. Run the test again. See "Diagnostic tools overview" on page 148. 4. Make sure that the DSA code is up-to-date; upgrade if necessary. The latest code can be found at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008 &lndocid=SERV-DSA. 5. Make sure that the component firmware level is up-to-date; upgrade if necessary. The installed firmware level can be found in the DSA log within the Firmware/VPD section for this component. The latest level firmware for this component can be found at http://www.ibm.com/support/fixcentral/systemx/groupView?query.productGroup=ibm%2FBladeCenter .
166-824-xxx	IMM I²C test stopped: cannot execute the command.	1. Turn off the blade server, open the blade server release levers, and pull the blade server away from the blade server bay, but do not remove it. See "Removing the blade server from the BladeCenter chassis" on page 64. 2. Wait 45 seconds and reseat the blade server in the blade server bay and turn on the blade server. See "Installing a blade server in a BladeCenter chassis" on page 65 and "Turning on the blade server" on page 11. 3. Run the test again. See "Diagnostic tools overview" on page 148. 4. Make sure that the DSA code is up-to-date; upgrade if necessary. The latest code can be found at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008 &lndocid=SERV-DSA. 5. Make sure that the component firmware level is up-to-date; upgrade if necessary. The installed firmware level can be found in the DSA log within the Firmware/VPD section for this component. The latest level firmware for this component can be found at http://www.ibm.com/support/fixcentral/systemx/groupView?query.productGroup=ibm%2FBladeCenter .

• See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.
• If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.

Error code	Description	Action
166-901-xxx	Failed the IMM I²C test due to a failure in the host/H8 bus - BUS 0.	1. Turn off the blade server, open the blade server release levers, and pull the blade server away from the blade server bay, but do not remove it. See "Removing the blade server from the BladeCenter chassis" on page 64.
		2. Wait 45 seconds and reseat the blade server in the blade server bay and turn on the blade server. See "Installing a blade server in a BladeCenter chassis" on page 65 and "Turning on the blade server" on page 11.
		3. Run the test again. See "Diagnostic tools overview" on page 148.
		4. Make sure that the DSA code is up-to-date; upgrade if necessary. The latest code can be found at http://www.ibm.com/systems/support/ supportsite.wss/docdisplay?brandind=5000008 &lndocid=SERV-DSA.
		5. Make sure that the component firmware level is up-to-date; upgrade if necessary. The installed firmware level can be found in the DSA log within the Firmware/VPD section for this component. The latest level firmware for this component can be found at http://www.ibm.com/support/fixcentral/systemx/ groupView?query.productGroup=ibm%2FBladeCenter .
		6. (Trained service technician only). Reseat the system board (see "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144).
		7. Run the test again.

- See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.
- If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.

Error code	Description	Action
166-902-xxx	Failed the IMM I^{2}C test due to a failure in the blade server temperature sensor and light path bus - BUS 1.	1. Turn off the blade server, open the blade server release levers, and pull the blade server away from the blade server bay, but do not remove it. See "Removing the blade server from the BladeCenter chassis" on page 64. 2. Wait 45 seconds and reseat the blade server in the blade server bay and turn on the blade server. See "Installing a blade server in a BladeCenter chassis" on page 65 and "Turning on the blade server" on page 11. 3. Run the test again. See "Diagnostic tools overview" on page 148. 4. Make sure that the DSA code is up-to-date; upgrade if necessary. The latest code can be found at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 5. Make sure that the component firmware level is up-to-date; upgrade if necessary. The installed firmware level can be found in the DSA log within the Firmware/VPD section for this component. The latest level firmware for this component can be found at http://www.ibm.com/support/fixcentral/systemx/groupView?query.productGroup=ibm%2FBladeCenter . 6. Reseat the operator control panel (see "Removing the control panel" on page 126 and "Installing the control panel" on page 128). 7. Run the test again. 8. (Trained service technician only) Reseat the system board (see "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144). 9. Run the test again.

• See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.		
• If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.		

Error code	Description	Action
166-903-xxx	Failed the IMM I²C test due to a failure in the CPU bus - BUS 2.	1. Turn off the blade server, open the blade server release levers, and pull the blade server away from the blade server bay, but do not remove it. See "Removing the blade server from the BladeCenter chassis" on page 64.
		2. Wait 45 seconds and reseat the blade server in the blade server bay and turn on the blade server. See "Installing a blade server in a BladeCenter chassis" on page 65 and "Turning on the blade server" on page 11.
		3. Run the test again. See "Diagnostic tools overview" on page 148.
		4. Make sure that the DSA code is up-to-date; upgrade if necessary. The latest code can be found at http://www.ibm.com/systems/support/ supportsite.wss/docdisplay?brandind=5000008 &lndocid=SERV-DSA.
		5. Make sure that the component firmware level is up-to-date; upgrade if necessary. The installed firmware level can be found in the DSA log within the Firmware/VPD section for this component. The latest level firmware for this component can be found at http://www.ibm.com/support/fixcentral/systemx/ groupView?query.productGroup=ibm%2FBladeCenter .
		6. Reseat the DIMMs (see "Removing a DIMM - BladeCenter HX5" on page 105 and "Installing a DIMM - BladeCenter HX5" on page 106).
		7. Run the test again.
		8. (Trained service technician only) Reseat the following components, running the test again after reseating each component:
		• Microprocessors (see "Removing a microprocessor and heat sink" on page 132 and "Installing a microprocessor and heat sink" on page 136).
		• System board (see "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144).

• See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.	
• If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.	

Error code	Description	Action
166-904-xxx	Failed the IMM I²C test due to a failure in the I²C MUX bus (one of the expansion cards) - BUS 3.	1. Turn off the blade server, open the blade server release levers and pull the blade server away from the blade server bay, but do not remove it. See "Removing the blade server from the BladeCenter chassis" on page 64 for more information.
		2. Wait 45 seconds and reseat the blade server in the blade module bay and turn on the blade server. See "Installing a blade server in a BladeCenter chassis" on page 65 and "Turning on the blade server" on page 11.
		3. Run the test again. See "Diagnostic tools overview" on page 148.
		4. Make sure that the DSA code is up-to-date; upgrade if necessary. The latest code can be found at http://www.ibm.com/systems/support/ supportsite.wss/docdisplay?brandind=5000008 &lndocid=SERV-DSA.
		5. Make sure that the component firmware level is up-to-date; upgrade if necessary. The installed firmware level can be found in the DSA log within the Firmware/VPD section for this component. The latest level firmware for this component can be found at http://www.ibm.com/support/fixcentral/ systemx/groupView?query.productGroup=ibm %2FBladeCenter .
		6. Run the test again.
		7. Reseat the Ethernet expansion card (CIOv). See "Removing a CIOv expansion card" on page 121 and "Installing a CIOv expansion card" on page 125.
		8. Run the test again.
		9. Remove the Ethernet expansion card (CIOv). See "Removing a CIOv expansion card" on page 121 and "Installing a CIOv expansion card" on page 125.
		10. Run the test again. If the problem goes away, replace the CIOv expansion card.
		11. Reseat the CFFh expansion card. See "Removing a CFFh expansion card" on page 120 and "Installing a CFFh expansion card" on page 123.
		12. Run the test again.
		13. Remove the CFFh expansion card. See "Removing a CFFh expansion card" on page 120 and "Installing a CFFh expansion card" on page 123.
		14. Run the test again. If the problem goes away, replace the CFFh expansion card.
		15. (Trained service technician only) Reseat the system-board (see "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144).

Error code	Description	Action
	• See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.	
	• If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.	
166-905-xxx	Failed the IMM I^{2}C test due to a failure in the SMB bus - BUS 4.	1. Turn off the blade server, open the blade server release levers and pull the blade server away from the blade server bay, but do not remove it. See "Removing the blade server from the BladeCenter chassis" on page 64 for more information.
		2. Wait 45 seconds and reseat the blade server in the blade module bay and turn on the blade server. See "Installing a blade server in a BladeCenter chassis" on page 65 and "Turning on the blade server" on page 11.
		3. Run the test again. See "Diagnostic tools overview" on page 148.
		4. Make sure that the DSA code is up-to-date; upgrade if necessary. The latest code can be found at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA.
		5. Make sure that the component firmware level is up-to-date; upgrade if necessary. The installed firmware level can be found in the DSA log within the Firmware/VPD section for this component. The latest level firmware for this component can be found at http://www.ibm.com/support/fixcentral/systemx/groupView?query.productGroup=ibm%2FBladeCenter .
		6. Run the test again.
		7. (Trained service technician only) Reseat the system-board (see "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144).

- See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.
- If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.

Error code	Description	Action
166-906-xxx	Failed the IMM I^{2}C test due to a failure in the PCI-E DDR2 bus - BUS 5.	1. Turn off the blade server, open the blade server release levers and pull the blade server away from the blade server bay, but do not remove it. See "Removing the blade server from the BladeCenter chassis" on page 64 for more information. 2. Wait 45 seconds and reseat the blade server in the blade module bay and turn on the blade server. See "Installing a blade server in a BladeCenter chassis" on page 65 and "Turning on the blade server" on page 11. 3. Run the test again. See "Diagnostic tools overview" on page 148. 4. Make sure that the DSA code is up-to-date; upgrade if necessary. The latest code can be found at http://www.ibm.com/systems/support/ supportsite.wss/docdisplay?brandind=5000008 &lndocid=SERV-DSA. 5. Make sure that the component firmware level is up-to-date; upgrade if necessary. The installed firmware level can be found in the DSA log within the Firmware/VPD section for this component. The latest level firmware for this component can be found at http://www.ibm.com/support/fixcentral/systemx/ groupView?query.productGroup=ibm%2FBladeCenter . 6. Run the test again. 7. (Trained service technician only) Reseat the system-board (see "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144).

- See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.
- If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.

