System x iDataPlex dx360
Types 6313, 6316, 6385, 6390, 7831, and 7833

IBM

User's Guide

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User's Guide

Note: Before using this information and the product it supports, read the general information in Appendix B, "Notices," on page 45 and the *Warranty and Support Information* document on the IBM *Documentation* CD.

Contents

Safety

Before installing this product, read the Safety Information.

قبل تركيب هذا المنتج، يجب قراءة الملاحظات الآمنية

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

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

安裝本產品之前，請先閱讀「安全資訊」。

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

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.

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.

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 3:

CAUTION:
When laser products (such as CD-ROMs, DVD drives, fiber optic devices, or transmitters) are installed, note the following:

• **Do not remove the covers. Removing the covers of the laser product could result in exposure to hazardous laser radiation. There are no serviceable parts inside the device.**
• **Use of controls or adjustments or performance of procedures other than those specified herein might result in hazardous radiation exposure.**

DANGER

Some laser products contain an embedded Class 3A or Class 3B laser diode. Note the following.

Laser radiation when open. Do not stare into the beam, do not view directly with optical instruments, and avoid direct exposure to the beam.

Statement 5:

CAUTION:
The power control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.
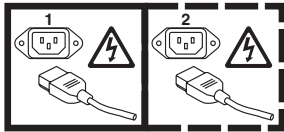
Statement 8:

CAUTION:
Never remove the cover on a power supply or any part that has the following label attached.

Hazardous voltage, current, and energy levels are present inside any component that has this label attached. There are no serviceable parts inside these components. If you suspect a problem with one of these parts, contact a service technician.

Statement 10:

CAUTION:
Do not place any object on top of rack-mounted devices.

Chapter 1. Introduction

IBM® System x™ iDataPlex™ products are ideally suited for data-center environments that require high-performance, energy-efficient, cost-effective hardware. The modular design of the iDataPlex components makes it possible for you to order customized server solutions that meet the specific needs of your current environment.

This *User's Guide* contains general information about how to use, upgrade, and configure the components in the customized server solutions. These components consist of the IBM System x iDataPlex dx360 Type 6316, 6390, or 7833 system-board tray, the IBM System x iDataPlex Types 6313, 6385, or 7831 2U flex chassis, and the IBM System x iDataPlex storage enclosure.

With the exception of the warranty period, the iDataPlex Types 6313, 6316, 6385, 6390, 7831, and 7833 products are functionally equivalent as follows:
- IBM System x iDataPlex dx360 system-board tray Types 6316, 6390, and 7833 are functionally equivalent
- IBM System x iDataPlex 2U flex chassis Types 6313, 6385, and 7831 are functionally equivalent

Depending on what you ordered, you received one or more of the following server solutions:
- Two dx360 system-board trays installed in a 2U chassis
- One dx360 system-board tray and one storage enclosure installed in a 2U chassis

See Chapter 2, "Components, features, and controls," on page 9 for detailed information about the components in the customized server solutions.

The iDataPlex products come with a limited warranty. For information about the terms of the warranty and getting service and assistance, see the *Warranty and Support Information* document.

You can obtain up-to-date information about the server and other IBM server products at http://www.ibm.com/systems/x/.

The system-board tray serial number is on a label at the front of the system-board tray to the left of the operator panel. The system-board tray baseboard management controller (BMC) media access control (MAC) address is on a label at the front of the system-board tray to the left of the PCIe slot. The chassis machine type and serial number are on a label on the front of the chassis at the right side. Label locations are shown in the illustration following the table. This illustration might differ slightly from your hardware.

Record information about the server in the following table.

Product name	IBM System x iDataPlex dx360
Machine type (system-board tray)	Type _____
Serial number (system-board tray)	_____
BMC MAC address (system-board tray)	_____
Machine type (chassis)	Type _____ (2U chassis)
Serial number (chassis)	_____

Serial number

MAC address

Serial number

System-board tray
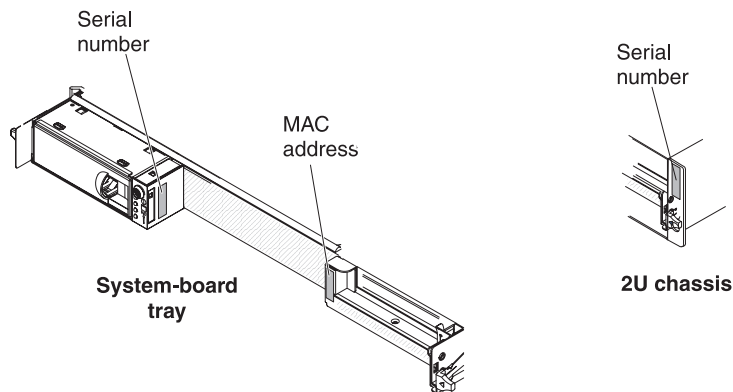
2U chassis

Related documentation

In addition to the printed *Important Notices* document and this *User's Guide*, the following documentation for the dx360 system-board tray and 2U flex chassis is provided in Portable Document Format (PDF) on the IBM *Documentation* CD:

- *Warranty and Support Information*

  This document contains information about the terms of the warranty and getting service and assistance.

- *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.

- *Problem Determination and Service Guide*

  This document contains information to help you solve problems yourself, and it contains information for service technicians.

Depending on the hardware configuration, additional documentation might be included on the IBM *Documentation* CD.

The iDataPlex documentation might be updated occasionally, or technical updates might be available to provide additional information that is not included in the documentation. These updates are available from the IBM Systems Information Center. To check for updated iDataPlex information and technical updates, go to http://publib.boulder.ibm.com/infocenter/idataplx/documentation/index.jsp .

The updated iDataPlex documentation also is available from the IBM Support Web site. To check for updated documentation and technical updates, complete the following steps.

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

1. Go to http://www.ibm.com/systems/support/.
2. Under **Product support**, click **System x**.
3. Under **Popular links**, click **Publications lookup**.
4. From the **Product family** menu, select **System x iDataPlex dx360 server** and click **Go**.

The IBM Documentation CD

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

Hardware and software requirements

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

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

Using the Documentation Browser

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

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

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

    `e:\win32.bat`

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

    `sh runlinux.sh`

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

When you select a document, a description of the document is displayed under **Topic Description**. To select more than one document, press and hold the Ctrl key

while you select the documents. Click **View Book** to view the selected document or documents in Acrobat Reader or xpdf. If you selected more than one document, all the selected documents are opened in Acrobat Reader or xpdf.

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

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

Notices and statements in this document

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

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

Features and specifications

The following information is a summary of the features and specifications of the hardware. Depending on the hardware configuration, some features might not be available, or some specifications might not apply.

Racks are marked in vertical increments of 4.45 cm (1.75 inches). Each increment is referred to as a unit, or "U." A 1U-high device is 1.75 inches tall.

Table 1. Features and specifications

Microprocessor: Supports two dual-core or quad-core Intel® Xeon microprocessors in each system-board tray
Note: Use the BIOS Setup Utility program to determine the type and speed of the microprocessor.
 	
Memory:
• Four-channel DIMMs: 16 DIMM connectors
• Types: Fully buffered double-data rate (DDR2) 667 MHz DIMMs with AMB+ or DDR2 800 MHz DIMMs with AMB+
• Supports 2 GB and 4 GB DIMMs (as of the date of this publication) with up to 64 GB of total memory in each system-board tray
 	
Hard disk drives:
• The system-board tray supports one 3.5-inch simple-swap SAS or one 3.5-inch simple-swap SATA hard disk drive.
• The system-board tray with a storage enclosure attached can support up to four 3.5-inch simple-swap SAS hard disk drives or up to five 3.5-inch simple-swap SATA hard disk drives.
	PCI expansion slots:
	• Each system-board tray supports one PCIe expansion slot
	
	Integrated functions:
	• Intel baseboard management controller (BMC) with Intelligent Platform Management Interface (IPMI) 2.0 compliant firmware
	• ATI ES1000 video controller with 32 MB DDR2 SDRAM
	• Dual 10 Mb/100 Mb/1 GB network interface controllers
	• Wake on LAN support
	• I/O Controller with six Serial ATA (SATA) ports
	• Front panel connectors:
	  – Two Universal Serial Bus (USB) 2.0 ports
	  – One systems management serial port
	  – VGA video port
	  – Two Ethernet ports
		Size (2U chassis):
		• Height: 86 mm (3.386 inches)
		• Depth: 473 mm (18.6 inches)
		• Width: 446 mm (17.56 inches)
		• Maximum weight: 6.98 kg (15.5 lb)
		
		Environment:
		• Air temperature:
		  – Server on: 10°C to 35°C (50°F to 95°F); altitude: 0 to 914.4 m (0 to 3000 ft). Derate maximum temperature by 1°C for every 304.8 m (1000 ft) increase in elevation to a maximum of 3,048.0 m (10000 ft) at an ambient temperature of 28°C.
		  – Server off: 10°C to 43°C (59°F to 109.4°F); maximum altitude: 2133 m (7000 ft)
		• Humidity:
		  – Server on: 10% to 80%
		  – Server off: 8% to 80%
		
		Electrical Input:
		• Input voltage low range: 100 V ac (minimum) to 127 V ac (maximum), 50 to 60 Hz, sine-wave input
		• Input voltage high range: 200 V ac (minimum) to 240 V ac (maximum), 50 to 60 Hz, sine-wave input

What your dx360 system-board tray offers

The dx360 system board uses the following features and technologies:

- **Active PCI Express x16 adapter capabilities**

  The dx360 system-board tray has one connector for PCI Express Generation two x16 adapters.

- **Baseboard management controller**

  The Intel baseboard management controller provides basic service-processor environmental monitoring functions. If an environmental condition exceeds a threshold or if a system component fails, the baseboard management controller lights LEDs to help you diagnose the problem and records the error in the error log. The baseboard management controller also provides remote server management capabilities, using the Intelligent Platform Management Interface (IPMI) version 2.0 protocol.

  Note: In messages and documentation, the term *service processor* refers to the baseboard management controller.

- **Dynamic System Analysis (DSA) programs**

  The DSA programs collect and analyze system information to aid in diagnosing problems. The diagnostic programs collect the following information:

  - System configuration
  - Network interfaces and settings
  - Installed hardware
  - Service processor status and configuration
  - Vital product data, firmware, and BIOS configuration
  - Hard disk drive health

  The diagnostic programs create a merged log that includes events from all collected logs. The information is collected into a file that you can send to IBM service and support. Additionally, you can view the information locally through a generated text report file. You also can copy the log to removable media and view the log from a Web browser.

- **High-performance graphics controller**

  The server comes with an integrated graphics controller. This high-performance controller supports high resolutions and includes many performance-enhancing features for the operating-system environment.

- **Integrated network support**

  The server comes with dual integrated Gigabit Ethernet controllers, which support connections to a 10 Mbps, 100 Mbps, or 1000 Mbps network. For more information, see "Configuring the Gigabit Ethernet controller" on page 38.

- **Large data-storage capacity**

  The dx360 supports one 3.5-inch simple-swap SAS or SATA hard disk drive in the system-board tray. With the storage enclosure attached, the dx360 can support up to four simple-swap SAS hard disk drives or up to five simple-swap SATA hard disk drives.

- **Large system-memory capacity**

  The dx360 supports up to 64 GB of system memory. The memory controller supports error correcting code (ECC) for up to sixteen industry-standard, 240-pin, double-data-rate 2 (DDR2) 667 MHz or 800 MHz, fully-buffered dual inline memory modules (DIMMs).

- **Redundant connection**

  The system-board tray provides a failover capability to a redundant Ethernet connection. If a problem occurs with the primary Ethernet connection, all Ethernet traffic that is associated with the primary connection is automatically switched to the redundant NIC. If the applicable device drivers are installed, this switching occurs without data loss and without user intervention.

