System x iDataPlex dx320
Types 6385 and 6388

User's Guide

System x iDataPlex dx320
Types 6385 and 6388

User's Guide

Note: Before using this information and the product it supports, read the information in Appendix B, “Notices,” on page 39, and the *IBM Safety Information, IBM Systems Environmental Notices and User Guide*, and the *IBM Warranty and Support Information* documents on the IBM *Documentation* CD.

Second Edition (March 2009)

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 4:

≥ 18 kg (39.7 lb.)

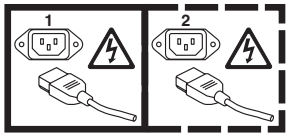
≥ 32 kg (70.5 lb.)

≥ 55 kg (121.2 lb.)

CAUTION:
Use safe practices when lifting.

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 dx320 system-board tray and the IBM System x iDataPlex 2U flex chassis.

The iDataPlex dx320 compute server solution consists of two Type 6388 system-board trays installed in a Type 6385 2U flex 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.

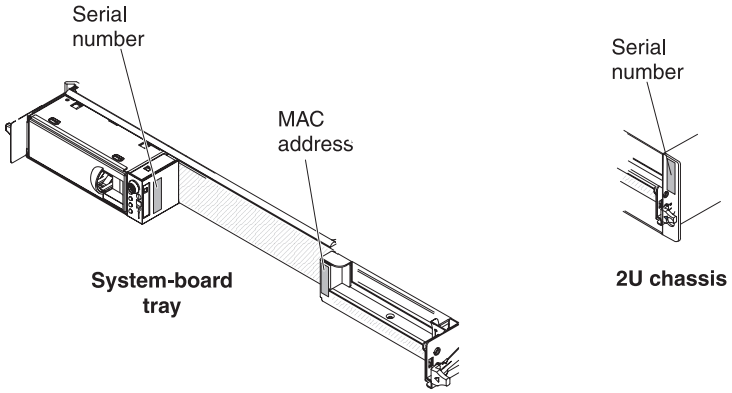
You can obtain up-to-date information about the server and other IBM server products at http://www.ibm.com/systems/x/.

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

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 dx320
Machine type (system-board tray)	Type 6388
Serial number (system-board tray)	_____
BMC MAC address (system-board tray)	_____
Machine type (chassis)	Type 6385 (2U chassis)
Serial number (chassis)	_____



Related documentation

In addition to the printed *Important Notices* document and this *User's Guide*, the following documentation for the dx320 system-board tray and 2U 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.
- *IBM Systems Environmental Notices and User's Guide*

  This multilingual document provides translated versions of the IBM environmental notices for your product.
- *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/systems/scope/idataplex/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 dx320 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 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.

Hard disk drives: The system-board tray supports one 3.5-inch simple-swap SATA hard disk drive.

Memory:

- Six DIMM connectors
- Minimum: 8 GB
- Maximum: 48 GB
- Double-data rate (DDR2) 667 MHz RDIMMs with Error Correcting Code (ECC)
- Supports 4 GB and 8 GB DIMMs (as of the date of this publication) with up to 48 GB of total memory in each system-board tray

Note: The default memory operating speed is 533 MHz for Web 2.0 power saving optimization. Memory operating speed can be adjusted using the BIOS Setup Utility program.

Integrated functions:

- Baseboard management controller (BMC) with Intelligent Platform Management Interface (IPMI) 2.0 compliant firmware
- ASPEED Technology AST1100 video controller
- Dual Broadcom 5722 Gigabit Ethernet controllers with Wake on LAN™ support
- I/O controller with five Serial ATA (SATA) ports
- Front panel connectors:
  - Two Universal Serial Bus (USB) 2.0 ports
  - One serial port
  - VGA video port
  - Three Ethernet ports (one dedicated to systems management)

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: 0°C to 60°C (-32°F to 140°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 dx320 system-board tray offers

The dx320 system-board tray uses the following features and technologies:

- **Baseboard management controller**

  The baseboard management controller (BMC) 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 1 Gbps network. For more information, see “Configuring the Gigabit Ethernet controller” on page 35.

- **Large system-memory capacity**

  The dx320 supports up to 48 GB of system memory. The memory controller supports error correcting code (ECC) for up to six industry-standard, 240-pin, double-data-rate 2 (DDR2) 667 MHz 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 network interface controller (NIC). If the applicable device drivers are installed, this switching occurs without data loss and without user intervention.

- **Symmetric multiprocessing (SMP)**

  The dx320 system-board tray comes with two Intel quad-core Xeon microprocessors.

- **Systems-management capabilities**

  The dx320 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 dx320 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 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 panel
- Upgradeable BMC firmware
- 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

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

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 36 for additional instructions about using an external USB CD-RW/DVD drive.