Error code	Description	Action
166-909-xxx	Failed the IMM I^{2}C test due to a failure in the scalable memory interconnect A and C - memory drawer BUS 0.	1. Turn off the blade server, open the blade server release levers and pull the blade server away from the blade server bay, but do not remove it. See "Removing the blade server from the BladeCenter chassis" on page 64 for more information.
		2. Wait 45 seconds and reseat the blade server in the blade module bay and turn on the blade server. See "Installing a blade server in a BladeCenter chassis" on page 65 and "Turning on the blade server" on page 11.
		3. Run the test again. See "Diagnostic tools overview" on page 148.
		4. Make sure that the DSA code is up-to-date; upgrade if necessary. The latest code can be found at http://www.ibm.com/systems/support/ supportsite.wss/docdisplay?brandind=5000008 &lndocid=SERV-DSA.
		5. Make sure that the component firmware level is up-to-date; upgrade if necessary. The installed firmware level can be found in the DSA log within the Firmware/VPD section for this component. The latest level firmware for this component can be found at http://www.ibm.com/support/fixcentral/systemx/ groupView?query.productGroup=ibm%2FBladeCenter .
		6. Run the test again.
		7. Reseat the scalability card (see "Removing the 2-node scalability card" on page 83 and "Installing the system-board assembly - BladeCenter HX5" on page 144).
		8. Run the test again.
		9. (Trained service technician only) Reseat the system-board (see "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144).

- See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.
- If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.

Error code	Description	Action
166-910-xxx	Failed the IMM I^{2}C test due to a failure in the scalable memory interconnect B and F - memory drawer BUS 1.	1. Turn off the blade server, open the blade server release levers and pull the blade server away from the blade server bay, but do not remove it. See "Removing the blade server from the BladeCenter chassis" on page 64 for more information. 2. Wait 45 seconds and reseat the blade server in the blade module bay and turn on the blade server. See "Installing a blade server in a BladeCenter chassis" on page 65 and "Turning on the blade server" on page 11. 3. Run the test again. See "Diagnostic tools overview" on page 148. 4. Make sure that the DSA code is up-to-date; upgrade if necessary. The latest code can be found at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 5. Make sure that the component firmware level is up-to-date; upgrade if necessary. The installed firmware level can be found in the DSA log within the Firmware/VPD section for this component. The latest level firmware for this component can be found at http://www.ibm.com/support/fixcentral/systemx/groupView?query.productGroup=ibm%2FBladeCenter . 6. Run the test again. 7. Reseat the scalability card (see "Removing the 2-node scalability card" on page 83 and "Installing the system-board assembly - BladeCenter HX5" on page 144). 8. Run the test again. 9. (Trained service technician only) Reseat the system-board (see "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144).

• See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.	
• If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.	

Error code	Description	Action
166-911-xxx	Failed the IMM I^{2}C test due to a failure in the scalable memory interconnect D and E - memory drawer BUS 2.	1. Turn off the blade server, open the blade server release levers and pull the blade server away from the blade server bay, but do not remove it. See "Removing the blade server from the BladeCenter chassis" on page 64 for more information.
		2. Wait 45 seconds and reseat the blade server in the blade module bay and turn on the blade server. See "Installing a blade server in a BladeCenter chassis" on page 65 and "Turning on the blade server" on page 11.
		3. Run the test again. See "Diagnostic tools overview" on page 148.
		4. Make sure that the DSA code is up-to-date; upgrade if necessary. The latest code can be found at http://www.ibm.com/systems/support/ supportsite.wss/docdisplay?brandind=5000008 &lndocid=SERV-DSA.
		5. Make sure that the component firmware level is up-to-date; upgrade if necessary. The installed firmware level can be found in the DSA log within the Firmware/VPD section for this component. The latest level firmware for this component can be found at http://www.ibm.com/support/fixcentral/systemx/ groupView?query.productGroup=ibm%2FBladeCenter .
		6. Run the test again.
		7. Reseat the scalability card (see "Removing the 2-node scalability card" on page 83 and "Installing the system-board assembly - BladeCenter HX5" on page 144).
		8. Run the test again.
		9. (Trained service technician only) Reseat the system-board (see "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144).

- See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.
- If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.

Error code	Description	Action
166-913-xxx	Failed the IMM I^{2}C test due to a failure in the light path bus - memory drawer BUS 4.	1. Turn off the blade server, open the blade server release levers and pull the blade server away from the blade server bay, but do not remove it. See "Removing the blade server from the BladeCenter chassis" on page 64 for more information. 2. Wait 45 seconds and reseat the blade server in the blade module bay and turn on the blade server. See "Installing a blade server in a BladeCenter chassis" on page 65 and "Turning on the blade server" on page 11. 3. Run the test again. See "Diagnostic tools overview" on page 148. 4. Make sure that the DSA code is up-to-date; upgrade if necessary. The latest code can be found at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 5. Make sure that the component firmware level is up-to-date; upgrade if necessary. The installed firmware level can be found in the DSA log within the Firmware/VPD section for this component. The latest level firmware for this component can be found at http://www.ibm.com/support/fixcentral/systemx/groupView?query.productGroup=ibm%2FBladeCenter . 6. Run the test again. 7. Reseat the scalability card (see "Removing the 2-node scalability card" on page 83 and "Installing the system-board assembly - BladeCenter HX5" on page 144).

• See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.		
• If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.		

Error code	Description	Action
166-916-xxx	Failed the IMM I²C test due to a failure in the temperature sensor and VPD bus - memory drawer BUS 7.	1. Turn off the blade server, open the blade server release levers and pull the blade server away from the blade server bay, but do not remove it. See "Removing the blade server from the BladeCenter chassis" on page 64 for more information. 2. Wait 45 seconds and reseat the blade server in the blade module bay and turn on the blade server. See "Installing a blade server in a BladeCenter chassis" on page 65 and "Turning on the blade server" on page 11. 3. Run the test again. See "Diagnostic tools overview" on page 148. 4. Make sure that the DSA code is up-to-date; upgrade if necessary. The latest code can be found at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA. 5. Make sure that the component firmware level is up-to-date; upgrade if necessary. The installed firmware level can be found in the DSA log within the Firmware/VPD section for this component. The latest level firmware for this component can be found at http://www.ibm.com/support/fixcentral/systemx/groupView?query.productGroup=ibm%2FBladeCenter . 6. Run the test again. 7. Reseat the scalability card (see "Removing the 2-node scalability card" on page 83 and "Installing the system-board assembly - BladeCenter HX5" on page 144).

Optical drive (CD or DVD) test

Use this information to diagnose and resolve optical drive test errors.

Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.

• See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.		
• If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.		

Error code	Description	Action
215-000-xxx	Passed the optical drive self test.	

- See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.
- If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.

Error code	Description	Action
215-801-xxx	Aborted the optical drive self test because it was unable to communicate with the device driver.	1. Make sure that the DSA code is at the latest level, and upgrade if necessary; then, run the test again (see "Diagnostic tools overview" on page 148). The latest code can be found IBM support website at http://www.ibm.com/ systems/support/supportsite.wss/ docdisplay?brandind=5000008&lndocid=SERV-DSA. 2. Make sure that the cable for the optical drive is securely connected at both ends of the cable, then; tighten any loose connections. See your BladeCenter documentation for information about replacing the optical drive (media tray). 3. Make sure that the cable for the optical drive is not damaged, then; replace the cable if damage is present. See your BladeCenter documentation for information about replacing the optical drive. 4. Run the test again. See "Diagnostic tools overview" on page 148. 5. For additional troubleshooting information, go to http://www.ibm.com/support/ docview.wss?uid=psg1MIGR-41559.. 6. Make sure that the system firmware level is at the latest level and upgrade if necessary; then, run the test again. The installed firmware level can be found in the DSA log within the Firmware/VPD section for this component. The latest level firmware for this component can be found on the IBM support website at http://www.ibm.com/support/fixcentral/ systemx/groupView?query.productGroup=ibm %2FBladeCenter . 7. Run the test again. See "Diagnostic tools overview" on page 148. 8. Replace the CD or DVD drive. See your BladeCenter chassis documentation for information about replacing the optical drive (media tray). 9. Collect the data from the DSA event log and send it to IBM Service. For information about contacting and sending data to IBM Service, go to "Getting help and technical assistance," on page 273.

• See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.	
• If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.	

Error code	Description	Action
215-802-xxx	Aborted the optical drive self test due to media tray being open.	1. Insert a new CD or DVD into the drive and wait for 15 seconds for the media to be recognized. Run the test again. See your BladeCenter chassis documentation for information about the optical drive (media tray).
		2. Run the test again. See "Diagnostic tools overview" on page 148.
		3. Make sure that the cable for the optical drive is securely connected at both ends of the cable and tighten any loose connections. See your BladeCenter documentation for information about the optical drive (media tray).
		4. Make sure that the cable for the optical drive is not damaged and replace the cable if damage is present. See your BladeCenter documentation for information about the optical drive (media tray).
		5. Run the test again. See "Diagnostic tools overview" on page 148.
		6. Make sure that the DSA code is at the latest level, upgrade if necessary. The latest code can be found at http://www.ibm.com/systems/support/supportsite.wss/docdisplay?brandind=5000008&lndocid=SERV-DSA
		7. Run the test again. See "Diagnostic tools overview" on page 148.
		8. For additional troubleshooting information, go to http://www.ibm.com/support/docview.wss?uid=psg1MIGR-41559..
		9. Run the test again. See "Diagnostic tools overview" on page 148.
		10. Replace the CD or DVD drive (media tray). See your BladeCenter documentation for information about replacing the optical drive.
		11. Collect the data from the DSA event log and send it to IBM Service. For information about contacting and sending data to IBM Service, go to "Getting help and technical assistance," on page 273.

- See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.
- If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.