- **Symmetric multiprocessing (SMP)**

  The dx360 comes with two Intel dual-core or quad-core Xeon microprocessors.

- **Systems-management capabilities**

  The dx360 supports IPMI version 2.0 over LAN system management protocol. It supports an optional rack-level management controller that uses industry-standard management tools.

Reliability, availability, and serviceability

Three important hardware and software design features are reliability, availability, and serviceability (RAS). The RAS features help to ensure the integrity of the data that is stored in the hardware, the availability of the hardware and software when you need it, and the ease with which you can diagnose and correct problems.

The dx360 system-board tray has the following RAS features:

- Advanced Configuration and Power Interface (ACPI)
- Advanced Desktop Management Interface (DMI) features
- Automatic error retry or recovery
- Automatic memory downsizing on error detection
- Automatic restart on nonmaskable interrupt (NMI)
- Automatic Server Restart (ASR) logic supporting a system restart when the operating system becomes unresponsive
- Automatic restart after a power failure, based on the BIOS setting
- Boot-block recovery
- Built-in monitoring for fan, power, temperature, and voltage
- Customer support center that is available 24 hours a day, 7 days a week[1]
- Error codes and messages
- Memory change messages posted to the error log
- Power-on self-test (POST) with error logging of POST failures
- Power management
- Integrated Ethernet controllers
- Read-only memory (ROM) checksums
- Redundant Ethernet capabilities with failover support
- Simple-swap Serial Attached SCSI (SAS) hard disk drives
- Simple-swap Serial Advanced Technology Attachment (SATA) hard disk drives
- Standby voltage for systems-management features and monitoring
- System auto-configuring from the configuration menu
- System-error LED on the front bezel
- Upgradeable BMC firmware

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1. Service availability will vary by country. Response time varies; may exclude holidays.

- Upgradeable microcode for POST, basic input/output system (BIOS) code, and read-only memory (ROM) resident code, locally or over a LAN
- Vital product data (VPD); includes serial-number information and replacement part numbers, stored in nonvolatile memory, for easier remote maintenance
- Wake on LAN capability

The Update*Xpress* program

The Update*Xpress* program detects supported and installed device drivers and firmware in the server and installs available updates. You can download the Update*Xpress* program from the Web at no additional cost, or you can purchase it on a CD. To download the program or purchase the CD, go to http://www.ibm.com/systems/management/xpress.html. Additional information about Update*Xpress* is available from the Tools Center at http://publib.boulder.ibm.com/infocenter/toolsctr/v1r0/index.jsp.

Note: To install the Update*Xpress* program, you might need to use an external USB CD-RW/DVD drive such as the IBM and Lenovo part number 73P4515 or 73P4516. See "Firmware updates" on page 39 for additional instructions about using an external USB CD-RW/DVD drive.

Chapter 2. Components, features, and controls

This section describes the server components and configurations, the server controls and light-emitting diodes (LEDs), and how to turn the system-board tray on and off.

System-board tray components

The following illustration shows the major components in the dx360 system-board tray.

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

System board tray cover

PCIe adapter
(some configurations)

One-slot riser
assembly

Heat-sink

Microprocessor

DIMM

System board

Power supply
paddle card

3.5-inch simple-swap
hard disk drive
(some configurations)

3.5-inch filler panel
(some configurations)
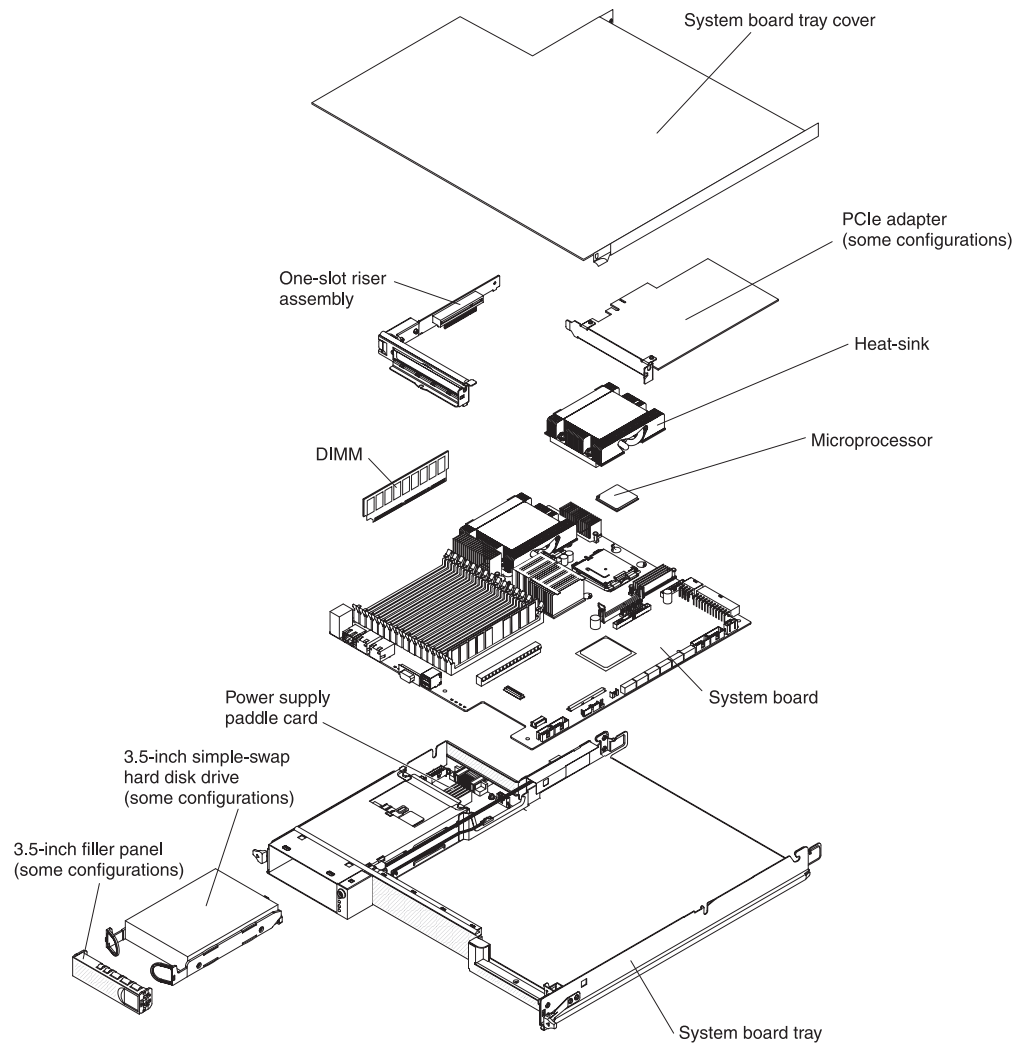
System board tray

System-board connectors

The following illustration shows the locations of internal connectors on the system board that are used for installing options. See "Operator panel controls, LEDs, connectors, and power" on page 13 for information about the external connectors. See the *Problem Determination and Service Guide* for information about the other system-board connectors.

Microprocessor 1   Microprocessor 2

Battery

SATA 0
SATA 1
SATA 2
SATA 3
SATA 4
SATA 5

PCIe x16 riser card connector

DIMM D4
DIMM D3
DIMM D2
DIMM D1
DIMM C4
DIMM C3
DIMM C2
DIMM C1

DIMM A1
DIMM A2
DIMM A3
DIMM A4
DIMM B1
DIMM B2
DIMM B3
DIMM B4
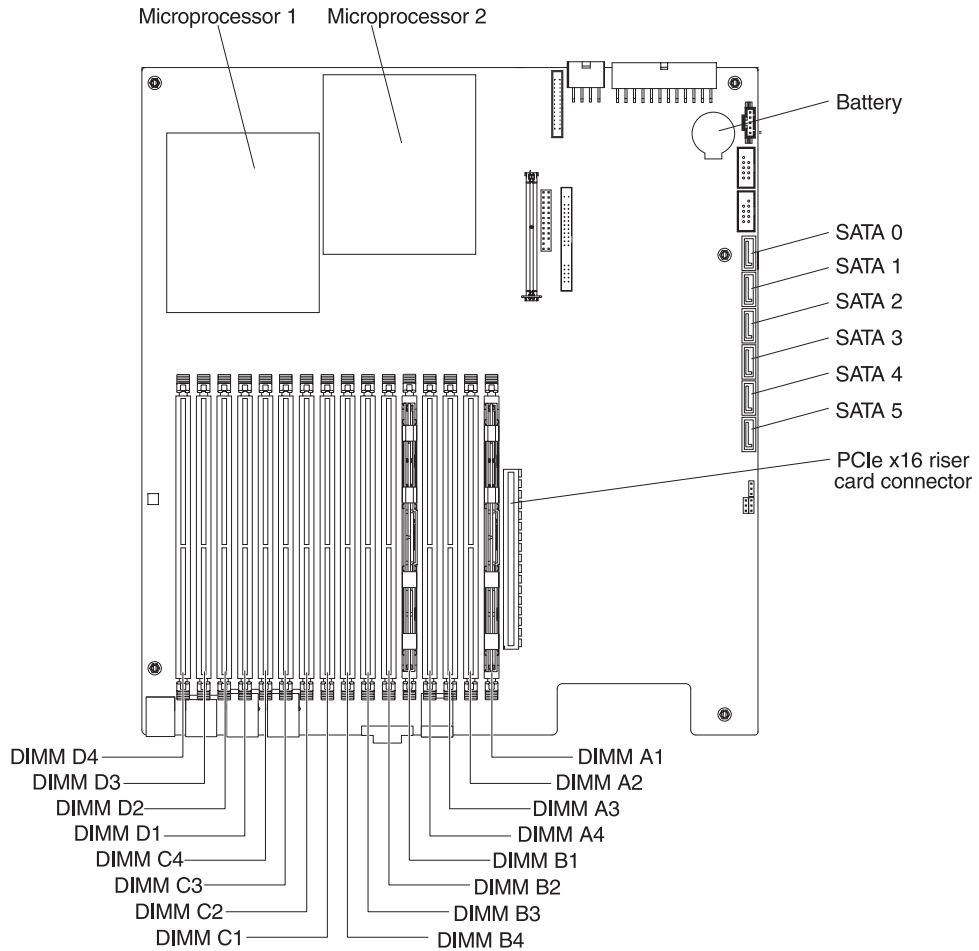
System-board switches and jumpers

The following illustration shows the locations of the jumpers on the system board that relate to selected system functions. See the *Problem Determination and Service Guide* for more information about using switches and jumpers on the system board.
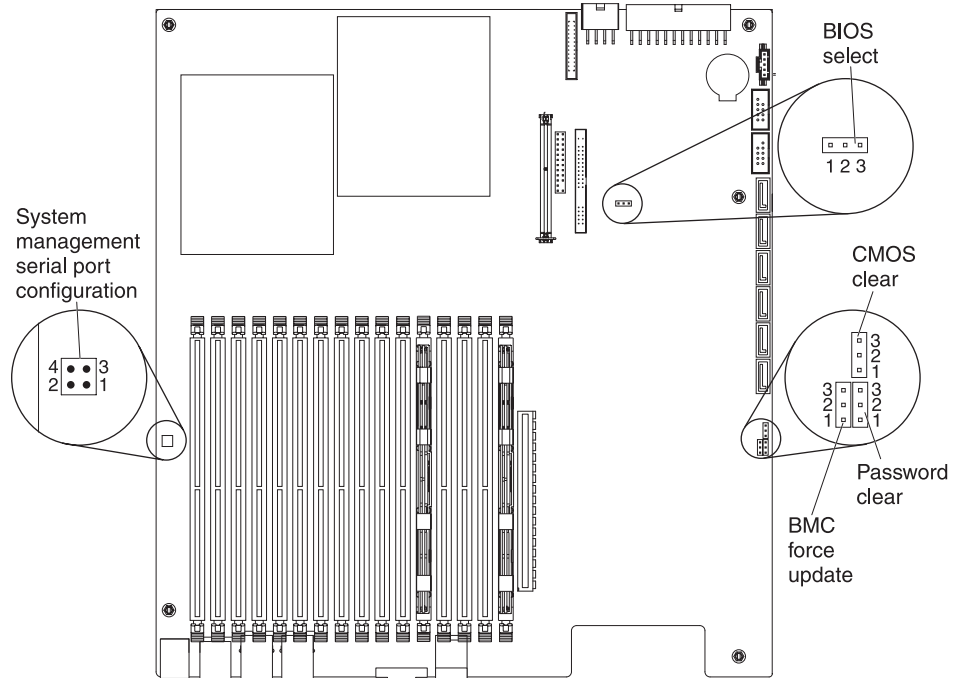
Flexible chassis features

The following illustration shows an IBM System x iDataPlex 2U flex chassis. The 2U chassis contains a power supply and a fan assembly that provide operating power and cooling for all components in the chassis. The 2U chassis can support two system-board trays or one system-board tray with a storage enclosure.