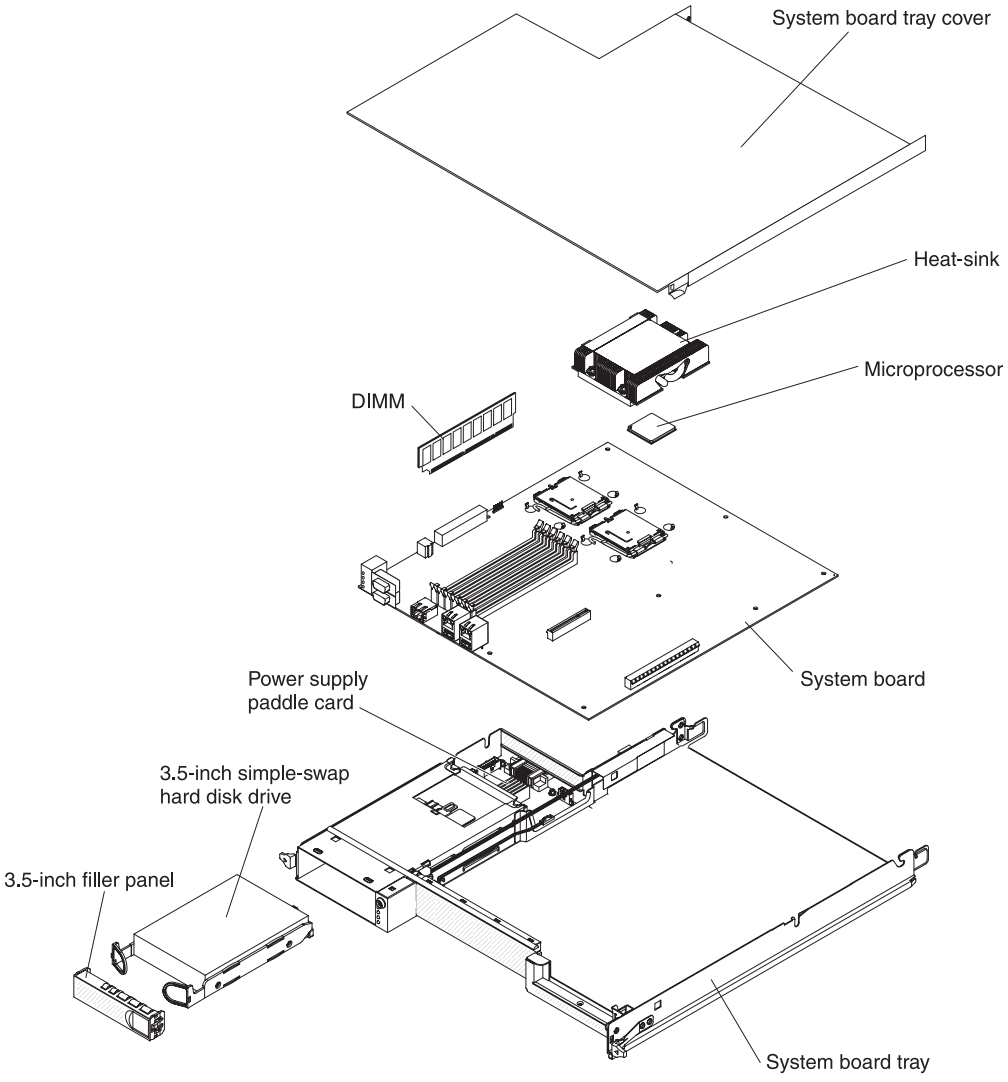
Chapter 2. Components, features, and controls

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

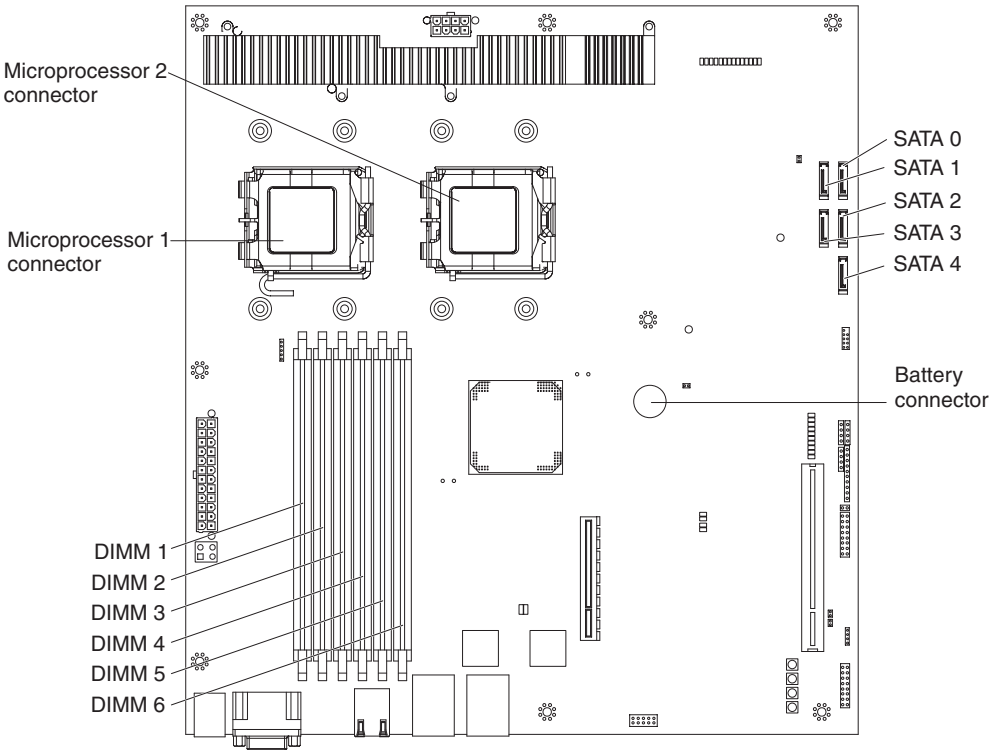
The following illustration shows the major components in the dx320 system-board tray.

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



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.



System-board switches and jumpers

The following illustration shows the locations of the switches 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.