Error code	Description	Action
215-803-xxx	Failed the optical drive self test due to the disk possibly being in use by the system.	1. Wait for the system activity to stop; then, run the test again. See "Diagnostic tools overview" on page 148. 2. Turn off and turn on the system, then; run the test again. See "Turning off the blade server" on page 12, "Turning on the blade server" on page 11 and "Diagnostic tools overview" on page 148. 3. If the component failure remains, see your BladeCenter chassis documentation for information about replacing the optical drive (media tray). 4. Collect the data from the DSA event log and send it to IBM Service. For information about contacting and sending data to IBM Service, go to "Getting help and technical assistance," on page 273.
215-901-xxx	Aborted the optical drive self test because the drive media was not detected.	1. Insert a new CD or DVD into the drive and wait for 15 seconds for the media to be recognized; then, run the test again. See "Diagnostic tools overview" on page 148. 2. Make sure that the cable for the optical drive is securely connected at both ends of the cable and tighten any loose connections. See your BladeCenter documentation for information about the optical drive (media tray). 3. Make sure that the cable for the optical drive is not damaged and replace the cable if damage is present. See your BladeCenter documentation for information about the optical drive (media tray). 4. Run the test again. See "Diagnostic tools overview" on page 148. 5. For additional troubleshooting information, go to http://www.ibm.com/support/docview.wss?uid=psg1MIGR-41559.. 6. Run the test again. See "Diagnostic tools overview" on page 148. 7. Replace the CD or DVD drive. See your BladeCenter chassis documentation for information about replacing the optical drive (media tray). 8. Collect the data from the DSA event log and send it to IBM Service. For information about contacting and sending data to IBM Service, go to "Getting help and technical assistance," on page 273.

• See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.	
• If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.	

Error code	Description	Action
215-902-xxx	Failed the optical drive self test due to a read miscompare.	1. Insert a new CD or DVD into the drive and wait for 15 seconds for the media to be recognized; then, run the test again. See "Diagnostic tools overview" on page 148. 2. Make sure that the cable for the optical drive is securely connected at both ends of the cable and tighten any loose connections. See your BladeCenter documentation for information about the optical drive (media tray). 3. Make sure that the cable for the optical drive is not damaged and replace the cable if damage is present. See your BladeCenter documentation for information about the optical drive (media tray). 4. Run the test again. See "Diagnostic tools overview" on page 148. 5. For additional troubleshooting information, go to http://www.ibm.com/support/docview.wss?uid=psg1MIGR-41559.. 6. Run the test again. See "Diagnostic tools overview" on page 148. 7. Replace the CD or DVD drive. See your BladeCenter chassis documentation for information about replacing the optical drive (media tray). 8. Collect the data from the DSA event log and send it to IBM Service. For information about contacting and sending data to IBM Service, go to "Getting help and technical assistance," on page 273.

• See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.	
• If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.	

Error code	Description	Action
215-903-xxx	Aborted the optical drive self test because the drive could not be accessed.	1. Insert a new CD or DVD into the optical drive and wait for 15 seconds for the media to be recognized; then, run the test again. See "Diagnostic tools overview" on page 148. 2. Make sure that the cable for the optical drive is securely connected at both ends of the cable. See your BladeCenter documentation for information about the optical drive (media tray). 3. Make sure that the cable for the optical drive is not damaged; then, replace the cable if damage is present. See your BladeCenter documentation for information about replacing the optical drive (media tray). 4. Make sure that the DSA code is at the latest level and upgrade if necessary; then, run the test again. The latest code can be found on the IBM support website at http://www.ibm.com/ systems/support/supportsite.wss/ docdisplay?brandind=5000008&lndocid=SERV-DSA. 5. For additional troubleshooting information, go to http://www.ibm.com/support/ docview.wss?uid=psg1MIGR-41559.. 6. Run the test again. See "Diagnostic tools overview" on page 148. 7. Replace the CD or DVD drive. Refer to your BladeCenter chassis documentation for information about replacing the drive. 8. Collect the data from the DSA event log and send it to IBM Service. For information about contacting and sending data to IBM Service, go to "Getting help and technical assistance," on page 273.

• See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.	
• If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.	

Error code	Description	Action
215-904-xxx	Failed the optical drive self test due to a possible read error.	1. Insert a new CD or DVD into the optical drive and wait for 15 seconds for the media to be recognized; then, run the test again. See "Diagnostic tools overview" on page 148. 2. Make sure that the cable for the optical drive is securely connected at both ends of the cable. See your BladeCenter documentation for information about the optical drive (media tray). 3. Make sure that the cable for the optical drive is not damaged; then, replace the cable if damage is present. See your BladeCenter documentation for information about replacing the optical drive (media tray). 4. Run the test again. See "Diagnostic tools overview" on page 148. 5. For additional troubleshooting information, go to http://www.ibm.com/support/docview.wss?uid=psg1MIGR-41559.. 6. Run the test again. See "Diagnostic tools overview" on page 148. 7. Replace the CD or DVD drive. See your BladeCenter documentation for information about replacing the optical drive (media tray). 8. Collect the data from the DSA event log and send it to IBM Service. For information about contacting and sending data to IBM Service, go to "Getting help and technical assistance," on page 273.

Hard disk drive test

Use this information to diagnose and resolve hard disk drive test errors.

Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.

• See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.	
• If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.	

Error code	Description	Action
217-000-xxx	Passed the hard disk drive self test.	
217-800-xxx	The hard disk drive test was canceled.	

• See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.		
• If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.		
Error code	**Description**	**Action**
217-900-xxx	Failed the hard disk drive test.	1. Reseat the hard disk drives (see "Removing a solid state drive" on page 102 and "Installing a solid state drive" on page 103). 2. Run the test again. See "Diagnostic tools overview" on page 148. 3. Make sure that the system firmware level is at the latest level and upgrade if necessary; then, run the test again. The installed firmware level can be found in the DSA log within the Firmware/VPD section for this component. The latest level firmware for this component can be found on the IBM support website at http://www.ibm.com/support/fixcentral/ systemx/groupView?query.productGroup=ibm %2FBladeCenter . 4. Run the test again. See "Diagnostic tools overview" on page 148.

Ethernet controller test

Use this information to resolve Ethernet controller errors.

Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.

• See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.		
• If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.		
Error code	**Description**	**Action**
405-000-xxx	Passed the EEPROM test on the system board.	
405-001-xxx	Passed the MII registers test.	
405-002-xxx	Passed the EEPROM test on the system board.	
405-003-xxx	Passed the internal memory test	
405-004-xxx	Passed the interrupt test.	
405-005-xxx	Passed the MAC layer loopback test.	
405-007-xxx	Passed LED test.	

• See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.	
• If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.	

Error code	Description	Action
405-901-xxx	Failed the Broadcom Ethernet tests due to a failure in the internal registers	1. Make sure that the component firmware level is up-to-date, and upgrade if necessary. The installed firmware level can be found in the DSA log within the Firmware/VPD section for this component. The latest level firmware for this component can be found at http://www.ibm.com/support/fixcentral/systemx/groupView?query.productGroup=ibm%2FBladeCenter . 2. Run the test again. See "Diagnostic tools overview" on page 148. 3. If the failure remains, refer to Chapter 4, "Removing and replacing blade server components," on page 63 to replace the failed component.
405-902-xxx	Failed the Broadcom Ethernet tests due to a failure in non-volatile RAM	1. Make sure that the component firmware level is up-to-date, and upgrade if necessary. The installed firmware level can be found in the DSA log within the Firmware/VPD section for this component. The latest level firmware for this component can be found at http://www.ibm.com/support/fixcentral/systemx/groupView?query.productGroup=ibm%2FBladeCenter . 2. Run the test again. See "Diagnostic tools overview" on page 148. 3. If the failure remains, refer to Chapter 4, "Removing and replacing blade server components," on page 63 to replace the failed component.
405-903-xxx	Failed the Broadcom Ethernet tests due to a failure in internal memory	1. Make sure that the component firmware level is up-to-date, and upgrade if necessary. The installed firmware level can be found in the DSA log within the Firmware/VPD section for this component. The latest level firmware for this component can be found at http://www.ibm.com/support/fixcentral/systemx/groupView?query.productGroup=ibm%2FBladeCenter . 2. Run the test again. See "Diagnostic tools overview" on page 148. 3. If the failure remains, refer to Chapter 4, "Removing and replacing blade server components," on page 63 to replace the failed component.

- See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.
- If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.

Error code	Description	Action
405-904-xxx	Failed the Broadcom Ethernet tests due to a failure in interrupts	1. Make sure that the component firmware level is up-to-date, and upgrade if necessary. The installed firmware level can be found in the DSA log within the Firmware/VPD section for this component. The latest level firmware for this component can be found at http://www.ibm.com/support/fixcentral/systemx/groupView?query.productGroup=ibm%2FBladeCenter . 2. Run the test again. 3. If the failure remains, refer to Chapter 4, "Removing and replacing blade server components," on page 63 to replace the failed component.
405-905-xxx	Failed the Broadcom Ethernet tests due to a failure in loopback test at MAC layer.	1. Make sure that the component firmware level is up-to-date, and upgrade if necessary. The installed firmware level can be found in the DSA log within the Firmware/VPD section for this component. The latest level firmware for this component can be found at http://www.ibm.com/support/fixcentral/systemx/groupView?query.productGroup=ibm%2FBladeCenter . 2. Run the test again. See "Diagnostic tools overview" on page 148. 3. If the failure remains, refer to Chapter 4, "Removing and replacing blade server components," on page 63 to replace the failed component.
405-906-xxx	Failed the Broadcom Ethernet tests due to a failure in loopback test at physical layer.	1. Make sure that the component firmware level is up-to-date, and upgrade if necessary. The installed firmware level can be found in the DSA log within the Firmware/VPD section for this component. The latest level firmware for this component can be found at http://www.ibm.com/support/fixcentral/systemx/groupView?query.productGroup=ibm%2FBladeCenter . 2. Run the test again. See "Diagnostic tools overview" on page 148. 3. If the failure remains, refer to Chapter 4, "Removing and replacing blade server components," on page 63 to replace the failed component.

• See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.	
• If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.	

Error code	Description	Action
405-907-xxx	Failed the Broadcom Ethernet tests due to a failure in status LED operation.	1. Make sure that the component firmware level is up-to-date, and upgrade if necessary. The installed firmware level can be found in the DSA log within the Firmware/VPD section for this component. The latest level firmware for this component can be at http://www.ibm.com/support/fixcentral/systemx/groupView?query.productGroup=ibm%2FBladeCenter . 2. Run the test again. See "Diagnostic tools overview" on page 148. 3. If the failure remains, refer to Chapter 4, "Removing and replacing blade server components," on page 63 to replace the failed component.

Troubleshooting tables

Use this information to troubleshoot problems in the blade server.