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

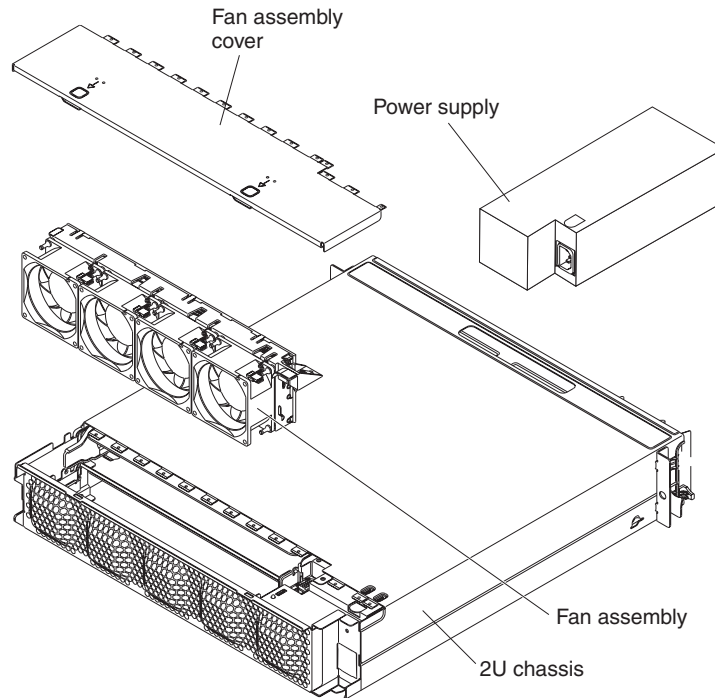# Hardware configuration examples

The iDataPlex 2U flex chassis supports the following dx360 server configurations:

- 2U compute server: A 2U chassis that contains two dx360 system-board trays
- 2U storage server: A 2U chassis that contains one dx360 system-board tray and an optional storage enclosure

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

2U compute server

The 2U compute server consists of two identical dx360 system-board trays installed in a 2U flex chassis. Each system-board tray has one PCIe adapter connector and one 3.5–inch hard disk drive bay.

One hard disk drive bay per system-board tray

One PCIe slot per system-board tray

2U flex chassis
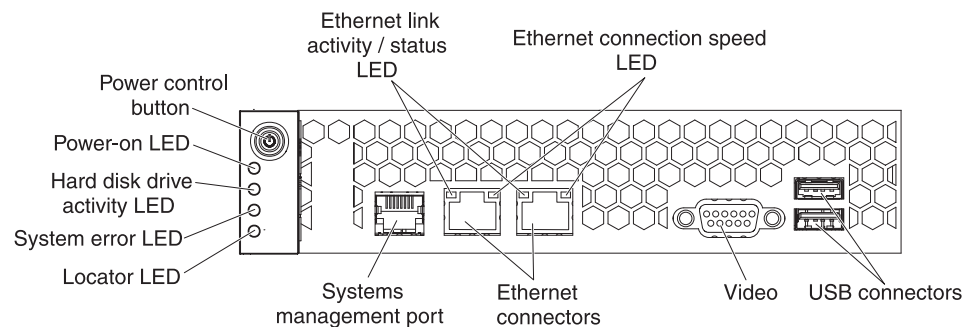with two dx360 system-board trays
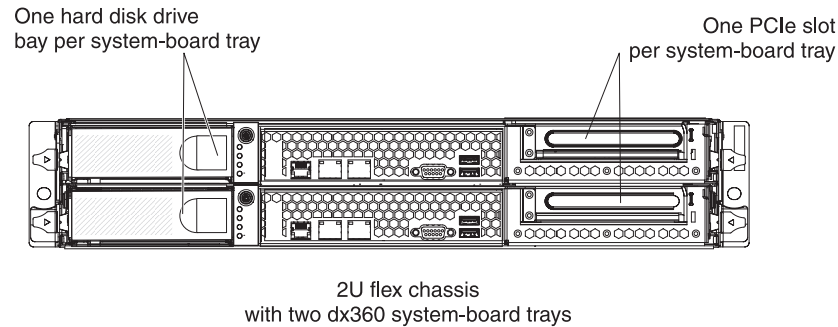
2U storage server

The 2U storage server consists of one dx360 system-board tray with the storage enclosure installed in a 2U flex chassis. The storage enclosure provides four additional 3.5–inch hard disk drive bays for the system-board tray, for a total of five. Depending on the server configuration, you can configure the 2U storage server with up to four 3.5–inch simple-swap SAS hard disk drives or up to five 3.5–inch simple-swap SATA hard disk drives.

Storage enclosure   Five hard disk drive bays

dx360 system-board tray   One PCIe slot

2U flex chassis
with one dx360 system-board tray
and storage enclosure
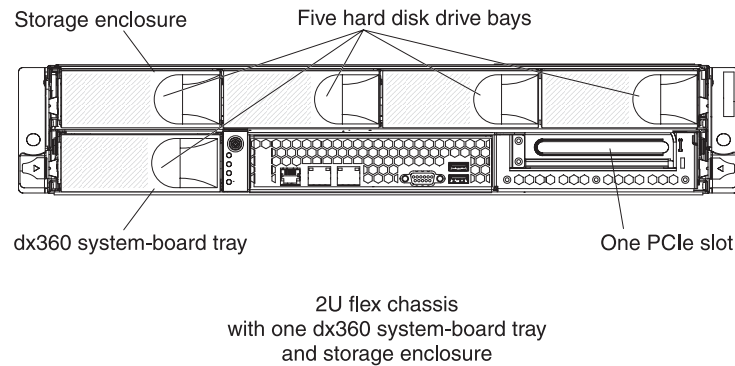
Operator panel controls, LEDs, connectors, and power

The following illustration shows the controls, LEDs, and connectors on the front of the dx360 system-board tray. The operator panel on the system-board tray is the same for all dx360 server configurations.

Ethernet link activity / status LED

Ethernet connection speed LED

Power control button

Power-on LED

Hard disk drive activity LED

System error LED

Locator LED

Systems management port

Ethernet connectors

Video

USB connectors

Power-control button: Press this button to turn the system-board tray on and off manually.

Note: You can also remove the power-control button cover for easier access to the power-control button.

Ethernet link activity/status LED: This LED is on each Ethernet connector. It indicates that there is an active connection on the Ethernet port. When this LED is flashing, it indicates that there is activity between the server and the network.

Ethernet connection speed LED: This LED is on each Ethernet connector. The status of this LED indicates the connection speed between the system-board tray and the network as follows:

- LED off: 10 Mbps connection
- LED lit Amber: 100 Mbps connection
- LED lit Green: 1000 Mbps connection

USB connectors: Connect USB 2.0 devices to these connectors.

Video connector: Connect a monitor to this connector.

Ethernet connectors: Use these connectors to connect the server to a network.

Systems management port: Connect a systems management device to this serial connector.

Locator LED: This LED can be lit remotely by the system administrator to aid in visually locating the server.

System-error LED: When this LED is lit, it indicates that a system error has occurred. The source of the error is logged in the BMC system-event log that is accessed in the BIOS Setup Utility program.

Hard disk drive activity LED: When this LED is flashing, it indicates that an associated hard disk drive is in use.

Power-on LED: When this LED is lit, it indicates that the system-board tray is turned on. When this LED is off, it indicates that ac power is not present or the power supply or the LED itself has failed.

Note: If this LED is off, it does not mean that no electrical power is present. The LED might be burned out. To remove all electrical power, you must disconnect the power cord from the chassis.

Rear connectors

Power-cord connector: Connect the power cord to this connector. When the chassis is installed in an iDataPlex rack, it is connected automatically to power through a power cord that is mounted to the rack rail.

Power-cord connector
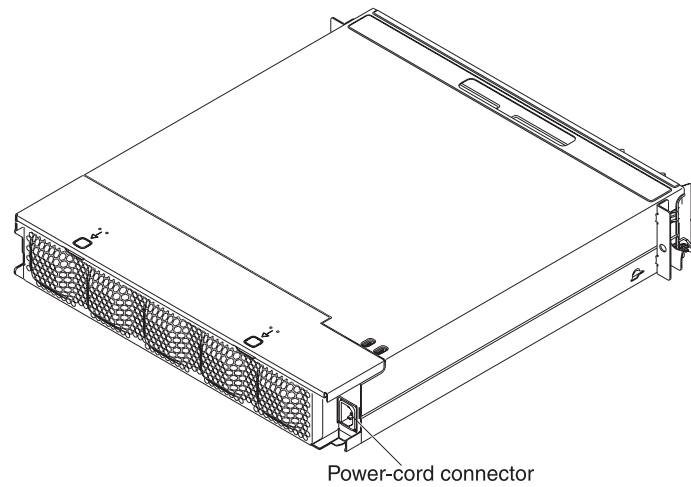
Turning on the system-board tray

After you install the system-board tray in a chassis, the system-board tray can start in any of the following ways:

Important: To avoid potential problems during startup, disconnect any USB keys from the system that contain the Smart Launch Utility before you turn on the system-board tray.

- You can press the power-control button on the front of the system-board tray (see "Operator panel controls, LEDs, connectors, and power" on page 13) to start the system-board tray.
- In an IPMI environment, the system administrator can turn on the system-board tray using the BMC IPMI **Chassis Control** command. See "Setting the BMC IP parameters" on page 40 for instructions to display or change baseboard management controller IP parameters.
- If a power failure occurs, the system-board tray can start automatically when power is restored, if it is configured to do so.

Turning off the system-board tray

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

Shut down the operating system before you turn off the system-board tray. See the operating-system documentation for information about shutting down the operating system.

The system-board tray can be turned off in any of the following ways:

- You can press the power-control button on the front of the system-board tray (see "Operator panel controls, LEDs, connectors, and power" on page 13). This starts an orderly shutdown of the operating system, if this feature is supported by the operating system.
- You can turn off the system-board tray from the operating system, if the operating system supports this feature. After an orderly shutdown of the operating system, the system-board tray will be turned off automatically.
- In an IPMI environment, the system administrator can turn off the system-board tray by using the BMC IPMI **Chassis Control** command.
- If the operating system stops functioning, you can press and hold the power-control button for more than 4 seconds to turn off the system-board tray.
- You might be able to turn off the system-board tray by using an optional management appliance.
  - If the system is not operating correctly, the management appliance might automatically turn off the system-board tray.
  - Through the management appliance control interface, you might also be able to configure the management appliance to turn off the system-board tray. For additional information, see the documentation for your management appliance.

Chapter 3. Installing optional devices

This section provides detailed instructions for installing optional hardware devices.