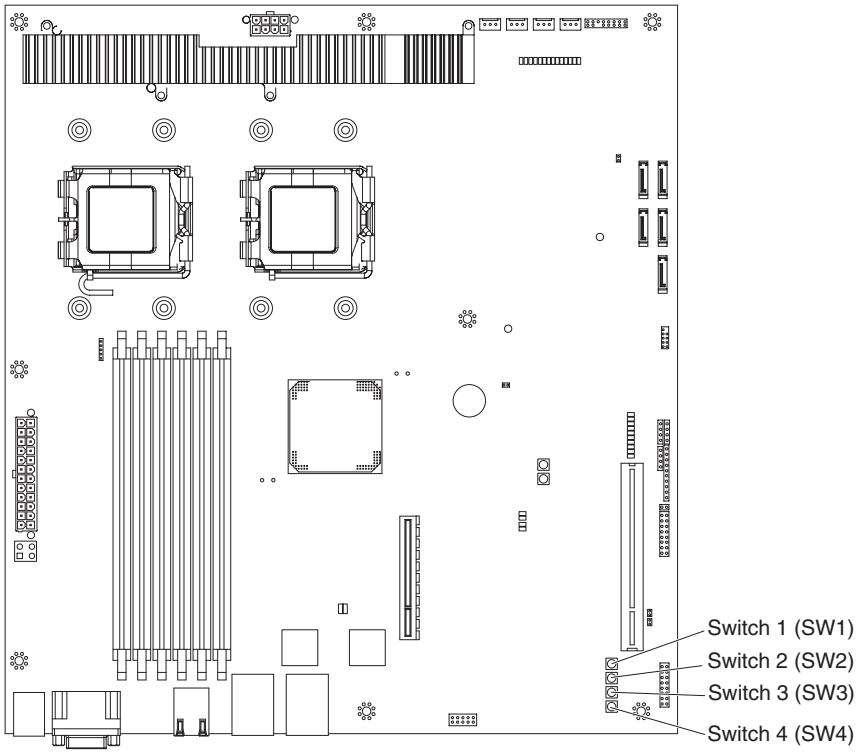


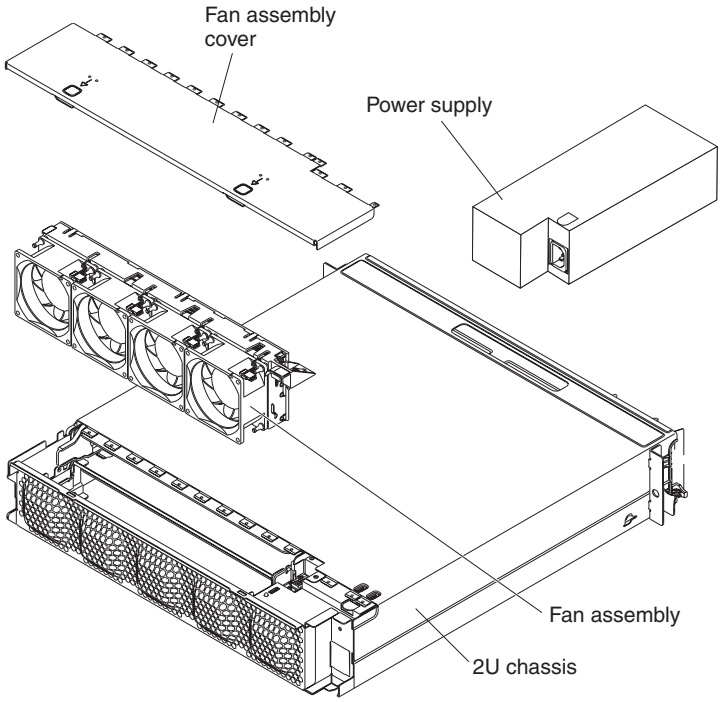
Table 2. System-board switches

Switch number	Switch (button) description
1	**NMI**. When this button is pressed, it issues a non-maskable interrupt (NMI) to the server. This button is functional only when power is connected to the server and the server is running.
2	**Clear CMOS**. When this button is pressed, it clears the CMOS data, which clears the user and supervisor passwords. This button is functional when no power is connected to the system-board tray.
3	**Power-on**. This button is not used for the dx320 server.
4	**Reset**. This button is not used for the dx320 server.

Flexible chassis features

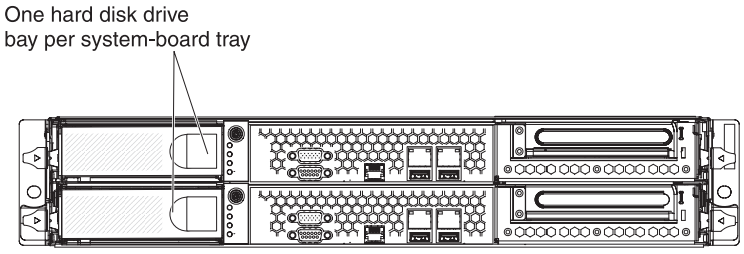
The following illustration shows an IBM System x iDataPlex 2U flex chassis. The 2U flex chassis contains a power supply and a fan assembly that provide operating power and cooling for all components in the chassis. The 2U flex chassis can support two dx320 system-board trays.

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



2U compute server

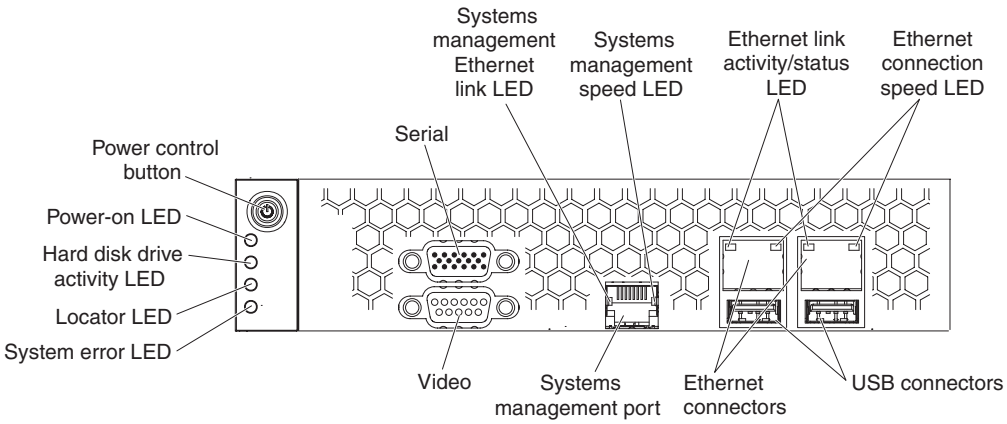
The dx320 2U compute server solution consists of two identical system-board trays installed in a 2U flex chassis. Each system-board tray has one 3.5–inch hard disk drive bay and one PCIe slot.



2U chassis
with two dx320 system-board trays

Operator panel controls, LEDs, connectors, and power

The following illustration shows the controls, LEDs, and connectors on the front of the dx320 system-board tray. The operator panel on the system-board tray is the same for all dx320 server configurations.



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

Serial connector: Connect a 9–pin serial device to this connector.