Use the troubleshooting tables to find solutions to problems that have identifiable symptoms. If these symptoms are related to shared BladeCenter chassis resources, see "Solving shared BladeCenter resource problems" on page 265.

If you cannot find a problem in these tables, see Chapter 5, "Diagnostics," on page 147 for information about testing the blade server.

If you have added new software or a new optional device, and the blade server is not working, complete the following steps before you use the troubleshooting tables:

1. Remove the software or device that you just added.
2. Run the diagnostic tests to determine whether the blade server is running correctly. For more information, see "POST error codes" on page 152.
3. Reinstall the new software or new device. For more information, see the documentation that came with the new software or device.

General problems

Use this information to resolve a general hardware problem.

Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.

• See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.	
• If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.	

Symptom	Action
A cover lock is broken, an LED is not working, or a similar problem has occurred.	• If the part is a CRU, replace it. See "Removing and replacing Tier 1 customer replaceable units (CRUs)" on page 70 or "Removing and replacing Tier 2 CRUs" on page 78 to replace the failed component. • If the part is a FRU, the part must be replaced by a trained service technician. See "Removing and replacing field replaceable units" on page 132. Or contact an IBM service representative. See "Hardware service and support" on page 275.
The server is hung while the screen is on. Cannot start the Setup utility by pressing F1.	1. See "Nx boot failure" on page 51 for more information. 2. See "Recovering from a UEFI update failure" on page 46for more information.

Chassis problems

Use this information to resolve chassis problems for a chassis in which the blade server is installed.

IBM continually updates the support website with tips and techniques that you can use to resolve any problems that you might be having with the BladeCenter HX5 blade server. Go to the BladeCenter support search website at http://www.ibm.com to see if any service bulletins have been generated. In the Search field, enter the following terms: 7872, retain tip, and chassis.

Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.

• See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.	
• If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.	

Symptom	Action
One or more LEDs are lit on the chassis system LED panel	1. Refer to the Problem Determination and Service Guide for the chassis to determine how to resolve the issue. 2. Refer to the advanced management module event log. You can view the advanced management module event log through the advanced management module web interface. For more information about viewing the advanced management module event log, see the *Advanced Management Module Installation and User's Guide*.

Storage drive problems

Use this information to resolve storage drive problems.

IBM continually updates the support website with tips and techniques that you can use to resolve any problems that you might be having with the BladeCenter HX5 blade server. Go to the BladeCenter support search website at http://www.ibm.com to see if any service bulletins have been generated. In the Search field, enter the following terms: 7872, retain tip, and hard disk drive.

Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.

• See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs. • If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.	

Symptom	Action
Not all storage drives are recognized by the Fixed Disk or SAS Attached Disk diagnostic test.	1. Remove the storage drive that is indicated by DSA. See Chapter 4, "Removing and replacing blade server components," on page 63. 2. Run the SAS Fixed Disk or SAS Attached Disk diagnostic test again. See "Diagnostic tools overview" on page 148. 3. If the Fixed disk or SAS Attached Disk diagnostic test runs successfully, replace the storage drive that you removed with a new one. See Chapter 4, "Removing and replacing blade server components," on page 63.
The blade server stops responding during the Fixed Disk or SAS Attached Disk diagnostic test.	1. Remove the storage drive that was being tested when the blade server stopped responding. See Chapter 4, "Removing and replacing blade server components," on page 63. 2. Run the SAS Fixed Disk or SAS Attached Disk diagnostic test again (see "Diagnostic tools overview" on page 148). 3. If the Fixed drive or SAS Attached Disk diagnostic test runs successfully, replace the storage drive that you removed with a new one. See Chapter 4, "Removing and replacing blade server components," on page 63.
A storage drive passes the Fixed Disk or SAS Attached Disk diagnostics test, but the problem remains.	1. Run the SAS Fixed Disk or SAS Attached Disk diagnostic test again. See "Diagnostic tools overview" on page 148. 2. If the Fixed drive or SAS Attached Disk diagnostic test runs successfully but the storage drive continues to have a problem, replace the drive with a new one.

Intermittent problems

Use this information to resolve intermittent problems with the blade server.

IBM continually updates the support website with tips and techniques that you can use to resolve any problems that you might be having with the BladeCenter HX5 blade server. Go to the BladeCenter support search website at http://www.ibm.com to see if any service bulletins have been generated. In the Search field, enter the following terms: 7872, retain tip, and intermittent.

Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.

• See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.	
• If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.	

Symptom	Action

A problem occurs only occasionally and is difficult to diagnose.	1. Check the AMM and IMM event logs for an error message (see "Event logs" on page 149).
	
	2. Make sure that:
	  • When the blade server is turned on, air is flowing from the rear of the BladeCenter chassis at the blower grille. If there is no airflow, the blower is not working. This causes the blade server to overheat and shut down.
	  • The storage drives are configured correctly.
	
	3. See "Solving undetermined problems" on page 271.

Keyboard or mouse problems

Use this information to look up and resolve keyboard or mouse problems.

IBM continually updates the support website with tips and techniques that you can use to resolve any problems that you might be having with the BladeCenter HX5 blade server. Go to the BladeCenter support search website at http://www.ibm.com to see if any service bulletins have been generated. In the Search field, enter the following terms: 7872, retain tip, keyboard, and mouse.

Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. The keyboard and mouse are shared BladeCenter chassis resources. First, make sure that the keyboard and mouse are assigned to the blade server; then, see the following table and "Solving shared BladeCenter resource problems" on page 265.

• See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.	
• If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.	

Symptom	Action

All keyboard and mouse problems.	1. Make sure that the keyboard/video/mouse select button LED on the front of the blade server is lit, indicating that the blade server is connected to the shared keyboard and mouse.
	
	2. Check the function of the shared BladeCenter chassis resources (see "Solving shared BladeCenter resource problems" on page 265).
	
	3. Make sure that:
	  • The device drivers are installed correctly. See "Updating firmware and device drivers" on page 31.
	  • The keyboard and mouse are recognized as USB, not PS/2, devices by the blade server. Although the keyboard and mouse might be a PS/2-style devices, communication with them is through USB in the BladeCenter chassis. Some operating systems allow you to select the type of keyboard and mouse during installation of the operating system. If so, select USB.
	
	4. (Trained service technician only) Replace the system-board assembly. See "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144.

Memory problems

Use this information to diagnose and resolve memory problems with the blade server.

IBM continually updates the support website with tips and techniques that you can use to resolve any problems that you might be having with the BladeCenter HX5 blade server. Go to the BladeCenter support search website at http://www.ibm.com to see if any service bulletins have been generated. In the Search field, enter the following terms: 7872, retain tip, and memory.

Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.

• See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.	
• If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.	

Symptom	Action

The amount of system memory that is displayed is less than the amount of installed physical memory.	1. Make sure that:
	  • You have installed the correct type of memory (see "Installing a DIMM - BladeCenter HX5" on page 106).
	  • If you changed the memory, you updated the memory configuration in the Setup utility (see "Using the Setup utility" on page 20).
	  • All banks of memory are enabled. The blade server might have automatically disabled a memory bank when it detected a problem, or a memory bank might have been manually disabled (see "Using the Setup utility" on page 20).
	
	2. Check the IMM event log for a memory error (see "Viewing event logs through the Setup utility" on page 150 or "Viewing event logs without restarting the blade server" on page 150):
	  • If a DIMM was disabled by a systems-management interrupt (SMI), replace the DIMM (see "Removing a DIMM - BladeCenter HX5" on page 105 and "Installing a DIMM - BladeCenter HX5" on page 106).
	  • If a DIMM was disabled by the user or by POST, run the Setup utility and enable the DIMM (see "Using the Setup utility" on page 20).
	
	3. Reseat the DIMM (see "Removing a DIMM - BladeCenter HX5" on page 105, "Installing a DIMM - BladeCenter HX5" on page 106).
	
	4. Replace the following components one at a time, in the order shown, restarting the blade server each time:
	  a. DIMM (see "Removing a DIMM - BladeCenter HX5" on page 105 and "Installing a DIMM - BladeCenter HX5" on page 106).
	  b. (Trained service technician only) System-board assembly (see "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144).

• See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.	
• If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.	

Symptom	Action
Multiple rows of DIMMs in a branch are identified as failing.	1. Make sure that the DIMMs are installed in the proper sequence (see "Installing a DIMM - BladeCenter HX5" on page 106).
	2. Reseat the DIMMs and restart the server (see "Removing a DIMM - BladeCenter HX5" on page 105 and "Installing a DIMM - BladeCenter HX5" on page 106).
	3. Remove each DIMM one at a time, restarting the server after removing each DIMM until the error is corrected(see "Removing a DIMM - BladeCenter HX5" on page 105).
	4. Replace the failed DIMM; then, reinstall the DIMMs to their original connectors and restart the server (see "Installing a DIMM - BladeCenter HX5" on page 106).
	5. (Trained service technician only) Replace the system board (see "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144).

Monitor or video problems

Use this information to diagnose and resolve monitor or video errors.

IBM continually updates the support website with tips and techniques that you can use to resolve any problems that you might be having with the BladeCenter HX5 blade server. Go to the BladeCenter support search website at http://www.ibm.com to see if any service bulletins have been generated. In the Search field, enter the following terms: 7872, retain tip, and monitor.

Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.

The video monitor is a shared BladeCenter chassis resource. First, make sure that the video monitor is assigned to the blade server; then, see the following table and "Solving shared BladeCenter resource problems" on page 265.

• See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs. • If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.	

Symptom	Action

The screen is blank.	1. Check the function of the shared BladeCenter chassis resources (see "Solving shared BladeCenter resource problems" on page 265).
	2. Make sure that the blade server is turned on (see "Turning on the blade server" on page 11).
	3. Make sure that the monitor is connected correctly. See the documentation for your BladeCenter chassis for more information.
	4. Make sure that:
	  • Damaged UEFI code is not affecting the video; see "Recovering from a UEFI update failure" on page 46.
	  • The device drivers are installed correctly.
	5. (Trained service technician only) Replace the system-board assembly (see "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144).