Installation guidelines

Before you install optional devices, read the following information:

- Read the safety information that begins on page v and "Handling static-sensitive devices" on page 18. This information will help you work safely.
- Before you install optional hardware devices, make sure that the server is working correctly. Start the server, and make sure that the operating system starts, if an operating system is installed, or that a I9990305 error code is displayed, indicating that an operating system was not found but the server is otherwise working correctly. If the server is not working correctly, see the *Problem Determination and Service Guide* for diagnostic information.
- Observe good housekeeping in the area where you are working. Place removed covers and other parts in a safe place.
- Do not attempt to lift an object that you think is too heavy for you. If you have to lift a heavy object, observe the following precautions:
  - Make sure that you can stand safely without slipping.
  - Distribute the weight of the object equally between your feet.
  - Use a slow lifting force. Never move suddenly or twist when you lift a heavy object.
  - To avoid straining the muscles in your back, lift by standing or by pushing up with your leg muscles.
- Back up all important data before you make changes to disk drives.
- Have a small flat-blade screwdriver and a small Phillips screwdriver available.
- You do not have to turn off the system-board tray to install or replace hot-plug Universal Serial Bus (USB) devices. However, you must shut down the operating system and turn off the system-board tray before you install or remove simple-swap drives.
- Blue on a component indicates touch points, where you can grip the component to remove it from or install it in the server, open or close a latch, and so on.
- Orange on a component or an orange label on or near a component indicates that the component can be hot-swapped, which means that if the server and operating system support hot-swap capability, you can remove or install the component while the server is running. (Orange can also indicate touch points on hot-swap components.) See the instructions for removing or installing a specific hot-swap component for any additional procedures that you might have to perform before you remove or install the component.

System reliability guidelines

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

- Each of the drive bays has a drive or a filler panel and electromagnetic compatibility (EMC) shield installed in it.
- You have followed the cabling instructions that come with optional adapters.
- The system-board tray battery is operational. If the battery becomes defective, replace it immediately.

Handling static-sensitive devices

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

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

- Limit your movement. Movement can cause static electricity to build up around you.
- The use of a grounding system is recommended. For example, wear an electrostatic-discharge wrist strap, if one is available.
- 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 surface on the outside of the chassis or rack 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 system-board tray or storage enclosure 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 a metal surface.
- Take additional care when you handle devices during cold weather. Heating reduces indoor humidity and increases static electricity.

Removing a system-board tray from a 2U chassis

Attention: When two system-board trays are installed in the chassis, do not operate the upper system-board tray with the bottom system-board tray removed or powered off, except for servicing. When the bottom system-board tray is removed or powered-off, chassis-level system management information is not read correctly. For example, chassis fan speeds and temperatures might be returned as zero values. In this situation, the unit will continue to operate normally, since the power supply and fans are designed to operate independently.
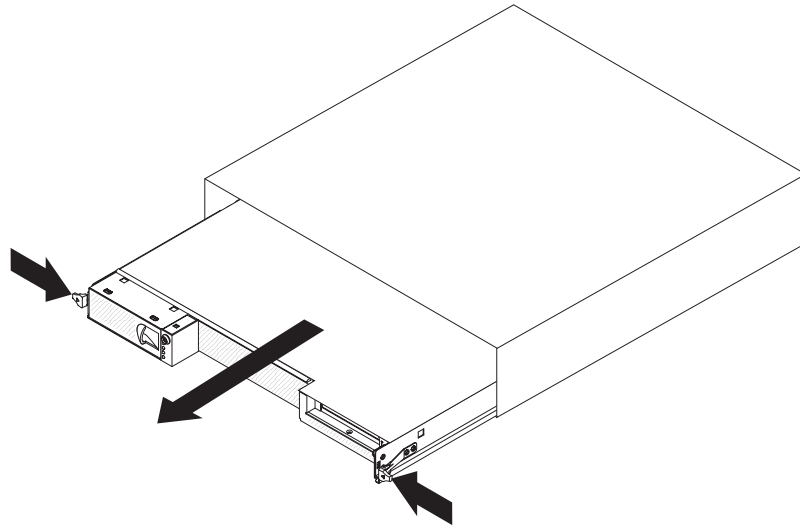

Notes:

1. If two system-board trays are installed in the chassis, they can be removed independently of each other.
2. If a storage enclosure is installed on the system-board tray, you will remove the storage enclosure and the system-board tray from the chassis as one assembly.

To remove a system-board tray from the chassis, complete the following steps.

1. Read the safety information that begins on page v and "Installation guidelines" on page 17.
2. Turn off the system-board tray and all attached devices (see "Turning off the system-board tray" on page 16).
3. If external cables are connected to the front of the system-board tray, note where they are connected; then, remove them.
4. Press in on the two release handles, pull the system-board tray and storage enclosure, if one is attached, out of the chassis, and set it on a flat, static-protective surface.

Removing the system-board tray cover

Note: If a storage enclosure is installed on the system-board tray, remove it (see "Removing a storage enclosure" on page 21).
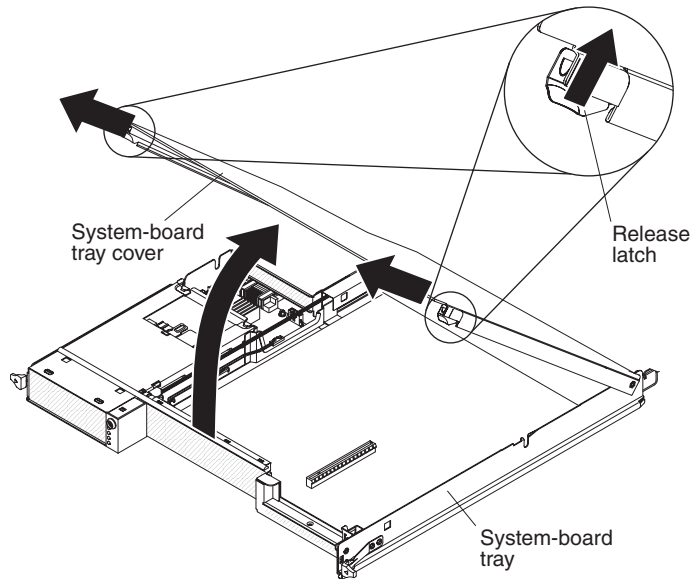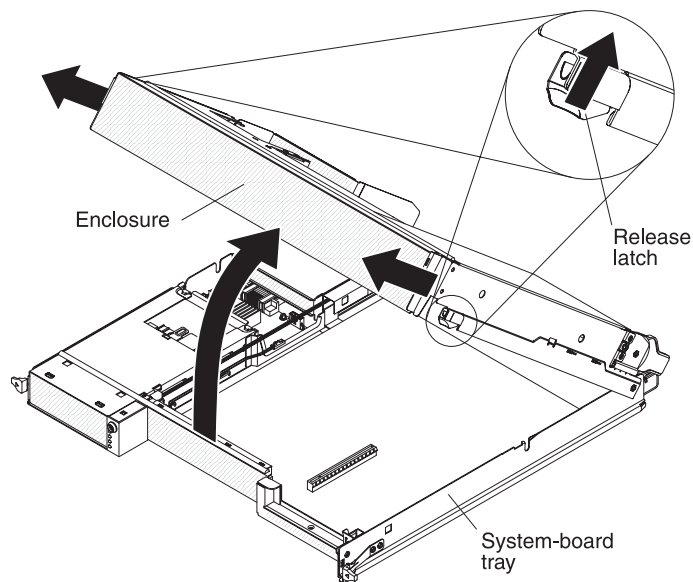

To remove the system-board tray cover, complete the following steps:

1. Read the safety information that begins on page v and "Installation guidelines" on page 17.
2. Turn off the system-board tray and all attached devices (see "Turning off the system-board tray" on page 16).
3. If the system-board tray is installed in a chassis, remove it (see "Removing a system-board tray from a 2U chassis" on page 19).
4. Carefully set the system-board tray on a flat, static-protective surface, with the cover side up.
5. Pull the cover release latch on each side of the system-board tray upward; then, lift the cover open.
6. Lift the cover off the system-board tray and store it for future use.

Note: If two system-board trays are installed in a 2U chassis, both must have their covers installed.
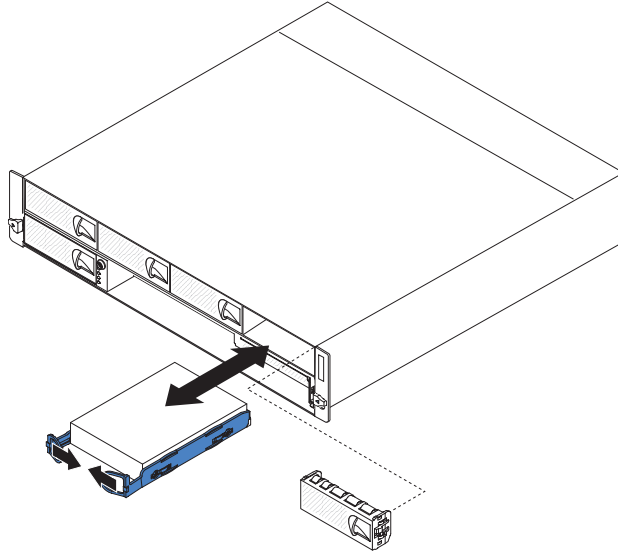
Removing a storage enclosure

To remove a storage enclosure from the system-board tray, complete the following steps:

1. Read the safety information that begins on page v and "Installation guidelines" on page 17.

2. Turn off the system-board tray and all attached devices (see "Turning off the system-board tray" on page 16).

3. If the system-board tray is installed in a chassis, remove it (see "Removing a system-board tray from a 2U chassis" on page 19).

4. Carefully set the system-board tray on a flat, static-protective surface.

5. Note the cable routing and connection locations; then, disconnect the cables that connect the storage enclosure to the system-board tray.

6. Pull the release latch on each side of the system-board tray outward; then, rotate the storage enclosure open.

7. Using care not to pull on the cables, lift the storage enclosure from the system-board tray and carefully set it on a flat, static-protective surface.

Removing a 3.5-inch simple-swap hard disk drive

Note: The following illustration shows how to remove a 3.5-inch simple-swap hard disk drive from a storage enclosure. Removing a 3.5-inch simple-swap hard disk drive from a system-board tray is similar.

To remove a simple-swap hard disk drive, complete the following steps:

1. Read the safety information that begins on page v and "Installation guidelines" on page 17.
2. Turn off the system-board tray and all attached devices (see "Turning off the system-board tray" on page 16).
3. Remove the filler panel from the simple-swap hard disk drive bay.
4. Pull the loops of the drive toward each other; then, pull the drive out of the drive bay.

   Note: A hard disk drive or filler panel must always be installed in each drive bay when the server is turned on. Simple-swap disk drives must always have a filler panel installed along with the hard disk drive.
5. Store the drive and filler panel for later use.

Installing an adapter

The following notes describe the types of adapters that the server supports and other information that you must consider when you install an adapter:

- Locate the documentation that comes with the adapter and follow those instructions in addition to the instructions in this section. If you have to change the switch setting or jumper settings on the adapter, follow the instructions that come with the adapter.
- The server comes with a one-slot PCI Express (PCIe) riser card. The riser card slot supports PCIe x16 adapters.

Notes:

1. The one-slot riser card supports installation of only half-length, full-height adapters.
2. The maximum power consumption from all supply voltages for a single PCIe slot is the same as specified in PCI Local Bus Specification Revision 2.3 for conventional slots (25 W).