Systems management Ethernet link LED: This LED is on the Systems Management Ethernet connector. When this LED is lit, it indicates that there is an active link connection on the 10BASE-T or 100BASE-TX interface for the Ethernet port.

Systems management Ethernet connection speed LED: This LED is on the Systems Management Ethernet connector. When this LED is lit and is amber, it indicates that the Ethernet network speed is 100 Mbps. When this LED is not lit, it indicates that the Ethernet network speed is 10 Mbps.

Ethernet link activity/status LED: This LED is on each Ethernet connector. When this LED is lit, it indicates that there is an active link connection on the 10BASE-T, 100BASE-TX, or 1000BASE-TX interface for the Ethernet port. When this LED is flashing, it indicates that the server is transmitting to or receiving signals from the Ethernet LAN that is connected to the Ethernet port.

Ethernet connection speed LED: This LED is on the each Ethernet connector. When this LED is lit and is amber, it indicates that the Ethernet network speed is 1 Gbps. When this LED is lit and is green, it indicates that the Ethernet network speed is 100 Mbps. When this LED is not lit, it indicates that the Ethernet network speed is 10 Mbps.

USB connectors: Connect USB 2.0 devices to these connectors.

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

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

Video connector: Connect a monitor to this 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.

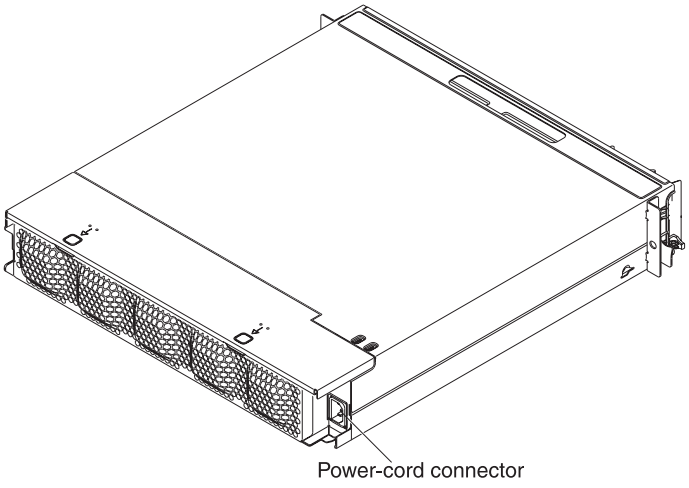
Hard disk drive activity LED: When this LED is flashing, it indicates that an associated hard disk drive is in use.

Power-on LED: When this LED is lit, it indicates that the system-board tray is turned on.

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.



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:

- 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 server.
- You can turn on the system-board tray remotely by using the management appliance.
- If the system-board tray is connected to power, the operating system supports the Wake on LAN feature, and the Wake on LAN feature has not been disabled, the Wake on LAN feature can turn on 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.
- 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 traybefore 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.
- The system-board tray battery is operational. If the battery becomes defective, replace it immediately.
- You have replaced one or both system-board trays within 2 minutes of removal.
- The upper system-board tray is not operating with the bottom system-board tray removed or powered off.
- The system-board tray cover is installed and closed.

Handling static-sensitive devices

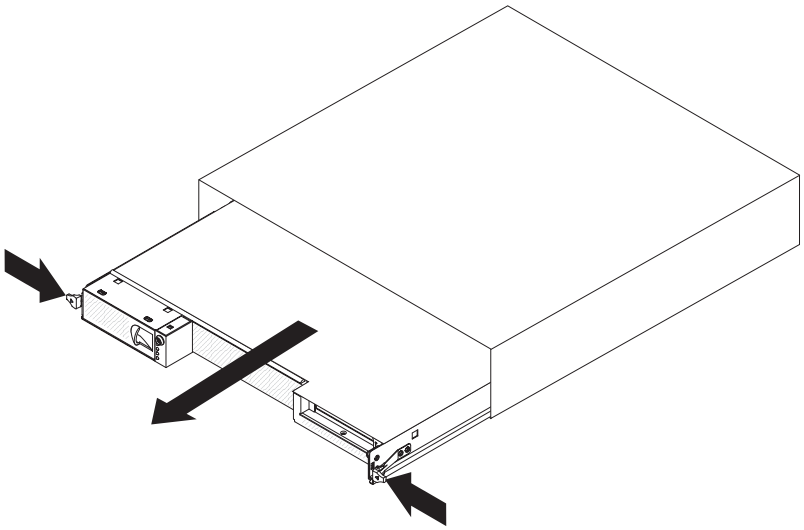
Attention: Static electricity can damage the server and other electronic devices. To avoid damage, keep static-sensitive devices in their static-protective packages until you are ready to install them.

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 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.

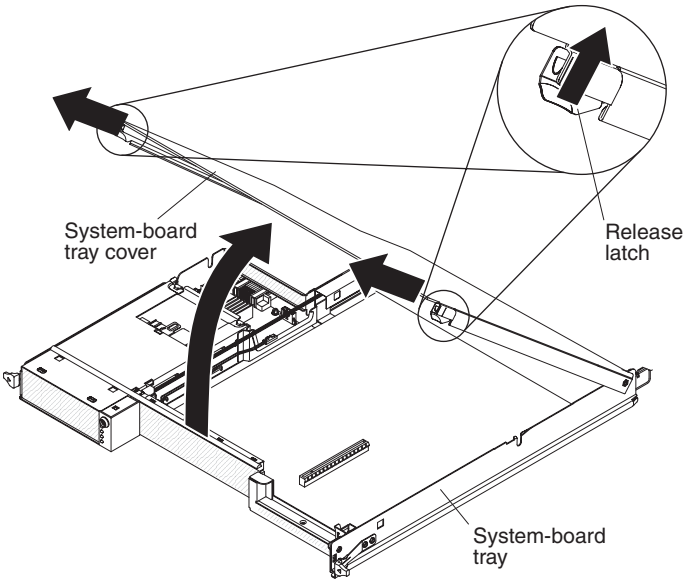


Note: If two system-board trays are installed in the chassis, they can be removed independently of each other.