The monitor has screen jitter, or the screen image is wavy, unreadable, rolling, or distorted.	1. Check the function of the shared BladeCenter chassis resources (see "Solving shared BladeCenter resource problems" on page 265). 2. (Trained service technician only) Replace the system-board assembly (see "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144).
Wrong characters appear on the screen.	1. If the wrong language is displayed, update the firmware or operating system with the correct language in the blade server that has ownership of the monitor. 2. Check the function of the shared BladeCenter chassis resources (see "Solving shared BladeCenter resource problems" on page 265). 3. (Trained service technician only) Replace the system-board assembly (see "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144).

Network connection problems

Use this information to diagnose and resolve network connection errors.

IBM continually updates the support website with tips and techniques that you can use to resolve any problems that you might be having with the BladeCenter HX5 blade server. Go to the BladeCenter support search website at http://www.ibm.com to see if any service bulletins have been generated. In the Search field, enter the following terms: 7872, retain tip, and network.

Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. The blade server connects to the network by using shared BladeCenter chassis resources. See the following table and "Solving shared BladeCenter resource problems" on page 265.

• See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.	
• If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.	

Symptom	Action
One or more blade servers are unable to communicate with the network.	1. Check the function of the shared BladeCenter chassis resources. See "Solving shared BladeCenter resource problems" on page 265). 2. Make sure that: • The correct device drivers are installed. See "Updating firmware and device drivers" on page 31. • Optional I/O-expansion cards are correctly installed and configured. See "Installing an I/O expansion card" on page 122 and Chapter 2, "Configuring the blade server," on page 19. 3. (Trained service technician only) Replace the system-board assembly. See "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144.
An error message "Loading Java Applet failed" displays when trying to establish a remote control console session to a blade server.	Refer to the *BladeCenter Advanced Management Module User's Guide* for information pertaining to the proper installation and configuration of Java, operating systems, and browsers that are supported for remote access.

Operating system problems

Use this information to diagnose operating system problems.

IBM continually updates the support website with tips and techniques that you can use to resolve any problems that you might be having with the BladeCenter HX5 blade server. Go to the BladeCenter support search website at http://www.ibm.com/systems/support/supportsite.wss/search?brandind=5000020 to see if any service bulletins have been generated. In the Search field, enter the following terms: 7872, retain, and operating system.

The following table lists problem symptoms and suggested solutions.

Symptom	Action
The RAID configuration program cannot view all installed drives, or the operating system cannot be installed.	• Make sure that there are no duplicate SCSI/SAS IDs or interrupt request (IRQ) assignments. See "Using the LSI Logic Configuration Utility program" on page 30. • Make sure that the storage drive is connected correctly. See "Blade server connectors - BladeCenter HX5" on page 13 to locate the storage drive connector.
The operating-system installation program continuously loops.	Make more space available on the hard disk.
The operating system cannot be installed; the option is unavailable.	Make sure that the operating system is supported on the blade server. If the operating system is supported, either no logical drive is defined (SCSI/SAS RAID systems) or the ServerGuide System Partition is not present. Run the ServerGuide program and make sure that setup is complete.

Optional-device problems

Use this information to diagnose and resolve optional-device problems.

Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.

• **See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.**	
• **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**	

Symptom	Action

An IBM optional device that was just installed does not work.	1. Make sure that:
	  • The device is designed for the blade server. See http://www.ibm.com/servers/eserver/serverproven/compat/us/eserver.html.
	  • You followed the installation instructions that came with the device and the device is installed correctly. See the instructions that came with the device.
	  • You have not loosened any other installed devices or cables.
	  • You updated the configuration information in the Setup utility program. Whenever memory or any other device is changed, you must update the configuration. See "Using the Setup utility" on page 20.
	2. If the device comes with its own test instructions, use those instructions to test the device.
	3. Reseat the device that you just installed.
	4. Replace the device that you just installed.

Power error messages

Use this information to diagnose and resolve power error messages for the blade server.

Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. Power to the blade server is provided by shared BladeCenter chassis resources. See the following table and "Solving shared BladeCenter resource problems" on page 265.

• **See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.**	
• **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**	

Message	Action
System Power Good fault	1. Reseat the blade server. See "Removing the blade server from the BladeCenter chassis" on page 64 and "Installing a blade server in a BladeCenter chassis" on page 65. 2. Check the function of the shared BladeCenter chassis resources. See "Solving shared BladeCenter resource problems" on page 265. 3. (Trained service technician only) Replace the system-board assembly. See "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144.

- See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.
- If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.

Message	Action
VRD Power Good fault	1. Reseat the blade server. See "Removing the blade server from the BladeCenter chassis" on page 64 and "Installing a blade server in a BladeCenter chassis" on page 65. 2. Check the function of the shared BladeCenter chassis resources. See "Solving shared BladeCenter resource problems" on page 265. 3. (Trained service technician only) Replace the system-board assembly. See "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144.
System over recommended voltage for +12 V.	Informational only. If the problem remains, complete the following steps: 1. Reseat the blade server. See "Removing the blade server from the BladeCenter chassis" on page 64 and "Installing a blade server in a BladeCenter chassis" on page 65. 2. Check the function of the shared BladeCenter chassis resources. See "Solving shared BladeCenter resource problems" on page 265. 3. (Trained service technician only) Replace the system-board assembly. See "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144.
System over recommended voltage for +0.9 V.	Informational only. **Note:** If the problem remains, complete the following steps: 1. Reseat the blade server. See "Removing the blade server from the BladeCenter chassis" on page 64 and "Installing a blade server in a BladeCenter chassis" on page 65. 2. Check the function of the shared BladeCenter chassis resources. See "Solving shared BladeCenter resource problems" on page 265. 3. (Trained service technician only) Replace the system-board assembly. See "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144.
System over recommended voltage for +3.3 V.	Informational only. **Note:** If the problem remains, complete the following steps: 1. Reseat the blade server. See "Removing the blade server from the BladeCenter chassis" on page 64 and "Installing a blade server in a BladeCenter chassis" on page 65. 2. Check the function of the shared BladeCenter chassis resources. See "Solving shared BladeCenter resource problems" on page 265. 3. (Trained service technician only) Replace the system-board assembly. See "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144.

• See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.	
• If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.	

Message	Action
System over recommended 5 V fault.	Informational only. **Note:** If the problem remains, complete the following steps: 1. Reseat the blade server. See "Removing the blade server from the BladeCenter chassis" on page 64 and "Installing a blade server in a BladeCenter chassis" on page 65. 2. Check the function of the shared BladeCenter chassis resources. See "Solving shared BladeCenter resource problems" on page 265. 3. (Trained service technician only) Replace the system-board assembly. See "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144.
System under recommended voltage for +12 V.	Informational only. **Note:** If the problem remains, complete the following steps: 1. Reseat the blade server. See "Removing the blade server from the BladeCenter chassis" on page 64 and "Installing a blade server in a BladeCenter chassis" on page 65. 2. Check the function of the shared BladeCenter chassis resources. See "Solving shared BladeCenter resource problems" on page 265. 3. (Trained service technician only) Replace the system-board assembly. See "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144.
System under recommended voltage for +0.9 V.	Informational only. **Note:** If the problem remains, complete the following steps: 1. Reseat the blade server. See "Removing the blade server from the BladeCenter chassis" on page 64 and "Installing a blade server in a BladeCenter chassis" on page 65. 2. Check the function of the shared BladeCenter chassis resources. See "Solving shared BladeCenter resource problems" on page 265. 3. (Trained service technician only) Replace the system-board assembly. See "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144.
System under recommended voltage for +3.3 V.	Informational only. **Note:** If the problem remains, complete the following steps: 1. Reseat the blade server. See "Removing the blade server from the BladeCenter chassis" on page 64 and "Installing a blade server in a BladeCenter chassis" on page 65. 2. Check the function of the shared BladeCenter chassis resources. See "Solving shared BladeCenter resource problems" on page 265. 3. (Trained service technician only) Replace the system-board assembly. See "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144.

• See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.	
• If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.	

Message	Action
System under recommended +5 V fault.	Informational only. **Note:** If the problem remains, complete the following steps: 1. Reseat the blade server. See "Removing the blade server from the BladeCenter chassis" on page 64 and "Installing a blade server in a BladeCenter chassis" on page 65. 2. Check the function of the shared BladeCenter chassis resources. See "Solving shared BladeCenter resource problems" on page 265. 3. (Trained service technician only) Replace the system-board assembly. See "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144.

Power problems

Use this information to diagnose and resolve power problems for the blade server.

IBM continually updates the support website with tips and techniques that you can use to resolve any problems that you might be having with the BladeCenter HX5 blade server. Go to the BladeCenter support search website at http://www.ibm.com to see if any service bulletins have been generated. In the Search field, enter the following terms: 7872, retain tip, and power.

Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.

• See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.	
• If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.	

Symptom	Action
The power button does not work.	1. Reseat the control-panel connector. See "Blade server controls and LEDs" on page 6. 2. (Trained service technician only) Replace the system-board assembly. See "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144.

• See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.	
• If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.	

Symptom	Action
The blade server does not turn on.	1. Check the function of the shared BladeCenter chassis resources. See "Solving shared BladeCenter resource problems" on page 265.
	2. Make sure that the power-on LED on the blade server control panel is flashing slowly. See "Blade server controls and LEDs" on page 6. • If the power LED is flashing rapidly and continues to do so, the blade server is not communicating with the advanced management module; reseat the blade server. See "Removing the blade server from the BladeCenter chassis" on page 64 and "Installing a blade server in a BladeCenter chassis" on page 65. • If the power LED is off, the blade server bay is not receiving power, the blade server is defective, or the operator control panel is loose or defective. See "Removing the blade server from the BladeCenter chassis" on page 64 and "Installing a blade server in a BladeCenter chassis" on page 65. In addition, see "Removing the control panel" on page 126 and "Installing the control panel" on page 128.
	3. Check the power-management policies in the operating system for the blade server. See the *Advanced Management Module User's Guide* for more information.
	4. Check the advanced management module event log of the corresponding blade server for an error that is preventing the blade server from turning on. See "Event logs" on page 149.
	5. Reseat the blade server. See "Removing the blade server from the BladeCenter chassis" on page 64 and "Installing a blade server in a BladeCenter chassis" on page 65.
	6. If you just installed a device in the blade server, remove it and restart the blade server. If the blade server now starts, you might have installed more devices than the power to that blade server bay supports.
	7. (Trained service technician only) If you tried another blade server in the blade server bay when you check the function of the shared BladeCenter chassis resources and the other blade server worked, replace the system-board assembly. See "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144.
	8. See "Solving undetermined problems" on page 271.
The blade server turns off for no apparent reason.	1. Check the function of the shared BladeCenter chassis resources. See "Solving shared BladeCenter resource problems" on page 265.
	2. (Trained service technician only) If the microprocessor error LED is lit, replace the microprocessor. See "Removing a microprocessor and heat sink" on page 132 and "Installing a microprocessor and heat sink" on page 136.
	3. (Trained service technician only) Replace the system-board assembly. See "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144.