One-slot riser card assembly

PCIe adapter

System-board tray

Riser-card assembly connector
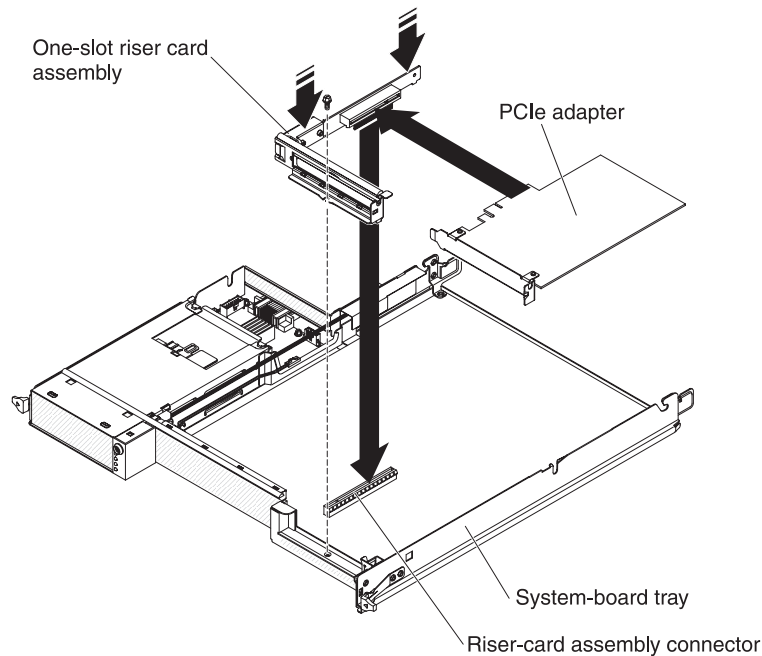
To install an adapter in the system-board tray, complete the following steps:

1. Read the safety information that begins on page v and "Installation guidelines" on page 17.
2. Turn off the system-board tray and all attached devices (see "Turning off the system-board tray" on page 16).
3. If the system-board tray is installed in a chassis, remove it (see "Removing a system-board tray from a 2U chassis" on page 19).
4. If a storage enclosure is installed on the system-board tray, remove it (see "Removing a storage enclosure" on page 21); otherwise, remove the system-board tray cover (see "Removing the system-board tray cover" on page 20).
5. Remove the riser card retaining screw on the front of the system-board tray. Store the screw for future use.

Note: If an adapter is already installed in the riser card, the riser card and adapter are removed together.

6. Carefully grasp the one-slot riser card by its top edge or upper corners, and pull the riser card straight up and out of the system-board tray.

7. Carefully set the riser card on a flat, static-protective surface. If an adapter is installed in the riser card, remove it.

8. Touch the static-protective package that contains the adapter that you are installing to any unpainted metal surface on the system-board tray; then, remove the adapter from the static-protective package. Avoid touching the components and gold-edge connectors on the adapter.

9. Follow the instructions that come with the adapter to set any jumpers or switches.

10. Carefully grasp the adapter by the top edge or upper corner and insert it in the one-slot riser card. Align the adapter with the riser card connector; then, press the adapter firmly into the connector.

   Note: Make sure that the adapter is inserted correctly. Improper installation of an adapter might damage the PCIe riser-card assembly or the adapter.

11. Follow the cabling instructions, if any, that come with the adapter. If possible, route the adapter cables before you install the adapter.

12. Pinch the two sides of the one-slot riser card, and align the riser card with the riser-card connector on the system board; then, press the riser card firmly, evenly with both hands, into the connector.

13. Install the riser card retaining screw at the front of the system-board tray.

If you have other devices to install or remove, do so now. Otherwise, go to "Completing the installation" on page 30.

Installing a 3.5-inch simple-swap hard disk drive

Note: The following illustration shows how to install a 3.5-inch simple-swap hard disk drive in a storage enclosure. Installing a 3.5-inch simple-swap hard disk drive in the system-board tray is similar.
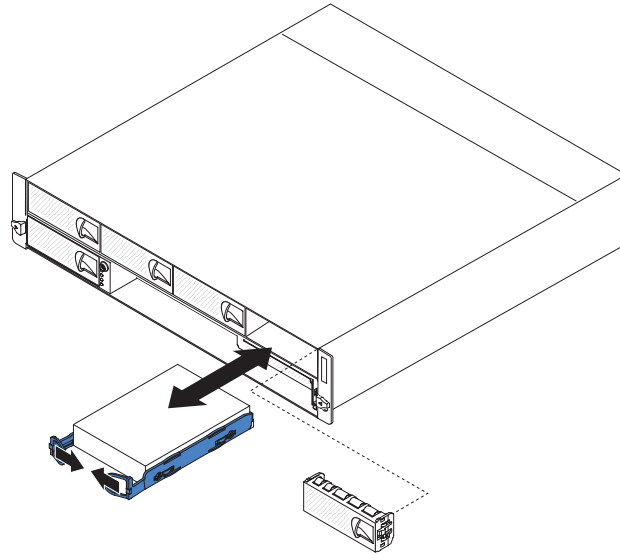
To install a 3.5-inch simple-swap hard disk drive, complete the following steps:

1. Read the safety information that begins on page v and "Installation guidelines" on page 17.
2. Turn off the system-board tray and all attached devices (see "Turning off the system-board tray" on page 16).
3. Remove the filler panel from the simple-swap hard disk drive bay.
4. Touch the static-protective package that contains the hard disk drive to any *unpainted* metal surface on the outside of the system-board tray for at least 2 seconds; then, remove the hard disk drive from the package.

   Attention: Do not press on the top of the drive. Pressing the top might damage the drive.
5. Align the drive with the guide rails in the drive bay.
6. Pull the loops of the drive toward each other; then, carefully slide the drive into the bay until it stops, and release the loops.

   Note: Do not release the loops on the drive until it is completely seated.
7. Install the filler panel in the simple-swap hard disk drive bay.

If you have other devices to install, do so now. Otherwise, turn on the system-board tray (see "Turning on the system-board tray" on page 16).

Note: If the server has a PCIe RAID adapter and you install or remove a hard disk drive, see the documentation that comes with your RAID adapter for more information about re-configuring the disk arrays.

Installing a memory module

The following paragraphs describe the types of dual inline memory modules (DIMMs) that the system-board tray supports and other information that you must consider when you install DIMMs.

- The system-board tray supports only industry-standard, 1.8 V, 240-pin double-data-rate 2 (DDR2), 667 MHz or 800 MHz, fully-buffered, dual inline memory modules (DIMMs) with error correcting code (ECC). These DIMMs must be compatible with the latest DDR2 buffered DIMM specification.
- The server supports a minimum of 2 GB and a maximum of 64 GB of system memory.
- The amount of usable memory depends on the system configuration. Some memory is reserved for system resources. To view the total amount of installed memory and the amount of configured memory, run the Configuration/Setup Utility program and select **System Summary** from the menu. For additional information, see Chapter 4, "Configuring the dx360 server," on page 35.
- When you restart the server after you add or remove a DIMM, the server displays a message that the memory configuration has changed.

The dx360 system board contains sixteen DIMM connectors organized into four fully-buffered DIMM memory channels (A, B, C, and D) and two branches (0 and 1). Each branch is supported by a separate memory controller.

The following illustration shows DIMM slot organization on the dx360 system board.
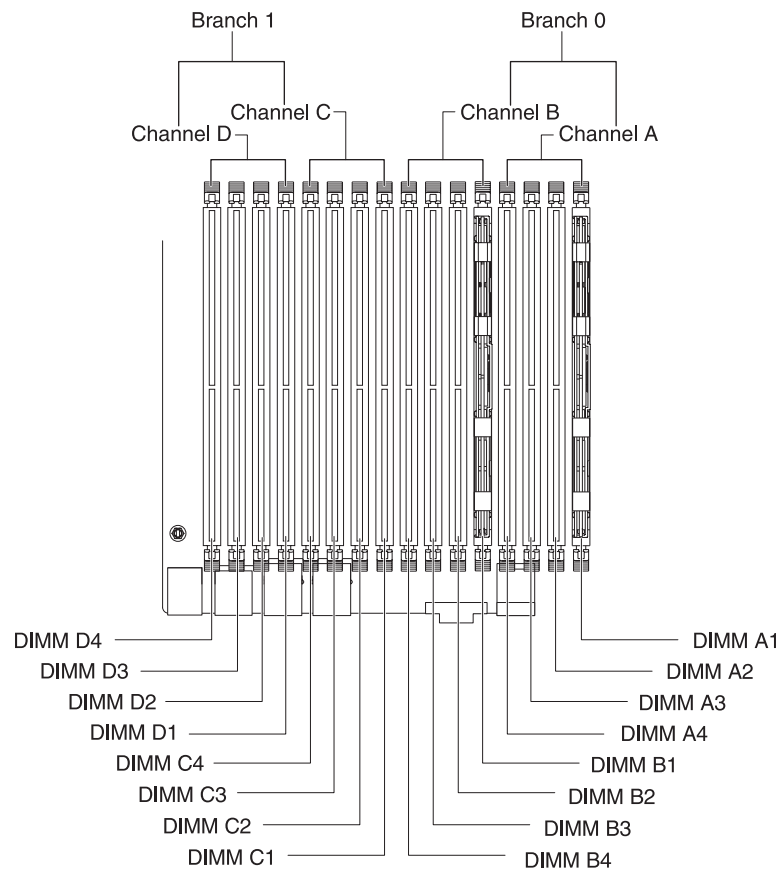
The following table shows the DIMM configurations that are supported for the dx360 server.

Table 2. Supported DIMM configurations

| Branch 0								Branch 1							
Channel A				Channel B				Channel C				Channel D			
A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4	D1	D2	D3	D4
X				X											
X				X				X				X			
X	X			X	X			X	X			X	X		
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Legend:															
X	Slot is populated: Supported configuration.														
	Slot is not populated.														

DIMM slot population rules for the dx360 server are as follows:

- Within a branch, DIMMs must be populated in slot order starting with Slot 1 for each channel, followed by slot 2, then slot 3, and ending with slot 4.
- DIMMs must be populated in matching pairs across channels within a given branch. Therefore, when populating DIMM pairs, the population order would be as follows:

  A1 and B1; C1 and D1; A2 and B2; C2 and D2; A3 and B3; C3 and D3; A4 and B4; C4 and D4

- DIMMs that make up a given pair must match with respect to size, speed, and organization.
- DIMM size can vary from one DIMM pair to another, however, speed and organization must be the same. For example, DIMM Pair A1 and B1 are populated with x8 1GB DDR2-667 DIMMs. DIMM Pair C1 and D1 can be populated with x8 2GB DDR2-667 DIMMs.

Notes:

1. For best performance, the number of DIMMs installed should be balanced across both memory branches. For example, a four DIMM configuration will perform better than a two DIMM configuration and should be installed in DIMM Slots A1, B1, C1, and D1. An eight DIMM configuration will perform better than a six DIMM configuration.
2. The minimum memory upgrade increment is two DIMMs per branch. The DIMM options that are available for the server are 2 GB and 4 GB.
   - DIMMs must cover the same slot position on both channels.
   - DIMM pairs must be identical with respect to size, speed, and organization.
   - DIMMs that cover adjacent slot positions do not need to be identical.