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 15).
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 out of the chassis, and set it on a flat, static-protective surface.

Removing the system-board tray cover

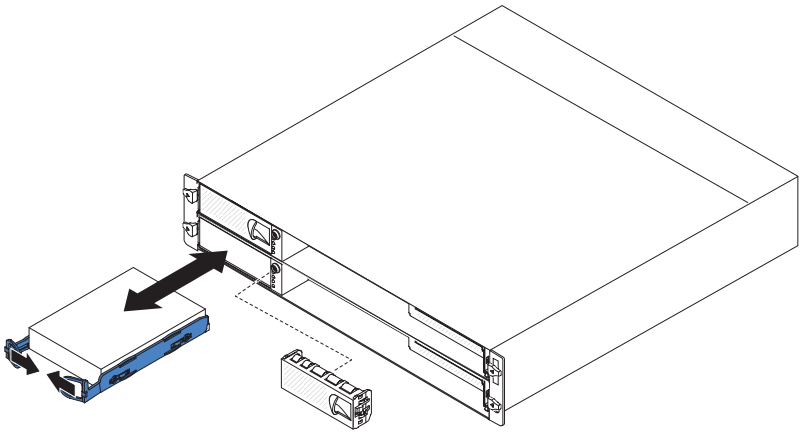


To remove the system-board tray cover, complete the following steps:

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 15).
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 3.5-inch simple-swap hard disk drive

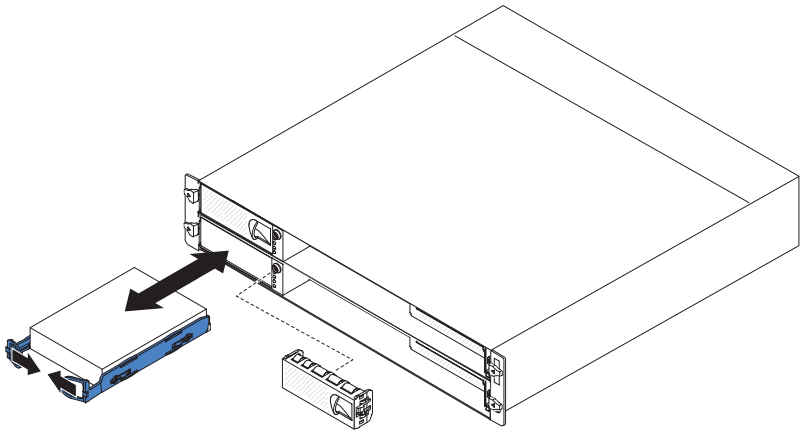


To remove a simple-swap hard disk drive, complete the following steps:

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 15).
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 a 3.5-inch simple-swap hard disk drive



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 15).
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 14).

Installing a memory module

When you install memory, you must install a pair of matched DIMMs. Each DIMM in a pair must be the same size, speed, type, and technology to ensure that the server will operate correctly. Make sure that the replacement DIMM is the correct type of memory (see the *Problem Determination and Service Guide* for a list of memory that is compatible with the server).

Note: The default memory operating speed is 533 MHz for Web 2.0 power saving optimization. Memory operating speed can be adjusted using the **Chipset** option in the BIOS Setup Utility program.

When you install DIMMs, you must install the DIMMs in the order shown in the following tables, to maintain performance.

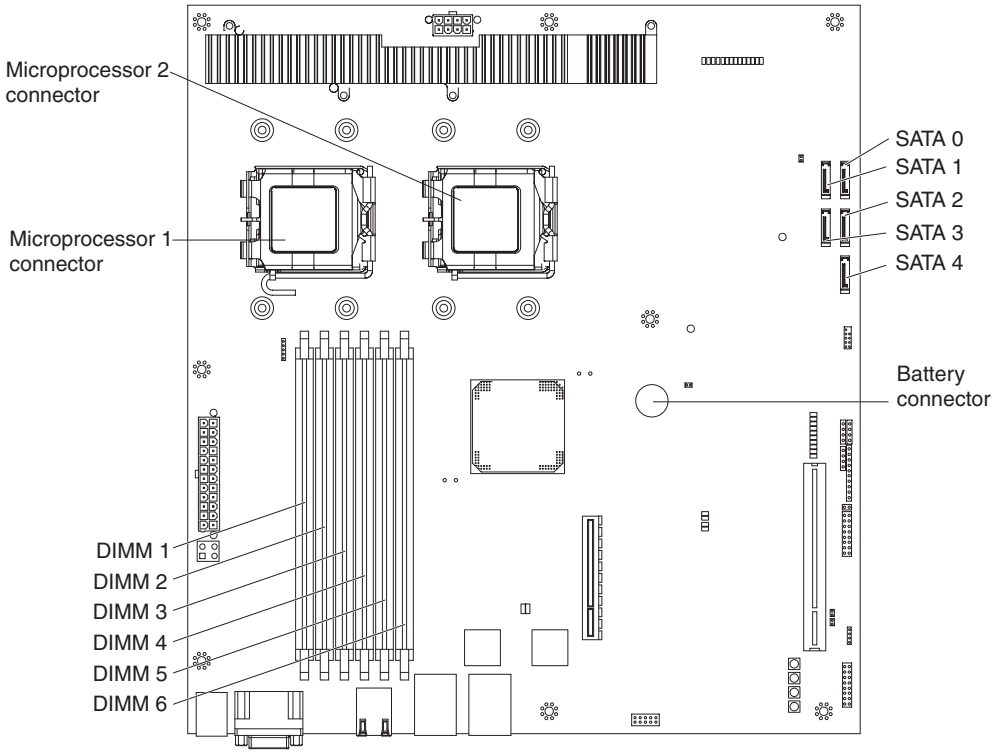
Table 3. DIMM installation sequence, non-interleaved