• See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.	
• If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.	

Symptom	Action
The blade server does not turn off.	1. Verify whether you are using an Advanced Configuration and Power Interface (ACPI) or non-ACPI operating system.
	2. If you are using a non-ACPI operating system, complete the following steps:
	a. Turn off the blade server by pressing the power button for 4 seconds. See "Blade server controls and LEDs" on page 6.
	b. If the blade server fails during POST and the power button does not work, remove the blade server from the bay and reseat it. See "Removing the blade server from the BladeCenter chassis" on page 64 and "Installing a blade server in a BladeCenter chassis" on page 65.
	3. If the problem remains or if you are using an ACPI-aware operating system, complete the following steps:
	a. Check the power-management policies in the operating system for the blade server.
	b. (Trained service technician only) Replace the system-board assembly. See "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144.

Removable-media drive problems

Use this information to diagnose and resolve removable-media drive problems in the blade server.

Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved. The removable-media (CD or DVD) drives are shared BladeCenter chassis resources. First, make sure that the drives are assigned to the blade server; then, see the following table and "Solving shared BladeCenter resource problems" on page 265.

For additional troubleshooting information, go to http://www.ibm.com/support/docview.wss?uid=psg1MIGR-41559..

• See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.	
• If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.	

Symptom	Action
All removable-media drive problems. The media-tray select button LED on the front of the blade server is lit, indicating that the blade server is connected to the shared removable-media drives.	1. Check the function of the shared BladeCenter chassis resources. See "Solving shared BladeCenter resource problems" on page 265. 2. Run the Setup utility and make sure that the drive is enabled. See "Using the Setup utility" on page 20. 3. For SAS storage drive problems, make sure that the correct device driver is installed. For the latest device drivers, go to http://www.ibm.com/systems/support/. 4. Reseat the battery. See "Removing the battery" on page 75 and "Installing the battery" on page 76. 5. Replace the battery. See "Removing the battery" on page 75 and "Installing the battery" on page 76. 6. (Trained service technician only) Replace the system-board assembly. See "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144.

The CD or DVD drive is detected as /dev/sr0 by SUSE Linux. (If the SUSE Linux operating system is installed remotely on a blade server that is not the current owner of the media tray [CD or DVD drive and USB port], SUSE Linux detects the CD or DVD drive as /dev/sr0 instead of /dev/cdrom.)	Establish a link between /dev/sr0 and /dev/cdrom as follows:
	1. Enter the following command:
	`rm /dev/cdrom; ln -s /dev/sr0 /dev/cdrom`
	2. Insert the following line in the /etc/fstab file:
	`/dev/cdrom /media/cdrom auto ro,noauto,user,exec 0 0`

The CD or DVD drive is not recognized after being switched back to the blade server running Windows 2000 Advanced Server with SP3 applied. (When the CD or DVD drive that is owned by blade server *x* is switched to another blade server, then is switched back to blade server *x*, the operating system in blade server *x* no longer recognizes the CD or DVD drive. This happens when you have not safely stopped the drives before you switched ownership of the media tray [CD or DVD drive and USB port]).	**Note:** Because the BladeCenter chassis uses USB to communicate with the media tray devices, switching ownership of the media tray to another blade server is the same as disconnecting a USB device. Before you switch ownership of the CD or DVD drive (media tray) to another blade server, safely stop the media tray devices on the blade server that currently owns the media tray, as follows: 1. Double-click the **Unplug/Eject Hardware** icon in the Windows taskbar. 2. Select **USB Floppy** and click **Stop**. 3. Select **USB Mass Storage Device** and click **Stop**. 4. Click **Close**. You can now safely switch ownership of the media tray to another blade server.

ServerGuide problems

Use this information to diagnose ServerGuide problems and suggested actions.

The following table lists problem symptoms and suggested solutions.

Symptom	Action
The *ServerGuide Setup and Installation* CD will not start.	• Make sure that the CD drive is associated with the blade server that you are configuring. • Make sure that the blade server supports the ServerGuide program and has a bootable CD (or DVD) drive. • If the startup (boot) sequence settings have been changed, make sure that the CD drive is first in the startup sequence.
The ServerGuide program will not start the operating-system CD.	Make sure that the operating-system CD is supported by the ServerGuide program. See the *ServerGuide Setup and Installation* CD label for a list of supported operating-system versions.

Service processor problems

Use this information to diagnose and resolve service processor problems for the blade server.

IBM continually updates the support website with tips and techniques that you can use to resolve any problems that you might be having with the BladeCenter HX5 blade server. Go to the BladeCenter support search website at http://www.ibm.com to see if any service bulletins have been generated. In the Search field, enter the following terms: 7872, retain tip, and service processor.

Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.

• **See "Parts listing - BladeCenter HX5" on page 55 to determine which components are CRUs and which components are FRUs.** • **If an action step is preceded by "(Trained service technician only)," that step must be performed only by a trained service technician.**	

Symptom	Action
The management module reports a general monitor failure.	Disconnect the BladeCenter chassis from all electrical sources, wait for 30 seconds, reconnect the BladeCenter chassis to the electrical sources, and restart the blade server. If the problem remains, see "Solving undetermined problems" on page 271.

Solving shared BladeCenter resource problems

Use this information to diagnose and resolve shared BladeCenter resource issues.

About this task

Problems with BladeCenter shared resources might appear to be in the blade server. The following sections provide procedures to help you isolate blade server problems from shared BladeCenter resource problems. If the problem is thought to be with a shared resource, see the BladeCenter component documentation for additional information. If the problem cannot be solved, see "Solving undetermined problems" on page 271.

To check the general function of shared BladeCenter resources, complete the following tasks:

• Make sure that:

– The BladeCenter unit has the required power modules and is connected to a working power source.

– Power management has been correctly set for your BladeCenter unit configuration.
- Determine whether the problem is being experienced with more than one blade server. Perform a test of the function on a known-good blade server.
- Try the blade server in a different blade server bay.
- Try a known-good blade server in the blade server bay.

Keyboard or mouse problems

Use this information to diagnose and resolve keyboard and mouse issues.

About this task

To check for keyboard or mouse problems, complete the following steps until the problem is solved:

Procedure

1. Make sure that:
   - Both the blade server and the monitor are turned on.
   - The keyboard/video/mouse select button LED on the front of the blade server is lit, indicating that the blade server is connected to the shared keyboard and mouse.
   - The keyboard or mouse cable is securely connected to the active BladeCenter advanced management module.
   - The keyboard or mouse works with another blade server.
2. Check for correct advanced management module operation (see the documentation for your BladeCenter chassis).

   Note: Some BladeCenter chassis types have several management-module components that might have to be tested or replaced (see the *Installation Guide* for your advanced management module for more information).
3. Replace the keyboard or mouse.
4. Replace the advanced management module (see the documentation for your BladeCenter chassis).

Results

If these steps do not solve the problem, it is likely a problem with the blade server. See "Keyboard or mouse problems" on page 253.

Media tray problems

Use this information to diagnose and resolve media tray issues for the blade server.

About this task

To check for problems with the media tray (removable media drives and USB ports), complete the following steps until the problem is solved:

Procedure

1. Make sure that:
   - The media-tray select button LED on the front of the blade server is lit, indicating that the blade server is connected to the shared media tray.
   - The media tray devices work with another blade server.

2. Determine whether the problem affects more than one media tray component:
   - USB ports
   - CD or DVD drive

3. For problems that affect only a USB port:
   a. Make sure that the USB device is operational. If you are using a USB hub, make sure that the hub is operating correctly and that any software that the hub requires is installed. Connect the USB device directly to the USB port, bypassing the hub, to check its operation.
   b. Reseat the following components:
      1) USB device cable
      2) Media tray cable (if applicable)
      3) Media tray
   c. Replace the following components one at a time, in the order shown, restarting the blade server each time:
      1) USB cable (if applicable)
      2) Media tray cable (if applicable)
      3) Media tray

4. For problems that affect only the CD or DVD drive, make sure that:
   a. The CD or DVD is inserted correctly in the drive. If necessary, insert the end of a straightened paper clip into the manual tray-release opening to eject the CD or DVD. The drive LED flashes once per second when the CD or DVD is inserted.
   b. The CD or DVD is clean and not damaged. (Try another CD or DVD if you have one.)
   c. The software program is working properly.

5. For problems that affect one or more of the removable media drives:
   a. Reseat the following components:
      1) Removable-media drive cable (if applicable)
      2) Removable-media drive
      3) Media tray cable (if applicable)
      4) Media tray
   b. Replace the following components one at a time, in the order shown, restarting the blade server each time:
      1) Removable-media drive cable (if applicable)
      2) Media tray cable (if applicable)
      3) Removable-media drive
      4) Media tray

6. Check for correct advanced management module operation (see the documentation for your BladeCenter chassis).

   Note: Some BladeCenter chassis types have several management-module components that might have to be tested or replaced (see the *Installation Guide* for your advanced management module for more information).

7. Replace the advanced management module (see the documentation for your BladeCenter chassis).

Results

If these steps do not solve the problem, it is likely a problem with the blade server. See "Removable-media drive problems" on page 263 or "Universal Serial Bus (USB) port problems" on page 270.

Network connection problems

Use this information to diagnose and solve network connection issues with the blade server.