The following illustration shows the dual inline memory module (DIMM) connectors on the system board.
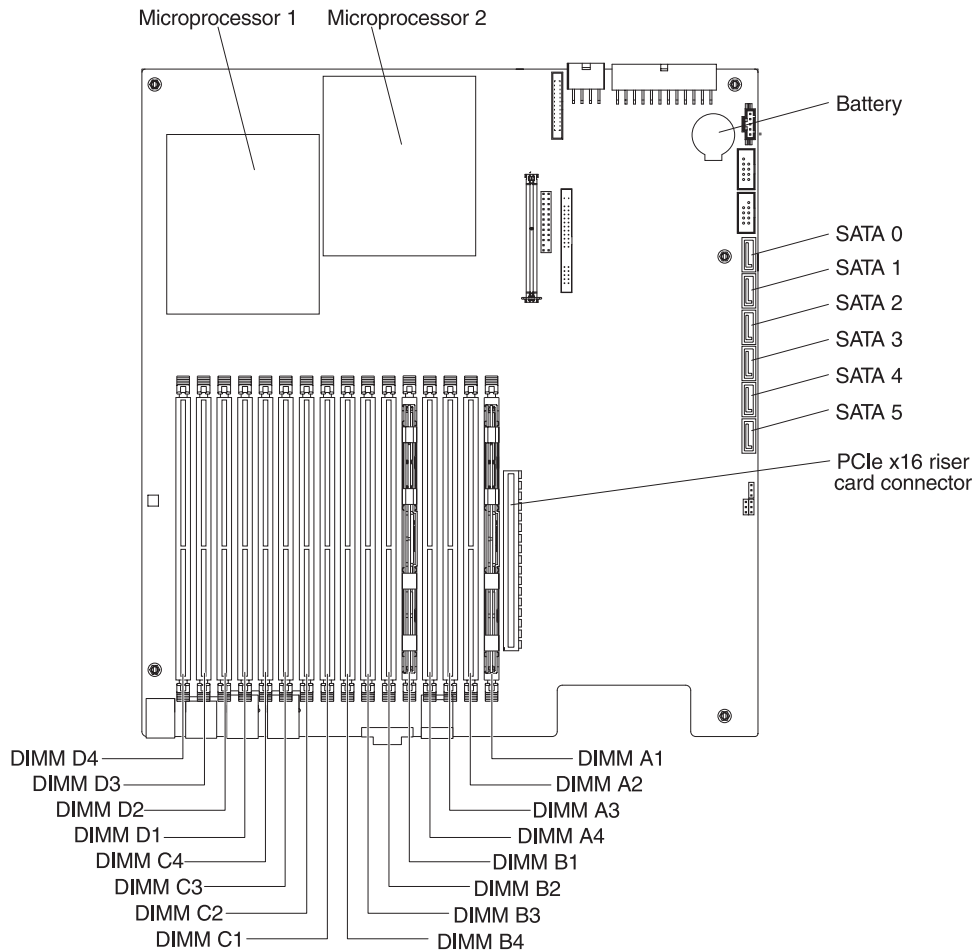
To install a DIMM, complete the following steps:

1. Read the safety information that begins on page v and "Installation guidelines" on page 17.
2. Turn off the system-board tray and all attached devices (see "Turning off the system-board tray" on page 16).
3. Make note of where the cables are attached on the front of the system-board tray; then, disconnect them.
4. If the system-board tray is installed in a chassis, remove it (see "Removing a system-board tray from a 2U chassis" on page 19).
5. If a storage enclosure is installed on the system-board tray, remove it (see "Removing a storage enclosure" on page 21). Otherwise, remove the system-board tray cover (see "Removing the system-board tray cover" on page 20).
6. Locate the DIMM connectors on the system board. Determine the connectors into which you will install the DIMMs.

   Attention: To avoid breaking the retaining clips or damaging the DIMM connectors, open and close the clips gently.
7. Open the retaining clips and, if necessary, remove any existing DIMM.

DIMM

Retaining
clip
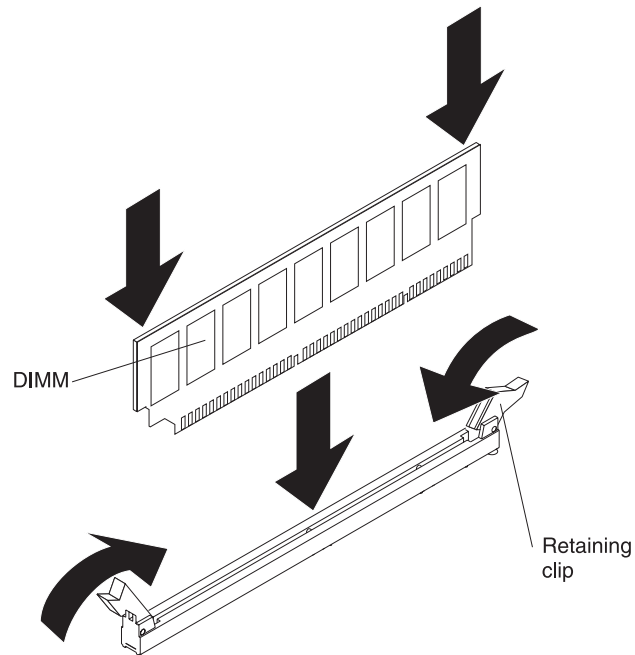
8. Touch the static-protective package that contains the DIMM to any unpainted
    metal surface on the system-board tray. Then, remove the new DIMM from the
    package.

9. Turn the DIMM so that the DIMM keys align correctly with the connector.

10. Insert the DIMM into the connector by aligning the edges of the DIMM with the
    slots at the ends of the DIMM connector. Firmly press the DIMM straight down
    into the connector by applying pressure on the top of the DIMM at both ends
    simultaneously. The retaining clips snap into the locked position when the
    DIMM is firmly seated in the connector. If there is a gap between the DIMM
    and the retaining clips, the DIMM has not been correctly installed. Open the
    retaining clips, remove the DIMM, and then reinsert it.

If you have other devices to install or remove, do so now; otherwise, go to
"Completing the installation" on page 30.

Completing the installation

To complete the installation, complete the following tasks. Instructions for each task are in one of the following sections.

1. Install the system-board tray cover (see "Reinstalling the system-board tray cover") or storage enclosure (see "Reinstalling a storage enclosure" on page 31).

2. Install the system-board tray in the chassis (see "Reinstalling a system-board tray in a 2U chassis" on page 32).

3. Connect the cables. For more information, see "Connecting the cables" on page 33.

4. For some devices, run the server BIOS Setup Utility program. For more information, see "Updating the server configuration" on page 33.

Reinstalling the system-board tray cover

Attention: You cannot install the system-board tray into the chassis until the cover is installed and closed or a storage enclosure is installed. Do not attempt to override this protection.

Note: If a storage enclosure is installed on the system-board tray, the system-board tray cover is not used.
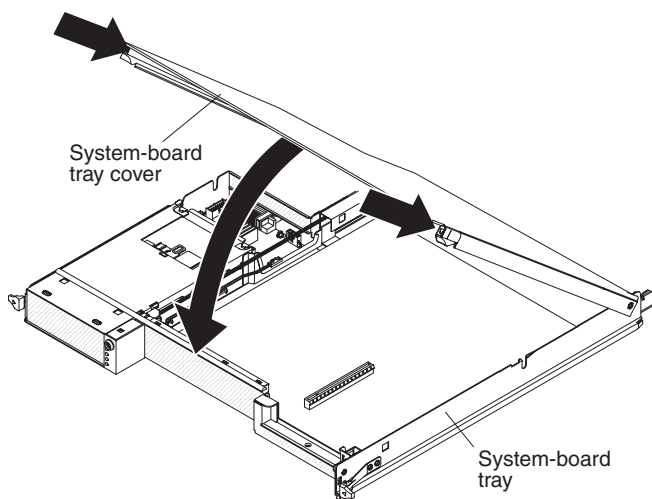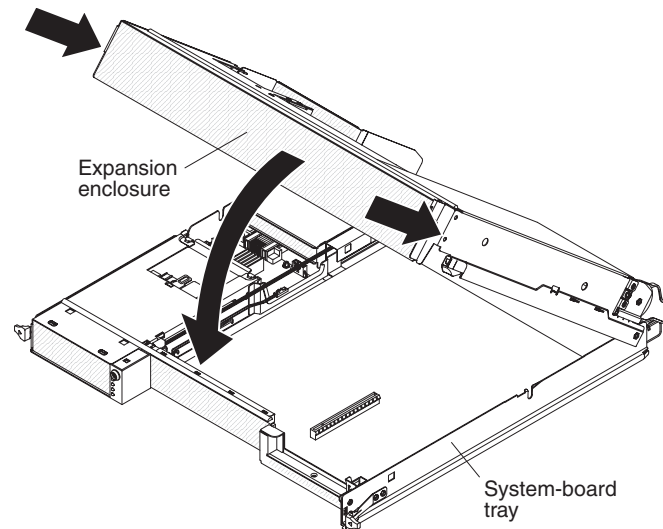

To reinstall the system-board tray cover, complete the following steps:

1. Lower the cover so that the pins at the rear slide down into the slots at the rear of the system-board tray. Before you close the cover, make sure that all components are installed and seated correctly, all internal cables are correctly routed, and you have not left loose tools or parts inside the system-board tray.

2. Pivot the cover to the closed position until it clicks into place.

3. Install the system-board tray in the chassis (see "Reinstalling a system-board tray in a 2U chassis" on page 32).
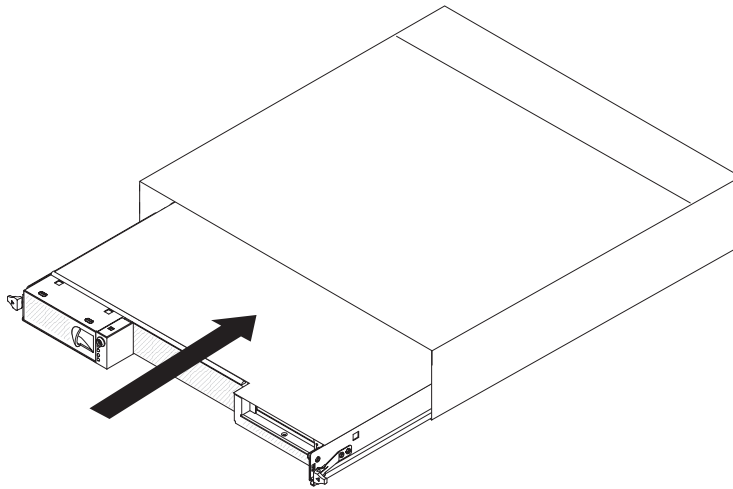
Reinstalling a storage enclosure

Attention: You cannot install the system-board tray in the chassis until the cover is installed and closed or a storage enclosure is installed. Do not attempt to override this protection.

Expansion enclosure

System-board tray

To reinstall a storage enclosure, complete the following steps:

1. Orient the storage enclosure above the system-board tray.
2. Lower the storage enclosure so that the pins at the rear slide down into the slots at the rear of the system-board tray. Before you close the storage enclosure, make sure that all components are installed and seated correctly, all internal cables are correctly routed, and you have not left loose tools or parts inside the system-board tray.
3. If you disconnected cables when you removed the storage enclosure, reconnect them.
4. Pivot the storage enclosure down onto the system-board tray until it clicks into place.
5. Install the system-board tray in the chassis (see "Reinstalling a system-board tray in a 2U chassis" on page 32).

Reinstalling a system-board tray in a 2U chassis

To reinstall a system-board tray in a 2U chassis, complete the following steps:

1. If a storage enclosure is installed on the system-board tray, make sure that the blue air damper actuator is parallel to the system-board tray before you slide the assembly into the chassis.

2. Slide the system-board tray into the chassis until it stops and the release handles click into place.

3. Reconnect the cables on the front of the system-board tray.

4. Turn on the system-board tray (see "Turning on the system-board tray" on page 16).

5. Make sure that the power-on LED on the system-board-tray operator panel is lit continuously, indicating that the system-board tray is receiving power and is turned on.

If you have changed the configuration of the system-board tray, you might have to update the server configuration through the BIOS Setup Utility program. See "Updating the server configuration" on page 33 for additional information.

Connecting the cables

Attention: To prevent damage to equipment, connect cables before you turn on the system-board tray.

All cable connections, other than power, are on the front of the server. See "Operator panel controls, LEDs, connectors, and power" on page 13 for connector locations.