DIMM	DIMM connectors
1st	1
2nd	3
3rd	5

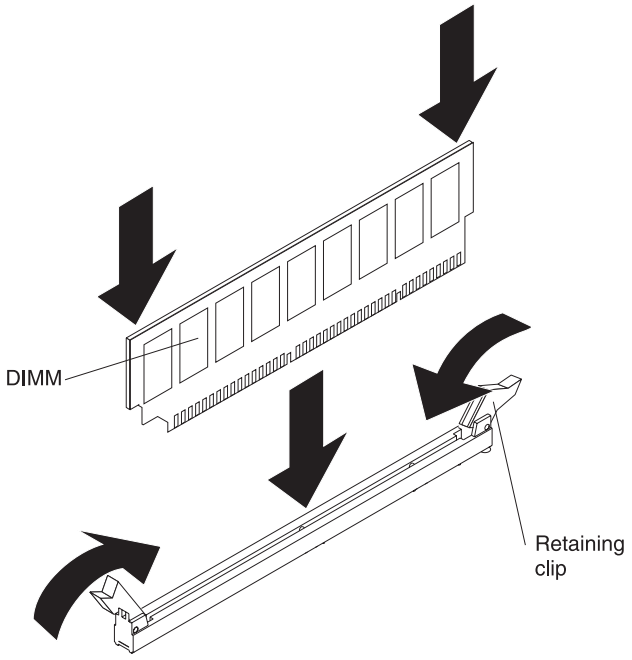
Table 4. DIMM installation sequence, interleaved

DIMM pair	DIMM connectors
1st	1 and 2
2nd	3 and 4
3rd	5 and 6

The following illustration shows the location of the DIMM slots on the dx320 system board.



To install a DIMM in the system-board tray, complete the following steps.



1. Read the documentation that comes with the DIMM.
2. Locate the DIMM connectors on the system board (see “System-board connectors” on page 10). Determine the connectors into which you will install the DIMMs.

3. Touch the static-protective package that contains the DIMM to any unpainted metal surface on the outside of the system-board tray; then, remove the DIMM from the package.

   Attention: To avoid breaking the DIMM retaining clips or damaging the DIMM connectors, open and close the clips gently.
4. Make sure that both of the connector retaining clips are in the fully open position.
5. Orient the DIMM so that the DIMM keys align correctly with the connector on the system board.
6. Insert the DIMM by applying pressure along the top of the DIMM at both ends simultaneously. Make sure that the retaining clips snap into the closed positions.

   Attention: If there is a gap between the DIMM and the retaining clips, the DIMM has not been correctly installed. In this case, open the retaining clips and remove the DIMM; then, reinsert the DIMM.

If you have other devices to install or remove, do so now. Otherwise, go to "Completing the installation" on page 26.

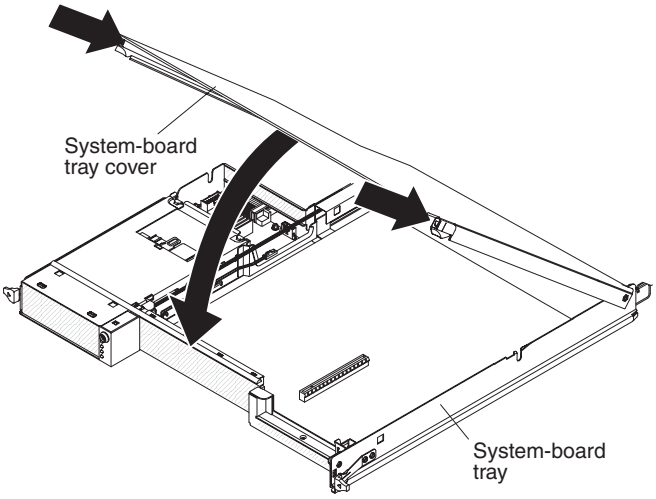
Completing the installation

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”).
2. Install the system-board tray in the chassis (see “Reinstalling a system-board tray in a 2U chassis” on page 27).
3. Connect the cables. For more information, see “Connecting the cables” on page 28.
4. For some devices, run the server BIOS Setup Utility program. For more information, see “Updating the server configuration” on page 28.

Reinstalling the system-board tray cover

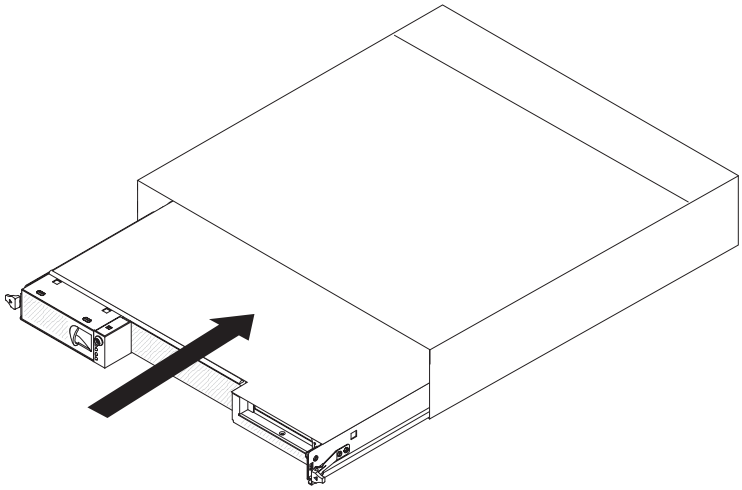
Attention: You cannot install the system-board tray into the chassis until the cover is installed and closed. Do not attempt to override this protection.



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 27).

Reinstalling a system-board tray in a 2U chassis



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

1. Slide the system-board tray into the chassis until it stops and the release handles click into place.
2. Reconnect the cables on the front of the system-board tray.
3. Turn on the system-board tray (see “Turning on the system-board tray” on page 14).
4. 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 28 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 Setup Utility program starts automatically so that you can save the new configuration settings. For more information, see Chapter 4, “Configuring the dx320 server,” on page 29.

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

For information about configuring the integrated Gigabit Ethernet controller, see “Configuring the Gigabit Ethernet controller” on page 35.