About this task

To check for network connection problems, complete the following steps until the problem is solved:

Procedure

1. Make sure that:
   - The network cables are securely connected to the I/O module.
   - Power configuration of the BladeCenter chassis supports the I/O-module configuration.
   - Installation of the I/O-module type is supported by the BladeCenter chassis and blade server hardware.
   - The I/O modules for the network interface that is being used are installed in the correct BladeCenter I/O-module bays and are configured and operating correctly.
   - The settings in the I/O module are correct for the blade server (settings in the I/O module are specific to each blade server).
2. Check for correct I/O-module operation; troubleshoot and replace the I/O module as indicated in the documentation for the I/O module.
3. Check for correct management-module operation (see the documentation for your BladeCenter chassis).

   Note: Some BladeCenter unit types have several management-module components that might have to be tested or replaced (see the *Installation Guide* for your advanced management module for more information).
4. Replace the advanced management module (see the documentation for your BladeCenter chassis).

Results

If these steps do not solve the problem, it is likely a problem with the blade server. See "Network connection problems" on page 256.

Power problems

Use this information to diagnose and solve power issues with the blade server.

About this task

To check for power problems, make sure that:
- The LEDs on all the BladeCenter power modules are lit.
- Power is being supplied to the BladeCenter chassis.
- The BladeCenter chassis support installation of the blade server type.

- The BladeCenter chassis has the correct power configuration to operate the blade server bay where the blade server is installed (see the documentation for your BladeCenter chassis).
- The BladeCenter chassis power-management configuration and status support blade server operation (see the *Advanced Management Module User's Guide* or the *Management Module Command-Line Interface Reference Guide* for information).
- Local power control for the blade server is correctly set (see the *Management Module User's Guide* or the *Advanced Management Module Command-Line Interface Reference Guide* for information).
- The power LED on the blade server flashes slowly before you press the power button.

  Note: While the service processor in the blade server is initializing and synchronizing with the management module, the power LED flashes rapidly, and the power button on the blade server does not respond. This process can take approximately 2 minutes after the blade server has been installed.
- The BladeCenter chassis blowers are correctly installed and operational.

If these procedures do not solve the problem, it is likely a problem with the blade server. See "Power error messages" on page 258 and "Power problems" on page 261.

Video problems
Use this information to diagnose and solve video issues.

About this task

To check for video problems, complete the following steps until the problem is solved:

Procedure
1. Make sure that:
   - Both the blade server and the monitor are turned on, and the monitor brightness and contrast controls are correctly adjusted.
   - The keyboard/video/mouse select button LED on the front of the blade server is lit, indicating that the blade server is connected to the shared BladeCenter monitor.
   - The video cable is securely connected to the BladeCenter advanced management module. Non-IBM monitor cables might cause unpredictable problems.
   - The monitor works with another blade server.
   - Some IBM monitors have their own self-tests. If you suspect a problem with the monitor, see the information that comes with the monitor for instructions for adjusting and testing the monitor. If the monitor self-tests show that the monitor is working correctly, consider the location of the monitor. Magnetic fields around other devices (such as transformers, appliances, fluorescent lights, and other monitors) can cause screen jitter or wavy, unreadable, rolling, or distorted screen images. If this happens, turn off the monitor.

     Attention: Moving a color monitor while it is turned on might cause screen discoloration.

     Move the device and the monitor at least 305 mm (12 in.) apart. Turn on the monitor.
2. Check for correct advanced management module operation (see the documentation for your BladeCenter chassis).

Note: Some BladeCenter chassis types have several management-module components that might need to be tested or replaced (see the *Installation Guide* for your advanced management module for more information).

3. Replace the monitor cable, if applicable.
4. Replace the monitor.
5. Replace the advanced management module (see the documentation for your BladeCenter chassis).

Results

If these steps do not solve the problem, it is likely a problem with the blade server. See "Monitor or video problems" on page 255.

Software problems

Use this information to diagnose and resolve software problems for the blade server.

IBM continually updates the support website with tips and techniques that you can use to resolve any problems that you might be having with the BladeCenter HX5 blade server. Go to the BladeCenter support search website at http://www.ibm.com to see if any service bulletins have been generated. In the Search field, enter the following terms: 7872, retain tip, and software.

1. To determine whether the problem is caused by the software, make sure that:
   * The blade server has the minimum memory that is needed to use the software. For memory requirements, see the information that comes with the software.

     Note: If you have just installed an adapter or memory, the blade server might have a memory-address conflict.
   * The software is designed to operate on the blade server.
   * Other software works on the blade server.
   * The software works on another server.
2. If you receive any error messages while you use the software, see the information that comes with the software for a description of the messages and suggested solutions to the problem.
3. Contact your place of purchase of the software.

Universal Serial Bus (USB) port problems

Use this information to diagnose and solve USB port problems in the blade server.

IBM continually updates the support website with tips and techniques that you can use to resolve any problems that you might be having with the BladeCenter HX5 blade server. Go to the BladeCenter support search website at http://www.ibm.com to see if any service bulletins have been generated. In the Search field, enter the following terms: 7872, retain tip, and usb.

The USB ports are shared BladeCenter chassis resources. First, make sure that the USB ports are assigned to the blade server; then, see the following steps and "Solving shared BladeCenter resource problems" on page 265.

1. Check the function of the shared BladeCenter chassis resources. See "Solving shared BladeCenter resource problems" on page 265.
2. Make sure that:
   * The operating system supports USB devices.

- The correct USB device driver is installed. For the latest device drivers, go to http://www.ibm.com/supportportal/.
3. (Trained service technician only) Replace the system-board assembly - See "Removing the system-board assembly - BladeCenter HX5" on page 142 and "Installing the system-board assembly - BladeCenter HX5" on page 144.

Solving undetermined problems

Use this information to diagnose and solve undetermined issues with the blade server.

About this task

Note: When you are diagnosing a problem in the blade server, you must determine whether the problem is in the blade server or in the BladeCenter chassis.

- If all of the blade servers have the same symptom, the problem is probably in the BladeCenter chassis. For more information, see the *Hardware Maintenance Manual and Troubleshooting Guide* or *Problem Determination and Service Guide* for your BladeCenter chassis.
- If the BladeCenter chassis contains more than one blade server and only one of the blade servers has the problem, troubleshoot the blade server that has the problem.

If DSA did not diagnose the failure or if the blade server is inoperative, use the information in this section.

If you suspect that a software problem is causing failures (continuous or intermittent), see "Software problems" on page 270.

Damaged data in CMOS memory or damaged UEFI code can cause undetermined problems. To reset the CMOS data, remove and replace the battery to override the power-on password and clear the CMOS memory; see "Removing the battery" on page 75. If you suspect that the UEFI code is damaged, see "Recovering from a UEFI update failure" on page 46.

Check the LEDs on all the power supplies of the BladeCenter chassis in which the blade server is installed. If the LEDs indicate that the power supplies are working correctly and reseating the blade server does not correct the problem, complete the following steps:
1. Make sure that the control panel connector is correctly seated on the system board (see "Blade server connectors - BladeCenter HX5" on page 13 for the location of the connector).
2. If no LEDs on the control panel are working, replace the bezel assembly; then, try to turn on the blade server from the advanced management module (see the documentation for the BladeCenter chassis and advanced management module for more information).
3. Turn off the blade server.
4. Remove the blade server from the BladeCenter chassis and remove the cover.
5. Remove or disconnect the following devices, one at a time, until you find the failure. Reinstall, turn on, and reconfigure the blade server each time.
   - I/O expansion card.
   - Storage drives.
   - DIMMs. The minimum configuration requirement is 4 GB (two 2 GB DIMMs on the system board).
   The following minimum configuration is required for the blade server to start:

- System board
- One microprocessor
- Two 2 GB DIMMs
- A functioning BladeCenter chassis
6. Install and turn on the blade server. If the problem remains, suspect the following components in the following order:
   a. DIMM
   b. System board
   c. Microprocessor

If the problem is solved when you remove an I/O expansion card from the blade server but the problem recurs when you reinstall the same card, suspect the I/O expansion card; if the problem recurs when you replace the card with a different one, suspect the system board.

If you suspect a networking problem and the blade server passes all the system tests, suspect a network cabling problem that is external to the system.

Appendix. Getting help and technical assistance

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.

Use this information to obtain additional information about IBM and IBM products, determine what to do if you experience a problem with your IBM system or optional device, and determine 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.

If you believe that you require IBM to perform warranty service on your IBM product, the IBM service technicians will be able to assist you more efficiently if you prepare before you call.

- 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.
- Check for updated software, firmware, and operating-system device drivers for your IBM product. The IBM Warranty terms and conditions state that you, the owner of the IBM product, are responsible for maintaining and updating all software and firmware for the product (unless it is covered by an additional maintenance contract). Your IBM service technician will request that you upgrade your software and firmware if the problem has a documented solution within a software upgrade.
- If you have installed new hardware or software in your environment, check http://www.ibm.com/systems/info/x86servers/serverproven/compat/us to make sure that the hardware and software is supported by your IBM product.
- Go to http://www.ibm.com/supportportal to check for information to help you solve the problem.
- Gather the following information to provide to IBM Support. This data will help IBM Support quickly provide a solution to your problem and ensure that you receive the level of service for which you might have contracted.
  - Hardware and Software Maintenance agreement contract numbers, if applicable
  - Machine type number (IBM 4-digit machine identifier)
  - Model number
  - Serial number
  - Current system UEFI and firmware levels
  - Other pertinent information such as error messages and logs
- Go to http://www.ibm.com/support/entry/portal/Open_service_request to submit an Electronic Service Request. Submitting an Electronic Service Request will start the process of determining a solution to your problem by making the pertinent information available to IBM Support quickly and efficiently. IBM service technicians can start working on your solution as soon as you have completed and submitted an Electronic Service Request.

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/supportportal.

Getting help and information from the World Wide Web

Up-to-date information about IBM products and support is available on the World Wide Web.

On the World Wide Web, up-to-date information about IBM systems, optional devices, services, and support is available at http://www.ibm.com/supportportal. IBM System x information is at http://www.ibm.com/systems/x. IBM BladeCenter information is at http://www.ibm.com/systems/bladecenter. IBM IntelliStation information is at http://www.ibm.com/systems/intellistation.

How to send DSA data to IBM

Use the IBM Enhanced Customer Data Repository to send diagnostic data to IBM.