Updating the server configuration

When you start the server for the first time after you add or remove a device, you might receive a message that the configuration has changed. The BIOS Configuration Utility program starts automatically so that you can save the new configuration settings. For more information, see Chapter 4, "Configuring the dx360 server," on page 35.

Some optional devices have device drivers that you must install. For information about installing device drivers, see the documentation that comes with each device.

If the server has an optional RAID adapter and you have installed or removed a hard disk drive, see the documentation that comes with the RAID adapter for information about re-configuring the disk arrays. For more information about the RAID controller, go to http://www-304.ibm.com/jct01004c/systems/support/supportsite.www/docdisplay?lndocid=MIGR-4JTS2T&brandind=5000008 or complete the following steps.

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

1. Go to http://www.ibm.com/systems/support/.
2. Under **Product support**, click **Hardware upgrades**.
3. Under **Product family**, click **RAID**.
4. Under **Type**, click on the type of RAID controller that is installed in your server.

For information about configuring the integrated Gigabit Ethernet controller, see "Configuring the Gigabit Ethernet controller" on page 38.

Chapter 4. Configuring the dx360 server

To update the firmware, you might have to use an external USB CD-RW/DVD drive. To run the BIOS Setup Utility or the Dynamic System Analysis (DSA) Preboot diagnostic programs, you must have the following additional hardware:

- Monitor
- Combination USB keyboard and pointing device such as IBM part number 40K5372
- External USB CD-RW/DVD drive such as the IBM and Lenovo part number 73P4515 or 73P4516

The following configuration programs come with the dx360 server:

- **BIOS Setup Utility program**

  The BIOS Setup Utility program is part of the basic input/output system (BIOS). Use it to configure serial port assignments, change interrupt request (IRQ) settings, change the startup-device sequence, set the date and time, and set passwords. For information about using this program, see "Using the BIOS Setup Utility program."

- **Boot Manager program**

  The Boot Manager program is part of the BIOS. Use it to override the startup sequence that is set in the BIOS Setup Utility program and temporarily assign a device to be first in the startup sequence. For information about using this program, see "Using the Boot Manager" on page 38.

- **Gigabit Ethernet controller configuration**

  To configure the integrated Gigabit Ethernet controller, see "Configuring the Gigabit Ethernet controller" on page 38.

- **IBM Dynamic System Analysis (DSA) Preboot Diagnostic Programs**

  The IBM Dynamic System Analysis (DSA) Preboot diagnostic programs are the primary method of testing the major components of an IBM System x iDataPlex server. You can use the USB memory key that comes with the iDataPlex rack when you run the DSA Preboot diagnostic programs on an iDataPlex server.

  To download the most current USB or ISO image of the DSA Preboot diagnostic programs go to http://www.ibm.com/support/docview.wss?uid=psg1SERV-DSA.

  For additional information about the DSA diagnostic programs, see the *Problem Determination and Service Guide* for the iDataPlex server on the IBM *Documentation* CD that comes with the iDataPlex rack solution.

Using the BIOS Setup Utility program

Use the BIOS Setup Utility program to perform the following tasks:

- View configuration information
- View and change assignments for devices and I/O ports
- Set the date and time
- Set and change passwords
- Set the startup characteristics and the order of startup devices
- Set and change settings for advanced hardware features
- View the POST error log
- Change interrupt request (IRQ) settings

Starting the BIOS Setup Utility program

To start the BIOS Setup Utility program, complete the following steps:

1. Turn on the server. If the server is already on when you start this procedure, you must shut down the operating system, turn off the server, wait a few seconds until all in-use LEDs are turned off, and restart the server.

2. When the message `Press F2 to enter Setup` is displayed, press F2. (This prompt is displayed on the screen for only a few seconds. You must press F2 quickly.) If you have set both a power-on password and an administrator password, you must type the administrator password to access the full BIOS Setup Utility menu. If you do not type the administrator password, a limited BIOS Setup Utility menu is available.

    Note: If a serious error is detected during start up, the server will automatically enter setup and display the Error Manager screen. If the CMOS/NVRAM has been corrupted, you will not see the F2 prompt, instead, you will see the following message prompts:

    > `Warning: CMOS checksum invalid`
    >
    > `Warning: CMOS time and date not set`

    Information on clearing the CMOS is provided in the *Problem Determination and Service Guide*.

3. Select settings to view or change.

BIOS Setup Utility menu choices

Note: Some options in the BIOS configuration menus might not be supported in all server configurations.

The following choices are on the BIOS Setup Utility menu at the top of the screen. Depending on the version of the BIOS code, some menu choices might differ slightly from these descriptions. Depending on how passwords are configured, certain BIOS Setup Utility fields might not be editable by all users. See "Passwords" on page 37 for additional information.

*   **Advanced**

    Select this choice to view and change configuration information for the server options.

    –   **Processor Configuration**

        Select this choice to view the processor information, including the type, speed, and cache size of the microprocessor.

    –   **Memory Configuration**

        Select this choice to view or change information about the memory that is installed in the server.

    –   **ATA Controller Configuration**

        Select this choice to view details about the hard disk drives that are installed in the server. Use this option also to enable, disable, or configure hard disk drives.

    –   **Mass Storage Controller Configuration**

        This feature is not available on the dx360 server.

    –   **Serial Port Configuration**

        Select this choice to set up serial port A and serial port B.

    –   **USB Configuration**

Select this choice to enable or disable USB support.

- **PCI Configuration**

  Select this choice to view or change the settings for the PCI Express card, the onboard NIC controller, or video information.

- **System Acoustic and Performance Configuration**

  Select this choice to view or change the server thermal information.

• **Security**

Select this choice to set passwords and other security options. The server supports two password levels:

- **Administrator Password**

  Select this choice to set or change an administrator password. An administrator password is intended to be used by a system administrator; it limits access to the full BIOS Setup Utility menu. If an administrator password is set, the full BIOS Setup Utility menu is available only if you type the administrator password at the password prompt.

- **User Password**

  Select this choice to set, change, or delete a user (power-on) password.

For more information about passwords, see "Passwords."

• **Server Management**

Select this choice to view information about the server and to configure Console Redirection information. When you make changes through other choices in the BIOS Setup Utility program, some of those changes are reflected in the System Information.

• **Boot Options**

Select this choice to view boot devices during POST or to change the order in which you want to boot the devices.

• **Boot Manager**

Select this choice to view a list of available boot devices or to select which device to boot. You also can use this option to launch the EFI Shell.

• **Error Manager**

Select this choice to view any errors that were encountered during POST.

• **Exit Setup**

Select this choice to save your changes and exit from the BIOS Setup Utility program. This choice also provides you with options to restore the server to the factory default values or to restore a set of default values that you define.

Passwords

From the **Security** choice, you can set or change a user password and an administrator password. Depending on how passwords are configured, certain BIOS Setup Utility fields might not be editable by all users.

Administrator password

If you set only an administrator password, you must type the administrator password to access all editable fields in the BIOS Setup Utility program. If an administrator password is set, you also can set a user password. You can use any combination of up to seven characters (A - Z, a - z, and 0 - 9) for the administrator and user passwords.

If you forget the administrator password, you can clear the password by using the Password Clear jumper.

User password

If you set an administrator password for a system administrator and a user password for a user, a system administrator who types the administrator password has access to change all editable BIOS Setup Utility fields. A user who types the user password can view all BIOS Setup Utility fields but can change values in a subset of those fields that are editable by the system administrator. You can use any combination of up to seven characters (A - Z, a - z, and 0 - 9) for the user password.

If you forget the user password, you can regain access to the server in any of the following ways:

- If an administrator password is set, type the administrator password at the password prompt. Start the BIOS Setup Utility program and reset the user password.
- Clear the password by using the password clear jumper (see the *Problem Determination and Service Guide* for instructions).

Using the Boot Manager

The Boot Manager is a part of the BIOS Configuration Utility program that you can use to temporarily redefine the first startup device without changing settings in the BIOS Configuration Utility.

To use the Boot Manager, complete the following steps:

1. Turn off the system-board tray.
2. Restart the system-board tray.
3. Press F2.
4. Select **Boot Manager**.
5. Select the startup device and press Enter to boot from the selected device.

The next time the system-board tray is started, it returns to the startup sequence that is set in the BIOS Configuration Utility program.

Configuring the Gigabit Ethernet controller

The Ethernet controller is integrated on the system board. It provides an interface for connecting to a 10 Mbps, 100 Mbps, or 1 Gbps network and provides full duplex (FDX) capability, which enables simultaneous transmission and reception of data on the network. If the Ethernet port in the server supports auto-negotiation, the controller detects the data-transfer rate (10BASE-T, 100BASE-TX, or 1000BASE-T) and duplex mode (full-duplex or half-duplex) of the network and automatically operates at that rate and mode.

You do not have to set any jumpers or configure the controller. However, you must install a device driver to enable the operating system to address the controller.

Notes:

1. Changes are made periodically to the IBM Web site. The actual procedure might vary slightly from what is described in this document.
2. To install the device driver for the Ethernet controller, you might need to use an external USB CD-RW/DVD drive such as the IBM and Lenovo part number 73P4515 or 73P4516.

To find updated information about configuring the controller, complete the following steps:

1. Go to http://www.ibm.com/systems/support/.
2. Under **Product support**, click **System x**.
3. Under **Popular links**, click **Publications lookup**.
4. From the **Product family** menu, select **System x iDataPlex dx360 server** and click **Go**.

Note: The BIOS Setup Utility provides an option in **Advanced** → **PCI Configuration** → **Onboard NIC ROM** to enable or disable the preboot execution environment function. Disabling **Onboard NIC ROM** does not disable the Wake On LAN function. See "Using the BIOS Setup Utility program" on page 35 for more information.

Firmware updates

The firmware for the server is periodically updated and is available for download on the Web. Go to http://www.ibm.com/systems/support/ to check for the latest level of firmware, such as BIOS code, vital product data (VPD) code, and device drivers. Download the latest firmware for the server; then, install the firmware, using the instructions that are included with the downloaded files.

When you replace a device in the server, you might have to either update the server with the latest version of the firmware that is stored in memory on the device or restore the pre-existing firmware.

The following firmware updates are downloadable from the Web at http://www.ibm.com/systems/support/. Follow the instructions on how to apply the updates using documentation that is included in the downloaded files:

- BIOS code
- BMC firmware
- FRU/SDR data

Major components contain VPD code. You can select to update the VPD code when you update the BIOS code.

To download the firmware for the server, go to:

1. http://www.ibm.com/systems/support/.
2. Under **Product support**, click **System x**.
3. Under **Popular links**, click **Software and device drivers**.
4. Click **System x iDataPlex dx360 server** to display the matrix of downloadable files for the server.

For additional information about tools for updating, managing, and deploying firmware, see the System x and xSeries Tools Center at http://publib.boulder.ibm.com/infocenter/toolsctr/v1r0/index.jsp.

Setting the BMC IP parameters

When the iDataPlex dx360 server is turned on, you can access the BIOS Setup Utility menu by pressing function key F2. With the iDataPlex dx360 server, you might not be able to display or change the IP parameters for the Baseboard Management Controller (BMC) using the BIOS Setup Utility.

This symptom occurs when the dx360 server is configured with one of the following operating systems:

- Red Hat Enterprise Linux 5, any update
- SUSE Linux Enterprise Server 10, any service pack

This section provides work-around procedures for systems that do not allow you to display or change the BMC IP parameters via the BIOS Setup Utility. The procedure depends on the operating system being used.