Chapter 4. Configuring the dx320 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 dx320 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” on page 30.
- **Baseboard management controller utility programs**

  Use these programs to configure the baseboard management controller, to update the firmware and sensor data record/field replaceable unit (SDR/FRU) data, and to remotely manage a network. For information about using these programs, see “Using the baseboard management controller utility programs” on page 33.
- **Gigabit Ethernet controller configuration**

  To configure the integrated Gigabit Ethernet controller, see “Configuring the Gigabit Ethernet controller” on page 35.
- **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 and change the startup characteristics of the server and the order of startup devices (startup-drive sequence)
- Set and change settings for advanced hardware features
- View and clear the error and event logs
- Resolve configuration conflicts

Starting the BIOS Setup Utility program

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

1. Turn on the server.
2. When the prompt `Press F1 for BIOS Setup` appears, press F1. If you have set both a user password and a supervisor password, you must type the supervisor password to access the full BIOS Setup Utility menu. If you do not type the supervisor password, a limited BIOS Setup Utility menu is available.
3. Select the settings to view or change.

BIOS Setup Utility menu choices

The following choices are on the BIOS Setup Utility main window taskbar. Depending on the version of the BIOS code, some taskbar choices might differ slightly from these descriptions.

- **Main**

  Select this choice to view system information, such as the machine type and model, serial number, Universally Unique Identifier (UUID), system board identifier, asset tag number; information about the BIOS, microprocessors, system memory size; and to view or change the system date and time. This is the default page that is displayed when you start the BIOS Setup Utility program.

- **Advanced**

  Select this choice to view or configure advanced features for the server hardware and software.

  – **CPU configuration**

    Configure advanced features for the microprocessors.

  – **SATA configuration**

    View each recognized SATA device, and configure SATA as disabled, enhanced, or compatible.

  – **Super I/O configuration**

    Select the base address for the serial port used by the Super I/O chipset.

  – **USB configuration**

    View the USB configuration and enable or disable USB functions and legacy USB support.

  – **ACPI configuration**

    View and change the settings in the Advanced Configuration And Power Interface (ACPI), such as whether to enable support for the advanced programmable interrupt controller.

  - **APM configuration**

    View and change the settings in the advanced power management (APM) configuration, such as whether the server should automatically restart when ac power is restored.
  - **Event log configuration**

    View the event log, clear the event log, or enable or disable PCI Express advanced error logging.
  - **IPMI configuration**

    View and change the settings in the Intelligent Platform Management Interface (IPMI) configuration: view the version of IPMI and the version of BMC firmware; view and change the addresses and subnet mask for the LAN configuration; view or clear the BMC system event log; specify whether the BMC resets the server or powers down the server in the event the operating system crashes or fails to respond (enable or disable the BMC watchdog timer action).
  - **Remote Access configuration**

    Configure the type of remote access and the parameters for remote access, such as the serial port and mode used.
  - **Memory settings**

    View recognized DIMMs and enable a DIMM after it replaces a failed DIMM.
  - **NMI auto reboot**

    Configure whether the server automatically restarts when it receives a non-maskable interrupt.
- **PCIPnP**

  Select this choice to view or change advanced settings for the PCI bus and plug and play (PnP) interface. You can change the master latency timer value, clear non-volatile RAM, and specify whether BIOS or the operating system should configure all the devices in the server.
- **Boot**

  Select this choice to specify the server startup options, including the boot device sequence, type, and priority.
- **Security**

  Select this choice to specify the supervisor password and user (power-on) password.
- **Chipset**

  Select this choice to specify the advanced options for the memory controller chipset, including default memory operating speed.
- **Exit**

  Select this choice to save your changes and exit the BIOS Setup Utility program, to discard your changes and exit, to discard your changes without exiting the program, or to load the default values for all the setup options.

Passwords

From the **Security** choice, you can set, change, and delete a user (power-on) password and a supervisor password.

If you set only a user password, you must type the user password to complete the system startup.

A supervisor password is intended to be used by a system administrator; it limits access to the configuration choices. If you set only a supervisor password, you do not have to type a password to complete the system startup, but you must type the supervisor password to access all the BIOS Setup Utility program configuration choices.

If you set a user password for a user and a supervisor password for a system administrator, you can type either password to complete the system startup. A system administrator who types the supervisor password has access to the full BIOS Setup Utility program configuration choices; the system administrator can give the user authority to set, change, and delete the user password. A user who types the user password has access to only the limited BIOS Setup Utility program configuration choices; the user can set, change, and delete the user password, if the system administrator has given the user that authority.

User password

If a user password is set, when you turn on the server, the system startup will not be completed until you type the user password. You can use any combination of up to seven characters (A–Z, a–z, and 0–9) for the password.

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

- If a supervisor password is set, type the supervisor password at the password prompt (see “Supervisor password”). Start the BIOS Setup Utility program and reset the user password.
- Remove the battery from the server and then reinstall it. For instructions for removing the battery, see the *Problem Determination and Service Guide* on the IBM *Documentation* CD.
- Press the Clear CMOS button on the system board to clear the user and supervisor passwords. See the *Problem Determination and Service Guide* on the IBM *Documentation* CD for additional information.

Supervisor password

If a supervisor password is set, you must type the supervisor password for access to the full BIOS Setup Utility settings. You can use any combination of up to seven characters (A–Z, a–z, and 0–9) for the password.

If you forget the supervisor password, you can reset it after you press the Clear CMOS button. See the *Problem Determination and Service Guide* on the IBM *Documentation* CD for additional information.

Using the baseboard management controller utility programs

The baseboard management controller provides basic service-processor environmental monitoring functions for the server. 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 also records the error in the BMC system event log.

Use the baseboard management controller utility programs to configure the baseboard management controller, download firmware updates, and remotely manage a network.

Note: You can update the baseboard management controller (BMC) firmware to the latest version. See "Using the baseboard management controller firmware update utility program" for the instructions to update the BMC firmware.

Using the baseboard management controller configuration utility program

Use the baseboard management controller configuration utility program to view or change the baseboard management controller configuration settings. You can also use the utility program to save the configuration to a file for use on multiple servers.