Before you send diagnostic data to IBM, read the terms of use at http://www.ibm.com/de/support/ecurep/terms.html.

You can use any of the following methods to send diagnostic data to IBM:
* **Standard upload:** http://www.ibm.com/de/support/ecurep/send_http.html
* **Standard upload with the system serial number:** http://www.ecurep.ibm.com/app/upload_hw
* **Secure upload:** http://www.ibm.com/de/support/ecurep/send_http.html#secure
* **Secure upload with the system serial number:** https://www.ecurep.ibm.com/app/upload_hw

Creating a personalized support web page

You can create a personalized support web page by identifying IBM products that are of interest to you.

To create a personalized support web page, go to http://www.ibm.com/support/
mynotifications. From this personalized page, you can subscribe to weekly email
notifications about new technical documents, search for information and
downloads, and access various administrative services.

Software service and support

Through IBM Support Line, you can get telephone assistance, for a fee, with usage,
configuration, and software problems with your IBM products.

For information about which products are supported by Support Line in your
country or region, see http://www.ibm.com/services/supline/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 **Business Partner Locator**. 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,
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from 9 a.m. to 6 p.m.

IBM Taiwan product service

Use this information to contact IBM Taiwan product service.

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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:

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Important notes

Processor speed indicates the internal clock speed of the microprocessor; other factors also affect application performance.

CD or DVD drive speed is the variable read rate. Actual speeds vary and are often less than the possible maximum.

When referring to processor storage, real and virtual storage, or channel volume, KB stands for 1024 bytes, MB stands for 1,048,576 bytes, and GB stands for 1,073,741,824 bytes.

When referring to hard disk drive capacity or communications volume, MB stands for 1,000,000 bytes, and GB stands for 1,000,000,000 bytes. Total user-accessible capacity can vary depending on operating environments.

Maximum internal hard disk drive capacities assume the replacement of any standard hard disk drives and population of all hard disk drive bays with the largest currently supported drives that are available from IBM.

Maximum memory might require replacement of the standard memory with an optional memory module.

Each solid-state memory cell has an intrinsic, finite number of write cycles that the cell can incur. Therefore, a solid-state device has a maximum number of write cycles that it can be subjected to, expressed as `total bytes written` (TBW). A device that has exceeded this limit might fail to respond to system-generated commands or might be incapable of being written to. IBM is not responsible for replacement of a device that has exceeded its maximum guaranteed number of program/erase cycles, as documented in the Official Published Specifications for the device.

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IBM makes no representations or warranties with respect to non-IBM products. Support (if any) for the non-IBM products is provided by the third party, not IBM.

Some software might differ from its retail version (if available) and might not include user manuals or all program functionality.

Particulate contamination

Attention: Airborne particulates (including metal flakes or particles) and reactive gases acting alone or in combination with other environmental factors such as humidity or temperature might pose a risk to the device that is described in this document.

Risks that are posed by the presence of excessive particulate levels or concentrations of harmful gases include damage that might cause the device to malfunction or cease functioning altogether. This specification sets forth limits for particulates and gases that are intended to avoid such damage. The limits must not be viewed or used as definitive limits, because numerous other factors, such as temperature or moisture content of the air, can influence the impact of particulates or environmental corrosives and gaseous contaminant transfer. In the absence of specific limits that are set forth in this document, you must implement practices that maintain particulate and gas levels that are consistent with the protection of human health and safety. If IBM determines that the levels of particulates or gases in your environment have caused damage to the device, IBM may condition provision of repair or replacement of devices or parts on implementation of appropriate remedial measures to mitigate such environmental contamination. Implementation of such remedial measures is a customer responsibility.

Table 18. Limits for particulates and gases

Contaminant	Limits
Particulate	• The room air must be continuously filtered with 40% atmospheric dust spot efficiency (MERV 9) according to ASHRAE Standard 52.2[1]. • Air that enters a data center must be filtered to 99.97% efficiency or greater, using high-efficiency particulate air (HEPA) filters that meet MIL-STD-282. • The deliquescent relative humidity of the particulate contamination must be more than 60%[2]. • The room must be free of conductive contamination such as zinc whiskers.
Gaseous	• Copper: Class G1 as per ANSI/ISA 71.04-1985[3] • Silver: Corrosion rate of less than 300 Å in 30 days

Table 18. Limits for particulates and gases (continued)

Contaminant	Limits
[1] ASHRAE 52.2-2008 - *Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size*. Atlanta: American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. [2] The deliquescent relative humidity of particulate contamination is the relative humidity at which the dust absorbs enough water to become wet and promote ionic conduction. [3] ANSI/ISA-71.04-1985. *Environmental conditions for process measurement and control systems: Airborne contaminants*. Instrument Society of America, Research Triangle Park, North Carolina, U.S.A.	

Documentation format

The publications for this product are in Adobe Portable Document Format (PDF) and should be compliant with accessibility standards. If you experience difficulties when you use the PDF files and want to request a web-based format or accessible PDF document for a publication, direct your mail to the following address:

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Electronic emission notices

When you attach a monitor to the equipment, you must use the designated monitor cable and any interference suppression devices that are supplied with the monitor.

Federal Communications Commission (FCC) statement

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio

communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. IBM is not responsible for any radio or television interference caused by using other than recommended cables and connectors or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment.

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

Industry Canada Class A emission compliance statement

This Class A digital apparatus complies with Canadian ICES-003.

Avis de conformité à la réglementation d'Industrie Canada

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

Australia and New Zealand Class A statement

Attention: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

European Union EMC Directive conformance statement

This product is in conformity with the protection requirements of EU Council Directive 2004/108/EC on the approximation of the laws of the Member States relating to electromagnetic compatibility. IBM cannot accept responsibility for any failure to satisfy the protection requirements resulting from a nonrecommended modification of the product, including the fitting of non-IBM option cards.

Attention: This is an EN 55022 Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Responsible manufacturer:

International Business Machines Corp.
New Orchard Road
Armonk, New York 10504
914-499-1900

European Community contact:

IBM Deutschland GmbH
Technical Regulations, Department M372
IBM-Allee 1, 71139 Ehningen, Germany
Telephone: +49 7032 15 2941
Email: lugi@de.ibm.com

Germany Class A statement

Deutschsprachiger EU Hinweis: Hinweis für Geräte der Klasse A EU-Richtlinie zur Elektromagnetischen Verträglichkeit

Dieses Produkt entspricht den Schutzanforderungen der EU-Richtlinie 2004/108/EG zur Angleichung der Rechtsvorschriften über die elektromagnetische Verträglichkeit in den EU-Mitgliedsstaaten und hält die Grenzwerte der EN 55022 Klasse A ein.

Um dieses sicherzustellen, sind die Geräte wie in den Handbüchern beschrieben zu installieren und zu betreiben. Des Weiteren dürfen auch nur von der IBM empfohlene Kabel angeschlossen werden. IBM übernimmt keine Verantwortung für die Einhaltung der Schutzanforderungen, wenn das Produkt ohne Zustimmung der IBM verändert bzw. wenn Erweiterungskomponenten von Fremdherstellern ohne Empfehlung der IBM gesteckt/eingebaut werden.

EN 55022 Klasse A Geräte müssen mit folgendem Warnhinweis versehen werden: **Warnung:** Dieses ist eine Einrichtung der Klasse A. Diese Einrichtung kann im Wohnbereich Funk-Störungen verursachen; in diesem Fall kann vom Betreiber verlangt werden, angemessene Maßnahmen zu ergreifen und dafür aufzukommen.

Deutschland: Einhaltung des Gesetzes über die elektromagnetische Verträglichkeit von Geräten

Dieses Produkt entspricht dem Gesetz über die elektromagnetische Verträglichkeit von Geräten (EMVG). Dies ist die Umsetzung der EU-Richtlinie 2004/108/EG in der Bundesrepublik Deutschland.

Zulassungsbescheinigung laut dem Deutschen Gesetz über die elektromagnetische Verträglichkeit von Geräten (EMVG) (bzw. der EMC EG Richtlinie 2004/108/EG) für Geräte der Klasse A

Dieses Gerät ist berechtigt, in Übereinstimmung mit dem Deutschen EMVG das EG-Konformitätszeichen - CE - zu führen.

Verantwortlich für die Einhaltung der EMV Vorschriften ist der Hersteller:

International Business Machines Corp.
New Orchard Road
Armonk, New York 10504
914-499-1900

Der verantwortliche Ansprechpartner des Herstellers in der EU ist:

IBM Deutschland GmbH
Technical Regulations, Abteilung M372
IBM-Allee 1, 71139 Ehningen, Germany
Telephone: +49 7032 15 2941
Email: lugi@de.ibm.com

Generelle Informationen:

Das Gerät erfüllt die Schutzanforderungen nach EN 55024 und EN 55022 Klasse A.

Japan VCCI Class A statement

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

This is a Class A product based on the standard of the Voluntary Control Council for Interference (VCCI). If this equipment is used in a domestic environment, radio interference may occur, in which case the user may be required to take corrective actions.

Japan Electronics and Information Technology Industries Association (JEITA) statement

> 高調波ガイドライン準用品

Japan Electronics and Information Technology Industries Association (JEITA) Confirmed Harmonics Guidelines with Modifications (products greater than 20 A per phase)

Korea Communications Commission (KCC) statement

This is electromagnetic wave compatibility equipment for business (Type A). Sellers and users need to pay attention to it. This is for any areas other than home.

Russia Electromagnetic Interference (EMI) Class A statement

> ВНИМАНИЕ! Настоящее изделие относится к классу А.
> В жилых помещениях оно может создавать радиопомехи, для снижения которых необходимы дополнительные меры

People's Republic of China Class A electronic emission statement

> 中华人民共和国 "A类" 警告声明
>
> 声 明
> 此为A级产品，在生活环境中，该产品可能会造成无线电干扰。在这种情况下，可能需要用户对其干扰采取切实可行的措施。

Taiwan Class A compliance statement

警告使用者:
這是甲類的資訊產品,在
居住的環境中使用時,可
能會造成射頻干擾,在這
種情況下,使用者會被要
求採取某些適當的對策。

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