Systems configured with Red Hat Linux

To set BMC IP parameters for systems configured with Red Hat Enterprise Linux 5, complete the following steps:

1. Attach a keyboard, mouse, and monitor to the dx360 server for which you want to display or modify the BMC IP parameters.
2. Turn on the dx360 server and allow it boot to the Red Hat operating system.
3. On the desktop in the upper left hand corner of the screen, select **Applications --> Accessories --> Terminal --> Enter**. This opens up a new window on the desktop and starts a terminal session with the Red Hat operating system.
4. Type the following commands to display the entire set of IP parameters for the baseboard management controller:
    - `modprobe ipmi_si` and press Enter
    - `modprobe ipmi_devintf` and press Enter
    - `modprobe lan print 1` and press Enter
5. Search for the `IP Address` line. This indicates the IP address of the baseboard management controller.
6. To change the baseboard management controller IP address for Linux Red Hat, type `ipmitool lan set 1 ipscr static` and press Enter. This sets the IP address source as entered by the user.

    Note: Changing the BMC IP address might cause network issues. Contact the IT administrator before attempting to change any network settings.
7. Type `ipmitool lan set 1 ipaddr` *IP address* and press Enter, where *IP address* is the desired baseboard management controller IP address.
8. To change the IP address network mask, type `Ipmitool lan set 1 netmask` *net mask* and press Enter, where *net mask* is the desired network IP mask.
9. To change the IP address gateway, type `ipmitool lan set 1 defgw` *IP address* and press Enter, where *IP address* is the desired gateway IP address.
10. Type the following commands to verify that the changes were made correctly:
    - `modprobe ipmi_si` and press Enter
    - `modprobe ipmi_devintf` and press Enter
    - `modprobe lan print 1` and press Enter
11. Click the **X** in the right corner of the terminal window to close the window.

Systems configured with SUSE Linux

To set BMC IP parameters for systems configured with SUSE Linux Enterprise Server 10, complete the following steps:

1. Attach a keyboard, mouse, and monitor to the dx360 server for which you want to display or modify the BMC IP parameters.

2. Turn on the dx360 server and allow it boot to the Linux operating system.

3. On a blank place on the desktop, click the left mouse button and select **Applications --> Gnome Terminal --> Enter**. This opens up a new window on the desktop and starts a terminal session with the Linux SUSE operating system.

4. Type the following commands to display the entire set of IP parameters for the baseboard management controller:
   - `modprobe ipmi_si` and press Enter
   - `modprobe ipmi_devintf` and press Enter
   - `modprobe lan print 1` and press Enter

5. Search for the `IP Address` line. This indicates the IP address of the baseboard management controller.

6. Search for the `IP Source` line. This indicates if the IP address is set by dynamic host controller protocol (DHCP) or is set statically by the user.

7. To change the baseboard management controller IP address for SUSE Linux, type `ipmitool lan set 1 ipscr static` and press Enter. This sets the IP address source as entered by the user.

   Note: Changing the BMC IP address might cause network issues. Contact the IT administrator before attempting to change any network settings.

8. Type `ipmitool lan set 1 ipaddr` *IP address* and press Enter, where *IP address* is the desired baseboard management controller IP address.

9. To change the IP address network mask, type `Ipmitool lan set 1 netmask` *net mask* and press Enter, where *net mask* is the desired network IP mask.

10. To change the IP address gateway, type `ipmitool lan set 1 defgw` *IP address* and press Enter, where *IP address* is the desired gateway IP address.

11. Type the following commands to verify that the changes were made correctly:
    - `modprobe ipmi_si` and press Enter
    - `modprobe ipmi_devintf` and press Enter
    - `modprobe lan print 1` and press Enter

12. Click the **X** in the right corner of the Gnome terminal window to close the window.

Appendix A. 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. This section contains information about where to go for additional information about IBM and IBM products, what to do if you experience a problem with your system, and whom to call for service, if it is necessary.

Before you call

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

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

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

Using the documentation

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

Getting help and information from the World Wide Web

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

The address for IBM iDataPlex information is http://www.ibm.com/systems/x/
hardware/idataplex/index.html. The address for IBM BladeCenter® information is
http://www.ibm.com/systems/bladecenter/.

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

Software service and support

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

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

Hardware service and support

You can receive hardware service through your IBM reseller or IBM Services. To
locate a reseller authorized by IBM to provide warranty service, go to
http://www.ibm.com/partnerworld/ and click **Find a Business Partner** on the right
side of the page. For IBM support telephone numbers, see http://www.ibm.com/
planetwide/. In the U.S. and Canada, call 1-800-IBM-SERV (1-800-426-7378).

In the U.S. and Canada, hardware service and support is available 24 hours a day,
7 days a week. In the U.K., these services are available Monday through Friday,
from 9 a.m. to 6 p.m.

IBM Taiwan product service

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

IBM Taiwan product service contact information:
    IBM Taiwan Corporation
    3F, No 7, Song Ren Rd.
    Taipei, Taiwan
    Telephone: 0800-016-888

Appendix B. Notices

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Active PCI	IntelliStation	Tivoli Enterprise
Active PCI-X	NetBAY	Update Connector

AIX	Netfinity	Wake on LAN
Alert on LAN	PowerExecutive	XA-32
BladeCenter	Predictive Failure Analysis	XA-64
Chipkill	ServeRAID	X-Architecture
e-business logo	ServerGuide	XpandOnDemand
@server	ServerProven	xSeries

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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.

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Some software might differ from its retail version (if available) and might not include user manuals or all program functionality.

Product recycling and disposal

This unit must be recycled or discarded according to applicable local and national regulations. IBM encourages owners of information technology (IT) equipment to responsibly recycle their equipment when it is no longer needed. IBM offers a variety of product return programs and services in several countries to assist equipment owners in recycling their IT products. Information on IBM product recycling offerings can be found on IBM's Internet sites at http://www.ibm.com/ibm/recycle/us/index.shtml and http://www.ibm.com/ibm/environment/products/index.shtml.

Esta unidad debe reciclarse o desecharse de acuerdo con lo establecido en la normativa nacional o local aplicable. IBM recomienda a los propietarios de equipos de tecnología de la información (TI) que reciclen responsablemente sus equipos cuando éstos ya no les sean útiles. IBM dispone de una serie de programas y servicios de devolución de productos en varios países, a fin de ayudar a los propietarios de equipos a reciclar sus productos de TI. Se puede encontrar información sobre las ofertas de reciclado de productos de IBM en el sitio web de IBM http://www.ibm.com/ibm/recycle/us/index.shtml y http://www.ibm.com/ibm/environment/products/index.shtml.
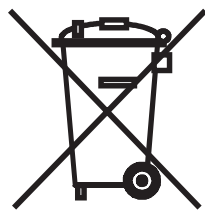
Notice: This mark applies only to countries within the European Union (EU) and Norway.

This appliance is labeled in accordance with European Directive 2002/96/EC concerning waste electrical and electronic equipment (WEEE). The Directive determines the framework for the return and recycling of used appliances as applicable throughout the European Union. This label is applied to various products to indicate that the product is not to be thrown away, but rather reclaimed upon end of life per this Directive.

注意: このマークは EU 諸国およびノルウェーにおいてのみ適用されます。

この機器には、EU 諸国に対する廃電気電子機器指令 2002/96/EC(WEEE) のラベルが貼られています。この指令は、EU 諸国に適用する使用済み機器の回収とリサイクルの骨子を定めています。このラベルは、使用済みになった時に指令に従って適正な処理をする必要があることを知らせるために種々の製品に貼られています。

Remarque : Cette marque s'applique uniquement aux pays de l'Union Européenne et à la Norvège.

L'etiquette du système respecte la Directive européenne 2002/96/EC en matière de Déchets des Equipements Electriques et Electroniques (DEEE), qui détermine les dispositions de retour et de recyclage applicables aux systèmes utilisés à travers l'Union européenne. Conformément à la directive, ladite étiquette précise que le produit sur lequel elle est apposée ne doit pas être jeté mais être récupéré en fin de vie.

In accordance with the European WEEE Directive, electrical and electronic equipment (EEE) is to be collected separately and to be reused, recycled, or recovered at end of life. Users of EEE with the WEEE marking per Annex IV of the WEEE Directive, as shown above, must not dispose of end of life EEE as unsorted municipal waste, but use the collection framework available to customers for the return, recycling, and recovery of WEEE. Customer participation is important to minimize any potential effects of EEE on the environment and human health due to the potential presence of hazardous substances in EEE. For proper collection and treatment, contact your local IBM representative.

Battery return program

This product may contain a sealed lead acid, nickel cadmium, nickel metal hydride, lithium, or lithium ion battery. Consult your user manual or service manual for specific battery information. The battery must be recycled or disposed of properly. Recycling facilities may not be available in your area. For information on disposal of batteries outside the United States, go to http://www.ibm.com/ibm/environment/products/index.shtml or contact your local waste disposal facility.

In the United States, IBM has established a return process for reuse, recycling, or proper disposal of used IBM sealed lead acid, nickel cadmium, nickel metal hydride, and battery packs from IBM equipment. For information on proper disposal of these batteries, contact IBM at 1-800-426-4333. Have the IBM part number listed on the battery available prior to your call.

For Taiwan: Please recycle batteries.

For the European Union:
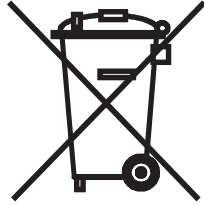
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Batteries or packaging for batteries are labeled in accordance with European Directive 2006/66/EC concerning batteries and accumulators and waste batteries and accumulators. The Directive determines the framework for the return and recycling of used batteries and accumulators as applicable throughout the European Union. This label is applied to various batteries to indicate that the battery is not to be thrown away, but rather reclaimed upon end of life per this Directive.

Les batteries ou emballages pour batteries sont étiquetés conformément aux directives européennes 2006/66/EC, norme relative aux batteries et accumulateurs en usage et aux batteries et accumulateurs usés. Les directives déterminent la marche à suivre en vigueur dans l'Union Européenne pour le retour et le recyclage des batteries et accumulateurs usés. Cette étiquette est appliquée sur diverses batteries pour indiquer que la batterie ne doit pas être mise au rebut mais plutôt récupérée en fin de cycle de vie selon cette norme.

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This notice is provided in accordance with Royal Decree 106/2008 of Spain: The retail price of batteries, accumulators, and power cells includes the cost of the environmental management of their waste.

For California:

Perchlorate material – special handling may apply. See http://www.dtsc.ca.gov/hazardouswaste/perchlorate/.

The foregoing notice is provided in accordance with California Code of Regulations Title 22, Division 4.5 Chapter 33. Best Management Practices for Perchlorate Materials. This product/part may include a lithium manganese dioxide battery which contains a perchlorate substance.

German Ordinance for Work gloss statement

The product is not suitable for use with visual display work place devices according to clause 2 of the German Ordinance for Work with Visual Display Units.

Das Produkt ist nicht für den Einsatz an Bildschirmarbeitsplätzen im Sinne § 2 der Bildschirmarbeitsverordnung geeignet.

Electronic emission notices

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 may 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.

United Kingdom telecommunications safety requirement

Notice to Customers

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

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.

This product has been tested and found to comply with the limits for Class A Information Technology Equipment according to CISPR 22/European Standard EN 55022. The limits for Class A equipment were derived for commercial and industrial environments to provide reasonable protection against interference with licensed communication equipment.

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 Community contact:
   IBM Technical Regulations
   Pascalstr. 100, Stuttgart, Germany 70569
   Telephone: 0049 (0)711 785 1176
   Fax: 0049 (0)711 785 1283
   E-mail: tjahn@de.ibm.com

Taiwanese Class A warning 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。

Chinese Class A warning statement

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。

Japanese Voluntary Control Council for Interference (VCCI) 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

Korean Class A warning statement

이 기기는 업무용으로 전자파 적합등록을 받은 기기
이오니, 판매자 또는 사용자는 이점을 주의하시기
바라며, 만약 잘못 구입하셨을 때에는 구입한 곳에
서 비업무용으로 교환하시기 바랍니다.

Index

A

B

C

D

E

F

G

H

I

L

M

N

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