To download the program, 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 **Software and device drivers**.
4. Click **System x iDataPlex dx320 server** to display the matrix of downloadable files for the system-board tray.
5. From the BMC software, copy the files bmc.exe and Init.ini to a setup utility diskette.

Note: You must attach an optional monitor, USB keyboard, and USB diskette drive to the server to run this program.

To start the baseboard management controller configuration utility program, complete the following steps:

1. Connect a monitor, USB keyboard, and USB diskette drive to the connectors on the front of the system-board tray.
2. Insert the configuration utility diskette into the diskette drive and restart the server.
3. From a command-line prompt, type `bmc_cfg` and press Enter.
4. Follow the instructions on the screen.

Using the baseboard management controller firmware update utility program

Use the baseboard management controller firmware update utility program to download a baseboard management controller firmware update. This program updates the baseboard management controller firmware only and does not affect any device drivers.

Important: To ensure proper operation, be sure to update the baseboard management controller firmware before you update the BIOS code.

To download the program, 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 **Software and device drivers**.
4. Click **System x iDataPlex dx320 server** to display the matrix of downloadable files for the system-board tray.
5. From the BMC software, copy the files bmc.exe and Init.ini to a setup utility diskette.

To update the firmware, use one of the following procedures:

- If the Linux or Windows operating-system update package is available from the World Wide Web and you have obtained it, follow the instructions that come with the package.
- If you are using a diskette, complete the following steps:
  1. Connect a monitor, USB keyboard, and USB diskette drive to the connectors on the front of the system-board tray.
  2. Turn on the system-board tray.
  3. Insert the firmware update diskette into the diskette drive.
  4. From a command line, type `flash -?` and press Enter.

For the program to interface with the baseboard management controller, the parameters in the Intf.ini file must be set correctly. To modify the Intf.ini file, use the baseboard management controller setup utility program or a text editor.

Using the baseboard management controller management utility program

Use the baseboard management controller management utility program to remotely manage and configure a server network. The following features are available from the program:

- **IPMI Shell**

  Use this feature to remotely perform power-management and system identification control functions over a LAN or serial port interface from a command-line interface. Use this feature also to remotely view the event log.
- **Serial over LAN Proxy**

  Use this feature to remotely perform control and management functions over a Serial over LAN network. Use this feature also to remotely view and change the BIOS settings.

To download the utility program and create the baseboard management controller management utility CD, 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 **Software and device drivers**.
4. Click **System x iDataPlex dx320 server** to display the matrix of downloadable files for the system-board tray.
5. From the BMC software, use the information on the CD to install and use the 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 the device driver or 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 **Software and device drivers**.
4. Click **System x iDataPlex dx320 server** to display the matrix of downloadable files for the server.

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.

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

To download the firmware for the server:

1. Go to 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 dx320 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.

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

This information was developed for products and services offered in the U.S.A.

IBM may not offer the products, services, or features discussed in this document in other countries. Consult your local IBM representative for information on the products and services currently available in your area. Any reference to an IBM product, program, or service is not intended to state or imply that only that IBM product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any IBM intellectual property right may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any non-IBM product, program, or service.

IBM may have patents or pending patent applications covering subject matter described in this document. The furnishing of this document does not give you any license to these patents. You can send license inquiries, in writing, to:

IBM Director of Licensing
IBM Corporation
North Castle Drive
Armonk, NY 10504-1785
U.S.A.

INTERNATIONAL BUSINESS MACHINES CORPORATION PROVIDES THIS PUBLICATION "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some states do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement may not apply to you.

This information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. IBM may make improvements and/or changes in the product(s) and/or the program(s) described in this publication at any time without notice.

Any references in this information to non-IBM Web sites are provided for convenience only and do not in any manner serve as an endorsement of those Web sites. The materials at those Web sites are not part of the materials for this IBM product, and use of those Web sites is at your own risk.

IBM may use or distribute any of the information you supply in any way it believes appropriate without incurring any obligation to you.

Trademarks

IBM, the IBM logo, and ibm.com are trademarks or registered trademarks of International Business Machines Corporation in the United States, other countries, or both. If these and other IBM trademarked terms are marked on their first occurrence in this information with a trademark symbol (® or ™), these symbols indicate U.S. registered or common law trademarks owned by IBM at the time this information was published. Such trademarks may also be registered or common law trademarks in other countries. A current list of IBM trademarks is available on the Web at "Copyright and trademark information" at http://www.ibm.com/legal/copytrade.shtml.

Adobe and PostScript are either registered trademarks or trademarks of Adobe Systems Incorporated in the United States and/or other countries.

Cell Broadband Engine is a trademark of Sony Computer Entertainment, Inc., in the United States, other countries, or both and is used under license therefrom.

Intel, Intel Xeon, Itanium, and Pentium are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries.

Java and all Java-based trademarks are trademarks of Sun Microsystems, Inc., in the United States, other countries, or both.

Linux is a registered trademark of Linus Torvalds in the United States, other countries, or both.

Microsoft, Windows, and Windows NT are trademarks of Microsoft Corporation in the United States, other countries, or both.

UNIX is a registered trademark of The Open Group in the United States and other countries.

Other company, product, or service names may be trademarks or service marks of others.

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.

IBM makes no representation or warranties regarding non-IBM products and services that are ServerProven®, including but not limited to the implied warranties of merchantability and fitness for a particular purpose. These products are offered and warranted solely by third parties.

IBM makes no representations or warranties with respect to non-IBM products. Support (if any) for the non-IBM products is provided by the third party, not IBM.

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

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、情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）の基準に基づくクラス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。

Korean Class A warning statement

이기기는 업무용으로 전자파 적합등록을 받은 기기이오니, 판매자 또는 사용자는 이점을 주의하시기 바라며, 만약 잘못 구입하셨을 때에는 구입한 곳에서 비업무용으로 교환하시기 바랍니다.

Index

P

R

S

T

U

V

W

Part Number: 46M1465

Printed in USA

(1P) P/N: 46M1465